Topkodas

GTAUTO

GSM SMS/DIAL security and remote control system

User's guide
Prog. Version GTauto v3

APPLICATION

- The module may be applied for remote monitoring and control of vehicles, motorcycles, boats or other vehicle as well as for their protection via GSM network.
- Individual protection of houses, garages, cottages and other premises.
- Remote control of the devices via GSM network
- Access control. Gate/door control.
- Automation of premises, temperature and voltage control. GSM Temperature controller-Thermostat
- Remote voice listening.

FEATURES

- 7 inputs. Fully programmable zones.
- 2 inputs for arm/disarm the security system. The module can be controlled from the central lock of the vehicle or from additional keyboard or from other access control device.
- 3 programmable outputs for remote control or for fulfillment of selected function.
- 1 output for monitoring of system's state. LED indicator.
- 16 users who receive information about protected object. Reception of information in a form of SMS or via DIAL short call.
- 400 users, enabling to control gate or electromagnetic lock via free short call.
- ARM/DISARM of the system via free short call.
- Temperature measurement. For temperature control, alarm and control.
- Voltage measurement. Voltage monitoring and alarm.
- External microphone. Remote voice listening option via external microphone.
- Option to connect BELL for alarm indication. For protection of car, house, garage.
- System state BUZZER. (Optional output type)
- Light FLASH feature can be used for car direction indicator or for light alarm indication of other objects (Optional output type)
- Sending of periodical test including system parameters.
- SMS about state of each sensor, alarms, power supply voltage and GSM communication level.
- Built-in GSM module.
- Testing and diagnostic of the module via USB by using program SERA
- Remote setup via SMS messages.
- Configuration of the module via USB.
- Free configuration program SERA.

Content

1 Safety requirements

Before applying the module GTAUTO, please read this user's guide. Any operations, related with mounting of the module and connecting of peripheral devices, should be performed only after unplugging the module from the mains.

2 Application of the device

GSM communication module GTAUTO (hereinafter the Module) is applied for transferring of GSM SMS messages to the mobile phone of a user. The module GTauto may be applied for protection of house, garages, cottages, vehicles as well as for access control, gate control, objects' automation, smart house and temperature control. The module may be used for protection of vehicle or in combination with the vehicle security system, which has control lock control. The module may also be used for protection of objects and for wide scope of application. In the event of burglary the device depending on algorithm of programming is able to call or to send SMS to up to 16 users. A user is able to hear what is going on in his vehicle or premises after answering a call or he may call to the module himself. The user is able to receive an SMS with detailed information about status of each protected zone and occurrence of alarms. The user is able to control the device via SMS messages only if he knows user's password. If s call is being performed from the telephone number not included in the system's storage, the call is cancelled immediately. SMS message is being sent to the user also if power supply voltage drops. The SMS message includes voltage of backup battery. The module has external temperature sensor. The user receives temperature alarms and restores via SMS messages. The SMS about voltage of the module and ambient temperature is also available. Temperature may be measured in Celsius and Fahrenheit. SMS periodical test ensures constant control of the module. The module is able to send periodical test. Test time is programmable. The test will include GSM communication strength, system (battery) power supply voltage, temperature and IMEI of the module.

The module GTauto ideally suits for remote control of gate, barrier gate operator systems and electromagnetic locks. In order to open gate, a user calls to the number of GTauto module. The module compares incoming number with programmed users' numbers and in a case of compliance activates gate control device and interrupts the call automatically. Up to 400 users are able to control gate.

All parameters of the module should be configured via PC by using software SERA or in remote manner by sending appropriate SMS including password.

Additional information. The module may be used as measure to track and to detect the location of the vehicle having the module installed. Example see: www.traceamobile.co.uk . Contact your GSM communication provider due to this additional feature.

3 Used definitions and terms

- *Installer* – a person provided with INST (installer's) password.
- *User* – a person provided with USER (user's) password.
- Authorized user - a person whose mobile phone's number is entered in GSM module. Two equal authorized users may be entered into the module.
- *Configuration* – programming of the module settings, which will define the operation of the item. E.g. users telephone numbers, sending of SMS message, input names etc.
- *Event* – event the user receives information about.
- *ARM* – status of the security system. The module is activated.
- *DISARM* – status of the security system. The module is in standby mode; only 24h inputs are active.
- *NO* - input type (Normal Open) - this means that the alarm will be send when the input will be connected with ground (-V).
- *NC* input type (Normal Close) - this means that the alarm will be send when the circuit between input and ground (-V) will be broken.
- *EOL* - (end of line resistor) input type with resistor
- Service messages – on/off, test, resetting of the system.
- *DIAL* – the system calls to the set number.
- *Pull-up resistor* - the pull-up resistor is that it weakly "pulls" the voltage of the wire it's connected to towards +V (or whatever voltage represents logic "high").
- *MIC* - microphone
- *COM* – negative terminal of power supply.
- *+V* - positive terminal of power supply.
- *SSR* – Solid State Relay

4 Short description of operation principle

The module transfers messages about event of the security system to the mobile phone of a user via GSM communication channel.

Upon alarm response of the security system, the module will generate SMS message about alarmed sensors, which is being sent to the user along with short call. it is possible to send SMS and to call to 16 users. Algorithm of message sending is SMS1, SMS2...SMSn till all SMS messages will be send. After DIAL1, DIAL2....DIALn. All messages are being sent until all users will be notified about the event. Preferred messages and texts of these messages should be set when programming the module.

The module understands when the call is rejected and will not repeat calling. When the module is calling to the user's phone, the user can not reject the call at least 15 seconds. Otherwise the module will understand that the user's number is busy and will try to repeat the call again. In a case user's number is busy, the module will try to call in so far as set when programming the module. Note: Operation of this function depends on interpretation of call control by the operator; in some cases the operator may wrongly interpret rejection of the call and in this case the module will repeat calling each 60 seconds and in so far as the amount of programmed repetitions (by default 3 repetitions). In such case GSM operator may be changed or simply the amount of DIAL repetitions reduced.

Operational parameters of the module should be set by sending SMS messages or via PC by using programming cable and configuration program SERA, which is available at www.topkodas.lt website.

In order to activate voice listening it is necessary to call from the user's telephone number. When calling the module will immediately activate voice listening, which will last as long as the user will cancel the call or when the module will start performing other commands. Calls from other telephone numbers (of non-authorized users) are ignored.

5   Specifications

Parameters of built-in GSM module:
    Quad-band (850/900/1800/1900 MHz)
    Sending of SMS messages
    Receiving of calls and dialing
    Microphone
Outputs:
    OUT1 max current ....- (-V) 1500 mA.
    OUT2 max current ....- (-V) 1500 mA.
    OUT3 max current ....- (+V) 100 mA.
All outputs can be controlled via short call DIAL or via SMS message. This feature may be used for gate opening, ignition locking etc.
    Output alarm parameters may be programmed.
    Programmable algorithms for outputs operation: CTRL/SMS/DIAL, SIREN, BUZER, ARM state, Zones OK, Light Flash
INI-IN7 inputs:
    SMS text for input alarm and restore
    Programmable enabling or disabling of inputs;
    Input type ....NC/NO/EOL
    Algorythm for zones operation: delay, interior, instant, 24 hours, silent, fire
    Response time;
    Time of additional response;
 IN8 voltage control (virtual input)
    Alarm voltage (programmable);
    Restore voltage (programmable);
    Programming-based voltage calibration;
    Measuring scale 0.01V;
 IN9 (temperature control) parameters:
    External temperature sensor;
    Alarm temperature (programmable);
    Restore temperature (programmable);
    Programming-based calibration of temperature sensor;
    Temperature measurement range ....from -40 ^{o}C to +60 ^{o}C
    Measuring system ....Farenheit/Celcius
    Measuring scale ....0.1 ^{o}C / 0.18 ^{o}F;
Module control:
    ARM/DISARM of the security system via LOCK/UNLOCK outputs.
    via SMS message
   via short call DIAL
Automatic periodical test:
    Test sending in a form of SMS message. Sending communication control messages (tests) at time range from 1 to 24 hours after pressing RESET button or after entering into ARM (security) mode. Discretion of settings is one hour.
Power supply voltage:
    Nominal power supply voltage...12,6 V.

Power supply voltage range ....9 - 16 V.

Consumption current:
    In standby mode...less than 50 mA.
    In a mode of short call/SMS sending...less than 300mA.

Environmental parameters:
    Temperature range for storage of the module ....from -40 to +85 ^{o}C / from -40 to 185 ^{o}F
    Operation temperature range ....from -30 to +75 ^{o}C / from -22 to 167 ^{o}F
    Max relative humidity under 40 ^{o}C / 104 ^{o}F 95%

