COMMUNICATION MODULE

GSM-3

(program version 3.05)

OPERATING INSTRUCTION

GDAŃSK, POLAND

gsm3_e 12/02

VERSION 3.02

The software version 3.02 for the GSM-3 communication module is supplemented by the new servicing function the „***Bypassing input***” in submenu “Inputs/Outputs” – as compared to version 3.01.
Sending and receiving SMS text messages is now acknowledged by appropriate messages on the module’s display.
Pager telephone number, programmed in the alarm control panel, can be dialled by this panel in pulse or DTMF tone dialling modes (only tone dialling mode for version 3.01).

VERSION 3.03

The version 3.03 of the module software has been supplemented by the „***GSM main line***” function in the main menu of the servicing mode.
The „*Flash via GSM*” function has changed its name to „***FLASH – GSM/TL***”, and also its operation and description have been partly changed. Now the telephone „*FLASH*” function will connect the output line from GSM to cable or vice versa – depending on which basic line is chosen. In previous versions, the cable line, unless inoperative, was always the basic line.
Section 1 has been supplemented by a description of the module new features.
Section 3 contents has been changed to include the option of basic line selection and the function of changing voltage polarization across T-1 and R-1 terminals after getting connected (new function of the module).
During messaging, the module displays a corresponding message.

VERSION 3.05

Section 5 - the option to disable the "Tel. line failure" message has been indicated in the note.

Section 8 – a distinction between violated and non-violated zones has been introduced for SMS confirmation of zone status.

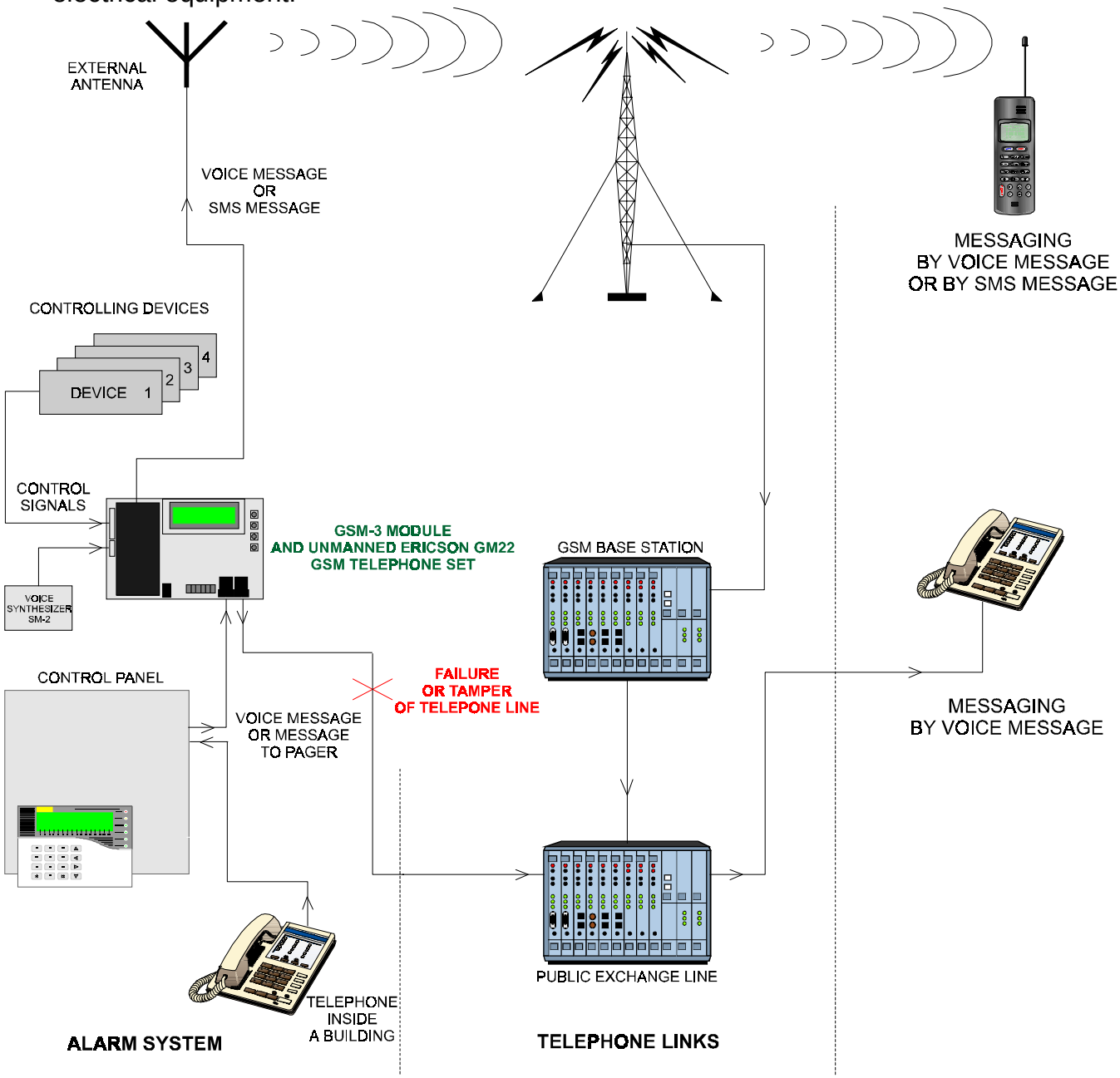
Section 11 – a functional description of new *"Service code"* function has been added. The main menu has been extended by this function and two new options: „*Show T l.failure*” and „*Show dial.num.*”

Section 12 – descriptions of new options and the „*Service code*” function have been added.

CONTENTS

The GSM-3 communication module performs four essential operations:

1. Checks if a cable telephone line is available to get the possibility of the phone connection. In case of a loss of such possibility, the module replaces the cable line with the ERICSSON GM22 professional cellular telephone. The module can also send a message about the telephone line failure to the user.
2. Captures text messages to be sent to paging system, and transmits such messages in a form of SMS text message to the required cellular telephone number.
3. Checks the status of four inputs and informs the user on the violation of these inputs, or about the termination of such violation. The messaging can be implemented by SMS text message or by voice message – replayed from the SM-2 voice synthesizer and supplemented by special acoustic signals
4. Supervises the status of three outputs, which can be used for remote controlling the electrical equipment.



SINGLE-LINE DIAGRAM OF CONNECTING THE MODULE TO A TELEPHONE LINE THE ARROWS SHOW THE ROUTE OF MESSAGING AN ALARM IN CASE OF A FAILURE OR A LOSS OF TELEPHONE LINE.

Figure 1

1. GSM-3 MODULE FEATURES:

- Operation with ERICSSON GM22 two-range professional cellular telephone, compatible with any GSM network.
- Operation with alarm control panels and with other equipment (e. g. DT-1 plus telephone set) using the telephone line for transmitting the voice information about the alarm, or for sending the text message to paging system.
- Capability of telephone messaging about the alarms on site at the loss or the failure of the cable telephone network.
- Answering incoming and making outgoing calls via cable telephone network and via mobile communication system (cellular network).
- Option to choose the basic outgoing line: GSM / cable (subscriber line).
- Signaling of answering (receiving) a call initiated from the module T-1, R-1 terminals by changing the voltage polarization across those terminals (possibility of tariffication).
- Operation with PBX telephone exchange as additional subscriber's line.
- Impulse and tone dialing modes.
- Substitution of the direct access to cable telephone network and the access to cable telephone network via PBX.
- Four inputs, the violation of which (and restoring to normal status) can be monitored by SMS messages or voice messages.
- Three outputs for controlling the electrical devices (e. g. by relays directly connected to the module).
- Output for signaling the telephone line failure and the cellular line failure.
- Remote controlling the status of module's outputs and bypassing the module inputs by using SMS text message or dual tone phone push - buttons (DTMF Signals).
- Capability of recognizing the message directed to paging system and transmitting it in the form of SMS text message to any cellular telephone number. SMS messages are always sent, irrespective of availability of subscriber's telephone line.
- Possibility of restricting the access to cellular telephone by making connections to 32 precisely defined numbers, or reduction of available numbers by assigning initial digits to such numbers.
- Checking for cellular telephone availability and for antenna signal level.

2. LIMITATIONS

Since cellular telephones are designed from the point of view of the best possible transmission of the voice signals, it is reasonable that the data compression systems, which are used in cellular communication, introduce distortions into the audio signals transmitted. Because of this, it is impossible to downloading (to transmit modem signals) via simulated telephone line. Such condition limits to a large extent, and often even make it impossible to perform the monitoring by using GSM-3 communication module. The possibility of using this module for operation with monitoring stations is not provided for by the manufacturer.

Cellular telephones make limitation in using the remote control function by DTMF signals. Not every type of cellular telephone can generate the proper form of these signals. Some models of cellular telephone have a special function permitting the DTMF control - in such case, this special function is to be activated.

The function of remote control by DTMF signals are always available from a traditional, stationary telephone set. The only limitations in this case can result from the quality of telephone cables and the telephone signal level, which reaches the module.

3. OPERATION OF THE MODULE WITH THE ALARM CONTROL PANEL AND THE STATIONARY TELEPHONE

As shown in Figure 1, the module is to be connected in series between the telephone line (if it is available) and the remaining devices which use the same line. Where a selection option is provided, then, using the appropriate service function, determine which output line (GSM/cable) will be the basic one. The module will test availability of the selected line and in case of troubles the calls will be routed through a parallel line.

