

1-Wire Temperature Sensor

1 Introduction

1.1 About the Functionality

The 1-Wire temperature sensor can be used to measure temperature in a vehicle or track cargo temperature in a trailer or refrigerator. Data collected by the GPS tracking device is then transmitted to the vehicle tracking system.

The sensor operates with a $\pm 0,5^{\circ}\text{C}$ accuracy in the temperature range from -40°C to $+120^{\circ}\text{C}$.

1.2 Legal Information

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1.3 Compatibility

1-Wire temperature sensors are compatible with the following devices with the newest firmware version:

- HCV5
- LCV5
- PRO5
- FM-Tco4 HCV
- FM-Tco4 LCV
- FM-Pro4
- FM-Eco4
- FM-Eco4 S
- FM-Eco4 T

1.4 Contact Information

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1.5 Document Changelog

Version	Date	Modification
1.0	2017-02-20	Initial draft.
1.1	2018-11-15	Updated: Compatible device list.
2.0	2019-10-02	Updated: User manual structure and design.
2.1	2019-10-18	Updated: Connection schematic for Pro family devices.
2.2	2020-05-27	Corrected: Eco4 schematic and multiple temperature sensors wiring schematic
2.3	2020-07-16	Added: Connection schematic for 5 th generation devices.

1.6 Notations

The following notations are used in this document to highlight important information:

Bold text

Used to indicate user interface elements or for emphasis.

Italic text

Used to indicate items that belong to a list and can be selected.

1.7 References

Datasheet: <https://doc.ruptela.lt/pages/viewpage.action?pageId=884777>

2 Connection

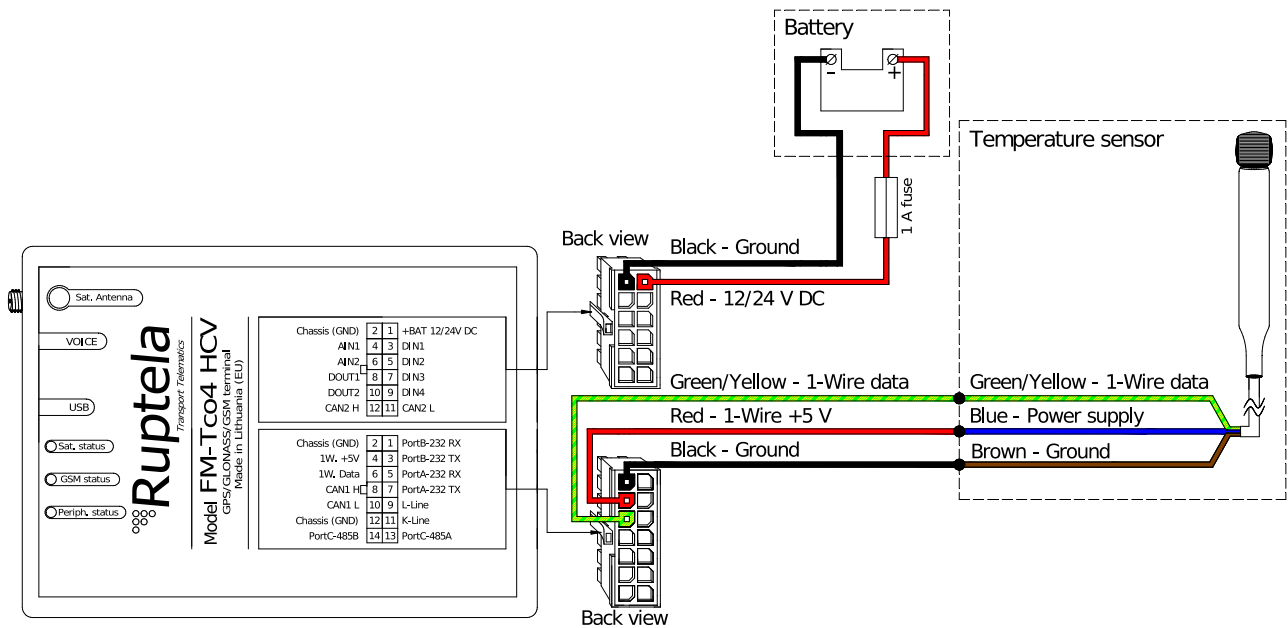
1-Wire temperature sensor wire colours might differ. Alternative colours:



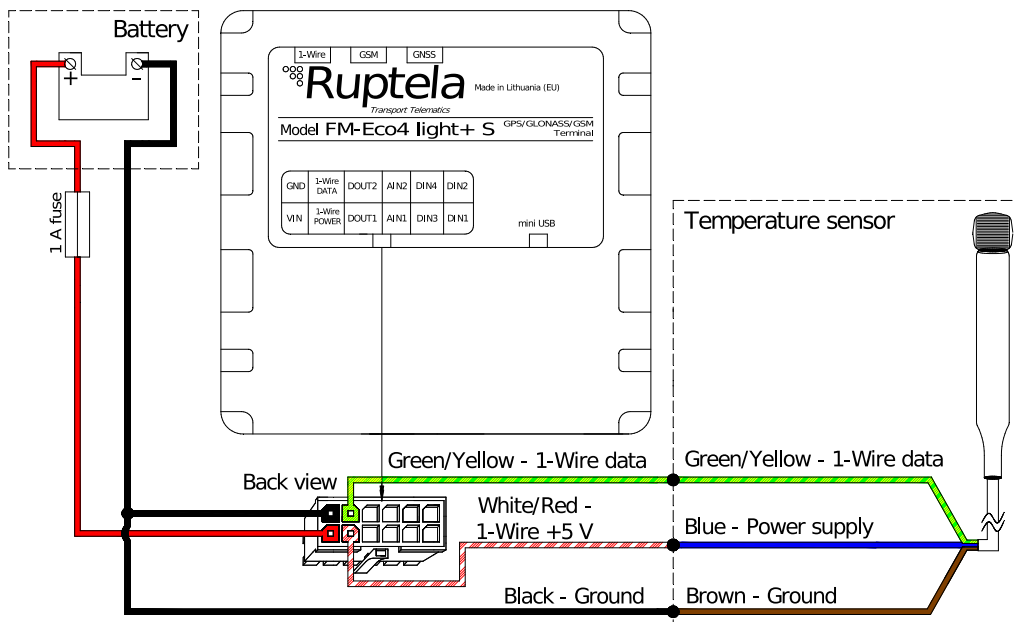
- Power supply – Red
- 1-Wire data – Blue
- Ground – Black

