# VEGA NB-IOT CONFIGURATOR

1.11.5 Version

# User Manual

www.vega-absolute.ru

# Contents

# Introduction

This manual is designated for application “Vega NB-IoT Configurator” developed by Vega-Absolute OOO for work with NB-IoT end devices which manufactured by Vega-Absolute OOO.

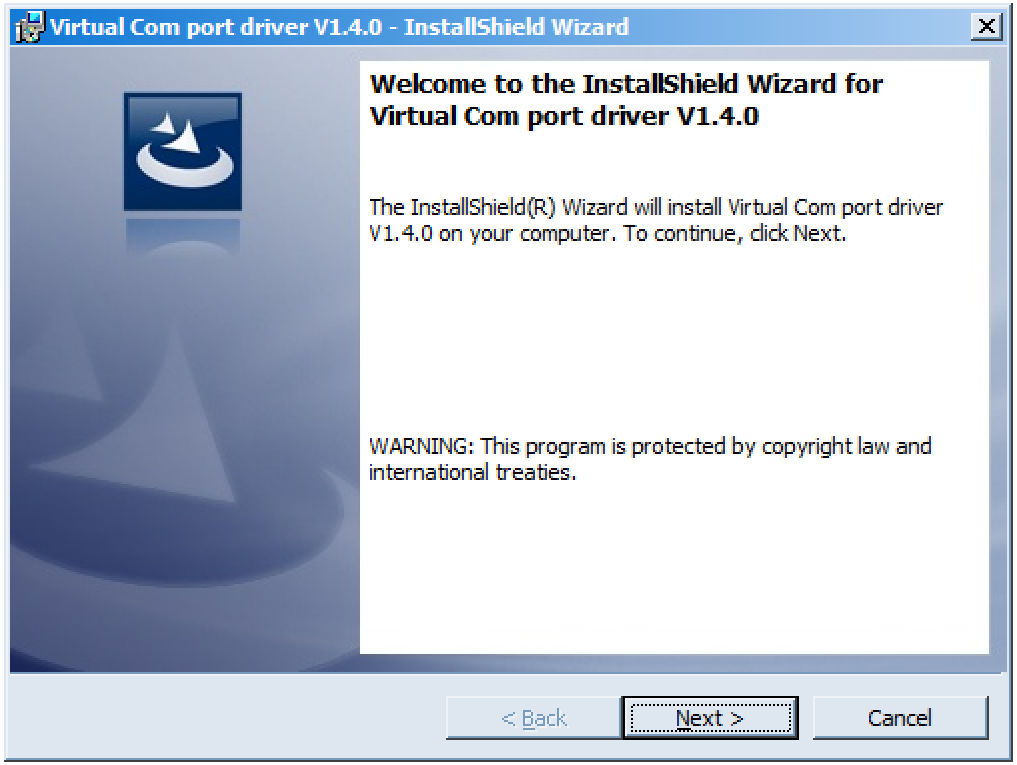
This manual is targeted at users the application and equipment.

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. USB Connecting

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

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](iotvega.com) site from any device page. After running the executable file **VCP_V1.4.0_Setup.exe**, the installer window will appear:



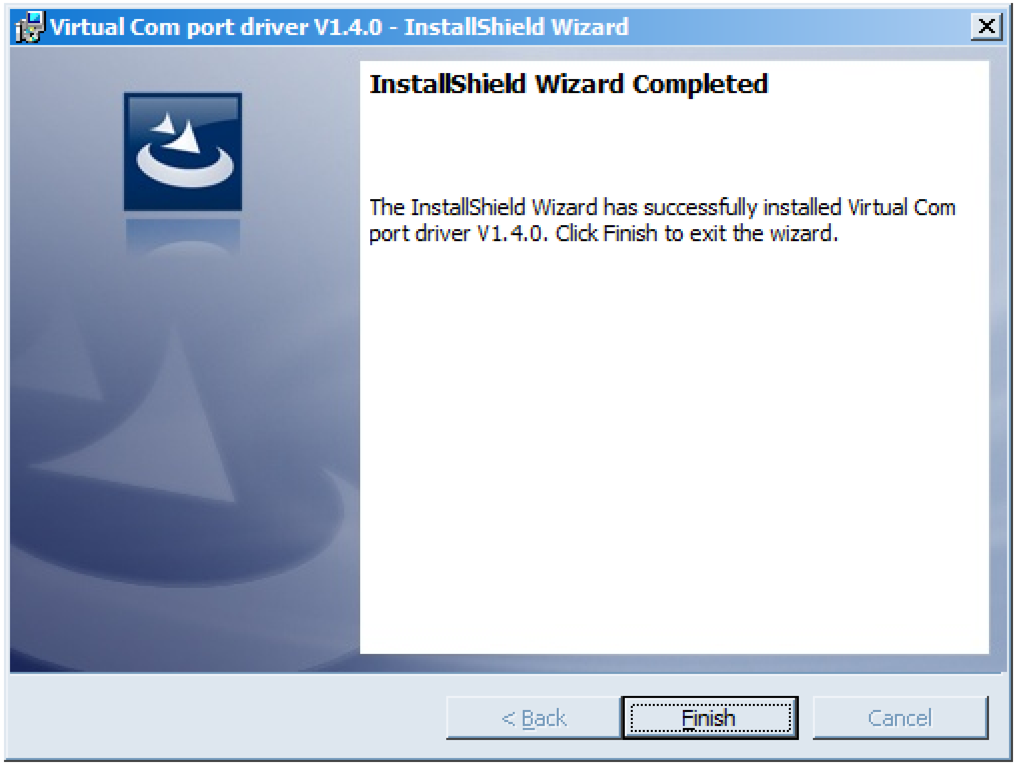
Virtual Com port driver V1.4.0 - InstallShield Wizard

**Welcome to the InstallShield Wizard for Virtual Com port driver V1.4.0**

The InstallShield(R) Wizard will install Virtual Com port driver V1.4.0 on your computer. To continue, click Next.

WARNING: This program is protected by copyright law and international treaties.

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



Virtual Com port driver V1.4.0 - InstallShield Wizard

InstallShield Wizard Completed

The InstallShield Wizard has successfully installed Virtual Com port driver V1.4.0. Click Finish to exit the wizard.

After pressing Finish the driver is ready for operation, - you may connect the device via USB.

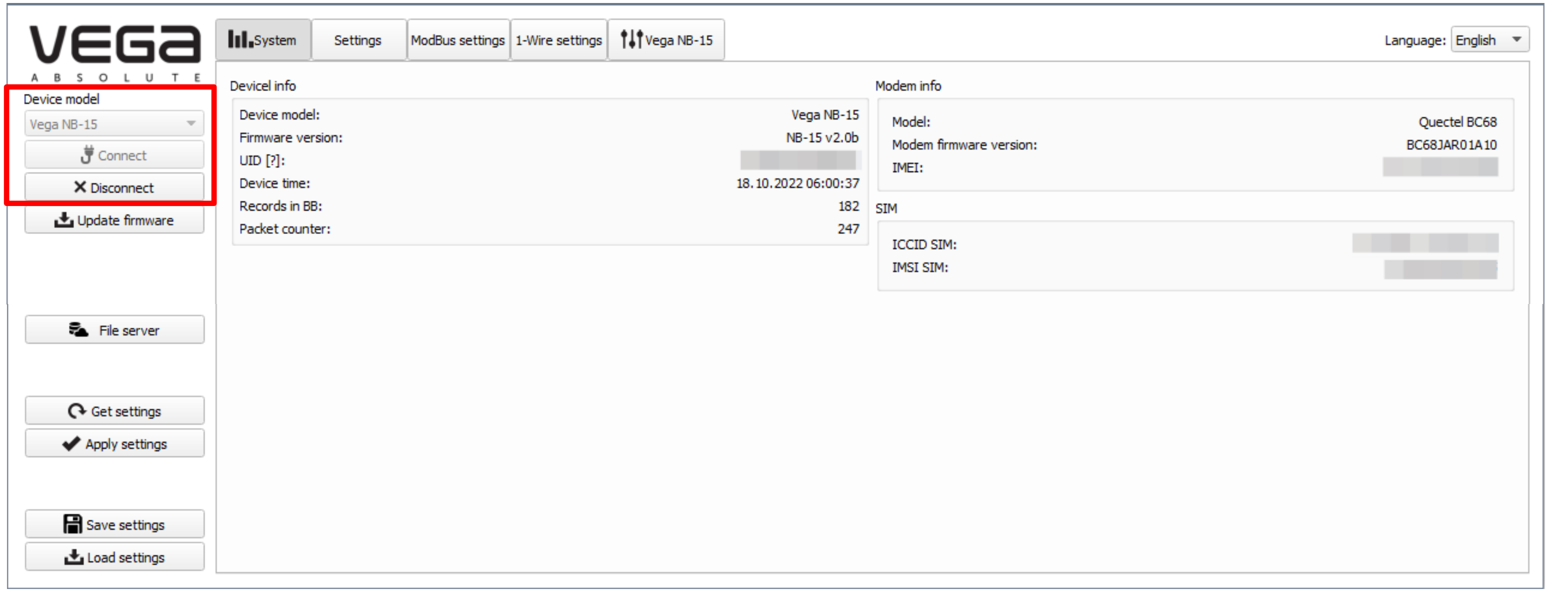
For the connection to the device, perform the following steps:

1. Connect the USB cable to the device.
2. Run "Vega NB-IoT Configurator" application.

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

3. Click the "Connect" button in the menu on the left.

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



Devicel info

Device model: Vega NB-15
Firmware version: NB-15 v2.0b
UID [?]: [redacted]
Device time: 18.10.2022 06:00:37
Records in BB: 182
Packet counter: 247

Modem info

Model: Quectel BC68
Modem firmware version: BC68JAR01A10
IMEI: [redacted]

SIM

ICCID SIM: [redacted]
IMSI SIM: [redacted]

