



# UNIVERSAL OFFICE SENSOR 5 IN 1

# SMART-UM0101

User Manual



## Document Information

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02	20.02.2020	KEV	Minor changes
03	25.02.2020	KEV	We add new parameters at <a href="#">the data packet</a>
04	08.04.2020	KEV	Unsupported settings with id 4 and 49 are removed
05	25.05.2020	KEV	Warranty number of packets is changed
06	27.05.2020	KEV	Measurement CO <sub>2</sub> concentration level is changed
07	03.06.2020	KEV	<a href="#">Measurement</a> temperatures, humidity and light level are changed
08	31.08.2020	KEV	Added measurement <a href="#">errors</a>
	26.01.2020	KEV	Fixed a typo in English version only in the first packet of the <a href="#">communication</a> protocol (noise<->light)

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## INTRODUCTION

This manual is designated for Vega Smart-UM0101 universal sensor (hereinafter – device, sensor) manufactured by Vega-Absolute OOO and provides information on powering and activation procedure, control commands and functions of the device.

This manual is targeted at specialists familiar with installation work fundamentals for electronic and electrical equipment.



**To provide the stable radio between the gateway and the end device it is recommend avoiding the device installation in the places which are barriers for the radio signal getting through like a reinforced floors and walls, a basement, an underground facilities and wells, a metal case etc. The necessary stage for the network deploying including a big quantity of end devices is a radio planning work with nature experiments**

Vega-Absolute OOO reserves the right to make changes to the manual related to the improvement of equipment and software, as well as to eliminate typos and inaccuracies, without prior notice.

## 1 DESCRIPTION AND OPERATION

### DEVICE DESCRIPTION

The sensor is designed for purpose of using as a temperature sensor, a humidity sensor, also for measuring a CO<sub>2</sub> level, an ambient light level, a noise level including control of coming out the specified range of these parameters. All controlled parameters may be a source of triggering with initiate of the alarm communication session and transmitting the message with the alarm flag.

Sensors are produced in modern plastic case and have an option of producing without CO<sub>2</sub> concentration level sensor on the board by the request.

The sensor powered by two replaceable batteries of the common capacity is 2800 mAh, also has an option to connect to the external power.

The sensor configuring via USB with special software «Vega LoRaWAN Configurator».

### COMUNICATION AND DATA COLLECTION ALGORITHM

The readings store in the device memory with a configurable period from 5 minutes to 24 hours. The stored readings transmit during the next communication session with the LoRaWAN network.

The adjustable data transfer period can be from 5 minutes to 24 hours. Data transferring in random point in time during set period. At the next communication session, the device starts sending accumulated packets with readings, from the earliest to the latest.

When measurements are out of specified range the communication period still the same if parameter "Immediately send data when temperature is out of range" is not active. If that parameter is active, then the alarm message will form and send during 2 minutes after the moment of temperature/humidity measurements are out of specified range. Every following message, which will form according to the data collection period, will have sent according to the communication period.

With the "Confirmed uplinks" option turned on, the device will send the next packet only after receiving a confirmation of the delivery of the previous one. If such confirmation has not received after the fulfilled in the settings uplink number of transmissions, device completes the communication session until the next one according to the schedule. In this case, the device continues to collect data according to the data collection period and store it in memory. Non-transmitted packets remain in the device memory until the next communication session.

With the "Confirmed uplinks" option turned off, the device just sends all accumulated packets to the network in order from the earliest to the latest. There are no checks of package delivery in this mode. There are no non-transmitted messages in the device memory.

The internal clock is set automatically when device connected to the "Vega LoRaWAN Configurator" via USB, also adjustable via LoRaWAN.

## FUNCTIONAL

Sensor is class A device (LoRaWAN classification) and has the following features:

- Frequency plans RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865 supported
- Ability to set a custom frequency plan
- ADR support (Adaptive Data Rate)
- Sending of confirmed packets (configurable)
- OTAA or ABP activation (configurable)
- Communication period - every 5, 15, 30 minutes, 1, 6, 12, 24 hours (configurable)
- Extra communication in case of humidity value come out of specified range
- Extra communication in case of temperature value come out of specified range
- Extra communication in case of CO<sub>2</sub> level value come out of specified range
- Extra communication in case of ambient light level value come out of specified range
- Extra communication in case of noise level value come out of specified range
- Measurement of temperature, humidity, CO<sub>2</sub> level, light level, noise level
- Battery charge measurment (%)
- Measurement of a deviation angle from the vertical
- Sensitivity: up to -138dBm
- Saving collected data in "black box" for the next transmitting

## MARKING

Device marked with sticker that contain the next information:

- Device model;
- DevEUI;
- Month and year of manufacture;
- QR-code containing DevEUI for automatized count.

Sticker located in three places – on device case, in factory certificate and on the packing box.

Besides, there is an additional sticker located on the packing box and contains:

- Information about firmware version;
- QR-code containing DevEUI and keys for device registration in network via OTAA method.

## 2 SPECIFICATION

### Main

USB-port	micro-USB, type B
Operating temperatures	-40...+85 °C
Measurement temperatures	-40...+85 °C $\pm$ 1 °C
Measurement humidity	0...100% $\pm$ 3%
Measurement CO <sub>2</sub> concentration level	0...40 000 ppm $\pm$ 30 ppm
Measurement ambient light level	0...10,000 lx $\pm$ 0,5%
Measurement sound pressure level	40...110 dB $\pm$ 1 dB

### LoRaWAN

AppEui by default	4D554C53454E2031
LoRaWAN class	A
Quantity of LoRa channels	16
Frequency plan	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, custom (EU868 based)
Activation type	ABP or OTAA
Communication period	5, 15, 30 minutes, 1, 6, 12 or 24 hours
Data collection period	5, 15, 30 minutes, 1, 6, 12 or 24 hours
Memory amount for storing packets	200 packets
Antenna	internal
Sensitivity	-138 dBm
Radio coverage in restrained urban conditions	max 5 km
Radio coverage within line of sight	max 15 km
Transmitter power by default	25 mW (configurable)
Maximum transmitter power	100 mW

### Power

Replaceable batteries, common capacity	2xCR123A 3V, 2800 mAh
External power	12...24 V
Calculated number of packets sent by the device while data collection period is 6 hours, and communication period is 12 hours	5 000
Calculated battery lifetime while data collection period is 6 hours, and communication period is 12 hours	3 years

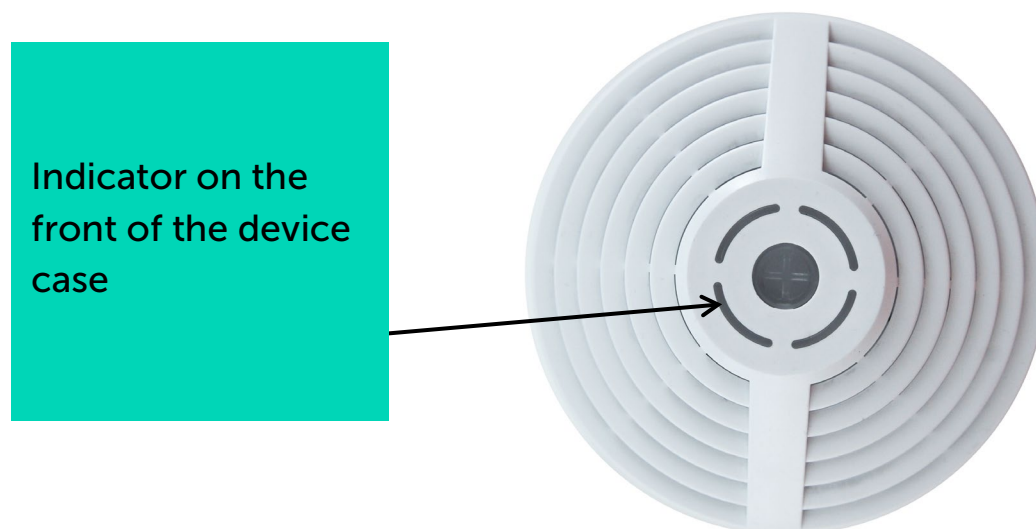
### Case




Housing dimensions	ø105 x 45 mm
Ingress protection rating	IP40
Removal sensor	yes

## 3 OPERATION

### INDICATION

A double color indicator is located on the sensor front and informs a user about the device state.



