

YO**SENSI**.IO

YO Power

User guide v 4.2

Release notes

Date	Version	Changes
11.06.2021	1.0	Initial release.
07.12.2021	2.0	Change of power supply from 100~240 V AC, 50/60 Hz to 6 - 30 V DC, 5 - 21 V AC
06.09.2022	3.0	Added specifications of the device, Installation instruction, upgraded device configuration and operation of the device, updated payloads description, added compliance statement
31.07.2023	4.0	Added CT clamps up to 1000 A, added configuration option node with Yosensi Management Platform. CLI configuration is outdated for new device (firmware 3.3.0 and older). Changed description of connecting nodes with Yosensi Management Platform.
25.10.2023	4.1	Added new configurable parameters: energysendinterval, currentsream, energymeter, powerfactor, voltage, clearenergy. New form based editor option in device configuration. Configuration of the device via Yosensi mobile app. Changed decoded payload description.
19.12.2023	4.2	Added outlier detection mechanism with description

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Product description

Overview

The YO Power measures AC flowing through devices connected to the electricity grid. With one YO Power it is possible to measure the current simultaneously (e.g., in two three-phase, six single-phase, one three-phase and three single-phase devices, etc.). It is possible to install current clamps without knowing the direction through which the current flows. Wireless communication eliminates the need for additional wiring or conversion of existing installations. By means of the application algorithm developed by the Yosensi Team it is possible to establish accurate measure of current and power consumption.

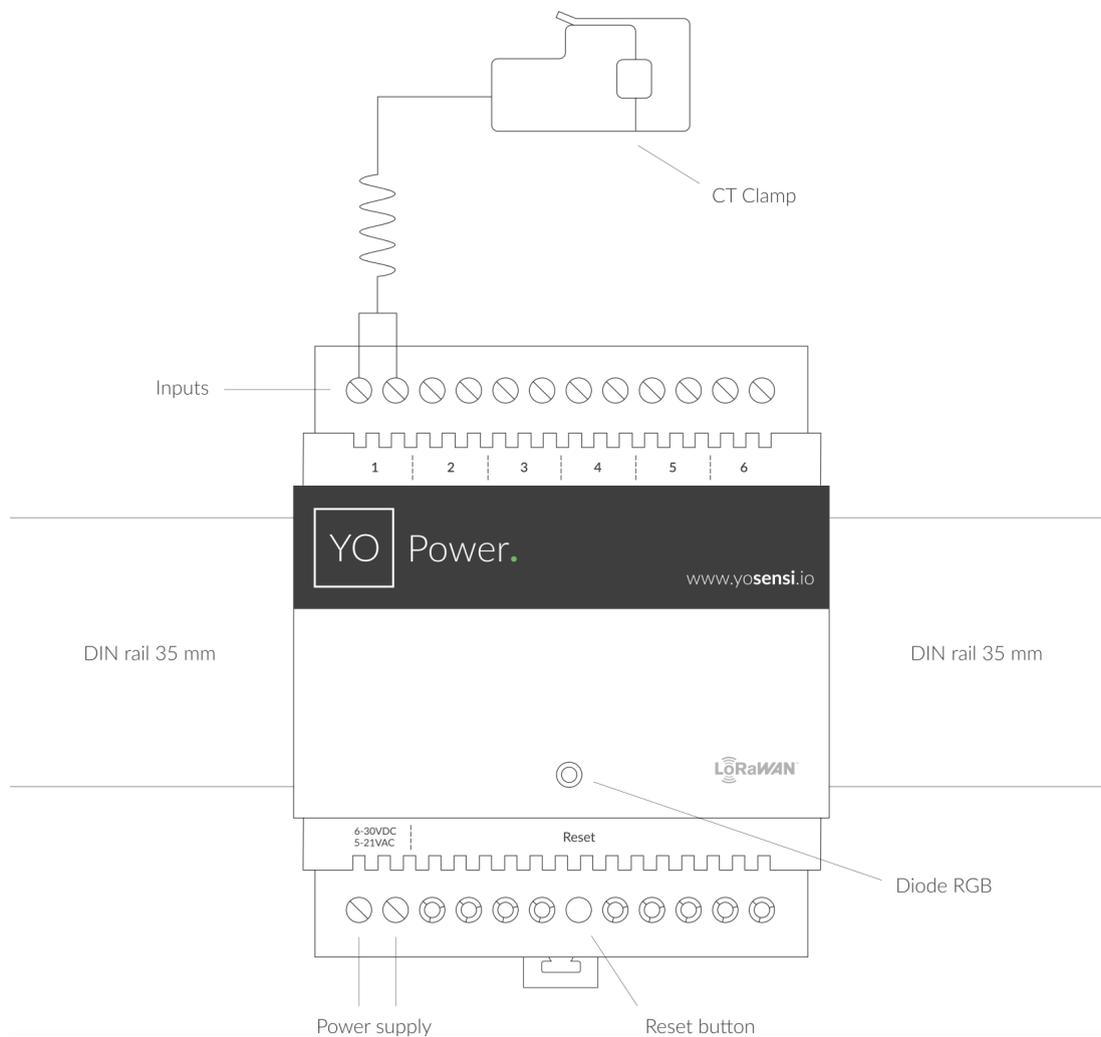


Figure 1 Device top view.

Device sticker placed on the right side of the device enclosure contains information about model, version, LoRaWAN region and 3 parameters important in case of device identification and configuration:

- **DEV EUI:** 64-bit unique device identifier in a LoRaWAN network,
- **DEV ADDR:** address required to connect via ABP activation type to LoRaWAN,
- **BLE MAC:** bluetooth physical address.



Figure 2 Device label.

Physical interfaces

LEDs

YO Power communicates its current behavior to the user by RGBW LED placed on the top of the device shown on figure one.

DIODE STATUES INTERPRETATION

BEHAVIOUR	COLOUR	DEVICE STATUS
Single flash	Green	General: device is working correctly (power and memory).
Single flash	Red	General: device is working incorrectly (power and memory). LoRaWAN communication: failed to receive an acknowledgement from LoRaWAN Server within specified timeout.
Single flash	White	LoRaWAN communication: LoRaWAN frame sent \ confirmation from LoRaWAN Server after receiving the frame.
Slow flashing	Blue	BLE communication: connection to the device via BLE (configuration).
Rapid flashing	Blue	LoRaWAN communication: connecting to LoRaWAN network.

Buttons

YO Power is equipped with one reset button inside the device on the PCB board under the inscription “reset” shown on the figure 1. It is possible to press it with a thin stick.

Specifications

Physical

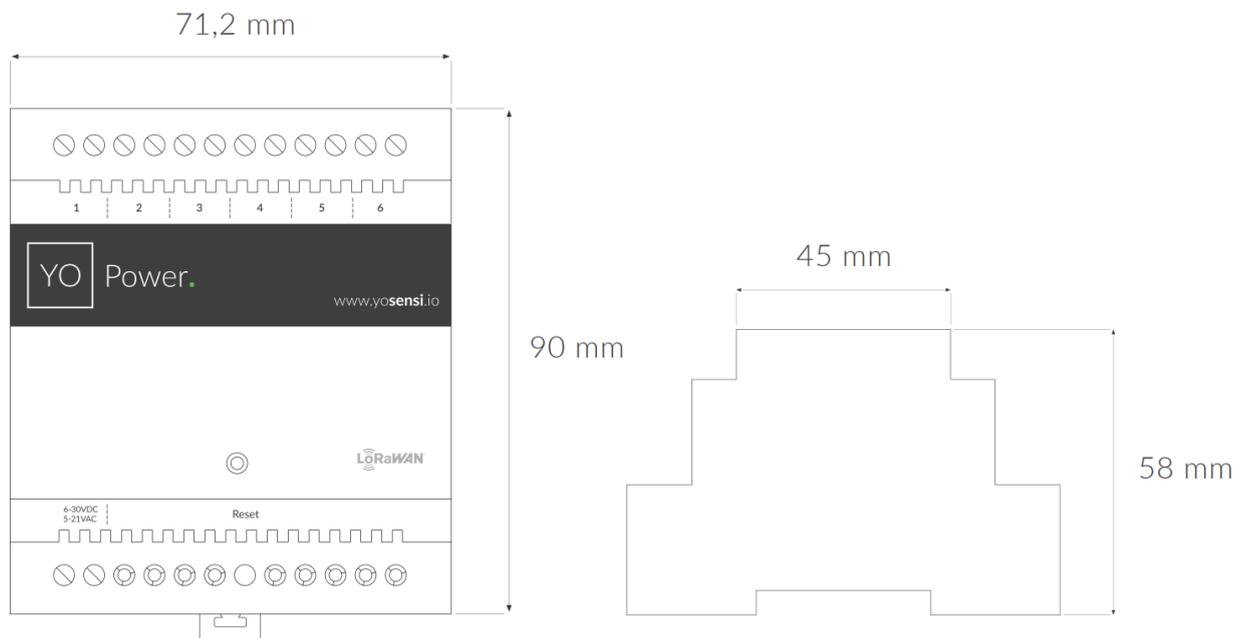


Figure 3 Dimensions of the device.

