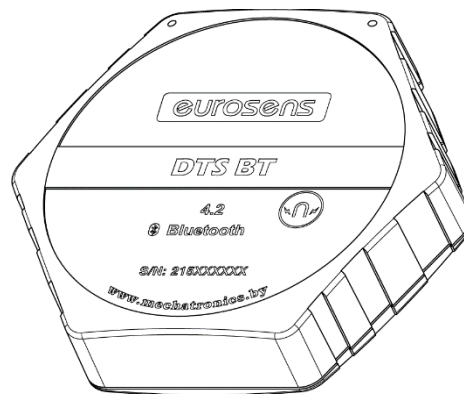


Temperature Sensors

eurosens DTS BT



User Manual

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1 GENERAL INFORMATION

1.1 APPLICATION

The eurosens DTS BT temperature sensors (hereinafter referred to as the Sensor) are designed to measure ambient air temperature within the range from -40°C to +85°C and from -55°C to +125°C (Ext. version). The Sensor may be installed inside the refrigerated compartment of a refrigerator truck. It is compatible with vehicle monitoring terminals.

If the vehicle monitoring terminal is not equipped with a Bluetooth interface, the sensors can be used together with the Eurosens BT-COM receiver or BT-COM Mini receiver. The receiver can receive data from several transmitters: up to 10 transmitters for BT-COM and up to 4 transmitters for BT-COM Mini, and transmit the received information via the RS485 (LLS) interface.

1.2 OPERATING PRINCIPLE

The operating principle of the Sensor is based on measuring the temperature of the metal base using a microelectronic transducer incorporated in the Sensor, processing the data with the built-in microcontroller, and transmitting the resulting values via the wireless interface.

1.3 MODIFICATIONS

Different Sensor modifications are designated as follows:

EUROSENS DTS X Y Z, where

X - interface designation:

BT - Bluetooth wireless interface;

Y - built-in data logger option:

blank - no built-in data logger;

Logbook - built-in data logger.

Z - design version designation:

blank - housing version with bayonet mounting according to Fig. 1.1;

Ext - remote temperature-sensitive element (Fig. 1.2);



Fig. 1.1. eurosens DTS BT version11



Fig. 1.2. EUROSENS DTS BT Ext version1

1.4 SCOPE OF SUPPLY

The scope of supply for eurosens DTS BT includes:

- eurosens DTS BT sensor;
- product passport;
- magnetic key;

Ordered separately:

- mounting kit (Fig. 1.4).

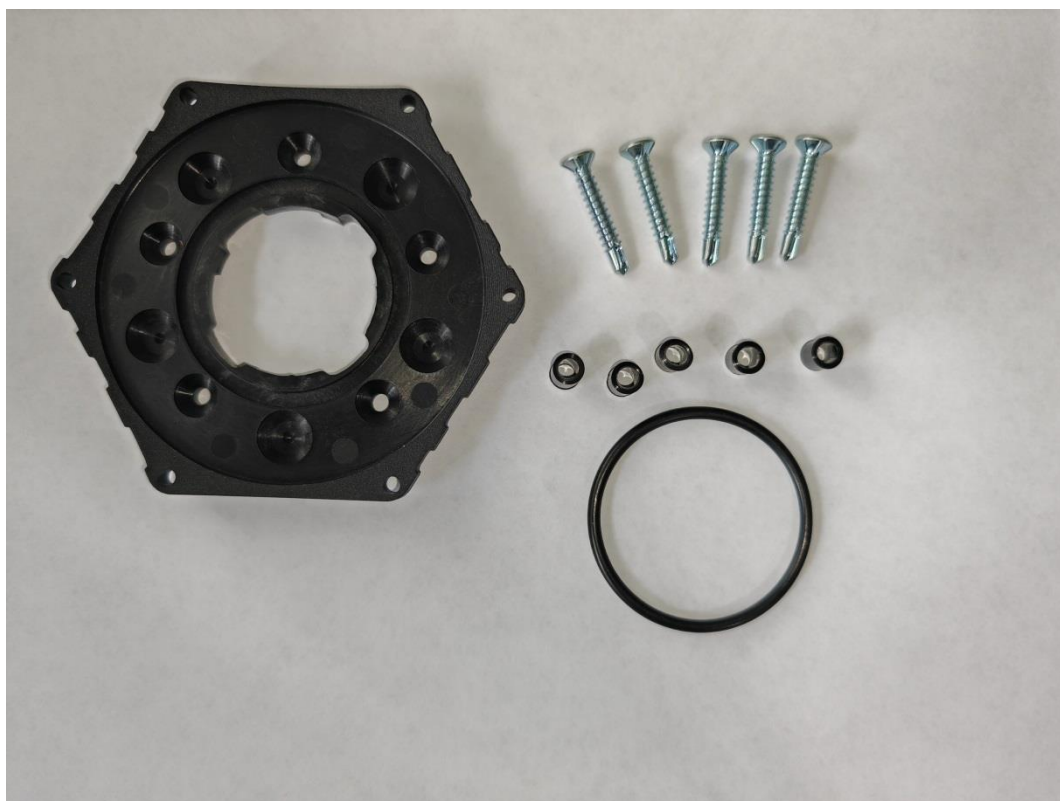


Fig. 1.4. eurosens DTS BT mounting kit1

2 TECHNICAL SPECIFICATIONS

Table 2.1. Technical Specifications of eurosens DTS BT.

Parameter, measurement unit	Value
Supply voltage, V	3.6
Measured temperature range, °C	-40 - +85 °C -55 - +125 °C (Ext. version)
Absolute measurement error, °C	±1°C ±0.5°C (Ext. version)
Operating ambient temperature range, °C	-40...+85°C
Data interface	Bluetooth 4.2
Data transmission range in direct line of sight, m, not less than	20

3 SENSOR INSTALLATION AND SEALING

Sensor installation is performed using a bayonet base into which the Sensor snaps. Select the installation location for the Sensor and fasten the bayonet plate using the self-tapping screws from the mounting kit. Install the spacers from the mounting kit between the plate and the mounting surface to allow free airflow behind the sensor (Fig. 3.1, Fig. 3.2).

