TechnoКом

GLONASS GPS
VEHICLE TRACKING SYSTEM

STEALTH AutoGRAPH

CAR TRACKING & SECURITY SYSTEM
HIDDEN • COMPACT • AUTONOMOUS

2015 VERSION 2.2
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USER GUIDE

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Introduction

This User Manual applies to the AutoGRAPH-ST autonomous anti-thief device (hereafter - device, AutoGRAPH-ST) produced by TechnoKom Ltd. 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 with TU 6811-004-12606363-2013 and warranty provisions.

All information on functions, functional capabilities and other specifications related to AutoGRAPH-ST tracking devices 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.

Basic information

• AutoGRAPH-ST is an autonomous anti-thief device intended for acquisition of the exact coordinates of assets and delivery of the coordinates to the customer by SMS, Email and GPRS.

• The customer can track asset in real-time using the AutoGRAPH-Web application.

• The compact form factor makes the device easy to install and difficult to detect.

• The autonomous power supply is enough to send 1200 messages. Under normal usage the battery life time is up to 2 years.

• Operation of the device is organized in such way that the device is in Standby mode most of time. The AutoGRAPH-ST switches to Operation mode for acquisition of asset coordinates and delivery to the customer. The device will then switch to Standby mode until next period of Operation mode. First of all such behaviour extends battery life time. Secondly, it makes detection by GSM/GPS scanners more difficult by limiting operational time.

• All operation parameters of AutoGRAPH-ST are configurable, so the device can be customized for a great number of applications. Standard profiles provide quick setup of the device for most common applications by sending a short command to device.

• Remote setting allows the customer to control the device by sending settings in an SMS from anywhere without device removal and connection to a PC.

• In addition to location, the AutoGRAPH-ST sends information on current battery voltage, SIM balance, ambient temperature and asset speed to the customer.

• A built-in accelerometer detects start of motion, overturning, vibrations and other forces on the device which could be an attempt at wilful damage of the asset. The AutoGRAPH-ST can be customized to send a notification to the customer if the device detects acceleration above a preset threshold.

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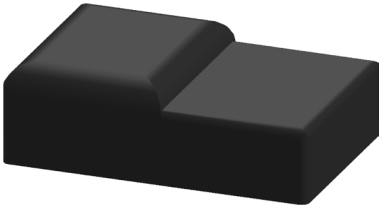
Scope of Supply

№	Description	Qty
1	«AutoGRAPH-ST»	1 pc.
2	Battery Set (Li-SOCI2)*	1 pc.
3	Password Card	1 pc.
4	User Sheet	1 pc.
5	Warranty Certificate	1 pc.

* installed in device.



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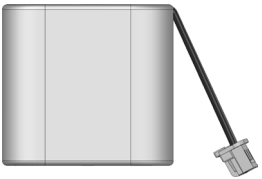

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Technical Specification

Description	Value
GNSS chipset	Mediatek MT3333
Supported GNSS	GPS+GLONASS / GALILEO / Beidou
Accuracy, when using GPS/GLONASS GNSS*: • position, m • velocity, m/s • time (typ), μs	 3.0 0.02 1
Type of GPS/GLONASS antenna	Internal
Position accuracy when using LBS**: • in city • in the countryside	 200...1000 m 1...30 km
Communication	GSM / GPRS / SMS / SMTP (Email)
SIM holders	1
Type of GSM antenna	Internal
Connection to PC	USB 2.0
Internal FLASH memory, records	> 270.000
Built-in accelerometer	Optional
Power consumption in Standby mode, μA	15
Battery type	Li /SOCl2
Rated battery voltage, V	7.2
Battery capacitance, mA/h	1700

Description	Value
Battery life	up to 2 years / approx. 1200 messages***
Time to first position fix (typ.), s	23*
Operating temperature, °C	от - 40 до + 85
Dimensions, mm	74 x 48 x 21
Weight (with battery), g	80

* With nominal signal levels - 130 dBm.

