



GPRS TRANSMITTER EPX400

Installation and programming manual

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OSM server version: 1.3.68.2

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1. INTRODUCTION

EPX400 Transmitter is a modern, microprocessor device for data transmission in real time, capable of simulating a telephone line (PSTN). In case of telephone line failure or by selecting the appropriate prefix, the device is able to perform a connection to the monitoring station, allowing you to transfer data from the control panel via Contact ID (DTMF) or SIA (FSK) protocol.

EPX400 Transmitter provides the highest security of data transmission through up to five channels of transmission: ETHERNET, GPRS, SMS, PSTN.

The primary purpose is to use the device as a security systems transmission module in ETHERNET, GPRS and PSTN. The transmitter works with all most popular alarm systems. Ethernet connection and packet data transmission (GPRS), can reduce the operating cost of the alarm systems. This device provides an opportunity to send text messages to private mobile phones.

An advanced encoding methods like a 256 bits encoding key and AES (Advanced Encryption Standard) provides for security of data transmission. As a result reception of this transmission is possible with OSM.Server 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.

EPX400 transmitter depending on model can be equipped with 2G or 3G modem.

Programming of receiver is possible:

- Locally: - with computer and "GPRS Transmitters Configurator" software
- with computer and web browser via Ethernet connection
- Remotely : - via GPRS connection (or SMS)
- via SMS commands
- via transmission on CSD channel

2. FUNCTIONAL AND TECHNICAL PARAMETERS

Transmission channels *transparent, PSTN dialer required in a CP	ETH, GPRS, SMS, PSTN*	
Backup server	YES (GPRS, SMS, ETH)	
User notifications	SMS (5 phone numbers)	
Communication watchdog	YES	
Inputs	9 (NO/NC/EOL-NO/EOL-NC/DEOL-NO/DEOL-NC)	
Partitions	2	
Simulated PSTN Line	YES	
Protocols supported on the phone input	SIA, ContactID	
Control panel dialer bypass	NO (optional)	
Voice gateway functions	NO (optional)	
Outputs	2 (OC, max. load 100mA)	
	1 relay output (NO/NC, max. load 1A/30VDC or 0,5A/125VAC)	
Output functions	<ul style="list-style-type: none"> - unavailable GSM signal or ETH channel - GSM jamming (only for BGS2-W module) - from server or through SMS - incoming CLIP - in reaction on events and inputs 	
RC Receiver: 434 MHz	NO (optional)	
Max.number supported keyfobs	-	
Power output +12V	YES (max. load 200mA)	
Serial interface	RS232 / RS485 (lines: RxD, TxD, RTS, CTS) transmission speed up to 115200bps	
Alarm events buffer size	-	
Quantity of system events stored in history	min. 5000	
Event's timestamps	-	
GPRS/SMS transmission security	AES encryption	
Status LEDs (functions)	4 LEDs (GSM signal level, device state, DTMF communication)	
Configuration	Remote: GPRS, SMS, CSD, ETHERNET cable via Web Browser	
	Local: PC through RS232 (required cable: GD-PROG or SP-PROG)	
Remote firmware update	YES	
Remote access to the control panels	NO (optional)	
Phone line protection circuit	NO (optional)	
Dual SIM	NO (optional)	
Multiantenna steering output	NO (optional)	
Supported modems	model EPX400-50: Cinterion BGS2-W (Quad-Band GSM: 850, 900, 1800, 1900 MHz)	
	model EPX400-60: Cinterion EHS6 (Five Bands UMTS: 800, 850, 900, 1900, 2100 MHz; Quad-Band GSM: 850, 900, 1800, 1900 MHz)	
Ethernet	<ul style="list-style-type: none"> - 10BaseT/100Base-TX IEEE 802.3 compliant - speed and duplex auto-negotiation - auto-detection of correct cable connections (cross/straight) 	
Power supply parameters - PCB	Voltage supply	18V _{AC} (acceptable: 16-20V _{AC})
	Power consumption DC (AKU) (average / max)	100mA/170mA@13,8VDC* * Measured with full charged battery, modem BGS2-W Cinterion 120mA/205mA@13,8VDC* * Measured with full charged battery, modem EHS6-A Cinterion
	Power consumption AC (AC) (average / max)	125mA/185mA@18VAC* * Measured with full charged battery, modem BGS2-W Cinterion 156mA/235mA@18VAC* * Measured with full charged battery, modem EHS6-A Cinterion
Power supply parameters - PCB in EBS plastic casing	Voltage supply	230V _{AC} (acceptable: 190-250V _{AC})
	Power consumption (average / max)	3W/13W@230V _{AC} (recommended transformer 20W)

Charging module functions	<ul style="list-style-type: none"> - protection against reverse battery connection - AC failure signalization - low battery/no battery signalization - protection against short circuit battery output - polymer fuse
Backup battery connection	YES, lead-acid 12V
Battery charging current	max. 220mA
Threshold of signaling low AC voltage (at secondary / at primary)	13.5V _{AC} / 160V _{AC} (with EBS transformer)
Threshold of signaling low battery voltage	11V _{DC}
Cut-off battery voltage level	-
Dimension	PCB: 159 x 73 x 35mm
Working temperature	-10°C ... +55°C
Working humidity	5% ... 93%
Standards	<ul style="list-style-type: none"> - CE - according with EN 50136-1-1 Grade 3 ATS Class 5

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.

Length of the wires connecting between the transmitter and control panel must not exceed 3 m.

3.1. EPX400 TRANSMITTER

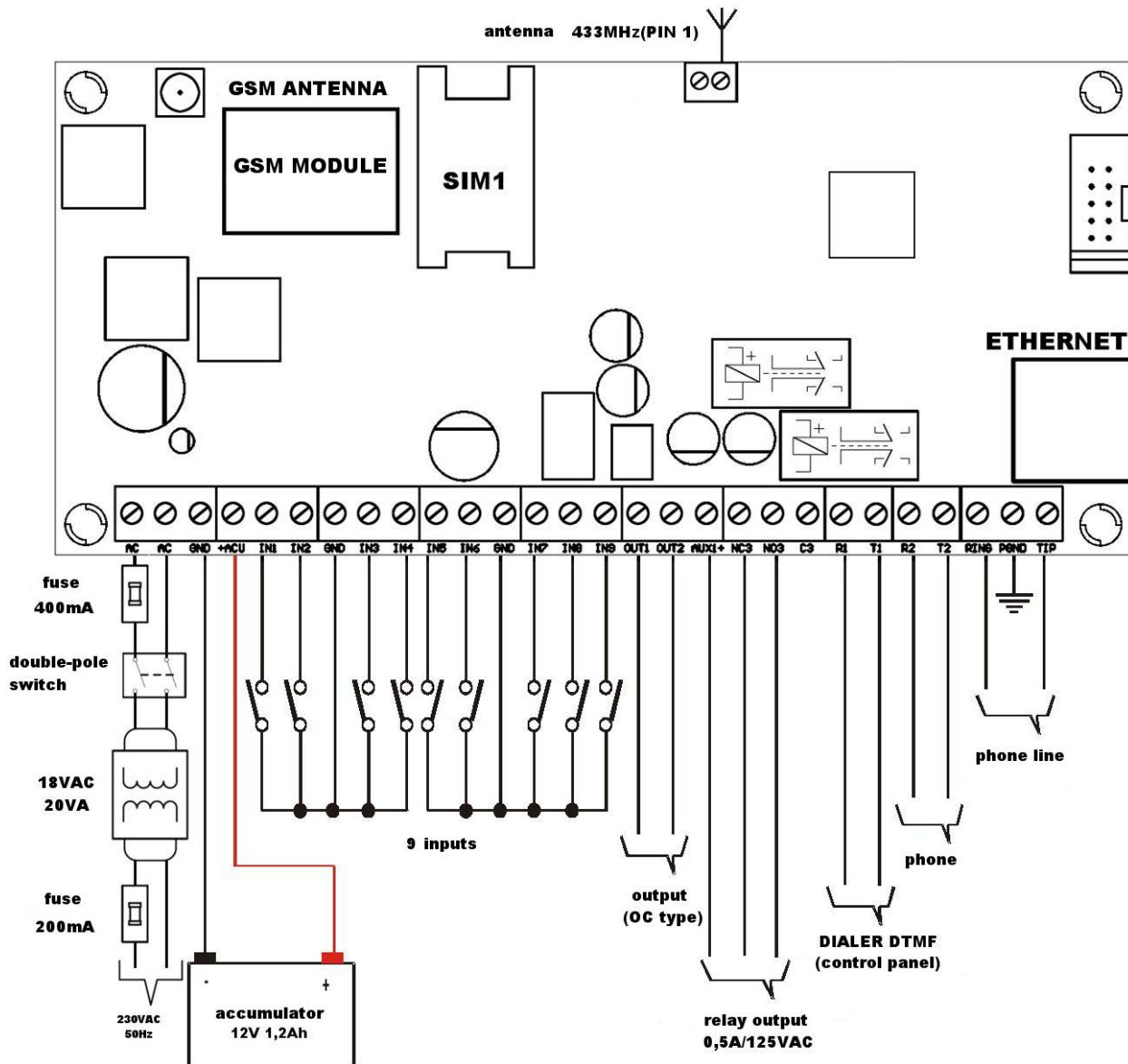


Figure 1. Connecting the EPX400 transmitter

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. For safety reasons, on AC supply lines must be mounted fuse 400mA/250VAC and double

pole switch that provides the ability to quickly disconnect the external power supply from the transmitter.

According to the figure 1 terminals of transmitter shall be connected to:

Terminal	Connection description
AC, AC	Two terminals for AC power supply (output from AC transformer)
GND	Device ground, common for other input and output
+ACU	Positive terminal of the battery
IN1 – IN9	Signal inputs. Possible connection of detectors contacts or alarm control panel outputs. GND terminal is common for all inputs.
OUT1, OUT2	Type OC outputs. It may control external device. Provides ground during activation.
NC3, NO3, C3	Additional output relay. It may control external device. During activation disconnects C terminal from NC, and connects C to NO terminal.
AUX1+	Supply voltage output. Provides up to 100mA.
R1, T1	Connection to alarm control panel phone communicator
R2, T2	Connection to the phone
RING, TIP	Terminals for a PSTN telephone
PGND	Ground line for protecting an external phone line
GSM	Connector for external GSM antenna

NOTES:

OUT1 and OUT2 outputs can sink up to 100mA. Don't short this outputs to power supply because it can cause permanent damage of the output.

Don't connect power supply when GSM antenna isn't connected, because it can cause permanent damage of GSM/GPRS modem.

After careful connections examination a battery may be connected (to +ACU and GND terminals) and then power may be switched on for transformer and programming procedure of transmitter may begin (See chapter 7.).

3.2. PCB VERSION

The customer may choose to purchase only PCB version of transmitter. In this case, is required to connect the appropriate power to the AC connectors.

NOTE !

MANUFACTURER RESERVES THE RIGHT TO AMEND APPEARANCE OF PRINTED CIRCUIT WITH NO EFFECT ON FUNCTIONALITY OF DEVICE.

3.3. INPUT CONFIGURATION

Inputs IN1 – IN9 might work as normally closed (NC) or normally open (NO). Additionally inputs might be configured as end of line (EOL-NO or EOL-NC) with resistors 2.2kΩ or as double end of line (DEOL-NO or DEOL-NC) with resistor 1.1kΩ. Examples of connecting sensors to the inputs in various configurations are shown in figure 2.

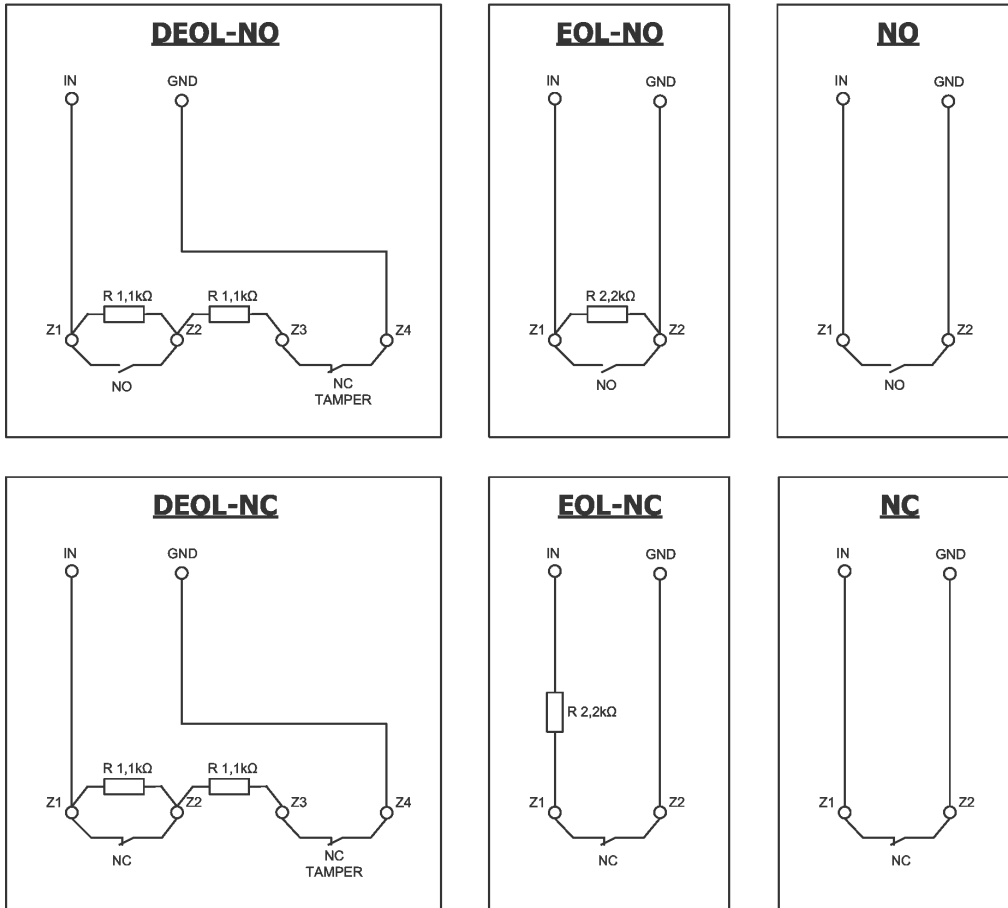


Figure 2. Configuration of input lines

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.Server server. 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 computer keyboard and programming cable).

Two phases comprise programming in this option:

- a) sending to transmitter of main parameters (with SMS) that enable GPRS connection to communication server (OSM.Server system).
- b) full configuration of device with remote programming (GPRS transmitters configurator and OSM.Server).

Quick start procedure:

- a) insert into device SIM card with PIN code 1111 or without PIN code.
- b) connect power supply for module,
- c) send to SIM card number with SMS parameters related to connection of device to communication server (OSM.Server)
- d) waiting for moment, when device indicates connection to server

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

- e) complete, remote programming with GPRS transmitters 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 to set the parameters of the GPRS connection 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

EPX400 device is able to transmit data via channel over GSM network, via GPRS, via SMS messages and via Ethernet.

Communication mode is configurable – see chapter 8. Programmable parameters for more information. As a result the transmitter may be used only at the territory covered with mobile phone operator network or with wired Ethernet network.

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

In case of voice channel communication mode there is possibility to choose 2 signalling formats: ContactID or SIA.

Note:

Each input (IN1 – IN9) may be individually defined as normally open (NO) or normally closed (NC). It means that when input was defined as NO, input shorting will be an active state, and when input was defined as NC, input opening will be an active state. EOL and DEOL (parametrized and double parametrized) are options where you use 1 or 2 resistors to distinguish alarm from sabotage.

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 messages 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.

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. PRE-CONFIGURATION VIA ETHERNET PORT

To enable the EPX400 to communicate properly, you need to provide basic server connection parameters. The simplest way to do this is via the built-in web server WWW.

To access the server, connect the EPX400 using an Ethernet cable to a PC that has an RJ-45 Ethernet port and a web browser.

The device is equipped with Auto MDI-MDIX function – supports straight-through and crossover cable. Connection does not require network switch.

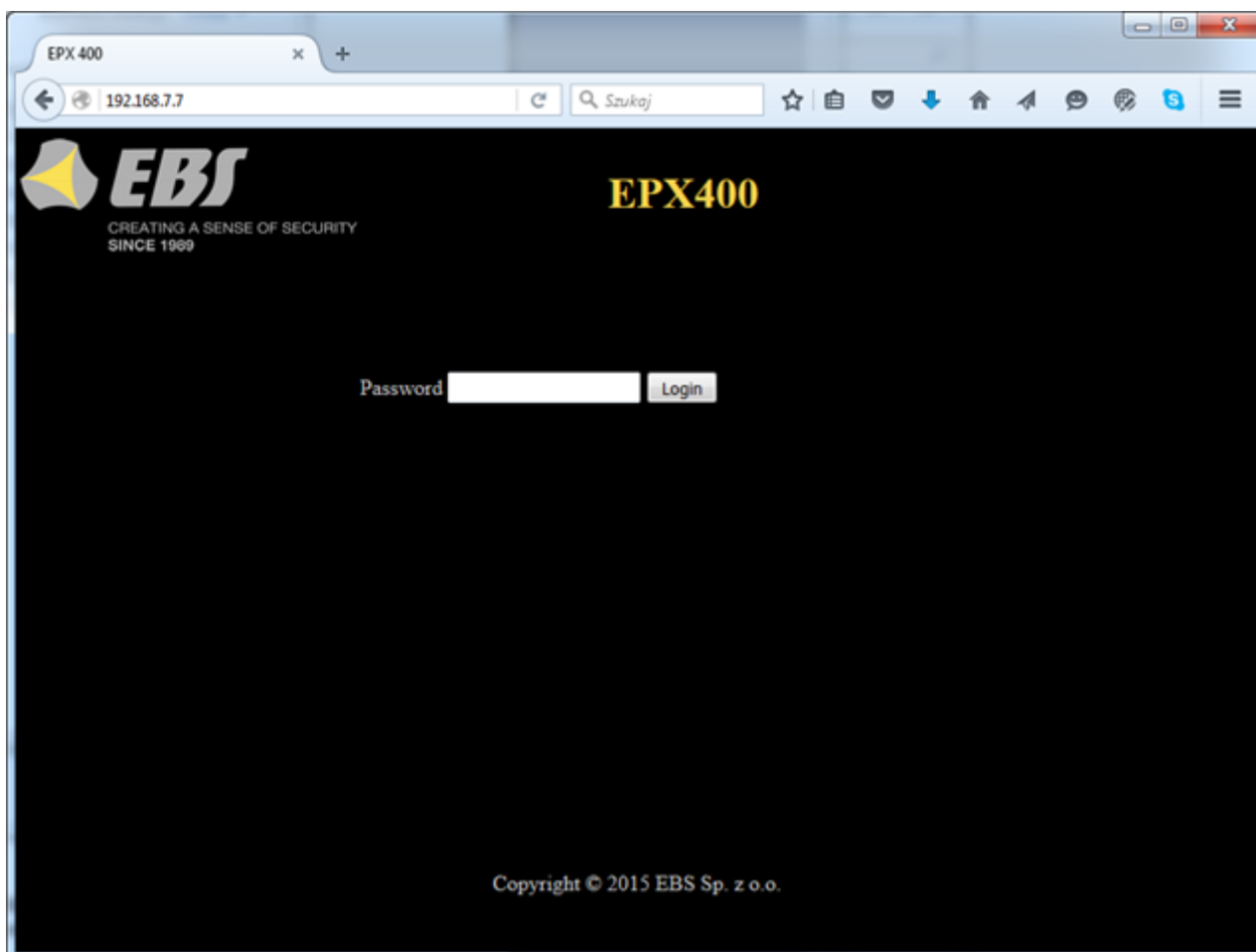
The default settings of the device is IP=192.168.7.7 , mask = 255.255.255.0 and the following description applies to such settings.

