TechnoKom

GLONASS • GPS
VEHICLE TRACKING SYSTEM

AutoGRAPH

GSMConf software

VERSION 3.3.1

SETUP AND CONFIGURATION

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Introduction

This User Manual describes how to configure the AutoGRAPH-GSM and AutoGRAPH-GSM+WiFi Series devices (hereinafter – device) using the GSMConf v.3.3.1-r3 application.
The GSMConf software is designed to configure Wi-Fi and GSM modules of the device; modes of operation within a native network and while roaming; data recording and transmitting parameters; settings to enable interaction with external devices, connected to the device; as well as to troubleshoot modules of the device.
For proper operation it is sufficient to set up periods of data recording and transmission, select data recording mode, specify server settings which is used to transfer data and set up SIM settings. But for the experienced users, the application offers the advanced options intended to completely configure the device operation.

All software updates are supported by AutoGRAPH device with firmware of version AGXL-11.49 or later.

UPDATE HISTORY

Version 3.3.1-r3:

- Added the option “APC output to RS-485-2 interface” on the tabs “RS485 extension” and “CAN IRMA MATRIX”.

System Requirements

- **Recommended operating system:** Microsoft Windows XP / Vista / 7 (x32 / x64) / 8
- **Recommended minimum RAM capacity:** 1 GByte.
- **Processor requirements:** 1 GHz and higher.
- **Screen resolution:** minimum - 1024x768, recommended 1280x1024 and higher.

Installing the drivers for Microsoft Windows 7

To connect the AutoGRAPH-GSM to the PC, the device drivers must be installed. For AutoGRAPH-WiFi-GSM+, AutoGRAPH-GSM/GSM+, AutoGRAPH-SL devices, those support a new driver, install "AutoGRAPH AGUSB Driver" developed by TechnoKom. For other devices you should install legacy drivers "AutoGRAPH_DRIVER_AND_GPS-MOUSE".
Starting from version 3.3.0 GSMConf supports both legacy USB driver and a new one.

DEVICES WITH NEW DRIVER

- New device will be automatically detected when the device is connected to the PC running MS Windows 7.
- When connecting the devices, those supports the new driver, system Device Manager detects two new devices: AutoGRAPH and AutoGRAPH CDC (Fig.1). If the automatic driver installation is enabled in the system settings and the Internet connection is available, the AutoGRAPH device drivers will be automatically downloaded from the Windows Update server and installed in the system. After the driver installation, the connected device will be recognized.

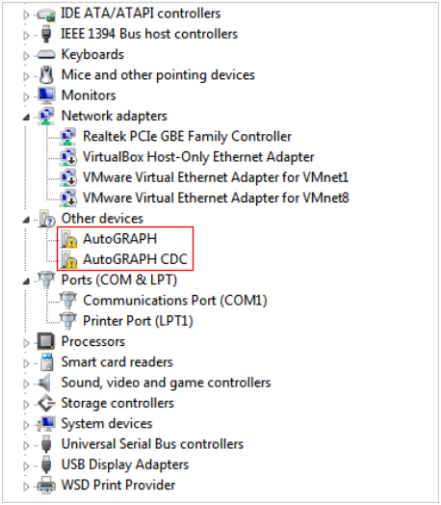


Fig.1. The device with new driver.

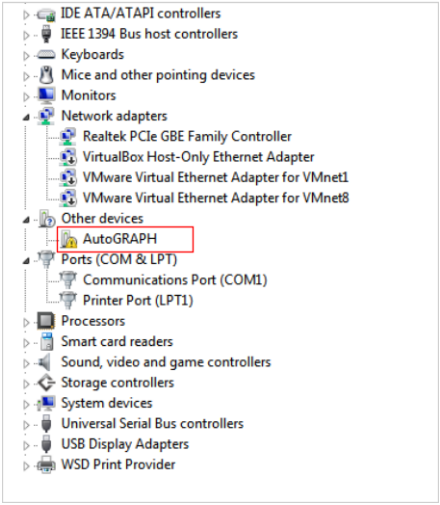


Fig.2. The device with old driver.

- If the automatic driver installation is disabled, you should install the drivers manually.
- To do it, download new driver (file AutoGRAPH AGUSB Driver.zip) from the official website of TechnoKom.
- Extract files to a temporary directory on a hard drive and install drivers for detected AutoGRAPH device.
- After successful driver installation, new device will be automatically identified by the system.

DEVICES WITH NONLINEAR FIRMWARE (OLD DRIVER)

- New device will be automatically detected when the device is connected to the PC.
- If the Internet connection is available, the drivers for AutoGRAPH-GSM devices will be installed automatically. If the Internet connection is unavailable, download the drivers from official web site of TechnoKom and install them manually.

DEVICES WITH LINEAR FIRMWARE

- Device will be automatically detected when it is connected to the PC running MS Windows 7. The Device Manager detects a new device – AutoGRAPH (Fig.2). Download drivers with MS Windows 7 support (AutoGRAPH_DRIVER_AND_GPS-MOUSE.zip) from official website of TechnoKom and install them manually.
- When drivers are installed you will see two new devices in Device Manager: USB Serial Converter (under "USB Controllers") and USB Serial Port (COMx) (under "Ports (COM and LPT)"), where "x" is the number of a port (may vary).
- To ensure normal operation of AutoGRAPH-GSM devices in Windows 7, disable the serial port created during installation of drivers. To do this, right-click the USB Serial Port (COMx) (under "Ports (COM and LPT)") and select "Disable" in a shortcut menu, the icon will change from  to  as displayed below:

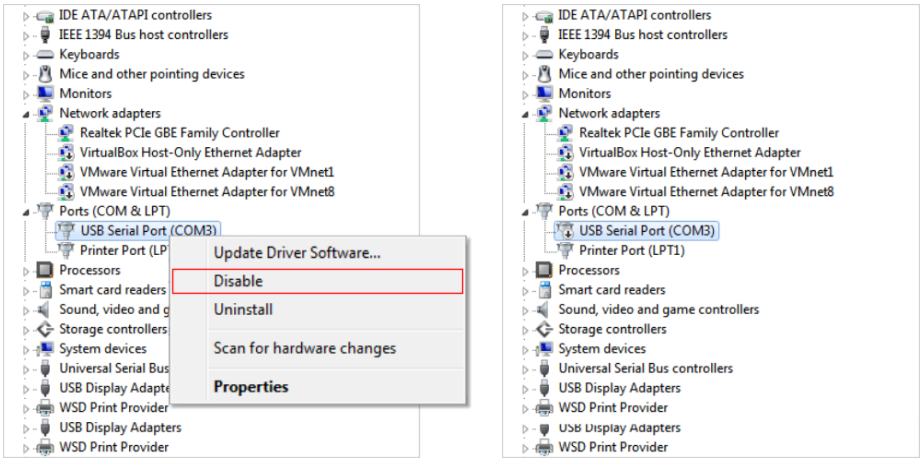


Fig.3. Installation of drivers for Microsoft Windows 7.

For devices with firmware till v. 4.0 (serial number up to 22000) it is recommended to install legacy driver for Windows 98/XP without GPS mouse support. You can download these drivers from Downloads section of the official web site of TechnoKom (www.tk-chel.ru).

Shortcut Keys

When using the software, try these shortcut keys for convenience:

- **Ctrl+arrow keys, Alt+arrow keys** – to switch between tabs.
- **Ctrl+R, Alt+R, F5** – to read settings of the device.
- **Ctrl+Enter, Alt+Enter** – to save the settings to the device.
- **Ctrl+O, Alt+O** – to open .atg file or create a new one.
- **Ctrl+S, Alt+S** – to save as... .atg file.
- **Ctrl+Delete, Alt+Delete** – to delete records from the device.
- **Ctrl+L, Alt+L** – to load the settings from .atc file.

Program Layout

Main screen of the GSMConf 3.3.1-r3 application has following elements:

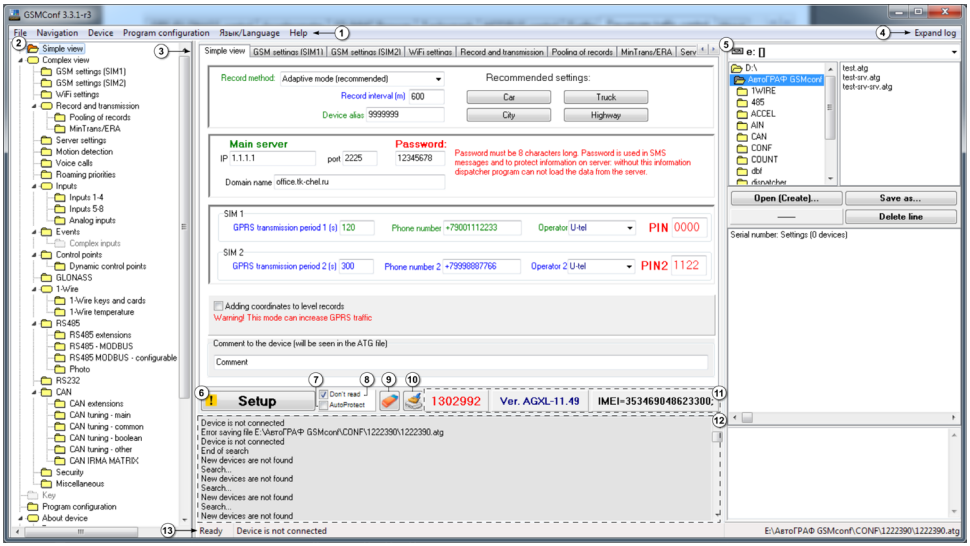


Fig.4. Program Layout.

1. Main menu provides an easy way to access the function of the software.

2. Dendrogram of the software sections is a list of application tabs, which allows to navigate the application quickly. It may be hidden if necessary.

3. Tabs. This bar includes the application tabs, used for configuring various settings of the device.

4. "Expand Log" button – this button expands the full-screen status window to display the application operation log. This option is useful to review a large log file. To minimize the log press the button again.

5. ATG Browser enables the user to create and edit .atg files.

6. "Setup" button saves the settings to the device. If "Don't read" option is selected, a warning sign ! will be displayed on the button.

7. AutoProtect – the option allows to automatically protect the settings when writing the settings into the device.

8. Don't read – the option prevents from reading the device's settings when it is connected to a PC.

9. "Clear fields (in program)" button clears the fields in the application.

10. Delete records from device button removes all records from the connected device.

11. Information about device. Serial number, firmware version and IMEI of a modem of the connected device are displayed on this panel.

12. Log – this window displays current state of the GSMConf application.

13. Status Bar displays the current operation status of the GSMConf application.

Main menu

FILE MENU

To enable the menu, select the File menu on the Main menu. Commands of the File menu allows the user to operate with the configuration files.

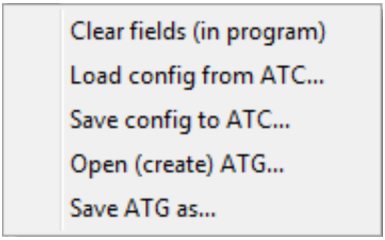


Fig.5. File menu.

Clear fields (in program)
Clears the fields in the application and restores default settings.

Load config from ATC . . .
Reads the settings from an external configuration file (.atc file).

Save config to ATC. . .
Saves the settings to the configuration file (.atc file).

Open (create) ATG (or Ctrl+O, Alt+O)
Opens an existing .atg file or creates a new one.

Save ATG as. . . (or Ctrl+S, Alt+S)
Saves the selected .atg file with a new name or in another directory.

NAVIGATION MENU

Menu is designed to quickly navigate between the tabs containing all principal settings of the device.
Options of the menu which are not supported by a firmware of the device (as well as the tabs) are automatically hidden, when connecting the device. Navigation menu is also shown in the dendrogram (see. Fig.4, item 2).

DEVICE MENU

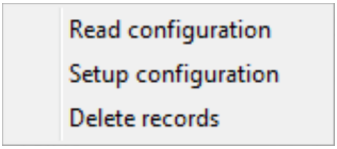


Fig.6. Device menu.

Read configuration (or Ctrl+R, Alt+R)
Reads the configurations from the connected device.

Setup configuration (or Ctrl+Enter, Alt+Enter)
Saves the configurations to the device.

Delete records (or Ctrl+Delete, Alt+Delete)
Removes records from the device.

The records could not be restored once deleted.

PROGRAM CONFIGURATION MENU

Menu options are also available on the "Program configuration" tab.

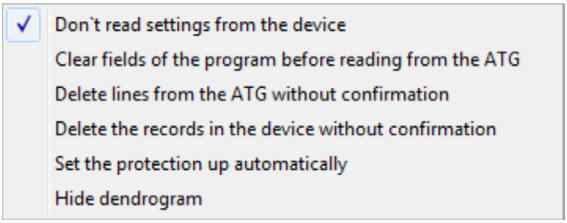


Fig.7. Program configuration menu.

Don't read settings from the device
This option prevents automatic reading of settings when connecting the device to a PC.

Clear fields of the program before reading from ATG
This option clears the fields in the application before reading new settings from .atg file.

Delete lines from the ATG without confirmation
When enabled, the application removes the strings from .atg file and does not ask the user to confirm the removal.

Delete the records in the device without confirmation
When enabled, the application removes the records from the device without the removal confirmation.

Set the protection up automatically (at least level 1)
Automatically enables protection of device's settings, when saving them to the device.

Hide dendrogram
Hides the dendrogram.

LANGUAGE MENU

This menu is used to select the language of the application.

HELP MENU

This menu provides help information on the device and the GSMConf software.

About
Displays copyright info and version of the GSMConf software.

About device
Displays the information about the device currently connected to a PC.

Manufacturer's website
Takes the user to the manufacturer's website.

ATG Browser

ATG browser is located on the right side of the window and is designed for creating and editing .atg files with the settings of one or more devices.

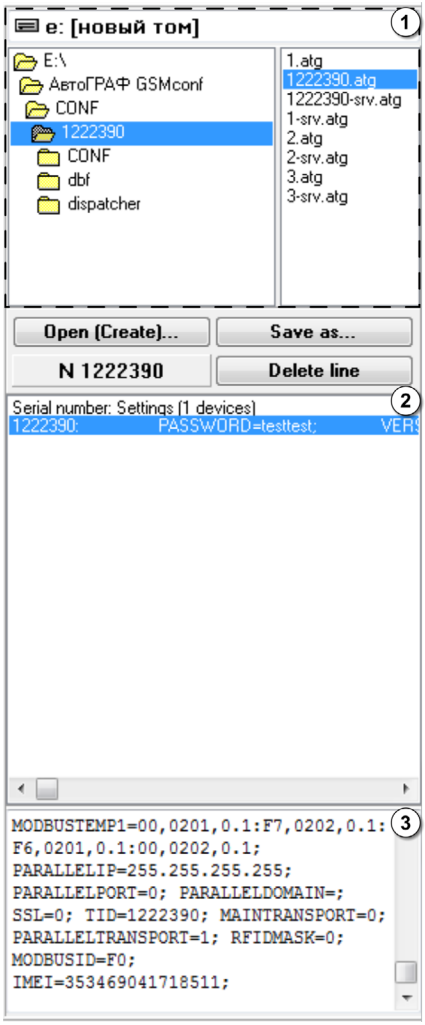


Fig.8. ATG browser.

In the upper part of the browser (see Fig.8, item 1), select the required file with settings. Double-click opens the file. Alternatively, use the "Open (create)" button to open the .atg file.

The contents of the opened .atg file is displayed in section 2 (see Fig.8). File may contain the settings of several devices. Settings of each device appear in a different line following the serial number of a relevant AutoGRAPH device.

Select the line to review the settings of required device. Its settings will appear in section 3 (see Fig.8).

To delete the line from .atg file, select the line (see section 2) and press the "Delete line" button. Remember that removed records can not be restored.

To apply the changes, press the "Save as…" button and type a name for a new file in the "Save as" window.

Getting Started

- Run the GSMConf application.
- When running, the application will automatically open the ATG file that has been used last time. If the file used previously isn't found due to any reasons (the file was deleted, moved, etc.), the application prompts the user to create a new file or select another configuration file.
- Select *File menu-> Open (create) ATG* (or press the "Open (create)" button in the ATG browser) to create a new file. In the dialog box, type a name of a new file in the "File name" field, and press the "Open" button.
- The user can save settings of one or more devices within one file. The file is created in a text format. Thus, the user can easily check the content of the .atg file by opening it with any text editor (even without launching GSMConf).
- When saving settings into the device, the application creates two files with passwords and settings: **[file_name].atg and [file_name]-srv.atg.**
- Furthermore, the application creates *\CONF* folder with **[device_no.].atg** and **[device_no.-date-time].atc files** and the *\dispatcher* folder with a file containing the device's serial number **[device_no.]**. The folders are created in the GSMConf directory, and in the opened .atg file directory.
- **[device_no.]** file is used by the server software to include the device to the list of device serviced by the server.
- **[device_no.].atg** file contains the settings of only one device with the No. as indicated in the file name.
- When recording other settings to this device, a new file named [device_No.-date-time].atc is created. The file contains settings recorded to the device and s the date and time of the settings recording. The file enables the user to track the changes as they are made in the device settings. The settings can be uploaded from .atc file to the application.
- [file_name]-srv.atg file must be submitted to the server administrator to include the device to the list of devices serviced by the server. If the device has already been serviced by the server and its password hasn't been changed, there is no need to send this file. When the password of the device is changed, this file residing on server must be changed; otherwise, the server won't accept any data from that device.
- **[file_name].atg** file should be saved in *\dbf* folder which is located in the AutoGRAPH dispatch software installation directory on all dispatchers' PCs which will be used to monitor AutoGRAPH-GSM devices with serial numbers as indicated in [file_name].atg file.

If your devices are serviced by TechnoKom server, please submit your [file_name]-srv.atg files to mail@tk-chel.ru.

When the device is connected to a PC, the GSMConf application automatically reads firmware version of this device and disables parameters and options if they are not supported by the firmware version.

Program configuration

Before starting operation, go to the “Program configurations” tab and configure all applicable settings.

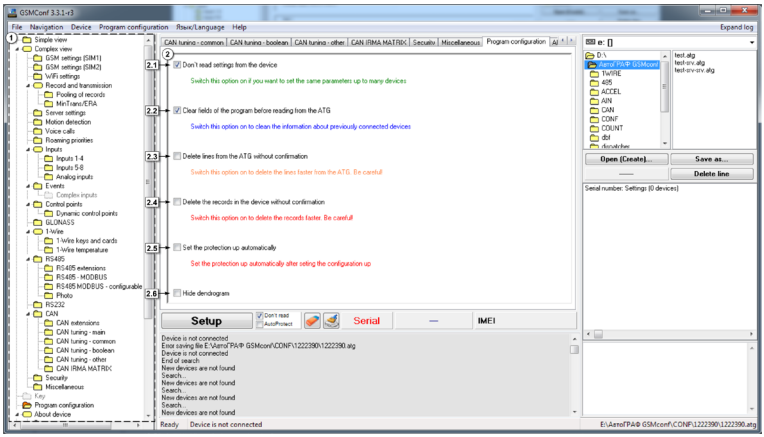


Fig.9. Program Configuration tab.

All tabs of the software can also be found in the dendrogram (see , item 2).

1. Settings. Options available on this tab can also be found in the “Program configuration” menu (see Fig. 4).

1.1. Don’t read settings from the device. This option prevents automatic reading of the settings from the connected device. Switch this option on if it is necessary to setup the same parameters to multiple devices.

1.2. Clear fields of the program before reading from ATG. When this option is enabled, the previous settings are removed from the fields in the application prior to reading new settings from .atg file.

1.3. Delete lines from ATG without confirmation. This option enables quick removal of settings from .atg file.

1.4. Delete the records in the device without confirmation. This option enables quick removal of records from connected device.

Be careful when enabling the options «Delete lines from ATG without confirmation» and «Delete the records in the device without confirmation». Removed record can not be restored!

1.5. Set the protection up automatically. The option allows automatic protection of the settings when saving them to the device. Protection is set according to protection settings specified on the “Security” tab.

1.6. Hide dendrogram. This option hides the dendrogram (see Fig.9, item 2).

Simple View

There are two type of configuration: Simple View providing device quick setup and Extended View intended for advanced users and providing setup of the device serial buses, inputs, extended SIM settings, Wi-Fi setting and etc.

To setup standard settings, go to the "Simple view" tab.

On this tab, the user can configure data recording, server and SIM settings.

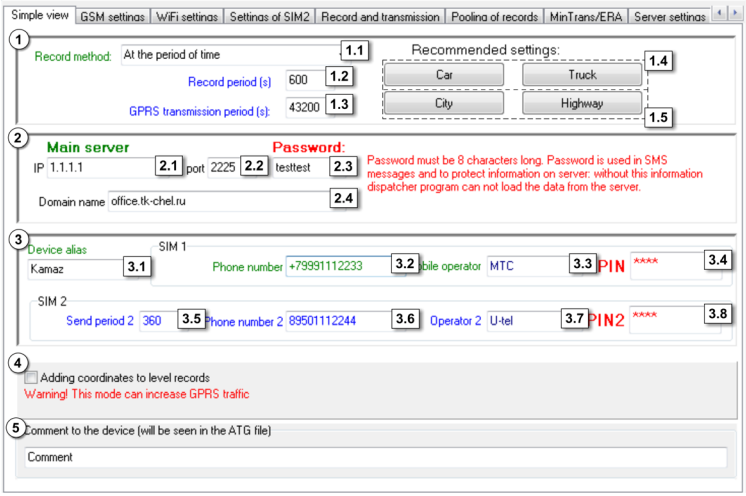


Fig.10. Simple View.

1. Data recording and transmission parameters. This set of settings is intended to configure period of position data recording.

1.1. Record method is the mode of recording coordinates of the asset to the device's memory. The user can select one of the two methods:

- **At the period of time.** In this mode the records are made at regular intervals equal to specified Record period, regardless of the status of inputs and motion characteristics.
- **Adaptive mode.** In the adaptive mode, the device analyses characteristics of the motion: the speed and direction of motion, acceleration, displacement, etc. and then concludes to record a point. This allows to describe the vehicle's track more accurately and to spend less time for data transmission due to the reducing outgoing traffic.

1.2. Specify following settings for the selected record method:

- **Record period (s).** Applies to the recording at the period time and means an interval of recording the position data in the device's memory. Possible values range from 1 to 300 seconds.
- **Record interval (m).** Applies to the adaptive recording mode and means minimal distance after which the device may record the next coordinate point. This option prevents the device from recording track points too frequently (each time when a vehicle changes the way of its movement at short intervals). Recommended value for cars is 5…10 meters, for trucks – 10…20 meters. Possible values range from 1 to 600 meters.

Irrespective of this value, the current coordinates will be recorded not more than once a second and not less than once in five minutes.

1.3. Device alias is a name of the device which will be displayed in SMS to identify the device. Device name should not include more than 8 characters which may be uppercase and lowercase letters of Latin alphabet and numbers from 0 to 9.

1.4. Recommended settings for "Car" and "Truck". This option applies to the Record interval and is intended for autocomplete of the field with recommended settings according to transport type.

1.5. Recommended settings for "City" and "Highway". This option applies to the GPRS transmission period for SIM1 and is intended to autocomplete the fields with recommended settings according to speed limit in particular locality.

2. Main server settings. This is a set of settings intended to configure details of data server, which the device transfers data to.

2.1. IP is an IP address of the server, which receives data from the device. The server should have a real static IP address.

2.2. Port is the port designated for data transfer. The port number should match the values set within the server software. By default this value is 2225 for the server running Windows, and 2227 for the server running Linux.

2.3. Password is the password to access data on the server. Password must be 8 characters long and can consist of numbers from 0 to 9, uppercase and lowercase letters of Latin alphabet. Password is used to configure the device using SMS commands and to access the data on the AutoGRAPH server ver. 3.

2.4. Domain name is a domain name of the data server.

Algorithm of connection to the server when using a domain name:

- If the domain name is specified, the device will send DNS request as soon as it establishes GPRS connection.
- If the specified domain name is resolved, the device receives a response (an IP address associated with the domain name), and updates the IP address specified in the server settings.
- If the request fails, data will be transferred to the server using the recently resolved IP address.

If the device is served by TecknoKom server, specify following details: IP address 78.46.216.154, port number 2225, domain name – auto.tk-chel.ru.

The appropriate port in the firewall of your server must be opened, otherwise the devices would not be able to transfer data to the server.

3. The SIM cards settings:

3.1. GPRS transmission period 1 (s) is a period of transferring the collected data to the server using GPRS, when the device operates with SIM1.