The telephone line simulation mode, in which the GSM-3 module takes over the task of handling the devices connected to the T-1 and R-1 terminals, consists in providing across these terminals impedance and voltage required for proper operation of the telephone. From the point of view of the equipment connected, the module is considered as a typical telephone exchange providing the cable telephone line. The parameters of the module output line (T-1, R-1) meet the requirements of Polish standard for subscriber equipment.

When the control panel is „off-hook", or when a user lifts the handset of a telephone connected to the T-1 and R-1 terminals, the module will generate the continuous dialing tone and receive the tone or pulse dialing signals (similarly as the telephone exchange). If the first four digits of the dialed number correspond to the pre-programmed „pager station number", the module goes over to the procedure of receiving the alphanumeric message and sending it as an **SMS text message** (see Section 9). Checking of the first four digits is always performed.

In case the telephone line is lost or when the GSM telephone has been chosen as the basic connection mode, the module, after receiving the whole telephone number for outgoing connection, makes appropriate corrections to this telephone number, and then initiates dialing and getting connection via the GM22 telephone. The corrections are necessary, since the module gets the dialed telephone number as when connecting via the cable telephone network, while the connection through a cellular telephone requires area codes to be given. The principles of conversion are described in Section 10. When the cellular telephone gets connected, the module transmits L.F. audio signals between the extension line T-1 and R-1 terminals and the cellular telephone.

In case the telephone cable line is operative and has been chosen as the basic one, signals from the telephone set (T-1, R-1) are directly transmitted to the telephone line terminals (TIP, RING).

The voice messaging initiated by the alarm control panel is effected in a manner selected as the basic one (if this is impossible, the module selects a substitute way).

When making a call from the telephone connected to the GSM-3 module, the user has **the option to select the connection route: via cable or via GSM**. Lifting the handset makes the basic line available for getting connections. Pressing the **FLASH** key on the telephone will change the output line from the basic one to the substitute one (GSM to cable or cable to GSM). This function of the module is set up by means of the „*FLASH – GSM/TL*" service function.

After the handset is lifted by the subscriber the connection is made with, the module changes the direct voltage polarization across the T-1, R-1 extension line terminals. This function makes it possible to keep individual tariffication of telephone calls.

Since the cellular telephone, being the integral part of the module, has its own number (SIM card number), there is the possibility of calling to this number. **The incoming calls** to the GM22 cellular telephone are transferred to T-1 and R-1 terminals of extension line, and the ringing tone will be generated - similar as during making connection via cable telephone line. It is then possible to answer on incoming call by a telephone set connected to this extension

telephone line. To enable this function, the option for answering calls has to be selected by the servicing function having the same designation.
The capability of answering the calls is utilized for remote controlling the status of outputs and for bypassing and unbypassing the inputs of the module. The possibility of receiving and sending SMS text messages via the GM22 cellular telephone is used for the some purposes. The function of remote control is described in section 8.

4. OPERATING INSTRUCTION FOR THE GM22 CELLULAR TELEPHONE

The GM22 industrial cellular telephone, similar as any other cellular telephone, can be operated by **SIM activation card**. The user of the GSM-3 module and the GM22 telephone has to obtain such card. The SIM card is inserted into a special holder located under a small cover at the front part of the telephone.
PIN code is entered in the module's memory by the servicing function from the sub-menu "***GM22 options***". The change of PIN code or entering PUK code, if needed, is only possible after putting the SIM card into an ordinary cellular telephone.
While making connection, the telephone transmits its own identifier (ID), unless this function is reserved at GSM operator (change of option is available via normal telephone set).

The **green LED** is located at the outer, upper part of the GM22 telephone housing.

The meaning of LED's light is as follows:
- Slow flashing: proper operation of the GM22 telephone with the GSM-3 module.
- Flashing at high frequency: the telephone receives SMS message
- Steady light: the telephone is not logged in the network.
- OFF: loss of power supply.

The GM22 cellular telephone set is delivered with special cable fitted, having a connector for external antenna (see fig. 2). Addition adapter for antenna is delivered as well.

5. DESCRIPTION OF THE MODULE

The module has the build in **LCD display** which is used for reading the information on the current status of the module, and for programming the data required during normal operation.
In the first line of LCD display (during normal operation), the following information is displayed: the telephone line status, the GM22 telephone status, power level of the signal received by antenna (0-4) and the status of the inputs and the outputs of the module. The antenna symbol flashes during the communication of the GM22 telephone with GSM base station (during telephone connection as well).
In the second line, the information about the current status of the module is displayed (e. g. dialing, loss of telephone line, telephone number at dialing and others).

***Note**: The message **"Phone line loss**" is displayed when cable telephone line (subscriber's line) is not connected to TIP and RING terminals or to LINE socket - this is a normal operation condition in case of the loss of such line. It is possible to disable the function of displaying this message – just deselect the option „Show T l.failure" in the main menu.*

THE MODULE'S TERMINALS:

TIP, RING	- public exchange telephone line (subscriber's line)
LINE	- jack for public exchange telephone line
T-1, R-1	- extension telephone line (connection to the alarm control panel or to a telephone set)
PHONE	- jack for extension telephone line
+ 12V	- power supply input

GND - ground (0V)
SM2 - socket for the SM-2 voice synthesizer
IN1-IN4 - the module's inputs
OT1-OT3 - the controlling output (OC)
OT4 - output (OC) for signalling the failure of telephone line or GM22 telephone – designate as "AWL" in previous versions of GSM modules.

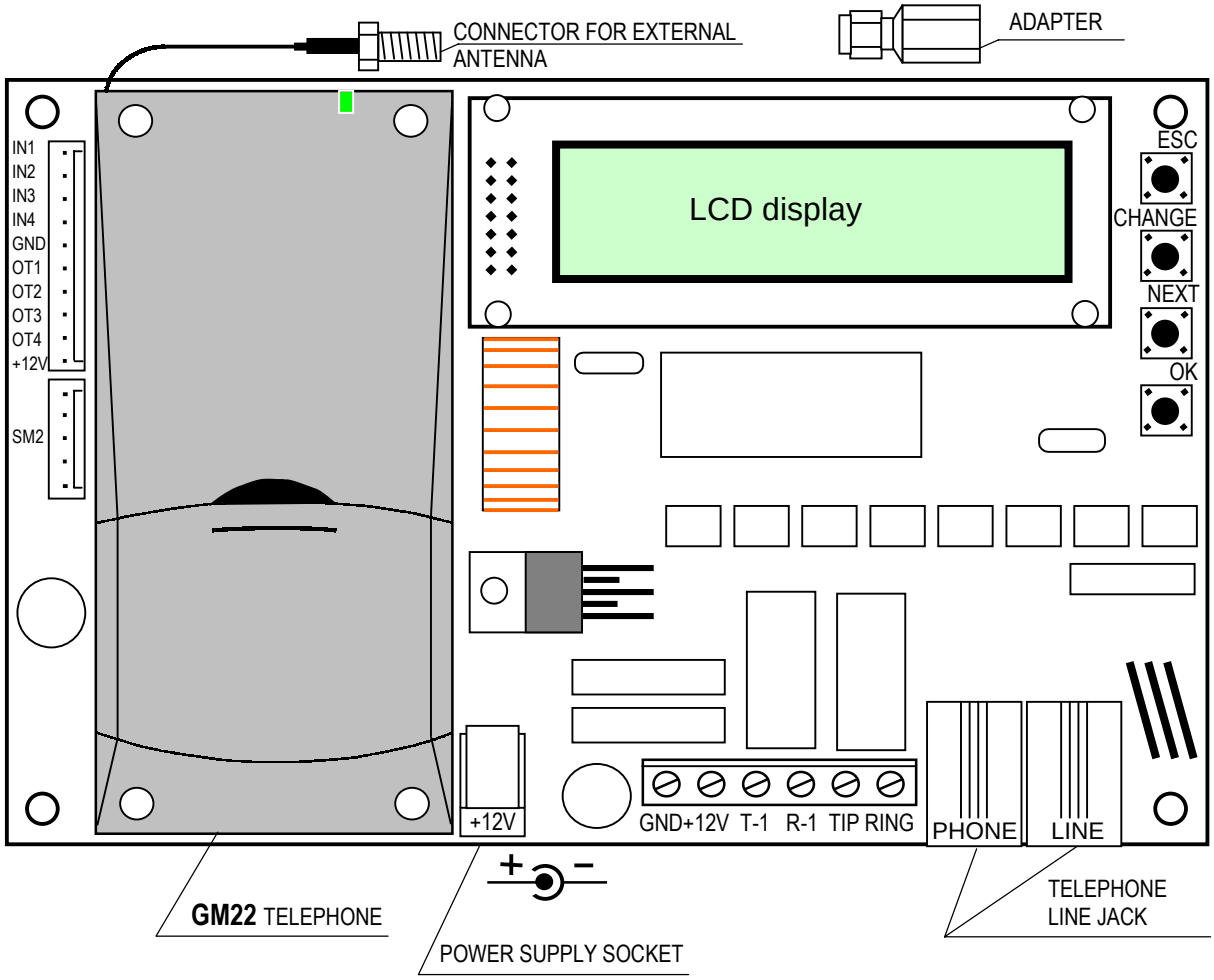


Figure 2. The view of the GSM-3 module board.

The figure 2 shows the arrangement of terminals and essential elements, which are important for connecting and programming the GSM-3 module. For information on how to connect the wiring, refer to section 13 "IMPORTANT INFORMATION".