Mass of the package:...*430g*
Overall dimensions of the module:...*90x63x32 mm*

6 General view of the product and layout of control devices
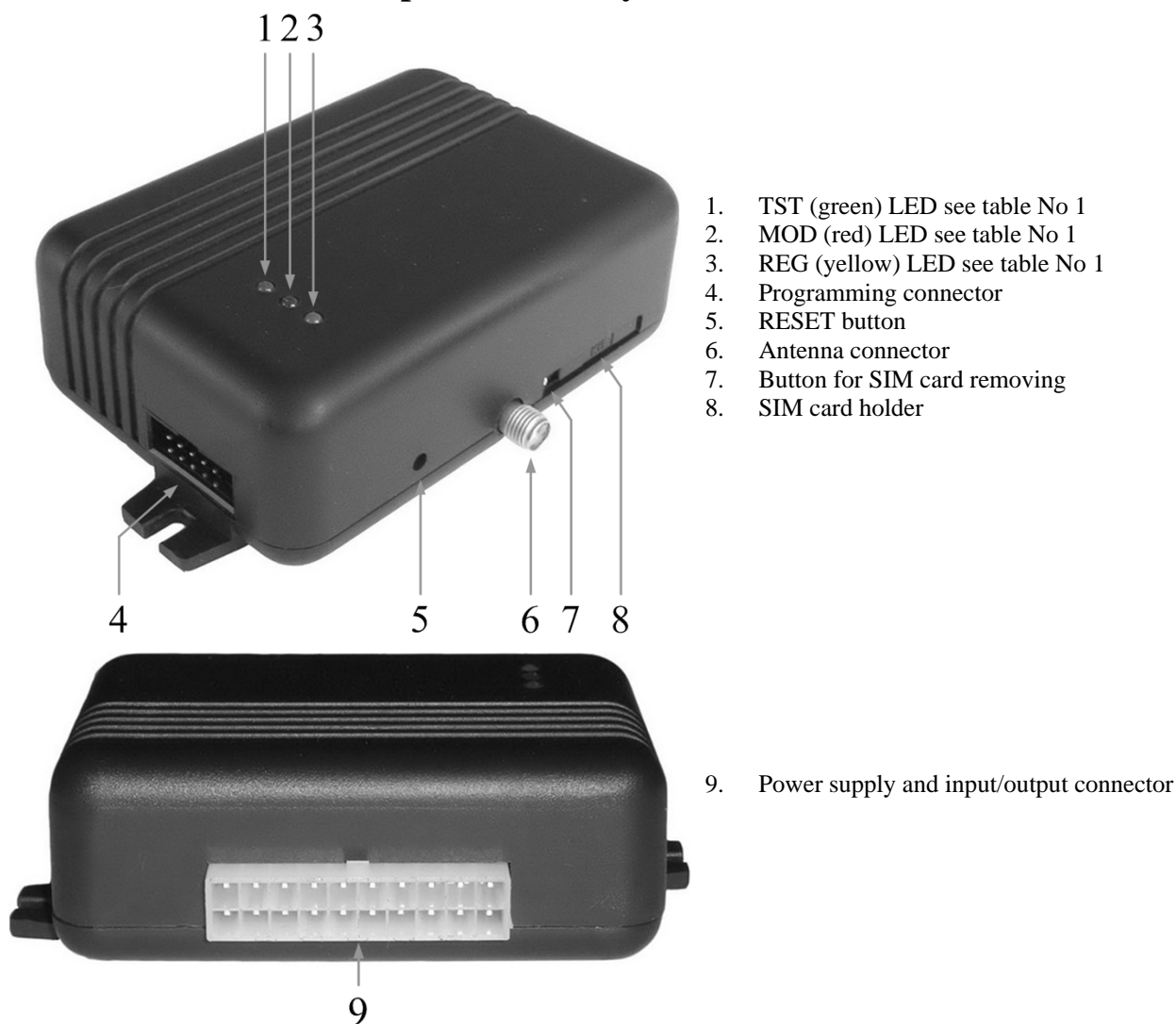
1. TST (green) LED see table No 1
2. MOD (red) LED see table No 1
3. REG (yellow) LED see table No 1
4. Programming connector
5. RESET button
6. Antenna connector
7. Button for SIM card removing
8. SIM card holder

9. Power supply and input/output connector

6.1 Application of LEDs

Table 1

Designation	Indication variations	Meaning
External LED on the system cable "ARM state"	Blinking, remains lit for 50ms, turns off for 300ms.	GSM module is in ARM (security) mode.
	Blinking, remains lit for 50ms, turns off for 10s.	GSM module is in DISARM (non-security) mode.
"TST" (green)	Blinking, remains lit for 50ms, turns off after 1000ms.	The module is functioning.
	Off	The module is out of order or no voltage.
"REG" (yellow)	Lights continuously	Modem has been registered to the network.
	Flashes, remains lit for 50ms, turns off for 300ms.	Modem is being registered to the GSM network.
	Off	Modem failed to register to the network.
"MOD" (red)	Flashes	Power supply OK and the module is registered to the GSM network.
	Lights continuously	Modem power supply OK, and the module failed to register to the GSM network.
	Off	Modem power supply failure or it is switched off.
Note:	*All LEDs turn off for 15sec when resetting GSM modem of the module.*	

6.2 Input/output connector pinouts

Table 2

Contact No	Name	Wire color	Description
1	GND	Black	Negative supply voltage (GND)
11	+V	Red	Positive supply voltage Power supply voltage 8-16V
2	Input 1	Green/Yellow	1 zone/input, NC/NO/EOL
12	Input 2	Green	2 zone/input, NC/NO/EOL
3	Input 3	Yellow	3 zone/input, NC/NO/EOL
13	Input 4	Brown	4 zone/input, NC/NO/EOL
4	Input 5	Blue	5 zone/input, NC/NO/EOL
14	Input 6	Orange	6 zone/input, NC/NO/EOL
5	Input 7	Grey	7 zone/input, NC/NO/EOL
15	Lock	Black/White	Input for security ARMING
6	Unlock	Black	Input for security DISARMING
16	OUT1	Green/Yellow	First output 1500mA. Open Collector.
7	OUT2	Green	Second output 1500mA. Open Collector.
17	OUT3	White	Third output 100mA. Open Collector +V
8	LED(K)	Black/White	ARM/DISARM state LED cathode
18	LED(A)	Black	ARM/DISARM state LED anode
9	Temp+	Black/White	Temperature sensor input
19	Temp-	Black	Temperature sensor input
10	MICP	Black/White	Positive differential input of the microphone.
20	MICN	Black	Negative differential input of the microphone.

7 Users

7.1 Control and programming of the module via SMS messages

7.1.1 Installer

Installer us able to carry out all (INST) commands available in the Table 3. The installer is able to change parameters of the module only with INST password

7.1.2 User

User is able to carry out only user's (USER) commands available in the Table 4. The User is able to make an inquiry anytime and to receive parameters of the security system as well as to control outputs of the module (Out1, Out2, Out3) and to activate AMR/DISARM modes. The User is able to control the module only when using USER password.

## 7.2 Users to receive SMS/DIAL messages

The amount of users is up to 16. These users are able to receive messages or/and calls after alarm response of the security system or communication test or system state test messages, which are being generated after alarm response of the security system or following test sending schedule. The amount of users is up to 16. It is possible to select type of SMS messages to be sent to each user.

7.3 Remote control USERs. Users who are able to control the module via short call.

The amount of users is up to 400. These users are able to control outputs via short call, to activate voice listening and to activate ARM/DISARM mode of the system. Action of the user is free-to-select. It is possible to select the actions of the module regarding telephone number of each user when it will recognize a telephone number.

The following actions may be selected regarding telephone number of each user:
- To activate outputs OUT1,OUT2,OUT3 optionally. This feature may be used for gate control, car ignition blocking or to release a dog.
- ARM/DISARM security system
- Activate voice listening via external microphone MIC

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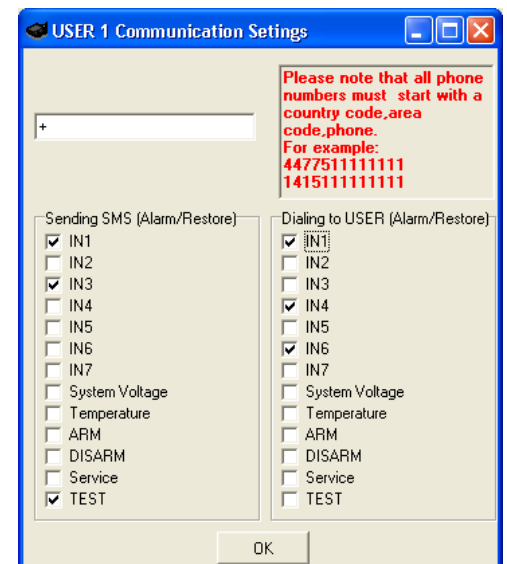
8   ARM/DISARM of the module

The module can work in the ARM mode and DISARM mode. ARM/DISARM state of the module may be changed in several manners: via short call, via SMS message or by using Lock/Unlock inputs. All possible ARM/DISARM methods may complement one another. E.g. it is possible to activate the module from the keyboard and to deactivate via short call.

8.1   ARM/DISARM via short call

It is possible for 400 users to activate/deactivate the module via short call. The module will recognize user's number and will automatically cancel the call. Not recognized numbers are being ignored. Programming of user's numbers see manual of SERA software.

8.2   ARM/DISARM by sending SMS message

It is possible to ARM/DISARM of the module by sending SMS message and using USER or INST password. Example of SMS message:
- Deactivate the system USER 123456 59 0
- Activate the system USER 123456 59 1

More info see clause 13.1.

8.3   ARM/DISARM by using Lock and Unlock inputs

It is possible to ARM/DISARM the module by using Lock and Unlock inputs. These inputs may be used when it is necessary to control the module with any peripheral device using NO or NC output:
- Signal of central lock of vehicle;
- Access control device, e.g.: RFID, IBUTTON, keyboard;
- It is possible to use switch, button, reed switch etc for generating of control signal.

Several Lock/Unlock modes are available:
- Mode 1 (V+ Pulse using Lock and Unlock inputs). Lock input sets ARM mode after pulse or steady signal. Unlock sets DISARM mode. It is comfortable to use 1 or 2 mode when connecting the module to the central lock of vehicle. Central lock mostly generates lock and unlock signals with two wires.
- Mode 2 (V- Pulse using Lock and Unlock inputs) similar as 1 mode only inverted.
- Mode 3 (V+ Level using Lock input) used only one Lock input. Unlock input is not used. These modes are comfortable to use when activating/deactivating the system by using switch or other access control device.
- Mode 4 (V- Pulse using Lock and Unlock inputs) similar as 3 mode only inverted.

1,2,3,4 see diagrams annex No 3.

Lock and Unlock inputs have no Pull-Up resitor inside the module. In that cases when there is no external signal, you need to connect external 2,2K pull-up resistor. The resistor should be connected between power supply positive terminal +V and input. Such case may be when switch is connected beween lock input and ground as shown in Fig. 1.

