

ADGT 3G/GPRS ADM Modem Series



User Guide

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The user guide contains information about the purpose, design, technical parameters and basic operating principles of the 3G/GPRS ADM Modem Series (hereinafter referred to as the modems). The manual contains information about the purpose, design, technical parameters and operating principles of the converters.

ADGT systems s.r.o. reserves the right, without any prior notice, to make changes to the User Guide, related to the improvements of hardware and software, as well as to eliminate typos and inaccuracies.

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Contents

Chapter 1. Product Overview	4
Product description	4
Appearance.....	6
Front Panel View.....	6
Rare Panel View (Serial Connectors Side).....	7
LED Indication.....	10
Chapter 2. Modem connection types and operating modes.....	12
GPRS/3G (TCP/IP) connection channel.....	12
Client and Server modes.....	12
IP address types.....	13
Connection schemes	14
Backup CSD connection channel	16
Chapter 3. Getting started	17
Connection.....	17
Chapter 4. Configuring modem	18
First ADM modem connection to PC.....	18
Types of configuration software connection to ADM Modems	20
Local connection via PC	20
Connection via CSD channel	22
Main operating parameters configuration.....	23
SIM cards configuration	24
Switching SIM cards.....	25
Operating mode configuration	25
Serial port configuration.....	30
Managing Input/Output (I/O) lines	30
CSD mode configuration	35
System settings	35
Time setting and synchronization	36
Configuring connection establishment on schedule and on request.....	37
Saving configuration in file	38
Password setting	38
Debug Console	39
Software update.....	39
Appendix 1. Specifications	40

Chapter 1. Product Overview

Product description

3G/GPRS ADM modems - industrial smart modem series designed for remote automated wireless data transmission over cellular GPRS, 3G (TCP/IP) network or CSD (voice) channel. Devices are intended to be used in remote monitoring and dispatching systems.

All modems are manufactured in rugged metal enclosures, provided with two SIM card slots, industrial serial ports (RS-232 and/or RS-485) and USB 2.0 interface for configuring device via PC. The built-in microcontroller ensures transparent data exchange between the system nodes and provides vast possibilities in the remote devices management and control.



Fig. 1. 3G/GPRS ADM modem series.

Modems can be powered by an external DC source with the voltage range of 7-30 V.

The modems product line is presented in Table 1.

Table. 1. ADM modems product line.

Model	Network Type	Serial Port	Enclosure
ADM112	GPRS	RS-232	small aluminum
ADM114	GPRS	RS-485	small aluminum
ADM114-G	GPRS	RS-485 isolated	small aluminum
ADM216	GPRS	RS-232 + RS-485	wide aluminum
ADM236	3G	RS-232 + RS-485	wide aluminum

Key device features:

- Transparent data transmission between a remote network node and the locally connected equipment via GPRS, 3G or CSD channel.
- TCP/IP Server and Client modes.
- Two SIM card slots for communication redundancy.
- Local and remote configuration using a special software.
Remote configuration via GPRS, CSD, SMS.

Modems are connected to the equipment (e.g., to meters) via RS-232 and/or RS-485 interfaces and transmit information to the monitoring center in transparent mode via 3G/GPRS or CSD channels. The dispatching software will require only the access to the Internet for obtaining data.

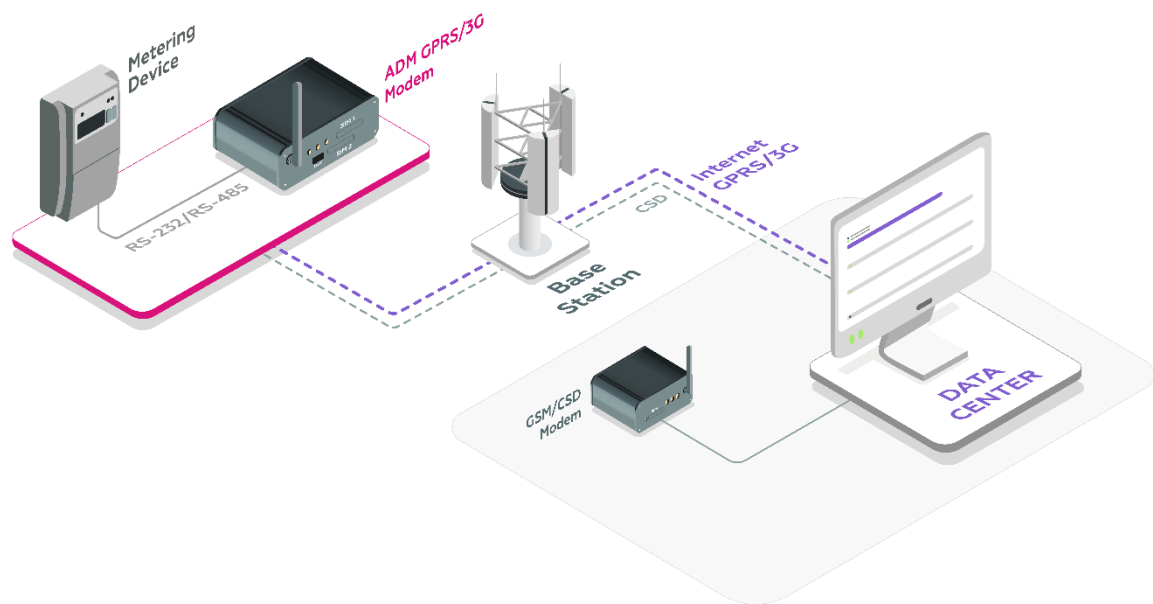


Fig. 2. ADM Modem connection scheme.

Additional options

- TCP Client/TCP Server modes
- Simultaneous connection to 5 servers in Client mode. Simultaneous connection of up to 5 PCs in Server mode
- Connection on schedule and on request to optimize the cost of communication services
- Checking network connectivity using PING/TCP requests
- Local and remote configuring and firmware update using convenient configuration tool. More than 200 configuration parameters. Remote configuration via TCP, CSD or SMS
- ADC input to ensure remote facilities monitoring
- Time synchronization using the NTP servers.

Appearance

Front Panel View

All the ADM modems are manufactured in metal enclosures with IP30 protection class.

Modems with **one serial interface (RS-232 or RS-485)** are manufactured in a compact square enclosure capable of being mounted on a DIN rail or on a table. The description of the enclosure front side elements is presented in Fig. 3 and Table 2.

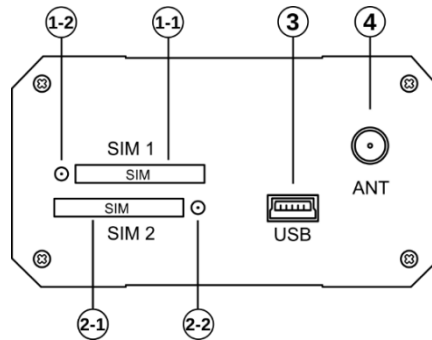


Fig. 3. ADM modems with one serial port. Front side.

Modems with **two serial interfaces (RS-232 & RS-485)** are manufactured in a wide rectangular enclosure and can be mounted on a DIN rail, a wall or on a table. The description of the enclosure front side elements is presented in Fig. 4 and Table 2.

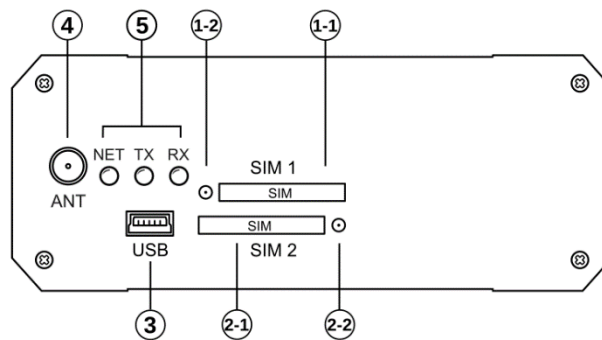


Fig. 4. ADM modems with two serial ports. Front side.

Table. 2. ADM modems front side connections.

Designation	Name	Description
1-1	SIM 1	SIM card 1 slot
1-2		SIM card 1 extraction button
2-1	SIM 2	SIM card 2 slot
2-2		SIM card 2 extraction button
3	USB	Mini-USB type B connector for modem configuration via PC (connection – using mini USB-B/USB-A cable)
4	ANT	SMA-F type connector for commuting GSM/3G antenna
5	NET, TX, RX	LED indicators

Rare Panel View (Serial Connectors Side)

Models with RS-232 interface

Modem **ADM112** with the serial asynchronous duplex RS-232 interface is equipped with a standard DB-9F connector to commute the external equipment.

Modem is powered by a 12VDC power supply source using the following connectors:

- 6P6C connector (**PWR**);
- **I/O** connector (**V, G** contacts).

When the **PWR** connector is used to ensure the modem power supply, **V** input can operate as the 7-30V output to power external devices.

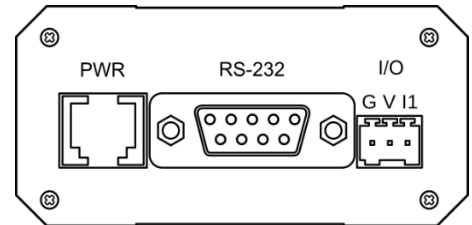
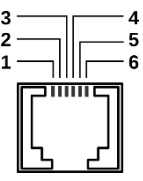
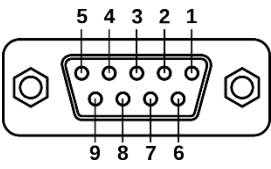
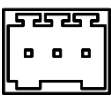


Fig. 5. ADM modem with RS-232 interface. Rare side

Connectors' pinouts are presented in Table 3. In addition, modems are provided with the ADC type **I1** input, which is able to operate in Dry Contact mode.

Table 3. ADM modem with RS-232 interface pinouts.

Connector	Name	Contact	Designation
	PWR 6P6C connector	1	Power supply positive voltage input
		2-5	Not used
		6	Ground
	RS-232 DB-9F connector	1	+5V output
		2	TX data output
		3	RX data input
		4	Not used
		5	Signal ground
		6	DSR output ¹
		7	CTS input
		8	RTS output ¹
		9	-5V output
	I/O Additional inputs/outputs terminal block connector	G	Ground
		V	Power supply positive voltage input ²
		I1	ADC type input

¹ Pins 6 and 8 are closed to each other.

² When the modem is powered via the **PWR** connector, it can operate as a 7-30V output to power external devices.

Models with RS-485 interface

Modems **ADM114** and **ADM114-G** equipped with the RS-485 serial interface ensure data exchange between multiple devices using a single two-wire communication line in the half-duplex mode and allow to connect up to 256 transceivers at the distances of up to 1200 m.

Modems are powered with 12VDC power supply source via the following connectors:

- 6P6C connector (**PWR**);
- **I/O** connector (**V**, **G** contacts).
When the **PWR** connector is used to ensure the modem power supply, **V** input can operate as the 7 - 30V output to power the external devices.

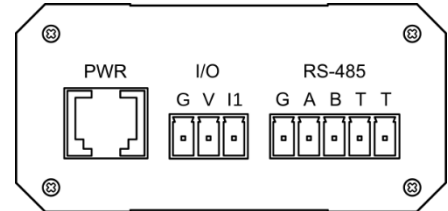
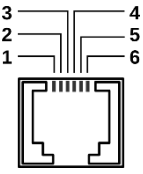
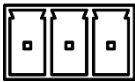
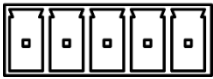


Fig. 6. ADM modem with RS-485 interface. Rare side.

RS-485 interface has a terminal block connector and is provided with the 120 Ohm terminating resistor (indicated as **T**). The terminating resistor is connected to the line, when the **T** contacts are closed. In addition, modem is provided with the ADC type **I1** input. Connectors' pinouts are presented in Table 4.

Table 4. ADM modem with RS-485 interface pinouts.

Connector	Name	Contact	Designation
	PWR 6P6C connector	1	+12V power supply input
		2-5	Not used
		6	Ground
	I/O Additional inputs/outputs terminal block connector	G	Ground
		V	Power supply positive voltage input ³
		I1	ADC type input
	RS-485 Terminal block connector	G	RS-485 cable shield
		A	RS-485 line "A+" signal
		B	RS-485 line "B-" signal
		T	120 Ohm modem resistor output 1
		T	120 Ohm modem resistor output 2

³ If the device is powered using the **PWR** connector, can be used as the output to ensure the external devices power supply.

Models with two interfaces (RS-232 & RS-485)

ADM216 and **ADM236** modems are equipped with both RS-485 and RS-232 interfaces. These interfaces are not parallel and independent. At a single time period, data exchange is possible between one of the interfaces and a remote node (Server or Client). Data received over a TCP channel are simultaneously transmitted to two interfaces; and the response received on any of the interfaces is transmitted into a single TCP channel.

Modems are powered with 12VDC power supply source via the following connectors:

- **V** and **PG** contacts of **I/O** connector.

The connector pinouts are presented in Table 5.

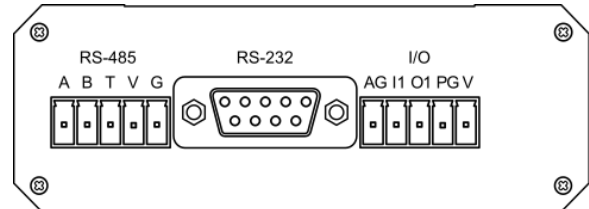


Fig. 7. ADM modem with two interfaces and 12VDC power supply.

