



NEOMATICA

Vehicle tracker ADM007 GLONASS/GPS-GSM/GPRS

Operation manual

Edition 1.3

EAC C E

Content

1. Purpose and Function	4
2. Technical specifications	5
3. Design	6
4. Installation	7
5. Setting the tracker	8
5.1 Connecting to the Configurator.....	8
5.2 Setting using commands	9
5.3 Setting the connection to the server	10
5.4 Setting data transmission	11
5.5. Setting route (track) drawing.....	11
5.5.1 Selecting presets of route drawing quality	11
5.5.2 Expert setting of tracking parameters.	12
5.6 Setting the fixation (freezing) of coordinates during the parking.....	14
5.6.1 Coordinates fixation by the ignition	14
5.6.2 Coordinates fixation by speed.....	15
5.7 Operation mode.....	15
5.7.1 “Tracker” operation mode	15
5.7.2 “Beacon” operation mode	16
6. Connection of additional equipment	16
7. Description of commands	18
8. Upgrading tracker software	24
8.1 Updating the tracker software via the configurator	24
8.2 Updating the tracker software via the configurator using the firmware file.....	24
8.3 Updating the tracker software via GPRS	25
9. Handling and transport regulations	25
10. Warranty obligations	25
11. Marking and packaging	26
12. Disposal	26
13. Scope of supply	26
14. Acceptance certificate	27
Appendix A. Description of the field bits «STATUS»	28
Appendix B. Description of transmitted parameters in Wialon	29

This Operation manual relates to the tracker ADM007 (hereinafter referred as tracker) and describes the procedure of its installation and connection as well as its function and settings.

The Operation manual is designed for professionals who have familiarized themselves with the rules of repair and installation works execution in vehicles and who have special professional knowledge in electronic and electric equipment used on various transport means.

The tracker proper work can be guaranteed if it is installed and set by qualified professionals. To use the tracker properly it is necessary to familiarize with the monitoring system work principles in general and to understand the function of all its components. For this reason, it is strictly recommended to get basic knowledge on GLONASS and GPS global navigation satellite systems functioning, GSM network, issues related to data transmission by means of short message service (SMS), GPRS and Internet.

1. Purpose and Function

The tracker is intended for installation on a vehicle as an additional device that records the location of the vehicle, its speed, and travel direction. View of the tracker is shown in Figure 1. Additionally, the voltage level at the analog input is recorded. All events and conditions fixed by the tracker are stored in its non-volatile memory.

The accumulated data is transmitted through the GSM 850/900/1800/1900 cellular network operator using packet data transmission technology GPRS to a dedicated server with a static IP address or domain name from which it can be received via the Internet for further analysis and processing in a monitoring center.

The tracker can be configured in any convenient way: locally (via Bluetooth, using the Configurator program) or remotely (by sending commands via SMS or GPRS). To ensure data security, when the external power is turned off and the GSM network is lost, the tracker has got a non-volatile memory. Data transmission is possible only if there is a GSM 850/900/1800/1900 cellular network supporting a packet data service (GPRS).



Figure 1 – View of the tracker (the wires are not shown)

The vehicle travel route is described in the form of separate points in time. The route point is saved when at least one event occurs, such as:

- travel direction changes by an angle which is greater than the pre-set one;
- the straight-ahead travel is performed at a distance, which is longer than the pre-set one;
- the pre-set acceleration limit is broken;
- the time for putting the point while traveling (parking) is expired;
- device status change (see the Appendix A);
- an event occurs on analogue input.

In this way, route points can be saved with the time interval from one second to several minutes allowing for a quality routing, recording any changes without a surfeit of information saved in the “black box” and increase in GPRS traffic.

The tracker with the GLONASS/GPS module ensures time and navigation parameters measuring based on GLONASS and/or GPS satellites. After being connected to the power supply, the tracker starts receiving data from satellites, locating itself, identifying speed, time, measuring voltage in inputs and connecting to the server. After being connected to the server, the tracker transmits thereto the data packets with the pre-set frequency or when an event occurs. If for any reason the connection to the server fails, all the information will be saved in the tracker non-volatile memory and transmitted as soon as the connection is restored. If there is no signal from GLONASS and/or GPS satellites and there is GPRS connection the time is synchronized via NTP protocol with one of the available public servers. The points will be recorded without data about location.

Data transmitted by the tracker:

- GMT date and time;
- coordinates (latitude, longitude, altitude);
- speed, acceleration and travel direction;
- number of satellites when fixing a navigation problem;
- precision loss factor in a horizontal plane;
- voltage values on analogue input;
- data about events occurred;
- device status

2. Technical specifications

- GLONASS/GPS receiver:
 - chipset: MT3333 (MediaTek);
 - frequency ranges: GLONASS – L1 (CT-code), GPS - L1 (C/A code);
 - sensitivity in cold start/tracking, dBm: -149 dBm/-161dBm;
 - number of tracking/picking-up channels: 33/99;
 - positioning precision, 95% of time, not worse: 3 m
- Connection standard: GSM 850/900/1800/1900, GPRS Multi-slot Class 12
- GSM transmitter power: 2 W
- Number of SIM-cards: 1 or 1 SIM-chip (optional, upon request)
- Number of analogue inputs: 1
- Analogue input features:
 - voltage measurement range: 0...58,8 V
 - discreteness (sensitivity): 57,4 mV

input resistance: 200 kOhm

- Number of route records saved: at least 49 000
- PC connection interface: Bluetooth
- Operation temperature: -40..+85°C.
- Power voltage: +8..+45 V of unregulated direct current
- Current consumption (at the supply voltage 12 V):
 - maximum: 200 mA
 - average: 30 mA
- Dimensions: 45x25x12mm
- Weight: not more than 30 g.