Example of wiring diagram with two switches. One switch for ARMing, another - DISARMing. 1 or 2 modes should be set by using two switches.
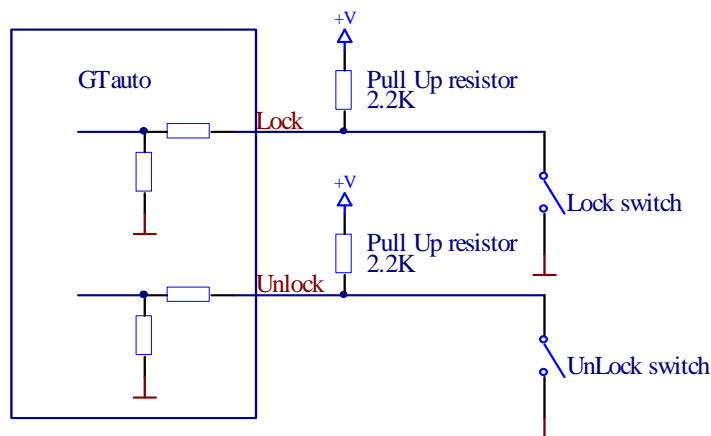

Fig. 1

Example of wiring diagram with central lock of vehicle, see annex 2.

8.4 Automatic arming of the security system "Auto rearm"

If the function „Auto-reARM" is on, the module will automatically return to ARM state, if during „Entry Delay" no one zone was alarmed. This feature is active only if the module was deactivated via telephone DIAL or SMS. This protects from random deactivation of the system via telephone.

8.5 Activation of the security system via IN7 input. „Force ARMing" function

This feature is comfortable to use when the module operates in parallel with other security system. For example, if default security system is used in the module, thus bell signal may be used for IN7. If default security system will be alarmed for appropriate reasons and will activate the bell, thus GTauto module will automatically turn into ARM state. and will send all information related with alarmed sensors. Thus the user gains additional protection from undesirable deactivation of GTauto module. This IN7 feature may be disabled.

8.6 "Blocking ARM" IN6 additional feature

This is additional feature IN6, which enables to block activation of ARM State. This feature may be applied in vehicles by connecting IN6 input to ignition. If GTauto module was deactivated and after ignition was turn on thus while the ignition will be on, the module would not be able to enter into ARM state. This feature may be disabled.

8.7 Bell confirmation signal by arming/disarming the security system

The bell will generate confirmation signal when arming/disarming the security system, if function „Siren signal on ARM/DISARM"was selected in the software SERA. When the security system is being ARM the bell will beep once. When security system is being DISARM – the bell will beep twice.

9 Inputs of the module

The module GTauto has:
- 7 programmable external inputs (zones).
- 1 temperature sensor input.
- Measuring of power supply voltage. Internal input is seen in programming table.
- 2 control inputs Lock and Unlock, see clause 9.3

Each input may be related with selected output, i.e. to switch selected output depending on output state. This feature allows applying module for automation of premises, as well as for temperature control and handling. E.g. if temperature drops till the permissible limit, the module is able to automatically activate heating system and also to inform a user about critical temperature in a form of SMS.

9.1 Equivalent diagrams of inputs

Equivalent diagram of 1-5 inputs:
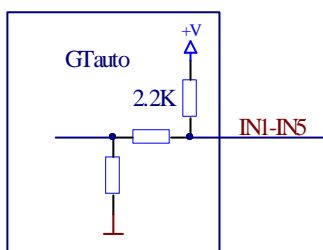
6 and 7 inputs are used only when Pull-Up resistor is not desirable. For example, when it is necessary to get signal from siren or ignition of the vehicle or from other device for which outside signal can not be given. These inputs have no internal Pull-Up resistor. Input resistance is 22kOhm. Equivalent diagram of 6-7 inputs:
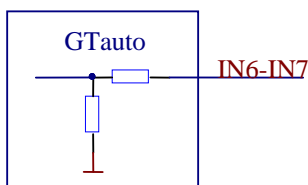

9.2 Sensor connection diagrams

Sensors may be connected following 4 different connection diagrams:
- NC – normally closed contact;
- NO – normally open contact;

- NC/EOL – normally closed with end of line resistor,
- NO/EOL – normally closed with end of line resistor,

NOTE. All resistors should be 1 kOm ± 10%. The length of wires for connection of sensors can not exceed 300m and resistance of wire connected to sensor contacts can not exceed 300 Ohms. Resistors should be mounted as near the sensor as possible. Improper connection of resistors system will not work properly. Pull-Up resistors should be 2,2 kOhm.
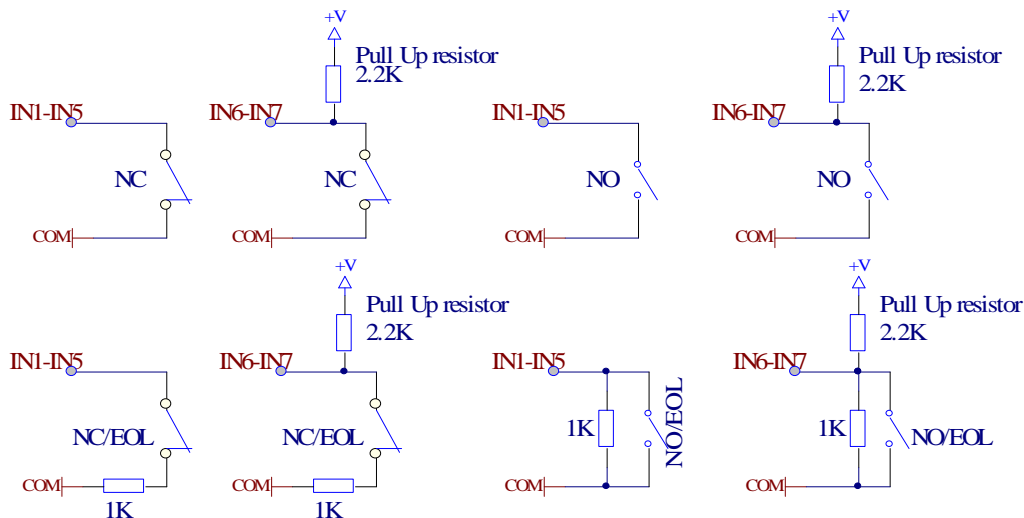
9.3   Input configuration parameters

The following parameters may be set for all inputs:
- Text of SMS messages for alarms and restores. This text will be included when sending SMS message to a user about alarms and restores of zones.
- Input types: NC,NO,EOL. These parameters should be set depending on type of zone connection.
- Definitions of input application:
  - Delay – Entry/Exit zone. Set "Entry delay" and "Exit Delay" are applied for this zone. Such type zones are used for connection of door sensor.
  - Interior – disturbance of this type of the zone will not be responded if alarm of "Delay" type zone occurred and "Entry Dlay" or "Exit Delay" time still have not run out. Such type zones may be used for connection of motion sensor in front of the door. The input will be activated immediately if the door has not been open before.
  - Instant – Instant zone. Upon disturbance of this zone, the system will immediately activate burglary alarm. If the security system was ARM'ed.
  - 24 hours - Upon disturbance of this zone, the system will activate burglary alarm not depending whether the security system is ARM or DISARM. The applications of this type zones are safes, storehouses, tampers of the sensors.
  - Silent - silent zone is always active not depending on whether the security system is ARM or DISARM. Upon disturbance of this zone, SMS messages are being generated but the siren will not be activated. These zones may be applied for voltage, temperature control, AC mains failure control and for alarm of silent panic.
  - Fire - this zone is always active not depending on whether the security system is ARM or DISARM. The zone generates a special siren signal with interruptions. The zone is applied for smoke sensors and for fire alarm.
- Enabling or disabling of zone alarm or restore.
- Input speed – time of the input reaction, this is the time period during which changed input state should remain stable in order to let the module to register alarm or restore input state.
- Repeat time – this is the time period, during which repeated event of the input will be ignored.
- Input action – switching of selected output (OUT1, OUT2, OUT3) after changing input state event of alarm of restore. May be used for automation of objects, e.g. for temperature control in premises. Upon dropping of temperature will critical limit, heater would be switched on automatically.

9.4   Voltage measuring IN8 (internal)

This input is visible only in configuration window of the SERA software of the module. IN8 input is intended for power supply voltage control. If the module is being applied for the security of vehicle, it is very comfortable to follow cat battery voltage. A user will always be alerted that car battery has been discharged. This the car battery will be protected from full discharge or damage. Alarm and restore voltages are programmable. Voltage measurement may be calibrated additionally.

9.5 Temperature sensor input IN9

Temperature sensor is connected to the system wire contacts 9 Temp(+) and 19 Temp(-). Temperature input number in "Inputs" configuration table is IN9. Alarm and restore temperature may be changed. Upon temperature alarm, the module will send SMS message to a user. And if set when programming, the module will commutate the output. It is comfortable to use this function for premises heating management. In a case of accuracy shortage, temperature sensor may be calibrated additionally.

Following the equation "Temperature=X*ADC+Y" and by selecting X and Y coefficients. Temperature calibration may be performed in software SERA in testing window. It is necessary to have accurate thermometer in order to measure temperature at least in two points. In testing window temperature ADC indications in these points should be read. Following the equation "Temperature=X*ADC+Y" and by calculating X and Y coefficients. Calculated X and Y coefficients should be programmed in the module. It is easy to calculate X and Y coefficients in MC Excel by using trendline.

$$y = 0{,}3284x - 269{,}26$$
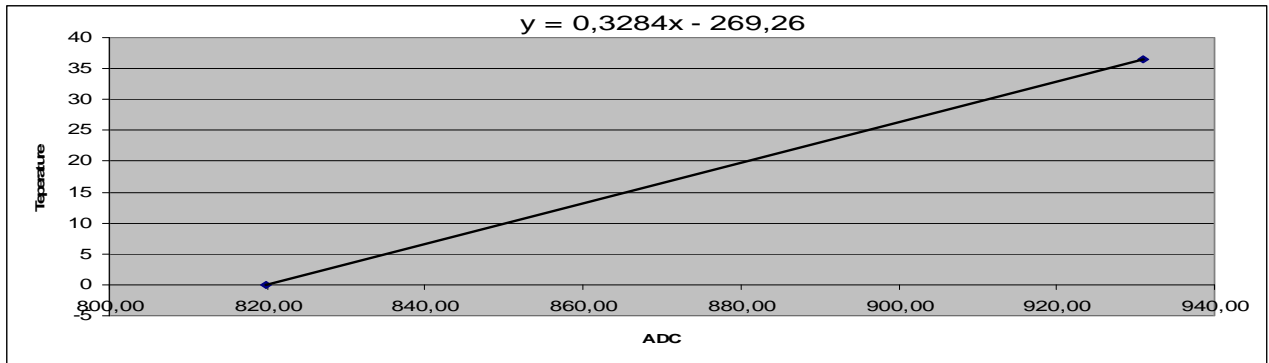
Temperature may be measured in Celsius and Fahrenheit.

