User Guide

Evvos Sigfox-Enabled Wireless Sensor Data Acquisition Devices

OSPURX.AAA | OSCURX.AAA | OSVURX.AAA
OSTURX.AAA | OSAURX.AAA
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Preface and Safety

Thank you for choosing the Sigfox-Enabled Wireless Sensor Data Acquisition Device by Evvos.
This document describes how to setup the Device.
Before using the device, please, read this user guide thoroughly.

**WARNING**

Ensure installation of the Device meets applicable state and national electrical code requirements. The installation of the Device should only be performed by a qualified installer or an authorized factory representative.

Use only batteries and/or battery packs recommended by Evvos.

Ensure your Device model supports external power before connecting it to external power supply. Do not exceed the defined voltage of 7-28Vdc max when connecting the Device to an external power supply.

Contains no user serviceable parts.

Unauthorized modification to device or supplied accessories may damage devices and void warranty.

This product is not intended for use in hazardous locations.

Do not install or mount the Device on high vibration equipment.

To prevent static discharge, wipe with damp cloth only.

Disconnect battery when device is not in use.

Document Revision

<table>
<thead>
<tr>
<th>Revision #</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.12</td>
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</tr>
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</tr>
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<td>Oct-2018</td>
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</tr>
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</table>

Symbols

- **WARNING**
- **NOTE**
- **HINT**
Product and Cloud-based Integration Services

Portal Overview

Out-of-the-box connectivity
No network equipment necessary to connect sensors. No setup needed to start using your devices. Just select sensors, turn on your device, and immediately start collecting data.

Cost effective
Low cost per sensing point due to the possibility to connect multiple sensors to one device. Reduced total cost of ownership thanks to Low-Power Wide-Area Network connectivity.

Very low energy consumption
Increased battery life expectancy. Minimized environmental impact and reduced device maintenance. Depending on your use case, batteries will last for several years.

Powerful cloud integration services platform
Scalable integration services platform, capable of processing and storing data from millions of sensors. RESTful APIs and message relaying for easy integration with your apps.

Highlights
- Plug’n’Play – connect sensor, turn device on and start receiving sensor data
- 2 x analog inputs + 1 x discrete/pulse counter input
- Analog input: Voltage (0-10V)
- Analog input: Current (4-20mA)
- Discrete input, dry contact, open-drain output, and pulse counter – logic level (TTL/CMOS) compatible
- Supports 7-28 Vdc external power (optional, add-on board required)
- Resolution 12-bit / 16-bit
- Ingress protection class IP66
- Operation temperature range -20 °C to +70 °C
- RC1, RC2, RC3 and RC4
Hardware Overview

- Antenna
- 4x Quick Assembly Screws
- LED Indicator
- Pressure Compensator
- 3x Cable Glands
- Magnetic On/Off/Reset Button
- Micro USB Port
- Battery Connector
- Extension Header Connector
- Internal On/Off/Reset Button
- Terminal Block for Sensors
- Battery Plug
- Battery Cable Clip
- Battery Holder
- Silicon Seal
- Light Pipe for LED Indicator
Modes of operation

Inactive mode

OneSense is switched off. No measurements are conducted. All electronic modules except the real-time clock are in lowest power consumption state to preserve battery. The inactive mode should be engaged during transportation or long-term storage.

Operational mode

OneSense is switched on. Measurements and wireless transmissions are conducted at regular intervals defined by the user or by the firmware revision. Operational mode consists of several states that are automatically switched between during normal operation: sampling, transmission and idle states.

In sampling state OneSense powers and reads the connected sensors. In transmission state, all gathered and processed sensor data is parsed into a Sigfox message and transmitted wirelessly to an antenna. The idle state takes up the remaining 95% of the operational cycle. Idle state is optimized for minimal power consumption.

Bootloader mode

Some versions of OneSense support firmware upgrade via USB. Forcing a device into bootloader mode activates all necessary routines to securely flash the new firmware. This mode can only be activated manually by the user.

PC communication mode

Implemented only in device versions with USB. Many configuration parameters of OneSense are accessible by the user via a configuration menu. Options like intervals between Sigfox transmissions, clock setting, alarming, sensor selection, and device diagnostics.

Hardware reset mode

This mode overrides all routines in progress and resets the internal microprocessor and the RF module. Hardware reset is used to engage bootloader mode. Furthermore, it is easy and effective way to clear any suspected errors.
Operation Algorithm

LED Indicator light

OneSense is equipped with multicolor LED indication. Some versions of OneSense have acoustic indication. To preserve battery, LED and the acoustic indicator engage only during change of device state or user interaction.

