RT4-5gc object module

V.2.5

User manual

2012

Table of contents

General information....3
Device preferences....3
Technical information....3
Module appearance....4
Basic programming....5
Working with module....5
Module installing....5
Module inputs....5
Connecting module with built-in interface to security panel....6
Connecting module without built-in interface to different security panels....6
Connecting TMR-20 device to the module....8
Arming....8
Disarming....8
Touch-memory key registration....9
Working with module in SMS mode....9
Working with module in GPRS mode....9
Indication....11
Enclosure 1. Terminal block pin purpose....11
Enclosure 2. Module events....12
Enclosure 3. Module control commands....13
Enclosure 4. Module configuration commands....13
Enclosure 5. List of event codes....16

General information

RT4-5gc object device is designed for collecting information from control panel, it's processing and transmitting it to the Central Unit and/or 4 registered mobile phones. **RT4-5gc** also monitors the state and level of it's power supply and in case of trouble reports to the Central unit and/or user's mobile phone.

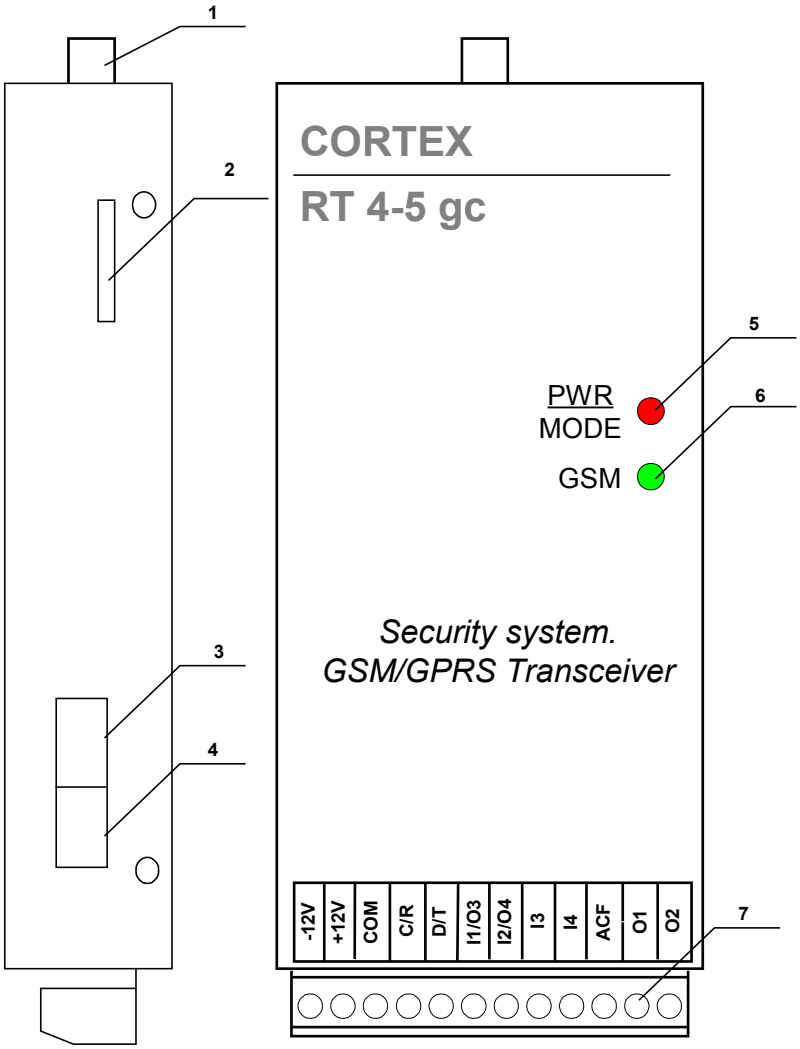
Device preferences

- Ability to transmit information via SMS and GPRS;
- 63 event log;
- RS-232 port for module settings programming;
- GSM-modem state and Signal strengths indication;
- Power and data transmitting indication;
- One programmable input;
- Status input (arming/disarming);
- 220V monitoring input;
- 2 remotely controlled general purpose outputs;
- 2 switchable inputs/PGM outputs;
- Built in interface for collecting information from security panel in Contact ID protocol (optional);
- SIA IP protocol support;
- Supports up to 4 users;
- Two switchable message modes: "User" and "Modem";
- Periodic channel test;

Technical information

GSM-protocol	E-GSM 900/1800/GPRS
GSM-modem	Quectel M10
SIM interface	3 and 1,8 V
Number of users	4
Output capacity	1A
PGM output capacity	10mA
Maximum voltage on closed output	15V
Maximum voltage on closed PGM output	5V
Maximum voltage on closed inputs	15V
Supply voltage	11 – 15V
Input current (at 12V supply)	15mA
Input current in GPRS mode	150mA
Overall dimensions, mm	160x70x25

Module appearance



Pic. 1 RT4-5gc module.