6.1. LOGGING IN

You must configure the Ethernet interface to which the device is connected, you need to manually set the appropriate IP address for example. 192.168.7.42 (Control Panel \ Network and Internet \ Network and Sharing Center -> Connections-> Properties-> Internet Protocol Version 4 (TCP / IPv4) -> Properties - for Windows 10) and the mask of 255.255.255.0. In the Web browser, enter the device address <http://192.168.7.7>

There will appear the home page described below. Service code is the password.

NOTE: The address of the EPX400 network and the computer to which the device is connected should be the same, and the IP addresses should be different.



6.2. DESCRIPTION

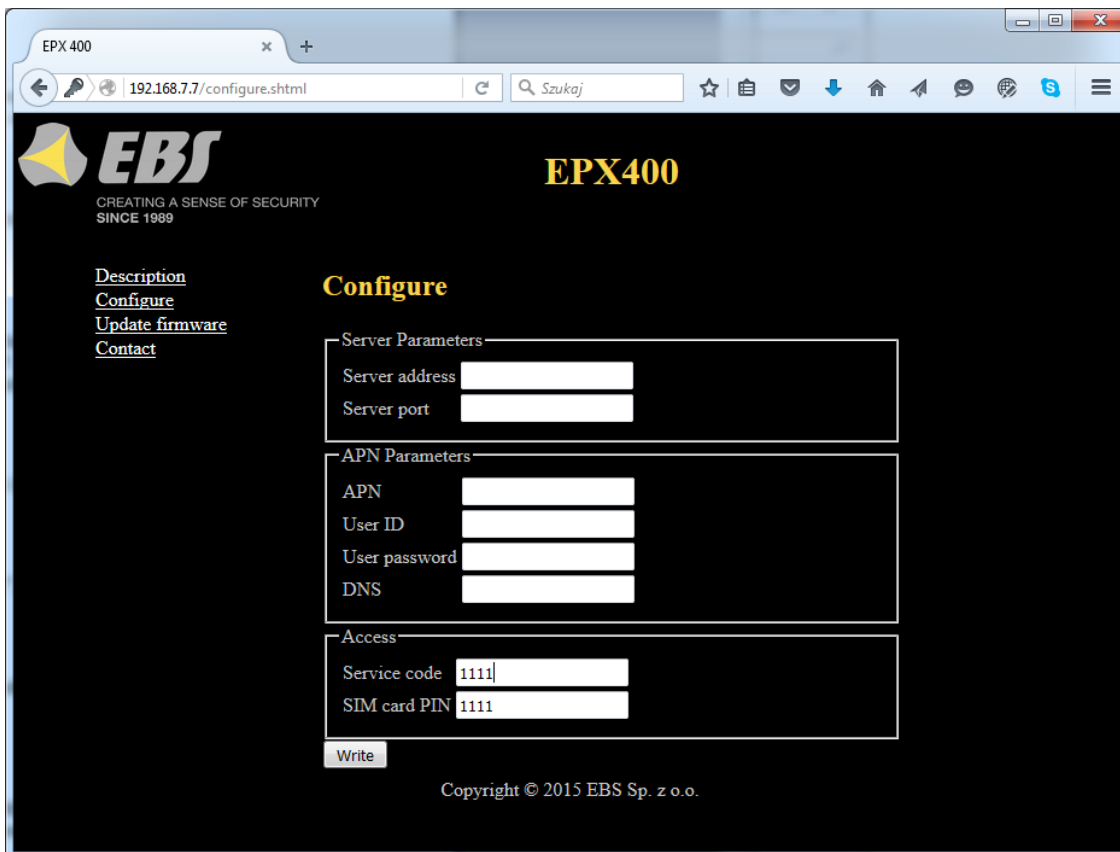
“Description” item.

Displays information about the type of device and its serial number.



6.3. CONFIGURATION

“Configure” item.



6.3.1. Server parameters

In this section we define the server parameters in the monitoring station.

6.3.1.1. Server address

This is the IP address of the monitoring system receiver (OSM.Server), e.g. "89.123.115.8". The address can be specified as a domain name of the server, e.g. "module.gprs.com".

For domain name addresses, a DNS sever address is also required.

6.3.1.2. Server port

Specifies the server port assigned to receive data from the transmitter.

6.3.2. APN parameters

In this section we define the APN parameters needed for GPRS connection.

6.3.2.1. APN

In "APN" field you can enter the APN name. This parameter depends on the GSM network provider whose services you are going to use. It specifies the name of the access point to the GPRS network. It is possible to use a private access point. In this case, the name of the access point will be provided by your GSM network provider. This is usually not required with public APNs.

6.3.2.2. User ID

In this field you can enter the user name required to connect to the GPRS network. This is usually not required with public APNs. If you have a private APN, you should ask your provider for this parameter.

Note: Using a private APN increases the security of the system.

6.3.2.3. User password

In this field you can enter the user password required to connect to the GPRS network. This is usually not required with public APNs. If you have a private APN, you should ask your provider for this parameter.

Note: Using a private APN increases the security of the system.

6.3.2.4. DNS

Identifies the address of the primary DNS server (Domain Name System). If you provided the server's address as a domain, at least one DNS address must be specified.

6.3.3. Access Parameters

In this section we define the parameters of access to the device.

6.3.3.1. Service code

Protects the device against unauthorized access. It is used during the device programming process and for remote control of the device (in TCP/IP or SMS mode). The code is factory set to **1111**. You should change this code at the first programming the device. It may contain up to seven alphanumeric characters.

6.3.3.2. SIM card PIN

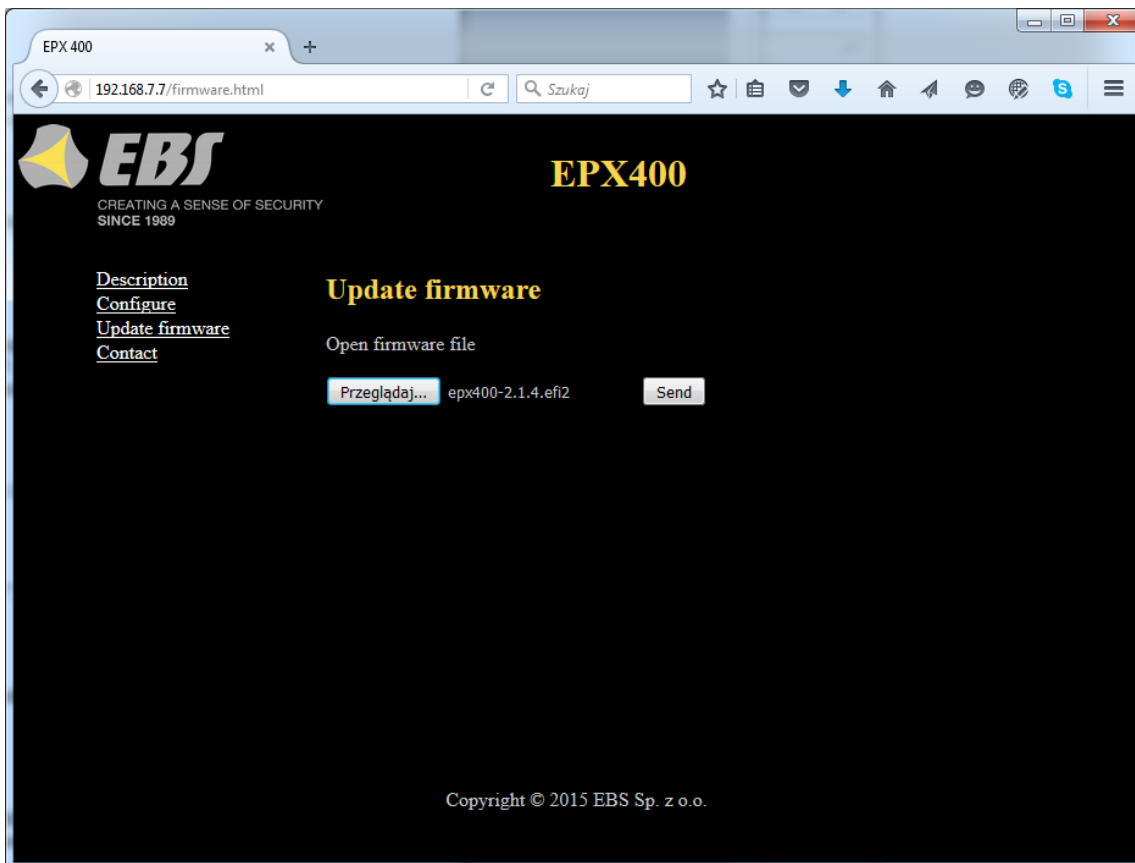
As the device works in a GSM network, you need a SIM card from a mobile telephone network provider. Before first use, you need to enter the PIN code of the SIM card that will be used with the particular transmitter. This is required for automatic system start-up. If you have a SIM card without PIN code protection, you can enter any value, e.g. 0000.

If the PIN you enter is incorrect, SIM card may be blocked after you insert the card and power on the transmitter. To unblock the SIM card you will need to enter the PUK code (using any GSM phone) before you can use the card again.

Factory PIN number in EPX400 is set to 1111.

6.4. UPDATE FIRMWARE

The device features a firmware update mechanism.



To flash new firmware, follow these steps:

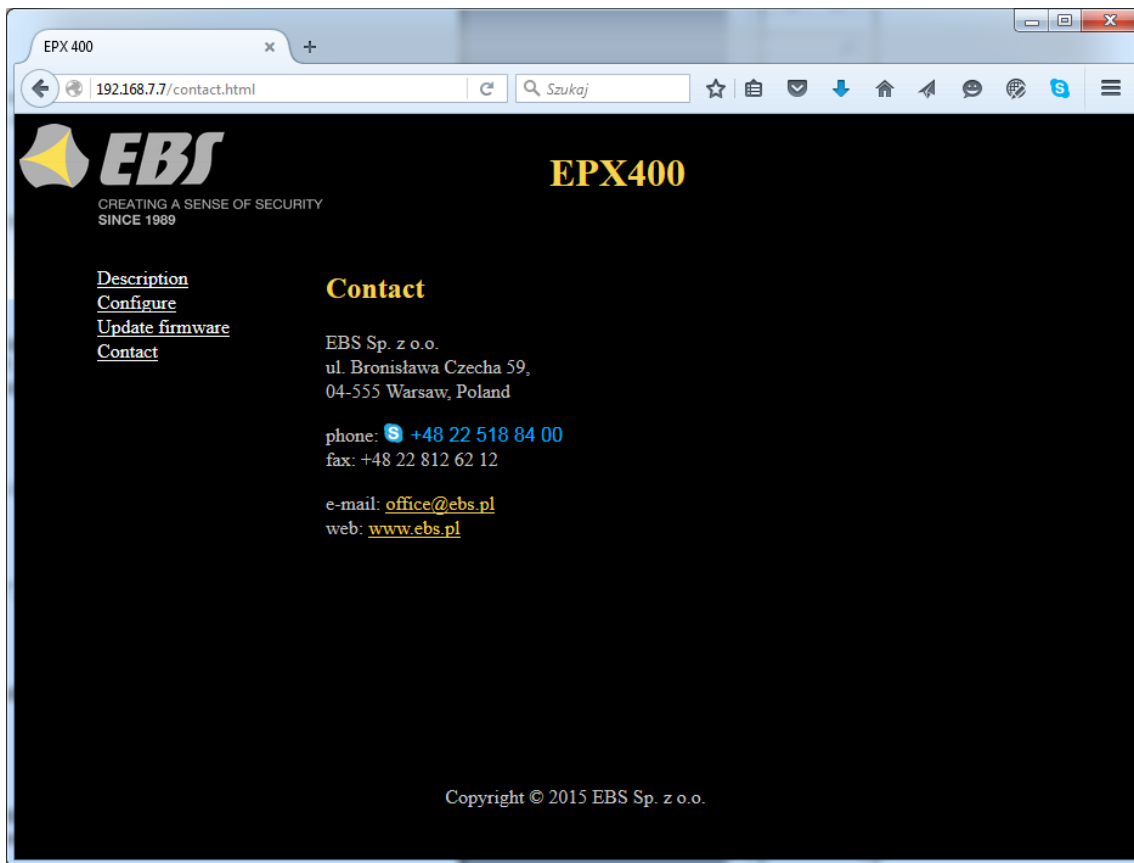
- a) Open the file with the new firmware (click [Browse] to locate the file, which should have the extension ".efi2", e.g. *epx400-2.1.7.efi2*).
- b) Click [Send]. The firmware update process will start.
- c) After the process is complete, you will see the update status
 - success: "The firmware has been updated successfully."
 - error: "This operation has been cancelled."

To activate the new firmware, power on the device again or restart it.

Note: this procedure should be performed with the utmost care, as any error, especially due to loss of power supply during the update, can result in improper operation of the device.

6.5. CONTACT

"Contact" item – displays the manufacturer's contact details.



7. CONFIGURATION PROGRAM

7.1. INITIAL REMARKS

“GPRS transmitters configurator” software may be downloaded from <http://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 before card inserting, PIN code shall be changed with mobile phone. Default PIN code in transmitter is 1111.

7.2. COMPUTER – REQUIREMENTS

Minimum requirements for computer system where configuration software (Configurator from 1.3.69.022 version) is to be installed are the following:

Hardware:

- Processor 1GHz or faster,
- 1 GB RAM,
- 4GB HDD,

Software:

- Operating system: Windows 7 or newer,
- .NET Framework 4,5 software

7.3. PROGRAM FUNCTIONS

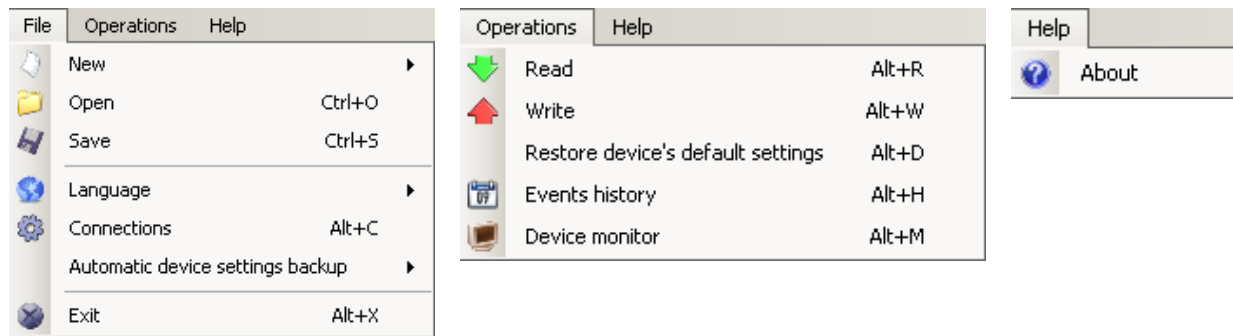
After installation and program starting a main view shall be displayed on screen. Thanks to this view an access to program or programmable parameters of device is possible.(See chapter 8.).

Main window of program is divided into some fields.

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



Main menu contents:

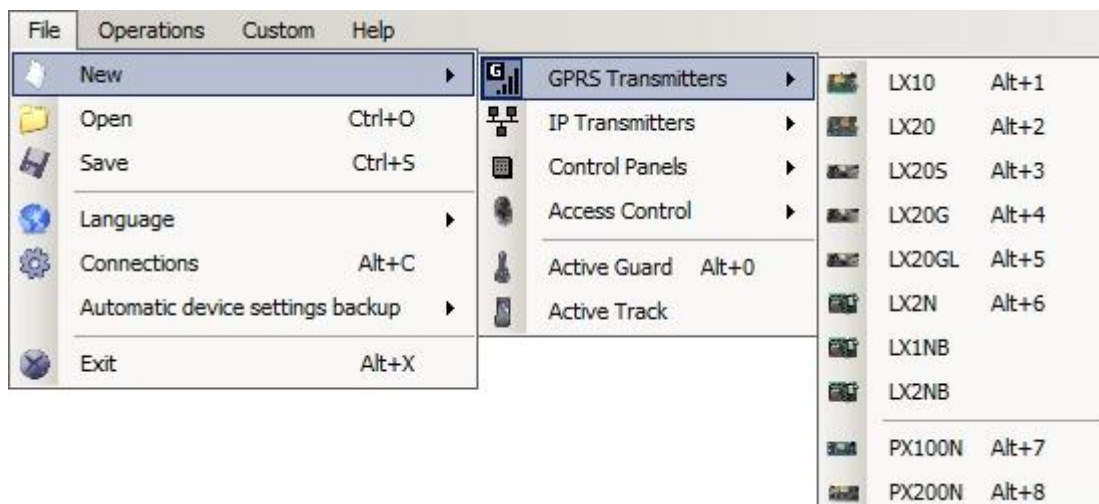


Main menu is available as icons on fast access bar:



7.3.1. File -> New

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



Select type of device – EPX400.

7.3.2. File -> Open

If file contains saved settings, they may be used to program next device. Firstly a folder 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.

7.3.3. 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 under any name and it may be loaded later. 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.

7.3.4. File -> Language

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

7.3.5. File -> Connections


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

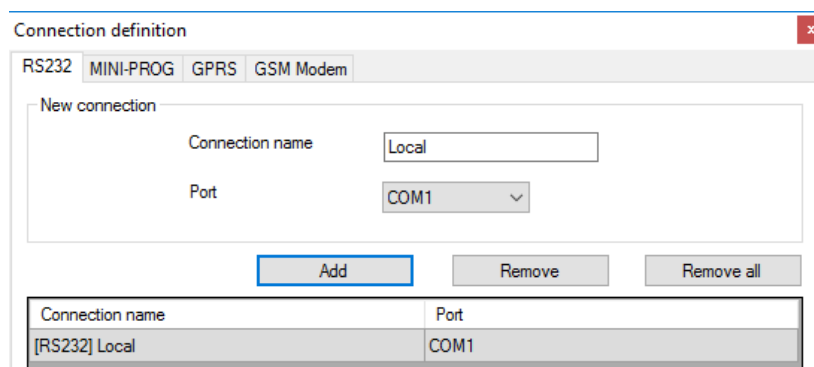
- locally
- remotely.

7.3.5.1. Local connection

Local connection means that configuration software (or, in fact, a computer, on which it is installed) is directly connected to proper terminal of transmitter via special wire and through RS-232 serial port (GD-PROG) or USB port or Bluetooth (MINI-PROG-BT, SP-PROG-BT). All channel connection (also USB and Bluetooth) "open" virtual COM serial ports used in communication control panel-Configurator.

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.

For the above purpose you shall use the following window, available after activating File option from the Main Menu and selecting Connection function or after clicking  icon on a taskbar and opening RS232 tab.