Indicator signal	Meaning
 A series of short blue flashes	Linking to the network in progress
 One long blue flash	The device connected to the network and in «Active» mode
 One long red flash	Linking to the network is unsuccessful or the device switched to the «Storage» mode



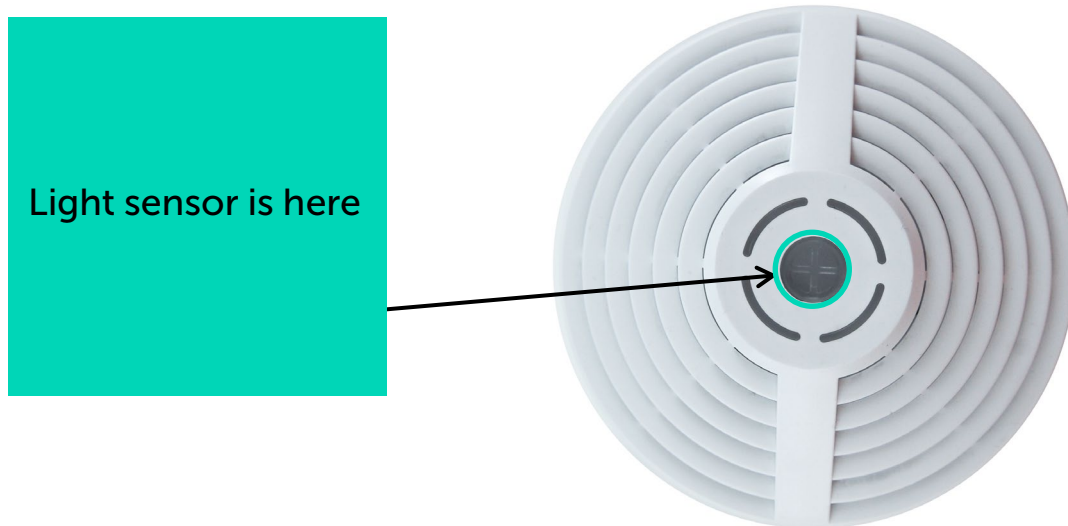
In case of connection attempt fail, the device will continue to accumulate data and will attempt to connect to the network every 6 hours



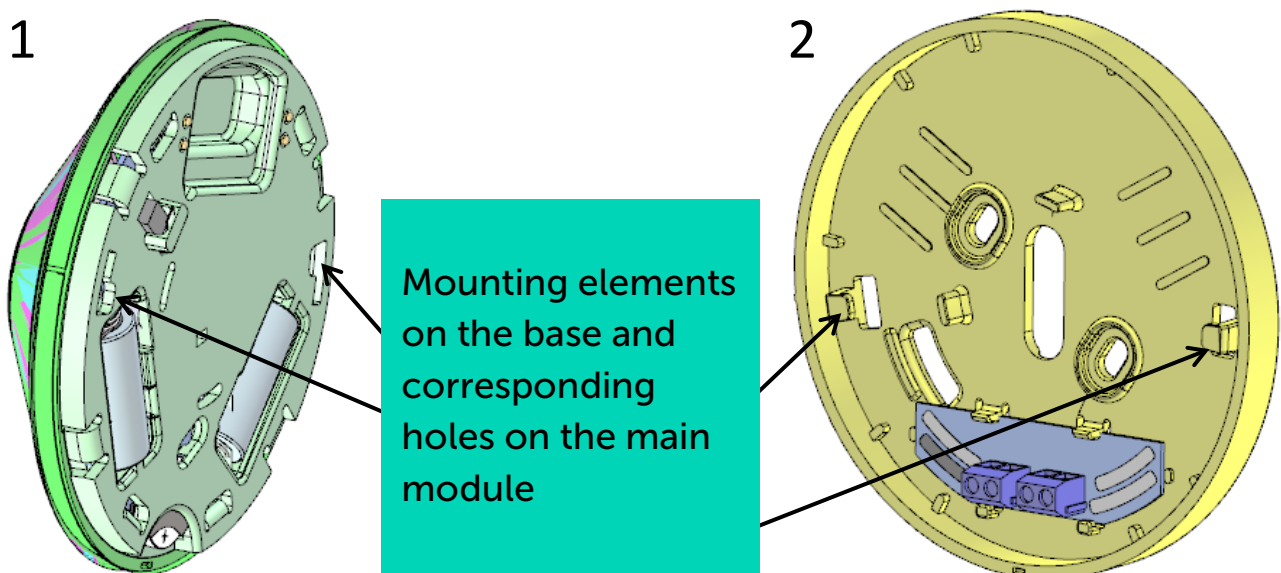
## MOUNTING OPTIONS

Since CO<sub>2</sub> gas is much heavier than ordinary air, it is advisable to install sensors at the level where it is necessary to control the concentration of CO<sub>2</sub>, for example, in office premises at a level of 1...1.5 m.

The light sensor is located on the front of the case, which should also be considered when placing the device.



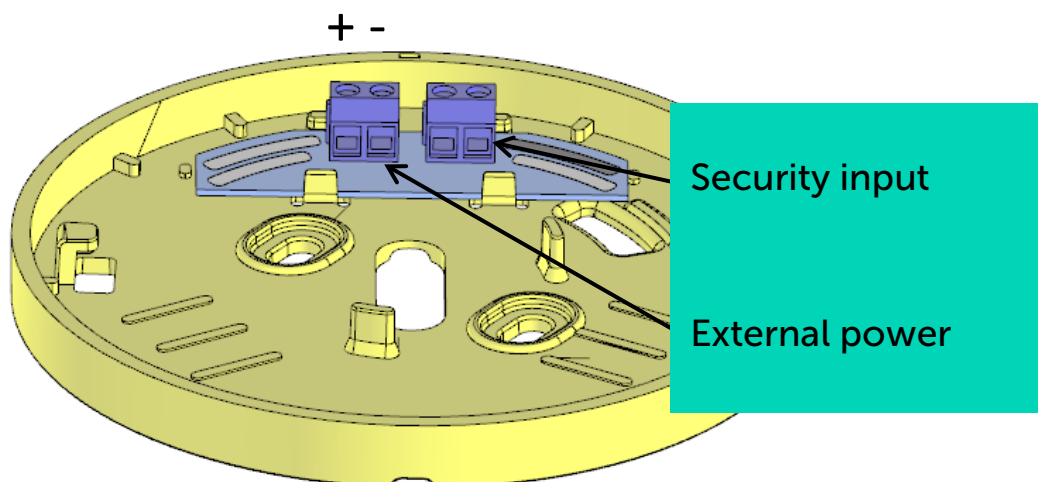
Constructively Smart-UM0101 consist of two parts: a main device module (1) and a base (2).