PHYSICAL SPECIFICATION

Dimensions	Height: 90 mm Width: 71,2 (4 pole) mm Depth: 58 mm
Colour	Light grey
Mounting method	35 mm DIN rail Vertical (can be screwed to the wall)
Enclosure material	Polycarbonate
Fire resistance class	UL94-VO
Level of protection	IP20
Weight	125,2 g

Operating conditions

OPERATING CONDITIONS

Temperature	0° to 70°C
Humidity	0 to 90%
Placement	Indoor use
Power supply	6 - 30 V DC 5 - 21 V AC
Power consumption	Typical: 12 mA DC (12 V DC) Maximum: 120 mA DC (12 V DC)

Measured values

MEASUREMENT RANGES

Parameter	Measuring range	Accuracy
Current	CT Model : 50mA-100 A	±1%
	CT Model : 40mA-160A	±3%
	CT Model : 50mA-200 A	±3%
	CT Model : 50mA-400 A	±3%
	CT Model : 50mA-600 A	±3%
	CT Model : 50mA-800 A	±3%
	CT Model : 50mA-1000 A	±3%
Energy meter	0-230 V	Not given in datasheet

Current

YO Power offers automatically switchable measurement ranges, which results in even greater precision when measuring current. The YO Power has measurement inputs with specialized integrated circuits (e.g. specialized analog-to-digital converters) that ensure high measurement accuracy.

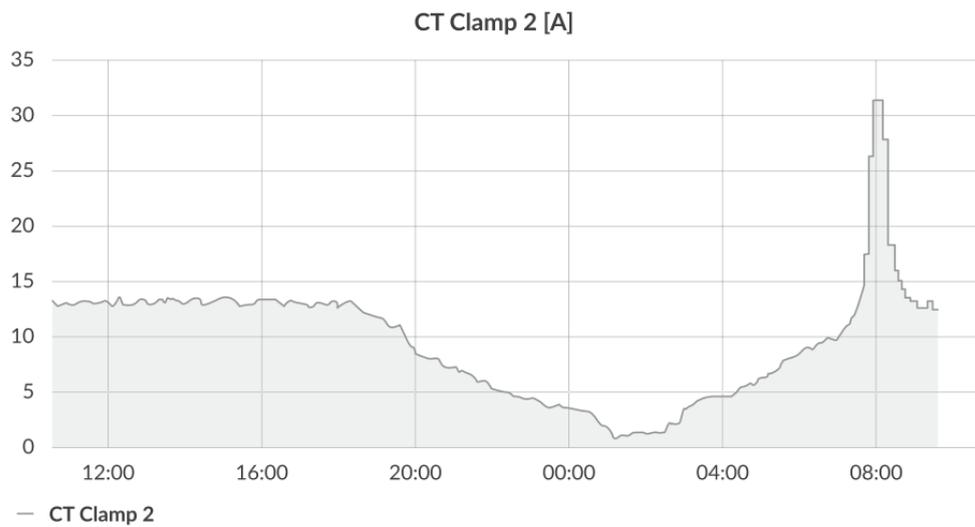


Figure 4 Current flow on the second channel of the device exemplary chart.

Energy

Each time YO Power makes measurements it stores the value of current in internal memory. Then for each measurement it calculates the power on each electrical grid connected to the current transducer. Device sends LoRa packet about energy consumption in a given time interval [s]. The value of the energy meter is calculated after the first startup or reset of the device.

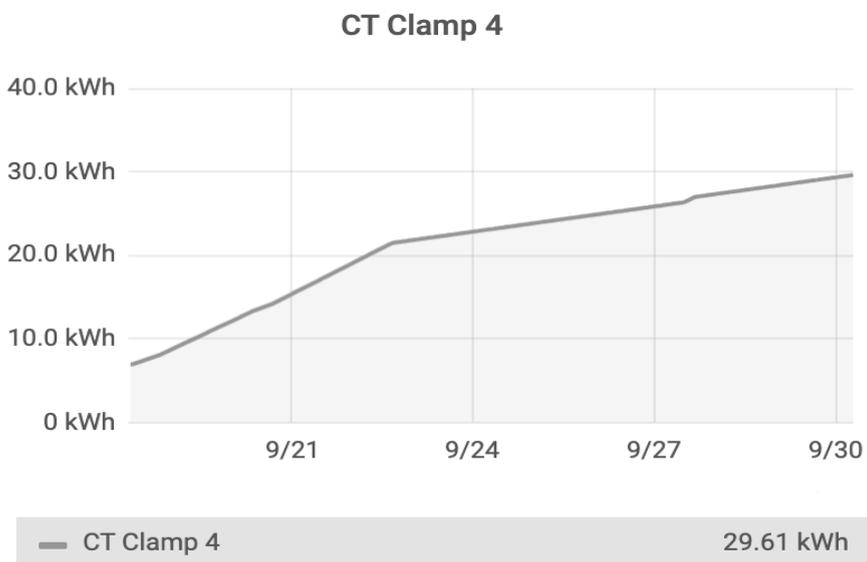


Figure 5 Energy meter chart on.

Installation

Package contents

1. Device.
2. Warranty card.

Safety precautions

SAFETY PRECAUTIONS

SYMBOL	DESCRIPTION
	Device is marked with a symbol saying that electrical and electronic products may not be mixed with unsorted household waste. Remember that batteries used to power the device must be treated at a specialized treatment facility.
	Remember about possible electrostatic discharge when replacing battery, connecting input or doing some other operations near inside electronics.
	Be careful while handling the device – dropping it may cause damage that will affect the sensors and other electronics inside.
	When installing the device on the wall remember to wear adequate protective equipment.
	To maintain the level of protection device cover screws must be properly tightened. Device shouldn't be used without cover.
	Any actions inside the device's enclosure (excluding replacing batteries) must be performed by trained personnel only.
	Clean the device only with damp cloth.
	Device is intended for indoor use. Make sure that device is not exposed for long term UV rays and in an environment in the immediate vicinity of water which may flood the device.

Installation guide

1. Mount the device on a 35 mm DIN rail.

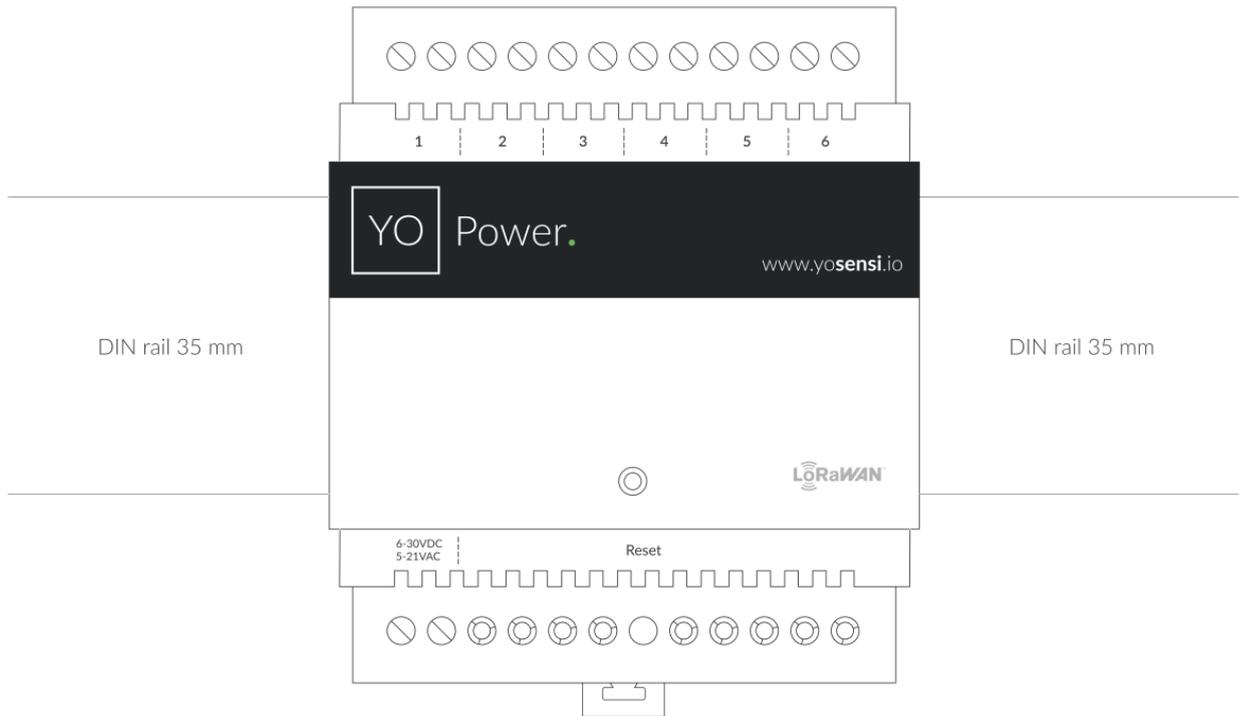


Figure 6 Device mounting instructions.