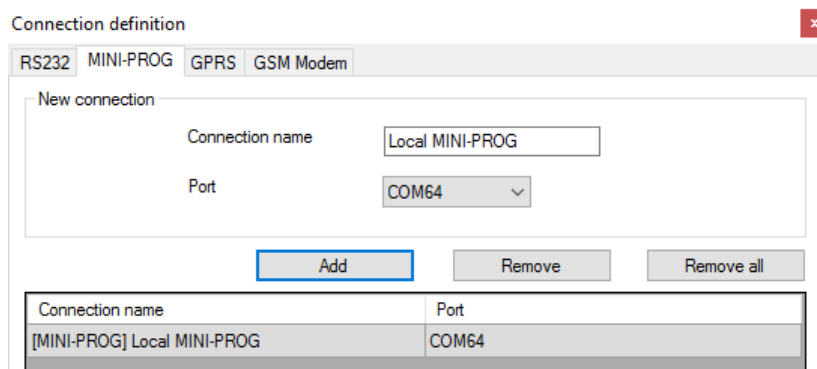
Define:

Name of connection e.g. Local

Choose serial port e.g. COM 1

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 memory will be possible.

In the next tab "MINI-PROG" (the name derived from the programmer) you have to also define the connection parameters.




Operations are the same as with the "RS232" tab. Specify the name, the correct COM port and add a connection.

Programmers MINI-PROG-BT and SP-PROG-BT have microUSB ports, through which we can connect to the computer using the USB port, but also have built-in Bluetooth interface.

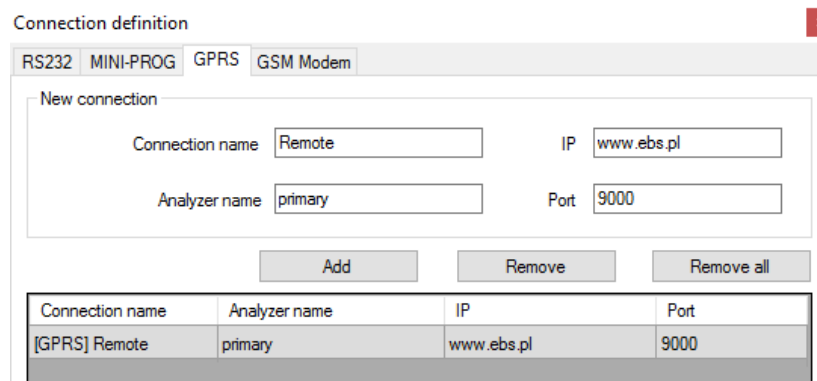
7.3.5.2. Remote connection

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 linking

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.: **www.ebs.pl**
- Enter port on which analyzer operates e.g. **9000**

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 memory shall be possible.

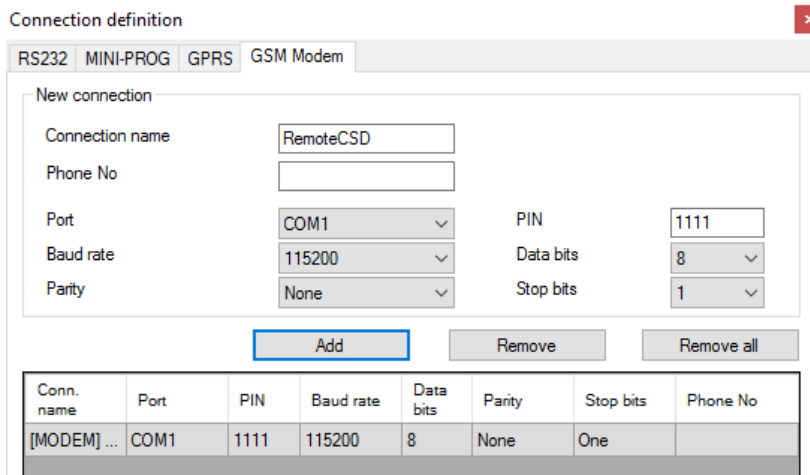
Notice: The following parameters: analyzer name, analyze address, port relate to settings of OSM.Server receiver of monitoring system. Remote programming is available only if above mentioned device (or software) is used.

CSD connection

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 transmitter memory is possible.

Note: Remote configuration with CSD canal 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. Beside, transmitter must enable to pick up data calls (see 8.5.1.2. *GSM modems authorized phones*).

Programming with CSD is also possible if OSM.Server 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.Server Operation Manual – chapter 3.1.3.1. *Settings* and chapter 3.1.3.2. *Adding and modifyng devices*) it is possible to use link via OSM. It is possible if device is not connected to the OSM.Server 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.

7.3.6. 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\EPX400_20000

Folder "EPX400_20000" contains all files associated with programming of the EPX400 with factory number 20000. The name contains date and time of operation and its type (saving/reading). Files have **.cmi** extension.

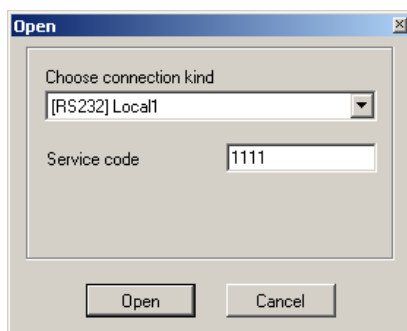
7.3.7. File -> Exit

Finishes program operation.

7.3.8. 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 7.3.3.) 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:

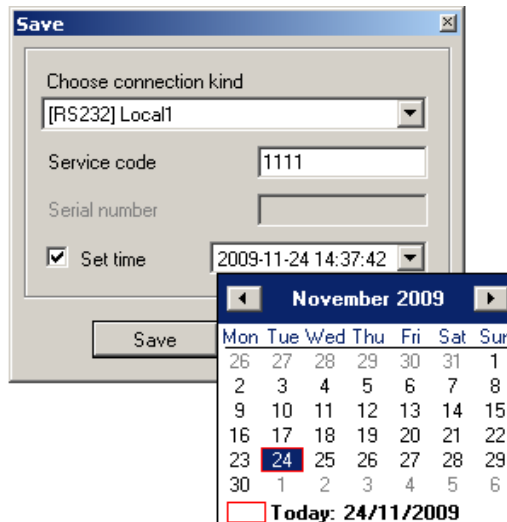
Connection kind – serial port to which module is connected

Access code – service code of transmitter

Detailed description of connections configuration is included in clause 7.3.5.

7.3.9. Operations -> Send

This function is analogical to the above one, at the same time it enables data saving into EEPROM module. Correct saving is confirmed with message on a screen.



7.3.10. Operation -> Device monitor

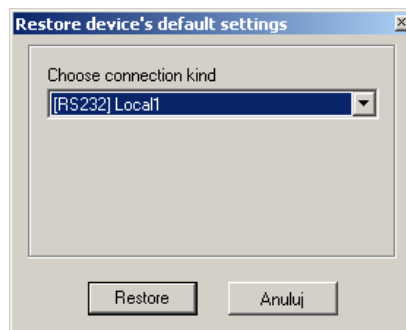
Function provides real-time information on device state. See chapter 8.11. *Device monitor*.

7.3.11. Operation -> System events history

Function provides information about last events stored in EPX400 device memory. See chapter 8.12. *Events history*.

7.3.12. Operation -> 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". e "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.

7.3.13. Help -> About program

Select this information to view additional information about program.

8. PROGRAMMABLE PARAMETERS

Parameters available in configuration program are divided into groups: Access, Transmission, Inputs/Outputs, Monitoring, Restrictions, SMS Notifications, RS232, Link control, Phone line and Firmware. Every from these groups will be described in detail in next part of this manual.

8.1. ACCESS

8.1.1. Transmitter

The screenshot shows the 'GPRS transmitters configurator' application window. The 'Access' group is selected in the sidebar. The main configuration area for the 'Transmitter' tab is visible, showing the following parameters:

Parameter	Value
Service Code	1111
Installer code	2222
SIM Card PIN	1111

The 'Embedded HTTP server' checkbox is checked. The status bar at the bottom indicates the device type is EPX400 and shows the time as 13:31:16.

This tab contains parameters for access to the transmitter and SIM cards.

8.1.1.1. Group: Access

Service Code

It provides security against unauthorized access. It is being used during programming of device and during remote controlling (in TCP/IP or SMS mode). 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.

Installer code

Allows restricted access to the parameters of device. When installer code is used following groups of parameters are unavailable: Access, Transmission, Restrictions,

SMS notifications, RS232, Link control, and Phone line. An unauthorized attempt to access to this parameters causes error notification.
Default installer code: **2222**.

8.1.1.2. Group: SIM Cards

SIM Card PIN

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).

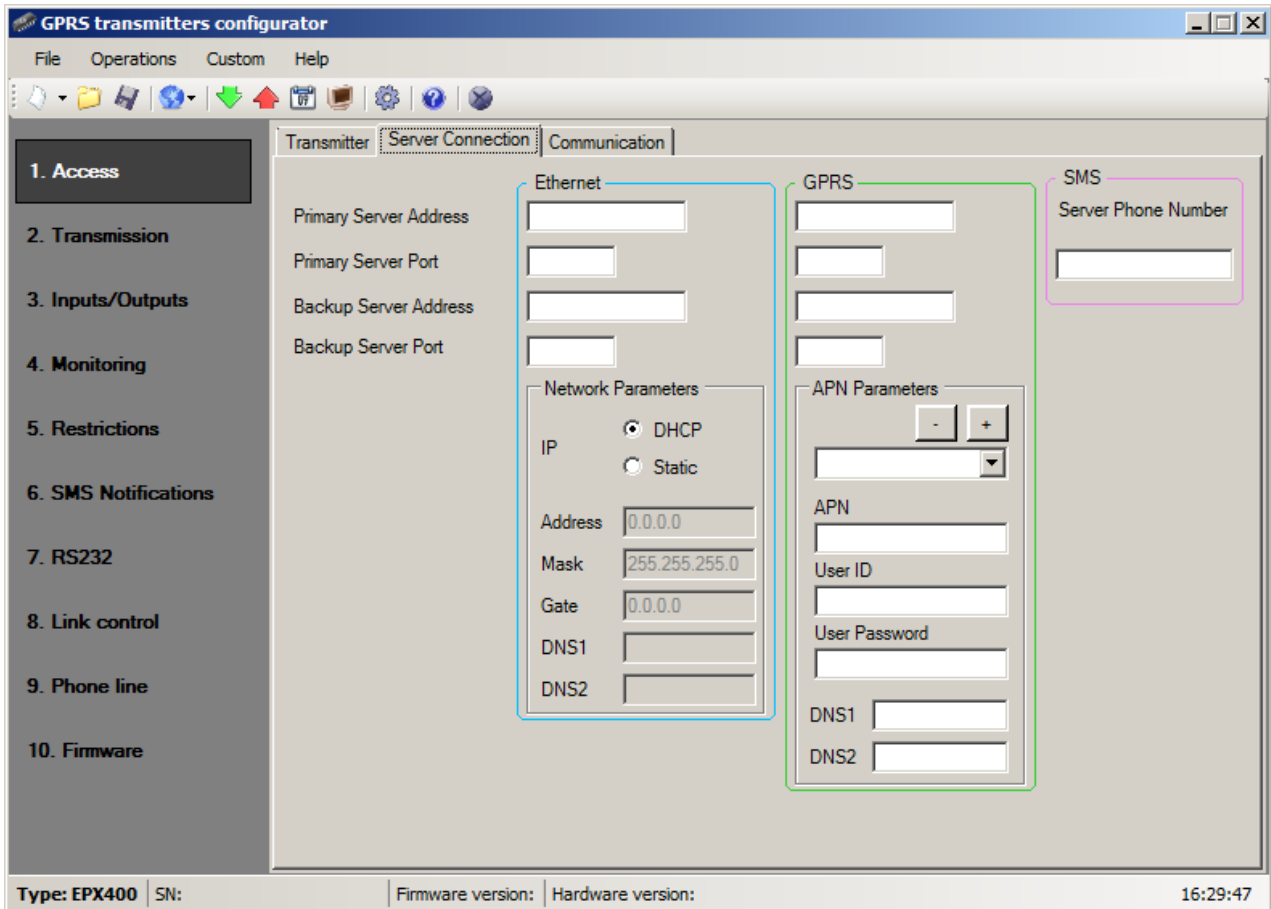
Factory setting of PIN in transmitter is **1111**.

8.1.1.3. Option: Embedded HTTP server

Selecting this option allows to configure the basic parameters for the EPX400 connection to the server through a Web browser. The method of this configuration is described in chapter "6. Pre-configuration via Ethernet port"

NOTE: To avoid unauthorized tampering with the device, the manufacturer recommends that you disable this option when you install the GPRS Transmitter Configurator (This option is factory-set on).

8.1.2. Server connection



In "Server Connection" tab you can set the basic parameters of Ethernet, GPRS and SMS connections

8.1.2.1. Ethernet parameters

Primary Server Address

It is address of receiver of monitoring system (OSM.Server) 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.

Primary Server Port

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

Backup Server Address

It is address of second (backup) receiver of monitoring system (OSM.Server) 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.

Backup Server Port

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

IP

Option "DHCP": address of the device and other network settings can be assigned by the DHCP server (default setting).

Option "Static": allows you to define your own settings. The remaining fields form described below will be activated.

Address

The IP address of the device for the LAN to which you want to work.

Mask

Subnet mask, default mask is "255.255.255.0".

Gate

The IP address of the computer on the local network that routes the traffic from the device to the outside network and the communication server.

DNS1, 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.

8.1.2.2. GPRS parameters

Primary Server Address

It is address of receiver of monitoring system (OSM.Server) 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.

Primary Server Port

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

Backup Server Address

It is address of second (backup) receiver of monitoring system (OSM.Server) 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.

Backup Server Port

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

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.

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).

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.

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.

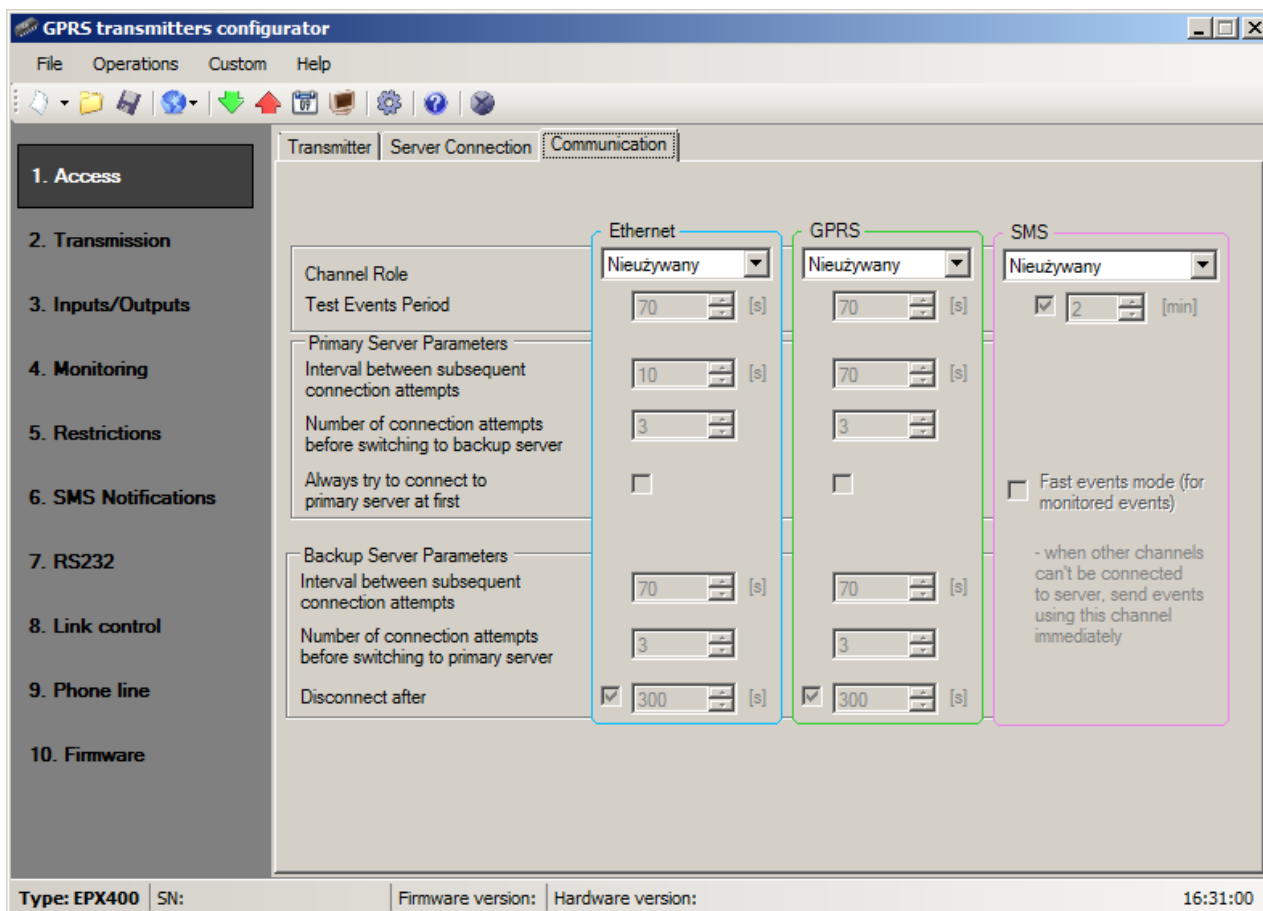
8.1.2.3. SMS Parameters

Server Phone Number

If GSM modem is connected to server application (e.g. OSM.Server) 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 not be operating in SMS mode.

8.1.3. Communication



Channel Role (Channel Priority)

By the term channel we mean the data transmission channel to the monitoring center. This can be Ethernet, GPRS or SMS. The transmitter while connecting to the monitoring station is trying to select main channel first, then a backup one, and emergency channel at last. If there is an address and port of backup server provided, then we try to take advantage of this connection before switching to another transmission channel. When in the result of the disconnection in the main channel, a channel with lower priority is used, then the availability of primary channel is being checked periodically. If the connection to main channel returns, the transmitter will switch over to it and will try to stay on it. You can set channel role as "unused" – so the communication in this way will not be possible.

There are four settings possible:

- *Unused*
- *Main*
- *Backup*
- *Emergency*

8.1.3.1. Ethernet and GPRS Parameters

Channel Role (Channel Priority)

By the term channel we mean the data transmission channel to the monitoring center. This can be Ethernet, GPRS or SMS. The transmitter while connecting to the monitoring station is trying to select main channel first, then a backup one, and emergency channel at last. If there is an address and port of backup server provided, then we try to take advantage of this connection before switching to another transmission channel. When in the result of the disconnection in the main channel, a channel with lower priority is used, then the availability of primary channel is being checked periodically. If the connection to main channel returns, the transmitter will switch over to it and will try to stay on it. You can set channel role as "unused" – so the communication in this way will not be possible.

There are four settings possible:

- *Unused*
- *Main*
- *Backup*
- *Emergency*

Test Events Period

The device sends message "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).

Primary Server Parameters

Interval between subsequent connection attempts

Configured 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 attempt will follow if the previous attempt failed.

Number of connections attempts before switching to backup server

In this field you determine how many times the device will try to make connection to primary server. If connection fail, after execution of some connections, device will start connecting to backup server.

Always try to connect to primary server at first

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 (especially number of connection attempts).

Backup Server Parameters

Interval between subsequent connection attempts

In this field you define the period (in seconds) after which next attempt of connection to backup server will follow if the previous attempt failed.

Number of connections attempts before switching to primary server

In this field you determine how many times the device will try to make connection to backup server. If connection fail, after execution of some connections, device will start connecting to primary server.