3. Design

Functionally, the tracker consists of a microcontroller, non-volatile memory, a combined GLONASS/GPS-, GSM-, Bluetooth module, analog input.

The GLONASS/GPS unit of the combined module is designed to receive signals from the GLONASS / GPS satellites and determine the geographical coordinates of the receiver antenna (latitude, longitude and altitude), as well as the exact time (GMT), speed and direction of travel.

GSM/GPRS unit of the combined module performs the following functions:

- establishment and maintenance of outgoing TCP / IP connection (data reception and transmission in GPRS mode);
- receiving and sending SMS messages.

For information transmission, the GSM / GPRS unit of the combined module establishes and maintains connection to the server, periodically transmitting information packets. The period of data transfer to the server during the parking and during the movement of the vehicle is different and can be changed by user.

Bluetooth unit of the combined module provides connection to the PC, as well as wireless information exchange between the tracker and the configurator program ADM Configurator. To display the operating status, the tracker has 2 LED indicators: green and blue.

The green LED indicates the status of the GLONASS/GPS unit of the combined module:

- flashes three times - the GLONASS/GPS unit is on, but there is no data from it;
- flashes twice - data from the GLONASS/GPS unit received, but the coordinates are invalid;
- flashes once - the GLONASS/GPS unit has determined the time and the actual coordinates.

The blue LED indicates the status of the GSM/GPRS unit of the combined module:

- flashes three times - the GSM/GPRS unit is disabled for re-initialization;
- flashes twice - the GSM/GPRS unit is on, but there is no connection to the server;
- flashes once - the tracker has established connection to the server and successfully transmits information packets;
- constantly shines, briefly turning off - SIM card is not available.

Three wires are put out of the tracker: red – plus of the tracker power, black - minus, yellow - analog input. The color marking of the tracker wires is shown in Figure 2.

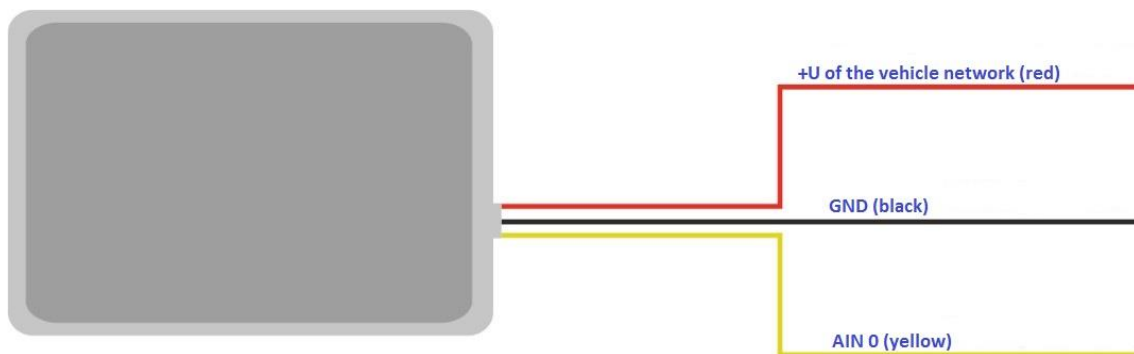


Figure 2 – Color marking of the tracker wires

4. Installation

The internal GLONASS/GPS and GSM antennas are used in the tracker, which allow for its installation almost in any place of the vehicle. However, it is not recommended to install it in the places where the received signals will be attenuated by the vehicle metallic housing, since this can affect the tracker work quality. For a proper function of the receiver GLONASS/GPS, put the tracker so that its sticker is directed upwards.

Insert the SIM card into the holder with a deactivated PIN code request, activated data transmission service via GPRS, SMS and sufficient balance for these services

Supply the power to the wires according to the layout in Figure 3: for the red wire - plus of the vehicle network, for the black - minus of the vehicle network (housing, GND). When connecting the plus of the vehicle network to the tracker, install a 2A fusible as close as possible to the point of

connection to the vehicle network, which is especially important when connecting directly to the battery clamp.

