



# NB-IOT PULSE COUNTER VEGA NB-11

## USER MANUAL



DOCUMENT REVISION	FIRMWARE VERSION
09	2.2

# CONTENTS

INTRODUCTION.....	3
1 DEVICE PURPOSE AND OPERATION PRINCIPAL.....	4
Device Purpose.....	4
Operation Algorithm.....	4
Functional.....	5
Marking.....	5
2 SPECIFICATION.....	6
Device Specification.....	6
Default Device Settings.....	7
3 OPERATION.....	8
Device Appearance.....	8
Contacts.....	10
Pulse Inputs Settings.....	11
Hall Sensor.....	12
Buttons.....	13
Indication.....	14
Mounting Recomendations.....	15
4 COMMUNICATION PROTOCOL.....	17
Pulse counter Vega NB-11 transmits the following types of packets.....	17
Pulse counter Vega NB-11 receives the following types of packets.....	19
5 IMPORTANT SAFETY INSTRUCTIONS.....	23
General Recommendations.....	23
Electrical Safety.....	23
Battery Safety Instructions.....	24
Safety Instructions In Case Of Damaged Housing.....	24
Emission Information.....	25
Solving Common Problems.....	25
6 STORAGE AND TRANSPORTATION REQUIREMENTS.....	26
7 CONTENT OF THE PACKAGE.....	27
8 WARRANTY.....	28

## INTRODUCTION

This manual is designated for Vega NB-11 pulse counter (hereinafter – the counter) manufactured by Vega-Absolute OOO and provides information on powering and activation procedure, control commands and functions of the counter.

This manual is targeted at specialists familiar with installation work fundamentals of electronic and electrical 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 DEVICE PURPOSE AND OPERATION PRINCIPAL

## DEVICE PURPOSE

Vega NB-11 pulse counter is designed for counting of pulses incoming to 6 independent inputs, further accumulating and transmitting of this information in NB-IoT network.

In addition, Vega NB-11 can be used as a security device – all inputs can operate in security mode, there is also Hall sensor.

The pulse counter can be used for any utilities' meters and industrial equipment with pulse output of herkon type or open-drain type.



Equipment with NAMUR pulse output is not supported

The counter is powered by a 6400 mAh built-in battery.



Long-term storage of equipment outside the operating mode leads to battery passivation, which does not allow the equipment to operate in the declared mode.

For correct operation, before starting the equipment, carry out the depassivation process. To request the instructions please e-mail us [support@vega-absolute.ru](mailto:support@vega-absolute.ru)

## OPERATION ALGORITHM

The readings collecting from the meter with a configurable schedule. The readings stored in the device memory and transmitting during the next communication session with the NB-IoT network.

Data are transferred with a configurable schedule too. Data can be transferred in random point in time during set period or in the set time. At the next communication session, the device starts sending accumulated packets with readings, from the earliest to the latest.

The device operates with confirmation all the time and send the next packet only after receiving a confirmation of the delivery of the previous one. If such confirmation was not received, NB-11 completes the communication session until the next one according to the schedule. Herewith, 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.

The internal clock is set automatically when device connected to the "Vega NB-IoT Configurator" via USB.

## FUNCTIONAL

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Vega NB-11 pulse counter has the following features:

- ⦿ Six pulse inputs for connecting the external devices with pulse output
- ⦿ All inputs can operate in «security» mode for connecting the external leakage and safety sensors, etc.
- ⦿ Queue of sending when delivery is not possible
- ⦿ Time referencing of readings by internal clock
- ⦿ Communication in case of security inputs or Hall sensor actuation
- ⦿ Temperature measurement
- ⦿ Charge measuring of the built-in battery (%)
- ⦿ Ability to filter the pulses by the duration

## MARKING

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Device marked with sticker that contain the following information:

- ⦿ Device model;
- ⦿ IMEI;
- ⦿ Month and year of manufacture.

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

## 2 SPECIFICATION

### DEVICE SPECIFICATION

MAIN	
Pulse inputs	6
Maximum input frequency	200 Hz
USB-port	micro-USB, type B
Operating temperatures	-40...+85 °C
Built-in temperature sensor	yes
Hall sensor	yes
Quantity of black box records	up to 100 000
CELLULAR COMMUNICATIONS	
Supported Cellular Standards	LTE Cat NB1
Data transfer protocol	MQTT
Calculated number of transmitted packets if the data transferring once a day	3600
LTE NB-IoT antenna type	external
POWER	
Built-in battery	6400 mAh
CASE	
Housing dimensions	95 x 95 x 50 mm
Ingress protection rating	IP67
PACKAGE	
Dimensions	165 x 118 x 57 mm
Weight	0,350 kg

## DEFAULT DEVICE SETTINGS

---

PARAMETER	VALUE
Confirmed Uplinks	OFF
Uplink number of repeats	0
Repeating period	0
Communication period	24 hours
Data collection period	24 hours
Time zone	UTC +00:00
Guard inputs operate	on short
Hall sensor	ON
Send network statistics	OFF
Pulse filtering settings	50 ms for pulse and pause

For changing the device settings, you need to connect to it with “Vega NB-IoT Configurator” application. You can download app on the [iotvega.com](https://www.ionvega.com) site in SOFT section as well as User Manual for configurator. [Go to the app page.](#)

## 3 OPERATION

### DEVICE APPEARANCE

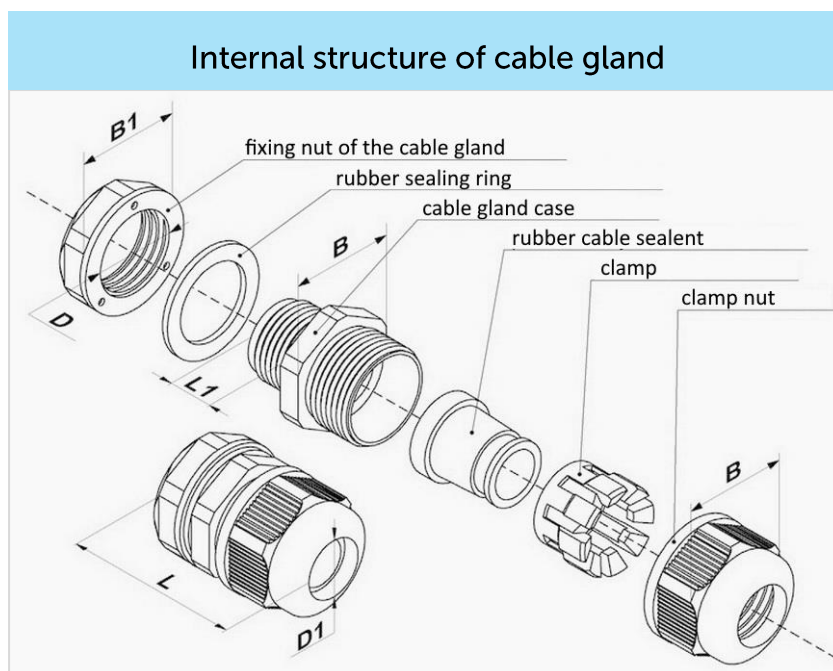
Vega NB-11 is represented in gray plastic case which has six screws and mounting for DIN-rail. The device case is equipped with a hermetic gland of M12 size. A sealant is installed inside the gland, ensuring compliance with the declared Ingress Protection rating of the device case.



