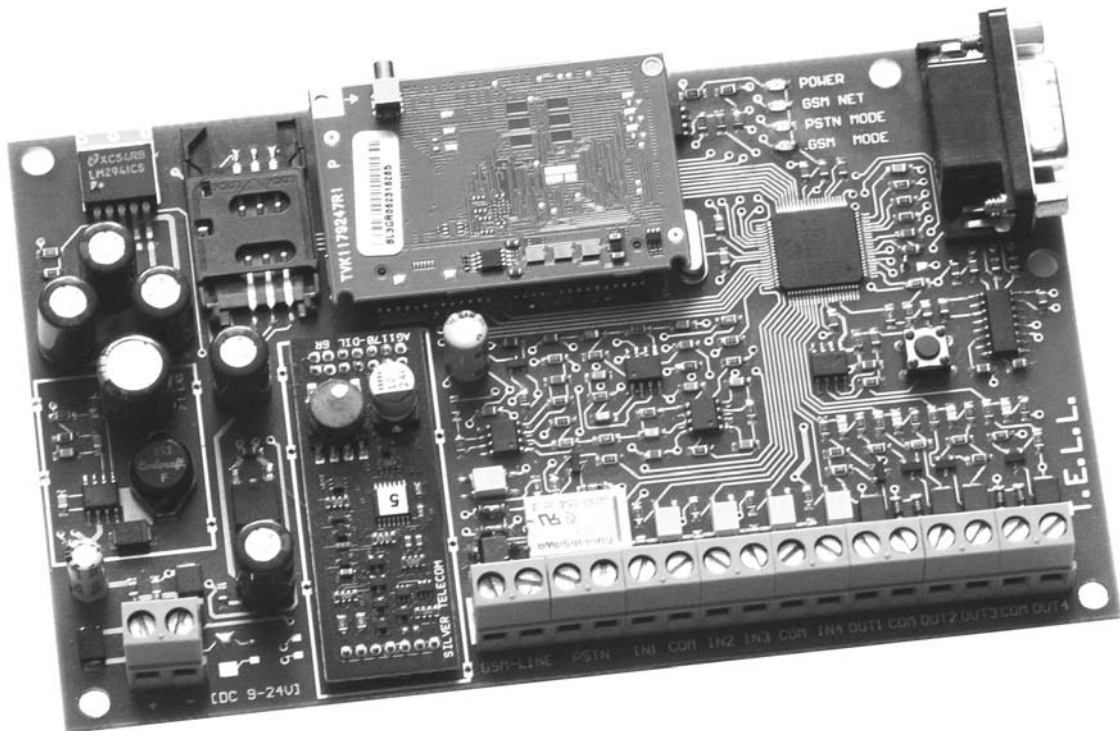# GSM-LINE ADAPTER PRO 5
GSM 900/1800 MHz

USER MANUAL

Functions of the Unit

The purpose of the GSM-LINE ADAPTER PRO 3 is to interface to GSM network an alarm system that can inform the security monitoring station through wired telephone line.

There are two main application areas of the unit:
- This adapter makes it possible to install alarm systems in places where there is no wired PSTN line but it can be necessary to alarm the security monitoring station.
- By means of the GSM transmission, the adapter improves the reliability of alarm reporting in cases when the wired alarm transmission does not work or fails (e.g. when the phone lines are tampered or the telephone service is suspended due to technical reasons).

The adapter has some additional functions:
- The unit continuously watches if a CONTACT ID or ADEMCO Express report is directed towards the security monitoring station through the wired or GSM network, and if either of the preset report codes is noticed, it sends an appropriate SMS message with definable text to one or two telephone numbers. Using this function, the owner can get instant SMS messages not only of alarms but also of every event of closing/opening.
- The module can convert CONTACT-ID signals into SMS messages without being connected to the monitoring station. To do this, enter 123456789 instead of the telephone number of the monitoring station. In this case **GSM-Line Pro 5** module will simulate the monitoring station.
- The adapter can be set to forward the SMS messages arriving to the SIM Card to one or two phone numbers. This function makes the use of non-subscription cards more secure, since the owner/user can get the message about the actual balance to his own phone set.
- In connection with certain special devices (e.g. emergency telephone) a telephone number can be set, which the module will automatically call when the receiver is picked up.
- Moreover, as a result of short circuit contact (IN1, IN2, IN3 inputs), it is possible to send an SMS message with pre-set text.
- By means of OUT1 and OUT2 open collector outputs, it is possible to turn on and off different devices remotely, through a telephone call.