9.6 Microphone and voice listening

The microphone may be connected to the contacts 10 MICP and 20 MICN of system wire. In order to avoid noises, the microphone should be mounted as far as possible from GSM antenna. 400 users are allowed activating voice listening in the objects. In order to allow a user to activate voice listening, it is necessary in user table „GSM remote control" to check the box „MIC".

Note: If a user number is enabled for ARM/DISARM and MIC thus after making a call to the module, the state ARM or DISARM will be changed and also microphone will be activated.

10 Programmable outputs

The module GTauto has 3 programmable outputs. Outputs of the module may be used to switch relay, LEDs, siren or other sound device. Current commutated by OUT1 and OUT2 is 1500mA. Current commutated by OUT3 output is 100mA.

10.1 Equivalent diagrams of diagrams

OUT1 and OUT2 outputs are open collector in terms of grounding –V. OUT3 output is open collector in terms of power supply positive terminal +V.

OUT1 and OUT2 Equivalent diagram: OUT3 Equivalent diagram:
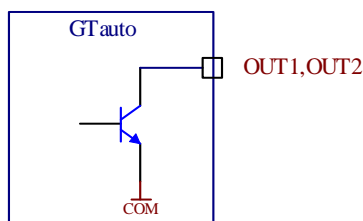
10.2 Output connection diagrams

Examples of input connection diagrams see below:

10.3 Operational parameters of inputs

The following parameters may be set for each output:
- SMS text for ON output state
- SMS text for OFF output state
- Output operation algorithm „OUT def":
  - CTRL/SMS/DIAL – output used for remote control via short call or SMS. E.g. for ignition blocking, for gate control or for remoter starting of a car etc.
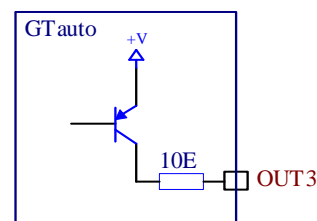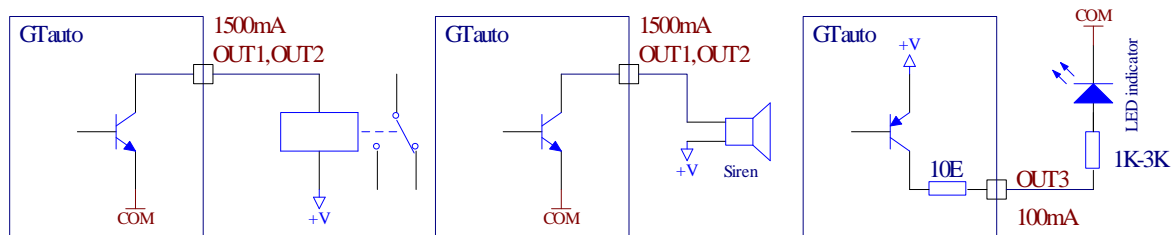 - SIREN – output used for connection of siren.
  - BUZER – sound signaling device. Upon alarm of the zone beeps continuously. When security system starts calculating Exit time "Exit Delay", the used is able to hear short voice signals. When 10 seconds are left till the activation, signals are being repeated each 0.5 seconds. If after expiry of delay time all zones remains unalarmed, the system turns into ARM state along with conformation beep.
  - ARM state – state of alarm system ARM/DISARM. For light indication may be used. When the output is set for operation in pulse mode, this feature may be used to close car windows or roof ventilation. Impulse time should be set 20-30 seconds. When the security system will be turn on, the output will generate signal to close windows.
  - Inputs OK- if any of zones is disturbed, the output will be alarmed. This feature is usually used for indication whether all zones are in order.
  - Light Flash – used for connection of light signal. Upon alarm of the security system the light starts blinking. Lights will also blink when activating/deactivating the security system. This feature may be applied to connect car direction signals.
- Output inversion;
- Output type level or impulse;
- Output impulse duration. 1-65535 seconds.

11 Timers of the security system

„Entry Delay"– time period, during which the user after activate „Delay" zone should manage to turn off the security system.
"Exit Delay"– time period, during which the user should manage to leave premises and pass „Delay"zone.
"Siren time" – siren operation time after alarm occurrence;
"Test time" – time of automatic periodical test.

12 Sending of automatic periodical test

Periodical test may be used for communication control of the module. Test sending time is programmable [Test Time]. Asynchronous periodical test may be programmed. This means that after each activation of the system test time is being calculated from the beginning „Reset test counter ARMing". Test sending may be disabled when setting test time 00.

Periodical test may be used for SIM card balance control. The following parameters of the module are available in a test message: GSM communication strength, power supply voltage, temperature, IMEI number of the module, software version.

13 Preparation for operation

Before or after mounting of the module it is necessary to set its parameters.
SIM card settings may be performed by using only GSM phone.
The following steps should be fulfilled:
- check and if necessary enter SMS message center number (this should be done by using GSM phone);
- disable PIN code requirement of the SIM card (this should be done by using GSM phone);

- GSM communication strength, IMEI, SMS message center number is visible in software window "Test"; see SERA description.
- configure telephone numbers to which information should be transferred*;
- set the numbers to send SMS and to make a call*;
- set active inputs, which will be used. E.g. if microwave sensor will not be used, its input should be disabled*;
- set periodicity of communication test (if 00 is entered, the test will not be send);
- set input parameters.
- set output OUT1, OUT2, OUT3 states (if applied)*;

After inserting SIM card or upon changing parameters of the module, it is necessary to press RESET button.

There are two types to configure the module. The first – via SMS messages. The second – via PC, by connecting the module to PC via programming cable. <u>Full change of parameters is possible only via PC by connecting programming cable.</u> If possible we recommend configuring the module via PC.

13.1 Configuration and control of GSM communication module via SMS messages

Only basic parameters of the module, shown in the table No 1, may be configured via SMS messages. All parameters of the module may be changed via USB by using configuration software SERA.

Configuration of the module via SMS messages may be performed only with installer's password.

The table No1 shows configuration and control codes of the module. Configuration of the module may be performed via SMS messages.

Command structure:
- Verifier:
  INST – Install. This verifier is used for configuration of parameters of the module.
  USER – User. This verifier is used for module control.
- Installer's or user's password.
- Command code.
- Parameters of the command.

One SMS message may include as many commands as one SMS message may cover, i.e. 160 symbols (including spaces).

In such case firstly verifier should be sent, password should be written without space after the verifier and further comes command code, parameter, command code, parameters etc. separated with space „_".

The module performs the commands following the sequence: firstly performs the first command next after the password and further come all other commands from the left to the right.

Table 3 Installer's command codes.

Pradžia rašwor	Command code.	Command parameters default settings	Examples of command parameters	Clarifications
INST 123456	01	none	3701111111#01	Telephone number of users whom to send SMS and whom to make a call (DIAL) up to 16 symbols, the end symbol "#") after the symbol "#" user priority number comes 01-16
	02	none	01	Delete selected user's telephone number according to priority number. Priority number from 01 to 16
	03	none		Delete telephone numbers of all users
	05	1	4	Lock/Unlock modes: 0,1,2,3,4 see diagrams in annex No 3
	06	24	01	Periodicity of communication test (from 00 am to 00 pm), 00 – no test In the example test to users will be send each hour.
	07	1	0	LED indication *Test, Reg* (1-On, 0-Off)
	08	111111211	021111333	Input IN1,IN2,IN3,IN4,IN5,IN6, IN7, IN8, IN9 modes (0-'delay',1-'interior',2-'instant',3-'24h',4-'silent',5-'fire')
	09	111112211	021111111	Input IN1,IN2,IN3,IN4,IN5,IN6, IN7, IN8,IN9 types (0-NO type,1-NC type,2-EOL)
	10	1111	0011	Service messages: Arm, Disarm, Reset, Test (1-On, 0-Off) In the example service messages Reset and Test will be sent.
	11	111111111	000001011	Input alarms: IN1,IN2,IN3,IN4,IN5,IN6, IN7,IN8, IN9 (1-On, 0-Off) In the example alarms of IN6 IN8 IN9 will be activated.
	12	111000011	101011011	Input restores: IN1,IN2,IN3,IN4,IN5,IN6, IN7, IN8, IN9 (1-On, 0-Off) In the example restores of IN1, IN3, IN5, IN6, IN8, IN9 will be activated.
	21	Alarm Luggage #	Atidare bagazine#	IN1 input name changing up to 16 symbols, the end symbol "#"
	22	Alarm Bonnet#	Atidare kapota#	IN2 input name changing up to 16 symbols, the end symbol "#"
	23	Alarm Door#	Atidare duris#	IN3 input name changing up to 16 symbols, the end symbol "#"
	24	Alarm Microwave#	Suv. mikr.#	IN4 input name changing up to 16 symbols, the end symbol "#"
	25	Alarm Shock.#	Suv. smug.#	IN5 input name changing up to 16 symbols, the end symbol "#"
	26	Ignition On#	Ijunge degima#	IN6 input name changing up to 16 symbols, the end symbol "#"
	27	Siren on#	Suv Siren#	IN7 input name changing up to 16 symbols, the end symbol "#"
	28	Low Battery#	Low Battery#	IN8 input name changing up to 16 symbols, the end symbol "#"
	29	Low Temperature#	Low Temp#	IN9 temperature alarm name changing up to 16 symbols, the end symbol "#"
	31	Rest. Luggage #	Uzdare bagazine#	IN1 input restore name changing up to 16 symbols, the end symbol "#"