1. GSM antenna connector
2. SIM holder
3. Jumpers
4. Programming joint
5. Power and mode indicator
6. GSM indicator
7. Terminal block for power supply and external device connection

Pic. 2 GSM antennas.

Basic programming.

Module programming is made using **Reader_for_gc_v.2.0** software. To activate the programming mode just connect the programming cable to the module. When the **PWR/MODE** LED will turn orange you can start programming the module.

At first you have to program first user's phone number, module account and message format.

If it is impossible to program the module using **Reader_for_gc_v.2.0** software, you can program first user's number by SMS:

To do so insert activated SIM into the module, beforehand deleting all the contacts from the SIM memory. If PIN request is activated, PIN code must be set as "0000".

Power up the device. After the **PWR/MODE** LED turned green, from any phone send a following message to the module **91.xx...xx**, where **xx...xx** – first user's phone number (if you register the phone number with international code, you have to add "+" before the number).

After that the first user will receive "**Security code?**" message. He has to answer that with the module security code (1234 by default). Security code must be sent within 10 minutes time, otherwise phone number will be deleted from the memory.

After all that is done, the first user becomes the "Master" and further programming cam be made only from his phone.

Command and signal list is given in Enclosures.

Working with module.

Using the GPRS mode, module can transmit information directly to the WinSC software, or to any Central Unit that supports SIA IP protocol. Module can send information to 4 users. You can program message delivery depending on the event for every user and each user's ability to control module. First registered user becomes a master and by default receives some exclusive rights for module control and programming (see enclosures 2-4).

If you use module in GPRS mode it is strictly recommended to program CU-GSM central unit as master.

Module installing.

Before installing the module you have to make basic programming and configure other parameters.

After that you can install the module on the object.

When installing you should pay special attention to the antenna placement. Close metal constructions may highly affect the signal strength.

For the signalization purposes module has the following inputs and outputs for external device connection:

- general purpose input (I3);
- status input (armed/disarmed) (I4);
- 220V monitoring input (ACF);
- 2 switchable inputs/PGM outputs (I1/O3, I2/O4);
- 2 general purpose outputs (O1, O2);
- built-in interface module for receiving information from security panels in Contact ID protocol (optional);
- RS-232 port for module programming;

By default all inputs are set as 24H (doesn't depend on I4 status)

General outputs are made using "open collector" scheme and designed for maximum **1A** current anf 15V voltage on the closed output.

PGM outputs are designed for maximum **10mA** current and **5V** voltage on the closed output.

Module inputs

Device inputs are organized the following way.

220V monitoring input strictly loaded to «+» (reacts on **«0»/«break»** signals). Doesn't depend on module status. In order to monitor 220V you have to connect ACF input to the «ACF» output of the **VSCS-1,5/VSC-3,0-12** devices or to the «OUT» output of the **AC_detector device**. Otherwise you can use it as general alarm input.

Alarm and status inputs can be loaded both on «0» and on «+». Choice is made using jumpers. Jumper 1 corresponds to alarm on zone 1 input, 2 – alarm on zone 2 input, 3 – alarm on zone 3 input, 4 - status input. Removed jumper provides load on «+» (reacts on **«0»/«break»** signals), set – on «0» (reacts on **«+»/«break»** signals). Counting from the programming joint. Maximum voltage on input - **+15V**.

All alarm inputs (1-3) by default active 24 hours a day.

After connecting external devices to inputs, object should be armed and the **00.xxxx** command must be sent to module (where xxxx – security code). With this command all input status is accepted as normal and module status – «armed».

RS-232 port has standard voltages and designed to work with cable up to **30m**.

