GPRS TRANSMITTER

LX10
LX20/LX20S

Installation and programming manual

Issue:	1.7
Release date:	29.09.2016
Firmware version:	1.17.2
GPRS transmitter configurator version:	1.3.63.1

DECLARATION OF CONFORMITY

EBS Ltd. Co. hereby declares that mentioned product conforms to all the applicable requirements of EU and Council Directive No.1999/5/EC of 9 March 1999. A copy of Conformity Declaration is available at: http://www.ebs.pl/en/certificates/ .

IMPORTANT INFORMATION

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Depending on programming of devices there are varied available functions. Further details available at Distributor of devices.

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1. INTRODUCTION

Transmitter GPRS type LX is an advanced microprocessor device, made with surface moulding technology and designed according to the latest trends. This transmitter is purposed for data transmitting from electronic security systems of facilities and other technical devices with the use of GSM mobile phone network.
Data transmission follows via GPRS or SMS.

Due to many settings a transmitter may be applied with many systems of various requirements The device is basically purposed for data transmission from security systems installed in detached houses and in small business facilities. Additionally LX20 Transmitter has got input for connection of an alarm control panel's phone communicator. This provides for a cheap system of data transmission.
Communication with a monitoring station follows by GPRS/SMS mode. This device provides an opportunity to send text messages to private mobile phones.

An advanced encoding methods like a 256 bytes encoding key and AES (Advanced Encryption Standard) provides for security of data transmission. As a result reception of this transmission is possible with OSM.2007 monitoring receiver system.
Furthermore there is possibility to transmit not coded messages that are to be comprehensible by reception solutions and also by GPRS Server software.

Programming of receiver is possible:

- Locally on computer and with recommended "GPRS transmitter configurator" software
- Remotely
  - via GPRS connection
  - via SMS commands
  - via transmission on CSD canal

2. FUNCTIONAL AND TECHNICAL PARAMETERS

Inputs: (programmable)	LX10	LX20/LX20S
	8 NO/NC RS232	4 NO/NC RS232 DTMF
	Sabotage - 1 NO/NC	
Outputs: (programmable)	Sabotage - 1 Additional - 1	
Operation modes:	➢ GPRS transmission only ➢ SMS transmission only ➢ GPRS and SMS transmission	
Messages:	Sending of text messages for defined mobile phones	
Configuration:	Remote – via GPRS link Remote- SMS Remote – CSD Locally –from PC with the use of software and RS-232 link	
Security:	SMS/GPRS transmission – AES encoding	
Loading of PGM and SAB outputs		50 mA
Working temperature		-10ºC ~ +55 ºC
Operating humidity		5% – 93%

In dependence from user's decision "Transmitter LX" can be delivered in different versions. Therefore also the parameters as type of the power supply voltage, current consumption as well as the dimensions were introduced for following options separately:

Option 1 – Transmitter LX10 / LX20 + power supply LX-ZAS in metal box
Option 2 – PCB of transmitter (LX10 / LX20)

	Option 1	Option 2	
Voltage	typ. 230 VAC (190 – 250 VAC) 50 – 60 Hz	typ. 13.8 VDC (12 – 14 VDC)	
Current/Power consumption (average/max)	3 W / 20 W @230 VAC	LX10	LX20
		90 mA / 500 mA @13.8 VDC	120 mA /550 mA @13.8 VDC
Dimensions	255 x 255 x 90 mm (metal box)	102 x 73 x 35 mm	

3. ASSEMBLY AND WIRING

Transmitter is delivered along with a power supply (See below). The manufacturer provides necessary wiring linking a power supply with the transmitter, and described procedures relate to wiring of a transmitter printed circuit board.

Switch power off to perform any connection.

3.1. LX10 TRANSMITTER

a) Connections of wires shall be made with due care to prevent any faults or dead shorts. Places of connections shall be protected against weather conditions.

b) According to the figure below terminals of transmitter shall be connected to:

Terminal	Connection description
COM	Device ground, common for other input and output
T	Connection of monitoring sabotage switch (the second switch contact connected to COM terminal).
IN1 till IN8	Signal inputs. Possible connection of detectors contacts or alarm control panel outputs. COM terminal is common for all inputs.
TMP	Sabotage output indication output type OC. It may control external device. Provides ground during activation.
AUX	Type OC additional output. It may control external device. Provides ground during activation.

After careful connections examination a battery may be connected (to +/- AKU terminals of LX-ZAS power supply) and then power may be switched on for transformer and programming procedure of transmitter may begin (See chapter 6).

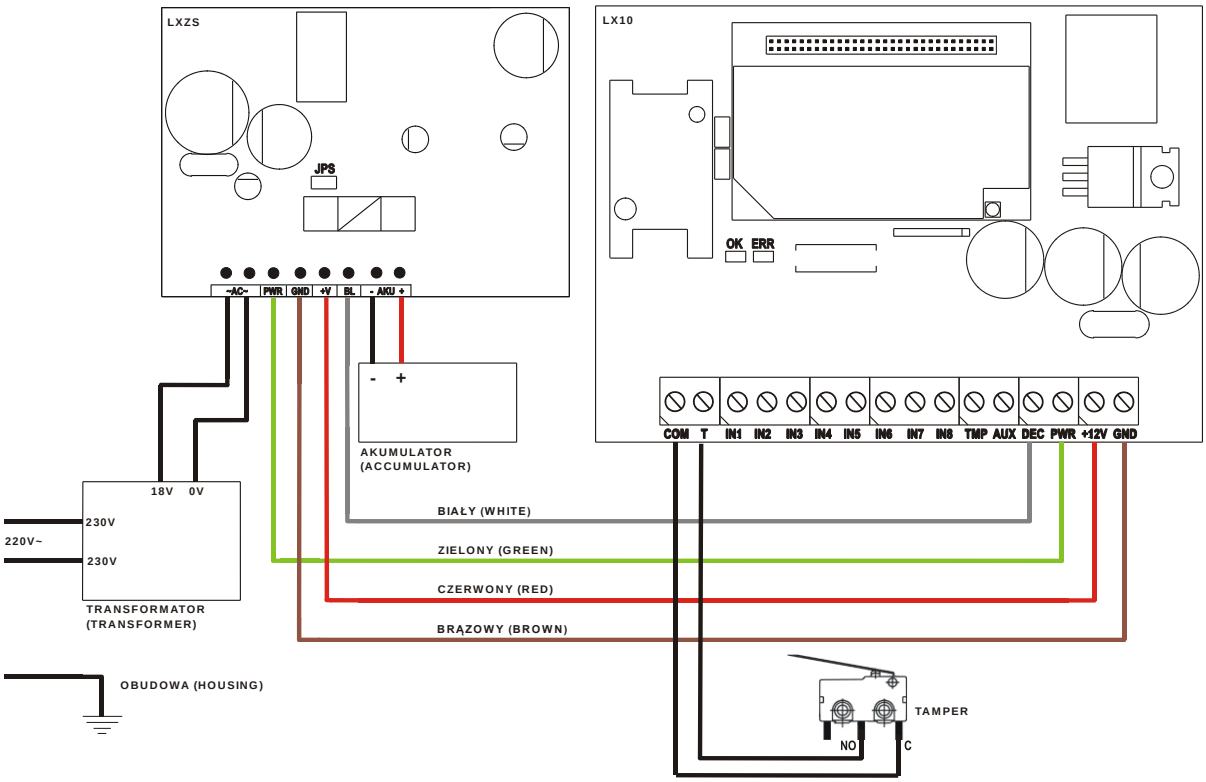


Figure 1. LX10 Transmitter with LX-ZAS

3.2. LX20/LX20S TRANSMITTER

a) Connections of wires shall be made with due care to prevent any faults or dead shorts. Places of connections shall be protected against weather conditions.

b) According to the above figure terminals of transmitter shall be connected to:

Terminal	Connection description
RING - TIP	Terminals for an PSTN telephone line
T1 – R1	Connection to alarm control panel phone communicator
COM	Device ground, common for other input and output
T	Connection of monitoring sabotage switch (the second switch contact connected to COM terminal).
IN1 do IN4	Signal inputs. Possible connection of detectors contacts or alarm control panel outputs. COM terminal is common for all inputs.
TMP	Sabotage output indication output type OC. It may control external device. Provides ground during activation.
AUX	Type OC additional output.. It may control external device. Provides ground during activation.

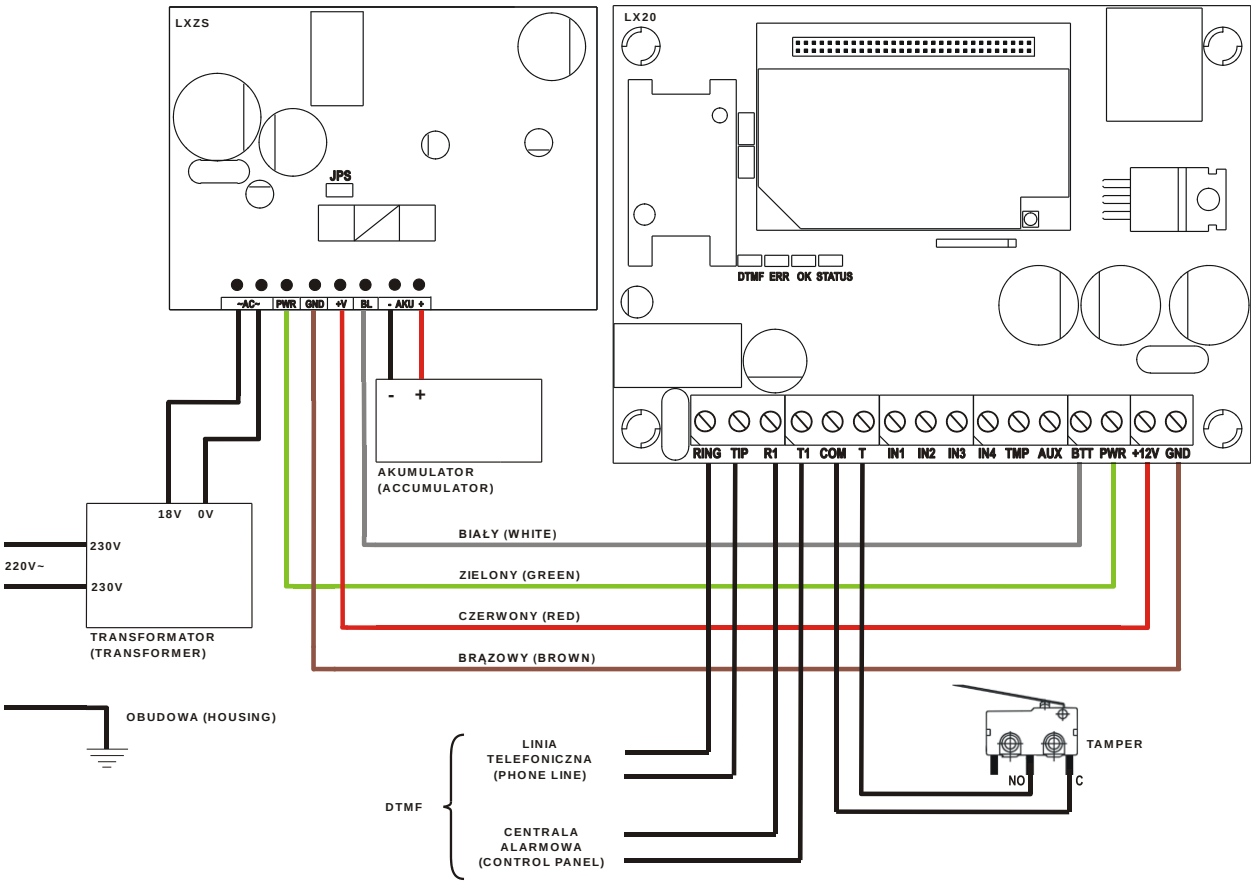


Figure 2. LX20/LX20S Transmitter with LX-ZAS

After careful connections examination a battery may be connected (to +/- AKU terminals of LX-ZAS power supply) and then power may be switched on for transformer and programming procedure of transmitter may begin (See Chapter 6).

3.3. PCB VERSION

To connect the power to the board, use the following connectors:

+12 V	The positive terminal of power supply
GND	The negative terminal of power supply

THE FOLLOWING CONNECTIONS ARE PURPOSED FOR COOPERATION WITH LX-ZAS POWER SUPPLY. IF OTHER POWER SUPPLY APPLIED, INPUTS SHALL BE LEFT WITHOUT WIRING.

BTT	Control input for verification of battery connected to EBS power supply.
PWR	Control input connected to adequate EBS power supply output. Purposed for monitoring AC power supply.

Manufacturer reserves the right to amend appearance of printed circuit with no effect on functionality of device.

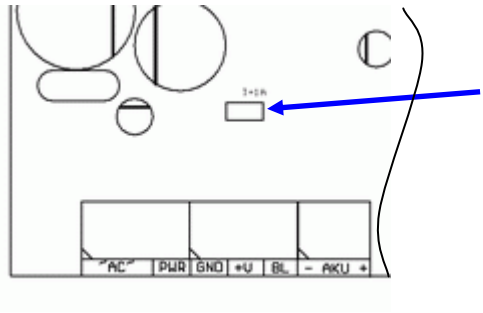
3.4. LX-ZAS POWER SUPPLY

The dedicated power supply **LX-ZAS** (product of EBS) possesses the following parameters:

Parameter	Value
Served batteries	Acid-leaded 12V
Maximum voltage of charging battery	13.8V
Charging current	0.2A lub 1A (switched by jumper)
Voltage of signaling of low level	11 V
Voltage of switch-off battery	9.5V

as well as it characterizes with following proprieties:

- protection against opposite connecting battery.
- protection against excessive unloading battery:
  The battery protects before damage in case of long-lasting fading the AC. In case of lack the AC and unloading below voltage 9.5 V the battery becomes separated from device automatically.
- quick charging of the battery:
  The jumper showed on drawing place causes settlement of maximum current of charging on 1A. We recommended jumper be taken off and the current of charging battery carries out 0.2 A.



Jumper ON => charging current 1A

Jumper OFF => charging current 0,2A

Figure 3. Choice of current of charging the battery

Note: *the* ***applying*** *the quick charging can bring to damage of battery.*

4. QUICK START PROCEDURE

NOTE :
Do not insert SIM card before the first programming of transmitter as it may block the card if PIN code is required for the card.

This chapter is purposed for users that possess experience regarding GPRS data transmission systems and who work with OSM.2007 receiver for monitoring system. Other users shall skip this chapter and go to chapter 5 of this Manual.

As many users possess protected facilities spread at vast locations, local programming of transmitter is not always available (with PC computer and programming cable).

Two phases comprise programming in this option:

a) sending to transmitter of main parameters (with SMS) that enable connection to receiver (OSM.2007 system).
b) full configuration of device with remote programming (GPRS transmitter configurator and OSM. 2007).

Quick start procedure:

a) insert into device SIM card with PIN code 1111.
b) connect power supply for module,
c) send to SIM card number with SMS parameters related to connection of device to receiver (OSM. 2007)
d) waiting for moment, when device indicates connection to OSM.2007

Note: Connection to receiver is possible if the device was registered into it. Registration procedure has been described in OSM.2007 Operation Manual.

e) complete, remote programming with GPRS transmitter configurator.

SMS text message shall provide the following information:

<transmitter's service code> SERVER=*<server address>* PORT=*<server port>*
APN=*<access point name>* UN=*<user ID number>*
PW=*<user password>*

Where:
␣: space (every parameter shall be separated with space – blank character)
<transmitter's service code>: factory settings - **1111**
<server address>: address of communication server purposed for collection of transmitter signals e.g. 89.123.115.8 In case address is provided as domain e.g. block.autostrada.com, SMS message shall include DNS1 parameter (address of main DNS server)
<server port>: Number of port in server that receives messages from a device
<access point name>: defines access point name to GSM network.

If private network is used, SMS message shall provide the following parameters:

UN=*<user ID number>* and PW=*<user password>*.
Exemplary SMS is as follows (if we use public network and provide server address as IP):

1111 SERVER=89.123.115.8 PORT=6780 APN=general.t-mobile.uk UN= PW=

Where:
␣: space character

5. OPERATION

A device maintains communication via GSM-GPRS network. If any problem follows a device automatically switch to SMS mode (if this mode has been programmed before-See chapter *7 PROGRAMMABLE PARAMETERS*). As a result the transmitter may be used only at the territory covered with mobile phone operator network.

If status of inputs is the same as programmed one (NO or NC) a device stays in a rest. Change of status on any input results in immediate signal transmitting of this event by the device.

Note :
Each device input (from IN1 till IN8[1] or from IN1 till IN4[2]) may be individually defined as on open one (NO) or closed one (NC). It means that when in NO, input shorting will be an active state and, a non-shorting will be an active state in NC.

To avoid an excessive cost of use related in particular to false alarms a device possesses a programmable analysis of inputs.

All inputs respond only to states change which means that transmitting will follow only if an active state is on input and maintains during programmed minimum time. Maintenance of active state longer than a minimum time will result in single indicating. Another input activation (another transmitting) is possible only after input reached based state.

Number of messages sent in SMS mode is limited (limit includes also text massages or answers to orders sent by user).This function provides for cost reduction by limiting messages e.g. in case of damage of sensor connected to any input. After passage of programmed time new messages will be sent but only in a number determined by the user.

Text message on events sent to private phone numbers may be edited.

LX20/LX20S transmitter additionally is equipped with input of a PSTN telephone line, and input to connect telephone communicator module of alarm control panel.

Module constantly controls availability of an external telephone line. Decrease of line voltage below around 5V is deemed as a line damage. If an exterior phone line is operating, it is provided for output of telephone communicator module. If damage of urban line follows, a module disconnects a urban line and provides a voltage simulating telephone line to output of telephone communicator module. Module always provides voltage corresponding to operating phone line for an alarm control panel (namely to phone communicator module) regardless of urban line status.

Configuration of transmitter for cooperation with an control panel's phone communicator requires entering into memory a phone number for which transmitter is to answer.

[1] Applies to LX10 transmitter
[2] Applies to LX20/LX20S transmitter

Once a phone is picked up via an alarm control panel telephone communicator , a telephone number is being dialled to make connection. After the control panel dialled a number to which transmitter is to respond, a transmitter takes over a phone line namely disconnects a urban line from an control panel and provides to a phone communicator voltage that simulates an operating phone line. Next it generates confirmation signal and awaits for data from a control panel –next DTMF tones generated with communicator are treated as data. After transmitting adequate number of DTMF signs (16 for ContactID and 9 for Ademco Express 4/2) a transmitter generates Kissoff signal. Collection of data from control panel finishes at hanging up a phone of a control panel by phone communicator module. After that transmitter comes back to standard operation –namely if urban line is operating, it is being connected to an alarm control panel and awaits for dialling of new number.

If telephone number dialled with communicator is other than number GPRS module answers, no operation follows and it waits until communicator hangs up a phone and picks it up again – since picking up a telephone number dialled with a communicator module is being checked.

All programmable parameters are saved in memory and in case of voltage drop that are not lost. Supply of power starts the transmitter with saved settings.

6. CONFIGURATION PROGRAM

6.1. INITIAL REMARKS

GPRS transmitters configurator may be downloaded from www.ebs.pl (login: ebs, password: ebs).
To install program an installation wizard shall be started that performs installation in default place C:\Program Files\EBS\. During installation process shortcuts on screen and Windows menu are created.