- Shorter interval means more recent data on the server but higher overhead associated with the data transfer. Recommended value is 60 seconds when traveling within the city (urban roads), and 120…180 seconds when traveling out of the city (highway). Maximum period of sending the data to the server is 86,400 seconds (24 hours).
- Note that if the data transmission is failed due to no GSM connection, all missing data will be sent when the connected is restored. When GSM connection is lost, the device tries to send data 6 times and in case of no success waits until the next transmission period.
- In case of receiving a call to a number of the device's first SIM card all data that has not yet been sent will be sent immediately upon calling not waiting for the next transmission period.
- When the data transmission period is set to "0" (for AutoGRAPH devices with firmware ver. 3.7 or higher), the device will not transfer the data using GPRS automatically. In such a case the data will be transferred either after receiving a call to the device's SIM card or upon occurrence of an event which requires data transmission a via GPRS (e.g. digital input triggering, entering to or exiting from the control point). The device will break GPRS connection immediately after transfer of all collected data. This mode is useful when the device is roaming.

3.2. Phone number is the telephone number associated with the first SIM card installed in the device.

3.3. Operator – enables configuration of GPRS and USSD settings for the first SIM card using preset settings. Use the "Operator" field to select mobile network operator of the SIM card installed in the AutoGRAPH-GSM controller – all corresponding fields will be auto completed with the operator's settings. GPRS and USSD settings can be set up manually on the "GSM settings (SIM1) tab" of the Complex view.

3.4. PIN – PIN code used by the device to register the first SIM card installed in it. If PIN code check is disabled for the SIM card, enter any four digits.

Be careful entering the PIN. Wrong PIN (if it is not disabled for a SIM card) will block the SIM card!

3.5. GPRS transmission period 2 (s) is a period of data transmission to data server for SIM2.

- Shorter interval means more recent data on the server but higher overhead associated with the data transfer. Recommended value is 60 seconds when traveling within the city (urban roads), and 120…180 seconds when traveling out of the city (highway). Maximum period of data transmission to the server is 43,200 seconds (12 hours). "0" means that the data should not be transferred to the server, in this case the data will be transferred either upon making a call to the second SIM card or upon occurrence of an event that requires data transfer.

3.6. Phone number 2 – telephone number associated with the second SIM card installed in the device.

3.7. Operator 2 - enables configuration of GPRS and USSD settings for the SIM2 using preset settings. Use the "Operator" field to select mobile network operator of the SIM card installed in the AutoGRAPH-GSM controller – all corresponding fields will be auto completed with the operator's settings. GPRS and USSD settings can be set up manually on "GSM settings (SIM2) tab" of the Complex view.

3.8. PIN 2 is the PIN code used by the device to register the second SIM card installed in it. If PIN code check is disabled for the SIM card, enter any four digits.

Be careful entering the PIN. Wrong PIN (if it is not disabled for a SIM card) will block the SIM card!

4. Adding coordinates to level records is an option which is used when the data is transferred to TransNavigation server and enables to record additional coordinate data when recording readings from level sensors connected to the device.

This mode can increase GPRS traffic. Do not enable this mode, unless you need to transfer data to the TransNavigation's server.

5. Comment to the device – a field, where a user can type any comments applicable to the device. The comments will be seen in the .atg file.

GSM settings (SIM1)

Go to the "GSM settings (SIM1)" tab to specify settings of GSM network for SIM1. SIM1 is the main SIM card which is installed at the bottom slot of the SIM holder.

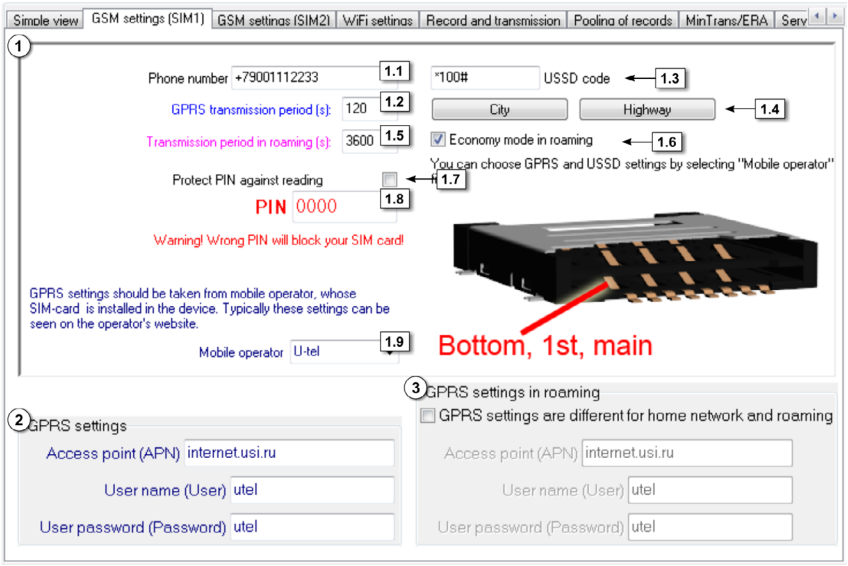


Fig.11. GSM settings (SIM1).

1. GSM Settings.

1.1. Phone number – telephone number associated with the first SIM card installed in the device.

1.2. GPRS transmission period (s) is a period of transferring the collected data to the server using GPRS, when the device operates with SIM1.

- Shorter interval means more recent data on the server but higher overhead associated with the data transfer. Recommended value is 60 seconds when traveling within the city (urban roads), and 120…180 seconds when traveling out of the city (highway). Maximum period of sending the data to the server is 86,400 seconds (24 hours).
- Note that if the data transmission is failed due to no GSM connection, all missing data will be sent when the connected is restored. When GSM connection is lost, the device tries to send data 6 times and in case of no success waits until the next transmission period.
- In case of receiving a call to a number of the device's first SIM card all data that has not yet been sent will be sent immediately upon calling not waiting for the next transmission period.
- When the data transmission period is set to "0" (for devices with firmware ver. 3.7 or higher), the device will not transfer the data using GPRS automatically. In such a case the data will be transferred either after receiving a call to the device's SIM card or upon occurrence of an event which requires data transmission a via GPRS (e.g. digital input triggering, entering to or exiting from the control point). The device will break GPRS connection immediately after transfer of all collected data. This mode is useful when the device is roaming.

1.3. USSD code – USSD request being applied within the network of mobile operator to check the balance (e.g. *100#). This option is not available for all operators and is not applicable to all pricing plans especially when it comes to corporate pricing plans. Furthermore, mobile network operator may generate a response to the request which would not be supported by the internal GPRS modem of AutoGRAPH-GSM device. For convenience, the user can use Customer Care Internet Services provided by the mobile network operator to check SIM balance.

1.4. Recommended settings for "City" and "Highway". This option applies to the GPRS Transmission period for SIM1 and is intended for autocomplete of the fields with recommended settings associated with the applicable speed limit when a user presses the corresponding button.

1.5. Transmission period in roaming (s) is a period of transferring the collected data in roaming, when the device uses the first SIM card. Enabling this option allows a user to significantly reduce data transmission costs when a device is in roaming.

1.6. Economy mode in roaming - when this option is enabled the data will be transferred with "Transmission period in roaming", if the device is in roaming. And GPRS connection will be disabled each time after data transmission. Minimum transmission period in roaming is 30 seconds, maximum period is 43,200 seconds. If "0" period is specified, the data will be sent only after calling to SIM1 number.

1.7. Protect PIN against reading – this option is intended to protect SIM1 PIN code against reading by the SMS command and the configuration software. If the option is enabled, PIN code will be hidden under asterisks in SMS messages and the configuration software.

1.8. PIN – PIN code used by the device to register the first SIM card installed in it. If PIN code check is disabled for the SIM card, any four digits must be entered.

Be careful entering the PIN, especially when it is hidden under asterisks. Wrong PIN (if it is not disabled for a SIM card) will block the SIM card!

1.9. Mobile operator – enables to specify GPRS and USSD settings for the first SIM card using preset settings. Use the "Operator" field to select mobile network operator which provided the SIM card installed in the device. When selecting a mobile operator, all corresponding fields will be auto completed with the operator's settings.

2. GPRS settings – this set of settings is intended to configure an access point (APN), user name (User) and password (Password) to access GPRS services. GPRS settings should be taken from mobile operator, whose SIM-card is installed in the device. Typically these settings can be seen on the operator's website.

Make sure that GPRS data transmission service is included in pricing plan of the SIM card that is installed in the device. The user can use the preset settings by selecting a mobile network operator in the corresponding field.

3. GPRS settings in roaming. Enable "GPRS settings are differ for home network and roaming" option to set other GPRS settings for roaming. The GPRS details can be taken from mobile operator, whose SIM-card is installed in the device or seen it on the official web site of the mobile network operator.

GSM settings (SIM2)

Go to the "GSM settings (SIM2)" tab to configure GSM/GPRS parameters for the second SIM card (reserve SIM card installed on the top slot of the SIM holder).

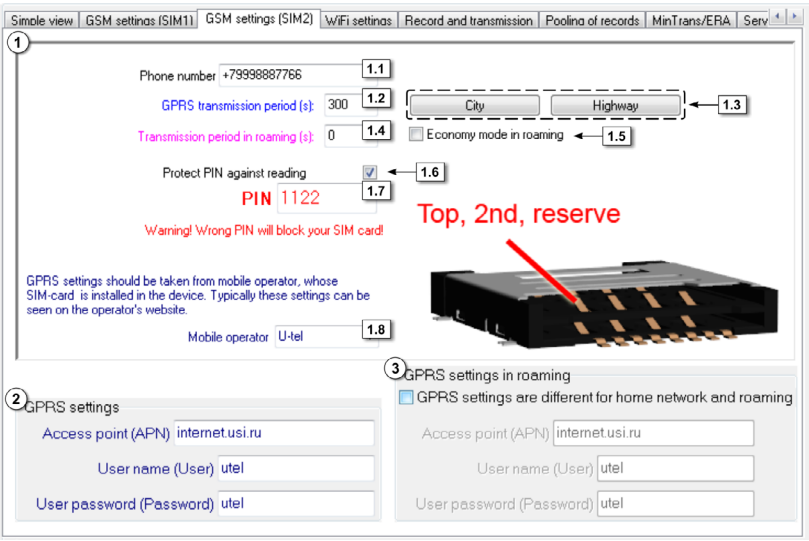


Fig.12. GSM settings (SIM2).

1. GSM Settings.

1.1. Phone number – telephone number associated with the second SIM card installed in the device.
1.2. GPRS transmission period (s) – period of transferring the collected data to the server using GPRS, when the device operates with SIM2.

- Shorter interval means more recent data on the server but higher overhead associated with the data transfer. Recommended value is 60 seconds when traveling within the city (urban roads), and 120…180 seconds when traveling out of the city (highway). Maximum period of sending the data to the server is 86,400 seconds (24 hours).
- Note that if the data transmission is failed due to no GSM connection, all missing data will be sent when the connected is restored. When GSM connection is lost, the device tries to send data 6 times and in case of no success waits until the next transmission period.
- In case of receiving a call to a number of the device's second SIM card all data that has not yet been sent will be sent immediately upon calling not waiting for the next transmission period.
- When the data transmission period is set to "0" (for devices with firmware ver. 3.7 or higher), the device will not transfer the data using GPRS automatically. In such a case the data will be transferred either after receiving a call to the device's SIM card or upon occurrence of an event which requires data transmission a via GPRS (e.g. digital input triggering, entering to or exiting from the control point). The device will break GPRS connection immediately after transfer of all collected data. This mode is useful when the device is roaming.

1.3. Recommended settings for "City" and "Highway". This option applies to the GPRS Transmission period for SIM2 and is intended for autocomplete of the fields with recommended settings associated with the applicable speed limit when a user presses the corresponding button.

1.4. Transmission period in roaming (s) is a period of transferring the collected data in roaming, when the device uses the second SIM card. Enabling this option allows a user to significantly reduce data transmission costs when a device is in roaming.

1.5. Economy mode in roaming – when this option is enabled the data will be transferred with "Transmission period in roaming", if the device is in roaming. And GPRS connection will be disabled each time after data transmission. Minimum transmission period in roaming is 30 seconds, maximum period is 43,200 seconds. If "0" period is specified, the data will be sent only after calling to SIM1 number.

1.6. Protect PIN against reading – this option is intended to protect SIM2 PIN code against reading by the SMS command and the configuration software. If the option is enabled, PIN code will be hidden under asterisks in SMS messages and the configuration software.

1.7. PIN – PIN code used by the device to register the second SIM card installed in it. If PIN code check is disabled for the SIM card, any four digits must be specified in the device settings.

Be careful entering the PIN, especially when it is hidden under asterisks. Wrong PIN (if it is not disabled for a SIM card) will block the SIM card!

AutoGRAPH-GSM devices with firmware ver.10.41 and higher do not switch to the second SIM card unless the PIN code of the SIM card is specified in settings.

1.8. Mobile operator – enables to specify GPRS and USSD settings for the second SIM card using preset settings. Use the "Operator" field to select mobile network operator for the SIM2 installed in the device. When selecting a mobile operator, all corresponding fields will be auto completed with the operator's settings.

2. GPRS settings – this set of settings is intended to configure an access point (APN), user name (User) and password (Password) to access GPRS services. GPRS settings should be taken from mobile operator, whose SIM card is installed in the device. Typically these settings can be seen on the operator's website.

Make sure that GPRS data transmission service is included in pricing plan of the SIM card that is installed in the device. You can use the preset settings by selecting the mobile network operator in the corresponding field.

3. GPRS settings in roaming. Enable "GPRS settings are differ for home network and roaming" option to set other GPRS settings for roaming. You can take the data from mobile operator, whose SIM-card is installed in the device or see it on the official web site of your mobile network operator.

WiFi Settings

The options on this tab are intended to configure Wi-Fi settings for AutoGRAPH devices with built-in Wi-Fi module: AutoGRAPH-WiFi-GSM+ and AutoGRAPH-WiFi.
The AutoGRAPH-WiFi-GSM+ device supports data transmission both via Wi-Fi and GPRS. Thus, if the data transfer via GPRS is disabled, the data will be transferred via Wi-Fi and vice versa.

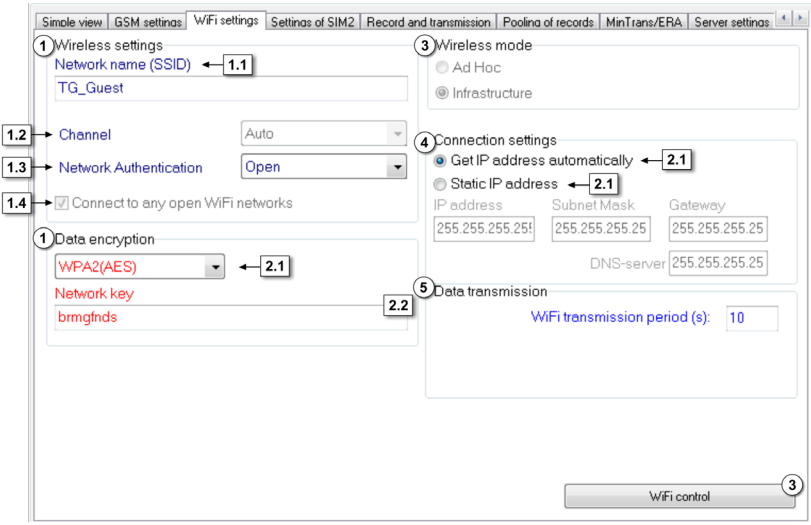


Fig.13. Wi-Fi settings.

1. Wireless settings.
Specify the wireless access point which will be used by the AutoGRAPH-WiFi-GSM+ to connect to the network in order to transfer data to the server.
1.1. Network name (SSID) – name of wireless network used by the device to identify this network.
1.2. Channel – select a channel to be used by the device to connect to the access point. It is recommended to select an option "Auto", which enables the device to select any available channel.
1.3. Network Authentication – use this option to select a way of authentication for the wireless network. This option is available for WEP encryption.

Open – this method does not include network authentication. To connect to the wireless network the device needs just to be aware of the name of this network (SSID).

Shared – this authentication is being performed by an encryption key shared within the whole network. To access the wireless network the device needs to be aware of SSID and the encryption key.

1.4. Connect to any open WiFi networks – check this box to allow the device to connect to any open wireless network.

Checking the "Connect to any open WiFi network" option, remember that using unknown Wi-Fi access points and hotspots which do not require access password is associated with higher risks of loss or steal of confidential and personal data!

2. Data encryption. Encryption ensures protection of data transferred from unauthorized access.

2.1. Encryption method. Select an encryption applicable to settings specified for the wireless network.

- **No encryption** – without encryption.
- **WEP** – encrypts the transmitted data with RC4 method using a key of 5 to 13 characters. This encryption is commonly used for public networks and provides minimal security.
- **WPA (TKIP)** uses the same RC4 method, but WPA encryption is more secure than WEP. The key may be up to 32 ASCII characters long.
- **WPA2 (AES)** encrypts data using the cryptosecure AES method. WPA2 is known as the most secure encryption, however, it may not be supported by some Wi-Fi adapters. The key may be up to 32 ASCII characters long.

2.2. Network key – is an encryption key of the wireless network. Length of this key will vary depending on the selected encryption method. The key should contain only ASCII characters.

DO NOT set the network key in HEX format when using WEP encryption. It is highly recommended to specify the key in any other format.

3. Wireless mode – select a type of wireless network which the device will connect to. This option is not available for AutoGRAPH-WiFi-GSM+ devices since it is not supported by the WiFi module. AutoGRAPH-WiFi-GSM+ devices support only "Infrastructure" type.

- **Infrastructure** – select this option, if the device uses the wireless access point to send data to the server via the Internet.
- **Ad Hoc** – select this option, if the device sends data directly to the local folder of a PC with a Wi-Fi adapter.

4. Connection settings.
Depending on access point settings the device may either have static IP address or get IP address automatically. If the access point uses dynamic allocation of IP addresses, select "Get IP address automatically". If the IP addresses of devices in the network are specified in the access point settings, you should select "Static IP address" option and set an IP address of the device, a subnet mask, a gateway and DNS-server address up.

5. WiFi transmission period (s) – specify a period to which the device will connect to the access point (if available) to send the collected data. If data transmission via wireless network is failed, the device delays the transmission till the next period or transfers the collected data via GPRS.

6. "WiFi Control" button – use the button to go to the WiFi control tab, which enables to perform step-by-step diagnostics of the device Wi-Fi module.

Record and Transmission

Go to the "Record and transmission" tab to configure the settings of recording and transmission the data.

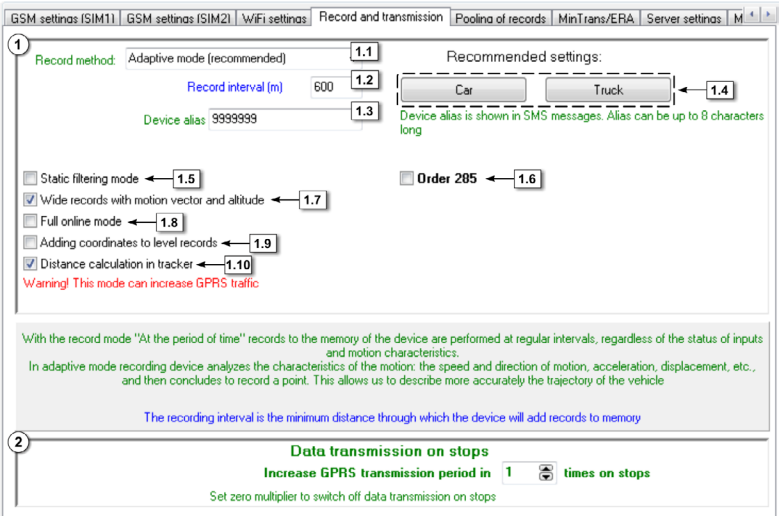


Fig.14. Record and transmission.

1. Data recording and transmission parameters. This set of settings is intended to configure period of position data recording.

1.1. Record method is the mode of recording coordinates of the asset to the device memory. The user can select one of the two methods:

- **At the period of time.** In this mode the records are made at regular intervals equal to specified Record period, regardless of the status of inputs and motion characteristics.
- **Adaptive mode.** In the adaptive mode, the device analyses characteristics of the motion: the speed and direction of motion, acceleration, displacement, etc. and then concludes to record a point. This allows to describe the vehicle's track more accurately and to spend less time for data transmission due to the reducing outgoing traffic.

1.2. Specify following settings for the selected record method:

- **Record period (s).** Applies to the recording at the period time and means an interval of recording the position data in the device's memory. Possible values range from 1 to 300 seconds.
- **Record interval (m).** Applies to the adaptive recording mode and means minimal distance after which the device may record the next coordinate point. This option prevents the device from recording track points too frequently (each time when a vehicle changes the way of its movement at short intervals). Recommended value for cars is 5…10 meters, for trucks – 10…20 meters. Possible values range from 1 to 600 meters.

1.3. Recommended settings for "Car" and "Truck". This option applies to the Record interval and is intended for autocomplete of the field with recommended settings according to transport type.

1.4. Device alias - device name which is displayed in SMS to identify the device. Device alias can be up to 8 characters long and can consist of uppercase and lowercase letters of Latin alphabet and numbers from 0 to 9.

1.5. Static filtering mode – if checked, the device will filter minor movements which result from inaccuracies of coordinates at stops to avoid excessive track jerks when vehicle is not in motion. This mode is not recommended for slowly moving vehicles (road rollers, etc.).

1.6. Order 285 – enables "Order 285" mode. This mode implies that when the vehicle voltage shuts down and the device switches to the backup power source, it makes an additional record and notifies the server on failure of the main power source. When the vehicle voltage shuts down, the device switches off within 1 minute. The device switches on again, when the vehicle voltage is restored.

1.7. Wide records with motion vector and altitude – when this option is enabled the device will record velocity vector (including direction and value) and height in addition to coordinates. This will boost GPRS traffic but can reduce the load of server if it is being used for processing data (used by some navigation software manufacturers).

1.8. Full online mode – when this option is enabled, the data will be transferred as soon as it is available. This mode ensures that the data on server is always up-to-date. This option may be useful for services which need real time monitoring of vehicles.

1.9. Adding coordinates to level records is an option which is used when the data is transferred to TransNavigation server and enables to record additional coordinate data when recording readings from level sensors connected to the device.

Do not enable this mode, unless you need to transfer data to TransNavigation server. Using this mode can increase GPRS traffic.

1.10. Distance calculation in device – when this option is enabled, the device will calculate the vehicle distance and record this value to the memory. This option is used when the device transfers data to the third party server.

2. Data transmission on stops. This option enables to specify data transmission period at stops. "0" period disables the data transmission on stops.

Pooling of records

Go to the "Pooling of records" tab to specify data to be grouped with coordinates.

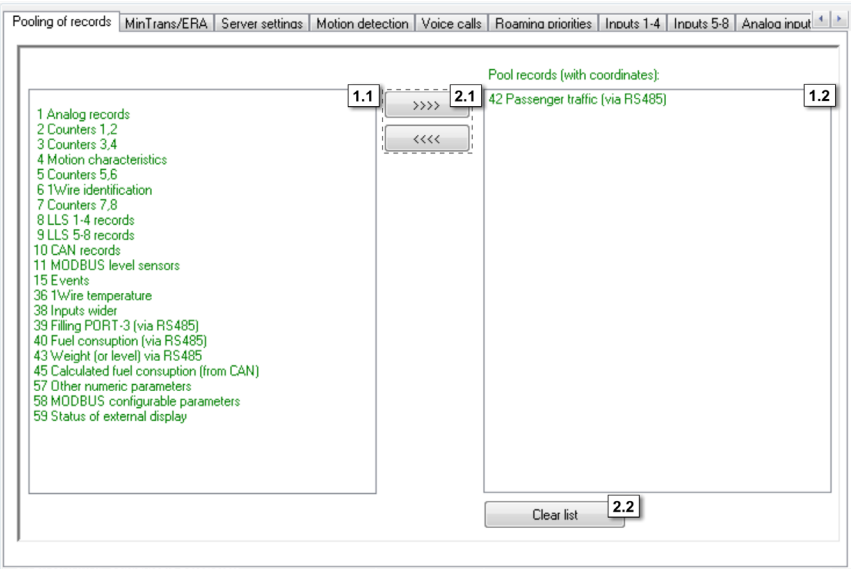


Fig.15. Pooling of records.

1. Settings of the pooling are described below:

1.1. Records – the list of device records.

1.2. Pool records (with coordinates) – all records added to this list will be in a common group. This means that when the device records any parameter of the group, it will record the states of all other parameters of this group, as well as current coordinates of the vehicle.