# 2. Application Interface

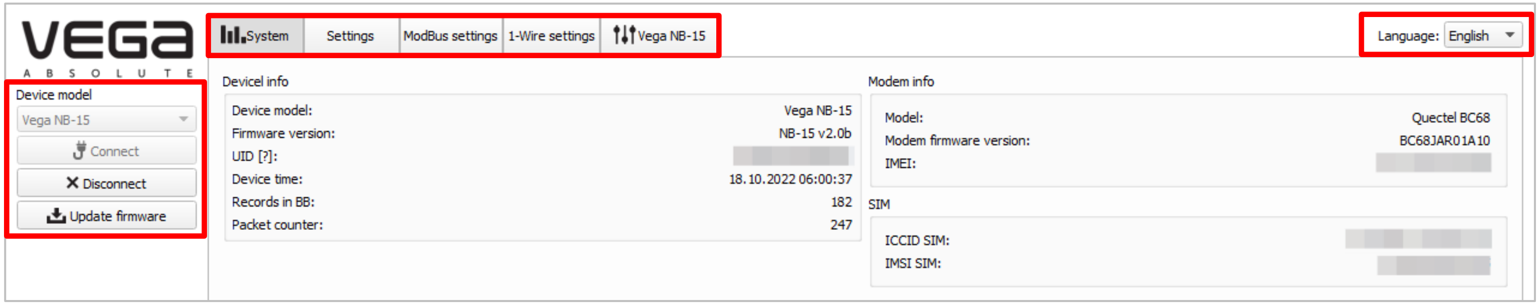
«Vega NB-IoT Configurator» application is designed to configure the device via USB.

The left side menu allows you to select a device model, connect to, or disconnect from a device and update firmware also.

**Button "Update Firmware"** - allows you to select the firmware file from the hard disk of the computer and load it into the device. Upon completion of the download, the device will disconnect from the configurator automatically. The current firmware version of the device can be downloaded from the website [iotvega.com](iotvega.com) on the page of the corresponding product

In the upper section there are tabs: System, NB-IoT Settings, ModBus settings, 1-Wire settings and device state. The composition and number of tabs depends on the model of the connected device.

The language selection menu is in the upper right corner.



Language: English

Device model: Vega NB-15

Devicel info

Device model: Vega NB-15
Firmware version: NB-15 v2.0b
UID [?]: [redacted]
Device time: 18.10.2022 06:00:37
Records in BB: 182
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Modem info

Model: Quectel BC68
Modem firmware version: BC68JAR01A10
IMEI: [redacted]

SIM

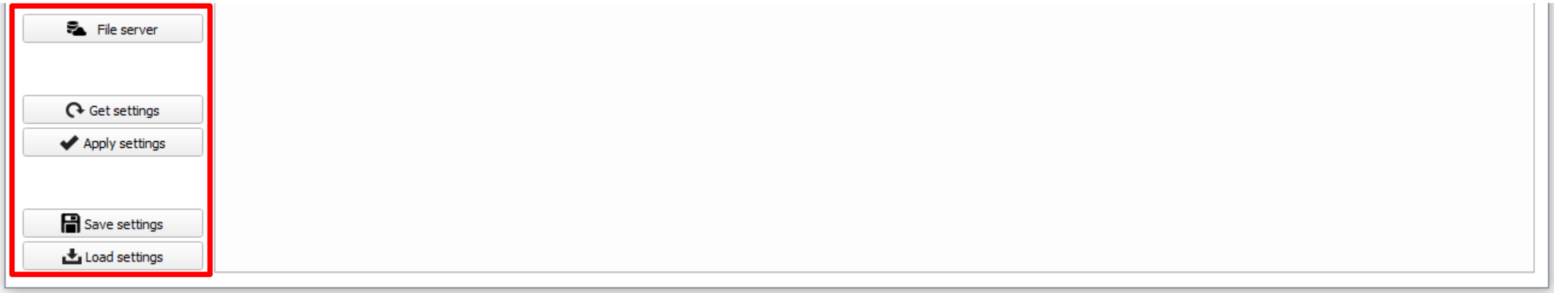
ICCID SIM: [redacted]
IMSI SIM: [redacted]

By clicking on the "File Server" button, access to the ftp-server is provided, which hosts the latest firmware for various devices, software and user manuals.

To read the settings from the device, you need to click the "Get settings" button, until this 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.

The buttons "Save settings" and "Load settings" allow you to save a set of settings to a file and then load them from the file.



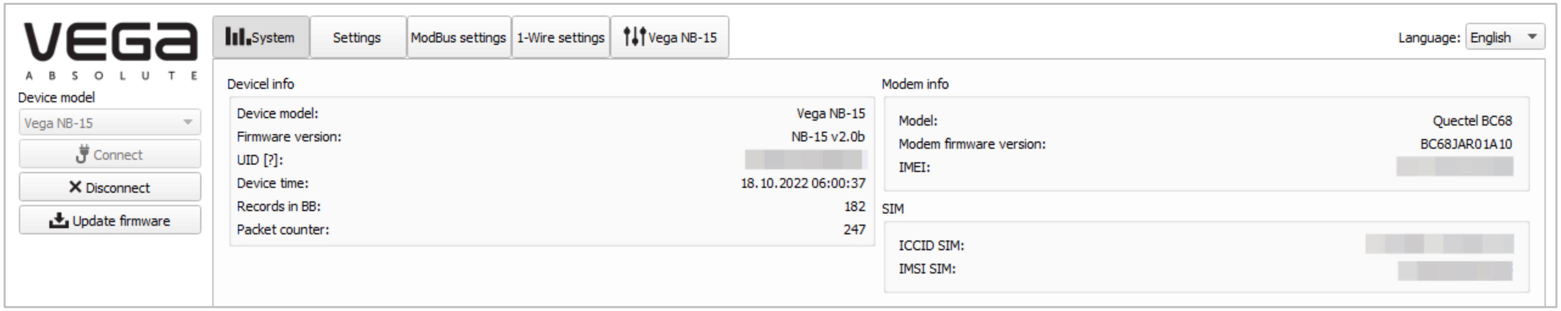
# 3. «System» Tab

The "Device info" tab displays information about the device, modem, and SIM.

**Device info** - the configurator reads information about the device model, its firmware and automatically corrects the device's time when connected to it. In that block you can find out the number of records in the black box and the number of packets sent by the device.

**Modem info** – in that block information about LTE-modem is displayed.

**SIM** – identifiers of the SIM card (SIM chip).



Device model: Vega NB-15

Devicel info

| | |
|---|---|
| Device model: | Vega NB-15 |
| Firmware version: | NB-15 v2.0b |
| UID [?]: | [redacted] |
| Device time: | 18.10.2022 06:00:37 |
| Records in BB: | 182 |
| Packet counter: | 247 |

Modem info

| | |
|---|---|
| Model: | Quectel BC68 |
| Modem firmware version: | BC68JAR01A10 |
| IMEI: | [redacted] |

SIM

| | |
|---|---|
| ICCID SIM: | [redacted] |
| IMSI SIM: | [redacted] |

# 4. Settings tab

The " Settings" tab allows you to configure various parameters of the NB-IoT network and device operation.

**Connection settings** – network settings group.

Used frequency bands for NB-IoT devices connection can be different for different cellular operators. You can ask the operator about used band or select all the bands.

Network registration timeout – it is a period after which the modem will switch to the “Sleep” mode when registration waiting. For battery economy it is better to set minimal period for which the device can registered in the network in the specific covering conditions.

Time zone set up for the data collection period which is equal to the device time (UTC) plus time zone. Transmission period is always use UTC time regardless of the time zone setting.

Cellular operator can give you APN or set it by default if the field is empty.

In **Additional** you can receive network statistics: base station number, connection quality etc. By default, the function is disabled to save transmitted traffic.

It is also possible to apply voltage to the power output terminals (option available only for NB-13).

***RS interface settings***[1] – allows to configure the RS-232 or RS-485 interface depending on the model of the connected device.

