



TEMPERATURE SENSOR VEGA TD-11 REV.2

USER MANUAL



| DOCUMENT REVISION | FIRMWARE VERSION |
|-------------------|------------------|
| 08 | 1.01 |
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INTRODUCTION

This manual is designated for Vega TD-11 rev.2 device (hereinafter – device, converter) manufactured by Vega-Absolute OOO and provides information on powering and activation procedure, control commands and functions of the device.

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

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

1 DESCRIPTION AND OPERATION

DEVICE DESCRIPTION

The device Vega TD-11 rev.2 is designed for measurement atmosphere temperature (air and non-aggressive gases) by the external thermistor and further transmitting of this data to the LoRaWAN network.

Also, device can act as a security sensor and send extraordinary alarm message by the triggering security input.

There is a function of temperature range control in the device. During device setting, you may set allowed temperature low and high thresholds. When temperature measurements are out of specified temperature range then extraordinary communication session appears. Data collection periods when measurements in temperature range and out are set independently.

Vega TD-11 rev.2 may be used in systems where temperature control is required but its directly measurement is difficult. For example, car engine temperatures control and temperature control at the production rooms, stocks.

The counter is powered by a replaceable 3.6 V Li-SOCl₂ battery with a capacity of 3600 mAh (size A).



The device is powered by a non-rechargeable lithium-thionyl chloride (LiSOCl₂) battery. Attempts to charge the battery may result in fire.



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

COMUNICATION AND DATA COLLECTION ALGORITHM

Vega TD-11 rev.2 operates in modes listed below:

“Active” – is a main mode of device operation.

Before start using you need to switch the device out of “Storage” mode.

Vega TD-11 rev.2 supports two activation methods in the LoRaWAN® network - ABP and OTAA. Select one of the methods via the “Vega LoRaWAN Configurator” application (see “User Manual” on the program).

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

OTAA method. After pressing the start button, the device makes three attempts to connect to the network within the set frequency plan. After the activation in the LoRaWAN® network is confirmed, the device sends a signal (LED flashing for 5 seconds) and switches to the "Active" mode. If all attempts fail, the device will continue to accumulate data and will attempt to connect to the network every 6 hours.

The device forms the data packet with current state with a configurable period from 15 seconds to 24 hours. The packets stored in the device memory and transmitting during the next communication session with the LoRaWAN® network.

Examples

If the data collection period is set to 24 hours the packet is formed at 00.00 on the internal clock of the device

If the data collection period is 12 hours then at 00.00 and at 12.00, and so on.

Data collection period **when measurements are out of specified temperature range** set independently and may be equal from 15 seconds to 24 hours.

The adjustable **data transfer period** can be from 15 seconds to 24 hours. When beginning of communication session, the device starts sending packets with readings from the earliest packet. The time of data transmitting cannot be specified, it's defined in random way for every device in chosen period of transmission from the moment of connection to the network.

Example

Transmission period is 30 minutes, and device was started at 16:40 by the internal device clock. In random way the device calculate data transmitting time and set it at 16:41 in the half-hour period from 16:40 to 17:10. Thus, packets from this device will transmit at 16:41, at 17:11, at 17:41, at 18:11 and so on every 30 minutes by the internal device clock.

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

The internal clock is set automatically when you connect to the device through USB-UART, also can be adjust via LoRaWAN® network.

FUNCTIONAL

Vega TD-11 rev.2 temperature sensor is class A device (LoRaWAN classification) and has the following features:

- ⦿ Temperature measurement in range of -55... +100 °C
- ⦿ Charge measuring of the built-in battery (%)
- ⦿ Extra communication in case of security inputs actuation
- ⦿ Extra communication in case of tamper sensor actuation
- ⦿ Extra communication in case of Hall sensor (1 or 2) actuation
- ⦿ Extra communication in case of temperature measurements coming out of specified range
- ⦿ single operating mode - "Active"
- ⦿ ADR support (Adaptive Data Rate)
- ⦿ Sending of confirmed packets (configurable)
- ⦿ Ability to configure security input triggering on short, open or both cases
- ⦿ Ability to set different data collection period for case of temperature measurements are out of specified range
- ⦿ Immediately data sending at moment of message forming for case of temperature measurements are out of specified range

MARKING

Device marked with sticker that contain the next information:

- ⦿ Device model;
- ⦿ DevEUI;
- ⦿ Month and year of manufacture;

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

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

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

2 SPECIFICATION

DEVICE SPECIFICATION

| MAIN | |
|---|---|
| Security input modes | security/pulse |
| PC interface | UART, FSK radio channel |
| Operating temperatures | -40...+85 °C |
| Measurement temperatures | -55...+100 °C |
| Hall sensor sensitivity | 5 mT, bipolar |
| External temperature sensor type | B57861-S 103-F40 10 kOhm |
| Accuracy of temperature measurement | ±0.5 °C in range -10...+40 °C ±1 °C in range -55...+100 °C |
| LORAWAN® | |
| LoRaWAN® class | A |
| Quantity of LoRaWAN channels | 8 |
| Frequency plans supported by default | RU868, EU868, KZ865, custom (EU868 based) |
| Frequency plans available as order option | IN865, AS923, AU915, KR920, US915 |
| Activation type | ABP or OTAA |
| Communication period | 15, 30 seconds, 1, 2, 3, 4, 5, 15, 30 minutes, 1, 3, 6, 9, 12 or 24 hours |
| Data collection period | 15, 30 seconds, 1, 2, 3, 4, 5, 15, 30 minutes, 1, 3, 6, 9, 12 or 24 hours |
| Memory amount for storing packets | 200 packets |
| Type of the LoRaWAN antenna | internal |
| Sensitivity | -138 dBm |
| Radio coverage in restrained urban conditions | up to 5 km |
| Radio coverage within line of sight | up to 15 km |
| Transmitter power by default | 25 mW (configurable) |
| POWER | |
| Battery | LiSOCl ₂ 3.6 V, 3600 mAh |
| Calculated number of packets sent by the device with default settings | 80 000 |
| CASE | |
| Housing dimensions | 90 x 49 x 46 mm |
| Ingress protection rating | IP65 |
| Mounting | Clamp fastening to the support, DIN-rail, wall-mounting |