1.3. Counter shows a number of records added to the "Pool records" list.

2. There are three buttons on the tab:

2.1. Navigation buttons – these buttons are used to move data between "Records" and "Pool records (with coordinates)" lists. Alternatively, the user can use mouse to click and drag records from one list to other.

2.2. Clear list button – clears the "Pool records (with coordinates)" list.

MinTrans/ERA

On this tab the user can set up communication protocol to transfer data to the MinTrans (Ministry of Transport) server.

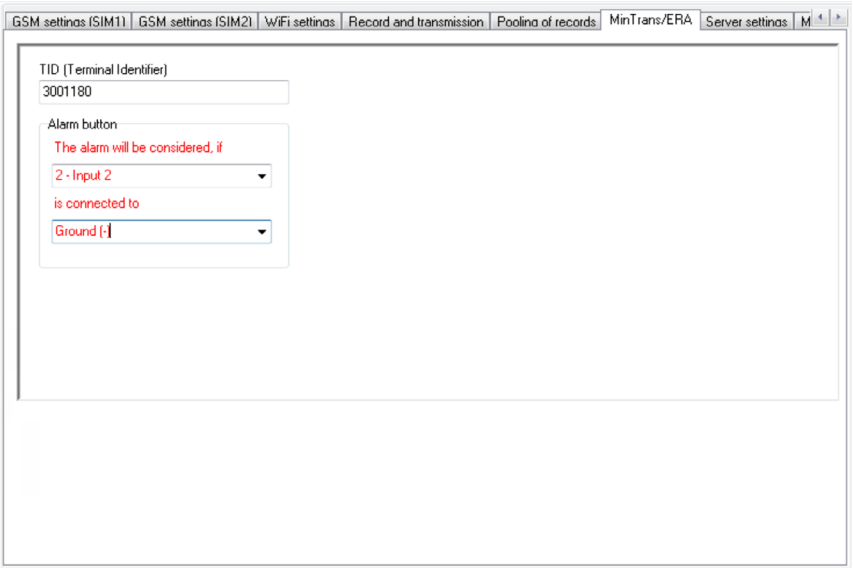


Fig.16. MinTrans/ERA options.

TID (Terminal Identifier) – a unique identifier of the device designed for identification of the device, when it sends data to the MinTrans server (using the protocol pursuant to Order No. 285). By default TID corresponds to the serial number of the AutoGRAPH-GSM device.

Alarm button. If an alarm button is connected to the device, to enable the Alarm button function specify the next:

- select a digital input of the device, which the alarm button is connected to in the "The alarm will be considered, if" field.
- specify a state of selected digital input, which corresponds to pressed alarm button in the "is connected to" field.

Server Setting

On the "Server settings" tab the user can set up parameters of the main and parallel servers which the AutoGRAPH device transfers data to.

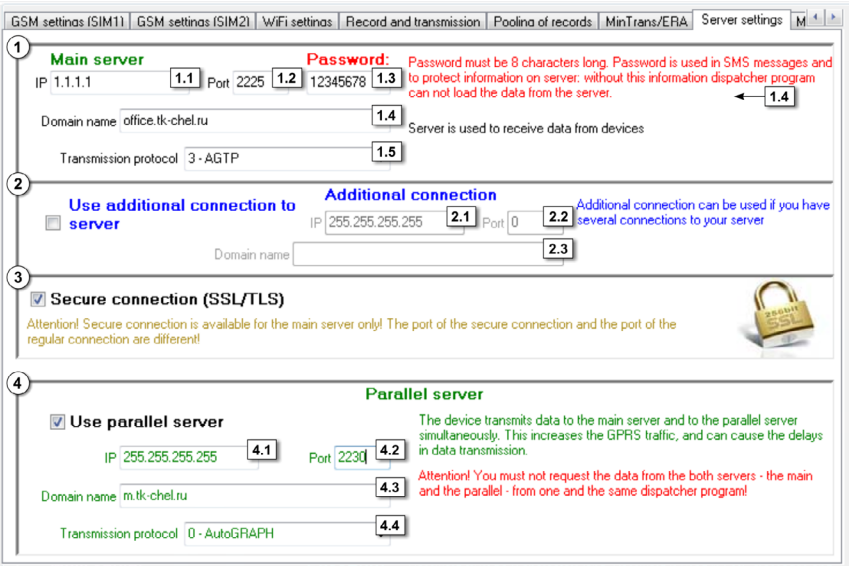


Fig.17. Server settings.

To receive data from the device, the following settings must be specified:

1. Mail server settings. The device sends collected data to the main server if GPRS is enabled.

1.1. Server IP is an IP address of the server which receives data from the controller. The server should have a real static IP address.

1.2. Server port is the number of the port designated for the data transfer. These numbers should match the values set within the server software. By default this value is 2225 for the server running Windows.

The server port specified in the device must be enabled in the firewall settings of the server, otherwise the devices would not be able to transfer data to the server.

1.3. Password is the password to access the data on the server. Password must be 8 characters long and can consist of numbers from 0 to 9, uppercase and lowercase letters of Latin alphabet. Password is used to configure the device using SMS commands and to access the data on the AutoGRAPH server ver. 3.

1.4. Domain name – domain name of the server which receives data from the device.

Algorithm of connection to the server when using a domain name:

- If the domain name is specified, the device will send DNS request as soon as it establishes GPRS connection.
- If the specified domain name is resolved, the device receives a response (an IP address associated with the domain name), and updates the IP address specified in the server settings.
- If the request fails, data will be transferred to the server using the recently resolved IP address.

If the device is served by TecknoKom server, specify following details: IP address 78.46.216.154, port number 2225, domain name – auto.tk-chel.ru.

1.5. Transmission protocol. Select the protocol used to transfer data.

0 – AutoGRAPH – closed AutoGRAPH protocol used to transfer data to the AutoGRAPH server. By default all AutoGRAPH-GSM series devices except AutoGRAPH-GSM-SL use AutoGRAPH protocol to transfer data. AutoGRAPH-GSM-SL devices require unlocking of AutoGRAPH protocol.

1 – MinTrans (285) – protocol used to transfer data to MinTrans server (pursuant to Order No. 285).

2 – TKmonitoring.com – closed AutoGRAPH protocol used to transfer data to TKmonitoring.com server. TKmonitoring.com protocol is supported by AutoGRAPH-GSM series devices with firmware of ver. AGXL-11.43 and higher.

3 – AGTP - closed AutoGraph Data Transfer protocol providing high transmission rate compared to AutoGRAPH protocol. AGTP protocol is supported with the AutoGRAPH server of ver. 5 and higher.

2. Additional connection.

An additional connection can be used if there are several connections to the server.

If main connection to the server (specified on the main server settings) is unavailable, the device may use an additional connection to this server. To enable this option, check the "Use additional connection to server" box and specify following settings:

2.1. Server IP is an IP address, which used for additional connection to the main server. The server should have a real static IP address.

2.2. Server port is the number of the port designated for data transfer. These numbers should match the values set within the server software. By default this value is 2225 for the server running Windows, and 2227 for the server running Linux. "0" value disables using of the additional connection.

2.3. Domain name – domain name of the server for the additional connection.

The additional connection to the server is used only if the main connection is failed.

3. Secured connection (SSL/TLS) – this option enables using a secured connection to the server for the data transmission.
The secure connection is supported by the controllers with firmware ver. 10.45-beta3 and higher.
After updating the device firmware via USB, connect the device to external power supply and wait until the device connects to the GSM network.
This procedure is required to check if the device supports the secured connection. Then, if the device supports secured connection, the settings of SSL connection become available in the GSMConf application (on the Server settings tab) when connecting the device to a PC.
If the firmware is updated remotely (via GPRS), the capability of the device to support the secured connection will be checked automatically. The secured connection supporting can be check using 'GSSL' command. For more information on the command see the "Control SMS and server commands" document.
If the device supports the secured connection, the icon  is displayed on the "About" tab of the GSMConf application.

Secured connection is available for the main server only. The port of the secured connection and the port of the regular connection are different. If the type of server connection is changed, the appropriate server port must be specified too.

By default the AutoGRAPH server uses port 2443 for the secured connection. Secured connection is supported by the AutoGRAPH server of ver. 4.1.0 and higher.

If any error occurs when connection the device to the server using secured connection, contact TechnoKom technical support. Some cases may require update of the device's GSM modem firmware.

4. Parallel server.
The device can transmit data to the main server and to the parallel server simultaneously. The device sends the same data to both servers but in different packages. For example, if the main server is not available, the data will be transferred only to the parallel server. When the main server is restored, it will receive all collected data that have already been transferred to the parallel server. Similarly, if the parallel server is not available, the data will be transferred only to the main server. And when the parallel server is restored, it will receive all collected data. To access the parallel server the device use password of the main server.

To enable the parallel server, set up following parameters:

To enable data transmission to the parallel server and to be able to specify its parameters, check the "Use parallel server" box.

4.1. IP address – an IP address of the parallel server. The server should have a real static IP address.

4.2. Server port – a number of the parallel server port designated for data transfer. The port should match the values set within the server software. By default this value is 2225 for the server running Windows, and 2227 for the server running Linux.

4.3. Domain name – a domain name of the parallel server.

4.4. Transmission protocol. Select the protocol used to transfer data to the parallel server.

0 – AutoGRAPH – closed AutoGRAPH protocol used to transfer data to the AutoGRAPH server. By default all AutoGRAPH-GSM series devices except AutoGRAPH-GSM-SL use AutoGRAPH protocol to transfer data. AutoGRAPH-GSM-SL devices require unlocking of AutoGRAPH protocol.

1 – MinTrans (285) – protocol used to transfer data to MinTrans server (pursuant to Order No. 285).

2 – TKmonitoring.com – closed AutoGRAPH protocol used to transfer data to TKmonitoring.com server. TKmonitoring.com protocol is supported by AutoGRAPH-GSM series devices with firmware of ver. AGXL-11.43 and higher.

3 – AGTP – closed AutoGraph Data Transfer protocol providing high transmission rate compared to AutoGRAPH protocol. AGTP protocol is supported with the AutoGRAPH server of ver. 5 and higher.

To receive data from main and parallel servers, the different AutoGRAPH dispatch software must be used.

The data transmission to two servers increases the GPRS traffic and can cause the delays in transmission.

The parallel server can be used only for data transmission. The device will not process any commands being sent by the parallel server. The device cannot send any photos or messages to the parallel server.

Motion detection

On the "Motion detection" tab the user can set methods of vehicle stops and motion detection.

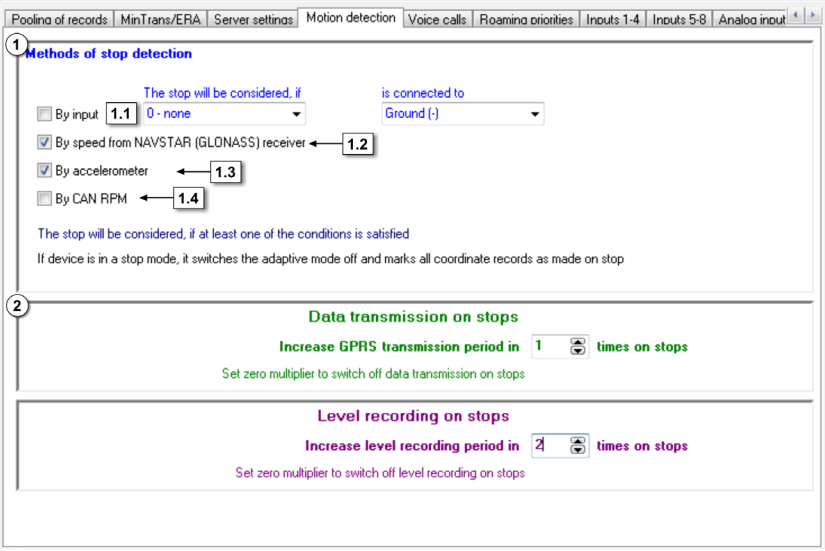


Fig.18. Motion detection settings.

The AutoGRAPH device is able to detect vehicle stops and motion starts. To enable this function, specify following settings:

1. Methods of stop detection.

1.1. By input – the stop is considered, if the selected input of the AutoGRAPH device switches to the specified state - "ground" or "power".

1.2. By speed from NAVSTAR (GLONASS) receiver – the stop is detected on the basis of vehicle coordinates received from NAVSTAR (GLONASS) satellites.

1.3. By accelerometer – the stop is detected according the readings of build-in accelerometer.

1.4. By CAN RPM – the stop is detected on the basis of RPM, scanned from CAN bus of the vehicle.

2. Data transmission on stops. This option enables to specify the data transmission period on stops. Set "0" multiplier to switch off data transmission on stops.

3. Level recording on stops. This option enables to increase recording period of analog sensors and LLS sensors. Minimum value is 1, maximum value is 100. Set "0" multiplier to switch off level recording on stops.

The stop will be considered, if at least one of the conditions is true. If the vehicle stop is detected, the device turns off the adaptive mode of data recording and marks all coordinate records as made on stops. The data is recorded with the data transmission period or every 5 minutes on the stop.

Voice calls

On the "Voice calls" tab the user can configure voice communication parameters.

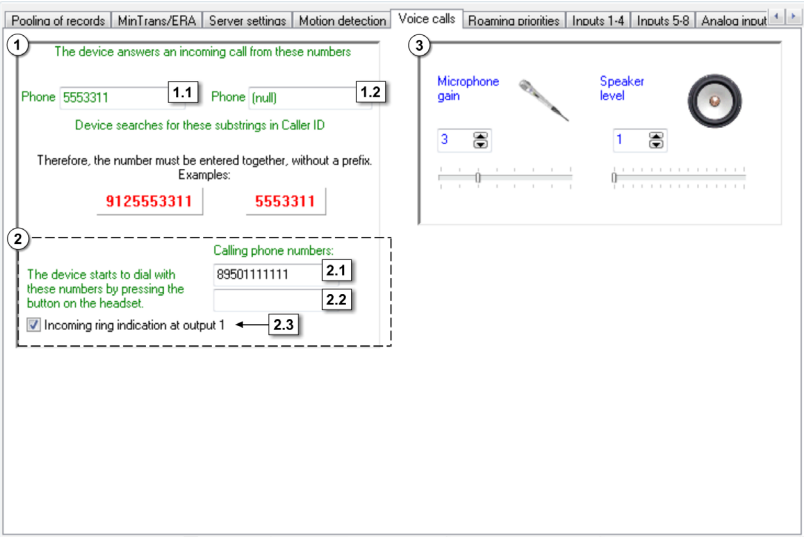


Fig.19. Voice communication settings.

AutoGRAPH-GSM+ and AutoGRAPH-GSM+WiFi devices support voice communication. To be able to make and receive voice calls devices must be configured.

1. Incoming call settings.

The device answers an incoming call from specified numbers. The phone numbers must be entered without spaces and prefixes for international calling. The incoming call is answered automatically if the line of telephone number contains a sub-line of either first or second telephone number.

Example: The first number is 50044, the second number is 9005554433. The device will automatically answer calls coming from any phone numbers containing line 50044 (e.g. +79005004433, +79005004434, +79005550044), as well as calls coming from number +79005554433. All other calls will be answered only by pressing the "Answer" button on the headset connected to the device.

1.1. First phone number – a field for specifying the first telephone number.
1.2. Second telephone number – a field for specifying the telephone number.

2. Calling phone numbers – telephone numbers which the device dials with by pressing the "Call" button on the headset. Enter numbers without spaces and use prefixes for international calling (8 or +7).
2.1. First calling phone number – telephone number which the device dials by pressing the button on the headset.
2.2. Second calling phone number – telephone number which the device dials, if the first calling number is not available.

First and second phone numbers for dialling are similar to the phone numbers used by the device to send SMS messages when first and second digital inputs trigger.

2.3. Incoming ring indication at output 1 – when this box is checked an incoming call will be indicated at the first output of the device. You can install different acoustic radiators, LEDs and lamps, etc. to warn you on incoming call.

3. Microphone gain and speaker level settings.

3.1. Microphone gain – set microphone gain. Possible values range from 1 to 8. "1" is a minimum value, "8" is a maximum value.

3.2. Speaker level– set volume of the speaker. Possible values range from 1 to 15. "1" is minimal volume, "15" is maximum volume.

Roaming properties

On the "Roaming properties" tab the user can customize device operation in roaming and home network.

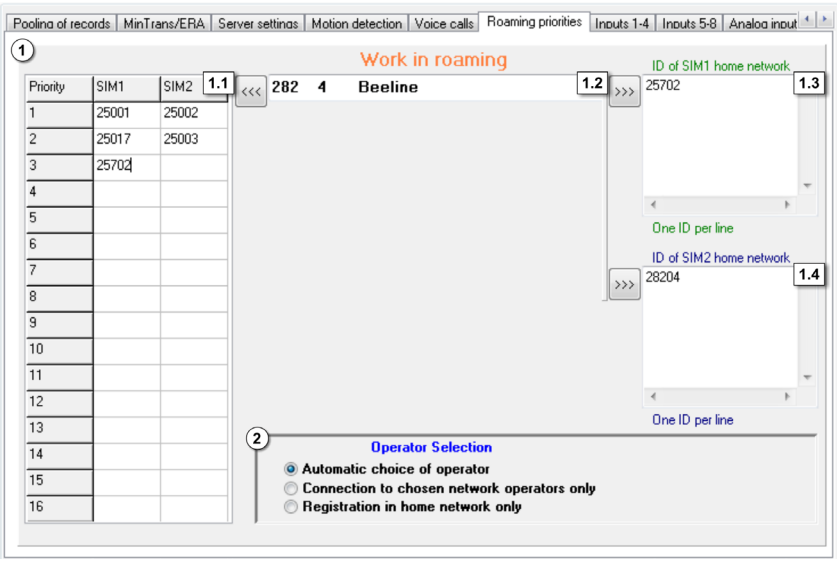


Fig.20. Roaming priorities.

1. Work in roaming.

1.1. Priorities – table consists list of networks for SIM1 and SIM2 in roaming, sorted in descaling order of priorities.

1.2. List of operators – select an operator in the list and add it to the list of priorities or lists of home network. Use "<<<" and ">>>" buttons to move selected item to necessary list.

1.3. ID of SIM1 home network – list of operators of home networks for the first SIM card. Select an operator from the list of available operators and add it to the list of home network using navigation buttons.

1.4. ID of SIM2 home network – list of operators of home network for the second SIM card. Select an operator from the list of available operators and add it to the list of home network using navigation buttons.

The device select necessary SIM card as follows:

1. When switched on, the device will operate with the main SIM card.

2. The device scans the network regularly to search for identifiers of networks available around the device.

3. After resuming information, the device selects SIM card as follow:

- If SIM1 home network (item 1.3) is available, the device switches to the main SIM card (or if it is already in use, continues operation with this card) and connects to this network.

- If SIM2 home network (item 1.4) is available, the device switches to the second SIM card (or if it is already in use, continues operation with this card) and connects to this network.
- If no home networks are available, the device checks for identifiers of other operators from the priority list (item 1.1). The device first checks identifiers of the first priority, then passes on to identifiers of the second priority, then third priority and so on. When some identifier from the list matches the one detected by the device during scanning, the device switches to the corresponding SIM card to use the services of its operator.

2. Operator selection. Select one of following options:

- Automatic choice of operator – the device connects to any available operator to transfer the data regardless of the specified network priorities.
- Connection to chosen network operators only – when this option is selected the device transfers data only when connected to the operators with identifiers listed in list of priorities and lists of home network operators (see items 1.1, 1.3, and 1.4 for applicable SIM card).
- Registration in home network only – when this option is selected the device connects only to the operators of the home network (see items 1.3 and 1.4 for applicable SIM card).

Inputs 1-4

Go to "Inputs 1-4" tab to configure parameters for digital inputs 1-4 (active low) of the device. When AutoGRAPH-GSM-SL is connected, all inputs those are not supported will be hidden automatically.

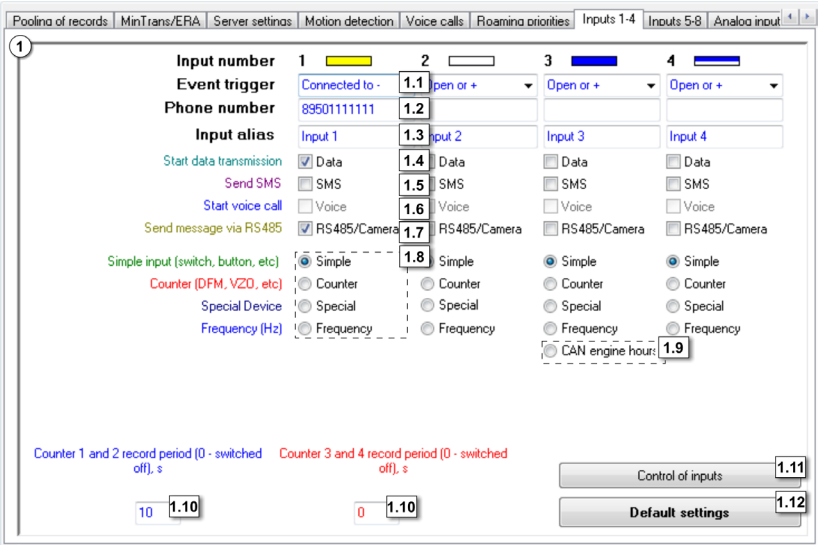


Fig.21. Inputs 1-4.

Settings of the digital inputs are described below:

1.1. Event trigger – select a state of input that initiates data sending ("supply (+)" or "ground (-)"). When the device's input switches to the specified state, the selected operation will be performed.

If an active low input is open-circuit it denotes logical "1".

1.2. Phone number – the device will send SMS message to specified number, when the input is triggered. Enter numbers without spaces and use prefixes for international calling (8 or +7).

Phone numbers of the first and the second inputs are similar to phone numbers of dialling (see chapter "Voice Calls"). Specifying phone numbers for the inputs 1 and 2 automatically changes the phone numbers of dialling.

1.3. Input alias – name of digital input displaying in messages which are sent by the device to notify about the input triggering. The input alias can consist of only the characters of LATIN alphabet, e.g. "ALARM BUTTON", "INPUT 1".

The device can be set up to perform following operations if the input triggers:

1.4. Start data transmission – transfer collected data via GPRS immediately after the device's input triggering not waiting the next data transmission period. The device will perform a coordinate record, when the input is triggered.

1.5. Send SMS – send SMS message to the specified phone number, when the device's input switches to the state specified in the "Event trigger" field.

1.6. Start voice call – make the voice calls to the specified number when the input is triggered.

1.7. Send message via RS485 (RS485)/Camera – transfer the data to an external device connected to the device via RS-485 when the input is triggered (for example, to external display).

1.8. Mode of digital input. Digital inputs can operate in following modes:

- **Simple (A).** In this mode, digital inputs are monitored. When the input's state changes, the time and location data is stored into the device memory. Simple mode is useful for recording the time of different sensors' activation and for monitoring the performance of equipment and mechanisms, such as an alarm button, oil pressure sensor, ignition system, passenger presence sensor, security alarm triggering, opening of doors, limit switches of various special-purpose and construction machinery mechanisms, etc. This mode also enables the device to perform unscheduled transmission of data to the server via GPRS upon input state changes, as well as to send an SMS message to the specified phone number.

When the device input is used to connect an alarm button, it is recommended to check the "Start data transmission" box to enable immediate data transmission to the server upon the alarm button press not waiting for the next data transmission period. As a result, the data will be transferred to the server much faster and the operator will be notified about alarm situation.
If necessary, enable sending the warning SMS to inform a dispatcher or any other responsible person on an alarm situation in time (if provided that the mobile operator delivers messages in time).

- **Counter (B).** This mode is intended to monitor the input switching states and to count various events. This may include counting of pulses from fuel-flow pulse output sensor (of DRT-5 or VZO type), passenger count, speed sensor, tipper body lift sensor, etc. In storage counter mode, the number of pulses from each sensor is stored in memory. The location data is not stored.
- **Special (C).** This mode is intended for counting of pulses within one minute. Periodic counter mode is used for taking the readings of sensors, which transmit measured values in pulse bursts in amounts proportional to the measured value. This mode is used, for example, for fuel level, temperature and engine speed sensors with pulse outputs. This mode does not involve recording of a track point into the storage memory when the input state changes.
- **Frequency (F).** This mode is intended for sensors with frequency outputs. The device is capable of measuring frequencies of 0 – 1,500 Hz. Frequency measurement mode is used, for example, for fuel level sensors with frequency outputs, engine and shaft speed sensors, proximity sensors and etc.