Table 5. ADM modem with both RS-232 & RS-485 interfaces pinouts.

Connector	Name	Contact	Designation
<p>RS485</p> <p>A B T V G</p>	RS-485 Terminal block connector	A	RS-485 line "A+" signal
		B	RS-485 line "B-" signal
		T	Built-in modem resistor output (in order to enable, it is necessary to close on B output, signal "B-")
		V	7.5V output for powering external devices
		G	RS-485 line shield (should be connected if necessary)
	RS-232 DB-9F connector	1	DCD output
		2	TX data output
		3	RX data input
		4	DTR input
		5	Signal ground
		6	DSR output
		7	RTS input
		8	CTS output
		9	RING output
<p>I/O</p> <p>AG I1 O1 PG V</p>	I/O additional inputs/outputs terminal block connector	AG	Analog ground (ADC connection)
		I1	ADC type input
		O1	Open Collector type output
		PG	Power ground (to connect 7–30 VDC power supply and O1 output) Protected from polarity reversal.
		V	7–30 VDC power supply positive voltage input

LED Indication

Each ADM modem is provided with a set of LED indicators:

- NET, RX and TX indicators** are designed to display the modem network registration and server connectivity status.

In modems with one interface indicators are placed on the enclosure side part, and in devices with two interfaces indicators are located on the front panel.

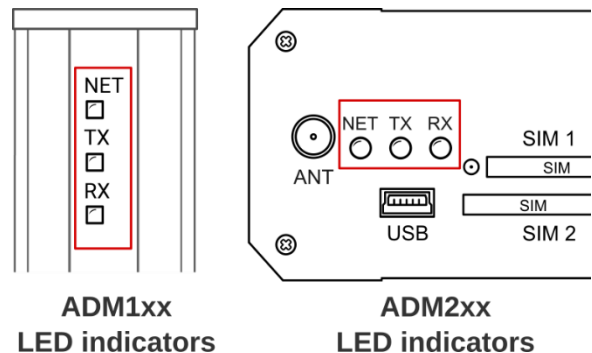


Fig. 8. ADM modems LED indicators.

Indicators operating modes are presented in Table 6.

Table 6. Network registration and server connectivity indication modes.

	NET	RX	TX
Power supply disabled (GSM module not switched on)	–	–	–
USB cable or power supply is connected	–	RX and TX indicators blink alternately	
Power supply provided, network search, initialization	very frequent blinking	–	–
GSM network registration received	blinking once in 3 sec	–	–
GPRS network registration received	3 sec lighting/ 0.5 sec out	–	–
TCP/IP connection established	permanent lighting	–	–
TCP/IP data receiving in progress	permanent lighting	blinking 2-3 times/sec	permanent lighting
TCP/IP data transmitting in progress	permanent lighting	permanent lighting	blinking 2-3 times/sec

- Cellular signal indicators** (are presented only in modems with one interface in small square case) show cellular signal strength. Indicator values are presented in Table 7.

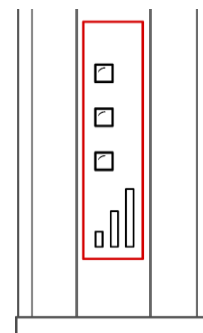


Fig. 9. Cellular signal indication.

Table 7. Cellular signal indication modes

Indicator status	Signal value	Signal quality
Not lighting	< -113dBm	Very low cellular signal
1 LED is lighting	< -93dBm	Low cellular signal
2 LEDs are lighting	from -93dBm to -79dBm	Average cellular signal
3 LEDs are lighting	> -79dBm	Strong signal

3. **Active SIM card indicators** (are presented only in modems in small square case). The indicators are integrated within the SIM slots. During one single time period only one of the SIM cards (by default, SIM1) could be active; that means only one LED will be lighting. The active SIM indicator will be lighting, even in case the SIM card is not inserted in the slot.

Indication modes are presented in Table 8.

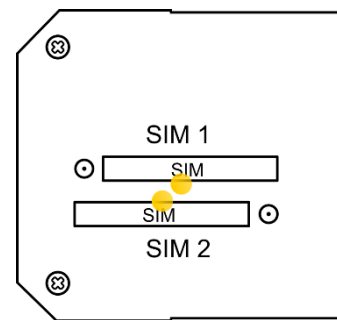


Fig. 10. SIM indication.

Table 8. SIM cards indication modes.

Operating mode	LED status	
	SIM 1 indicator	SIM 2 indicator
SIM card 1 is active	Lighting	Not lighting
SIM card 2 is active	Not lighting	Lighting

Chapter 2. Modem connection types and operating modes

GPRS/3G (TCP/IP) connection channel

GSM/3G ADM modems provide wireless connection of remote devices using the **TCP/IP** protocol over GPRS or 3G connection.

TCP protocol is the data transmission control protocol that provides data stream transportation accompanied by preliminary verification of the connection establishment using the IP address, which guarantees security and integrity of the transmitted information.

TCP protocol has a **client/server architecture**, which means that interaction between devices is organized according to the Client - Server algorithm, where the Client is a program or a device attempting to connect to the specified IP port on the server, and the Server is the party that monitors the specified port and accepts the incoming connection originating from the Client.

After the connection is established, the modem organizes an end-to-end (transparent) data transmission channel inside the TCP tunnel between the remote device (computer or modem) and the proprietary local serial interface (RS-232 or RS-485).

The data arriving at the serial interface is packaged in a TCP packet according to the waiting time-out for the next byte, or till the maximum TCP packet size is reached. The time-out period and the maximum packet size can be changed by the user. When an incoming packet arrives, the data is immediately transmitted to the serial interface.

Client and Server modes

ADM modems support three operating modes:

- **Client mode** - modem automatically connects to the GPRS/3G network and establishes the outgoing TCP connection with the server IP address and port specified in the settings. After the successful connection, modem switches to transparent data transmission mode from the network to the serial port and back.
- **Server mode** - modem automatically connects to the GPRS/3G network and stays waiting for the incoming TCP connections. Both a remote device (modem or computer) and a user program using the TCP/IP connection to exchange data with remote devices can be employed as the Client. In the Server modem is able to receive up to 5 incoming connections simultaneously. In this case data from any Client is transmitted exclusively to the Server serial port, and in the opposite direction the data from the serial port (Server) is simultaneously transmitted to all the connected Clients.
- **Client + Server mode** – modem operates in the Client and Server modes simultaneously. In this case, the modes are distributed as follows:
 - for the main communication channel (for transparent data transmission), the modem will work in the Server mode.
 - for the service communication channel (for remote configuration and updating of the modem software), the modem will connect to the service server in the Client mode.

IP address types

When setting up the GPRS/3G connection with a cellular operator, addressing (data packets transmission) is organized using the IP addresses. The following types of IP addresses are available:

1. **Dynamic internal IP** is an IP address that is changing with each connection ("floating"). The internal IP address provides the device access to Internet resources, but access to the device itself from an external network is unavailable.
2. **Dynamic external IP** is a public IP address that can be accessed from any point of the global network. The external IP address allows the computer to operate in the Server mode. The dynamic external address is also changing with each connection.
3. **Static (permanent) external IP** is a fixed public IP-address that remains the same with each connection. It is employed in cases, when the device should be operating in the Server mode, and requires remote connection from the outside.

Usually, operators assign IP addresses of Type 1 for GPRS connection, but when an additional service is provided (Real IP, External IP), it is possible to use the dynamic external IP addresses, which, as a rule, is subjected to charging an additional monthly fee. Several corporate tariffs envisage assigning an external static IP address (Type 3), but, as a rule, such service implies a pretty high subscription fee.

4. **Static internal IP** is a fixed address used in a local network. The static local IP addresses connection is usually used in regard to corporate tariffs specifically designed to ensure wireless data transmission between remote devices. Such tariffs are named Telematics, Remote Objects Management, M2M, etc. (the exact name could be obtained at the communication operator)

M2M tariffs are widely used in monitoring and dispatching of the remote devices (resources consumption systems, protected facilities, payment modems, vending machines, etc.); and could become a best solution in cases, where the combination of devices in a wired network is not possible or economically unfeasible. Cellular operator provides for such tariffs the access point name (APN), which is employed by the user to connect to the Internet services, and a set of internal addresses located within the same network and available to each other (Private APN service). Using the M2M solutions brings about the following benefits:

- low cost of services;
- no subscription fee for using a static IP address, which means that only the transmitted data should be paid;
- all transmitted information is transferred inside a local closed subnet, which ensures reliable and safe data transmission.

Connection schemes

When using the TCP connection, the following connection schemes are possible:

1. ADM Modem in Client mode is connected to a computer (PC) operating in Server mode. In this case the PC should be provided with an Internet connection with a permanent external IP address. A SIM card with an IP address of any type should be installed in the modem.

*EXAMPLE: we have a PC with IP address 10.0.0.1, and the port number 1234. In **ADM configuration tool** software select **Client** operating mode and set in the Client's settings IP-address and port number of the computer with the dispatching software, where connection should be established: "10.0.0.1:1234".*

This scheme is recommended to be employed to ensure connection between the remote equipment and the PC, for example, in polling meters. In this case, the polling program installed on the PC should also be able to work in the TCP server mode, that is, to listen on a specific TCP port (1234).

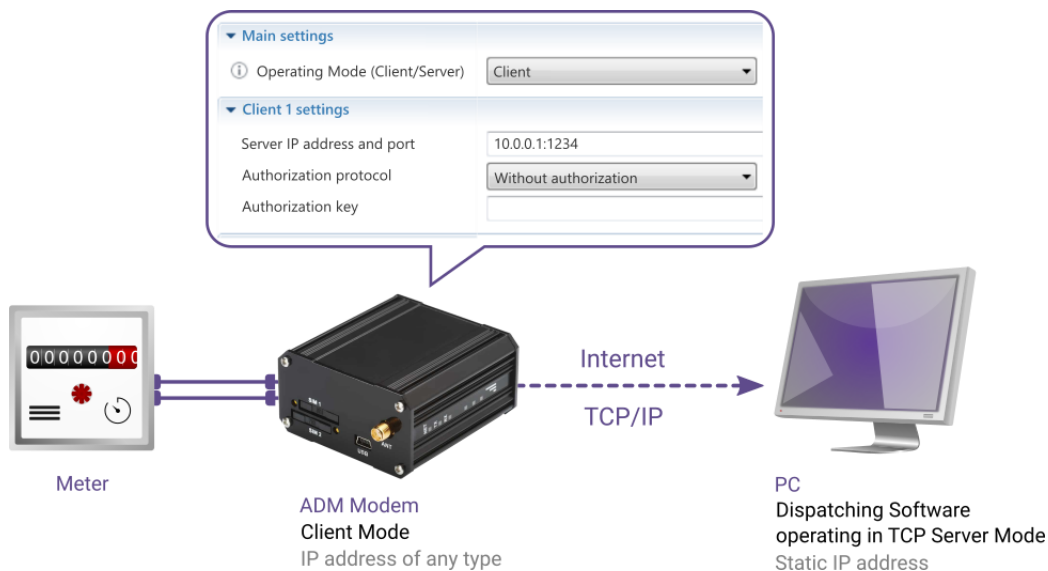


Fig. 11. ADM Client – PC Server connection scheme.

2. ADM Modem in Client mode is connected to ADM Modem operating in Server mode. In this case, SIM card with a static external or internal IP address should be installed in the ADM Modem (Server). The ADM Modem (Client) should be provided with an IP address of any type.

*EXAMPLE: ADM Modem (Server) IP address is 10.0.0.1, and the port number is 1234. When configuring the Modem (Server), select the appropriate operating mode and enter in the server settings the incoming port number: 1234. When configuring the Modem (Client), select the **Client** operating mode, and in the Client's settings indicate the Server modem address and port: "10.0.0.1:1234".*

The scheme is used, if it is required to connect two devices with the RS-232/485 ports, e.g., a controller and a sensor. In this scheme, a bunch of two modems operates as a wireless serial port extender.

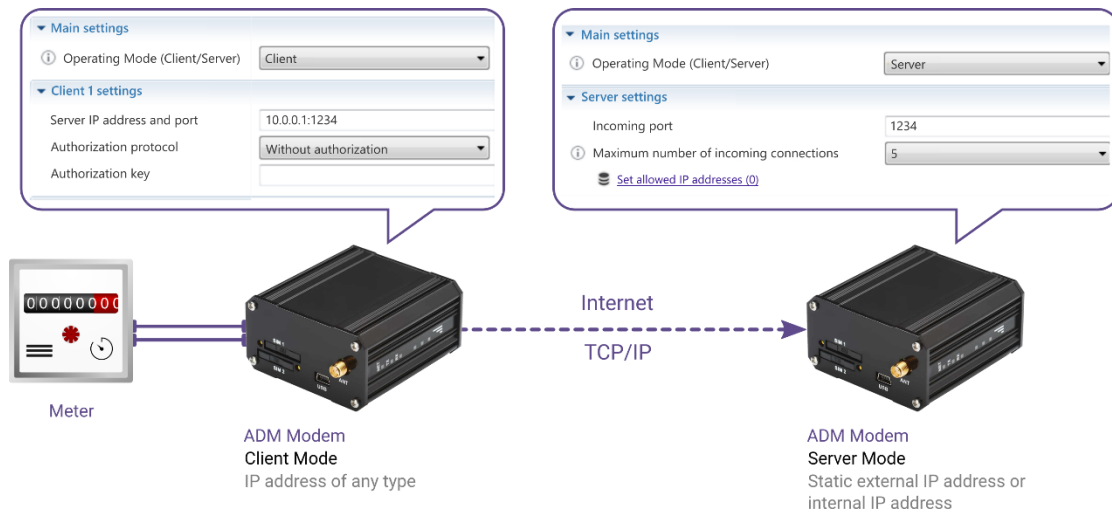


Fig. 12. ADM Client – ADM Server connection scheme.