If device is to be used for the first time it shall be programmed with the above program and after this procedure the SIM card may be inserted into the device. Otherwise SIM card may be blocked if wrong PIN code is entered. Alternatively SIM card may be used along with switched off PIN code.

In case of remote programming it is necessary to insert SIM card prior to sending configuration settings. In this situation SIM card with switched off PIN code shall be used or PIN code shall be changed with mobile phone before inserting card to the transmitter.

6.2. COMPUTER – REQUIREMENTS

Minimum requirements for computer system where configuration software is to be installed:

Hardware:
- Processor Pentium II 400 MHz,
- 64 MB RAM,
- 1 GB HD.
- CD-ROM,
- RS-232 serial port
- Colour monitor (minimum 15 inch , min. 800x600 resolution),
- Keyboard
- Mouse

Software:
- Operation system Windows 2000, Windows XP, Windows Vista or Windows 7.
- NET Framework 2.0 (delivered along with installation wizard of configuration).

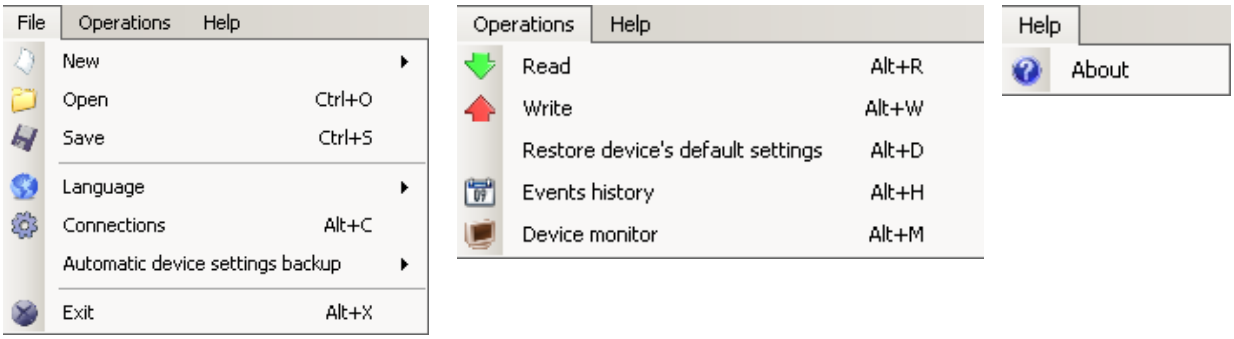
6.3. PROGRAM FUNCTIONS

After installation and program starting a main view shall be displayed on screen. Thanks to this view an access to program or programmable parameters of device is possible.(See chapter 7).

Main window of program is divided into some fields.

Main menu: at upper part of window, contains control and configuration options.

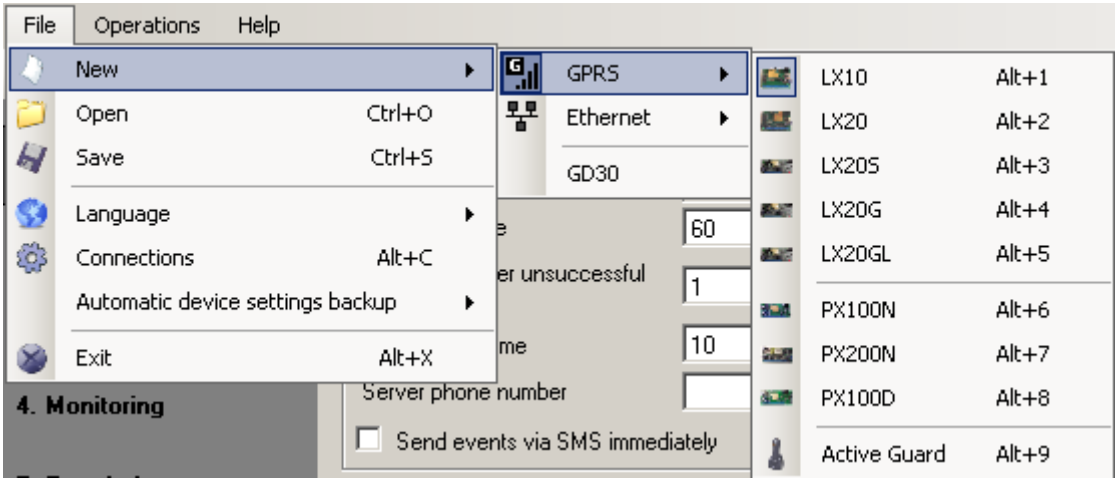
Main menu contents:



Main menu is available as icons on fast access bar:

6.3.1. File-> New

Opens new set of parameters. Editing of configuration parameters is possible.



Select type of device.

6.3.2. File -> Open

If file contains saved settings, they may be used to program next device. Firstly a catalogue where file has been saved shall be chosen and then name of file shall be provided. Obtained data collection may be modified by the user. Any amendments are effective if send to device.

6.3.3. File -> Save

During programming many devices in different configurations, it is not necessary to have in mind each one as it may be saved on hard disc or floppy disk under any name and it may be loaded later on. This function save on disc any information from configuration wizard window. After activation of function a dialog window appears with request to provide file name. Default data is saved with CMI extension (Configuration Memory Image).

6.3.4. File -> Language

Allows for selection of any available languages (determined in attached exterior language files).

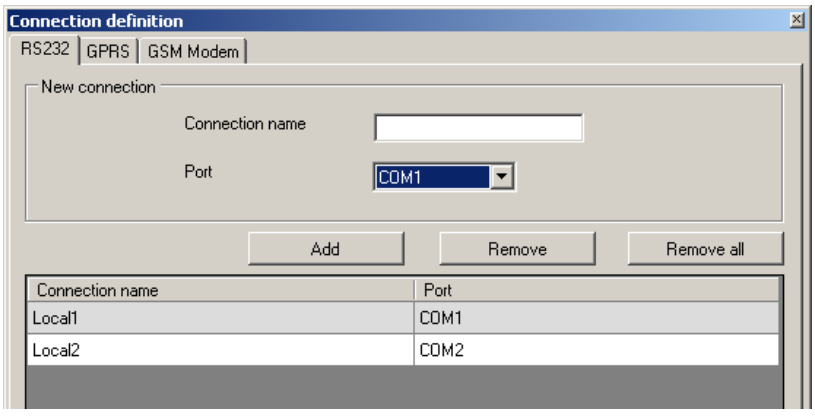
6.3.5. File->Connections

Before programming of devices, a connection type shall be defined. It is possible to do it with two methods:
- locally
- remotely

6.3.5.1. Local connection

Local connection means that configuration software (namely computer on which is installed) is directly connected to proper terminal of transmitter. Connection is possible owing to special wire and through RS-232 serial port.

To program device or make any other operations (e.g. reading of device settings, firmware amendments, etc.) it is necessary firstly to define connection parameters.



It is possible to do so with the above window that is available after activation of connection from Main Menu and selection Configuration tab or after clicking on  icon on fast access bar and clicking on RS-232 tab.

Define:
Name of connection e.g. Locally
Choose serial port e.g. COM 4

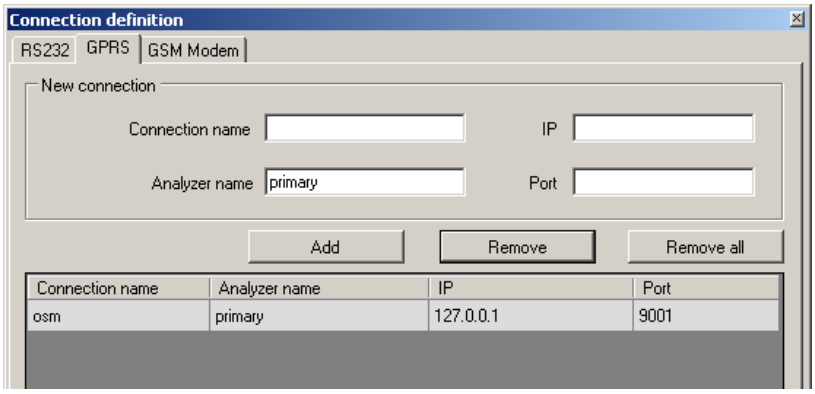
Click on [Add] button to confirm settings. Connections shall be saved (and inserted in table). From this time on program shall enable wires connection with device and reading, and saving of parameters in LX memory will be possible.

6.3.5.2. Remote connection

As provided above the device and software makes for complete configuration with GPRS link or CSD channel. This programming mode requires definition of linking parameters.

GPRS link

Activate file in Main menu and select Connection function (or after clicking on  icon on fast access bar) and click on GPRS tab to carry out configuration of this mode.
On screen the following window shall appear:



Define:

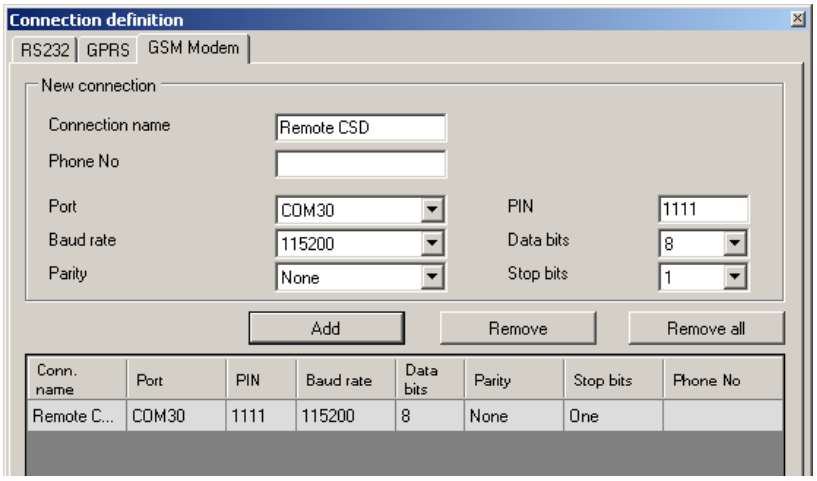
- Name of connection e.g.: **Remote**
- Select name of analyzer e.g.: **Primary**
- Enter analyzer address e.g.: **87.128.125.8**
- Enter port on which analyzer operates e.g. **7000**

Click on [Add] button to confirm settings. Connections shall be saved (and inserted in table). From this time on program shall enable remote connection to device and reading and saving of parameters in LX memory shall be possible.
Notice: The following parameters: analyzer name, analyze address, port relate to settings of OSM.2007 receiver of monitoring system. Remote programming is available only if above mentioned device (or software) is used.

CSD link

Activate file in Main Menu and select Connection function (or after clicking on  icon on fast access bar) and click on GSM Modem tab to carry out configuration of this mode.
On screen the window shall appear where it is possible to define:
- Name of connection e.g. Remote CSD
- Serial port where GSM modem is connected (e.g. Wavecom Fastrack)
- PIN code of SIM card installed in GSM modem e.g. 1111

➢ Serial port parameters: amount of bytes/sec. (e.g. 115200), data bytes (8), parity (none), stop bytes (1)



Click [Add] button to confirm settings and save connection (settings are inserted into table). Since that time a remote connection to device, reading and saving of parameters in LX memory is possible.

Note: Remote configuration with CSD channel is possible if option of CSD data sending has been activated both for SIM card inserted into a device and SIM card installed in GSM modem. In addition, the transmitter must have turned on permission to receive CSD data calls, see clause *7.5.2 GSM modems authorized phones.*

Programming with CSD is also possible if OSM.2007 system has been installed, and minimum one GSM modem is connected. If device has been entered onto server list (factory number and SIM card telephone number –See OSM.2007 Operation Manual) it is possible to use link via OSM. It is possible if device is not connected to the OSM.2007 via GPRS. During programming procedure (with GPRS link- See above) a question will be displayed if user want to use a modem connected to the server. After confirmation procedure will follow as in case of other programming channels.

6.3.6. File -> Automatic device settings backup

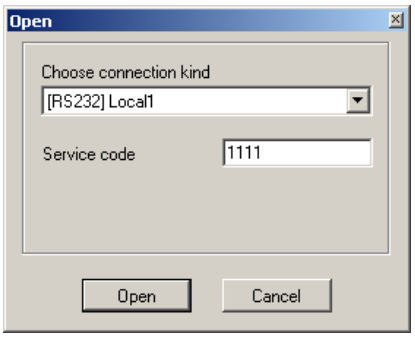
All configuration settings including reread from devices and saved on devices are to be automatically saved on hard disc. If during installation on configuring tool settings have not been changed, files will be saved as follows:
C:\Program Files\ EBS\KonfiguratorLX\configs\LX10_20000
Catalog LX10_20000 contains all files in respect of LX10 with factory number of 20000 programming. The name contains date and time of operation and its type (saving/ reading). Files have **cmi** extension.

6.3.7. File -> Exit

Finishes program operation.

6.3.8. Operations -> Read

Function reads data saved in memory of GPRS module. Exchange of data follows on port selected in section "Select Connection Type" (See below description of option "Configuration"). Correct reading is confirmed with message on a screen. Data downloaded from device may be saved on file (see clause 6.3.3) and use for other devices.
To use this function it is necessary to define type and parameters of connection. E.g. for local connection the following view is displayed:

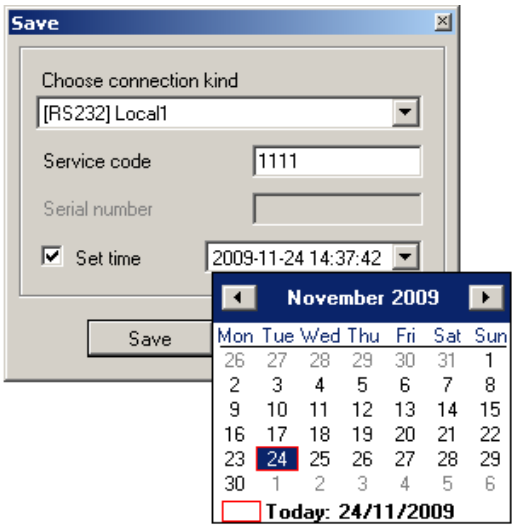


where:
Connection kind - serial port to which module is connected
Access code- service code of transmitter

Detailed description of connections configuration is included in clause 6.3.5.

6.3.9. Operations -> Send

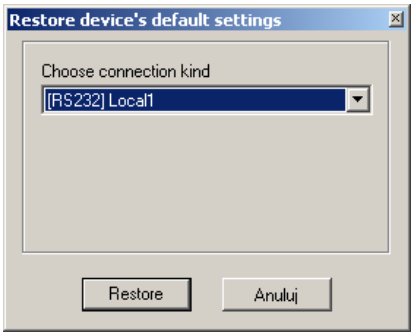
This function is analogical to the above one, at the same time it enables data saving into EEPROM module. There is also possibility to set correct time into LX device. Correct saving is confirmed with message on a screen.



6.3.10. Operations -> Restore default settings

If operation "Read" finishes with error message (e.g. if access code is unknown) it is possible to come back to default settings by selecting "Restore default settings". The

screen displays the message "Do you want to overwrite current configuration with default values?". After confirming the following window shall appear:



This operation is possible only with local connection. After operation completing device parameters shall come back to default settings.

6.3.11. Operations -> System events history

„Events history" provides information about last events stored in LX device memory. See chapter *7.12 EVENTS HISTORY.*

6.3.12. Operations->Device monitor

"Device Monitor" provides real-time information on LX device state. See chapter *7.11 DEVICE MONITOR*.

6.3.13. Help -> About program

Select this information to view additional information about program.

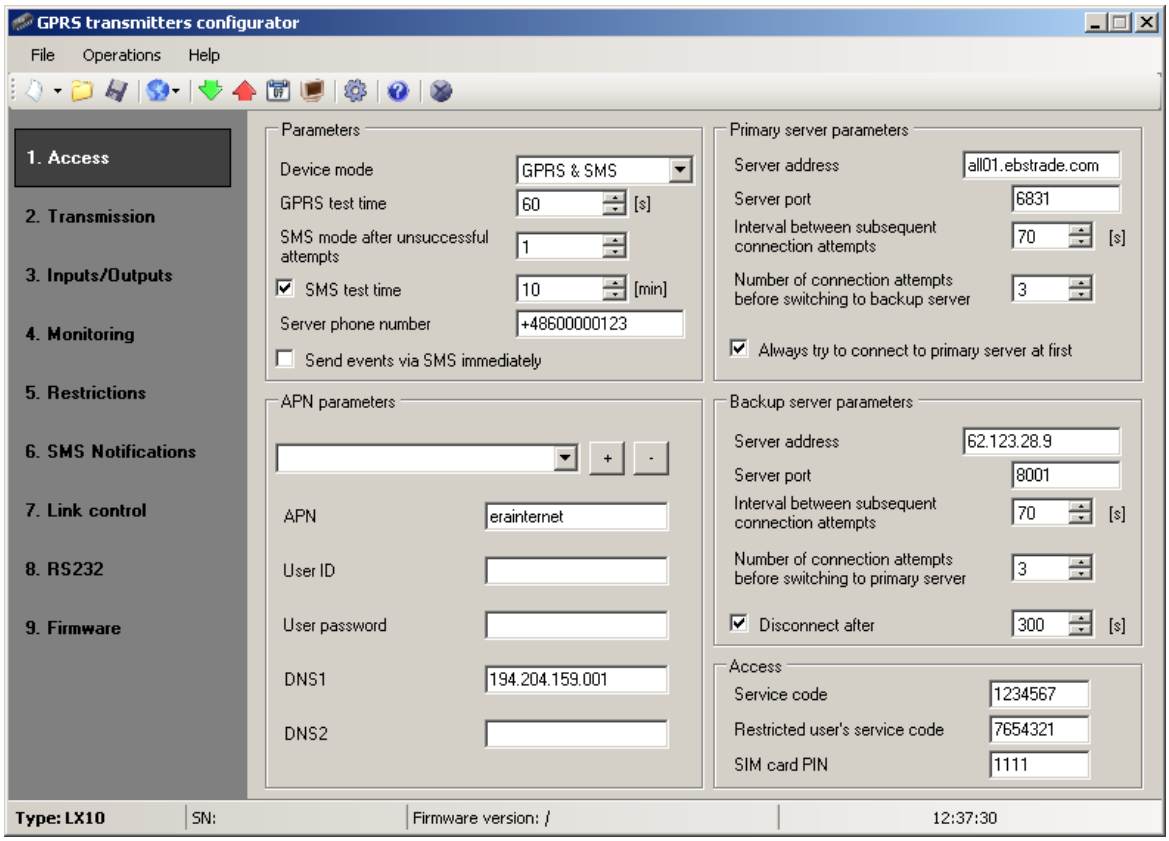
7. PROGRAMMABLE PARAMETERS

Parameters available in configuration program are divided into groups: Access, Transmission, Inputs/Outputs, Monitoring, Restrictions, SMS Notifications, Link control, RS-232, Phone line[3] and Firmware. Every from these groups will be described in detail in next part of this manual.

7.1. ACCESS

7.1.1. Parameters

7.1.1.1. Device mode



Depending of user preferences, a device may operate in 1 out 4 modes (available from scrolled list) :

- *GPRS & SMS*: GPRS standard transmission (TCP/IP Protocol), and if any problems follow with this link it automatically SMS mode will follow.
- *SMS*: Transmission only in SMS mode, without trial to establish GPRS link
- *GPRS*: GPRS standard transmission (TCP/IP Protocol), and in case of any problems with this link no transmission will follow.
- *Serverless*: no transmission to the server with is possible, remote communication possible only via SMS notifications to the user

[3]Applies to LX20/LX20S transmitter

7.1.1.2. GPRS test time

The device sends signal "Test" with determined interval that informs monitoring station that the device is in operation mode. In this field you can determine how often this message will be sent (in seconds).