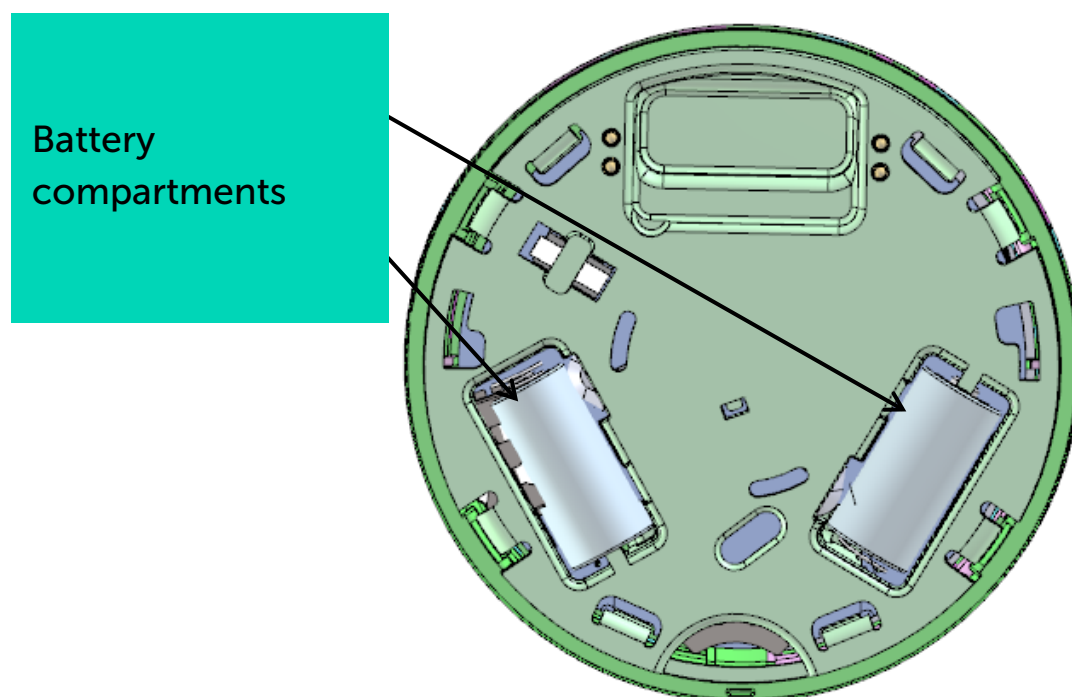
During installation, firstly you need to install the base, then connect all necessary wires to it. After that, it is necessary to combine the mounting holes on the main module and the mounting elements on the base and turn the sensor clockwise until it clicks firmly.

## INITIAL STARTUP

Sensor can be powered by the external supply or replaceable batteries. Contacts for the external power 12...24 V connection are located on the base.



There are two compartments for batteries installing on the inner surface of the case.



The sensor supports two activation methods in the LoRaWAN network - ABP and OTAA. Select one of the methods using "Vega LoRaWAN Configurator" application (See part 4).

**1. ABP.** After pressing the start button, the device immediately starts working in the "Active" mode.



**2. OTAA.** After pressing the start button, the device makes three attempts to connect to the network within the set frequency plan. After the activation request confirmed by LoRaWAN network, the device sends a signal and switches to the "Active" mode. If all attempts fail, the sensor will continue to accumulate data and will attempt to connect to the network every 6 hours.

To switch the device from the "Active" mode to the "Storage" mode, you can use the long press of the start button (more than 5 seconds).

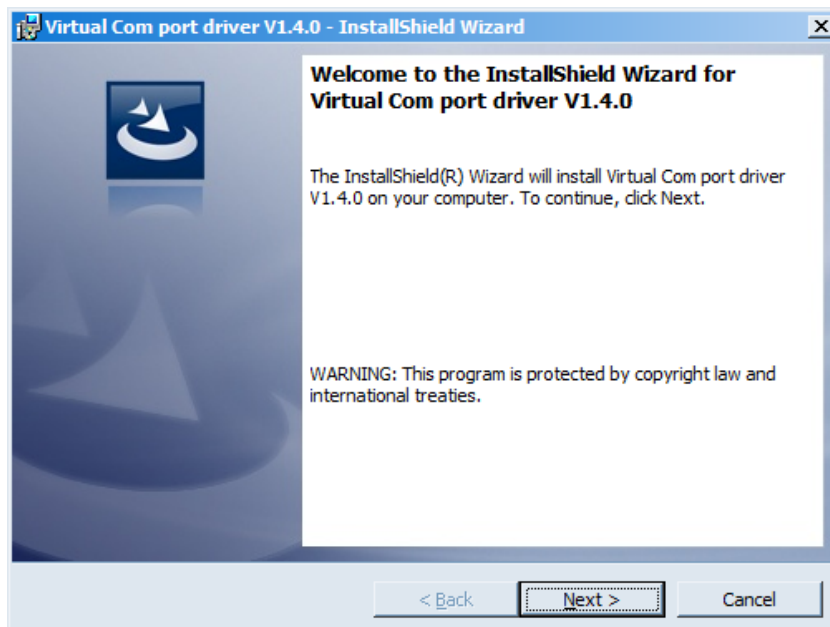


**Before connecting the device, make sure that its registration data is entered in the network - Device EUI, Application EUI and Application Key for OTAA, or Device address, Application session key and Network session key for ABP**

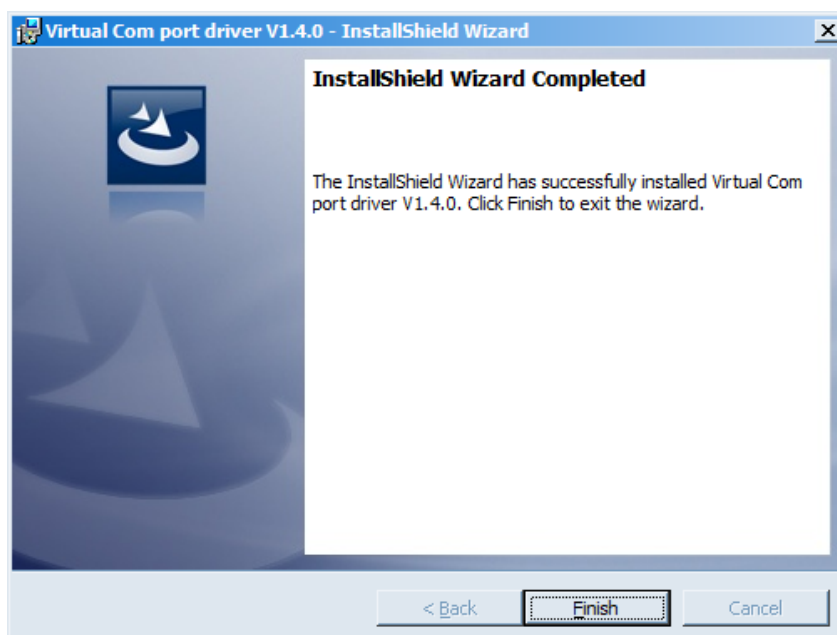
## CONNECTING VIA USB

The device Smart-UM0101 can be configured with the "Vega LoRaWAN Configurator" application (See part 4).