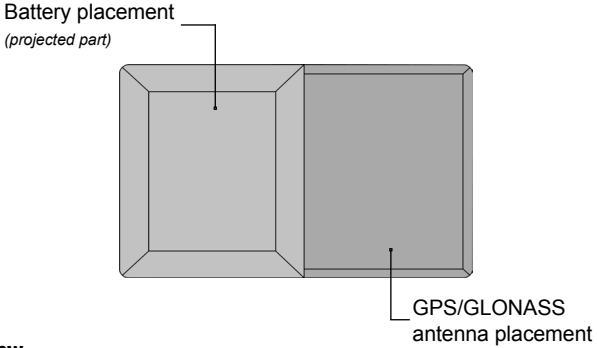
** A wide specified range is supplied as the position accuracy when using LBS depends on base stations location around asset.

*** Battery capacity is enough to send 1200 messages with coordinates (Email, SMS and data to server). Under normal use battery life time amounts up to 2 years.

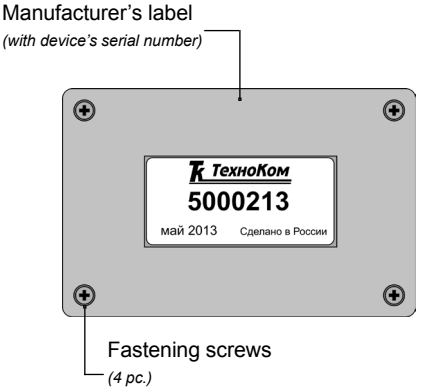
Components of AutoGRAPH-ST

The small form factor of the device makes it easy to install and prevents easy discovery.

Front view

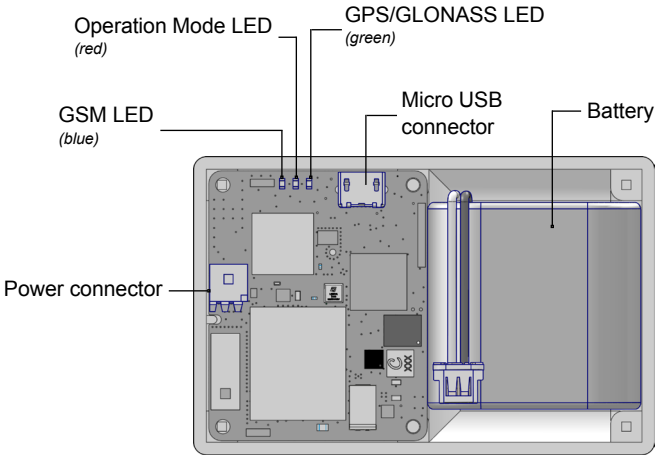


Back view



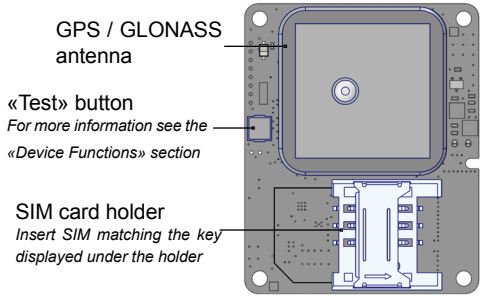
Internal view

Unscrew four fastening screws and remove the back cover of the device.



Detailed information on LEDs' indication is given in the «AutoGRAPH-ST Indication» section of the User Manual.

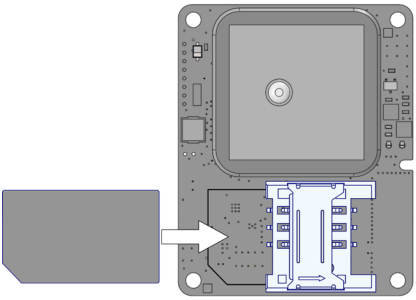
Remove device PCB from the case. The following components are on the rear:



Getting Started

Installation of a SIM card

• Unscrew the four fastening screws and remove the back cover of the device.
• The SIM holder is located on the rear of the PCB.
• Insert a SIM card in the slot with the card's contacts facing the PCB. Be sure that the card's keying matches the key on the PCB.
• After the installation insert the PCB into the case. Incorrect installation of the PCB into the case can cause incorrect operation of GNSS receiver. To prevent this, the case and the PCB are keyed: there is a boss in the case and there is a mating cut on the PCB.