7.1.1.3. SMS mode after unsuccessful attempts

Define number of reconnections to server. If during all reconnections fail the device will go into SMS mode. In this mode LX will try to make connection with server, according to interval defined in clause 7.1.3.3.

7.1.1.4. SMS test time

This function is analogical to GPRS. It is activated when problems with GPRS transmission follow when the device automatically goes into SMS mode (it relates to operation mode in SMS). Usually it is undesirable to send text as SMS so often as with GPRS transmission. Parameter this allow for significant extension of distance between tests (time in minutes) or completely interlocking of this option.

7.1.1.5. Server phone number

If GSM modem is connected to server application (e.g. OSM. 2007) enter in this field its number. Any SMS will be sent to this number if transmitter has got problems with GPRS transmission.
If this field is left blank or 0 was entered, the transmitter will be operating exclusively in GPRS mode.

Note : This field will be inactive if device is to operate in GPRS mode.

7.1.1.6. Send events via SMS immediately

In case of GPRS connection lost device will send SMS reports immediately, even if the LX isn't in SMS mode yet.

7.1.2. APN Parameters

7.1.2.1. APN

Parameter depending on GSM network operator that supplies GPRS (SMS) services. It provides GSM network access point name.
It possible to obtain a private access point. In this case a name will be provided by GSM network operator.

7.1.2.2. User ID

When using public APN, user ID is mostly not required. For private APN this parameter shall be obtained from operator (it is impossible to be granted access to GPRS network without it).

7.1.2.3. User password

When using public APN , user ID is mostly not required. For private APN this parameter shall be obtained from operator (it is impossible to be granted access to GPRS network without it).

Note : Private APN provides for higher system security.

7.1.2.4. DNS1 and DNS2

It determines address of main and backup DNS server (Domain Name System).
If IP server address has been entered in form of domain it is required to provide minimum one DNS address.

7.1.3. Main Server Parameters

7.1.3.1. Server IP Address

It is address of receiver of monitoring system (OSM.2007) or computer where "Communication Server" software has been installed , e.g. 89.123.115.8. This address may be provided in domain name of server, e.g. modul.gprs.com. In this case it is required to provide minimum one address of DNS server.

7.1.3.2. Server port

It determines server port that was selected in server for collection of data from transmitter.

7.1.3.3. Interval between subsequent connection attempts

Programmable and equipped with SIM card device will try to make automatic connection with server. In this field you define interval (in seconds) after which next connection will follow if the previous connection failed.

7.1.3.4. Number of connection attempts

In this filed you determine how many times device will try to make connection to server. If connections fail, LX after execution of some connection will start procedure of connection to back up server. This option is active only if we define parameters of backup server.

7.1.3.5. Order of connection to servers

Mark this check box means, that the device will try in first order to connect to primary server, without regard on definition of parameters for backup server (in peculiarity of number of connection attempts).

7.1.4. Backup server parameters

7.1.4.1. IP server address

It is IP address of second (backup) receiver of monitoring system (OSM.2007) or computer where "Communication Server" software has been installed , e.g. 89.130.125.82. This address may be provided in domain name of server, e.g. monitor.gprs.com. In this case it is required to provide minimum one address of DNS server.

7.1.4.2. Server port

It determines server port that was selected in server for collection of data from transmitter.

7.1.4.3. Interval between subsequent connection

If device can not connect to primary server defined this after exhaustion for him number of attempts, it will begin realizing the procedure of connecting to backup server. We in this place define space of time (in seconds), after which test will connecting renewed if previous finished with failure.

7.1.4.4. Number of connection attempts

In this field you determine how often device will try to make connection to backup server. If connections fail, LX after execution of some connection will back to procedure of connection to primary server.

7.1.4.5. Disconnect after time limit

If you mark this choice field the device will disconnect from back up server after passage of set time. Further operation depends on defined parameter Order of connection (See clause 7.1.3.5). If this option is active the device reconnects to the primary server. If this option is not active the device firstly completes connection to backup server procedure and if this fails, the device will try to connect to the primary server.

7.1.5. Access

7.1.5.1. Service code

It provides security against unauthorized access. It is being used during programming of device and during remote controlling via CSD connection. Factory setting is **1111**. During the first starting of device (programming) it shall be changed. Code may consist of up to seven alpha numerical characters.

7.1.5.2. Restricted user's service code

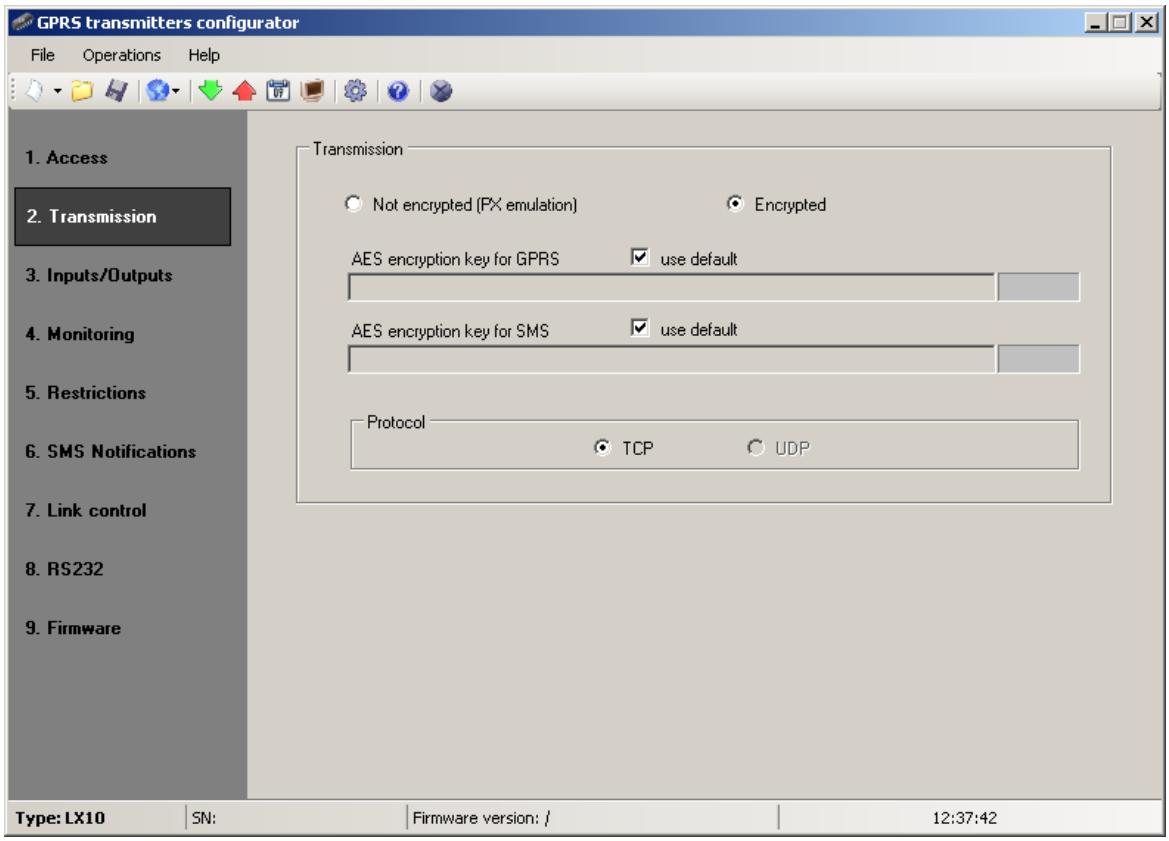
Allows restricted access to the parameters of device. When restricted user's service code is used following groups of parameters are unavailable: Access, Transmission, Restrictions, SMS notifications, Link control, RS232, Phone line and Dialer. Choosing unauthorized groups of parameters in "GPRS transmitters configurator" causes error notification.
Default restricted user's service code: **2222**

7.1.5.3. PIN of SIM card

As a device operates via GSM network, SIM card is indispensable and it may be received from phone operator. Before the first use PIN code of SIM card shall be programmed for operation in given transmitter. PIN code is indispensable for automatic system launching. In case of card without PIN code, it is possible to enter any value e.g. 0000.
If you enter wrong PIN number after inserting card and switching on transmitter, the system will not launch and you may be able to use card after entering PUK card only (with use of any GSM mobile phone).
Factory setting of PIN in LX transmitter is **1111**.

7.2. TRANSMISSION

For the purpose of maximum security of transmission, data is encrypted with AES key. This option may be used for GPRS and SMS transmission.
After selection of encrypted transmission you may use your own code (256 bytes – signs 0-9 and A-F) or use default settings.
Selection of not coded transmission means device operation similar to PX transmitters.



7.3. INPUTS/OUTPUTS

Transmitter has got 8[4] or 4[5] signal inputs and additional input for sabotage signal switch-key connection. Module is equipped with two outputs: indicating sabotage and an additional one. In/Out option enable programmable configuration so that transmitter operates pursuant to requirements of the user.
All inputs of the device are 24 hour alarm inputs.

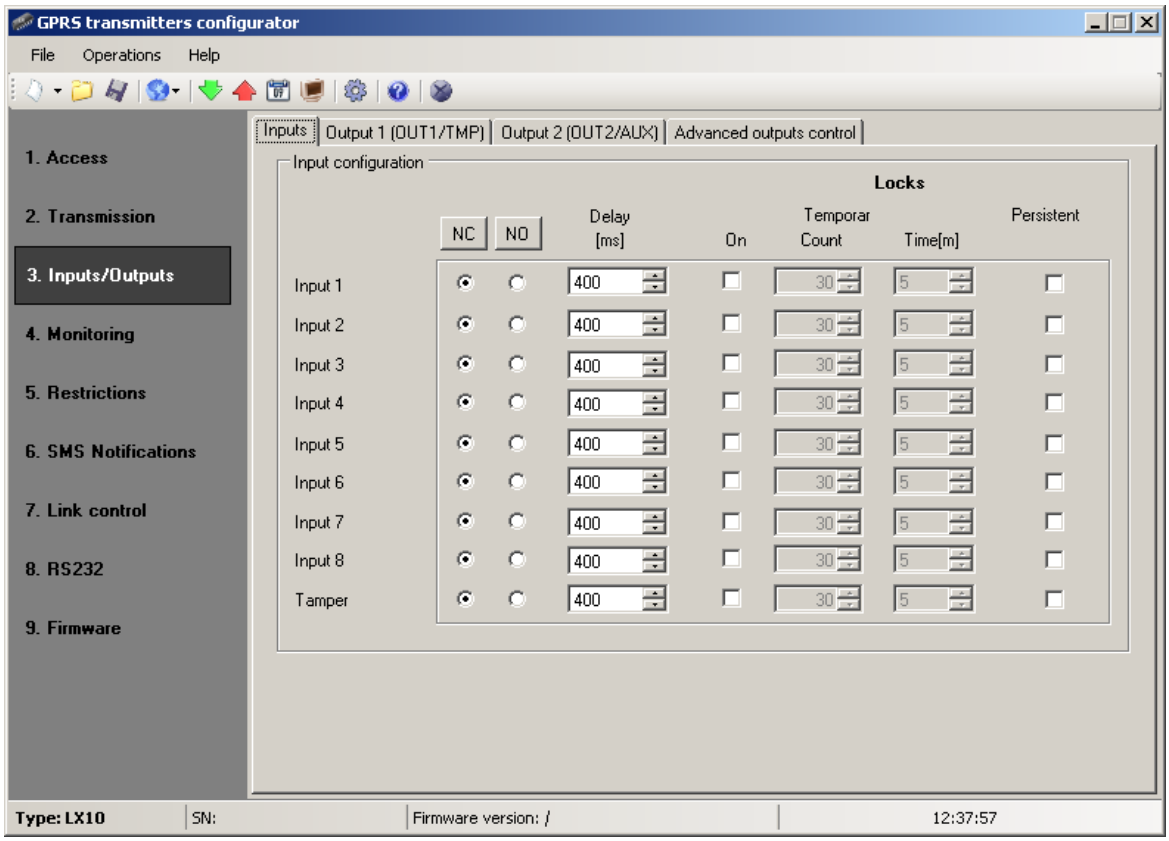
7.3.1. Inputs configuration

For every input the following settings shall be determined respectively.

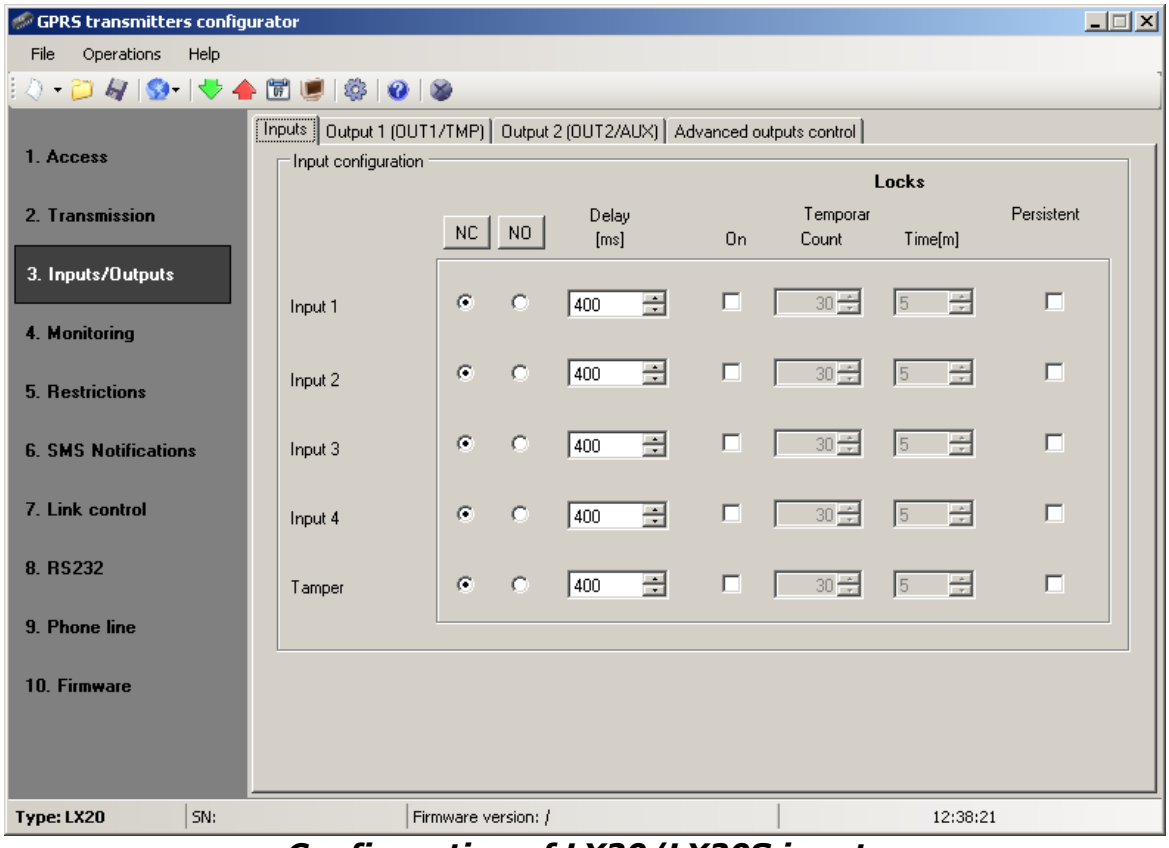
7.3.1.1. NO/NC

This parameter allows us to determine the steady state of the input. Change of this state results in sending information on alarm. Allowable NC and NO input. NC input shall be shorted to ground. Actuation follows after decay. NO input remains open. At this moment of shortening to ground activation follows.

[4] Applies to LX10 transmitter
[5] Applies to LX20/LX20S transmitter



Configuration of LX10 inputs



Configuration of LX20/LX20S inputs

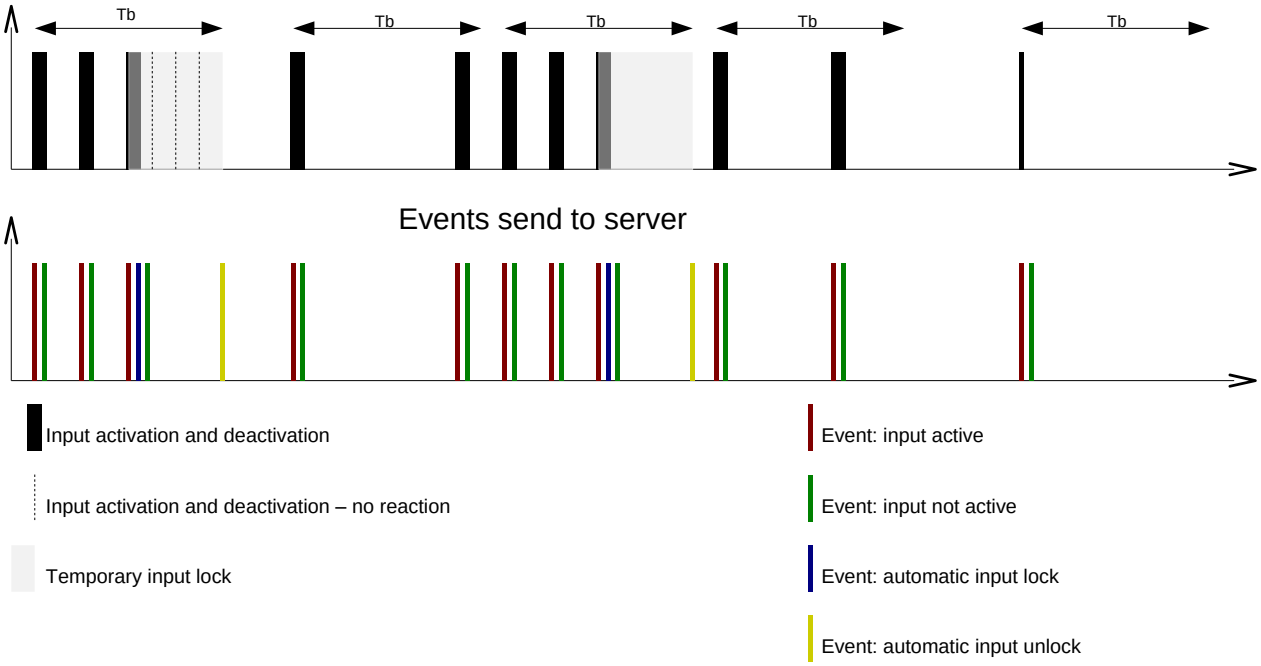
7.3.1.2. Delay [ms]

This parameter means minimum time for change maintenance at input so that it would be detected by transmitter. Factory setting is 400ms.

7.3.1.3. Lock

With this option you can lock any input of module, and as a result condition changes on this input will be ignored and will not be reported to monitoring station. Lock may be persistent or temporary.
In case of temporary lock – user can set lock time and number of input state changes after which lock occurs. Lock time is counted from first input state change.
Both types of lock can be deactivated by SMS command (see RLIMIT command described in chapter 9).