Before connecting the device to the computer for the first time, you must install the driver for the COM port **stsw-stm32102**, which can be downloaded from [iotvega.com](http://iotvega.com). After running the executable file **VCP\_V1.4.0\_Setup.exe**, the installer window will appear:



In this window, you need to click **Next**, then **Install**, and then the installation will begin. When the installation is completed successfully, the following screen appears:



After pressing **Finish** the driver is ready for operation, - it is possible to connect the device via USB.

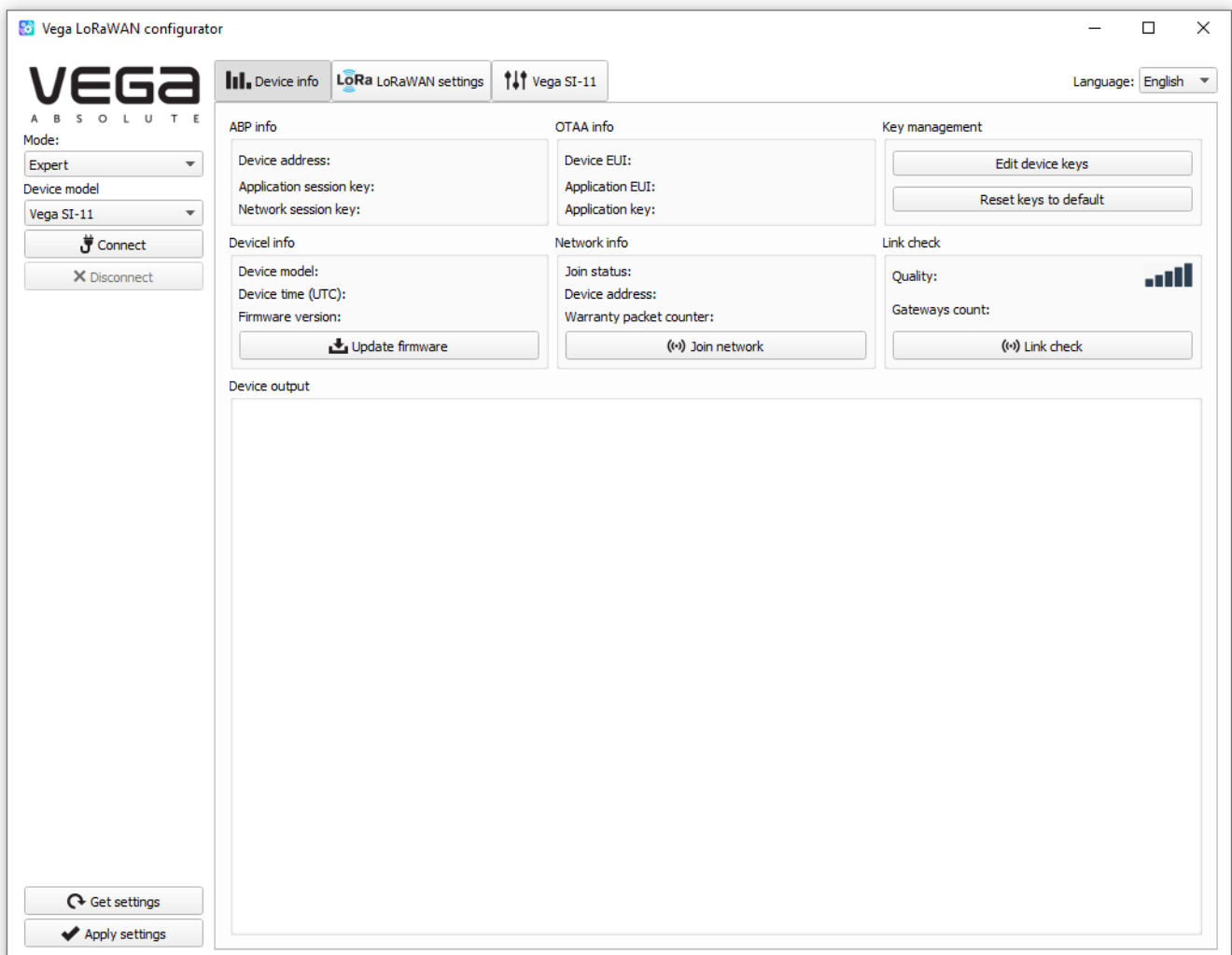
## 4 VEGA LORAWAN CONFIGURATOR

The "Vega LoRaWAN Configurator" application (hereinafter referred to as the configurator) is intended for setting up the device via USB.

The configurator has two modes of operation - "Simple" and "Expert". In the "Simple" mode, only basic settings are available. In the "Expert" mode the basic settings, advanced settings and the ability to check the coverage area of the signal from the gateways are available. Next, the work of the configurator is considered in the "Expert" mode.

### INTERFACE OF THE APPLICATION

The "Vega LoRaWAN Configurator" application does not require the special installation. When the executable file is launched, the window for working with the application appears.



The menu on the left allows you to switch between the "Simple" and "Expert" modes, select the device model, connect to the device or disconnect from it, get and apply settings.

The application window contains three tabs – Device info, LoRaWAN settings and device settings.

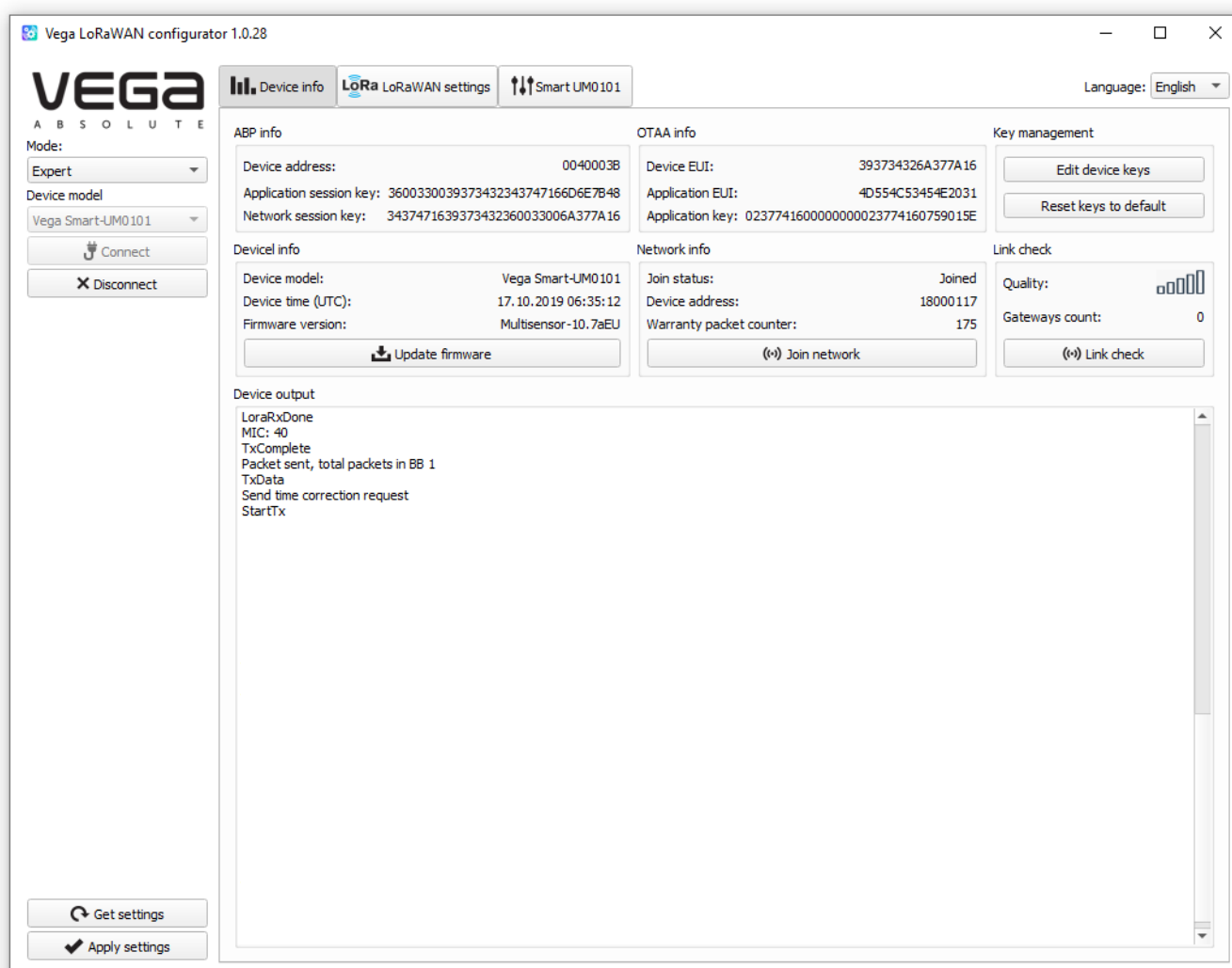
The language selection menu is in the upper right corner.