LED indicator

LED can light in red, green or yellow. Yellow indicates a transient state (initialization/reset/bootloader) that will automatically be transferred to stationary state (any mode of operation except for Hardware Reset Mode). PC communication mode and loading new firmware is unavailable in device versions without USB port.

Device Switch-on/off

Switching on/off is done by the magnetic or the internal electromechanical button. At light-up the LED indicates the current state for approximately 1.5 sec. This helps the user find out the state of the device without interrupting its operation. If the magnet is held in place (or the internal button is being pressed) for more than a 1.5 sec. device switches states according to the new LED color.

NOTE

On every switch-on (entering Active mode) OneSense sends a Welcome message to test network coverage. Battery status is also transmitted with every Welcome message.
Countdown to Hardware Reset

Full hardware resets of microprocessor and RF-module occur if the magnet is held in place (or the internal button is being pressed) uninterruptedly for approximately 8 sec. During the first 3-5 sec. device is switched on/off (refer to “Device Switch-on/off section”) followed by yellow colour blinking until hardware reset takes place or button is released prematurely.

Activation Window for Bootloader Mode + Bootloader Mode Engaged

Activation of this mode can only be executed only after a device has been reset. Yellow light for approximately 3 sec., followed by yellow blinking indicates open window for activating bootloader mode. If the magnet is held in place (or the internal button is being pressed) continuously during the blinking phase a bootloader mode is entered successfully indicated by red light. If no further actions are done the red light is off in approximately 20 sec. and device goes through reset and initialization and enters a stationary on/off state (section “Stationary state after reset”). During this reset the activation window for bootloader mode is opened again indicated accordingly. Refer to section Loading Firmware for the corresponding procedure once the bootloader mode is activated.

Device Initialization

After every reset, the device goes through initialization for approximately 2 sec. indicated by yellow light. Device is non-responsive to user commands during initialization.

Stationary State after Reset

Device enters stationary state immediately after initialization. The stationary state is indicated by long light followed by multiple fast blinking.

PC Communication Mode Engaged

In bootloader mode or during operational mode (regardless if device is on/off) a successful connection to PC is indicated by constant green light throughout the course of the connection. In bootloader mode: once PC connection is engaged (LED becomes green) the current firmware is automatically erased in the microcontroller. After successful firmware is loaded, the device resets to enter a stationary on/off state indicated accordingly. In operational mode: green LED is on for successful PC connection and goes off when the USB cable is disconnected.
Welcome message transmission

On every switch-on (entering Active mode) OneSense sends a Welcome message to test network coverage. Battery status is also transmitted within this message.

Low Battery Indication

If battery charge is low, the device will automatically switch off to preserve battery. On user attempt to switch device on, the red LED blinks fast in 4 packets to indicate low battery. Device then remains off until battery is recharged or replaced.

No firmware state

(Activation Window for Bootloader Mode)

Available only on devices with USB port. The current firmware is erased automatically if a successful PC connection is established while in bootloader mode. If the PC connection is cut off before a new firmware is loaded, the device indicates this erroneous state with continual fast red blinking. To load new firmware, repeat the corresponding procedure.

WARNING

Do not store device while in “no firmware state” as there is no low power mode available and battery may be damaged by excessive discharging.
Sensor Wiring for OneSense Pulse and Voltage 0-10Vdc

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUX</td>
<td>Vbat</td>
<td>Direct access to unregulated battery voltage. Do not use</td>
</tr>
<tr>
<td>A</td>
<td>COM</td>
<td>Common terminal</td>
</tr>
<tr>
<td>B</td>
<td>12Vdc</td>
<td>12Vdc regulated supply voltage for sensors (channel 1)</td>
</tr>
<tr>
<td>C</td>
<td>5Vdc</td>
<td>5Vdc regulated supply voltage for sensors</td>
</tr>
<tr>
<td>D</td>
<td>12Vdc</td>
<td>12Vdc regulated supply voltage for sensors (channel 2)</td>
</tr>
<tr>
<td>E</td>
<td>Analog channel A</td>
<td>Connection to sensor 1 voltage output pin (10V max)</td>
</tr>
<tr>
<td>F</td>
<td>Sensor 1 COM</td>
<td>Connection to sensor 1 GND/COM (negative) pin</td>
</tr>
<tr>
<td>G</td>
<td>Analog channel B</td>
<td>Connection to sensor 2 voltage output pin (10V max)</td>
</tr>
<tr>
<td>H</td>
<td>Sensor 2 COM</td>
<td>Connection to sensor 2 GND/COM (negative) pin</td>
</tr>
<tr>
<td>I</td>
<td>Unused</td>
<td>Unused</td>
</tr>
</tbody>
</table>

Table 5: Terminal functions OneSense Pulse and Voltage 0-10Vdc

(1) Use either G or M depending on the sensor output scale. Do not use both terminal pins simultaneously

**WARNING**

Observe power supply polarity of sensors. Reverse polarity may permanently damage a sensor.

