RS232. CAN. Integration with Tachograph “Continental VDO DTCO”

User Manual
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Necessary Tools, Equipment and Materials

To connect tachograph “Continental VDO DTCO 3283” (“Continental VDO DTCO 1381”) (hereinafter-tachograph) to Galileosky tracking device (hereinafter – tracking device), you should have:

1. Electrical-installation tools.
2. A set of connecting wire.
3. A computer with Windows-based operating system and an installed configuration program for Galileosky tracking devices— «Configurator 4.0» or a more advanced version. It is recommended to install the last version from the site https://galileosky.com/podderzhka/programmyi.html
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(version 5 dated from August 8, 2018)

General Information

Tachograph “Continental VDO DTCO 3283” (with CIPF block for internal transportation) or “Continental VDO DTCO 1381” (for international transportation) is a test and measurement device for registration vehicle mileage, speed limits and periods of drivers’ work and rest. Tachograph (pic. 1) is required for monitoring observance of traffic rules and established regime of driver’s work. That is aimed at preventing road accidents.

Tracking device provides the following functions:

1. Displays the current mode of the tachograph:
   1.1 vehicle speed;
   1.2 information on the first and second driver:
     1.2.1 current activity;
     1.2.2 driver’s card in a slot;

2. Uploading ddd-file from the driver’s card.

Pic. 1
Tachograph “Continental VDO DTCO”
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ATTENTION! Such functionality is implemented in the tracking devices by means of Easy Logic technology (https://galileosky.com/products/easylogic.html). It is necessary to use tracking devices with Easy Logic support. You can find out whether the tracking device supports Easy Logic or not in the following ways:

- in tracking device’s specification there should be abbreviation (AI) or sticker on the back of the device should have abbreviation (2) near IMEI (Pic.2).
- send Hardversion command to the tracking device, if you receive numbers different from zero after comma in response, algorithms are supported (example of reply: HARDVERSION=21,8243)

Minimum firmware version is 230.5 for Galileosky v.2.X and v.5.X tracking devices.

Minimum firmware version is 1 for Galileosky 7.0 and Base Block tracking devices.
Connecting Tachograph to the Tracking Device

Connection of tachograph to the tracking device is carried out in accordance with the scheme presented in Picture 3.

ATTENTION! Tachograph can be connected either by RS232 interface, in this case .dd file from driver’s card can be uploaded separately, or by CAN interface to get current data from tachograph. If both options are used, information can be received to the full extent.

ATTENTION! Grounds (GND) of the tracking device and tachograph must be connected, RS232 contacts must be connected strictly according to the scheme – RX of the indicator to TX0 (TX1) of the tracking device and TX of the indicator to RX0 (RX1) of the tracking device. Power supply is provided separately.

To connect the tracking device via RS232 use 6-pin connector for programming, calibration and data downloading, below you can find its location and pin definition:
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Pic. 4

Location and pin definition of 6-pin connector

<table>
<thead>
<tr>
<th>№</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Minus of onboard network</td>
</tr>
<tr>
<td>2</td>
<td>K-Line</td>
</tr>
<tr>
<td>3</td>
<td>Rx RS232</td>
</tr>
<tr>
<td>4</td>
<td>Calibration input/output signal</td>
</tr>
<tr>
<td>5</td>
<td>Plus of onboard network</td>
</tr>
<tr>
<td>6</td>
<td>Tx RS232</td>
</tr>
</tbody>
</table>
Device Settings

Tracking device settings for tachograph connection are carried out via Configurator:

1. connect tachograph to the tracking device;
2. connect the tracking device to PC;
3. run Configurator program on PC;
4. go to tab “Settings”/“Protocol” in Configurator, set the main packet to transfer data to the server, for this tick any pair from 16 and 32-bit tags “CAN32BITRx”, “CAN16BITRx” of the protocol, apart from those referred to a dynamic archive, for example “CAN32BITR2”, “CAN16BITR2” (Pic. 5);

![Pic. 5](image)

Main packet setting

5. go to tab “Digital inputs” in Configurator, set “Nothing” for “RS232[0] peripheral type” parameter (Pic. 6);

![Pic. 6](image)

Setting of RS232[0] peripheral type

6. go to tab “CAN” in Configurator; enter bus speed equal to “250000”; select filter type “J1939 custom filter, 29bit ids”; enter timeout value equal to 2000ms (Pic. 7);
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7. click “Apply” button;
8. activate engine ignition, if CAN-bus does not work without it; click “Listen CAN” button and wait till scanning is completed; if ID=0CFE6CEE identifier is not found due to scanning, check connection and CAN-bus operation, because current data from tachograph will not be read;
9. add two records in filters table, tab “CAN”:
   – message identifier - 0CFE6CEE, tag in protocol - CAN32BITR2 (for example), shifting – first 4 bytes, big-endian – not active;
   – message identifier - 0CFE6CEE, tag in protocol - CAN16BITR2 (for example), shifting – the 7th and the 8th from 8 bytes, big-endian – not active (Pic. 8);
10. click “Apply” button;
11. go to tab “Commands” in Configurator, send command “script galileosky/tahograf_continental” (Pic. 9);

ATTENTION! Algorithm is downloaded from the server, that is why a SIM-card with established GPRS-connection should be installed in the tracking device.
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12. go to Device tab and check the Easy Logic parameter and make sure it includes information on the algorithm (Pic. 10);

13. to check algorithm operating go to tab “Troubleshooting” in Configurator, tick “Algorithms” parameter and check troubleshooting messages (Pic. 11);
Monitoring Software Setting

After configuring the tracking device, the monitoring software needs to be set up.