## CONNECTION TO THE DEVICE

For the connection to the device, perform the following steps:

1. Connect the USB cable to the device.
2. Start the "Vega LoRaWAN Configurator" application.
3. Click the "Connect" button in the menu on the left.

The configurator automatically recognizes the type of device, and the device selection menu becomes inactive.

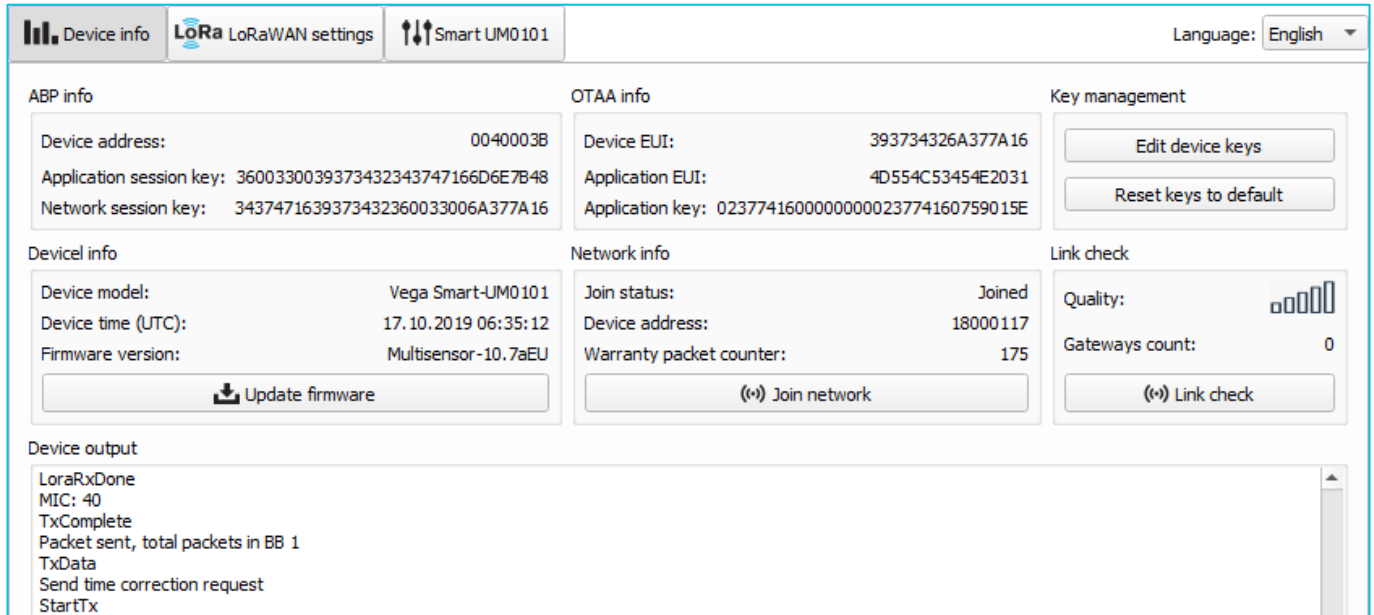


To read the settings from the device, you need to click the "Get settings" button, until this point the application will display the default settings or from the last connected device.

After making the necessary changes to the settings, you should click the "Apply settings" button and only then disconnect from the device with the "Disconnect" button.

## "DEVICE INFO" TAB

The "Device info" tab displays information about the device, its status, and the data needed to register the device in the LoRaWAN network.



The screenshot shows the 'Device info' tab selected in the configurator. The interface includes a top navigation bar with 'Device info', 'LoRa LoRaWAN settings', and 'Smart UM0101' tabs. A language dropdown is set to 'English'. The main content area is divided into several sections:

- ABP info:** Displays fields for Device address (0040003B), Application session key (3600330039373432343747166D6E7B48), and Network session key (3437471639373432360033006A377A16).
- OTAA info:** Displays fields for Device EUI (393734326A377A16), Application EUI (4D554C53454E2031), and Application key (0237741600000000023774160759015E).
- Key management:** Includes buttons for 'Edit device keys' and 'Reset keys to default'.
- Device info:** Displays fields for Device model (Vega Smart-UM0101), Device time (UTC) (17.10.2019 06:35:12), and Firmware version (Multisensor-10.7aEU). It includes an 'Update firmware' button.
- Network info:** Displays fields for Join status (Joined), Device address (18000117), and Warranty packet counter (175). It includes a 'Join network' button.
- Link check:** Displays fields for Quality (represented by a signal strength icon) and Gateways count (0). It includes a 'Link check' button.
- Device output:** A log area showing messages such as 'LoraRxDone', 'MIC: 40', 'TxComplete', 'Packet sent, total packets in BB 1', 'TxData', 'Send time correction request', and 'StartTx'.

**ABP info** - displays the data necessary to register the device in the LoRaWAN network with ABP method (Activation By Personalization).

**OTAA info** - the data required to register the device in the LoRaWAN network with OTAA method (Over The Air Activation) is displayed.

**Key management** (not displayed in the "Simple" mode) - allows you to change the factory keys to register the device on the network and reset the keys back to the factory settings.

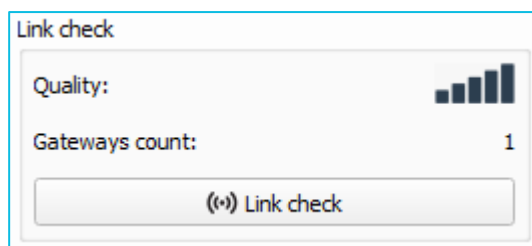
**Device info** - the configurator reads information about the device model, its firmware and automatically corrects the device's time when connected to it.