The status of inputs and outputs are displayed alternately (2s/2s) at last four characters of top line on LCD display (counting from the left to the right) in a form of the following symbols:

	SYMBOL	MEANING
INPUT	**i**	normal status
	I	violated
	b	bypassed
OUTPUT	**o**	normal status
	O	active

Normal status of input - status in accordance with the input type (NO, NC) set by the servicing function.

Input violated - the change of the supervised status occurred, from normal to opposite, for the duration at least equal to the time period defined as the sensitivity of the input.

Input bypassed - the status of the input is not supervised by the module.

Normal status of output - output disconnected from ground.

Output activated - output shorted to ground.

When the symbol "**O**" or "**o**" of the output's status blinks, it means that the output was activated by monostable circuit (for the period of time determined by the servicing function).

On the right side of the LCD display, there are **four push–buttons** to be used for programming the module and for manual controlling the inputs and outputs of the module. Using these push–buttons is the only way for programming the GSM-3 module.

PUSH – BUTTON NUMBER	PUSH – BUTTON DESCRIPTION
1	ESC
2	CHANGE
3	NEXT
4	OK

The number of push–buttons given in table above correspond to the number of inputs and outputs during manual control.

Simultaneous pressing and holding for one second both push – buttons, ESC and OK., makes the restart of the module, with program version and GSM telephone model being displayed on LCD display. The restart of the module does not change the status of inputs and outputs. In case of the loss, and then the restoral of power supply of the module, its inputs and outputs are restored to the status before the disconnection of power supply.

The cables of telephone lines: public exchange line (subscriber's) and extension line (to the alarm control panel and telephone set) can be connected to the terminal strip or to the telephone jacks located on the board.

Beside the telephone, on the left side, there are two sockets to be used for wiring to inputs and outputs of the module, for power supply, ground, and for connecting the SM-2 voice synthesizer.

6. DESCRIPTION OF OUTPUTS AND INPUTS OF THE MODULE

The GSM-3 module is equipped with three outputs and four inputs of the technical features similar to those of inputs and outputs of the alarm control panel. The attendance of the outputs consists in controlling their operation (switching on, switching off and monostable switching) ,while attending the inputs is connected with supervising their status and with monitoring the changes of any status. The supervision of inputs can be bypassed. The attendance of outputs and inputs is performed by the module irrespective of attending the telephone line.

OUTPUTS

Outputs (OC – open collector type) are intended for connecting the voltage controlled equipment. The configuration of the output and the way of connecting the load are shown in fig. 3.

R - load resistance
n - module's output number

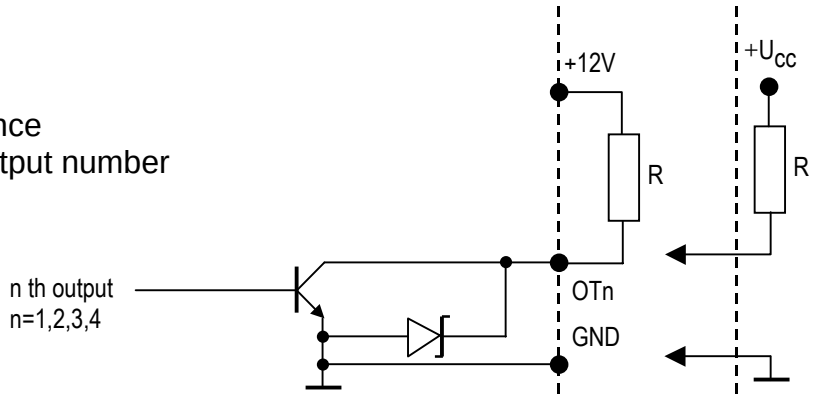


Figure 3.

It is possible to connect the load resistance **R** (e. g. Relay) directly to the output, provided that the load current is not greater than **50 mA**.

The output can have one of the two logic status:

"**0**" – output is OFF: **normal status** (contact Otn cut off from ground; n=1,2,3),
"**1**" – output is ON: **active status** (contact Otn shorted to ground; n= 1,2,3).

The GSM-3 module has 3 outputs, which can be used for controlling the electrical equipment. The control of the output's status can be done **remotely** by telephone (traditional or cellular), or **manually** by using the module's push – buttons. The change of the output's status can be also initiated by **the violation of the input**.

The remote control can be implemented by **DTMF** telephone signals or by SMS text messages.
The control by DTMF signals is possible after getting connection with the number of GM22 telephone and entering (from telephone keypad) the password for controlling the output's status.
The control by SMS messages consists in sending, to the number of GM22 cellular telephone, the SMS text message which contains an appropriate password. The text message can be sent from a cellular telephone, or by means of computer and INTERNET.

The status of outputs may be changed in the following way:

- bistable switching: the change of the current status of individual output to the stable opposite status (output which is OFF will go ON, output which is ON will go OFF),
- monostable switching: the change of the status of individual output to the opposite status for the duration set separately for a given output, this duration is set by a special servicing mode function,
- switching OFF all outputs simultaneously: all outputs which are ON will go OFF, but the outputs which are OFF will remain unchanged,
- switching ON all outputs simultaneously: all outputs which are OFF will go ON, but the outputs which are ON will remain unchanged.

The control of outputs is possible upon programming the appropriate service functions (submenu: control of SMS, control of DTMF).

INPUTS

The sensors of both types, **NC** and **NO**, can be connected to the module. The type of sensors is to be entered in the servicing function. The wires from the sensor are to be connected between the input terminal IN and ground (GND), as shown in fig. 4.

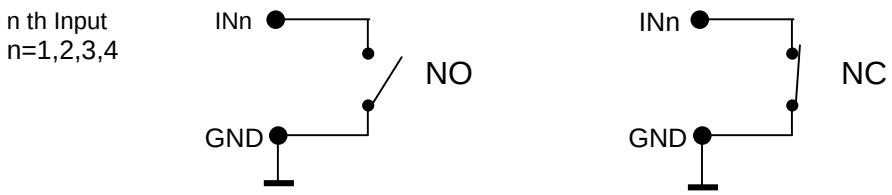


Figure 4.

The first parameter, **the sensivity** of the input is programmed for each input. The sensivity of the input is defined as a minimum time which must elapse from the moment of the status change at the input (open for NC input, closed for NO input), in order to classify such change as violation of the input. This time delay can have the values within the range from 20 ms to 1275 ms.
"**The time to restore the input**" is the next parameter to be programmed for each input. Time to restore the input is defined as a time delay which must expire from the termination of the input violation to the moment in which the module changes the symbol displayed on LCD display (from **I** to **i**) and re-enables the supervision of input status (4 seconds or 4 minutes).

Controlling the operation of inputs consists in **bypassing** and **unbypassing** their operation. This control can be performed **manually** or **remotely**. The remote control is implemented analogous to the remote control of the status of the module outputs. The input can be automatically bypassed after one violation or after three violations of such input (set by the servicing function), or after violating another input (designated as the bypassing input).

7. MESSAGING

This function is related to the attendance of module's inputs, and is activated by violation or restoral to normal status (termination of violation) of the input, which is not bypassed. Activation of output OT4 (formerly designated as AWL – telephone line failure), or its restoral to normal status, can also initiate messaging, similar as for input.

The messages can be sent maximally to four telephone numbers. The messaging can have a form of SMS message or the sound information. For the voice messaging, it is possible to initiate the function of calling a given number twice (two phone connections with replaying the message each time).

SMS MESSAGES
The SMS messages to be transmitted can have standard contents or can be modified by the user. The user's own message can be entered by using the module's push – buttons or by utilizing the SMS message sent from another telephone to the GM22 telephone number. The contents of messages are entered by special servicing mode functions (submenu MESSAGING).

To change the contents of a standard message, it is necessary to follow the steps:
- Initiate the servicing mode.
- Go to submenu MESSAGING.
- Select appropriate function for programming the contents of SMS message.
- Read the present contents of the message, after recalling the selected functions. By using push - buttons NEXT and CHANGE it is possible to enter your own contents of SMS message regarding the event which corresponds with the function's description.
- Accept the introduced changes by pressing push-button OK., and proceed with programming the next message, or abort the operation of servicing mode.

To enter the contents of the message by means of another cellular telephone, it is necessary to follow the sequence:

- After recalling the function for programming the contents of a message, simultaneously press and hold push-buttons NEXT and CHANGE .
  If the contents of present message are standard, the information "**Read-out from SMS**" will be displayed on LCD display, and the module will go into "awaiting for SMS message mode" for the duration of approx. 110 seconds.
- Send SMS message (previously prepared) from another cellular telephone to the GM22 telephone number. The message to be sent should be of a special format. The contents of the message, which is to be loaded into the module's memory should be put into brackets and closed by asterisks, as follows: **(∗Contents of message∗)**.