**MQTT server for sending telemetry** - a telemetry server to which the device will publish telemetry.

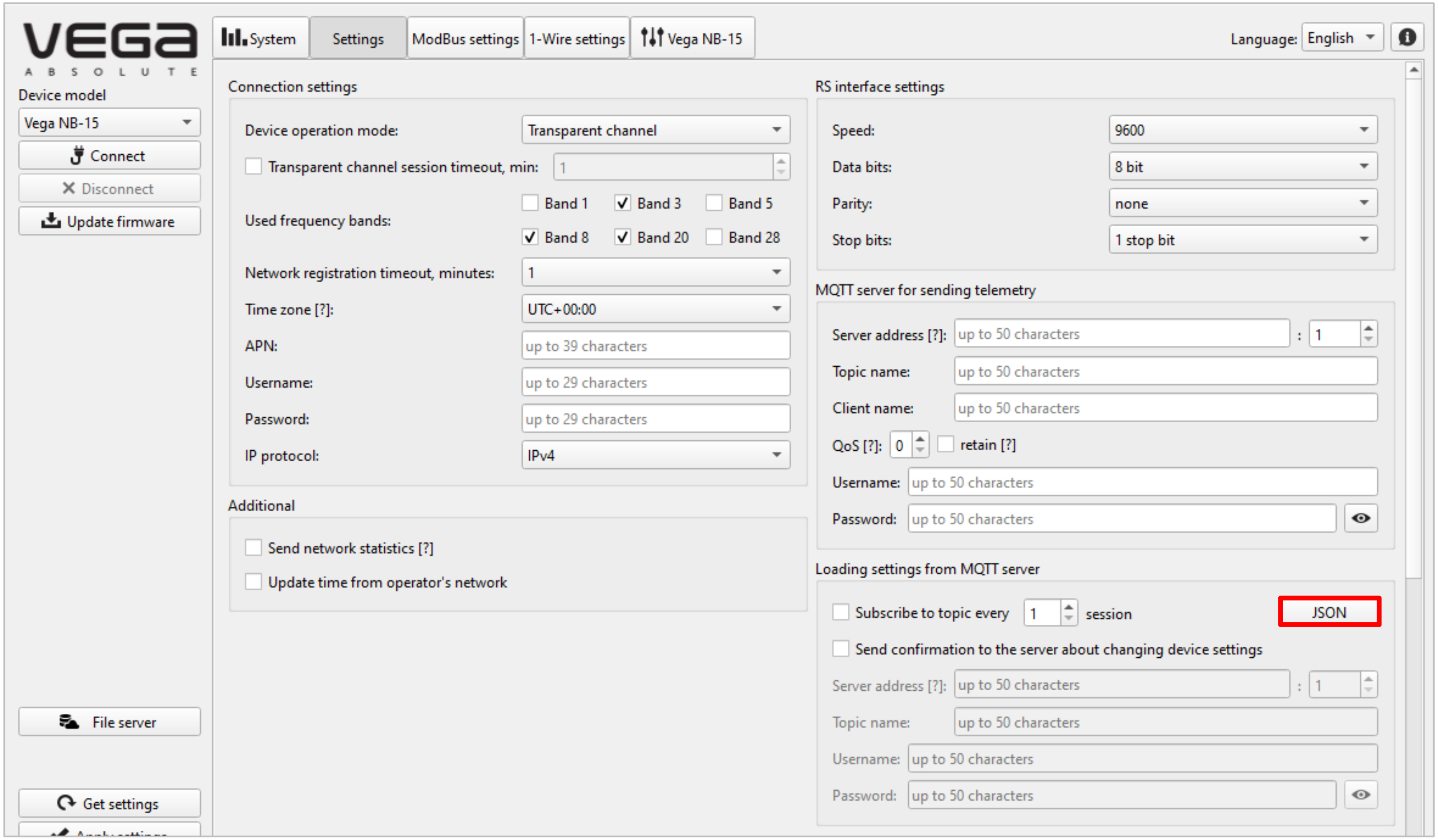
[1] The section is displayed if the connected device has an RS-232 or RS-485 interface

**Loading settings from MQTT server** – the settings server from which the device will update its settings. The telemetry server and the settings server can be either the same server or different servers.

By pressing the "JSON" button, the configurator generates a JSON text with the settings that are currently set in the configurator, regardless of which ones are saved on the device. In order for the device to update the settings remotely, this JSON text is published to the settings server. During the next communication session, the device will take the new settings from the settings server. You can also set the period with which the device will check the settings server. It is set by the number of communication sessions.

The device can send confirmation of a successful remote settings update from the settings server if the corresponding option is enabled. The confirmation is sent to the telemetry server.

A detailed interpretation of the text in JSON format is in the "Communication protocol" section in the corresponding user manuals for the devices.



Device model: Vega NB-15

Connection settings

Device operation mode: Transparent channel

□ Transparent channel session timeout, min: 1

Used frequency bands: □ Band 1 ☑ Band 3 □ Band 5 ☑ Band 8 ☑ Band 20 □ Band 28

Network registration timeout, minutes: 1

Time zone [?]: UTC+00:00

APN: up to 39 characters

Username: up to 29 characters

Password: up to 29 characters

IP protocol: IPv4

Additional

□ Send network statistics [?]

□ Update time from operator's network

RS interface settings

Speed: 9600

Data bits: 8 bit

Parity: none

Stop bits: 1 stop bit

MQTT server for sending telemetry

Server address [?]: up to 50 characters : 1

Topic name: up to 50 characters

Client name: up to 50 characters

QoS [?]: 0 □ retain [?]

Username: up to 50 characters

Password: up to 50 characters

Loading settings from MQTT server

□ Subscribe to topic every 1 session

□ Send confirmation to the server about changing device settings

Server address [?]: up to 50 characters : 1

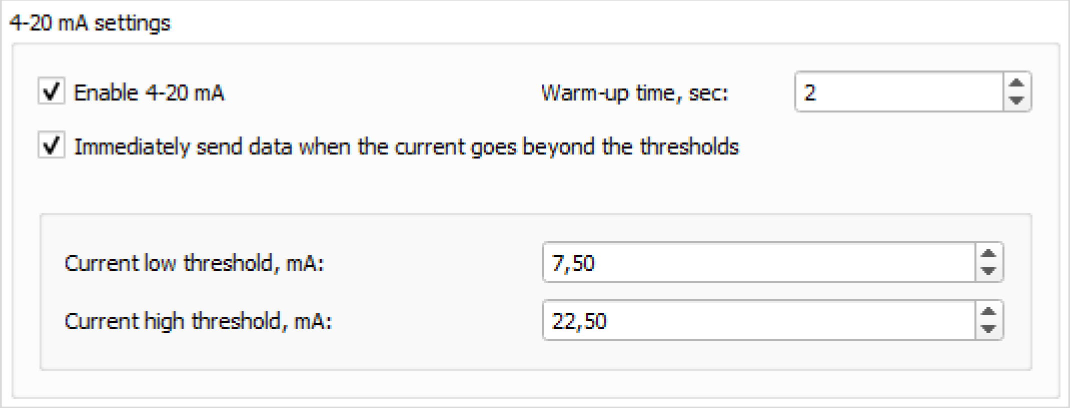
Topic name: up to 50 characters

Username: up to 50 characters

Password: up to 50 characters

*4-20 mA settings*[2] allows to configure the 4-20 mA interface depending on the model of the connected device: warm-up time, alarm current thresholds. If there is no 4-20 mA interface in the device, this section will not be displayed in the configurator.

[2] The section is displayed if the connected device has an 4-20 mA interface



4-20 mA settings

☑ Enable 4-20 mA

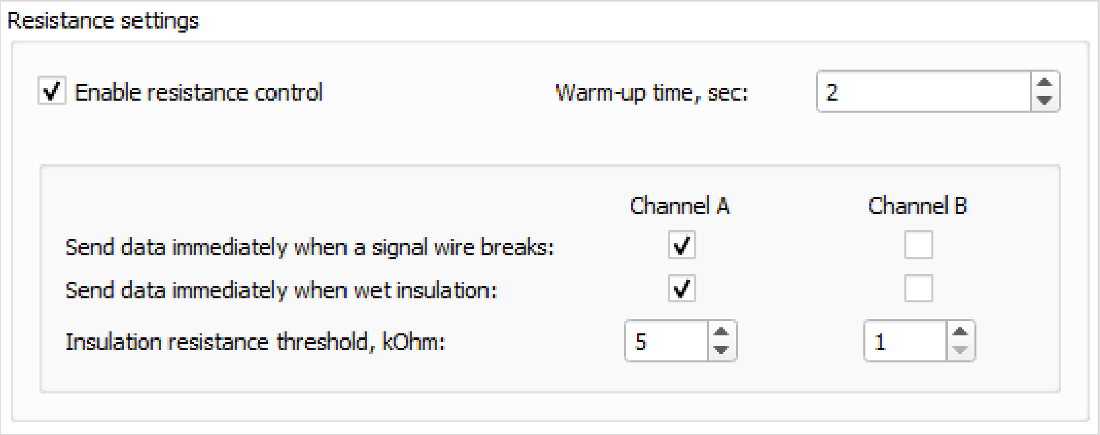
Warm-up time, sec: 2

☑ Immediately send data when the current goes beyond the thresholds

Current low threshold, mA: 7,50

Current high threshold, mA: 22,50

*Resistance settings*[3] allows to configure the resistance control interface: warm-up time, insulation resistance alarm thresholds, etc. You can turn off the interface when not in use. Designed for operational remote control system.



Resistance settings

☑ Enable resistance control

Warm-up time, sec: 2

| | Channel A | Channel B |
|---|---|---|
| Send data immediately when a signal wire breaks: | ☑ | □ |
| Send data immediately when wet insulation: | ☑ | □ |
| Insulation resistance threshold, kOhm: | 5 | 1 |

[3] The section is displayed if the connected device has resistance control interface

*Hall sensor settings*[4] enable or disable the sending of messages when the Hall sensor is triggered.

**DNS settings** – allows manually register a DNS server.

**Inputs settings** – allows to fine-tune the operation of each input. The inputs can work both in impulse and in security mode. If the input is in pulse mode, then you can configure a pulse filter for it and set alarm thresholds for pulses. If the input is in armed mode, then you can specify in which case an alarm event will be generated.

**Pulse filtering** – in this part you can set minimum values of the pulse and pause duration apparently for each of four pulse inputs. Value can be set in milliseconds and can be equal from 2 to 65535 ms.

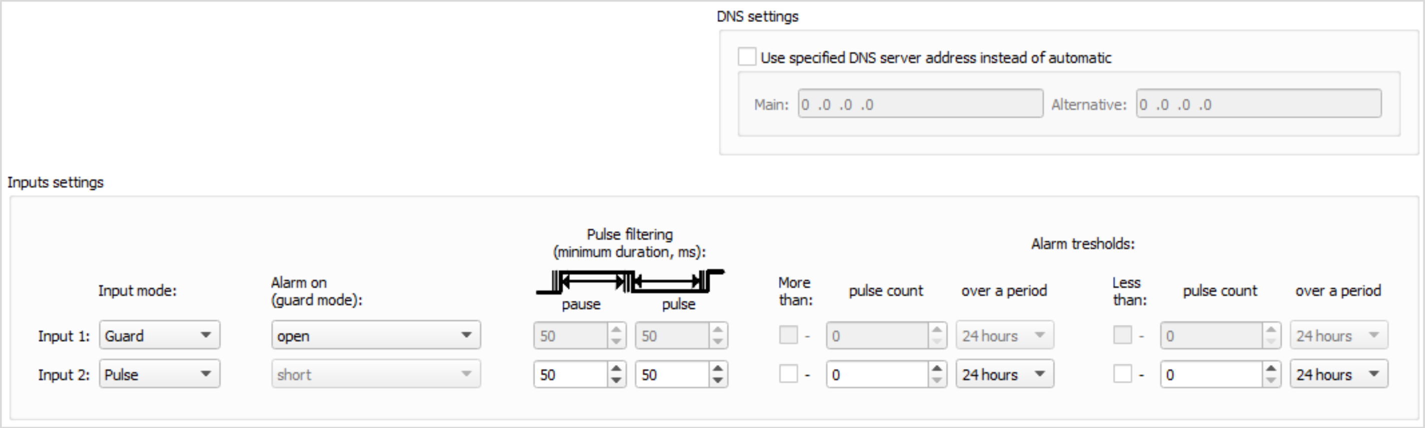
Minimum pulse duration – the value of the minimum pulse duration in ms, at which the pulse will be recorded by the modem, pulses with a duration less than the specified one will be regarded as bounce and will not be recorded by the modem.