Do not apply above 15V on terminals E, G and above 5V on any other terminals. Failure to comply may result in a permanent damage to OneSense.

Observe the specified power supply voltage for the sensors. Undervoltage may result in incorrect operation of a sensor while overvoltage may damage sensors.

**NOTE**

If multiple sensors are powered by OneSense with 5V and 12V the peak net current consumption must be below 40 mA.

**HINT**

To maximize battery life, do not connect more sensors than explicitly needed for your use case.

To ensure maximal accuracy, use a 0-10V interface version if both 0-5V and 0-10V versions of your sensors is available.
Sensor Wiring for OneSense Pulse and Current 4-20mA

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUX</td>
<td>Vbat</td>
<td>Direct access to battery voltage. Do not use</td>
</tr>
<tr>
<td>A</td>
<td>COM</td>
<td>Common terminal</td>
</tr>
<tr>
<td>B</td>
<td>Ext PS (+)</td>
<td>Positive electrode of external power supply</td>
</tr>
<tr>
<td>C</td>
<td>Sensor 2 (+)</td>
<td>Power supply pin of sensor 2 (see note)</td>
</tr>
<tr>
<td>D</td>
<td>Sensor 1 (+)</td>
<td>Power supply pin of sensor 1 (see note)</td>
</tr>
<tr>
<td>E</td>
<td>Analog channel A</td>
<td>Sensor 1 current input</td>
</tr>
<tr>
<td>F</td>
<td>Ext PS (-)</td>
<td>Negative electrode of external power supply</td>
</tr>
<tr>
<td>G</td>
<td>Analog channel B</td>
<td>Sensor 2 current input</td>
</tr>
<tr>
<td>H, L</td>
<td>COM</td>
<td>Common terminal</td>
</tr>
<tr>
<td>I, J, K, M, P</td>
<td>Unused</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>Pulse input (+)</td>
<td>Pulse counter input (5V max, square waveform)</td>
</tr>
<tr>
<td>O</td>
<td>Pulse counter (-)</td>
<td>Pulse counter GND</td>
</tr>
<tr>
<td>M</td>
<td>Unused</td>
<td>Do not use</td>
</tr>
</tbody>
</table>

Table 6: Terminal functions OneSense Pulse and Current 4-20mA

**NOTE**
Sensor configuration of OneSense Pulse and Current 4-20mA: max. 2 X sensors with current interface (4-20mA, 0-20mA, 2-10mA, etc.) + external power supply (3-28Vdc) + 1x pulse counter.
In case two sensors are connected to the device: a short-circuiting bridge wire of small length must be screw-in between terminals B and C together with the sensor wires. This way both sensors will be powered by the external power supply.

**HINT**
A 4-wire cable can be used to carry both external power supply and pulse signal.

**Requirements for an external power supply cable**
1. Outer diameter: max 6.5mm
2. 2-wire or 4-wire cable (see HINT)
3. Wire gauge: 14-18 AWG
4. Wire type: copper strands
5. Shielding: not required
6. Outer sheath: PVC, PUR (for outdoor conditions)
7. Length: unspecified

**HINT**
Split the copper strands of the positive power supply wire into 2 groups to connect simultaneously to both terminal B and C without the need of bridge wire.

**Requirements for external power supply source**
1. Voltage: 28Vdc max
2. Output power: > 1W (recommended)
3. Overvoltage protected: recommended

**WARNING**
Use only DC external power supply. Any AC power applied directly may damage OneSense.
Enclosure disassembly

1. push down
2. rotate 1/4 turn

There are 4 quick assembly screws at the corners of a device lid.

HINT
Use Phillips-head screwdriver to open/close device lid.

Wiring sensor to terminal block

OneSense is equipped with pluggable terminal connectors to ease the process of wiring sensors to the device.

HINT

Unplug the terminal blocks from the header before beginning sensor wiring. Thus, pin numbering will be visible.

Pluggable terminal blocks

Front view
Rear view

The terminal blocks can be conjoined together to form longer arrays.