IMPORTANT

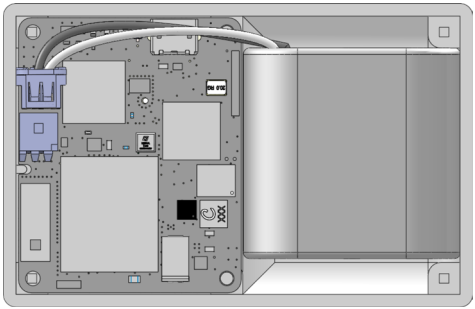
Do a test of a new SIM card in a cell phone before you install it into the device. Do the test to make sure that GPRS / SMS / USSD services are enabled and operate properly, the PIN code matches the code pre-set in the device (in order to prevent locking), and a personal account associated with the SIM card has the sufficient balance for successful operation of the services.

Inserting the battery

The AutoGRAPH-ST comes with a non-rechargeable Li /SOCI2 battery with a life time of up to 2 years.

To insert the battery:

- Insert the battery into a pocket in the case intended for battery installation.
- There is a connector on a front side of the PCB intended for connection of the battery. Plug a male connector from the battery to the connector on the PCB. Both connectors are keyed to prevent wrong orientation.



- After connection, the battery Power LED will turn on and the device will start operation. In normal operating mode, the red LED will flash once every 2 seconds. Detailed information about LED operation is given in the «Indication of Operation» chapter.
- Route the battery cable accurately in the case to stop pinching of cables. It is not recommended to make tight bends in the cable.

IMPORTANT

Before installation, check the battery for any damage. Do not use expired batteries. Use only approved batteries. Do not connect incompatible products.

Settings

When shipping, the device is set to the manufacturer's default settings. After inserting a SIM card and battery, the device is fully operational. If necessary, a customer can set up the device with personalised settings.

The device is fully configurable for any requirements and it can be set up in following way:

- using the AGSTConf program that is intended especially for configuring AutoGRAPH-ST devices via USB.
- remotely by sending control commands in SMS.

The device settings are secured with a password. The default security password is specified in password card supplied with the device.

To ensure security of the device, it is highly recommended that the security password is changed from that specified by the manufacturer upon purchase.

When the device is secured with a password, it is not possible to change the settings with the configuration program without entering the correct password. A password is also required when using the SMS control commands.
Apart from the four digit security password, every AutoGRAPH-ST device has a 16 digit master password, which enables a reset of the security password in case of its loss.
The master password of the device is given in the password card supplied with the device. The master password cannot be changed.

To avoid unauthorized access to the device settings and data stored in device, it is not recommended to disclose device passwords. It is highly recommended to keep the password card in a secure place away from the device.

For more information on configuration of the AutoGRAPH-ST device using the AGSTConf program see the «AGSTConf. Configuration Program for AutoGRAPH-ST» document.

For more information on the device configuration using remote control commands see the «Remote control of AutoGRAPH-ST using SMS commands» document.

After the SIM card is inserted, the battery is connected and the device settings are set, perform the following steps:

- Insert the PCB and the battery into the case.
- Replace the back cover and tighten the four fastening screws.
- The device is now ready to use.

Device Functions

Most of the time the AutoGRAPH-ST device is in Standby mode. When the device is in Standby mode, the GNSS receiver and GSM modem are turned off, so communication with the device is unavailable. At preset intervals, the device switches to Operation mode to acquire the location and send the position to the customer.