2. Connect the inputs to the individual channels of the device according to the polarity shown on the enclosure label.

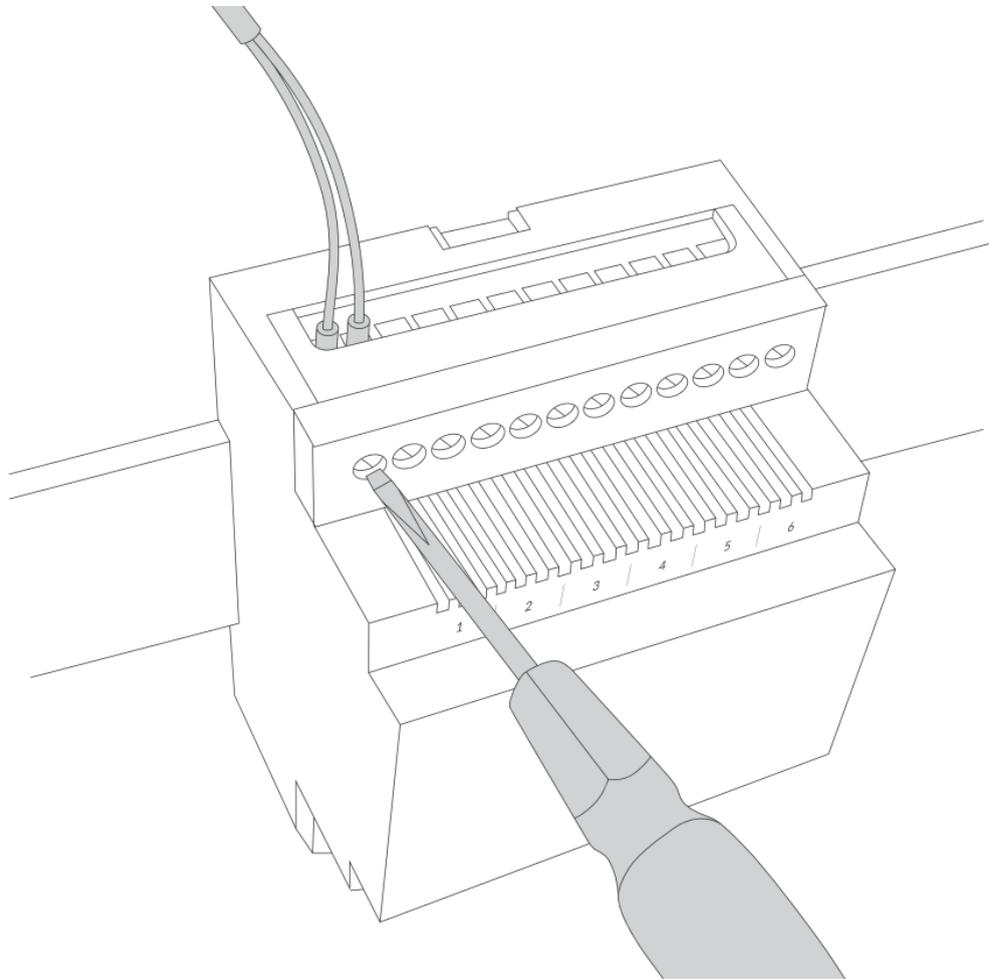


Figure 7 Connect the inputs to the individual channels of the device.

3. Fasten the current clamps around the wires in which the current is to be measured (a clamp should be placed around one wire).

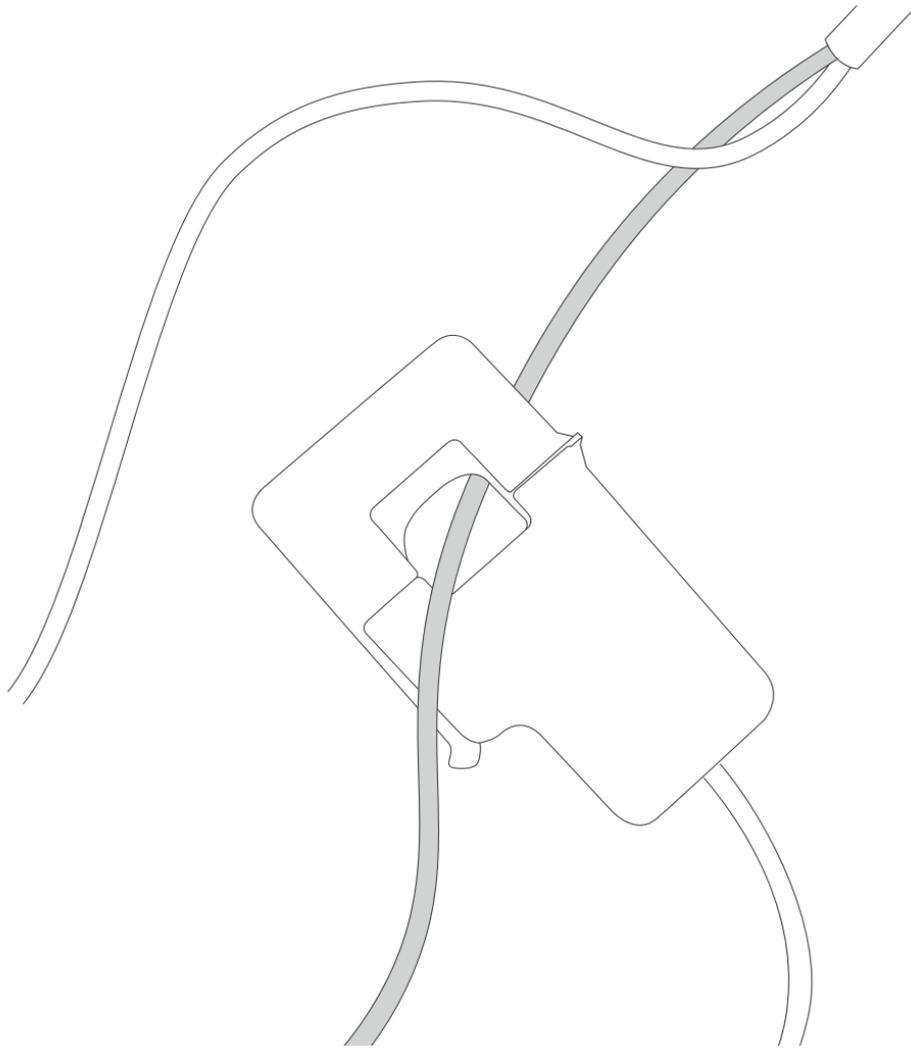


Figure 8 Instruction on how to fasten the current clamps around the wires.

4. Screw the power supply wires to the device regardless of polarity (6 - 30 V DC, 5 - 21 V AC).

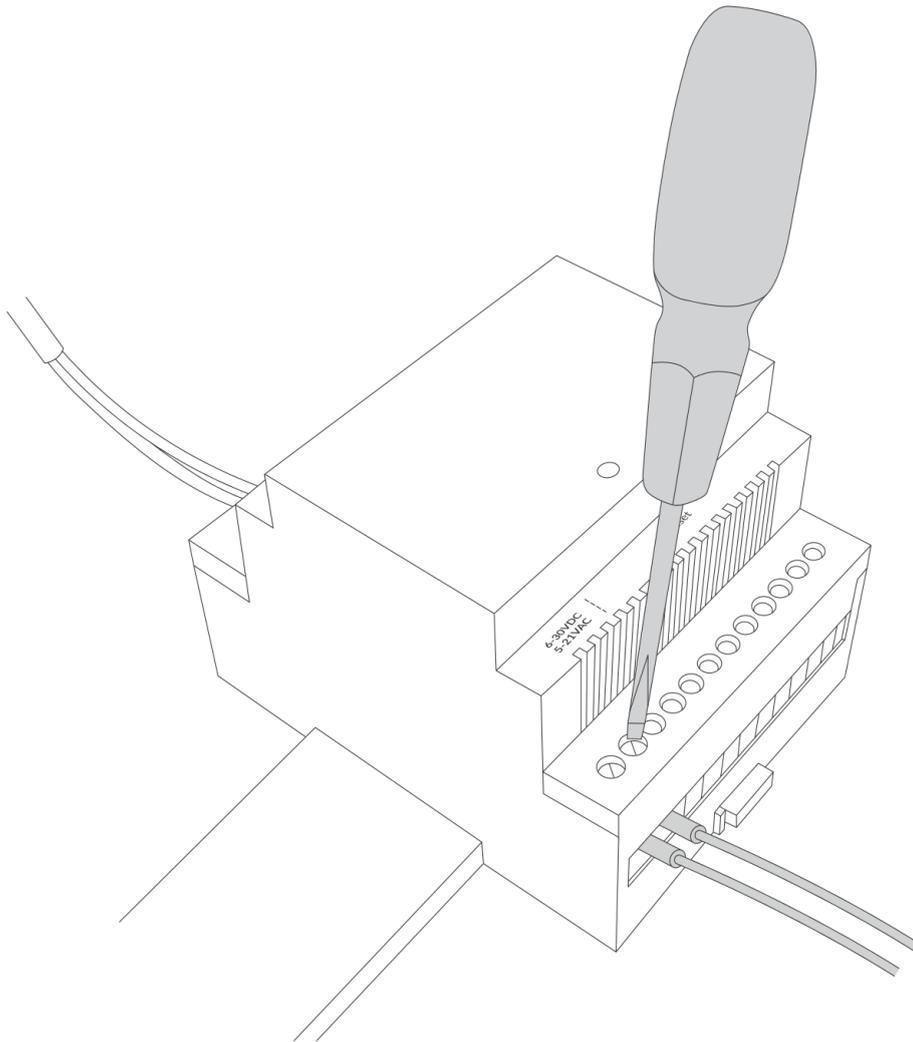


Figure 9 Instruction on how to connect the power to the device.

