TechnoKom

GLONASS · GPS

«AutoGRAPH-INFO.MINI»
11:11
Time: 11:11
Date: 26-10-15
TANK 1   MORE·   MENU

DOCUMENT
VERSION
1.0

AutoGRAPH
INFO MINI

USER MANUAL

Table of content

Introduction

This User Manual applies to AutoGRAPH-INFO MINI informational display (hereafter - display, device) produced by TechnoKom Ltd[1]. It contains installation and connection procedures of this device, as well as its function and control. This Manual constitutes the Operating Rules to be observed to ensure successful operation of the controller and its compliance warranty provisions.

The Manual is intended for specialists who are aware of maintenance and installation principles typical for motor vehicles and are proficient in using the electronic and electrical equipment of various vehicles.

To ensure the best performance of the AutoGRAPH-INFO MINI devices, they should be installed and set up only by qualified specialists.

This User Manual contains the instructions intended only for AutoGRAPH-INFO MINI devices and does not contain connection and configuration instruction for external devices which may be connected to the displays (AutoGRAPH on-board controller, TKLS fuel level sensors and etc.). For detailed information on connection and configuration of other devices see the User Manuals intended for those devices.

IMPORTANT

All information on functions, functional capabilities and other specifications related to AutoGRAPH-INFO MINI informational displays, as well as all information contained in this User Manual is based on current data (at time of writing) and is deemed to be valid as of the date of publication. TechnoKom reserves the right to modify the information or specifications without prior notice or commitment.

Version history

This table provides a summary of the document revision.

Version	Description	Data
1.0	Initial version of the document	2015-10

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Product Overview

The AutoGRAPH-INFO MINI informational display is intended to indicate a vehicle operation parameters and exchange messages between a driver and a dispatcher.

The AutoGRAPH-INFO MINI functionality:

• connected to the AutoGRAPH on-board controller the display allows a dispatcher and a driver to exchange short text messages in order to provide executive control of the driver and vehicle operation;

• connected to the AutoGRAPH on-board controller the display provides indication of vehicle operation parameters such as motion characteristics, data from CAN bus, data from sensors connected to the AutoGRAPH controller.

• connected to the AutoGRAPH on-board controller the display provides indication of data from the fuller;

• the display indicates data received from connected fuel level sensors (fuel level and fuel temperature) and other sensors supporting LLS protocol.

Technical Specifications

Description	Value
Processor	ARM Cortex-M4 LPC 4078FET208
Display	128 x 64 pixels
Internal FLASH memory, records	up to 270.000
Connection to PC	USB 2.0
Connection to AutoGRAPH on-board controller	RS-485
Digital inputs, total number	1
Digital outputs, total number	1
RS-485 bus (TIA / EIA-485-A)	1
Operating voltage, V	10...60
Power consumption at 12 VDC, mA	50
Operating temperature, °C	-40...+85
Weight, g	90
Dimensions, mm	105 x 57 x 18
Average life time, years	10

Scope of supply

№	Description	Qty
1	AutoGRAPH-INFO MINI informational display	1 pc.
2	Power supply cable	1 pc.
3	1A fuse with a holder	1 pc.
4	Warranty certificate	1 pc.
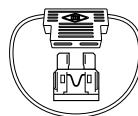
①   ②   ③
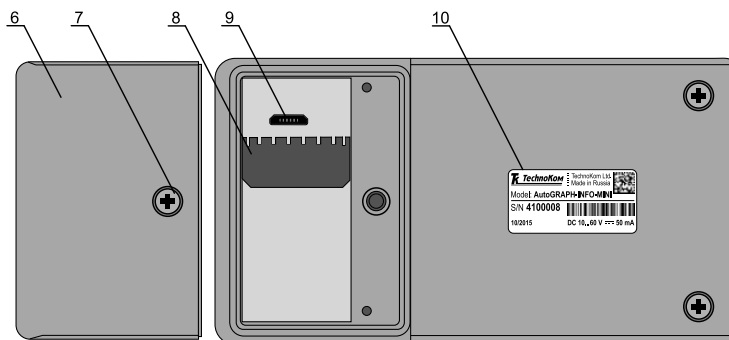
Components of AutoGRAPH-INFO MINI

1. **Navigation LED (NAV LED).**
2. **Communication LED (COMM LED).**
3. **Status LED.**
4. **Display.**
5. **Control buttons[1].**
6. **Removable cover.**
7. **Fastening screw of the removable cover.**
8. **Interface connector.**
9. **Micro USB connector.**
10. **Manufacturer's label.**

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[1] Functions of buttons vary from menus and are shown at the bottom of the display.

Interface Connectors

Power supply connector

№	Colour of a wire in a cable	Assignment
1	Red	«+» Vin
2	Black	«-» Vin
3	Gray	Open collector output 1 (0.5 A)
4	Yellow	Digital input 1 (active low)
5	Orange with a white stripe	RS-485 (A)
6	Brown with a white stripe	RS-485 (B)

USB connector

ID	Assignment
A	Micro USB connector (programming / configuring)[1]

[1] Micro USB connector position is shown in the section «Components of AutoGRAPH-INFO MINI», i. 9.

Connection of AutoGRAPH-INFO MINI

This section covers connection procedures of the AutoGRAPH-INFO MINI:

• Power supply connection
• Digital input connection
• Digital output connection
• Connection of RS-485 bus

The AutoGRAPH-INFO MINI is designed to operate as a complete device intended to indicate readings of LLS sensors or connected to AutoGRAPH on-board controller which extends the AutoGRAPH-INFO MINI functionality – provides message handling, indication of a vehicle operation parameters and etc.

Before connecting the AutoGRAPH-INFO MINI to AutoGRAPH controller, GPS/GLONASS and GSM antennas must be connected to the controller according the instructions given in the User Manual on the AutoGRAPH device.

Power supply connection

The AutoGRAPH-INFO MINI is connected to the power supply source through the interface cable supplied with the device. Also the AutoGRAPH-INFO MINI is supplied with a fuse intended to provide a short circuit protection of power supply driver. The fuse holder is installed on a wire ring, which should be cut before installation.

When making connections, pay special attention to the safety rules stipulated by the regulations for motor vehicle repair procedures. All connections should be properly isolated and securely connected. If the wire is too short, it can be spliced with a wire of at least 0.5 mm2 cross section (20 AWG or thicker).

The power supply input of the AutoGRAPH-INFO MINI is rated for the vehicle system operating voltage of 10-60 V DC. The pin 1 and pin 2 on the device interface connector must be connected to 12 or 24 V of vehicle operating voltage through a fuse rated for at least 1 A.

The scheme of power supply connection to the AutoGRAPH-INFO MINI depends on the power supply connection to AutoGRAPH controller. So power can be fed to the display either before or after the vehicle's battery disconnecting switch:
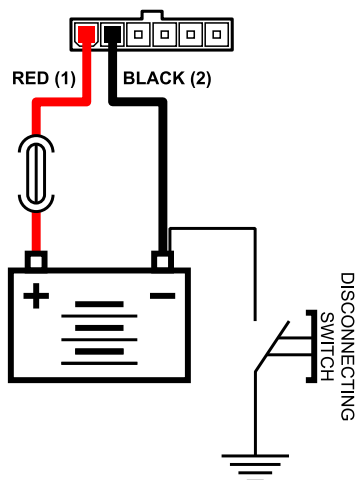
Power connection before the vehicle battery disconnecting switch
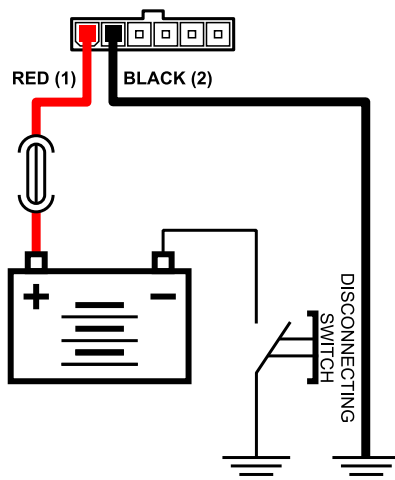
Power connection after the vehicle battery disconnecting switch

IMPORTANT

The fuse should be placed as close as possible to the point where the AutoGRAPH-INFO MINI is connected to the vehicle power system.