Operation of the Unit

In case of incident, the alarm system initiates a call to the monitoring station.
The adapter continuously watches the existence and the functioning of a wired phone line. If there is a functioning wired phone line, the unit directs the call to it; otherwise, if no wired line is connected or the connected line does not work, the unit initiates the call through the GSM network. Usually, an alarm system can be programmed to give a PGM output signal if it could not access the monitoring station on several attempts (e.g. due to some fault in the telephone exchange or sub-exchange). Connecting the mentioned output of the alarm system to the **IN4 (DIRECT GSM)** terminal of the adapter, it is possible to switch over to direct GSM transmission even if a functioning wired phone line is connected to the adapter.

Preparation of the SIM Card

The SIM card necessary for the operation of the unit can be bought from any GSM service provider.
(The adapter is independent of the actual GSM network).
For preparation and programming purposes, insert the SIM card into a mobile phone and perform the following settings.
Before starting to set up the adapter, go through the following steps using the mobile phone:
- Make sure that the number of the SMS message centre is correctly set on the SIM card.
- **Disable the PIN code request** on the SIM card so that it shall not prompt for a PIN code on turning the unit on.
- Delete the unnecessary SMS messages from the card.

Setting the Parameters of the Adapter

For the basic operation of the unit, it is not necessary to set any parameter on the SIM card.
However, in order to reach the additional functions of the adapter as detailed in the following sections, it is required to set certain parameters (e.g. the owner's phone number, the number to be dialed to access the external PSTN line, the texts of SMS messages, etc.)
These parameters can be entered in two ways:
- By means of a computer, from www.tell.hu with the freely downloadable **"Pro5 programmer""** through serial port.
- By means of the SIM card inserted in the module, in the form of telephone directory entries (phone numbers) and stored SMS messages
(Only core settings can be reached by means of SIM card downloading, for setting extended functions, the use of "Pro5_programmer" is necessary.)

In the latter case, insert the SIM card into a normal mobile phone and enter the necessary parameters as phone numbers into the directory. Enter the necessary SMS messages too, but, instead of sending them, save them on the SIM card by selecting "SAVE" in the menu. (This will result in putting the message among the messages that can be sent later.)
It is important that the telephone numbers and SMS messages should be stored on the SIM card and not in the telephone's own memory.
When you have entered the necessary parameters into the SIM card, make sure that the adapter is not under voltage, and put the card into the SIM case of the unit.
Then connect the power supply to the panel and push the button next to the SIM case for approx. 5 seconds, until **PSTN MODE and GSM MODE** LEDs start quick, alternate blinking. Then the adapter loads over the corresponding parameters from the SIM card into its own memory. This process lasts about 2 minutes, and then the quick blinking terminates. (If the loading was not successful, e.g. due to a break in the power supply, the slow alternate blinking of the two LEDS indicates that the loaded data are faulty. Then you must start the loading procedure once again.)

The module only reads and does not modify data on the SIM card.

Function of the IN4 (DIRECT GSM) Input

Short-circuiting the IN4 input, the module switches over to GSM transmission, i.e. irrespective of the existence of an analogue phone line, the adapter initiates the call through the GSM network. This ensures the call transmission in case there is some fault in the telephone exchange or sub-exchange, i.e. if the wired phone line seemingly works but the alarm system cannot reach the monitoring station through the wired PSTN network. Most alarm systems can be programmed to give an output PGM signal after a certain number of unsuccessful attempts. If this signal arrives to the IN4 input of the adapter, i.e. the wired line cannot be used, the unit will initiate the next call through the GSM network. If there is no wired telephone line connected to the adapter, additional care must be taken to connect the IN4 input as follows:
If it is necessary to manage incoming GSM calls, connect the IN4 input to the alarm system so that it will short-circuit the input at the time of starting a call. This is important to prevent an eventual incoming call from disturbing alarm reporting.