Minimum pause duration – the value of the minimum pause duration in ms, after which the next pulse is let to be fixed.

*In most cases, when working with reed water meters, the following pulse filtering configuration is suitable: 50 ms per pause and 50 ms per pulse.*

**Alarm thresholds** allows to set for each input individually the threshold value of pulses for the period at which an alarm should be generated.

[4] The section is displayed if the connected device has Hall sensor



DNS settings

□ Use specified DNS server address instead of automatic

Main: 0 .0 .0 .0 Alternative: 0 .0 .0 .0

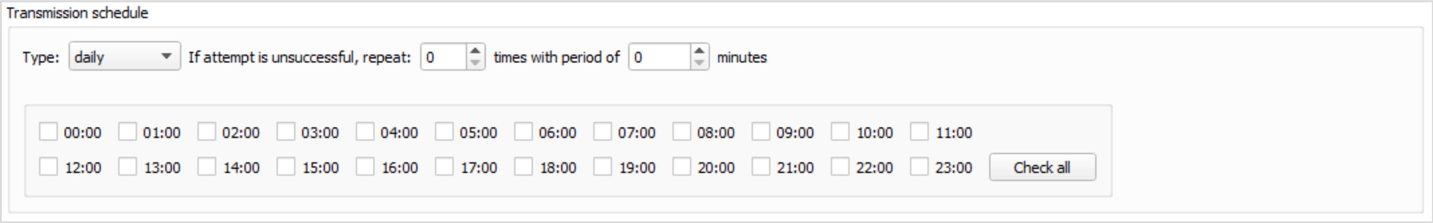
Inputs settings

Pulse filtering (minimum duration, ms):

Alarm tresholds:

| | Input mode: | Alarm on (guard mode): | pause | pulse | More than: | pulse count | over a period | Less than: | pulse count | over a period |
|---|---|---|---|---|---|---|---|---|---|---|
| Input 1: | Guard | open | 50 | 50 | □ - | 0 | 24 hours | □ - | 0 | 24 hours |
| Input 2: | Pulse | short | 50 | 50 | □ - | 0 | 24 hours | □ - | 0 | 24 hours |

**Transmission schedule** – in this part the data transmission schedule is set. While weekly or monthly schedule is choosing you can use option “Random communication time during the day” or set the hour for transmitting data in the field “Transmission hour”.

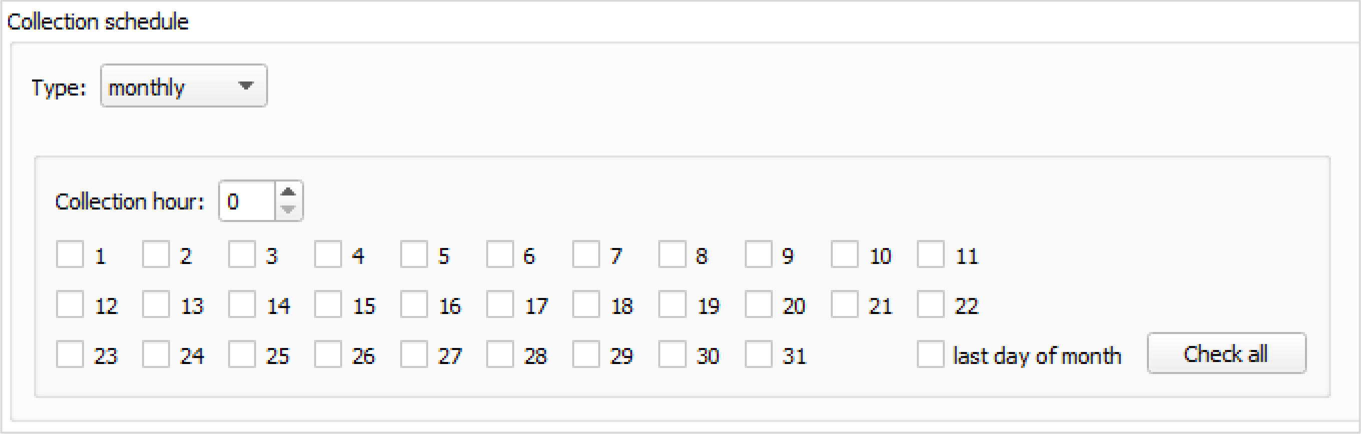


Transmission schedule

Type: daily If attempt is unsuccessful, repeat: 0 times with period of 0 minutes

□ 00:00 □ 01:00 □ 02:00 □ 03:00 □ 04:00 □ 05:00 □ 06:00 □ 07:00 □ 08:00 □ 09:00 □ 10:00 □ 11:00
□ 12:00 □ 13:00 □ 14:00 □ 15:00 □ 16:00 □ 17:00 □ 18:00 □ 19:00 □ 20:00 □ 21:00 □ 22:00 □ 23:00

**Collection schedule** – in this part the data collection schedule is set. Data collection is made in the time by the set schedule.



Collection schedule

Type: monthly

Collection hour: 0

□ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □ 8 □ 9 □ 10 □ 11
□ 12 □ 13 □ 14 □ 15 □ 16 □ 17 □ 18 □ 19 □ 20 □ 21 □ 22
□ 23 □ 24 □ 25 □ 26 □ 27 □ 28 □ 29 □ 30 □ 31 □ last day of month

Both schedules are available in four types:

Hourly – you can set any point at time with step of 5 minutes. For example, if you choose 10 and 35 then the device will act twice an hour at 00:10 and 00:35, then at 01:10 and 01:35, and so on.

Daily – you can set any point at time with step of hour.

Monthly – you can set the dates of month for action and set the time accurate to the hour.

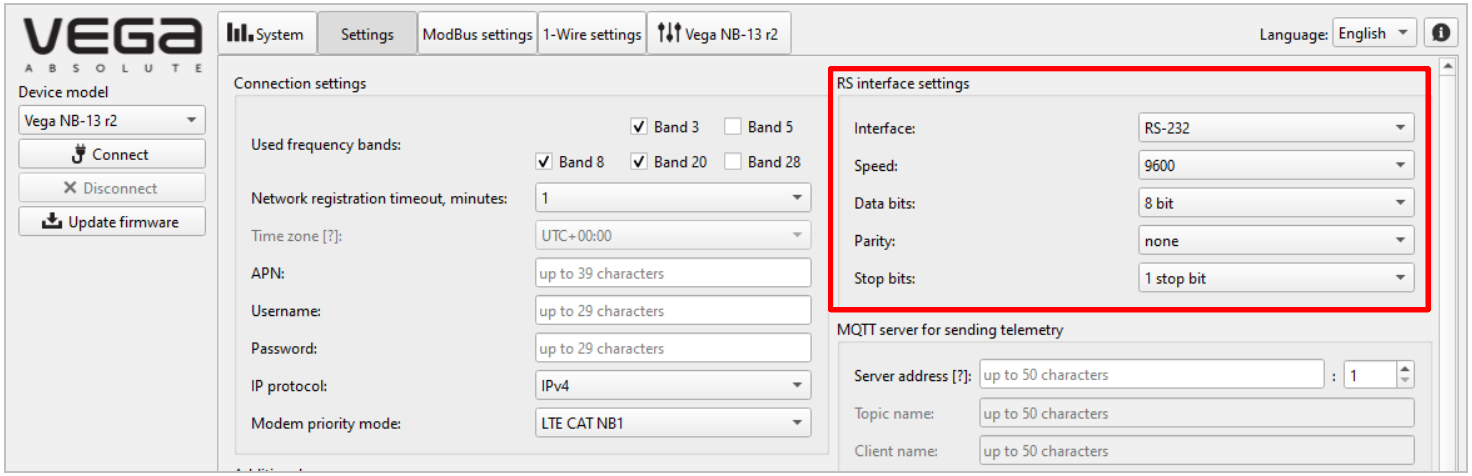
Weekly – you can set days of week and the time accurate to the hour.

For all types of data transfer schedule, there is a configurable option to resend if the current session failed to send data. The number of resend attempts and the interval between them is configurable.

# 5. ModBus settings

On the "ModBus Settings" tab in Vega NB-IoT Configurator, you can enable, disable, or configure data transmission via the ModBus protocol.

To use the ModBus protocol, the RS interface must first be configured, which is done on the "Settings" tab, in the "RS Interface Settings" section.