Connection of digital input 1

The AutoGRAPH-INFO MINI is equipped with one active low digital input: pin 4 on the interface connector.

Active low digital input has two states:
• logical «1», when the input is connected to the supply voltage or open-circuit.
• logical «0», when the input connected to the ground. This state is considered to be active.

The input intended for connection to various dry contact sensors. Ensure that the sensors are in good order and able to maintain reliable operation. The manufacturer shall not bear any responsibility for incorrect state recording of these sensors (chatter, loss of contact and etc.).
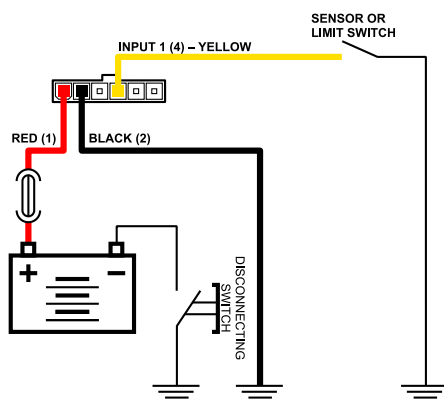
IMPORTANT

It should be noted that all voltage levels of active low digital inputs under 5 V shall be considered to be logical '0', while all voltage levels above 6 V shall be considered to be logical «1» . If the input is disconnected it shall denote logical «1».

Internal connection diagram of the digital input 1:
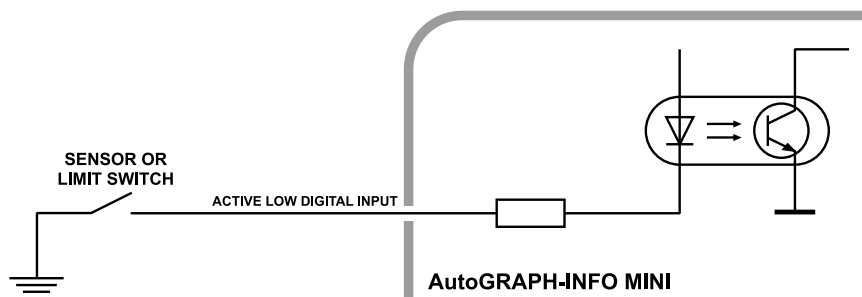
External connection diagram of the digital input 1:

The external connection diagram of digital input 1 can vary depending on the position of the vehicle battery disconnect switch in the circuit (see Power Supply Connection diagrams). This is due to the fact that when the sensors are connected to the vehicle body (after vehicle battery disconnect switch option), and the disconnect switch opens; the AutoGRAPH-INFO MINI will not be able to record sensor states on the digital input 1 correctly.
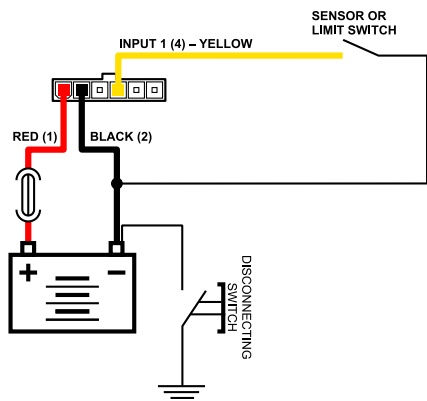
Connection diagram for «After the disconnecting switch» option   Connection diagram for «Before the disconnecting switch» option

After making the connection, the digital input 1 operation mode must be set in the AutoGRAPH device. Detailed information on the device digital input configuration is given in the section «Digital input configuration» of this document.
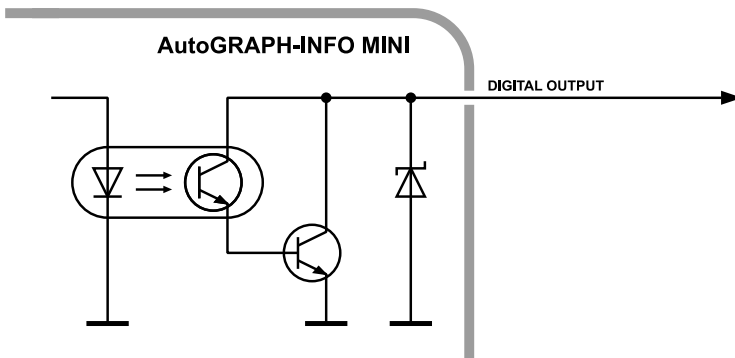
Digital output 1 connection

The AutoGRAPH-INFO MINI is equipped with an open-collector digital output: pin 3 on the interface connector. The digital output is intended to control various external devices, e.g. to turn on an LED.

Minimum recommended load current is 10 mA.
Maximum load current should not exceed 500 mA.

Internal connection diagram of the digital output 1:

External connection diagram of the digital output 1:

The following is an example of a LED connected to the AutoGRAPH-INFO MINI digital output.

To control different external device, a relay can be connected to the device output. When connecting a relay, to avoid damage of the output due to back EMF, induced from disconnecting an inductive load, connect a protective diode in parallel to the relay. To select a correct diode make sure that direct current of this protective diode is at least 1.5 times greater than the relay holding current.

OUTPUT 1 (3) – GRAY

RED (1)

R
1 kOhm*

LED

+Vin
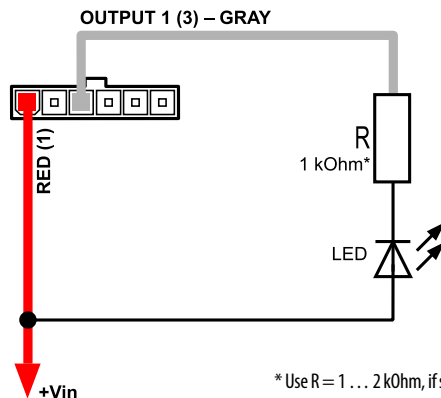
* Use R = 1 . . . 2 kOhm, if supply voltage is 24 V.
  Use R = 500 Ом . . . 1 kOhm, if supply voltage is 12 V.

Connection of RS-485

RS-485 is one of the most commonly used industrial standards of communication. A network based on an RS-485 interface consists of transceivers connected with twisted pair wires. All devices are connected to one twisted pair in the same manner: non-inverting outputs (A) to one wire and inverting outputs (B) to another wire.

The AutoGRAPH-INFO MINI is equipped with one RS-485 bus intended to connect to AutoGRAPH on-board controller or fuel level sensors. The AutoGRAPH-INFO MINI allows up to 8 fuel level sensors supporting LLS protocol to be connected to RS-485 bus.
Pin 5 on the device interface connector is assigned to line A of RS-485, pin 6 is assigned to line B of the bus.

Connection to AutoGRAPH on-board controller

The AutoGRAPH-INFO MINI supports connection to AutoGRAPH on-board controllers equipped with RS-485 bus. The connection to AutoGRAPH controller allows the AutoGRAPH-INFO MINI to handle messages and indicate a vehicle operation parameters, as well as data from the vehicle CAN bus, different temperature data, vehicle motion characteristics and etc.

Connection diagram of AutoGRAPH controller:
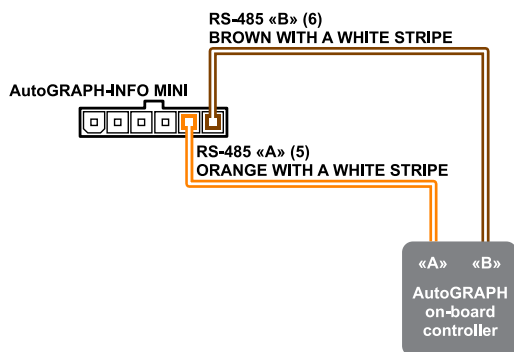
AutoGRAPH-INFO MINI configuration for interaction with AutoGRAPH controller:

To enable the AutoGRAPH-INFO MINI operation with AutoGRAPH on-board controller via RS-485 bus, you need to set up the appropriate RS-485 bus mode. To do it, select *Main menu/Settings/Control menu/operation with AG*.