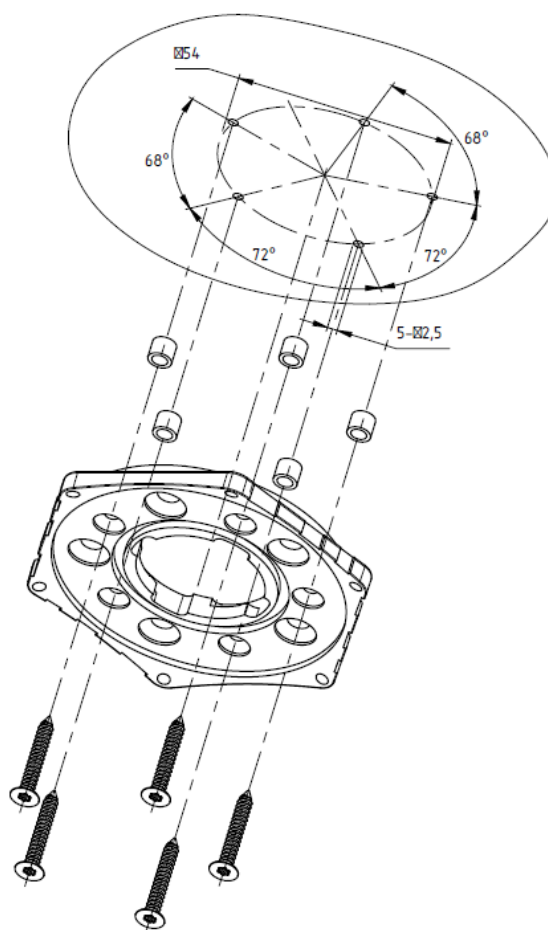


Fig. 3.1. eurosens DTS BT mounting kit

After installing the bayonet plate, place the sealing ring from the mounting kit into its groove. Then align the Sensor mounting lugs with the bayonet slots, push the Sensor into the bayonet plate until it stops, and rotate it as far as it will go (Fig. 3.3). As a result, the Sensor edges and sealing holes align with the mating parts of the bayonet plate (Fig. 3.4).

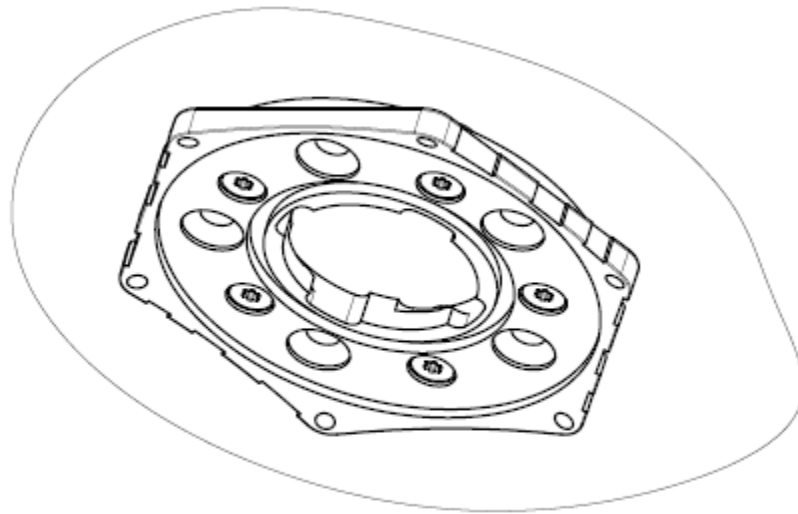


Fig. 3.2. Installed bayonet plate

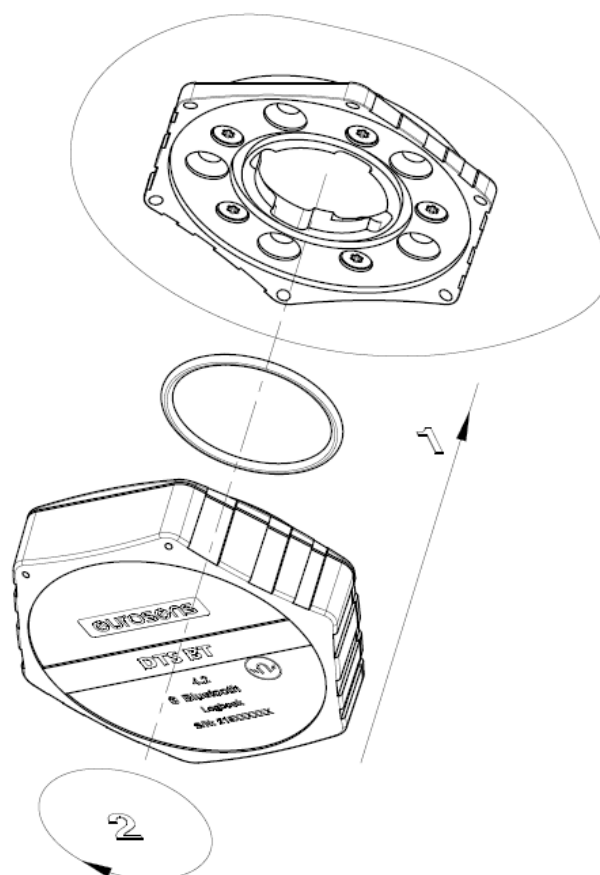


Fig. 3.3. Installing the sensor into the bayonet plate

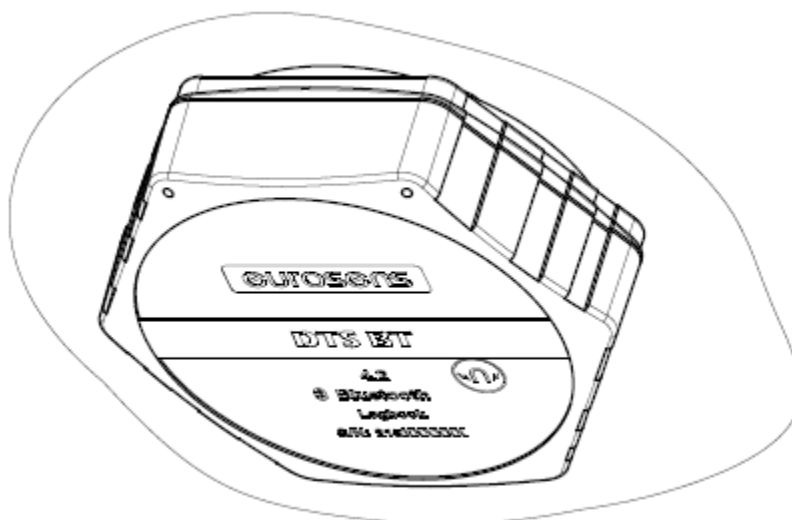


Fig. 3.4. Installed sensor

The Sensor is sealed using a cable seal. To do this, pass the sealing cable through the two holes in the Sensor and in the bayonet plate from top to bottom (Fig. 3.5).