***NOTES**:*

- *If, after recalling the function, the contents of the displayed message is not standard, pressing and holding the push-button NEXT and CHANGE will cancel this message, the next pressing will result in displaying the standard message and only the successive pressing will make it possible to load the message by means of SMS message.*
- *Both push-buttons must be pressed simultaneously, otherwise the module will enter the mode for manual editing the message and it will be necessary to renew the procedure for reading the message from SMS.*
- *The length of the message stored in the module's memory is limited to 32 characters.*

The standard contents of the transmitted SMS messages are as follows:

"**Violation of input n**"
"**Restoral of input n**" } for inputs; where n = 1,2,3,4

"**Failure of telephone line**"
"**Restoral of telephone line**" } for output OT4

VOICE MESSAGING

If the SM-2 voice synthesizer with recorded voice message is connected to the module, the violation of any input and its restoral or activation of output OT4 and its restoral can initiate sending this message to the selected telephone numbers. Since the module can transmit only one voice message, it is also possible to activate **the sound signalling** for indicating the reason why the messaging was initiated. After getting connection, the module generates the respective sequence of sounds every 2 seconds:

1 short beep - violation of input 1
2 short beeps - violation of input 2
3 short beeps - violation of input 3
4 short beeps - violation of input 4
2 short and one long beep – activation of output OT4

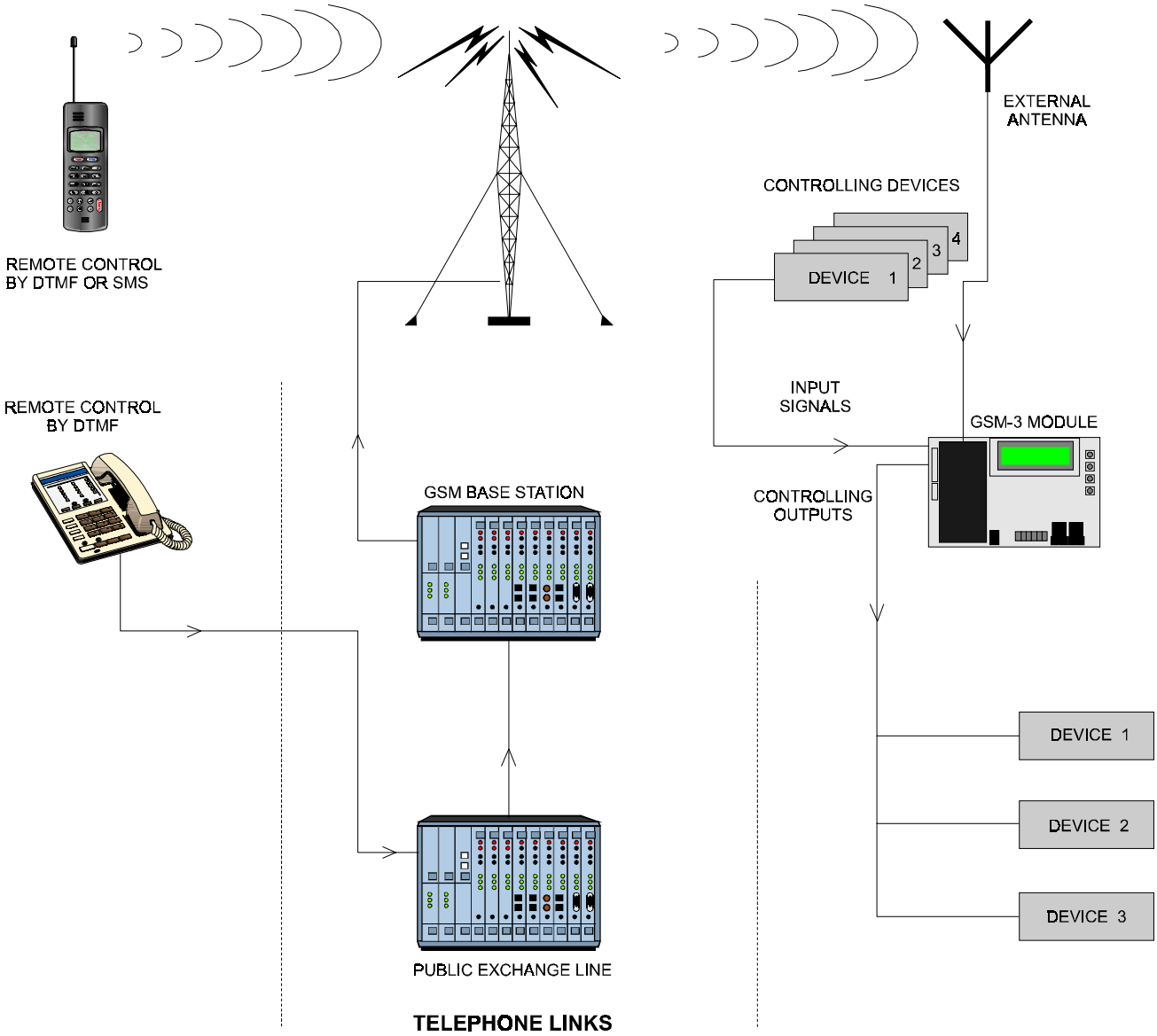
1 long + 1 short beep – restoral of input 1
1 long + 2 short beeps – restoral of input 2
1 long + 3 short beeps – restoral of input 3
1 long + 4 short beeps – restoral of input 4
1 long, 1 short, 1 long beep – restoral of input OT4

To enable the messaging, it is necessary – after switching ON the GM22 telephone and connecting the sensors to the inputs – to program the module by using the servicing functions (submenu of servicing functions: "Messaging", "Inputs/Outputs", "GM22 options"), as follows:

- Program at least one telephone number to which the message is to be transmitted ("***Tel. 1 for mess. 1....4***").

- Determinate if the output OT4, or if the inputs after violation or restoral will activate the messaging function (to which telephone number) and also determine the way of messaging (SMS/ voice) – functions "***In. 1...4 -> Tel.; Rest. 1 -> Tel.; F. L. -> Tel.; Rest. L. Tel.***"
- If the voice messaging is selected, and several inputs can activate this messaging – set the option "***Mess. sounds***" to distinguish which input was violated.
- Program the required parameters for the inputs (**type, sensitivity, time to restore, automatic bypassing**)
- If the SMS messaging is selected, program the function "***SMS Centre No.***"

All functions for programming the passwords which control the status of outputs and the bypass of inputs are described in section "DESCRIPTION OF FUNCTIONS FOR PROGRAMMING THE MODULE".



THE WAYS OF REMOTE CONTROLLING THE STATUS OF OUTPUTS AND THE BYPASS OF INPUTS OF THE MODULE.

Figure 4.

8. DESCRIPTION OF METHODS OF CONTROLLING THE STATUS OF THE OUTPUTS AND BYPASSING THE INPUTS

REMOTE CONTROLLING BY **DTMF** SIGNALS FROM TOUCH – TONE TELEPHONE KEYPAD.

To have the remote control by dual tone phone push-button, it is necessary to properly program the module by using the servicing functions, as follows:

- mark option "***Answering calls***" as allowable
- set the required "***Time of ringing***"
- program the **password** (4 digits) for controlling the status of outputs and for the bypass of inputs. The contents of the controlling password are loaded into the module's memory by the servicing functions contained in the submenu of the servicing mode "***DTMF control***". The password can not recur. To erase to password completely (to disable a given function), simultaneously press push-buttons CHANGE and NEXT.

For remote controlling the status of the outputs or bypassing/unbypassing the inputs follows the sequence:

- dial the GM22 telephone number from any telephone having DTMF features
- wait until "Time of ringing" is completed after which the module will answer a call and generate three short sounds (beeps) acknowledging that the module is ready to have the DTMF controlling enabled.

  NOTE*: When receiving a call, the module applies ringing tone to extension line for the duration equal to "Time of ringing". Answering a call from this extension line makes it impossible to use the functions for controlling the outputs.*
- enter from dual tone phone keypad the required control passwords (utilizing DTMF tone signals). Entering the password consists in pressing successively the numeric push - buttons, according to the contents of the password. After recognizing the password by the module, the respective action will be taken, depending on the password loaded. For example, recognizing the password loaded in the module by the function "DTMF bist. OUT2" will make a permanent change of the status of the output OUT2, while recognizing the password programmed by the servicing function "DTMF bypass In. 4" will bypass the supervision of input 4.
- The module acoustically acknowledges the execution of the function by audible indication as follows:
  - **three short beeps** – switching OFF the output (disconnecting the ground)
  - **four short and one long beeps** – switching ON the output (short circuit to ground), such signal also acknowledges the execution of function "DTMF off OUT 123" (switching OFF all outputs simultaneously) and the function "DTMF on OUT 123" (switching ON all outputs)
  - after implementing the function for bypassing/unbypassing the input , the module automatically checks the status of the inputs and generates **four sound** corresponding to the status of consecutive inputs (1 – 4)
    - **short beep** – input unbypassed
    - **long beep** – input bypassed

    (for instance: the sequence of signals – short, long, short, long indicate that inputs 1 and 3 are unbypassed, and inputs 2 and 4 are bypassed)
  - **two long beeps** – the password is unknown to the module
- enter the next control password or hang up.

The additional feature of the DTMF control function is **the capability of checking the status** of the outputs without necessity of switching these outputs. To obtain such possibility, enter from a telephone keypad the password programmed by the servicing function "**DTMF check outs.**". After reading the password, the module generates the sound signals indicating only these outputs, which are ON (with the exception of situation when all three outputs are OFF):

- one short beep – output OT1
- two short beeps – output OT2
- three short beeps – output OT3
- four short and one long beep – all three outputs are OFF

For example: if, after entering the password, one beep is heard in a telephone receiver, and then after a while three beeps are heard, it means that the first and the third output (OT1 and OT3) are ON, and the second output (OT2) is OFF.

***NOTES**:*

- *During checking the status of the output which was switched in monostable mode, the module informs about the normal state (stable) of the output before switching over – irrespective of switching time.*
- *In case of errors while entering the password, press push-button * or # and enter the password from the beginning. A triple attempt of entering the password, which is unknown to the module results in a loss of connection – the module will "hang up".*

REMOTE CONTROL BY **SMS** MESSAGES

The remote control by SMS text messages is enabled by entering appropriate password in the module's memory. The contents of the control passwords are loaded in the module's memory by the servicing functions contained in the submenu of servicing mode "***SMS control***". The passwords can not recur. Erasing the password is similar as for DTMF control function.

