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Necessary Tools, Devices, Materials

To connect passenger counting sensor PP-01 manufactured by TS Automatica (hereinafter – PP-01) to Galileosky tracking devices (hereinafter – tracking device) one should have:

1. Electrical tool.
2. Set of connecting wires.
3. Windows-based computer with the installed program of configuration of Galileosky tracking units – “Configurator”. You can download the latest version of it here: https://galileosky.com/podderzhka/programmyi.html
General Information

Galileosky tracking devices equipped with RS485 interface have a function that enables to work with passenger counting sensor PP-01. The tracking devices make it possible to fix number of passengers enter and exit and transmit these data to the monitoring software.

ATTENTION! This functionality is implemented in the tracking devices by means of Easy Logic technology (https://galileosky.com/products/easylogic.html). You can determine whether tracking devices support Easy Logic technology in 2 ways:

1. In the specification of tracking device there should be abbreviation (AI) or (2) before IMEI in the label of the tracking unit box.
2. By sending Hardversion command to the tracking device, if in the response there are numbers different from zero after comma, cooperation with Easy Logic is possible (for example, response: HARDVERSION=21,8243)

In order to cooperate with PP-01 sensor, minimal firmware version of Galileosky tracking devices should be:
- for 5.0 devices – 230;
- for Base Block devices – 13;
- for 7 devices – 1.

It is possible to set two operation modes of Galileosky units and PP-01 sensors concurrent working:
- Calculating the number of passengers and recording the data by the event of opening/closing the door;
- Calculating passengers and recording data on a cumulative total.

You need to download an algorithm depending on the selected operation mode.
Connecting the Passenger Counting Sensor PP-01 to the Tracking Device

PP-01 sensor is connected to the tracking unit via RS-485 interface in accordance with the schemes presented in Picture 2.

- Yellow wire of PP-01 sensor – RS485A;
- White wire of PP-01 sensor – RS485B.

**ATTENTION!** Grounds (GND) of the tracking device and the sensor must be connected, power supply is provided separately.
Presetting of PP-01 Sensor

Before setting Galileosky tracking devices it is necessary to carry out the presetting of the PP-01 sensor. For that you need to perform the following actions:

1. Connect PP-01 sensor to PC with the help of RS485-USB adapter;
2. Launch software «Configurating service program» for PP-01 sensor (Pic.3)

**ATTENTION!** Software “Configurating service program” is provided together with PP-01 sensor.

3. In order to connect the sensor, go to menu “Connection parameters” and select parameter “Connection parameters” (Pic.4).
4. Choose the necessary COM-port and set the parameters as it is presented in Picture 5.

![Parameters of COM-port for connection to PP-01 sensor](image1)

5. Read the current address and if necessary set the new address for PP-01 sensor using buttons “Read address”, “Record address” (Pic. 6). Addresses in the range of 1 to 8 are supported.

![Reading and recording the addresses of PP-01 sensor](image2)
Counting Passengers and Recording Data by the Event of Closing/Openning the Door

When using the mode of counting passengers by the event of closing/opening the door the operation algorithm is the following:

1. The sensor determines the event of doors opening according to the data received from PP-01 sensor;
2. After defining the event of doors closing the sensor records received data and transmits them into the monitoring server, after that the sensor sets value of passengers’ number to zero.

For Galileosky tracking units to cooperate with PP-01 sensor and calculate the number of passengers with recording data by the event of opening/closing doors you need to follow these steps:

1. Connect sensor of opening/closing the door in accordance with the scheme presented in Picture 7;
2. In software “Configurating software program” for PP-01 set the value “Calculate with doors open” (Pic. 8)

Additionally, when clicking the “Read” button, “Configurating service program” can show current number of entering and exiting passengers and also doors state at the moment.
3. Go to tab “Commands”, send command "script galileosky/PP-01" and wait till the command is confirmed by the tracking device (Pic.9);

4. Make sure the algorithm is downloaded successfully by sending “script” command (Pic.10).
5. Go to tab Settings -> Track and select parameter “dynamic” for “Archive structure mode” (Pic.11).