Detailed information on how to configure RS-485 bus mode of the AutoGRAPH-INFO MINI is given in section «RS-485 operation mode».

To display vehicle operation parameters received from AutoGRAPH controller on the main screen, the mode «Parameters» of the main screen must be set up in the AutoGRAPH-INFO MINI. Furthermore, the list of vehicle parameters which are indicated on the main window must be recorded in the AutoGRAPH-INFO MINI. For more detailed information, see section «Main screen mode» of this document.

Connection of fuel level sensors

The AutoGRAPH-INFO MINI supports connection of up to 8 fuel level sensors supporting LLS protocol via RS-485 bus. The connection diagram is given below.

The AutoGRAPH-INFO MINI supports operation with only that fuel level sensors which network addresses ranges from 1 to 8. The sensors which addresses are greater than 8 are not scanned. Therefore, all fuel level sensors must be correctly configured prior connection to the AutoGRAPH-INFO MINI.

Connection diagram of fuel level sensors:
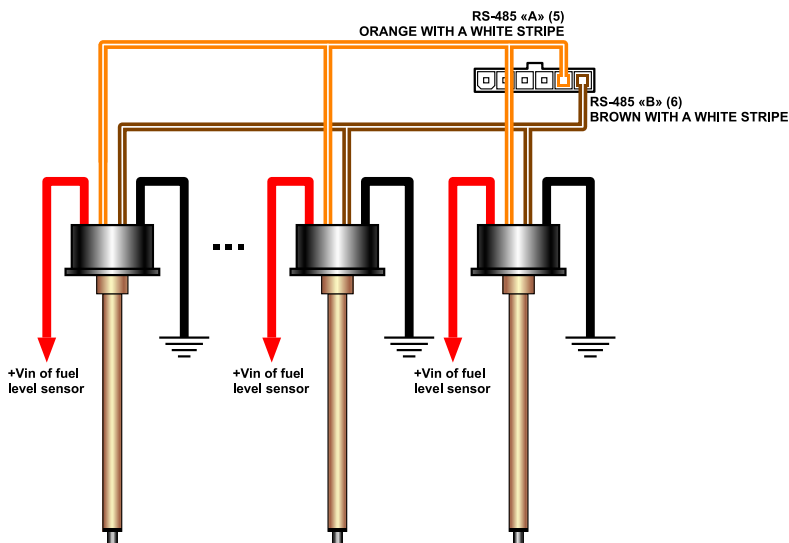
AutoGRAPH-INFO MINI configuration for operation with fuel level sensors:

For proper operation of the AutoGRAPH-INFO MINI with fuel level sensors via RS-485 bus, the appropriate RS-485 bus mode must be enabled in the AutoGRAPH-INFO MINI. To do it, you need to go to *Main menu/Settings/Control menu/operation with LLS*.

Detailed information on how to configure RS-485 bus mode of the AutoGRAPH-INFO MINI is given in the section «RS-485 operation mode».

To display reading from fuel level sensors, connected to RS-485, the mode «Parameters» of the main screen must be enabled in the AutoGRAPH-INFO MINI. Furthermore, you need to set up charts for fuel level indication and create the list of parameters to be displayed on the main screen using the DisplayConfigure application. For more detailed information see section «Main screen mode» of this document.

All connections should be made when the AutoGRAPH-INFO MINI and all external devices to be connected to the RS-485 bus are disconnected from power supply.

Be careful not to cross the «A» and «B» wires, otherwise the device connected to the AutoGRAPH-INFO MINI may operate incorrectly.

Getting started

The AutoGRAPH-INFO MINI turns on immediately after connecting it to power supply source. If the AutoGRAPH-INFO MINI is connected to AutoGRAPH on-board controller, it will display the current time on the main screen after the turning on. As the AutoGRAPH-INFO MINI is equipped with real-time clock, the current time is available, even when the device is not connected to AutoGRAPH controller.

NOTE

For the first start, the time 05:00 will be set up in the device, if it is not connected to AutoGRAPH controller. To adjust current time, go to the Main menu/Settings/Control menu/Set time. More detailed information on how to set up the device time is given in the section «Device settings» of this document.
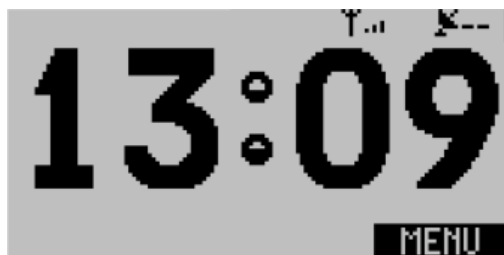

Fig.1. Main screen.

Status bar at the top of the main screen contains icons intended to indicate vehicle operation: GSM signal level, navigation state and GSM modem error codes.

Described below is GSM modem error codes:

Error code	Description of error
PWR	Bad power of GSM modem or failure of GSM modem power supply monitor
MOD	GSM modem does not response
SIM	SIM is not inserted or unknown SIM error
PIN	PIN error
PUK	PUK is required
REG	Data transmission is required, but no data is transmitted for a long time Data transmission capability is unavailable for a long time Unable to connect to GSM network
NET	GPRS status is unavailable for a long time Multiple errors occurred when enabling GPRS Multiple errors occurred when connecting to data server Connection to server is unavailable for a long time Connection to server is established, but data transmission is not initialized
OPR	Data transmission is disabled by mobile operator.
SRV	The device is not serviced by the server Invalid server password.

NOTE

Statuses indicated on the status bar are received from AutoGRAPH controller. Transmission of operation statuses via RS-485 is supported by AutoGRAPH controllers with firmware of version AGXL-11.62 and higher.

To select the required menu and command on the main screen, use control buttons on the device front panel.
To go to the device main menu, press the MENU button on the main screen.

Without any activity the AutoGRAPH-INFO MINI reduces display brightness by 50% in 20 seconds. This option can be disabled. For more detailed information see section «Device functions lock».

Indication of operation

The AutoGRAPH-INFO MINI is equipped with three LEDs on the front panel intended to indicate the device operation.

The AutoGRAPH-INFO MINI fully repeats AutoGRAPH controller indication:

• **NAV LED (green)** is intended to indicate the position determination state.
• **COMM LED (orange)** is intended to indicate state of data transmission to server.
• **STAT LED (red)** is intended to indicate the device errors and system events.

Given below is the device indication description:

When connecting the device to power supply, NAV and COMM LEDs turn on for a second then they turn off.

Navigation state

• NAV LED is constantly flashing if the device (on-board controller) has determined the position and the LED turns off if position data is not available.

Communication state

• COMM LED is constantly flashing while data transmission to server.
• The COMM LED flashes twice a second in case of data transmission failure.
• The COMM LED flashes once per two seconds if GPRS is available.

Errors indication

• The NAV LED turns on, then the STATUS LED flashes once and the NAV LED turns off in case of the AutoGRAPH-INFO MINI firmware failure.

• The NAV LED turns on, then the STATUS LED flashes twice and the NAV LED turns off in case of the AutoGRAPH-INFO MINI FLASH memory failure.

• In case of the device failure contact technical support of TechnoKom Ltd.

Message handling

The AutoGRAPH-INFO MINI allows a driver to send messages to a data server those then become available for a dispatcher. Message handling function is available only when the device is connected to AutoGRAPH controller. At the beginning of a message the device sends its current coordinates. A driver can sent only standard messages grouped according to their subjects.

Messages profile

The messages profile can be set up in the *Main menu/Settings/Message profile.*
The AutoGRAPH-INFO MINI supports one profile of messages – Custom profile.

Fig.2. Message Profiles.

The custom profile is intended to store user-defined messages. To add a new message in the profile, use the AutoGRAPH-INFO configuration tool – DisplayConfigure application. The custom profile can contain up to 6 different subjects with 8 messages in each of them.

NOTE *Detailed information on how edit message profile is given in the section «Create/Edit list of standard messages, standard replies, and phone numbers of recipients» of this User Manual.*

Sending messages

To send a standard message, you need to select *Main menu/Messages* (Fig.3), then select «Send message» option.