2.1 Connecting Single Temperature Sensor

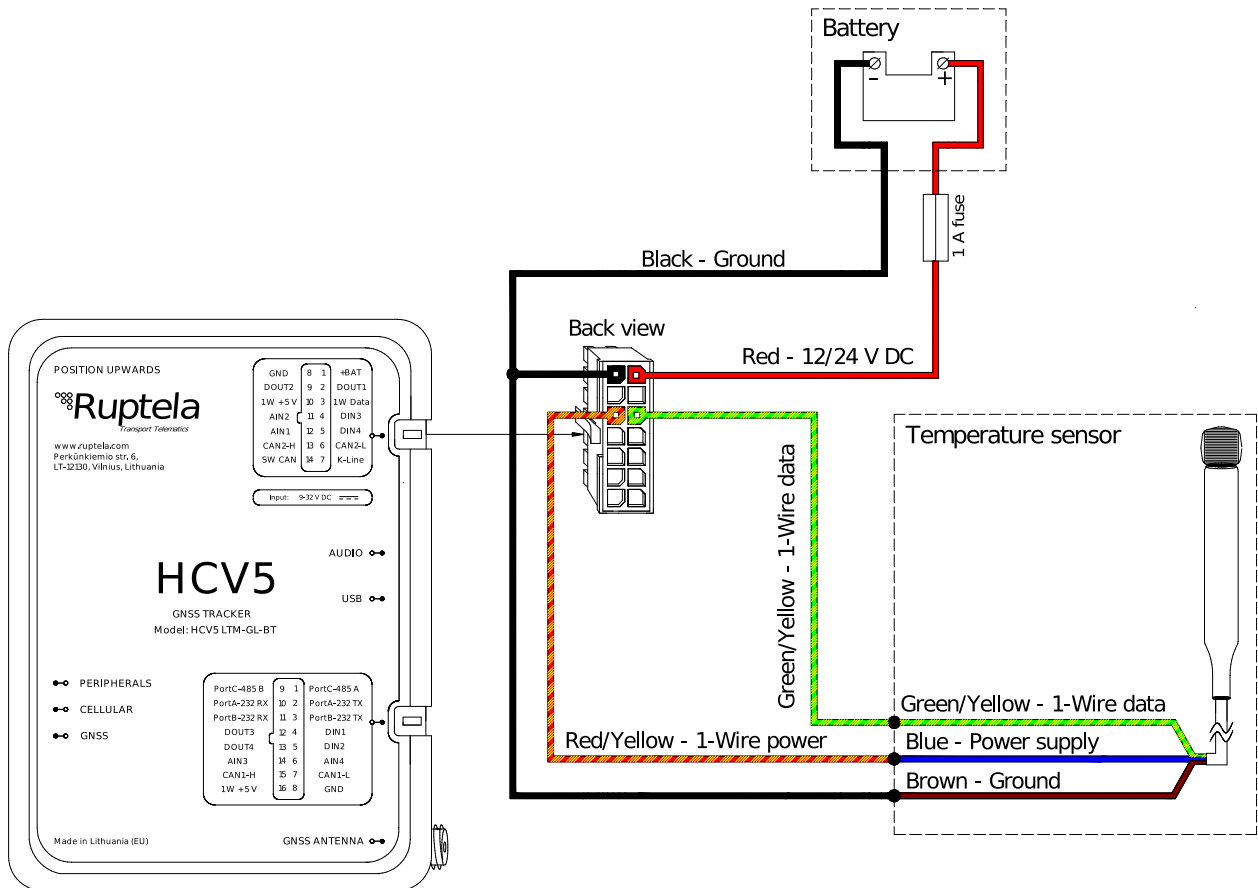
Connection schematic for FM-Tco4 HCV, FM-Tco4 LCV, FM-Pro4 devices:



Connection schematic for FM-Eco4, FM-Eco4 S devices:

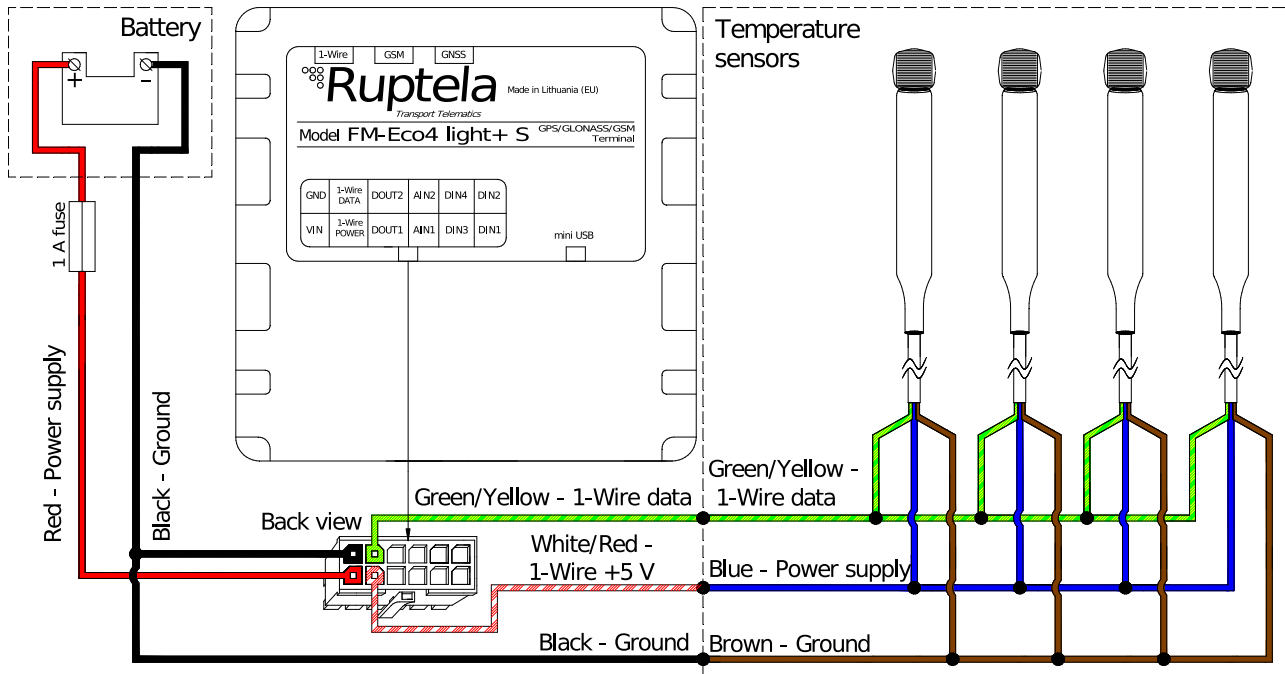


Connection schematic for HCV5, LCV5, PRO5 devices:



2.2 Connecting Multiple Temperature Sensors

Multiple (up to four) sensors can be connected to one tracking device. Connect multiple sensors according to the following connection schematic, which is suitable for all [compatible devices](#):



When multiple temperature sensors are connected, the tracking device will assign a number to each connected sensor. This ensures that data from multiple sources do not mix. However, number assignment is random and will be lost after the tracking device restarts. This can be ignored if you are interested in temperature values only, and do not need to know, which sensor provides the data. To track temperature readings for each sensor, an additional software application should be used to permanently assign numbers to each sensor.

Refer to the [Marking Temperature Sensors](#) chapter to mark temperature sensors.