**ATTENTION!** Completion of software to retrieve ddd-files from tachograph through the tracking device is already made in monitoring system Wialon Hosting (Pic. 15). To get data analysis of ddd-files, you should use application TachoManager: http://apps.wialon.com/docs/ru/tachomanager.html and TachoView: http://apps.wialon.com/docs/ru/tachoview.html.

If your software does not support receiving information from tachograph through Galileosky tracking device, you should individually develop and install software to the monitoring server, processing data in accordance with the protocol of exchange between the tracking device and server. There is protocol description in Appendix №1.

Connecting tachograph "Continental VDO DTCO 3283" ("Continental VDO DTCO 1381") to the tracking device Galileosky is completed, the tracking device is ready for use.

RSA “Galileosky”, LLC produces satellite monitoring equipment for GPS and GLONASS real time vehicles monitoring. The tracking devices determine the mobile object location recording the time and route as points with geographical coordinates and send the data to the server to be further processed and sent to the traffic controller panel.

In addition, a number of other vehicle parameters are recorded: the state of analog and discrete inputs of the tracking device and the state of digital interfaces.

The tracking devices can be used in any vehicle.
APPENDIX № 1

Instruction on developing monitoring server software for operating with tachograph

Display of current status of the tachograph

Data are transmitted in tags specified in the table (bytes order is little-endian):

<table>
<thead>
<tr>
<th>Tags name</th>
<th>Size in bytes</th>
<th>Bits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN32BITRx</td>
<td>4</td>
<td>0 – 2</td>
<td>Current activity of driver №1:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 – rest;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 – readiness;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 – work;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 – driving;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 – error;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7 – not available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – 5</td>
<td>Current activity of driver №2:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 – rest;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 – readiness;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 – work;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 – driving;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 – error;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7 – not available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 – 13</td>
<td>Driver card №1:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 – no card;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 – card is in.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 – 21</td>
<td>Driver card №2:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 – no card;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 – card is in.</td>
</tr>
<tr>
<td>CAN16BITRx</td>
<td>2</td>
<td>0 – 15</td>
<td>Vehicle speed (divide value in 256), km/h</td>
</tr>
</tbody>
</table>

Example: value 4098 is received in tag CAN32BITRx (10000000000010 in binary code) – driver card №1 is in, his current activity is work, the second driver’s activity is rest.

Value 7951 is received in tag CAN16BITRx – speed is 31 km/h (7951/256).

Uploading the driver’s card

Uploading the card is run by the server. Receiving requests from the server, the tracking device reads file of uploading driver card from tachograph and sends it to the server. Operation can take a long time.
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- The server sends commands to the tracking device in tag 0xE1 (text):
  - see below “Server Commands”;
  - tracking device transmits commands to the tachograph;
- The tracking device sends responses to the server in tags 0xE1 (text), 0xEB (binary data):
  - see below response’s format (text) and binary data.

You can read description of tracking device-server exchange protocol in Galileosky protocol, which you can find in our site in the tabs Support -> User manuals -> Galileosky Protocol -> “Server exchange protocol of Galileosky tracking devices” (https://galileosky.com/podderzhka/dokumentacziya.html).

**ATTENTION!** Uploading is possible only from one inserted driver’s card. Slot number is not important. In case of two inserted SIM-cards, error 03 (error in file uploading) will occur during file reading.

### Logic of server’s work

Server requests a part of uploading file (Pic.13). If tachograph returned a requested part of the file to the tracking device, the tracking device sends the data to the server without changing, otherwise error 03 (error in uploading file) occurs.

**ATTENTION!** Formation of the responses of both commands can take a long time

- Server needs to wait for the response for 7 minutes;
- If no response is received, it is necessary to repeat the request.

![Diagram of server and tracking device interaction](image_url)

**Server commands**

1) A request to form a driver card uploading file. Attention, this command is left for protocol correspondence with other tachographs. As a response, 00 will always be returned – command is successfully completed. There are no binary data in response.

   \texttt{T AHOPREPARE <slot_number>}

2) Request for prepared uploading file in parts

   \texttt{T AHOF IL E <chunk_number>}

   - You should specify \textit{block number},

   ![Pic. 13] Receiving ddd-file algorithm
The block size is 251 bytes;
File size is ~ 27 Kb;

Response contains binary data, if requested part of an uploading file is received from the tachograph;
If there is a request for the last part of an uploading file, the length of the binary data will be in the range [0, 251] bytes.

3) Request for authentication key installation. Attention, this command is left for protocol correspondence with other tachographs. As a response, 00 will always be returned – command is successfully completed. There are no binary data in response.

TAHOKEY <auth_key>

Device’s answers (tag 0xE1)

- TAHO <answer_code>

Answer codes:

- 00 – command is successfully completed;
- 01 - tracking device is not authorized;
- 02 - card is not installed, or wrong type of a card is installed;
- 03 - error in uploading file;
- 04 - parameter is incorrect.