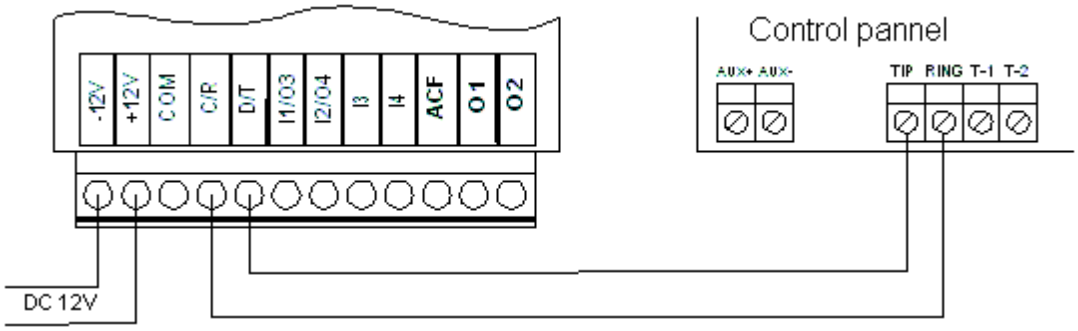
Connecting module with built-in interface to security panel

Module is connected to the panel's phone communicator.

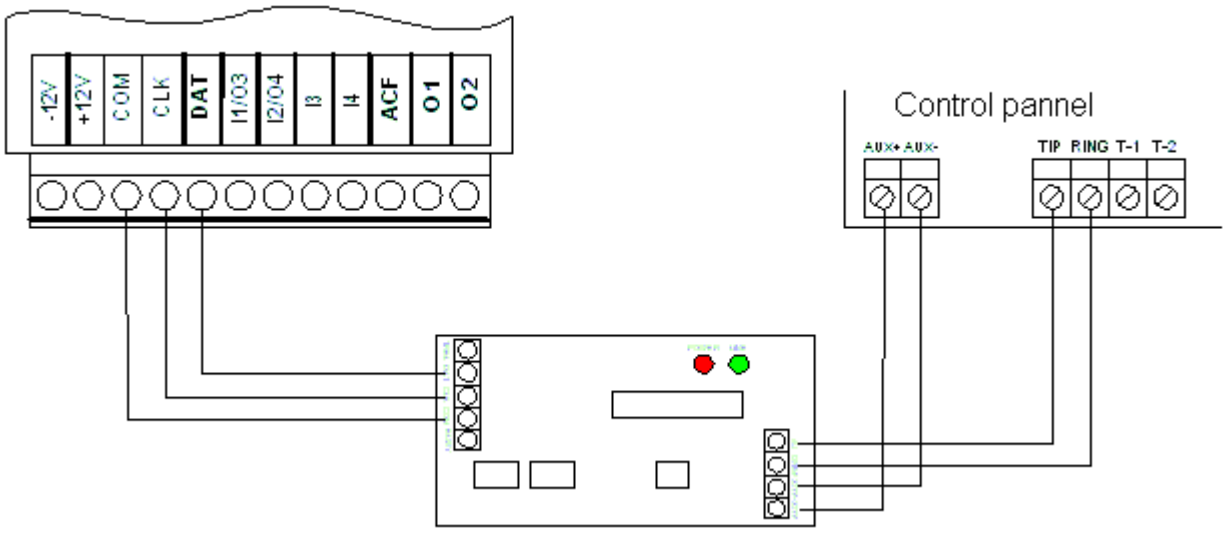
Module's **C/R** contact is connected to the panel's **RING** contact.

Module's **D/T** contact is connected to the panel's **TIP** contact.

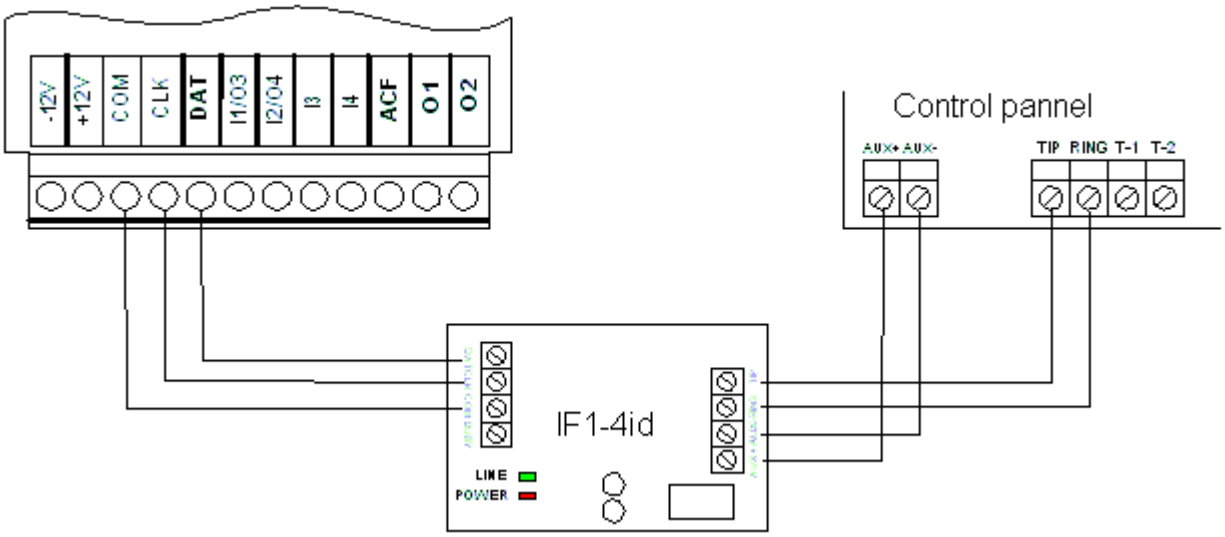
Security panel must transmit information in automatic Contact ID codes, in DTMF format and call to the number "2".



