



iRZ TC65i-485GI
GPRS class 12
GSM modem

USER MANUAL

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1. Safety requirements

Limitations for using the modem near other electronic devices:

- switch off iRZ TC65i-485GI modem in the hospitals or near medical equipment (for instance: near pacemakers or hearing devices). Interference with medical equipment is possible;
- switch off modem in the airplanes. Take measures against accidental switching on;
- switch off the modem near the petrol stations, chemical enterprises, locations where blasting operations are performed. Interference with technical devices is possible;
- in case of close distances modem can create interference for TV-sets, radio receivers.

Protect modem against dust and moisture.

In case of improper utilization the warranty becomes void.

2. General information

2.1. Device assignment

iRZ TC65i-485GI modem is a structurally complete GSM modem intended for reception and transmission of data, text and fax messages. Ideally suited for industrial applications - telemetry, wireless collection of data from the sensors, remote surveillance and alarm systems.

Modem is assembled on the basis of the GSM module TC65i Cinterion. **Java platform** Control is performed with the help of standard AT-commands. The terminal is fitted with LEDs that allow to track status of the connection.

2.2. Complete set

Set of the GSM modem iRZ TC65i-485GI:

- IRZ TC65i-485GI terminal,
- label,
- mounting bracket for fixing on a DIN rail,
- factory box.

2.3. Features

Main features:

- frequency ranges: GSM 850/900/1800/1900 MHz;
- output capacity:
 - 2W (class 4 for EGSM850),
 - 2W (class 4 for EGSM900),
 - 1W (class 1 for GSM1800),
 - 1W (class 1 for GSM1800),
- GPRS class 12;
- TCP/IP stack available via AT commands;
- MC class B;
- CSD up to 14.4 kbps;
- USSD;
- SMS;
- fax - group 3: class 1
- Java applications development open platform.

Power supply:

- power supply voltage from 9 to 25 V;
- useful current, not more than:
 - in case of supply voltage of +12 V - 400 mA;
 - in case of supply voltage of +24 V - 200 mA.

Physical features:

- dimensions of not more than 76x85x30 mm;
- weight not more than 130 g.;
- operating temperature range from -30°C to +65°C.

Interfaces:

- RJ11 socket for power supply, 2 keys for "grounding" and 2 ADC,
- RJ11 socket – 4 GPIO. +5V.
- Umbilical terminal connector for data cable (RS-485 and power),
- SMA socket for connecting the GSM antenna.

Power can be supplied to any of the two first sockets.

2.4. Appearance

The modem presents a compact device fitted with a robust and light aluminum housing. Appearance of the device is given on fig. 2.4.1 and fig. 2.4.2.

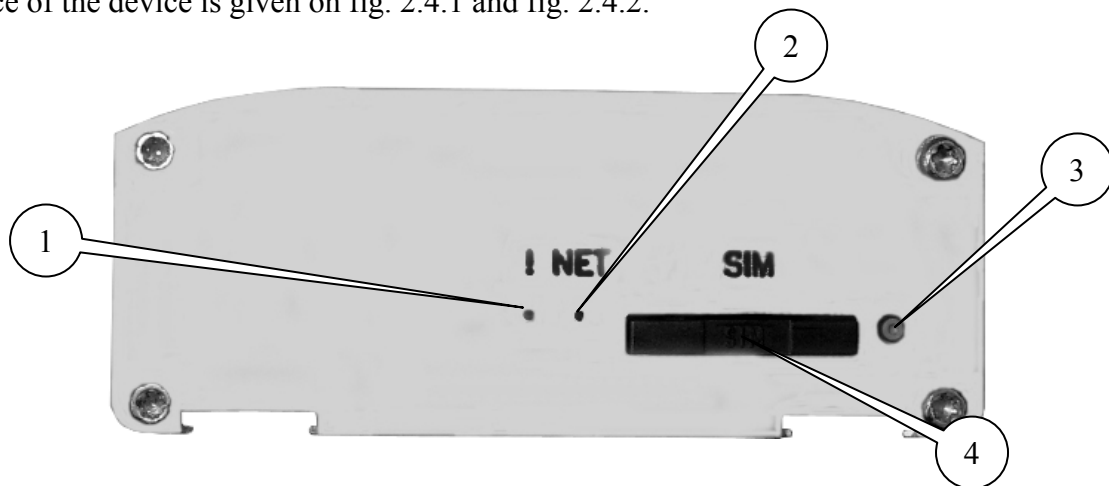


Fig. 2.4.1 Front view

The figure shows with numbers:

1. Emergency LED,
2. Network LED,
3. Button for ejecting a SIM-card,
4. SIM-card tray,

2.5. Interfaces

2.5.1. Umbilical terminal connector

The socket is used for connecting power supply and control devices, RS485 communications protocol.