In Operation mode, the device acquires its coordinates from satellites, records them into internal memory, sends collected data to the customer via enabled channels and receives control commands which were sent to the device during Standby mode. After performing all of the preset tasks, the device switches to Standby mode until the next period of Operation mode.

This method of operation prolongs the life of the battery and reduces the risk of device detection by a GSM scanner.

AutoGRAPH-ST devices have several groups of pre-set settings called profiles which customize the device for different applications. The customer can select one of default profiles or a personalized User profile. Detailed information on profiles is given in the «Profiles» section.

«Test» button

The «Test» button forces the device into Operation mode:

• a short press initiates data transfer via enabled paths to preset recipients. Immediately after transmission, the device switches back to Standby mode. In this case all data transfer periods are reset.

• a long press (more than 2 sec) activates Operation mode for 20 seconds. During this time the customer can send new settings to the device using remote control commands. A second press before 20 seconds has elapsed will force the device back into Standby mode. Data will not be transferred when in operation mode after a long press.

Use of the «Test» button allows the customer to setup the device and to check its operation before installation on an asset.

Coordinate acquisition

When the device is in Operation mode, it determines its position using global navigation system GLONASS and GPS (NAVSTAR). If it is unable to determine its position using GNSS, the device will determine its approximate GSM localization using the Yandex.Locator Service. Position accuracy, when fixing in relation to a GSM base station, can attain 1 km in city and 30 km in the country.

If GPRS or Yandex.Locator Service are not available, the device will send the characteristics of the base station which it is connected to and the characteristics of the six nearest stations.

Recording the data

The device can be specified to acquire and record current coordinates into internal memory without sending it to the customer. The period of data recording is configurable and can be set using SMS command or the AGSTConf program.

If the device's current profile enables data transfer to a data server, all collected data will be transferred to the server in the next period of data transmission. Also the collected data can be read via USB into the AutoGRAPH Dispatch Software.

Along with the device coordinates, ambient temperature, battery voltage and speed are also saved in the internal memory.

Data transmission

The AutoGRAPH-ST is capable of transferring data to a data server by GPRS, to telephone numbers by SMS and to email addresses by Email.

If data transfer to a server is enabled, the device will transfer current position and collected data from the internal memory to the specified server. If the device is unable to transfer data to the server, e.g. because of GPRS unavailability, the device will retry during the next transmission period.

Current position coordinates can be sent to the customer by SMS and Email. Along with the coordinates, the device sends speed, battery voltage level, ambient temperature, number of visible satellites, positioning accuracy in case of fixing using LBS and total number of SMS sent at last switch on. The device is able to send SMS messages to 3 different telephone numbers and Email messages to 4 addresses in one period of Operation mode.

Coordinates can be send to the customer as a link to the online mapping service (Google Maps or Yandex Maps) or the customer can set up the AutoGRAPH-ST to send longitude and latitude values without a link.

Motion detection

Depending on the hardware version, AutoGRAPH-ST devices may be equipped with a built-in accelerometer.

The accelerometer can detect motion, device overturning and impact effects on the device and notify the customer. To provide quick notification, the device sends first SMS without coordinates and after position acquisition it sends second SMS with asset coordinates.

To check whether the device has an accelerometer, the customer can use the AGSTConf program or send an SMS request to the AutoGRAPH-ST.

Additional functions

• Delay of Standby mode. This allows the device to stay in Operation mode after sending an SMS for a specified amount of the time between 3 and 10 minutes. This can be used for sending new settings to the device after it has switched to Operation mode and sent it's current position data by SMS.

• Balance inquiry. The device can be set up to send the balance of the SIM card to the customer in the SMS and Email with the coordinates. The customer can check the balance of the SIM card themselves by sending a control command to the device. The device can also be set up to send a notification if the balance falls below a preset amount.

• Indicator switch off. The AutoGRAPH-ST is equipped with three LEDs intended to indicate device operation. The indicators can be completely switched off to extend battery life. This can be done using control commands or the AGSTConf program.