**Update firmware** - allows you to select the firmware file from your computer's hard drive and load it into the device. The device will automatically disconnect from the configurator when the download is complete. The current version of the device firmware can be downloaded from [iotvega.com](http://iotvega.com).

**Network info** - shows whether the device is connected to the LoRaWAN network and its network address.

**Join network button** - launch the LoRaWAN network connection procedure with the previously selected ABP or OTAA method. If the device is already connected to the network, reconnection procedure will occur.

**Link check** (not displayed in the "Simple" mode) - when pressed, the device sends a special signal to the LoRaWAN network, in response to which the network informs it of the number of gateways that received this signal and the signal quality. This button only works when the device is connected to the network.

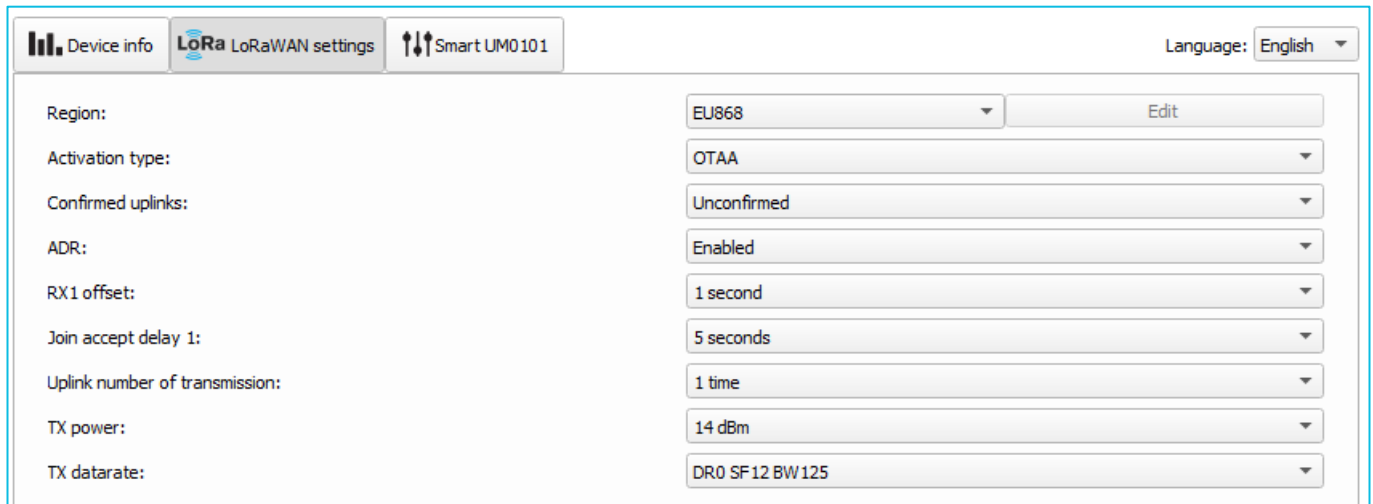


**Device output** (not displayed in the "Simple" mode) - monitoring the device status, all events in real time are displayed.

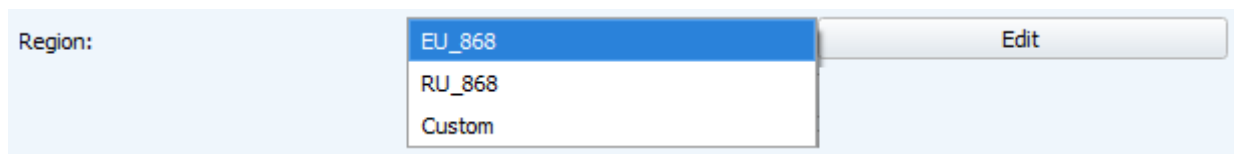


## "LORAWAN SETTINGS" TAB

The "LoRaWAN Settings" tab allows you to configure various parameters of the LoRa network.

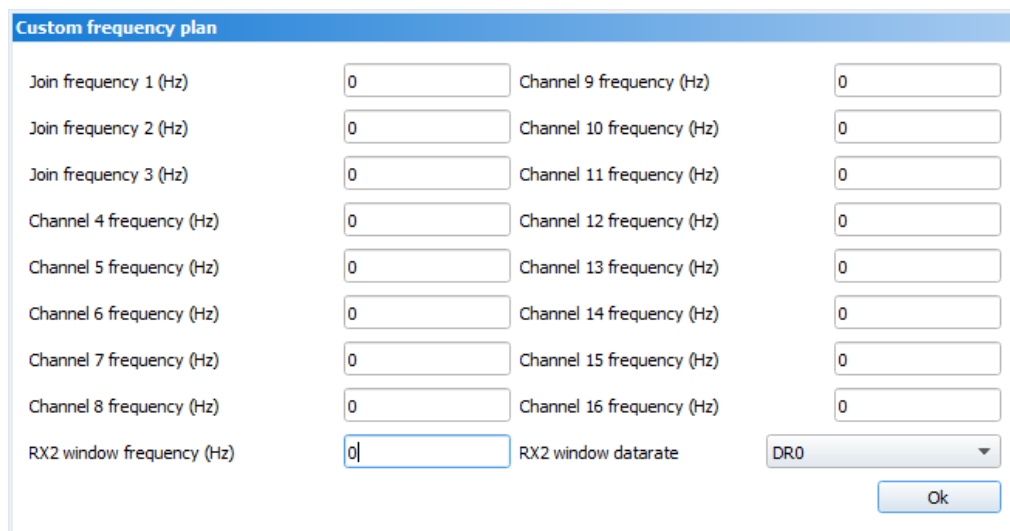


**Region** - allows you to select one of installed frequency plans or specify a custom frequency plan. Custom frequency plan is EU-868 based.



In the device frequency plan, only those channels are active by default, on which sending requests for connection to the network (join channels). The remaining channels (that the device should use) can be transferring by the LoRaWAN network server during the device activation procedure (only OTAA).

If you select "Custom" in the "Region" field, you must manually specify the frequencies that the device will use. To do this, click the "Edit" button, the channel frequency editing window will appear:



This frequency plan allows you to set up to 16 channels, as well as the frequency and speed of the second receiving window.



**The first three channels and the second receiving window parameters are mandatory. Without these parameters the custom frequency plan will be considered empty.**

**Activation type** – selecting ABP or OTAA device activation method.

Activation type:	<div>OTAA</div> <div>ABP</div>
------------------	--------------------------------

**Confirmed uplinks** – when you choose "confirmed", the device will retry sending the packet until it receives the server confirmation, or until the "Uplink number of transmission" is over (see below).

Confirmed uplinks:	<div>Confirmed</div> <div>Unconfirmed</div>
--------------------	---



**If you choose to send packets without confirmation, the modem will not know whether the packet delivered or not**

**ADR** – this option activates the Adaptive Data Rate algorithm for automatic control of the data transfer rate from the LoRaWAN network server side. The higher the quality of the signal received by the network, the higher the speed will be installed on the device. This option is recommended only on permanently installed devices.

ADR:	<div>Enabled</div> <div>Disabled</div>
------	--

**RX1 offset** (not displayed in the "Simple" mode) – specifies the time between end of packet transmission and first receiving window opening. The second receiving window always opens after 1 second after the first.