Fig.3. Messages menu.

The AutoGRAPH-INFO MINI will prompt you to select a topic of standard messages available in the preset profile (Fig.4), then a message to send.

Fig.4. The list of standard messages.

Before sending the message, select a recipient using FOR+ button (Fig.5). Using the DisplayConfigure tool up to 4 recipients can be set up: a dispatcher and other responsible persons. When recipient is selected, press the SEND button to transfer the message. As the message is transmitted, the status «Message is sent» will be displayed on the display.

Fig.5. Selecting a recipient.

Transmission of messages can be disabled by locking the function in the device settings. In this case the user will get a notification «Transmission is disabled» when trying to send a message. For more detailed information on how to lock or unlock the device functions see section «Device functions lock» of this document.
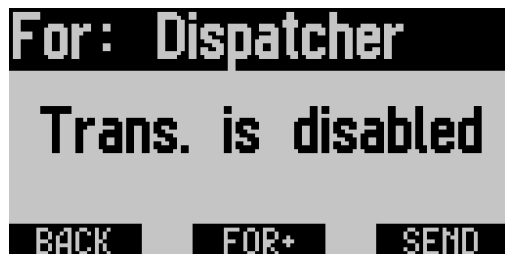
Fig.6. Transmission is disabled.

Incoming messages

The AutoGRAPH-INFO MINI supports reception of messages from data server via AutoGRAPH on-board controller. When the device receives a new message, the notification «SMS n» is displayed on the device main screen (n – a number of new messages), Fig.7. Furthermore, the device beeps once a minute.

To read an incoming message, press the READ button on the lower right of the main screen which is displayed instead of MENU button when there is an unread incoming message.
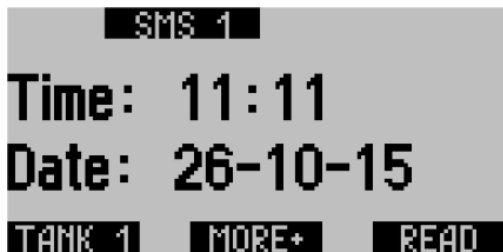

Fig.7. Notification of incoming message.

In the message menu, you can press the NEXT button to read the next incoming message. The REPLY button is intended to create and send a reply to open incoming message. The BACK button goes to previous menu.

Fig.8. Incoming message menu.

You can open the incoming messages menu also by selecting *Main menu/Messages/ Incoming messages*. The AutoGRAPH-INFO MINI can store up to 30 messages in memory. The AutoGRAPH-INFO MINI uses the ring buffer principle to store messages. It means that new message will be written over the oldest message first, ensuring that the most recent message is always available.

To send a message to the AutoGRAPH-INFO MINI, it is necessary to send the command DISPLAY=…; with the required text to AutoGRAPH on-board controller connected to the AutoGRAPH-INFO display. The command can be sent via data server or by means of SMS to a number of the SIM installed in the controller. After processing the command, the AutoGRAPH controller will send the message to the AutoGRAPH-INFO MINI via RS-485 bus.

Incoming messages can be removed from the AutoGRAPH-INFO MINI. To do it, select *Main menu/Settings/Delete all messages.*

Format of the command DISPLAY=; must match the format of remote control commands specified for AutoGRAPH on-board controller. More detailed information on remote control commands is given in the document «AutoGRAPH-GSM. Server and SMS control commands».

Main screen mode

Main screen is intended to display vehicle operating parameters, received from AutoGRAPH on-board controller, current time, fuel level sensors readings or other information preset by user.

Fig.9. Main screen modes.

To select parameter which will be displayed on the main screen of the device, go to *Main menu/Settings/Main screen*.

The AutoGRAPH-INFO MINI allows the following information to be displayed on the main screen.
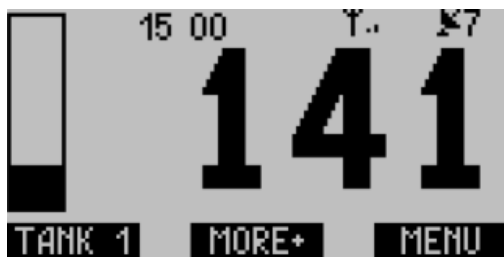

Fig.10. Indication of vehicle parameters.

• **Time** – current time, received from internal real-time clock.

• **Parameters** – parameters received from AutoGRAPH on-board controller or LLS sensors connected to RS-485 bus of the display.

The list of parameters displayed on the main screen must be preset using the DisplayConfigure application. Furthermore, this mode provides indication of readings in the form of a chart

if the appropriate chart is preset in the device. To configure charts, use the DisplayConfigure application. Parameters and charts can be displayed on several pages. To go to the next page of the main screen, press the MORE+ button. To look through scales, use TANK 1 (2,3 or 4) buttons.

> **NOTE** *Detailed information on how to set up the list of parameters displayed on the AutoGRAPH-INFO MINI main screen is given in the section «Parameters list» of this document.*

> **NOTE** *Detailed information on how to add a chart on the AutoGRAPH-INFO MINI main screen is given in the section «Charts» of this document.*

• **Speed** – a vehicle current speed received from AutoGRAPH on-board controller (Fig.11). The indication of vehicle speed is available only when the mode «Operation with AG» of the AutoGRAPH-INFO MINI RS-485 bus is set up. In the «Receiving mode» of RS-485 bus, vehicle speed will be indicated if there is an active AutoGRAPH-INFO device connected to RS-485 bus. For more detailed information see the section «RS-485 bus mode».

Fig.11. Vehicle speed indication.

• **Fueller** – data received from a fueller via RS-485. In this mode the AutoGRAPH-INFO MINI receives PORT-3 device readings from AutoGRAPH on-board controller connected to RS-485 of the display. As new data from the fueller becomes available, it is displayed on the main screen: first data is the notification of filling start and an identifier of vehicle being filled (Fig.12). As the filling has been completed, total volume of fuel (in liters) dispensed by the fueller and the filling duration (e.g. T: 32 sec) are displayed on the main screen (Fig.14).
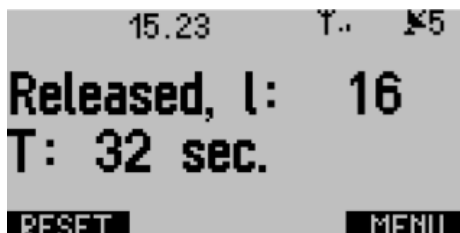

Fig.12. Filling start.

Fig.13. Fueller data.

If there is no data from the fueller, the message «Waiting for filling» is displayed (Fig.14).

Fig.14. Waiting for filling.

• **Add. application** – a mode intended to display user-defined information on the main screen. In order to display the required information, contact a technical support specialist of TechnoKom Ltd. regarding the integration of this information into the device firmware.

Device settings

To set preferences of the AutoGRAPH-INFO MINI such as screen brightness, key tones, interface language, and etc., select *Main menu/Personalization*.

Fig.15. Device general settings.

Brightness

To adjust display brightness of the device, you need to go to the menu «Brightness» and select the required brightness level using buttons «<<» and «>>». To save settings, press SAVE button.

Fig.16. Display brightness.

Contrast

To adjust display contrast of the device, you need to go to the menu «Contrast» and select the required contrast level using buttons «<<» and «>>». To save settings, press SAVE button.

Fig.17. Display contrast.

Key tone

To set up key tone duration, you need to go to the menu «Tone duration» and select the required value using buttons «<<» and «>>». To save settings, press SAVE button.

Fig.18. Key tone duration.

Interface language

To select the AutoGRAPH-INFO MINI interface language, you need to go to menu «Select language» then using NEXT button select a language. To apply settings, press the SELECT button.
The selected language will be set without device restart.

Fig.19. Interface language.

Device time zone

To use correct time, you need to set up time zone in the device. To set a time zone, go to the *Main menu/Settings/Local time*, select a time zone as time offset from GMT using the SELECT button and apply new settings pressing the SAVE button.