NOTE
Do not insert to neighboring blocks without conjoining first.
Steps to wire a sensor
1. Open OneSense. Loosen the caps of the cable glands
2. Sensor cable must end with bare wires.
3. Make sure that sensor wires are cleaned of their insulation at 3-4 mm
4. Unplug terminal blocks
5. Insert sensor wires through one of the cable glands of the device
6. Screw-in the wires to the terminal block(s) observing wire function and terminal marking
7. Connect wired terminal blocks to terminal pins observing markings.
8. Tighten caps of cable glands around sensor cable
9. Close OneSense’s lid
10. Switch device ON

Turning a device ON

1. hold magnet close to the on/off symbol
2. observe LED indication

NOTE
Acoustic signaling accompanies the change of LED colour in some versions of OneSense

HINT
See LED indication description for more information on all device states.

Switch on/off: hold magnet on place until LED colour has changed (approximately 3 sec.)
Reset: hold magnet on place for approximately 8 sec.

Installing devices
Evvos devices are designed with installation flexibility in mind and can be installed outdoors as well as indoors. In order to achieve optimal RF performance follow the recommendations below.

Recommendations
1. Install a device at least 1 m (or more) above ground to extend RF range.
2. Regardless of the device orientation, always point antenna in vertical (upward) direction.
3. Use only the antenna supplied with your device.
4. When installing outdoors, install as far away as possible from surrounding buildings to maximize RF range.
5. When installing indoors, install as close to a window as possible to extend RF range.
6. Always use the rubber plugs your received with your device. Properly installed rubber plugs prevent moisture ingress in a device, through unused cable glands.

To be avoided

1. Whenever possible, avoid installing a device very close to, or below big metal objects (sheet metal fences, liquid tanks, large-diameter pipes, etc.) as this may impact RF range.
2. Whenever possible, avoid installing a device within metal enclosures/chambers (sheet metal garages, industrial all-metal chambers, Faraday cages, inside truck trailers, in metal liquid tanks, etc.) as this may impact RF range.
3. Whenever possible, avoid installing a device in deep underground locations as this as this will impact RF range.
4. Whenever possible, avoid installing a device under thick foliage as this may impact RF range.

WARNING

Do not turn device on without antenna mounted beforehand, as this may lead to damages of RF circuitry.

HINT

Welcome message can be used to test Sigfox network coverage on any installation location. A welcome message is sent on every time a device is turned on.

Battery replacement/charging

Battery holder is located on the inner side of a device lid.

WARNING

Observe closely battery polarity. Reverse polarity may cause permanent damage to the device and the battery itself.
Use only batteries with the specified chemistry for your device. Using other chemistries will result in over/undervoltage and may cause operation issues and device damage.
Do not recharge Alkaline and Lithium non-rechargeable batteries. Failure to comply may result in fire hazard and severe burns.
Do not short-circuit batteries as this may cause fire hazard and reduced operational life.
Do not install new and used batteries together (for Alkaline batteries)

HINT

On all type of batteries to be used with OneSense the negative electrode is the flat side of the cylinder while the positive electrode is protruding. Usually there are markings on the batteries (+) and (-) close to the electrodes.
Remove batteries during long-term storage or transportation.
Correct battery polarity is shown on the inner bottom side of the battery holder within your device.
Wire colours coming from OneSense’ battery holder show correct battery polarity: red (or orange, or brown) means positive (+) while black (or green, or blue) means negative (-)
Correct battery polarity is marked with (+) and (-) on the device board next to the corresponding pins on the battery connector.
Charging rechargeable batteries through the USB port

The internal charger of OneSense includes special function for charging discharged Li-Ion batteries (under 2.8V) to their full capacity.

**NOTE**
Dispose of batteries only on designated places. Batteries contain toxic substances harmful to the environment.

To reduce the probability of fire hazard caused by short-circuiting most Li-Ion batteries size 18650 are designed with only slightly protruding positive electrode.

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### Loading Firmware

All versions of OneSense with USB port support flashing the firmware. This allows users to load the most recent firmware revisions and provides additional functionalities. The process of firmware loading takes place on both device and PC sides and requires altogether three operations:

a. Setting OneSense into **bootloader mode**;
b. Engaging **USB communication** between the device and a PC;
c. Running the **Evvos loading program** on the PC (free downloaded from Evvos’ web site: [https://www.evvos.com/downloads/](https://www.evvos.com/downloads/)).

**NOTE**
OneSense devices are not programmable with user-designed firmware. Loading such firmware will cause loss of functionality and may result in permanent device damage. In case a custom firmware is needed, please, contact Evvos’ sales team at sales@evvos.com.

**HINT**
Refer to the LED indication description for Activation window for bootloader mode, Bootloader mode, PC communication mode engaged.