1 – screw  $\varnothing$  4 mm x 27 mm, cross

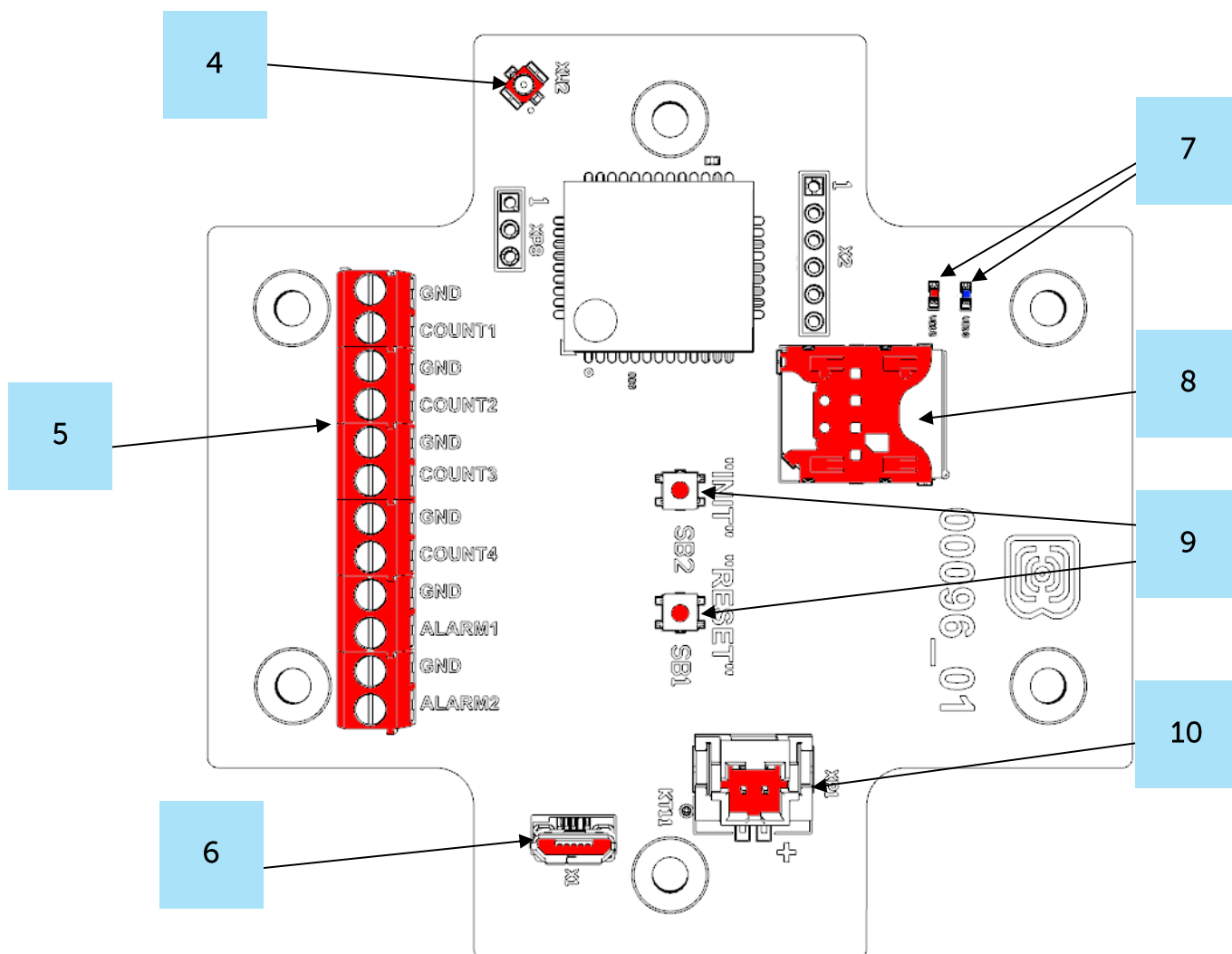
2 – cable gland of M12 size for installing the cables and wires with circular cross-section with a diameter of 5...6 mm

3 – input of external antenna





All of elements for manage and indication as well as connecting contacts are placed on the board inside the case.