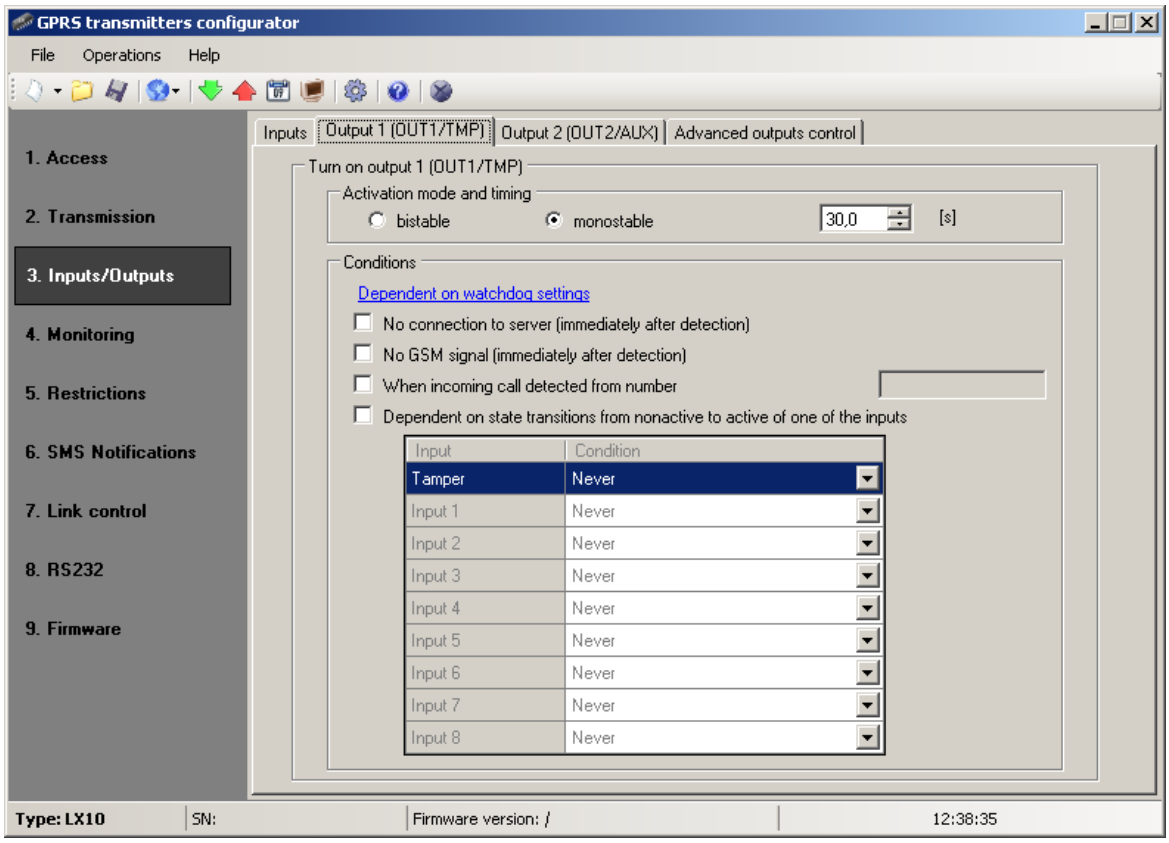
Limit: N = 2 input changes during Tb time (3rd change activates input lock)



- N and Tb parameters may be set per input
- Locally there can be 2 x N – 1 input activations. In summary average number of activations during defined period of time will be preserved.

7.3.2. Outputs configuration

Tab „Output 1 (OUT1)” and „ Output 2 (OUT2)” specify conditions of switch outputs. Settings for all outputs are identical so they will be described in one chapter.



7.3.2.1. Activation mode and timing

Thanks to this option you may choose output operation mode. There are two operation modes available:

- Bistable – connection follows for indefinite time – up to the moment of disconnection of power for module or remote command which switches output off,
- Monostable – connection follows for time defined by user – every 100ms.

7.3.2.2. Conditions

Defines conditions for activating both of outputs. User can set following conditions:

- No GSM signal (immediately after detection);
- Detection of incoming call from defined telephone number;
- Dependent on state transitions from non-active to active of one of the inputs. Outputs can be also activated by internal watchdog, which can be configured in “Link control” group.

7.3.2.3. Additional conditions

If option "Dependent on state transitions from non-active to active of one of the inputs" is chosen, we might configure additional conditions for output activations:

- **Never:** input disturbance does not cause operation of sabotage output,
- **No network:** input disturbance causes actuation of sabotage output if sending of information to server is impossible.
- **Always:** every input disturbance causes actuation of sabotage output.
- **Available network:** input disturbance causes actuation of sabotage output if sending of information to server is possible.

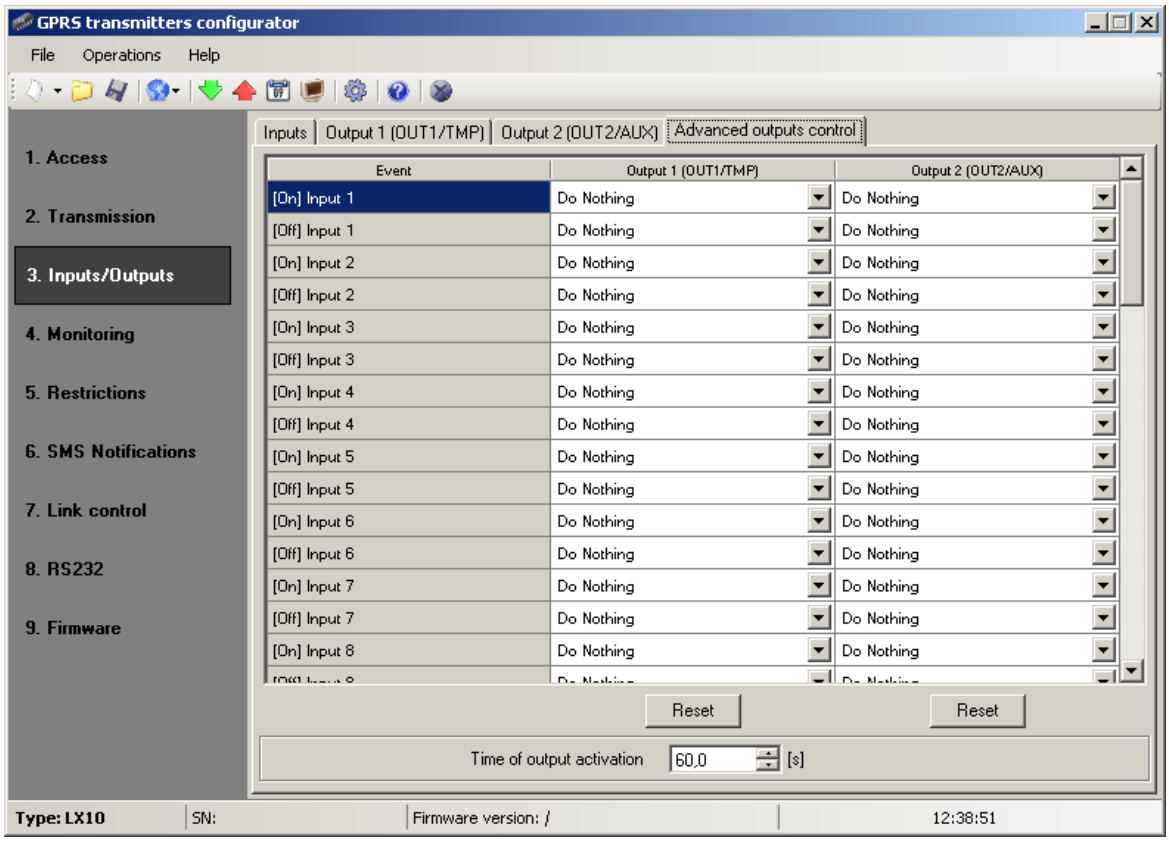
Note : Both outputs may be controlled by SMS commands.

7.3.3. Advanced outputs control

The user is able to determine an alternative course of action to go over basic outputs configuration function described in *7.3.2 Outputs configuration.* In the "Advanced outputs control" you may define separately the behavior of each of the outputs, depending on events taking place. "Advanced outputs control" differs from the existing basic "Outputs configuration" by:

- it is possible not only to turn on but also to turn off the output
- output can be activated temporarily for specified amount of time
- there is a complete list of events for which you can define the behavior of the output

Note: Do not use at the same time the basic configuration of outputs (*7.3.2 Outputs configuration*) and the "Advanced outputs control"!
In particular, the basic configuration of existing options: "No GSM signal (immediately after detection)" and "Dependent on state transitions from non-active to active of one of the inputs" should not be used with their replacements "[Off] GSM" and "[On] Input x". The use the basic configuration of outputs and "Advanced outputs control" at the same time, may cause unexpected behavior of the transmitter.



7.3.3.1. Output 1/Output 2

These columns define which signals are to influence the status of a specific output. Possible choices are:

- *Do Nothing* – output status will be not changed (default action)
- *Turn on output* – output will be permanently turned on
- *Turn on output temporarily* – output will be turned on for an amount of time specified by parameter *7.3.3.2 Time of output activation*
- *Turn off output* – output will be turned off

Press the [Reset] button to assign the action "Do Nothing" for each event.

The output state does not change if the current state of the output coincides with the result of the action.

7.3.3.2. Time of output activation

Parameter defining amount of time for which the output is to be turned on for the functions of advanced outputs control.

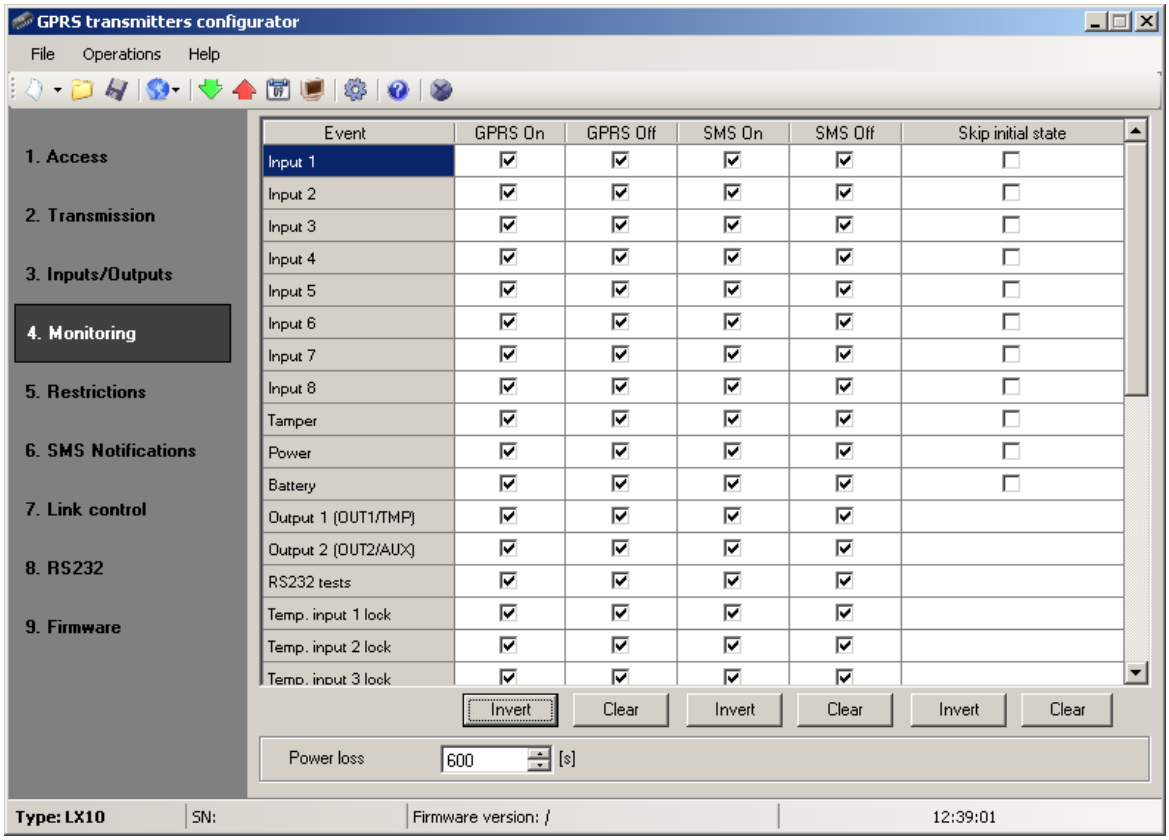
7.4. MONITORING

Thanks to this option you may determine which of available signals generated by the device shall be transmitted to monitoring station.

NOTE: "Configuration changed" event refer to configuration changes made by SMS or GPRS commands.

7.4.1. GPRS On / GPRS Off

In this column you define signals that are to be reported to monitoring station with GPRS transmission. There is possibility to send information on alarms (input state change from rest to action status) and on returns of input state from action to rest (normalization).
To transmit any signal you should only click it (proper square on your right).
Click on [Clear] button to remove all marked signals.
Click on [Invert] button to change markings to contrary.



7.4.2. SMS On / SMS Off

In this column you define signals that may be reported at monitoring station with SMS messages – when there is no connection with server over GPRS. There is possibility to send information on alarms (input state change from rest to action status) and on returns of input state from action to rest (normalization).
To transmit any signal you should only click it (proper square on your right).
Click on [Clear] button to remove all marked signals.
Click on [Invert] button to change markings to contrary.

7.4.3. Skip initial state

This option allow for locking of sending of information on status of active inputs at power connection. Information on inputs will be sent to server after the first change from inactive to active status.
For the events "Power" and "Battery" no selection "Skip initial state" will cause sending information about the power supply / battery on boot device regardless of the power supply / battery state.

7.4.4. Power loss

One of device additional options is monitoring of power supply voltage. As short voltage drop may follows at some facilities, it is possible to avoid reporting by entering time after which information will be sent.
Value of this parameter means that voltage drop shall follow within this determined time so that device recognizes it as real voltage drop and that information might be sent.

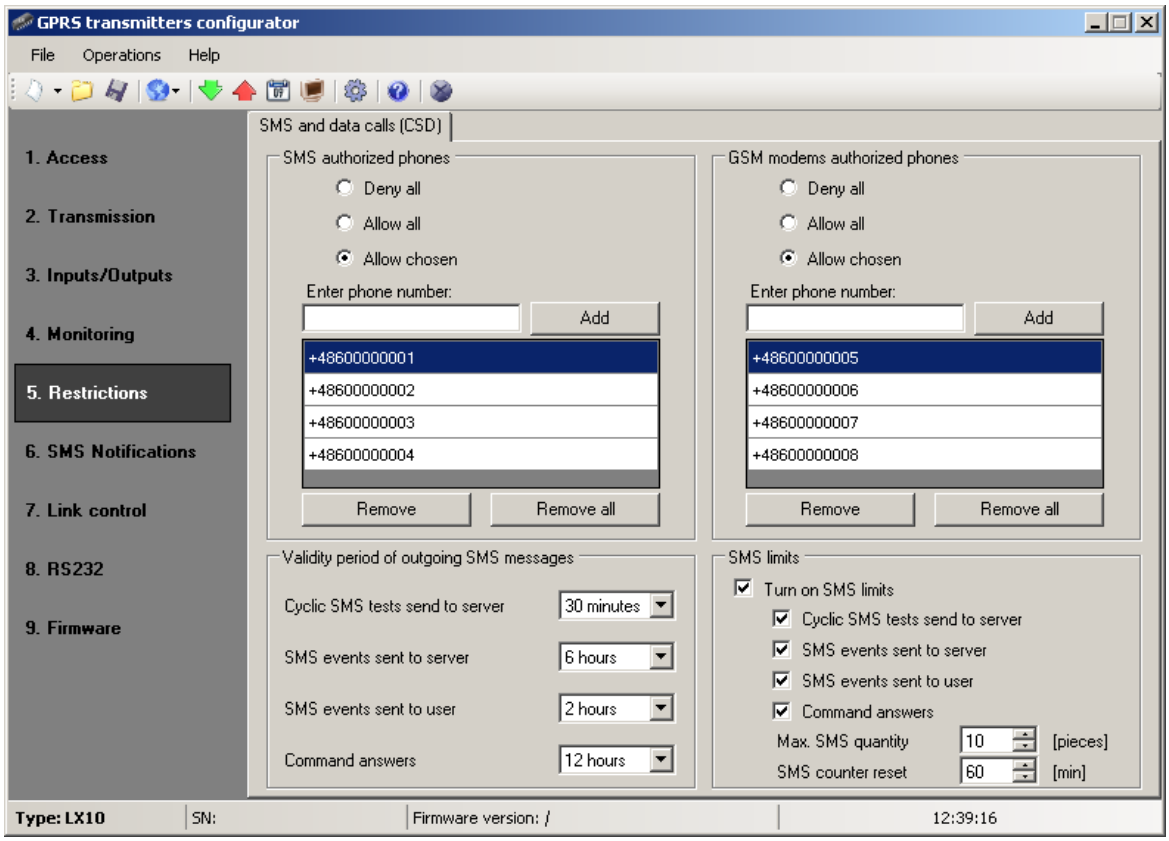
7.5. RESTRICTIONS

7.5.1. SMS Authorized phones

User may restrict remote access to the device (via SMS) for determined phone numbers. A list of numbers (up to 5 numbers) determines which numbers are allowed to connect with transmitter.
Available options:
- Deny all: means no available telephone communication.
- Allow all: means that telephone communication is possible from any phone.
- Allow chosen: means that telephone communication is possible only from these numbers that are on the list. It is possible to list up to 5 phone numbers.

Select "Allow chosen" to get access to edition window. Enter another numbers and click on [Add] button to send them to the below table. Position cursor on line with number and click on "Remove" to remove number from table.
Click on "Remove all" to remove all numbers from table.

Note:
a) authorizing of coming SMS comes through comparing number of oncoming SMS with numbers from table. It is allowable to enter only a part of number e.g. 1234. As a result all numbers with this sequence will be authorized e.g.600**1234**56 or 60**1234**567.
b) If modem connected to OSM.2007 server will be used to send SMS, its number have to be entered on the list.



7.5.2. GSM modems authorized phones

For connections on CSD channel the user may limit remote access to device from GSM modems. Only numbers on the list (up to 5) allow for communication with transmitter.

Available options:
- Deny all: means no available telephone communication.
- Allow all: means that telephone communication is possible from any phone.
- Allow chosen: means that telephone communication is possible only from these numbers that are on the list. It is possible to list up to 5 phone numbers.

Select "Allow chosen" to get access to edition window. Enter another numbers and click on [Add] button to send them to the below table. Position cursor on line with number and click on "Remove" to remove number from table.
Click on "Remove all" to remove all numbers from table.

Note:
a) authorizing of coming CSD comes through comparing of number from which it was sent with numbers from table. It is allowable to enter only a part of number e.g. 1234. As a result all numbers with this sequence will be authorized e.g.600**1234**56 or 60**1234**567.
b) If modem connected to OSM.2007 server will be used to make connections CSD, its number have to be entered on the list.

7.5.3. Validity period of outgoing SMS messages

User may limit time for the device to send information via SMS. Time limit is defined separately for the following groups of information:

- SMS test to server
- SMS events sent to server
- SMS events sent to user
- Answers to commends

Selection is to be made from scrolled down values by clicking on arrow besides selection area. Allowable options: 5, 10, 15, 30 minutes; 1, 2, 6, 12 hours; 1, 7 days, MAX (meaning no specified time).

7.5.4. SMS limits

User may limit number of SMS sending by transmitter. As the main way of transmission should be GPRS this limitation is essential to reduce costs.

Mark field [Turn on SMS limits] to activate access to information groups that shall subject to limitation:
- SMS test to server
- SMS events sent to server
- SMS events sent to user
- Answers to commends

Limitation are defined by providing two values:
- SMS maximum number: determines maximum number of sent SMS messages per time unit (see SMS counter reset). This option protects user against sending too much of SMS messages e.g. in case of failure.