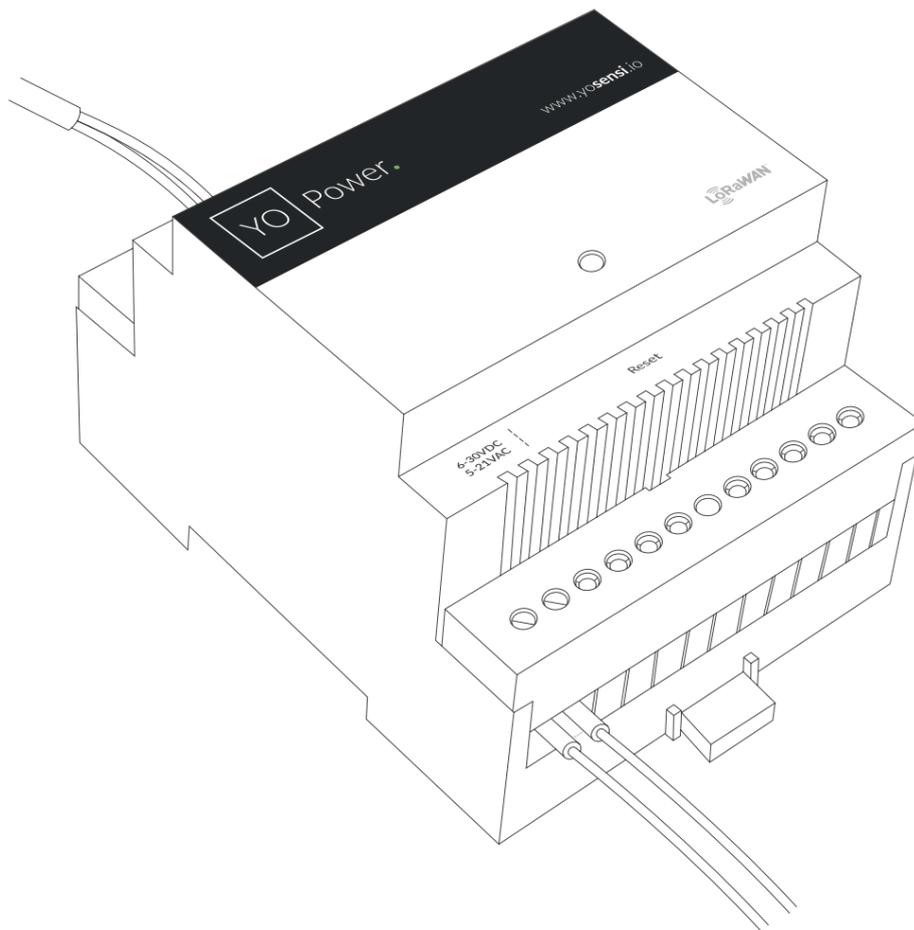


Figure 10 Final look of the device.

Operation

IoT system components

Typical IoT systems consist of 3 main elements (*Figure 11*), brief described below. In order to set communication, each element must be properly configured.

1. **Node** – device with sensors and a wireless communication module that gathers data, forms the payload and sends it to the gateway.
2. **Gateway** – device similar to routers, equipped with a LoRa concentrator, that receives LoRa packets and send them to the Internet-connected server.
3. **Server** – in most cases, a cloud-based service where data is processed, stored, analysed, and presented in user-friendly ways (via a user interface); Yosensi default and recommended tools are Yosensi Management Platform (for IoT structure management) and Grafana (for data presentation).

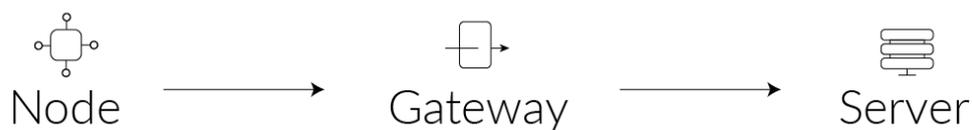


Figure 11 IoT system components.

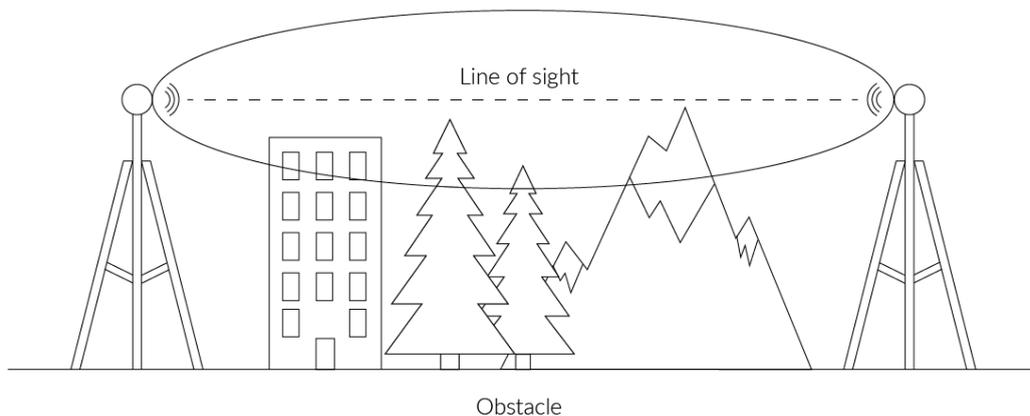


Figure 12 Fresnel zone where communication between two antennas can occur.

Device configuration

Configurable parameters

A few parameters must be set before sending data to the gateway. The default firmware is configured in OTAA mode with predefined *deveui*, *appkey* (OTAA) and *appskey*, *nwkskey* (ABP).

Configuration of the device is stored in a JSON file divided into the following sections:

- **info** (generic, read only): information about the device,
- **lorawan** (generic): configuration data for LoRaWAN connection,
- **ble** (generic): bluetooth settings,
- **device** (dynamic): individual configuration for a specific device (this section's structure differs for each device),
- **channels** (dynamic): each channel of YO Power with specific configuration of current stream energy meter, voltage on electricity grid.

Sample configuration file for the YO Power device.

```
{
  "info": {
    "devmodel": "LNPW",
    "fwver": "4.0.1",
    "loraradio": "SX1261",
    "lorawanver": "1.0.2",
    "loraregion": "EU868",
    "blemacaddr": "80e126180c74"
  },
  "lorawan": {
    "subband": 1,
    "nwkskey": "private",
    "acttype": "otaa",
    "otaa": {
      "deveui": "0123456789abcdef",
      "appeui": "fedcba9876543210",
      "appkey": "000102030405060708090a0b0c0d0e0f",
      "trials": 3
    },
    "abp": {
      "devaddr": "01234567",
      "nwkskey": "0123456789abcdef0123456789abcdef",
      "appskey": "000102030405060708090a0b0c0d0e0f"
    }
  },
  "ble": {
    "power": 0,
    "interval": 1600
  },
  "device": {
    "measinterval": 300,
    "measthreshold": 10,
    "ch1ctype": "50mA-100A",
    "ch2ctype": "50mA-100A",
    "ch3ctype": "50mA-100A",
    "ch4ctype": "50mA-100A",
    "ch5ctype": "50mA-100A",
    "ch6ctype": "50mA-100A",
    "energysendinterval": 3600,
  }
}
```

```
"channels": [  
  {  
    "channel": 1,  
    "currentstream": "on",  
    "energymeter": "on",  
    "voltage": 230,  
    "powerfactor": 0.90,  
    "clearenergy": "no"  
  },  
  {  
    "channel": 2,  
    "currentstream": "on",  
    "energymeter": "on",  
    "voltage": 230,  
    "powerfactor": 0.90,  
    "clearenergy": "no"  
  },  
  {  
    "channel": 3,  
    "currentstream": "on",  
    "energymeter": "on",  
    "voltage": 230,  
    "powerfactor": 0.90,  
    "clearenergy": "no"  
  },  
  {  
    "channel": 4,  
    "currentstream": "on",  
    "energymeter": "on",  
    "voltage": 230,  
    "powerfactor": 0.90,  
    "clearenergy": "no"  
  },  
  {  
    "channel": 5,  
    "currentstream": "on",  
    "energymeter": "on",  
    "voltage": 230,  
    "powerfactor": 0.90,  
    "clearenergy": "no"  
  },  
  {  
    "channel": 6,  
    "currentstream": "on",  
    "energymeter": "on",  
    "voltage": 230,  
    "powerfactor": 0.90,  
    "clearenergy": "no"  
  }  
]  
}
```

GENERIC PARAMETERS

SECTION	NAME	DESCRIPTION	POSSIBLE VALUES	DEFAULT VALUE	READ/ WRITE
info	devmodel	Device name	-	LNPW	R
	fwver	Firmware version	-	4.0.1	R
	loraradio	Radio chipset model	-	SX1261 ¹	R
	lorawanver	LoRaWAN stack version	-	1.0.2	R
	loraregion	LoRaWAN region	-	EU868 ¹	R
	blemacaddr	Bluetooth LE address	-	predefined	R
lorawan	subband	Uplink subband number	Table ²	predefined	R/W
	nwktype	Network type	public, private	public	R/W
	acttype	Activation type	otaa, abp	otaa	R/W
lorawan-otaa	deveui	Device EUI (Extended Unique Identifier)	8 B (HEX)	predefined	R/W
	appeui	Application EUI	8 B (HEX)	predefined	R/W
	appkey	Application Key	16 B (HEX)	predefined	R/W
	trials	Join request trials	1-9	3	R/W
lorawan-abp	devaddr	Device Address	4 B (HEX)	predefined	R/W
	nwkskey	Network Session Key	16 B (HEX)	predefined	R/W
	appskey	Application Session Key	16 B (HEX)	predefined	R/W
ble	power	Bluetooth LE transmit power [dBm]	0 ⁴	0	R/W
	interval	Bluetooth LE advertising interval [ms]	MS_INPUT ³	1600	R/W

¹ LoRa radio chipset used defines the LoRaWAN region: SX1261 - EU868; SX1262 - AU915, US915, AS923

² Uplink subband list for specific LoRaWAN regions - UPLINK SUBBAND Table.