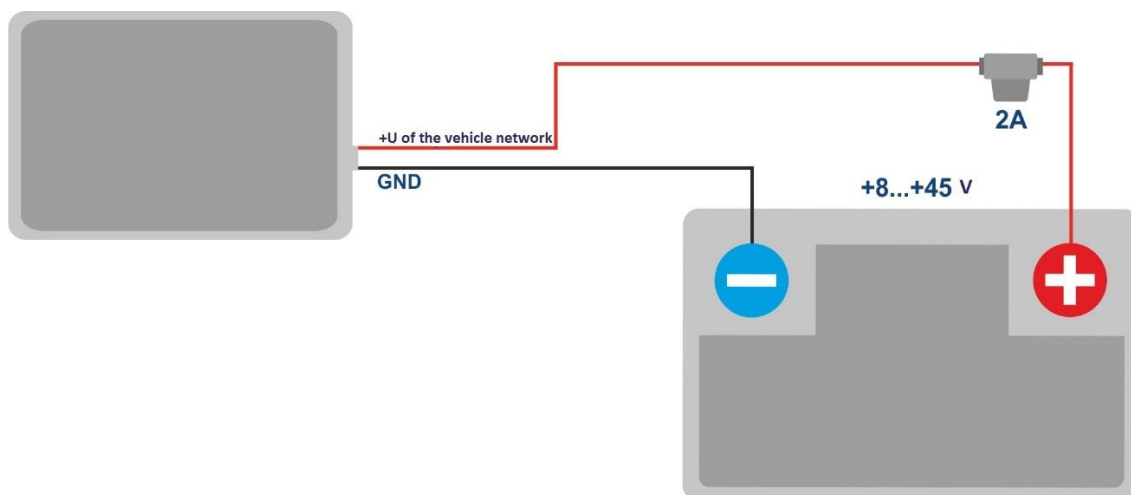


Figure 3 – Standard connection layout of the tracker

If there is valid satellite data and an established connection to the server, the tracker will determine the time, coordinates and transmit information packets to the server, which will be marked by a single flashing of the green and blue LEDs.

It is highly recommended to conduct a preliminary test of the tracker's performance in the laboratory, using a power supply instead of the vehicle network, providing an output voltage of 8 to 45 VDC and a current of at least 1A.

5. Setting the tracker

5.1 Connecting to the Configurator

To connect the ADM007 tracker to a personal computer using Bluetooth wireless technology, you should do the following:

- 1) Bring the Bluetooth adapter of the PC to the working state;
- 2) Start the ADM Configurator program version not older than 2.2 (available for download at <http://neomatica.com>);
- 3) Turn the Configurator to the Bluetooth radio connection mode. To do this, you need to select the way to connect the device by clicking on the Bluetooth icon in the upper left corner of the Configurator, as shown in Figure 4;



Select method of device connection

Figure 4 - ADM Configurator: choosing how to connect the device

- 4) Supply power to the tracker;
- 5) If there are several active trackers ADM007 within the reach of the Bluetooth adapter of the personal computer, select the "Select device" flag and enter the last 4 digits of IMEI in accordance with Figure 5. If there is only one active tracker ADM007 within the reach of the Bluetooth adapter of the personal computer, you may remove the "Select device" flag. In this case, a random tracker will be connected from all detected;

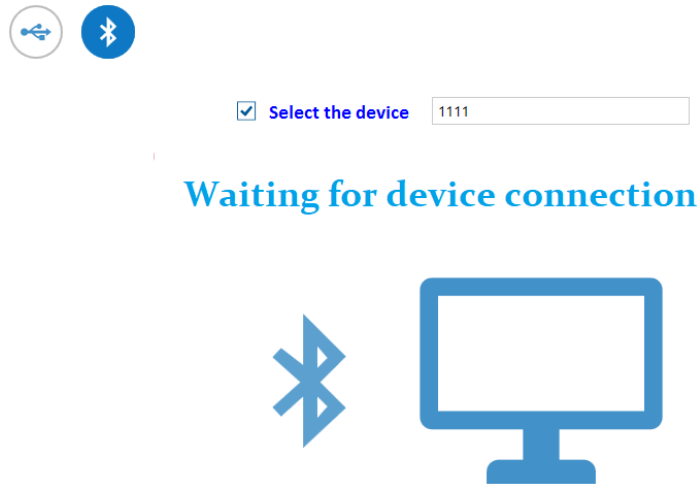


Figure 5 - ADM Configurator in device connection standby mode

- 6) After a few seconds the connection between the tracker and the ADM Configurator program will be installed and the settings window will be displayed;
- 7) After the device is set or, if connection of another tracker is required, click "disable device" in the upper right corner of the ADM Configurator program. The configurator will go into a standby mode, as shown in Figure 6.