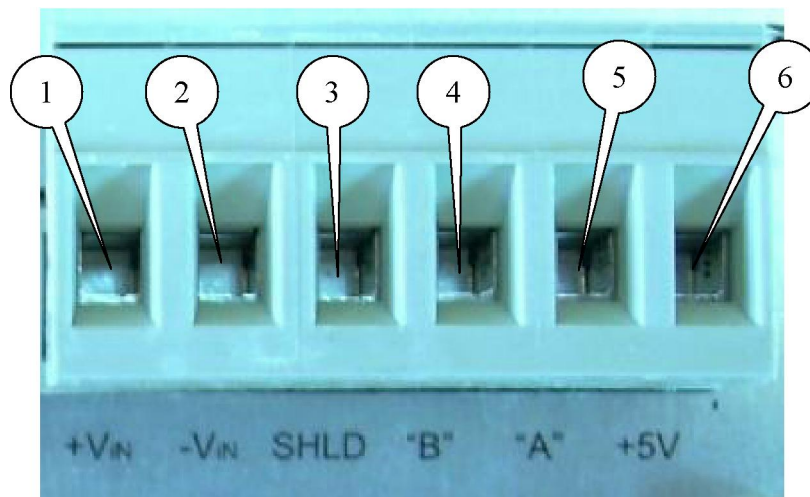


Fig. 2.5.1 Umbilical terminal connector

Table 2.5.1 Assignment of connector pins.

Terminals	Signal	Application
1	+Vin	"+" of the power source
2	-Vin	"-" of the power source
3	SHLD	RS-485 "Shield"
4	"B"	"d-" RS-485;
5	"A"	"d+" RS-485;
6	+5V	RS-485 "+5V"

2.5.2. RJ11 socket

This socket is used for connection of power supply, 2 keys for "grounding" and 2 ADCs.

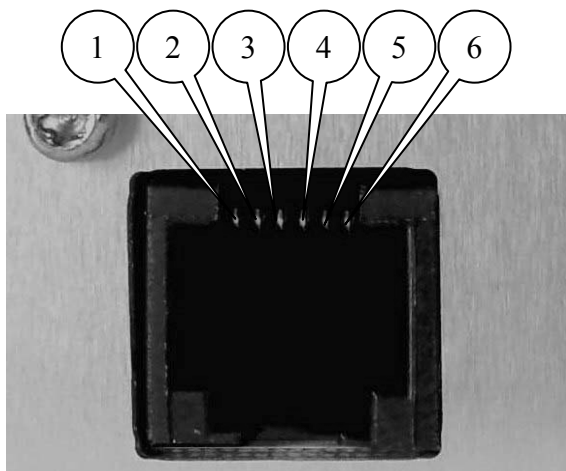


Fig. 2.5.2 RJ11 socket

Table 2.5.2 Assignment of power supply outlets

Pin	Signal	Application
1	+ 12V	Positive pole of direct supply voltage. Protected with a fuse, surge protection circuit (in case of voltage supply of more than 30 V) and reverse polarity protection.
2	key for "grounding"	Controlled by GPIO4 module output. In case of "logical 1" the output is cut to the "grounding"
3	ADC1	Analog-to-digital converter
4	ADC2	Analog-to-digital converter
5	key for "grounding"	Controlled by GPIO5 module output. In case of "logical 1" the output is cut to the "grounding"
6	GND	System housing

2.5.3. RJ11 socket

The socket is used for connecting 4 GPIO.