4 – input for connecting an external antenna

5 – contacts<sup>1</sup>

6 – USB-port

7 – LED indicators

8 – SIM holder

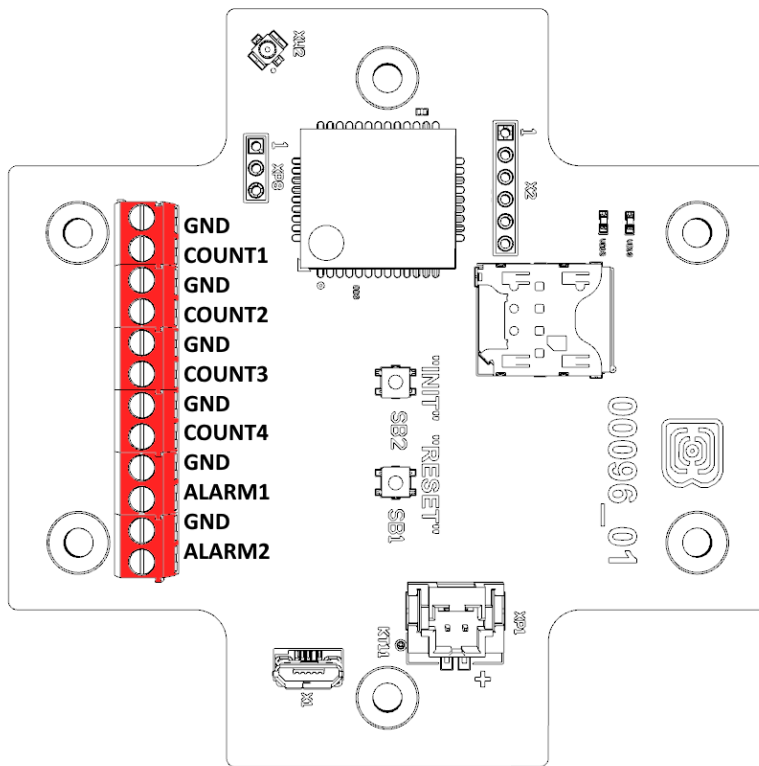
9 – manage buttons

10 – input for connecting a battery

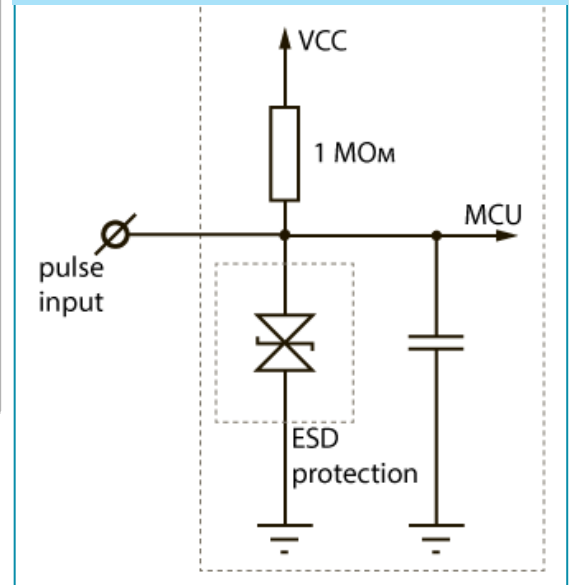
<sup>1</sup> In various versions of the board, digital inputs can be designated as COUNT or ALARM, while all digital inputs have the same functionality.

## CONTACTS

When connecting a radio modem to external devices, consider the internal circuitry of its pulse inputs shown below.



### Circuit design of the pulse inputs



De-bouncing logics with 5 msec time constant is integrated in the pulse counter. The pulse counting is carried out for frequencies up to 200 Hz.

The pulse counter allows to connect circuits with the following types of NO contacts:

- ◉ reed switch;
- ◉ mechanical pushbutton;
- ◉ open-collector output.



**Equipment with NAMUR pulse output is not supported**

Polarity effects only "open collector" circuits.

There are two security inputs on the board. The device monitors status changes on the security inputs and when the security input triggers, the device is activated and sends an alarm message to the network.

## PULSE INPUTS SETTINGS

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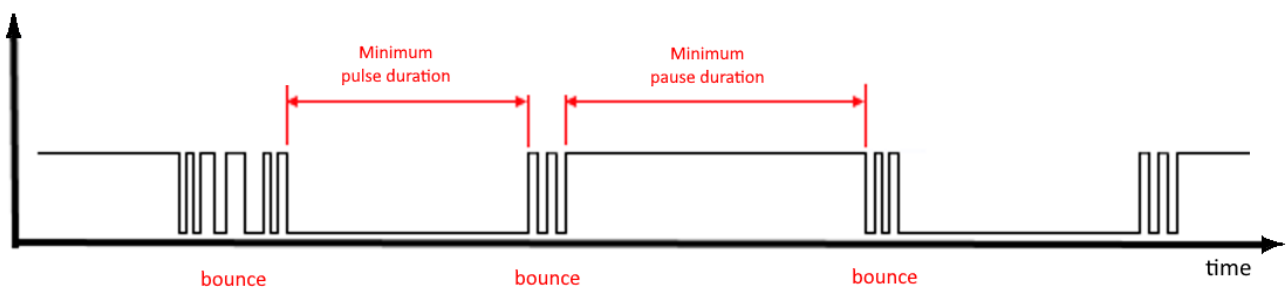
When you connect the modem to metering devices with a pulse output, it is necessary to consider the features of the pulse of a specific type of metering device: bounce, minimum pulse and pause duration. To do this, it is necessary to record the characteristics of the pulse with an oscilloscope or obtain information from the manufacturer of the meter.

The modem has a special software pulse filter. The filter is represented by two settings for each pulse input (see section 4, "Settings" tab). Consider the features of filtering settings for different pulse outputs.

### 1) Mechanical pulse output

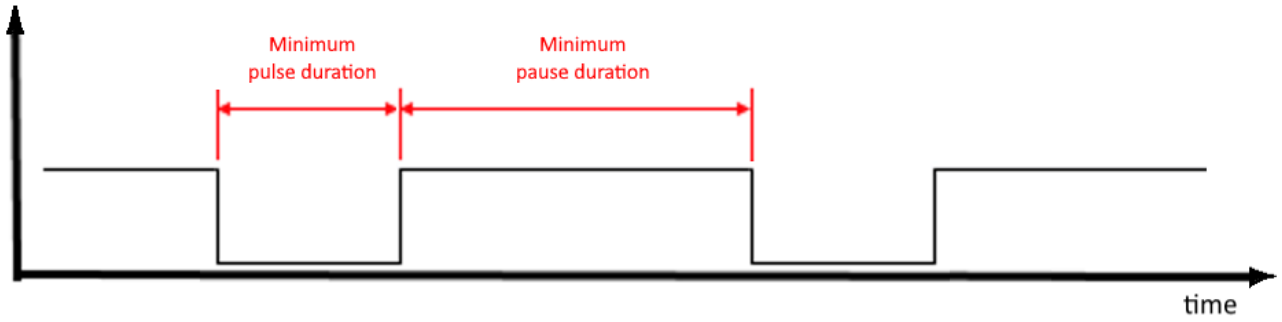
Usually, the mechanical pulse output in metering devices is implemented on a reed switch, but it can also be a button or other mechanics. The main problem with such outputs is contact bounce. At a moment of falling and rising, there are many additional impulses that need to be no considered in the calculation. In addition, the pulse duration floats and depends on the current flow rate of the meter. For correct counting, it is necessary to determine the minimum useful pulse duration and the minimum pause between useful pulses (all that is less is bounce). The obtained values must be set in the modem settings.

The minimum useful pulse duration is the pulse duration that the meter produces at the maximum flow rate (the maximum flow rate is indicated in the meter's passport). This duration does not include bounce time. The minimum pause duration can be set equal to the minimum pulse width, or longer if necessary. Usually, the pause between pulses is an order of magnitude higher.