32	Rest. Bonnet#	Uzdare kapota#	IN2 input restore name changing up to 16 symbols, the end symbol "#"	
33	Rest. Door#	Uzdare duris#	IN3 input restore name changing up to 16 symbols, the end symbol "#"	
34	Rest. Microwave#	Atsistate mikr.#	IN4 input restore name changing up to 16 symbols, the end symbol "#"	
35	Rest. Shock.#	Atsistate smug.#	IN5 input restore name changing up to 16 symbols, the end symbol "#"	
36	Ignition Off#	Isjunge degima#	IN6 input restore name changing up to 16 symbols, the end symbol "#"	
37	Siren Off#	Siren off#	IN7 input restore name changing up to 16 symbols, the end symbol "#"	
38	Battery Restore#	Battery Restore#	IN8 input restore name changing up to 16 symbols, the end symbol "#"	
39	Temp Restore#	Temperature Res#	IN9 temperature restore name changing up to 16 symbols, the end symbol "#"	
40	Out1 ON#	Degimas on#	Out1 output activation text changing up to 16 symbols, the end symbol "#"	
41	Out2 ON#	Blokavimas on#	Out2 output activation text changing up to 16 symbols, the end symbol "#"	
42	Out3 ON #	Kondic.on#	Out3 output activation text changing up to 16 symbols, the end symbol "#"	
43	Out1 OFF#	Degimas off#	Out1 output deactivation text changing up to 16 symbols, the end symbol "#"	
44	Out2 OFF#	Blokavimas off#	Out2 output deactivation text changing up to 16 symbols, the end symbol "#"	
45	Out3 OFF #	Kondic. off#	Out3 output deactivation text changing up to 16 symbols, the end symbol "#"	
46	000	111	Outputs OUT1 OUT2 OUT3 states: 1-Inverted, 0-Normal In the case of example OUT1 OUT2 OUT3 outputs are inverted	
47	000	102	Description of outputs operation algorithm: Out1, Out2, Out3 0-CTRL,1-SIREN,2-BUZZER,3-ARM state,4-Zones OK,5-Flash In the example output OUT1 will work in siren mode; OUT2 – for remote control; OUT3 – for activation of Buzzer.	
50	none	1,2,3	1-OUT1, 2-OUT2, 3- OUT3. Change state of selected OUT. Output state: changes every time when sending command code. Clarification see below the table.	
51	none	0 or 1	Activates or deactivates OUT1 output. 0 – activate, 1- deactivate	
52	none	0 or 1	Activates or deactivates OUT2 output. 0 – activate, 1- deactivate	
53	none	0 or 1	Activates or deactivates OUT3 output. 0 – activate, 1- deactivate	
59	none	0 or 1	ARM/DISARM command. 0- activates ARM state, 1- activates DISARM state	
60	none	3701111111#001#00010	Command to enter new user for remote control via short call. Command parameters: User telephone number, end symbol #, user ID number from 001 to 400, #, dial mode 0 – off or 1 - on, sequence OUT1,OUT2,OUT3,ARM/DISARM,MIC	
61	none	001	Delete selected user's telephone number according to priority number. User ID from 001 to 400	
62	none		Delete all telephone numbers of remote control users from 001 to 400	
80	none	1	Send a part of information regarding configuration of the module in a form of SMS: 1. 05…12 parameters of command codes will be sent; 2. 21…28 parameters of command codes will be sent; 3. 31…38 parameters of command codes will be sent; 4. 40…49 parameters of command codes will be sent; 5. make an inquiry about states of Out1-Out3 outputs; 6. test inquiry; 7. system state inquiry. input/output states will be sent along with current state of the system (ARM/DISARM).	
90	123456	654321	To change installer's (INST) code (recommended to change before applying the module in operation)	
91	123456	948921	To change user's (USER) code (recommended before applying the module in operation)	

13.1.1 Examples of typical programming messages:

1. Programming of users telephone numbers to send SMS and to make a call:
   INST123456 01 37011111111#01
   - 123456 – installer's code;
   - 01- command code (programming of users' numbers);
   - user's telephone number without (+) comprised of country code, operator's code and user's telephone number. the end symbol #;
   - 01 – User's priority number 01-16. In this example telephone number of the first user will be entered;

After the telephone number has been entered all events of the security system will be sent to a user. Optional events to be sent may be selected only when configuring via USB.

2. It is possible to delete telephone numbers one by one according order of priority or all 16 numbers at once:
   INST123456 02 15   Detele user's telephone number whose priority number is 15. It is possible to select from 01 to 16.
   INST123456 03 Delete all 16 users'telephne numbers.

3. To enter user's telephone number for remote control via short call:
   INST123456 60 3701111111#001#00010
   - 123456 – installer's code;
   - 60 – command code (programming of users' telephone numbers for remote control via short call);
   - 3701111111# - user's telephone number without (+) comprised of country code, operator's code and user's telephone number. the end symbol #;

- 001 – user's priority number from 001 to 400. In this example telephone number of the first user will be entered;
- 00010 – What actions should be done after making call to a user. Sequence from the left to the right: OUT1,OUT2,OUT3,ARM/DISARM,MIC 0 - active functions, 1- non-active function. In the example function ARM/DISARM is selected.

4. Delete user's for remote control via short call telephone number according to priority number or all numbers at once:

   INST123456 02 61 001;   Delete user's number whose priority number is 001. It is possible to select from 001 to 400.

   INST123456 62 ; Delete all numbers of remote control users from 001 to 400.

5. Inputs programming

   INST123456 11 000001111 12 011011111 80 1
   - 123456 – installer's code;
   - 11 – command (see table)
   - 000001111 – used inputs are calculated from the left to the right. IN1, IN2, IN3, IN4, IN5 alarms are disabled and IN6,IN7, IN8, IN9 alarms are enabled.
   - 12 – command (see table)
   - 011011111 - IN1, IN4 restores are enabled, IN2, IN3, IN5, IN6, IN7,IN8, IN9 restores are enabled.
   - 80 – command (see table)
   - 1 will send command code 05-12 parameters back to SMS sender.

   More input parameters may be changed via USB.

6. Programming of input names:

   INST123456 21 Alarmbagazi# 22 Alarmkap# 23 Alarmdurys# 80 2

7. Programming of outputs names:

   INST123456 40 ignition on # 43 ignition off # 80 4
   - 123456 – installer's code;
   - 40 – command (see table)
   - „degimas ij.#" name of output state when ignition is on.
   - 43 – command (see table)
   - „degimas isj.#" – name of output state when ignition is off.
   - 80 – command (see table)
   - 4 – will send 40-49 parameters of command codes.

8. Programming of output parameters:

   INST123456 46 101 47 000 80 4
   - 46 – command – outputs inversion (see table)
   - 101 – OUT1 inverted, OUT2 normal, OUT3 inverted.
   - 47 – command - description of operation output algorithm (see table)
   - 105 – OUT1 siren, OUT2 – remote control, OUT3 light signalling device (FLASH).
   - 80 – command (see table)
   - 4 – will send 40-49 parameters of command codes.

9. Module control modes (ARM/DISARM) see diagrams in the annex No3:

   INST123456 05 1
   - 123456 – installer's code;
   - 05 – command (see table)
   - 1- lock/unlock modes of the module, see diagrams in the annex No 3

Table 4 Table of users codes.

Beginin g	Password	Command code.	Command parameters default settings	Possible commands	Clarifications
USER	123456	50	none	1,2,3	1-OUT1, 2-OUT2, 3- OUT3. Change state of selected OUT output. Output state: changes every time after sending command code. Explanation see below the table.
		51	none	0 or 1	Activates or deactivates OUT1 output. 0 - activates; 1- deactivates
		52	none	0 or 1	Activates or deactivates OUT2 output. 0 - deactivates; 1- activates
		53	none	0 or 1	Activates or deactivates OUT3 output. 0 – deactivates, 1 - activates
		59	none	0 or 1	ARM/DISARM command. 0 – DISARM the security system, 1 - ARM the security system

		80	none	1,2,3,4,5,6,7	Send a part of information regarding configurations of the module in a form of SMS: 1. 05…12 parameters of command codes will be sent;; 2. will send command code 21-28 parameters; 3. will send command code 31-28 parameters; 4. will send command code 40-49 parameters; 5. make an inquiry about states of outputs (Out 1 – Out 3); 6. test inquiry. 7. System state inquiry. will send informakion on input/output states and system state (ARM/DISARM).

Outputs control via SMS messages:

Output states of the module may also be controlled via SMS messages. Let's say that car ignition should be blocked, thus the first output should be connected to ignition blocking relay. For outputs control the following commands are used: 50,51,52,53,58.

Command 50 changes (inverts) state of selected output. When this command is being sent, output state is being changed, i.e. if output has been deactivated, it is activated and vice versa.

51, 52, 53 commands sets preferred output state: if 0 is being sent, the output is being deactivated; if 1 – the output is being activated.

50 and 51, 52, 53 commands perform the same action, i.e. changes output states. The user may use commands, which are more convenient for him.

Command 58 changes state of selected output for set time period.

