VEGA NB-IOT CONFIGURATOR

1.8.3 Version

User Manual

Contents

Introduction 3

1. USB Connecting 4

2. Application Interface 7

3. «System» Tab 9

4. Settings tab 10

5. ModBus settings 17

6. 1-Wire settings 20

7. Device state tab 22

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.

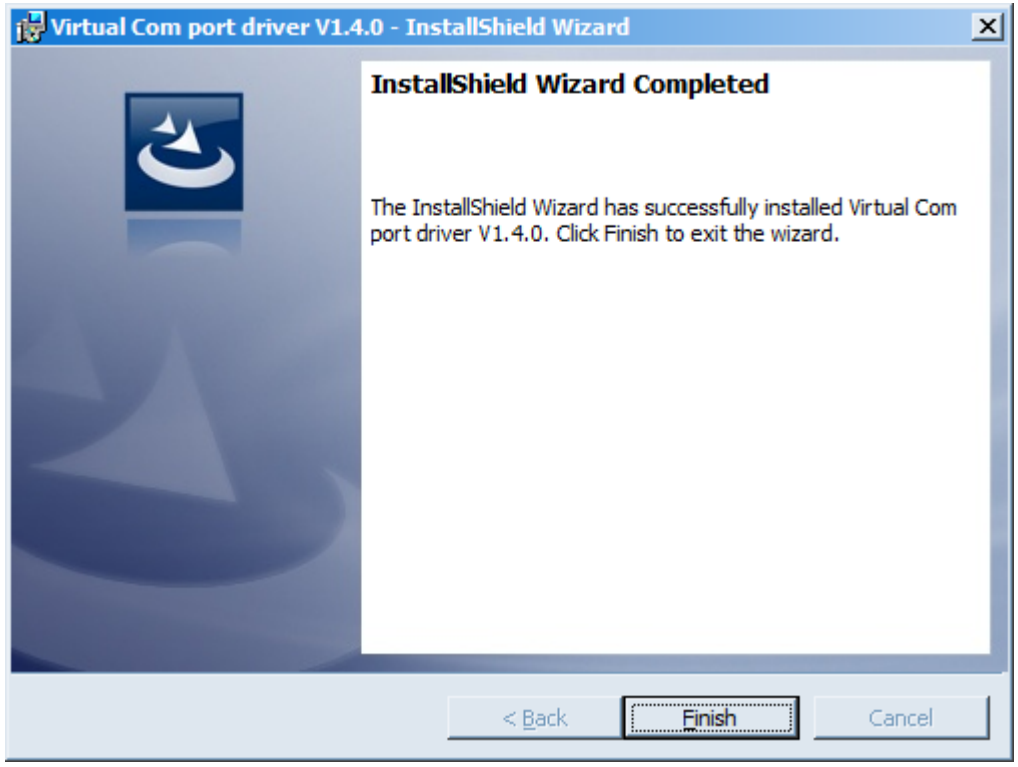
Vega-Absolute OOO reserves the right to make changes to the manual related to the improvement of equipment and software, as well as to eliminate typos and inaccuracies, without prior notice.

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 site from any device page. 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 after that the installation will begin. When the installation will have been successfully completed, the following screen appears:



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

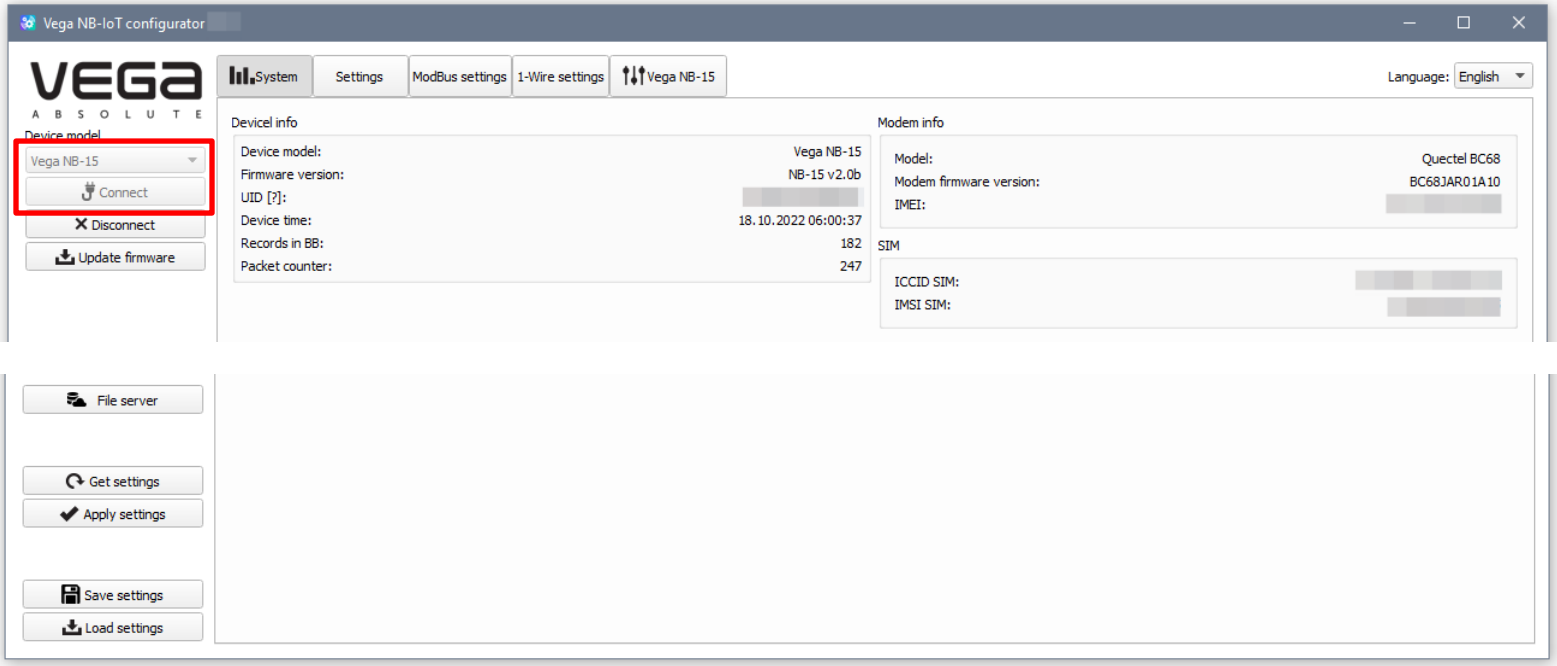
For the connection to the device, perform the following steps:

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.



2. Application Interface

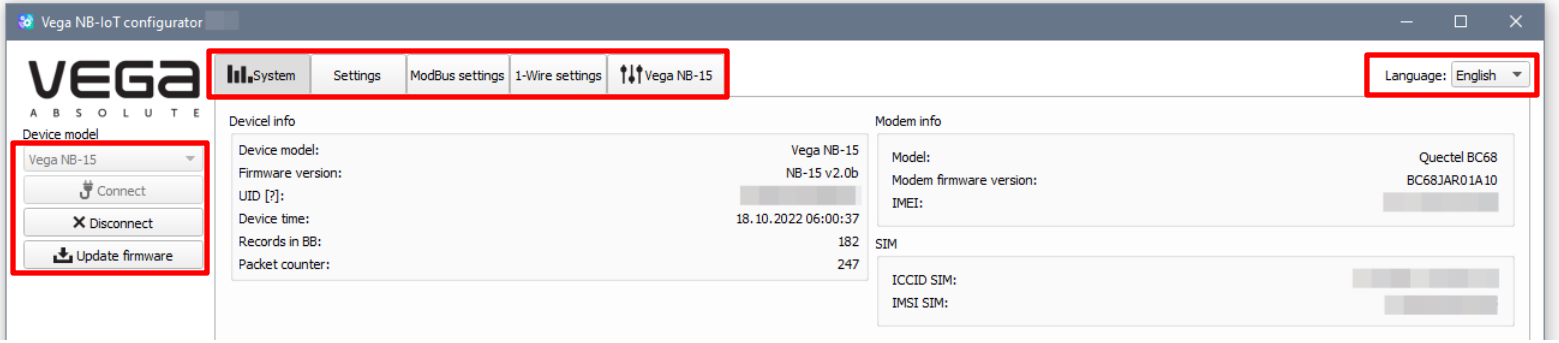
«Vega NB-IoT Configurator» application is designed to configure the device via USB.

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 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.

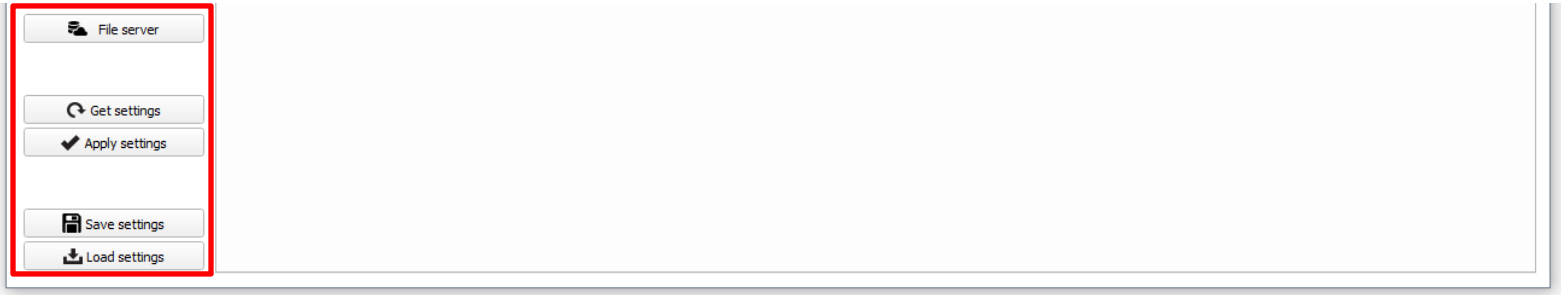


By clicking on the "File Server" button, access to the ftp-server is provided, which hosts the latest firmware for various devices, software and user manuals.

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.



