RS232. Connecting Refrigerators Equipment

User Manual

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Necessary Tools, Devices, Materials

To connect the equipment of Thermo King, Carrier, Mitsubishi, Lumikko refrigeration units to the Galileosky tracking device (hereinafter - tracking device) one should have:

1. Electrical tools.
2. Set of connecting wires.
3. Windows-based computer with the installed program of configuration of the tracking devices – "Configurator". It is recommended to install the latest version of the program from the site https://galileosky.com/podderzhka/programmyi.html
General Information

Tracking devices have the functionality of reading digital signal via RS232 interface. Transport refrigerators, issued by companies Thermo King, Carrier, Mitsubishi, Lumikko can be used as a source of digital signal (Pic. 1).

All transport refrigerators consist of two integral parts - the refrigeration unit and the isothermal body. Isothermal bodies - vans or the semi-trailers minimizing heat leakage from the ambient air. Refrigeration units maintain the temperature inside the isothermal bodies from +20 to -25 degrees. The units carry out maintenance of the set temperature automatically, by means of the thermostat.

The control of the refrigerator is performed by the built-in microprocessor controller which provides self-diagnostics and simplifies control of the refrigeration unit. For controllers interfacing with external equipment the following devices are used: i-Box translators for Thermo King refrigerators, Carrier Gateway, DataCold 500, DataCold 600 recorders for Carrier refrigerators, general Euroscan recorder for Thermo King, Carrier, Mitsubishi, Lumikko refrigerators (hereinafter - retransmitters) (Pic. 2).

These retransmitters allow you to transmit information about the state of the refrigerator to the tracking device which, in turn, sends the following data to the server after conversion:

1. operating modes of refrigeration units;
2. cargo temperature (for single and multitemperature units);
3. emergency signals;
4. the total number of hours of operation of the engine;
5. fuel level;
6. battery voltage;
7. engine speed of refrigerating equipment (starting from firmware 229.4).
Connection of Retransmitters via RS232 Interface

In order to work with the retransmitters the tracking device should be equipped with RS232 interface.

Connection of retransmitters to the tracking device via RS232 protocol is carried out in accordance with the scheme of Picture 3.

**ATTENTION!** Grounds (GND) of the tracking device and the retransmitter must be connected; RS232 contacts must be connected strictly according to the scheme: RX of the retransmitter - TXD0(1) of the tracking device and TX of the retransmitter - RXD0(1) of the tracking device. The retransmitter is powered separately.

In some cases, it is necessary to perform additional settings for the retransmitter in accordance with the user manual. As an example, below you can see an extract from the User manual of DataCOLD 500 about configuring RS232.
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DataCold settings

Push the button [menu] and hold it for 2-3 sec
Further, in the appeared panel

PARAMETER SETTING
Enter PIN code
Enter pin-code 1111 in the panel

8. Temperature inputs settings
Find the positions using arrows up [^] and down [v]

11. Communication settings
Press [edit]

11.1 COM 1 port
(No protocol)
Press [edit] then
Using arrows right [>] and left [<]
Choose Third party,
Press [Accept]
In the appeared panel
COM 1 port
(Third party) (for COM 1 parameters are specified, the settings are completed)
COM 2 port
Choose the value Vector
Press [<-menu] button
And go back to the initial panel with current parameters (date, temperature and so on)

In Application 1 of the user manual you can find the extract from DataCOLD 600 user manual concerning the RS232 configuration.
Setting the Tracking Device

To set Galileosky tracking devices to work with retransmitters the firmware of the devices should be the following:

- In tracking devices Galileosky v1.x, v2.x, v5.x firmware should be not less than 206 version for working with DataCOLD 500, ThermoKing, Euroscan, and not less than 231 firmware version for working with DataCOLD600;
- In tracking devices Galileosky Base Block and v7.x the firmware version should be 16 or higher.