Below is the sequence of required steps to load new firmware from a PC to a OneSense:

Hold the magnet on the on/off symbol until LED is constantly red (for approximately 12 sec). Then connect the USB cable you have received with your order and proceed with the steps on the PC side.
Current device state

LED blinks slowly in yellow

Hardware reset

LED is yellow

Activation window for bootloader mode

LED blinks quickly in yellow

Activated Bootloader mode

LED is red

Connect USB cable between device and PC (within 20 seconds)

Bootloader: device side

Automatic transition if no USB connection

Device off state

Disconnect USB cable

Open loading program

Select COM port

Select firmware to load

Load firmware to device

Bootloader: PC side

Hold magnet on the on/off symbol to induce hardware reset

Hold magnet on the on/off symbol to activate bootloader mode

Remove magnet from the on/off symbol

LED blinks slowly in yellow

LED blinks quickly in yellow

LED is red

LED is green

USB connection

Automatic transition after loading is completed
Dimensions
OneSense Configuration Options

Some of the options on OneSense devices equipped with USB port can be reconfigured. This is very useful during POC (proof-of-concept) projects as it allows users to easily change how often sensor data will be acquired and transmitted, set the date, time, increase and decrease sensor settling time etc.

Perquisites:
- OneSense device with USB port and batteries
- USB data cable (supplied by Evvos)
- Windows PC (HyperTerminal or Putty) or MAC computer (Serial)

How to access the USB Menu:
1. Open the lid
2. Connect batteries and wait until the LED stops flashing
3. Connect the USB cable to a PC or MAC
4. Start HyperTerminal or Putty (Windows PC) or Serial (MAC)
5. Connect the other end of the cable to OneSense. The OneSense LED will turn on (green). If the LED does not turn on or is red or orange, disconnect the USB cable from OneSense and connect it again.
6. Window only - make sure Windows OS does not block the USB port and find out the COM port assigned to OneSense (Device Manager). MAC only – the device will be displayed in Serial.

Once you connect to the device a screen will all available options will be displayed. The list of available options will depend on the device model – eg. OneSense Pulse, Voltage, Current, Temperature or Environment and Agriculture.

WARNING

Resetting the device or disconnecting batteries will set all variables to their default (factory) values. After completing your tests/POC, please contact us to request a firmware will you preferred settings.
[0] Factory Setting

Restores default values for all user-selectable variables to their factory values.

[2] Sigfox transmission rate

Configures the interval between consecutive transmissions of Sigfox messages containing sensor data. Sensor readings are performed just before every Sigfox transmission. Pulse counting (if available) is continuously operational.
[3] System clock

Set time and date

Select option: 3
Change settings? (y/n)
01/00/20120 (DD/MM/YY)
weekday:4
16:05:05

Select option: 3
Change settings? (y/n)
01/00/20120 (DD/MM/YY)
weekday:4
10:00:16

[3]>> Clock settings
Set year ('00-'99): 18
Set month (1-12): 10
Set date (1-31): 5
Set weekday (1-7): 5
Set hour (0-23): 16
Set min (0-59): 05
Set sec (0-59): 00

Press any key to set:
05/10/2018 (DD/MM/YY)
weekday:5
16:05:05

[4] Device info

Technical information about device hardware, installed firmware, on-board RF module, ID, PAC and values for the most common settings.

```
EVVOS DEVICE INFO
Device type: OneSense E&A + GPS board
FW rev.: 2.8 for Automatic selection + EXPGN v3.0
Bootloader rev.: 30
Calib. value: 0.995
Sigfox transmission: 30 min.
GNSS Sigfox transmission: 10080 min.
Counter mode: accumulative
FMP: Environment & Agriculture
Use case: 3, rev 2.1, RHT (if any): xM2315

SIGFOX MODULE INFO
Software ver.: AX-Sigfox
Silicon rev. (upper): 8F
Silicon rev. (lower): 51
FW rev. (major): 1
FW rev. (minor): 1
Frequency band: FCC
FW VCS ver.: 0
Sigfox library ver.: UDL1-1.8.7
Device ID: [Redacted]
PAC: [Redacted]
```

(Press any key to exit)
[5] **SDI-12 command interpreter**

Direct user communication with SDI-12 sensors connected to the device. Refer to the datasheet of your sensor for more information on SDI-12 commands.

```
Select option: 5
[5]> SDI-12 command interpreter:
Enter SDI-12 command: q
q
Timeout!
Continue? (y/n):
```