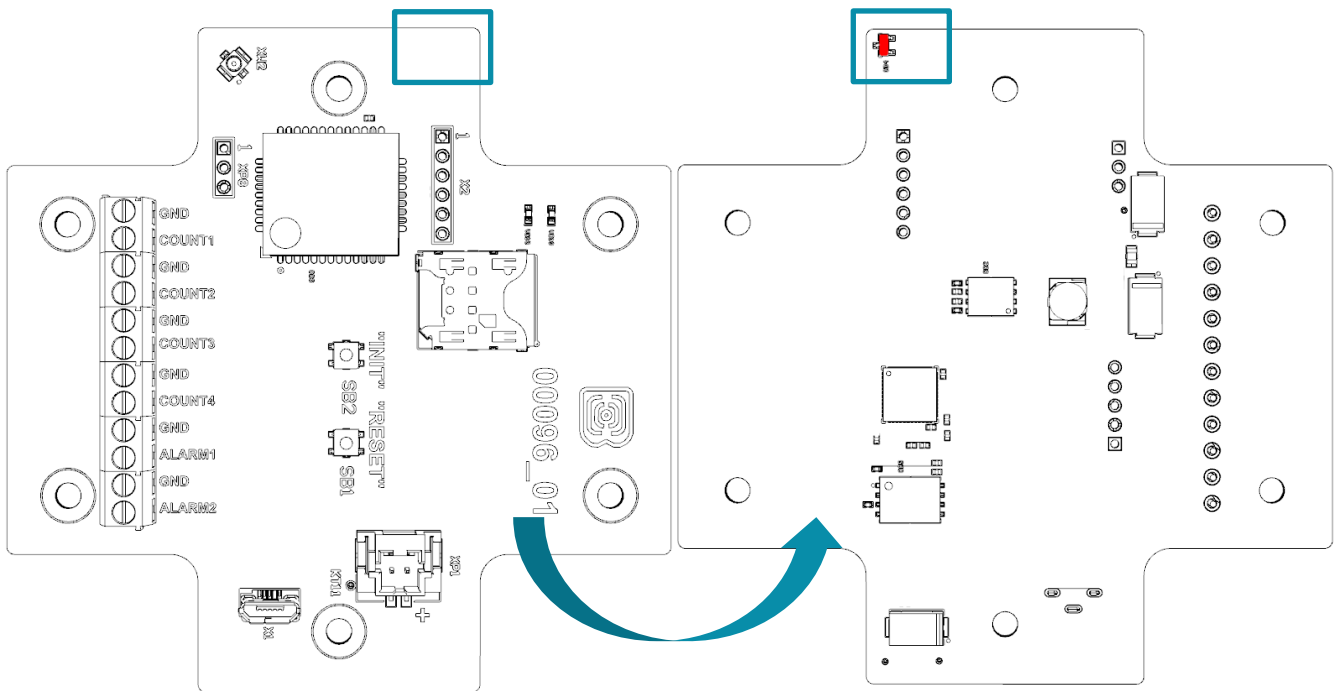
### 2) Electronic pulse output

The electronic pulse output has no bounce (open collector output). This output usually has a fixed pulse width. For the modem to fix the pulse, it is necessary to set in the settings the minimum pulse duration less than the actual pulse duration issued by the meter.



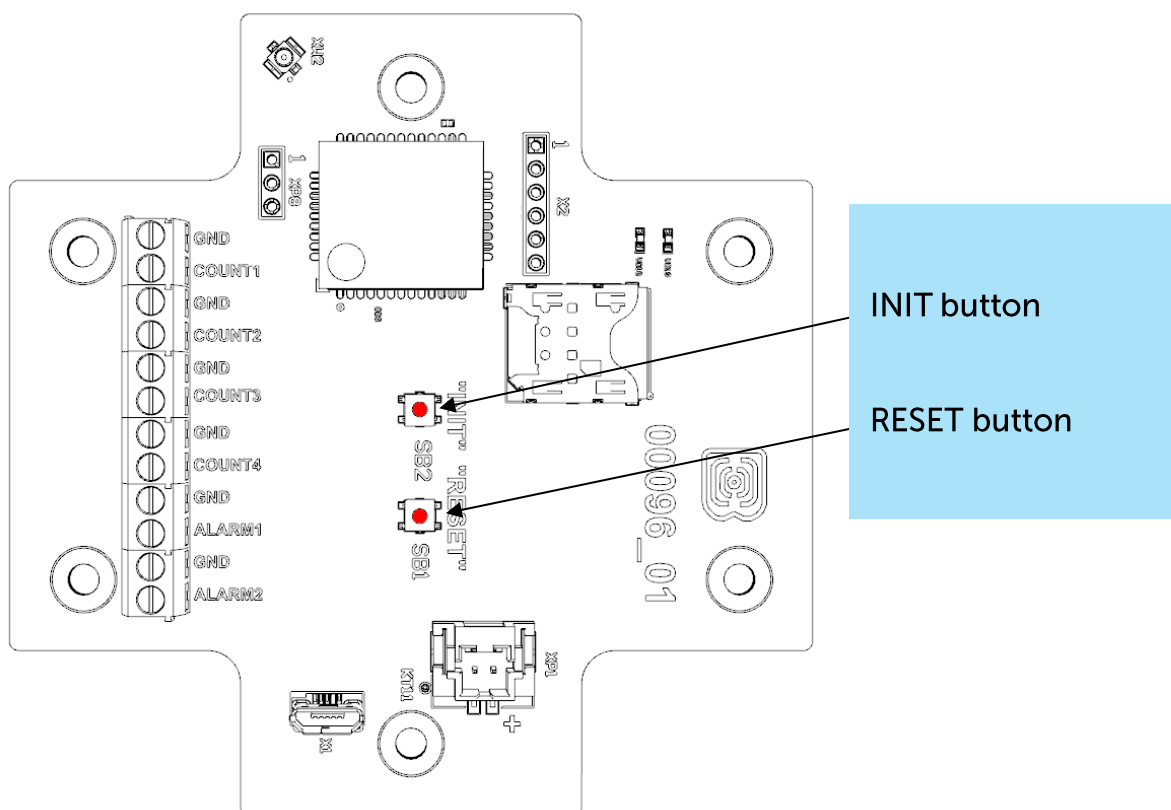
## HALL SENSOR

The device has Hall sensor which located on the board edge on the bottom side. When the magnet is brought up the sensor triggered, and the device can form the alarm message which immediately transmitted to the server.



## BUTTONS

There are two buttons on the board which can help you to manage the device. Buttons are described in the table below.