3. ADM modem in Server mode is waiting for connection from a PC running in Client mode. In order to ensure Server mode operation, SIM card installed in the modem should possess a static external IP address; and the PC should be provided with an access to the Internet.

When using SIM cards with a static internal IP operating inside a local subnet, it is required to connect a GPRS modem with a similar SIM card to the computer (using the “Private APN” service) and establish a GPRS connection. Besides, access to modems in the local subnet from the Internet could be obtained without using the modem. To do this, it would be necessary to connect a special service rendered by the communication operator, which envisages provision of a dedicated communication channel.

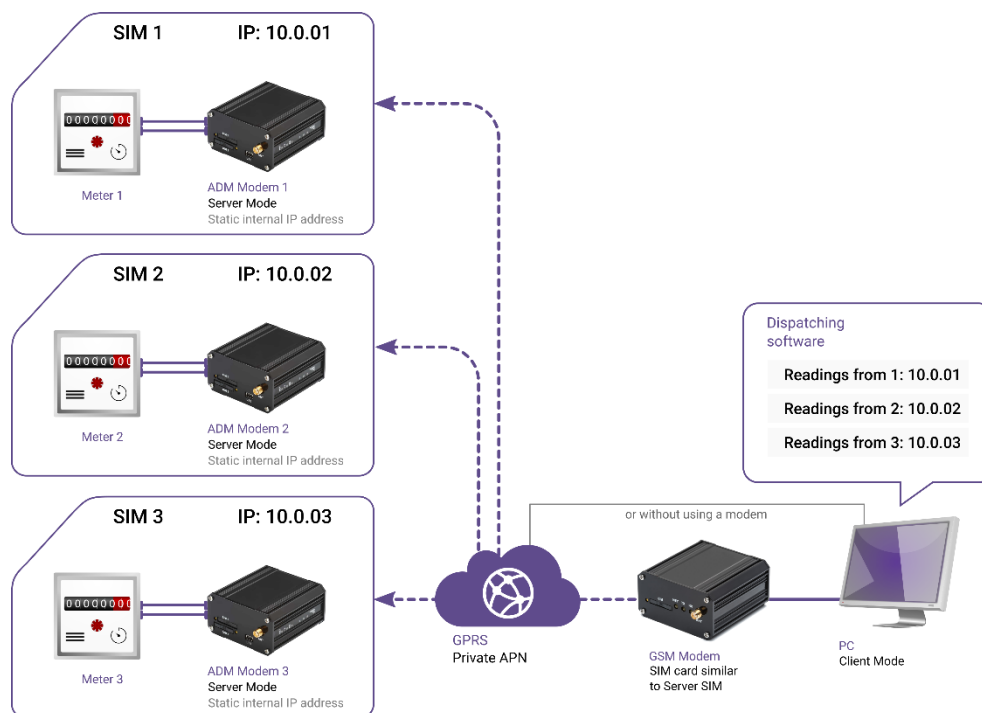


Fig. 13. ADM Server – PC Client connection scheme. Dedicated APN.

This scheme is recommended to be used to ensure the remote equipment and PC connection, because the majority of polling programs support the “TCP polling” function, i.e. operating as TCP clients.

Backup CSD connection channel

ADM modems series support backup connection over the CSD channel, which could be activated, if the GPRS/3G connection is found to be unavailable or unstable. The maximum data transmission rate in the CSD mode constitutes 9600 bps.

The connection is provided using the CSD modem, which is required to ensure outgoing calls to the modem, since the modem receives only the incoming calls. When the CSD call arrives, the modem opens a transparent channel for data transmission. At the same time, the current GPRS connections are suspended.

Chapter 3. Getting started

Connection

1. Before the first connection, configure the modem locally, via a PC using the **ADM Configuration Tool** configuration software (see the [Chapter 4. Configuring modem](#) section).
2. Insert SIM card(-s) into the modem:
 - Before installing SIM cards for the first time, remove the plastic protective tape from the SIM1 connector preventing the premature discharge of the autonomous power supply battery of the real time clock. After removing the tape, the clock will start working.
 - In order to insert SIM card 1, extract a SIM card tray out of the **SIM1** slot by pressing SIM card tray ejection button near the **SIM1** slot with a SIM ejection tool. Place the SIM card into the tray and insert the tray back into the slot. If necessary, insert the second SIM card 2 into the **SIM2** slot, repeating the above steps.
3. Connect GSM or 3G antenna (SMA-m type) to the **ANT** SMA-f connector.
4. Connect modem to a metering device via the interface wires.
5. Connect 7-30V DC power supply source to the modem.
6. After registration in the network (**NET** indicator is lighting continuously), the modem is ready for operation.

Chapter 4. Configuring modem

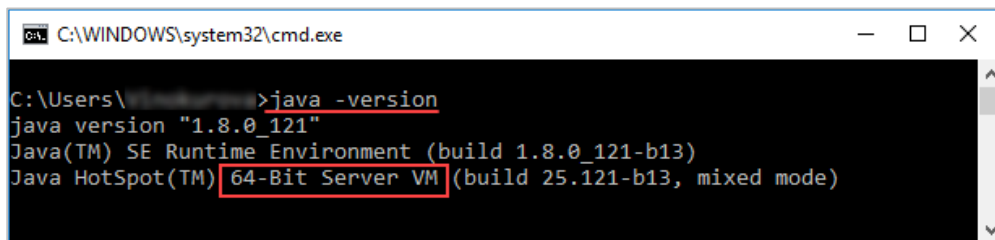
ADM modems support both local and remote configuration.

- Local configuration is carried out via PC using **ADM Configuration Tool** software.
- Remote configuration can be carried out via SMS commands as well as via GPRS/3G (TCP) network using the modem service channel.

First ADM modem connection to PC

The first configuration must be performed **locally** by connecting modem via USB to the computer. Further configuration can be carried out remotely.

ADM Configuration Tool software is written in Java language; that is why, to start the program, it is necessary to install the Java Runtime Environment (JRE) software, version 1.6 and higher. When downloading software, pay attention to the fact that the digit capacity of the program version (32-bit or 64-bit) should correspond to the digit capacity of the Java version on your PC. To test PC Java version, run the command line (**Start** → **Execute** (or **Win+R**) → type **cmd** → **Enter**) and enter the command: **java -version** → **Enter**.



```

C:\WINDOWS\system32\cmd.exe
C:\Users\>java -version
java version "1.8.0_121"
Java(TM) SE Runtime Environment (build 1.8.0_121-b13)
Java HotSpot(TM) 64-Bit Server VM (build 25.121-b13, mixed mode)
  
```

Fig. 14. Checking Java version.

In case the program is not started or starts with errors, install the latest version of JRE from the site: <http://java.com/en/download/>

To perform modem local configuration:

1. Before starting the program, enable the modem power supply and connect the device to PC via USB using the USB A - mini-USB-B cable. When connecting for the first time, the computer will detect a new unknown device in Device Manager (**Start** menu → **Device Manager** → **Ports (COM & LPT)**), for which it is required to install the USB driver.
2. Download the [adgt usbdriver](#) zip-archive and unzip it.

- In **COM & LPT** right-click "**Unknown Device (COMx)**", click **Properties** and select **Driver** tab. Click **Update Driver**, choose **Browse my computer for driver software**, click **Browse...** and choose the unzipped folder with the driver.

Then click **Next** and the computer will automatically search through that specified folder and install the driver files. You will see in the **Device Manager** your device changes the name to the correct driver's name "**ADGT USB Device**".

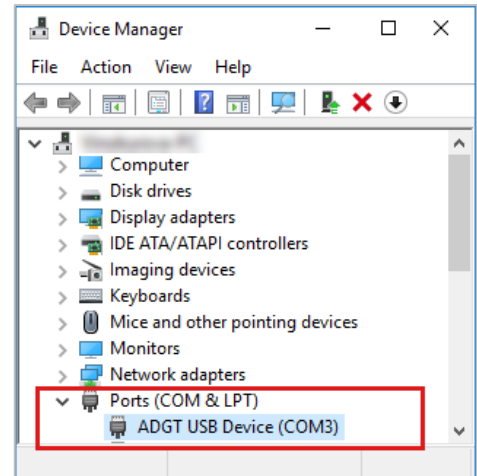


Fig. 15. ADM Modem in Windows OS.

- After installing the driver, run the **ADM Configuration Tool.exe** configuration software. The software interface is presented below:

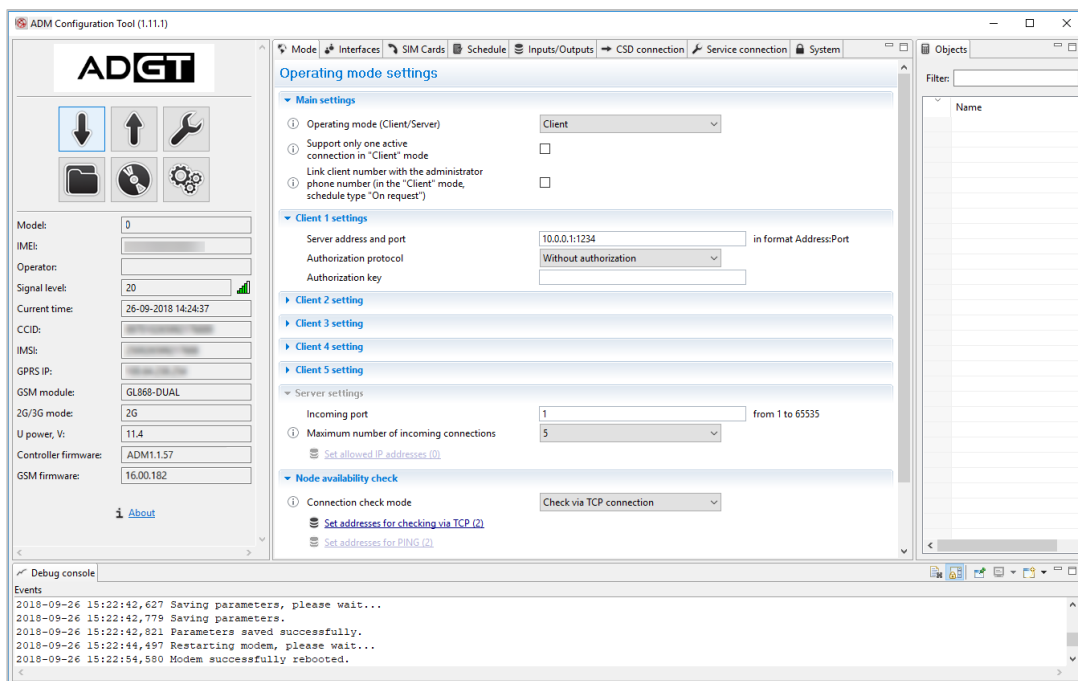


Fig. 16. ADM Configuration Tool interface.







The program consists of the main window containing working tabs, and **Debug console** window at the bottom part of the program interface. The console displays log messages about the current processes and changes in the modem operation.

In the left part of the program main window, the modem configuration control panel buttons are displayed, as well as the information table about the connected device (modem model, IMEI, cellular operator, etc.). Description of the control panel is presented in Table. 9.



Fig. 17. Control panel buttons.

Table. 9. ADM Configuration Tool control panel buttons.

Button	Function
 Read parameters	Using this button, you can read the current parameters from the connected modem: select the required modem in the list of objects and click the Read parameters button.
 Save parameters	The button allows you to record parameters configuration changes into the modem.
 Service	Access to the modem's service functions: changing the access password to settings, updating firmware version, restarting the device, resetting the modem configuration back to factory settings, as well as installing the time parameter from the computer into the modem. Attention: resetting settings back to the factory configuration does not require entering a password.
 Open settings file	Allows you to download the previously saved settings from the modem file (.xml extension file).
 Save as configuration file	Saves configuration changes in the computer file (.xml extension file).
 Connection settings	Menu provides selecting the type of connection to the modem and configuring program update settings.

ATTENTION!

The modem configuration can be performed without providing the power supply to the **PWR** connector; but it should be noted that the built-in GSM module will stay in the inactive mode.

Types of configuration software connection to ADM Modems

When the work is started, it is required to select the type of the program configuration connection to the modem. The following options to connect the ADM Configuration Tool software to the modems are available:

1. **Local connection** via the USB connector or through a serial port (RS-232/RS-485).
2. **Connection via CSD channel** using the GSM modem that ensures remote outgoing connection with the ADM modem.

The first connection of the modem is **always performed locally**, via PC. Subsequent configuration could be carried out remotely via CSD connection.

Local connection via PC

Local connection is executed via PC, using either the mini-USB connector, or the main serial port (RS-232/RS-485).