Language: English

Device model: Vega NB-13 r2

Connection settings

Used frequency bands: ☑ Band 3 □ Band 5 ☑ Band 8 ☑ Band 20 □ Band 28

Network registration timeout, minutes: 1

Time zone [?]: UTC+00:00

APN: up to 39 characters

Username: up to 29 characters

Password: up to 29 characters

IP protocol: IPv4

Modem priority mode: LTE CAT NB1

RS interface settings

Interface: RS-232

Speed: 9600

Data bits: 8 bit

Parity: none

Stop bits: 1 stop bit

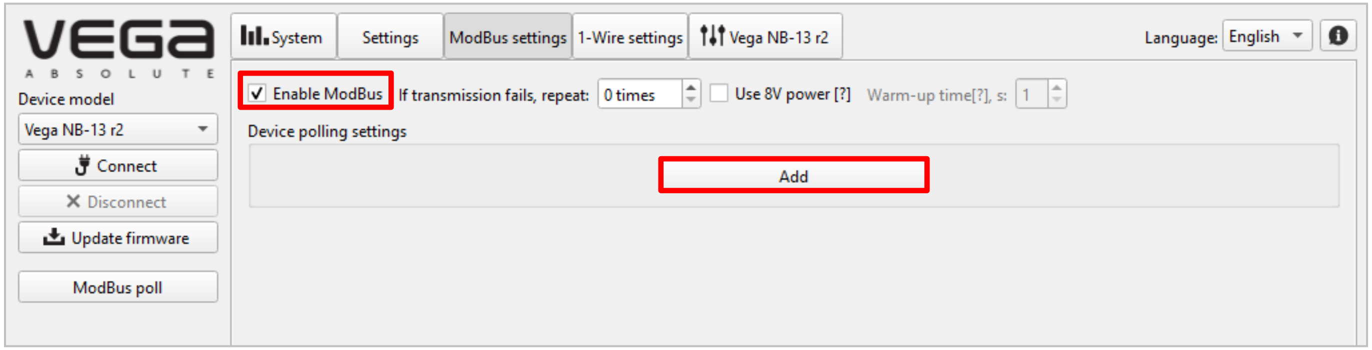
MQTT server for sending telemetry

Server address [?]: up to 50 characters : 1

Topic name: up to 50 characters

Client name: up to 50 characters

After that, go to the "ModBus Settings" tab, enable the "Enable ModBus" option, and click the "Add" button.



Language: English

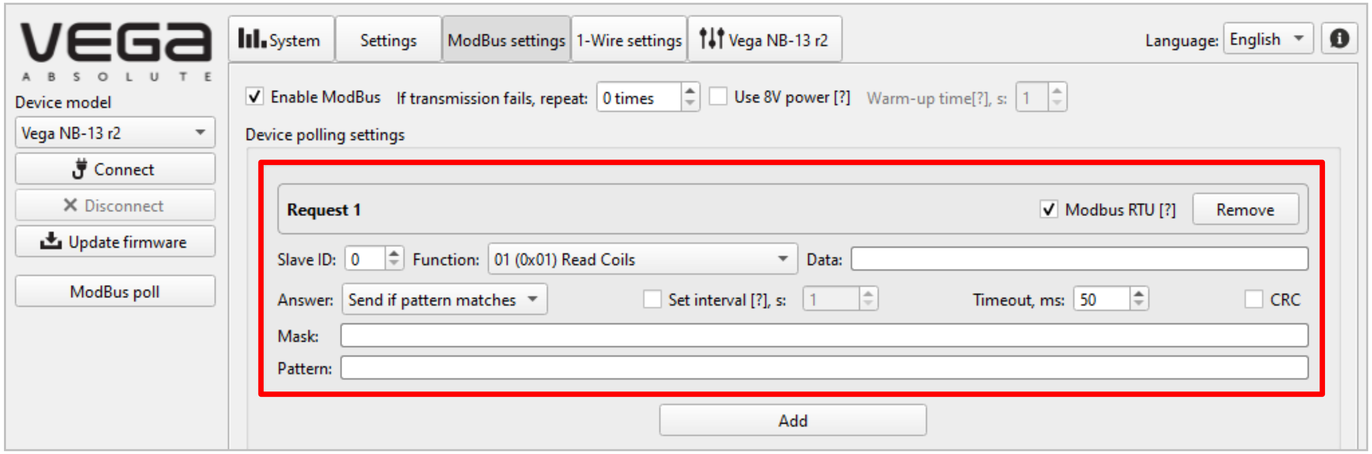
Device model: Vega NB-13 r2

☑ Enable ModBus  If transmission fails, repeat: 0 times  □ Use 8V power [?]  Warm-up time[?], s: 1

Device polling settings

After completing these actions, "Request 1" will appear, along with fields for its further configuration.

**NB-modem supports connecting up to 20 devices via RS485/RS232 interfaces, with independent requests configured through the "Vega NB-IoT Configurator" software.**
**Each request can be configured either using the Modbus RTU protocol or a custom user-defined protocol.**



Language: English

Device model: Vega NB-13 r2

☑ Enable ModBus  If transmission fails, repeat: 0 times  □ Use 8V power [?]  Warm-up time[?], s: 1

Device polling settings

**Request 1**  ☑ Modbus RTU [?]

Slave ID: 0  Function: 01 (0x01) Read Coils  Data:

Answer: Send if pattern matches  □ Set interval [?], s: 1  Timeout, ms: 50  □ CRC

Mask:

Pattern:

## MODBUS SETTINGS EXAMPLE

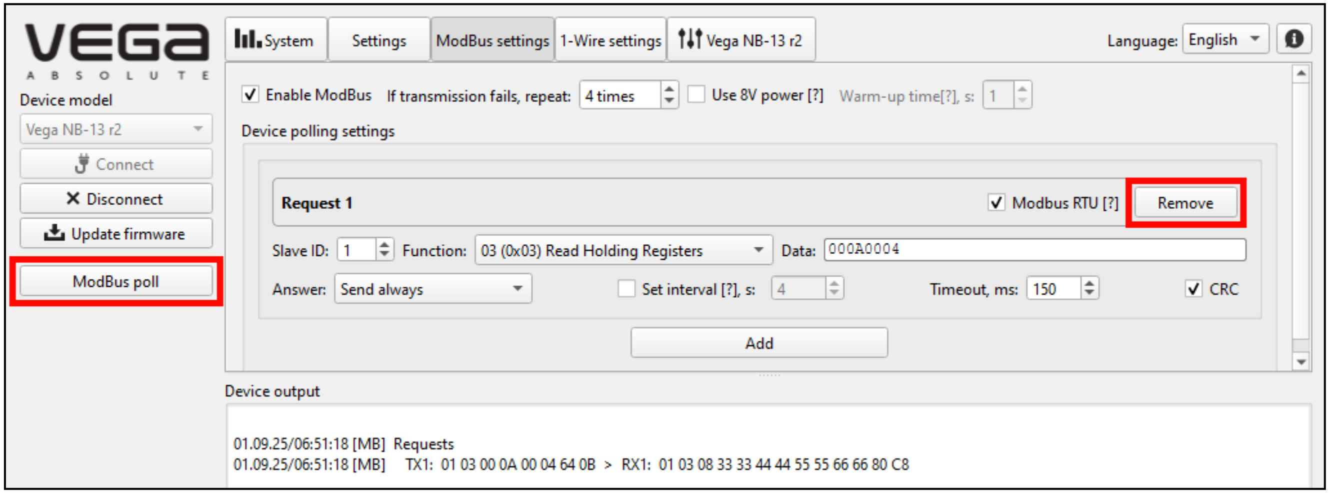
Consider an example of configuring a request to read four registers from a Modbus device, starting at address 0x000A. The device address on the RS485/RS232 bus is 1.

To configure this, set the following parameters: in the Slave ID field, enter the device address — 1; in the Function field, select operation 0x03 (Read Holding Registers); in the Data field, enter: starting register address — 0x000A, number of registers to read — 0x0004 (in accordance with the Modbus RTU format).

The CRC value does not need to be entered manually — it is automatically calculated and added to the packet.

After completing these steps, click the Apply Settings button to save the request.

To test the request, click the Modbus Poll button. The communication result will be displayed in the configurator log (Device Output). To delete the request, click the Delete button next to the corresponding request.



Language: English

Device model: Vega NB-13 r2

☑ Enable ModBus  If transmission fails, repeat: 4 times  □ Use 8V power [?]  Warm-up time[?], s: 1

Device polling settings

Request 1  ☑ Modbus RTU [?]

Slave ID: 1  Function: 03 (0x03) Read Holding Registers  Data: 000A0004

Answer: Send always  □ Set interval [?], s: 4  Timeout, ms: 150  ☑ CRC

Device output

```
01.09.25/06:51:18 [MB]  Requests
01.09.25/06:51:18 [MB]    TX1:  01 03 00 0A 00 04 64 0B  >  RX1:  01 03 08 33 33 44 44 55 55 66 66 80 C8
```

*Example of a sent request (TX1):*

01 03 00 0A 00 04 64 0B

01 — device address (Slave ID)

03 — function (Read Holding Registers)

00 0A — address of the first register to read (big endian)

00 04 — number of registers to read (big endian)

64 0B — CRC, automatically added by the modem in ModBus RTU mode

*Example of a response from the device (RX1):*

01 03 08 33 33 44 44 55 55 66 66 80 C8

01 — Slave ID

03 — function

08 — number of bytes read (4 registers × 2 bytes)

33 33 — value of register 0x000A

44 44 — value of register 0x000B

55 55 — value of register 0x000C

66 66 — value of register 0x000D

80 C8 — CRC, automatically verified by the device in ModBus RTU mode

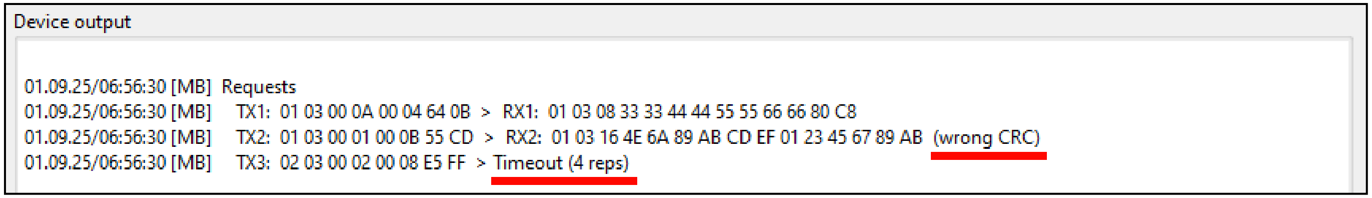
To configure additional requests — for example, to poll other registers or devices — click the **"Add"** button, set the parameters of the new request, and click **"Apply Settings"** again.