- SMS counter reset: This parameter determines time schedule (in minutes) according to which counter of sent SMS messages will be zeroed.

7.6. SMS NOTIFICATIONS

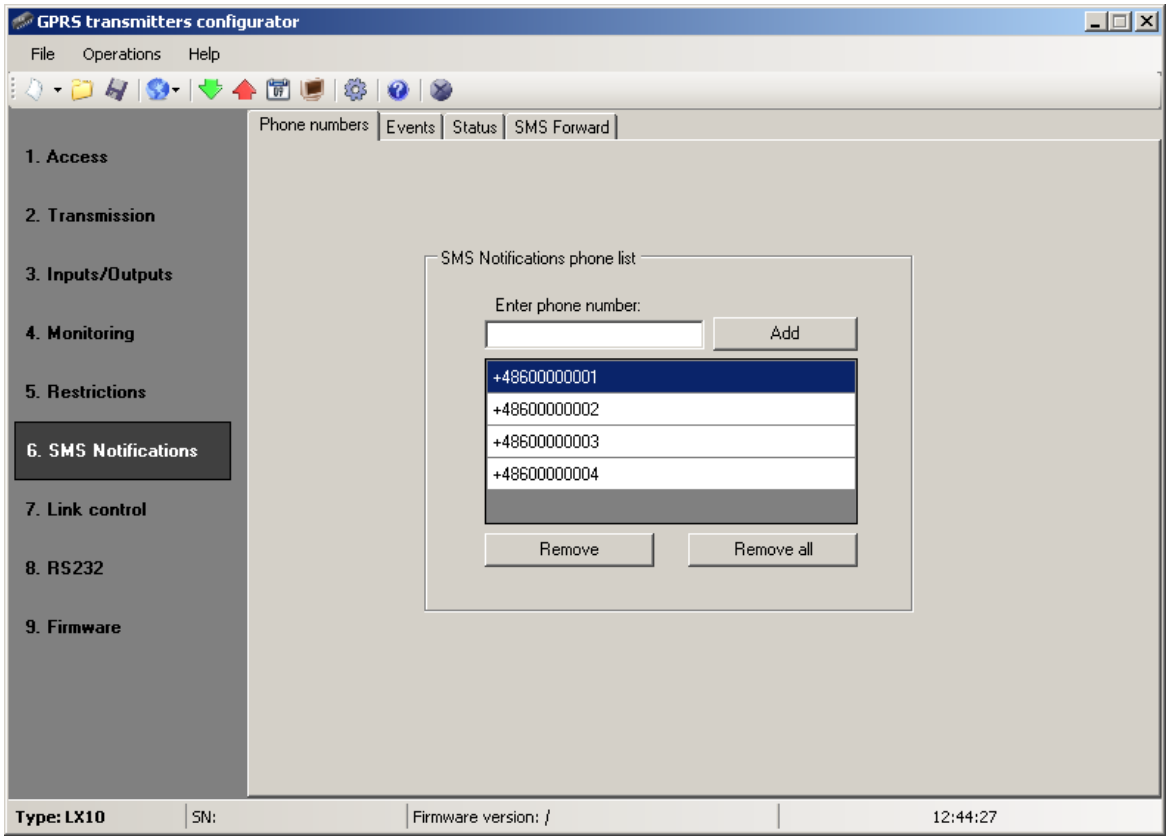
User may define messages that in case of any event (e.g. input state change) will be sent to private phone numbers. At the same time it is worth to remember about limitation in this respect.

7.6.1. Phone numbers

One way to limit amount of sent information (by SMS) is to define a list of 5 private phone numbers. This list means that only telephones listed on it will receive messages sent by transmitter.

To edit you shall follow this procedure:

- Enter due telephone number into edition field.
- Click on [Add] button to transfer number to the below table
- Repeat procedure (up to 5 phone numbers).



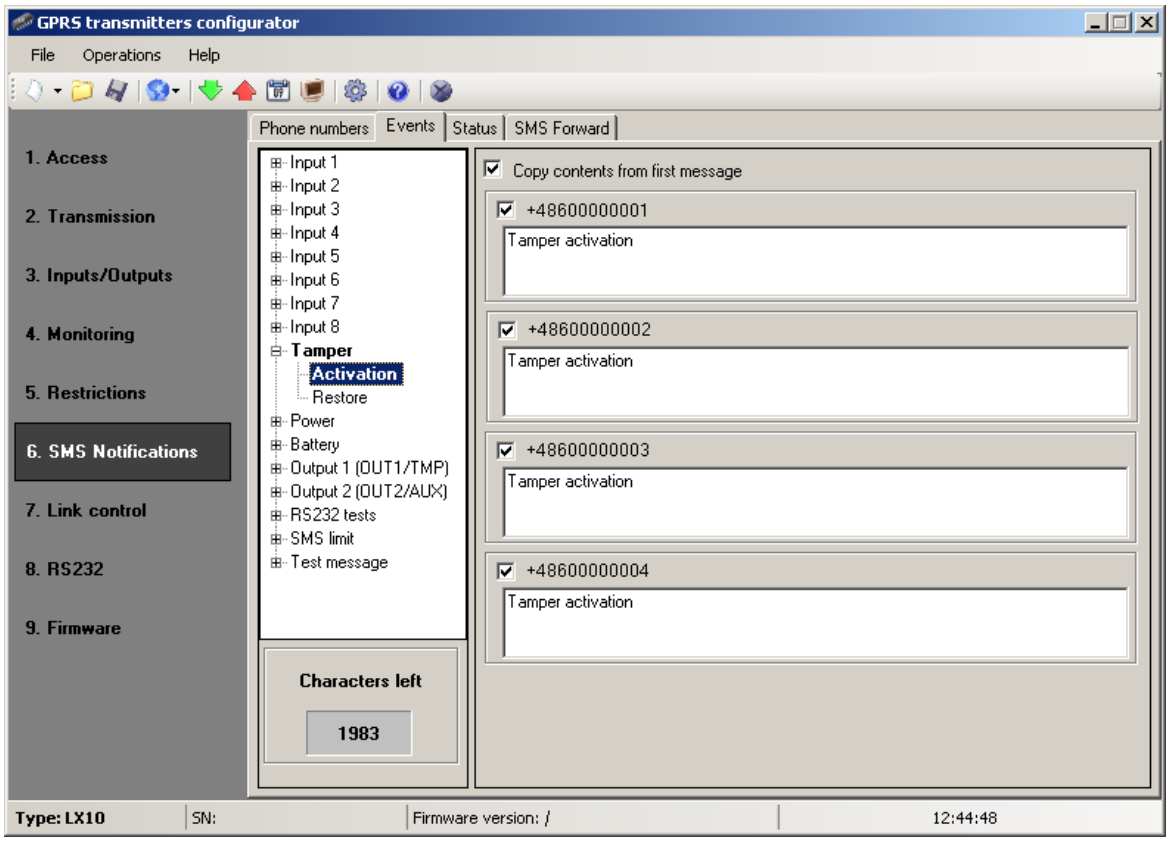
Position cursor on line with phone number and click on "Remove" button to remove number from table.
Click on "Remove all" button to remove all numbers from table.

7.6.2. Events

This tab is to configure and edit SMS messages to be sent to listed phone numbers. You may define SMS text message with reference to any event from the list (Tamper: Activation, Restore; Input1: Activation, Restore; etc.) that will be sent if this event follows. To define use edition field on the right of events list.

Follow the procedure:

a) Select event to edit from the list.
b) Mark square next to phone number that SMS is to sent to
c) Enter message text of SMS when field is active
d) If the "Copy the contents from first message" will be marked then selection and text content will be automatically copied from the first message, otherwise you may copy one text and paste to other field manually



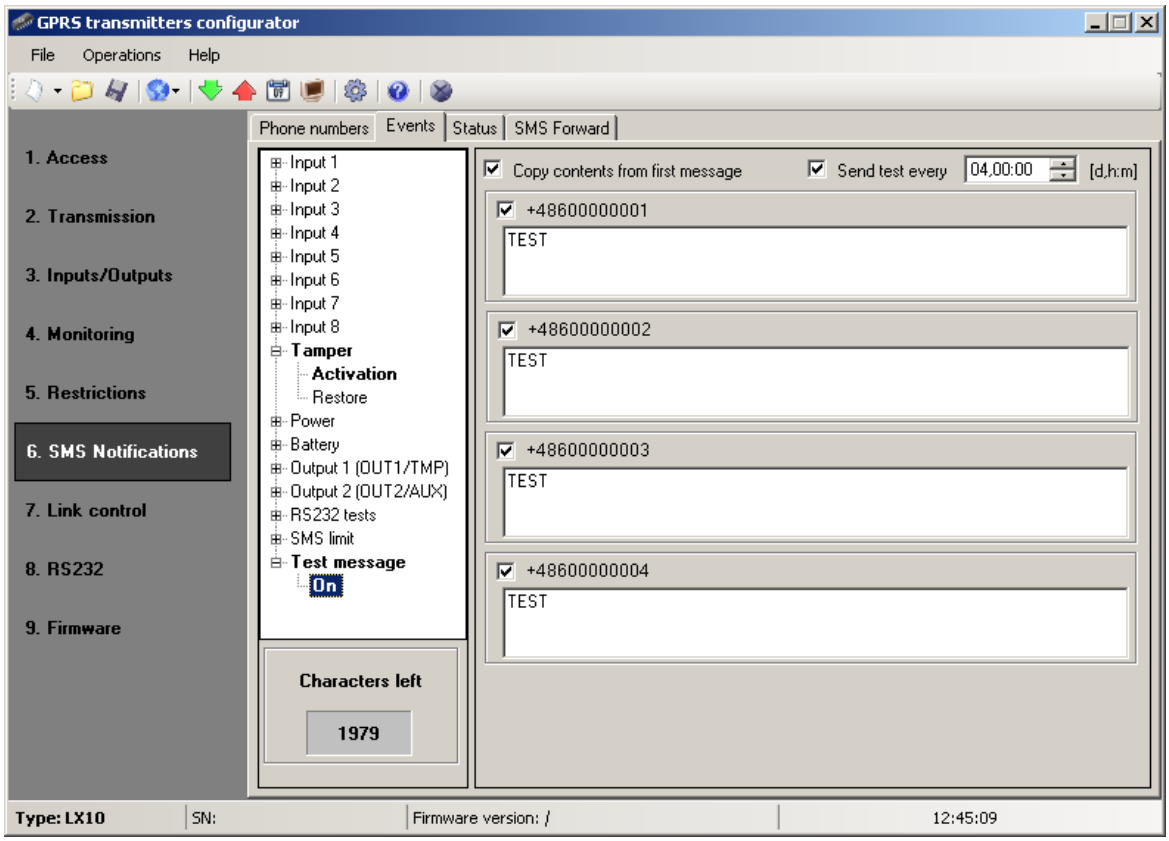
Note :

- The total number of characters for all SMS messages shall not exceed **2000**
- Mark any mistake and delete by pressing [Del] button
- You may copy one text and paste to other field

7.6.3. SMS user tests

SMS user tests sent to specified phone numbers are carried out independently of the operating mode of the device (GPRS / SMS / GRPS & SMS / Serverless). To enable the cyclic tests provide up to 5 phone numbers in "*SMS Notifications*" tab.

Then, for the event "Test message", type your message and provide a period of the test message. To do this, mark "Send test every" and indicate the period of the test set out in the next field. The format of the test period field is *"the total number of days, number of hours:the number of minutes*". No selection in the "Send test every" will disable SMS user tests.

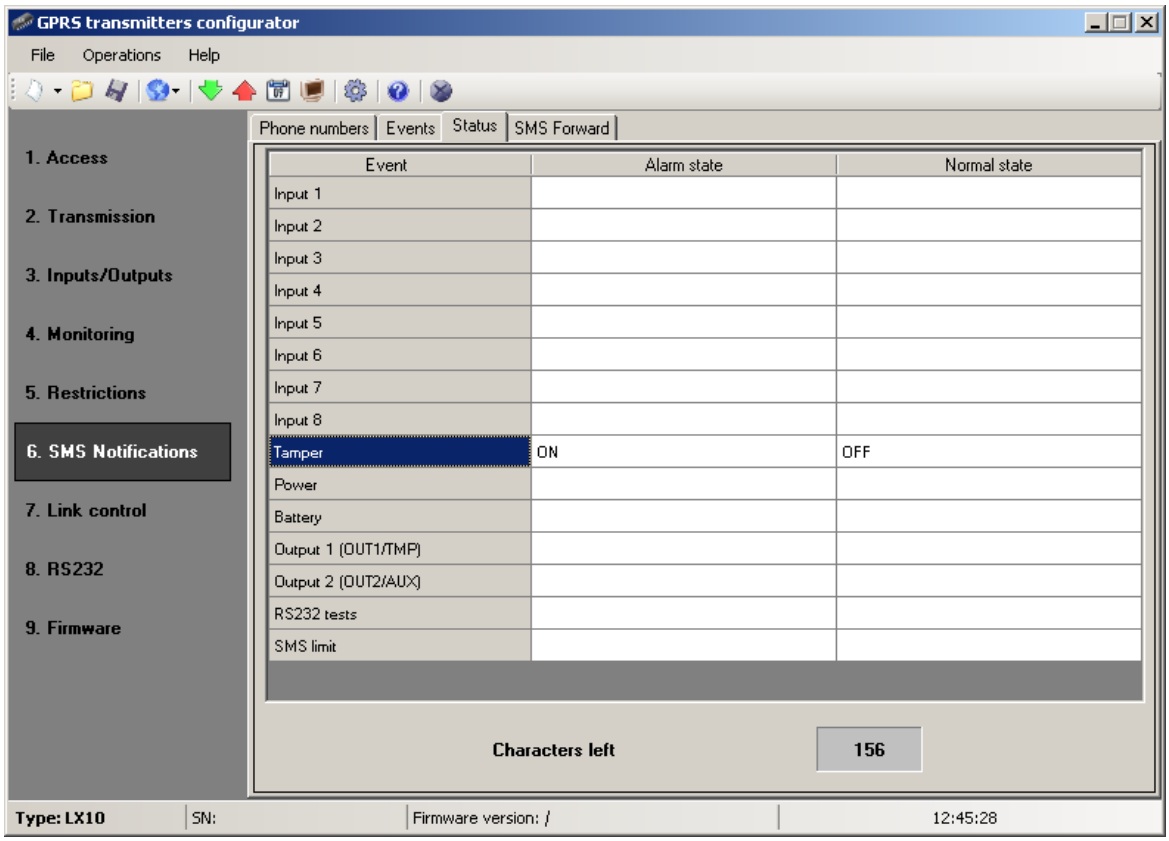


7.6.4. Status

The device provides for remote enquiry about the status. Edit in this field message text that is to be sent to the user as a reply to command regarding status checking.

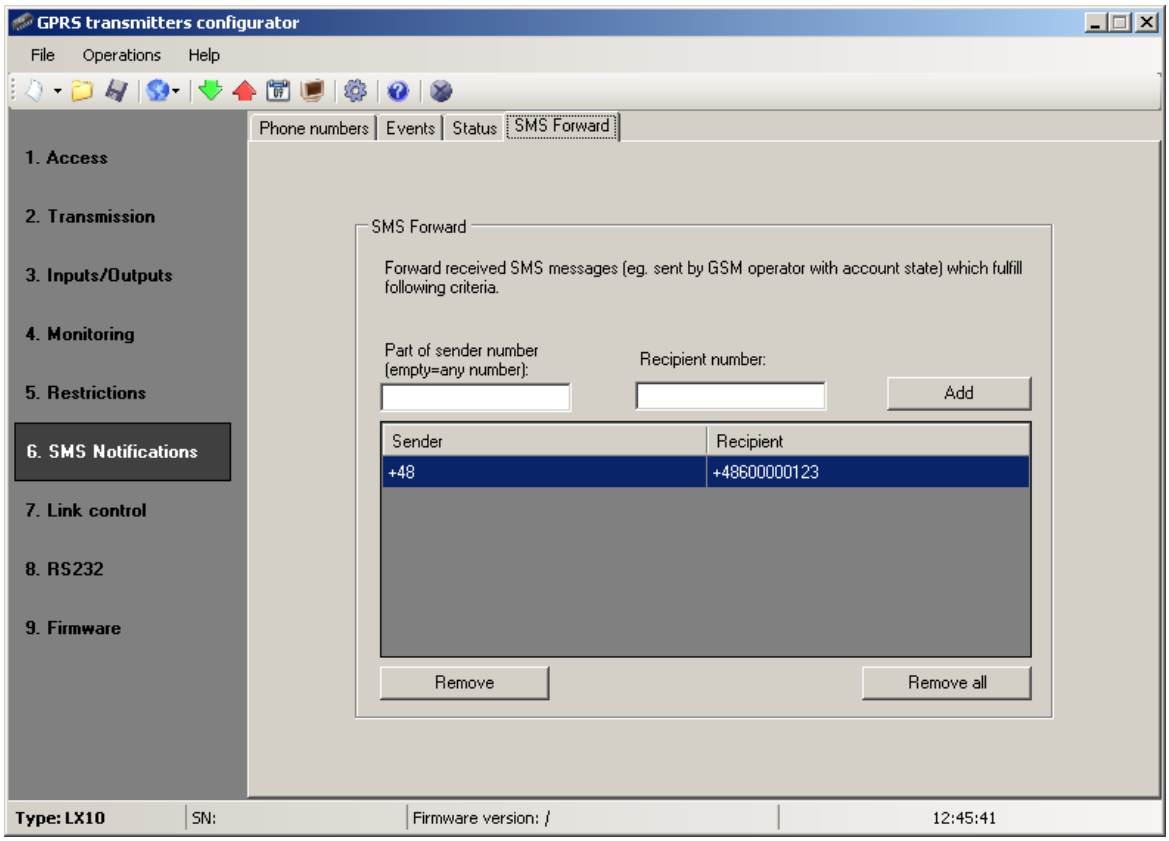
Telephone numbers authorized to send enquiry about status are defined in option Restrictions >Authorized SMS phones.
Reply from device shall be sent at number, from which enquiry was sent.
In reply about status a device shall send one SMS message containing proper text defining actual output , input state and power supply.

Note : Counter "**Allowed characters**" informs about the total number of characters that may be inserted into the table.



7.6.5. SMS Forward

The device is able to forward received SMS messages according to the specified rules. This function may be helpful for example when GSM operator sends messages with account state to SIM card installed within device. In this window you may provide up to 5 rules.
Each rule contains a pair: part of sender phone number and correct recipient phone number. In some cases a part of sender phone number may be an empty string which means that any phone number matches to the rule. All rules are processed with given order. It means that in some cases one SMS message may be forwarded to more than one recipients and/or some of them may be forwarded more than once to the same recipient. The second case may occur when there are at least two rules with the same recipient phone number and their part of sender phone number matches with message sender phone number.
Note : It is a user's responsibility to provide correct rules which will not create loops of forwarded SMS messages.



7.7. LINK CONTROL

These options enable automatic action of device if communication with monitoring station was broken up. It relates to situations when device lost connection to GSM network or if GPRS transmission is impossible.