1.9. CAN engine hours – select the option to use the third digital input to count engine hours. If there are data about engine hours on CAN bus, the third input will be triggered. In this case other functions of the third input are not available. "CAN engine hours" option is also available on CAN tab (see Fig.32, item 1.4).

1.10. Counter record period – if input is in Counter or Frequency mode the parameter specified the period of recording the pulses collected for this period. If the input is in Special mode parameter specified the period of recording the pulses collected within one minute. Minimum period is 5 seconds; maximum period is 3,600 seconds (1 hour). Specify "0" here to disable the recording of counters readings.

1.11. Control of inputs button – press the button to go to Control (Inputs and Outputs) tab to test operation of digital inputs of the connected device.

1.12. Default settings button – use this button to restore the default settings of digital inputs.

In the GSMConf configuration software digital input 3 stands for inverted state of the AutoGRAPH-GSM-SL device's high-impedance input, and digital input 8 stands for direct state of the high-impedance input.

Inputs 5-8

Go to the "Inputs 5-8" tab to configure parameters for digital inputs 5-8 (active high) of the device. For AutoGRAPH-GSM-SL devices digital inputs 2 and 3 are displayed on digital inputs 7 and 8 respectively.

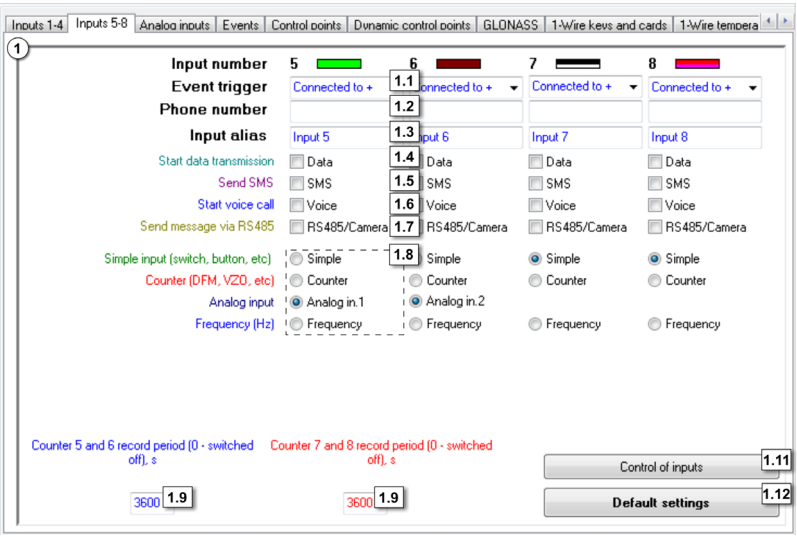


Fig.22. Inputs 5-6.

The settings of the device's digital inputs are described below:

1.1. Event trigger – select a state of input that initiates data sending ("supply (+)" or "ground (-)"). When the device's input switches to the specified state, the selected operation will be performed.

If an active high input is open-circuit it denotes logical "0".

1.2. Phone number – the device sends SMS message to specified number, when the input is triggered. Enter numbers without spaces and use prefixes for international calling (8 or +7).

1.3. Input alias – a name of a digital input which will be displayed in messages which are sent by the device to notify about the triggering of the digital input. The input alias can consist of only the characters of LATIN alphabet, e.g. "ALARM BUTTON", "INPUT 1".

The device can be set up to perform following operations if the input triggers:

1.4. Start data transmission – transfer collected data via GPRS immediately after the device's input triggering not waiting the next data transmission period. The device will perform a coordinate record, when the input is triggered.

1.5. Send SMS – send SMS message to the specified phone number, when the device's input switches to the state specified in the "Event trigger" field.
1.6. Start voice call – make the voice calls to the specified number when the input is triggered.
1.7. Send message via RS485 (RS485)/Camera – transfer the data to an external device connected to the device via RS-485 when the input is triggered (for example, to external display).

1.8. Mode of digital input. Digital inputs can operate in following modes:

- **Simple (A).** In this mode, digital inputs are monitored. When the input's state changes, the time and location data is stored into the device memory. Simple mode is useful for recording the time of different sensors' activation and for monitoring the performance of equipment and mechanisms, such as an alarm button, oil pressure sensor, ignition system, passenger presence sensor, security alarm triggering, opening of doors, limit switches of various special-purpose and construction machinery mechanisms, etc. This mode also enables the device to perform unscheduled transmission of data to the server via GPRS upon input state changes, as well as to send an SMS message to the specified phone number.

When the device input is used to connect an alarm button, it is recommended to check the "Start data transmission" box to enable immediate data transmission to the server upon the alarm button press not waiting for the next data transmission period. As a result, the data will be transferred to the server much faster and the operator will be notified about alarm situation.
If necessary, enable sending the warning SMS to inform a dispatcher or any other responsible person on an alarm situation in time (if provided that the mobile operator delivers messages in time).

- **Counter (B).** This mode is intended to track the input switching states and to count various events. This may include counting of pulses from fuel-flow pulse output sensor (of DRT-5 or VZO type), passenger count, speed sensor, tipper body lift sensor, etc. In storage counter mode, the number of pulses from each sensor is stored in memory. The location data is not stored.
- **Analog in 1 (2)** digital input of the device functions as an additional analog input: fifth digital input is used as the first analog input, sixth one is used as the second analog input.
- **Frequency (F).** This mode is intended for sensors with frequency outputs. The device is capable of measuring frequencies of 0 – 1,500 Hz. Frequency measurement mode is used, for example, for fuel level sensors with frequency outputs, engine and shaft speed sensors, proximity sensors and etc.

1.9. Counter record period – the parameter specified the period of recording the data from digital inputs 5-6 and 7-8. Minimum period is 5 seconds; maximum period is 3,600 seconds (1 hour). If you specify "0" here, the counters records won't be performed.
1.10. Control of inputs button – press the button to go to Control (Inputs and Outputs) tab to test operation of digital inputs of the connected device.
1.11. Default settings button – use this button to restore the default settings of digital inputs.

In the GSMConf configuration software digital input 3 stands for inverted state of the AutoGRAPH-GSM-SL controller's high-impedance input, and digital input 8 stands for direct state of the high-impedance input.

Analog Inputs

Go to the "Analog inputs" tab to configure parameters for analog inputs of the device. When the AutoGRAPH-GSM-SL is connected all inputs those are not supported will be hidden automatically.

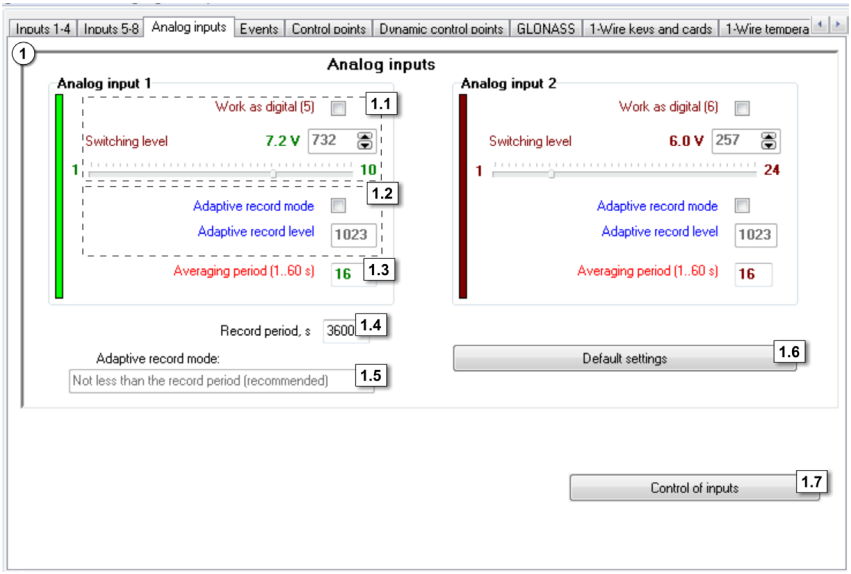


Fig.23. Analogue input.

1. Analog input 1 (2). The settings of the analog inputs are described below:

1.1. Work as digital – enables to use analog input of the device as additional digital input (first analog input is used as the fifth discrete input, second one is used as the sixth discrete input). When you use the analog input as a digital one, it reserves its functionality of analog input: it records not only switching events, but also ADC readings.

Switching level – use this option to change the level of voltage for switching of input when analog input functions as a digital one.

1.2. Adaptive record mode – (adaptive record level) – in this mode, the device will perform an additional record of readings of analog input, if the voltage level on this input changes greater than the specified adaptive record level reflected in the ADC readings.

Measuring range of the first analog input is 0 V to 10 V, second analog input is 0 V to 24 V (but not to exceed supply voltage level). Both measuring ranges are divided by 1024 ADC levels (from 0 to 1023).

1.3. Averaging period – is an averaging period of the analog input readings. Longer period provides more smoothing of analog input readings, but can cause missing of a short-term voltage spike on the input.

Recommended value of averaging period is 1 second, when using analog input as digital input on simple mode.

1.4. Record period (s) – period of recording of analog input readings to the devices memory.

1.5. Adaptive record mode settings – select one of two options:

- **A –** Not less than the record period – record of the analog input readings is performed at least as frequent as record period or is done as soon as the voltage variation on analog input (reflected in the ADC reading) exceeds the value specified in "Adaptive record level".
- **B –** Not more than the record period – record of analog input readings is performed as soon as the voltage change on analog input (reflected in the ADC reading) exceeds the value specified in "Adaptive record level", but not so frequent as the record period.

This mode implies that when another voltage values on analog inputs are recorded within the time equal to the record period, NO more voltage will be measured on any analog input.

Long averaging period and settings the analog input as a digital one provide the input operation as digital input passing short pulses and triggering only by long-term switching of the logical state.

1.6. Default settings button – use this button to restore the default settings of analog inputs. When applying these settings, the analog inputs function similar to analog inputs of the device with firmware of version under 4.0.

1.7. Control of inputs button – press the button to go to the "Control (Inputs and Outputs)" tab to test operation of digital inputs of the connected device.

Events

On the "Events" tab users can specify the parameters of events and configure response behaviour of the device on the events.

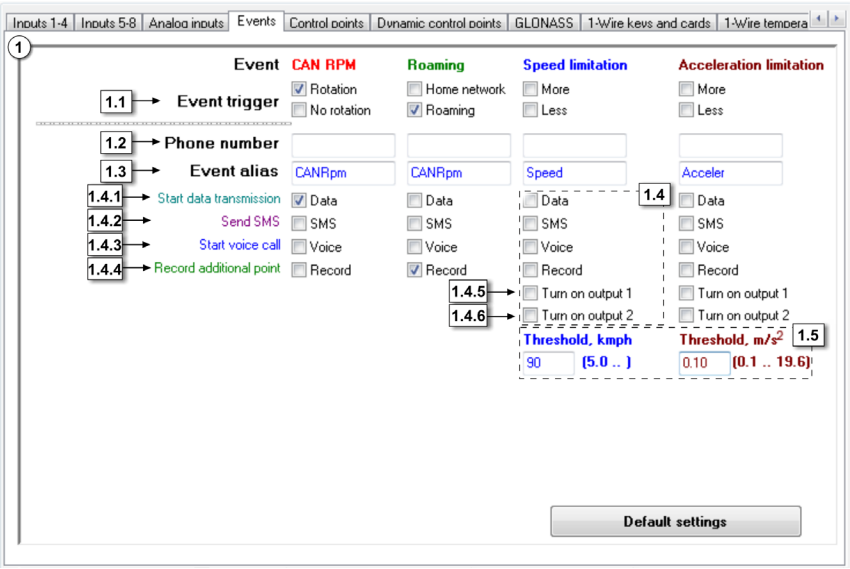


Fig.24. Events settings.

1.1. Event trigger. Select event, those initiate specified operation.

- CAN RPM: check "Rotation" or "No rotation".
- Roaming: check "Home network" or "Roaming".
- Speed limitation: check "More" or "Less".
- Acceleration limitation: check "More" or "Less".

1.2. Phone number – specify the telephone number that the device will use for notifying about the event: sending SMS or making a voice call (depending on settings). Enter number without any spaces and use prefixes for international calling (8 or +7).

1.3. Event alias – a name of an event which will be displayed in SMS messages to identify the event.

1.4. Operations. Select an operation that will be performed when selected event is triggered.

1.4.1. Start data transmission – check this box to transfer collected data to the server when selected event occurs.

1.4.2. Send SMS – check this box to send SMS notification to the specified phone number (item 1.2) when selected event occurs.

1.4.3. Start voice call – check this box to make a voice call to the specified telephone number (item 1.2) when selected event occurs.

1.4.4. Record additional point – check this box to make an additional record of coordinates when selected event occurs.

Furthermore, the user can specify following operation for “Speed limitation” and “Acceleration limitation” events:

1.4.5. Turn on output 1 – check this box to turn on output when selected event occurs.

1.4.6. Turn on output 2 – check this box to turn on output 2 when selected event occurs.

1.5. Threshold. Specify thresholds of speed (km/h) and acceleration (m/sec2), which will be used on handling of events.

Default settings button – press this button to restore default settings: each event will be assigned a default name (alias).

Control Points

On the "Control Points" tab the user can set up parameters for static control points and configure the response behaviour when the device enters to / exits from these points. There are three control points in total.

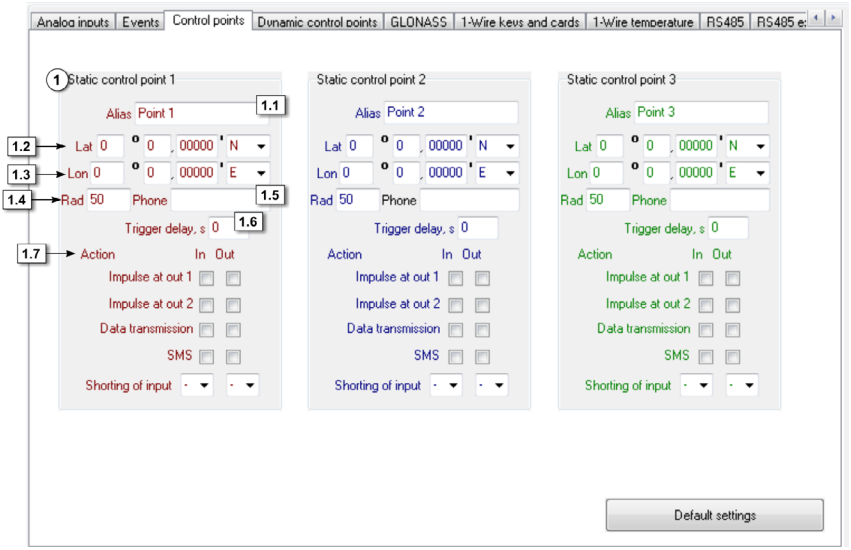


Fig.25. Control Points settings.

Use the following options to set up each control point:

1.1. Alias – a name of the control point which will be displayed in SMS messages to identify the point.

1.2. Latitude (Lat) – latitude of the control point center. To specify latitude follow the format: DD MM,sssss, where DD are degrees, MM are minutes, and sssss are seconds. Use dropdown list to select the hemisphere: Northern (N – northern latitude) or Southern (S – southern latitude).

1.3. Longitude (Lon) – longitude of the control point center. To specify longitude follow the format: DD MM,sssss, where DD are degrees, MM are minutes, and sssss are seconds. Use dropdown list to select the hemisphere: Eastern (E – eastern longitude) or Western (W – western longitude).

1.4. Rad – radius of the control point. When the device becomes closer to the center of the control point than the specified radius, the event of entering to the control point is recorded. When the device becomes farther to the center of the control point than the specified radius, the event of exiting from the control point is recorded. You can specify an action to be performed when the device enter to the control point or out from it.

1.5. Phone – number used by the device to send SMS message when the device enters to or exits from the control point. Enter numbers without spaces and use prefixes for international calling (8 or +7).

1.6. Trigger delay, (s) – period of time for which the device should be inside or outside the control point to consider entering or exiting, respectively.

1.7. Action. Select operations which are performed by the device when entering to (In) and exiting from (Out) the control point:

- **Impulse at out 1** – to send a pulse to the first output of the device;
- **Impulse at out 2** – to send a pulse to the second output of the device;
- **Data transmission** – to start data transmission to the server via GPRS immediately.
- **SMS** – to send SMS message to the specified telephone number immediately.
- **Shorting of input** – select the input, that closes when the device enters to or exits from the control point. The device will perform a record of input state. This option is available for inputs 1-6.

"Default settings" button – press this button to restore default settings.

Dynamic Control Points

Go to "Dynamic Control Points" tab to set up the parameters of control points in the device and to configure actions to be performed when the device enters to/exits from these control points.

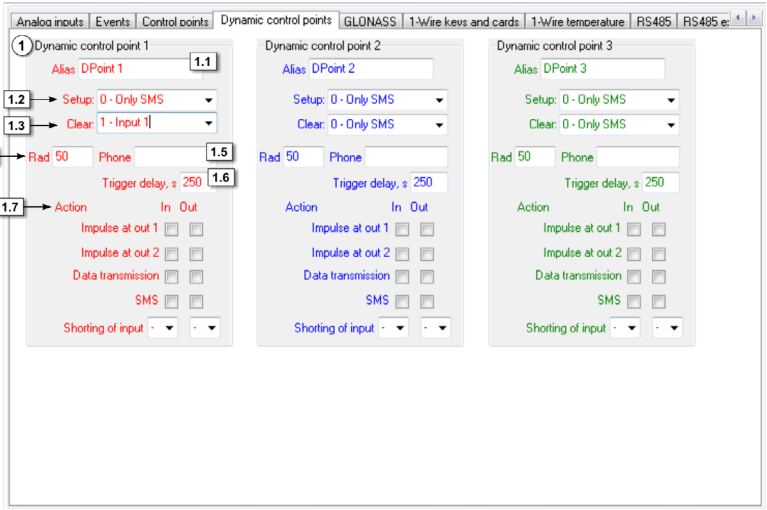


Fig.26. Dynamic Control Points settings.

Use following options to set up each control point:

1.1. Alias – name of the control point which will be displayed in SMS messages to identify the point.

1.2. Setup – select an event occurrence of which will setup a dynamic control point.

1.3. Clear – select an event occurrence of which will clear a dynamic control point.

- **Only SMS** – the option enables control point setup by the SMS command "DCPoint" used for remote configuration.
- **Input 1 (or 2-8)** - control point will be set, when selected input is triggered.
- **Can RPM** – control point will be set, when the device performs record of RPM scanned from CAN

Bus.

- **Roaming mode** – control point will be set, when the device is in roaming.
- **Speed limitation** – control point will be set, when the overspeed occurs.
- **Acceleration limitation** – control point will be set, when the current acceleration of vehicle is over specified threshold.

1.4. Rad – radius of the control point. When a vehicle becomes closer to the center of the control point than the specified radius, the event of entering to the control point is recorded. When a vehicle becomes farther to the center of the control point than the specified radius, the event of exiting from the control point is recorded. You can specify an action to be performed upon occurrence of each event associated with the control point.

1.5. Phone – a phone number used by the device to send SMS message when the device enters to or exits from the control point. Enter numbers without spaces and use prefixes for international calling (8 or +7).

1.6. Trigger delay (s) is a period of time for which the device should be inside or outside the control point to consider entering or exiting, respectively.

1.7. Action. Select operations which will be performed by the device when entering to (In) and exiting from (Out) the control point:

- **Impulse at out 1** – to send a pulse to the first output of the device;
- **Impulse at out 2** – to send a pulse to the second output of the device;
- **Data transmission** – to start data transmission to the server via GPRS immediately.
- **SMS** – to send SMS message to the specified telephone number immediately.
- **Shorting of input** – select the input, that to be closed when the device enters to or exits from the control point. The device will perform a record of input state. This option is available for inputs 1-6.

GLONASS

Go to the "GLONASS" tab to configure operation of GNSS receiver.

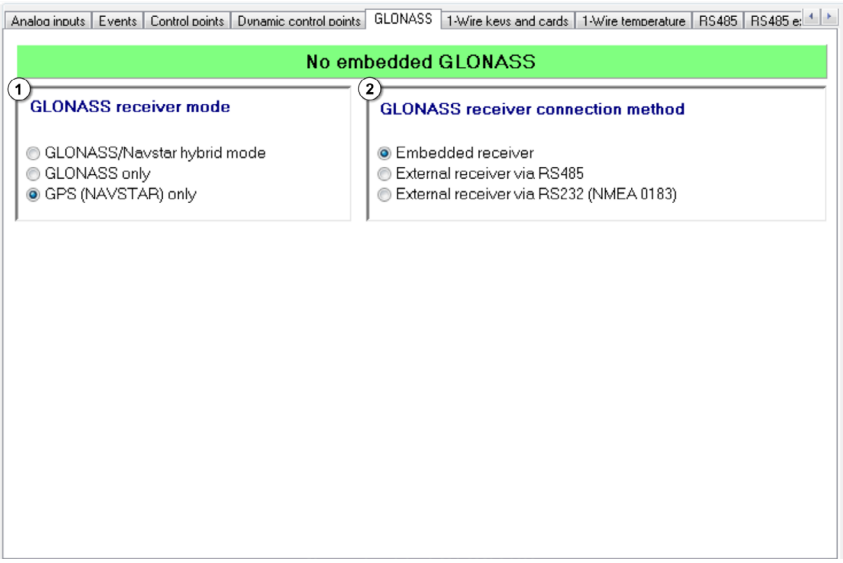


Fig.27. GNSS receiver settings.

1. Select GLONASS receiver mode:

1.1. GLONASS/Navstar hybrid mode – select the option to use GLONASS and GPS (NAVSTAR) satellites for the position fix.

1.2. GLONASS only – select the option to use only GLONASS satellites for the position fix.

1.3. GPS only – select the option to use only GPS (NAVSTAR) satellites for the position fix.

2. Specify GLONASS receiver connection method:

2.1. Embedded receiver – select the option to use the device's embedded GLONASS/GPS receiver for the position.

2.2. External receiver via RS485 – select the option to use for the position fix an external GLONASS receiver being connected to the device via RS-485.

2.3. External receiver via RS232 (NMEA 0183) – select the option to use for the position fix an external receiver being connected to the device via RS-232 and supported NMEA 0183 protocol.

1-Wire Keys and Cards

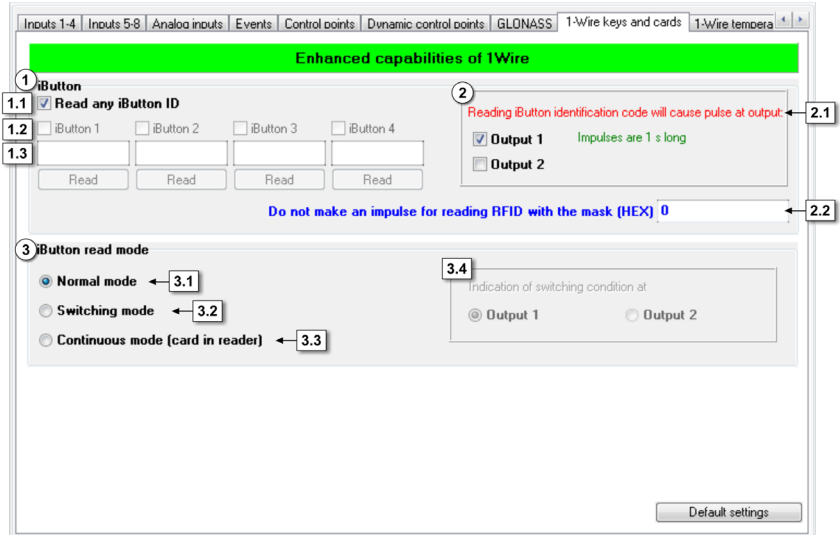


Fig.28. 1-Wire Keys and Cards.

iButton is a tool intended for identification the owner of 1-Wire device by reading the unique code programmed in that device. iButton is commonly used in systems intended to control access to equipment and devices.

Connected to the AutoGRAPH-GSM device iButton allows to identify a driver of a vehicle and select trips performed by that driver.

1.1. Read any iButton ID – if the option is selected the device will record the time of any key registration to the memory regardless of iButton ID that have been read.

1.2. iButton 1 (2, 3, 4) – this option allows to save iButton IDs (up to 4 numbers) to the devices settings. If the option is enabled, the device will read and record only specified IDs. Keys will be ignored if their IDs aren't specified in the device settings.

1.3. iButton IDs – specify iButton IDs in this field to save them in the device. To make it easy, connect iButton tool to the device and press the "Read" button to read the ID of connected key.

"Read" button – press this button to read the ID of connected iButton.