Disconnect after

If you mark this field the device will disconnect from backup server after defined time. 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.

8.1.3.2. SMS Parameters

Channel Role (Channel Priority)

There are four settings:

- *Unused*
- *Main*
- *Backup*
- *Emergency*

Test Events Period

The device sends message "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 minutes). Usually it is undesirable to send text as SMS so often as with GPRS or Ethernet transmission. Parameter this allow for significant extension of distance between tests (time in minutes) or completely disabling this option.

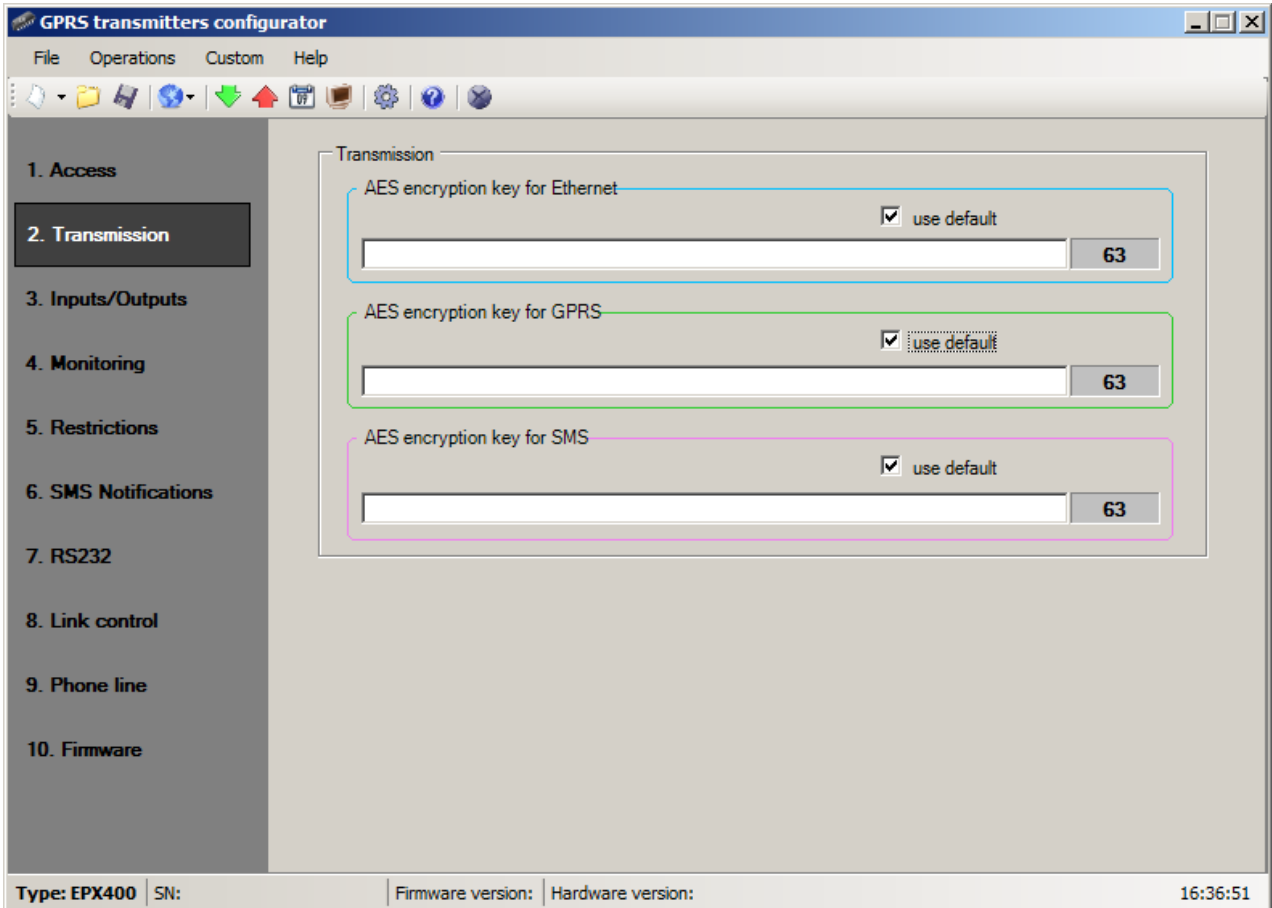
Fast events mode

Selecting this option will immediately send the monitored events (considered as more important) if other transmission channels had not established communication with the server. This means that potentially events can be sent by more expensive and less optimal channels like SMS, but we have greater confidence that the notification arrives as quickly as possible. If this option is disabled, the device stops sending events until it connects to the server.

8.2. 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 bits – signs 0-9 and A-F) or use default settings.



8.3. INPUTS/OUTPUTS

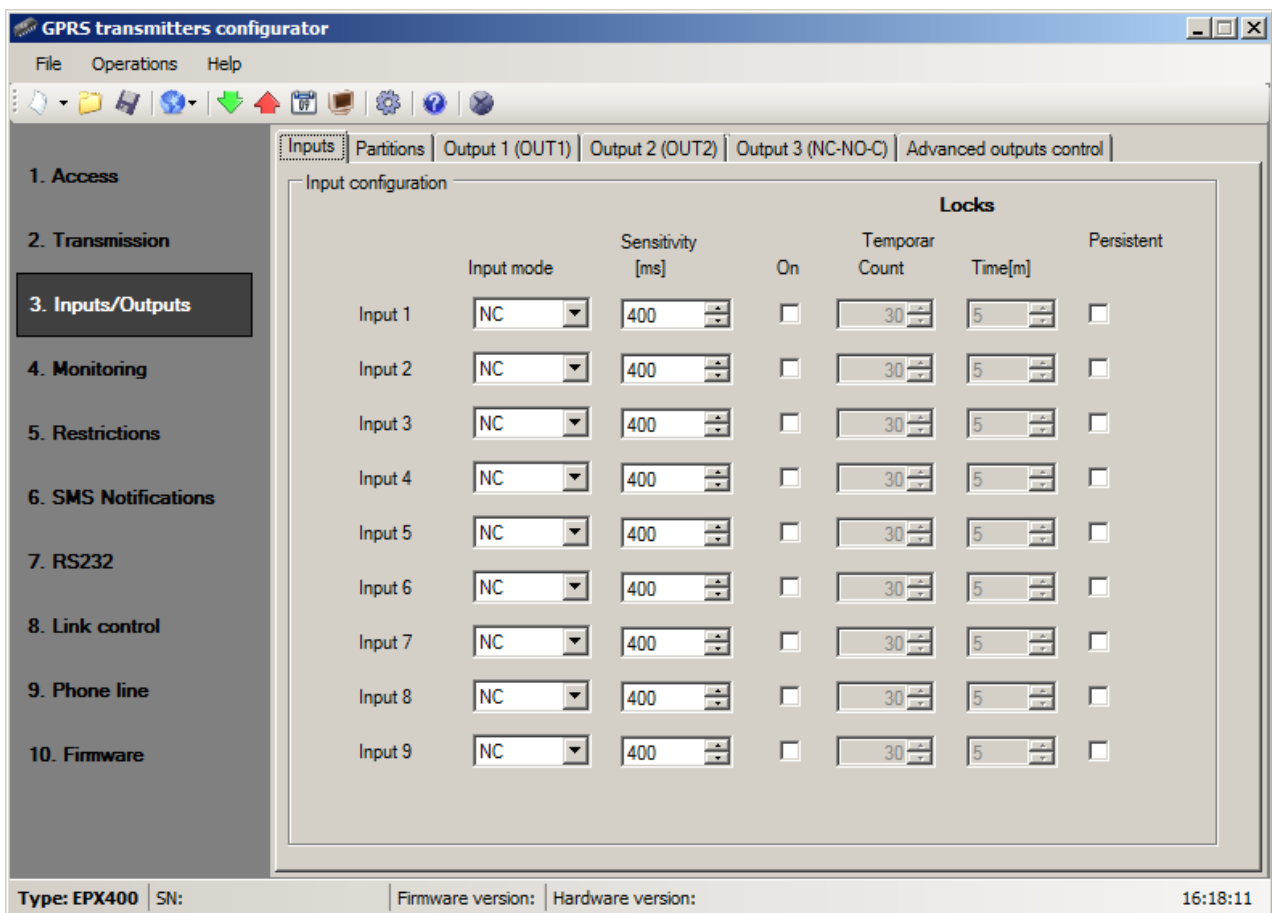
Transmitter has got 9 inputs, two OC type outputs and one relay output. The "Input/Output" option allows to configure the transmitter in accordance with the requirements of the user.

8.3.1. Inputs configuration

For every input the following settings shall be determined respectively.

8.3.1.1. Input mode

The parameter describes input configuration and stable state of input. Any change of that state causes alarm message to be sent. The following configuration types are available: NO / NC / EOL-NO / EOL-NC / DEOL-NO / DEOL-NC. NC type input must be closed for the whole time. Line interruption causes its induction. NO type input remains open. It activates when closed. EOL and DEOL (single end-of-line resistor and double end-of-line resistor) differ with 1 or 2 resistors allowing distinguishing alarm from sabotage. Electric diagrams for all configuration types were described in chapter 3.3. Input configuration.



8.3.1.2. Sensitivity

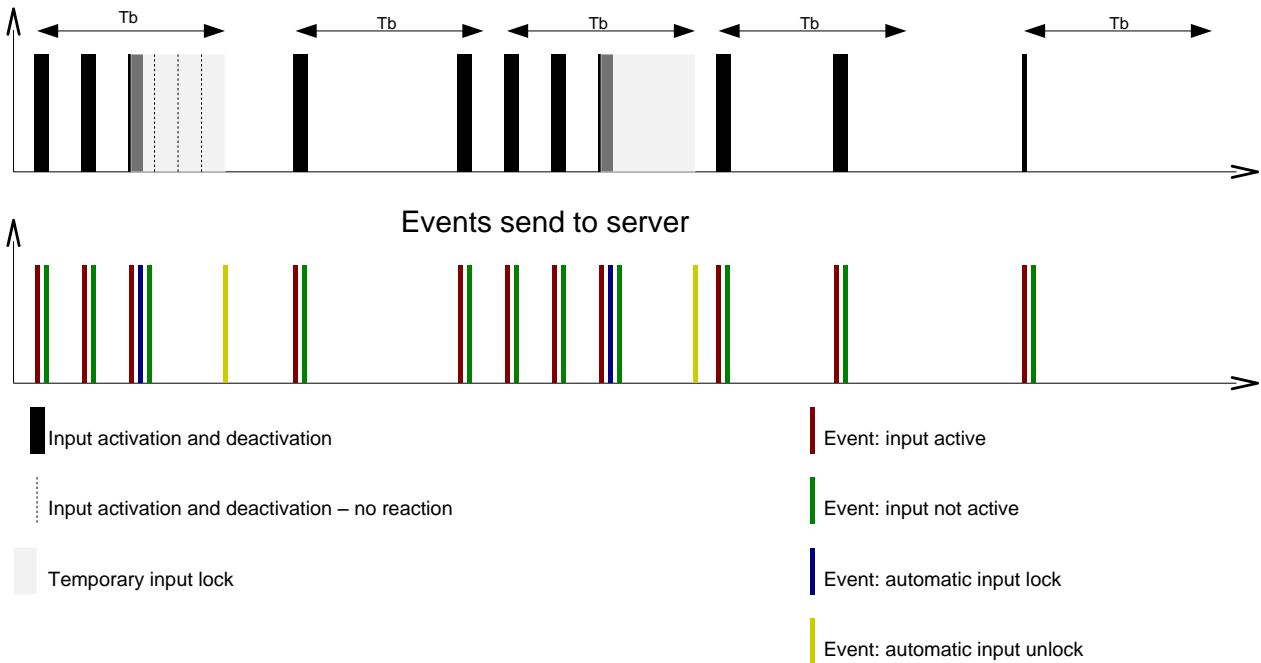
This parameter means minimum time for change maintenance at input so that it would be detected by transmitter.. Default setting is 400ms.

8.3.1.3. Locks

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. More detailed information about input locks is shown on a diagram.

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



- N and T_b parameters may be set per input

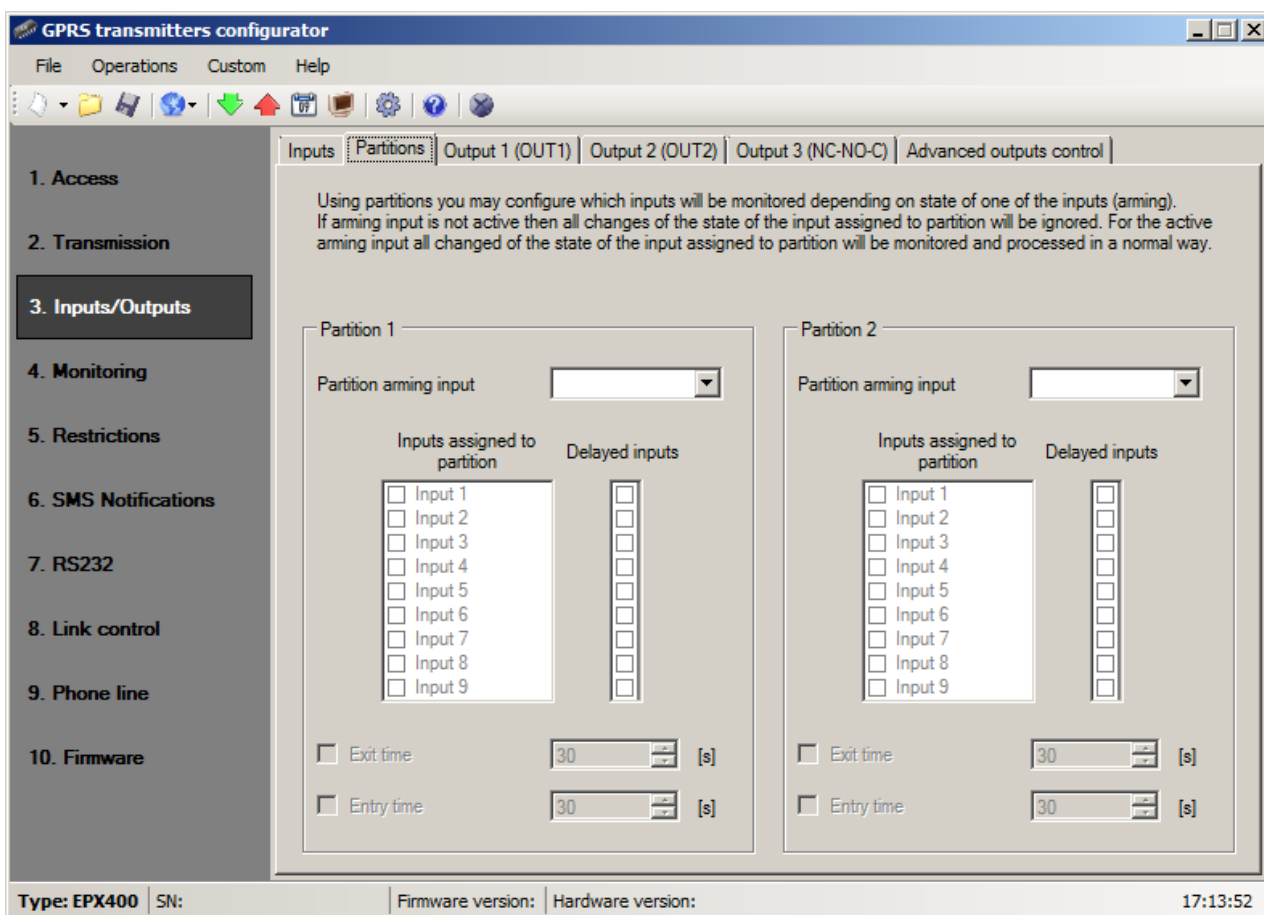
- Locally there can be $2 \times N - 1$ input activations. In summary average number of activations during defined period of time will be preserved.

Temporary lock may be deactivated by SMS or GRPS command (RLIMIT command).

8.3.2. Partitions

Partitions are configured using Partitions tab.

Using partitions you may configure which inputs will be monitored depending on state of one of the inputs (arming). If arming input is not active then all changes of the state of the input assigned to partition will be ignored. For the active arming input all changes of the state of the input assigned to partition will be monitored and processed in a normal way.



8.3.2.1. Partition arming input

Using this, partition arming input can be selected. To selected input, arming device (remote controller receiver output or electronic keyboard NO/NC output for instance) is connected. When this input is armed, partition is armed (after Exit Time, see below). When arming input is disarmed, partition is disarmed.

8.3.2.2. Inputs assigned to partitions

Assigning input to partition means that it is monitored only when partition to which input belongs is armed. Input can be assigned up to one partition. Arming inputs can not be assigned to any partition. If input is not assigned to any partition, it acts as 24 hours input – it is monitored regardless of partitions state.

8.3.2.3. Delayed inputs

Here, delayed inputs can be selected. Delayed input switches on associated output, ie. generates alarm, after expiry of Entry time, but only when partition to which input belongs will not be disarmed before Entry time period.

8.3.2.4. Exit time

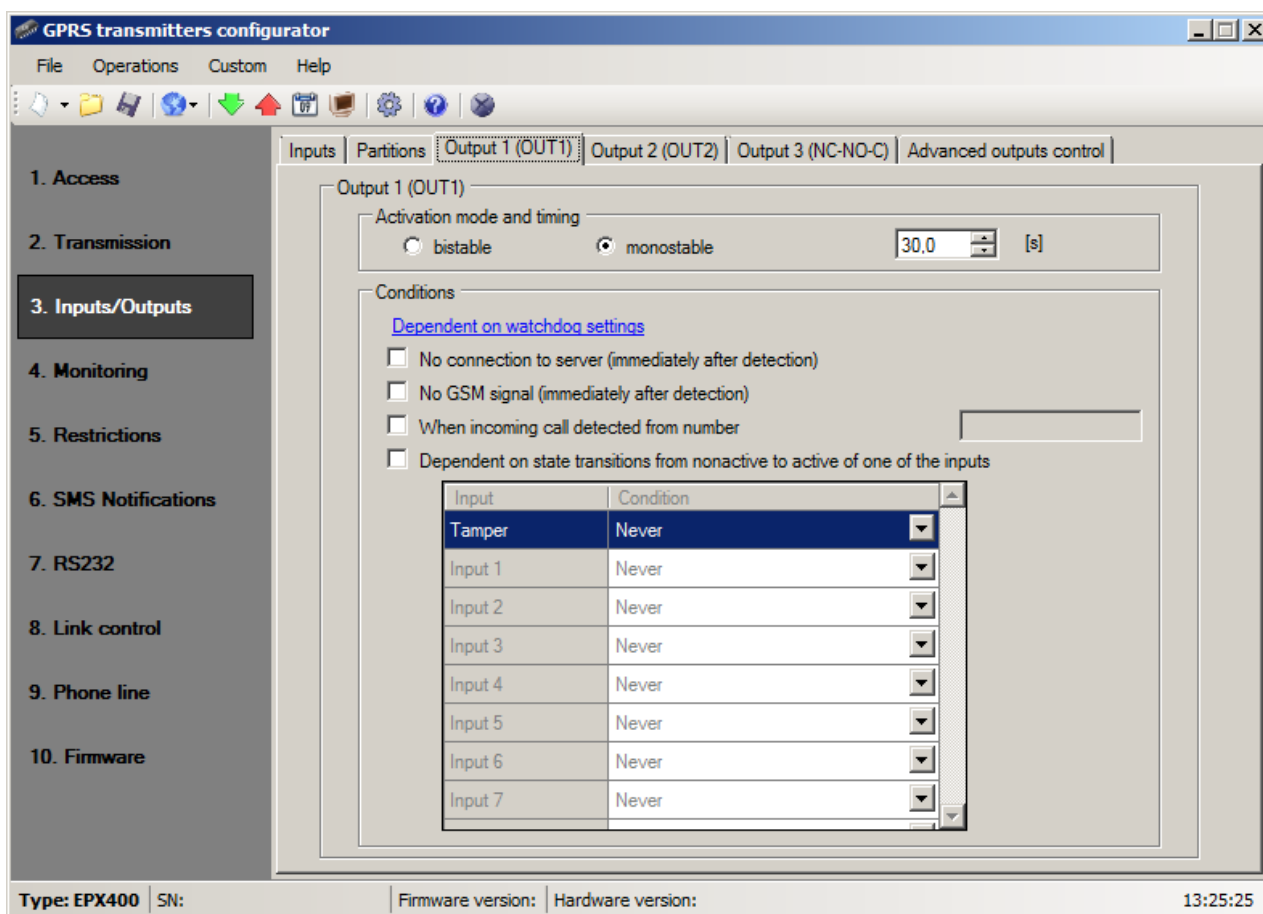
Partition exit time. Partition inputs will be monitored when this configured time elapses after partition input had been armed.