Receiving calls through the GSM network

GSM-LINE ADAPTER PRO 5 is able to manage the calls coming through the GSM network, i.e. it can receive the incoming GSM calls by means of a simple analogue telephone set in places where there is no wired phone line extension.
This function works only if there is no wired telephone line connected to the module and the IN4 (DIRECT GSM) input is not short-circuited. (This input of the module prevents the eventual incoming calls from disturbing the outgoing calls initiated by the alarm system.)
Furthermore, incoming calls can be restricted according to telephone numbers. This function can only be set by means of „PRO5_programmer", and not by SIM card downloading. (After SIM card downloading, the module enables all incoming calls.)
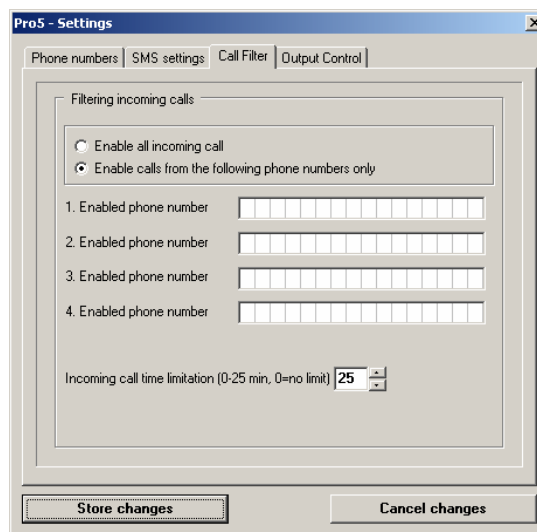
 The duration of incoming calls can be restricted as well.

Important note: In case of telephone number restriction, do not write the inland area changing prefix before the telephone number, only the area code and telephone number. (The telephone uses international format +3630… while displaying telephone numbers. The module compares the received telephone number with the restricted telephone number by starting to compare them from the last digits. The module handles the two numbers as identical even if +36 is left out.

Setting a prefix number necessary to access external PSTN line

If the module is connected to a wired network where the dialing of a certain number (e.g. 9) is necessary to access the external PSTN main line, this number must be given the adapter so that it shall omit this number from the called number in case of initiating a GSM call.
To do this, enter a new item into the telephone directory of the SIM card under the name **#PREFIX**, and give the number that is necessary to access the external main line as a phone number (e.g. 9).
This newly entered parameter can be used when it has been downloaded into the adapter's own memory as detailed in the section "*Setting the Parameters of the Adapter*".
Setting can also be performed with **"Pro5_programmer",** by means of the computer through serial port.
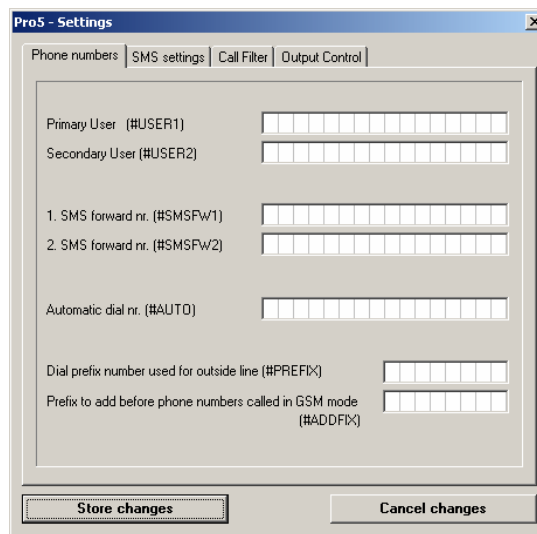
As it can be seen on the picture there is an #ADDFIX parameter.
This is another prefix number, which the module inserts in front of the dialled number in all those cases when the telephone call takes place through GSM network (GSM mode)
(For example, if the alarm system calls the wired telephone number without the area code, with this parameter the area code can be added in case of calls through GSM network. In fact, this function got vital importance because of the characteristics of some foreign wired telephone line networks.)