RX1 offset:

- 1 second
- 2 seconds
- 3 seconds
- 4 seconds
- 5 seconds
- 6 seconds**
- 7 seconds
- 8 seconds
- 9 seconds
- 10 seconds
- 11 seconds
- 12 seconds
- 13 seconds
- 14 seconds
- 15 seconds

**Join accept delay 1** (not displayed in the "Simple" mode) – sets the time that the device will open the first receiving window to receive confirmation for the join request from the LoRaWAN network while OTAA mode active. The second window always opens after 1 second after the first.

Join accept delay 1:

- 1 second
- 2 seconds
- 3 seconds
- 4 seconds
- 5 seconds
- 6 seconds
- 7 seconds
- 8 seconds**
- 9 seconds
- 10 seconds
- 11 seconds
- 12 seconds
- 13 seconds
- 14 seconds
- 15 seconds

**Uplink number of transmission** (not displayed in the "Simple" mode) – if the "Confirmed uplinks" function is disabled, the device will simply send each packet as many times as specified in this option. If "Confirmed uplinks" is enabled, the device will send packets until it receives a confirmation or until it sends as many packets as specified in this option.

Uplink number of transmission:	1 time
	2 times
	3 times
	4 times
	5 times
	6 times
	7 times
	8 times
	9 times
	10 times
	11 times
	12 times
	13 times
	14 times
	15 times

**TX power** (not displayed in the "Simple" mode) – the device RF transmitter power is adjusted to this value when sending packets to the LoRaWAN network. This option can be change by the network server.

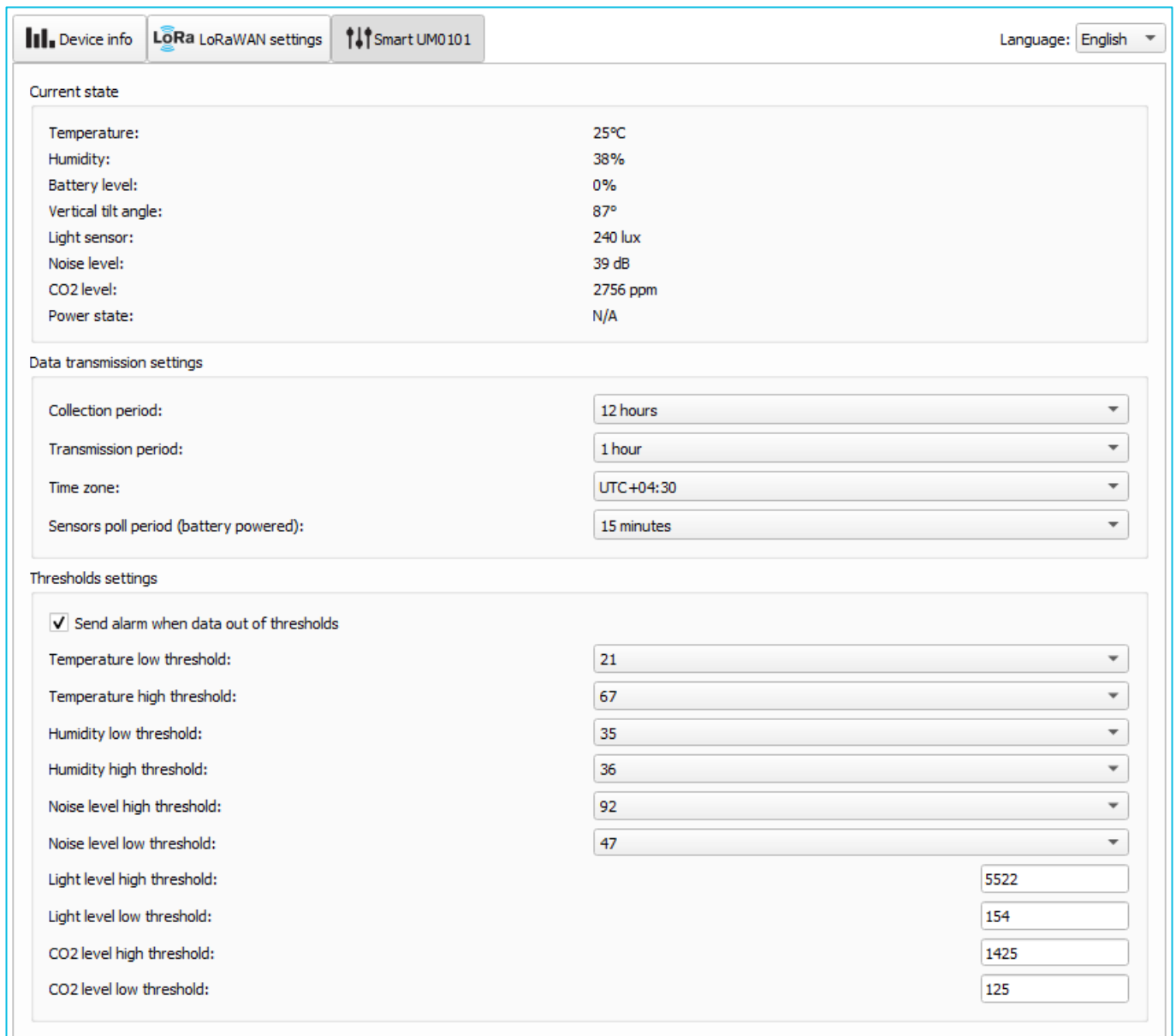
TX power:	2 dBm
	5 dBm
	8 dBm
	11 dBm
	14 dBm
	20 dBm

**TX datarate** (not displayed in the "Simple" mode) – the device transmission datarate at which it will transfer packets to the LoRaWAN network. This speed can be change by the network server if the ADR algorithm enabled.

TX datarate:	DR0 SF12 BW125
	DR1 SF11 BW125
	DR2 SF10 BW125
	DR3 SF9 BW125
	DR4 SF8 BW125
	DR5 SF7 BW125

## "SMART-UM0101" TAB

The "Smart-UM0101" tab contains the settings of the connected device.



Language: English

**Current state**

Temperature:	25°C
Humidity:	38%
Battery level:	0%
Vertical tilt angle:	87°
Light sensor:	240 lux
Noise level:	39 dB
CO2 level:	2756 ppm
Power state:	N/A

**Data transmission settings**

Collection period:	12 hours
Transmission period:	1 hour
Time zone:	UTC+04:30
Sensors poll period (battery powered):	15 minutes

**Thresholds settings**

☒ Send alarm when data out of thresholds

Temperature low threshold:	21
Temperature high threshold:	67
Humidity low threshold:	35
Humidity high threshold:	36
Noise level high threshold:	92
Noise level low threshold:	47
Light level high threshold:	5522
Light level low threshold:	154
CO2 level high threshold:	1425
CO2 level low threshold:	125

**Current state** – displays the current parameters of the device: battery charge, power type (external or battery) so as sensors readings.

**Data transmission settings** – a group of parameters that allows you to configure the collection and transmission periods, and the time zone for the internal clock of the counter will be set which.

The readings stored in the device memory at 00.00 on the internal clock of the device if the data collection period is set to 24 hours, at 00.00 and at 12.00, if the period is 12 hours and so on. All readings are stored in the device memory until the next communication session.

The data transfer period adjustable from 5 minutes to 24 hours. Data transferring in random point in time during set period. At the next communication session, the device starts sending accumulated packets with readings, from the earliest to the latest.