8.3.2.5. Entry time

Time after which alarm will be generated after delayed input had been armed and partition to which delayed input belongs will not be disarmed.

8.3.3. Outputs

Tabs "Output 1 (OUT1)", "Output 2 (OUT2)" and "Output 3 (NC-NO-C)" define the outputs parameters. The options for the outputs are common and are described in a single section.



8.3.3.1. 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.

8.3.3.2. Conditions

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

- No connection to server (immediately after detection);
- No GSM signal (immediately after detection);
- Detection of incoming call from defined telephone number;

After selecting this option can be generated CLIP event, if appropriate position in the "Monitoring" group is set (see item 8.4.6. *Event: CLIP*). You can enter full phone number or only a part of number. The device will detect all numbers with specified sequence. E.g. if entered number is **1234**, the output will activate after incoming call from number **123456789** or **600123456**.

Note: The phone number must be entered without country code (e.g. without prefix 0048 and +48).

- Dependent on state transitions from non-active to active of one of the inputs. Outputs can be also activated by internal watchdog (see 8.8. Link control).

8.3.3.3. 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 the output,
- **No network:** input disturbance causes actuation of the output if sending of information to server is impossible.
- **Always:** every input disturbance causes actuation of the output.
- **Available network:** input disturbance causes actuation of the output if sending of information to server is possible.

Note: The outputs may be controlled by SMS commands.

The outputs can also be activated by the watchdog that can be configured in tab "8.8. Link control".

8.3.4. Advanced outputs control

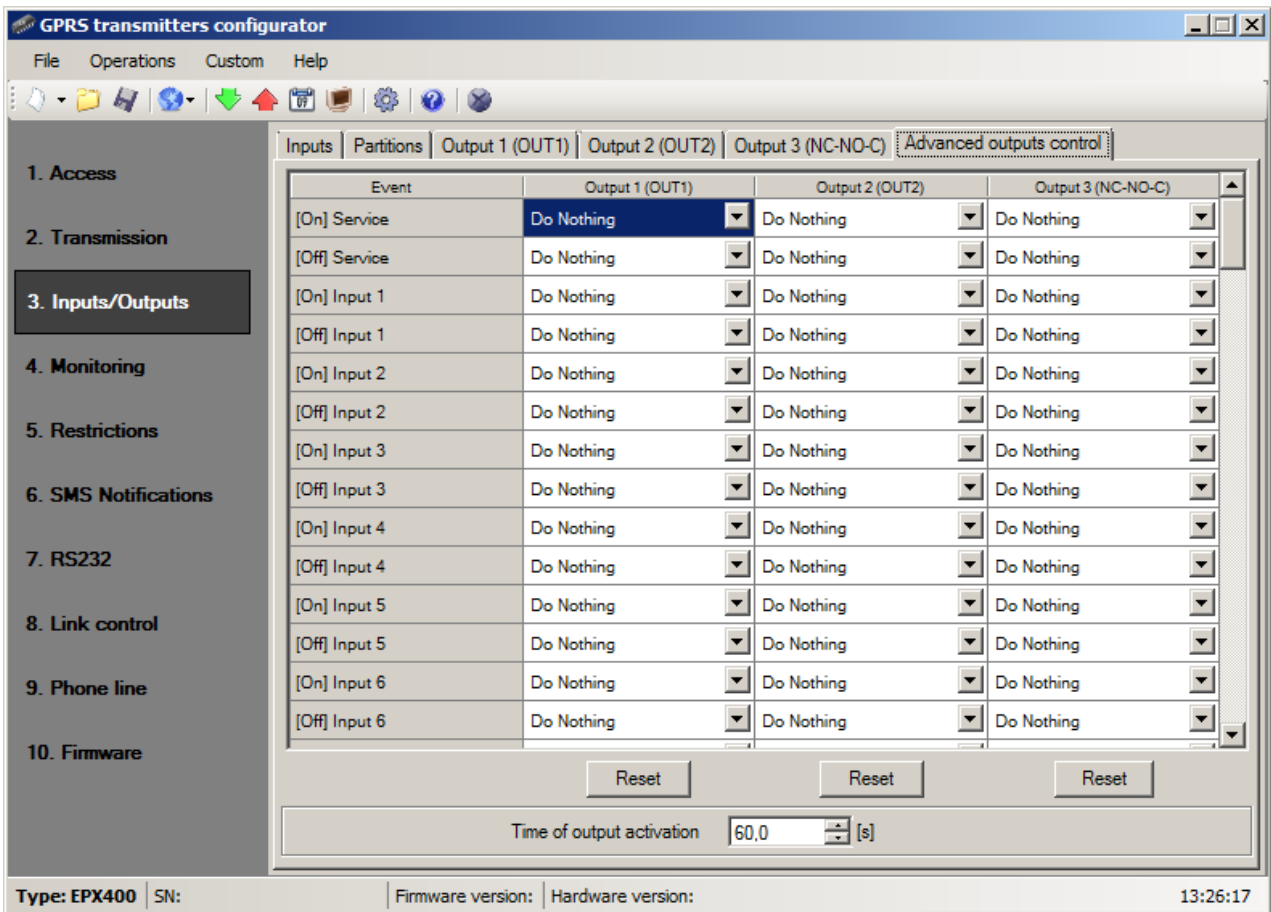
The user is able to determine an alternative course of action to go over basic outputs configuration function described in 8.3.3. Outputs.

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 (8.3.3 Outputs) 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.



8.3.4.1. Output 1 / Output 2 / Output 3

These columns define which events 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 8.3.4.2. 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.

8.3.4.2. 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.

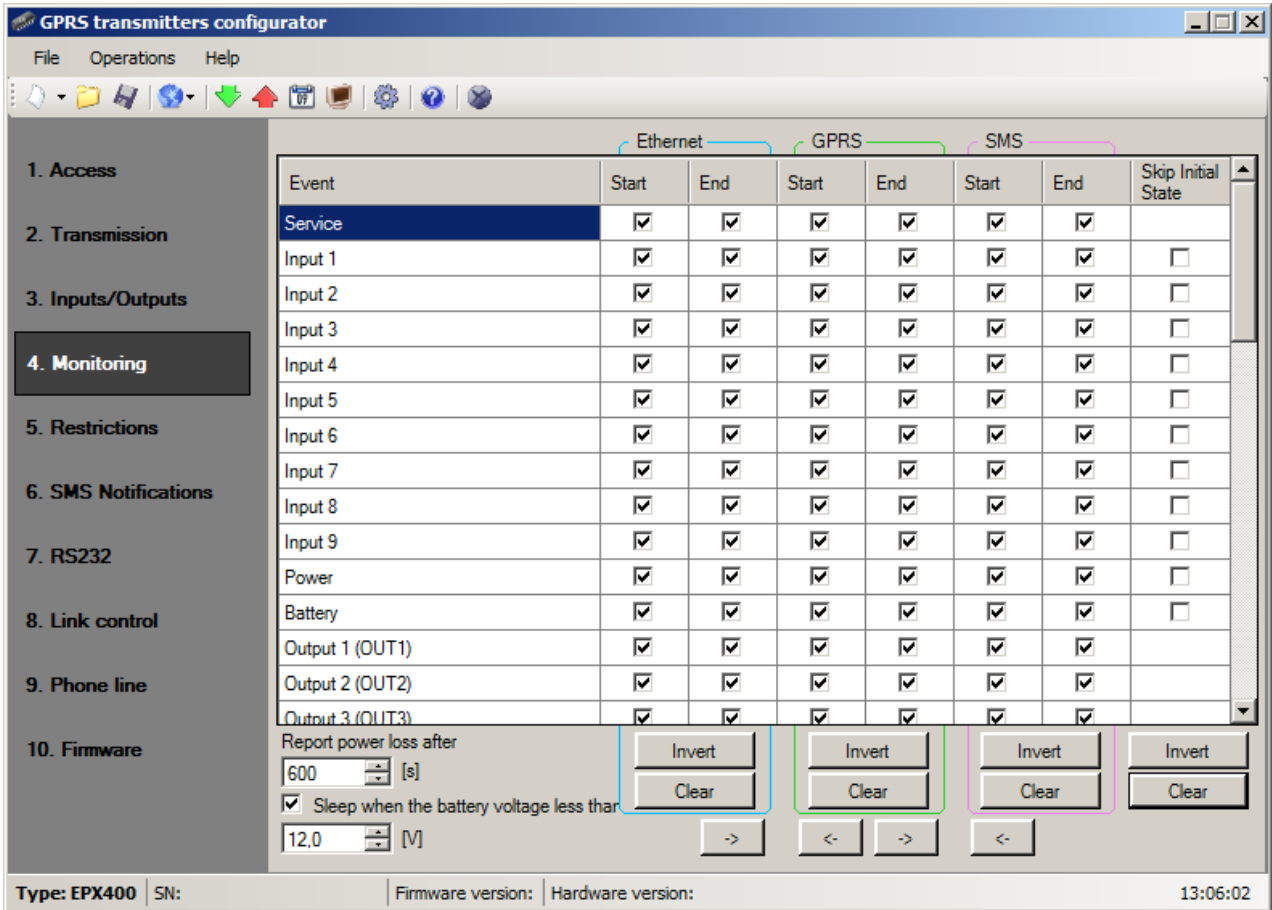
8.3.4.3. Event: CLIP

Incoming call from the number defined in option: Inputs/Outputs → Output 1 / Output 2 / Output 3. The phone number is entered at option: “When incoming call detected from number” (see item 8.3.3.2.).

8.4. MONITORING

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

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



8.4.1. Ethernet

In this columns you define events that are to be reported to monitoring station with Ethernet transmission. There is possibility to send information on alarms (violation of input) and on returns of inputs state to normal (inactive) state. To transmit any event you should only click it (proper square on your right).

Click on [Clear] button to remove all marked events.

Click on [Invert] button to change markings to contrary.

8.4.2. GPRS

In this columns you define events that are to be reported to monitoring station with GPRS transmission. There is possibility to send information on alarms (violation of input) and on returns of inputs state to normal (inactive) state. To transmit any event you should only click it (proper square on your right).

Click on [Clear] button to remove all marked events.

Click on [Invert] button to change markings to contrary.

8.4.3. SMS

In this columns you define events 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 (violation of input) and on returns of inputs state to normal (inactive) state. To transmit any event you should only click it (proper square on your right).

Click on [Clear] button to remove all marked events.

Click on [Invert] button to change markings to contrary.

8.4.4. 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.

8.4.5. 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.

8.4.6. Event: CLIP

Incoming call from the number defined in options: "Inputs/Outputs ->Output 1 / Output 2 / Output 3". The phone number is entered at option: "When incoming call detected from number" (see item 8.3.3.2.).

8.4.7. Sleep when the battery voltage less than

If you check an option "Sleep when the battery voltage less than" battery voltage threshold field becomes available. The threshold is used when the transmitter goes into Sleep mode. Due to the characteristics of the battery Sleep mode ensures reliable operation of the device when the battery is the only source of power at the time. If the option "Sleep when the battery voltage less than" will remain unchecked transmitter will work as long as it allows the battery. This may adversely affect the capacity of the battery for a further period of use as well as cause a generation of false alarms.

Transition to Sleep mode occurs when the battery voltage falls below the defined threshold (taken into account the 3 consecutive measurements performed in 10-second interval). The following steps are then performed:

1. "Too low voltage – sleep" event is generated
2. Transmitter for up to 30 seconds is trying to send "Too low voltage – sleep" event to the software
3. Device switches to Sleep mode, i.e. the modem goes to off, inputs are not being monitored, outputs are turned off, an external telephone line is attached

Sleep mode is indicated by alternating lighting and off LEDs: OK and ERR.

Exit from Sleep mode occurs when one of the following situations takes place:

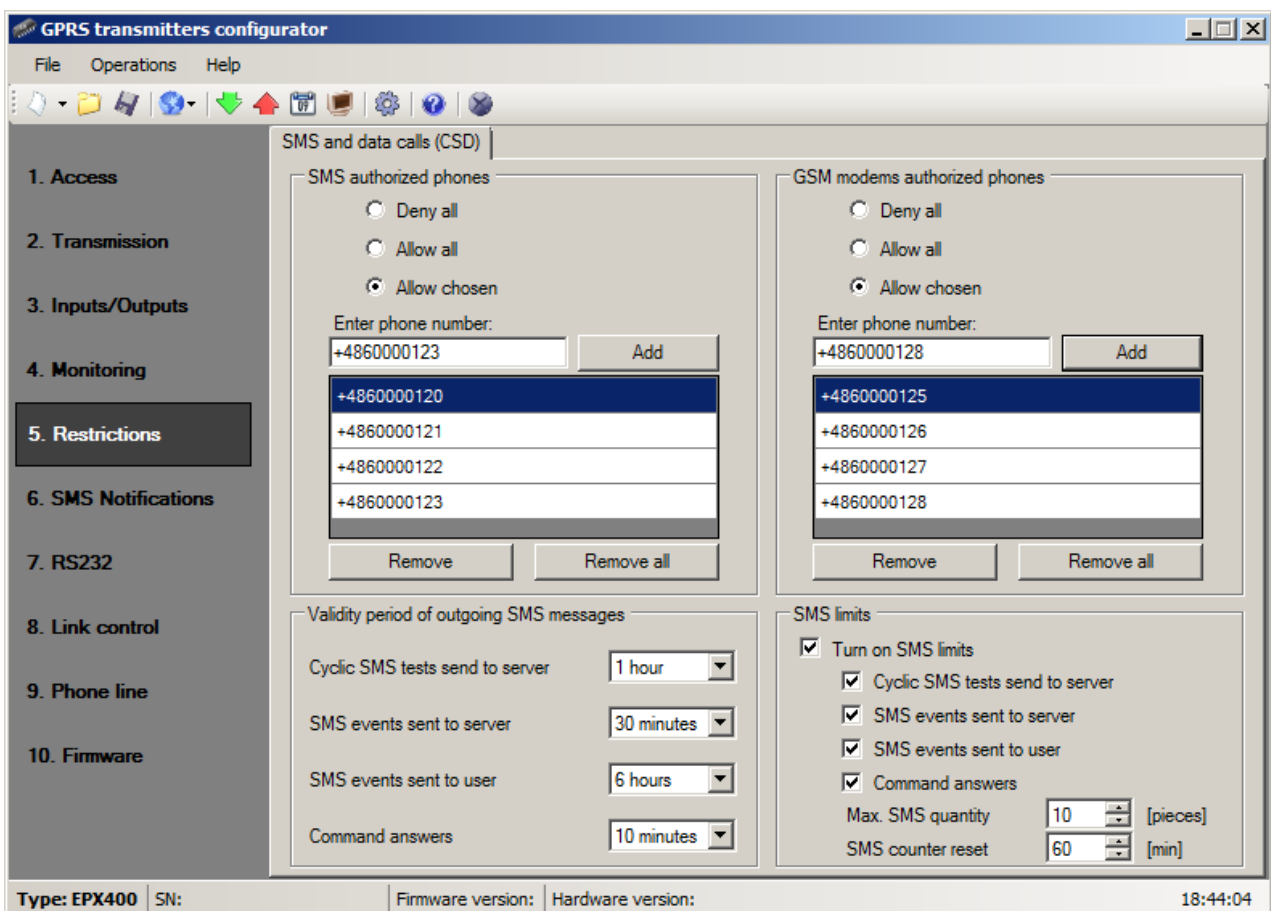
- Main power supply is connected and the battery voltage exceeded a value of "threshold of sleep" + 0.6 V
- Overall disconnect power and re-connect the battery and/or AC power

For transmitter inputs are reported only changes in relation to the state before sleep.

8.5. RESTRICTIONS

8.5.1. SMS and data calls (CSD)

In this section, you can define the restriction for the phone numbers from which incoming data calls and SMS commands are received. You can also specify SMS validity period and outgoing SMS limits.



8.5.1.1. 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.Server server will be used to send SMS, its number have to be entered on the list.*

8.5.1.2. 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.

Po wyborze *Pozwól wybranym* uzyskuje się dostęp do pola edycji. Kolejne numery należy wpisać w pole, po czym kliknięcie przycisku [Dodaj] przeniesie numer do tabeli poniżej. Ustawienie kursora na danej linii z numerem i kliknięcie przycisku „Usuń” spowoduje usunięcie numeru z tabeli.

Opcja „Usuń wszystkie” wyczyści całą zawartość tabeli.

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.Server server will be used to make connections CSD, its number have to be entered on the list.*

8.5.1.3. Validity period of outgoing SMS messages

User may limit time for the GSM operator to deliver information via SMS when recipient is unavailable due to out of GSM signal coverage for example. 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 comments

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).

8.5.1.4. SMS limits

User may limit number of SMS sending by transmitter. As the main way of transmission should be Ethernet and 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 comments

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.