To have this control feature enabled, send to a text message containing the required control password (6 characters) to the GM22 telephone number. After decoding the password by the module, an appropriate action will be initiated, depending on the password transmitted.

E. G.: Recognizing the password loaded into the module's memory by the function "*SMS mono. OUT3*" will result in changing the status of output OT3 to the opposite for the duration set by the function "*Time mono. OUT3*". Recognizing the password entered in the module's memory by the function "SMS unbypass all" will result in unbypassing all module's inputs which were bypassed.

It is possible to send to the module a message containing the password only, but it is also permitted that the contents of the message can be longer than just the password (the password can be a part of a longer word). It is important that the password be inserted at the initial part of the text message (32 first characters). This feature enables the user to load the description of the operation in words into the memory of the telephone, from which the controlling is to be executed (SMS to be sent). This capability will keep the user free from the necessity of remembering the passwords or the functions, which these passwords execute.

Only one control password can be sent in one message. Transmitting SMS message not containing the password will make no response of the module. The control function is executed directly after receiving the message and recognizing the control password. The message received will be then cancelled, and the telephone is ready for receiving the next text message.

ACKNOWLEDGEMENT OF EXECUTING THE SMS CONTROL

If the number to be used for acknowledging the SMS control and SMS centre number are pre-programmed in the module's memory (servicing functions: "***SMS acknowl. No***.", "***SMS centre No***."), then after executing the control of individual output by SMS message, the GSM-3 module sends the message confirming the type of control and the present status of outputs. Controlling all outputs simultaneously or bypassing/unbypassing the inputs is confirmed by the message on the present status of all inputs and outputs of the module. The message transmitted by the module can have one of the following forms:

- OUT [n] switched ON (status: OUT1 = ? OUT2 = ? OUT3 = ?)
- OUT [n] switched OFF (status: OUT1 = ? OUT2 = ? OUT3 = ?)
- OUT [n] monostably switched (status: OUT1 = ? OUT2 = ? OUT3 = ?)
- status of inputs: IN1 =?, IN2 =?, IN3 =?, IN4 =?, status of outputs: OUT1 =?, OUT2 =?, OUT3 =?

when character [n] is replaced with the output's number: 1, 2 or 3.

While designating the output, character "?" is replaced with the logic state (i. e. The status) of the output:

0 – output switched OFF (inactive)
1 – output switched ON (active).

For designating the inputs, character "?" is replaced with the letter:

i – input in normal status unbypassed (non-violated),
I - input unbypassed violated,
b – input bypassed.

NOTE*: The module always acknowledges the stable status, in which the output remains after completing the control (for the monostably switched output – the status in which the output will go after the switching time expires).*

CONTROLLING THE OUTPUTS BY THE VIOLATION OF INPUTS

The violation of input, besides the telephone messaging, can also result in activating any output or several outputs simultaneously. To initiate such control it is necessary to program relevant functions from submenu "Inputs/Outputs" (see section 12).
This control can result in:

- Monostable switching – the change of status to the opposite status for the duration determined by the servicing function "Time mono. OUT [n]", where n = 1,2,3 indicates the number of output.
- Bistable switching – change of the status of the output to the stable opposite status.
- Bistable switching with delay – change of the status of the output to the opposite stable status after the time determined by the function "Time mono. OUT [n]", where n = 1,2,3 indicates the output's number.

MANUAL CONTROL

OUTPUTS

During normal operation, pressing and holding one of the module's push – button for the duration of 1 second will result in switching over (bistable switch) the status of the output, number of which corresponds to the push – button's number. The message on the output's status is displayed on the LCD display and the module simultaneously generates the sound signal identical to that during remote control by DTMF signals (see description in section 8).
The following push – buttons are used for controlling the status of outputs or for bypassing/ unbypassing the inputs:

1. **ESC**	- controlling **OT1**;	bypassing **IN1**
2. **CHANGE**	- controlling **OT2**;	bypassing **IN2**
3. **NEXT**	- controlling **OT3**;	bypassing **IN3**
4. **OK**	- switching OFF **all** outputs;	bypassing **IN4**

INPUTS

The manual bypassing/unbypassing the inputs is also implemented by the GSM-3 module's push – buttons. Pressing one of these push – buttons three time will cause bypassing the input of the number corresponding to the number of a given push – button (see: description of module's push – button). The bypass of this input will be confirmed on LCD display by displaying character "b" in the field indicating the status of a given input, and by displaying the message "*Inp. n bypassed*", where "n" = 1,2,3,4 corresponds to the input's number. At the same time three short beeps are generated. If this input has been already bypassed, the execution of this operational sequence will result in unbypassing this input. Unbypassing should be acknowledged by changing the indication of the input's status, by displaying the message "*Inp. n unbypassed*" and by audible signals (four short and one long beeps).

9. TRANSMITTING SMS MESSAGES

The alarm occurred on secures site can initiate the telephone messaging mode by the alarm control panel. If the alarm control panel has the function for messaging to pager system, it can be used for sending SMS messages to the cellular telephone number. The message transmitted by the control panel is transferred to the GSM-3 module, not to pager station. For example: the alarm control panel CA-64 can send messages to three different paging systems. If one of pager system is assigned to the operation with the GSM-3 module, the remaining two can perform normal function.
To enable the SMS messages to be sent, pre-program telephone number of pager station at the alarm control panel and load appropriate text to be sent into the control panel memory.

The pre-programmed telephone number consists of two parts:

1. The first four digits must be identical with "the pager system number" stored in the GSM-3 module (entered by the servicing function "**PAGER tel. No.**").
2. The following digits indicate the cellular telephone number to which the SMS text message is to be sent. The telephone number should be ended with the letter "A" symbolizing the end of the number – indication according to the operating instructions for the alarm control panel manufactured by SATEL.

*NOTE: The first and the second part of the number can not be separated by any pause, digits must be transmitted by the control panel as one impulse train or in DTMF or pulse dialing mode. In case that the module has troubles with receiving the pager number dialed in the DTMF tone mode, select **pulse** dialing mode at the alarm control panel.*

DESCRIPTION OF THE PROCEDURE FOR CONVERTING **PAGER MESSAGE** INTO **SMS MESSAGE**

When the alarm control panel is "Off Hook" and after dialing the number – the module checks the first four digits of that number. If these digits agree with the programmed "Pager tel. No." In the module, then the module sends hand shake signal (similar as pager station) and receives the message sent by the control panel. Next, this message is transmitted via the GM22 cellular telephone as SMS text message. The subscriber's number to whom the message is to be sent, is compiled from the "SMS prefix" pre-programmed in the module and the second part of the number received from the alarm control panel.

***NOTE**: Pager number must be unique and can not be the same as any prefix, outgoing numbers or the beginning of other telephone numbers.*

For the SMS messages to be sent, it is required to add the prefix with a country code (48 for Poland). This prefix is programmed by the servicing function "***Prefix for SMS***". If the cellular telephone number is given by the control panel together with prefix, the function "Prefix SMS" should not be programmed.

To enable the transmission of SMS messages, the SMS centre number is to be loaded into the module's memory by the servicing function "***SMS centre No.***", depending on GSM network in which the telephone is activated.
The parameters of the pager system signal should be **programmed at the alarm control panel** (or telephone set DT-1; DT-1 plus) as follows:

0	E	1	1	0	C	0	E	0	E	1	1

The message to be sent should be entered in the control panel according to the POLPAGER standard.

10. THE RULES FOR CONVERTING THE NUMBERS

In case when the GSM-3 module operates in telephone line simulation mode, the number received from the alarm control panel or normal telephone set (before sending it to GM22 telephone) is subjected to the required corrections. Thus, it is not necessary to take the connection route into consideration, while programming the telephone number for messaging or during dialing the number at normal telephone set. The built-in algorithm of the number convertion permits the module to be installed directly on subscriber's line (public exchange telephone line) or on extension lines as well. If such line is cut off or lost , the module will simulate the operation of PBX exchange and after receiving the number of "outgoing line" the module will simulate the access to public exchange telephone line.
The conversion of the number is done after completing the dialing by the alarm control panel or by the user. The module considers the dialing as completed when 4 seconds elapse after dialing the last digit. The processing of the number starts during dialing with the checking if the first digits matches the pager number or one of the "outgoing lines numbers". If the outgoing line number is dialed, the remaining part of the dialed number will be converted (digits to follow after digits of "outgoing number").

The algorithm of converting the number is as follows:

1) If the dialed number begins with one of permanent prefixes (prefix -digits added before the exact telephone number), the module skips to step 4.
2) If the dialed number begins with a "prefix to be erased" this prefix is erased and the module skips to step 4.
3) If the dialed telephone number have no prefixes known to the module, "prefix to be added" is entered to the beginning of the dialed number, and the module skips to step 4.
4) If the dialed telephone number, after correcting in steps 1...3, is included in the list of allowable numbers (1...32 telephone numbers), or if the first digits of the dialed number correspond to one of the pre-programmed numbers, or if the option "any number" is set - the number is recognized as the correct one, and the module starts to make connection with the dialed telephone number via the GM22 cellular telephone. Otherwise, the connection is disabled and a busy tone is generated.