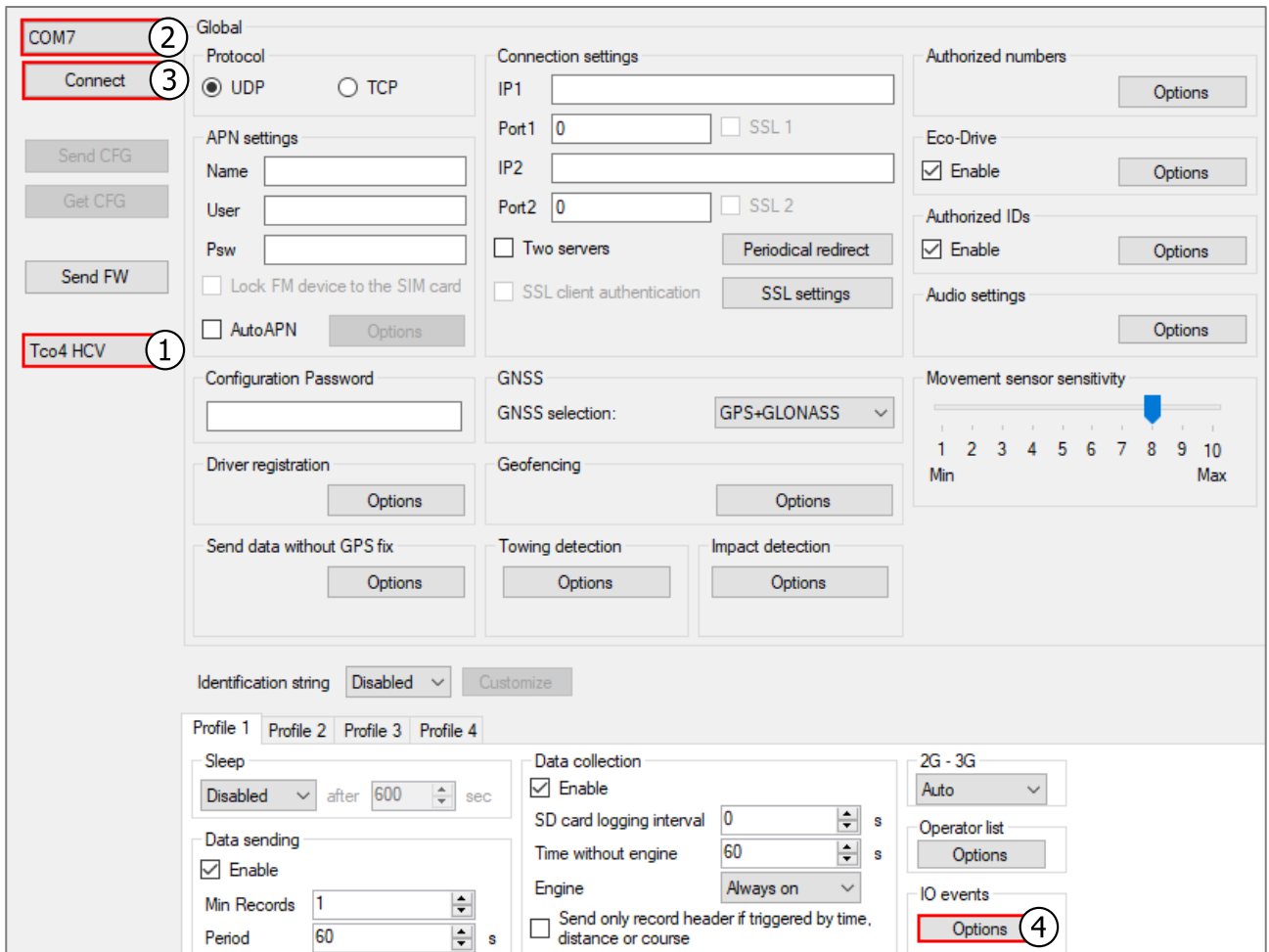
3 Configuration

i This functionality requires the use of the advanced configurator.

3.1 Starting the Configuration

To start the configuration, follow these steps:

1. Open the advanced configurator. Select your tracking device.
2. Select a COM port to which your device is connected.
3. Click **Connect**.
4. Click the **Options** button in the **IO events** section to open the **IO Settings** window.



3.2 Configuring Temperature Sensor

Follow these steps to enable IO parameters:

1. In the **IO settings** window, select a slot for the IO parameter.
2. Tick the **Enable** checkbox in the **IO properties** section to use the selected slot.
3. Select temperature sensor parameters from the **ID** drop-down list:
 - *Temperature sensorN*
 - *Temperature sensorN ID*
4. Set the **Event on** to *Monitoring*.
5. Set the **Priority** to *Low*.

The screenshot shows the 'IO settings' window with the following configuration:

- Slot 1:** Temperature sensor0 (circled 1)
- IO properties:**
 - Enable (circled 2)
 - ID:** Temperature sensor0 (circled 3)
 - Level:** 0
 - Delta:** 0
 - Average:** 1000 ms
 - Event on:** Monitoring (circled 4)
 - Include data only on event
 - Priority:** Low (circled 5)
 - Switch to:** No Switch
- Protocol selection:**
 - Send I/O data with v1.1 protocol
- Interfaces:**
 - PortA
 - PortB
 - PortC
 - K-Line
 - CAN
 - CAN2
 - 1-Wire
 - DIN3 mode:** Positive mode
 - DIN4 mode:** Positive mode
- Buttons:** Clear all IO, Enable common IO, Enable IO
- IO counters:** Records on event: 1
- Digital outputs:**
 - DOUT1:** Disabled Inverted
 - DOUT2:** Disabled Inverted
 - Activation conditions



If multiple sensors are connected to the tracking device, make sure to configure the same number of the IO parameters. Configuring the wrong number of IO parameters will result in an error.

More information about the IO parameters: [Temperature Sensor IO Parameters](#) chapter.

3.3 Finishing the Configuration

To finish the configuration, close the **IO settings** window. Click **Send CFG** to send the configuration to the device.

The screenshot displays the Ruptela configuration software interface. At the top, there is a 'File' and 'Tools' menu. Below this is a 'Configuration file information' section with the following details: Configuration source: **Configurator**, Target device: n/a, FM device FW version: n/a, CFM Tag: [input field], FM4 Configurator version: n/a, and Last edited: n/a. The Ruptela logo is visible in the top right corner.