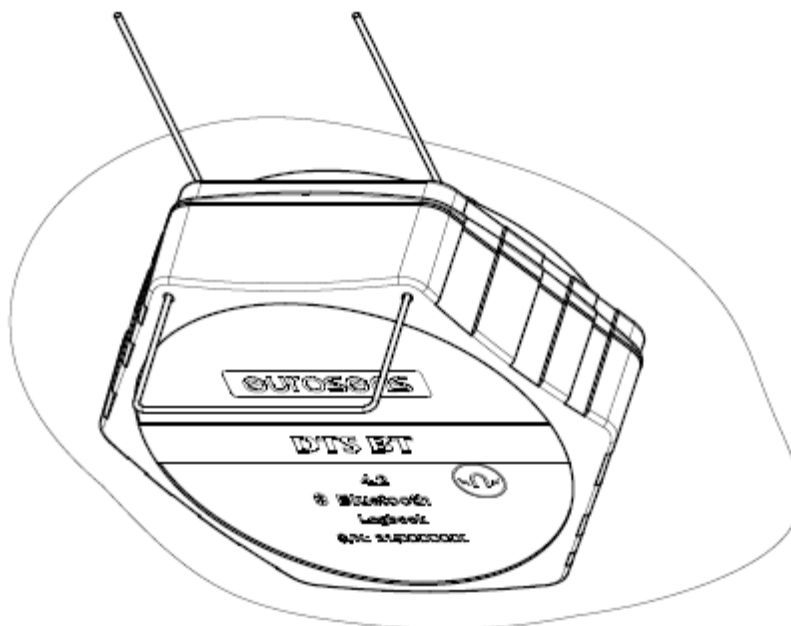


Fig. 3.5. Passing the sealing cable through

Then tighten the cable, for example, using the screw-seal mechanism (Fig. 3.6).

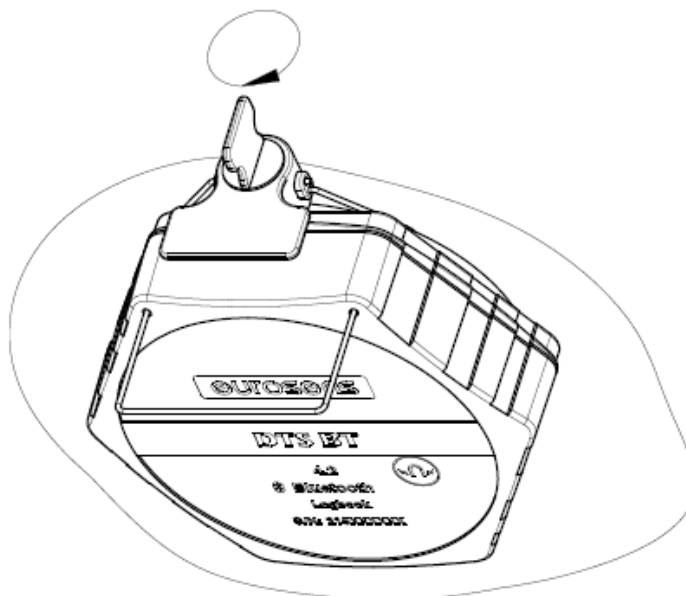


Fig. 3.6. Installing the seal

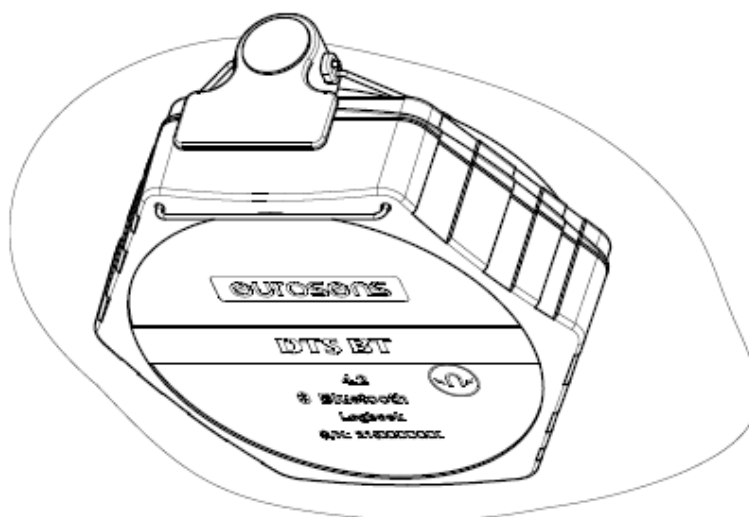


Fig. 3.7. Sealed Sensor

4 SENSOR CONFIGURATION

Sensor configuration is performed using the “Configurator DTS BT” mobile application version 1.1.

To work with the mobile application, a smartphone meeting the following requirements is required:

- Android version 9.0 or later;
- Bluetooth version 4.2 or later.

4.1 APPLICATION INSTALLATION

During application installation, grant all requested permissions to the application (Fig. 4.1), and enable Bluetooth and geolocation.