To enable automatic adjustment for daylight saving time, press the button «YES/NO». A second press disables the option. The option status is displayed at the top of the menu (the «Automatic» option).

Fig.20. Device time zone set up.

Device time

To set date and time in the device, go to the *Main menu/Settings/Control menu/ Set time* then specify the required time and date:
• select a figure to edit using the button «>>»;
• change the selected figure using the button CHANGE. One press increases the edited value by 1.
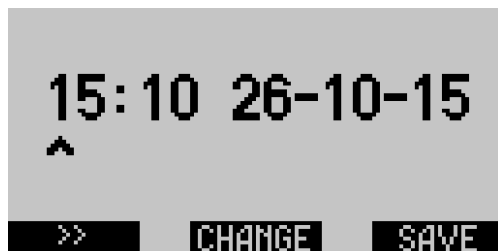

Fig.21. Device time and date set up.

Device password

The settings of the AutoGRAPH-INFO MINI are protected by a password. Access to the Settings menu of the device is provided by the device password.

By default all AutoGRAPH-INFO MINI devices have the password «0000» which is set by the manufacturer and highly recommended to be changed to more reliable password at first device start.

To change a password:

• go to the *Main menu/Settings*;

• enter the device current password;

• as the password is entered, go to the menu «Change password».

• enter a new password. The password can be from 4 to 8 characters long and contain figures from 0 to 9 and uppercase letters of Latin alphabet. The password characters are to be entered one by one. To select a character value from the list of available symbols, press the button «SYMBOL» until the required symbol is entered. To move to next character, press the NEXT button. To apply the password, press the ENTER button;

• enter the password one more time to confirm it and press the ENTER button.

Fig.23. New password.

Device configuration backup

This section of the User manual covers the procedures of the AutoGRAPH-INFO MINI configuration backup and recovery from the backup file. The AutoGRAPH-INFO MINI configuration is a file containing all settings specified using the DisplayConfigure application and settings which are set in the device internal menus.

To back up the configuration or restore backed up settings, select *Main menu/Settings/Configuration*.
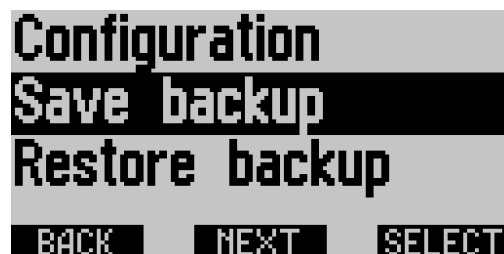

Fig.22. Configuration menu.

Device configuration backup

The backup of the configuration is intended to save the device settings on FLASH memory and restore them in case of settings damage, modification or corruption.

Fig.24. Configuration backup.

To back up the device settings, select *Main menu/Settings/Configuration/Save backup*. As the settings are backed up, the status «Configuration is saved» is displayed at the bottom of the menu.

Device configuration restore

To restore the backed up settings, select *Main menu/Settings/Configuration/Restore backup*. The device settings backed up previously will be read from FLASH memory and restored, after that the AutoGRAPH-INFO MINI will be restarted.

If back up file is not found, the message «Configuration copy not found» is displayed.

Device functions lock

Certain functions of the AutoGRAPH-INFO MINI can be disabled. To disable a function, go to *Main menu/Settings/Control menu/Functions lock*.

Fig.25. Device functions lock.

In this menu, you need to select the required function using the NEXT button and check it pressing the button «V» (left button) to disable the function. Given below is the list of AutoGRAPH-INFO MINI functions available to be locked:

• **turn down light** – disables automatic brightness reduction by 50% after 20 seconds of inactivity.

• **output messages** – disables sending of text messages from the AutoGRAPH-INFO MINI.

• **status bar** – hides the status bar on the main screen. If the lock is enabled only current time is displayed at the top of the main screen.

• **daily reset** – disables daily reset of Timer 1. If the lock is disabled, Timer 1 is reset every day at 00:00:00 in GMT.

After enabling a function lock, press the SAVE button to apply new settings.

Internal timers

The AutoGRAPH-INFO MINI has two internal timers intended to count time from preset events.

• **Timer 1** – is started by the AutoGRAPH-INFO MINI digital input triggering. The Timer 1 can be used to count time of vehicle operation (engine motohours) if the input is connected to +12 V terminal of the vehicle ignition.

• **Timer 4** – is started at first AutoGRAPH-INFO turning on and intended to count total operation time of the display.

Readings of the device timers are stored into the FLASH memory every minute.

To enable the Timer 1 and set up an event of its starting, go to *Main menu/Settings/Control menu/Input* (Fig.26), then select:

• Timer (+) to enable the timer running when the input 1 connects to +Vin;

• Timer (-) to enable the timer running when the input 1 connects to -Vin;

Fig.26. Timer 1 set up.

The readings of the device timers can be displayed on the main screen in the «Parameters» mode. For this purpose, the timers can be added in the list of parameters, displayed on the main screen. You can edit the list of parameters using the DisplayConfigure application (on the Parameters tab).
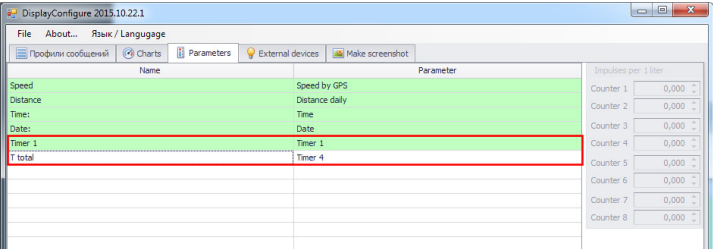
Fig.27. Timers indication set up.

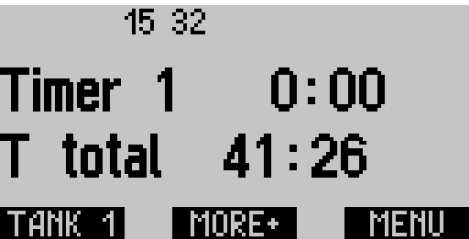The Fig.31 is a sample of the timers readings indication on the main screen.

Fig.28. Timer readings on the main screen.

Digital input mode

The AutoGRAPH-INFO MINI is equipped with one digital input with configurable functionality. To set up the digital input, select *Main menu/Settings/Control menu/Input*, then select the input function.

Fig.29. Control menu.

• **Disabled** – this mode is required to be set if the device digital input is not used.
• **LCD brightness** – this mode enables the AutoGRAPH-INFO MINI display turning on by vehicle ignition start. To use this function, the digital input must be connected to +12 V terminal of the ignition.
• **Reset consump.** – this mode enables reset of accumulcable consumption counters by pressing the button connected to the digital input.
• **Timer (+)** – this mode enables timer 1 starting when the digital input connects to +Vin (+12V).
• **Timer (-)** – this mode enables timer 1 starting when the digital input connects to -Vin.

Fig.30. Digital input modes.

> **IMPORTANT**
>
> *Take into account the digital input operation logic when connecting external devices to the input. The external connection diagram for the input 1 of the AutoGRAPH-INFO MINI is given on the section «Connection of AutoGRAPH-INFO MINI» of this User Manual.*

RS-485 bus mode

To operate with external devices via RS-485 bus, the bus of the AutoGRAPH-INFO MINI must be switched to the correct mode.

To set up RS-485 bus, go to *Main menu/Settings/Control menu/RS-485 mode* (Fig.31).

Fig.31. RS-485 mode.

RS-485 bus of the AutoGRAPH-INFO MINI can operate in one of the following modes:

• **operation with AG** – this mode must be enabled if the AutoGRAPH-INFO MINI is connected AutoGRAPH on-board controller. This mode provides reception of data from AutoGRAPH controller and external devices connected to the controller as well as text messages exchange.

• **operation with LLS** – this mode must be enabled if LLS sensors, including fuel level sensors, are connected to the AutoGRAPH-INFO MINI via RS-485 and the AutoGRAPH-INFO MINI is not connected to AutoGRAPH on-board controller.