DEFAULT DEVICE SETTINGS

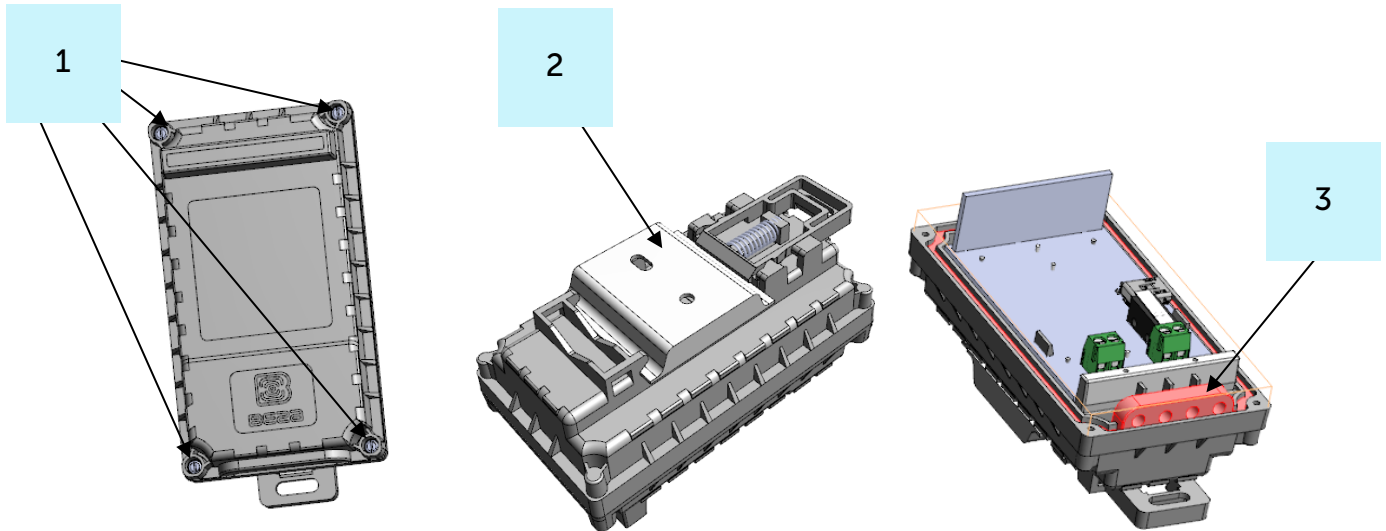
| PARAMETER | VALUE |
|---|------------|
| Frequency plan | RU868 |
| Activation type | OTAA |
| Adaptive Data Rate | ON |
| Confirmed Uplinks | OFF |
| Rx 1 Delay | 1 second |
| Join Accept Delay | 5 seconds |
| Uplink number of transmissions | 1 |
| Data rate | DR0 |
| Power | 14 dBm |
| Communication period | 24 hours |
| Data collection period | 24 hours |
| Data collection period when temperature is out of range | 1 hour |
| Time zone | UTC +00:00 |
| Inputs operate in mode | pulse |

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

3 OPERATION

DEVICE APPEARANCE

Vega TD-11 rev.2 is represented in small plastic case which has four screws and mounting for DIN-rail.