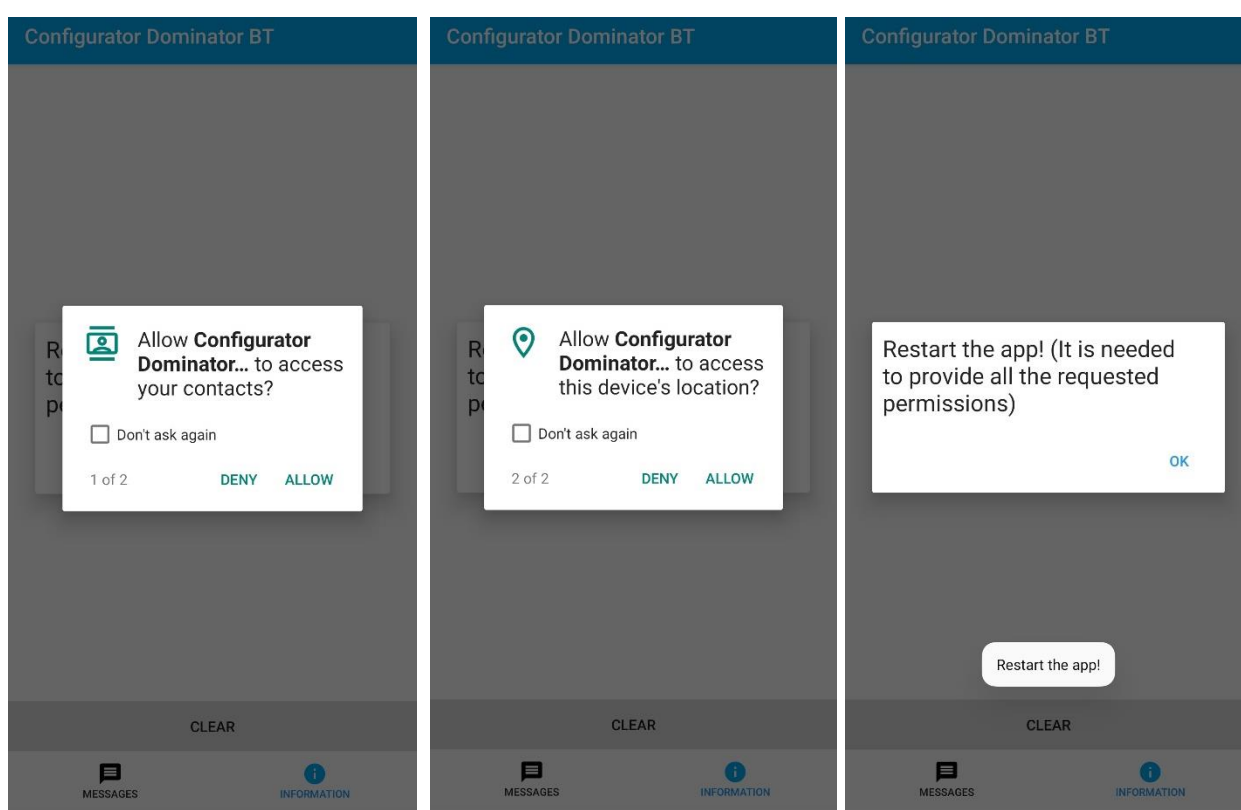


Fig. 4.1. Granting permissions4

Then launch the application. Follow the instructions in the application. On first launch, fill in the registration request form and send it to JSC Mechatronics (Fig. 4.2 and Fig. 4.3).

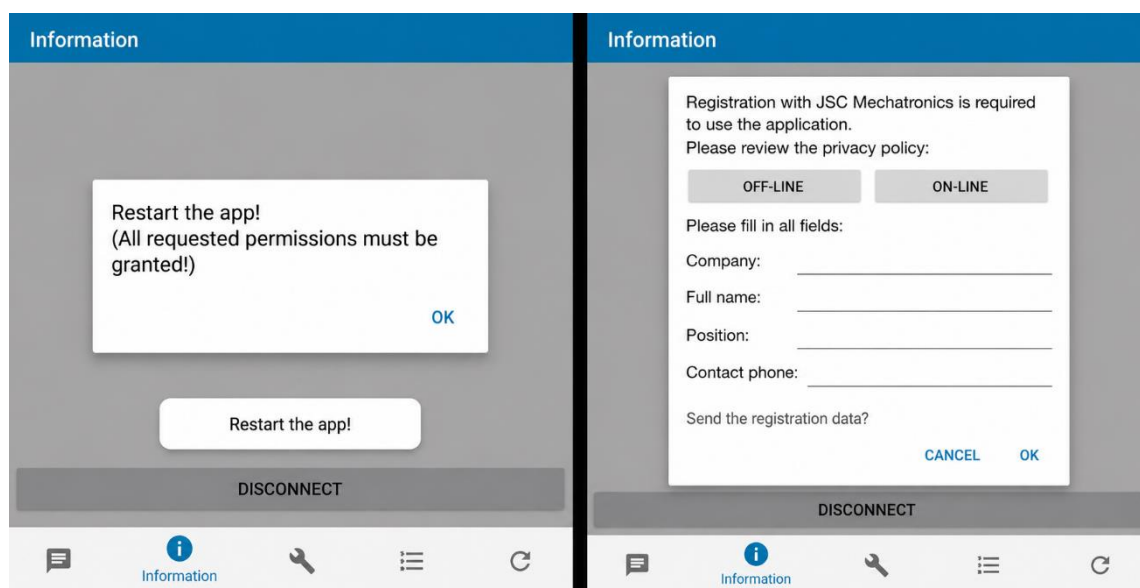


Fig. 4.2 Registration form

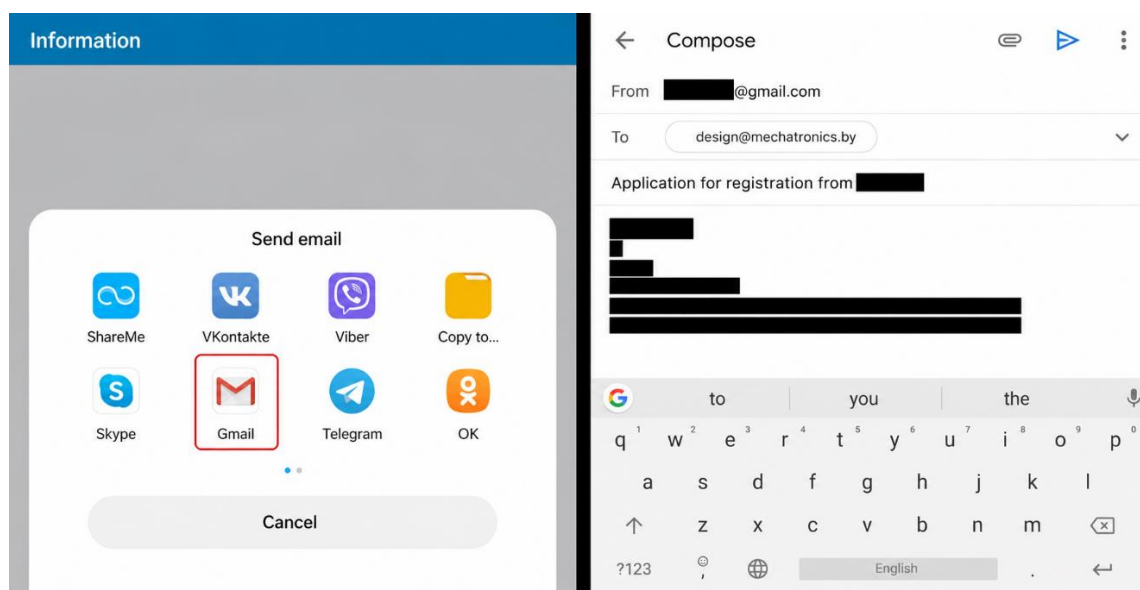


Fig. 4.3 Registration form

After the manager verifies the data, your account will be added to the list of authorized accounts. After registration is complete, restart the application. **An Internet connection is required until the registration process is completed** (during registration and to check the permission after restarting). Thereafter, the program can operate offline.