The configurator log displays information about retries:

**(1 rep)** — the request was retried once

**Timeout (4 reps)** — no response received, the request was retried 4 times

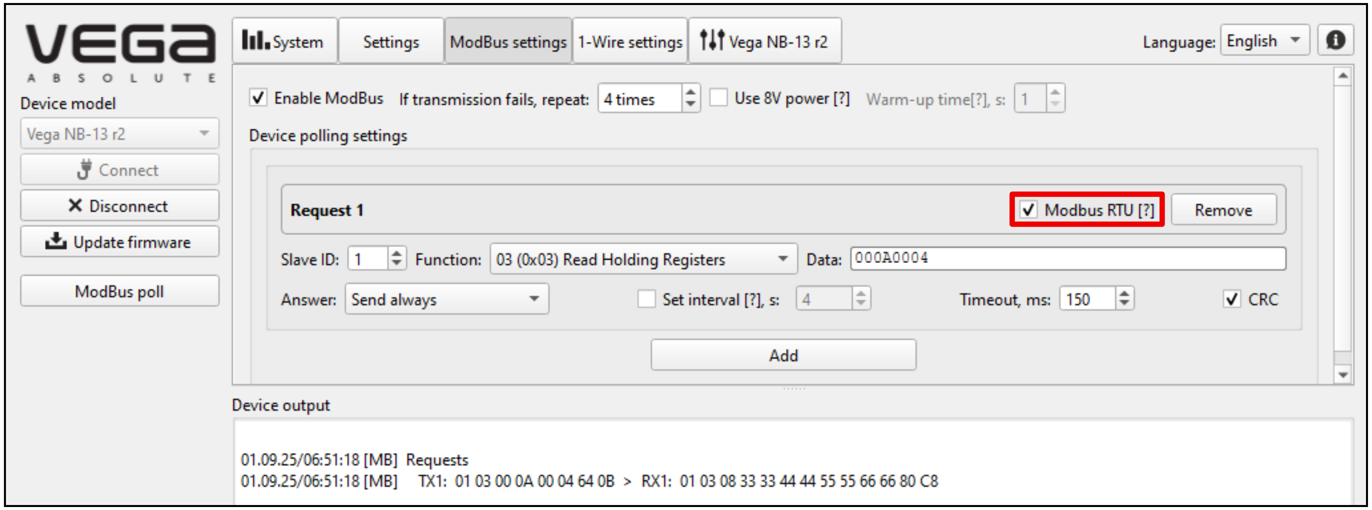
If the request fails after all retries, it terminates with an error, and the counter proceeds to the next request.



```
01.09.25/06:56:30 [MB]  Requests
01.09.25/06:56:30 [MB]    TX1:  01 03 00 0A 00 04 64 0B  >  RX1:  01 03 08 33 33 44 44 55 55 66 66 80 C8
01.09.25/06:56:30 [MB]    TX2:  01 03 00 01 00 0B 55 CD  >  RX2:  01 03 16 4E 6A 89 AB CD EF 01 23 45 67 89 AB  (wrong CRC)
01.09.25/06:56:30 [MB]    TX3:  02 03 00 02 00 08 E5 FF  > Timeout (4 reps)
```

## CONFIGURING OPERATION WITH A CUSTOM PROTOCOL

To use a custom protocol, disable the "Modbus RTU" mode and enter the required request packet into the "Request" field in HEX format. After clicking "Apply Settings", the NB-modem will send the contents of this field directly to the RS485/RS232 bus.



Language: English

Device model: Vega NB-13 r2

☑ Enable ModBus If transmission fails, repeat: 4 times □ Use 8V power [?] Warm-up time[?], s: 1

Device polling settings

Request 1 ☑ Modbus RTU [?]

Slave ID: 1 Function: 03 (0x03) Read Holding Registers Data: 000A0004

Answer: Send always □ Set interval [?], s: 4 Timeout, ms: 150 ☑ CRC

Device output

```
01.09.25/06:51:18 [MB]  Requests
01.09.25/06:51:18 [MB]    TX1:  01 03 00 0A 00 04 64 0B  >  RX1:  01 03 08 33 33 44 44 55 55 66 66 80 C8
```

## DESCRIPTION OF MODBUS SETTINGS INTERFACE ELEMENTS

**Enable ModBus** — a parameter that activates ModBus protocol functionality; when enabled, it allows polling of ModBus devices upon events, and the received response data is saved into the "black box"; all accumulated data is transmitted within a JSON message during the next communication session with the server, where the response to the first request is marked with the key "mb1", the second with "mb2", and so on; if this option is disabled, ModBus polling is not performed, no data is accumulated, and the "mb" key is absent from the JSON message.

**If transmission fails, repeat** — a parameter defining the number of retry attempts for sending a request in case of failure. If the first ModBus request fails, for example due to no response within the set timeout (configured in the "Timeout" field) or a CRC check error in the received packet, the pulse counter automatically re-sends the request the specified number of times. If a valid response is received, the process completes successfully and the data is saved to the black box. If no successful response is received after all retry attempts, the counter proceeds to the next request.

**Use 8V power** — when enabled, the pulse counter supplies power to the "+8V" terminal, waits for the time specified in the "Warm-up time" field, and then proceeds to poll the connected device.

**Warm-up time** — time interval (from 1 to 60 seconds) between power application and the start of polling.

**Slave ID** — the address of the ModBus device to which the request is sent.

**ModBus poll** — a button that allows real-time polling of a ModBus device without saving data to the black box. Can be used for debugging ModBus connections. The configurator log displays the communication process: request packets and corresponding response packets from the ModBus device.

**Modbus RTU** — this parameter enables Modbus RTU protocol request configuration mode. If inactive, the custom (user-defined) request mode is activated.

When Modbus RTU mode is selected, the following fields become available: "Slave ID", "Function", and "Data".

In custom request mode, you can define a unique request to be sent to the connected device interface. This mode allows manual specification of any byte sequence, providing full flexibility in device interaction. In the "Request" field, enter a fully user-defined request, including the CRC checksum if required by the protocol.

Function — function for reading/writing registers according to the ModBus protocol.

Data — a field where the PDU (Protocol Data Unit) must be entered according to the ModBus RTU protocol (available when "Modbus RTU" mode is enabled).

Request — a field for entering a custom protocol request (available when "Modbus RTU" mode is disabled).

Set interval — enabling this parameter allows flexible configuration of the request transmission interval to the connected device interface, beyond the standard data collection schedule. The request execution period can be set from 1 to 65535 seconds.

Timeout, ms — a parameter that defines the waiting time for a response from the connected device after sending a request. If no response is received within the specified interval, the pulse counter proceeds to the next request. It is recommended to set the timeout value considering the time required by the device to process the request and send a response. The lower the communication speed (bitrate), the higher the timeout value should be.

Timeout settings also allow introducing a delay between requests, which can be useful when working with devices that require additional actions before data can be read. For example, when working with a pressure sensor, it may be necessary to first send a command to start measurement (which updates data in the sensor’s corresponding register), and then read the measurement result. In this case, two requests — to start measurement and to read the register — are executed sequentially, and a sufficient timeout ensures correct timing between them.

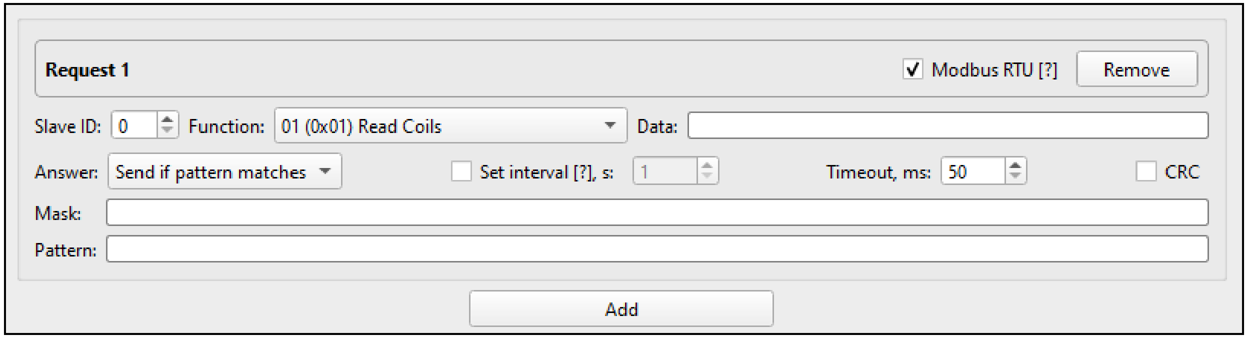
CRC — sending CRC to the server. If enabled, CRC bytes are transmitted along with the data in the response. This option can be disabled to reduce network traffic.

**Answer** — a parameter for selecting further actions with the answer to the current ModBus request. Available options:

- *Send always* — the response to the current request is saved in the black box and transmitted to the server during the next communication session. Recommended if the response contains data that needs to be sent to the server.

- *Do not send* — the response to the current request is not saved in the black box and not sent to the server. Recommended if the response does not contain information that needs to be transmitted, for example, responses to control commands or configuration changes.

- *Send if pattern matches* — this option allows sending the response to the server only if its content matches a specified pattern, for example, to detect changes in specific bits or bytes. When enabled, the configuration fields "Mask" and "Pattern" become available.



**Request 1**

☑ Modbus RTU [?]