In order to connect the modem via the USB:

1. Open the **Connection settings** menu (button with the 'gear' image, Fig. 18-1).

2. In the right part of the window that opens, select the **Local** connection type.

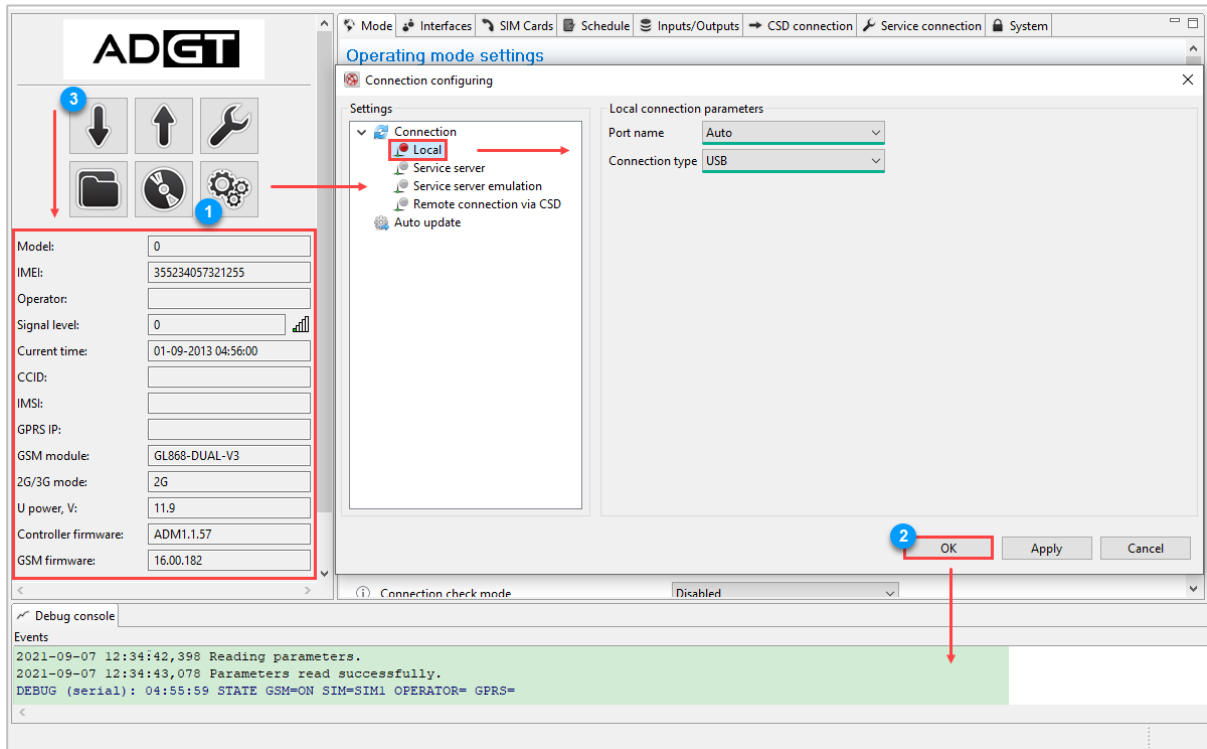



Fig. 18. Configuring local connection to the modem.

3. In the left part of the window, click the **Local** connection type to configure parameters. When connecting via USB, use the default settings:

- Port name – **Auto** (automatic search of the connected modem COM port)
- Connection type – **USB**. The specific COM port could be indicated as the port name.

ATTENTION!

- The password for accessing the default local connection settings is **0000**. It could be changed on the control panel in the **Service** menu (the "wrench" button) 
- The length of the password for accessing the settings could not exceed 32 characters (only numbers and Latin letters, the password is sensitive to the letters register).

4. Save the parameters clicking **OK** (Fig. 18-2). Wait for the log message "Successful authorization in device" on the corresponding COM port in the console.
5. After the successful connection, click the **Read parameters** button (Fig. 18-3) to obtain information about the connected modem in the window below the control panel.
6. After the connection is established, it is possible to start the modem configuration.

ATTENTION!

- The modem could also be configured using a computer via the serial port (RS-232, RS-485). For this purpose, start the modem without the SIM1 holder tray. In this case, only information about the modem model, current time, power supply voltage and controller software version shall be displayed in the connected device data section. The parameters associated with the GSM module will not be displayed.
- The modem could only be configured via the USB cable and without connecting the PWR main power supply. In this case, the GSM module will also stay in the inactive mode, but the modem configuration will be possible.

Connection via CSD channel

The ADM modem supports the remote configuration option using the CSD channel. In this case, modem configuration is performed using the CSD modem connected to a computer with the installed **ADM Configuration Tool** software. The modem is required for establishing the outgoing CSD connections, since the ADM modem accepts only the incoming calls.

In order to configure the modem to support the CSD connection:

1. When you first connect to the **ADM Configuration Tool** software, in the **Connection settings** menu (button with the 'gear' image) select the **Local** connection type.
2. In the **System** tab, set the administrator's phone number – the number of the modem, from which CSD connections will be allowed. Save changes using the **Save parameters** button

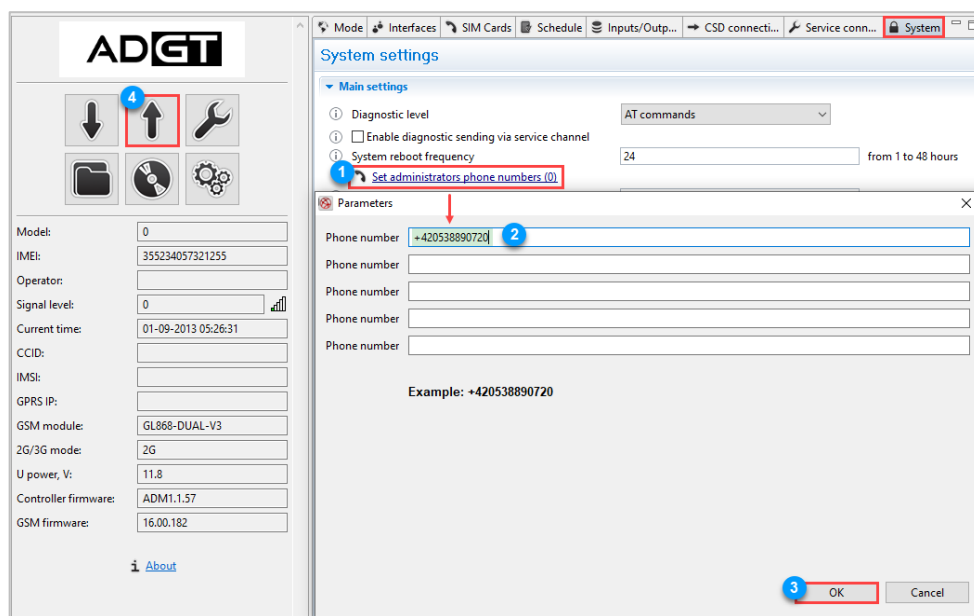


Fig. 19. Setting administrator phone number.

3. Now the modem **could be disconnected from the computer** and installed at the remote object. Further configuration of the device could be performed remotely.
4. Next, connect the GSM/CSD modem to the computer.

5. Go to **Connection settings** menu . In the left part of the window, select the **Remote connection via CSD** and enter the connection parameters: name and speed of the connected modem virtual COM port, access password and ADM modem phone number, where the CSD call will be directed (Fig. 20). Click **OK**.

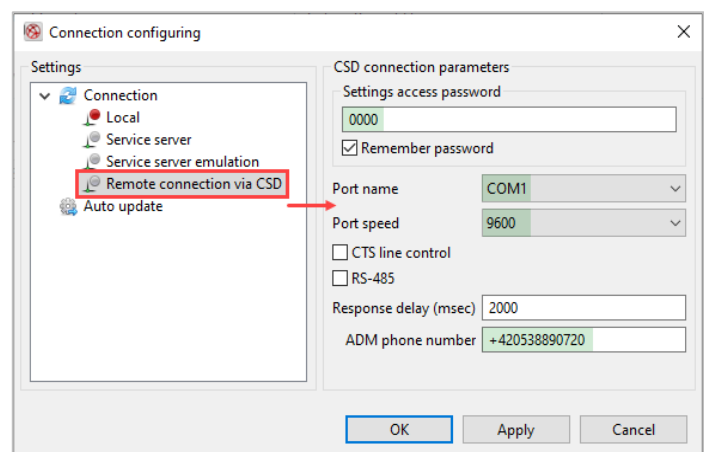


Fig. 20. Configuring CSD connection.

6. Click **Connection** in the left part of the window, and in the right part select **Remote connection via CSD** type. Click **OK** to save changes.

- If the connection is successful, the modem immediately starts calling the modem number; and a log message confirming successful authorization will appear in the console.

After establishing the successful CSD connection, the modem configuration could be started.

- To terminate the current connection, close the **ADM Configuration Tool**, or change the connection type.

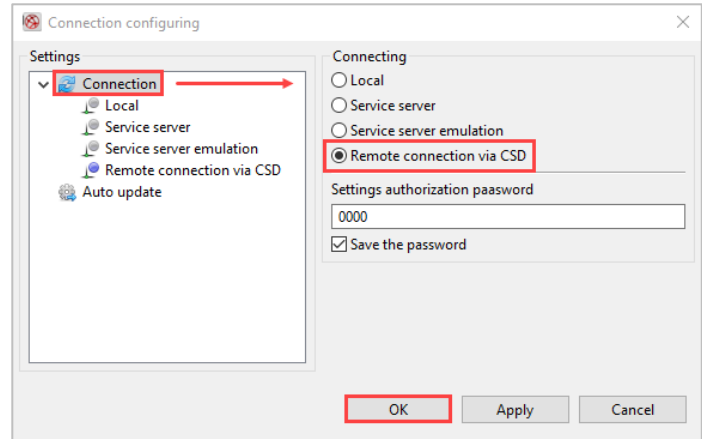


Fig. 21. Connecting via CSD.

Configuring additional connection parameters via CSD:

- Port speed** parameter is configured according to the interface standards.
- CTS line control** function initiates the data flow control for the RS-232 interface. The function should be activated, if the hardware control function is enabled in the connected CSD modem. Line monitoring allows to suspend data transmission, when the input buffer of the device connected to the modem is overfilled. Data will not be transmitted, until the device provides the appropriate CTS signal.
- RS-485** line should be ticked, when working with the RS-485 interface.

ATTENTION!

- In order to activate the backup communication channel, your communication operator should be connected to the **Remote connection via CSD** service.
- It is recommended to indicate several administrator phone numbers, since in case no numbers are specified or the connection is established from another number, configuration will not be possible.
- The default password for accessing the modem settings is **0000**.

Main operating parameters configuration

The modem operating parameters configuration is performed in the ADM Configuration Tool program central window, which contains several operating tabs.

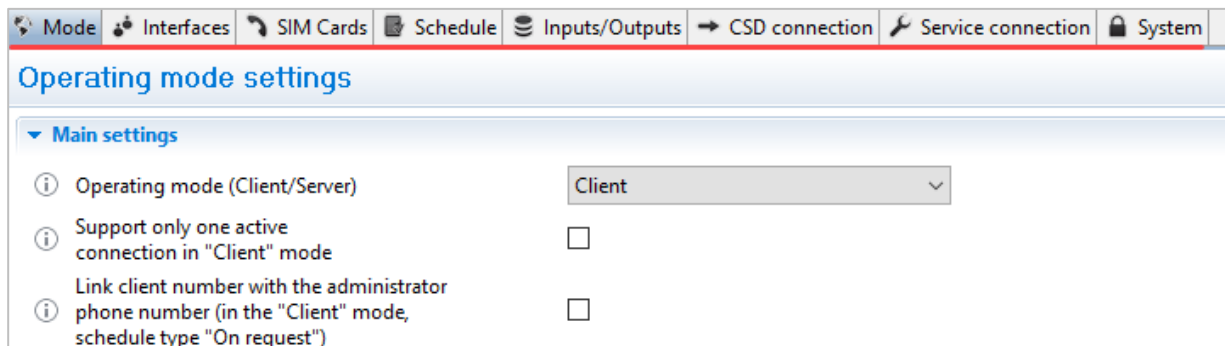


Fig. 22. Modem parameters configuration window.

ATTENTION!

Each time the configuration is changed, it is required to synchronize the changed parameters with the device using the **Save parameters** button All the unsynchronized changes will be marked with a yellow warning triangle

SIM cards configuration

ADM modems support the alternate operation of two SIM cards, that allows to set the operating priority for each of them and increases reliability of data transmission. Both SIM cards are enabled by default, and SIM1 has a higher priority. This means that, if both SIM cards are provided with the same priority, then the modem will always start on SIM1; and when the transfer to the second card occurs, there will be no attempts to return to the first one.

In order to ensure the correct operation of the modem, it is required to set the **GPRS/3G connection parameters**: access point (APN) and user name/password (if required) see Fig. 23. These parameters should be specified with the communication operator.