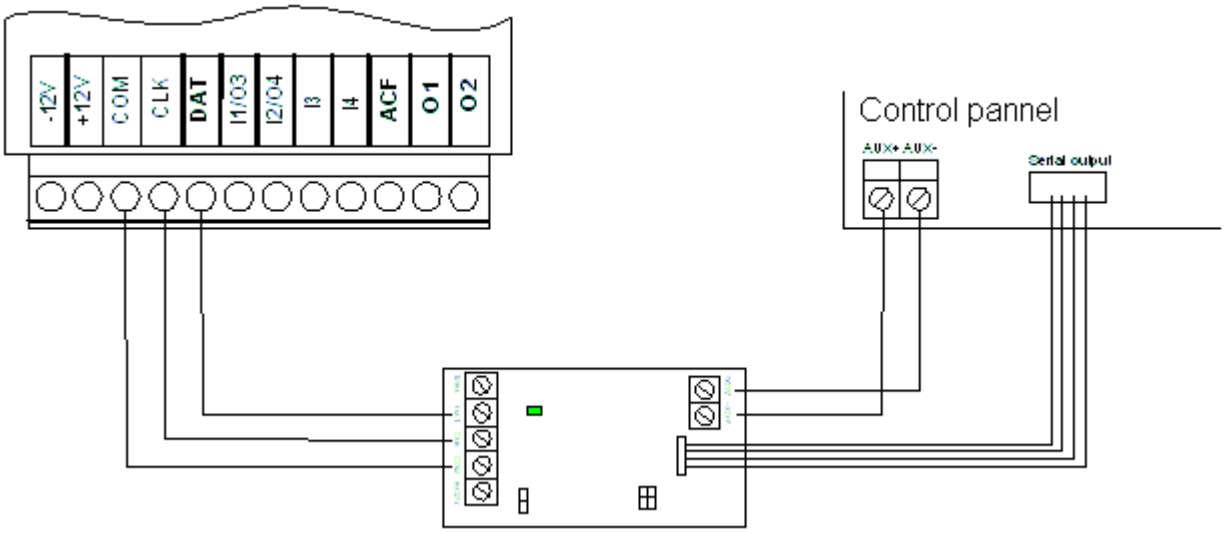
Connecting module without built-in interface to different security panels



Connecting, using IF1-2u interface module(Silent Knight protocol).



Connecting, using IF1-4id interface module (Contact ID protocol).



Connecting, using PARADOX_2 or IF-Magellan interface modules.

Connecting TMR-20 device to the module

Module can be armed and disarmed using touch-memory keys.