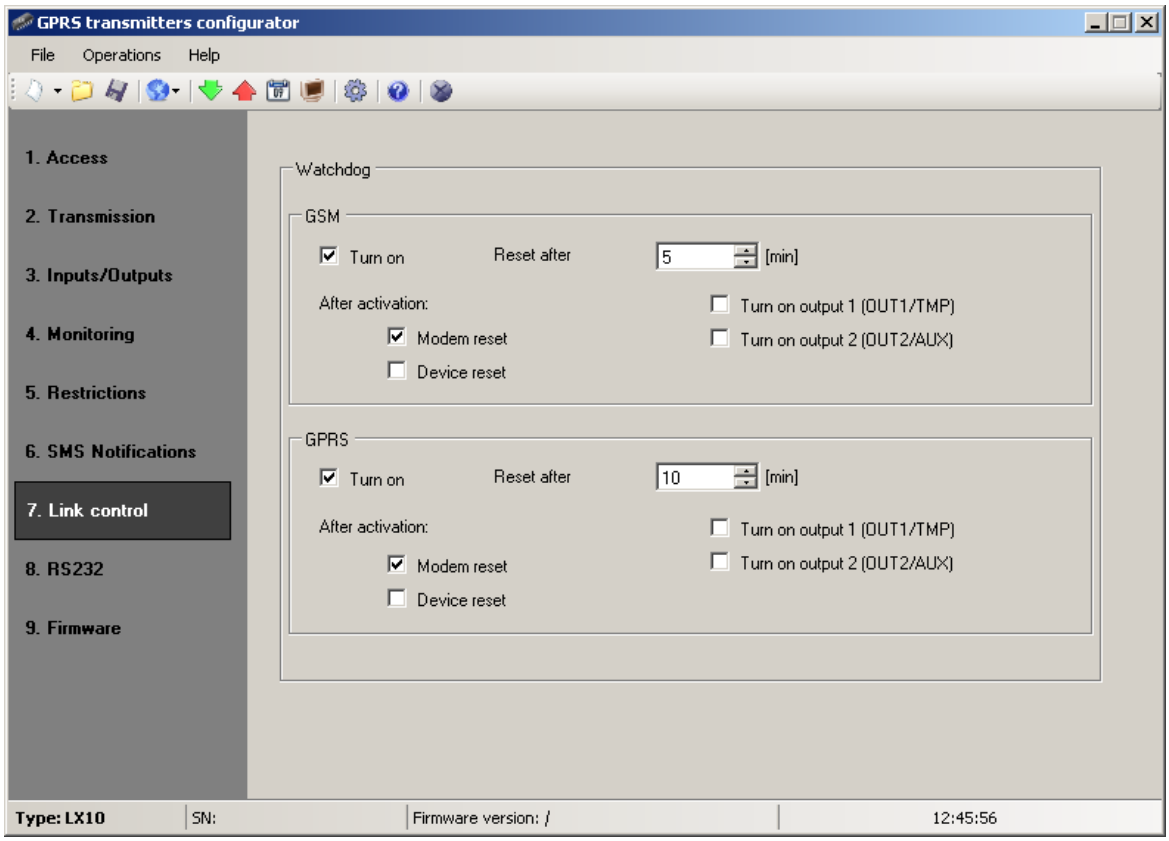
7.7.1. GSM

Activate this function (mark [Turn On] field) to get access to parameters determining action of device if outside GSM network.
Define time limit after which transmitter shall reconnect to network. Enter time limit in field [Reset after] and provide this value in minutes.

Next define action that the device shall perform. Select action by marking proper square next action description:

- Modem Reset
- Device Reset
- Turn on auxiliary output
- Turn on sabotage output

In case of no connection with GSM network the device after recognizing the situation shall wait during provided time limit and then shall perform programmed actions.



7.7.2. GPRS

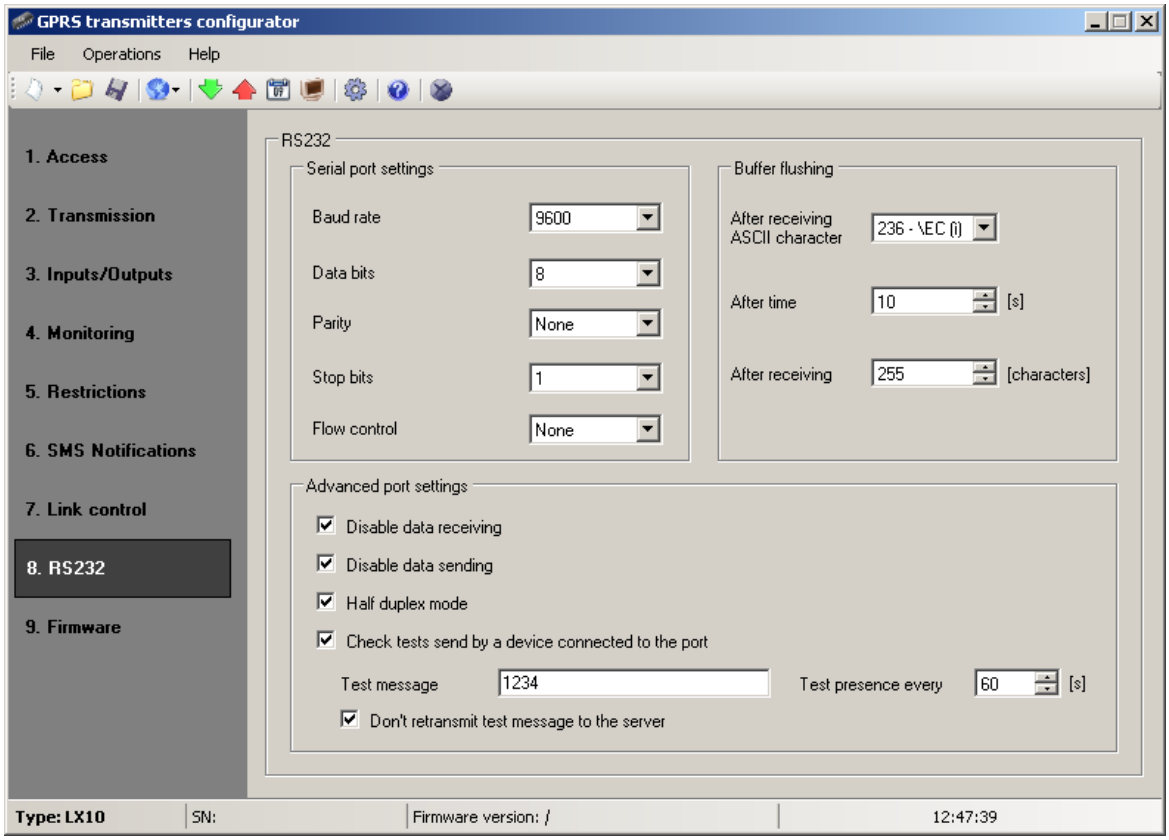
Activate this function to (mark [Turn On] field) to get access to parameters determining action of device if GPRS connections is lost.
Define time limit after which transmitter shall reconnect to network. Enter time limit in field [Reset after] and provide this value in minutes.

Next define action that the device shall perform. Select action by marking proper square next action description:

- Modem Reset
- Device Reset
- Turn on sabotage output
- Turn on auxiliary output

In case of no connection with GPRS network the device after recognizing the situation shall wait during provided time limit and then shall perform programmed actions.

7.8. RS-232



7.8.1. Serial port settings

The device has been equipped with RS-232 serial port to enable obtaining additional information. To make use of this link it is required to define its parameters. For this purpose select parameters from the below table:

Parameter	Value
Baud rate (bits/sec)	300,1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.
Data bits	5, 6, 7, 8
Parity	None, even, odd, mark, space
Stop bits	1, 2
Flow control	None, RTS, CTS, RTS/CTS

The selected parameters shall correspond to RS-232 port settings in device, with which the transmitter is to cooperate.

7.8.2. Buffer flushing

Data received from connected device are stored in transmitter buffer. Buffer capacity is 511 bytes. Define criteria that meeting shall mean data transmission to monitoring system transmitter. The following options are available:
- After receiving ASCII character
- After expiry of defined time

- After receiving defined amount of characters

For every option list of available values are provided, and they me be scrolled down after clicking on adequate arrow.

The transmitter controls buffer contents in respect of meeting of determined criteria. It is performed with the following order: selected character, time, number of characters.
Discharge of buffer (transmission) follows if one criteria is fulfilled.

7.8.3. Advanced port options

7.8.3.1. Disable data receiving

This option allow for lock of data received from device connected to RS-232 port of transmitter. It is used in case of failure or situation when LX is being used to control the device.

7.8.3.2. Disable data sending

This option allow for lock of data sending to device connected to RS-232 port of transmitter. This prevent accidental or unauthorized controlling of the device.

7.8.3.3. Half Duplex mode

This option provides for automatic lock of data receiving (via RTS) if transmitter begin to send data to the device.

7.8.3.4. Tests of device connection to port

If the device connected to transmitter port generates periodical connection tests, these tests may be under LX control. To provide for that (after this option activation) enter text message and define frequency (in "Test presence every [s]" option).
Additionally user may determine if text messages will be sent to server. If this option was not selected it is required to make sure that while the device connected to transmitter port is not sending text message to transmitter, LX sends to server due message (See chapter 7.4 Tests RS-232).

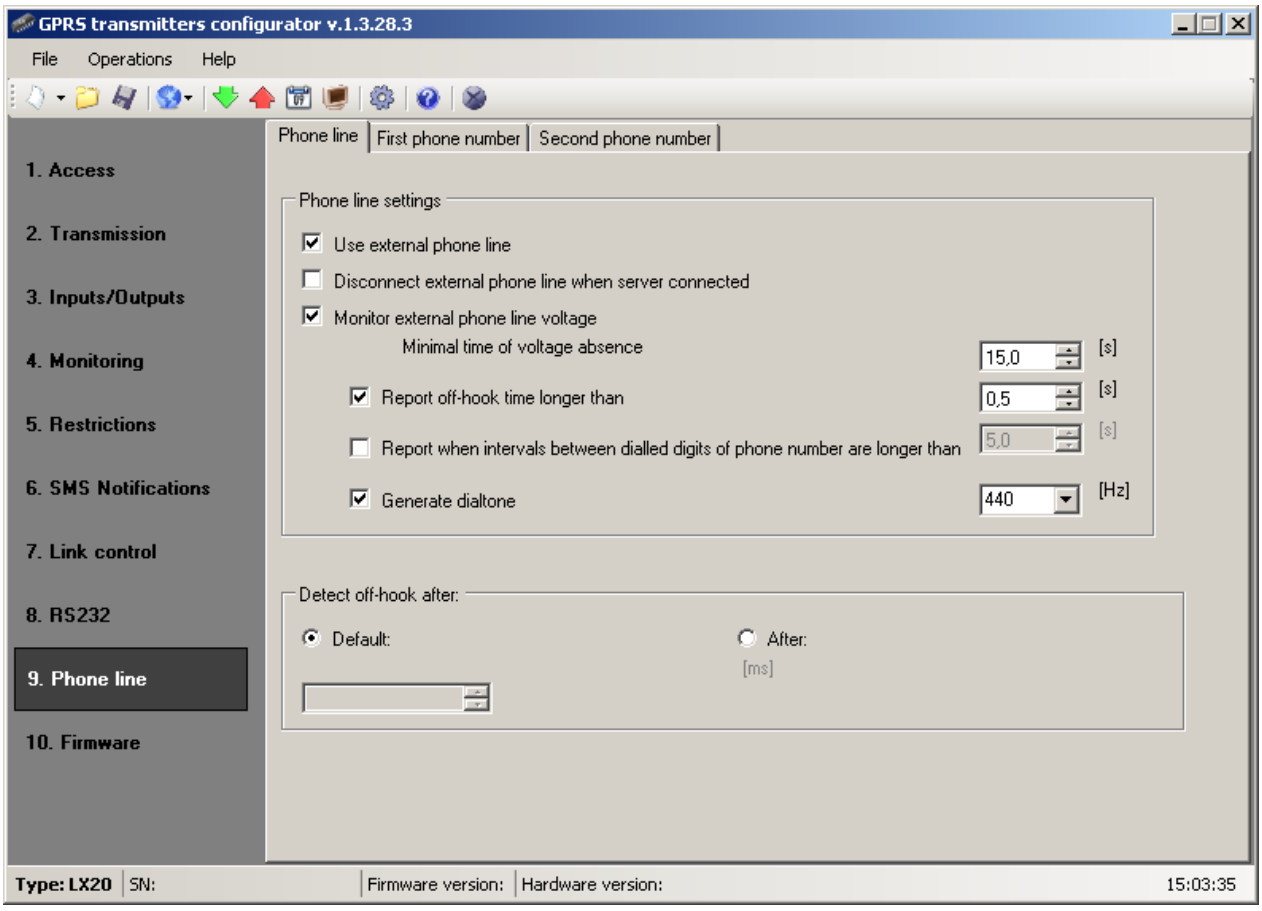
7.9. PHONE LINE[6]

The device is equipped with an external, city telephone line. It may be used to transmit data from an alarm control panel. Additionally transmitter may collect information from an control panel using its a phone communicator, and next transmit them via GPRS link. The mentioned below parameters shall be defined for proper operation of the device.

[6] Applies to LX20/LX20S transmitter

7.9.1. Phone line

This tab is provided to determine settings of telephone line.



7.9.1.1. External phone line

If this function has been chosen (Activation) the transmitter will be cooperating with PSTN line. This way data transmission is possible from an alarm control panel with two ways: via GPRS link and standard telephone line.

7.9.1.2. Disconnect external phone line

If option "Disconnect external phone line if connection to server is established " is enabled, PSTN line will be disconnected from T1-R1 port when connection with the server is established. If events registered by the alarm control panel are supposed to be sent by GPRS, this option can be used to separate external line from the alarm control panel.

7.9.1.3. Monitor external phone line voltage

If transmission with two ways follows, it is necessary that operator of monitoring system received information on access to an external telephone line. Choice of this option will result in voltage drop on telephone line (longer that defined minimal time of decay) that will be signalized with an adequate message sent via GPRS.

Note: The transmitter is to simulate a telephone line access if:
- A PSTN line is not connected
- A PSTN line is connected but has not been activated –option from clause 7.9.1.1
- Options from clause 7.9.1.1 and clause 7.9.1.3 are active and voltage on terminals TIP-RING decreased below 8V.

7.9.1.4. Report off-hook condition

If a phone set is connected in parallel output of control panel communicator (to terminals T1-R1 of transmitter), picking up of a phone prevent from exchange of data between an control panel and a transmitter. There is possibility to control this situation. Choice of this option result in sending a report to monitoring station if time of picking up the phone exceeds determined time limit.

Note: This operation of this device follows if it works with new protocol. If transmitter is to work in emulation PX mode (See chapter 7.2) the above mentioned situation will result in sending "No telephone line" message.

7.9.1.5. Report "intervals too long"

This option is being used if in configuration PSTN line- LX- Alarm Control Panel there are not other telecommunication devices. If such device will be connected and telephone number will be dialled (and a call will follow) after expiry defined time limit (counted since conclusion of last digit dialling) the transmitter sends a message. This operation prevents unauthorised installation of additional devices.

Note: This operation of this device follows if it works with new protocol. If transmitter is to work in emulation PX mode (See chapter 7.2) the above mentioned situation will result in sending "No telephone line" message.

7.9.1.6. Generate dial tone

Some alarm control panels require that during a receiver picking up a tone of dialling was actuated. To enable cooperation with a transmitter it is possible to make a transmitter to generate such tone.

7.9.1.7. Detect off-hook after

The default value for the delay detection off-hook 100ms. You can define your own delay value by choosing option "After" and giving the number in milliseconds.

7.9.2. First and Second phone number

To provide for proper cooperation between a transmitter and a control panel in DTMF mode determination of some parameters is required. The below described functions are analogous to the both telephone numbers that may be saved in the device memory.

7.9.2.1. DTMF phone number

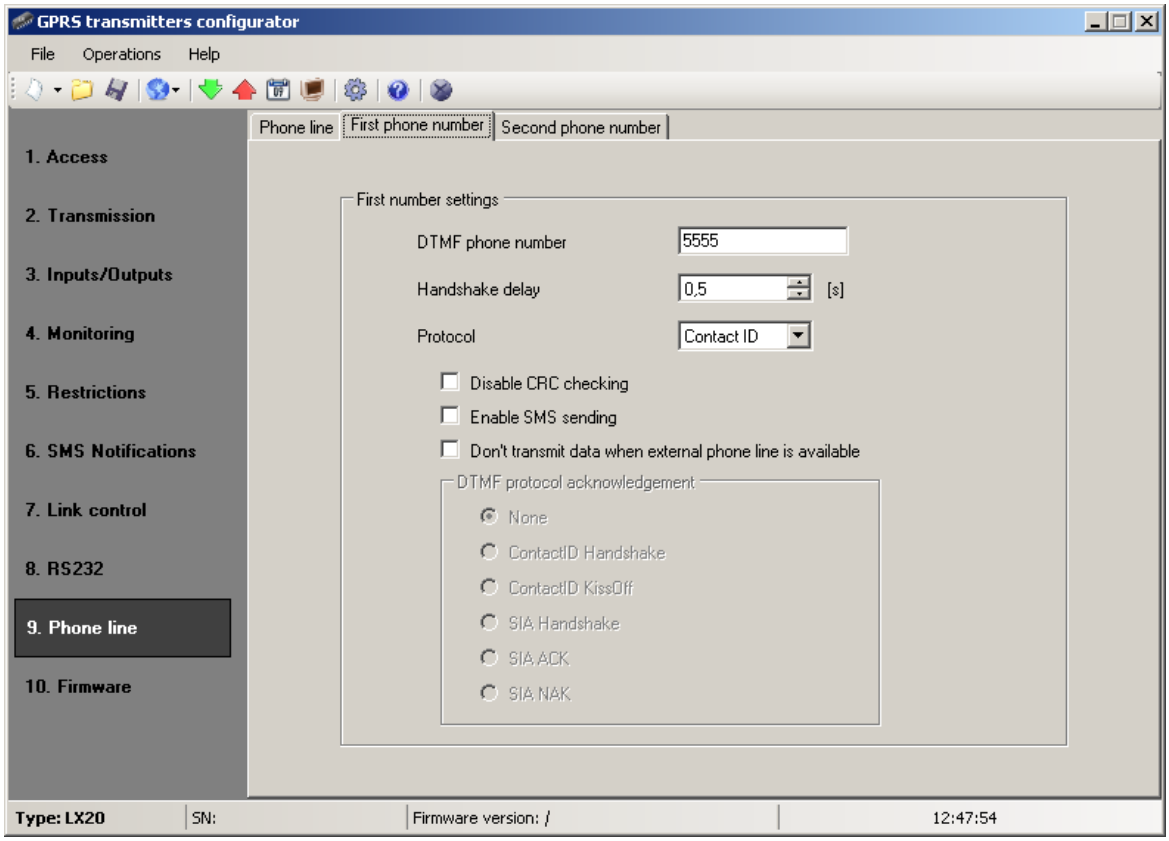
This is a number that has been saved in memory of an alarm control panel. If the panel is to transmit information on an event it shall dialled this number. Transmission of this information via GSM (GPRS) will be possible if this number will be identical as a number entered into the transmitter.