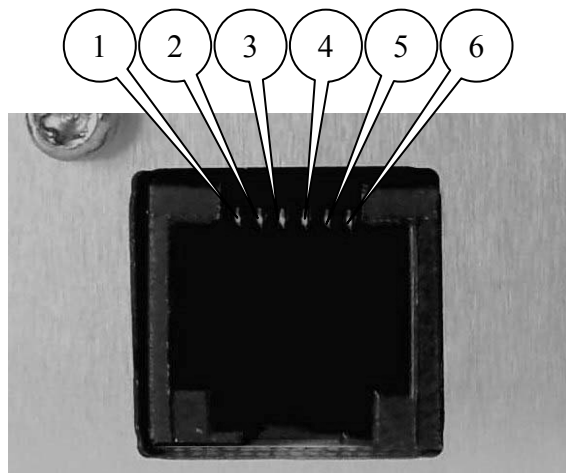


Fig. 2.5.2 RJ11 socket

Table 2.5.2 Assignment of power supply outlets

Pin	Signal	Application
1	GND	System housing (grounding)
2	GPIO10	GPIO10 module output
3	GPIO3	GPIO3 module output
4	GPIO2	GPIO2 module output
5	GPIO1	GPIO1 module output
6	+5V	Modem induced voltage

2.6. Modem status indication

Two LEDs are used to indicate operation mode or status of the emergency situation.

Table 2.6.1 Indication of operation mode (green LED)

Indication mode	Operation mode
OFF	The modem is switched OFF or emergency situation
600 ms ON/ 600 ms OFF	Modem is not registered in the network
75 ms ON/ 3 ms OFF	Modem is registered in the network
75 ms ON/ 3 ms OFF/ 75 ms ON/ 3 ms OFF	GPRS connection established
500 ms ON/ 50 ms OFF	Data transfer effected
250 ms ON/ 10 ms OFF	Modem in standby mode, alarm mode
250 ms ON/ 250 ms OFF	Programming mode/ menu mode

Table 2.6.2 Indication of an emergency situation (red LED)

Indication mode	Fault description
Permanently ON	Wrong input voltage
0.5 s ON/ 0.5 s OFF	Wrong module power supply
0.25 s ON/ 0.25 s OFF/ 0.25 s ON/ 1 ms OFF	GSM module was not launched

3. Functional chart and operation principles

4. Connection and setup

4.1. Connection

Before supplying power it is necessary to install a SIM-card into the modem (SIM-card must be unlocked). In order to do this:

- remove SIM-card tray having pressed on the button for ejecting a SIM-tray (fig. 2.4.1);
- install a SIM-card into the SIM-tray;
- insert a SIM-tray with a SIM-card into the modem.

No excessive physical effort should be applied for inserting a SIM-card.

Connect GSM antenna to the antenna socket and connect data cables. After this power up the modem via RJ11 socket (fig.2.5.2) or umbilical connector (fig.2.5.1).

Note: GSM antenna, data cables and power supply module are not included in the delivery set.

After powering up registration is executed in the automatic mode. It is indicated by frequent blinking of a green LED. Upon completion of registration the modem switches to the operation mode and the green LED starts to blink less frequently (table 2.6.1).

4.2. Reboot and switching OFF

The modem can be rebooted by one of the following ways:

- reboot after a defined time interval (WD interval, OFF by default), setting is performed in the menu mode;
- temporary shutoff.

The modem can be switched off by one of the following ways:

- by program means with AT commands (shifting to hibernation);
- power shutoff.

In case of using the AT commands for switching the modem OFF it is placed in hibernation mode (minimum power consumption). Termination of the hibernation mode with turning the GSM module on with an alarm.

4.3. Menu mode

Menu mode is designed for changing modem parameters and overview of statistical data. In the menu mode the GSM module is de-energized and it is automatically launched again on termination of the menu mode. Menu mode can be activated in operation mode. Before beginning connect the modem to the computer (speed of 115200 bit/s, 8-N-1), power the modem up, launch Hyper Terminal or similar program for communicating with the modem. In case of removal of a SIM-card tray (operating the button for ejecting a SIM-tray) the modem shifts into the menu mode. At this the main menu screen is displayed:

Menu mode:
Variant XX

- <P1> Show statistics
- <P2> WD interval=OFF (or interval value in hours)
- <P3> 'AT' control=OFF (or "ON")
- <PC> Power control
- <PR> Clear statistic
- <PS> Change speed: auto (or speed value)

where **Variant XX** stands for firmware upgrade version.