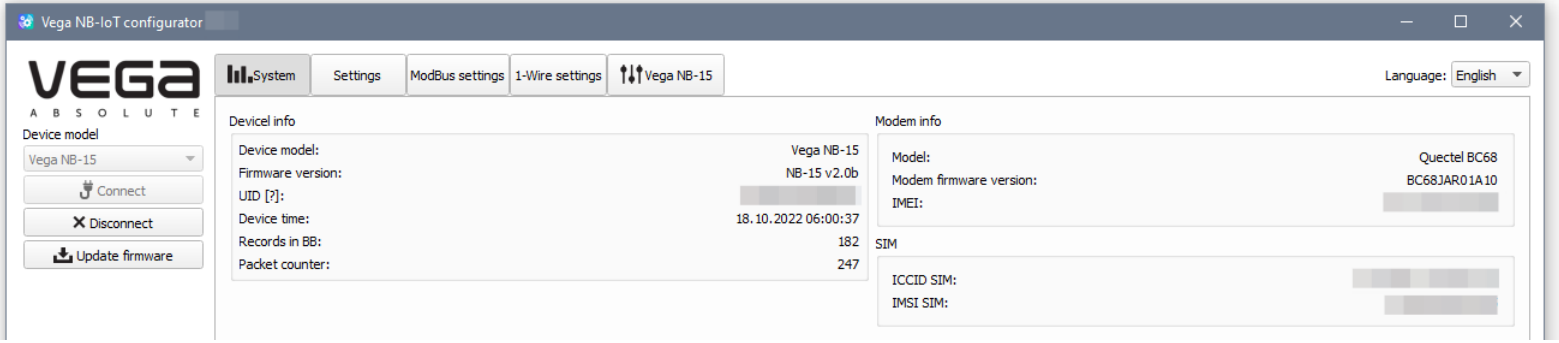
3. «System» Tab

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).



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.

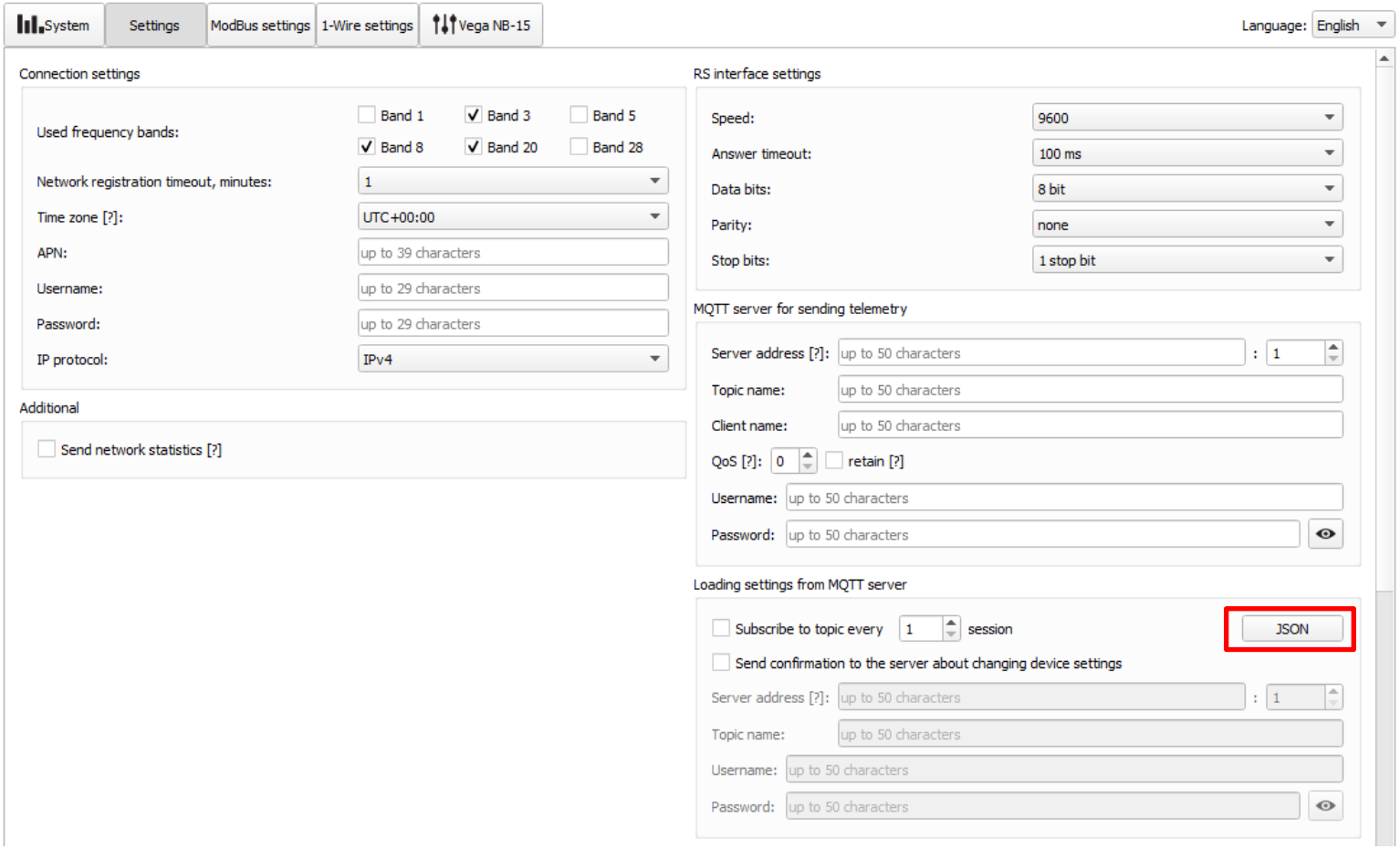
[1] The section is displayed if the connected device has an RS-232 or RS-485 interface

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.