**ATTENTION!** For Base Block and Galileosky v7.0 tracking devices the setting of archive structure mode is not needed.

6. Go to tab Settings -> Digital inputs. Depending on the connected additional periphery to digital RS485 input, set one of the values in inputs settings:

6.1. In case only PP-01 sensors are connected via RS485 interface, select parameter “Algorithms RS485 handlers only” (Pic.12).
6.2. If other equipment is connected to the tracking device, for example, digital fuel sensor, Galileosky photocamera and PP-01 sensors, select variant “Photocamera and FLS” (Pic. 13);

7. Go to tab Settings -> Protocol and tick User Array of the main packet (Pic. 14)

8. Save the settings by clicking “Apply” button (Pic. 14)
Calculating Passengers and Recording Data on a Cumulative Total

To set the device for working with passenger counting sensor PP-01 you need to do the following:

1. In Configurator software go to tab Commands, send command "script galileosky/PP-01_cumulative" and wait till the command is confirmed by the tracking device (Pic.15)

2. Go to tab Settings -> Track and select “dynamic” for Archive structure mode (Pic.11)

**ATTENTION!** For Base Block and Galileosky v7.0 tracking units the setting of archive structure mode is not needed.

3. Go to tab Settings -> Digital inputs. Depending on the connected additional periphery to digital RS485 input, set one of the values in inputs settings:

   3.1. In case only PP-01 sensors are connected via RS485 interface, select parameter “Algorithms RS485 handlers only” (рис. 12)

   3.2. If more than one different devices are connected to the tracking unit, for example, digital fuel sensor, Galileosky photocamera and PP-01 sensors, select variant “Photocamera and FLS” (рис. 13).

4. Go to tab Settings -> Protocol and tick option User array for the main packet (Pic. 14)

5. Click “Apply” button.
Sensors’ scanning is held every 10 minutes. Recording and data transmission are carried out in accordance with the settings of points recording period in "Track" tab (Pic. 16)

Additional points are not recorded.

**ATTENTION!** With the current operating mode PP-01 sensor sends numbers of entering and exiting passengers on a cumulative total. After receiving this information, it is not set to zero.
Setting the Monitoring Software

After setting the tracking unit you need to perform the settings of the monitoring software. If your monitoring software does not support user array processing, you should individually prepare the software that would process the data in accordance with the data exchange protocol and set it in the monitoring server. Description of data exchange protocol of the tracking unit and the server is presented in the following document – “Server Exchange Protocol”, which you can find in our site in the tabs Support -> User Guides -> Galileosky protocol https://galileosky.com/podderzhka/dokumentacziya.html.

Galileosky tracking units enable to transmit to the monitoring software the following parameters:

- Sensor address;
- Sensor state;
- Number of entering passengers;
- Number of exiting passengers.

The array’s first byte contains type of the data and is equal to 0x0A.

The array includes 8 groups, each of them contains received data from correspondent sensor.

Each of 8 sensors records 8 bytes.

Maximum array size is equal to 65 bytes.

The format of recorded data (bytes order is little-endian) for one group:

<table>
<thead>
<tr>
<th>№ of field</th>
<th>Size in bytes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>Sensor address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sensor state:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0 – normal work of the sensor;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1 – sensor is probably covered;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 9 – wrong data are received from the sensor;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 10 – no connection with the sensor</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Number of entering passengers</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Number of exiting passengers</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
Example of the data:

Sensor 1 – no connection, sensor 2 – 20 entering passengers, 300 exiting passengers.

<table>
<thead>
<tr>
<th>Byte</th>
<th>DEC</th>
<th>HEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>0x0A</td>
</tr>
<tr>
<td>1-3</td>
<td>1</td>
<td>0x010000</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>0x0A</td>
</tr>
<tr>
<td>5-6</td>
<td>0</td>
<td>0x0000</td>
</tr>
<tr>
<td>7-8</td>
<td>0</td>
<td>0x0000</td>
</tr>
<tr>
<td>9-11</td>
<td>2</td>
<td>0x020000</td>
</tr>
<tr>
<td>12</td>
<td>0</td>
<td>0x00</td>
</tr>
<tr>
<td>13-14</td>
<td>20</td>
<td>0x1400</td>
</tr>
<tr>
<td>15-16</td>
<td>300</td>
<td>0x2C01</td>
</tr>
</tbody>
</table>

As a set of bytes in the user array: 0A 0100000A 00000000 02000000 14002C01.

The results of data transmission of events and photos are presented in the monitoring software in the following order:

Connection of passenger counting sensor PP-01 to Galileosky tracking device is completed, the tracking unit is ready for use.

RSA “Galileosky”, LLC produces satellite monitoring equipment for GPS and GLONASS real time vehicles monitoring. The tracking units 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 unit and the state of digital interfaces.

The tracking units can be used in any vehicle.