7.9.2.2. Handshake delay

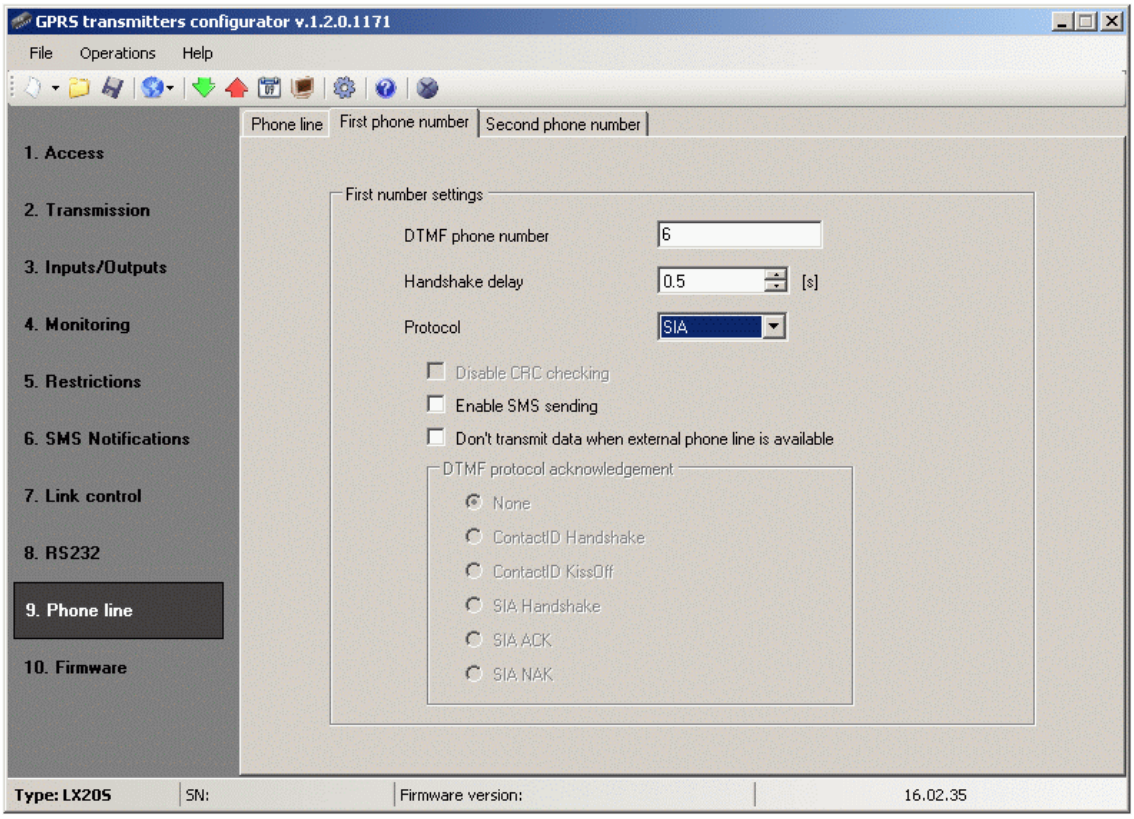
This defines time after which a transmitter generates confirmation to an alarm control panel for correct phone number dial. Default setting is 2.0 sec. European Standard determines this value at 0.5 to 12.5 sec.

7.9.2.3. Protocol

Select protocol of data transmission used by an alarm control panel and that is acceptable for monitoring station. Available options: ContactID, Ademco Fast, and DTMF for LX20 device. For LX20S SIA Level 1 & 2 protocol is also available.



Configuration of LX20



Configuration of LX20S

Note:

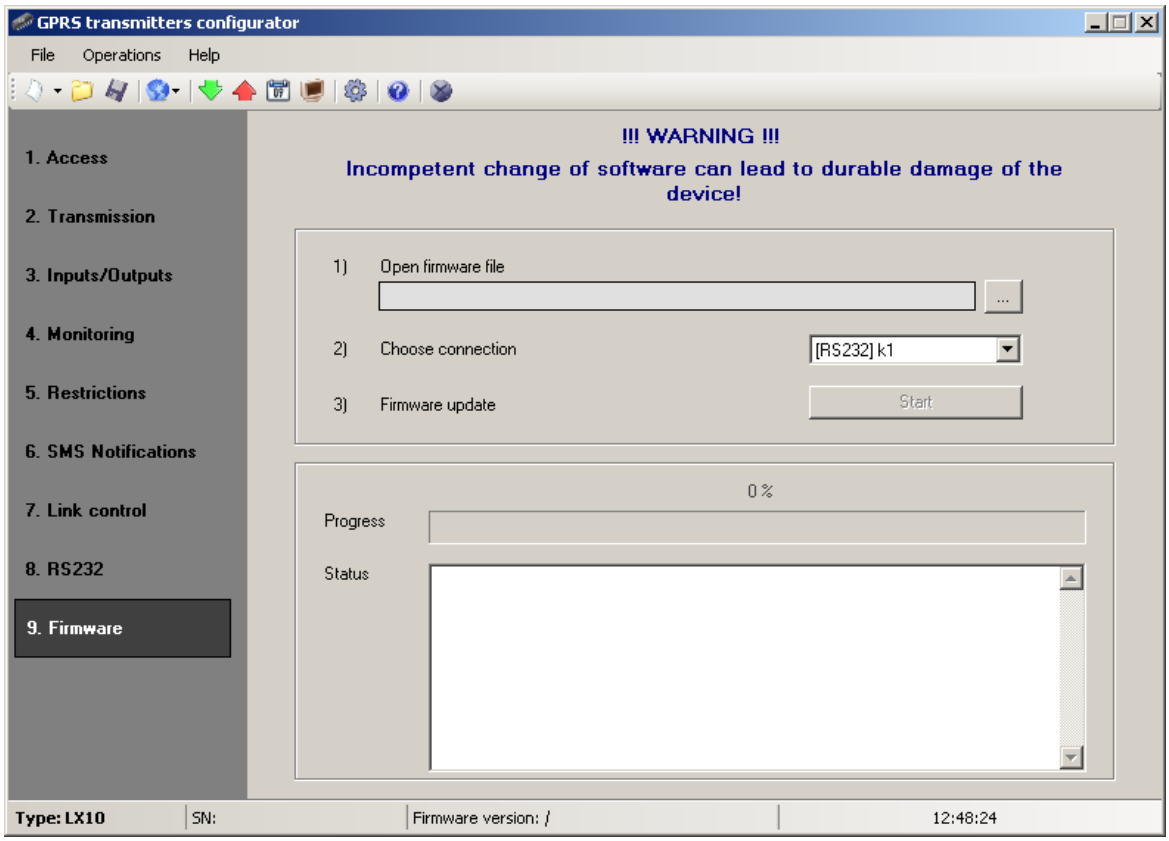
1) For all protocols you may use following options:
   - [Enable SMS sending] which means that in case of no GPRS connection, data will be sent via SMS (if this mode will be accessible).
   - [Don't transmit data when external phone line is available] which means that when the external PSTN line is available then it will be used during transmission from the control panel.

2) [Disable CRC checking] option may be used for ContactID and Ademco formats. Some control panel generate improper messages regarding a control sum for transmitted data, the device is not able to confirm collection of data, and as a result the panel tries to send them again (until execution of all determined trials). Select this option to avoid the above mentioned.

3) In case of DTMF protocol we gain access to specific parameters used to generate some control signals.

7.10. FIRMWARE

The device is equipped with built in bootloader that allow for updating and change of firmware. During programming all information is displayed in respect of carried out operation.



Follow the following procedure:

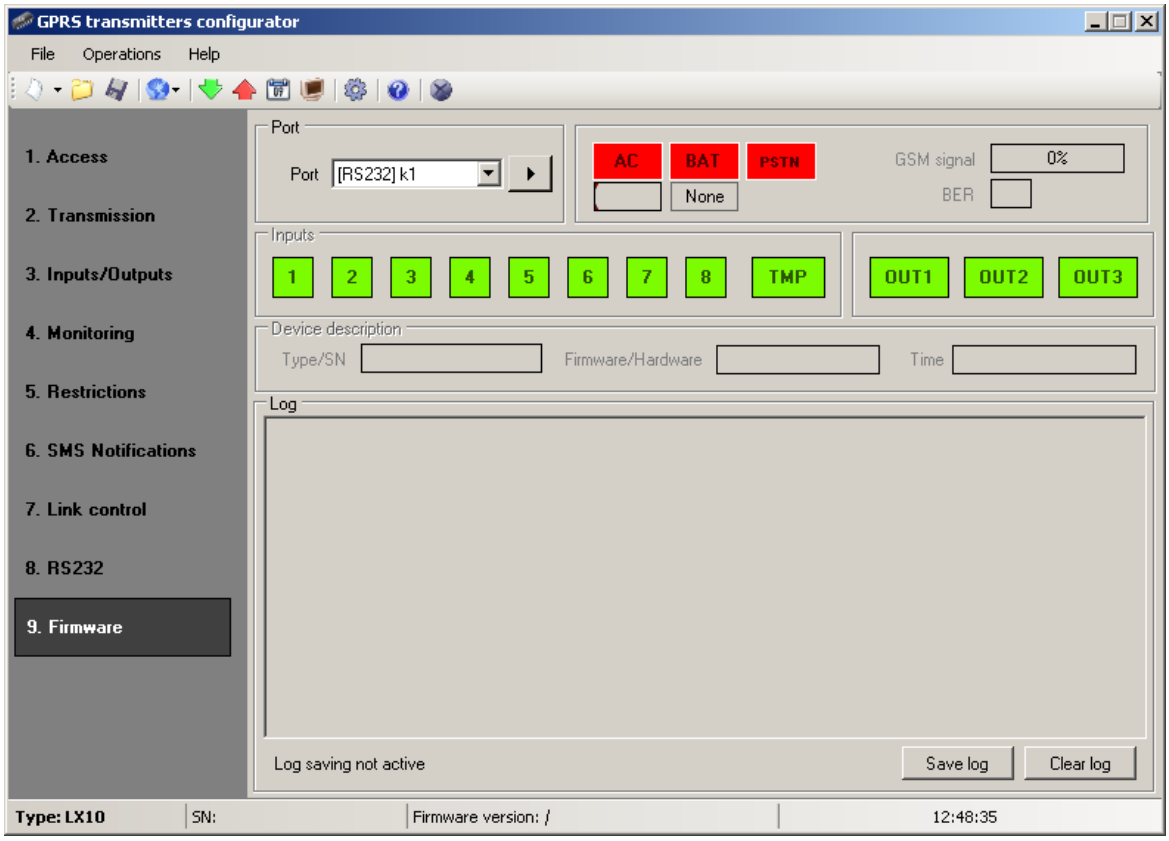
a) Launch configuration program
b) Open "Firmware" option of configuration wizard
c) Open file with new firmware (click [Open] button to locate where file is).
d) Select file transmission mode: local or remote.

Note: Procedure of assigning firmware to a device is analogous to programming a device. For procedure refer to chapter 8 Programming of the device.

e) Click [Start] button to start software exchange.
f) Loading course is displayed on special window.
g) Close the window after completed saving

From this time on the device will work under control of new firmware.
Note : The above procedure shall be carry out with due care to avoid improper device operation.

7.11. DEVICE MONITOR

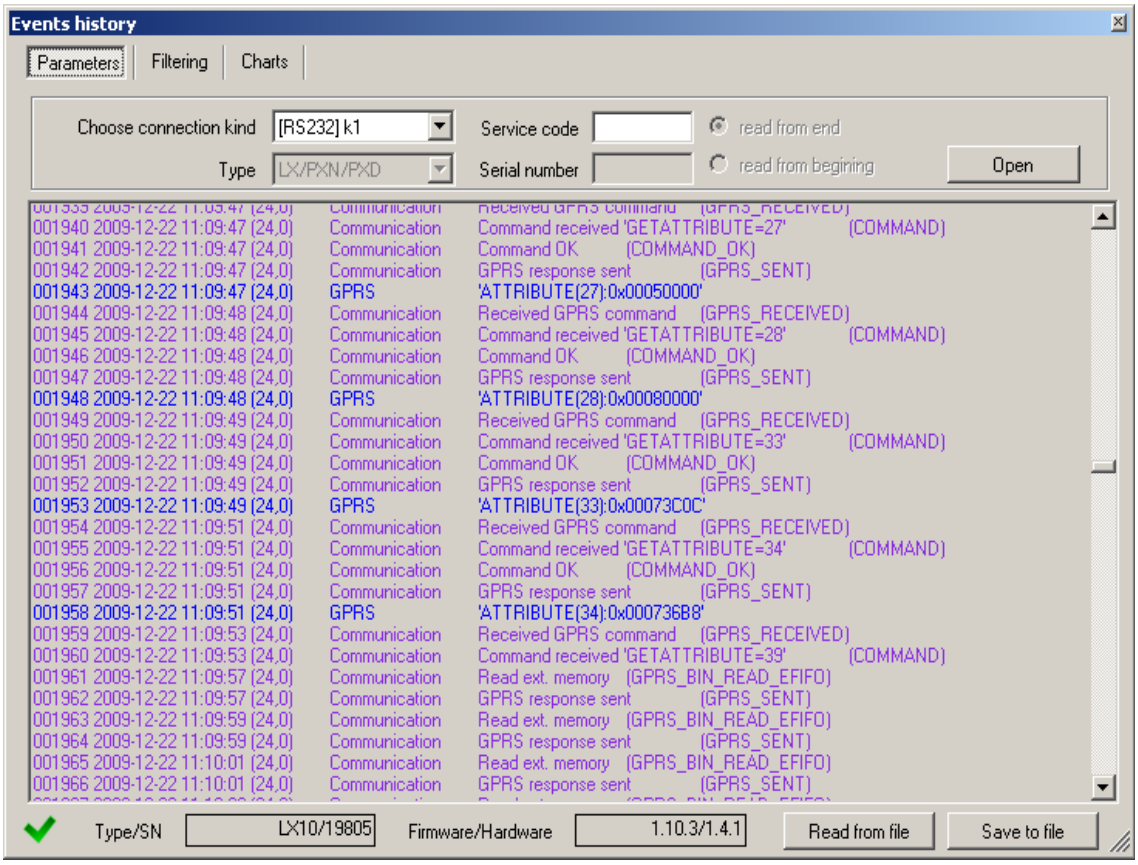


"Device Monitor" provides real-time information about device state. To use this function device must be connected to PC computer with LX-DATA cable (using DEBUG plug). Correct RS232 port must be chosen in "Port" field. "Device monitor" provides following information:

- AC power indication
- Battery power indication
- PSTN line indication
- GSM network signal level indication
- Bit-Error-Rate level measuring
- Inputs and outputs state monitoring
- Type or serial number of device
- Firmware and hardware revision
- Device time

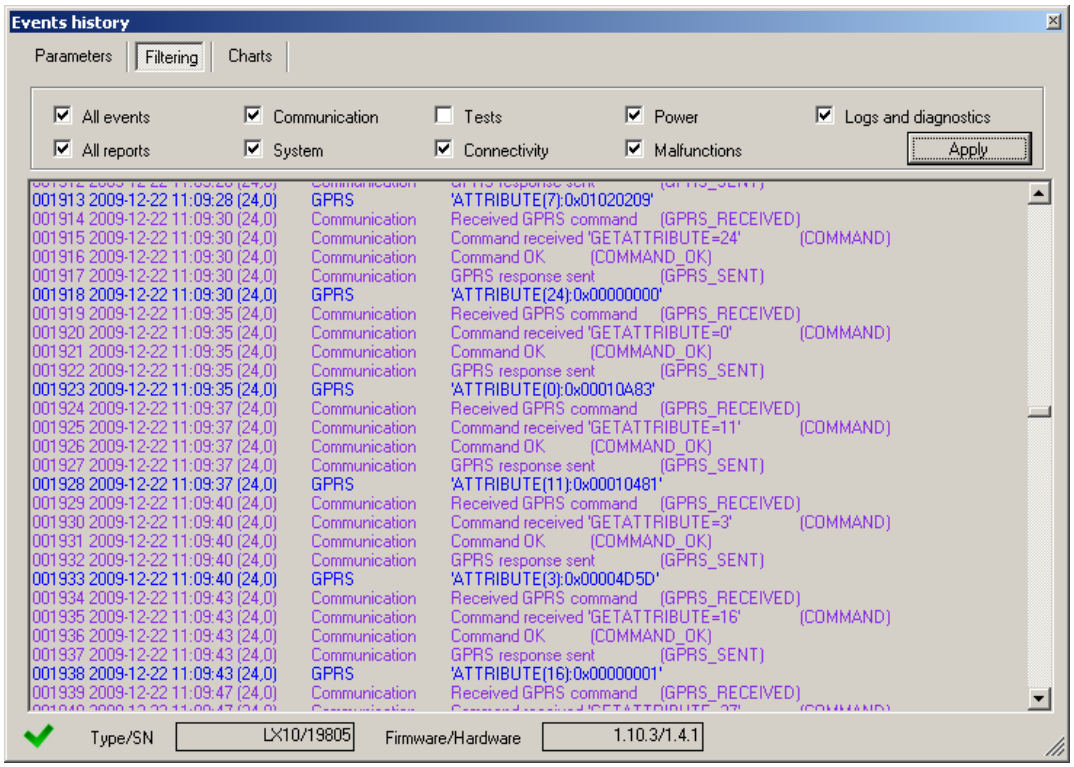
These parameters are also shown in LOG window in text style. All data can be saved to file.

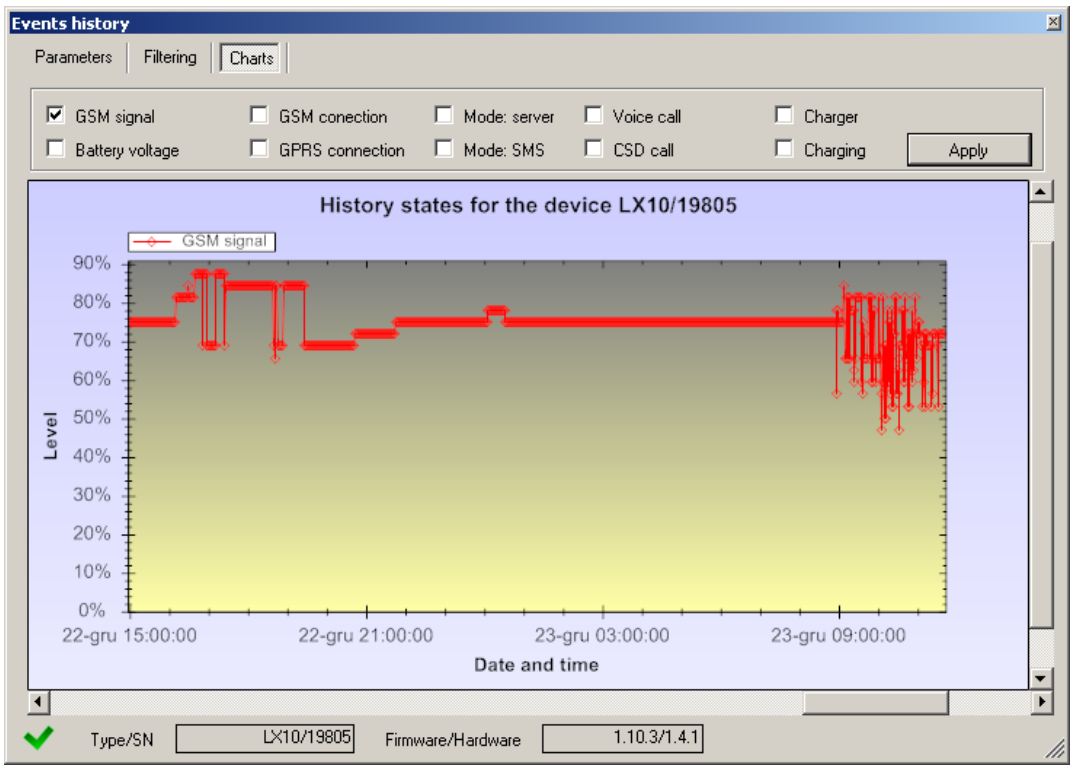
7.12. EVENTS HISTORY



„Events history" provides information about last events stored in LX device memory. LX transmitter is able to save 192kB of data, which is about 8000 events. It is possible to read the history of both using a GPRS connection and RS232. In the second case data can be send to PC only via LX-PROG cable (the white one). Correct RS232 port or GPRS connection must be chosen in "Choose connection kind" field. After providing Service code and clicking "Open" button events data will be downloaded from LX memory. After properly reading access to features such as the "Filtering" and "Charts" becomes possible. Both of them may be used to quickly diagnose the device.