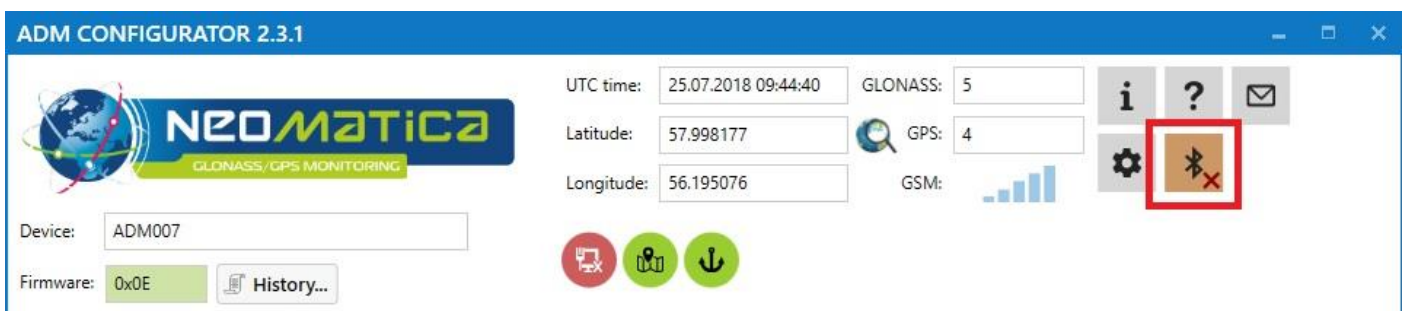


Figure 6 - ADM Configurator: the "disable device" button

5.2 Setting using commands

The tracker is managed by commands sent via SMS, GPRS or Bluetooth. The syntax is the same for any way of sending.

General rules for writing and sending commands:

- only Latin characters and punctuation may be used in commands;
- character case does not matter;
- commands transmission syntax is the same for SMS, GPRS and Bluetooth.
- All commands syntax: «CMD X1,...,X3», where CMD is a command, X1..X3 are commands parameters.
- Commands are separated by a SPACE. Parameters are separated by commas, except for the **DNO** command which parameters are separated by a colon.

After receiving a command, the tracker executes it and sends a feedback message.

If the command parameters extend beyond the acceptable range, the tracker changes them to the nearest acceptable values. If it is not possible to change parameters or parameters are not enough, the tracker will answer with an error message. A command without parameters returns the current settings.

- **Sending commands using ADM Configurator program**

To configure the tracker via Bluetooth, you should use the "ADM Configurator" program. If a password different from "0" was set in the tracker then the Configurator will ask to enter the password.

- **Sending commands using SMS messages**

To manage the tracker using SMS, it is necessary to send the SMS command "**ADD ME 0**" to the number of the SIM card installed in the tracker, where 0 (zero) is the default password (if the password has been changed, you should enter it instead of 0). The phone number from which this command was sent will be authorized in the tracker. An authorization is done only once, afterwards the tracker saves the telephone number in a non- volatile memory within its whole service life. The tracker can save up to 4 numbers. Resetting settings to the factory ones clears the list of phone numbers.

- **Sending commands from the server via TCP connection**

To configure via GPRS, authorization is not required. The tracker receives commands from the server via TCP connection used for data transmission.

5.3 Setting the connection to the server

Configure the APN settings for the selected cellular operators using the «**SETGPRS0**» command.

Configure the IP address and port of the server (host) using the command «**SETHOST0**» or "**DNO**".

Change of these parameters is possible in the graphical interface of the program "ADM Configurator".

5.4 Setting data transmission

Navigation data and data received from different sensors being transmitted from the tracker to the server, are divided by data packets. Depending on the functionality used, it is necessary to activate the transmission of the necessary data packets.

The setting is done in the graphic interface of the ADM Configurator or by **PROTOCOL** command.

Table 1 shows the correspondence of data packets to the values of **PROTOCOL** command. If data transmission is required to be transmitted from several packets then calculate **PROTOCOL** command parameter by addition. To save the traffic it is recommended to set only the transmission of necessary data packets.

For example:

Main data (0) +analogue inputs (8) = PROTOCOL 8

Table 1. Values of the main parameters for PROTOCOL command

Data packet name		Parameter value
Main data	NAVIGATION DATA	0
Analogue inputs	IN_A	8

5.5. Setting route (track) drawing

5.5.1 Selecting presets of route drawing quality

To facilitate the process of setting the route drawing quality there are several factory presets. The preset can be selected in ADM Configurator (version 2.4.5 at least) or by **TRACKSET** command. The presets contain several sets of parameters. In total 5 presets are available. All presets allow to get a drawing of the travel path, the differences are in the degree of route details. The more detailed route is the more route points will be transmitted to the server, this increases the traffic consumption. Less detailed route reduces traffic consumption.

• **TRACKSET command description:**

TRACKSET X

X –number of route drawing preset

X = 0..4

In response a total list of set parameters will be displayed.

Answer example: TRACK 4,1000,100; (1):3,5; (2):3,5; (3):3,5
Command without parameters displays current route settings.

• **Presets description:**

TRACKSET 0

Satisfactory tracking quality, money-saving variant as regards route points and traffic consumption. The quality is enough to monitor the movement path. The drawing of road turns is simplified. Slight route changes are not drawn (expected points per km are twice less than in preset 2).

TRACKSET 1

A good tracking quality. The drawing of slight changes of direction and road turns is simplified (expected points per km are 1.3 times less than in preset 2)

TRACKSET 2

Set by default. A good tracking quality. The variant suits to the most of tasks. Is an average variant as regards tracking drawing quality and traffic consumption. Slight direction changes and road turns are drawn with details.

TRACKSET 3

Slight changes in direction are drawn with more details (expected points per km are 1.3 times more than in preset 2)

TRACKSET 4

High tracking detalization. Slight changes in direction are drawn with many details. (expected points per km are 1.6 times more than in preset 2).