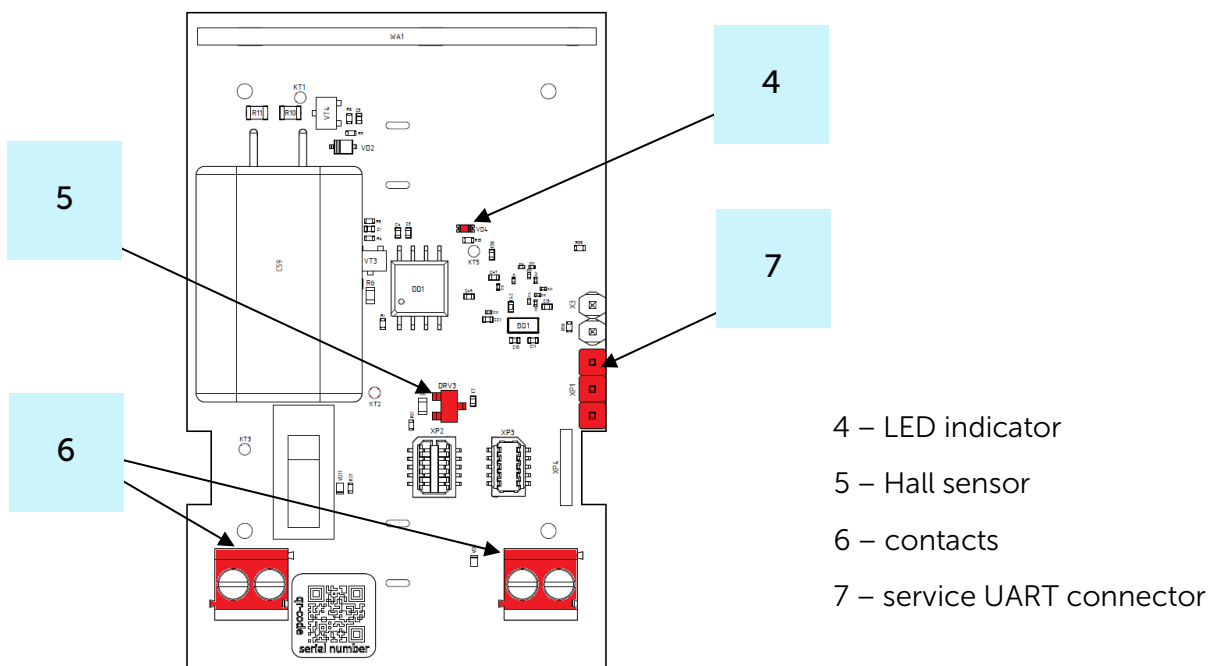


1 – screw \varnothing 2 mm x 8 mm, cross \oplus

2 – DIN-rail with mounting holes \varnothing 3 mm

3 – silicone gasket without through holes, ensuring the protection rating of the device case IP65.

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



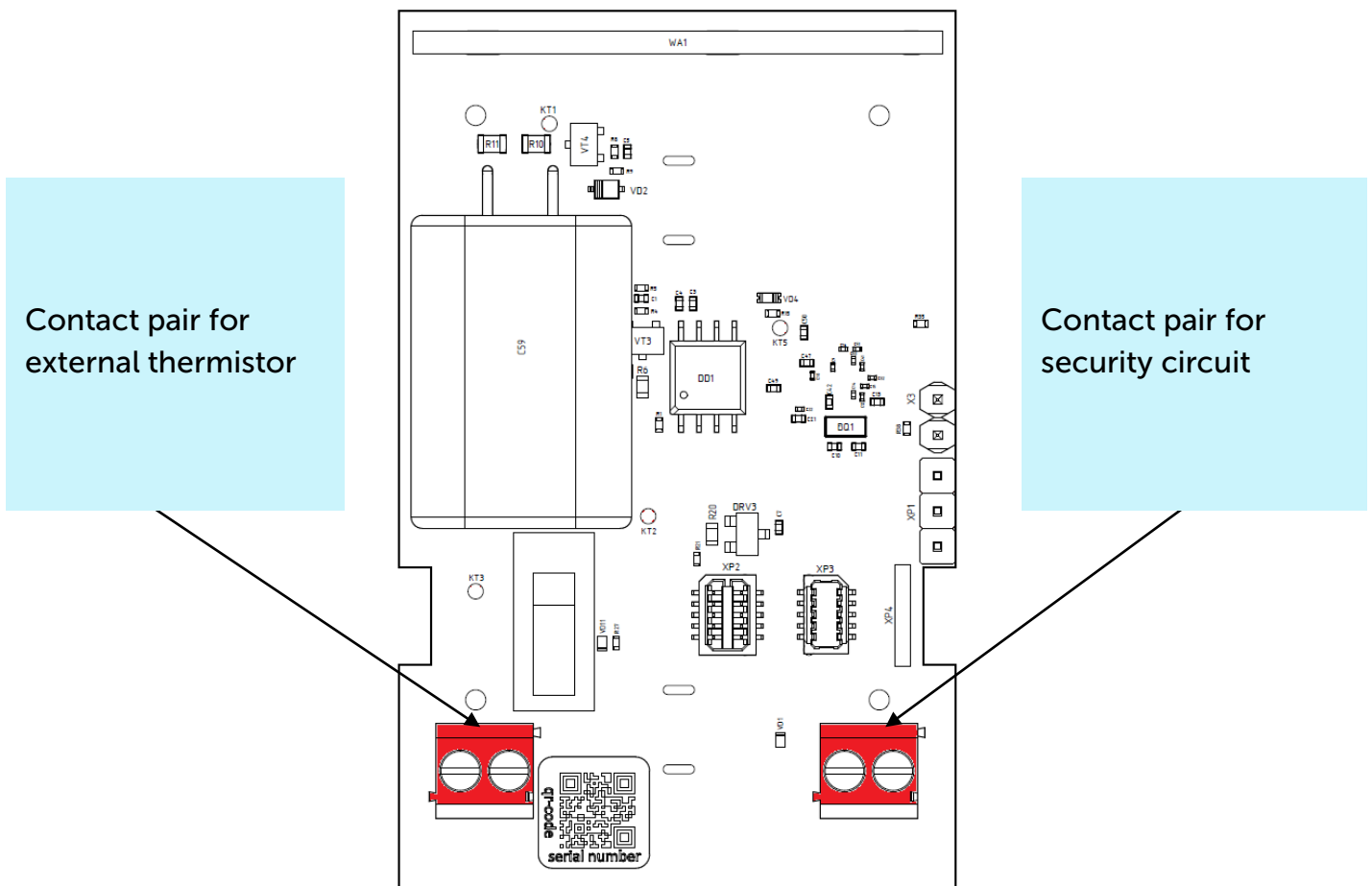
4 – LED indicator

5 – Hall sensor

6 – contacts

7 – service UART connector

CONTACTS DESCRIPTION



Temperature sensor has a two contact pairs. One pair ("Therm" and "⊥" contacts) is for connect to external thermistor, another one is security input ("Drv" and "Sens" contacts).