³ Calculation formula: MS_INPUT = INTERVAL_MS × 1.6.

⁴ Change currently not supported.

DEVICE PARAMETERS

NAME	DESCRIPTION	POSSIBLE VALUES	DEFAULT VALUE	READ/ WRITE
measinterval	Measuring and sending interval LoRa [s]	120-999999	300	R/W
measthreshold	Measurement threshold for each channel	1-9999	10	R/W
ch1cttype – ch6cttype	Number of channels with different possible CT clamps.	50mA-100 A, 40mA-160 A, 50mA-200A, 50mA-400A, 50mA-600A, 50mA-800A, 50mA-1000A	50mA-100A	R/W
energysendinterval	Interval of time which sends information about measured energy [s].	600-999999	3600	R/W
currentstream	Streaming of current flow on electrical networks.	on, off	on	R/W
energymeter	Energy meter for each channel [kWh].	on, off	on	R/W
voltage	Voltage for each channel of the electricity grid [V].	1-1000	230/110	R/W
powerfactor	Power factor	0 - 1	0.90	R/W
clearenergy	Reset of stored energy meter on each channel.	no, yes	no	R/W

Parameters description

- **nwktype:** used for setting the device in public or private network type.
- **acttype:** used for setting the device in ABP or OTAA mode.
- **deveui, ... , appskkey:** predefined addresses and keys, these parameters are generated using multiple IDs specific to the particular MCU and are unique for each device.; they can be changed if needed.
- **interval:** determines the interval of sending broadcast packets, used to connect to every BLE receiver around the device.

- **subband:** used for setting the communication frequency sub-band in LoRaWAN.
- **measinterval:** measurement interval [s] between sending LoRa packets with value of measurements of current.
- **measthreshold:** measurement threshold for each channel. If the current value between the previous measurement and the next differs by a value of 'measthreshold', it queues this data for sending. The current difference is reported in subsequent LoRa packets along with the measurement time.
- **ch1ctype...ch6ctype:** 6 different channels to which the current transducer clamps can be connected. For correct measurements and measuring ranges, the possible value must coincide with the sensor connected to the device.
- **energysendinterval:** Interval of time which sends information about calculated energy in electrical network [s]. The minimum time interval between measurement is 600 s.
- **currentstream:** YO Power monitor current flow on each phase. This parameter activates or deactivates streaming and monitoring current on Yosensi Management platform.
- **energymeter:** This parameter activates or deactivates the energy meter. Due to current flow on each phase YO Power stores information about current. Algorithms built in the device calculate energy consumption and send a LoRa packet with a given parameter 'energysendinterval'.
- **voltage:** voltage of electricity grid [V]. This parameter differs for LoRa regions. YO Power with firmware for EU868 is 230 V, AU915 220 V and US915 is 110 V.
- **powerfactor:** power factor is the ratio of working power, measured in kilowatts (kW), to apparent power, measured in kilovolt amperes (kVA). Apparent power, also known as demand, is the measure of the amount of power used to run machinery and equipment during a certain period. Default value is 0.9.
- **clearenergy:** parameter that clears the value of measured energy consumption.

Outlier detection mechanism

The **measthreshold** configuration parameter defines the sensitivity range for each data point used to determine if the subsequent measurement should be placed in the payload and sent to the server. If all values are within range, then only the first and last values remain (see the left side of *Figure 25*). If measurements are out of range, then the payload includes more than two points (see the right side of *Figure 13*). The scenario where too many data points exist such that they do not fit in one payload is possible, so they are sent in subsequent payloads with a reduced sending time despite the value configured in **measinterval**

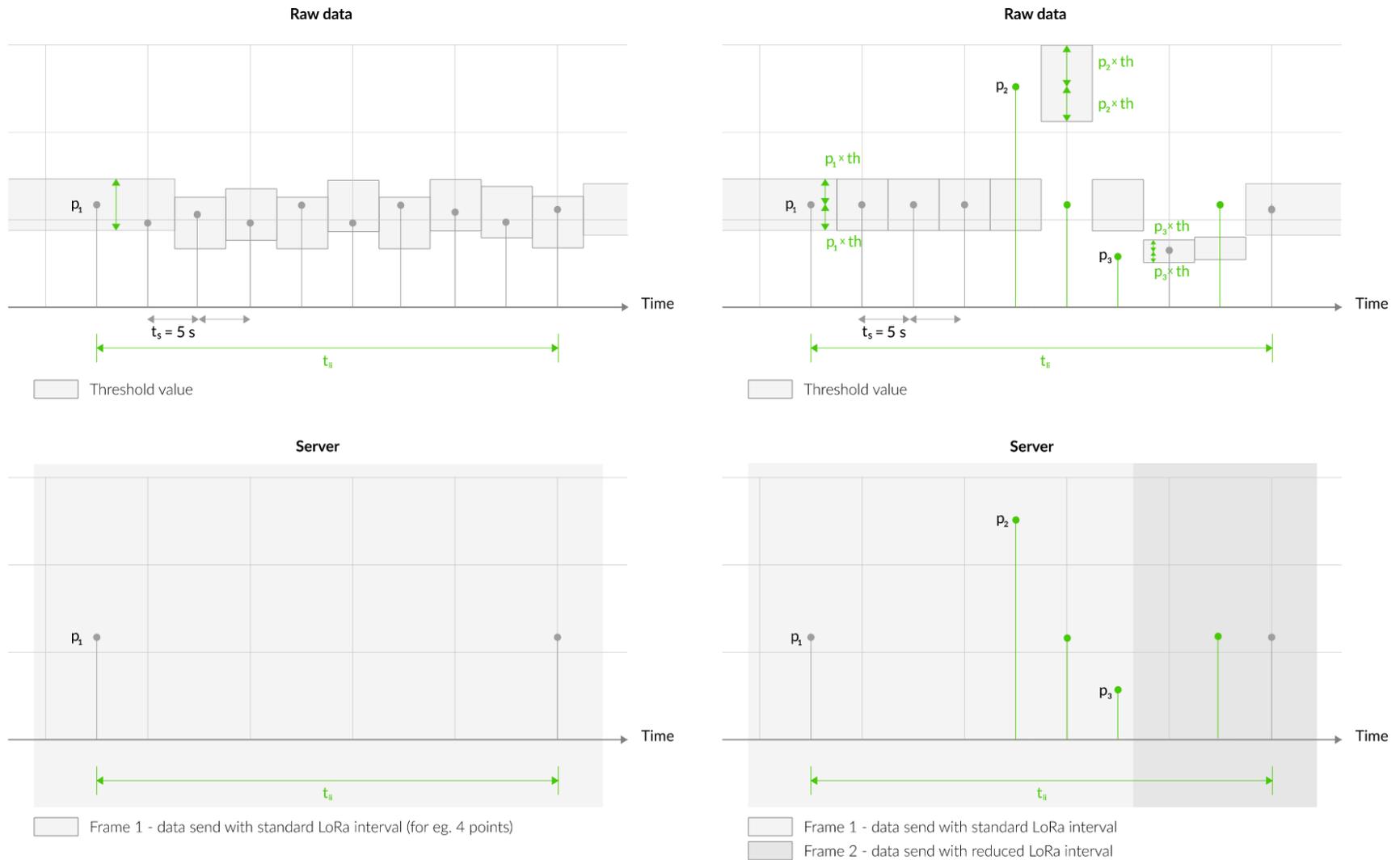


Figure 13 The outlier detection mechanism using a configurable threshold value

UPLINK SUBBAND

REGION	DESCRIPTION	POSSIBLE VALUES	DEFAULT VALUE	READ/ WRITE
EU868	Sub-band 1; 867.1 - 868.5 MHz; channels 0-7	1	1	R
	Sub-band 1; 902.3 - 903.7 MHz; channels 0-7	1		
	Sub-band 2; 903.9 - 905.3 MHz; channels 8-15	2		
	Sub-band 3; 905.5 - 906.9 MHz; channels 16-23	3		
US915	Sub-band 4; 907.1 - 908.5 MHz; channels 24-31	4	2	R/W
	Sub-band 5; 908.7 - 910.1 MHz; channels 32-39	5		
	Sub-band 6; 910.3 - 911.7 MHz; channels 40-47	6		
	Sub-band 7; 911.9 - 913.3 MHz; channels 48-55	7		
	Sub-band 8; 915.5 - 914.9 MHz; channels 56-63	8		
	Sub-band 1; 915.2 - 916.6 MHz; channels 0-7	1		
	Sub-band 2; 916.8 - 918.2 MHz; channels 8-15	2		
	Sub-band 3; 918.4 - 919.8 MHz; channels 16-23	3		
AU915	Sub-band 4; 920.0 - 921.4 MHz; channels 24-31	4	2	R/W
	Sub-band 5; 921.6 - 923.0 MHz; channels 32-39	5		
	Sub-band 6; 923.2 - 924.6MHz; channels 40-47	6		
	Sub-band 7; 924.8 - 926.2 MHz; channels 48-55	7		
	Sub-band 8; 926.4 - 927.8 MHz; channels 56-63	8		
	Sub-band 1; 922.0 - 923.2 MHz; channels 0-8	1		
	Sub-band 2; 923.2 - 924.5 MHz; channels 9-17	2*		
	AS923	Sub-band 1; 922.0 - 923.2 MHz; channels 0-8		
Sub-band 2; 923.2 - 924.5 MHz; channels 9-17		2*		