5.5.2 Expert setting of tracking parameters.

It is recommended to use this method of setting only if none of the presets fit the task. The change of these parameters can lead to an increase of traffic consumption or to a decrease of the route drawing quality.

• **Setting using TRACK command**

To set all the parameters send TRACK command twice. The degree of road turns detalization is set by sending TRACK command with three parameters. Command format: TRACK M,A,B

The threshold values of additional circumstances of route points drawing in movement are set by sending TRACK command with four parameters. Command format: TRACK 255,X,Y,Z

• **Setting the degree of road turns drawing detalization. Setting threshold values of angle change and deflection.**

A route point is drawn when the thresholds are exceeded.

TRACK M,A,B

M – number of speed mode.

M=255 – apply the same parameters for all the modes

M=0 – slow movement

M=1 – medium -speed movement

M=2 – fast movement

A – angle for speed mode with M number.

B – deflection for speed mode with M number.

The threshold values of angle change and deflections are set separately for three speed modes. If the same values should be set for all speed modes then the command should be sent once, M parameter in this case equals to 255. If different threshold values should be set for three speed modes then the command should be sent 3 times, choose speed mode using M parameter.

Example

• **Setting same parameters for all speed modes:**

TRACK 255,10,6 – Set 10 degrees for the threshold value of route change and 6 for deflection

• **Setting different parameters for all speed modes:**

TRACK 0,20,7 – Set 20 degrees for the threshold value of route change and 7 for deflection of slow speed mode.

TRACK 1,10,6 – Set 10 degrees for the threshold value of route change and 6 for deflection of medium speed mode.

TRACK 2,5,6 – Set 5 degrees for the threshold value of route change and 6 for deflection of fast speed mode.

• **Setting minimum speed, distance and acceleration.**

If the set threshold values are exceeded, a route point will be recorded.

TRACK 255, X,Y,Z –

First parameter should always be equal to 255. For all speed modes these parameters are set the same.

X – minimum speed

Y – distance (meters)

Z – acceleration (km/h per second)

• Viewing set parameters

TRACK – Display current settings.

The response displays minimum speed, distance, acceleration, angle and deflection for three speed modes.

Response format:

TRACK X,Y,Z; (M) A1,B1; (M) A2,B2; (M) A3,B3

X – minimum speed

Y - distance (meters)

Z - acceleration (km/h per a second)

M=0 – slow movement

M=1 – medium speed movement

M=2 – fast movement

A – angle for speed mode with M number

B – deflection for speed mode with M number

Answer example: TRACK 4, 1000, 15; (0):5,6; (1):10,6; (2):20,6

5.6 Setting the fixation (freezing) of coordinates during the parking

The margin of error might cause a slight coordinates dispersion during a long-term parking of the vehicle. To prevent this effect the coordinates freezing function can be used in the beginning of the parking. This mode is activated automatically when the discrete level is changed at the analog input, or at a speed below the set level. Simultaneous use of both ways of coordinates fixation is impossible. The tracker records the coordinates in the mode that was last configured.

5.6.1 Coordinates fixation by the ignition

To activate the function of fixing the coordinates with the vehicle ignition off, it is necessary to connect to the analog input a circuit being under voltage when the ignition is on. Activate a discrete mode for this analogue input and set the values range of voltage level for the logical one as "INTRUE" and for the logical zero as "INFALSE". Afterwards select coordinates fixation mode "by

the ignition”. Thus, when the ignition is off, coordinates fixation will be initiated by an event formed at the input.

- Examples of using **INSTATIC** command:

Coordinates fixation at 0 in the input AIN0 **INSTATIC 0,0**

The function is disabled by the command «**INSTATIC 255**».

5.6.2 Coordinates fixation by speed

In such a mode the coordinates fixation is done automatically if the tracker registers the speed beyond the set threshold. The precision of this function depends on the precision of the coordinates determination. Thus, in case of bad signal receipt from GLONASS/GPS satellites, the coordinates fixation by the speed might be not stable.

The function of fixing coordinates by speed is activated by the command «**SPEEDSTATIC X**», X is the speed (km / h), below which the coordinates are fixed. The function is disabled by the «**SPEEDSTATIC 255**» command.

SPEEDSTATIC 3 is set by default.

Selecting rather high-speed threshold may result in improvement of function performance during parking, but may cause data loss when driving at the beginning or when driving at a low speed.

5.7 Operation mode

The tracker has got two modes of routes record: “Tracker” and “Beacon”. The working mode is set by **BMODE** command. Mode “Tracker” is set by default.

BMODE X

X=0 – “Tracker” mode.

X=1 – “Beacon” mode.

5.7.1 “Tracker” operation mode

This mode is used to create (draw) exact path of travel.

The routes record is done using all possible criteria:

- change of speed;
- acceleration threshold exceeding;
- distance passage;
- direction change;

- regarding the period of movement;
- regarding the period of parking;
- regarding alarm period;
- at tracker start up;
- change of discrete state at input;
- change of device status.