Security input of the device can be used for connecting to circuits with the following types of NO contacts:

- ⦿ reed switch;
- ⦿ mechanical pushbutton;
- ⦿ open-drain output.

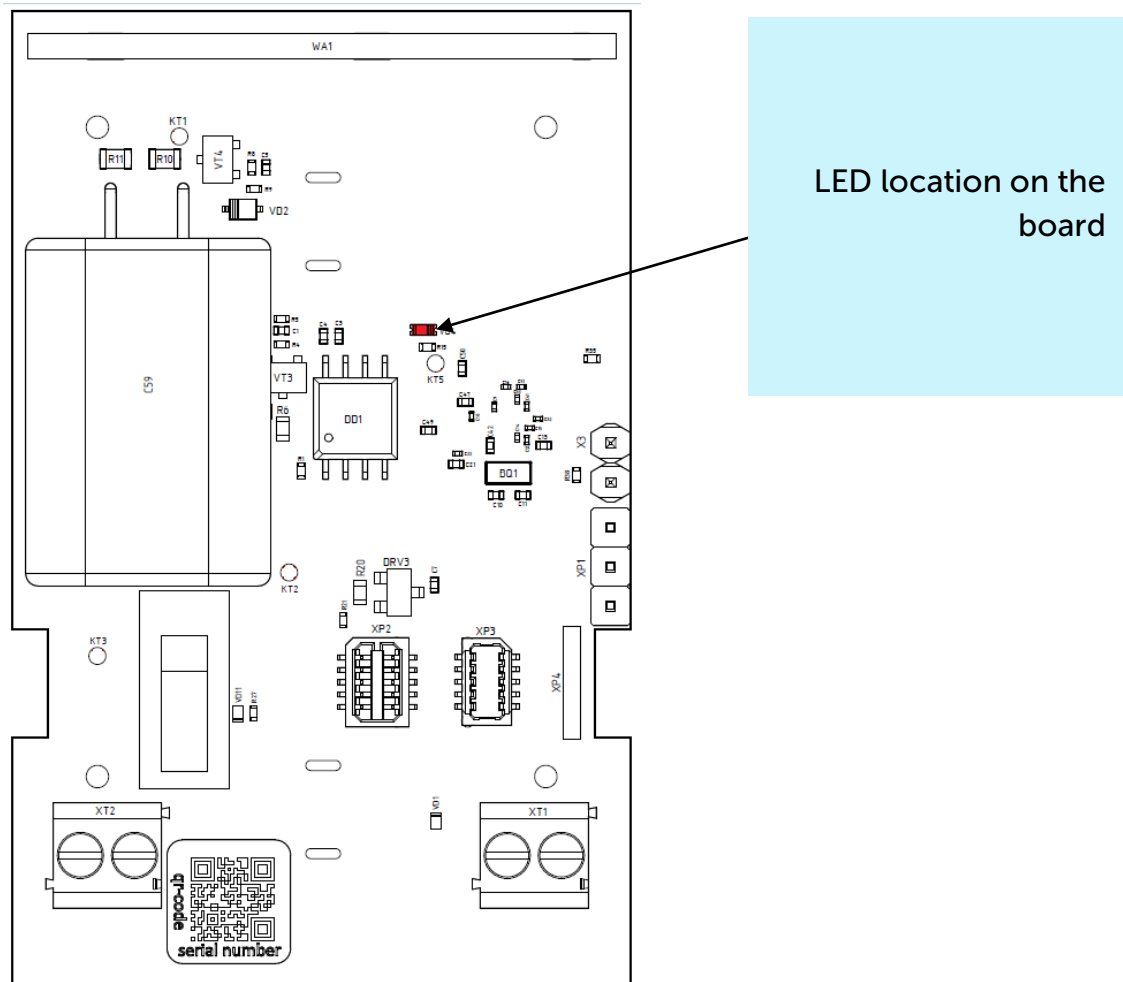
Polarity effects only "open collector" circuits. Open drain output must be connected to "Drv" contact and ground to "Sens".





Security input can trigger on short, open or both cases. It is configured by the "Vega LoRaWAN Configurator" application. Should the security input triggering, the device is activated and sends an alarm message to the network.




When thermistor connecting you should to configure sending data parameters in "Vega LoRaWAN Configurator" application.