• Geofencing with notification by SMS.

Depending on the firmware revision, the device may not support all features. It is recommended that the latest firmware is used at all times.

Real-time tracking

The customer can track asset movement in real-time using «AutoGRAPH-Web» application. This application can be run on any web enabled mobile device.

A personal login and password for access into the application are given to the customer when purchasing the device.

It is recommended to use the «AutoGRAPH MOBILE» application for Android and iOS devices. «AutoGRAPH MOBILE» offers the same functionality as the «AutoGRAPH-Web» application and can be downloaded for free from Google Play on Android or the App Store on iOS.

Profiles

The AutoGRAPH-ST has five standard profiles which customize the device for different applications. Each profile customizes settings such as transmission time or period and methods. At specified intervals or at a scheduled time the device acquires its location and sends the location data to the customer. After sending the SMS the device stays in Operation mode for a preset amount of time before returning to Standby mode. During the delay the device is able to receive and process incoming control commands. The delay time can be between 3 and 10 minutes. The default value is 5 minutes which should be enough for the customer to send new settings or select a different profile.

SLP (SLeeP)

The SLP profile is the most power saving profile. In this mode the device acquires its position at specified intervals, then records the coordinates into memory, and doesn't transfer the data to the customer. After data recording, the device can stay in Operation mode for a preset duration. The default location acquisition period is 24 hours. The period can be customized by means of short SMS command - *SLP*. The period can vary from 1 to 648 hours with accuracy of 1 hour.

SLP profile may be used to disable temporarily data transmission (e.g. when asset is in roaming).

Position fixing using LBS is not available in SLP profile. If GNSS satellites are not available, the device will not acquire location data and after the delay time will return to Standby mode.

CAR (CAR)

CAR profile sets the device to send an SMS with current position to preset numbers once a day. By default the SMS is sent at 12:00. After sending the SMS the AutoGRAPH-ST device will stay in Operation mode for a preset duration for receiving control commands that may have been sent.
This profile is intended for use when the device is installed in a car as a security device. If the CAR profile is activated, the customer will receive an SMS with the current position of the vehicle every day at the scheduled time. In addition to the car location, the SMS contains information about ambient temperature, SIM balance and battery voltage level.

CRG (CaRGo)

The Cargo profile sets the device to send an SMS with the current position to preset numbers and to transfer data to a specified server. The period between each SMS and data transfer can be set from 1 to 24 hours with accuracy of 1 hour. By default, the period of each is set to 12 hours. After sending the SMS, the device stays in Operation mode for a preset duration then switches to Standby mode. This profile is recommended for use when the device is used for tracking valuable cargo.

TKR (TracKeR)

The profile sets the device to operate as a tracking device. In this profile, the AutoGRAPH-ST device acquires the asset's position after a specified period and records the data into internal memory. Collected data is transferred to a specified server at preset interval. The data recording period can be set from 10 minutes to 24 hours with accuracy of 1 minute. The default value is 15 minutes.

Transmission period varies from 1 to 648 hours with accuracy of 1 hour. The default value is 24 hours.

After data transmission, the device switches to Standby mode without a delay for receiving control commands.

This profile is recommended for personal tracking (e.g. for emergency and service companies, child tracking etc.).

SRH (SeaRcH)

The profile is intended for an operational search for a stolen asset. For quicker and more accurate acquisition of the asset location, the GNSS receiver is permanently turned on whilst SRH profile. After specified periods AutoGRAPH-ST sends an SMS with the asset's current coordinates and transfers the data to a specified server.

The period of data transmission to a server can be set from 5 minutes to 24 hours with accuracy of 1 minute.

The period of sending SMS can be set from 10 minutes to 24 hours with accuracy of 1 minute. After sending an SMS, the device will stay in Operation mode for a preset delay time for receiving incoming control commands.

Activate SRH profile by sending short control command - *SRH* to the device immediately after detecting asset loss. During the next period of Operation mode, the device will process the command and activate the SRH profile.