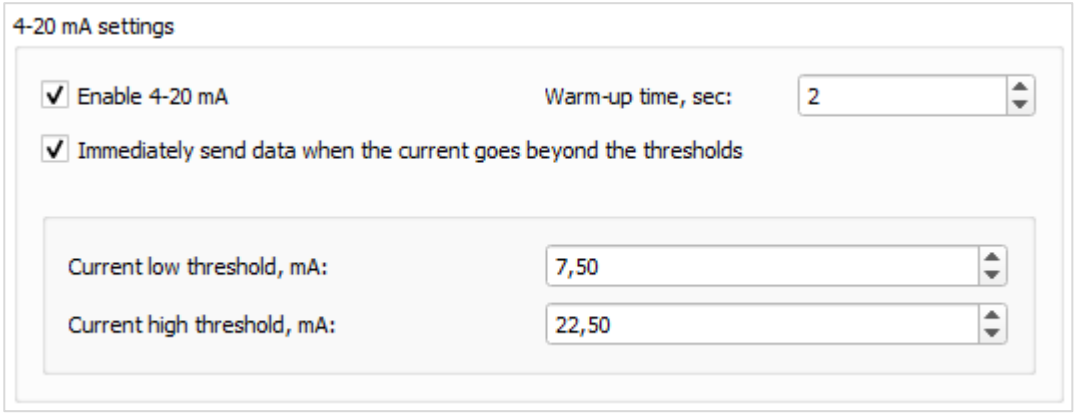
The device can send confirmation of a successful remote settings update from the settings server if the corresponding option is enabled. The confirmation is sent to the telemetry server.

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

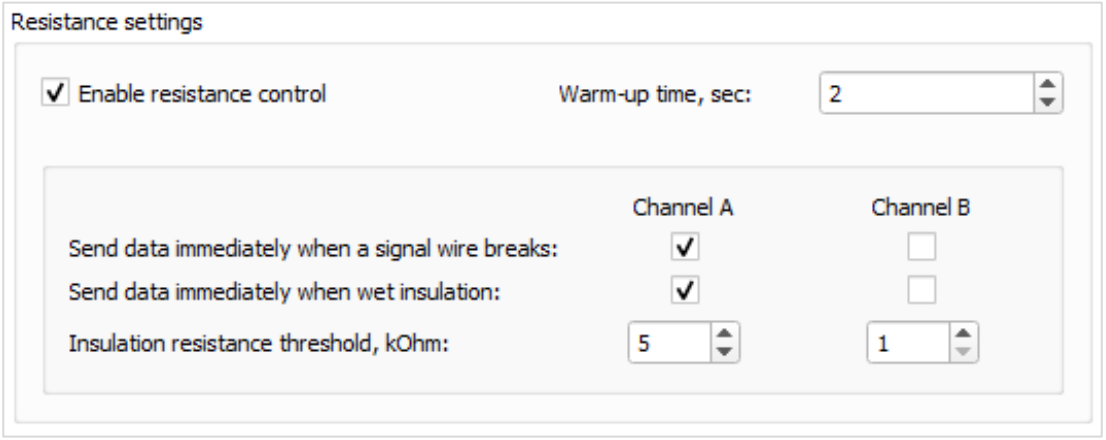


4-20 mA settings[2] allows to configure the 4-20 mA interface depending on the model of the connected device: warm-up time, alarm current thresholds. If there is no 4-20 mA interface in the device, this section will not be displayed in the configurator.

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



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.



[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.

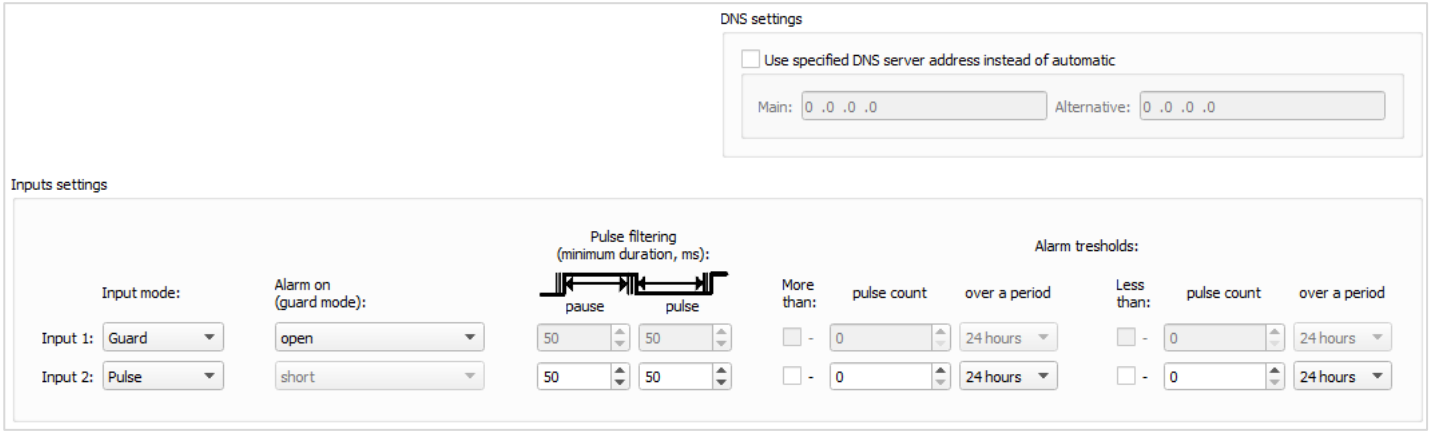
Minimum pulse duration – the value of the minimum pulse duration in ms, at which the pulse will be recorded by the modem, pulses with a duration less than the specified one will be regarded as bounce and will not be recorded by the modem.