INDICATION

The device has a single red LED indicator located on the board. The indicator is used only during device activation in the LoRaWAN network and when switching between operating modes.



| LED SIGNAL | | MEANING |
|---|--|---|
|  | 2 flashes after 5 sec pause, then flashing for 2 sec | Device startup after power-on |
|  | Uniform short flashes of 1 sec | Depassivation process in progress after storage |
|  | Short flashings | Linking to the network in progress |
|  | 1 long flash for 5 sec | Device successfully connected to network and in active mode |

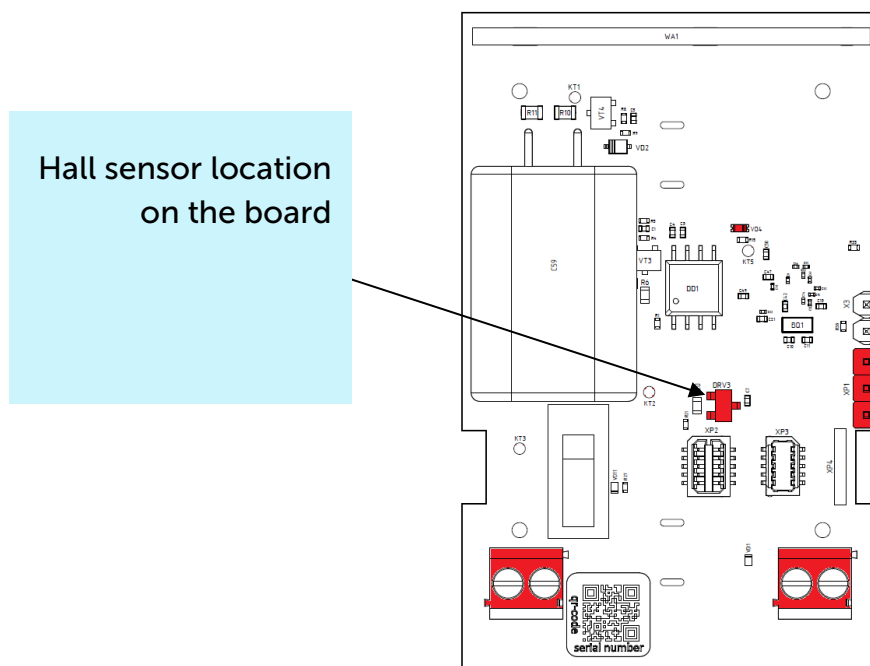
| | | |
|---|-------------------------------|---|
|  | Three flashings each by 3 sec | Linking to the network has been failed |
|  | Steady light | Data exchange with configurator in progress |
|  | Flashing | Firmware update in progress |



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

HALL SENSOR

A Hall sensor is located on the top side of the board. The Hall sensor is activated in the presence of a magnetic field.



| MAGNET EXPOSURE DURATION | RESULT |
|--------------------------|--------------------------------------|
| ≥10 seconds | Device activation |
| 6..9 seconds | Network pairing start |
| 1..2 seconds | FSK radio or UART service connection |

FSK RADIO CHANNEL

For local wireless connection to a personal computer, the device supports switching between LoRa and FSK modulation modes, i.e., an FSK radio channel is implemented. To establish such a connection, an additional "Vega FSK Dongle" device is used, which connects to the computer's USB port. To read and modify the temperature sensor parameters, the "Vega LoRaWAN Configurator" software is used.

CONNECTING THE METER TO A PERSONAL COMPUTER

The FSK radio channel enables a local wireless connection (up to several tens of meters) to the temperature sensor for reading and modifying its parameters.

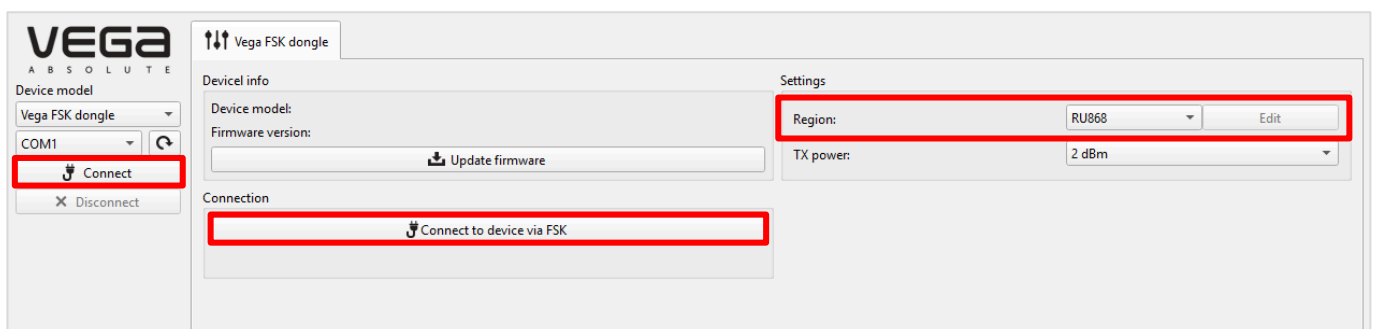
For FSK connection, you will need:

- A "Vega FSK dongle" device connected to the USB port of a personal computer;
- An FSK key, which is unique for each device and is contained in the QR code on the adhesive label, along with LoRaWAN[®] network activation keys and other identifiers.

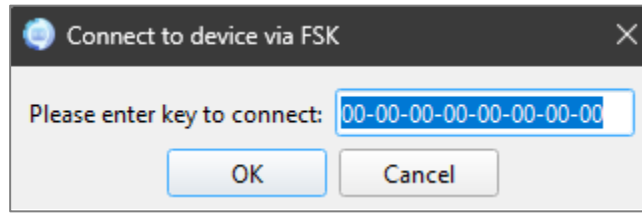
Connection procedure:

1. Connect the Vega FSK dongle to the computer's USB port.
2. Launch the "Vega LoRaWAN Configurator" program.
3. Click the "Connect" button in the left menu.