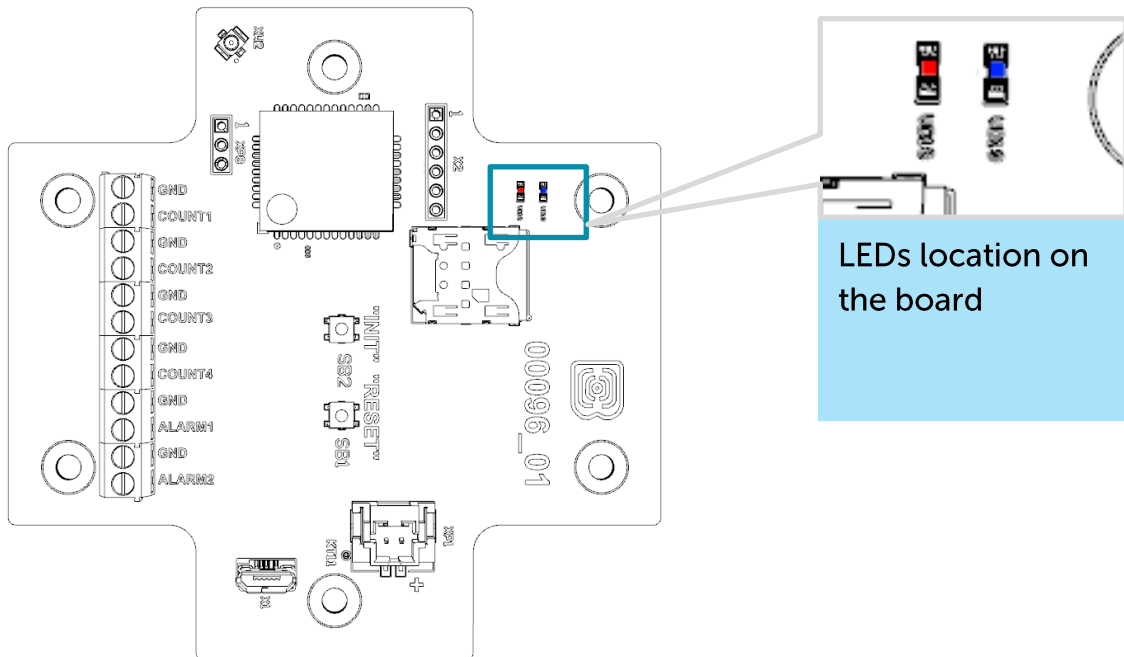



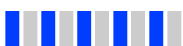
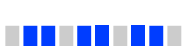




RESET	
Short pressing	Device reloading
INIT	
Pressing for 1 second	Registration at the network
Pressing for 2 seconds	Data transmitting
Pressing for 3 seconds	LTE-modem switching off
Pressing for 4 seconds	To form record to the black box

When you hold down the button, the red LED starts flashing once a second, which will help you to find out the duration of pressing. Pressing for 1 second corresponds to one flash of the LED, pressing for 2 seconds corresponds to two and so on.

## INDICATION

There are two LEDs on the board: red and blue. Blue LED VD19 shows LTE-modem state, and red LED VD18 – the device state.



LTE-modem		
	Short flash every three seconds	Device searches the network
	Short flash every second	Device is successfully registered, and it is in the network
	Two short flashes every one second	Device transmits data to the network
	No light	LTE-modem is switched off
Device		
	Short flash every second	Battery charge is lower than 5%
	Short flash every five seconds	Device is in the 'Operation' mode
	No light	Device is in the 'Sleep' mode or switched off

## MOUNTING RECOMENDATIONS

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The counter shall be installed and adjusted by qualified specialists to ensure proper operation of the device.

When connecting the pulse output of the metering device to the counting input of the modem, it is recommended to use cables with a shielding braid, and to install the metering device with the modem away from sources of radio interference. It is recommended to use a two-wire shielded cable. The shield is connected on the side of the impulse counter to its ground.

1<sup>st</sup> wire – signal from pulse output is connecting to contact COUNT/ALARM

2<sup>nd</sup> wire – ground is connecting to contact GND

Shield – is connecting to contact GND



**Before starting mounting work, you must make sure that the latest firmware version is installed on the equipment**

For mounting you will need:

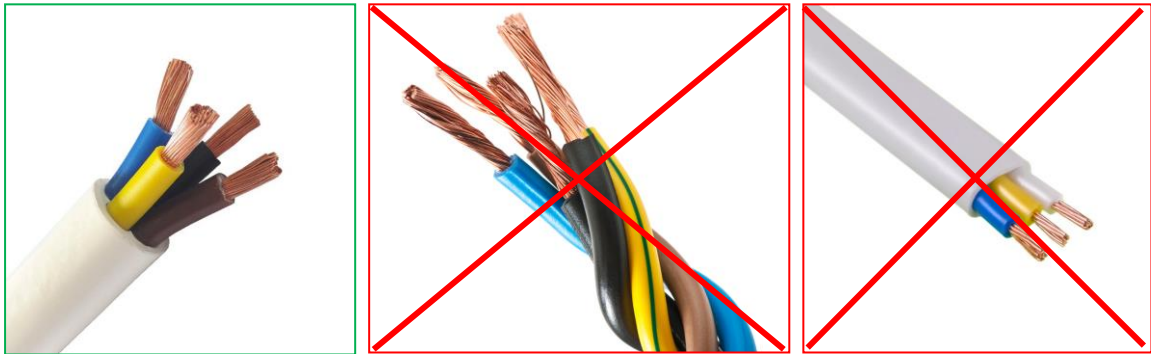
- ◉ SIM-card;
- ◉ cross-shaped screwdriver;
- ◉ wire stripper;
- ◉ laptop.

Step by step mounting be like:

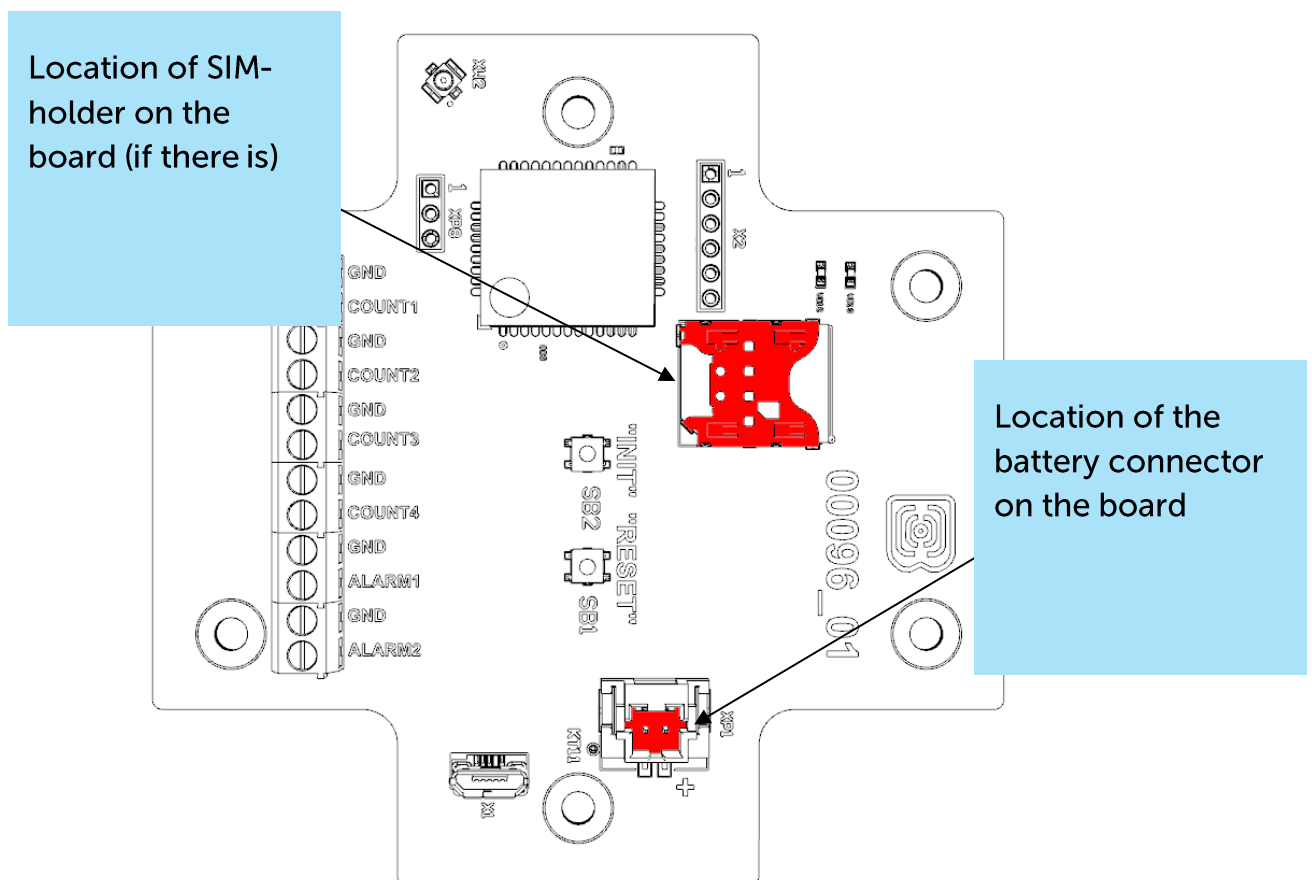
1. Installing SIM-card into holder;
2. Setting the device through the “Vega NB-IoT Configurator” – the first and second steps are usually carried out in the office.
3. De-energizing the connected equipment, metering devices, etc.
4. Placement the wires in the cable gland. It must be remembered that the wires must be united in one cable of circular cross-section with diameter of 5...6 mm.



**Inside the cable gland there is a sealant ensuring compliance with the declared Ingress Protection rating of the device case. When removing the sealant, as well as when installing wires of a different diameter or cross-section, device performance may deteriorate until failure due to moisture entering the case**



5. Connecting all necessary wires to the contacts.
6. Connecting the battery at the connector. After the battery connection the device loads and comes to sleep until the next communication session.



7. If you need to test the data transmitting, then press and hold the INIT button for the 2 seconds.
8. Before assembling the device, you can reset the pulses accumulated during testing and connection through the "Vega NB-IoT Configurator" if it is necessary.
9. Assembling the device.



## 4 COMMUNICATION PROTOCOL

### PULSE COUNTER VEGA NB-11 TRANSMITS THE FOLLOWING TYPES OF PACKETS.

Data transmits via MQTT protocol. You should specify in the device settings the address and port of the server where the data will be sent. Those settings specified in application "Vega NB-IoT Configurator". It must be MQTT broker as a server (received side). You should specify in the device settings the address and port of the broker. Also, you should specify a topic name where the data published and a client name – the name which the device use for publishing. All those settings specified in "Vega NB-IoT Configurator" in part "MQTT settings". For watching the data sending by the device you should deploy MQTT broker on a PC and subscribe some application on MQTT broker.

Vega NB-11 sends the message on the server as a text of JSON format. See example below.

```
{
  "Message": {
    "dev": "NB-11 v0.5",
    "IMEI": "867723030711633",
    "IMSI": "250990283462252",
    "ICCID": "8970199170730496963",
    "num": 3,
    "UTC": 1571227504
  },
  "CellStatus": {
    "SQ": 19,
    "EARFCN": 1240,
    "PCID": 26,
    "RSRP": -822,
    "RSRQ": -108,
    "RSSI": -744,
    "SNR": 119
  },
  "Telemetry": {
    "reason": "time",
    "UTC": 1663560300,
    "bat": 99,
    "temp": 24.9,
    "pulse1": {"C":72,"H":0,"L":0}
    "pulse2": {"C":72,"H":0,"L":0}
    "pulse3": {"C":72,"H":0,"L":0}
    "pulse4": {"C":72,"H":0,"L":0}
    "pulse5": {"C":74,"H":0,"L":0}
    "pulse6": {"C":73,"H":0,"L":0},

    "States"
    {"I1":1
    "I2":1
    "I3":1
    "I4":1
    "I5":1
```

```
"I6":1  
"M":0  
}}}
```

Transcription of the message fields:

**Message** – part with information about current message.

**dev** – name and version of the device firmware

**IMEI** – LTE-modem identifier

**IMSI, ICCID** – SIM-card (SIM-chip) identifiers

**num** – the number of the message

**UTC** – the date and the time of message sending in UTC format by Greenwich

**CellStatus** – part with information about the cellular state

**EARFCN** – the number of radio frequency channel (absolute)

**PCID** – physical network address

**RSRP** – input signal power (in santibells<sup>2</sup>)

**RSRQ** – input signal quality (in santibells)

**RSSI** – indicator of the input signal power (in santibells)

**SNR** – signal to noise ratio

**Telemetry** – part with collected data (one packet)

**reason** – reason for packet forming\*

**UTC** – the date and the time of message collecting in UTC format by Greenwich

**bat** – battery charge

**temp** – processor temperature

**pulse $x$**  – pulse number on the input  $x$ , where  $x$  - input number from 1 to 6.

**C** – pulse quantity

**H** – higher than the specified number of pulses per period (0 - no threshold exceeded, 1 - exceeded)

**L** – lower than the specified number of pulses per period (0 - no threshold exceeded, 1 - exceeded)

\*Possible values for **Reason** field (Reason for packet forming):

**time** – packet formed by the time (data collection period set up in the Configurator for the device)

**alarm $x$**  - packet formed by the alarm on the input  $x$ , where  $x$  - input number ("COUNT $x$ /ALARM $x$ "). Communication session initiated by this event.