8.6. SMS NOTIFICATIONS

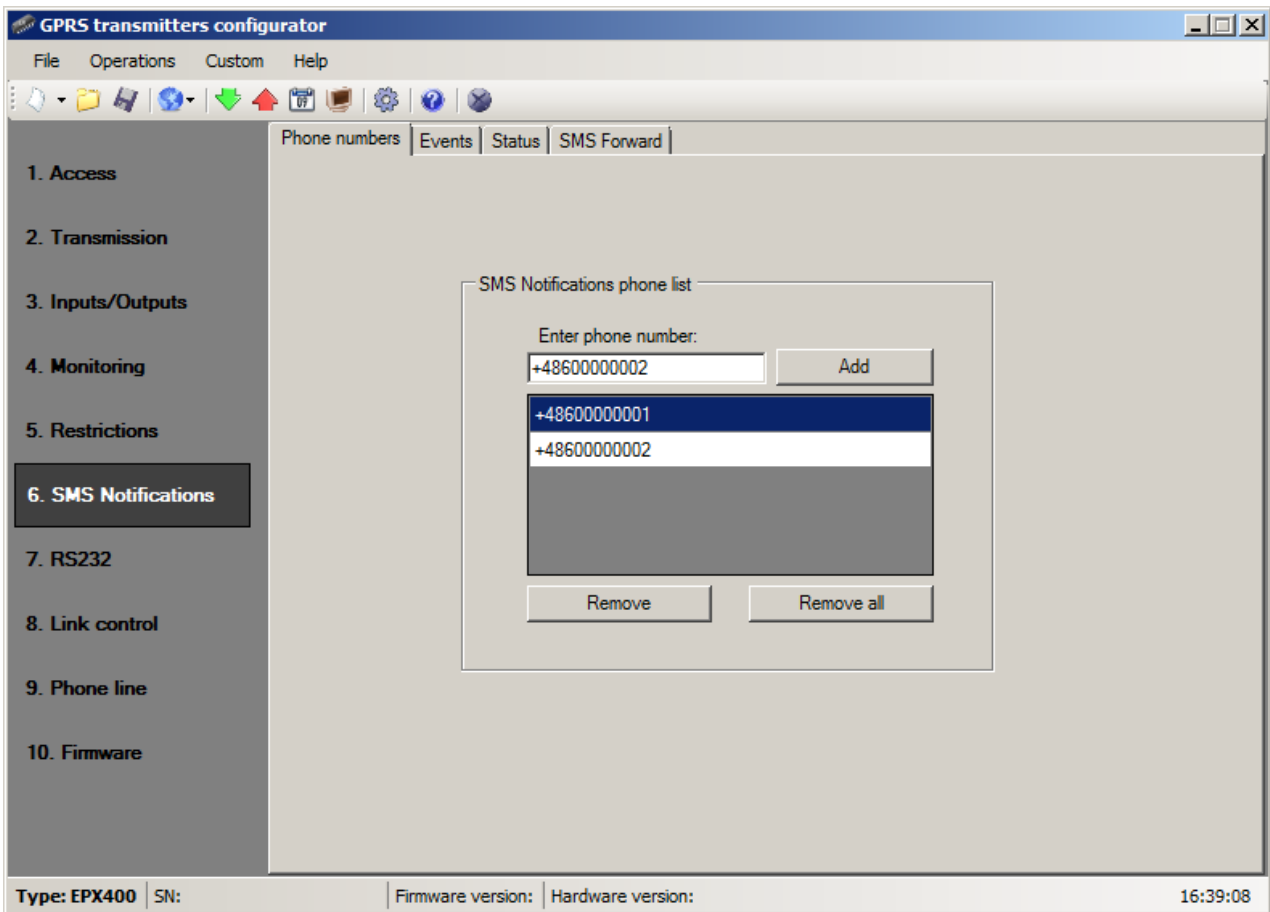
User may define messages that in case of any event (e.g. input state change) will be sent to private phone numbers. At the same time it is worth to remember about limitation in this respect.

8.6.1. 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.

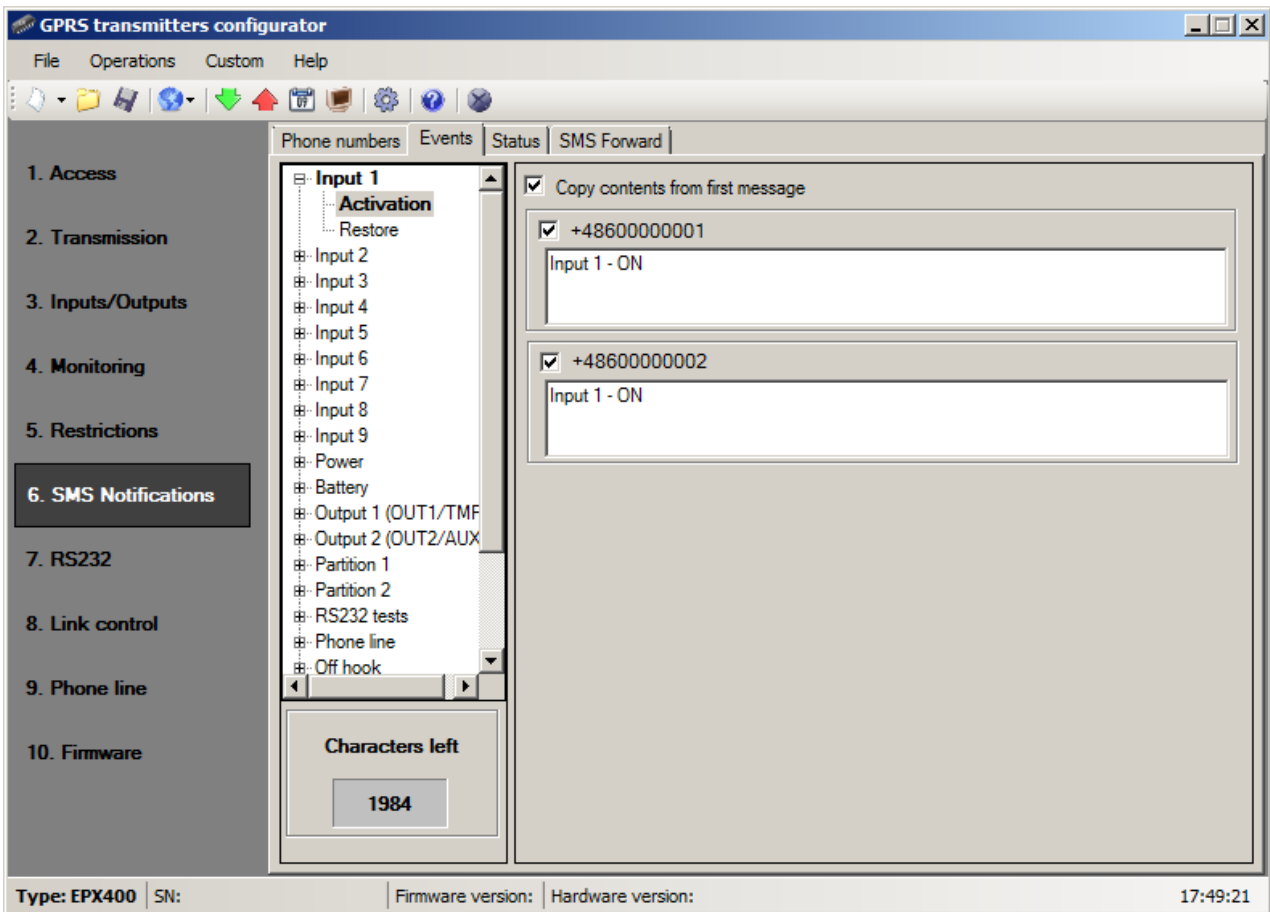
8.6.2. Events

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 (Input 1: Activation, Restore; Input 2: 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



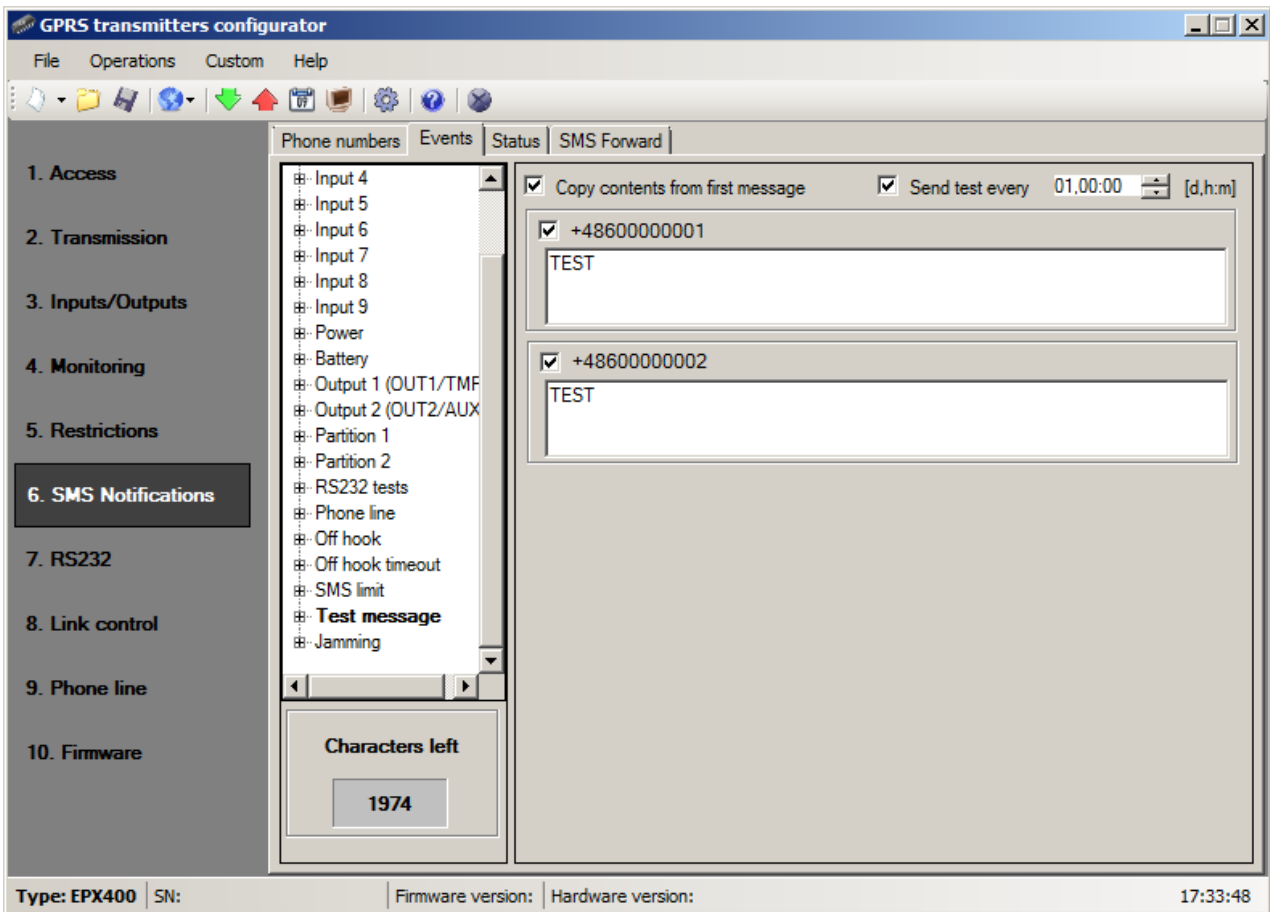
Note:

- 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.

8.6.2.1. 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.



8.6.3. Status

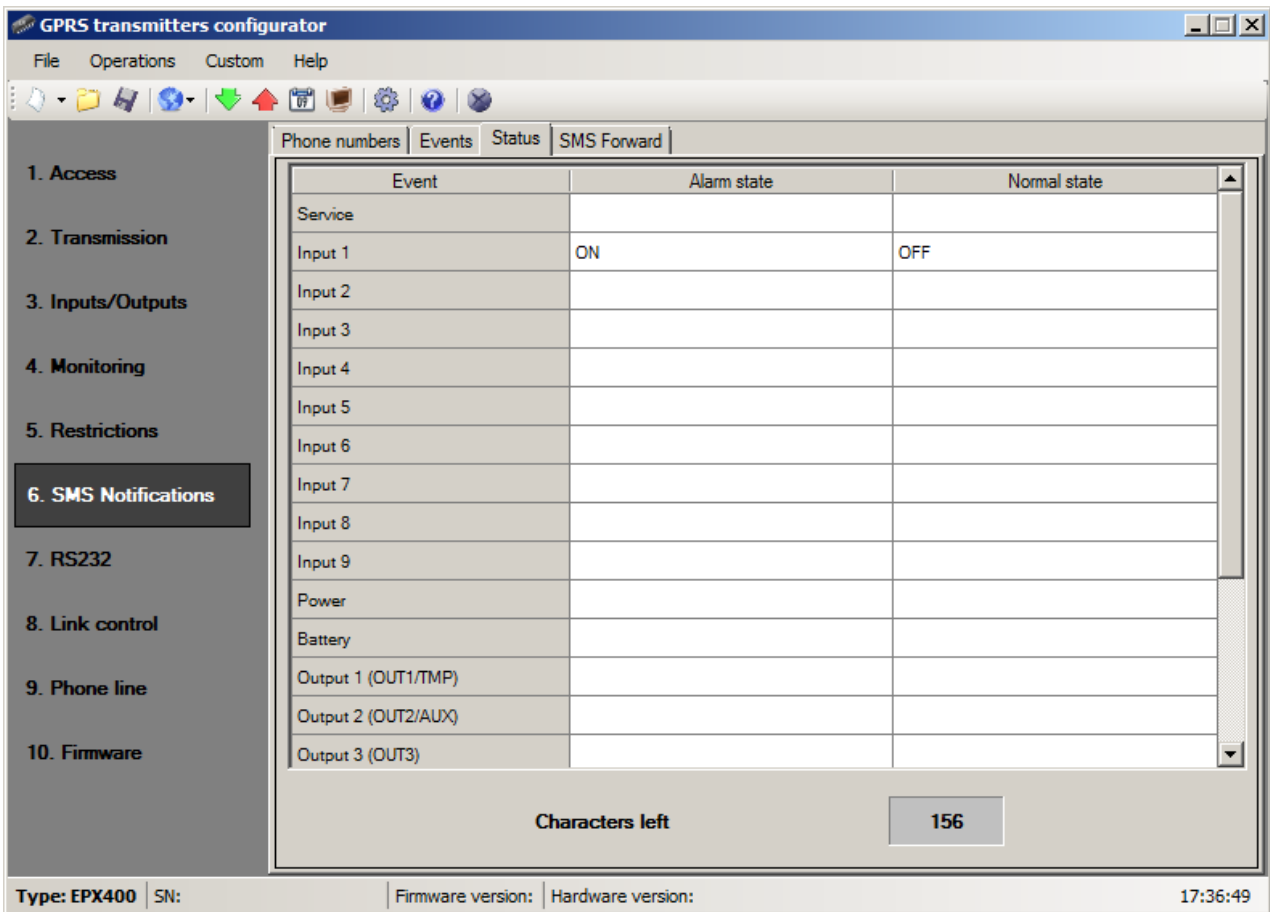
The device provides for remote enquiry about the status. Edit in this field message text that is to be sent to the user as a reply to command regarding status checking.

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.

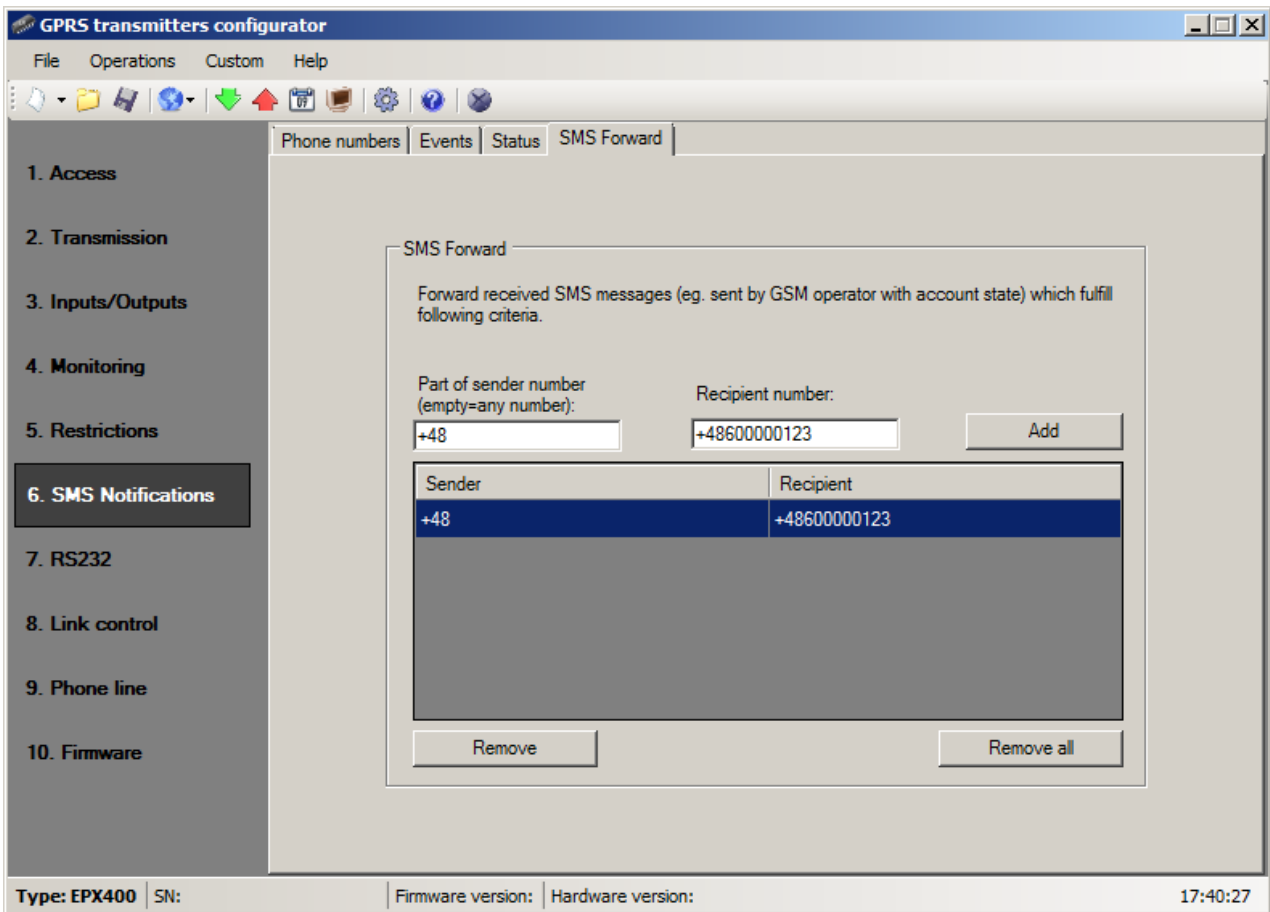


8.6.4. SMS Forward

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.