2. Set up a response of the device on reading of iButton ID.

2.1. Reading iButton identification code will cause pulse at outputs: Output 1 and / or Output 2. Impulses are 1 second long. This option applies to both normal and switching modes of iButton.

2.2. Do not make an impulse for reading RFID with mask (HEX) – specify a mask of RFID card here in hexadecimal system.

3. iButton read mode.

3.1. Normal mode – in this mode the device records iButton ID and time of its registration.

3.2. Switching mode – in this mode rereading of the card's or key's ID causes completion of the trip that has begun during initial reading. Reading of keys or cards with different IDs automatically completes the current trip and begins a new one.

3.3. Continuous mode (card in reader) – this mode implies continuous reading of card's ID by the device. For the purposes of reducing traffic the ID is recorded to the device's memory once a minute. Trip will continue until the card is in the reader.

3.4. Indication of switching condition at:

- In switching mode, Output 1 (2) switches on when the trip begins (card is being read for the first time), and switches off when the trip ends (card is being read for the second time).
- In continuous mode, LED connected to one of outputs is on while the card is in the reader.

"Default settings" button – press this button to restore default settings.

1-Wire Temperature

Go to "1-Wire Temperature" tab to configure operation of up to 8 18B20 thermometers.

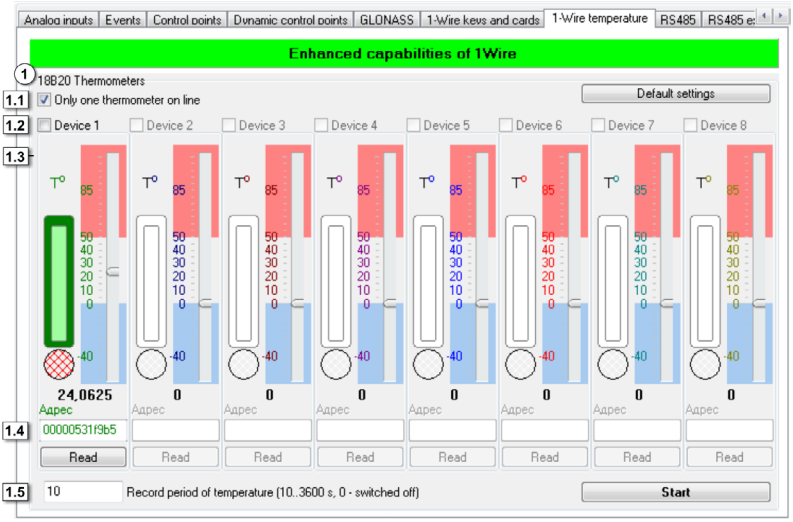


Fig.29. 1-Wire Temperature.

1. 18B20 thermometers.

1.1. Only one thermometer on line – check this box to record readings of only one thermometer connected to the device via 1-Wire.

1.2. Device 1 (2,3,4…8) – select thermometers to enable recording of their readings to the device's memory.

1.3. The sensor operation test. The diagram indicates the sensor operation. To start the test, press the "Start" button.

1.4. Thermometers' ID – specify ID's of selected thermometers. To enable the device to operate with multiple sensors, the ID of each connected sensor must be specified in the device settings. To do it, connect one sensor to the device and then read its address using the "Read" button to the required filed.

1.4. Record period of temperature (s) – is an interval of time with which the data from thermometers will be recorded. Possible values range from 10 to 3600, "0" value disables recording of temperature readings.

Simultaneous connection of 1-Wire readers and 1-Wire thermometers is supported by AutoGRAPH-GSM devices with serial number 200 000 or higher.

"Default settings" button – press this button to restore default settings.

To make diagnostic of the sensors operation:
Configure the sensors addresses connecting them alternately and reading their address to the "Address" fields. To read correct address connect only one sensor, read its address, then disconnect it. Make such configuration for each sensor operating with the device.
If the device operates with one temperature sensor via 1-Wire, it is recommended to enable the "Only one thermometer on line" option.
Press the "Start" button to start the diagnostics. The application test only those sensors which addresses has been specified.
A state of scanning of each temperature sensor indicates using three indicators. When scanning the sensor, the red round indicator turns on. If the program captures temperature reading from the sensor, the outer bar switches to green. If no reading has been captured during the current scanning, the outer bar stays white.
Inner bar indicates state of scanning in common. If the program has captured readings just for once during all period of scanning, the inner bar switches to light green. Pre scanning allows to troubleshoot sensors before installation and check settings of the device. If no readings have been captured from any sensor during the scanning it can means the sensor failure or wrong settings.

RS-485

Go to the RS-485 tab to configure and test the device's operation when using RS-485 interface. Before test connect the fuel level sensors to the device.

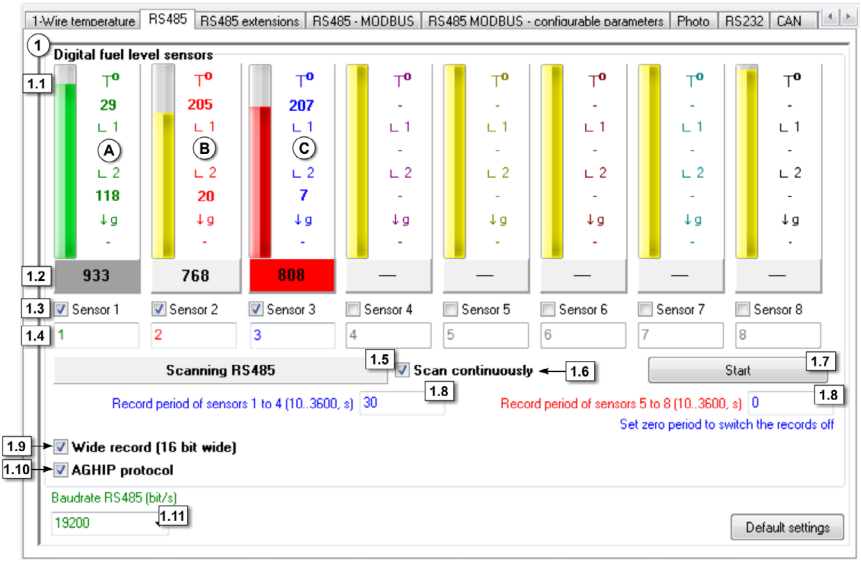


Fig.30. RS-485.

1. Digital fuel level sensors.

1.1. Level scale – during the scanning each bar displays level of fuel measured by each sensor. Addition to fuel level, the program displays temperature (°C) on the right of the bar. If the AGHIP communication protocol is enabled in the device, it is able to capture angles of slope and inclination of the sensor.

1.2. Sensor's readings – readings scanned from sensors, connected to the device.

Depending on scanning status, colours of the level scale and a field of the readings may be:
Green/Grey – if data reading is in progress (Fig.30, item A);
Yellow/White – if data has been successfully read (Fig.30, item B);
Red/Red – if data has not been read and it is more than 20 seconds since last successful reading (Fig.30, item C).

1.3. Sensor 1 (2,3..8) – select sensors for the scanning.

1.4. Network address – network address of the sensor.

1.5. Scanning RS485 – indication of scanning.

1.6. Scan continuously– if this box is checked, sensors are continuously being scanned, if the box is not checked, scanning lasts 20 seconds.

1.7. "Start / Stop" button – pressing the button starts scanning of fuel level sensors. Scanned data will be represented as a level bar and numeric values.

1.8. Record period of sensors – specify a period of recording of sensor's readings to the device's memory. Possible values range from 10 to 3600. Set '0' period to switch the records off.
1.9. Wide record (16 bit wide) – check this box to record information about fuel temperature in addition to the level data. In this case data will be 16 bit wide.
1.10. AGHIP protocol – enables data reading using the AGHIP hardware communication protocol, which, in addition to fuel level, allows to capture angles of sensor inclination and slope, and an acceleration of the force, applied to the sensor. The AGHIP protocol is intended only for communication with the TKLS fuel level sensors.
1.11. Baudrate RS-485 (bit/s) – set up baudrate of RS-485 interface. Default speed is 19,200 bit/s.

Default settings button – press this button to restore default settings.

RS-485 extensions

Go to the RS-485 extensions tab to configure operation of weight sensors, passenger traffic sensors and discrete input wider which are connected to the device via RS-485.

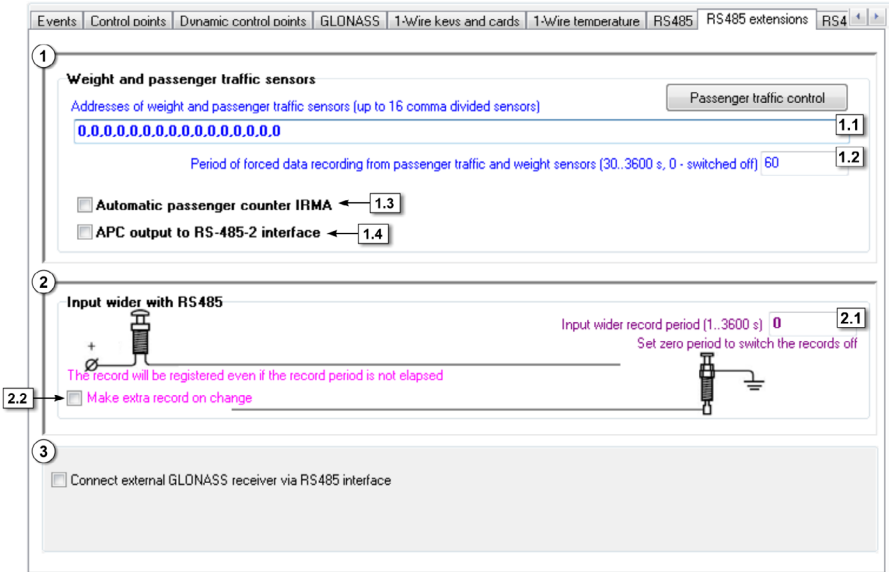


Fig.31. RS-485 extensions.

1. Weight and passenger traffic sensors.
1.1. Addresses of weight and passenger traffic sensors – specify addresses of sensors. Separate addresses by commas, possible values range from 1 to 254. The AutoGRAPH device supports connection of up to 16 sensors. Passenger traffic control button allows to go to the «Passenger traffic control» tab to control operation of passenger traffic sensors.

1.2. Period of forced data recording from passenger traffic and weight sensors – specify a period of recording the readers of passenger traffic and weight sensors. Possible values range from 30 seconds to 3600 seconds. Set 0 period to switch the records off.
1.3. Automatic passenger counter IRMA – check this box to connect automatic passenger counter IRMA to the device. When connecting IRMA system to the device, the device would not be able to interact with other devices via RS-485.
1.4. APC output to RS-485-2 interface - check this box to enable transmission of data collected with passenger counting sensors to external device, connected to the AutoGRAPH device via RS-485-2 bus.

AutoGRAPH-GSM device supports interaction with IRMA Basic, IRMA Advanced, and IRMA 3D counters being connected by means of two-wire RS485 interface using IBIS protocol.

2. Input wider with RS485.
2.1. Input wider record period (s) – period of recording the data from the input wider. Possible values range from 1 second to 3600 seconds, zero period switches the record off.
2.2. Make extra records on change – check this box to enable to make an additional record on change of input state. The record will be registered even if the record period is not elapsed.

3. Others.
- **Connect external GLONASS receiver via RS485 interface** – check this box, an external GLONASS/GPS receiver is connected to the device via RS485. This option is also available on GLONASS tab (see Fig.27, item 2.2).

RS485-MODBUS

On the RS485-MODBUS tab users can configure the device to operate with devices connected to the device via MODBUS.

1. MODBUS temperature sensors.
MODBUS can be used to connect multiple temperature controllers to the device. Each temperature controller provides operation with multiple temperature sensors. Readings of each sensor are recorded into the certain registers of the controller.
By default, settings of EVCO temperature controllers are displayed in the GSMConf software. The user can set up the device to operate with other temperature controller. Detailed information on the controller setting is usually given in technical documentation supplied with the controller.
Configure following parameters for each temperature sensor:
1.1. Temperature sensor 5 (6-8) – number of temperature sensor connected to the device. Data acquired from temperature sensor (for example, sensor 5) will be recorded to the readings of a corresponding 1-Wire sensor (1-Wire 5th sensor).

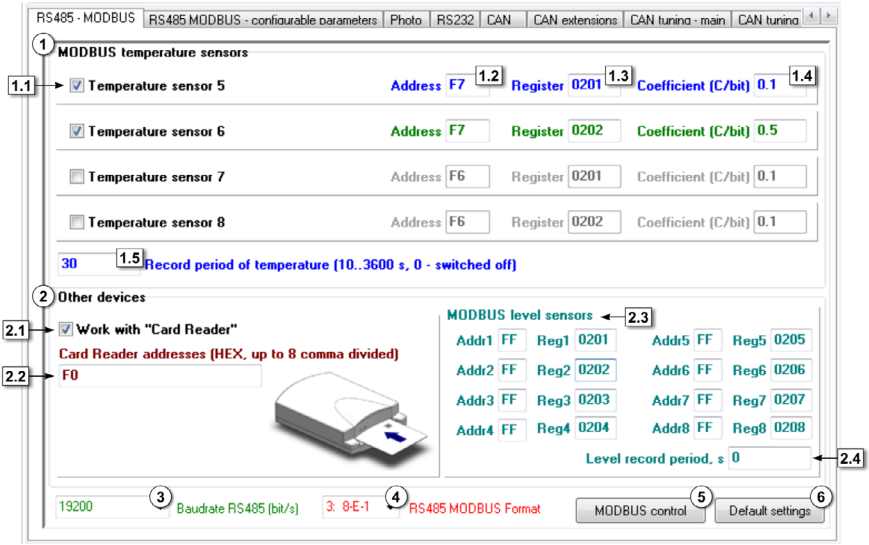


Fig.32. RS485 – MODBUS.

1.2. Address is a bus address of the controller to which the sensor is connected. By default this value is A7 for EVCO controllers. When connecting several temperature sensors, their addresses may be other than A7.

1.3. Register – register of controller which stores temperature reading. By default (for EVCO controllers) this value is 0201 for the first sensor, and 0202 for the second sensor.

1.4. Coefficient (C/bit) – a coefficient to convert register value to degrees. Coefficient should be specified in C°/bit. By default this value is 0.1 C°/bit for EVCO controllers.

1.5. Record period of temperature – specify the record period of temperature, measured by EVCO sensors. Minimum period is 10 seconds, maximum period is 3600 seconds. Set zero period to disable the data record. This option is also available on the 1-Wire Temperature tab.

2. Other devices.

2.1. Work with "Card Reader" – check this box to enable interaction of the device with AutoGRAPH-CR device manufactured by TechnoKom and connected to the device via RS485-MODBUS.

2.2. Card Reader address (HEX) – bus addresses of AutoGRAPH-CR devices. The addresses should be specified in HEX format, comma separated. Up to 8 card readers can be connected to the device simultaneously. If only one card reader is connected to the device, its default address is F0.

2.3. MODBUS level sensors – specify the bus address of the controller (Addr) to which the level sensor is connected. Also a register of the controller (Reg) used to capture data from sensor should be specified. AutoGRAPH-GSM device supports connection of up to 8 sensors via MODBUS bus.

2.4. Level record period, sec. – specify an interval of time at which the device will record data from level sensors connected with MODBUS bus. The period should be specified in seconds.

3. Baudrate RS485 – set up a baudrate of RS485 interface. Recommended rate for EVCO controllers

is 9,600 bit/s, however you can customize this value. This option is also available on "RS485" and "RS485 MODBUS – configurable parameter" tabs. If you need to connect several different devices to the device concurrently, for example fuel level sensors (LLS) and temperature sensors, these devices should support the same baudrate.

4. RS485 MODBUS Format – select data format. Format specified in AutoGRAPH-GSM controller should comply with the format specified in the device being connected to the controller via RS-485 MODBUS bus:

- 8-N-1 – 8 data bits, no parity check, 1 stop bit.
- 8-N-2 – 8 data bits, no parity check, 2 stop bits.
- 8-O-1 – 8 data bits, odd parity, 1 stop bit.
- 8-E-1 – 8 data bits, even parity, 1 stop bit.

5. MODBUS control button – allows to go to the «MODBUS control» tab to control operation of MODBUS sensors.

6. Default settings button – press this button to restore default settings.

RS-485 MODBUS – configurable parameters

On the "RS485 MODBUS – configurable parameters" users can configure different sensors connected to the AutoGRAPH-GSM device with RS485 MODBUS bus.

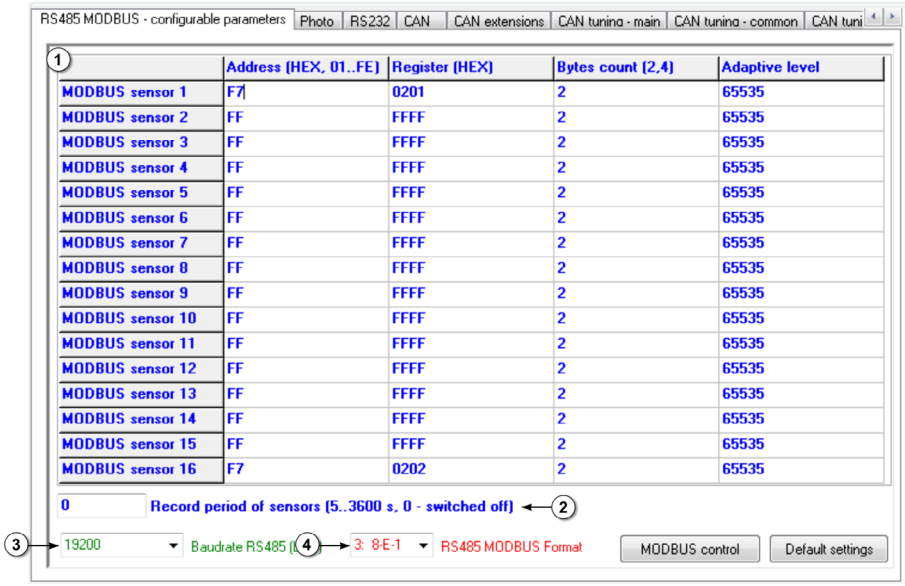


Fig.33. RS485 – RS485 MODBUS – configurable parameters tab.

1. MODBUS sensor 1-16 – configurable sensors connected to the controller via RS485 MODBUS bus. Configure following parameters for each sensor:

- **Address (HEX)** - specify a MODBUS address of the controller to which the concerned sensor is connected. Specify address in HEX format.
- **Register (HEX)** – specify a register of the controller which is used to capture data acquired from the concerned sensor. Specify number of the register in HEX format.
- **Bytes count (2, 4)** – specify number of data bytes to be read from the bus: 2 or 4 bytes. By default one MODBUS register is 2 bytes wide. The device can read 1 or 2 registers at a time.
- **Adaptive level** – when the sensor's reading reflected in ADC readings changes greater than the value specified in Adaptive level field, the device makes an additional record of readings not waiting for the next record period.

2. Record period of sensors – an interval of time at which the device will record data from the sensors to its internal memory. Specify this period in seconds, possible values range from 5 to 3600, zero period switches records off.

3. Baudrate RS-485 (bit/s) – a baudrate of RS-485 interface. This option is also available on "RS485" and "RS485 MODBUS" tabs. If you need to connect several different devices to the device concurrently, e.g. fuel level sensors (LLS) and temperature sensors, these devices must be support the same baudrate.

4. RS485 MODBUS format – select data format. Format specified in AutoGRAPH-GSM controller should comply with the format specified in the device being connected to the controller using RS-485 MODBUS bus:

- 8-N-1 – 8 data bits, no parity check, 1 stop bit.
- 8-N-2 – 8 data bits, no parity check, 2 stop bits.
- 8-O-1 – 8 data bits, odd parity, 1 stop bit.
- 8-E-1 – 8 data bits, even parity, 1 stop bit.

This option is also available on "RS485 – MODBUS" tab.

MODBUS control button – allows to go to the «MODBUS control» tab to test operation of MODBUS sensors.

Default settings button – allows to set default MODBUS settings in the device.

Photo

On the "Photo" tab the customer can configure cameras, connected to the device via RS-485 bus. Interaction with camera is supported by the AutoGRAPH-GSM devices equipped with additional memory for storing photos. The AutoGRAPH-GSM device is equipped with the slot for connecting microSD card, the AutoGRAPH-GSM+ device is equipped with internal eMMC memory. Up to 16 cameras can be connected to the device simultaneously.

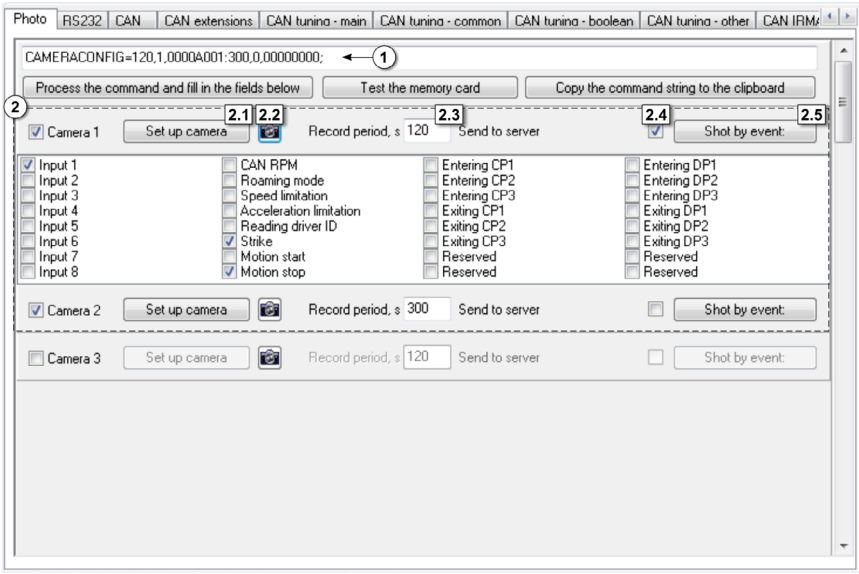


Fig.34. Photo settings.

1. Control command. CAMERACONFIG command provides remote configuration of cameras connected to the device. When changing settings in the tab, corresponded parameters of the command are automatically specified. The specified command can be sent to the device via server or SMS. To copy the command, press "Copy the command string to the clipboard" button. To get cameras' configuration from the device, send the GCAMERACONFIG; command. To fill the fields in the tab with the requested settings, paste the reply in the program and press "Process the command and fill in the fields below" button.

Photos are stored in the additional memory of the device. To troubleshoot the memory and copy photos to local folder, the customer can on the "SD/MMC Browser" tab. To go to this tab, press "Test the memory card" button.

2. Camera's settings.

Before connection, all cameras must be configured. To enable camera, check the box of this camera.

2.1. "Set up camera" button – allows to assign address to connected camera. To assign an address, connect only one camera to RS-485-2 bus of the device and press the button. If more than one camera is connected to the device, it will be unavailable to assign the address.

2.2. "Make shot" button – allows to take a test photo. The photo will be stored in the device's memory.
2.3. Record period, s – period of photo recording to the device memory.
2.4. Send to server – an option, which enables photo transmission to the server upon its recording. If the option is disabled, photos will be stored in the device's memory and sent to the server by request.
2.5. "Shot by event" button - allows to set up cameras to make shots by different events. Pressing the button opens a list of events, which the device is able to capture. Select necessary events.

RS-232

On the "RS-232" tab you can select mode of RS-232 operation. RS-232 interface is supported by upgraded AutoGRAPH-GSM+ and AutoGRAPH-WiFi-GSM+ devices.

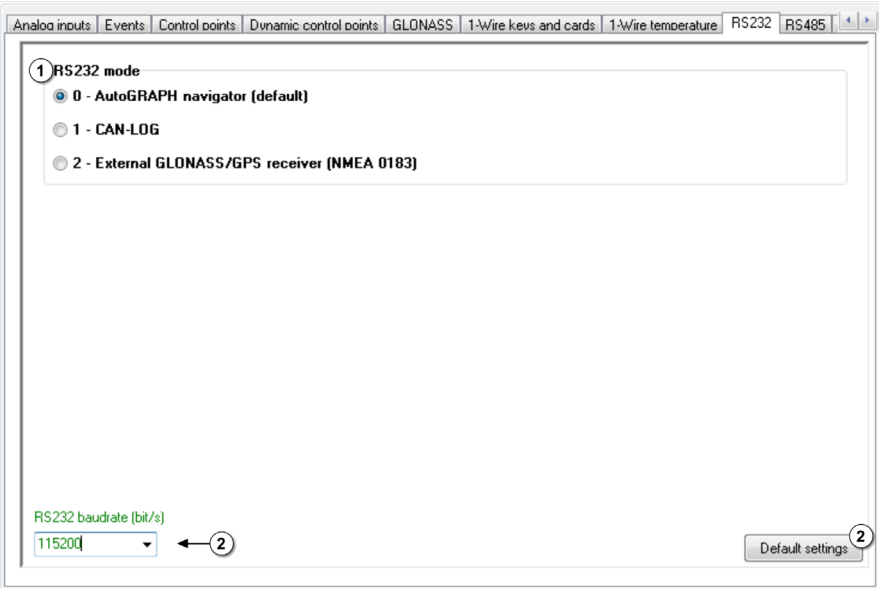


Fig.35. RS-232 tab.