Forwarding Incoming SMS Messages

It is possible to send the messages received by the SIM card to one or two other phone sets. This makes safe the use of cheap non-subscription cards for security purposes. To do this, enter the one or two phone numbers that you would like to get the incoming SMS messages, under the name(s) **#SMSFW1** (and **#SMSFW2**) into the directory of the SIM card.
(These parameters have to be loaded over into the module's own memory according to the section "*Setting the Parameters of the Adapter*".)
(Setting can be done with **"Pro5_programmer"** by means of a computer, through serial port, according to the picture above.)

Note: When the module successfully forwarded the incoming SMS message, the message will be deleted from the SIM card to make space for further incoming messages.

Sending SMS Messages In Case of Alarms or Other Incidents

The adapter continuously watches the calls initiated through the GSM network, and notices the reports of **CONTACT ID** or **ADEMCO Express** formats. If it observes any of the given incident codes (maximum 10), it will send an SMS message to one or two telephone numbers with a text that can be set by the user. This function needs the setting of the following parameters:

- Enter the phone numbers that you would like to send the SMS message to, into the directory of the SIM card, under the names **#USER1** and **#USER2**.
- Also enter the customer identification code into the directory of the SIM card under the name **#USERID** just like when entering a phone number (the module will watch only the reports having this customer identifier).
- Enter the incident codes that should be responded by the unit and the texts belonging to them as SMS messages, into the SIM card.

  In case of **CONTACT ID** format, the SMS message must start with a 4-digit incident code, then comes a '#' character, and then you can enter the required message.
  e.g.   **1130#Burglary**   *(The first digit "1" means new event or opening)*
  or   **3130#Restore after burglary** *(The first digit "3" means restore event or closing)*
  You can use the '*' joker character in the incident code, then the adapter accepts any digit in the place of the joker character.
  e.g.   **313*#Alarm**   In this case the module will send a message when it observes any incident that has a code starting with the 313 sequence (3130 .. 3139).

  In case of **Ademco Express** format you have to create similar SMS messages with the only difference that the incident codes have only two digits.
  e.g.   **31#Burglary**
  Here you can also use the '*' character.
 e.g.   **3*#Alarm**
          (This message will be sent in case of any incident with a code between 30 and 39)

Note! By entering **$** character in the text of SMS, in the sent SMS the information of **"event code/partition/zone"** will appear instead of $.

Note! In general, a maximum number of 10 messages can be stored on the SIM card; therefore, if you wish to send further SMS messages as a result of IN1, IN2, IN3 inputs besides the mentioned 10 messages, the use of **"Pro5_programmer"** is necessary for the setting.

Note: The module does not perceive signals sent through wired telephone lines.

Note.: In **Pro5_programmer** when an ADEMCO-Express code is entered, two zeros have to be inserted before the code.   (e.g. in case of 31=alarm, 0031 has to be entered in the program)
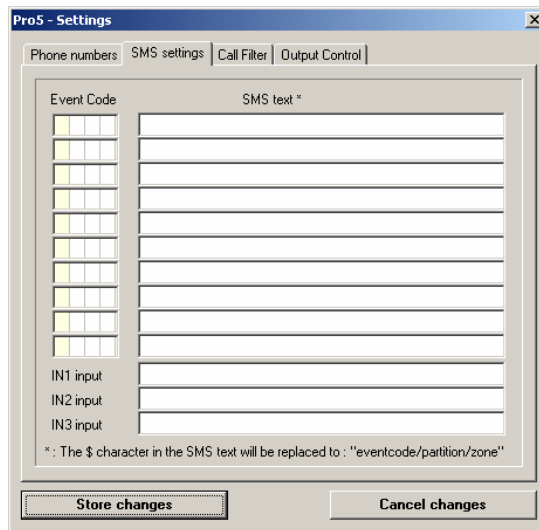
Sending SMS as a result of IN1, IN2, IN3 inputs

It is possible to send SMS to telephone numbers #USER1 és #USER2 due to short-circuit impulse on IN1, IN2, IN3 inputs. For this, enter an SMS message to the SIM card (as described previously) starting with **1#**, **2#** or **3#** then continuously the text of the message to be sent as a result of the given input. (The prepared SIM card must be downloaded to the module as described earlier).
(In the picture above, you can also see how to set this parameter.)