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

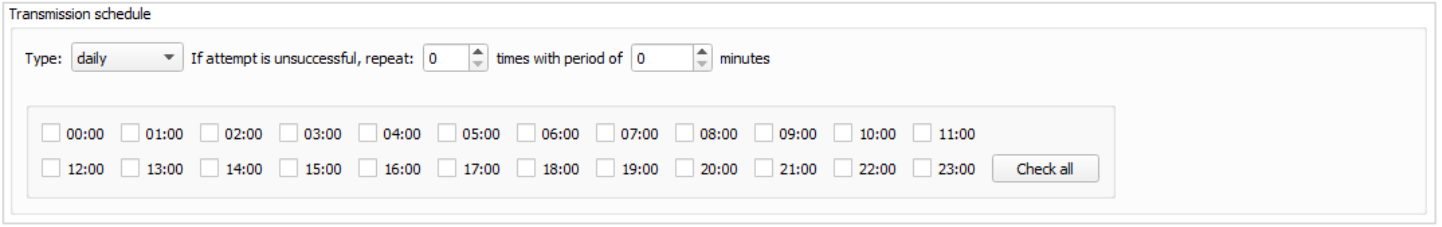
In most cases, when working with reed water meters, the following pulse filtering configuration is suitable: 50 ms per pause and 50 ms per pulse.

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

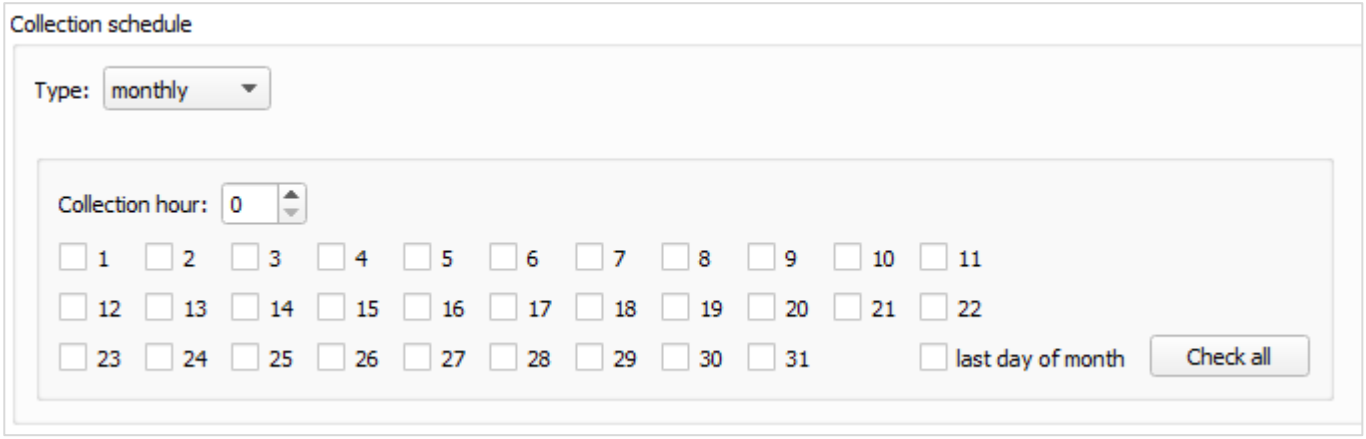
[4] The section is displayed if the connected device has Hall sensor



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".



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



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

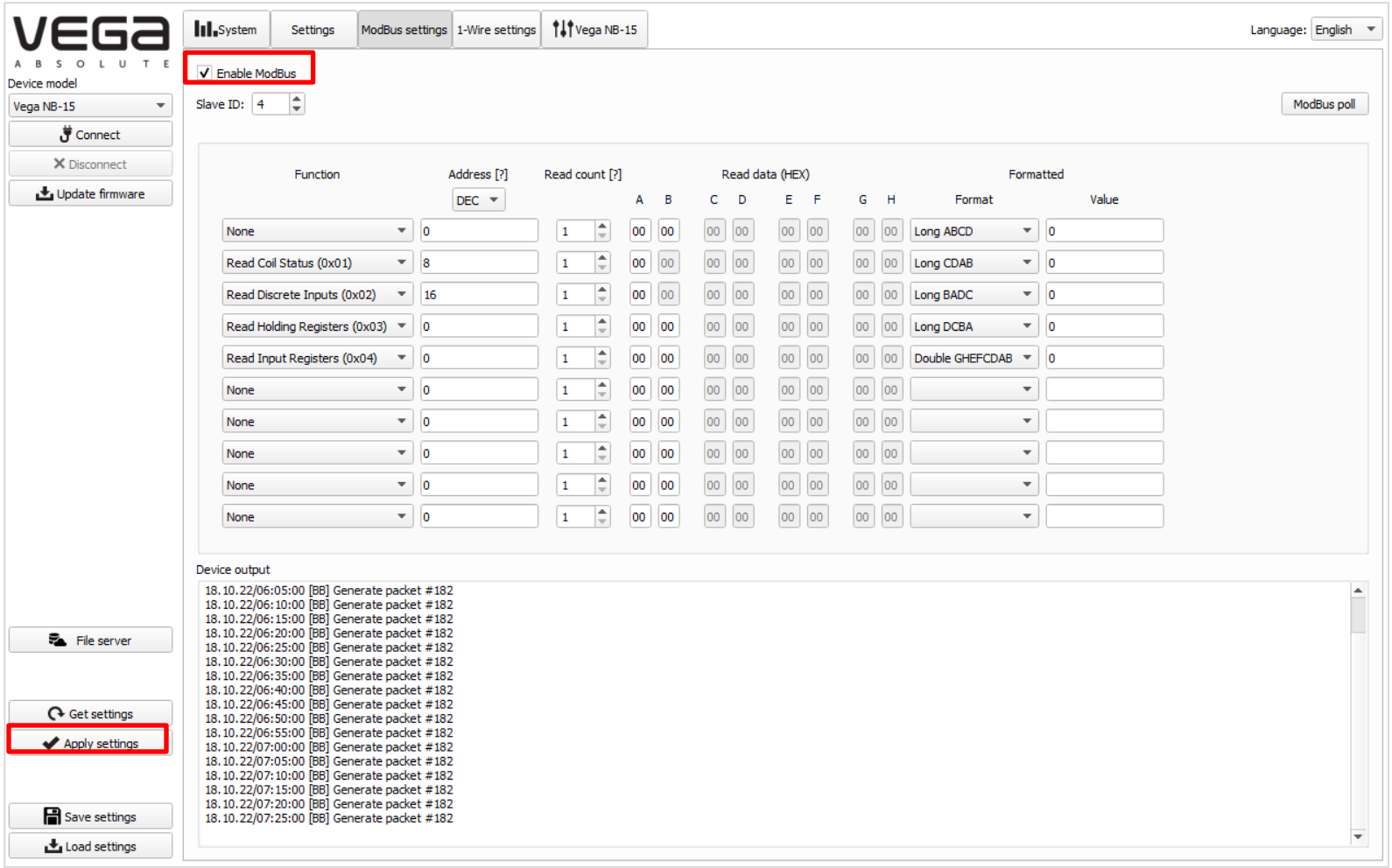
The ModBuS settings tab allows to enable/disable and configure data transmission via the ModBus protocol.