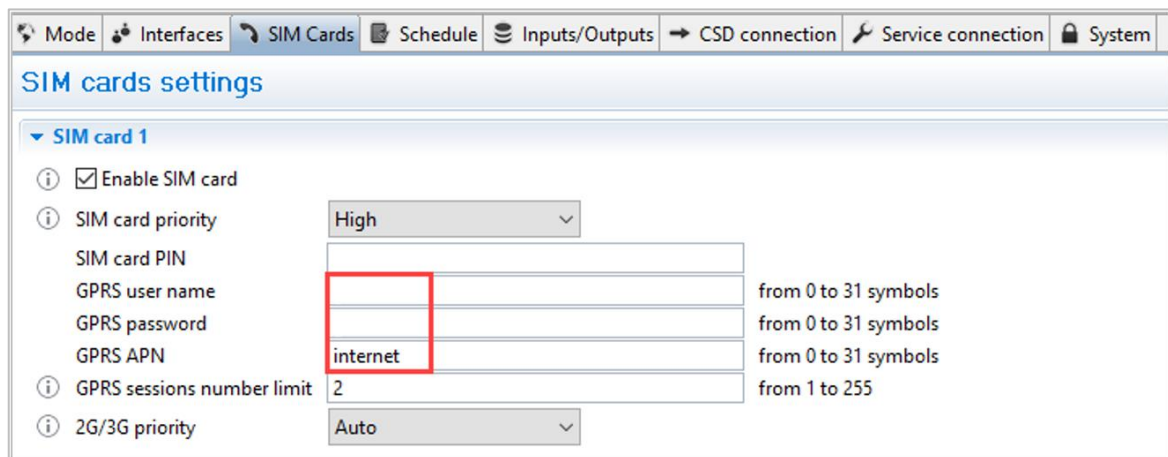


Fig. 23. SIM parameters configuration.

ATTENTION!

If static external, internal IP address, or dynamic external IP is connected to a SIM card, the APN should be obligatory set.

For **ADM 3G modems** it is possible to set the network type in the **2G/3G priority** line (**Auto** by default).

For each of the SIM cards in the **GPRS sessions number limit** line the maximum number of successful connections to the GPRS network within the time period specified by the **GPRS sessions number limitation period** could be set (Fig. 24).

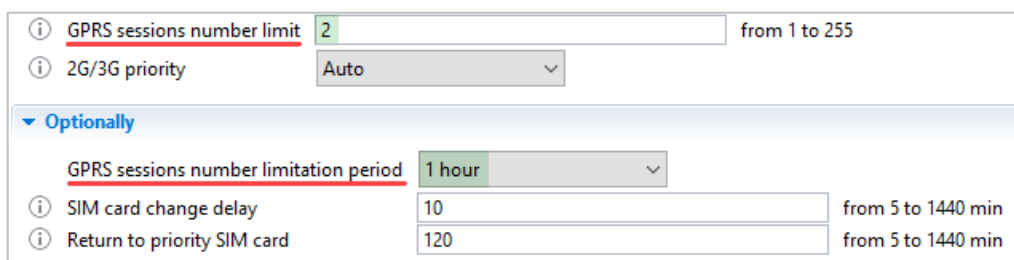


Fig. 24. SIM configuration. Limiting GPRS sessions number.

EXAMPLE

The limitation period is 1 hour and GPRS sessions number limit is 2 sessions for each SIM card. In this case, if the cellular network is overloaded and there are permanent GPRS disconnections, the modem is able to perform only 4 successful connections to the GPRS network per hour, two connections over each of the SIM cards. If all 4 connection attempts are executed, and the current hour not expired, the modem will no longer connect to the GPRS network before the start of a new hour. After beginning of a new hour, the modem will again be provided with 4 allowed attempts to connect.

Switching SIM cards

The modem switches from one SIM card to another in the following cases:

- Modem is not connected to the TCP/IP network for the time period specified by the **SIM card change delay** parameter.
- SIM card is not installed in the device. In this case, regardless of the SIM card priority, the modem will switch to another card in 30 seconds.
- SIM card tray is not inserted in the slot. In this case, the modem will immediately start the attempt to switch to another SIM card.
- Wrong PIN was entered in the modem settings, when connected. The modem will switch to another card after the time period specified by the **SIM card change delay** parameter.
- One of the SIM cards possesses higher priority than the other one. The modem will always be trying to switch to the priority SIM card by executing the switch attempts with periodicity set by the **Return to priority SIM card** parameter.

Operating mode configuration

Selecting the client or server mode

On the **Mode** tab it is possible to select the main modem operating mode, either **Client** or **Server** (Fig. 25).

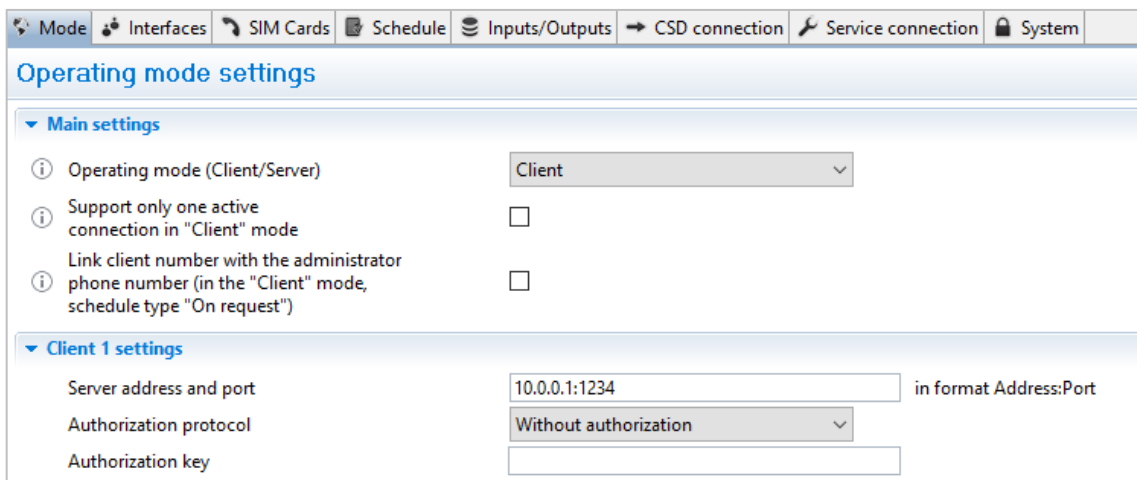


Fig. 25. Operating mode configuration.

In the **Client** mode (*default*) the modem is automatically connecting to the GPRS/3G network and independently establishes TCP connection to the server at the address specified in the **Server address and port** line. After that the modem switches to transparent data transmission mode from the network to the serial port and vice versa. In the **Client** mode, the modem is able to connect to 5 devices operating as **Server**, which allows maintaining connection with several dispatching offices and transmitting data to each of them on request.

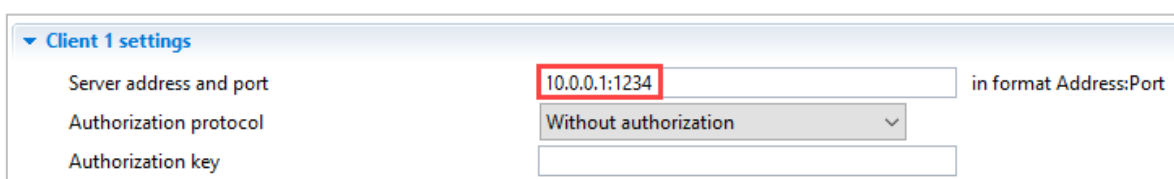


Fig. 26. Client mode configuration.

When selecting the **Server** mode, it is required to specify the number of the incoming TCP port. After the successful connection, the modem switches to the transparent mode of data transmission from the network to the serial port and vice versa.

In the **Server** mode, the modem is able to simultaneously receive from 1 to 5 incoming connections from the Clients (Fig. 27). At the same time, data from any **Client** are transmitted only to the serial port on the **Server**, and in the opposite direction, the data from the serial port **Server** are transmitted to all connected Clients simultaneously.

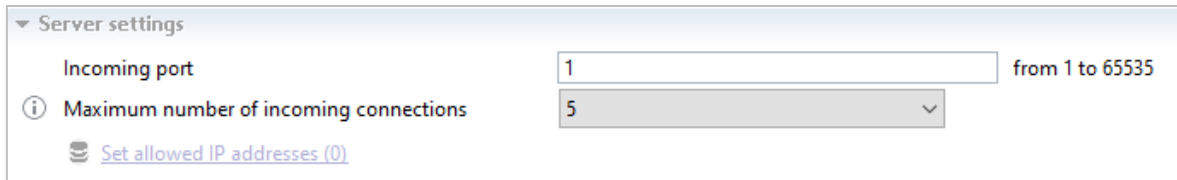


Fig. 27. Server mode configuration.

Client mode additional parameters

Authorization protocol selection

When the modem is operating in the **Client** mode, it is possible to select the **Authorization protocol of the modem** on the server. In most cases, connection to the server does not require any authorization, but sometimes the dispatching software requires execution of this procedure to ensure correct operation. The authorization protocol type is determined by the Authorization Code on the server, consisting, as a rule, of a certain number of digits contained in the IMEI number of the connected device. Based on the authorization algorithm, the dispatching server, where the larger number of devices is connected, differentiates each device and determines which channels the TCP-Client has access to.

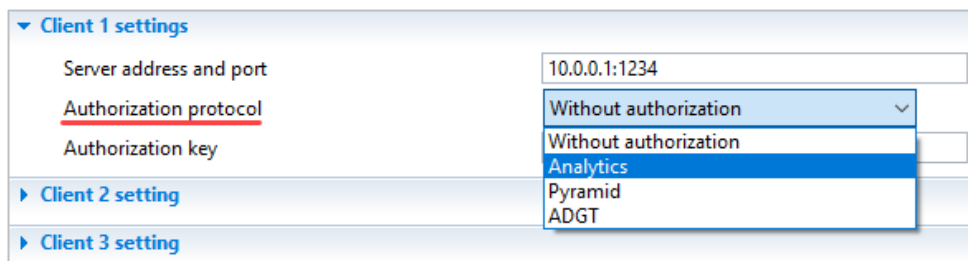


Fig. 28. Authorization protocol configuration.

The list of the supported authorization algorithms and the parameters thereof could be specified in the ADGT Technical Support Service. Authorization algorithms available for the ADM modems configuration include: **Analytics**, **Pyramid**, **ADGT** and **No Authorization**.

ATTENTION!

When connecting to the service server, the **Analytics** protocol is required to be selected as the authorization algorithm.

Algorithm ensuring connection of the modem to several servers

In the **Client** mode, the ADM modem could be connected to **5 devices** operating in the **Server** mode according to the following algorithm:

1. Modem establishes and maintains connections to all the predefined addresses before receiving a response either by TCP protocol, or from the serial COM port.
2. If the response arrives via the TCP protocol from a specific server, the modem closes all other connections and transmits data only to the serial port of this server.
3. If during the data transfer in the direction of a particular server, silence is registered in the channel (i.e., the data is no longer transmitted), the modem disconnects the operating connection and resumes connections to all servers after the elapsed time period specified by the **Allowed idle time duration in the channel** parameter. The silence time period in the channel is set in the corresponding field and constitutes from 1 to 3600 seconds (300 seconds, by default).
4. If the first request after the silence timeout or after enabling the modem arrives from the serial COM port, then the data from the modem will be transmitted to all the opened connection. If the answer arrives from a single server, the rest will be closed.

Maintaining single active connection to Server

In the **Client** mode, it is possible to configure the modems to support both the simultaneous connection to all active servers (5 maximum) and the connection to each server in turn. This parameter is configured by setting the checkbox in the **Support only one active connection in the "Client" mode** line (Fig. 29).

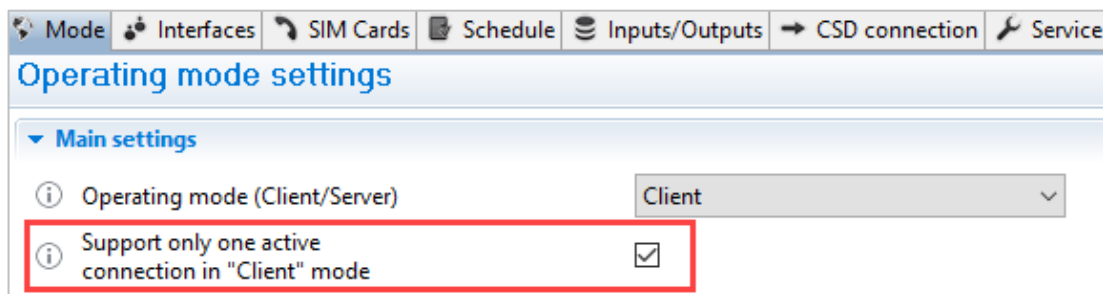


Fig. 29. Establishing single active connection in Client mode.

<input checked="" type="checkbox"/>	Ticked	<p>The modem will establish connection with each server in turn. If any server is unacceptable, the device will be connecting to the next one, etc. When silence is registered in the channel, the connection will be terminated after the time specified by the Allowed idle time in the channel parameter elapses.</p> <p><i>It is recommended to set the checkbox, if there is a single main server, and the others operate as the backup servers.</i></p>
<input type="checkbox"/>	Unticked	<p>The modem will establish and maintain a connection with all servers simultaneously (in accordance with the Algorithm ensuring connection of the modem to several servers).</p> <p><i>Do not check the box, in case you want to poll a single measuring instrument from different locations, for example, from the dispatching center and from the user's computer.</i></p>

Server mode additional parameters

The **Maximum number of incoming connections** parameter in the Server Mode allows to limit the number of simultaneous incoming connections. The maximum number of simultaneous incoming connections is 5.

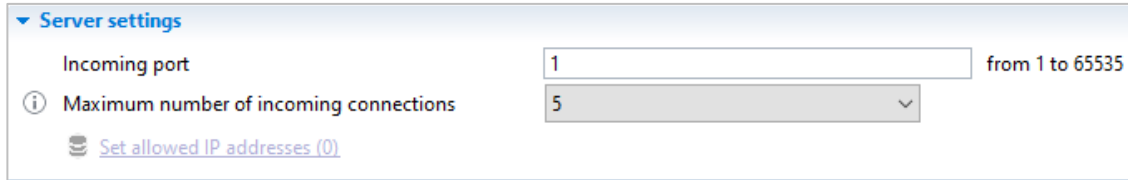


Fig. 30. Server mode configuration.