Slave ID: 0

Function: 01 (0x01) Read Coils

Data:

Answer: Send if pattern matches

□ Set interval [?], s: 1

Timeout, ms: 50

□ CRC

Mask:

Pattern:

**Mask** — a mask applied to the response from the Modbus device.

**Pattern** — a byte sequence against which the response from the ModBus device is compared after applying the mask.

*Using Mask and Pattern*

A logical AND operation is applied between the response packet and the mask, after which the resulting value is compared with the pattern. If the values fully match, the response is sent to the server; otherwise, it is not transmitted.

In the mask, a value of FF means that the corresponding byte from the ModBus device's response is fully compared with the corresponding byte in the pattern. A value of 00 means that the byte is ignored and not compared.

*Example 1 (full match):*

*In response to a request, the connected device sends the following data packet:*

*01 03 08 33 33 44 44 55 55 66 66 80 C8*

*The user has set the following mask:*

*00 00 00 FF FF 00 00 00 00 00 00 00 00*

*The user has set the following pattern:*

*00 00 00 33 33 00 00 00 00 00 00 00 00*

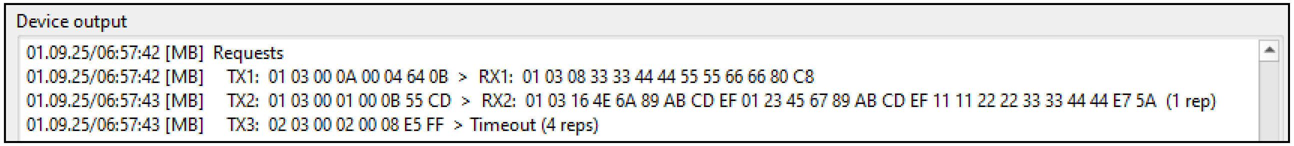
**Device output** – the log of communication with the connected ModBus device, which allows real-time monitoring of the device state.

*Tx* — the request packet in HEX format sent to the ModBus device

*Rx* — the response packet in HEX format sent by the ModBus device

The ModBus device polling process is displayed in the configurator log. The request packet (Tx) and its response (Rx) are shown on a single line:

*Tx0: 01 03 00 00 00 02 c4 0b > Rx0: 01 03 04 30 2e 0d 60 91 82*



Device output

```
01.09.25/06:57:42 [MB]  Requests
01.09.25/06:57:42 [MB]    TX1:  01 03 00 0A 00 04 64 0B  >  RX1:  01 03 08 33 33 44 44 55 55 66 66 80 C8
01.09.25/06:57:43 [MB]    TX2:  01 03 00 01 00 0B 55 CD  >  RX2:  01 03 16 4E 6A 89 AB CD EF 01 23 45 67 89 AB CD EF 11 11 22 22 33 33 44 44 E7 5A  (1 rep)
01.09.25/06:57:43 [MB]    TX3:  02 03 00 02 00 08 E5 FF  > Timeout (4 reps)
```

# 6. 1-Wire settings

The 1-Wire settings tab allows you to configure the work with sensors via the 1-Wire interface.

To use the 1-Wire interface, check the "Enable 1-Wire" box, then select the sensor type (Dallas/Analog/Auto), and click the "Apply Settings" button in the bottom-left corner of the configurator.

**For M1820Z sensors (equivalent of Dallas sensors), select the "Analogue" type — external power supply is required. When connecting sensors of different types, it is recommended to use the "Auto" mode: the device will automatically detect and correctly process each connected sensor.**

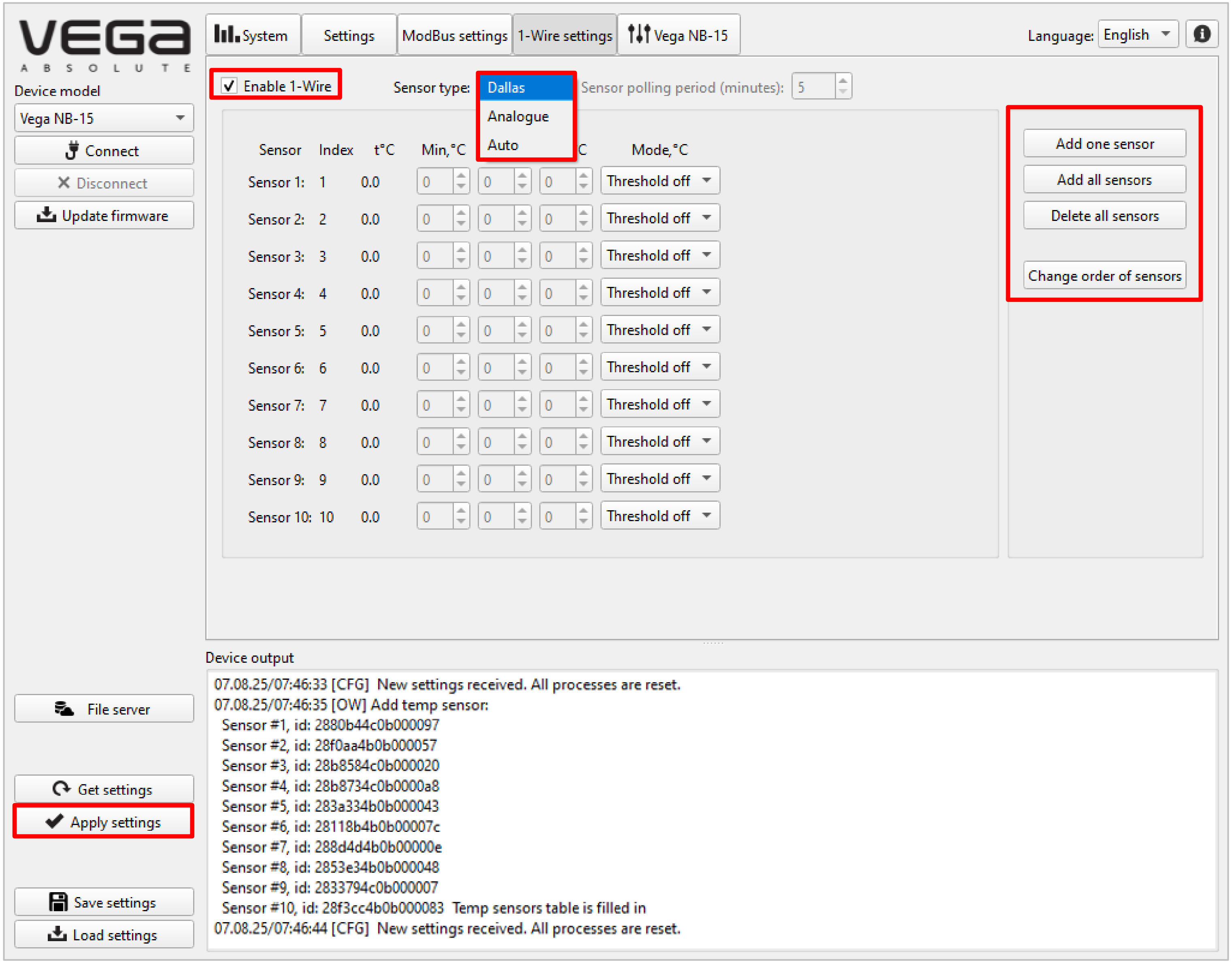
To work correctly with the add/remove sensors field, you must first complete and apply the sensor polling settings.

Add one sensor – one sensor will be added if one sensor is connected. If multiple sensors are attached, a random sensor will be added.

Add all sensors – all connected sensors will be randomly added.

Delete all sensors – all connected sensors will be deleted.

Change order of sensors – in a pop-up window, you will be able to change the order of the sensors. This is done by manually moving or using the buttons with the arrows depicted on them. After changing the position of one of the sensors, the rest will automatically change their index, moving up in the list.



Device model: Vega NB-15

Language: English

☑ Enable 1-Wire

Sensor type: Dallas

Sensor polling period (minutes): 5

| Sensor | Index | t°C | Min,°C | | C | Mode,°C |
|---|---|---|---|---|---|---|
| Sensor 1: | 1 | 0.0 | 0 | 0 | 0 | Threshold off |
| Sensor 2: | 2 | 0.0 | 0 | 0 | 0 | Threshold off |
| Sensor 3: | 3 | 0.0 | 0 | 0 | 0 | Threshold off |
| Sensor 4: | 4 | 0.0 | 0 | 0 | 0 | Threshold off |
| Sensor 5: | 5 | 0.0 | 0 | 0 | 0 | Threshold off |
| Sensor 6: | 6 | 0.0 | 0 | 0 | 0 | Threshold off |
| Sensor 7: | 7 | 0.0 | 0 | 0 | 0 | Threshold off |
| Sensor 8: | 8 | 0.0 | 0 | 0 | 0 | Threshold off |
| Sensor 9: | 9 | 0.0 | 0 | 0 | 0 | Threshold off |
| Sensor 10: | 10 | 0.0 | 0 | 0 | 0 | Threshold off |