Symbols <...> define control commands. Input of a command is executed after pressing "Enter" button. In case of incorrect input "ERROR" message is displayed. Not case sensitive.

After input of "P1" command - shift into the statistics view menu:

Statistics:

Power_Modem = XX...X
Bad_Power_Modem = XX...X
Power_Module = XX...X
Bad_Power_Module = XX...X
Start_Module = XX...X
Bad_Start_Module = XX...X
Deadlock_of_Module = XX...X
Reset = XX...X

During modem operation the following situations are stored automatically:

Power_Modem – number of times the modem was switched on,

Bad_Power_Modem – number of deviations of modem power supply from the allowed parameters,

Power_Module – number of times the GSM module was powered on,

Bad_Power_Module - number of deviations of GSM module power supply from the allowed parameters,

Start_Module – number of successful launches of the GSM module,

Bad_Start_Module – number of situations - GSM module was not launched,

Deadlock_of_Module

Reset – number of resets.

After the statistics output the system will shift for main menu.

The "P2" command input calls out WD menu:

WD interval, hh (hh=00 - WD off, max - 255)

<Q> Quit

WD interval=

In order to change the interval of reboot input a number from 0 to 255 (input after pressing "Enter" button). Reboot interval is given in hours. In case if it is necessary to turn this function off input 0. It is worth noting that after the defined timer interval unconditional modem reboot will be performed. In case of incorrect input the modem will display an "ERROR" message and WD menu will be opened again. In case of successful input of reboot interval or "Q" command input the system will shift into the main menu.

After "P3" command input - shift into AT menu:

'AT' control, (0 - off, 1 - on)

<Q> Quit

control=

ERROR

After input of the "PC" command - display of the input supply voltage and module supply voltage (measurement accuracy 5%):

POWER Uin=12.0 Umd=3.9

After the output the system will shift for main menu.

After input of "PR" command - shift into the statistics reset menu:

Clear statistic?

<YES> YES

<Q> Quit

The accumulated statistical data will be cleared with a "YES" command. In case of incorrect input the modem will display an "ERROR" message and statistics reset menu will be opened again. In case of successful input or "Q" command input the system will shift into the main menu.

After "PS" command input -

Menu speed:

<0> auto

<1> 115200

<2> 57600

<3> 38400

<4> 28800

<5> 19200

<6> 14400

<7> 9600

<8> 4800

<9> 2400

<10> 1200

<11> 600

<12> 300

<Q> Quit

ERROR

After input of the "M" command the main menu will be launched again.

Exit from the menu mode is realized after installation of the SIM-card tray.

5. Software upgrades

6. Emergency situations

Emergency situations tracking is intended for simplification of modem operation.

6.1. *Emergency situation 1 (incorrect power supply)*

Emergency situation 1 occurs when the power supply deviates from the allowed value. At this the module is shut down: GSM module power supply is switched off. Alarm on the emergency situation with a red LED (permanently ON). Exit from the emergency situation is possible only in case of restoring the correct power supply voltage.

6.2. *Emergency situation 2 (incorrect module power supply)*

Emergency situation 2 occurs when the GSM module supply voltage deviates from the allowed value. At this the module is shut down: GSM module power supply is switched off. Alarm on the emergency situation with a red LED (0.5 s ON/0.5 s OFF). Exit from the emergency situation is possible only in case the module supply voltage is restored within 10 seconds from the moment of the emergency situation. If the module supply voltage remains incorrect within 10 seconds (and the supply voltage is correct), the modem goes into standby, module power supply is switched off, emergency indication is preserved. Exit from the standby mode is possible only in case of complete power shutdown.

In case if the emergency situation is repeated during the next turning on of the modem the device is subject for repair.

6.3. *Emergency situation 3 (GSM module was not launched)*

Emergency situation 3 appears when the GSM module will not launch. Alarm on the emergency situation with a red LED: 0.25 s ON/ 0.25 s OFF/ 0.25 s ON/ 1 s OFF. Exit from the emergency situation only in case of successful launch of the GSM module. In case of 10 failed attempts to launch the module (15 seconds), the modem goes into standby, module power supply is switched off, emergency indication is preserved. Exit from the standby mode is possible only in case of complete power shutdown.

In case if the emergency situation is repeated during the next turning on of the modem the device is subject for repair.