USR (USeR)

USR profile can be customized to the customer's requirements. The profile can be activated by sending an SMS with the short control command - USR. This command only activates the USR profile with preset parameters of operation, it does not change them.

Therefore, it is recommended to set the profile's parameters using AGSTConf program or extended SMS commands before use, and activate the profile when necessary. If the profile parameters were not changed by the user, they will remain at their default values after profile activation.

Parameters, such as data recording period, intervals of time of data sending by SMS, Email and GPRS are available for adjustment in the USR profile.

The periods of data recording, SMS transmission, data transfer and Email sending can be set from 10 minutes to 648 hours with accuracy of 1 minute.

It is recommended that SMS commands are sent before the device switches to Operation Mode. The device will receive these commands promptly after switching to Operation mode. After processing the commands, the device will send a reply to the telephone number from which the commands were sent.

Device Indicators

The AutoGRAPH-ST has three LEDs on the front side of the PCB intended to indicate the device operation.

After installing a SIM card and connecting the battery, the device begins operation: it turns on the GNSS receiver and starts searching for satellites. After location acquisition, it calculates asset speed and sends collected data to the customer using enabled services (GPRS, Email or SMS). After sending data, the device switches to Standby mode until the next period of Operation mode.

Indication of operation mode:

• **The device is in Operation mode -** Operation mode LED flashes red once every two seconds.

Indication of GNSS receiver operation:

• **Receiver is turned on -** Operation mode LED is constantly red.

• **Searching for satellites -** GPS/GLONASS LED flashes green once every second.

• **Position is acquired -** GPS/GLONASS LED flashes green once every three seconds.

Indication of GSM modem operation:

• **GSM modem is turned off -** GSM LED is off.

• **Transferring data -** GSM LED frequently flashes blue.

Drivers Installation

This section covers the installation procedure of the AutoGRAPH-ST device drivers. For the proper operation of AutoGRAPH-ST devices, the AGUSB Drivers must be installed in system.

AutoGRAPH-ST drivers can be downloaded for free from the official web site of the manufacturer (www.tk-chel.ru).

AutoGRAPH-ST drivers are compatible with Microsoft Windows XP, 7, Vista, 8, Server 2003, Server 2008 and Server 2012.

To install the device drivers onto a Microsoft Windows 7 OS:

1. Connect the device to a PC. If automatic drivers installation is enabled, drivers for the AutoGRAPH-ST device will be automatically downloaded from the Windows Update server and installed in system. If the automatic drivers installation is disabled, install the device drivers manually. To do it, follow the next steps:
2. Download the archived drivers folder from the official web site of the manufacturer and extract the files to a temporary directory on a hard drive.
3. Connect AutoGRAPH-ST device to your PC using USB AM - USB microB pin5 interface cable.
4. The system automatically searches for new equipment. Launch the driver update wizard for new equipment.
5. Select “Browse my computer for driver software“ option and browse to the location where the drivers are saved.
6. When the drivers are installed, the system will automatically identify the connected device. The device is now ready to operate with the configuration utility and dispatch software.

Connection to PC

For configuration it is necessary to connect the AutoGRAPH-ST to a PC.

For correct operation it is required to install the AutoGRAPH-ST driver before connection to the PC. For more information on driver installation see the «Drivers installation» section of the User Manual.

To connect the device to a PC:

- Unscrew the four fastening screws and remove the back cover of the device.
- Use USB AM – USB microB 5pin data cable to connect the device to a PC.
- Connect the data cable to micro USB connector on the front side of the PCB.
- Connect the other end of the cable to the PC.
- If the device drivers have been installed previously, the system will automatically identify the connected device.
- Run the configuration program.