5 SENSOR CONFIGURATION

5.1 STARTING THE CONFIGURATOR

After installing and registering the application, check the application permissions and make sure Bluetooth and geolocation are enabled.

Launch the application. To monitor messages, go to the “**Messages**” tab. This tab displays the current data output by the Sensor to the monitoring system for operational data control.

For sensor configuration, the Sensor must be switched to service mode to establish a connection with the smartphone.



Fig. 5.1. “Messages” tab

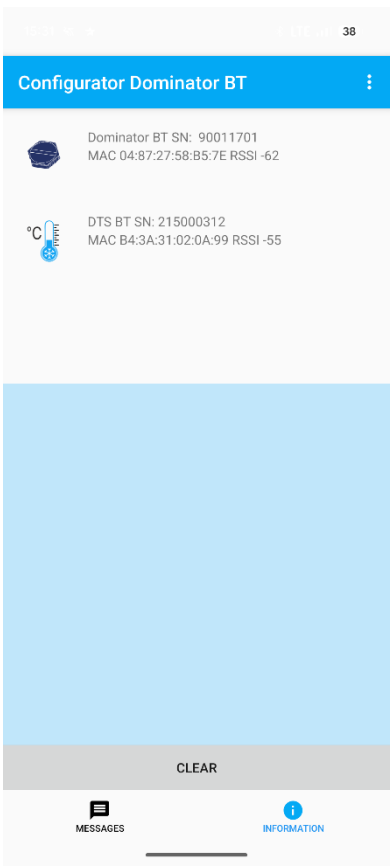


Fig. 5.2. “Information” tab

5.2 “INFORMATION” TAB

For sensor configuration:

- go to the **“Information”** tab (Fig. 5.3);
- switch the sensor to active state: place the **magnetic key** (included in the scope of supply) on the indicated area of the sensor (Fig. 5.3) and hold it for approximately 2-3 s until the sensor appears in the “Information” tab. It is not necessary to keep holding the key.



Fig. 5.3. Switching the sensor to service mode

- After sensor activation, connection to the smartphone is possible within 30 s. After connection, the sensor operates in configuration mode until the application is closed or the **“Disconnect”** button is pressed.



- If there are more than three unsuccessful connection attempts (the magnet was applied but no connection to the sensor was established), the next connection attempt will be available after 10 minutes.
- If unsuccessful attempts and false connections continue, the sensor will block connection for one hour.
- If there are no false connection attempts within 24 hours, the sensor will reset the lockout mode.

- After connecting the sensor, go to the **“Information”** tab to view manufacturer information, model, device MAC address, serial number and firmware version, production date, battery charge, temperature, and current temperature values (Fig. 5.4).



Fig. 5.4. "Information" tab



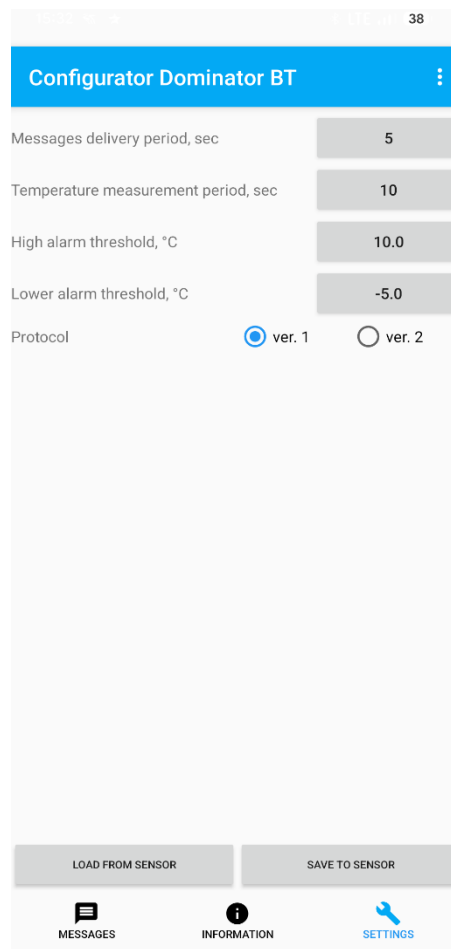
Do not press the **"Switch to firmware update mode"** button unless you plan to update the firmware.

If the sensor is left in firmware mode, this may cause rapid battery discharge (see the **"Firmware Update"** section).

5.3 “SETTINGS” TAB

In the “**Settings**” tab, set the following parameters (Fig. 5.5):

- Message transmission interval, in seconds.
- Temperature measurement interval, in seconds.
- Upper and lower alarm trigger thresholds.



Configurator Dominator BT

Messages delivery period, sec: 5

Temperature measurement period, sec: 10

High alarm threshold, °C: 10.0

Lower alarm threshold, °C: -5.0

Protocol: ☒ ver. 1 ☐ ver. 2

LOAD FROM SENSOR SAVE TO SENSOR

MESSAGES INFORMATION SETTINGS

Fig. 5.5. “Settings” tab

After setting the parameters, press the “**Write to sensor**” button.

5.4 SENSOR FIRMWARE UPDATE

- 1) To update the Sensor firmware, download the **EFR Connect** application from [Play Market](#).
- 2) Download the latest firmware from the manufacturer.
- 3) Switch the Sensor to firmware mode:
 - open the **“Information”** tab in the Configurator DTS BT application and press the **“Switch to firmware update mode”** button (Fig. 5.6);
 - confirm the action (Fig. 5.7).