5.7.2 “Beacon” operation mode

This mode is used to record routes at a given time period and is not suitable for the creation of exact path of travel. Time period of routes record equals to the period of routes record while parking. The routes record is done only using the following criteria:

- at tracker start up;
- change of discrete state at input;
- regarding the parking period;
- regarding alarm period;
- change of device status.

6. Connection of additional equipment

The analog input IN0 (AIN0) can be used to connect analog type sensors and voltage level measurement, and can also be interpreted as discrete.

Voltage measurement range: 0..58.8 V.

Discreteness (sensitivity): 57.4 mV.

Minimum input resistance: 200 kOhm.

Do not apply voltage exceeding the upper limit of the measuring range.

If it is necessary to record a certain voltage level, for example, in the ignition switching circuit, the voltage levels of the logical "0" with the "INFALSE" command and the logical "1" with the "INTRUE" command must be set for the selected analog input.

Description of the commands:

INFALSE IN, X0, Y0

IN - number of the analog input (always specify 0)

X0 - the lower limit of the logical range "0" (fixed value 0mV)

Y0 - upper limit of the logical range "0" (variable value)

INTRUE IN, X1, Y1

IN - number of the analog input (always specify 0)

X1 - the lower limit of the logical range "1" (variable value)

Y1 - the upper limit of the logical range "1" (fixed value of 60000 mV)

When entering these commands, the voltage must be specified in millivolts.

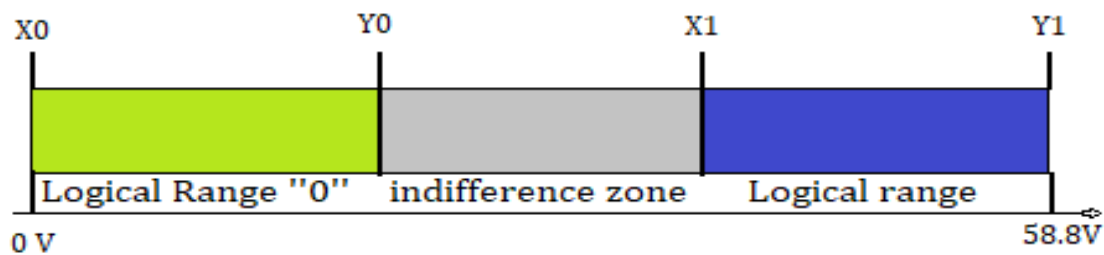


Figure 7 - Bands of discrete states

If the voltage level is in the zone of indifference, the previous discrete state is maintained until the level goes beyond the zone of indifference.

The measured voltage levels are registered by the tracker and transmitted to the server. When changing the discrete state, an extraordinary packet is sent.

7. Description of commands

Table 1. Description of commands

	Command	Answer	Parameters	Description
1	Name X Example: Name bus8	Device Name 'X ' Example: Device Name 'bus8'	X – tracker name	Set the name of the tracker. The name can contain only letters of the Latin alphabet and numbers. The name cannot exceed 10 digits in length. The tracker name is added to the alarm SMS messages.
2.1	ADD ME X,Y (only via SMS) Example: ADD ME 1234 ADD ME 1234,2	PHOES (0)= (1)= (2)= (3)= Example: PHONES (0) = (1) = (2) = (3) = +7xxxxxxxxxx (1) = (2) = (3) = PHONES (0) = (1) = (2) = (3) = +7xxxxxxxxxx (3) =	X – password, the default is "0". Y=0...3 – number of the memory cell to store the number. Optional parameter.	Authorize the phone number from which the SMS was received and write it to the memory cell Y. The command is needed only to create a list of numbers to control the tracker via SMS.
2.2	ADD ME X,Y (only via Bluetooth and GPRS) Example: ADD ME +7xxxxxxxxxx,1	PHOES (0)= (1)= (2)= (3)= Example: PHOES (0)= (1)= (2)= (3)= +7xxxxxxxxxx (2)= (3)=	X – phone number Y=0...3 – number of the memory cell to store the number	Adding a phone number from which you plan to manage the tracker via SMS.
3	PHONES X Example: PHONES 1234	PHOES (0)= (1)= (2)= (3)= Example: PHONES (0)= (1)= (2)= (3)= +7xxxxxxxxxx (2)= (3)=	X – password, default is "0".	Request a list of authorized phone numbers

	Command	Answer	Parameters	Description
4	PASS X,Y Example: PASS 0,86974543	Pass=X,Y Example: Pass=86974543	X – old password, default X=0. Y – New password.	Change the password from the old X to the newY. The password is a number from one to eight digits
5	STATUS	Example: ID=1 Soft=0x1A GPS=9291 Time=11:21:39 25.02.10 Nav=0 Lat=57.2359 Lon=56.2593 Speed=0.0 SatCnt=5 Stat=0x0000	Command without parameters.	Query the current state of the tracker. ID - the number of the tracker, Soft - the software version, GPS - the current number of the information packet, Time - current time and date according to Greenwich Mean Time, Nav- validity of coordinates, Lat - latitude, Lon - longitude, Speed-speed, SatCnt - number of satellites, Stat - status.
6	IMEI Example: IMEI	IMEI Example: IMEI 359587013832624	Command without parameters.	Request IMEI of GSM-module installed in the tracker. The command runs 20 seconds after the tracker is switched on or restarted.