1. RS-232 mode:

- **0 – AutoGRAPH navigator (default)** – select the option to configure the device to work with AutoGRAPH-Navigator device using RS-232 interface. This mode is set by default.
- **1 – CAN-LOG** – select the option to configure the device to work with CAN-LOG device using RS-232 interface.
- **2 – External GLONASS/GPS receiver (NMEA 0183)** – select the option to configure the device to work with external GLONASS/GPS receiver which supports NMEA 0183 protocol.

2. RS-232 baudrate – specify RS-232 interface baudrate in bit/s. Default rate is 115,200 bit/s.

3. Default settings button – press this button to restore default settings.

CAN

Go to "CAN" tab to configure operation of the device when using CAN bus.

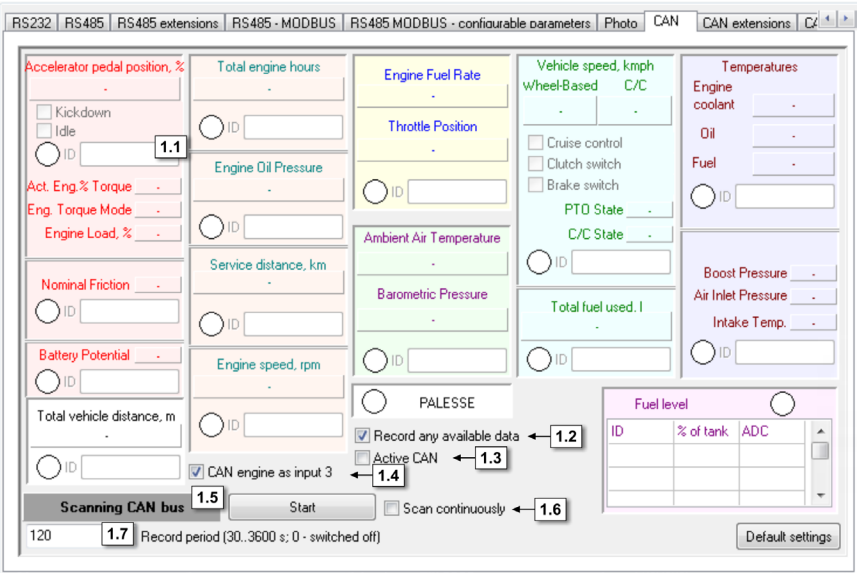


Fig.36. CAN.

Enable the "Use simple CAN settings" option on the "CAN" tab if it is disabled. The box checking enables the menu intended to set up identificator of reading from vehicle CAN bus and capture specified readings:

1.1. ID – use this field to specify the identificator. The device will record message from CAN bus, if its identificator specified in the device settings.
1.2. Record any available data – check this box to record all data with identifiers known to the device.
1.3. Active CAN – in this mode the device constantly requests data from CAN Bus. When this mode is enabled the device not only receives data from CAN bus but also sends messages to the bus. It is recommended to enable this mode only when it is necessary.
1.4. CAN engine as input 3 – select the option to use the third digital input of the device to count engine hours. If there are engine hour readings from CAN bus, the third input will be triggered. In this case other functions of the third input are not available.
1.5. Start / Stop button – press this button to start scanning of CAN bus, press the button again to stop scanning. Progress of scanning is displayed in "Scanning CAN bus…" field (item 1.5).
1.6. Scan continuously – if this box is checked, scanning will be performed continuously.
1.7. Record period (s) – specify a record period of readings from CAN bus to the device's memory. Possible values range from 30 to 3600, 0 value switches the record off.

"Default settings" button – press this button to restore default settings.

CAN extensions

On the CAN Extensions tab you can configure additional parameters of CAN bus of the device.

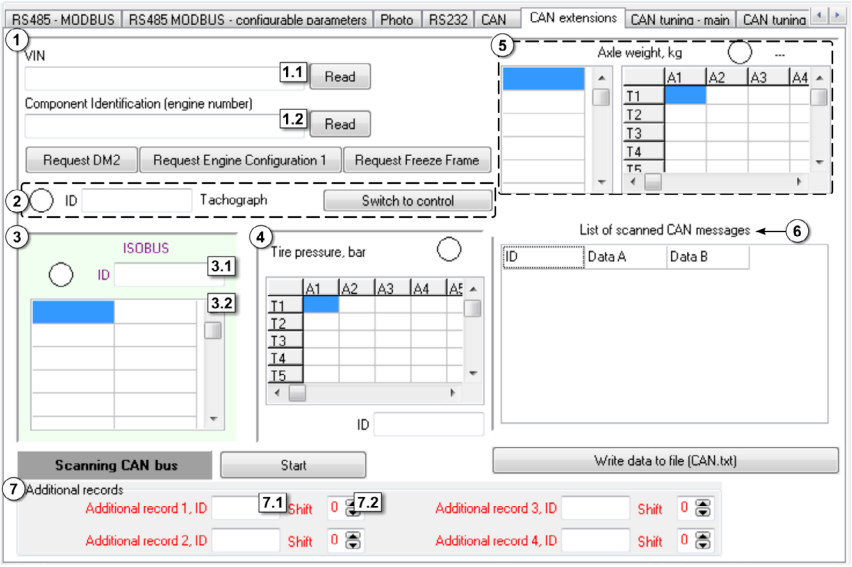


Fig.37. CAN Extensions.

Connect the device to CAN Bus of vehicle. Also connect the device to a PC. On the "CAN Extensions" tab, enable the "Use simple CAN settings" option, if it is disabled. After that, the menu for customizing extension CAN records will be displayed. Specify IDs of available CAN records and start the scanning. All data received by the device will be displayed on this tab.

1. Request data from CAN Bus. Options on this sections intended to receive vehicle engine parameters from CAN bus.

1.1. VIN – VIN code of a vehicle will be displayed here when requested. Press the "Read" button to request VIN.

1.2. Component Identification – engine number of a vehicle will be displayed here when requested. Press the "Read" button to request an engine number from CAN Bus.

Request DM2, Request Engine Configuration 1 and Request Freeze Frame buttons provide request of BCX, DM2, Freeze Frame data from CAN Bus. The data will be recorded in the device.

2. Tachograph – specify ID of a tachograph's records to enable recording of data, received from tachograph. The "Switch to control" button allows to go to the "Tachograph" tab to check the device operation with tachograph.

3. ISOBUS.

3.1. ID – identifier of ISOBUS parameter.

3.2. Data – this field will be autocompleted with data with specified identifier, when scanning the CAN bus.

4. Tire pressure, bar.

- **ID** – specify identifier of the record associated with the tire pressure.
- When scanning the bus, all acquired data will be displayed in a table. T1..T15 are axles of a vehicle, A1..A15 are wheels attached to these axles.

5. Axle weight, kg.

5.1. ID – when scanning the bus identifiers of the axle weight records will be added to this list.

5.2. Data – data from CAN bus on the axle weight.

6. List of scanned CAN messages – all messages scanned from CAN bus will be displayed here. This table contains records (Data A, Data B) and their identifiers (ID).

"Start / Stop" button – press the button to start scanning of CAN bus. Press the button again to stop scanning. If the option "Scan continuously" is enabled on "CAN" tab, scanning is performed continuously. Scanning progress is displayed in "Scanning CAN bus" field.

"Write data to file (CAN.txt)" button – press the button to write all data scanned from CAN bus to CAN.txt file.

7. Additional records.

7.1. Additional record 1 (2..4), ID – this field is intended for recording additional data. Specify appropriate record shift to display selected value.

CAN tuning

Tuning of CAN protocol is available for devices with firmware ver. 10.30 and higher. To tune the protocol go to the "CAN tuning - main" tab (or "CAN tuning - common", "CAN tuning - boolean", "CAN tuning – common" and "CAN tuning – other") and enable the "Use tune CAN settings" option.

CAN TUNING – MAIN

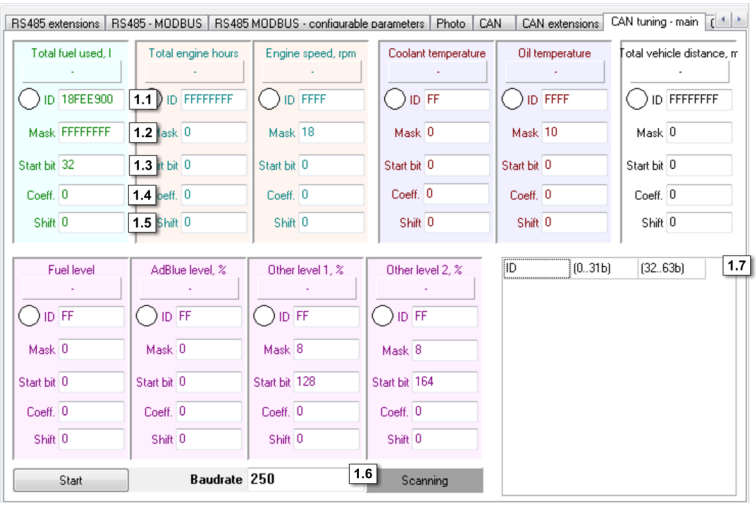


Fig.38. CAN tune – main.

1.1. ID – an identifier of record from CAN bus. Specify identifier in HEX format, use only uppercase letters.
1.2. Mask – a mask that determines number of bits to be read for the required parameter. Specify mask in HEX format, use only uppercase letters.
1.3. Start bit – a start bit which is the beginning of the set of data. Data (Data A and Data B) is represented as a single 64 bit number. Start bit is represented as a decimal number.
1.4. Coeff. – dimension of a parameter. It is determined by the used protocol of CAN.
1.5. Shift – initial value of a parameter which corresponds to "0" value in CAN bus.
"Start/Stop" button – press this button to start / stop scanning of CAN bus. Scanning progress is displayed in "Scanning" field.
1.6. Baudrate – CAN scanning baudrate in Kbit/s. Possible values: 100, 125, 250, 500, 1000.
1.7. Bus records – while scanning all records from CAN bus will be added to this list. Each record is accompanied with identifier (ID), data is displayed by 32 bits: from 0 to 31 bits and from 32 to 63 bits.

By default the options on the tab specified for J1939 standard of CAN Bus.

CAN TUNING – COMMON

Settings on the "CAN tune – common" tab are similar to settings on the "CAN tune – main" tab.

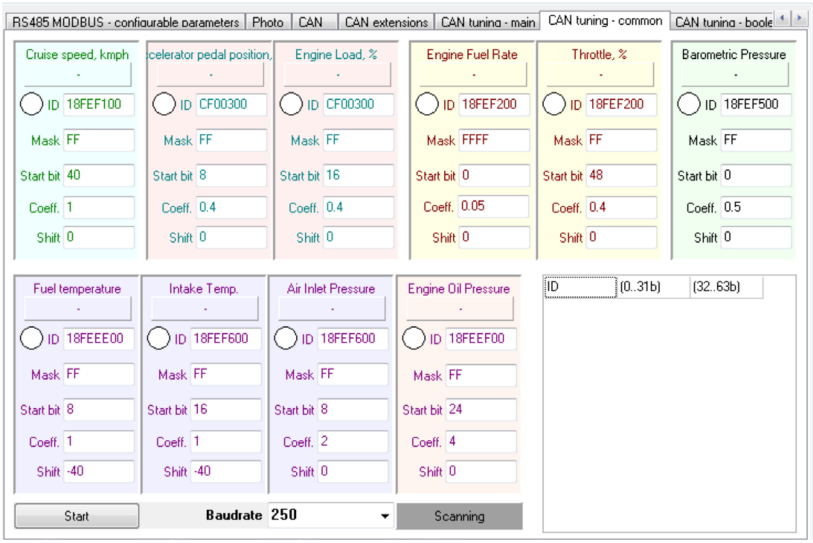


Fig.39. CAN tune - common.

CAN TUNING – BOOLEAN

On the "CAN tune – boolean" tab users can customize discrete records of CAN: cruise control state, brake switch, clutch switch, parking brake, kickdown state, idle and 10 additional records. To set up records, specify following parameters: IDs (ID, item 1.1), mask (Mask, item 1.2), and start bit (Start bit, item 1.3) for the records.

Fig.40. CAN tune - boolean.

CAN TUNING – OTHER

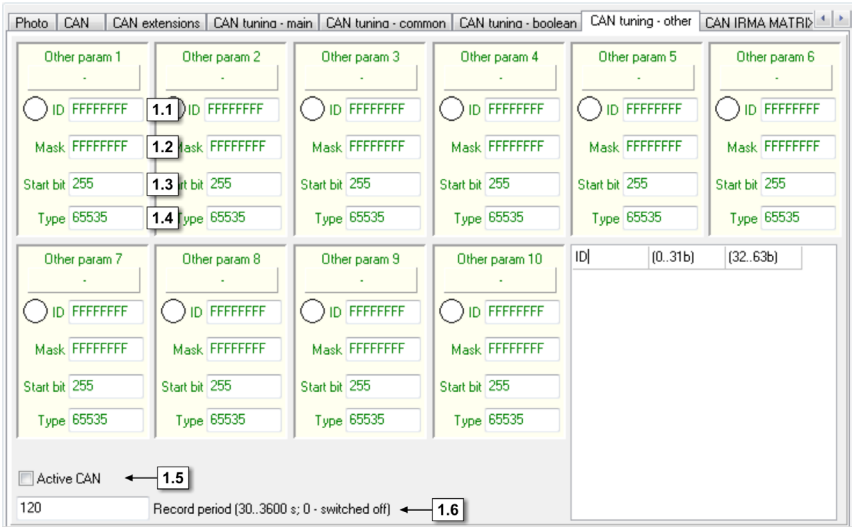


Fig.41. CAN tune - other.

On the "CAN tune – other" tab, user can customize additional records of CAN.
Configure following parameters for each record:
1.1. ID – an identifier of record from CAN bus. Specify the ID in HEX format, use only uppercase letters.
1.2. Mask – a mask that determines number of bits to be read for the required parameter. Specify mask in HEX format, use only uppercase letters.
1.3. Start bit – a start bit which is the beginning of the set of data. Data (Data A and Data B) is represented as a single 64 bit number. Start bit is represented as a decimal number.
1.4. Type – a type assigned to each record to identify this record. Type of CAN parameter recording may range from 1 to 65524. "0" and "65525" disable recording of this parameter.
Active CAN - in this mode the device constantly requests data from CAN Bus.
Record period - specify a record period of readings from CAN bus to the device's memory. Possible values range from 30 to 3600, 0 value switches the record off.

CAN IRMA MATRIX

This tab is used to configure parameters of IRMA MATRIX passenger counting sensor connected to the device via CAN interface.

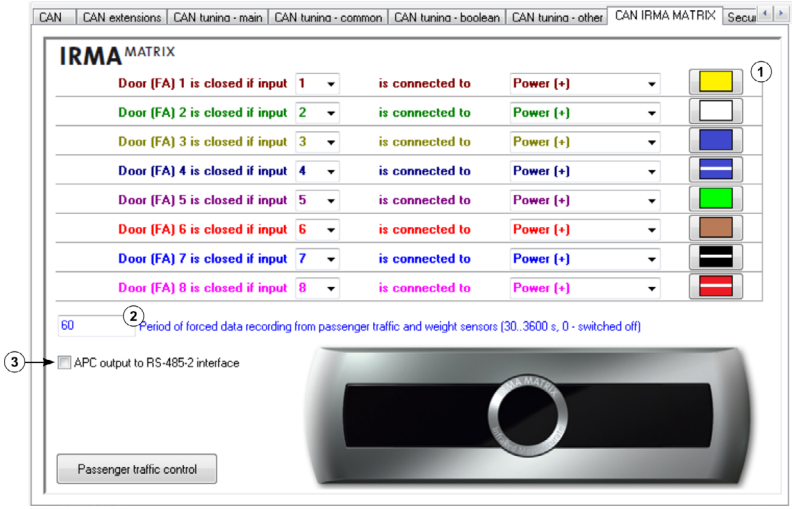


Fig.42. "CAN IRMA MATRIX" tab.

Go to the "CAN IRMA MATRIX" tab and enable CAN IRMA MATRIX option, if it is disabled. After that you will see menu for customizing of sensor operation (Fig.42).
Specify the state of one of eight device's inputs associated with the closed door for each vehicle door. Number of passengers is estimated on the basis of state of the door where the sensor is installed.
Press a shortcut button (Fig.42, item 1) to go to the necessary tab: "Inputs 1-4" or "Inputs 5-8" tabs.
Any change of sensor state is captured by the device and recorded to the memory. If there is nothing to record, the device scans the sensor in specified period and makes a forced record.

Period of forced data recording from passenger traffic and weight sensors (Fig.39, item 2) should be specified in seconds, minimum value is 30 seconds, maximum value is 3600 seconds, zero period switches the record off.

"APC output to RS-485-2 interface" option (Fig.42, item 3**)** provides transmission of data collected with passenger counting sensors to external device, connected to the AutoGRAPH device via RS-485-2 bus.

"Passenger traffic control" button provides quick access to the "Passenger traffic control" tab to troubleshoot passenger counting sensors connected to the AutoGRAPH device.

Security

Go to the "Security" tab to configure protection of the device against unauthorized alteration of its settings (for firmware 4.2 and higher, starting from serial number 26500).

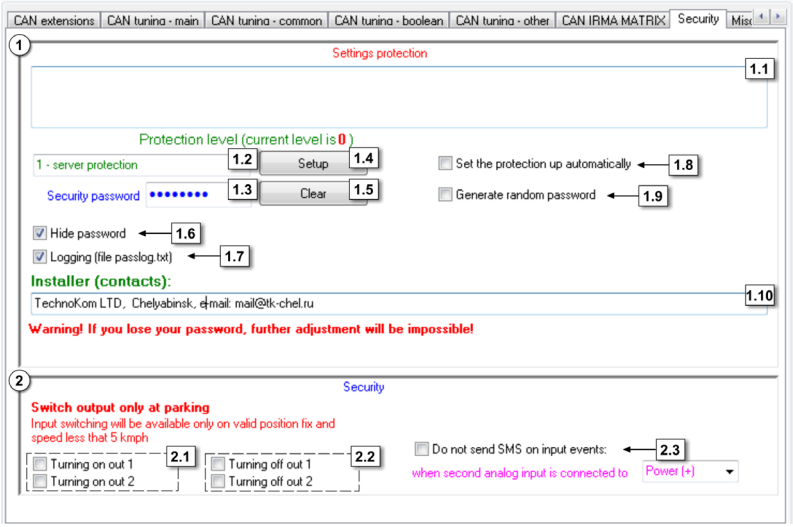


Fig.43. "Security" tab.

1. Settings protection.

1.1. When the device is connected to a PC this field displays details on the company that provides protection of settings.

1.2. Protection level – the device supports following levels of protection:

- 0 – no protection – data can be configured and saved without a password.
- 1 – server protection – enable protection of all server settings. Changing of the settings will be available neither by the configuration software nor using the commands of remote configuration.
- 2 – full protection – all of settings of the device will be protected. Changing of them neither by the configuration software nor by the commands of remote configuration will be available.

1.3. Security password – this field is intended for a password to protect settings. Password should contain EXACTLY 8 CHARACTERS. Password may contain numbers from 0 to 9, and letters of Latin alphabet. Letters may be upper- or lowercase. The user can choose a word and add necessary number of characters to its end. For example "avto0000".

1.4. "Setup" button – press the button to set up protection with the specified password to the settings.

1.5. "Clear" button – press the button to cancel the protection.

1.6. "Hide" password – hide password under the asterisk when entering. Be careful typing a password, when it is hidden. If you make a mistake, further adjustment will be impossible!

1.7. Logging (file passlog.txt) – when you check this box a file (passlog.txt) is automatically generated and saved in GSMConf directory. This file consists of following parameters:

- Device's serial number.
- State of protection, its level and password.
- Date and time of all operations concerning protection.

1.8. Set the protection up automatically – the option allows to set up settings protection automatically when saving the configuration. If the option is disabled the password typed in the "Security password" field will apply. If the password is not specified, the application will show error message.
1.9. Generate random password – when you check this box, the software generates a random password containing 8 characters.
1.10. Installer (contacts) – use this field to specify details of the company which provided the protection. This option is supported only by devices with firmware ver. 10.20 and higher.

How to set the protection:
1. Launch GSMConf software.
2. Connect the device to a PC using USB cable.
3. Configure parameters of the device.
4. Go to the "Security" tab of complex view.
5. Type the security password in "Security password" field (password has to contain 8 characters which may be Latin letters and numbers).
6. Select necessary protection level in field 1.2.
7. Press "Setup" button (item 1.4). Protection will be set to the device.
8. Connect the device again and ensure that the protection is enabled. You should see the selected protection level in "Protection level" field.

How to clear the protection:
1. Launch GSMConf software.
2. Connect the device to a PC using USB cable.
3. Go to "Security" tab of the complex view.
4. Type a security password that has been set to the device previously.
5. Press "Clear" button (item 1.5). Protection will be disabled.
6. Connect the device again. Make sure that the protection is disabled. You should see "0" level in "Protection level" field.

If the "Logging (file passlog.txt)" option is enabled, the application generates [device_No.]pass.txt file in the \PASS\[device_No.] folder where the device password is stored. When connecting the device to PC, the application check the log-file for the device password and apply it, if it is found.

2. Security. For the avoidance of incidents the output switching is available only on valid position fix and speed less than 5 km/h!
2.1. Turning on out 1(2) – to turn on output 1(2) ONLY at parking.
2.2. Turning off out 1(2) – to turn off output 1(2) ONLY at parking.
If the device's firmware supports motion detection (the "Motion detection" tab is available), the stop is detected according the device's settings. The motion detection is supported by the devices with firmware ver. 9.67 and higher.

2.3. Do not send SMS on input events:
- **when second analog input is connected to "Power (+)"/"Ground (-)"** – if the 2nd analog input is in the specified state, SMS message on input triggering will not be sent.

Miscellaneous

Go to the "Miscellaneous" tab to configure additional options of the device.

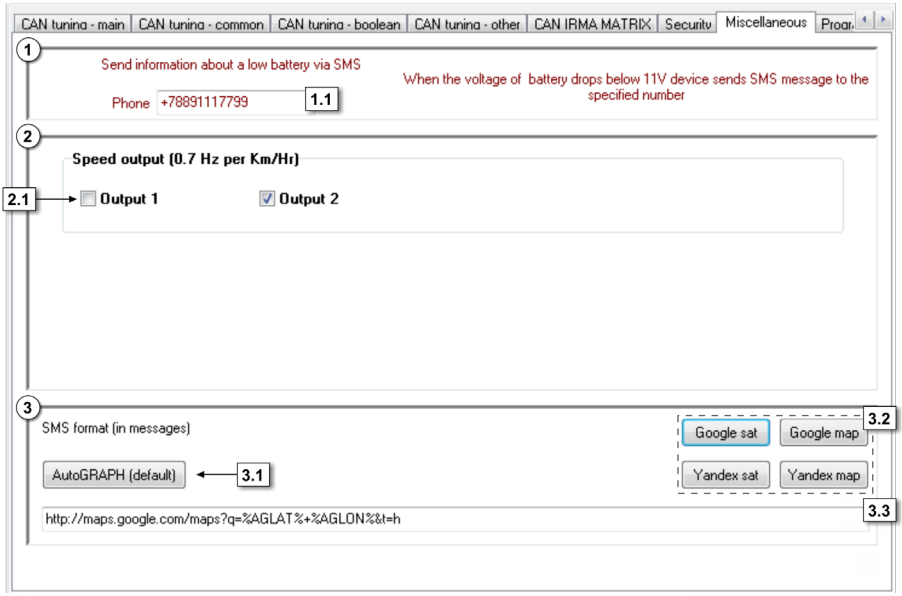


Fig.44. "Miscellaneous" tab.

1.1. Phone – when the voltage of battery drops below 11 V, the device sends SMS message to this telephone number. Enter number without spaces and use prefixes for international calling (8 or +7).

2. Speed output (0.7 Hz per km/Hr) option enables to use Output 1(2) as a frequency one to connect electronic speedometer with frequency output.