11. SERVICING MODE

The access to module's configuration is possible by entering the servicing mode. To enter this mode, simultaneously press and hold push - buttons CHANGE and NEXT approx. 1 second. While being in the servicing mode, the module makes the menu accessible (the menu is described below in this section). By using four push - buttons located on module's board, it is possible to go through the menu, select particular function and set the required parameters of these functions (options, numbers, passwords, time periods).
The access to the service mode can be protected by a code. The protection is activated by programming any code with the „*Service code*" function, and deactivated by deleting the code. The code consists of a combination of 1 to 8 digits from the range 0-9. The whole code can be erased in the process of its programming, when the **CHANGE and NEXT** keys are depressed at the same time.
When the code has been programmed, an attempt to enter the service mode will cause the module to display a suitable message and wait for entering the code. Unless the entered code is valid, the module will only enable the user to enter the service mode when all the settings are deleted. The „*Delete all (123=yes):*" message is displayed – then, entering the digits 123 followed by pressing the OK key will initiate the test and erasing of the module memory (PCF), and then the service mode will be made available.

The push - buttons, while being used in the servicing mode, have the following meaning:

- **ESC** move within the menu to item "End of service", return from sub - menu to the main menu, or exit from the function without saving the changes,
- **CHANGE** return to the previous function in menu or the change of selected element in the function (e. g. an option marker T, a digit of a telephone number or a letter of a password),
- **NEXT** move to next function item within menu or move to next element of the function being programmed at present (e. g. successive digit of the telephone number or successive character of the password),
- **OK** entry into the function selected from menu (indicated by arrow on LCD display) for checking or changing the settings, exit from the function with saving the changes made.

The module in the servicing mode operates in the same way, as during normal mode i. e. it is possible to make and answer calls, but the status is not displayed. Instead of the status, the description of servicing functions are displayed, thus enabling the user to go through the menu of servicing mode and to make appropriate changes in the module's configuration. The features of manual controlling the outputs and manual bypassing the inputs are disabled. Holding any push - button will make that the pressing of that push - button is automatically repeated. When no push - button is pressed for the duration of approx. 1 minute, the module automatically exits the servicing mode.

The main menu of servicing mode contains the following functions and submenu (designation of submenu is printed in boldface and underlined):

End of service
Service code
T line loss time
GSM loss time
Time of ringing
Show T l.failure
Show dial.num.
Signal testing

Answering calls
GSM for STAM-1
Any numbers
AWL - only GSM
GSM main line
FLASH – GSM/TL
Outgoing no 1
Outgoing no 2
Outgoing no 3
Outgoing no 4
Perm. prefix 1
Perm. prefix 2
Perm. prefix 3
Perm. prefix 4
Prefix to erase
Prefix to add
Allowed numbers
Messaging
SMS control
DTMF control
Inputs/Outputs
GM-22 options
Erase settings

Submenu of functions for programming the allowed telephone numbers:

Allowed numbers:
Tel. No. 1 begin
Tel. No. 2 begin
Tel. No. 3 begin
.....
Tel. No. 31 begin
Tel. No. 32 begin

Submenu of functions for programming the data and messaging options:

Messaging:
Tel.1 for mess.
Tel.2 for mess.
Tel.3 for mess.
Tel.4 for mess.
Mess.x2 for t.1
Mess.x2 for t.2
Mess.x2 for t.3
Mess.x2 for t.4
SMS violat.In.1
SMS violat.In.2
SMS violat.In.3
SMS violat.In.4
SMS fail. line
SMS restor.In.1
SMS restor.In.2
SMS restor.In.3
SMS restor.In.4
SMS restor.line

In.1 -> Tel.
In.2 -> Tel.
In.3 -> Tel.
In.4 -> Tel.
L.F. -> Tel.
Rest.1 -> Tel.
Rest.2 -> Tel.
Rest.3 -> Tel.
Rest.4 -> Tel.
Rest.L -> Tel.
Mess. priority
Mess. sounds

Submenu of functions for programming the SMS passwords utilized for SMS remote control:

SMS control:

SMS bypass In.1
SMS bypass In.2
SMS bypass In.3
SMS bypass In.4
SMS bypass all
SMS unbyps.In.1
SMS unbyps.In.2
SMS unbyps.In.3
SMS unbyps.In.4
SMS unbyps.all
SMS bist. OUT1
SMS bist. OUT2
SMS bist. OUT3
SMS mono. OUT1
SMS mono. OUT2
SMS mono. OUT3
SMS off OUT123
SMS on OUT123
SMS check I/O

Submenu of functions for programming DTMF passwords utilized for DTMF remote control:

DTMF control:

DTMF bypass In1
DTMF bypass In2
DTMF bypass In3
DTMF bypass In4
DTMF bypass all
DTMF unbyps.In1
DTMF unbyps.In2
DTMF unbyps.In3
DTMF unbyps.In4
DTMF unbyps.all
DTMF check inps
DTMF bist. OUT1
DTMF bist. OUT2
DTMF bist. OUT3

DTMF mono. OUT1
DTMF mono. OUT2
DTMF mono. OUT3
DTMF off OUT123
DTMF on OUT123
DTMF check outs.

Submenu of functions for programming the parameter and options for input and output operations:

Inputs/Outputs:

Input 1 type
Input 2 type
Input 3 type
Input 4 type
Input 1 sensit.
Input 2 sensit.
Input 3 sensit.
Input 4 sensit.
Input 1 restore
Input 2 restore
Input 3 restore
Input 4 restore
Inp.1 bypass #1
Inp.2 bypass #1
Inp.3 bypass #1
Inp.4 bypass #1
Inp.1 bypass #3
Inp.2 bypass #3
Inp.3 bypass #3
Inp.4 bypass #3
Bypassing input
Time mono. OUT1
Time mono. OUT2
Time mono. OUT3
In.1 -> Outputs
In.2 -> Outputs
In.3 -> Outputs
In.4 -> Outputs

Submenu of functions for programming the data required for operations of the GM22 telephone:

GM22 options:

PIN code
PAGER tel. No.
CA-64 tel. No.
SMS centre No.
SMS acknowl. No.
Prefix for SMS

12. DESCRIPTION OF FUNCTIONS FOR PROGRAMMING THE MODULE

It is required for the functions for programming the module operation to set option, or possible to enter numeric or alphanumeric data (telephone numbers, SMS messages).

Choice of option.

After the entry into the function (by pressing push - button OK) which requires choosing the option, pressing push - button **CHANGE** makes character T display (option chosen). The repeated pressing the push - button CHANGE will erase this marker and switch off this option. Pressing the push-button OK will result in storing the present setting of option, and exiting from the function to the menu.

Entering numeric or alphanumeric data.

After getting access to the function (by pressing push - button OK) which requires entering duration, telephone number, password or message, the blinking cursor is displayed on the module's display to show the field where the data can be entered. Each pressing the push - button **CHANGE** will result in changing the displayed digit or character. Digits are changing cyclically in the following order: 1→2→3→4→5→6 →7→8→9→0→1→2→3 and so on.
The content of the field for entering alphanumeric character is changing as follows:
A→B→C→D→E→F→G→H→I→J→K→L→M→N→O→P→Q→R→S→T→U→V→W→X→Y→Z→1
→2→3→4→5→6→7→8→9→0→,→.→+→-→✶→/→:→;→= →A→B→C→D and so on.
Pressing the push - button **NEXT** makes the cursor move to the next field to the right, or return to the first field on the left side of the number or password entered. Pressing the push - button **OK** results in storing the entered data and in exiting from the function.

DESCRIPTION OF THE SERVICING FUNCTIONS

End of service - completion of servicing mode and move to normal module operation.

Service code – combination of 1 do 8 digits from the range 0-9. Having programmed the code prevents access by the unauthorized users to the entered settings (see page 18).

Tel. line loss time - the time given in minutes (from 01 up to 99) determines the duration of voltage and current loss in telephone line (TIP, RING) after which the module will signal the line failure by changing the status of output OT4 (AWL) (see also the function "AWL - only GSM"). The time set in this function does not affect the speed of detecting the line failure and replacing such line with the GM22 telephone - the time of telephone line loss for this purpose is approx. 16 seconds.

GSM loss time - time to expire in minutes to (01 to 99), after which the failure of GSM telephone will be signaled by output OT4 (AWL). The module can ascertain the GSM telephone failure if this telephone is: disconnected from the module; no SIM card is inserted; required PIN is not entered; antenna signal is at zero level (scale from 0 to 4); or telephone is really damaged - for the duration set.

Time of ringing - this parameter is taken into account when option "Answering calls" is chosen. The time given in seconds (from 01 to 99) determines the period of time after which the module "hangs - up", in case of an attempt to call the GM22 telephone number - if nobody answer this call via extension line (T-1, R-1). However, if one of the passwords for controlling the input or output by DTMF signal is programmed - after this time the module will answer a call to enable the remote control. During the "time of ringing", the module transfers the ringing tone to terminals T-1, R-1, thus enabling the telephone set connected to extension line to answer a call.

Show T l.failure – the option activates the function of displaying a message about telephone line failure. It is used when the subscriber's line is permanently connected to the module.

Show dial. num. – the option which decides about displaying a telephone number when a call is made via the module (e.g. when the control panel is reporting an alarm).

Signal testing - selecting this option results in checking the tone in telephone line, after ”pick - up”. If no continuous tone is detected after approx. 2 seconds, the module will replace the cable line with GSM telephone.