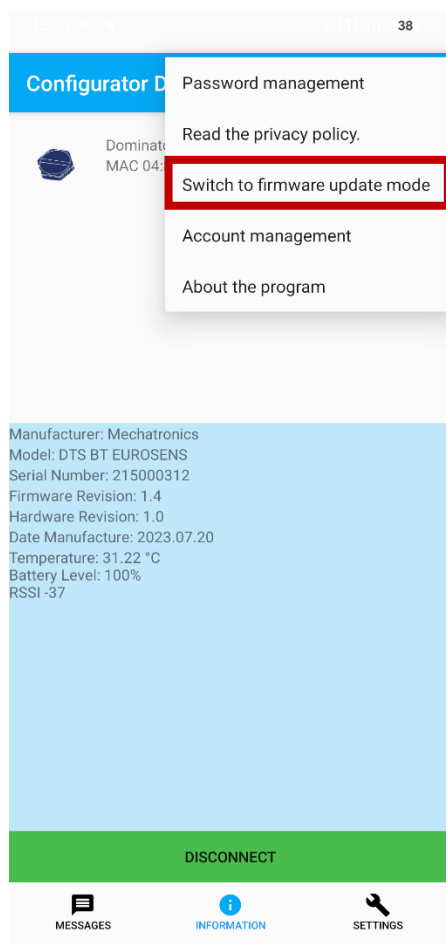


Fig. 5.6.

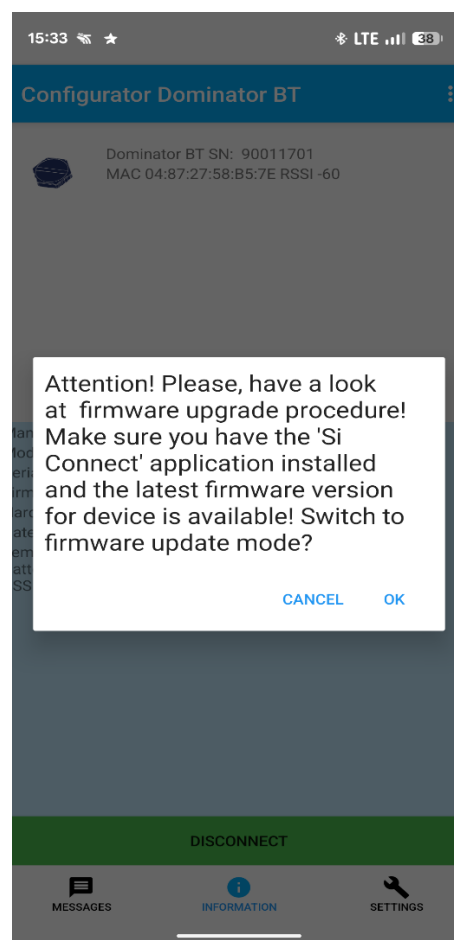


Fig. 5.7.

- 4) Launch the **EFR Connect** application and select the **“Browser”** tab (Fig. 5.8).



A device named “**OTA**” will appear in the browser window. This is the sensor in firmware mode. To be completely sure, compare the MAC addresses in the Configurator DTS BT and EFR Connect applications.

5) Press “**Connect**” to connect to the sensor (Fig. 5.9).

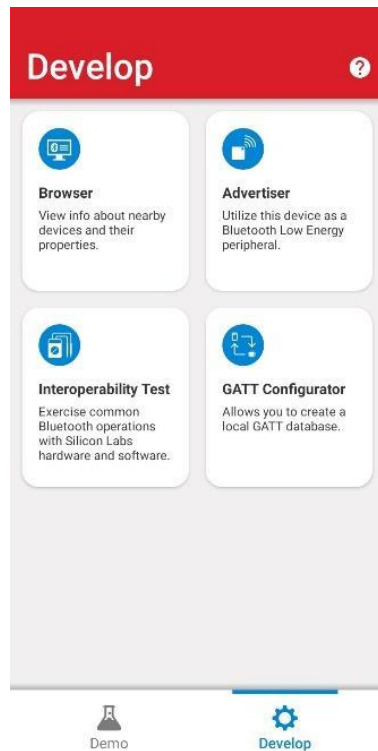


Fig. 5.8. “Browser” tab

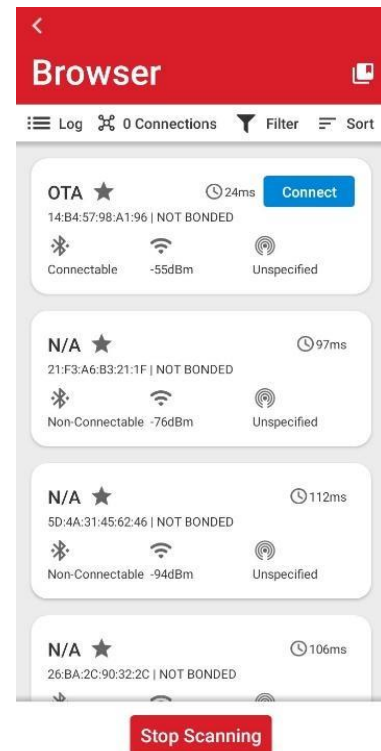


Fig. 5.9. “OTA” device

6) Press the “...” button in the upper-right corner and select “**OTA DFU**” (Fig. 5.10).