2.1. Output 1 (2) – check the appropriate box to select the output you want to use as a frequency one.

3. SMS format – select one of available options. Coordinates will appear in SMS messages as a link to the selected web mapping service. The setting will apply to all SMS messages being sending by the device.

3.1. AutoGRAPH (default) – AutoGRAPH format. This format is used by default. Press this button if you want to use this format for SMS messages.

3.2. Shortcut buttons allows to select the required format:

- Google sat ;
- Google map;
- Yandex sat;
- Yandex map.

3.3. Link format. Specify the link to the required web mapping service and change latitude to %AGLAT% and longitude to %AGLON% variables.

Key

The "Key" tab is available for software of GSMConf_key version.

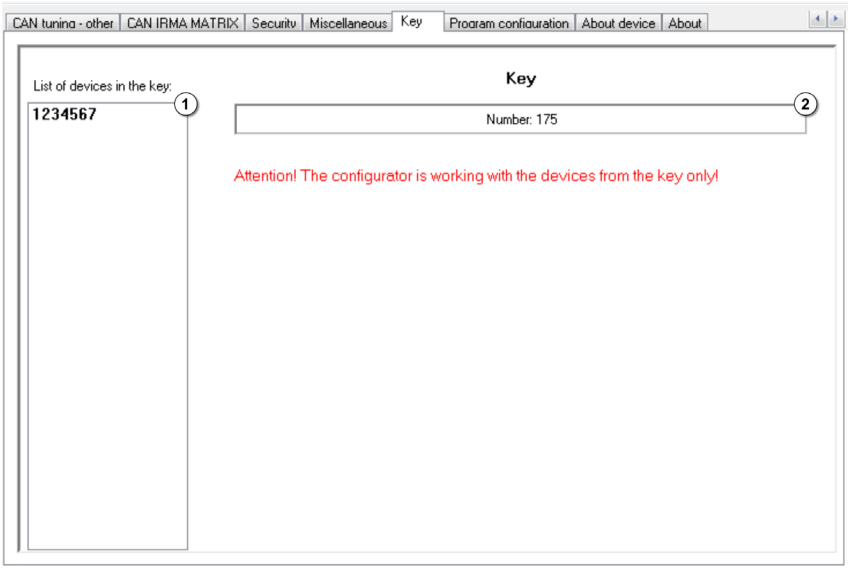


Fig.45. "Key" tab.

The GSMConf_key version is intended to operate with AutoGRAPH devices specified in a key file. The key is a file of the .confkey format containing a list of devices which are available for the user to configure using the GSMConf software. Key should be located in a folder with GSMConf.exe. After running the GSMConf_key application, it checks whether any key file is in the application folder. If the key file is found, the application loads the list of devices from that file and enables their setting. On the "Key" tab the user can view the key file content. The list of devices specified in the key file is displayed in the "List of devices in the key" filed (Fig.45, i.1). If the connected device is not specified in the key file, an error message will be displayed (Fig.46).

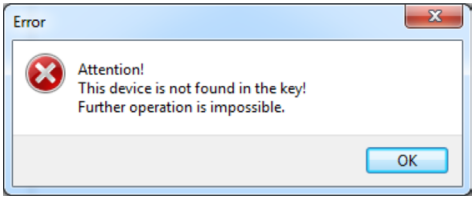


Fig.46. Error message.

The key identificator is displayed in the "key" field (Fig.45, i.2).

About device

On the "About device" tab you view the structure diagram of the connected device. Diagram varies according to hardware version of the device connected to a PC.

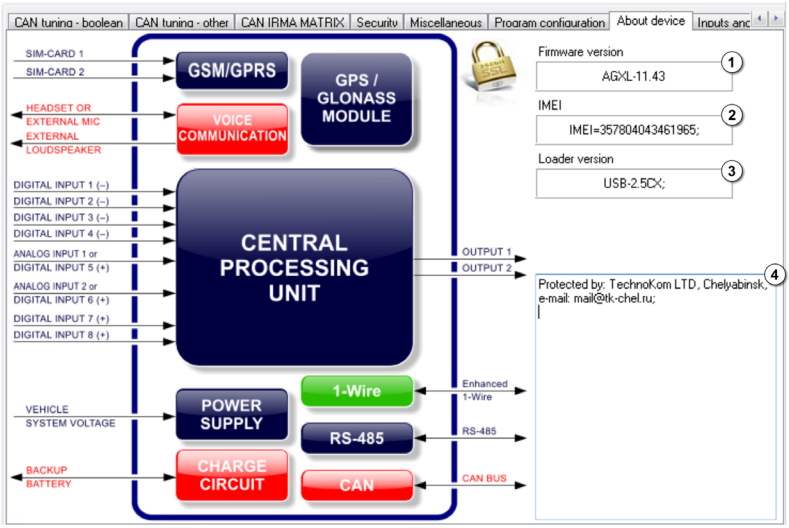


Fig.47. "About device" tab.

In addition to the structure diagram, general information on the connected device is displayed on the tab:

1. Firmware version.
2. IMEI of device's modem.
3. Loader version.
4. Protection installer – details of the company which provided the settings protection.

If the connected device supports secured connection with the server, the icon  is displayed on the "About device" tab.

Hardware lock

Go to the "Hardware lock" tab to enable functions of the AutoGRAPH-GSM-SL device if it is supplied with disabled functions. To unlock device's functions, special password is required. Each function requires an individual password.

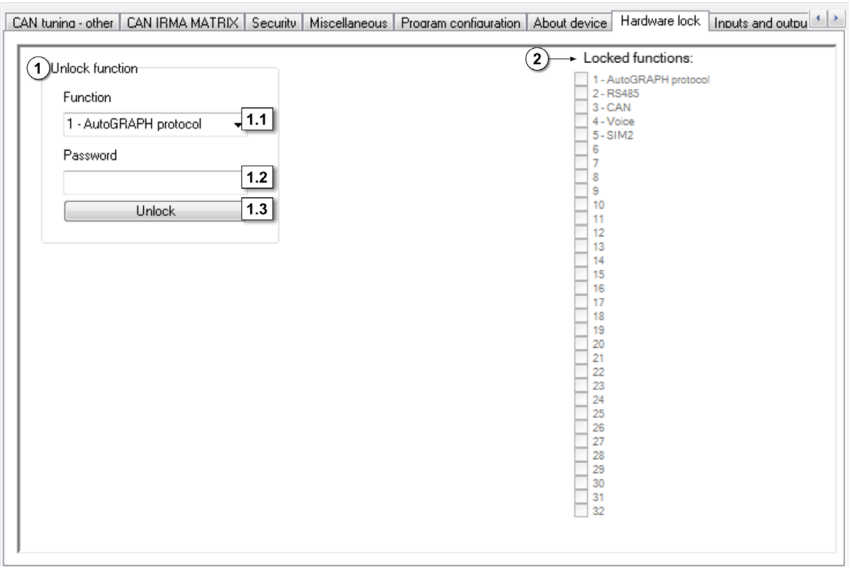


Fig.48. "Hardware lock" tab.

1. Unlock function.

1.1. Function – use this drop-down list to select a function that you want to unlock:

- **1 – AutoGRAPH protocol** – check this item to be able to transmit data to the server via AutoGRAPH protocol. This protocol is required to transfer data to the AutoGRAPH server and to further process data by the AutoGRAPH dispatch software.
- **2 – RS-485** – unlock RS-485 interface.
- **3 – CAN** – unlock CAN interface.
- **4 – Voice** – enable voice communication function.
- **5 – SIM2** – unlock support of the second SIM.

By default AutoGRAPH-GSM-SL devices transmit data using protocol of Order 285. Devices which do not support AutoGRAPH protocol could transfer data to AutoGRAPH server using AutoGRAPH-Transcoder service.

1.2. Password – eight-digit password provided on a paid basis to unlock one function of the device.
1.3. "Unlock" button – press the button to unlock chosen function of the device.

2. Locked functions – a list of disabled functions of the connected device.

Unlocking with password:

1. Connect "AutoGRAPH-GSM-SL" device to a PC using data cable.
2. Launch GSMConf of version 3.2.6 or higher. Go to Hardware lock tab.
3. Use Function dropdown list to select a function you want to enable.
4. Specify the eight-digit password to unlock selected function in Password field.
5. Press Unlock button.
6. If you entered correct password, the function will be enabled and available for further use.
7. To refresh settings of GSMConf software after unlocking disconnect the device from PC and connect it again.

To unlock device's functions the unlocking files can be used. Unlocking file is a special file which contains password for enabling the certain function of the device.
Unlocking file has following name: ***function-serial_number.unlk***, where ***function*** is two-digit (obligatory!) number of the device's function which may be enabled with this unlocking file; ***serial_number*** is a seven-digit (obligatory!) serial number of the device for which the unlocking password can be applied.
For example, 02-1222390.unlk file contains a key to unlock function 2 (RS-485 interface) of the device with serial number 1222390.
Unlocking file should be located in *\UNLOCK* folder in the GSMConf application directory.

Unlocking with unlocking file:

1. Create the *\UNLOCK* folder in the GSMConf application directory.
2. Copy the unlocking keys to the *\UNLOCK* folder.
3. Launch the GSMConf of version 3.2.6 or higher.
4. Connect the device which functions must be unlocked.
5. After connection and loading the device settings, the application check the *\UNLOCK* folder for the unlocking files for the connected device. If the files are available and passwords indicated in these files comply with unlocking passwords specified in the device, the applicable functions of the device will be enabled automatically. There is no need to re-connect the device in this case.

Unlocking file and unlocking password are provided only by TechnoKom.

Using the unlocking files provide quick unlocking of the device functions, and allows to unlock easily a great number of functions. Unlocked functions are immediately become available in the GSMConf for configuration.

Control

The GSMConf allows to make the device diagnostics. Diagnostic functions are available in the "Control" section of the application. There are several tabs in this section providing the troubleshooting of device's different modules: GSM and Wi-Fi modules, GNSS receiver, inputs and outputs and etc.

Inputs and Outputs

On the "Inputs and Outputs" tab the user can test operation of inputs and outputs of the device.

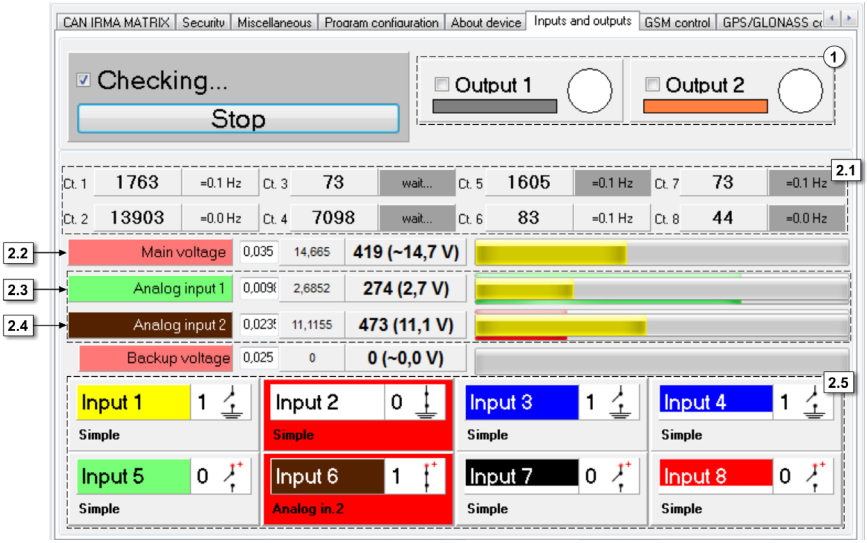


Fig.49. "Control tab. Inputs and Outputs" tab.

Follow these steps to test an input or an output:

- Connect your device to a PC.
- Launch GSMConf version 3.2.7 or higher.
- Go to "Inputs and Outputs' tab and press Start / Stop button.

When checking is in progress you will see the status on the top of screen (Checking). Uncheck the "Checking…" box or press Start / Stop again to stop the process.

The program scans states of inputs and outputs, receive readings of logical counters and displays results in the usable form.

1. State of outputs.

AutoGRAPH-GSM controllers (except the AutoGRAPH-GSM-SL) have two open drain digital outputs: Output 1 and Output 2 in the application.

Output state should be tested manually. Before test ensure that the external device is connected to the AutoGRAPH device output, e.g. a LED.

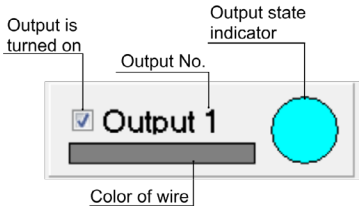


Fig.50. The output test.

To test the output state:

- Connect the device to a PC.
- Launch the GSMConf and go to the "Inputs and Outputs" tab. Press the "Start" button to start checking.
- Switch on the output by checking the box associated with this output. After that the output indicator is highlighted in colour (Fig.48) and the output switches to active state.
- Uncheck the box to switch the output off.
- By switching the output in the GSMConf and the user can watch the response of a device connected to the checking physical output of the device.

IMPORTANT

The device's output will respond to switching (performed in the program) only if the checking is started ("Checking" box is checked). If checking is stopped, the output will not change its state upon switching the output in the program.

2. Checking the input states.

AutoGRAPH-GSM devices (except the AutoGRAPH-GSM-SL) have 6 discrete inputs and are able to fix change of the inputs state, count pulses and measure frequency.

In addition to discrete inputs, devices also have 2 analog inputs. Analog input is designed to measure parameters which values proportional to the voltage. Analog inputs may be set up to operate as additional discrete inputs.

2.1. Counters 1..8.

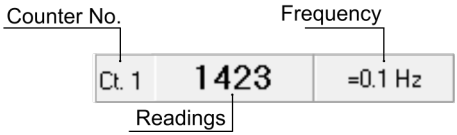


Fig.51. Counter reading.

- Connect the device to a PC.
- Go to the "Inputs and Outputs" tab and start input test by pressing the "Start / Stop" button.

- Device will start count pulses on the checking input. The program displays number of pulses on input and frequency of input signal.
- Wait until the input signal frequency is measured by the device. When frequency is being measured, the message "wait" is displayed.
- If the frequency is measured accurately, the value is preceded with "=" sign. If the frequency is measured approximately, the value is preceded with "~" sign. The accurate frequency measurement is supported by devices with firmware ver. 7.38 and higher.

2.2. Supply voltage.

The supply voltage of the AutoGRAPH device varies from 10 to 30 V. While testing, the program displays voltage level reflected in ADC readings and in Volts. The status bar displays variations of voltage level. Specify a coefficient to convert ADC readings to another value.

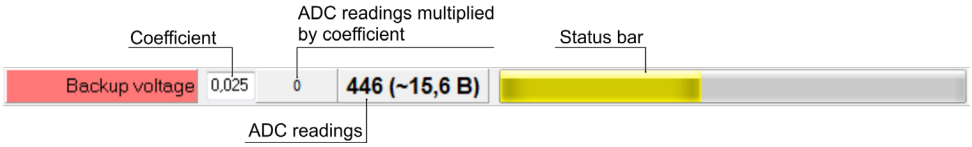


Fig.52. Main voltage of the device.

2.3. Analog inputs.

The AutoGRAPH-GSM has two analog inputs. The measurable voltage of the first analog input ranges from 0 to 10 Volts, but it does not exceed the supply voltage.

The measurable voltage of the second analog input ranges from 0 to 24 Volts, but it does not exceed the supply voltage.

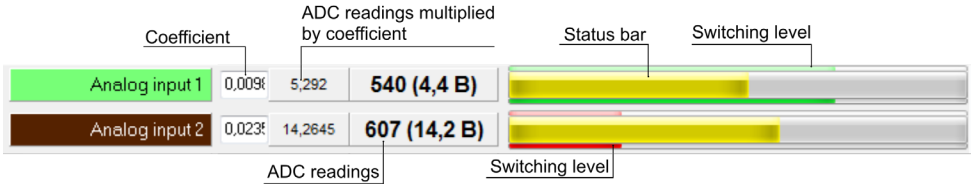


Fig.53. States of analog inputs.

The GSMConf measures voltage on analog input and displays the result in Volts and ADC readings: both true and multiplied by a coefficient.

The coefficient is required to convert the ADC readings to another value. Before starting the test, specify the coefficient.

Any change in analog input voltages is displayed on a status bar of the program. Status bar may indicate following states:

Yellow	Input current state
Green	Switching level of analog input when analog input operates as a discrete input
Red	Switching level of analog input when analog input operates as a discrete input and if the input has switched.

Use shortcut buttons (Analog input 1, Analog input 2) to switch to analog input settings, i.e. to "Analog Inputs" tab.

2.4. Backup power supply.

When the main power supply shuts down, to prevent the turning off the device switches to a backup power. Switching between the main power and the backup power is performed automatically.

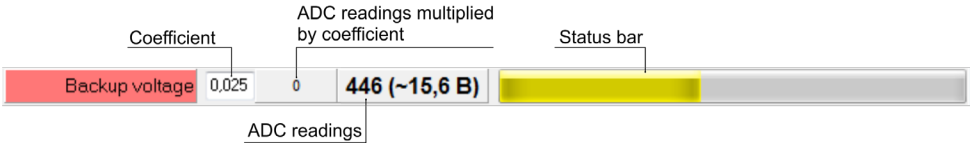


Fig.54. Backup power supply of the device.

2.5. Discrete inputs.

AutoGRAPH-GSM has 4 active low discrete inputs 1..4 and 2 active high discrete inputs 7,8. Furthermore, analog inputs can be used as additional digital inputs (5,6) operated by "+". AutoGRAPH-GSM-SL has one low active discrete input and one high active discrete input.

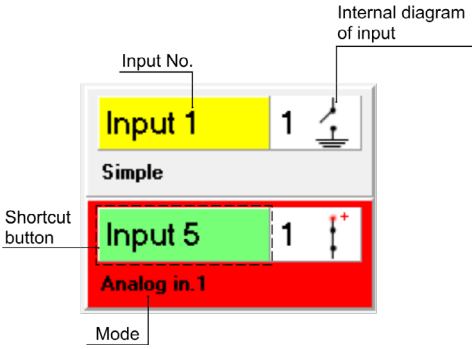


Fig.55. Discrete Inputs.

Each discrete input is designated with colour in compliance with the colour of its connecting wire. When input switches to active state, it is highlighted with red. Internal diagram of input displays its operation logic and changes according to the discrete input current state (0 or 1). Mode of operation can be selected on the "Input 1-4" or the "Input 5-8" tabs of the software. The input modes are described below:

- Analog input 1 (2) – analog input 1 (or 2) is configured to be used as a digital input.
- Simple – discrete input functions on simple mode.
- Counter – discrete input functions as a storage counter.
- Special – discrete input functions as a special counter.
- Frequency – discrete input measures frequency.

The user may quickly switch to settings of applicable input (to "Inputs 1-4", "Inputs 5-8" tabs) by pressing the shortcut buttons.

GSM Control

On this tab you can test operation of GSM modem.

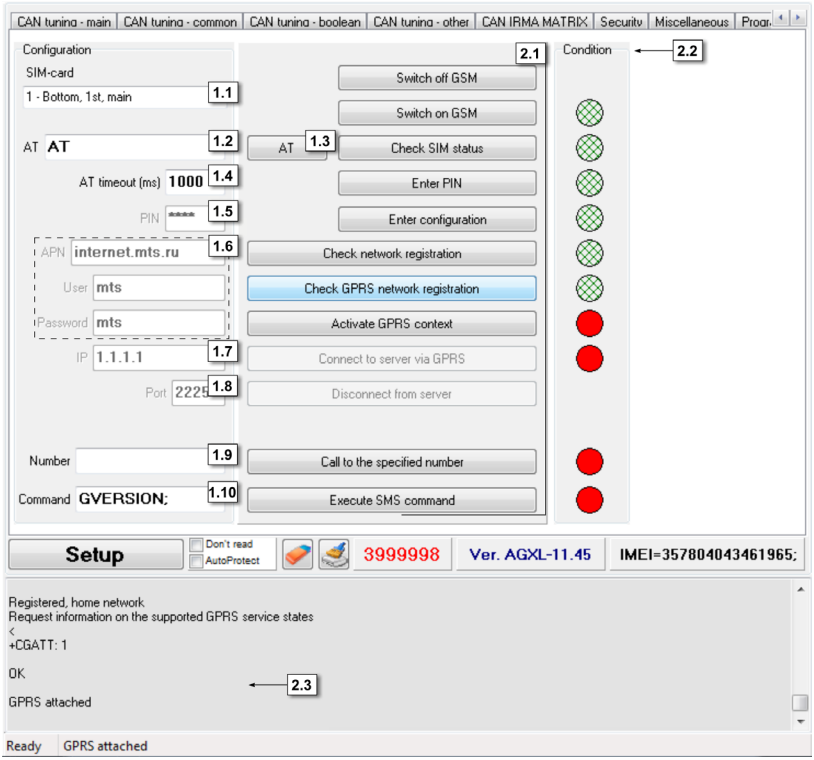


Fig.56. Control tab. GSM Control.

1. Configuration. This section displays GSM/GPRS settings scanned from the connected device. The user can change network settings on the "GSM Settings" tab of a corresponding SIM card.

1.1. SIM-card – select a SIM card to test GSM modem.

1.2. AT – type an AT command in field to send it to the modem.

1.3. AT button – press this button to send specified AT command to the modem.

1.4. AT timeout – period of waiting a response for GSM modem to respond to AT command upon elapsing of which the modem is deemed to be failed to respond. Specify timeout in ms.

1.5. PIN– use this field to specify PIN code of tested SIM card. If PIN code is disabled for this SIM card, leave this field blank.

1.6. GPRS Settings – settings of GPRS access point: access point (APN), user (User), password (Password).

1.7. IP is a real and static IP address of the server which receives data from the device.

1.8. Port is the number of the port of the server designated for data transfer.

1.9. Number – telephone number used for making a call when the modem is being tested. Enter number without spaces and use prefixes for international calling (+7 or 8).
1.10. Command – use this field to specify command for remote configuration. All commands should be in appropriate format and have only uppercase Latin letters.

Make sure that the command being processed is supported by firmware of your device.

For more information on format of SMS and server command refer to the "SMS and server commands for AutoGRAPH-GSM" document.

2. Testing GSM modem of device. Before testing select the SIM card to test the modem.
2.1. Commands – press buttons as they appear on the screen (from the top downward) to test the modem. It takes some time to process each command. You can monitor command processing on condition indicators (Fig.56, item 2.2) and status window (Fig.56,, item 2.3).

Operation is completed successfully

Operation has failed.

Test procedure:

1. Connect the device to a PC.
2. Read settings from the device, unless they are scanned automatically.
3. Select SIM card to test the modem.
4. Restart the GSM modem. To do this switch the modem off by pressing the "Switch off GSM" button. Status window will display message on switching the GSM module off.
5. Switch the modem on by pressing the "Switch on GSM" button. It may take the modem some time to switch on and initialization, wait until it initializes. Modem is on when GSM LED flashes ones a second.
6. Press the "Check SIM status" button to inquire status of SIM card. If PIN code is already specified or disabled, skip step 7, otherwise specify PIN code (see step 7).
7. Specify PIN code by pressing the "Enter PIN" button. Make sure that the specified PIN code is correct.
8. Apply settings to the device by pressing the "Enter configuration" button.

9. Press the "Check network registration" button to test whether the modem is being connected to the network. If modem has registered within the network, GSM LED flashes once in 3 seconds.

10. Check if a mobile base station supports GPRS by pressing Check GPRS network registration button.

11. If a mobile base station supports GPRS, connect the device to GPRS by pressing the "Activate GPRS context" button.

12. Connect to the server by pressing the "Connect to server via GPRS" button.

13. Disconnect from the server by pressing the "Disconnect from server" button.

14. Make a call to telephone number specified in field 1.9 (Fig.56) (use the "Call to the specified number" button). When making a voice call, GSM LED is continuously ON.

15. Send test SMS command. Specify the command in field 1.11 (Fig.56) and press the "Execute SMS command" button.

When modem is tested the status window displays a message on successful test or failure after each step. The user can use these statuses to identify failures of the GSM modem.

ONLINE GSM control

On this tab the user can test GSM modem during its operation.