[6] **SDI-12 address dispatcher**

Semi-automatic routine to assign addresses for multiple SDI-12 sensors to be connected to an Evvos device. Routine is applied for use cases supporting multiple SDI-12 sensors.

```
Select option: 6
[6]> SDI-12 address dispatcher:
Enter count of SDI-12 probes (1 to 9): 1
Connect SDI-12 probe at POSITION 1
Continue? (y/n):
```

[7] **AT command interpreter**

Direct user communication with the on-board RF module using AT-commands.

```
Select option: 7
[7]> AT command interpreter:
Please, wait...
Enter AT command: 1
ERROR: parse error
Continue? (y/n):
```

[8] **System clock calibration**

Lead/lag adjustment of the on-board astronomical clock.

```
Select option: 8
[8]> Clock calibration:
Current setting: +672226609
Continue? (y/n): y
Select (+/-): +
Enter value (1-99): 10
Save changes? (y/n):
```
[9] Device monitor

Data logging function for run-time cyclic reading of device status and battery voltage and logging these values directly to a PC through USB port and cable. This option does not transmit data over the Sigfox network.

[10] GNSS monitor

Data logging function for cyclic reading of GPS location and logging data directly to a PC data through USB port and cable. This option does not transmit data over the Sigfox network. Enabled only on devices with GNSS-compatible firmware and GNSS add-on board installed.


Configures the interval between consecutive transmissions of Sigfox messages containing GNSS location data. GNSS location is performed just before the Sigfox transmission.

[12] mV/uA monitor

Data logging function for cyclic reading of the connected analog output sensors and logging data directly to a PC through USB port and cable.
[13] Counter mode

Setting the counting dynamics of supported counters:
1. Resetting – counter value is cleared after each Sigfox transmission.
2. Accumulative – counter value is cleared only on device turn-on. Every next pulse increments the value until the max. possible value is reached. For 16-bit counters max value is 65535. After reaching max. value the counter is reset and starts from zero.

[XX] RTD sensors monitor

Data logging function for cyclic reading of the connected RTD type temperature sensors (Pt100/Pt1000, others) and logging data directly to a PC through USB port and cable. This option does not transmit data over the Sigfox network.

[XX] Thermocouple monitor

Data logging function for cyclic reading of the connected thermocouple and logging data directly to a PC through USB port and cable. This option does not transmit data over the Sigfox network.

[XX] 1-WIRE sensors monitor

Data logging function for cyclic reading of the connected 1-wire digital temperature sensors (DS18B20-based) and logging data

[14] Settling time for sensors

Time delay between sensor power-up and sampling measurement. Settling time ensures all transient processes within a sensor due to power-up are finished and thus the readings are within the specified sensor accuracy. Refer to the datasheet of your sensor for required settling (power-up) time.

Directly to a PC through USB port and cable. This option does not transmit data over the Sigfox network.

Default Values (factory settings)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigfox transmission rate</td>
<td>1x Sigfox message per every 15 minutes (96 messages per day)</td>
</tr>
<tr>
<td>GNSS transmission rate</td>
<td>1x Sigfox message per every 168 hours (once per week)</td>
</tr>
<tr>
<td>Counter mode</td>
<td>Accumulative</td>
</tr>
<tr>
<td>Settling time for sensors</td>
<td>200 ms</td>
</tr>
<tr>
<td>Analog resolution</td>
<td>12-bit</td>
</tr>
</tbody>
</table>
Environmental protection and electronic waste disposal

This symbol on the product(s) and/or accompanying documents means that used electrical and electronic equipment (WEEE) should not be mixed with general household waste. If you wish to discard this product please contact your local authorities or dealer and ask for the correct method of disposal. For proper treatment, recovery and recycling take this product(s) to designated collection points where it will be accepted free of charge. Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling. Contact your local authority for further details of your nearest designated collection point. Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.
Troubleshooting

Please ensure that:

1. Device has access to power (batteries) – batteries are installed, observing polarity, battery connector is connected to appropriate pins on the board or on the add-on board (if installed. Refer to page 15. Battery replacement/charging).
2. Batteries are charged or new (Refer to page 15. Battery replacement/charging).
3. Antenna is properly installed (SMA connector on the side). Use only an antenna supplied with the device.
4. Reset a device via the magnetic on/off/reset button (refer to page 6. Hardware reset mode).