Sending SMS messages on event, without being connected to a monitoring station

If you do not wish the alarm system's signals to be directed to the monitoring station, it is still possible to send SMS messages in case of some events. To do this, enter 123456789 instead of the telephone number of the monitoring station into the device. In case of alarm, the device will dial this number. The adapter module does not initiate a real phone call, but simulates the operation of the monitoring station (gives out handshake signals and acknowledges CONTACT-ID and ADEMCO Express signals).
It is possible to send SMS messages about the received signals. For this, the SMS messages to be sent have to be preset, as it is described in the previous section.

Automatic dial

In certain, specific tasks (e.g. emergency calls) the following function can be used. Enter a telephone number and call it #AUTO into the telephone directory of the SIM card, then load it into the module.
As a result, the module shall immediately initiate a call to the preset number through GSM network when the receiver is picked up.
(See picture at setting prefix numbers.)

Preparation of the Alarm System

Before installing the adapter, check the following settings on the alarms system:
- **The report format must be set to "CONTACT ID" or "ADEMCO Express".**
- **The call numbers of the monitoring station must be given together with district numbers so that they can be called from the SIM card through the GSM network.**
- **Dialing should be set to TONE mode**

Testing GSM Field Strength

After the pushbutton on the adapter has been pressed for a short time, the number of blinks of the GSM MODE LED on the adapter indicates the actual field strength on a scale between 1 and 5.

Pushbutton Functions

The pushbutton on the adapter serves two functions:
- Pressing for a short time, you can test the field strength (see the section "*Testing the GSM Field Strength*" and "*Listening to the line*")
- Pressing for a longer time (at least for 5 seconds), you can start the process of loading the data stored on the SIM card into the module (see the section "*Setting the Parameters of the Adapter*")

Controlling outputs

OUT1 and OUT2 open collector outputs can be turned on and off remotely through a telephone call. For this, set the parameters below in "PRO5_programmer" program.

Remote control will be reachable from the numbers set here. If there is an incoming call from any of the here given numbers, the module does not forward the call to the security panel or the telephone set, but automatically receives the call. A beep signals ready to use condition in the telephone, and the two outputs can be controlled through the phone by pushing the below mentioned buttons.

1# - turn on OUT1   2# - turn on OUT2
4# - turn off OUT1   5# - turn off OUT2

On the picture above it can also be set that the output should automatically turn off in certain given seconds after it is turned on.

Important note! Do not use area changing prefix when entering the telephone number, use only area code and telephone number, the same way as described in "Receiving calls through the GSM network" section.

LED Lights of the Unit

There are six LED lights on the module, indicating the following operational conditions:

- **POWER:** Indicates that the power supply is on
- **GSM NETWORK:**
  - Its continuous lighting indicates that the module is connected to the GSM network.
  - If the LED does not light at all, the attempt to sign in the GSM network has failed or is in progress.
- **PSTN MODE:** indicates the existence of an operating wired telephone line
- **GSM MODE**: Indicates that a call is going through the GSM network.
- **LED at output OUT3**: Indicates that either the GSM module has not been able to connect to the network after trying it for 3 minutes, or the field strength has decreased under the required minimal level for more than 3 minutes. When the OUT3 LED is lighting, the OUT3 output also gets activated, and it can be fed back to the alarm system or used for initiating local alarming.

- **LED at output OUT4:** Indicates if the wired line has not been in operating mode for more than three minutes. At the same time the OUT4 LED signals, the OUT output also gets activated and this can be fed back to the alarm system or used for initiating local alarming.

- **PSTN MODE and GSM MODE:** The slow alternate blinking of these two LEDs indicates that there are no parameters loaded from the SIM card in the module, or the loading process was unsuccessful. Their quick alternate blinking indicates that the loading process of the parameters from the SIM card is in progress.

Instructions on Installation

Before installing, check the future environment of the adapter:

- Test the field strength with your mobile phone. It may happen that the field strength is not sufficient in the selected place. In this case you can change the planned installation place before you mount the adapter. If there are field strength problems on the site of installation, order a longer antenna adapter that enables you to put the antenna higher.
- Do not mount the unit in places where it is influenced by strong radiofrequency disturbances (e.g. near electric motors, etc.).
- Do not mount the unit in wet or humid places.