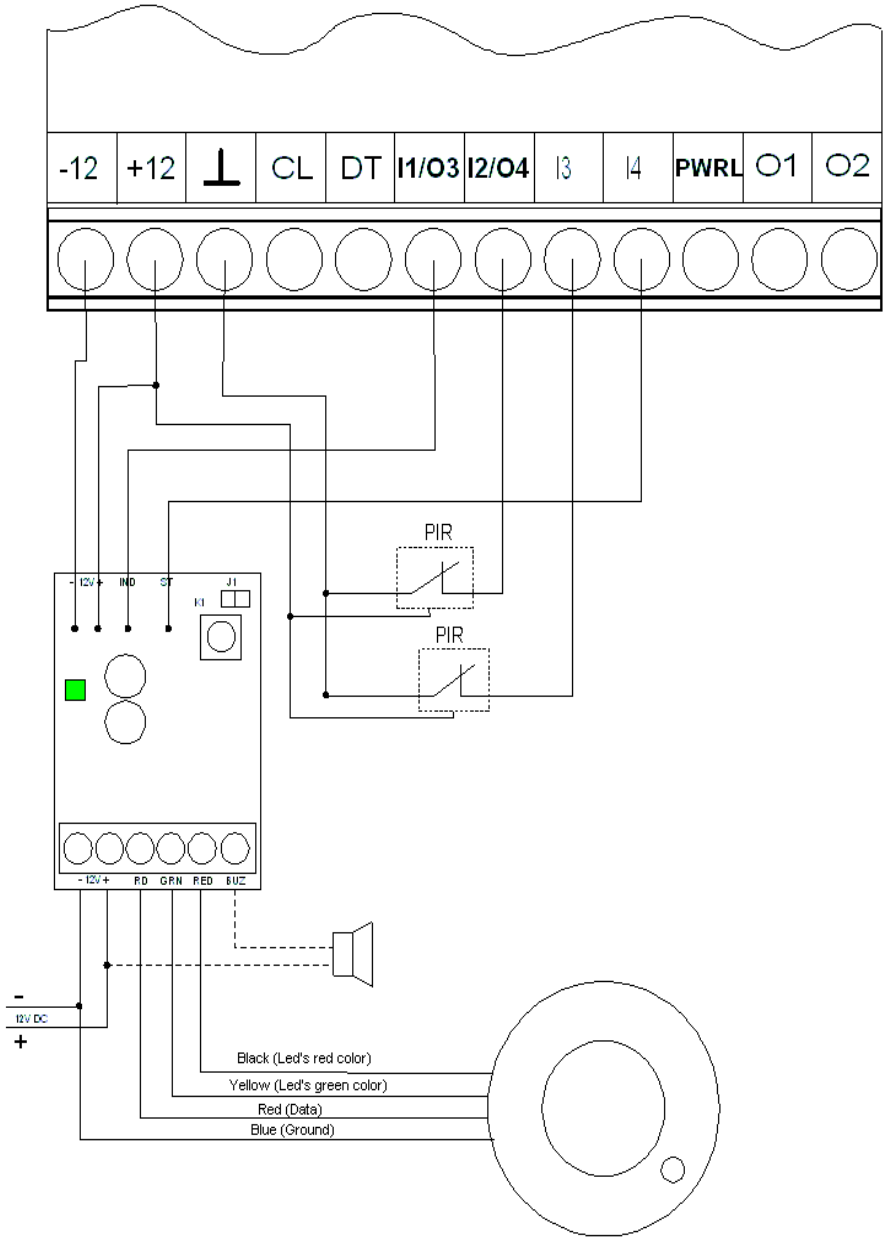
In order to do so you have to connect **TMR-20** reading device to the module.

To work properly **RT4-5gc** and **TMR-20** must be configured the following way:

I1/O3 contact must be configured as PRM output. reacting to the zone alarm, **I2/O4** and **I3** inputs must be set as instant (depend on module status).

J1 jumper on the **TMR-20** device must be removed.

Wiring scheme is shown on the picture below.



Arming.

Before arming **RT4-5gc** make sure that all the zones are in the normal state.

To arm the module just touch the reader with registered touch-memory key. Device will immediately arm (LED will turn off every 4 seconds) and corresponding message will be sent.

Disarming

To disarm an object, just touch the reader once again with the registered key. LED will turn permanent green.

Touch-memory key registration

Key programming is made in a special mode, that is activated by touching a reader with a "master"-key. "Master"-key for the device becomes the key, that touched the reader first.

"Master"-key registration is made the following way: touch the reader with any key for approximately 1 second. LED will turn red for 2 seconds. This key is now registered as the "master"-key.

User key registration is made the following way:

Touch the reader with the "master"-key for approximately 1 second - LED will flash red for 10 seconds. If during that time **K1** button will be pressed, all previously registered user keys will be deleted and device will turn on programming mode. Otherwise programming mode will be turned on in 10 seconds. Programming mode is indicated by the constant red light.

After that, touch the reader with the user keys (with the 5 sec. interval); after each touch LED will blink fast. Maximum number of user keys – 20.

To exit registration mode touch the reader with the "master"-key again. LED will turn green again.

Attention! If the **K1** button is pressed at the moment when you power up the device, than all the keys, including "master"-key, are deleted from the memory.

Working with module in SMS mode.

In SMS mode each user can receive information in two formats: "modem" and "user". Format selection is made by user and depends on the module usage strategy. Each user can change the format by sending "*" message to the module.

"Modem" format is designed for receiving by CU-GSM central unit and WinSC software.

"User" format is used if information is send to the mobile phone.

Working with the phone numbers of the defined length.