	Command	Answer	Parameters	Description
7	SN X Example: SN 123456789	SN X Example: SN 123456789	X –settable tracker ID	Set the tracker ID.
8	PIN0 X Example: PIN0 1234	PIN0 X Example: PIN0 1234	X – pin code of SIM card	Set the PIN code of the SIM card.
9	ICCID	ICCID	Command without parameters	Request of ICCID of installed SIM cards.
12	SETGPRS0 X,Y,Z Example: SETGPRS0 internet.mts.ru,mts,mts	GPRS0: APN=X, user=Y, pass=Z Example: GPRS: APN=internet.mts.ru, user=mts, pass=mts	X – access point, by default X=internet.beeline.ru; Y - login, default Y=beeline; Z – password, default Z=beeline.	Set APN settings for the SIM card. A command without parameters returns the current GPRS settings for the SIM card.
14	SETHOST0 X,Y Example: SETHOST0 134,236,21,2,12300	HOST0=X,Y Example: HOST0=134.236.21.2:1230 0	X - IP adress, Y - server port. Five numbers separated by commas.	Configuring the IP address and port of the server to which the tracker connects to transmit information. A command without parameters returns the current server address and port.

	Command	Answer	Parameters	Description
15	DN0 X:Y Example: DN0 www.test.ru:1000	HOST0=X:Y Example: HOST0= www.test.ru:1000	X - domain name of the server, Y - server port.	Configure the domain name and port of the server to which the terminal connects to transmit information. A command without parameters returns the current server address and port.
16	PROTOCOL X	PROTOCOL X	X – number determining a data set to be transmitted	Configure the set of data to be transmitted to the server. (detailed description see in clause 5.5 Setting data transmission).
17	BMODE X	BMODE X	X=0 – mode "Tracker". X=1 – mode "Beacon".	Choose the tracker working mode (mode of points record).
18	TRAFFIC X	TRAFFIC X	X=0..60- time in seconds. By default is X=6	Set the delaying time before sending a packet to the server for points grouping.
19	ERASE FLASH	ERASE FLASH	Command without parameters	Erase all information packets stored in the memory. After executing this command, the current information packet number is reset, the tracker is rebooted.
20	ERASE EEPROM	ERASE EEPROM	Command without parameters	Restore the tracker factory settings and restart the tracker.

	Command	Answer	Parameters	Description
21	PERIOD X,Y Example: PERIOD 20,120	PERIOD min=X, max=Y Example: PERIOD min=20, max=120	X – the recording period during the movement in seconds, default X=30. Y – the recording period during parking in seconds, by default Y=300.The value of X must be less than Y.	Set the recording period of information packets during driving and parking. A command without parameters returns current settings.
22	TRACKSET X	The response displays a detailed configuration of all the set parameters of the travel drawing	X= 0...4	Select the preset of route drawing quality. For more details see clause 5.6.1 Selecting presets of route drawing quality.
23	InTrue X,Y,Y Example: InTrue 0,10000,60000	InTrue X,Y,Y Example: InTrue 0,10000,60000	X=0 – input number (always 0); Y – minimum range limit in mV; Y=60000 – the maximum range limit in mV (unchanged value).	Set the voltage range of the logical “1” in the analog input.

	Command	Answer	Parameters	Description
24	InFalse X,Y,Y Example: InFalse 0,0,4000	InFalse X,Y,Y Example: InFalse 0,0,4000	X=0 – input number (always 0). Y – minimum range limit in mV; Y – maximum range limit in mV.	Set the voltage range of logical zero in the analog input.
25	InInfo X Example: InInfo 0	Example: Input 0: InTrue 8000..15000, InFalse 0..3000	X=0 – input number (always 0).	Request information about the input settings.
26	INPUT	INPUT0 = 12000	Command without parameters	Request current measured voltage level in the analog input (mV).
27	INSTATIC X,Y Example: INSTATIC 1,0	INSTATIC X,Y Example: INSTATIC 1,0	X=0 – input number, Y=0, 1 – activation by zero or one. X=255 –disabled function;	Set the input number to enable the coordinates fixation mode. A command without parameters returns the current setting. By default, no one input is set to enable coordinates fixation mode.
30	RESET	reset...	Command without parameters	Restart of the unit.
31	UPDATE	start update...	Command without parameters	Run the firmware update process.

8. Upgrading tracker software

The tracker software (firmware) can be updated via the Bluetooth radio channel using a configurator program or via a GPRS channel.

8.1 Updating the tracker software via the configurator

The configurator program, if the computer has access to the Internet, checks the current firmware version on the update server, and, if necessary, downloads the firmware file.

To update the firmware, do the following:

- 1) establish connection between the ADM007 tracker and the ADM Configurator program using the procedure described in [5.1 "Connecting to the Configurator"](#);
- 2) if ADM Configurator detects the firmware that is more updated than the one installed in the tracker then it will inform about this - the notification will be displayed in the lower left corner;
- 3) click "Update available";
- 4) in the opened "Notifications" tab, click "Update";
- 5) after the update, the tracker will reboot and become available for configuration.