Mounting

Plastic fixing clips are supplied with the unit. If it is possible, put the GSM adapter into the same metal house as the alarm system. If there is not enough room in the house of the alarm system, put the adapter into another metal case.
Fix the antenna on top of the case. Only after the antennae is fixed should you start mounting the alarm system and the adapter.
Screw the bigger connector of the antenna adapter cable into the antenna connector, then carefully flip the other end of the cable into the mini connection of the telephone module.

IMPORTANT NOTE: Make sure that you do not force and drag the antenna cable while fixing it, because we do not take guarantee if a mechanical damage occurs!

Connections

- In case a wired telephone line exists, connect the ends of the phone line to the terminal PSTN. The polarity is indifferent.
  If the PSTN MODE LED lights, the line has been connected correctly.
  (The signal of PSTN MODE LED is delayed)
- Connect the phone line input of the alarm system to the "GSM-LINE" output of the GSM adapter with the shortest cable possible. Here the polarity is also indifferent.
  Use possibly shielded cable, and connect one end of the shielding to the ground potential while leaving the other end free.
- Installation of further connections (**IN1, IN2, IN3, IN4, OUT1, OUT2, OUT3, OUT4**) can be done if requested, see at functions.

Setting Up

- Click the SIM card in its place, if it is necessary, in programmed state. PIN code request should be disabled.
- Make sure that the connections correspond to the above instructions.
- Put the unit under supply voltage (9-24V). Make sure that the energy supply capacity is enough when the alarm system and the adapter are working together.
  The rest current of the adapter is 200 mA, but the current may reach 500 mA during communication.

Setting by means of the computer

All necessary parameters for the operation of the module (beside downloading from a SIM card) can be done by means of a PC.
Download **"Pro5_programmer"** from www.tell.hu on the Internet.
For programming, it is necessary to have a 9-pole serial connecting cable (serial mouse expanding cable)
Connect the modul and the PC with the serial cable.
Run the program and choose the serial port where the module has been connected.
With this program not only settings, but the operation of the module can be traced as well.

Further notes

- The adapter accepts both Tone (DTMF) and Pulse dials.
- The adapter does not know the length of the number to be dialled in advance, therefore, do not wait too long before entering the next figure at, because if you do so the module might suppose that dial has already finished. (The adapter expects at least 7 figures, and does not start dialling until they are entered. It starts calling a number of 7 and 10 digits after a 5 second pause. In case of 11 or more figures, the adapter starts dialling after a 2 second pause.)
  If alarm systems are included, the above mentioned does not mean a problem because of the quick automatic dial, you have to consider this problem only in case of manual dial.
- You can dial telephone numbers shorter than 7 digits by entering # after the number.