To work via the ModBus protocol, you must first configure the RS interface, which is done on the "Settings" tab. After that, check the "Enable ModBus" checkbox and click the "Apply settings" button in the lower left corner of the configurator.

Slave ID – ModBus address of the device to which the poll is directed.

ModBus poll – when pressed, sends a command to poll the connected ModBus device. For correct polling of devices, you must first perform and apply the ModBus configuration.

Device output – log of the exchange with the connected ModBus device, by which you can find out the status of the device in real time, where *Tx* is a request packet in HEX format sent to the ModBus device, *Rx* is a response packet in HEX format sent by the ModBus device.



The process of polling the ModBus device is displayed in the configurator log. The Tx request packet and the response packet are presented in one line:

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

If the reading was not completed due to a timeout waiting for a response, then the log displays "timeout". If the ModBus device responds with an error code, then the log displays "error". If the reading was successful, then the log displays "OK".

```
13.07.20/06:30:00 [MB] Warm-up 1 sec >
      Tx: 01 03 00 00 00 04 44 09  > Rx: 01 03 08 00 e3 0f 78 12 34 56 78 9c d8   > OK
      Tx: 01 03 00 04 00 04 05 c8  > Rx: 01 03 08 11 10 22 20 33 30 44 40 fe 28   > OK
      Tx: 01 03 00 08 00 04 c5 cb  > Rx: 01 03 08 55 50 66 60 77 77 88 80 45 11   > OK
      Tx: 01 03 00 0c 00 04 84 0a  > Rx: 01 03 08 99 90 aa a0 bb b0 cc c0 24 98   > OK
      Tx: 01 03 00 10 00 04 45 cc  > Rx: 01 03 08 dd d0 ee e0 ff f0 11 10 23 fc   > OK
      Tx: 01 03 00 14 00 04 04 0d  > Rx: 01 03 08 22 20 33 30 44 40 55 50 58 5b   > OK
      Tx: 01 03 00 18 00 04 c4 0e  > Rx: 01 03 08 66 60 77 70 88 80 99 90 78 eb   > OK
      Tx: 01 03 00 1c 00 04 85 cf  > Rx: 01 03 08 11 10 22 20 33 30 44 40 fe 28   > OK
      Tx: 01 03 00 20 00 04 45 c3  > Rx: 01 03 08 55 50 66 60 77 70 88 80 f4 d0   > OK
      Tx: 01 03 00 24 00 04 04 02  > Rx: 01 03 08 99 90 10 10 20 20 30 30 11 95   > OK
13.07.20/06:30:02 [MB] Read completed
13.07.20/06:30:02 [BB] Generate packet #10
```

6. 1-Wire settings

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

To work via the 1-Wire interface, check the "Enable 1-Wire" checkbox and click the "Apply settings" button in the lower left corner of the configurator.