If you wish to change (invert) OUT1, OUT3 states and to receive information about outputs changes, the following message should be sent:

USER123456 50 1 50 3

- 123456 – user code
- 50 – to change state of selected output;
- 1 – to change state of first output;
- 50 – to change state of selected output;
- 3 – to change state of first output;

If you wish to activate OUT1 and to deactivate OUT2:

USER123456 51 1 52 0

- 123456 – user code
- 51- set OUT1 state;
- 1 – deactivated output;
- 52- set OUT2 state;
- 0 – deactivated output;

Outputs control by selecting output reaction timeout:

USER123456 58 1#48#   (enable OUT1 for 48 seconds)

USER123456 58 2#5#   (enable OUT2 for 5 seconds)

- 123456   user code
- 58   command (see table)
- 1   enable OUT1 output (1-OUT1, 2-OUT2, 3-OUT3);
- #   delimiter
- 48   output alarm time is 48 seconds; after 48 seconds OUT1 will be disabled automatically;
- #   delimiter

ARM/DISARM of the security system via SMS message:

To DISARM the security system: USER123456 59 0 or to ARM the security system: USER123456 59 1

It is possible to receive test of the module on the basis if inquiry command:

USER123456 80 6

- 123456 – user code
- 80- information inquiry command (see table No 3)
- 6 – command (test inquiry)

Upon sending command SMS (USER123456 80 6) test message will be sent to the number, from which SMS message has been sent.

Below see the example of received test SMS message:

Events:

--Test--
Signal strength:
17
Sistem voltage:
12.60 V
Temperature:
+23.3 C
IMEI:
353358010231707
HW:GTauto2
SW:GTauto v2 071124

*Clarifications***:**

Signal strength: Numerical values of communication signal level. Corresponds the following meanings (according GSM telephone):

0- very weak signal (communication loss limit);

1...5 - very weak signal (correspond to one bar on the monitor of a mobile phone);

6...9 - satisfied signal (correspond to two bars on the monitor of a mobile phone);

10...14 - good signal (correspond to three bars on the monitor of a mobile phone);

15 and more - excellent signal (corresponds to four bars on the monitor of a mobile).

*Voltage***:** Voltage of car battery or other power supply source the module is connected to.

*Temperature***:** temperature sensor's showings (C or F).

*IMEI***:** IMEI number of GSM modem.

HW: hardware version

SW: software version.

Inquiry of system state according to the command:

USER123456 80 7

- 123456 – user code;
- 80 - command (see table No 3)
- 7 – command (system state inquiry)

The module will sent two part message to the number the SMS was sent from.

Below you will see the exmaple of received SMS message following inquiry command (USER123456 80 7):

The first of two SMS:

System info:

State:ARM   (Explanation: system state)

Inputs:

In0:Luggage closed .   (Explanation: state of the first input)

In1:Bonnet closed .   (Explanation: state of the second input)

In2:Door closed .   (Explanation: state of the third input)

In3:MicrowaveRestore   (Explanation: state of forth input)

In4:Shock restore .   (Explanation: state of the fifth input)

The second of two SMS:

Inputs:

In5:Ignition OFF .   (Explanation: state of sixth input)

In6:Siren OFF .   (Explanation: state of seventh input)

In7:Batery restore .   (Explanation: state of eight input)

In8:Temp restore .   (Explanation: state of nineth input)

Output states

Out1 OFF .   (Explanation: state of the first controlled output)

Out2 OFF .   (Explanation: state of the second controlled output)

Out3 OFF .   (Explanation: state of third controlled output)

The module is considered equipped properly and communication is reliable, if all messages and calls are received properly and all user command is being performed properly.

13.2   Configuration of the module via PC

This configuration is being performed by using the software "SERA", which you may download at www.topkodas.lt
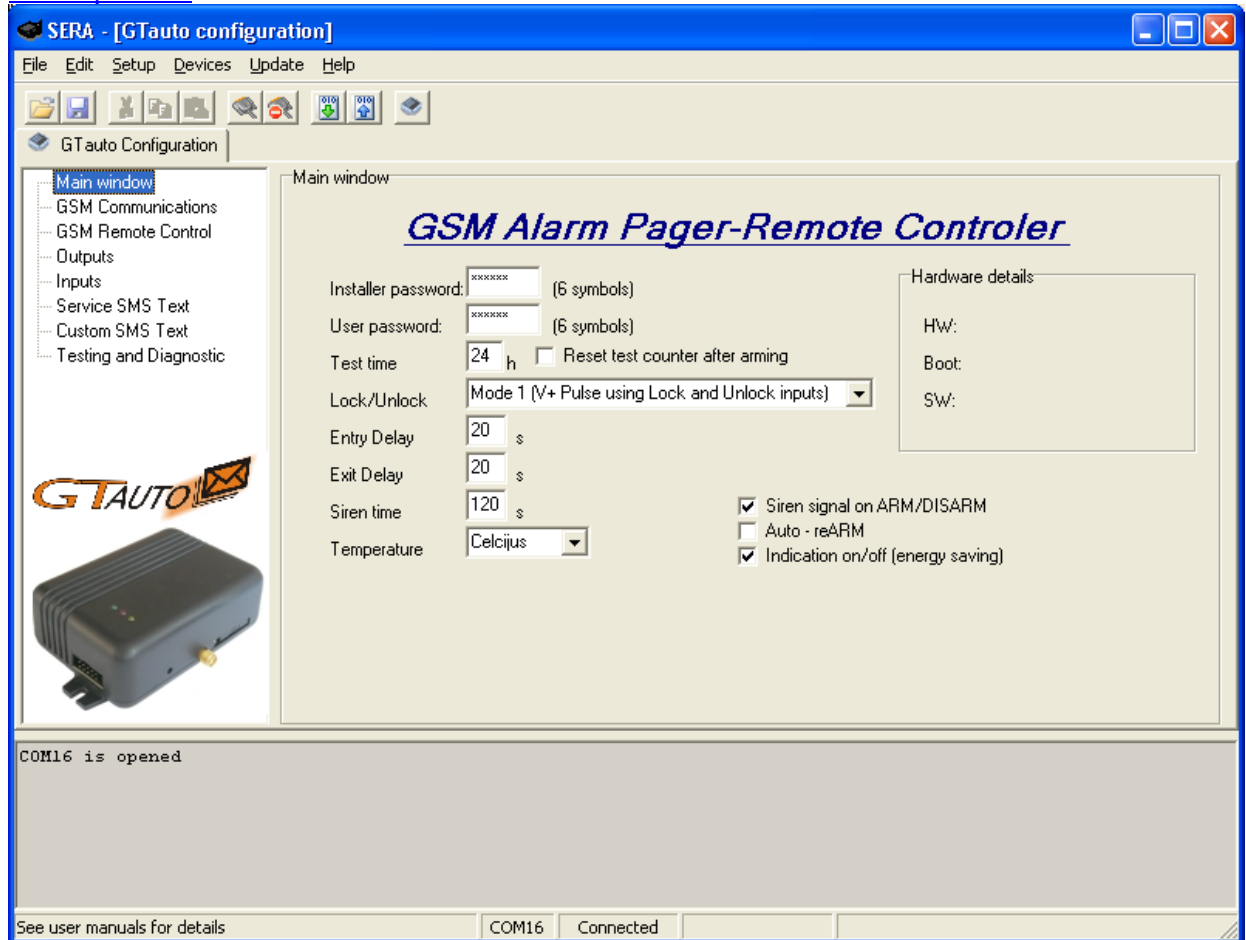
14   Installation of the product and connection diagram

The module should be installed in such way to ensure GSM communication. It is necessary to properly select site for GSM antenna. GSM antenna can not be hidden deeply in metal constructions, because thus GSM communication may be screened. GSM antenna should be mounted as far as possible from electronic sensors, shock, microwave, microphone, temperature sensor etc., because GSM electromagnetic field may disturb operation of sensors or other electronics.

We are not liable for disturbances related with your GSM communication service provider.

Connection diagram is available in the ANNEX 1; however other connections versions are also possible. Fuses are mandatory.

In order to check operation of the module it is necessary to activate used sensors, door, shock sensor etc. and to observe their operation. The user should receive messages a about alarmed zones (depending on programming). If SMS messages have not been received, please check GSM communication and whether the module is configured properly by sending 80 commands with 1,2,3,4,5,6,7 parameters. We recommend to check configurations of the module and test with the software SERA.

The module is considered to be equipped properly and communications is reliable, if all sent SMS and calls are properly received as well as all user commands are being performed.

14.1   Mounting instruction and connection diagram of security system for premises

It is recommended to place security system for premises into metal box. Antenna should be fixed to the top part of metal box from the outer side. 3x0,75 sq. mm cable of double insulation should be used for connection of 110V-230V power supply voltage. Chop switch or other voltage disconnection device should be mounted in line, which is used for powering 230V transformed.

It is recommended to use standard motion, fire, and glass breaking sensors. For powering of sensors we recommend to use standard 6-8 cores single core cable for, designed for installation of security system. For voice signaling we recommend to use siren DC12V up to 1500mA. It is recommended to connect the siren to the system by using 2x0,75 sq. mm double insulation cable.

It is possible to supply the security system from stabilized power supply source 10-15V and not less than 1,5A. It is necessary to calculate max current of power supply. Current consumption of the security system is comprised of; total current of the module, sensors, relays, siren and other devices. It is most convenient to use power supply source applied for power supply of security systems with the option to connect backup lead battery. It is recommended to mount remote control relays into sockets. Sockets may be easily fixed in metal box. It is necessary to select relays according to preferred voltage and current.