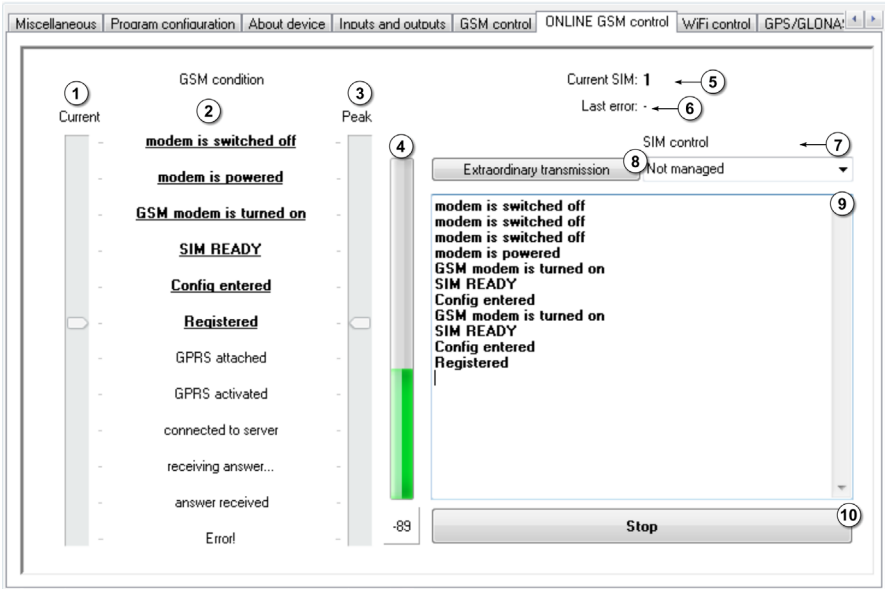


Fig.57. ONLINE GSM control.

1. Current – the slider moves to display the current step of a test.
2. GSM condition – steps to test the GSM modem. You can troubleshoot the GSM modem according current condition of it.
3. Peak – the slider displays the peak step achieved by GSM modem for the period of its operation. The peak step will be reset when the device is completely reset: by restarting, upon RESET command or once in a day. The peak step will be reset when restarting the GSM modem.
4. Level of GSM signal – during the test status bar indicates the current level of GSM signal. A decibel level of GSM signal is displayed under the status bar.
5. Current SIM – a number of active SIM-card.
6. Last error – an error, detected in previous test.
7. SIM control – select a SIM-card, that will be used to test the modem. If you select "Not managed" item, the GSM modem will select a SIM-card autocratically according the settings on "Roaming Priority" tab. If one of the SIM-cards is not available at instant, the modem will switch to another one.
8. "Extraordinary transmission" button – provides an extraordinary data transmission to server, do not wait the next GPRS transmission period.
9. Status window – details of process of testing the GSM module are displayed here. These details are also available in status window of the program at the bottom of the screen.
10. Start / Stop button – press the button to start the test. Press the button again to stop the current test.

To test GSM modem:
- Connect the "AutoGRAPH-GSM" device to a PC using Data-cable. Online control of GSM modem is supported by the device with firmware of version AGTK-10.63 and AGXL-11.45 or higner.
- Make sure that GSM antenna and SIM-cards are connected to the tested device.
- Turn on the power of the device.
- Launch the GSMConf software of version 3.3.0-r6 or higher. Go to "ONLINE GSM control" tab.
- You should select an active SIM-card if necessary.
- Start test of GSM modem pressing the "Start" button. The program will start testing of GSM modem.
- While in test the "Current" slider indicates current state of GSM modem. The "Peak" slider displayes a state of the GSM modem achieved as a result of previous tests.
- If GSM modem of the tested device is fault free and correct GSM settings are specified, the test will stop on "answer received" step.
- If GSM modem is faulty the program will display a massage about an error of testing.

WiFi Control

On "WiFi Control" tab the user can test the operation of Wi-Fi module.

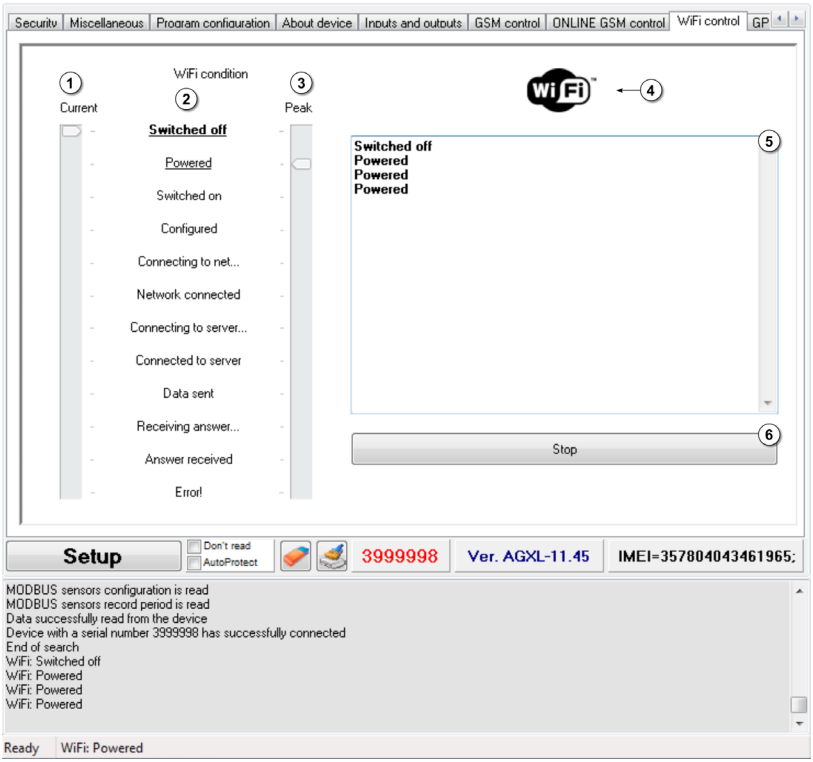


Fig.58. Control tab. WiFi Control.

1. Current operation – the slider moves to display the current step of a test.
2. WiFi condition – steps to test the WiFi module.
3. Peak – the slider displays the peak step achieved by WiFi module for the period of its operation. The peak step will be reset when the device is completely reset: by restarting, upon RESET command or once in a day.
4. "WiFi Settings" button – press WiFi symbol to switch to configuration of WiFi module on WiFi Settings tab.
5. Status window – details of process of testing the WiFi module are displayed here. These details are also available in status window of the program at the bottom of the screen.
6. Start / Stop button – press to start or stop test of WiFi module of the connected device.

To test WiFi module:

- Connect the AutoGRAPH-WiFi-GSM+ to a PC using data cable. Make sure that Wi-Fi antenna is connected to the device.

- Launch the GSMConf program of version 3.3.0 or higher. Go to the "WiFi Test" tab.
- Press the "Start" button on the tab to start testing of Wi-Fi module. The program will start step-by-step testing.
- Monitor the testing process. The slider will move in the course of testing to display the current state of Wi-Fi module. "Peak" slider displays the state of Wi-Fi module achieved as a result of previous tests.
- Wi-Fi module is fault free if all testing steps are completed successfully. After completion the test will start once again.
- The failure of Wi-Fi module can be identified on the basis of the step where the current state slider stops.

GPS/GLONASS Test

Use "GPS/GLONASS Test" tab to test operation of the GPS/GLONASS receiver.

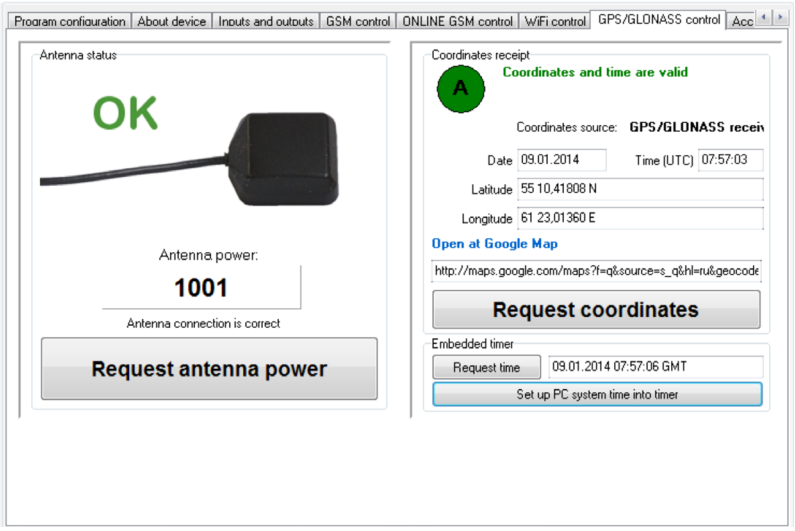


Fig.59. Control tab. GPS/GLONASS Contol.

To test GPS/GLONASS antenna:

- Connect GPS/GLONASS antenna to the device.
- Connect your device to a PC.
- Check the status of GPS/GLONASS antenna (see Antennas status section). Press Request antenna power button.
- Antenna status is illustrated with a symbol:

OK – antenna is in good order and is connected correctly;
Fault – antenna is probably disconnected or failed.
Short Circuit – ground short circuit.

- **Antenna power** – this f is used for identifying problems.
  - If receiver's antenna is faultless, proceed with testing the receiver (Coordinates receipt section).
  - Press Request coordinates button. Status of receiving the coordinates is displayed by indicators as follows:

Coordinates have not been requested yet

Data on coordinates and time have been received from satellite and are reliable

Coordinates and time are invalid

- If coordinates are received and valid, the window will display data on the source of coordinates (GPS, GLONASS, mixed mode), date and time of receipt (in UTC) latitude and longitude and a link to the web mapping service. Press Open at Google Map link to see the device's location at Google Map.
- Check an embedded timer of the device.
- Press the "Request time" button to request the time from the device's timer.
- The user can set up PC time into timer. To do this, press the "Set up PC time into timer" button.

Accelerometer

AutoGRAPH-GSM device is equipped with accelerometer which could be used to detect when the vehicle (with the device) starts moving or stops.

To make test of the accelerometer:

- Connect the device to a PC.
- Press Start / Stop button on "Accelerometer" tab.
- Move the device. While testing the application displays acceleration directions identified by the accelerometer along X, Y, Z axes with the arrows. Red arrow denotes direction of maximal acceleration.
- The program is also able to display rate of acceleration along three axes and modulus of a sum vector.

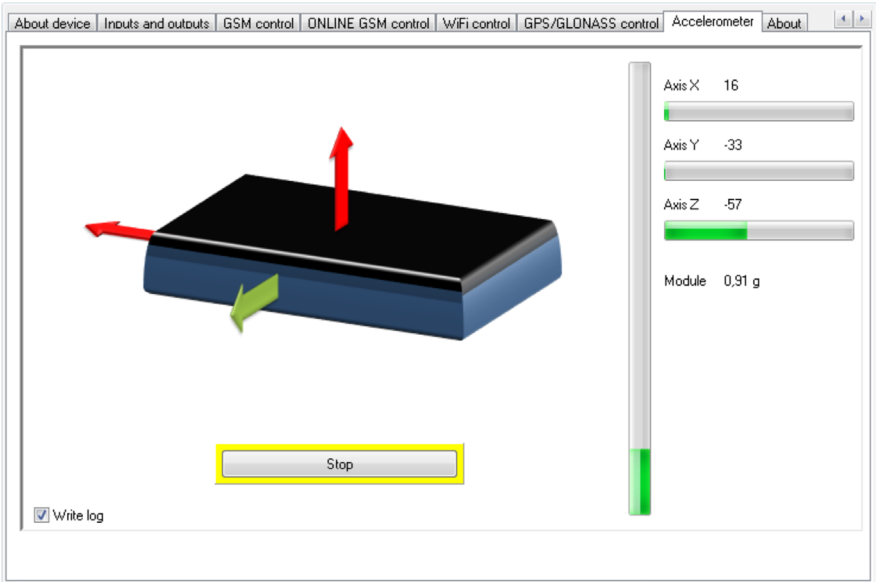


Fig.60. Control tab. Accelerometer.

SD/MMC Browser

On this tab, the user can test and browse SD card or eMMC of the AutoGRAph device. SD card and eMMC memory are intended to store photos from cameras connected to the device and log files. To do the memory test, connect the device to a PC. Make sure that the SD card is inserted. Then, press the "Test the memory card" button (Fig.61). After finishing, the test status will be displayed in the status window of the application.

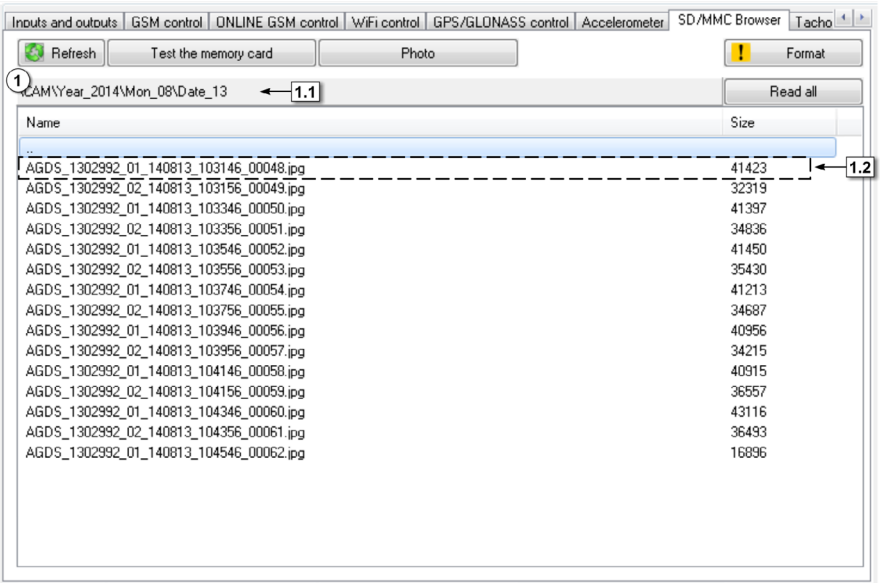


Fig.61. "SD/MMC Browser" tab.

The memory content (Fig.61, i.1).

The "Read all" button allows to read the list of files stored in SD card / eMMS of the device. The reading time depends on data size stored in the device memory.

After the reading, the list of file will be displayed in the application. The photos are stored in the \CAM folder and sorted to nested folders by year, month and day of recording.

To refresh the list of files, press the "Refresh" button. To erase memory, press the "Format" button.

Be careful selecting this command. The formatting will delete all files stored in the device memory (SD card or eMMC).

The path to the opened folder of the memory is displayed above the list (Fig.61, i.1.1). Pressing the path opens the \CAM folder which is located on local hard drive and contains photos copied from the device memory to the hard drive.
The photos are stored in the .jpg file. The file name has the following format ***AGDS_serial_cam_data_time_num,*** where ***cam*** – camera number, ***data*** – the photo recording date, ***time*** – the photo recording time, ***num*** – the photo number.

To copy photo from the device memory to hard drive, double click the photo. The copy of the photo will be loaded in the \SD folder in the application folder. The \SD folder has nested internal folders like the \CAM folder on the device memory. To open the \SD folder, press the path above the list of files (Fig.61, i.1.1).

Press the "Photo" to go to the cameras settings.

Tachograph

On this tab, the user can make the diagnostics of the tachograph connected to the AutoGRAPH-GSM-Drive or vehicle CAN bus.

To make the test:

Set up the ID of data from tachograph on the "CAN extensions" tab.

Press the "Start" button. If all connections are made correctly the application will read the captured data from the AutoGRAPH device and display it.

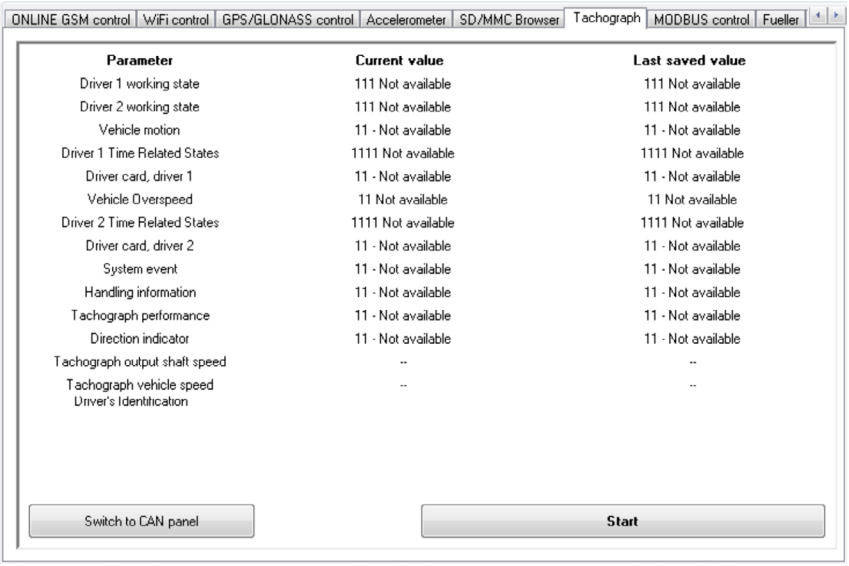


Fig.62. "Tachograph" tab.

MODBUS control

On the "MODBUS control" tab, the user can test the operation of MODBUS sensors connected to the device.

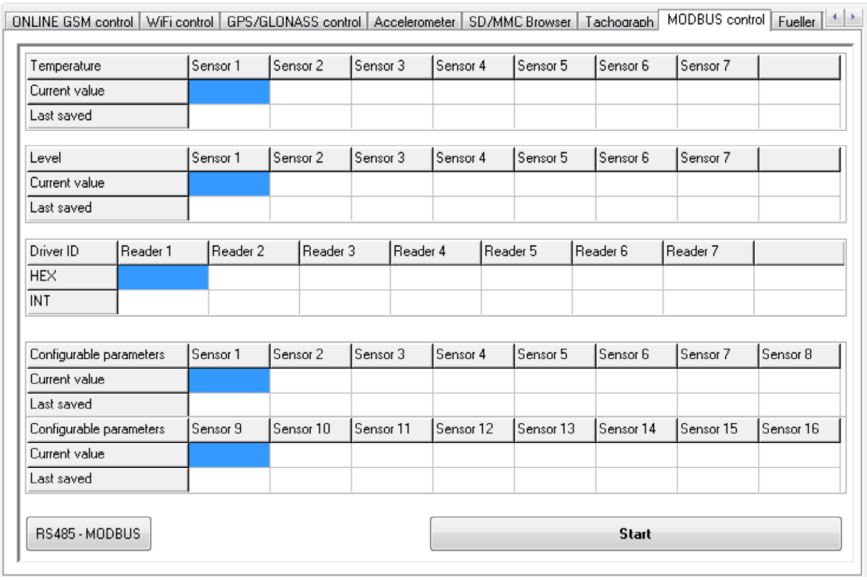


Fig.63. "MODBUS control" tab.

- **Temperature sensors.** The AutoGRAPh device can simultaneously operate with up to 8 temperature sensors via MODBUS. The user can set up sensors, on the "RS485-MODBUS" tab.
- **Level sensors.** The AutoGRAPh device can simultaneously operate with up to 8 level sensors. The user can set up sensors, on the "RS485-MODBUS" tab.
- **Card reader.** The AutoGRAPh device can simultaneously operate with up to 8 Card Reader-Smart or Card Reader-RFID devices. The user can set up addresses of the card readers on the "RS485-MODBUS" tab.
- **Configurable parameters.** On the "RS485-MODBUS" tab, the user can configure additional parameters from MODBUS.

After the configuration the user can test the device MODBUS on the "MODBUS" control tab. When testing the application displays readings received from MODBUS.

Passenger traffic control

On the "Passenger traffic control" tab the user can test the operation of IRMA sensors connected to the AutoGRAPH device.

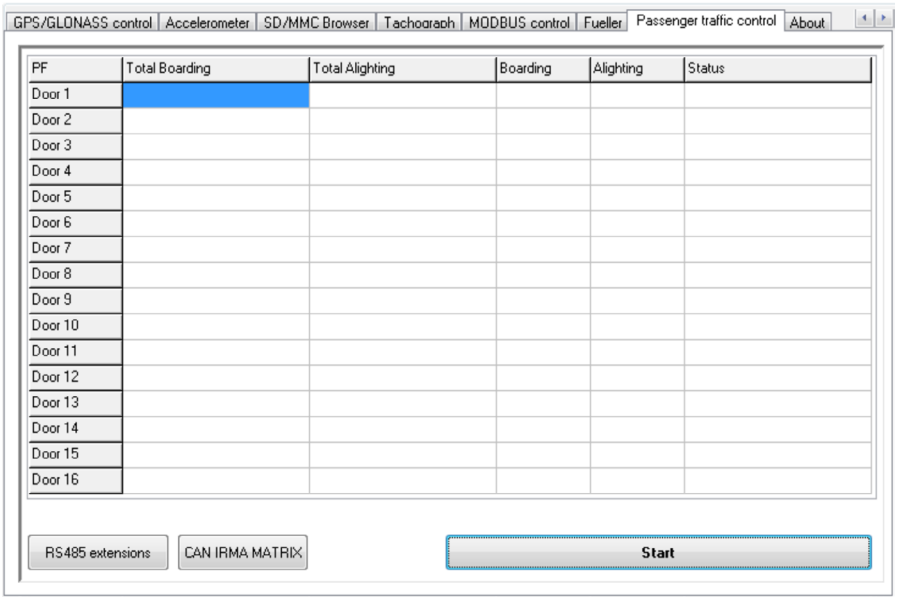


Fig.64. "Passenger traffic control" tab.

Before the test, go to the "RS485 extensions" and "CAN IRMA MATRIS" tab and set up parameters of passenger counting sensors.
To start the test, press the "Start" button. While the test, the application displays received data.

Set up the Settings into the Device

When you finished with all settings press Setup button to save your settings.
When saving settings red and green LEDs of the device will flash. When settings are saved you will see a corresponding message.
GSMConf software enables a user to create two key files with passwords and settings: [file_name].atg and [file_name]-srv.atg.
[file_name]-srv.atg file has to be submitted to the server administrator to include the file to the list of devices being serviced by the server. If the device has already been serviced by the server and its password hasn't been changed, there is no need to change the server key file. When the password of the device is changed, the key file residing on server must be changed, otherwise the server won't accept any data from this file.
[file_name].atg file should be saved in \dbf folder which is located in the AutoGRAPH dispatch software installation directory on all dispatcher PCs which will be used to monitor the devices with numbers as indicated in [file_name].atg file.

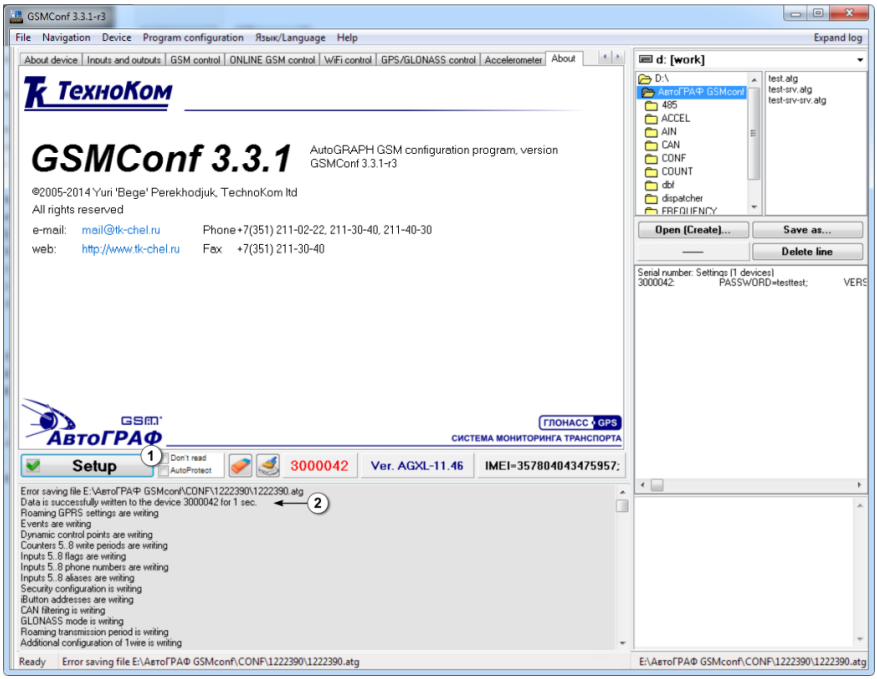
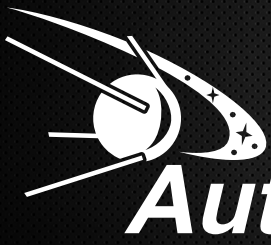


Fig.65. Applying the settings.

The "Setup" button saves the settings into the connected device. When settings are successfully applied to the device you will see  icon and a message on successfully saved settings in a status window (Fig.61, item 2).



GSM

AutoGRAPH

USER MANUAL

v 3.3.1-r3

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