The specific data transfer time cannot be set, it is determined randomly for each device within the selected data transmission period from the moment of connection to the network. For example, the specified period is 30 minutes, but the device was initiated at the 4:40 PM by the internal device clock. While randomly calculation the device set the time 4:41 PM for packet transmission in half an hour period from the 4:40 PM to 5:10 PM. Thus, packets from this device will be transmitted at the 4:41 PM, at the 5:11 PM, at the 5:41 PM, at the 6:11 PM and so on every 30 minutes by the internal device clock.

With the "Confirmed uplinks" option turned on, the device will send the next packet only after receiving a confirmation of the delivery of the previous one. If such confirmation has not received after the fulfilled in the settings uplink number of transmissions, device completes the communication session until the next one according to the schedule. In this case, the device continues to collect data according to the data collection period and store it in memory. Non-transmitted packets remain in the device memory until the next communication session.

With the "Confirmed uplinks" option turned off, the device just sends all accumulated packets to the network in order from the earliest to the latest. There are no checks of package delivery in this mode. There are no non-transmitted messages in the device memory.

Sensors poll period (battery powered) allows to independently set the period with which the device will poll sensors and compare their readings with the specified thresholds. The device does not form a packet while those polls. When the device has an external power supply, then the device polls sensors readings every 30 seconds.

**Thresholds settings** – allows specify range of values for which alarm message will be sent. Thresholds specified here cannot be out of measurement parameters range (see the [specification](#)).

«Send alarm when data out of thresholds». If that parameter is active, so for 2 minutes after parameter value come out of specified range the alarm message will be form and transmit. Every following message, which will form according to the data collection period, will be sent according to the communication period.

## 5 COMMUNICATION PROTOCOL

This part describes the Smart-UM0101 communication protocol with LoRaWAN network.



**In fields consisting of several bytes, the little-endian byte order is used**

### SMART-UM0101 TRANSMITS THE FOLLOWING TYPES OF PACKETS

1. Packet with current state is sent on LoRaWAN port 2 according with the schedule or by the alarm

Size in bytes	Field description	Data type
1 byte	Packet type 1 – current state 2 – CO <sub>2</sub> level is out of range 3 – light level is out of range 4 – by the accelerometer 5 – humidity value is out of range 6 – temperature value is out of range 7 – noise level is out of range 8 – when removing if find out	uint8
1 byte	Battery charge, %	uint8
4 bytes	Reading time for values in this packet	uint32
1 byte	Power type (1 – batteries, 2- external)	uint8
2 bytes	Temperature in °C, multiplied by 10	int16
1 byte	Humidity in %	uint8
2 bytes	Ambient light level	int16
1 byte	Noise level	uint8
2 bytes	CO <sub>2</sub> concentration level in ppm	int16
1 byte	Vertical tint angle (0...180)	uint8
1 byte	Temperature low threshold in °C	int8
1 byte	Temperature high threshold in °C	int8
1 byte	Humidity low threshold in %	uint8
1 byte	Humidity high threshold in %	uint8
2 bytes	Light level low threshold	uint16
2 bytes	Light level high threshold	uint16
1 byte	Noise level low threshold	uint8
1 byte	Noise level high threshold	uint8
1 byte	CO <sub>2</sub> concentration low threshold in ppm, divided by 10	uint8
1 byte	CO <sub>2</sub> concentration high threshold in ppm, divided by 10	uint8

2. Packet with time correction request is sent every seven days on LoRaWAN port 4

Size in bytes	Field description	Data type
1 byte	Packet type, this packet == 255	uint8
4 bytes	Time of the modem at a moment of the packet transmission (unixtime UTC)	int16

After receiving this type of package, the application can send to modem the packet with time correction.

3. Settings packet – transmitting on LoRaWAN port 3 by the device

Size in bytes	Field description	Data type
1 byte	Packet type, this packet == 0	
2 bytes	ID of parameter	uint16
1 byte	Data length (len)	uint8
len bytes	Parameter value	-----
2 bytes	ID of parameter	uint16
1 byte	Data length (len)	uint8
len bytes	Parameter value	-----
...	...	...
2 bytes	ID of parameter	uint16
1 byte	Data length (len)	uint8
len bytes	Parameter value	-----

#### SMART-UM0101 RECEIVES THE FOLLOWING TYPES OF PACKETS

1. Real-time clock adjustment – sent by application on LoRaWAN port 4

Size in bytes	Field description	Data type
1 byte	Packet type, this packet == 255	uint8
8 bytes	The value in seconds for which you need to adjust the time. Can be positive or negative	int64

2. Packet with request of settings – sent by application on LoRaWAN port 3

Size in bytes	Field description	Data type
1 byte	Packet type, this packet == 1	uint8

Answering that packet, the device sends the packet with settings.



3. Packet with settings is identical to such packet from device and is sent on LoRaWAN port 3

Size in bytes	Field description	Data type
1 byte	Packet type, this packet == 0	
2 bytes	ID of parameter	uint16
1 byte	Data length (len)	uint8
len bytes	Parameter value	-----
2 bytes	ID of parameter	uint16
1 byte	Data length (len)	uint8
len bytes	Parameter value	-----
...	...	...
2 bytes	ID of parameter	uint16
1 byte	Data length (len)	uint8
len bytes	Parameter value	-----

The package with settings sent to the device may not contain all the settings supported by the device, but only the part that needs to be changed.

Table of ID of Smart-UM0101 parameters and these possible values

ID of parameter	Description	Data length	Possible values
16	Communication period	1 byte	1 – 1 hour 2 – 6 hours 3 – 12 hours 4 – 24 hours 5 – 5 minutes 6 – 15 minutes 7 – 30 minutes
80	Temperature low threshold	1 byte	from -40 °C to +85 °C
81	Temperature high threshold	1 byte	from -40 °C to +85 °C
88	Humidity low threshold	1 byte	from 0 to 100%
89	Humidity high threshold	1 byte	from 0 to 100%
115	Noise level low threshold	1 byte	from 40 to 110
116	Noise level high threshold	1 byte	from 40 to 110
117	Light level low threshold	2 bytes	from 0 to 10,000
118	Light level high threshold	2 bytes	from 0 to 10,000
119	CO <sub>2</sub> concentration low threshold	2 bytes	from 0 to 40,000
120	CO <sub>2</sub> concentration high threshold	2 bytes	from 0 to 40,000

## 6 STORAGE AND TRANSPORTATION REQUIREMENTS

The Smart-UM0101 sensor shall be stored in the original packaging in heated room at temperatures +5°C to +40°C and relative humidity less than 85%.

The sensor shall be transported in covered freight compartments of all types at any distance at temperatures -40°C to +85°C.

## 7 CONTENT OF THE PACKAGE

The sensor is delivered complete with:

Sensor Vega Smart-UM0101 – 1 pc.

CR123A battery – 2 pcs.

Factory certificate – 1 pc.

## 8 WARRANTY

The warranty period for the device is 5 years from the date of sale.

The manufacturer is obligated to provide repair services or replace the failed device during the entire warranty period.

The consumer undertakes to comply with the terms and conditions of transportation, storage and operation specified in this user manual.

Warranty does not apply to:

- batteries.
- the device with mechanical, electrical, and/or other damages and defects caused by violation of the transportation, storage, and operation requirements,
- the device with traces of repair performed not by the manufacturer's service center,
- the device with traces of oxidation or other signs of liquids leaking inside the device.

In the event of a warranty claim, contact the service center:

113/1, Kirova Str., Novosibirsk, 630008, Russia.

Tel.: +7 (383) 206-41-35.



[vega-absolute.ru](http://vega-absolute.ru)

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