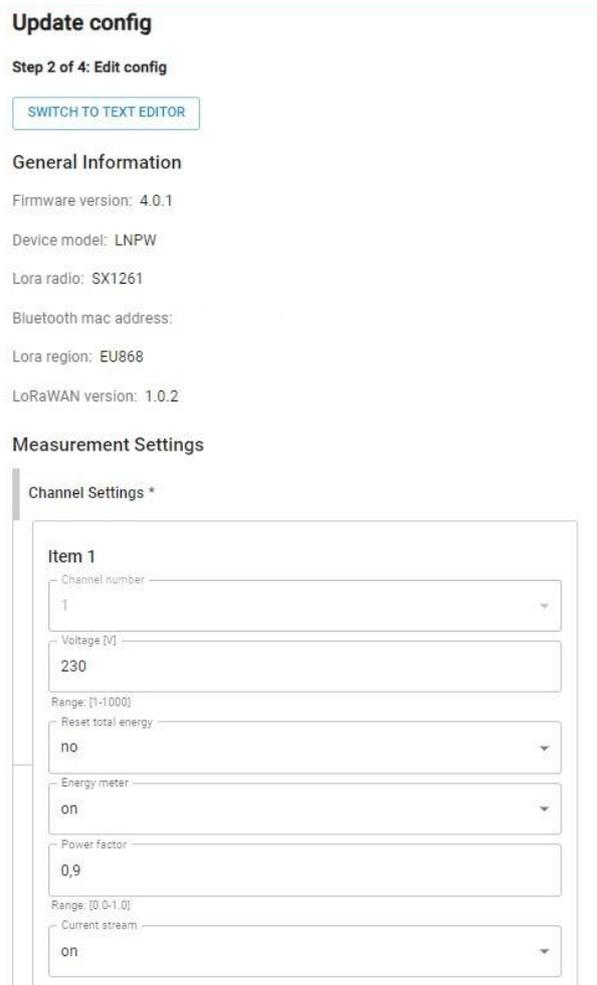
2* change is not supported

Configuration node with Yosensi Management Platform

Connect to the device as follows:

Connect to the device as follows:

1. Log in at app.yosensi.io
2. You'll see the dashboard organization view. Go to the Application section in the sidebar.
3. Select application, locate and select the device by looking for the DEV EUI on the device label.
4. Select the Firmware section. For the configuration of the device, you can see three different buttons:
 - Configure – here, you can change and upload the device parameters.
 - Update firmware – here, you can update the firmware to version 3.4.0 and newer.
 - Recover device – this section restores the firmware of the device. This button helps if you lose the connection while uploading firmware.
5. Once the “Configure” button has been selected and the node has been paired with the computer, the next step is configuring parameters. You will see 2 different display options for the configuration. The first recommended is “Form-based-editor” and the second is “Text editor”. Possible values with the description of each parameter can be found in the device configuration.



Update config

Step 2 of 4: Edit config

[SWITCH TO TEXT EDITOR](#)

General Information

Firmware version: 4.0.1

Device model: LNPW

Lora radio: SX1261

Bluetooth mac address:

Lora region: EU868

LoRaWAN version: 1.0.2

Measurement Settings

Channel Settings *

Item 1

Channel number: 1

Voltage [V]: 230

Range: [-1-1000]

Reset total energy: no

Energy meter: on

Power factor: 0,9

Range: [0.0-1.0]

Current stream: on

Figure 14 Update configuration section view.

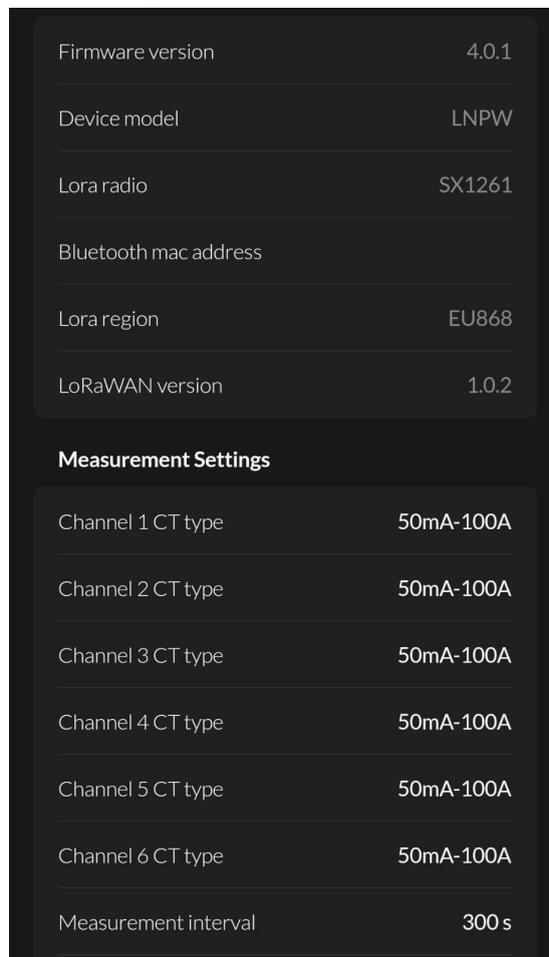
6. Press the Upload button and wait.

NOTE Additional information including device configuration can be found in [Yosensi configuration web tool](#).

Configuration node with Yosensi mobile app

Connect to the device using Yosensi app as follows:

1. Login to Yosensi App using your credentials.
2. Go to the Devices section and choose the device you want to configure. If you can not see the device ensure that you are in the correct organization. Alternatively you can also scan the QR code placed on the node. It will redirect you right to the device details.
3. After selecting the device go to the “configuration” option in device details. Now wait, your mobile will pair with the node.
4. You will see 2 different display options of the configuration, first recommended is “Form-based-editor” second “Text editor”. Possible values with description of each parameter can be found in the device configuration.



Firmware version	4.0.1
Device model	LNPW
Lora radio	SX1261
Bluetooth mac address	
Lora region	EU868
LoRaWAN version	1.0.2
Measurement Settings	
Channel 1 CT type	50mA-100A
Channel 2 CT type	50mA-100A
Channel 3 CT type	50mA-100A
Channel 4 CT type	50mA-100A
Channel 5 CT type	50mA-100A
Channel 6 CT type	50mA-100A
Measurement interval	300 s

Figure 15 Configuration view in mobile app.

5. After changing parameters, press the “Save” button.

Connecting node with network

The LoRaWAN architecture requires a configured Gateway and Network Server. We'll go through an example in our recommended Yosensi Management Platform software.

Yosensi Management Platform configuration

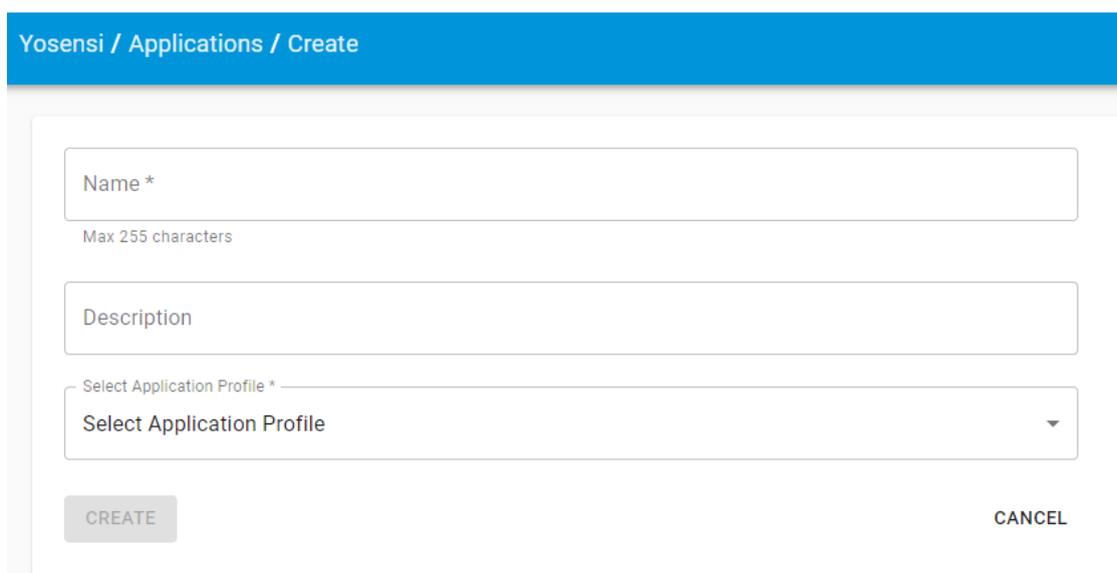
Before you can make the node visible, you'll need an **organization** and an **application**. The organization is your own space, at the highest level of IoT systems management (like the root directory in operating systems). It can be created only by Yosensi staff, and all clients using Yosensi Management Platform have one created for them by default. In case of any questions, you can find us at support@yosensi.io. The application is a representation of each system and, together with the node definitions, is created by customers. The basic integration of a node into the Yosensi Management Platform is described below. Nodes can be added manually or via Bluetooth.