Set allowed IP addresses parameter in the Server mode configuration allows to specify the list of "white" (allowed) IP addresses, which are authorized to connect to the given modem. If at least one address from this list is specified, connections from any other address will not be accepted. If no "white" addresses are specified, all incoming connections will be accepted.

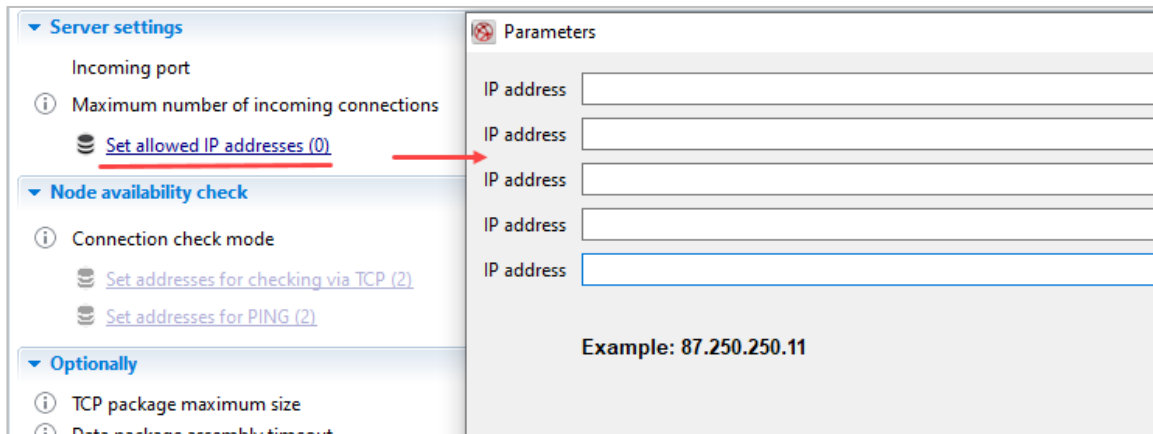


Fig. 31. Setting the list of the authorized IP addresses.

Addresses for testing TCP connection

For both **Client** and **Server** operating modes, it is possible to activate the function that envisages checking the presence of connection to the TCP/IP network. When this function is enabled, it is required to specify at least one testing TCP address and port. By default, in all the ADM modems this function is enabled and two public addresses are set to perform testing (Fig. 32).

ATTENTION!

- It is recommended to specify all the five addresses because of possible communication disconnections.
- The default set addresses could not be reached from the local GPRS networks. When operating in such networks, specify the IP address and the port of the node that is constantly working on the local network as the addresses for connection checking. Such a node could be a constantly working computer, or the ADM modem configured as a Server, or some other reliable network device.

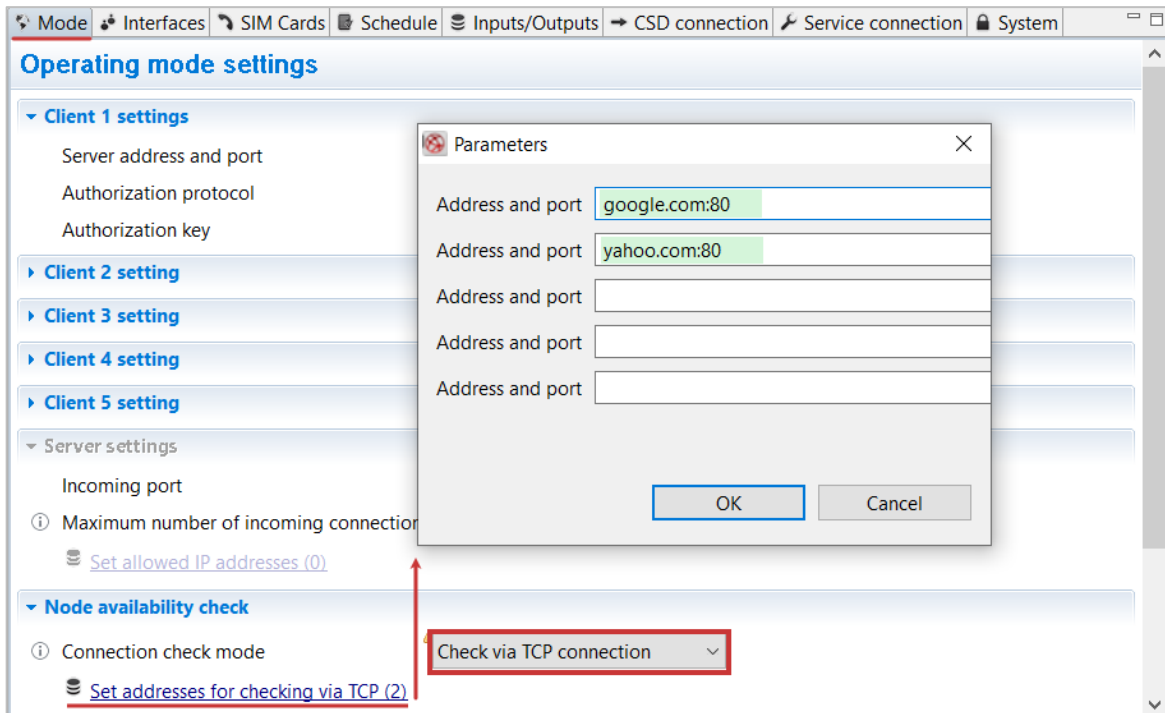


Fig. 32. IP addresses configuration to test TCP connection.

Operating mode additional settings

The **Optionally** section at the **Mode** tab allows to set the following parameters (Fig. 33):

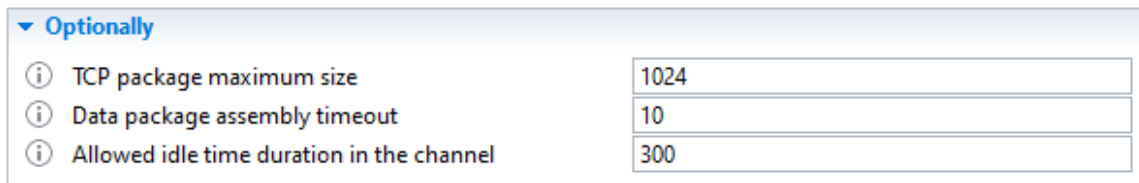


Fig. 33. Operational mode additional setting.

- **TCP package maximum size** is the maximum number of bytes of data, after receiving which, the packet will be immediately sent via the serial interface to the TCP channel (1024, by default).
- **Data package assembly timeout.** If after the expiration of the time period specified by this parameter, no data is received from the serial port, the packet will be immediately sent (10 msec, by default).
- **Allowed idle time duration in the channel.** If during the preset time period the silence in the channel remains, i.e. data is not transmitted, the modem breaks the current operating connection (300 seconds, by default).

ATTENTION!

When connecting to the service server, the **Analytics** protocol is required to be selected as the authorization algorithm.

Serial port configuration

On the **Interfaces** tab, you can configure the parameters for the modem serial port operation (Fig. 34):

- Serial port rate: 600 - 115200 (9600, by default).
- Parity control availability and bit type (8N, by default).
- Stop bit size (1, by default).
- Flow hardware control (disabled, by default).

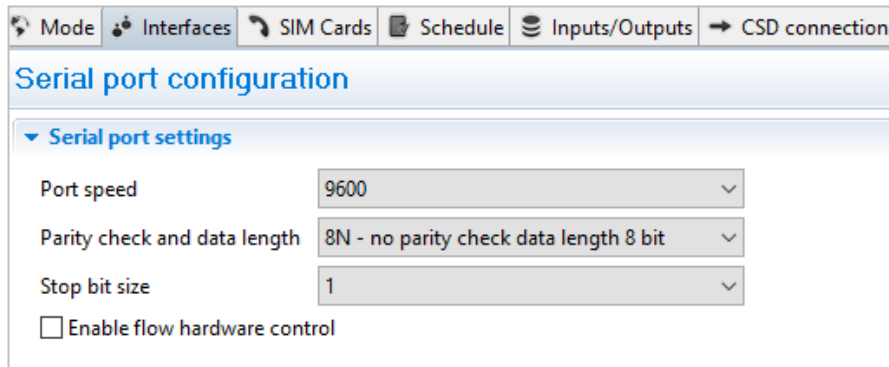


Fig. 34. Serial port settings.

ATTENTION!

When connecting to the service server, the **Analytics** protocol is required to be selected as the authorization algorithm.

Managing Input/Output (I/O) lines

On the **Inputs/Outputs** tab it is possible to configure the input and output lines settings to ensure the remote devices and processes control.

Input line parameters configuration

All modems are provided with a single ADC type input, which enables operating in the Dry Contact mode. When reading the settings, voltage at the analogue input of the connected device is displayed in the **Current voltage value at the input** line (Fig. 35).

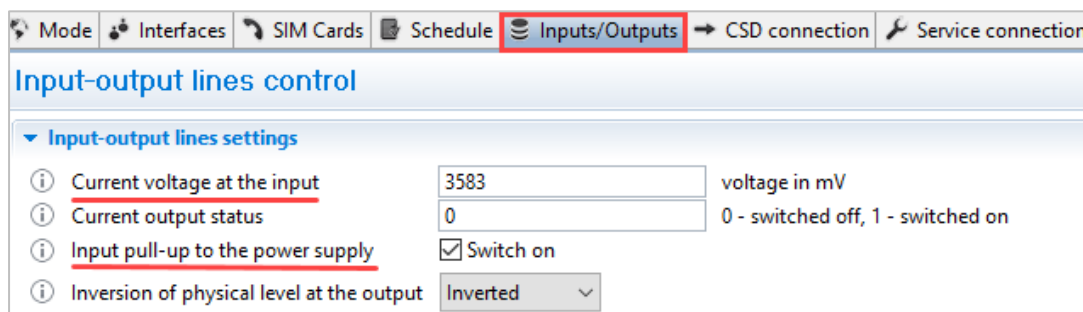
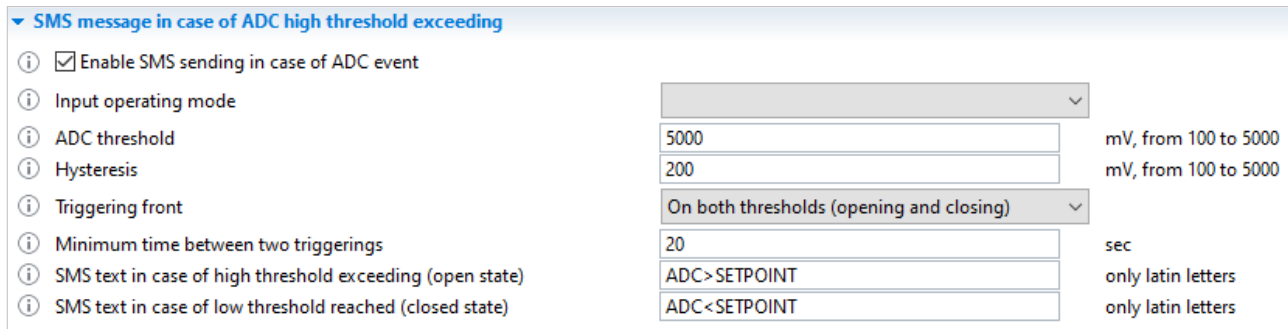


Fig. 35. Input/output lines configuration.

To switch the ADC to the Dry Contact mode, use the built-in **Input pull-up to power supply** function (disabled, by default). When the pull-up is enabled, the analog input is pulled up to the 3.7V power supply source voltage using a resistor.

Configuring SMS notifications about events at the input

ADM Modems are provided with an option of monitoring the voltage at the analog input and sending SMS notifications, when the ADC values are leaving the acceptable limits, or when the Dry Contact input is closed/open. This allows to quickly receive data about the event at the monitored object.



The screenshot shows a configuration window titled "SMS message in case of ADC high threshold exceeding". It contains several settings:

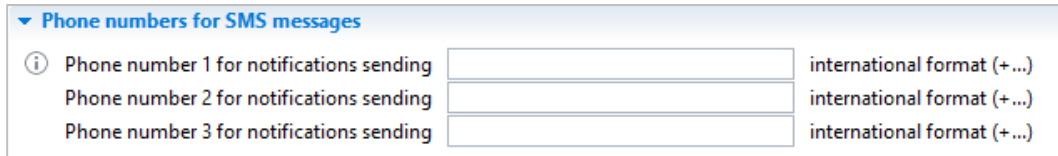
- Enable SMS sending in case of ADC event
- Input operating mode: [Dropdown menu]
- ADC threshold: [Input field with value 5000] mV, from 100 to 5000
- Hysteresis: [Input field with value 200] mV, from 100 to 5000
- Triggering front: [Dropdown menu with value "On both thresholds (opening and closing)"]
- Minimum time between two triggerings: [Input field with value 20] sec
- SMS text in case of high threshold exceeding (open state): [Input field with value "ADC>SETPOINT"] only latin letters
- SMS text in case of low threshold reached (closed state): [Input field with value "ADC<SETPOINT"] only latin letters

Fig. 36. Input/output lines configuration.