If the problem persists contact your local distributor for further actions.
The following troubleshooting steps can be performed by an end user with certain level of technical knowledge. Some of the advices require reference to external information sources – sensor datasheet and Evvos device datasheet.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Description</th>
<th>Possible Cause</th>
<th>Troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>No welcome message</td>
<td>Device is installed in place and turned on but no welcome message is received within 1 minute.</td>
<td>Device may still be off.</td>
<td>Turn device on using the supplied magnet or the internal on/off/reset button (refer to page 15. Turning a device on.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing or loose antenna.</td>
<td>Ensure the antenna is properly installed. Do not force/overtighten antenna onto its RF-connector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sigfox network coverage may not be sufficient.</td>
<td>Change device position. Try rotating device clockwise 45 degrees or less. Turn device off and then on again. Change installation location (refer to page 14. Installing devices).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low battery voltage.</td>
<td>Recharge battery (if rechargeable) or replaced with new one (if non-rechargeable). Refer to page 15. Battery replacement/charging.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accidental MCU error.</td>
<td>Reset device and then turn it on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing firmware - device cannot be turned on or off.</td>
<td>Load the most recent firmware compatible with your device type.</td>
</tr>
<tr>
<td>Problem</td>
<td>Description</td>
<td>Possible cause</td>
<td>Troubleshooting</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>No Sensor data message</strong></td>
<td>Device is installed in place and turned on. A welcome message is received but no other messages are received within the preset Sigfox transmission period</td>
<td>Incorrect sensor wiring.</td>
<td>Refer to the Sensor wiring documentation and observe electrical and interface specification of the sensor provided in its datasheet. Check if sensors and device communicate correctly via the dedicated option in the USB menu (refer to USB menu)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incompatible sensor.</td>
<td>Check if sensor is compatible with the Evvos device in terms of electrical specifications and interfacing. Consult both sensor and device datasheets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wrong Sigfox transmission rate setting.</td>
<td>Check if Sigfox transmission rate setting in the USB menu is set to the desired value (refer to USB menu)</td>
</tr>
<tr>
<td><strong>Sensor data seems erroneous</strong></td>
<td>Received values seem illogical or warning messages appear: “Disconnected sensor”, “Sensor may be disconnected”, “Sensor error” etc.</td>
<td>Incorrect sensor wiring.</td>
<td>Check if sensor wiring is correct.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incompatible sensor in terms of electrical (power/voltage/current) requirements.</td>
<td>Consult sensor datasheets for power supply requirements and device datasheet for power capabilities. Sensor power supply requirements must be within those of the power supply capabilities of your Evvos device in order to achieve specified accuracy of operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing or partial electrical connection between sensor and device.</td>
<td>Check if all sensor wires are well connected to terminal blocks</td>
</tr>
<tr>
<td><strong>No more Sigfox messages</strong></td>
<td>Device is on and has been operating without issues for a while but suddenly all Sigfox transmission has stopped.</td>
<td>Low battery.</td>
<td>Recharge/replace battery.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bad weather / theft.</td>
<td>Check if device is still on and in its original installation place and position: mounting should be intact, there should be no physical damage due to weather conditions or attempted theft.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Antenna is not operational.</td>
<td>Ensure antenna is not damaged, missing or disconnected.</td>
</tr>
<tr>
<td>Problem</td>
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</tr>
<tr>
<td><strong>No connection with PC</strong></td>
<td>Device is connected to PC via USB cable but no communication is enabled or PC does not recognize device.</td>
<td>No battery in device.</td>
<td>Device must be battery powered in order to establish operational connection with PC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USB cable does not support data transfer.</td>
<td>Check if USB cable supports data transfer. Do not use USB cables that support only battery charging/recharging. Use USB cable supplied with your order.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USB port is must be cleaned.</td>
<td>Clean the USB port on the device from dirt/dust/water drops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wrong communication settings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>USB cable error.</td>
<td>Disconnect USB cable. Reconnect USB cable to device first and then the other end to a PC. Use only Micro-USB to USB data cable. Use USB cable supplied with your order.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USB enumeration error.</td>
<td>Check if LED indicator lights in green when device and PC are connected with a USB cable. Repeat instructions for connecting Evvos device to PC if LED indicator is red.</td>
</tr>
<tr>
<td><strong>Device cannot be turned on using a magnet</strong></td>
<td>Device is in off-state or is being used for the first time. Device cannot be turned on.</td>