NOTE A subscription is needed to use Yosensi Management Platform. Contact us on contact@yosensi.io for more information and pricing.

Adding a node manually

Yosensi Management Platform integration instructions:

1. Log in to app.yosensi.io.
2. You'll see the default organization view. To switch to another organization, click on the user avatar in the right top corner and select 'Switch Organization'.
3. To create a new application, press the bottom right '+' button. Fill in the 'Name' and 'Description' fields and select an 'Application Profile', which is the region definition.



The screenshot shows the 'Yosensi / Applications / Create' form. It features a blue header bar with the text 'Yosensi / Applications / Create'. Below the header, there are three input fields: 'Name *' with a 'Max 255 characters' hint, 'Description', and a dropdown menu labeled 'Select Application Profile *' with the text 'Select Application Profile' and a downward arrow. At the bottom of the form, there are two buttons: 'CREATE' on the left and 'CANCEL' on the right.

Figure 16 Application creation form.

- Proceed to the application by clicking its name on the list, then press the '☰' button to add a node. Click **Add manually**. Set the node's 'Name' and 'Description' fields, and fill in 'Node ID' (*deveui*) and 'OTAA Key' (otaa section - *appkey*). **All device identifiers are provided by Yosensi Support when you order the nodes.**

Select a model that is compatible with your device — this choice affects the number of charts and data source (YO Power). You can also set the node's 'Location', if locations have been pre-defined. If you haven't defined a suitable location, leave this field set at <None>.

NODES LIST	NODES TREE	GATEWAYS	DETAILS	LOCATIONS	EXTERNAL API	>
Node Name ↑	Node ID	Model	Last Seen	Network	Disabled	Dashboard
No records found						

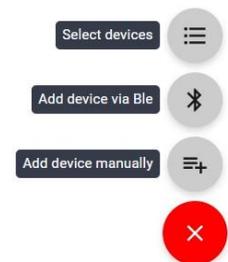
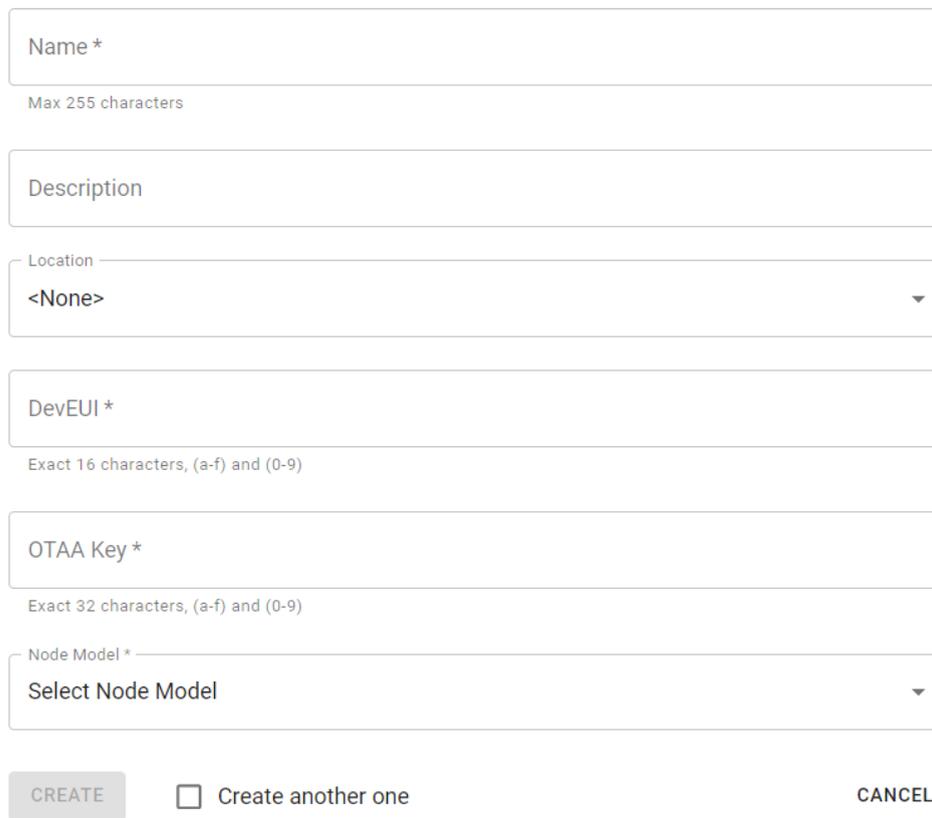


Figure 17 Adding node to the Yosensi Management Platform section view.

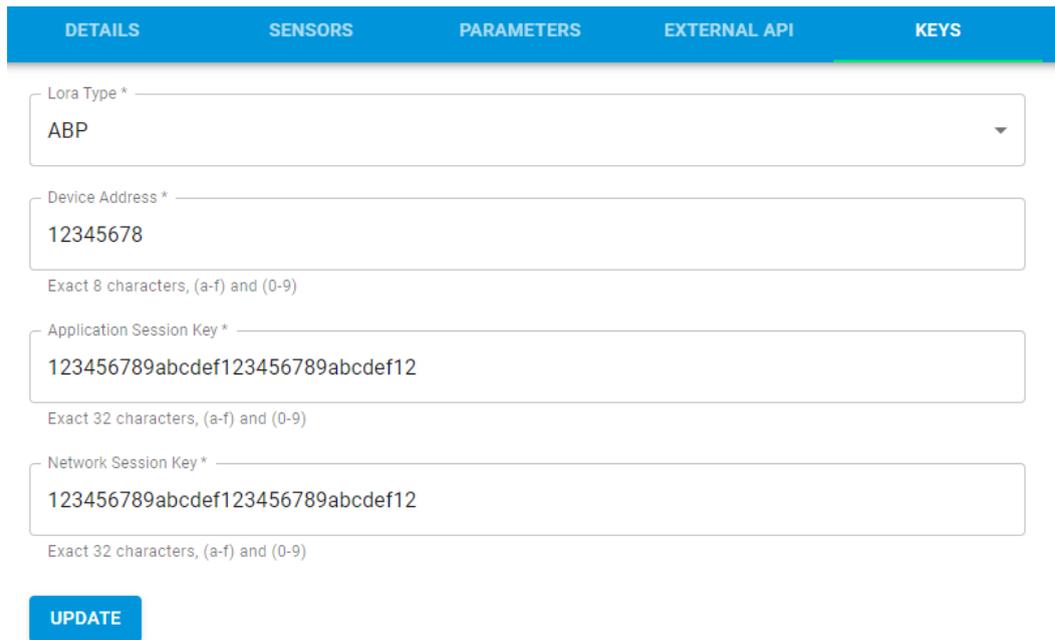


The form consists of several input fields and a submit button. The 'Name *' field has a maximum length of 255 characters. The 'Description' field is a simple text input. The 'Location' field is a dropdown menu currently set to '<None>'. The 'DevEUI *' field requires exactly 16 characters, using only lowercase letters (a-f) and digits (0-9). The 'OTAA Key *' field requires exactly 32 characters, using only lowercase letters (a-f) and digits (0-9). The 'Node Model *' field is a dropdown menu with the option 'Select Node Model'. At the bottom, there is a 'CREATE' button, a checkbox labeled 'Create another one', and a 'CANCEL' button.

Figure 18 Node creation form.

5. **New nodes must be added in OTAA mode.** Nodes can be switched to ABP mode after activation in the Yosensi Management Platform by changing the Node configuration.

Click on the link in the 'Node Name' column. Go to the 'KEYS' tab and switch 'LoRa Type' from OTAA to ABP and fill in the blank spaces, then press update. The identifiers 'Device Address' (*devaddr*), 'Application Session Key' (*appskey*) and 'Network Session Key' (*nwkskey*) are provided by Support, or can be found in the device's configuration pane while connected to the node in the firmware section.