Auxiliary BUZZER is recommended to mount inside the premises not far from entrance. Buzzer operates together with the main siren also when the systems starts calculating the time for leaving the premises and the time till alarm of the security system after entering the premises (see clause 7.1). It is possible to use buzzer of Hitpoint PB12N23P12Q or similar modified piezoelectric 12V DC, 150mA max.
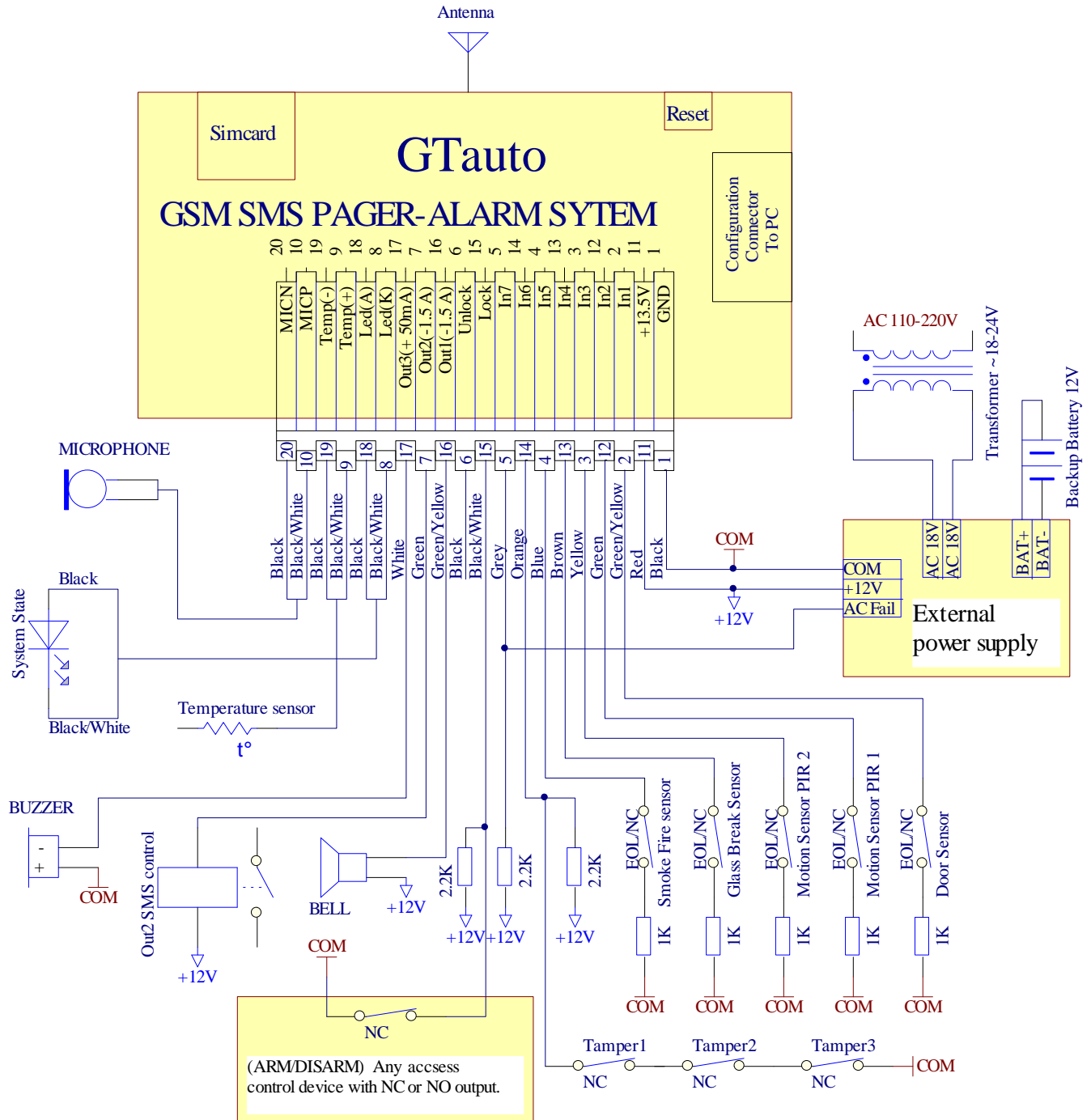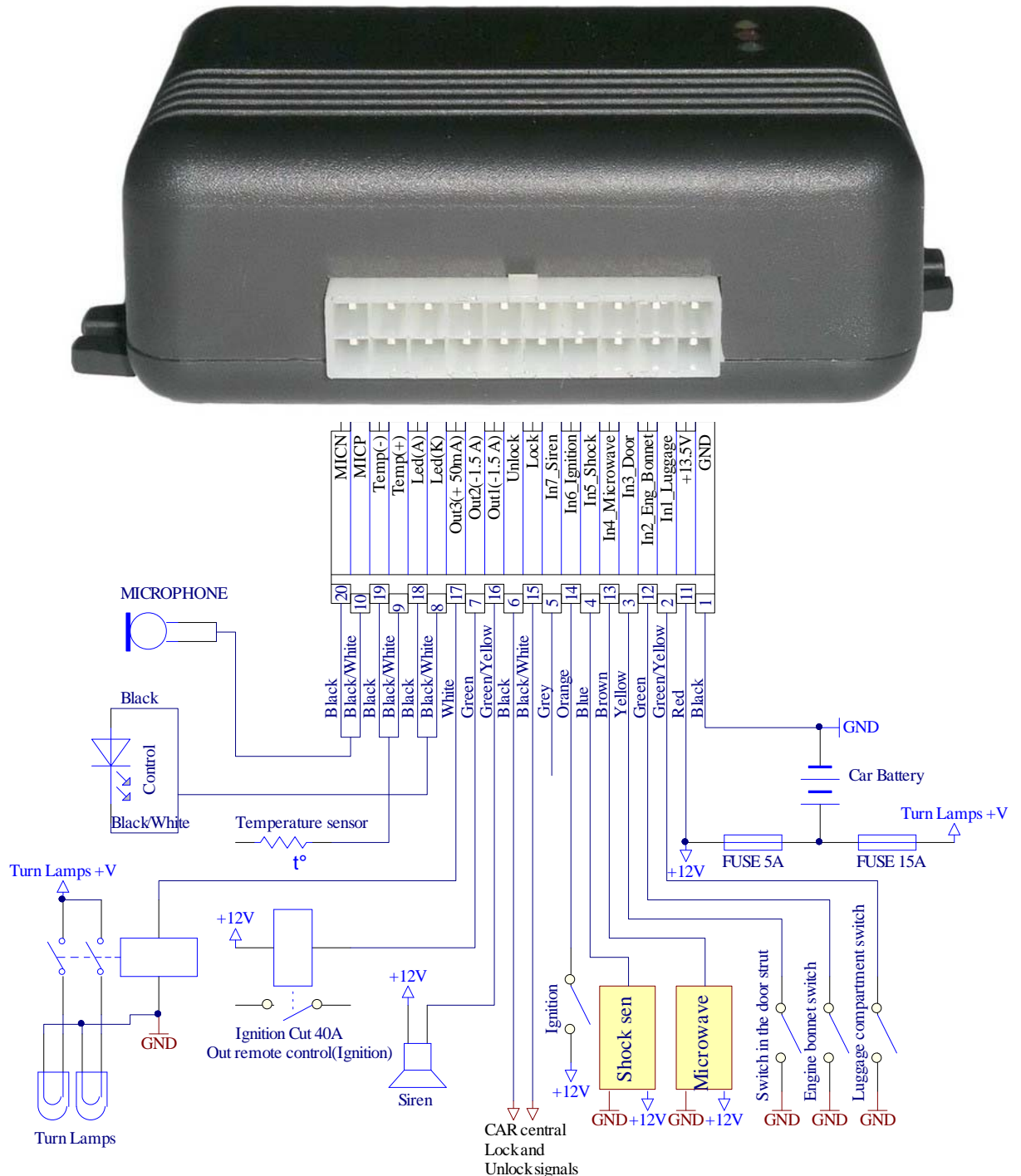

Sample of module configuration template for this diagram you will find after installation of configuration software SERA in the directory „ConfigTemplates". File name: *House_Office_Alarm.tcfg*

14.2 Car GSM messages system. Installation manual and connection diagram

The module may be mounted in all vehicles with petrol and diesel engines and 12V batteries negative pole of which is connected to car body. The system should be mounted in a saloon of vehicle following installation manual of the manufacturer.

The module may be installed in line with already available security system as GSM SMS pager or as independent separate system for car protection.

The connection diagram of the module in parallel with already available security system is available in annex No1.

Connection diagram of the module as independent protection system see below:

Sample of blank of this module configuration for this diagram you will find after installation of configuration software SERA in the directory „ConfigTemplates". File name: *CAR_alarm_pager.tcfg*

In the saloon of the vehicle the module should be placed in hard-to-reach place. The device should be mounted in a place protected from impact of humidity or other materials causing corrosion as far as possible from heating elements of passengers' saloon and sources of electromagnetic disturbances (auto computer, air conditioning system, relay units). Do not mount the unit directly to metal parts of the vehicle in order to avoid accumulation of condensate within system

block. The module should be mounted thus connectors of wires to be at the bottom side. Wires of the security system can not be laid near moving or hot part of the vehicle.

For fastening screws or plastic fastening straps. The battery should be mounted in a place protected from impact of humidity or other materials causing corrosion as far as possible from heating elements of passengers' saloon.

It is necessary to equip fuses mentioned in the diagram. Fuse seat should be mounted as near as possible to the car battery.

14.3 Automation of premises, mounting and connection diagram of temperature controller

Preparation of the module to operate by using configuration program (pictures and more additional information see the description of configuration program SERA):

- Set parameters of selected output. Output state SMS text; output operation description (OUT definition) „CTRL/SMS/DIAL", (state mode) – Steady. If necessary output operation may be inverted.
- „GSM Communication" window is used for setting user parameters to send SMS and DIAL. Also the user should check the options to send SMS and DIAL about temperature alarms.
- „GSM remote control" window is for entering user numbers who will be able to control selected outputs via shot free call.
- „Inputs"window is used to set input parameters. When pressing temperature sensor line IN9, temperature parameters setting will appear at the bottom of the window. The user should set alarm and restore temperatures

Inputs

Restore text	Alarm	Restore	Input Type	Input Def.	Input speed	Repeat time	Action
Restore IN1	☐	☐	NC	silent	200ms	60s	Disable
Restore IN2	☐	☐	NC	silent	200ms	60s	Disable
Restore IN3	☐	☐	NC	silent	200ms	60s	Disable
Restore IN4	☐	☐	NC	silent	200ms	60s	Disable
Restore IN5	☐	☐	NC	silent	200ms	60s	Disable
Restore IN6	☐	☐	NC	silent	200ms	60s	Disable
Restore IN7	☐	☐	NC	silent	200ms	60s	Disable
Batery restore .	☑	☑	NC	silent	65000ms	6000s	Disable
Temp restore .	☑	☑	NC	silent	200ms	1s	OUT1 ▼

Disable
OUT1
OUT2
OUT3

In9 Temperature parameters

Additional Calibration

Alarm temperature 15 °C   X 0.3329

Restore temperature 23 °C   Y -270.97

Temperature=X*ADC+Y

- If necessary set automatic output control depending on temperature. Select the output to be controlled at the end of the line IN9. Also it is necessary to check „Alarm" and „Restore" options.
- Set „Input speed" and „Reapeat time" .