Module can define phone number by the specified number of digits, instead of the whole number. Symbol count starts from the end of the number. Maximum number of symbols is 16, "+" is not counted. Number of symbols is set using **99.Nx** command, where **x** – number of symbols. If you will send **99.N0** command – module will work only with fully specified phone numbers. By default number length is set as 8.

This option can be configured using **Reader_for_gc_v.2.0** software.

Working with module in GPRS mode.

When using GPRS, module sends information directly to the WinSC software or to any central unit that supports **SIA IP** protocol.

Attention! In GPRS mode, module ignores any SMS messages, received from the first user, and doesn't send him any SMS.

GPRS-connection settings

To work in GPRS properly you have to configure the following parameters: **APN** (Access point name for accessing GPRS), **IP-address**, **TCP PORT**, **Domain name** (if used), **DNS Server IP** (if used). Thees parameters can be defined using **Reader_for_gc_v.2.0** software or by SMS-command:

99.I<IP>	Server IP-address
99.A <access point>	APN
99.P<port>	TCP port
99.R<attempts>	Number of attempts to reconnect to server
99.M<min>	Time between reconnection attempts

99.DI<IP>	DNS server IP-address (if used)
99.DD<domain name>	Domain name (if used)

You can configure the module to automatically go into GPRS mode and connect to server after powering on. To do so, you have to set number of attempts to reconnect to server - 255.

Attention! If module sends messages in **SIA IP** protocol, this option is ignored and module connects to server only when transmitting information.

Forced exit from GPRS mode

For power saving purposes module can exit GPRS mode if there are troubles with power supply. You can specify conditions on which module will exit GPRS. Those can be specified either by **Reader_for_gc_v.2.0** software, or by the following SMS commands:

99.F0 – Don't exit GPRS unless command **86.**<security code> is received
99.F1 – Exit GPRS if power low.
99.F2 – Exit GPRS if 220V lost.
99.F3 – Exit GPRS if power low or 220V lost.

If this option is activated, than after exiting GPRS, module will send the following SMS-message: **71:** (in "modem" mode) or **Check bat or power** (in 'user" mode).

Attention! If module sends messages in **SIA IP** protocol, this option is ignored and module connects to server via GPRS anyway.

Mobile operator authorization for GPRS activation.

In case if for GPRS activation you need to authorize with the mobile operator, you have to specify login and password. Those can be specified either by **Reader_for_gc_v.2.0** software, or by the following SMS commands:

Login is set by the **99.Y1xxxx** command, where **xxxx** – login.
Password is set by the **99.Y2xxxx** command, where **xxxx –** password.
Number of symbols in login and password must not exceed 8.
If you have to delete login or password send the following commands to the module: **99.Y1** (delete login) and **99.Y2** (delete password).

Online-identificator

In order to send a message to the module from the WinSC software, you have to assign a unicque ID for it. It is recommended that ID would be the same as phone number.

Attention! ID must only contain digits and be maximum 15 symbols long.

You can set online ID either by using **Reader_for_gc_v.2.0** software, or by using **99.W**xxxx messages, where xxxx – identificator.

By default online ID is set as 11111111.

By sending **99.Wi** command, you can set Online ID as GSM-modem IMEI**.**

Possible errors

- If failed to establish GPRS connection:

  GPRS error (in "user" mode) or command **85:** (in "modem" mode).

  Possible cause: wrong APN, login or password are set. GPRS not allowed for this SIM.

- Failed to connect to software or central unit:

  Online error (in "user" mode) or command **88:** (in "modem" mode).

  Possible cause: wrong IP-address or TCP port are set. Firewall blocks connection.

Indication

There are two LEDs used for indication.

PWR/MODE LED	
Constant green	Ready to work
Fast flashing green	Sending information
Flashing green once per second	Power low
Constant orange	Programming mode on
Flashing red	Receiving information frol security panel
GSM LED	
Flashing green once every 2-3 seconds	GSM coverage OK. GSM signal at high level
Flashing orange once every 2-3 seconds	GSM coverage OK. GSM signal at medium level
Flashing red once every 2-3 seconds	GSM coverage OK. GSM signal at low level
Flashing red once per second	Out of GSM coverage

Enclosure 1. Terminal block pin purpose.

Table 1.

Pin	Name	I/O	Description
1	12V-	I	Power supply
2	12V+	I	
3	⊥		Ground
4	C/R	I/O	Pins for connecting interface modules or security panel phone communicator
5	D/T	I/O	
6	I1/O3	I/O	Alarm input 1/PGM1
7	I2/O4	I/O	Alarm input 2/PGM2
8	I3	I	Alarm input 3
9	I4	I	Status input
10	ACF	I	220V monitoring input*
11	O1	O	Output 1
12	O2	O	Output 2

* In order to monitor 220V you have to connect ACF input to the «ACF» output of the **VSCS-1,5/VSC-3,0-12** devices or to the «OUT» output of the **AC_detector device**. Otherwise you can use it as general alarm input.