The program will automatically detect the device type, and the device selection menu will become inactive.



4. Click the "Get Settings" button and ensure that the frequency plan matches the frequency plan of the device to which FSK connection is planned.
5. Click the "Connect to device remotely via FSK" button.
6. In the window that appears, enter the FSK key of the required meter and click "OK".



7. Hold a magnet near the device's Hall sensor for 1-2 seconds or wait for automatic connection (the device activates the FSK radio channel once every two minutes).

A connection to the device will be established as if it were connected via USB, except that a window with FSK communication parameters will appear in the left menu. All settings are performed the same way as with a USB connection, using the "Get Settings" and "Apply Settings" buttons.



During an active communication session using the FSK radio channel, data transmission to the LoRaWAN[®] network will be unavailable. If device settings have been changed, the device will restart the network registration procedure immediately after the session with the "Vega LoRaWAN Configurator" program is completed.

CONNECTING THE METER TO A PERSONAL COMPUTER VIA Vega USB-UART CONVERTER

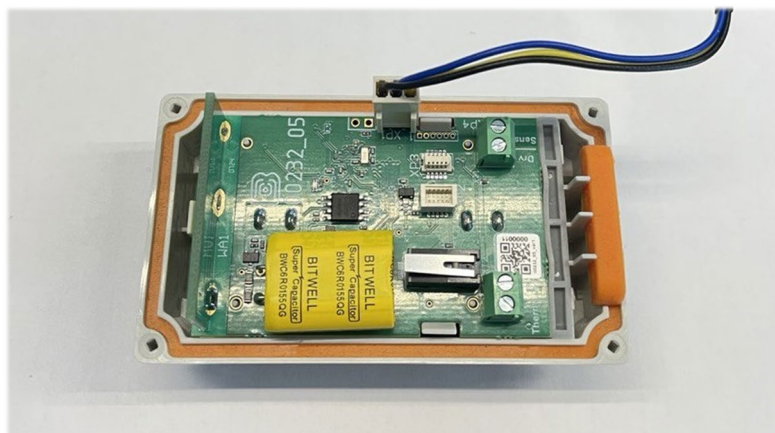
The Vega USB-UART converter enables a wired connection to the meter for reading and modifying its parameters. For connection, it is necessary to pre-install the MCP2200 COM port driver, which can be found [on the website](#) in the "Downloads" section

For connection you will need:

- a "Vega USB-UART converter" device connected to the USB port of a personal computer;

Connection procedure:

1. Connect the "Vega USB-UART Converter" to the service UART connector on the device board.



2. Connect the converter to the USB port of the personal computer.
3. Launch the "Vega LoRaWAN Configurator" program.
4. Bring a magnet close to the Hall sensor and wait for the LED signal.


In the "Vega LoRaWAN Configurator" program, switch to "Expert" mode in the left menu, select the device model and the assigned COM port. After that, click the "Connect" button.

MOUNTING RECOMENDATIONS

To provide the stable radio between the gateway and the end device is recommended avoiding the device installation in the places which are barriers for the radio signal getting through like a reinforced floors and walls, a basement, an underground facilities and wells, a metal case etc.

The necessary stage for the network deploying including a big quantity of end devices is a radio planning work with nature experiments.

For mounting you will need:

- ⦿ cross-shaped screwdriver ;
- ⦿ awl;
- ⦿ wire stripper;
- ⦿ laptop.

Step by step mounting be like:

1. Setting the devices and connecting them to the network are usually carried out in the office (see Network Deployment Manual).
2. Determination of suitable places for mounting at the object with a network tester.
3. De-energizing the connected equipment, metering devices, etc.
4. Making holes in the silicone gasket for wires - strictly according to the number of wires. It must be remembered that the wire must be of circular cross-section and no more than 3 mm in diameter.



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 TD-11 rev.2 contacts.
6. Device launching – switching to the "Active" mode and registration in the network.

4 COMMUNICATION PROTOCOL

This part describes the TD-11 rev.2 communication protocol with LoRaWAN® network.



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


TRANSMITS THE FOLLOWING TYPES OF PACKETS

1. Packet with current readings

Sent regularly on LoRaWAN® port 2

| Size in bytes | Field description | Values | Data type |
|---------------|---|--|-----------|
| 1 byte | Packet transmission reason: 00 – Time-based transmission 01 – Security input triggered 02 – Tamper sensor triggered 03 – NTC sensor temperature exceeded set thresholds 04 – Threshold exceeded on pulse input 05 – On server request | 0-8 | uint8 |
| 1 byte | Battery charge, % | 0-100 | uint8 |
| 1 byte | Limit exceeded | «0» - no limit exceeded, «1» - limit exceeded | uint8 |
| 4 bytes | Timestamp of readings transmitted in this packet (unixtime UTC) | | uint32 |
| 1 byte | Device temperature, °C | | uint8 |
| 2 bytes | NTC sensor temperature in °C, multiplied by 10 | -550 to +1000 | Int16 |
| 1 byte | Lower temperature threshold of the sensor, °C | -55 to +100 | Int8 |
| 1 byte | Upper temperature threshold of the sensor, °C | -55 to +100 | Int8 |
| 4 bytes | Discrete input readings | Depending on the type (5th bit of the bit field): – pulse count, or – state: 1 – closed, 0 – open | uint32 |
| 1 byte | Input state (bit field) | | uint8 |