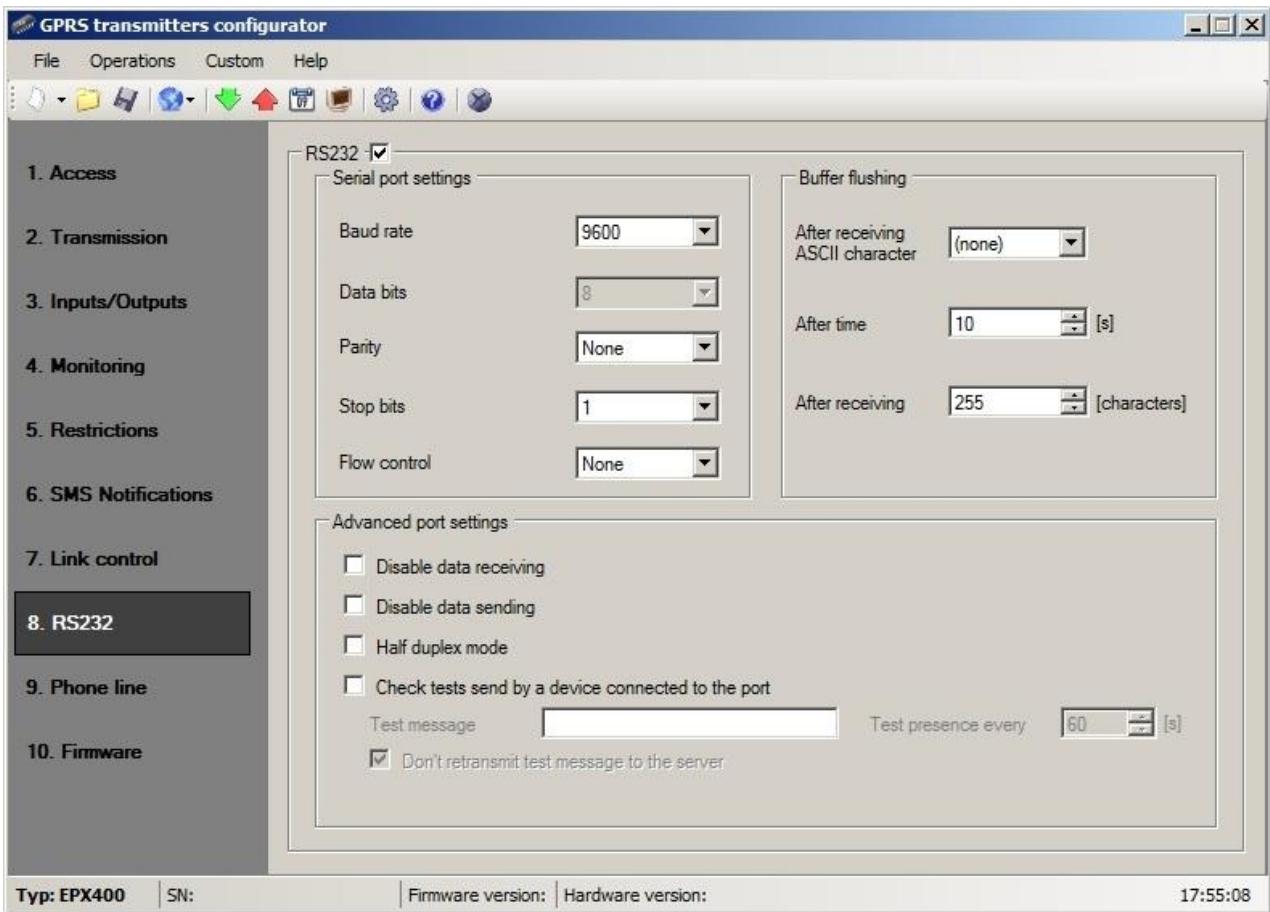
Each rule contains a pair: part of sender phone number and correct recipient phone number. In some cases a part of sender phone number may be an empty string which means that any phone number matches to the rule. All rules are processed with given order. It means that in some cases one SMS message may 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.



8.7. RS232

In order to provide additional capabilities for sending information, EPX400 transmitter is equipped with serial port RS-232, 3.3V TTL level. To connect devices equipped with a standard RS-232 or RS-485 the appropriate cables and converters are needed.



8.7.1. Serial port settings

The selected parameters shall correspond to RS-232 port settings in device which will be connected to the transmitter. Available parameters are shown in the table below:

Parameter	Value
Baud rate (bits/sec)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Data bits	8
Parity	None, Even, Odd
Stop bits	1, 2
Flow control	None, RTS, CTS, RTS/CTS

If RS232 checkbox will not be enabled, data to the Event monitor will be sent on device's serial port. With this setting, GD-PROG cable can be used to observe device state using GPRS transmitters configurator application and Monitor option described in point 8.11.

8.7.2. 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 defined 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.

8.7.3. Advanced port options

8.7.3.1. 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 transmitter is being used to control the another device.

8.7.3.2. 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.

8.7.3.3. Half duplex mode

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

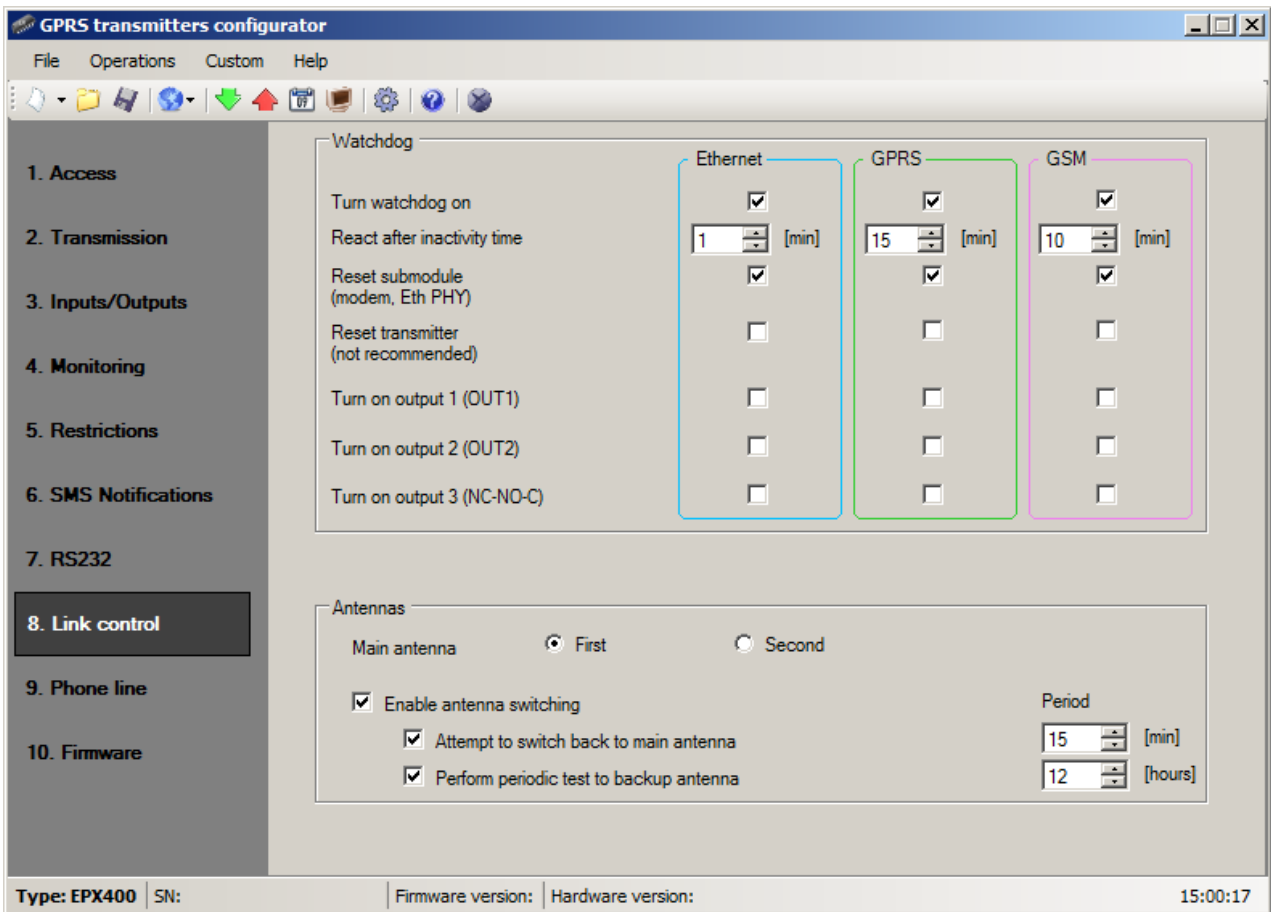
8.7.3.4. Check tests send by device connected to the port

If the device connected to transmitter port generates periodical connection tests, these tests may be under 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, then transmitter sends to server due message (See chapter 8.11. Device monitor – option "RS232 tests").

8.8. LINK CONTROL

By using the options described in this section, you can set the device to react automatically when the connection with the monitoring station is lost. This applies to situations where the device has lost GSM connectivity, GPRS transmission is not possible or the Ethernet link is not working.



8.8.1. Watchdog

In this section, you can enable the watchdog, a system that monitors the transmitter's operation. It can control the status of 3 transmission channels: Ethernet, GPRS and GSM.

The watchdog can be enabled for each transmission channel separately by checking the box "Turn watchdog on" in the respective column.

In the [React after inactivity time] box, specify the amount of time that must elapse from the loss of connectivity before the transmitter attempts to reconnect. The time should be specified in minutes.

If connectivity in a channel is lost, the device will wait for the specified amount of time from the moment of registering the loss of connectivity and then execute pre-defined actions.

The following actions are available:

- Reset submodule
- Reset transmitter
- Turn on output 1
- Turn on output 2
- Turn on output 3

To enable an action, check the corresponding box next to its name.

"Reset submodule" means restarting the communication module of the respective channel: PHY module for the Ethernet channel or GSM/GPRS modem for the GPRS and GSM channels.

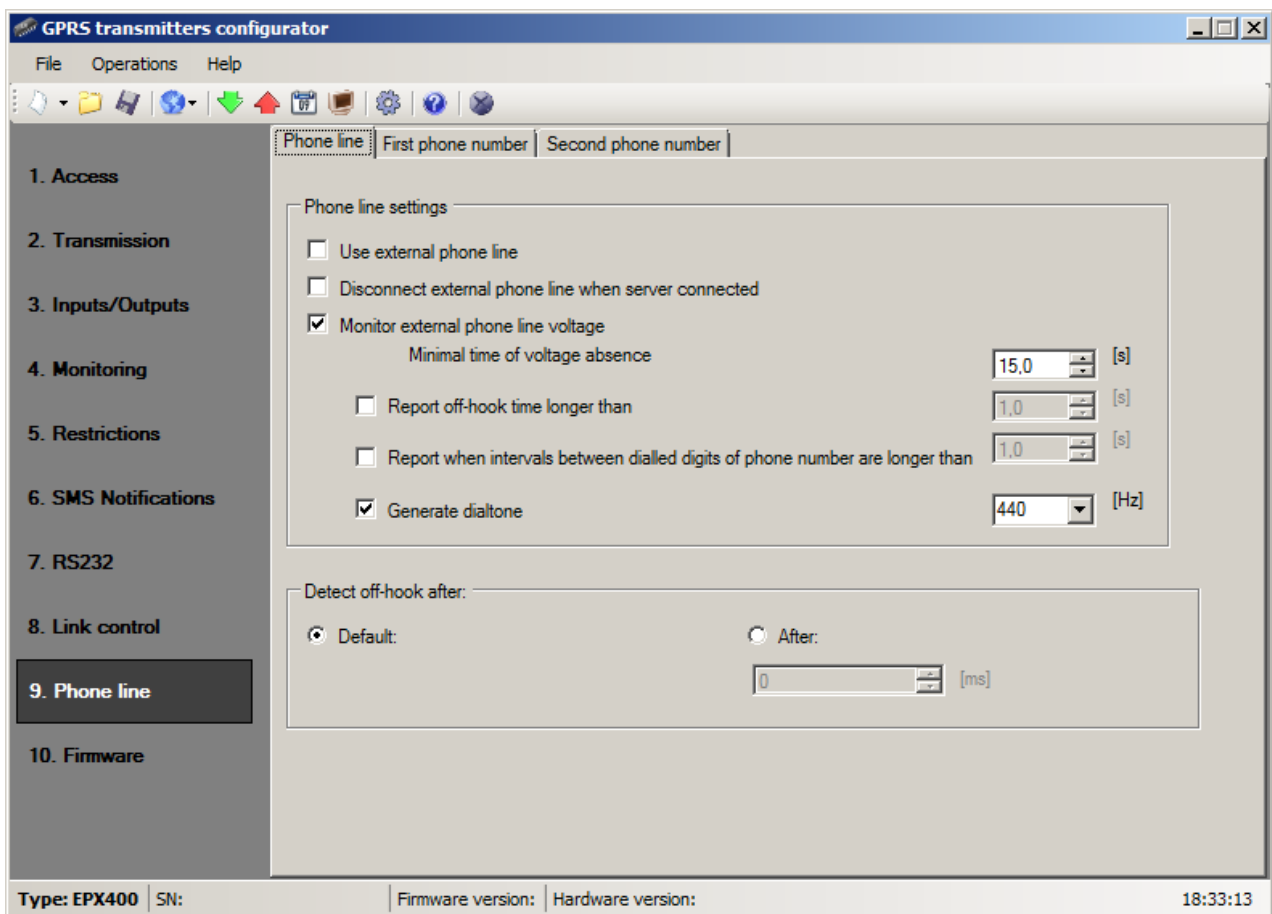
Enabling the "Reset transmitter" setting is not recommended, but it may be necessary in special situations.

8.9. PHONE LINE

The device is equipped with a PSTN phone line connector. 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 PSTN/GPRS/SMS link. For proper operation, define the parameters described below.

8.9.1. Phone line settings

This tab is provided to determine settings of telephone line.



8.9.1.1. Use 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.

8.9.1.2. Disconnect external phone when server connected

If 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.

8.9.1.3. 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 than defined minimal time of decay) that will be signaled 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 8.9.1.1. *Use external phone line*
- Options from clause 8.9.1.1. and clause **Błąd! Nie można odnaleźć źródła odwołania..** are active and voltage on terminals TIP-RING decreased below 8V.

8.9.1.4. 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.

8.9.1.5. Report intervals between dialled digits

This option is being used if in configuration "PSTN line – EPX400 – 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.

8.9.1.6. 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.

8.9.1.7. Detect off-hook after

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

8.9.2. 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.

8.9.2.1. DTMF phone number

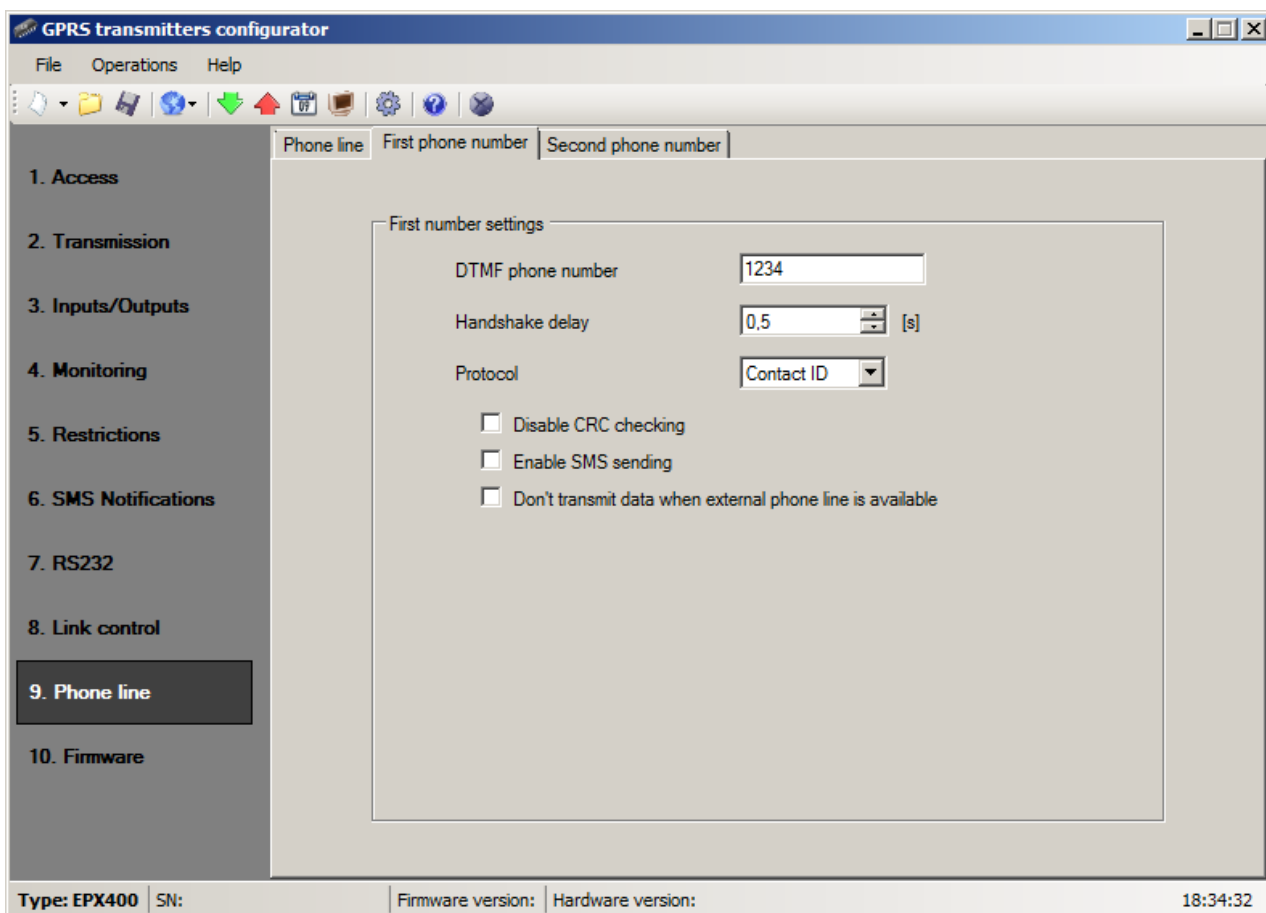
This is a number that has been saved in memory of an alarm control panel. If the panel is to transmit information on an event it shall dialled this number. Transmission of this information via GSM (GPRS) will be possible if this number will be identical as a number entered into the transmitter.

8.9.2.2. 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.

8.9.2.3. Protocol

Select protocol of data transmission used by an alarm control panel and that is acceptable for monitoring station. Available options: ContactID and SIA.



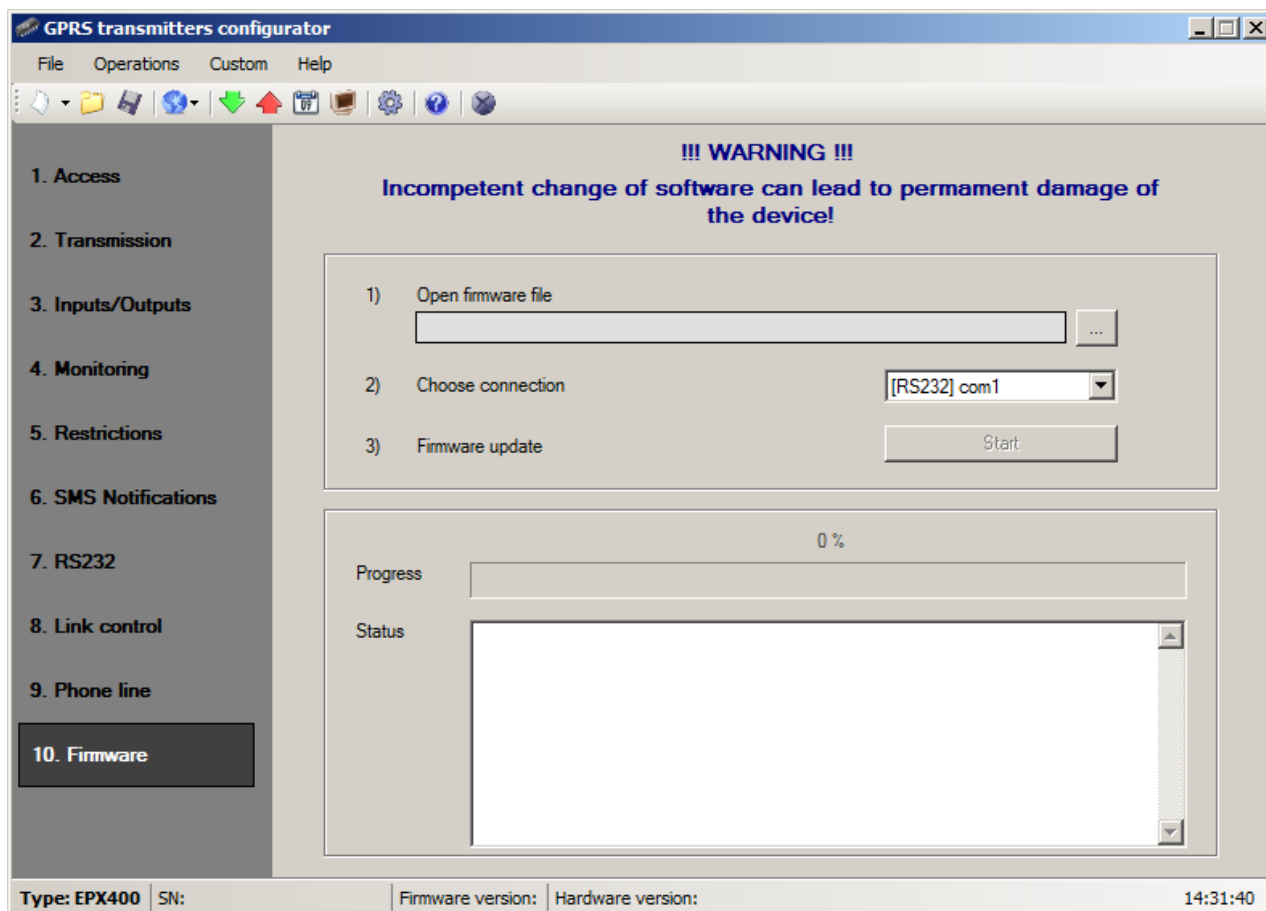
Note:

- 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 format. 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.