• **receiving mode** – this mode provides only reception of data available on RS-485 bus and disables transmission of any data to the bus. Example usage of this mode is two AutoGRAPH-INFO displays (TFT or MINI) connected to RS-485 bus of AutoGRAPH on-board controller. If one of these displays is set to «receiving mode» and other display is set to «operation with AG» mode, the receiving AutoGRAPH INFO display will only receive data transferred to other AutoGRAPH-INFO by AutoGRAPH on-board controller.

Drivers installation

This section covers the procedure of installing the drivers of AutoGRAPH-INFO MINI display – AGUSB Drivers for Microsoft Windows 7 OS.

NOTE

The AutoGRAPH-INFO MINI drivers required for Windows 2000, XP, Server 2003, Vista, 7, 8, Server 2003, Server 2008 (x86 and x64) are free of charge and can be downloaded from the official website of TechnoKom: http://www.tk-chel.ru

To install the drivers onto Microsoft Windows 7 OS:

1. Connect the AutoGRAPH-INFO MINI to PC using the USB cable. The system will automatically search for new equipment (Fig.33). For proper operation, it is necessary to install drivers for both devices: AutoGRAPH and AutoGRAPH CDC device.

2. If the Internet connection is available, Windows 7 will automatically connect to the Windows Update website and install suitable driver for the tracker. If the Internet connection is not available, continue with the procedure outlined below.

3. Download the archived drivers folder from the official website of TechnoKom – AGUSBDriver.zip and extract files to a temporary directory on a hard drive.

4. Launch the driver update wizard and select «Browse my computer for driver software» to search for drivers manually. Then browse to the location where the drivers are saved (Fig.33).
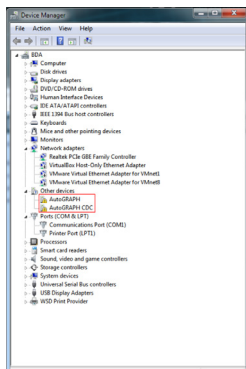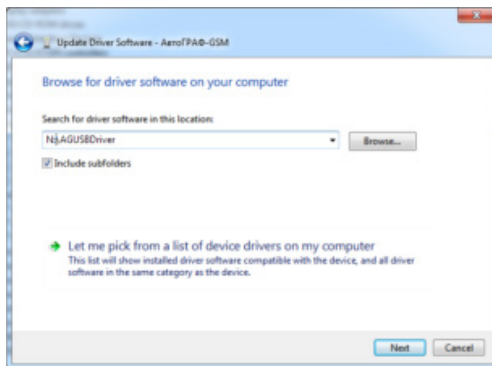

Fig.32. New equipment.

Fig.33. Browse for the driver folder.

5. Install the driver. When the driver is installed the system will automatically identify connected device (Fig.34).

6. Drivers for the AutoGRAPH-INFO are successfully installed. The device is ready to operate with troubleshooting utilities, dispatch software and other applications (Fig.36).
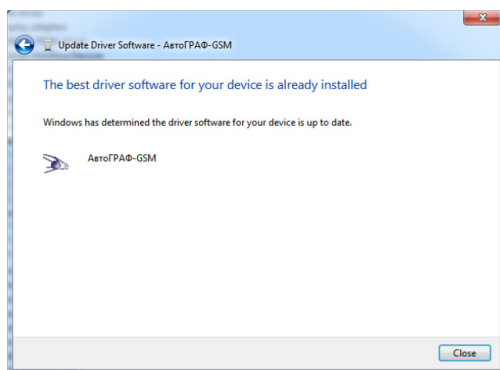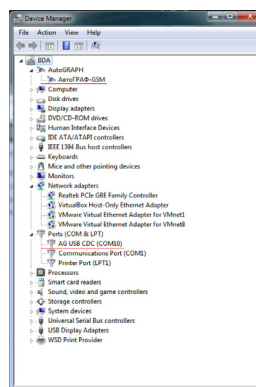

Fig.34. Drivers have been installed.

Fig.35. Connected AutoGRAPH-INFO device.

Connection to PC

Some cases may require connection of the AutoGRAPH-INFO MINI device to a personal computer (PC) or a laptop., e.g. for configuration using the DisplayConfigure application.

The AutoGRAPH-INFO MINI USB is connected to a PC using standard AM – USB micro B 5pin Data-cable.

To connect the AutoGRAPH-INFO MINI to a PC:

• Disconnect the device from vehicle power supply and external devices.

• Connect the device to PC using a USB cable. Micro USB connector is arranged on back case of the device under the removable panel.

• If the drivers are installed, the system automatically identifies the connected device. If the drivers are not installed, install them following the steps specified in the «Drivers installation» section. The device is now ready to operate with the applications.

DisplayConfigure application

The DisplayConfigure application is intended to set up the AutoGRAPH-INFO MINI – configure operation with external devices, edit templates of standard messages and etc.
For proper operation of the DisplayConfigure application, the .NET Framework 4.0 package (supplied) is required.
To start configuration of the AutoGRAPH-INFO MINI, connect it to a PC and open the DisplayConfigure application.

Interface of the DisplayConfigure application:
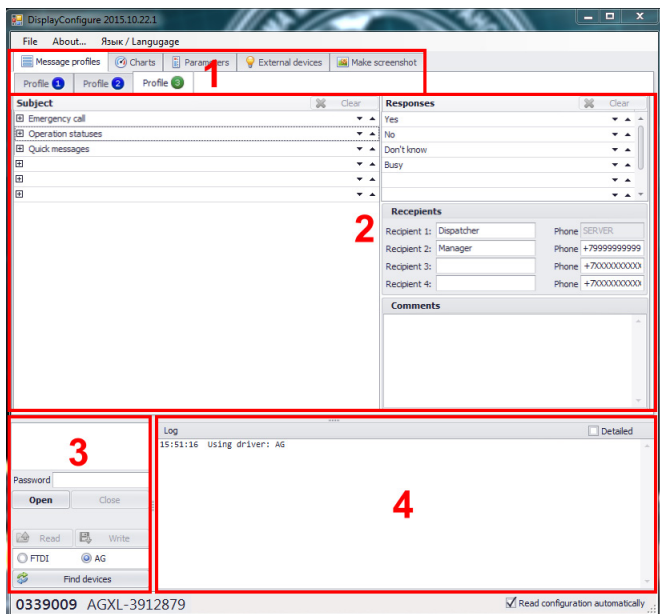

Fig.36. DisplayConfigure interface.

This section covers description of that functionality of the DisplayConfigure application which is supported by the AutoGRAPH-INFO MINI devices.

1. Tab area. The device settings are grouped into tabs.

  • «Profiles» tab is intended to edit standard message of the AutoGRAPH-INFO MINI. The device supports one messages profile (Profile 3).

  • «Charts» tab is intended to set up device charts which are used to indicate sensor readings on the device main screen.

  • «Parameters» tab is intended to create a list of parameters of AutoGRAPH on-board controller or a sensor connected to the AutoGRAPH-INFO MINI which will be displayed on the main screen of the device.

  • «External devices» tab is intended to configure the AutoGRAPH-INFO display operation with external devices and not supported by the AutoGRAPH-INFO MINI display.

  • «Make screenshot» tab is intended to make screenshots of the device menus.

2. AutoGRAPH-INFO MINI settings.

3. List of AutoGRAPH-INFO devices connected to the DisplayConfigure application.

! IMPORTANT	*The current version of the DisplayConfigure application does not support simultaneous connection of several devices.*

  • At the top of the panel serial numbers of the connected devices are displayed. To refresh the list of connected devices, press the «Find devices» button.

  • To connect the required device to the configuration tool, select its serial number and press the «Open» button.

  • To close the device settings, press the «Close» button.

  • To save settings in the connected device, enter the device password in the «Password» field then press «Write». Default password is 0000.

4. DisplayConfigure log. Log file contains statuses of the application, error messages and other important events which can appear while the AutoGRAPH-INFO MINI configuring. Check in the «Detailed» box to display more detailed logs of the application.

AutoGRAPH-INFO setting up procedure:

• Connect the AutoGRAPH-INFO MINI to a PC and open the DisplayConfigure application.