In order to control powerful AC facilities, solid state relays SSR may be used.

⚠ Caution! It is not allowed to connect AC facilities directly to the module. It is necessary ti apply proper relays or use other means in compliance with electrical safety requirements.

⚡ Caution! When controlling the facilities from the AC network, it is necessary to stick with electrical safety requirements.
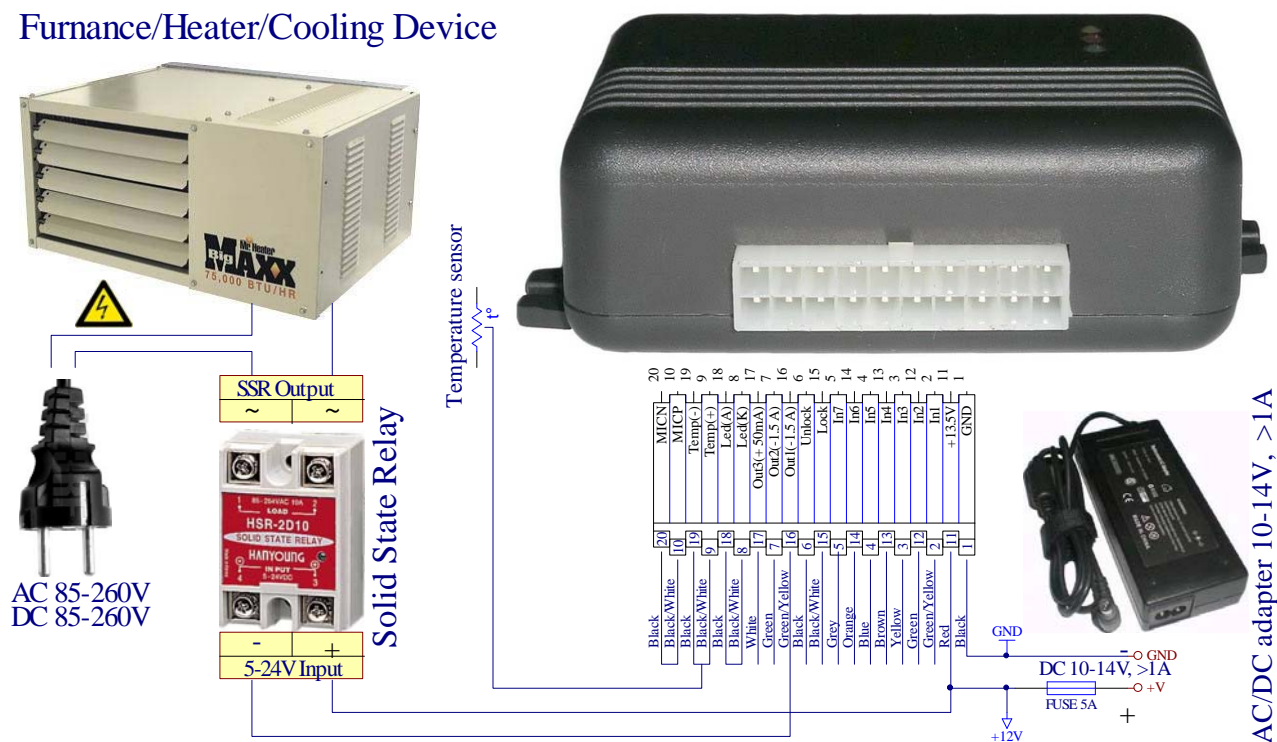
⚠ Please consult your licensed electrician/electrical engineer for professional advice before installation.

Standard AC/DC adapter with voltage 10V-14V and current >=1A may be used for power supply of the module.

The module connection diagram to control heating or cooling equipment:

Furnance/Heater/Cooling Device

Sample of module configuration template for this diagram you will find after installation of configuration software SERA in the directory „ConfigTemplates". File name: *Temperature_Controller.tcfg*

14.4 Testing and troubleshooting

Troubleshooting and testing of the module may be performed via USB port with software SERA. Please read SERA user manual for more information.

15 Sending of messages

Messages are being sent in a case of alarm of security system's inputs, after ARM/DISARM of the security system (if specified in the configuration), upon test sending time (if specified in the configuration), after changing of module configuration (if specified in the configuration), upon sending inquiry about parameters (command code 80).

SMS about alarm of the system is doubled with short telephone call (if specified in configuration).

16 Remote control

With the help of SMS messages it is possible to control devices connected to outputs Out1, Out2, Out3. It is possible to ARM/DISARM of the security system. Control command for user (USER) is available in the Table 4 The amount of users when controlling via SMS is unlimited.

Example of control command when states of all three outputs are being changed and inquiry is made to send information in a form of SMS about input states after changing of output states:

USER123456 51 52 53 80 5

- 123456 – user code;
- 51- changing of the first output state
- 52 – changing of the second output state
- 53 – changing of third output state
- 80 – information inquiry command (see table No 3)
- 5 – send information in form of SMS about outputs' states.

More examples of controlling via SMS message see "Configuration of GSM communication module via SMS modules.

All outputs may be controlled via short call (the module will automatically ignore the call). Up to 400 users may control the module. All users optionally may control outputs Out1, Out2, Out3, arm/disarm the security system and activate voice listening (MIC).

It is possible to assign to each user that he is able to control. This is comfortable to use a single module for controlling of few gates when several masters are.
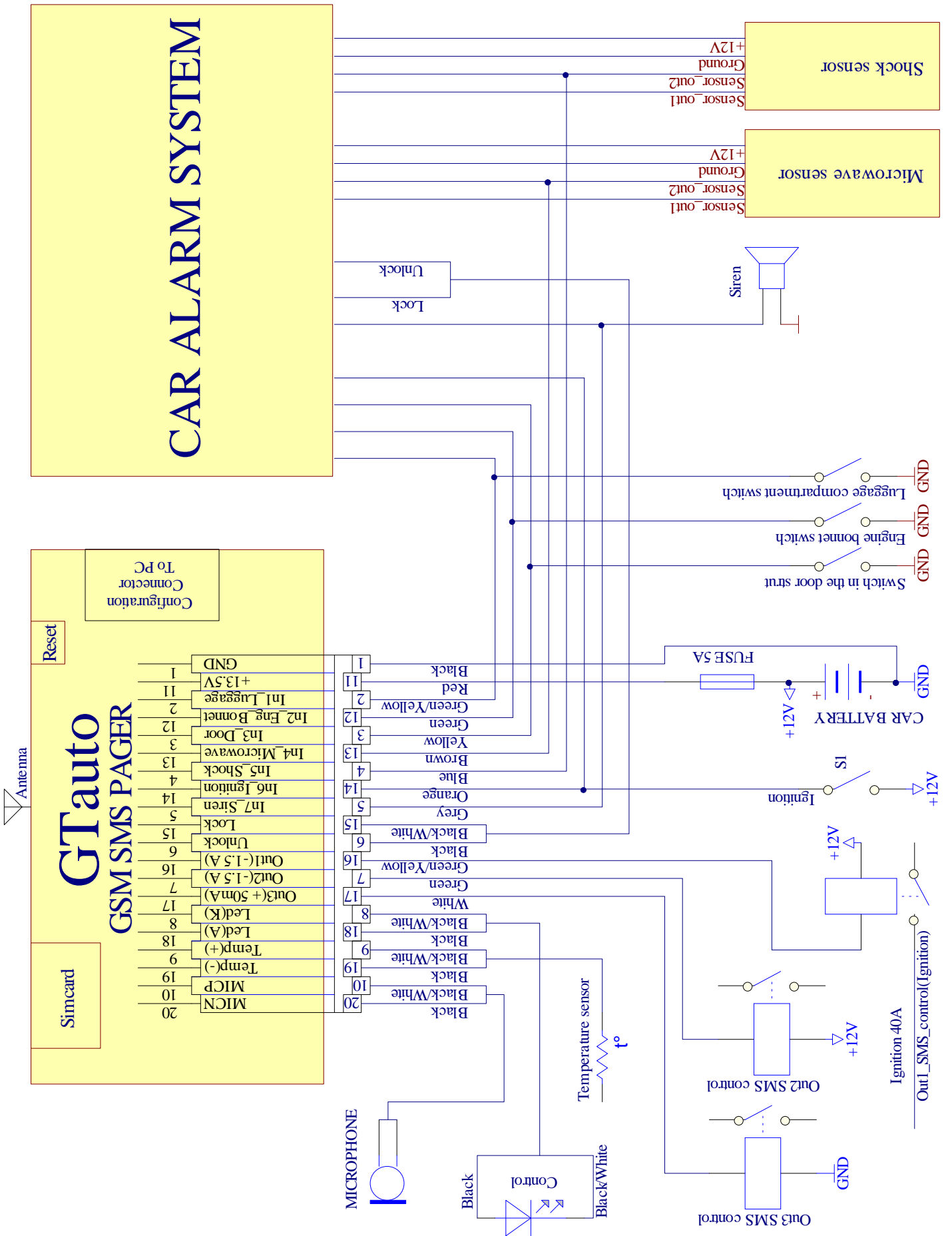
17 Software updating

Updating of firmware version is being performed via PC. The following is necessary:
- configuration cable,
- configuration software "SERA",
- new software version, which may downloaded at www.topkodas.lt.

More about software updating process see user manual of the software „SERA".

ANNEX 2   Lock an Unlock inputs diagram