8.10. 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.

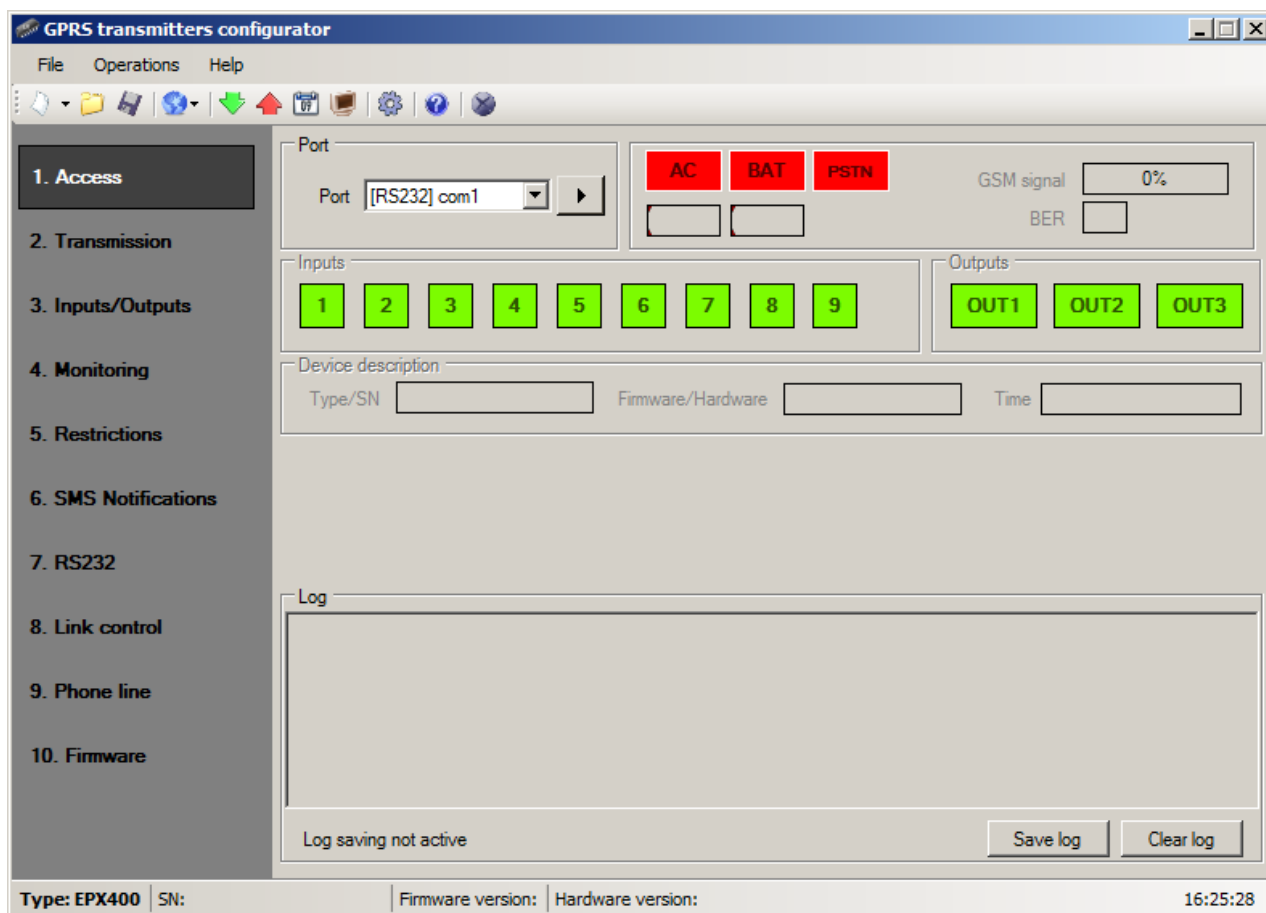
Note: Procedure of assigning firmware to a device is analogous to programming a device. For procedure refer to chapter 9. Device programming.

- 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.

8.11. DEVICE MONITOR



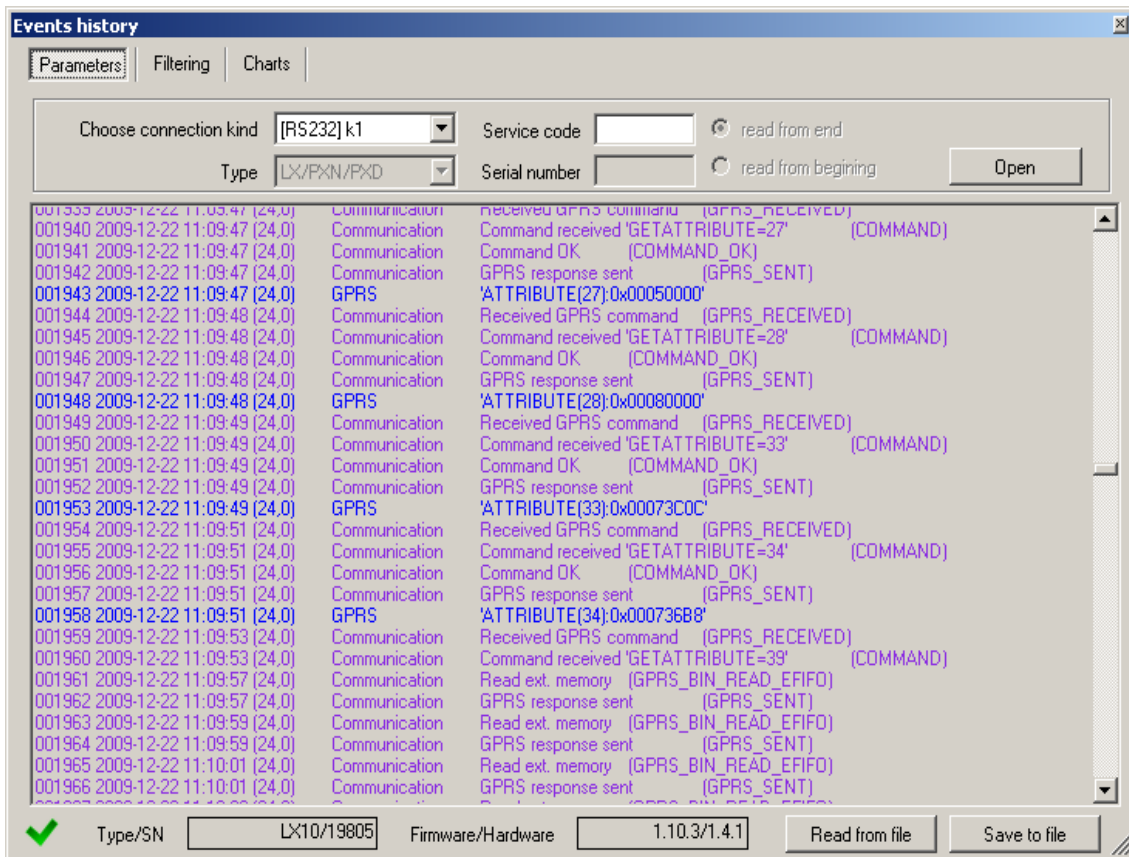
“Device Monitor” provides real-time information on device state. To use this function device must be connected to PC computer with GD-PROG cable (the switch in position DEBUG). Correct RS232 port must be chosen in “Port” field. “Device monitor” provides following information:

- 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.

Note: Relay output “NC-NO-C” in the Device Monitor window are presented as OUT3.

8.12. EVENTS HISTORY



„Events history“ provides information about last events stored in EPX400 device memory. EPX400 transmitter is able to save at least 5000 events. It is possible to read the history using a GPRS or RS232 connection. In the second case data can be send to PC via GD-PROG cable (the switch in position PROG). 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 EPX400 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.

Events history

Parameters | **Filtering** | Charts

All events
 Communication
 Tests
 Power
 Logs and diagnostics
 All reports
 System
 Connectivity
 Malfunctions

001912	2009-12-22 11:09:28 (24.0)	Communication	GPRS response sent (GPRS_SENT)
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)
001940	2009-12-22 11:09:47 (24.0)	Communication	Command received 'GETATTRIBUTE=23' (COMMAND)

Type/SN LX10/19805
 Firmware/Hardware 1.10.3/1.4.1

Events history

Parameters | Filtering | **Charts**

GSM signal
 GSM connection
 Mode: server
 Voice call
 Charger
 Battery voltage
 GPRS connection
 Mode: SMS
 CSD call
 Charging

History states for the device LX10/19805

Type/SN LX10/19805
 Firmware/Hardware 1.10.3/1.4.1

9. DEVICE PROGRAMMING

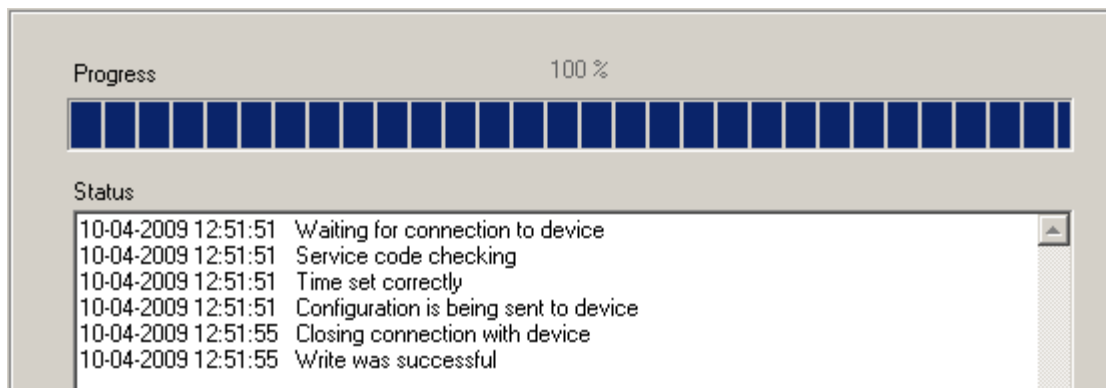
Programming of device is possible with "GPRS transmitters configurator" configuration program described in chapter 7. CONFIGURATION PROGRAM. To program the device establish connection with a device.

Depending on connection mode there are two ways for programming.

9.1. LOCAL PROGRAMMING

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 3. 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 3. Turn power supply on.
- g) The device is ready to transmit data.

9.2. REMOTE PROGRAMMING

Remote programming of device is possible if:

- user uses GPRS transmitters configurator and GSM modem connected to PC
- user uses OSM.Server 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 7.3.5.2. Remote connection – CSD connection).

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 7.3.5.2. Remote connection – GPRS linking, it is required to define remote link on grounds of OSM.Server parameters. As OSM.Server 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.Server Operation Manual.

9.2.1. The first programming of device

As the device does not have defined access parameters in respect of GPRS network and OSM.Server, programming shall be begun with providing parameters.

Irrespectively of providing these parameters the first operation shall be registration of device in OSM.Server data base.

Before remote programming user shall check that the device is furnished with SIM card (with reservations provided in chapter 8.1.1.2.) 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.Server console position cursor on proper device in "Devices" tab.
- b) Click "Config." option and then select "Set Configuration" function to display list 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 8. 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.

9.2.2. Reprogramming of device

As the device has defined access parameters in respect of GPRS network and OSM.Server, 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 8. 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.

10. 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. The device uses an encrypted protocol for transmission.

10.1. REMOTE COMMANDS DESCRIPTION

The following format of message is acceptable allowing to send some commands 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	Reset device. Note: all unsent events will be lost.
OUT=outNr, state	Turn on or turn off outputs. outNr specifies output number (0 for OUT1, 1 for OUT2, 2 for OUT3), state specifies requested output state (0 – switched off, 1 – switched on). <u>Examples:</u> <i>OUT=0,0</i> – switches off output OUT1 <i>OUT=2,1</i> – switches on output OUT3
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	Download device status. Command sends text back according to definition from chapter 8.6.3. <i>Status</i> .
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 address	If the role of the GPRS channel is sets as "Unused", this command sets the address of the server and the role GPRS channel as "Backup." If the role of the GPRS channel is DIFFERENT than "Unused" (it's mean turned on), this command sets only the address of the server.

SERVER= (empty string, without the parameter)	Clears the server address. NOTE: The Transmitter will not attempt communication with the server via GPRS.
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	If the role of the SMS channel is set as "Unused", this command sets the phone number of the server and the role of SMS channel as "Emergency". When there is GPRS failure, SMS with events will be sent to this number.
SMS= (empty string, without the parameter)	Clears the phone number. NOTE: The Transmitter will not go into SMS mode.
SMSPERIOD=time	Defines in minutes time between SMS test messages sending to the server.
RLIMIT	Removes automatic temporary locks on all inputs
RLIMIT=inputs_mask	Removes selected automatic temporary locks. Parameter is decimal number made from 10-bit word: A10 ... A2, A1, where A1 always equals 0, A2 means INPUT 1, A3 means INPUT 2, and A10 means INPUT9. <u>EXAMPLE:</u> <i>RLIMIT=6</i> removes locks on inputs:IN1, IN2 <i>RLIMIT=2</i> remove lock on input IN1
DT=YY/MM/DD, hh:mm:ss	Sets date and time in the transmitter; must be putted in a specific format (see the table on the left)
FLUSH=x	Flushes events buffer, where x is: <ul style="list-style-type: none"> • 2 – system events history
ETHSERVER=server_address:port	Server address and port which the transmitter EPX will connect. If the role of the channel ETHERNET was set as "Unused" is now set to "Main". Example: ETHSERVER = 89.123.115.8: 9000 The command returns: EOK - entered correctly value; EFORMAT - incorrect format of the command; EINVALID - if incomplete (e.g. the lack of port), or entering other characters after ":" than numbers.
ETHSERVER= (tzw. empty string)	Deleting the set server address.

ETHCONFIG=parameter	<p>It is used to configure the Ethernet interface where the parameter can be set to:</p> <p>DHCP - ETH interface set in DHCP mode;</p> <p>IP, MASK, GATEWAY [, DNS1, DNS2] - command sets the static IP MASK, GATEWAY, and optional server DNS1 and DNS2 (if the address is given in the form of domain e.g. black.autostrada.com)</p> <p>Example: ETHCONFIG = 192.168.7.7,255.255.255.0,192.168.7.5</p> <p>The command returns: EOK - entered correctly value; EINVAL - if the parameters do not correspond to the format of the IP address; EFORMAT - when the values of the parameters is not enough.</p>
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Notes:

1. *DESC, CMD, GETSTATUS, GETPARAM, GETCFG commands require separate SMS, so one command with only one SMS.*
2. *SERVER and SMS commands are not used to setting the priorities of the channel, but only for setting up a backup (or emergency) transmission channel in case of loss of communication with the monitoring system via main channel.*

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

11. LED DIODES INDICATION

LED diodes (4), mounted directly on printed circuit, are purposed to show current condition of the device.

11.1. 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		
	Green	Red
Logging to GSM		

11.2. GSM RANGE


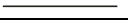


Flickering of a green diode indicates GSM signal (1-8 flickers).

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		
	Green	Red
GSM range = 8 GPRS mode		
GSM range = 6 GPRS mode		




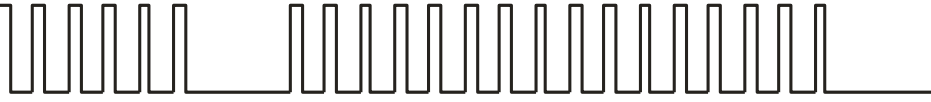
11.3. DATA TRANSMISSION

During data transmission a green diode indicates data transmitting.

Description	LED Diodes	
	Green	Red
GPRS Transmission		
SMS Transmission		





11.4. RECEIVING OF DTMF DATA

STATUS LED (blue) and DTMF LED (yellow) indicate actual condition during receiving data from a control panel.

Dioda LED	Signalling
<p>STATUS</p> 	
<p>DTMF</p> 	<p>(HandShake)</p> <p>(KissOff)</p>  <p>6 digits of phone 16 digits ContactID</p>


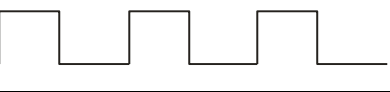
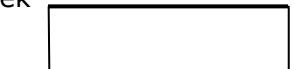
11.5. PROGRAMMING

After detection of programming cable, diodes indicate programming mode.

Description	LED Diodes	
	Green	Red
Connected service cable		
Programming in CSD mode		

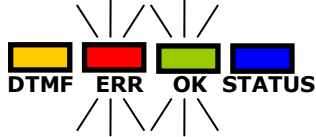
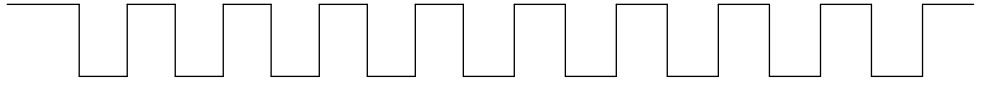

11.6. FIRMWARE UPDATING

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/sek)	
Software updating		
Received firmware decoding	 10 sek	

11.7. SIM CARD ERROR

In case of SIM card problems, device states this with ERROR LED (red) and OK LED (green).

LED diode	<p style="text-align: center;">Signalling</p> 
OK (Green)	
ERROR (Red)	

11.8. SYSTEM ERROR

Errors may occur during device operation. An error is indicated by a permanent lighting of red LED. In most cases it means a communication problem with the modem or SIM card.

12. CHANGELOG

<i>Date / Version</i>	<i>Description</i>
30.11.2015 / v1.0	First version of the manual
03.12.2015 / v1.1	Minor changes
15.01.2016 / v1.2	Expanded Ethernet description
08.07.2016 / v1.3	Removing few features
09.03.2017 / v1.4	Expansion of remote commands SMS and SERVER, added ETHSERVER and ETHCONFIG commands.
16.03.2017 / v1.5	Updating information about GPRS Transmitter Configurator
27.03.2017 / v1.6	Added information about "Embedded HTTP server"
30.10.2017 / v1.7	Update requirements for the computer in reference to configurator; replacement of OSM.2007 with OSM.Server