• Press the «Find devices» button to search for the connected devices.

• Select the required device serial number in the list of available devices and press the «Open» button. If the option «Read configuration automatically» is enabled, the device settings will be read in to the application. If the settings haven't been read automatically, press the «Read» button.

• Set up necessary settings on the application tabs.

• Enter the device password in the «Password» field, then press the «Write» button to save the specified settings in the connected device.

• Device configuration can be exported in the file of .dconfig format and then used to set similar settings in several devices. To save the settings to external file, select *Main menu/ File/Save as...* . To load a configuration file in the DisplayConfigure application, select *Main menu/File/Open.*

Create/Edit list of standard messages, standard replies, and phone numbers of recipients

This section cover the instruction on how to edit standard messages of the AutoGRAPH-INFO MINI.

To edit message profile, you need to connect the AutoGRAPH-INFO MINI to the DisplayConfigure tool as described in previous section. After reading the settings, device standard messages will be displayed on the «Messages profiles» tab grouped into three sections according to a profile. The Profile 1 and Profile 2 are not available in the English version of the DisplayConfigure.

Profile 3 (Custom profile) is fully configurable – you can add any subjects, messages, replies and recipients in the profile.
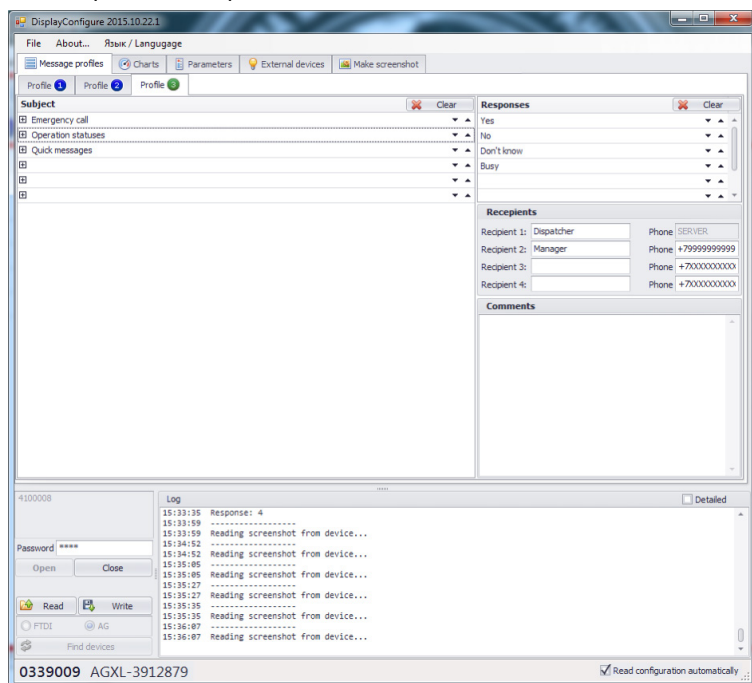
Fig. 37. Messages profiles.

Described below is an example of custom profile editing:
• Go to the Profile 3 tab.

• To edit messages stored in the AutoGRAPH-INFO MINI, read settings from the device and continue editing. Or fill in empty template on the tab without reading the device settings to create a completely new profile.

• The Custom profile can contain up to 6 subjects with up to 8 messages in each of them.

To create a new subject, enter the subject description, e.g. in the Subject 1 field. Then enter texts of messages provided by the created profile. Unnecessary message fields must be remained empty as well as the fields of unnecessary subjects.

Use Up and Down button, to set up an order of messages in the device.

Fig.39. Standard messages.

• The «Responses» panel (Fig.40) is intended to create a list of standard responses which a driver can use to send quick replies to a dispatcher.

Fig.40. Quick replies.

IMPORTANT   *The subject titles, text of messages and replies cannot exceed 22 characters.*

• The «Recipients» panel is intended to add recipients of AutoGRAPH-INFO messages. To add a new recipient, specify its name and a phone number. Format of the phone number is +7XXXXXXXXXX. Up to 3 different recipients can be specified (Recipient 2...4). The recipient 1 is non-configurable, besides the name, and used to send messages to the data server where they become available for the download to the AutoGRAPH Dispatch software.

Fig.38. Recipients.

....

> **NOTE**
>
> *When entering a recipient phone number, the format __7XXXXXXXXXX is required. In the case of wrong format of the specified number, the error message pops up.*

....

After the profile setting up, enter the device password in the «Password» field and press «Write» button to save new settings in the device.

Charts

Charts are displayed on the AutoGRAPH-INFO MINI main screen and intended to indicate readings of fuel level sensors.

To enable charts display on the main screen, you need to set up them in the DisplayConfigure application – on the «Charts» tab.
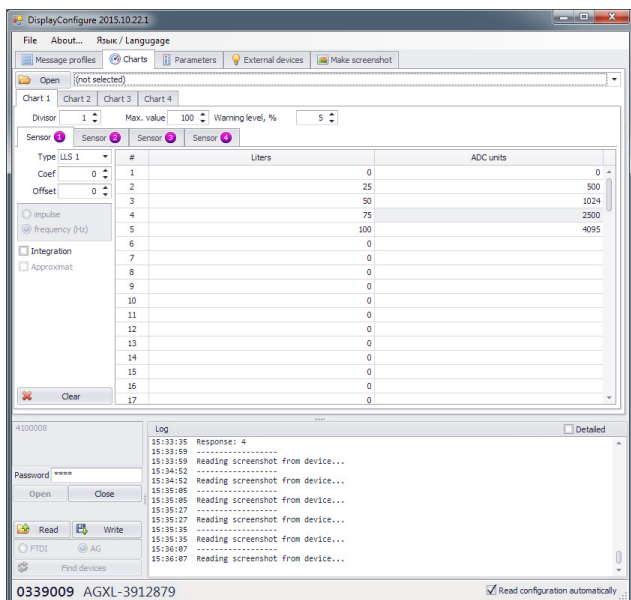

Fig.41. Charts.

The AutoGRAPH-INFO MINI supports up to 4 charts. To configure a chart follow the next:

1. On the «Charts» tab, select a chart to configure and set up its options:

• **Maximum value** is a maximum value which can be displayed on the chart. Zero value disables the chart.

• **Warning level** is a minimum value enabling the low level notification. The threshold must be specified in % of chart maximum value.

• **Sensor 1 (2..4)** is a sensor connected to the AutoGRAPH-INFO MINI via RS-485 or to AutoGRAPH on-board controller interacting with the display which reading will be indicated on the chart. The final value displayed on the chart can be calculated on the basis of up to

4 sensors readings according to a formula: (Sensor 1+ Sensor 2+ Sensor 3+ Sensor 4)/ divisor, where the divisor is an coefficient from 1 to 4 specified in the «Divisor» field. The sensors must be configured in that order as their settings specified in the DisplayConfigure application, i.e. if only one sensor is used, it must be set up on the Sensor 1 tab, and if two sensors are used, they must be set up on the Sensor 1 and Sensor 2 tabs and etc.

NOTE *The divisor must be selected depending on the tank configuration and sensors position in the tank. Detailed information on how to select a divisor for fuel level sensors is given in the Appendix 1.*

In order to use a sensor, it must be correctly configured. To configure the sensor:
• in the field «Type», select reading indicated on the configured chart. The AutoGRAPH-INFO MINI supports direct operation with only LLS sensors. So that, to display readings of the sensors connected to the AutoGRAPH-INFO MINI, you need to select the required LLS sensor in the drop-down list. Other parameters specified in the list are readings which can be received from AutoGRAPH on-board controller and external devices connected to the controller as well as LLS sensors connected to the controller (LLS1-LLS4). If you select Cntr1-Ctrl8, you need also to set up a mode of the counter output mode – impulse or frequency (in Hz). If the frequency mode is selected, the counter reading is divided into 100, then specified offset is subtracted from that value. The final value of the sensor is calculated according to calibration table (see below).