Answering calls - this option determines whether the module can answer the incoming calls to the GM22 telephone. In case of calling the GM22 telephone number (when this option is set), the module generates ringing tone at terminals T-1, R-1 - and after lifting the handset at extension telephone connected to these terminals - transfers the communication from the GM22 telephone to the extension telephone. If nobody pick - up during the time set by the function ”Time of ringing”, the module will hang - up or answer a call itself to enable DTMF control (provided that the servicing functions for DTMF control are programmed).

GSM for STAM-1 - in normal condition this option should be OFF. The option can be ON only in case when the telephone terminals T-1 and R-1 are minimally loaded by the device connected to these terminals (e. g. a card of monitoring station STAM-1, but ATTENTION: the monitoring routed from a GSM telephone connected to an alarm control panel to a GSM telephone connected to a monitoring station is INADVISABLE, and often impossible, due to design of such GSM telephones.

Any numbers - setting this option permits making outgoing calls from extension telephone, via the GSM-3 module, to any numbers (including “outgoing line numbers”, permanent prefixes, prefixes to be added and prefixes to be erased). If this function is disabled, it will be possible to call, via GSM telephone, only those telephone numbers, which the first digits (or complete telephone numbers) are loaded into the module’s memory by the servicing function “Tel. No 1 begin.” ÷ “Tel. No. 32 begin.”.

AWL only GSM - when this option is set, the output OT4 (AWL) is activated only on the failure of GSM telephone. If this option is not set, the output OT4 (AWL) is activated on GSM telephone failure and on the failure of cable telephone line (TIP, RING) as well.

GSM main line – checking this option results in selecting the wireless GM22 cellular telephone as the basic line to make connections (initiated from the T-1, R-1 terminals). If this option is unchecked, the cable line is the basic one.

FLASH – GSM/TL – this option activates the function of choosing the connection route (cable network /wireless GSM network) when making a call from a telephone connected to the T-1, R-1 terminals. To use this function, pick up the handset and press the FLASH key on the telephone. The telephone number should be always dialed in the same way as when making a call through the cable network. If the option remains unchecked, the call will be routed via the basic network, with „*GSM main line*” as the selected function.

Outgoing No. 1-4 - For these functions it is necessary to enter the telephone numbers, which will be treated as the numbers for getting subscriber’s line (Public Exchange Telephone Line), in case that the module is not directly connected to subscriber line, but indirectly via private exchange (PBX) – see section “Rules for converting the numbers”.

Perm. prefix 1…4 - For these functions it is required to enter permanent prefixes, which designate telephone numbers to be dialed together with area codes, i.e. without necessity to make corrections (see section “Rules for converting the numbers”). The permanent prefixes, for instance, can have the following figures: “602” – code for ERA GSM network, “58” – area code for Gdansk.

Prefix to erase - this prefix is to be considered as an outgoing number for a long-distance call. If the dialed number begins with such a prefix, this prefix is erased during converting the telephone number. For example, prefix to erase can have the value: “0” – standard

outgoing number for a long-distance call.

Prefix to add - this prefix is to be considered as the area code. If the dialed number contains neither the permanent prefix nor prefix to erase, the given prefix is added at the beginning of the dialed number. The added prefix can have, for example, figures: “58” – area code for Gdańsk.

ALLOWED NUMBERS: the move to submenu for programming the telephone numbers accepted by the module.

Tel. No. 1...32 beginning – for these functions it is required to enter the first digits (any number of digits), or complete telephone numbers, to which the calls can be made via GM22 telephone – if the option “Any numbers” is not set. When the option “Any numbers” is set, the above mentioned telephone numbers are of no importance. The numbers to be entered must have the same form as the numbers dialed by the GSM telephone i.e. must contain area code, for instance: “602 123456”, “58 5551122”. If the initial digits are programmed, the dialed number must contain all these programmed digits at the beginning.

NOTE: The list of telephones 1-32 and the option “Any number” do not affect the selection of addressee of SMS messages.

MESSAGING: The move to submenu of functions for programming the data and options for messaging.

Tel. 1…4 for mess. - programming the telephone numbers to which messaging on violation and restoral of inputs, or activation and switch OFF of output OT4 (AWL) will be sent. The telephone number programmed by this function must have a complete form including country and area codes or cellular network code, e.g. **4858**3456789; **48501**987654 etc.

Mess. x2 for T. 1…4 - setting this option for a given telephone number will result in making a call twice to a dialed number and replaying the voice message each time – while executing the voice messaging.

SMS violat. In.1…4 - programming the contents of SMS message to be sent to cellular telephone number after violation of a given input (indication on LCD display i→I). It is possible to choose a standard contents or to enter your own message (see section 7).

SMS fail. line - programming the contents of SMS message to be sent to cellular telephone number after activating the output OT4 (failure of telephone line).

SMS restor. In. 1 –> 4 - programming the contents of SMS message to be sent to cellular telephone number after the input is restored to normal state (I→i).

SMS restor. line - programming the contents of SMS message to be sent to cellular telephone number after restoral of input OT4 to normal state (telephone line available and operative).

In. 1- 4 -> Tel. and ***F. L. -> Tel.*** - These functions program the options for messaging. These options are used for selecting telephone numbers, to which the messages shall be sent after violating the input or after failure of telephone line, and for choosing the type of messaging (SMS/VOICE). The option is set by pressing push-button CHANGE. The successive pressing makes the character display at the telephone numbers:

s – SMS message to be sent
v – sound message to be sent.
(no display) – indicates that a given number is omitted while violating a given input.

Rest. 1…4 -> Tel. and ***Rest. L -> Tel*** - These functions are utilized for programming the second set of the messaging options. They are used for selecting telephone numbers to which the messages shall be sent after restoral of inputs to normal state or restoral of telephone line, and for choosing the type of messaging (SMS/VOICE). The way of programming is the same as for the function regarding the violation of inputs.

Mess. priority: setting this option assigns the priority for messaging. In case of making a call, when the condition for tripping the messaging occurs, the call will be interrupted and the module will transmit the messaging. When this option is not set, the messaging shall be sent after the user hangs-up.

Mess. sounds: setting this option for voice messaging makes the module generate sounds, informing which inputs has been violated (see: “Messaging”).

SMS CONTROL: the move to submenu of functions for programming the SMS passwords (6 alphanumeric characters) utilized for remote control by SMS messages.

SMS bypass In. 1…4: the functions assigning the passwords, which allow the system to bypass individual input.

SMS bypass all: the function assigning the password allowing the system to bypass all inputs simultaneously.

SMS unbyps. In 1…4: the functions assigning the passwords permitting the system to unbypass individual input.

SMS unbypass all: the function assigning the password permitting the system to unbypass all inputs simultaneously.

SMS bist. OUT 1…3: the functions assigning the passwords permitting the system to switch the state of individual output to the opposite (bistable switch).

SMS mono. OUT 1…3: the functions assigning the passwords enabling the system to switch the state of individual output in monostable mode (monostable switch).

SMS off OUT 123: the function assigning the password, which allows the system to switch OFF all outputs simultaneously.

SMS on OUT 123: the function assigning the password permitting the system to switch ON all outputs simultaneously.

SMS check I/O: the function assigning the password allowing the system to check the state of all inputs and outputs. After receiving this password, the module sends the text message on the present state of outputs and the bypassed inputs – to the telephone number programmed by the function SMS acknowl. No.”

DTMF CONTROL: the move to submenu of functions for programming the DTMF passwords (4 digits) to be used for remote control by dual tone phone keypad.

DTMF bypass In. 1…4: the functions assigning the passwords permitting the system to bypass an individual input.

DTMF bypass all: the function assigning the password, which permits the system to bypass all inputs simultaneously.

DTMF unbyps. In. 1…4: the functions assigning the passwords enabling the system to unbypass separate input.

DTMF unbypas. all: the function assigning the password permitting the system to unbypass all inputs simultaneously.

DTMF check inps: the function assigning the password permitting the system to check the status of module's inputs (bypassed/unbypassed). The way of signalling is described in section "Description of outputs and input" of this operating manual. After completing each command for bypassing/unbypassing, the module automatically executes this function.

DTMF bist. OUT 1…3: the functions assigning the passwords enabling the system to switch the state of individual output to the opposite (bistable switch).

DTMF mono OUT 1…3: the functions assigning the passwords permitting the system to switch the state of individual output in monostable mode (monostable switch).

DTMF off OUT 123: the function assigning the password permitting the system to switch OFF all outputs simultaneously.

DTMF on OUT 123: the function assigning the password allowing the system to switch ON all outputs simultaneously.

DTMF check outs: the function assigning the password allowing the system to check the state of all outputs. The way of signalling is described in section 12.

INPUTS/OUTPUTS: the move to submenu of functions for programming the parameters of module's inputs and outputs.

Input 1…4 type: the function assigning the type of sensor connected to the input. Selection of a sensor (1.NO; 2.NC) is done by push-button CHANGE.

Input 1…4 sensit.: the function assigning the sensitivity of each input. The following values (in msec) can bve programmed: 20, 40, 60, 80, 100, 130, 160, 200, 250, 300, 400, 500, 600, 800, 1000, 1275.

Input 1…4 restore: the functions assigning the time from the end of violation, after which the inputs shall be again supervised. The possible settings are 4 seconds or 4 minutes. The status of input is indicated as "violated" (I) until the restoral time expires.

Inp. 1…4 bypass # 1: setting this option for these functions will make the input, to which a given function refers, to be automatically bypassed after 1 violation.

Inp. 1…4 bypass # 3: setting this option within these functions will make the inputs, to which a given function refers, to be automatically bypassed after 3 violations, provided that a given input is not programmed to be bypassed after 1 violation.