The image shows a configuration form for a Node LoRa type. It has a blue header with five tabs: DETAILS, SENSORS, PARAMETERS, EXTERNAL API, and KEYS. The 'DETAILS' tab is active. Below the tabs are four input fields, each with a label and a value:

- Lora Type ***: A dropdown menu with 'ABP' selected.
- Device Address ***: A text input field containing '12345678'. Below it, a note says 'Exact 8 characters, (a-f) and (0-9)'.
- Application Session Key ***: A text input field containing '123456789abcdef123456789abcdef12'. Below it, a note says 'Exact 32 characters, (a-f) and (0-9)'.
- Network Session Key ***: A text input field containing '123456789abcdef123456789abcdef12'. Below it, a note says 'Exact 32 characters, (a-f) and (0-9)'.

At the bottom of the form is a blue button labeled 'UPDATE'.

Figure 19 Node LoRa type configuration form.

6. When the server receives data from the device, you'll notice that the 'Last Seen' column ('NODES LIST' tab) status changes from 'never' to a few 'seconds ago'.
7. Open charts by clicking on the 'OPEN' button in Dashboard columns or by entering the node's 'DETAILS' tab ('Node Name' column link) and clicking 'CHARTS'.

Adding node via Bluetooth

1. Log in at app.yosensi.io.
2. You'll see the default organization view. To switch to another organization, click on the user avatar in the right top corner and select 'Switch Organization'.
3. To create an application, click the bottom right '+' button. Fill in the 'Name' and 'Description' fields and select the 'Application Profile', which is the region definition.
4. Proceed to the application by clicking its name on the list, and press the '☰' button to add a node. Click '**Add via Ble**'. Select the device to add. Then, the list with devices available to connect to the application will appear. The name of the node will be generated automatically from the device model and DEV EUI (*deveui*), with OTAA key and DEV EUI filled in, press create.
5. When the server receives data, you'll notice that the 'Last Seen' column (NODES LIST' tab) status changes from 'never' to a few 'seconds ago'.
6. Open charts by clicking on the 'OPEN' button in Dashboard columns or by entering the node's 'DETAILS' tab ('Node Name' column link) and clicking 'CHARTS'.

Payload description

If you want to connect to your own server you have to decode the payload specific to each device. To do this you need a payload decoder which can be downloaded from [Payload decoder](#). Extended documentation of the protocol can be found at [Payload description](#). An exemplary payload produced by YO Power is presented below with division into each measurement marked together with decoded values whose interpretation is described in the Payload description document. First frame from the example with current measurements is sent with the [measurement interval](#) given in the configuration section. However second and third frames from the example are sent with an [energy](#) interval.

Example of YO Power payload with description:

First frame

02:02:01:13:2e:2a:11:01:02:ad:2e:00:11:02:03:4d:2e:00:11:03:03:4e:2e:00:11:04:03:0d:2e:00:11:05:03:54:2e:00:11:06:03:4a

Payload header				First measurement (CH1-current)					
0x02	0x02	0x01	0x13	0x2E	0x2A	0x11	0x01	0x01	0xAD
ver = 2	cnt = 1	pct [s] = 254		type = 11 prec = 2	md [s] = 0	addr_len = 1 meas_len = 2	addr = 1	val = 685 (6,85 [A])	

Second measurement (CH2-current)

0x2E	0x00	0x11	0x02	0x03	0x4D
type = 11 prec = 2	md [s] = 0	addr_len = 1 meas_len = 2	addr = 2	val = 845 (8,45 [A])	

Third measurement (CH3-current)

0x2E	0x00	0x11	0x03	0x03	0x4E
type = 11 prec = 2	md [s] = 0	addr_len = 1 meas_len = 2	addr = 3	val = 846 (8,46 [A])	

Fourth measurement (CH4-current)

0x2E	0x00	0x11	0x04	0x04	0x0D
type = 11 prec = 2	md [s] = 0	addr_len = 1 meas_len = 2	addr = 4	val = 845 (8,45 [A])	

Sixth measurement (CH5 - current)

0x2E	0x00	0x11	0x05	0x03	0x54
type = 11 prec = 2	md [s] = 0	addr_len = 1 meas_len = 2	addr = 5	val = 781 (7,81 [A])	

Fifth measurement (CH6 - current)

0x2E	0x00	0x11	0x06	0x03	0x4A
type = 11 prec = 2	md [s] = 0	addr_len = 1 meas_len = 2	addr = 6	val = 845 (8,45 [A])	

Second frame:

02:03:00:3d:9a:00:13:01:00:00:00:00:9a:00:13:02:00:00:0d:94:9a:00:13:03:00:00:0e:4c

Payload header**First measurement (Energy CT1 Clamp)**

0x02	0x03	0x00	0x3d	0x9A	0x00	0x13	0x01	0x00	0x00	0x00	0x00	
ver = 2	cnt = 3	pct [s] = 61		type = 38 prec = 2	md [s] = 0	addr_len = 1 meas_len = 4	addr = 1	val = 0				

Second measurement (Energy CT2 Clamp)

0x9A	0x00	0x13	0x02	0x00	0x00	0x0d	0x94
type = 38 prec = 2	md [s] = 0	addr_len = 1 meas_len = 4	addr = 2	val = 3476 (34.76 [kW/h])			

Third measurement (Energy CT3 Clamp)

0x9A	0x00	0x13	0x03	0x00	0x00	0x0e	0x4c
type = 38 prec = 2	md [s] = 0	addr_len = 1 meas_len = 4	addr = 3	val = 3660 (36.60 [kW/h])			

Third frame

02:04:00:79:9a:00:13:04:00:00:0e:80:9a:00:13:05:00:00:0d:f1:9a:00:13:06:00:00:0e:1a

Payload header				First measurement (Energy CT4 Clamp)							
0x02	0x04	0x00	0x79	0x9A	0x00	0x13	0x04	0x00	0x00	0x0e	0x80
ver = 2	cnt = 3	pct [s] = 121		type = 38 prec = 2	md [s] = 0	addr_len = 1 meas_len = 4	addr = 1	val = 3712 (37.12 [kW/h])			

Second measurement (Energy CT5 Clamp)

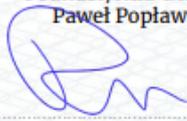
0x9A	0x00	0x13	0x05	0x00	0x00	0x0d	0xf1
type = 38 prec = 2	md [s] = 0	addr_len = 1 meas_len = 4	addr = 5	val = 3569 (35.69 [kW/h])			

Third measurement (Energy CT6 Clamp)

0x9A	0x00	0x13	0x03	0x00	0x00	0x0e	0x1a
type = 38 prec = 2	md [s] = 0	addr_len = 1 meas_len = 4	addr = 6	val = 3610 (36.60 [kW/h])			

Compliance statements

CE	
UNITED KINGDOM CONFORMITY ASSESSED	
No. 08/2021/UKCA	
with the European Directives: EMC 2014/30/UE; RED 2014/53/UE; RoHS 2011/65/UE	
Yosensi Sp. z o.o. ul. Żurawia 71A, lok. 1.50, 15-540 Białystok	
On our sole responsibility, we hereby declare that the product:	
Name	YO Power
Technical data	Voltage 6+30 V DC/5+21V AC; current mx 120 mA DC (12 V DC); IP20
to which this declaration of conformity applies is consistent with legal acts:	
The Directive EMC 2014/30/UE	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (Official Journal of the European Union L 96/79 of 29.3.2014)
The Directive RED 2014/53/UE	Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC(Official Journal of the European Union L 153/62of 22.5.2014)
The Directive RoHS 2011/65/EU and 2015/863/EU	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (Official Journal of the European Union L 174/88 of 1.7.2011) and Commission Delegated Directive (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU
Harmonized standards applied to the product to which this Declaration of Conformity relates:	
BS EN 50401:2017	Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when put into service
BS EN IEC 61326-1:2021	Electrical equipment for measurement, control and laboratory use -- EMC requirements -- Part 1: General requirements (IEC 61326-1:2020)
BS EN IEC 61000-6-2: 2019	Electromagnetic compatibility (EMC) -- Part 6-2: Generic standards -- Immunity standard for industrial environments (IEC 61000-6-2:2016)
BS EN IEC 61000-6-4: 2019	Electromagnetic compatibility (EMC) -- Part 6-4: Generic standards -- Emission standard for industrial environments (IEC 61000-6-4:2018)
ETSI EN 301 489-3 V2.1.1:2019	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
ETSI EN 300 220-2 V3.2.1:2018	Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz; Part 2: Harmonised Standard for access to radio spectrum for non specific radio equipment
ETSI EN 300 328 V2.2.2:2019	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard for access to radio spectrum
BS EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
The last two digits of the year in which the CE marking was affixed to the product: 21	
Białystok, 2021-11-18	Founder/R&D Director Paweł Popławski
Place and date of issue	Name, surname and signature of the authorized person
YOSENSI.IO	

CE	
EC DECLARATION OF CONFORMITY	
No. 08/2021/EN	
with the European Directives: EMC 2014/30/UE; RED 2014/53/UE; RoHS 2011/65/UE	
Yosensi Sp. z o.o. ul. Żurawia 71A, lok. 1.50, 15-540 Białystok	
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EN IEC 61000-6-4: 2019	Electromagnetic compatibility (EMC) -- Part 6-4: Generic standards -- Emission standard for industrial environments (IEC 61000-6-4:2018)
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Białystok, 2021-11-18	Founder/R&D Director Paweł Popławski
..... Place and date of issue	 Name, surname and signature of the authorized person
YOSENSI.IO	