Enclosure 2. Module events.

Table 2

Event	Event in "user" mode[1]	Event in "modem" mode[2]	By default is sent to
Out 1 activated	OUT 1	03:	U1[3]
Out 2 activated	OUT 2	06:	U1
Out 3 activated	OUT 3	09:	U1
Out 4 activated	OUT 4	11:	U1
Alarm, input 1	Alarm zone1	31:	U1, U2
Alarm, input 2	Alarm zone2	32:	U1, U2
Alarm, input 3	Alarm zone3	33:	U1, U2
Input 1 restored	Restore zone1	91:	U1
Input 2 restored	Restore zone2	92:	U1
Input 3 restored	Restore zone3	93:	U1
Disarming	Opened	34:	U1, U2
Arming	Closed	94:	U1, U2
Backup battery low	Battery low	35:	U1
Backup battery restored	Battery restore	95:	U1
Main power supply flost	220V Lost	39:	U1
Main power supply restored	220V restore	99:	U1
Test message	Test time	96:	U1
Programming mode activated	Programming	97:	U1
Device powered on	Ready	98:	U1
Error establishing GPRS connection	GPRS error	85:	U1
Error connecting to the central unit	Online error	88:	U1
Forced exit from GPRS mode	Check bat or power	71:	U1

☞**Note**:

1) Message text may be edited. Text given is a default.

2) In "modem" mode, before the code there are always added format identificator and module account, and after the code - checksum. For example, test message in "modem" mode will look the following way: **FF, 1234,96:<date>-<time>*<CS>** where <CS> - checksum. If there are several event coded in the message (status request) than event codes are separated with the comma: **FF, 1234,35, 94, 32:<date>-<time>*<CS>**

3) U1, U2, U3, U4 – User numbers; **U1 – Master**

Enclosure 3. Module control commands.

Table 3

Command	Description	Response in "user" mode	Response in "modem" mode	By default available to
*****	Change message mode	/Status/[1]	/Status/:	Everyone
0	Recuest module status	/Status/	/Status/:	Everyone
1	Activate Output 1	/Status/	/Status/:	U1
2	Deactivate Output 1	/Status/	/Status/:	U1
1.xxx	Activate Output 1 on time (xxx - time in minutes)	/Status/	/Status/:	U1, U2
3	Activate Output 2	/Status/	/Status/:	U1, U2
4	Deactivate Output 2	/Status/	/Status/:	U1, U2
3.xxx	Activate Output 2 on time (xxx - time in minutes)	/Status/	/Status/:	U1, U2
5	Activate Output 3	/Status/	/Status/:	U1, U2
6	Deactivate Output 3	/Status/	/Status/:	U1, U2
5.xxx	Activate Output 3 on time (xxx - time in minutes)	/Status/	/Status/:	U1, U2
7	Activate Output 4	/Status/	/Status/:	U1, U2
8	Deactivate Output 4	/Status/	/Status/:	U1, U2
7.xxx	Activate Output 4 on time (xxx - time in minutes)	/Status/	/Status/:	U1, U2
8.xxxx	Turn on programming mode (xxxx – security code)	Programming	97:	U1

☞**Note**:

1 - Status shows current module state (armed/disarmed) and lists all the alarmed inputs and activated outputs.

Enclosure 4. Module configuration commands.

Table 4

Command	Description	Response in "user" mode	Response in "modem" mode	By default available to
00.xxxx	Set current module state as normal (xxxx – security code)	/Status/	15:	U1
81	Request 1-st user's phone number	/TLF number/	/TLF number/	U1
82	Request 2-nd user's phone number	/TLF number/	/TLF number/	U1, U2