Note: This feature is available for the LX10 devices with serial numbers above 40583, and the LX20 devices with serial numbers above 44309.


Events history
Parameters
Filtering
Charts
All events
Communication
Tests
Power
Logs and diagnostics
All reports
System
Connectivity
Malfunctions
Apply
001913 2009-12-22 11:09:28 (24,0) GPRS 'ATTRIBUTE(7):0x01020209'
001914 2009-12-22 11:09:30 (24,0) Communication Received GPRS command (GPRS_RECEIVED)
001915 2009-12-22 11:09:30 (24,0) Communication Command received 'GETATTRIBUTE=24' (COMMAND)
001916 2009-12-22 11:09:30 (24,0) Communication Command OK (COMMAND_OK)
001917 2009-12-22 11:09:30 (24,0) Communication GPRS response sent (GPRS_SENT)
001918 2009-12-22 11:09:30 (24,0) GPRS 'ATTRIBUTE(24):0x00000000'
001919 2009-12-22 11:09:35 (24,0) Communication Received GPRS command (GPRS_RECEIVED)
001920 2009-12-22 11:09:35 (24,0) Communication Command received 'GETATTRIBUTE=0' (COMMAND)
001921 2009-12-22 11:09:35 (24,0) Communication Command OK (COMMAND_OK)
001922 2009-12-22 11:09:35 (24,0) Communication GPRS response sent (GPRS_SENT)
001923 2009-12-22 11:09:35 (24,0) GPRS 'ATTRIBUTE(0):0x00010A83'
001924 2009-12-22 11:09:37 (24,0) Communication Received GPRS command (GPRS_RECEIVED)
001925 2009-12-22 11:09:37 (24,0) Communication Command received 'GETATTRIBUTE=11' (COMMAND)
001926 2009-12-22 11:09:37 (24,0) Communication Command OK (COMMAND_OK)
001927 2009-12-22 11:09:37 (24,0) Communication GPRS response sent (GPRS_SENT)
001928 2009-12-22 11:09:37 (24,0) GPRS 'ATTRIBUTE(11):0x00010481'
001929 2009-12-22 11:09:40 (24,0) Communication Received GPRS command (GPRS_RECEIVED)
001930 2009-12-22 11:09:40 (24,0) Communication Command received 'GETATTRIBUTE=3' (COMMAND)
001931 2009-12-22 11:09:40 (24,0) Communication Command OK (COMMAND_OK)
001932 2009-12-22 11:09:40 (24,0) Communication GPRS response sent (GPRS_SENT)
001933 2009-12-22 11:09:40 (24,0) GPRS 'ATTRIBUTE(3):0x00004D5D'
001934 2009-12-22 11:09:43 (24,0) Communication Received GPRS command (GPRS_RECEIVED)
001935 2009-12-22 11:09:43 (24,0) Communication Command received 'GETATTRIBUTE=16' (COMMAND)
001936 2009-12-22 11:09:43 (24,0) Communication Command OK (COMMAND_OK)
001937 2009-12-22 11:09:43 (24,0) Communication GPRS response sent (GPRS_SENT)
001938 2009-12-22 11:09:43 (24,0) GPRS 'ATTRIBUTE(16):0x00000001'
001939 2009-12-22 11:09:47 (24,0) Communication Received GPRS command (GPRS_RECEIVED)
Type/SN
LX10/19805
Firmware/Hardware
1.10.3/1.4.1


Events history
Parameters
Filtering
Charts
GSM signal
GSM conection
Mode: server
Voice call
Charger
Battery voltage
GPRS connection
Mode: SMS
CSD call
Charging
Apply
History states for the device LX10/19805
GSM signal
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Level
22-gru 15:00:00
22-gru 21:00:00
23-gru 03:00:00
23-gru 09:00:00
Date and time
Type/SN
LX10/19805
Firmware/Hardware
1.10.3/1.4.1

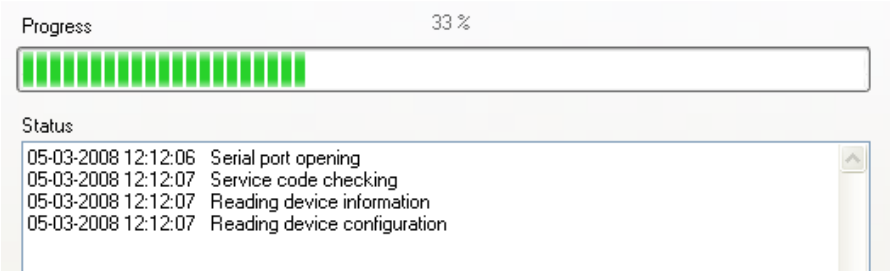
8. DEVICE PROGRAMMING

Programming of device is possible with "GPRS transmitters configurator" configuration program described in chapter 5. To program the device establish connection with a device.
Depending on connection mode there are two ways for programming.

8.1. LOCAL PROGRAMING

To program a device locally follow the procedure:

a) Connect PROG joint (on printed circuit) with COM computer port by way of service wire, defined in option -> RS-232.
b) Connect power supply to terminals **+12V** and **GND**. After connection and detection of programming wire a module shall signal this with LED diodes: a green one shall flash and red one shall flicker.
c) Launch software and define device options (description is in chapter 6 of this Manual). Provide right PIN code for SIM card.
d) Save settings into memory of device. Saving course is displayed in special window.



e) After saving disconnect power supply and disassembly service wire.
f) Insert SIM card. Connect module wiring pursuant to guidelines from chapter 4. Turn power supply on.
g) The device is ready to transmit data.

8.2. REMOTE PROGRAMMING

Remote programming of device is possible if:
➢user uses GPRS transmitter configurator and GSM modem connected to PC
➢user uses OSM.2007 monitoring system receiver.

In first case remote programming is possible on CSD channel and its procedure is analogous to local programming, remembering that "Modem GSM" shall be selected from connection options (See chapter 6.3.5.2-CSD Link).

***Note**: Remote configuration with use of CSD canal is possible only if transmission of CSD data is active both for SIM card inserted in the device, and for SIM card installed in GSM modem.*

In second case according to description in chapter 6.3.5.2 –GPRS Link, it is required to define remote link on grounds of OSM.2007 parameters. As OSM.2007 collects (and transmits) information exclusively from devices saved in data base, the first operation during remote programming is proper registration of the device. This procedure has been described in OSM.2007 Operation Manual.

8.2.1. The first programming of device

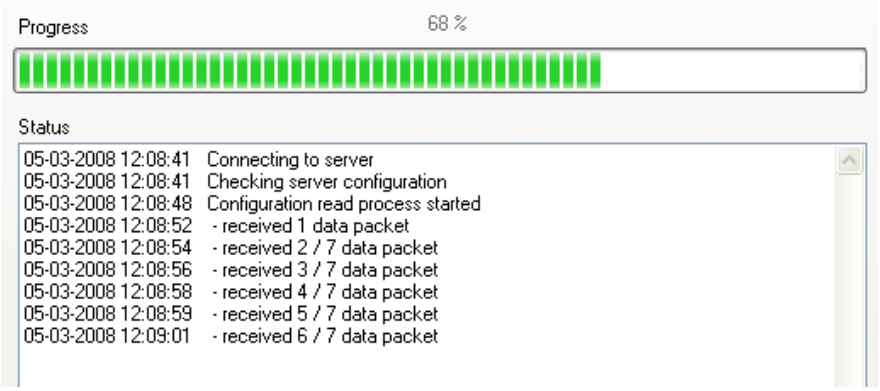
As the device does not have defined access parameters in respect of GPRS network and OSM-2007, programming shall be begun with providing parameters.
Irrespectively of providing these parameters the first operation shall be registration of device in OSM-2007data base.
Before remote programming user shall check that the device is furnished with SIM card (with reservations provided in chapter 7.1.5.3) and is connected to power supply. User shall know serial number of device and phone number for SIM card.

Follow the procedure:

a) With the use of OSM-2007 console position cursor on proper device in "Devices" tab.
b) Click "Config." option and then select "Set Configuration" function to display lit of parameters.
c) Enter server address, server port and APN. Click OK and system shall send to device provided parameters (SMS).
d) Wait till device addresses server (in "Devices" tab it will be marked with green colour).
e) Launch software and define options of device (description is provided in chapter 7 of this Manual).
f) Select "Send" to display a new window and select remote connection (GPRS tab). Save settings in memory of device. Saving course is displayed on special window.
g) After saving completion close configuration wizard.
h) The device is ready to transmit data.

8.2.2. Reprogramming of device

As the device has defined access parameters in respect of GPRS network and OSM-2007, it is possible to program device at any time.
If device is installed in secured object and is furnished with SIM card and connected to power supply follow the procedure:
a) Launch configuration wizard and define options of device (description is provided in chapter 7 of this Manual).
b) Select "Send" to display a new window and select remote connection (GPRS tab). Save settings in memory of device. Saving course is displayed in special window.



c) After saving completion close configuration wizard.
d) The device is ready to transmit data according to new settings.

9. RECEIVING OF SMS MESSAGE

GPRS module receives specially prepared SMS. If received SMS is not correct it will be automatically cancelled and device will not operate any action.

As mentioned above the device may operate in two modes:
- with a new encoded protocol (LX)
- with PX protocol

Depending on operation mode there are varied commands available to control the device.

9.1. LX PROTOCOL

The following format of message is acceptable allowing to send some commends with one SMS (every command shall be separated with SPACE):

SERVICE CODE COMMAND COMMAND .....

Where:

SERVICE CODE - device service code
 - SPACE
COMMAND - order (see the table below)

List of commands:

DISC	Disconnects active TCP connection.
KILL	Reset modem; after execution of command a confirmation is sent.
RESET	Resets device. Note: all unsent events will be lost.
OUT=outNr,state	Turn on or turn off outputs. **outNr** specifies output number (0 for TMP, 1 for AUX), **state** specifies requested output state (0 – switched off, 1 – switched on). Below are allowed combinations: *OUT=0,0* – switches off TMP output *OUT=0,1* – switches on TMP output *OUT=1,0* – switches off AUX output *OUT=1,1* – switches on AUX output
CMD=[timeout],command	Issues AT command to GSM modem and sends response back. Optional **timeout** parameter defines time for modem response. Time determined in seconds and ranges from 1-30 seconds. If **timeout** isn't specified, 3 seconds is assumed.
DESC	Returns device description, serial number (hexadecimal number) and firmware version.
GETSTATUS	Returns device status. Command sends text back according to definition from chapter 7.6.4
GETPARAM=parameter_name	Gets inquired parameter :SERVER, PORT, APN, UN, PW, DNS1, DNS2, SMS, SMSPERIOD
GETCFG	Gets primary communication parameters of device in form: SERVER:PORT,APN UN PW,DNS1
APN=apn	Access point to GPRS network. Parameter should be

	obtained from mobile network operator. If APN address contain space sign put it with "" e.g. "my apn".
UN=un	APN user name. Parameter should be obtained from mobile network operator. If APN user name contain space sign put it with "" e.g. "my user name".
PW=pw	APN password. Parameter should be obtained from mobile network operator. If APN password contain space sign put it with "" e.g. "my password".
SERVER=server	Server address; it can be in form of IP or domain name address.
PORT=port	Server port number.
DNS1=dns1	Specifies primary DNS server address (only needed when domain name address is used as SERVER address)
DNS2=dns2	Specifies secondary DNS server address (only needed when domain name address is used as SERVER address)
SMS=phone_number	Server phone number. When there is GPRS failure, SMS with events will be sent to this number.
SMSPERIOD=time	Defines in minutes time between SMS test messages sending to the server.
OLD	Switch device operating in encoded protocol mode (LX) into operation in PX emulation mode.
RLIMIT	Removes automatic temporary locks on all inputs
RLIMIT=inputs_mask	Removes selected automatic temporary locks. Parameter is decimal number made from 9-bit word: A9 … A2, A1, where A1 means TAMPER, A2 INPUT 1 and A9 INPUT8. EXAMPLE: *RLIMIT=7* removes locks on inputs: TAMPER, IN1, IN2 *RLIMIT=1* remove lock on input TAMPER
FLUSH=2	Flushes events buffer

Note: DESC, CMD, GETSTATUS, GETPARAM, GETCFG commands require separate SMS, so one command with only one SMS.

Samples of commands and device reaction:

Parameters setting:

1111 APN= general.t-mobile.uk SERVER=89.112.43.78 PORT=6670 SMS=500445566 SMSPERIOD=25

Parameters verification:

Inquiry: 1111 GETCFG

Answer: 89.112.43.78:6670,general.t-mobile.uk ,

Inquiry: 1111 GETPARAM=SMS

Answer:: 500445566

9.2. PX PROTOCOL

The following format of message is acceptable allowing to send some commends with one SMS (every command shall be separated with SPACE):

SERVICE CODE COMMAND COMMAND .....

Where:

SERVICE CODE - device service code
 - SPACE
COMMAND - order (see the table below)

List of commands:

NEW	Switch device operating in PX emulation mode into (LX) encoding protocol mode.
STAT	Enquiry regarding actual module condition
VER	Gets device firmware version
TMP1	Switches on TMP output
TMP0	Switches off TMP output
AUX1	Switches on AUX output
AUX0	Switches off AUX output
INT_ON	T (sabotage) input lock
IN1_ON	1 input lock
IN2_ON	2 input lock
IN3_ON	3 input lock
IN4_ON	4 input lock
IN5_ON	5 input lock
IN6_ON	6 input lock
IN7_ON	7 input lock
IN8_ON	8 input lock
INA_ON	All inputs lock (with no impact on sabotage input)
INT_OFF	T (sabotage) input unlock
IN1_OFF	1 input unlock
IN2_OFF	2 input unlock
IN3_OFF	3 input unlock
IN4_OFF	4 input unlock
IN5_OFF	5 input unlock
IN6_OFF	6 input unlock
IN7_OFF	7 input unlock
IN8_OFF	8 input unlock
INA_OFF	All inputs unlock (with no impact on sabotage input)
KILL	GSM modem reset

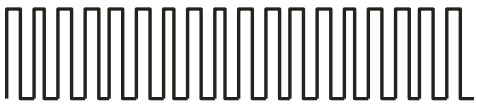
***Note**: IN4,_ON up to IN8_ON and IN4_OFF up to IN8_OFF Commands are available only for LX10 transmitter.*

10. LED DIODES INDICATION

LED diodes (2^{7} or 4^{8}), mounted directly on printed circuit, are purposed to show actual condition of the device.

10.1. LOGGING TO GSM NETWORK

Once SIM card has been inserted into the device and power supply was turned on logging to GSM system follows.

Description	LED Diodes	
	Green	Red
Logging to GSM		

10.2. GSM RANGE

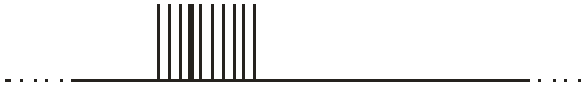
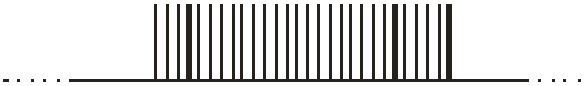
Flickering of a green diode indicates GSM signal (1-8 flickers).
Device operation mode is signalled with a green diode on during 2 seconds once the range was detected. If after signalling range diode will not flash for 2 seconds the device is in SMS mode. Range indication is interrupted during data transmission, and after sending of data again GSM range is being indicated.

Description	LED Diodes	
	Green	Red
GSM range = 8 GPRS mode		
GSM range = 6 SMS mode		

[7] Applies to LX-10 transmitter
[8] Applies to LX-20 transmitter

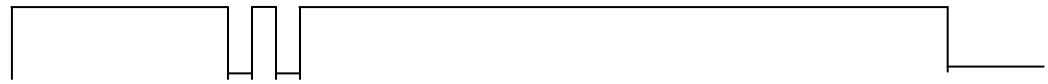
10.3. DATA TRANSMISSION

During data transmission a green diode indicates data transmitting.

Description	LED Diodes	
	Green	Red
GPRS Transmission		
SMS Transmission		

10.4. RECEIVING OF DTMF[9] DATA

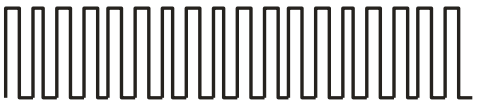
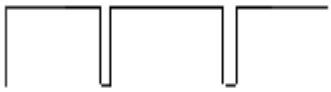
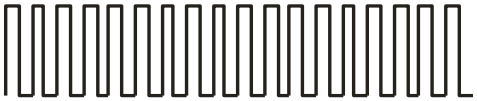
Yellow diodes marked as DTMF and STATUS indicate actual condition during receiving data from a control panel.

LED Diode	Signalling
STATUS	
DTMF	(HandShake) (KissOff)  6 digits of phone 16 digits ContactID

[9] Applies to LX-20 transmitter

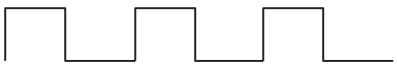
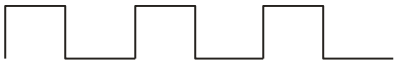
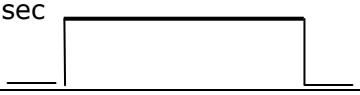
10.5. PROGRAMMING

After detection of programming wire diodes indicate programming.

Description	LED Diodes	
	Green	Red
Connected Service wire		
Programming in CSD mode		

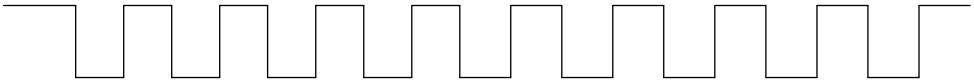
10.6. FIRMWARE UPDATING

During programming bootloader operating is indicated. If error follows during updating there is bootloader in device and another programming of device is possible.

Description	LED Diodes	
	Green	Red
No program in device	 (1/sec)	
Software updating		
Received firmware decoding	10 sec 	

10.7. SIM CARD ERROR

In case of SIM card problems, device states this with OK and ERROR LEDs.

LED diode	Signalling
OK (green)	
ERROR (red)	

10.8. SYSTEM ERROR

During operating errors may follow. Any error is indicated by constant flashing of a red diode and mostly it means communication problem with modem or SIM card.

11. CHANGELOG

Date / Version	***Description***
27.03.2009 / 1.1	Added device monitor; Updated list of commands
17.04.2009 / 1.2	Firmware update and GPRS configurator update
05.02.2010 / 1.3	SMS user tests added, Events History
06.06.2011 / 1.4	Added description of LX20S
11.10.2013 / 1.5	Added a function allowing a disconnection of external phone line when a connection to the server is established
21.10.2015 / 1.6	Added information about working temperature, humidity and manufacturer
29.09.2016 / 1.7	Description "Detect off-hook after" added.