<td>Low battery voltage.</td>
<td>Recharge/replace batteries.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reverse battery polarity.</td>
<td>Observe polarity of battery terminal block. Check if both battery wires are well connected to their corresponding terminal pins.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magnet is not strong enough.</td>
<td>Use the magnet supplied with the device or a stronger magnet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Firmware has been deleted or is not loaded.</td>
<td>Use the latest firmware revision.</td>
</tr>
<tr>
<td><strong>Device is not responding when you attempt to turn it off using a magnet.</strong></td>
<td>Device is on and operating as intended but cannot be turned off with a magnet.</td>
<td>Sensor measurement or RF-transmission may be in progress.</td>
<td>Wait for at least 20 seconds and try again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magnet is not strong enough.</td>
<td>Use the magnet supplied with the device or a stronger magnet.</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>Device cannot be turned on/off/reset using a magnet</strong></td>
<td>Device was operational in the past. Attempts to turn on/off/reset the device fail.</td>
<td>Device is connected to a PC. Magnet is not strong enough. Low battery voltage.</td>
<td>Disconnect the USB cable and try again. Use the magnet supplied with the device or a stronger magnet. Recharge/replace batteries.</td>
</tr>
<tr>
<td><strong>Battery is drained too fast</strong></td>
<td>Device has been operating for some time but the battery is drained in several weeks</td>
<td>Incorrect sensor wiring. Faulty or damaged sensor. High level of moisture within the device. Incompatible sensor.</td>
<td>Check sensor wiring. Pay attention to the supply voltage needed by the sensor. Connect sensor voltage supply wire to a device terminal pin that provides voltage closest but not exceeding the one recommended by sensor manufacturer (refer to terminal pin table). Replace sensor. Check if sensor is compatible with the Evvos device in terms of electrical specifications and interfacing. Consult both sensor and device datasheets. Always use the supplied rubber plugs to prevent moisture ingress through unused cable glands. Sensor power supply requirements may be too high for prolonged battery operation. Consult both device and sensor datasheets about power requirements.</td>
</tr>
<tr>
<td><strong>New firmware cannot be loaded successfully</strong></td>
<td>Device is in bootloader mode and USB cable is plugged in both device and PC.</td>
<td>Outdated firmware loading software. Unsuccessful USB connection. Interrupted firmware downloading. Incompatible firmware and device.</td>
<td>Always use the most recent version of the firmware loading software program - <a href="https://www.evvos.com/downloads/">https://www.evvos.com/downloads/</a>. Check if green light is on. If red – repeat PC connection procedure. Check if USB cable is still in place. Repeat firmware loading procedure. Load only firmware specified for your device type.</td>
</tr>
<tr>
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</tr>
<tr>
<td>While in bootloader mode, device resets before USB cable is plugged in</td>
<td>Device successfully enters Bootloader mode but resets in approximately 20 sec.</td>
<td></td>
<td>This is a standard functionality (refer to Bootloader mode in the Operation Manual, page 7). Repeat the procedure to enter Bootloader mode. Connect the USB cable to the device and the PC within 15 seconds when in bootloader mode. Successful connection is indicated with LED light changing from red to green.</td>
</tr>
<tr>
<td>No acoustic indication</td>
<td>Device does not generate any sound on switch on/off/reset, or in operational mode.</td>
<td></td>
<td>Some Evvos devices are equipped with LED light indication only and do not generate sounds. Refer to the datasheet of your device for more information.</td>
</tr>
<tr>
<td>No LED light indication</td>
<td>Device’s LED does not light up when device is turned on/off. Reset is not possible.</td>
<td>Battery is disconnected.</td>
<td>Open device and reconnect battery. Observe polarity.</td>
</tr>
<tr>
<td>Battery does not recharge</td>
<td>Charging through the USB port is active but the battery is still not charged after several hours, regardless of using a PC or stand-alone adapter.</td>
<td>Battery is deeply discharged. No electrical connection. Battery cable is disconnected within the device (recommended for long storage). Damaged USB cable. Non-rechargeable battery inside the device. Adapter does not provide enough output current.</td>
<td>Charging will take longer – more than 24 hours. Make sure the USB port is clean (no dirth). Open device and reconnect battery. Observe polarity. Replace USB cable. Some versions of Evvos devices use non-rechargeable batteries that need be replaced. Refer to the datasheet of your device for more information. Replace adapter.</td>
</tr>
<tr>
<td>Problem</td>
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</tr>
<tr>
<td>Device is upgraded with an add-on board but there is no additional functionality</td>
<td>Add-on board can be added to the main board in some Evvos devices. Main functionality may or may not be present.</td>
<td>Header of the add-on board is plugged-in incorrectly.</td>
<td>When installing add-on boards into the socket on the main board – observe pin to pin compatibility.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Current firmware does not support extended functionality.</td>
<td>Check in the USB menu if the current firmware version supports the desired added functionality or load the most recent firmware version compatible with your device.</td>
</tr>
</tbody>
</table>