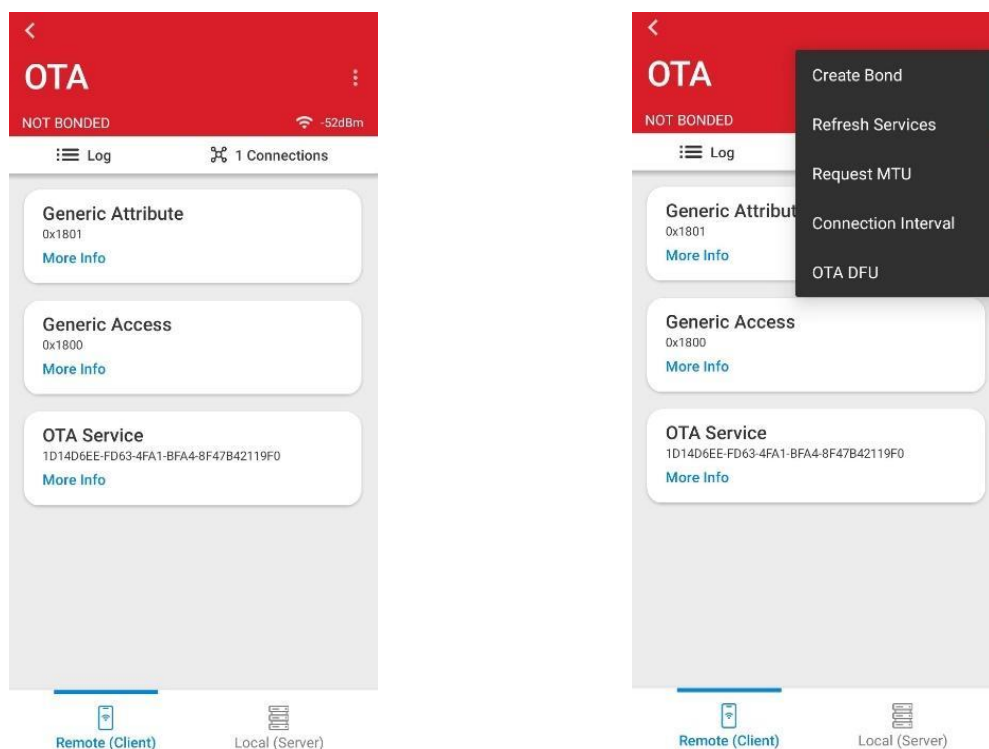


Fig. 5.10. Selecting “OTA DFU”

7) In the window that appears, select the firmware file and press **“OTA”** (Fig. 5.11).

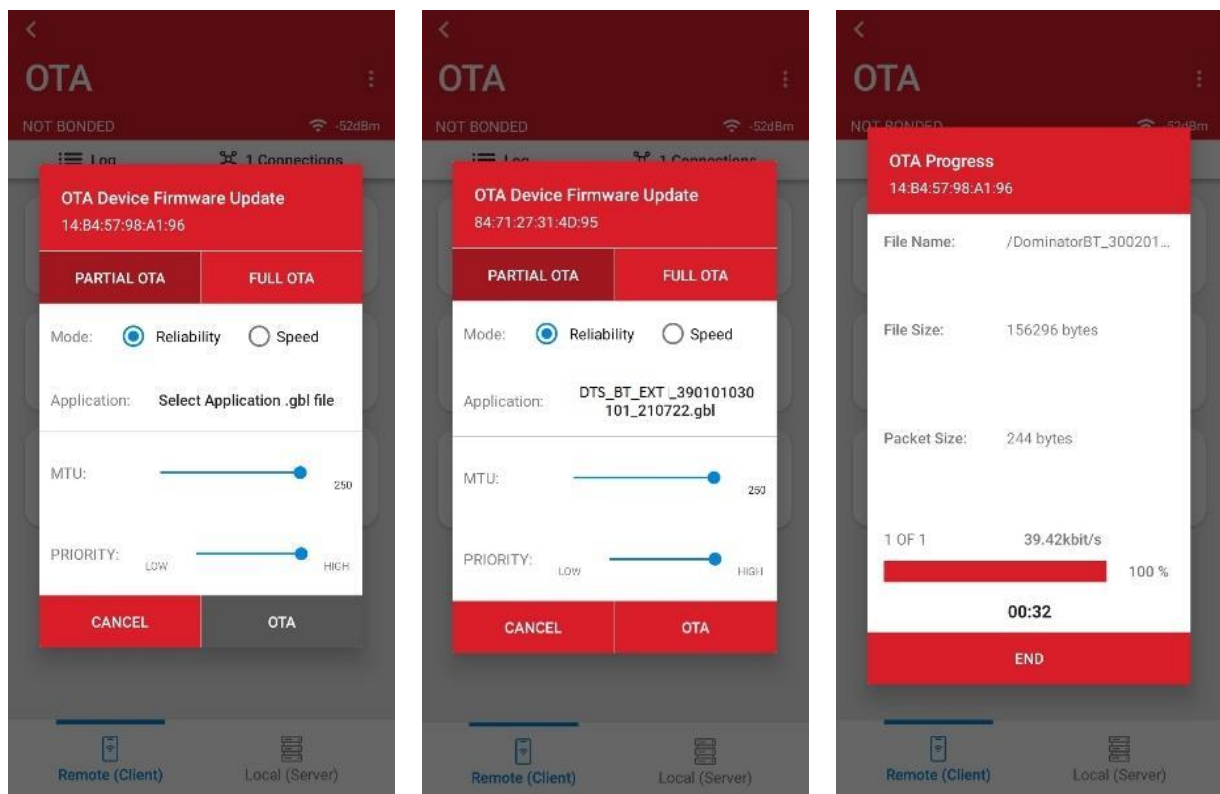


Fig. 5.11. Selecting the firmware file

After the firmware upload process is complete, the sensor will restart and be ready for operation.

6 ADDITIONAL INFORMATION

6.1 TECHNICAL SUPPORT



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6.2 CONTACTS

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www.eurosenstelematics.com

Appendix I. eurosens DTS BT Data Exchange Protocol

Field name	Description Specification	Example	Offset, byte	Length, bytes
40-bit Unique Identifier (UID)	constant	0x861EED574A	7	5
Type	constant	0xD7 (dec 215)	12	1
Serial number	constant	0x00001B (dec 27)	13	3
Message number	Transmitted message counter	0x0003CA36 (dec 248374)	16	4
Status*	status flags	0x0000 (dec 0)	20	2
Temperature, °C (0.01 °C/bit)	Current temperature value. Resolution: 0.01 °C per bit.	0x09C4 (dec 2500, t +25 °C)	22	2
Humidity, % (0.01%/bit)	Current humidity. Resolution: 0.01% per bit.	0x0000 (dec 0, vol 0,00 %)	24	2
Pressure, kPa (0.01 kPa/bit)	Current pressure. Resolution: 0.01 kPa per bit.	0x0000 (dec 0, vol 0,00 kPa)	26	2
Illuminance, lx (0.1 lx/bit)	Current illuminance. Resolution: 0.1 lx per bit.	0x0000 (dec 0, vol 0,00 lx)	28	2
Battery charge (1%/bit)	Current battery charge. Resolution: 1% per bit.	0x64 (dec 100)	30	1

*SENSOR STATUS FLAGS ARE LISTED IN THE TABLE BELOW:

STATUS FLAGS TABLE

Description	Bit number
Sensor locked	0
1-Wire error	1
I2C error	2
SPI error	3
Reserved	4 - 7
Temperature above the maximum threshold	8
Temperature below the minimum threshold	9
Temperature above the minimum threshold and below the maximum threshold	10
Reserved	11 - 15

APPENDIX II. OVERALL DIMENSIONS

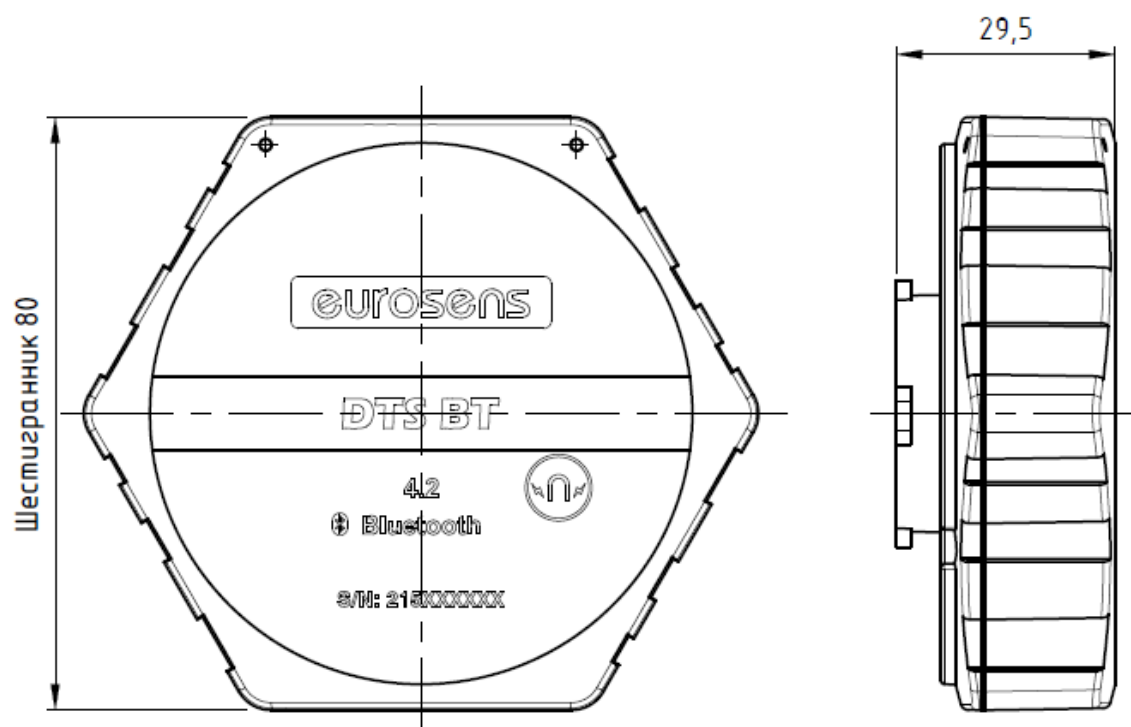


Fig. II-1. eurosens DTS BT / eurosens DTS BT Logbook

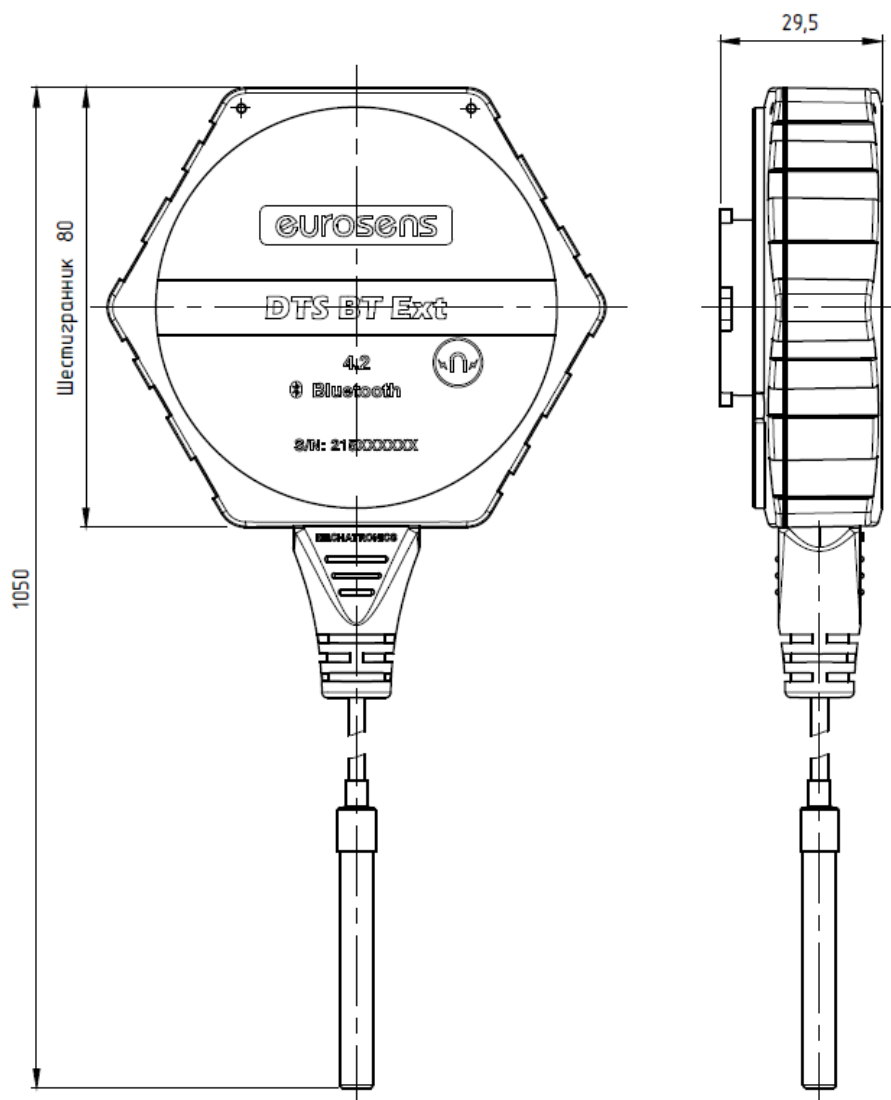


Fig. II-2. eurosens DTS BT Ext / eurosens DTS BT Logbook Ext