The order of setting is the following:

1. go to the “Settings” tab-> “Digital inputs” of the Configurator and select “Carrier DataCOLD500 refrigerator”, “ThermoKing” or “Euroscan” (Pic. 4);
2. click “Apply” button;
3. go to tab “Track” of Configurator software and select “dynamic” parameter for “archive structure mode” (Pic. 5)
ATTENTION! For Galileosky tracking devices of versions Base Block and 7.0 the setting of archive structure mode is not needed.

4. Go to tab “Protocol” of Configurator, set the main packet for data transmission to the server, for that tick parameter “Refrigerator (dynamic archive only)” (Pic. 6);

5. Click “Apply” button;

6. Reset the tracking device by clicking “Reset device” in the “Device” tab or sending Reset command in the tab “Commands”;

7. Make sure the tracking device receives data from the retransmitter: for that go to “Troubleshooting” tab of Configurator and tick “RS232[0](1)” – the troubleshooting will display different messages depending on the type of the retransmitter connected (Pic. 7);

By default, in accordance with the operation algorithm, the tracking devices scans the retransmitters every 3 minutes. The points’ record is carried out only if one or a few controlled parameters are changed.

Additionally, every 10 minutes the tracking device scans the retransmitter for receiving data on operating hours. Recorded points are transmitted to the monitoring software in accordance with the device settings.

If necessary, there is an opportunity to change the periods of scanning with command:

- for tracking devices Galileosky v1.x, v2.x, v5.x – Datacold500 a,b command, where
  a – scanning period of the current parameters in sec (180 by default);
b – period of sending operation hours to the server (600 by default);

- for tracking devices Galileosky Base Block and v7.0 – command Fridge a, b, where

a – scanning period of the current parameters in sec (180 by default);
b – period of sending operation hours to the server (600 by default).
Monitoring Software Setting

After setting the digital input of the tracking device you should configure the monitoring software.

In case the monitoring software that you use does not support receiving information from retransmitters through Galileosky tracking devices, you need to independently develop and install server monitoring software that processes the data according to the Protocol of exchange between the tracking device and the server. Description of the Protocol can be found in our site https://galileosky.com/assets/files/docs/manuals_en/server-exchange-protocol-description-(400176-v11).pdf.

The result of the data transmitted to the monitoring software may look in the following way:

- **Fridge.Type**: 1
- **Fridge.Status**: <<240,7>>
- **Fridge.DIns**: 50529027
- **Fridge.Temperature1**: 963
- **Fridge.Temperature2**: 941
- **Fridge.Temperature3**: 955
- **Fridge.Temperature4**: 940
- **Fridge.Temperature5**: 953
- **Fridge.Temperature6**: 952
- **Fridge.Alarms**: <<3,8,4,8,15,1,48,15,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0>
- **Fridge.HourMeter1**: 1000
- **Fridge.HourMeter2**: 2000
- **Fridge.HourMeter3**: 3000

Connection of refrigerators equipment to the Galileosky tracking device via RS232 protocol is completed; the tracking device is ready for operation.

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.
Application 1

Configuring RS232 for DataCOLD 600

2. In order to connect to serial port for data receiving from DataCOLD 600 it is necessary to use COM1 port which is in the CON2 connector on the back board of the retransmitter.

Configuration of DataCOLD 600 R/T

It is necessary to configure DataCOLD 600 to set the connection with the external devices and with Vector unit.

1. On the main screen: Press and hold the green button for 3 seconds to enter the parameters menu.

2. Enter the pin-code 1111

3. Find the following value in the parameters menu: “Communication settings” menu. Use blue or yellow buttons for searching.

4. Press the green button to enter the menu “Communication settings”.

5. Select “COM1 port setting”, using the yellow or blue buttons.

7. Select “Partner protocol”, using the yellow or blue buttons.
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6. Press the green button for editing

8. Press the green button to confirm the changes.

9. Press the red button twice to go back to the main menu.