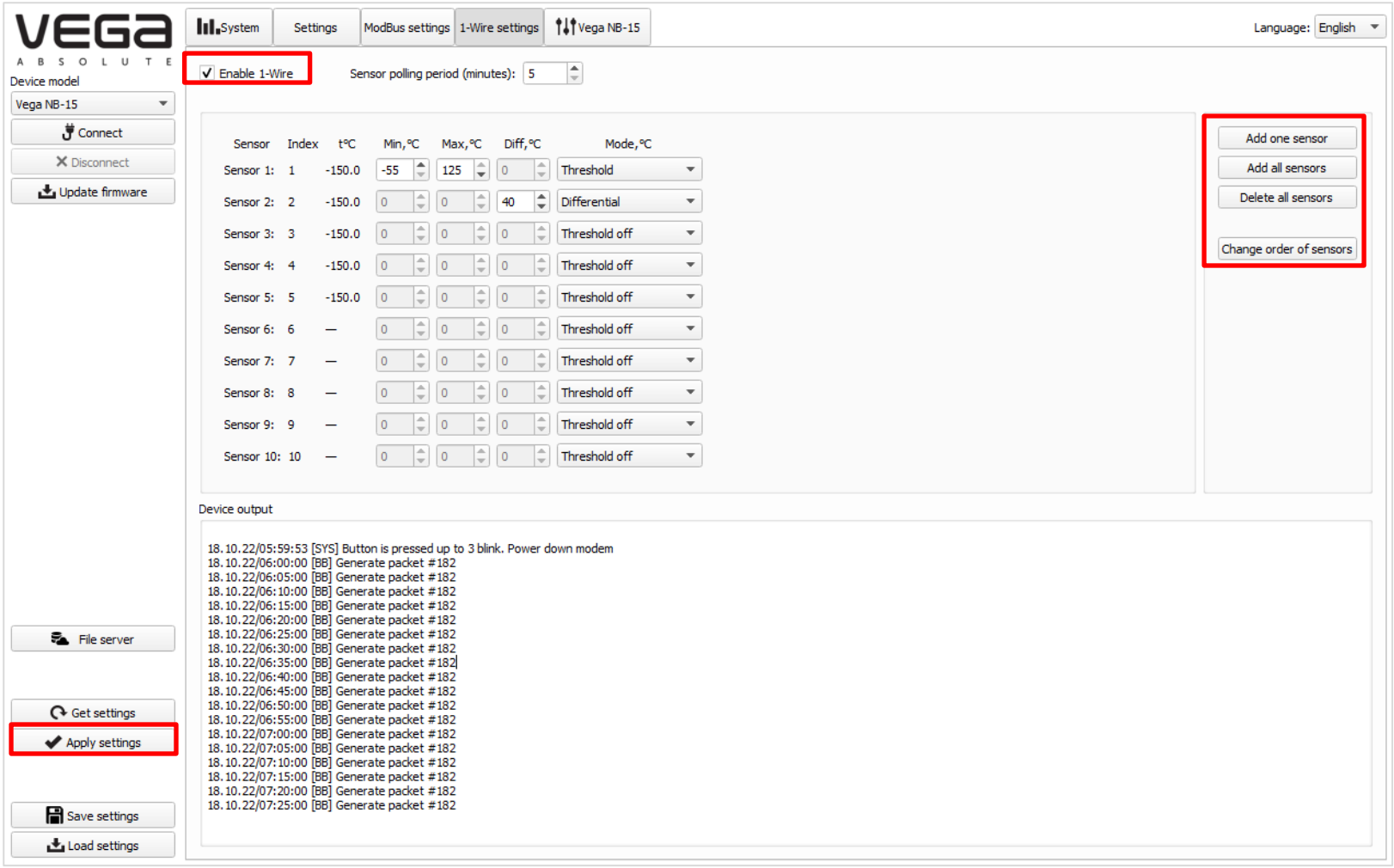
To work correctly with the add/remove sensors field, you must first complete and apply the sensor polling settings.

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.