Bypassing input: the function selecting the input's number, violation of which will result in bypassing the remaining module's inputs. This operation is bistable - the inputs bypassed will remain in such a status until the end of input violation (I $\rightarrow$ i) set by this function.
This function is disabled by selecting (during programming) the option designated as "No number".

Time mono. OUT 1…3: The functions determining the duration of monostable switch for a given input (1-99 seconds). Such duration is to be programmed, if it is intended to utilize the functions for controlling the inputs monostably or bistably with delays.

In. 1…4 -> Outputs: The functions programming the way of controlling the outputs to be tripped by the violation of input. Programming consists in choosing the type of control individually for each module's output. Setting the option is done by push-button CHANGE. One or two characters can be displayed at each output:

b - bistable switching of the output
m - monostable switching of the output

bm – bistable switching delayed for the time programmed by the function “Time mono OUT 1 – 3”. The delay in switching a given output is equal to the time programmed for this output.

(no mark) – no control of a given output.

GM22 OPTIONS – the move to submenu of functions for programming the data required for the operation of GM22 cellular telephone.

PIN code – the function for entering PIN code of the SIM card inserted in the cellular telephone. The code is entered in the module’s memory once. It is possible to read out the loaded PIN code after calling this function. If necessary, the code is transmitted from the GSM-3 module to the telephone. Entering the wrong PIN code can result in blocking SIM card. In case of such situation, the message is displayed on the module’s display with a request for entering the PUK code. Entering the PUK code should be performed by using normal cellular telephone (after replacing the SIM card).

PAGER tel. No.: 4 digits which activate the function for sending the message in a form of SMS text message. Detecting these digits at the beginning of the dialed number will result in classifying the remaining part of the number as the cellular telephone number, to which the message from the alarm control panel (in a form of a message to pager system) is to be transmitted.

CA-64 tel. No.: 4 digits of the telephone number, which enable the module to recognize the text message sent by the alarm control panel CA-64.

NOTE: The change of the number “pager station” and “alarm control panel CA-64” is updated in the module’s memory after the exit from the servicing mode.

SMS centre No.: programming the SMS centre number, which is required in order to send the text messages. The entered number depends on GSM network in which the telephone is activated. The numbers of SMS centre are as follows:

ERA	48602951111
PLUS	48601000310
IDEA	48501200777

SMS acknowl. No.: programming the cellular telephone number to which the module GSM-3 will send SMS messages acknowledging the execution of controlling and the present status of inputs and outputs. The programmed number must have a complete form including the country code (48 – for Poland) – similar as the SMS centre numbers given above.

Prefix for SMS: it is programmed if the cellular telephone numbers, taken from the alarm control panel while capturing the pager messages, do not possess such a prefix. Programming the prefix enables the module to send SMS messages to the cellular telephone number (48 – on territory of Poland).

Erase settings: this function erases all telephone numbers and prefixes and restores default settings for options and times. All outputs are switched OFF and all inputs are unbypassed. Before cancelling, the module requests for confirmation of such command.

NOTES:

- Each telephone number can consist of maximum 16 digits, and prefix can have maximum 8 digits.
- Erasing the telephone number is possible by erasing the last digit (push – button CHANGE and NEXT should be used), until the complete number is cancelled. The whole telephone

number can be also erased by holding both push – buttons CHANGE and NEXT simultaneously.
- The outgoing line numbers 1...4, permanent prefixes 1...4 and telephone numbers 1...32 do not require that they must be entered consecutively, for example two outgoing line numbers can be entered in any two of four available fields “Outgoing No. 1...4”, not necessarily in two first fields.
- The changes entered in the servicing functions have in majority immediate results, i. e. Immediately after the exit from the function by pressing push – button “OK”.

13. IMPORTANT INFORMATION

- The device operations with analog subscriber lines and meets the requirements of Polish Standard PrPN-T-83001.
- Management of SMS text messages is signalled on the module’s display with the following reports:
  SMS sent – after transmitting SMS text message via GM22 telephone.
  SMS received - after receiving text message containing SMS password pre-programmed in the module.
  Wrong SMS received - after receiving SMS message not containing the password pre-programmed in the module.

The remarks given below will facilitate the proper installation and putting the GSM-3 module into operation.

- It is recommended to pay special attention to running the wires from the module to telephone jack in the alarm control panel. The GSM-3 module in no circumstances can be located close to the alarm control panel or to other electrical wiring system via which the interference of H. F. GSM signals can be induced in L. F. circuits of the alarm control panel. Special attention must be paid to this effect!
- The following sequence must be strictly observed while putting the module into operation:
  1) Make complete wiring.
  2) Turn on power supply of the module without SIM card inserted into GM22 telephone.
  3) Activate the servicing mode of the module and call the servicing function “Cancell all” (restoral to factory default settings, if the module could have been programmed earlier).
  4) Enter PIN code and program the module as required.
  5) Switch off power supply.
  6) Insert SIM card into the module.
  7) Turn on the power supply again.

  CAUTION: It is not allowed to power the module and the GM22 telephone without antenna being connected.

- The module’s power supply voltage level should not be below 9,8 V, at maximum current consumption (the module restarts at lower voltage level).
- The module’s power supply should have sufficient current capacity. Please note that maximum load current is 0,6 A. It is advisable to power the module from a buffer power supply equipped with its own battery.

14.EXAMPLES OF PROGRAMMING THE NUMBERS AND PREFIXES

Example 1.

- the module is directly connected to a subscriber line in Gdansk (area code for Gdansk-58)
- outgoing calls via the module are to be allowed only to the following telephone numbers:
  - 111-00-11 - Security Dept.
  - 222-00-22 - Administration Dept.
  - 333-00-33 - residence telephone number of the owner
  - (0-602) 440-440 - cellular telephone number of the owner
  - (0-501) 550-550 - telephone number of the owner's partner
  - (0-39) 77-88-99 - telephone number of the Service

Since the alarm control panel is connected to the subscriber line via the module, these numbers are to be programmed in the control panel as if the module did not exist (the letter "D" in the number indicates the mark of waiting for continuous dial tone) :

- telephone numbers for messaging: "1110011"
  "2220022"
  "3330033"
  "0D602440440"
  "0D501550550"

The Service is accessible by dialing the following telephone number:
"0D39778899"

Configuring the module for such an operation requires programming the numbers and prefixes, and checking the settings of options, as given below:

- Any number: option OFF
- Signal testing: option chosen
- Permanent prefix: "602", "501", "39",
- Prefix to erase: "0",
- Prefix to add: "58"
- Telephone numbers: "581110011", "582220022", "583330033", "602440440", "501550550", 39778899"

The remaining prefixes and numbers should be blank.

Example 2:

- the module is connected to a PBX (private branch exchange), which has access to two subscriber lines (public telephone exchange lines) in Gdansk (area code-58) after dialing the "outgoing numbers" 71 or 72 ; in addition , PBX has access to the trunk line KOMERTEL (code number –39) after dialing the number 73.
- the calls via the module are to be allowed only to the following telephone numbers:
  - 111-00-11 - Security Dept.
  - 222-00-22 - Administration Dept.
  - 333-00-33 - residence telephone number of the owner
  - (0-602) 440-440 - cellular telephone number of the owner
  - (0-501) 550-550 - telephone number of the owner's partner
  - (0-39) 77-88-99 - telephone number of the Service

While programming (at the alarm control panel) the telephone numbers for messaging, it is required to choose one of three ways of getting connection .(the letter "D" indicates the mark of waiting for continuous dial tone):

"71D1110011" or "72D1110011" or "73D581110011"

"71D2220022" or "72D2220022" or "73D582220022"
"71D3330033" or "72D3330033" or "73D583330033"
"71D0D602440440" or "72D0D602440440" or "73D602440440"
"71D0D501550550" or "72D0D501550550" or "73D501550550"

The service can be rung up by dialing the following number:

"71DoD39778899" or "72D0D39778899" or "73D39778899"

In this case , the module is programmed as follows (items not shown below should be blank):

- Any number: option not chosen
- Signal testing: option chosen
- Outgoing No.: "71", "72", "73"
- Permanent prefixes: "602", "501", "39"
- Prefix to erase: "0"
- Prefix to add: "58"
- Telephone numbers: "581110011", "582220022", "583330033" "602440440", "501550550", "39778899"

Example 3

- programming to enable the module to send SMS message to cellular telephone number : (602)123123

Programming the module is as follows (items shown should be programmed):

- Pager Tel. No.: 1111
- SMS centre No.: 48602951111(contact GSM representative for the correct number)
- Prefix for SMS: 48

The pager number to be programmed in the alarm control panel should have the following form (FS-87 to FS-90 in the control panel CA-6 plus; FS-87 to FS-94 in the control panel CA-10 plus) :

1111602123123

The parameters of the paging system to be programmed in the alarm control panel should have the following form (FS-118 in the SATEL control panel CA-6 plus and CA-10 plus):

0E 11 0C 0E 0E 11

15. BASIC TECHNICAL DATA

Supply voltage..... DC 10.5V … 14V
Output current-carrying capacity..... 50mA
Maximum current consumption with control outputs supply 400mA
Current consumption measured in urban conditions of the module installation:
Maximum current consumption in the telephone standby mode (without outputs supply) 130mA
Maximum current consumption in the GM22 telephone active mode (without outputs supply).... 250mA

IMPORTANT:

PIN No .....PUK No .....

Telephone No .....