The main configuration area is divided into several panels:

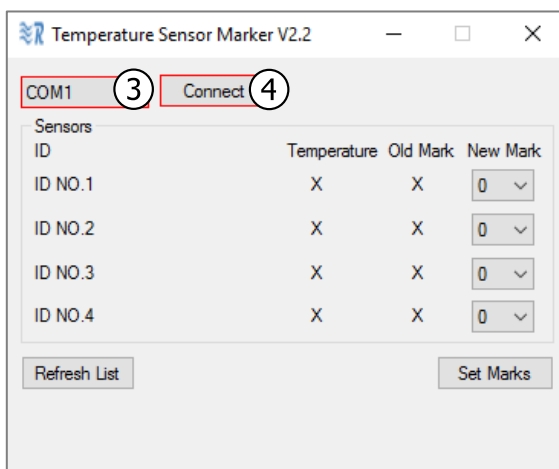
- Global:** Includes a 'COM8' dropdown, a 'Disconnect' button, and a 'Send CFG' button (highlighted with a red border). Other buttons include 'Get CFG', 'Send FW', and a 'Tco4 LCV' dropdown.
- Protocol:** Radio buttons for 'UDP' (selected) and 'TCP'.
- APN settings:** Fields for 'Name', 'User', and 'Psw'. Checkboxes for 'Lock FM device to the SIM card' and 'AutoAPN' (with an 'Options' button).
- Connection settings:** Fields for 'IP1', 'Port1' (0), 'IP2', and 'Port2' (0). Checkboxes for 'SSL 1', 'SSL 2', 'Two servers', and 'SSL client authentication'. Buttons for 'Periodical redirect' and 'SSL settings'.
- GNSS:** A dropdown menu for 'GNSS selection' set to 'GPS+GLONASS'.
- Geofencing:** An 'Options' button.
- Authorized numbers:** An 'Options' button.
- Eco-Drive:** A checked 'Enable' checkbox and an 'Options' button.
- Authorized IDs:** A checked 'Enable' checkbox and an 'Options' button.
- Audio settings:** An 'Options' button.
- Movement sensor sensitivity:** A slider ranging from 1 (Min) to 10 (Max), with the current value set at 8.

4 Marking Temperature Sensors

Click to download the temperature sensor marker: [TSM v2.2](#).

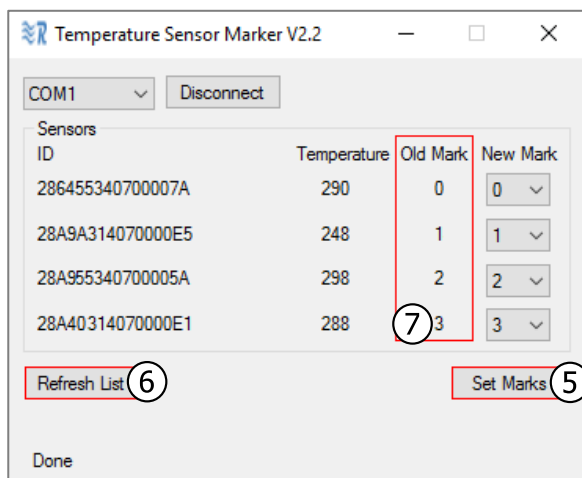
Assuming that all temperature sensors are properly connected to the tracking device, follow these steps:

1. Connect the device to the computer with a USB cable.
2. Launch temperature sensor marker tool.
3. Select the COM port to which your device is connected.
4. Click **Connect**.



All connected sensors with their IDs, temperature values and marking will be listed.

5. Click **Set Marks** to complete the assignation process.
6. Click **Refresh List** to check the assignation result.



7. Assigned marks will be displayed in the **Old Mark** column.
8. Reset the tracking device.

5 Temperature Sensor IO Parameters

IO ID	Parameter name	Minimum value	Maximum Value	Multiplier
74	Temperature sensor3	-550	1250	0.1 °C/bit
78	Temperature sensor0	-550	1250	0.1 °C/bit
79	Temperature sensor1	-550	1250	0.1 °C/bit
80	Temperature sensor2	-550	1250	0.1 °C/bit

Parameters can be set to generate records with events on change, hysteresis and monitoring.

Error codes:

Error code	Description
850	Power supply too low
2000	No device found
2001	Short-circuited data line (ground or 5 V power supply)
2002	CRC error (noise on the data line)
2003	No sensors found
2004	Temperature out of range

More information: [FMIOData size description](#).