If thermistor is not connected to the TD-11 rev.2 (contacts «Therm» and «»), in the «Temperature» field will be sent an -1000 value for breakage or fault indication. In case of thermistor short circuit will be sent an -1270 value

"Inputs state" bit field decoding

| Bits | Field description | Value |
|------------|---------------------------------|--------------------------------------|
| 0 bit | Security input state | "0" – short, "1" – open |
| 1 bit | Tamper status (tamper sensor) | "0" – case not open, "1" – case open |
| 2 bit | Hall sensor 1 status (reserved) | "0" – not used |
| 3 bit | Hall sensor 2 status (reserved) | "0" – not used |
| 4 - 5 bits | Input mode | "0" – security, "1" – pulse |
| 6 - 7 bits | Not used | |

"Packet transmission reason" field codes

| Code | Value |
|------|--|
| 0x00 | Time-based packet transmission |
| 0x01 | Security input triggered |
| 0x02 | Tamper triggered (tamper sensor) |
| 0x03 | NTC sensor temperature exceeded set thresholds |
| 0x04 | Threshold exceeded on pulse input |
| 0x05 | On server request |

2. Settings packet

Transmitting on LoRaWAN port 3 when settings request command received, or device connected to the network

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

RECEIVES PACKETS OF THE FOLLOWING TYPES

1. Settings request packet

Sent by application on LoRaWAN port 3

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

In response to this packet, the device will return a packet with settings.

2. Packet with settings

Sent by application on LoRaWAN port 3, identical to such packet from device

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

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

Table of ID of TD-11 rev.2 parameters and these possible values

| ID of parameter | Description | Data length | Possible values |
|-----------------|--------------------------------|-------------|--|
| 4 | Confirmed uplinks | 1 byte | 1 – confirmed 2 – unconfirmed |
| 5 | Adaptive data rate | 1 byte | 1 – on 2 – off |
| 8 | Uplinks number of transmission | 1 byte | from 1 to 15 |
| 16 | Communication period | 1 byte | 1 – 1 hour 2 – 6 hours 3 – 12 hours 4 – 24 hours 5 – 5 minutes 6 – 15 minutes 7 – 30 minutes |

| | | | |
|----|---|---------|---|
| | | | 8 – 4 hours 9 – 15 seconds 10 – 30 seconds 11 – 1 minute 12 – 2 minutes 13 – 3 minutes 14 – 4 minutes 15 – 3 hours 16 – 9 hours |
| 38 | Guard input, Send alarm message | 1 byte | 1 – on short 2 – on open 3 – short and open |
| 49 | Data collection period | 1 byte | 1 – 1 hour 2 – 6 hours 3 – 12 hours 4 – 24 hours 5 – 5 minutes 6 – 15 minutes 7 – 30 minutes 8 – 4 hours 9 – 15 seconds 10 – 30 seconds 11 – 1 minute 12 – 2 minutes 13 – 3 minutes 14 – 4 minutes 15 – 3 hours 16 – 9 hours |
| 55 | Time zone, in minutes | 2 bytes | from -720 to 840 |
| 78 | Data collection period when temperature is out of range | 1 byte | 1 – 1 hour 2 – 6 hours 3 – 12 hours 4 – 24 hours 5 – 5 minutes 6 – 15 minutes 7 – 30 minutes 8 – 4 hours 9 – 15 seconds 10 – 30 seconds 11 – 1 minute 12 – 2 minutes 13 – 3 minutes 14 – 4 minutes 15 – 3 hours 16 – 9 hours |
| 79 | Immediately send data when temperature is out of range | 1 byte | 0 – off 1 – on |
| 80 | Temperature low threshold | 1 byte | from -55 to +100 |
| 81 | Temperature high threshold | 1 byte | from -55 to +100 |

5 SAFE OPERATION RECOMMENDATIONS

GENERAL RECOMMENDATIONS

When connecting the device, the requirements of the "Rules for Electrical Installations", "Rules for Technical Operation of Electrical Installations of Consumers", Federal norms and rules in the field of industrial safety, requirements of this operation manual, and other regulatory documents governing the use of electrical equipment in hazardous (explosive) areas should be followed.

Installation and operation of the device must be carried out in accordance with the requirements of this operation manual, GOST 31610.0-2019 (IEC 60079-0:2017), GOST IEC 60079-14-2013.

Only personnel familiar with its functional structure, diagrams, installation and operation documents, who have undergone training and knowledge verification in occupational safety, are permitted to install and maintain the device.

Device installation is permitted only in a de-energized state. Connection of supply voltage to the device must be performed only after its complete installation.

Only serviceable hand tools are permitted for installation work. Hand tools must not have damage (cracks, chips, dents) or burrs at the tool gripping point by the operator's hand, cracks and burrs on the knurled part of the handles.

To prevent the appearance of electrostatic charges on the device case surface in hazardous areas, convective flows of the surrounding environment around the case must be avoided. Wiping (cleaning) of the surface is permitted only with a damp, clean cloth.

Compliance with safety regulations is a necessary condition for safe device operation.



PROHIBITED

- ⦿ **Operating the device at ambient temperatures that do not correspond to the case specifications;**
- ⦿ **Operating the device without cable glands;**
- ⦿ **Using non-circular cross-section cables for connection;**
- ⦿ **Using cables with an outer diameter that does not match the specifications of the cable glands;**
- ⦿ **Opening the device case in a hazardous (explosive) area**

All device operating conditions must be within the acceptable limits specified in the "Technical Specifications" section.