ATTENTION! Do not switch off the tracker during the firmware upgrade process until the tracker is detected by the setup program. Otherwise, it is possible to damage the software, which must be restored in the service center of the manufacturer

8.2 Updating the tracker software via the configurator using the firmware file

The firmware file must be requested from the technical support.

To update the firmware via Bluetooth using the firmware file, do the following:

- 1) establish a connection between the ADM007 tracker and the ADM Configurator program using the procedure described in section [5.1 "Connecting to the Configurator"](#);
- 2) open the "Settings" section in the "Device" tab, click - "Flash file";
- 3) click Update in the pop-up window;
- 4) drag the firmware file to the appropriate field in the configurator window;
- 5) after updating the firmware, the tracker will reboot and become available for operation.

ATTENTION! Don't switch the tracker power off when upgrading the tracker firmware until the tracker is detected by the setting program. Otherwise there is a risk of damaging the software whose recovery can be performed only in the manufacturer's office.

8.3 Updating the tracker software via GPRS

To update the tracker software via GPRS, install the active SIM card in the tracker, enter the APN, user, pass of the cellular operator. Otherwise, the tracker will be in the firmware download mode from the update server until all connection attempts are exhausted. The update process starts after the tracker receives the "**UPDATE**" command via one of the possible channels: Bluetooth, GPRS, SMS. After receiving the "**UPDATE**" command the tracker connects to the update server and downloads the current firmware. After a successful upgrade, the tracker switches to the basic mode of operation with the access point settings and server addresses that were installed before the update. The remaining settings after the update should be checked and, if necessary, reinstalled. Depending on the status of the GSM network, the upgrade process takes an average of 2 to 10 minutes. If there is no possibility to download the update, the tracker will return to work with the available software.

9. Handling and transport regulations

Trackers should be stored in a warehouse at a temperature of +5°C to +40°C and relative humidity at most 85 %.

After trackers' transportation in sub-zero temperatures they should be stored at room temperature within 24 hours.

10. Warranty obligations

The manufacturer guarantees the tracker proper function within 12 months from the day of its sale if consumer meets all the requirements and follows all the rules of transportation, storage, installation and handling.

The warranty does not cover:

- a tracker with mechanical damages and defects (cracks and chips, dents, signs of impacts, etc.) caused by consumer as a result of handling, storage and transportation rules violation. When there are signs of oxidation or other proofs of liquid penetration in the device housing;
- a tracker without housing;

- a tracker with signs of repair performed beyond the manufacturer's service center;
- a tracker with signs of electrical and/or other damages caused as a result of unacceptable changes in external power network parameters or improper use of the tracker;
- a tracker disabled because of an unauthorized software upgrade.

The device software is licensed, terms related to the manufacturer's limited liability in the framework of the License Agreement are provided at the web site https://neomatica.com/upload/docs/license_en.pdf

11. Marking and packaging

Marking is placed on the tracker housing. The trackers are packed in individual boxes, which protect them during transportation and storage. Multipack is possible.

12. Disposal

Device recycling is performed according to national and local norms and requirements.

13. Scope of supply

Table 2. Scope of supply

Device name	Quantity	Serial number	Comments
Tracker ADM007			
Datasheet			

14. Acceptance certificate

Trackers ADM007 GLONASS/GPS-GSM/GPRS in quantity of _____ pcs. is valid for use.

Manufacture date:



Manufacturer: *Neomatica LLC.*

24a Malkova Str., office 6, 614087, Perm, Russia

Tel: *+7 (342) 2-111-500.*

E-mail: *sales@neomatica.com*

Website: *neomatica.com/en*

Appendix A. Description of the field bits «STATUS»

Table A.1. Description of the field bits «Status»

Bits	Field description«Status»	Mask value
0	Sign of tracker reboot	1
1	-	2
2	No connection to the server	4
3	-	8
4	-	16
5	Sign of invalidity of coordinates (validity)	32
6	Coordinates are fixed in the absence of movement	64
7	-	128
8	-	256
9	-	512
10	-	1024
11	-	2048
12	-	4096
13	-	8192
14	-	16384
15	-	32768

Appendix B. Description of transmitted parameters in Wialon

Table B.1. Description of the field bits «Status»

Parameter	Description
acc	Current point acceleration module, km/h/s
sats_glonass	Number of GLONASS satellites involved in fixing a navigation problem
sats_gps	Number of GPS satellites involved in fixing a navigation problem
hdop	Precision reduction on a horizontal plane
pwr_ext	
pwr_int	
adc1	Analogue input voltage value, A_IN0, mB
adc2	GSM signal level, %
adc3	
adc4	
adc5	
adc6	
I/O	Value of device status
in1	Discrete state at input AIN0
in2	
in3	
in4	
in5	
in6	
in7	
in8	
in9	Sign of tracker restart
in10	
in11	No connection with server
in12	
in13	
in14	Sign of invalidity of coordinates
in15	Coordinates are fixed in the absence of movement
in16	
in17	
in18	
in19	

in20	
in21	
in22	
in23	
in24	