Device output

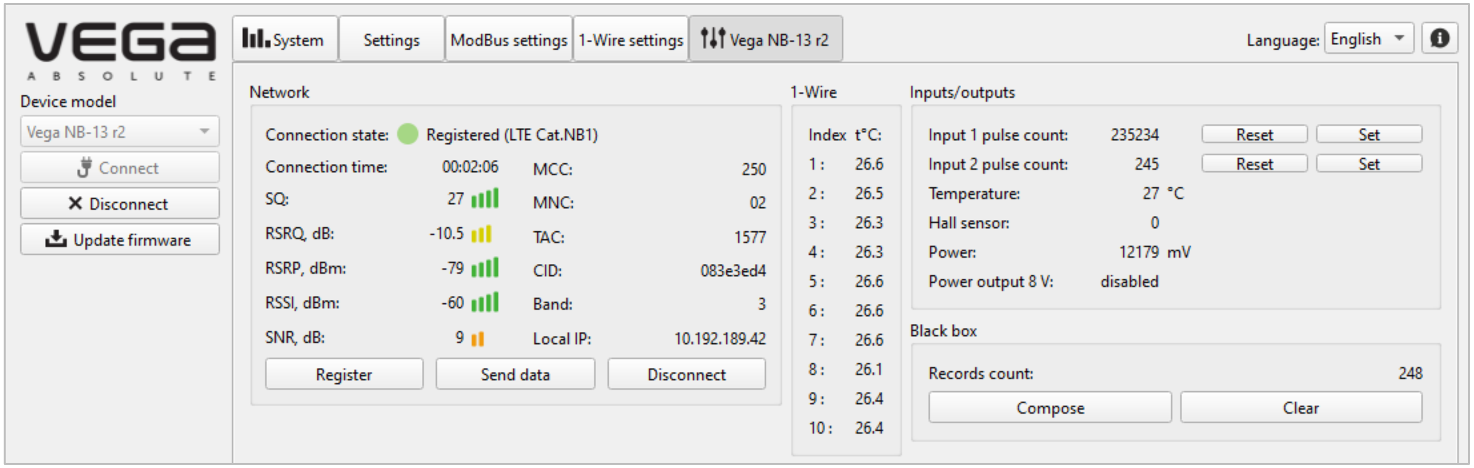
```
07.08.25/07:46:33 [CFG]  New settings received. All processes are reset.
07.08.25/07:46:35 [OW] Add temp sensor:
  Sensor #1, id: 2880b44c0b000097
  Sensor #2, id: 28f0aa4b0b000057
  Sensor #3, id: 28b8584c0b000020
  Sensor #4, id: 28b8734c0b0000a8
  Sensor #5, id: 283a334b0b000043
  Sensor #6, id: 28118b4b0b00007c
  Sensor #7, id: 288d4d4b0b00000e
  Sensor #8, id: 2853e34b0b000048
  Sensor #9, id: 2833794c0b000007
  Sensor #10, id: 28f3cc4b0b000083  Temp sensors table is filled in
07.08.25/07:46:44 [CFG]  New settings received. All processes are reset.
```

# 7. Device state tab

Tab with device state contains detail information about the network parameters, device input/output settings, connected device state, black box settings and device output.

Consider the fields common to all devices.

**Network** – displays the current parameters of the connection and allows to control it. Buttons in this block have logic like INIT button on the board.



Device model: Vega NB-13 r2

Network

| | | | |
|---|---|---|---|
| Connection state: | Registered (LTE Cat.NB1) | | |
| Connection time: | 00:02:06 | MCC: | 250 |
| SQ: | 27 | MNC: | 02 |
| RSRQ, dB: | -10.5 | TAC: | 1577 |
| RSRP, dBm: | -79 | CID: | 083e3ed4 |
| RSSI, dBm: | -60 | Band: | 3 |
| SNR, dB: | 9 | Local IP: | 10.192.189.42 |

1-Wire

| Index | t°C: |
|---|---|
| 1 : | 26.6 |
| 2 : | 26.5 |
| 3 : | 26.3 |
| 4 : | 26.3 |
| 5 : | 26.6 |
| 6 : | 26.6 |
| 7 : | 26.6 |
| 8 : | 26.1 |
| 9 : | 26.4 |
| 10 : | 26.4 |

Inputs/outputs

| | |
|---|---|
| Input 1 pulse count: | 235234 |
| Input 2 pulse count: | 245 |
| Temperature: | 27 °C |
| Hall sensor: | 0 |
| Power: | 12179 mV |
| Power output 8 V: | disabled |

Black box

Records count: 248

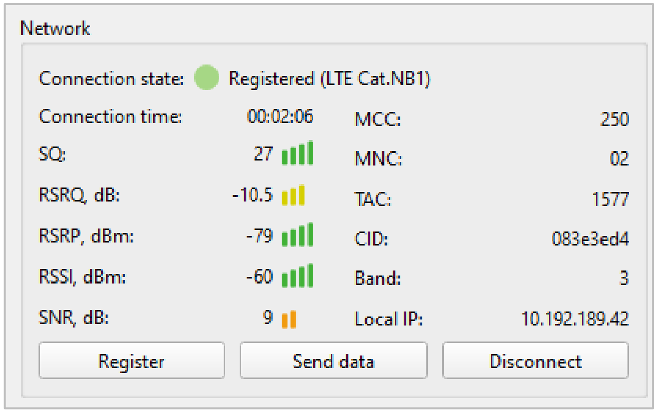
Connection state could be one of the listed:

No network - the device cannot find base station.

Searching... - the device is searching for a signal.

Registered - the device has successfully registered on the network.

Sleep mode - the device is in power-saving mode, not online.



Network

Connection state: ● Registered (LTE Cat.NB1)

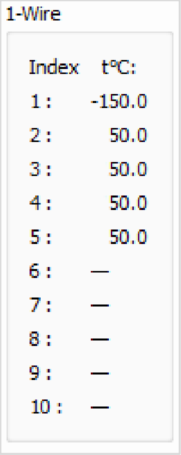
Connection time: 00:02:06
SQ: 27
RSRQ, dB: -10.5
RSRP, dBm: -79
RSSI, dBm: -60
SNR, dB: 9

MCC: 250
MNC: 02
TAC: 1577
CID: 083e3ed4
Band: 3
Local IP: 10.192.189.42

SQ parameter – Signal Quality – may be from 0 to 31 while connection is on, and 99 value means the connection absent. Table of values is shown below.

| Value in program | Signal Quality, dBm |
|---|---|
| 0 | -113 and lower |
| 1 | -111 |
| 2…30 | -109…-53 |
| 31 | -51 and more |
| 99 | No connection |
| 100 | -116 and lower |
| 101 | -115 |
| 102…190 | -114…-26 |
| 191 | -25 and more |
| 199 | No connection |

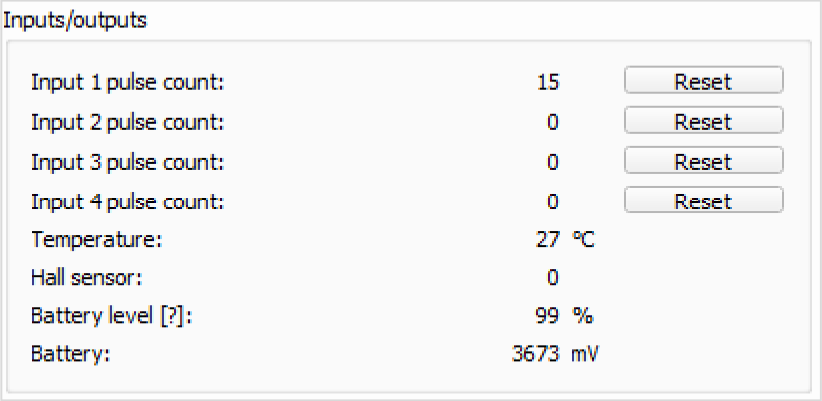
***1-Wire***[5] – displays the current temperature value transmitted by the sensors via 1-Wire. A dash means that the sensor is not registered. Value - 150.0 degrees means that there is no communication with the sensor.



1-Wire

| Index | t°C: |
|---|---|
| 1 : | -150.0 |
| 2 : | 50.0 |
| 3 : | 50.0 |
| 4 : | 50.0 |
| 5 : | 50.0 |
| 6 : | — |
| 7 : | — |
| 8 : | — |
| 9 : | — |
| 10 : | — |

**Inputs/outputs** – displays current parameters of the device and allows to reset pulse counters on the inputs.



Inputs/outputs

Input 1 pulse count: 15 Reset

Input 2 pulse count: 0 Reset

Input 3 pulse count: 0 Reset

Input 4 pulse count: 0 Reset

Temperature: 27 °C

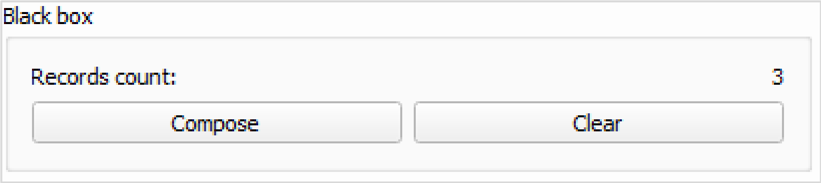
Hall sensor: 0

Battery level [?]: 99 %

Battery: 3673 mV

[5] The section is displayed if the connected device has a 1-Wire interface

**Black box** – there are buttons for black box management and the number of records is displayed. The button "Compose" initiates data collection from all the inputs and this packet is placed in the black box until the next communication session. The button "Clear" deletes all records from the black box.


Black box

Records count: 3

**Device output** – the device output window displays the device operation log. Events are displayed in the log with time and marker (determines the type of event).

| Marker | Transcript | Description |
|---|---|---|
| [M] | Modem | Events of the NB-IoT modem operation |
| [BB] | Black Box | Events of the black box |
| [SYS] | System | System events |
| [SE] | Sending Event | Events of the data sending start |
| [CFG] | Configurator | Events related to the work of the Configurator |
| [OW] | 1-Wire | 1-Wire interface events |
| [CL] | Current loop | Current loop interface events |
| [MB] | ModBus | ModBus interface events |

For example:

14.07.20/11:11:20 [MB] Requests

Where **14.07.20** is the date of the event; 11:11:20 - time of the event according to the internal clock of the modem; [MB] - the mareker indicates that this is an event of the ModBus interface; **Request** – the process of initiating requests to the ModBus device.

| DOCUMENT INFORMATION | |
|---|---|
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| Revision and date | 03 of 02.09.2025 |

| Revision of manual | Firmware version | Date | Name | Comments |
|---|---|---|---|---|
| 01 | 1.6.1 | 12.01.2022 | KEV | Document creation date |
| 02 | 1.8.3 | 11.10.2022 | KMA | New options added |
| 03 | 1.11.5 | 02.09.2025 | NEE | The following sections of the document have been updated: "ModBus settings", "1-Wire settings", and "Device state tab". All images in the document (from the second section onwards) have been replaced |
| | | | | |

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