AutoGRAPH-ST Messages

If the device set is up to send an SMS with coordinates, it will send an SMS with current position to all preset telephone numbers.
The SMS with coordinates has the following syntax (there are two cases):

- i**f location is acquired location by means of GPS/GLONASS satellites:**

Alias Profile
Date and Time (time zone)
Position
Speed,Battery,Temp,GSM state,Sat,SMS num
New: next wake-up time
Bal: SIM balance

parameters:
- **Alias -** device's identifier specified in its settings;
- **Profile -** current active profile;
- **Date and Time (time zone) -** date and time of SMS transmission, time zone is given in parentheses.
- **Position -** current location of asset as of a link to an online map or latitude and longitude values.
- **Speed** - asset speed at the time of sending SMS (km/h).
- **Battery -** voltage level of device's battery, V.
- **Temp -** ambient temperature, C.
- **GSM state -** GSM signal level, dBm.
- **Sat -** number of visible satellites at the time of location acquisition.
- **SMS num -** number of SMS sent by the device since last switch on.
- **Next wake-up time** - time of next data transmission.
- **SIM balance -** current balance of device's SIM card. To get the balance in the SMS, the proper option must be enabled and the code for balance check must be pre-set in the device.

Sample:

AutoGRAPH-ST USR
11:11:2013 09:56 (6)
http://maps.google.com/maps?near=54.891343+61.393755&t=h
4km/h,6.7V,22C,-69dBm,s5,#5
NEW:11.11 10:10
BAL:5$.

• **it is not possible to acquire location with satellites. The device sends approximate location fixed using LBS.**

Alias Profile
Date and Time (time zone)
Approximate position
PRC: accuracy
Battery,GSM,Sat,SMSNum
NEW: next wake-up time
BAL: SIM balance

parameters:

• **Alias -** device's identifier specified in its settings;
• **Profile -** current active profile;
• **Date and Time (time zone) -** date and time of SMS transmission, time zone is given in parentheses.
• **Approximate position -** approximate location of asset in relation to GSM base stations.
• PRC - position accuracy.
• **Speed** - asset speed at the time of sending SMS (km/h).
• **Battery -** voltage level of device's battery, V.
• **Temp -** ambient temperature, C.
• **GSM state -** GSM signal level, dBm.
• **Sat -** number of visible satellites at the time of location acquisition. The device sends 's0' if the position is fixed in relation to GSM base stations.

- **SMS num -** number of SMS sent by the device since last switch on.
- **Next wake-up time** - time of next data transmission.
- **SIM balance -** current balance of device's SIM card. To get the balance in the SMS, the proper option must be enabled and the code for balance check must be preset in the device.

Sample:

AutoGRAPH-ST USR
11:11:2013 10:11 (6)
http://maps.google.com/maps?near=54.891343+61.393755&t=h
PRC: 1000m
6.7V,25C,-65dBm,s0,#6
NEW:11.11 10:25
BAL:5$.

If it is not available to acquire asset location using both GPS/GLONASS satellites and LBS (in case of unavailability of GPRS or Yandex.Locator service) the device will send parameters of base station to which it is connected, along with parameters of the six nearest base stations, to the customer.

Different notifications may also be sent by SMS with the coordinates:

- **LOW BATTERY** – a notification about low voltage level of battery.
- **LOW BALANCE** – a notification about low balance in the device's SIM card. To receive a notification about low balance, it is necessary to enable the option in the device's settings and to specify the threshold of notification.
- **CP IN** – special SMS which notifies that the asset has entered the geofenced area
- **CP OUT** – special SMS which notifies that the asset has exited the geofenced area.

The syntax of email messages is the same as the syntax of SMS messages.

Recommendations on proper operation

- For consistent reception of GPS/GLONASS signal it is recommended to position the device with the GPS/GLONASS antenna facing the sky.
- It is not recommended to cover the device with a metallic object.
- Use only approved batteries. Do not connect incompatible products. Before installation, check the battery for any damage. Do not connect damaged batteries to the device.

USER MANUAL v. 2.2

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www.tk-chel.ru
mail@tk-chel.ru