Command	Description	Response in "user" mode	Response in "modem" mode	By default available to
83	Request 3-rd user's phone number	/TLF number/	/TLF number/	U1, U2
84	Request 4-th user's phone number	/TLF number/	/TLF number/	U1, U2
92	Delete user 2	Erased Tlf2	23:	U1
93	Delete user 3	Erased Tlf3	24:	U1
94	Delete user 4	Erased Tlf4	25:	U1
91.xx...xx [1]	Change master's phone number[2]	Security code?	26:	U1
92.xx…xx	Change 2-nd user's phone number	Changed Tlf2	27:	U1, U2
93.xx…xx	Change 3-rd user's phone number	Changed Tlf3	28:	U1, U3
94.xx…xx	Change 4-th user's phone number	Changed Tlf4	29:	U1, U4
95.xxxxyyyy	Change module account xxxx – security code, yyyy - new account	Code is changed	30:	U1
96.xxxxyyyy	Change module security code xxxx – current code, yyyy - new code	Code is changed	30:	U1
87.xxxx	Activate GPRS mode (xxxx - security code)	Depends on the result		U1
99.C ddMMyyhhmmss[3]	Set module date and time (dd – day, MM – month, yy – year, hh – hours, mm – minutes, ss - seconds)	Changed	83:	U1
99.Wxxxx	Set module Online identificator. xxxx – identificator (15 digits maximum)	Changed	83:	U1
99.Txxx	Test period (xxx – time*10 minutes. maximum - 255)	Changed	83:	U1
99.I<IP>	Set IP-address	Changed	83:	U1
99.DI<IP>	Set DNS-server IP address (if used)[4]	Changed	83:	U1
99.DD<domain name>	Set domain name (if used)	Changed	83:	U1
99.A <access point>	Set APN	Changed	83:	U1
99.P<port>	Set TCP port	Changed	83:	U1

Command	Description	Response in "user" mode	Response in "modem" mode	By default available to
99.R<attempts>	Number of attempts to connect to server. Maximum - 255	Changed	83:	U1
99.O<sec>	Frequency of connection test messages Maximum - 255	Changed	83:	U1
99.M<min>	Time between attempts to connect to server Maximum - 255	Changed	83:	U1
99.Y1<login>	Set login for GPRS access. Maximum – 8 symbols	Changed	83:	U1
99.Y2<password>	Set password for GPRS access. Maximum – 8 symbols	Changed	83:	U1
99.Nx	Number of digits to determine phone number Maximum - 16	Changed	83:	U1
99.C1	Show network configuration	/Configuration/	/Configuration/	U1
99.C2	Show general configuration	/Configuration/	/Configuration/	U1
99.C3	Show mobile operator and signal strength[5]	/Configuration/	/Configuration/	U1

☞ **Note**:

1. Phone numbers may be entered both with international code and without it. If you enter phone number with an international code than make sure to enter "+" in front of it (for example, Latvia: +371xxxxxxx, Estonia: +372xxxxxxx, Russia: +7xxxxxxxxxx). Maximum number length - 15 digits.
2. When changing Master, new master will receive "**Security code?**" message. Mew Master must reply to this message with the security code (1234 by default) within 10 minutes. Otherwise previous number will be restored as Master.
3. Module adds time to all the messages in "user" mode: for example 14:37:11 Ready

   Module adds time and date to all the messages in "modem" mode: for example FF, 1234,96:<date>-<time>

   To set correct time you have to either turn on GPRS mode or send special SMS message.

   Attention! After restarting module, time and date will be lost.
4. If you have to switch from connecting using domain name to connecting using the IP-address, you just have to delete DNS-server IP address. To do so, just send **99.DI** command to the module.
5. Appropriate signal strength 15-20 points, good – 20 – 30.

Enclosure 5. List of event codes.

Cortex protocol using GPRS	Cortex protocol using SMS	SIA IP protocol	Description
03	0003	---	Out 1 activated
06	0006	---	Out 2 activated
09	0009	---	Out 3 activated
11	1001	---	Out 4 activated
18	1008	---	Confirmation of receiving "Enter programming mode" command
23	2003	---	User 2 deleted
24	2004	---	User 3 deleted
25	2005	---	User 4 deleted
30	3000	---	Account/Security code is changed
31	3001	1140 FF 001	Alarm zone 1
32	3002	1140 FF 002	Alarm zone 2
33	3003	1140 FF 003	Alarm zone 3
34	3004	1401 FF 001	Disarmed
35	3005	1302 FF 000	Battery low
39	3009	1301 FF 000	220V lost
71	7001	---	Forced exit from GPRS
83	8003	---	Module configuration changed
85	8005	---	Error establishing GPRS connection
88	8008	---	Error connecting to Central Unit
91	9001	3140 FF 001	Restore zone 1
92	9002	3140 FF 002	Restore zone 2
93	9003	3140 FF 003	Restore zone 3
94	9004	3401 FF 001	Armed
95	9005	3302 FF 000	Battery restored
96	9006	1602 FF 000	Test message
97	9007	1627 FF 000	Programming mode on
98	9008	1600 FF 000	Module powered on
99	9009	3301 FF 000	220V restore