Configuring SMS notifications about events at the ADC input

Monitoring the status of the analog input is activated by ticking the **Enable SMS sending in case of ADC event** parameter. In the **Input operating mode** parameter, select the **ADC** mode and configure the following parameters:

- **ADC threshold** (set in mV starting from 100) is the voltage threshold value; if it is exceeded or decreased, an SMS will be sent. The upper and lower trigger limits are calculated as $Threshold + Hysteresis/2$ and $Threshold - Hysteresis/2$, respectively.
- **Hysteresis** (set in mV) is the range between the upper and lower trigger limits. It is installed to protect the system from permanent functioning (bounce) in case the voltage level at the input fluctuates within these limits. With the preset hysteresis, the system will generate alarm signals only when the voltage exceeds the hysteresis range.
- **Triggering front** allows to configure the mode of sending SMS notifications under the following conditions:
 - ✓ Operating threshold is exceeded (ADC input) or the circuit is opened (Dry Contact type input);
 - ✓ Decreasing lower than the operating threshold (ADC input) or the circuit is closed (Dry Contact type input);
 - ✓ On both response fronts (ADC input) or at closing and opening (Dry Contact type input).
- **Minimum time between two triggers** (set in seconds). If another event occurs after a notification is sent, a new notification will be delivered only after the specified time elapsed. This is necessary to protect against permanent system functioning.
- **Phone numbers for SMS message** (in the international format) is the phone numbers, where SMS notifications about events at the input will be sent. Up to three subscriber numbers could be specified in the setting parameters (Fig. 37).



▼ Phone numbers for SMS messages

Phone number 1 for notifications sending international format (+...)

Phone number 2 for notifications sending international format (+...)

Phone number 3 for notifications sending international format (+...)

Fig. 37. Phone numbers for SMS notifications about events at the input.

- **SMS text in case of high threshold exceeding (open state)/low threshold reached (closed state)** is the text of a notification that will be delivered to the preset phone numbers, if the parameter values exceed the acceptable limits. Only Latin letters should be used when writing the text.

After the specified parameters are registered, the modem will send SMS messages to the selected numbers according to the preset settings.

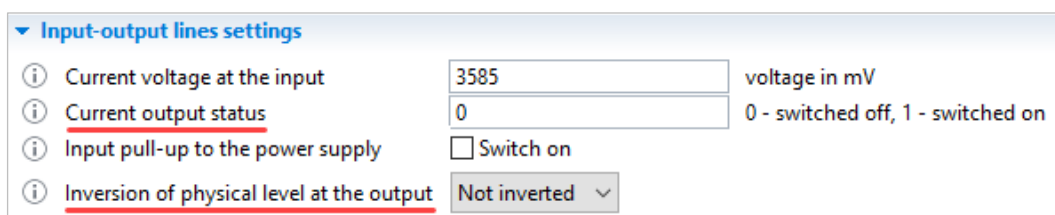
Configuring SMS notifications on the event at the input in the Dry Contact mode

In order to configure the SMS notifications sending to ensure the **Dry Contact** type input line operation, the corresponding value is selected in the **Input operating mode** parameter, and parameters similar to those of the ADC type input are configured. The response threshold value and hysteresis are configured automatically.

Output line parameters configuration

Separate ADM modems are provided with the Open Collector output. Using the **ADM Configuration Tool** software, **the output could be controlled** manually or according to the preset schedule (for example, to enable/disable the heating boiler, heater or light).

In the disabled state the output is open, and in the closed state it is closed to ground (0). The **Current output status** parameter has two values: **0** – *switched off* (configured by default) and **1** – *switched on* (Fig. 38).



▼ Input-output lines settings

Current voltage at the input voltage in mV

Current output status 0 - switched off, 1 - switched on

Input pull-up to the power supply Switch on

Inversion of physical level at the output

Fig. 38. Output line configuration window.

The **Inversion of physical level at the output** parameter allows changing the physical state at the modem output, when it is enabled.

Load control

The load-on monitoring function using a signal at the analog input, makes it possible to check whether the connected device was enabled (Fig. 39). The input monitoring is performed, when the output is switched to the active state. If the input status is incorrect, the terminal sends an SMS message about the accident to the specified phone numbers.

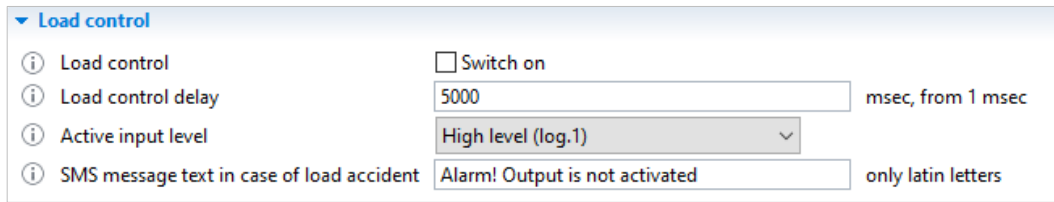


Fig. 39. Load control section.

The following parameters could be configured in the monitoring functions settings:

- **Load control.** When this function is on, the terminal will perform monitoring the load enabling on the events at the analog input.
- **Load control delay** determines the delay time period of checking the status of the analog input and serves to compensate the load commutation time period. By default, the delay time period constitutes 5 seconds (*set in msec*).
- **Active input level** is the voltage level at the modem analog input and corresponds to the state of the enabled load. If high voltage level is registered, when the load is enabled at the connected equipment input, then the high logic level is configured in the terminal settings. If low voltage level is registered, when the load is enabled, the low active level is configured in the settings.
- **SMS message text in case of load accident.** If after switching the output state, the logic level at the analog input is not matching the predetermined level, an SMS message with the specified text will be sent to the phone numbers from the list of the **Phone number for notifications sending** parameter. When writing the text, only Latin letters are used, for example, *Alarm! Output is not activated* (set by default).

Manual output control

In the output settings (Fig. 40), it is possible to enable/disable the output manually and to set the time for switching it back.

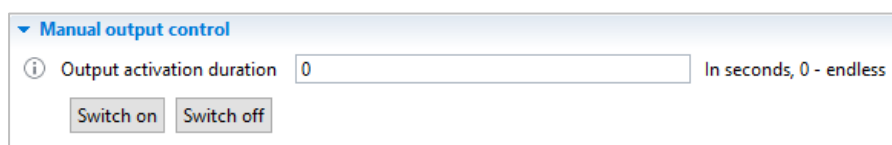
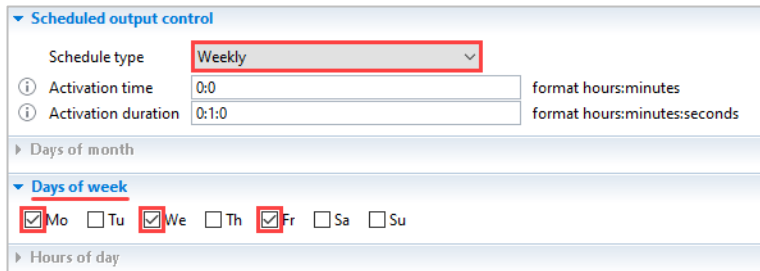


Fig. 40. Manual output control window.

By default, the time of switching back is set to "0" (do not switch after enabling). If the value of this parameter differs from "0", the output will be transferred from the **Switch on** state to the **Switch off** state after the specified time period elapses. The switching time is set in seconds.

Schedule output control

In order to control the output in the modem, it is possible to enable and configure the schedule on the daily, weekly and monthly basis. After selecting a certain type of schedule, the corresponding section (hours of day, days of week or days of month) becomes active.



Scheduled output control

Schedule type: Weekly

Activation time: 0:0 (format hours:minutes)

Activation duration: 0:1:0 (format hours:minutes:seconds)

Days of month: [collapsed]

Days of week

Mo Tu We Th Fr Sa Su

Hours of day: [collapsed]

Fig. 41. Schedule output control window.

For each type of schedule, the following parameters are configured:

- **Activation time** is the time period, when the output is switched to the *Enabled* state.
- **Activation duration** is the time period, during which the output will be enabled after the alarm functions (one minute, by default).

EXAMPLE

If you choose the **Weekly** type of the schedule, it is required to specify the days of the week, when the output is switched to the active state. If we specified the days of week - **Mo**, **We** and **Fr** - and set the response time at **0:0** and the time to function at 1 minute, then the output will be enabled three times a week: on Monday, Wednesday and Friday, at 0 hours 0 minutes and for 1 minute (Fig. 41).

CSD mode configuration

The incoming CSD calls receipt is enabled and disabled at the **CSD connection** tab. By default, the CSD mode is enabled, and the calls could be received from any phone numbers. If you prefer that the modem receives calls only from the authorized numbers, set the list of numbers in the **Receive calls from undefined numbers** parameter (Fig. 42).

Please note: the authorized phone numbers (on the **CSD connection** tab) and the administrators' phone numbers (on the **System** tab) should be different. If a CSD call is made from the administrator's phone number, instead of activating the transparent channel, the modem will pass to the remote configuration mode.

When the CSD mode is disabled, the modem will receive the incoming CSD calls only from the administrator number and only to ensure remote configuration.

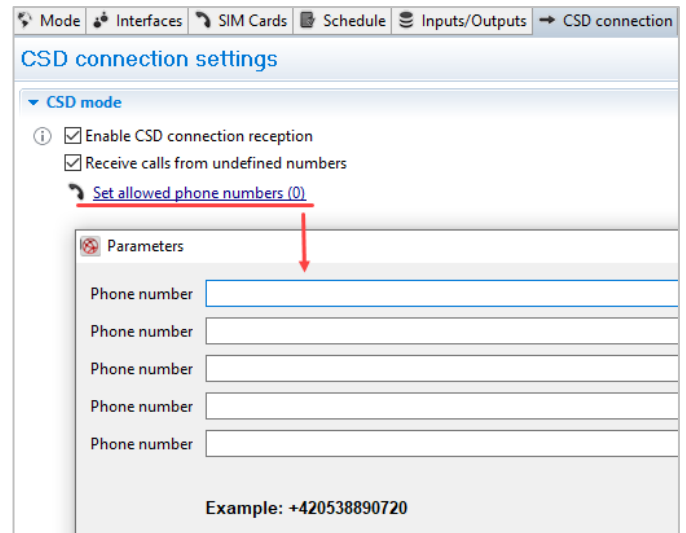


Fig. 42. CSD data transmission configuration.

ATTENTION!

It is also possible to enable/disable the CSD mode using the SMS, by sending the following SMS commands to the modem phone number: **0000;CSD=1** - enable CSD, **0000;CSD=0** – disable CSD.

System settings

The **System** tab ensures configuration of the diagnostic messages parameters, setting the reloading periodicity and setting the time synchronization parameters (Fig. 43).

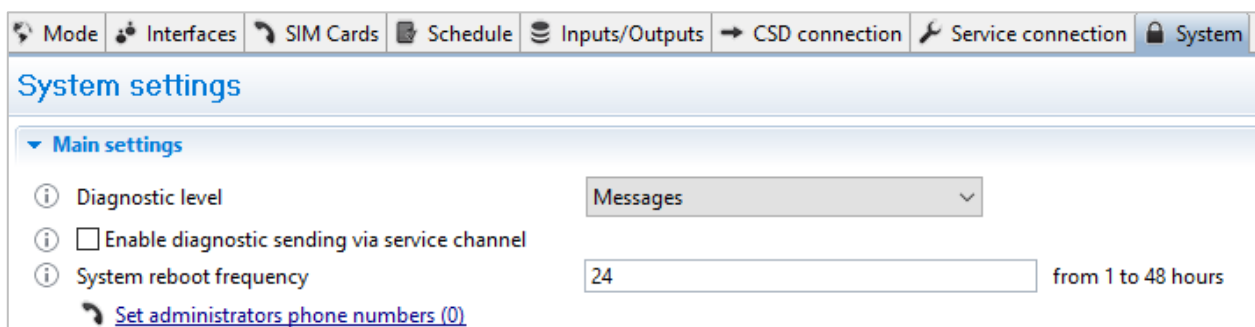


Fig. 43. System settings.

The **Diagnostic level** parameter determines the diagnostic messages granularity, when displaying the operating logs. There are 4 levels of diagnostics:

1. Switched off.
2. Messages - output of the setup program service messages (in black color) and modem debug messages (in blue color).
3. Messages, data - output of log messages, as well as of data in a transparent channel in the HEX hexadecimal format.

4. AT commands - advanced diagnostics level ensuring the output of log messages, data and AT service commands.

When diagnostics is enabled, the log messages are constantly transmitted via the modem USB port (when connected to a computer).

When the **ADM Configuration Tool** is operating with the modem via the remote TCP/IP connection, transmission of diagnostic messages should be enabled by setting the **Enable diagnostic sending via service channel**. Messages will be transmitted over the service channel every 30 seconds for the time period specified by the **System reboot frequency** parameter. This setting is effective until the device is rebooted and is automatically reset after the restart.

In the **System reboot frequency** parameter, the scheduled modem reboot is set to increase reliability of the device operation (24 hours, by default).

On the same tab the **Set administrators phone numbers** are set, i.e. phones, from which the SMS commands receipt is authorized, as well as the receipt of CSD connections that allow changing the parameters.

ATTENTION!

Administrators' telephone numbers are set in the international format, for example: +420 <10 number digits>.