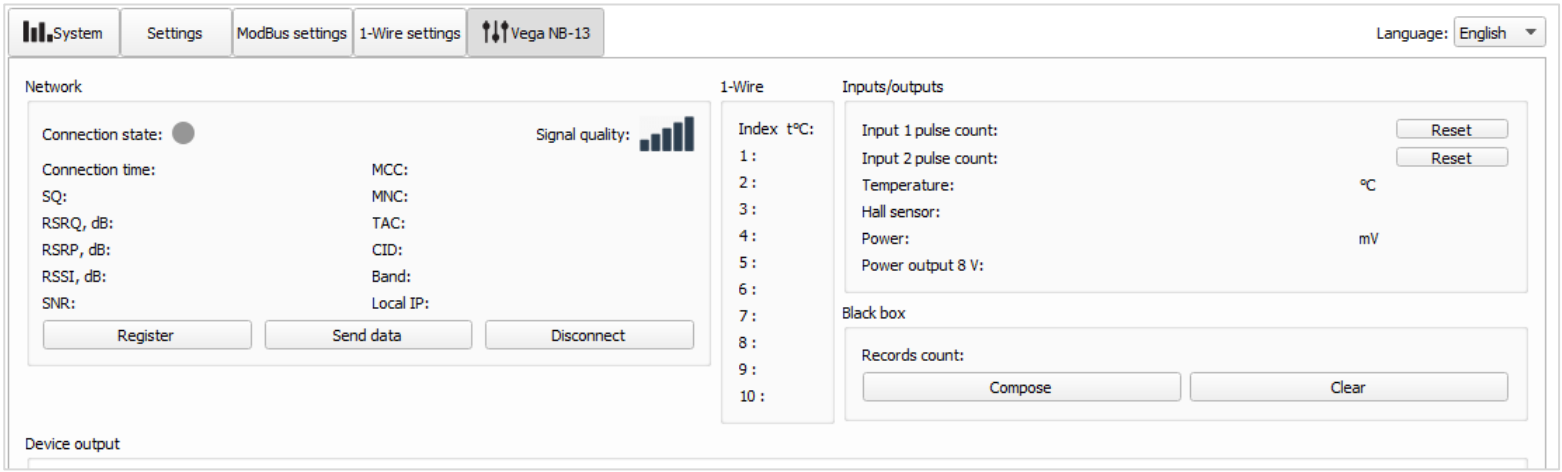

System
Settings
ModBus settings
1-Wire settings
Vega NB-15
Language: English
Device model
Vega NB-15
Connect
Disconnect
Update firmware
Enable 1-Wire
Sensor polling period (minutes): 5
Sensor Index t°C Min,°C Max,°C Diff,°C Mode,°C
Sensor 1: 1 -150.0 -55 125 0 Threshold
Sensor 2: 2 -150.0 0 0 40 Differential
Sensor 3: 3 -150.0 0 0 0 Threshold off
Sensor 4: 4 -150.0 0 0 0 Threshold off
Sensor 5: 5 -150.0 0 0 0 Threshold off
Sensor 6: 6 — 0 0 0 Threshold off
Sensor 7: 7 — 0 0 0 Threshold off
Sensor 8: 8 — 0 0 0 Threshold off
Sensor 9: 9 — 0 0 0 Threshold off
Sensor 10: 10 — 0 0 0 Threshold off
Add one sensor
Add all sensors
Delete all sensors
Change order of sensors
Device output
18.10.22/05:59:53 [SYS] Button is pressed up to 3 blink. Power down modem
18.10.22/06:00:00 [BB] Generate packet #182
18.10.22/06:05:00 [BB] Generate packet #182
18.10.22/06:10:00 [BB] Generate packet #182
18.10.22/06:15:00 [BB] Generate packet #182
18.10.22/06:20:00 [BB] Generate packet #182
18.10.22/06:25:00 [BB] Generate packet #182
18.10.22/06:30:00 [BB] Generate packet #182
18.10.22/06:35:00 [BB] Generate packet #182
18.10.22/06:40:00 [BB] Generate packet #182
18.10.22/06:45:00 [BB] Generate packet #182
18.10.22/06:50:00 [BB] Generate packet #182
18.10.22/06:55:00 [BB] Generate packet #182
18.10.22/07:00:00 [BB] Generate packet #182
18.10.22/07:05:00 [BB] Generate packet #182
18.10.22/07:10:00 [BB] Generate packet #182
18.10.22/07:15:00 [BB] Generate packet #182
18.10.22/07:20:00 [BB] Generate packet #182
18.10.22/07:25:00 [BB] Generate packet #182
File server
Get settings
Apply settings
Save settings
Load settings

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.



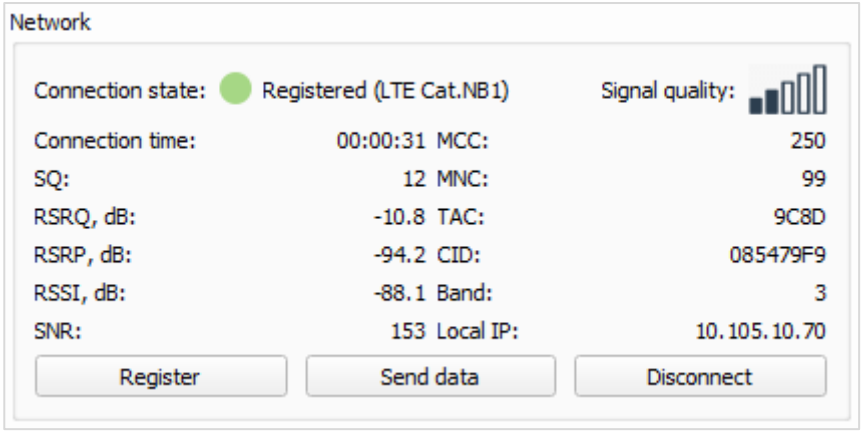
Connection state could be one of the listed:

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.

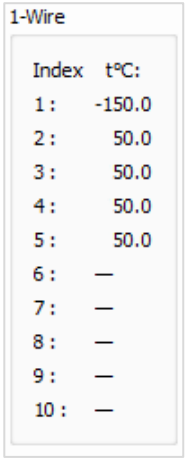
Sleep mode - the device is in power-saving mode, not online.



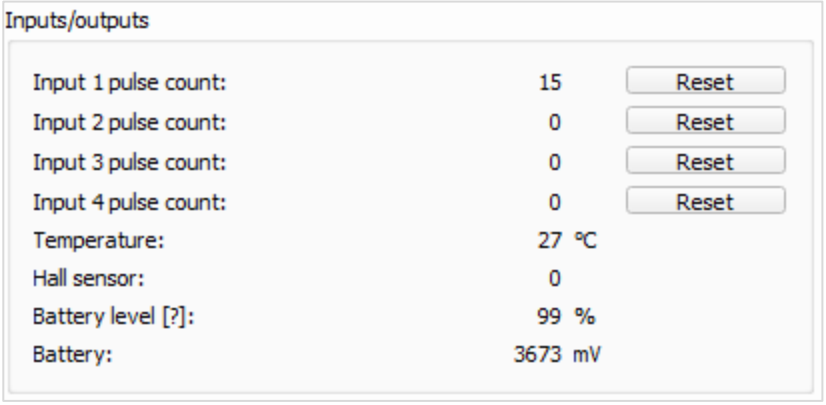
SQ parameter – Signal Quality – may be from 0 to 31 while connection is on, and 99 value means the connection absent. Table of values is shown below.

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.



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



[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.

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] Read completed

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; Read completed - the process of reading the ModBus device is completed.

DOCUMENT INFORMATION	
Title	Vega NB-IoT Configurator
Document type	Manual - Translation from Russian
Document number	V02-configNB-01
Revision and date	02 of 11.10.2022

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

vega-absolute.ru

User Manual © Vega-Absolute 2022