This device is designed to monitor temperature at various points of technological processes in the oil, gas, chemical industries, and other sectors by means of a remote thermistor connected to a temperature sensor with subsequent transmission of temperature values to the LoRaWAN® network. Use of the device for purposes other than those specified in this manual constitutes a violation of operating rules. The manufacturer assumes no responsibility for any damage resulting from improper use of the device.

Operation of the Vega TD-11 rev.2 device must be performed by trained personnel (according to GOST IEC 62368-1).



The device isn't intended for use by children or in areas where children may be present



**Prohibited:
independent repair of the device, making changes to the device design,
installation of any software (except for the producer's software)**

Unprofessionally performed repair work or installed third party software can result in device failure, personal injury, and property damage.



The producer does not assume liability for unpredictable effects resulting from the use of third party software on the device

ELECTRICAL SAFETY



Do not operate the device near an open flame or direct sunlight. Doing so may result in overheating and fire. The device should be used at air temperatures range from -40 °C (-40 F) to +85 °C (185 F)

If a fire is detected, immediately stop using the device and eliminate the fire. After that, the device should be sent to the producer for diagnostics (See the Warranty section for the producer's contacts).

Don't allow foreign objects to get into the device case during operation, as this may result in short circuits and fire. Don't operate the device with the case open or damaged.

Prohibited to immerse the device case in water, it is not recommended to put it under water jets.



Don't touch wires, circuit boards, or the device enclosure with wet hands

Don't use the device after it has been exposed to water. Doing so may result in injury or damage to the device and cause it to malfunction. In such cases, contact the producer's technical support.

BATTERY OPERATION SAFETY RULES



This device uses a ER17505 3600 mAh 3.6V battery. The use of batteries of other types is prohibited



The effective capacity of the battery decreases when operated in low-temperature conditions

When installing the battery, observe polarity.

The battery must not be used in conditions of extremely low air pressure; this may lead to explosion or leakage of flammable substances.

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

Heating and/or exposing the battery to open flame and/or placing it near open flame and/or deforming it is prohibited.

The battery supplied with the device contains lithium.



Do not open or attempt to recharge the battery; this may result in explosion, fire, or leakage of flammable substances

In case of battery fire, do not inhale combustion products and do not touch the battery with bare hands. This may cause chemical burns.

If electrolyte from the battery gets into the eyes, immediately rinse the eyes thoroughly with plenty of clean water and seek medical attention as soon as possible.

SAFETY RULES IN CASE OF DAMAGE TO THE ENCLOSURE

During normal operation of the device, the housing is not dangerous. If the case is mechanically damaged, sharp edges and corners may form, posing a potential hazard to the user. In this case, stop using the device and send it to the producer for replacement of the housing.

When operated in accordance with this manual, the device does not pose a danger to person.

RADIATION INFORMATION

When used correctly and following the installation recommendations, the device has no harmful effects on the person body and electrical equipment.

TROUBLESHOOTING COMMON ISSUES

If you observe smoke, fire, sparking, abnormal heating, functional malfunctions, or moisture ingress into the enclosure, immediately disconnect the battery pack to de-energize the device and contact the manufacturer's technical support.

6 STORAGE AND TRANSPORTATION REQUIREMENTS

Vega TD-11 rev.2 shall be stored in the original packaging in heated room at temperatures +5 °C to +40 °C and relative humidity less than 85%.

The device 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

Temperature sensor is delivered complete with:

Temperature sensor Vega TD-11 rev.2 – 1 pc.

External thermistor – 1 pc.

Screw – 4 pcs.

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 is 36 months.

The warranty does not apply to batteries.

The warranty period of operation is calculated from the date of sale marked in the product factory certificate, and from the release date when such a mark is absent. During the warranty period, the manufacturer is obliged to provide repair services or replace a failed device or its components.

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.).

The average service life of the product is 7 years.

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

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

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

e-mail: remont@vega-absolute.ru

| DOCUMENT INFORMATION | |
|----------------------|-------------------------------------|
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Revision History

| Revision | Date | Name | Comments |
|----------|------------|-------------|---|
| 01 | 14.09.2017 | KEV | Document creation date |
| 02 | 13.03.2018 | KEV | Changes in specification |
| 03 | 22.01.2019 | TII, KEV | Changes in specification, in communication protocol, in device operation logic, in warranty, "Marking" part added |
| 04 | 24.01.2019 | KEV | Inaccuracy in communication protocol fixed – packet type for packets with settings and request of settings |
| 05 | 10.06.2019 | KEV | Settings 80 and 81 corrected |
| 06 | 10.08.2021 | PAV | Scheduled revision of documentation. New warranty conditions, new parts |
| 07 | 23.08.2022 | KMA | Minor edits |
| 08 | 08.04.2026 | NEE | <p>Device version changed (rev.2). The following sections/subsections have been completely updated: "1 Description and operation", "Device specification", "Device appearance", "Contacts description", "Indication", "Mounting recommendations", "4 Communication protocol". Section "Device sensors" has been removed. New sections/subsections have been added: "Hall sensor", "FSK radio channel", "Connecting the meter to a personal computer", "Connecting the meter to a personal computer via Vega USB-UART converter", "5 Safe operation recommendations".</p> |
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