Time setting and synchronization

ADM modems are provided with a built-in real time clock (RTC) unit. The current time value is set using the configuration program or automatically, using the standard NTP server, which provides the exact time service to synchronize with the PC over the network. It is possible to configure up to three NTP servers; and by default, three active servers are defined. To ensure correct operation of algorithms using real time, it is necessary to specify the time zone and to allow/prohibit to change the clock to daylight saving time.

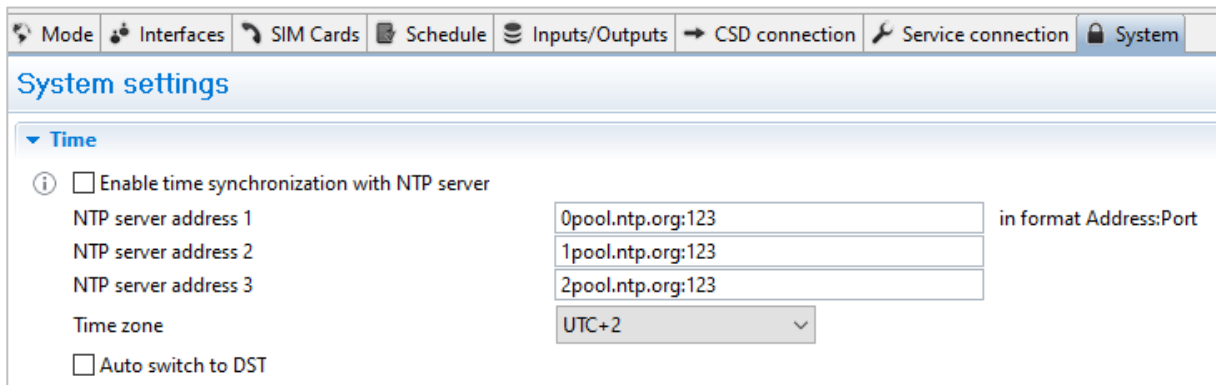


Fig. 44. Time synchronization setting.

In order to configure automatic time synchronization (disabled, by default), it is required to specify the address and port of NTP servers and authorize synchronization by ticking the **Enable time synchronization using NTP server** check box. Synchronization using the NTP service is performed by the modem during a scheduled reboot or at any restart.

ATTENTION!

- When working in a local network, the NTP service should be organized by the user independently by the IP address and port specified in the **NTP server address** field.

Configuring connection establishment on schedule and on request

The modems are provided with options to operate **on schedule** and **on request** (**Schedule** tab).

When configuring the scheduled mode, the modem should always stay in the off-line mode and perform GPRS/3G connection only when the time set in the schedule comes or on request. There are several options for selecting the scheduled connection establishment (Fig. 45):

- Daily;
- Weekly;
- Monthly;
- On request.

For any type of schedule, the response time is specified in the **Activation time** field.

For the **Daily** type of schedule, it is required to specify the hours, when the modem should establish communication. For example, if we set the response time at 00:15 and specify the 5, 13 and 23 hours, the modem will establish connection three times every day: at 05:15, 13:15 and 23:15.

For the **Weekly** type of schedule, it is required to specify the days of week, when the modem should establish communication. For example, if we set the response time to 00:15 and specify the following days of week: Monday, Wednesday and Friday, the modem will establish connection three times a week: on Monday, Wednesday and Friday at 00:15.

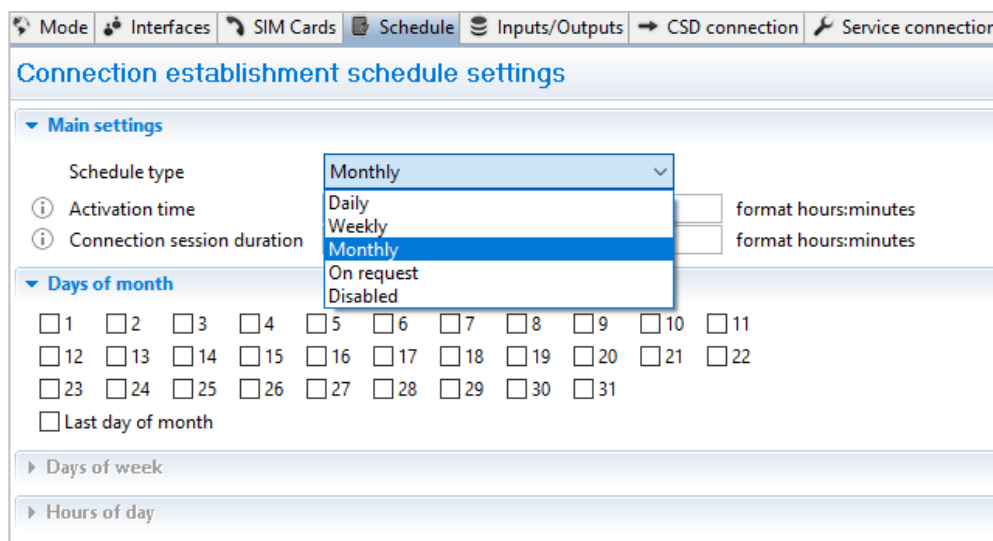


Fig. 45. Connection configuration on schedule.

For the **Monthly** type of schedule, it is required to specify the day of month, when the modem should establish communication. For example, if we set the response time at 00:15 and specify the following days of month: 4, 8 and 10, the modem will establish a connection three times a month: on the 4th, 8th and 10th, at 00:15.

The **Communication session duration** parameter determines duration of the time period, when the modem is staying online after the alarm clock functions. The duration period is counted by the modem starting from the moment of the latest transmitted/received data packet over the transparent channel.

ATTENTION!

- **Communication session duration** is set for 20 minutes. After the alarm clock functions, the modem establishes communication and is connected to the server. The server starts to exchange data with the remote device over the transparent channel; and the session lasts for 15 minutes. After the data exchange is finished, the modem will switch to the off-line mode in 20 minutes. Totally, the modem was operating in the online mode for $15 + 20 = 35$ minutes.
- When passing to the off-line mode, the modem is not disconnecting the current GPRS session independently; this solution saves monetary funds expenditure, when the operator rounds off traffic within the session.

If the **On request** mode is selected, the modem will not independently establish GPRS/3G connection under any conditions. Activation of the GPRS session will only be performed, if an incoming voice call arrives from the administrator's phone number or when the SMS command "**0000; INITLINK**" is sent to the SMS modem, where "0000" is the default administrator password.

Saving configuration in file

All the ADM modem settings could be both saved or downloaded into the file on a computer in the .xml format. In order to select files, use the **Open settings file** and **Save as configuration file** buttons (Table 9).



Fig. 46. File saving and downloading buttons.

Password setting

When the modem local connection is established, in order to access the settings, the common password is set by default: **0000**. You can change the password in the **Service** menu on the control panel (Fig. 47).

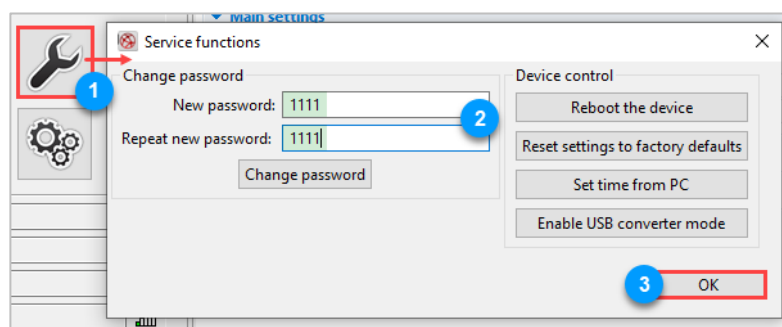


Fig. 47. Setting password for a local connection.

Debug Console

The ADM Configuration Tool software is provided with the **Debug console** (Fig. 48), where the configuration program service messages (in **black** color) and the modem debugging messages (in **blue** color) are submitted in accordance with the selected diagnostics level.

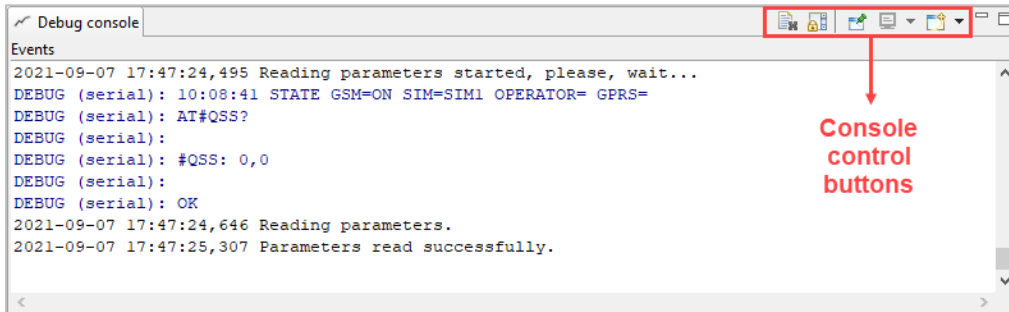


Fig. 48. Debug console.

In the upper right part of the debugging console the following **console control buttons** are located:

- **Clear Console**, clears all events from the console.
- **Scroll Lock**, locks text scrolling in the console.
- The **Pin Console**, **Display Selected Console** and **Open Console** buttons are not used.

Software update

The **Service** button on the control panel of the program window opens access to the service functions of the ADM modems. This window allows changing the access password, resetting the modem configuration back to factory values, restarting the device and updating the firmware.

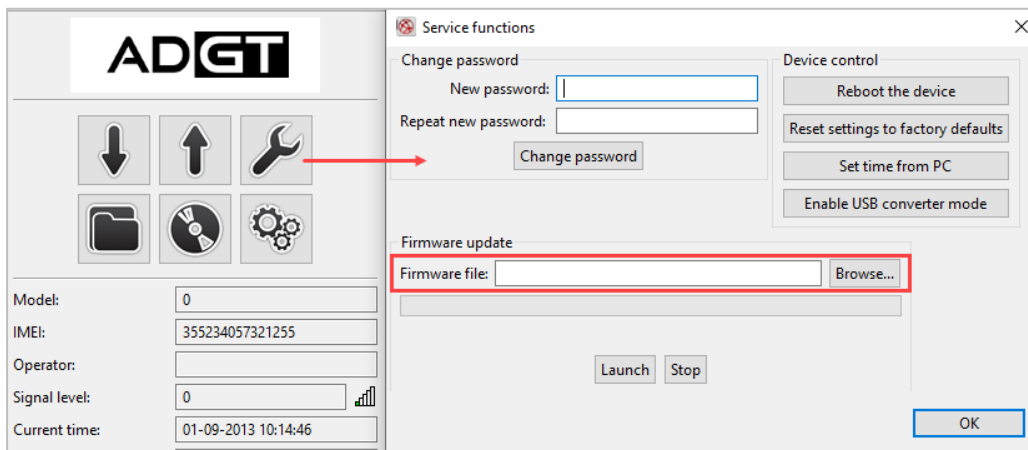


Fig. 49. Service functions.

In order to update the firmware version, select the firmware file with the **.crt** extension and click the **Launch** button. It is possible to download the new version of the firmware for the modem from our website: www.adgt.cz. After the successful download of the firmware file, the modem will perform an automatic restart. It should be noted that all operating settings and parameters are saved.

Resetting the configuration back to the factory settings does not require entering a password.

Appendix 1. Specifications

Table. 10. ADM Modems Technical Specifications.

	ADM112	ADM114	ADM216	ADM236
NETWORK PARAMETERS				
Standard	GSM/GPRS			3G
Frequency Range	850/900/1800/1900			UMTS 900/2100 GSM 850/900/ 1800/190
Rate (DL/UL)	85,6 kbps / 42,8 kbps			7,2 Mbps / 5,76 Mbps
CSD rate	up to 9,6 kbps			
MICROCONTROLLER				
CPU	ARM® Cortex-M3, 32bit			
Frequency	36 MHz			
POWER				
Source	DC 7 ~ 30 V			
Current	100 mA (12V)			
Power Connectors	1 x 6P6C 1 x 2-pin terminal block (when the modem is powered via the 6P6C connector, the input can work as a 7-30V output to external devices)			
SERIAL				
Interface	1 x RS-232 9-pin (D-Sub)	1 x RS-485 2-pin (A+, B-)	1 x RS-232, 1 x RS-485 9-pin (D-Sub), 2-pin (A+, B-)	
RS-485 termination resistor	—	120 Ohm, connected		
Baud Rate	600 bps ~ 115200 bps			
Data Bit	7, 8			
Check Bit	None, Even, Odd			
Stop Bit	0,5; 1; 1,5; 2			
Flow Control	RTS/CTS (RS-232 only)			
Receive Buffer	1024 byte			
INTERFACES				
Input	1 x ADC type input (I1). Input Voltage: 0 ~5 V			
Output	—	open collector digital output, 12 V power output, 7.5 V power output		
USB2.0	1 x USB mini B			
SIM	2 x mini-SIM slot			
Antenna connector	1 x SMA(f)			
ADDITIONAL OPTIONS				
RS-485 Protection (G)	galvanic isolation, 2500V rms for 1 min. per UL 1577			
MECHANICAL & ENVIRONMENTAL				
Dimensions (L x W x H)	76 x 65 x 35 mm		97 x 82 x 36 mm	
Weight	135 gr		195 gr	
Enclosure	Aluminum Alloy (IP30)			
Mounting	DIN rail, wall, table rubber feet			
Operating temperature	-40...+70°C			
Warranty	2 years			

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