## Enabling and disabling telephone number display

By entering *31# before the telephone number, telephone number display is enabled on the called person's telephone, and by entering #31# this function is disabled.
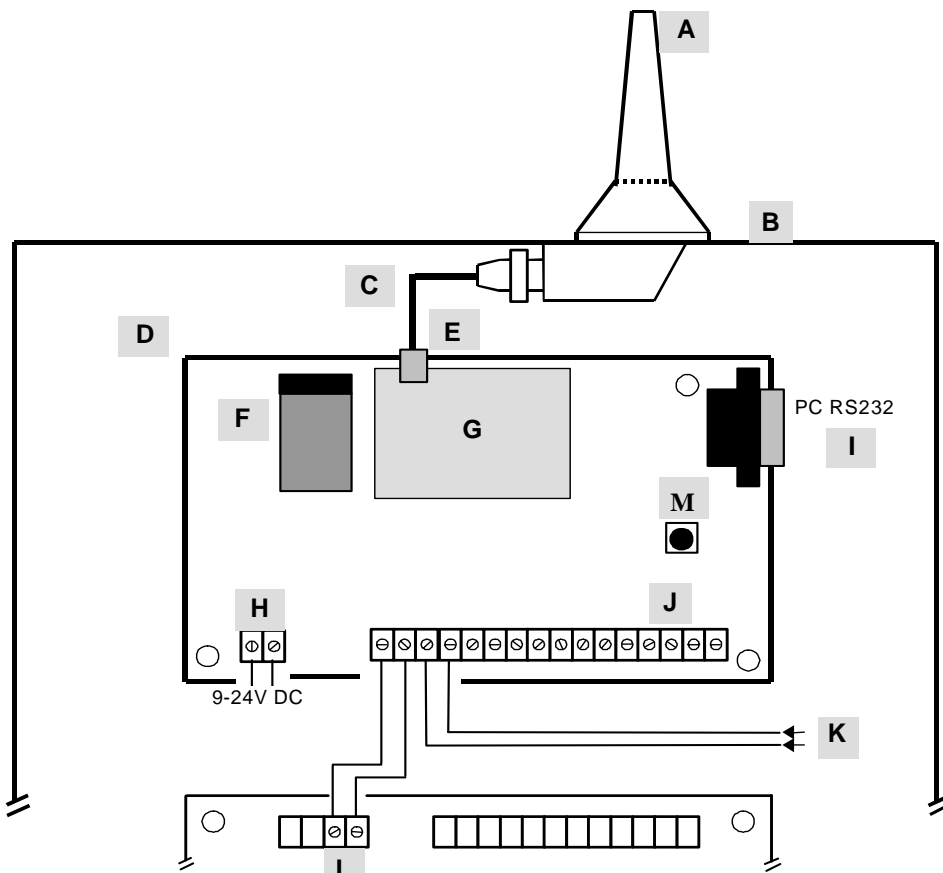
A – Antenna
B – Metal house
C – Antenna adapter cable
D – GSM-Line Adapter Pro 5
E – Antenna connection
F – SIM card case
G – GSM module
H – Power supply terminals 9-24V DC
 I – RS232 connector for the communication with PC
J – **Connectors :**
    - GSM-LINE (2 wire): Generated telephone line/ PSTN line connector towards the alarm system
    - PSTN   (2 wire): Connector for incoming wired telephone line
    - IN1 (contact input for sending SMS)
    - IN2 (contact input for sending SMS)
    - IN3 (contact input for sending SMS)
    - IN4 (DIRECT GSM function)
    - COM common point (ground) for IN1.. IN4 inputs
    - OUT1 : output that can be remote controlled through a telephone call (open collector)
    - OUT2 : output that can be remote controlled through a telephone call (open collector)
    - OUT3 : output for signalling the failure of GSM line that lasts longer than 3 minutes (open collector)
    - OUT4 : output for signalling the failure of wired line that lasts longer than 3 minutes (open collector)
K – Incoming wired telephone line (PSTN)
L – Telephone line input of alarm system
M – Pushbutton

Technical Data:

Supply voltage: 9-24V DC
Maximum power consumption: 500 mA
Operational temperature: between -10 ºC and + 60 ºC
Transmission frequency: GSM 900 MHz / PCN 1800 MHz
Dimensions: 127x86x27 mm
Net weight: 70 g
Gross weight (packed): 400 g
- Outputs OUT1, OUT2, OUT4, OUT4:
    - open collector outputs
    - current max 100mA
    - allowed smallest load: min.150 Ohm
    - it is necessary to use protecting diodes in case of using relays * (e.g. 1N4004)
    - **It is forbidden to connect it on supply voltage without loading!**
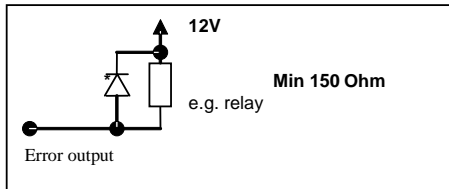
Data of generated telephone line

Line voltage: 48 V
Line current: 25 mA
Line impedance: 600 Ohm
Ringing voltage: ±72 V (25 Hz)
Dial tone: 400 Hz

Supply Content:

- **GSM LINE ADAPTER PRO 5**
- Antenna adapter cable (MMCX-FME)
- GSM 900 MHz / PCN 1800 MHz antenna
- 4 pieces of fixing supports
- User's Manual, Letter of Guarantee

Summary table of parameters:

#SMSFW1 #SMSFW2	Phone numbers necessary for forwarding the incoming SMS messages
#PREFIX	Prefix number necessary to access the external PSTN line
#USER1 #USER2	Phone numbers that get SMS messages from the module in case of observing given incident codes
#ADDFIX	Prefix number that should be added to telephone numbers called in GSM mode
#AUTO	Phone number for autodial function