**cnfg** – packet formed by the command from Configurator

**hall sensor** – packet formed by the Hall sensor (communication session initiated by this event)

**button** – packet formed by the button pressing (communication session initiated by this event)

**pulse limit** - the packet was formed by an alarm, since the number of pulses exceeds the set thresholds

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<sup>2</sup> Decibels multiplied by 10

**settings\_change** - confirmation of delivery of the package with settings (the checkbox "Send confirmation to the server about changing device settings" must be checked)

**States** – section contains information about the status of inputs

**I<sub>x</sub> – input<sub>x</sub>** - input state **x**, where **x** – input number: 0 - logical zero at the input, 1 - logical one at the input

**M -magnet** – the presence of an external magnetic field, where "0" - absent, "1" - present.

## PULSE COUNTER VEGA NB-11 RECEIVES THE FOLLOWING TYPES OF PACKETS.

The NB-11 device receives a message from the server in text form, in JSON format, an example is shown below:

using inputs as impulse

```
"inputConfig": {
  "mode1":"pulse",
  ...
  "mode6":"pulse"}
```

setting the inputs as security, for closing

```
"inputConfig": {
  "edge1":"short",
  "mode1":"guard",
  ...
  "edge6":"short",
  "mode6":"guard"}
```

setting the inputs as security, for opening

```
"inputConfig": {
  "edge1":"open",
  "mode1":"guard",
  ...
  "edge6":"open",
  "mode6":"guard"}
```

configuring inputs as security, for opening and closing

```
"inputConfig": {
  "edge1":"both",
  "mode1":"guard",
  ...
  "edge6":"both",
  "mode6":"guard"}
```

Pulse filtering settings

```
"pulseFilter":{
```

```
"FH1":100,
"FL1":50,
...
"FH6":100,
"FL6":50},
```

#### Pulse threshold setting

```
"pulseTreshold":{
  "EH1":true,           upper threshold for entry 1 enabled
  "WH1":"2h",          time interval for upper threshold
  "TH1":22222,         upper threshold, number of pulses

  "EL1":true,          lower threshold for entry 1 enabled
  "WL1":"5m",          time interval for lower threshold
  "TL1":20             lower threshold, number of pulses

  "EH2":false,         the upper threshold for input 2 is disabled,
                       so the WH2 time interval and the TH2 threshold can not be set

  "EL2":true,          lower threshold for entry 2 enabled
  "WL2":"5m",          time interval for lower threshold
  "TL2":50 }           lower threshold, number of pulses
```

```
"network": {
  "QoS":2,
  "retain":true,
  "stat":true},
```

```
"schedule":{
  "c_type":"hourly",
  "c_5min":[0,5,10,15,20,25,30,35,40,45,50,55],
  "t_type":"daily",
  "t_hours":[6,18],
  "t_attempt":3,
  "t_pause":15,
  "tz":"+07:00"},
```

```
"sensor":{
  "HalD":"off",
  "HalL":"gen",
},
```

```
"version":1}
```

**inputConfig** – section contains information on setting up counting inputs

**modex** – input **x** mode ("pulse" or "guard"), where **x** – input number from 1 to 6

**edgex** – edge of the signal for input **x**, on which the operation should occur ("short" – by closing, "open" – by opening, "both"), where **x** – input number from 1 to 6.

**pulseFilter** – the section contains information about setting the pulse filter

**FH<sub>x</sub>** – minimum duration of the pause between pulses at the input **x**, where **x** – input number from 1 to 6

**FL<sub>x</sub>** – minimum pulse duration at the input **x**, where **x** – input number from 1 to 6

**pulseThreshold** – the section contains information on setting the pulse thresholds

**EH<sub>x</sub>** – enable upper threshold for input **x** ("true" – enable, "false" - disable), where **x** – input number from 1 to 6

**EL<sub>x</sub>** – enable lower threshold for input **x** ("true" – enable, "false" - disable), where **x** – input number from 1 to 6

**WH<sub>x</sub>** – time interval for input **x**, during which the threshold number of pulses for the upper threshold is expected (from 5 minutes to 24 hours), where **x** – input number from 1 to 6.

**WL<sub>x</sub>** – time interval for input **x**, during which the threshold number of pulses for the upper threshold is expected (from 5 minutes to 24 hours), where **x** – input number from 1 to 6.

**TH<sub>x</sub>** – upper threshold for input **x** (maximum value 2147483647), where **x** – input number from 1 to 6.

**TL<sub>x</sub>** – lower threshold for input **x** (maximum value 2147483647), where **x** – input number from 1 to 6.

**network** – network configuration

**QoS** – quality of service ("0" - the message is sent once without waiting for delivery confirmation (minimal traffic), "1" - message delivery to the subscriber is guaranteed, there is a possibility of message duplication, "2" - message delivery to the subscriber is guaranteed and message duplication is excluded (maximum traffic))

**retain** – instructing the broker to store the last message for the subscriber, where: "true" - store, "false" - do not store.

**stat** - send network statistics, where "true" - send, "false" - do not send.

**schedule** – schedule setting

**t\_type** – data transmitting schedule type ("monthly", "weekly", "daily", "hourly")

**c\_type** – data collecting schedule type ("monthly", "weekly", "daily", "hourly")

**t\_days** – day of the month on which the data will be transmitted (from 0 to 31, where 0 means the last day of the month)

**c\_days** – day of the month on which the data will be collected (from 0 to 31, where 0 means the last day of the month)

**t\_wdays** – day of the week on which the data will be transmitted (from 1 to 7)

**c\_wdays** – day of the week on which the data will be collected (from 1 to 7)

**t\_hours** – hour at which data will be transmitted (from 0 to 23)

**c\_hours** – hour at which data will be collected (from 0 to 23)

**t\_attempt** – number of retries to send a packet if it fails (from 1 to 255).

**t\_pause** – pause time between attempts in minutes (from 1 to 65535).

**t\_rand** – random transmission time during the day ("true" - enabled, "false" - disabled)

t\_5min – data transmission time within an hour in steps of 5 minutes (from 0 to 55)

c\_5min – data collection time within an hour in steps of 5 minutes (from 0 to 55)

t\_act – hour of data transmitting (from 1 to 12)

c\_act – hour of data collecting (from 1 to 12)

tz – timezone

sensor – sensor setting

HalD – mode when a magnetic field is detected (off - do nothing, gen - only generate a packet, send - generate a packet and send it)

HalL – mode when the magnetic field is lost (off - do not perform any actions, gen - only generate a packet, send - generate a packet and send it)

If the schedule is **hourly**, or **daily**, then there is no need to add "c\_act", "t\_act" и "t\_rand", to the package, as well as specific days from another schedule (**monthly** or **weekly**).

## 5 IMPORTANT SAFETY INSTRUCTIONS

### GENERAL RECOMMENDATIONS

Before you start working with the Vega NB-11 device, you must read this User Manual (hereinafter – Manual).

Vega NB-11 pulse counter is designed for counting of pulses incoming to 6 independent inputs, further accumulating and transmitting of this information in NB-IoT network. Using the device for purposes other than those specified in this manual is a violation of the rules of operation. The manufacturer is not responsible for any damage resulting from the use of the device for other purposes.

The operation of the Vega NB-11 device must be carried out by an instructed person (EN 62368-1).