• set up an offset (Offset) and coefficient (Coeff) for the selected sensor type;

• specify calibration table to convert the sensor readings from ADC stages to liters. The sensor readings must be specified in ascending order. The calibration table can contain up to 100 pair of values. If the table contains less than 100 values, all fields of excessive rows must be empty.

• select a method of calibration table approximation in the :Approximation» field.

• As the required charts have been configured, save setting in the AutoGRAPH-INFO MINI. To do it, you need to enter the device password in the «Password» field, then apply settings pressing the «Write» button.

The configured chart is displayed on left of the main screen. To select other charts to view, press the «Tank n» button (n – the current tank number). The numeric value of chart calculated according to calibration table is displayed to the right of the chart. In order to display the numeric value, you need to add the required chart in the list of parameters displayed on the main screen.

If a threshold of the notification is set up for the chart, the notification will be displayed on the bottom of the main screen when the readings become lower than the specified threshold.

Fuel level in Tank 1 (Chart 1)

Button for selecting next chart

Low level notification

Fig.42. Chart.

List of displayed parameters

The «Parameters» tab is intended to specify a list of parameters which will be displayed on the main screen of the AutoGRAPH-INFO MINI.
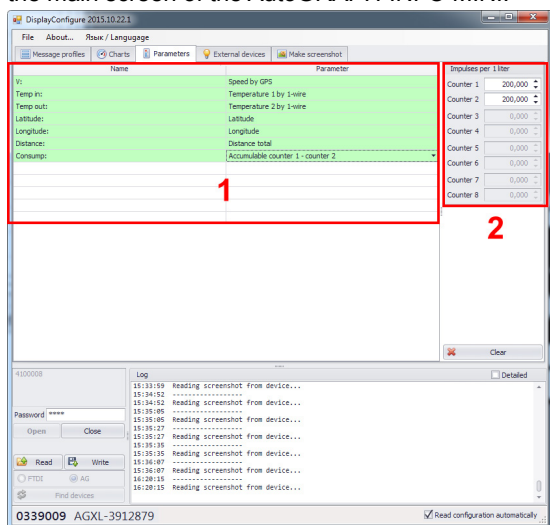
To set up list of parameters:
* *enter a parameter description in the «Name» field (Fig.43, i.1);*
* *select a parameter displayed in the «Parameter» field (Fig.43, i.1).*

If the «Name» field is empty, only the parameter value is displayed.
For the Accumulable counters which are used to indicate flow meters readings connected to the AutoGRAPH controller digital inputs you also need to set up impulse per 1 liter on left panel (Fig.43, i.2) in order to convert a number of pulses to liters. Full list of supported parameters is given in the Appendix 3 to this document.

Fig.43. Parameters tab.

The AutoGRAPH-INFO MINI supports up to 6 screens with up to 2 parameters on each screen.
The first screen contains top two parameters specified on the Parameters tab, the second screen contains third and fourth parameters and etc.
To go to the next screen, press the «MORE+» button.

Fig.44. Main screen.

When specifying parameters, you should note that the AutoGRAPH-INFO MINI displays parameters from that list till the first empty string. The parameters after the empty string are not displayed.
In order to display the specified list on the main screen of the AutoGRAPH-INFO MINI, you need to select *Main menu/Settings/Main screen/Parameters* in the device.
In the Parameters mode the AutoGRAPH-INFO MINI receives data from LLS sensors or AutoGRAPH on-board controller connected to RS-485 bus and displays the specified parameters on the main screen if their are available. If specified parameter is not available, the string «---» is displayed instead of the parameter value.
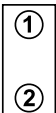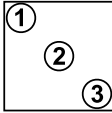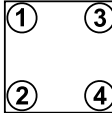
Appendix 1

Variants of sensor installation in fuel tank

This section covers the information on how to set up the divisor which is used to calculate charts' readings. The divisor is to be selected depending on tank configuration and sensors position in the tank.
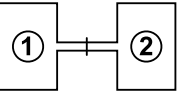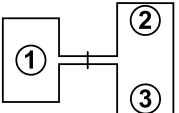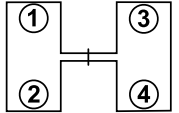
Given below is variants of LLS sensors installation on fuel tank depending on the tank type and methods of the divisor selection for each variants of the installation.

Top of the given formula is sum of the sensors readings. The figure at the bottom of formula is a coefficient (divisor) dividing the sum.
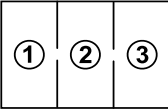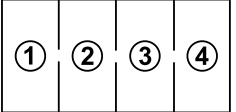
Given expressions and diagrams are applicable for other types of sensors.

	2 sensors in a tank	3 sensors in a tank	4 sensors in a tank
Sensor installation diagram			
Fuel level calculation formula	1: LLS1 2: LLS2 2	1: LLS1 2: LLS2 3: LLS3 3	1: LLS1 2: LLS2 3: LLS3 4: LLS4 4

	2 connecting tank, 2 sensors	2 connecting tank, 3 sensors	2 connecting tank, 4 sensors
Sensor installation diagram			
Fuel level calculation formula	1: LLS1 2: LLS2 1	1: LLS1 2: LLS1 3: LLS2 4: LLS3 2	1: LLS1 2: LLS2 3: LLS3 4: LLS4 2

	3 connecting tank, 3 sensors	4 connecting tank, 4 sensors
Sensor installation diagram		
Fuel level calculation formula	1: LLS1 2: LLS2 3: LLS3 1	1: LLS1 2: LLS2 3: LLS3 4: LLS2 1

Appendix 2

Given below is the list of parameters which are supported by the AutoGRAPH-INFO MINI and can be displayed on the device main screen. The list of parameters is set up in the DisplayConfigure application on the «Parameters» tab.

Parameters (in the order in which they are specified on the «Parameters» tab):

1. Speed by GPS.
2. Latitude.
3. Longitude.

Data from vehicle CAN bus
4. Speed from CAN bus.
5. Motohours from CAN bus.
6. Engine rotations from CAN bus.
7. Total distance from CAN bus.
8. Daily distance from CAN bus.
9. Oil temperature from CAN bus.
10. Coolant temperature.
11. Fuel temperature.

Fuel level from CAN bus
12. Total fuel level.
13. Fuel level in tank 1.
14. Fuel level in tank 2.
15. Fuel level in tank 3.
16. Fuel level in tank 4.
17. Fuel level in tank 5.
18. Fuel level in tank 6.

1-Wire data (temperature by 1-Wire sensors)
19. Readings of temperature sensor 1.
20. Readings of temperature sensor 2.
21. Readings of temperature sensor 3.
22. Readings of temperature sensor 4.
23. Readings of temperature sensor 5.
24. Readings of temperature sensor 6.
25. Readings of temperature sensor 7.
26. Readings of temperature sensor 8.

Fuel consumption (data from digital inputs which flow meters are connected to)
27. Accumulable counter 1.
28. Accumulable counter 2.
29. Accumulable counter 3.
30. Accumulable counter 4.
31. Accumulable counter 5.
32. Accumulable counter 6.
33. Accumulable counter 7.
34. Accumulable counter 8.

Two counters difference
35. Accumulable counter 1 – counter 2.
36. Accumulable counter 2 – counter 1.
37. Accumulable counter 3 – counter 4.
38. Accumulable counter 4 – counter 3.
39. Accumulable counter 5 – counter 6.
40. Accumulable counter 6 – counter 5.
41. Accumulable counter 7 – counter 8.
42. Accumulable counter 8 – counter 7.

Temperature by LLS sensors
43. Temperature by LLS 1.
44. Temperature by LLS 2.
45. Temperature by LLS 3.
46. Temperature by LLS 4.
47. Temperature by LLS 5.
48. Temperature by LLS 6.
49. Temperature by LLS 7.
50. Temperature by LLS 8.

51. Current date.
52. Current time (local).
53. Firmware version of AutoGRAPH-INFO.

The accumulable counters can be reset if it is necessary. To reset counters, you need to press button connected to the digital input 1 which is preset to the «Consumption reset» mode.
To edit the digital input mode, go to the Control menu.

GLONASS GPS

AutoGRAPH

VEHICLE AND PERSONAL TRACKING SYSTEM

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