**Independent repair and modifying are strictly prohibited, as well as install any firmware other than firmware supplied by the manufacturer**

Unprofessional repair work or third-party firmware installation may result in the device failure, personal injury, or property damage.



**The manufacturer do not hold any responsibility for unpredictable effects arising from the use of third-party firmware on the device**

### ELECTRICAL SAFETY



**Do not use the device near open flames and direct sunlight - this may lead to overheating and fire. The device must be used in ambient temperatures between -40°C (-40 F) and +85°C (185 F)**



If a fire is detected, stop using the device immediately. In case of a fire, stop using and disconnect device from the external power supply immediately! If device powered by built-in battery, eliminate the fire and disconnect the battery from the device (remove the battery or cut the wire leading to the battery). After that, the device and the battery must be sent to the manufacturer for diagnostics (for manufacturer's contacts please see chapter «Warranty»).

Avoid foreign matter ingress the device housing during operation, this can lead to a short circuit and fire. Do not operate devices with an open or damaged housing.



**Accidental damage to the power cable may result in electric shock or malfunctions which are not covered by the warranty.**

It is prohibited to immerse the housing of the device in water, it is not recommended to place it under water jets.



**Do not touch the wires, circuit boards, or device housing with wet hands**

Do not use in case of water ingress, it may result in injury or damage to the device and cause it to malfunction. In such cases, please contact the manufacturer's technical support.

## BATTERY SAFETY INSTRUCTIONS



**This device uses built-in batteries type ER 18505M 6400 mAh 3.6V. Do not use other types of batteries**

Strictly observe polarity during battery installation.

The device is not suitable for operation in conditions of extremely low air pressure (at altitudes above 2000 m).

The battery included with the device contains lithium.



**Do not open or attempt to recharge the battery as this may result in an explosion, fire, or flammable substances leakage**

If a battery ignites, do not inhale combustion products, and do not touch the battery with unprotected hands. This may result in chemical burns.

If battery electrolyte contacts with the eyes, immediately rinse your eyes with plenty of clean water and seek for medical attention as soon as possible.

## SAFETY INSTRUCTIONS IN CASE OF DAMAGED HOUSING

In the normal operational conditions housing of the device is inherently safe for users. Mechanical damage to the housing may result in sharp edges and corners that are potentially hazardous to the user. In this case, you must stop using the device and send it to the manufacturer for a housing replacement.

Device is safe for users if installation and mounting instructions are respected.



## EMISSION INFORMATION

With proper operation and following the recommendations for installation, the device does not have a harmful effect on the human body and electrical equipment.

## SOLVING COMMON PROBLEMS

If smoke, fire, sparking, abnormal heating, functional errors occur, or water ingress the housing, the device must be de-energized by disconnecting and / or removing the battery and it is necessary to contact the manufacturer's technical support.

## 6 STORAGE AND TRANSPORTATION REQUIREMENTS

Pulse counters Vega NB-11 must be stored in their original packaging in covered dry warehouses in conditions that exclude direct moisture. Devices must be protected from conductive dust, acid and alkali vapors, as well as gases that cause corrosion and destroy insulation. The ambient temperature should not be lower than plus 5 °C and should not exceed plus 40 °C. Relative humidity should not exceed 85%.

The devices are transported in their original packaging by all types of transport in covered vehicles in accordance with the rules for the carriage of goods in force for this type of transport, and the technical conditions for loading and securing goods,

During loading and unloading operations and transportation, the boxes should not be subjected to sharp impacts and the effects of precipitation.

The method of stacking the boxes with the product on the vehicle should exclude their spontaneous movement.

Transporting the device without packaging may damage it.

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

Long-term storage of the device in the "Storage" mode (more than 6 month) can lead to passivation of the battery.

## 7 CONTENT OF THE PACKAGE

The pulse counter is delivered complete with:

Vega NB-11 pulse counter – 1 pc.

Antenna – 1 pc.

Battery 6400 mAh – 1 pc.

Factory certificate – 1 pc.

## 8 WARRANTY

The manufacturer guarantees that the product complies with the current technical documentation, subject to the storage, transportation and operation conditions specified in the "User Manual".

The warranty period of the device is 36 months from the date of sale, subject to compliance with the rules of operation, as well as the conditions of maintenance and storage. If it is impossible to determine the date of sale, the warranty period is calculated from the date of manufacture of the device.

If it is established that the breakdown of the device occurred due to reasons beyond the control of the consumer and is associated with a defect in materials or a violation of technological processes during production, which ultimately makes it impossible to continue using the device, during the warranty period the manufacturer is obliged to provide repair services or replace the failed device or its constituent parts.

It may be necessary to carry out technical expertise or diagnostics by employees of the manufacturer's company to determine the reasons for the failure or the nature of the damage. Replacement or warranty repairs are made after confirmation by the manufacturer of compliance with the requirements of the warranty.

The warranty does not cover batteries and decorative coating of the device case.

The manufacturer does not bear warranty obligations in the event of a product failure if:

- the product does not have a factory certificate;
- the factory certificate does not have an TCD stamp and / or there is no sticker with information about the device;
- the serial number (DevEUI, EMEI) printed on the product differs from the serial number (DevEUI, EMEI) specified in the factory certificate;
- the product has been subject to alterations in the design and / or software which are not provided for in the operational documentation;
- the product has mechanical, electrical and / or other damage and defects arising from violation of the conditions of transportation, storage and operation;
- the product has traces of repair outside the manufacturer's service center;
- the components of the product have internal damage caused by the ingress of foreign objects / liquids and / or natural disasters (flood, fire, etc.)
- natural wear and tear of the device has occurred;
- violation of the rules of storage and operation;
- the permissible loads on the device have been exceeded.

The average service life of the product is 7 years.

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

119A, Bol'shevistskaya Str., Novosibirsk, 630009, Russia.

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

e-mail: [remont@vega-absolute.ru](mailto:remont@vega-absolute.ru)

## Document Information

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## Revision History

Revision	Date	Name	Comments
01	17.06.2019	KEV	The first release
02	14.07.2020	KEV	Minor changes
03	08.10.2020	KEV	We recalculate the number of transmitted packets in <a href="#">warranty</a> conditions
04	02.03.2021	KEV	New parts " <a href="#">Pulse inputs settings</a> ", " <a href="#">Mounting recommendations</a> ", we replace <a href="#">configurator</a> screenshots, new <a href="#">function of the pulse filtering</a>
05	01.07.2021	KEV	New settings of schedule in the " <a href="#">Configurator</a> "
06	12.01.2022	KEV	Planned revision, new <a href="#">parts</a> , new <a href="#">warranty</a>
07	22.08.2022	KMA	Minor edits
08	21.09.2022	KMA	Communication protocol changes
09	27.04.2023	KMA	Expanded functionality for setting the Hall sensor, updated warranty



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