iNELS Air

Sensors & actuators for IoT

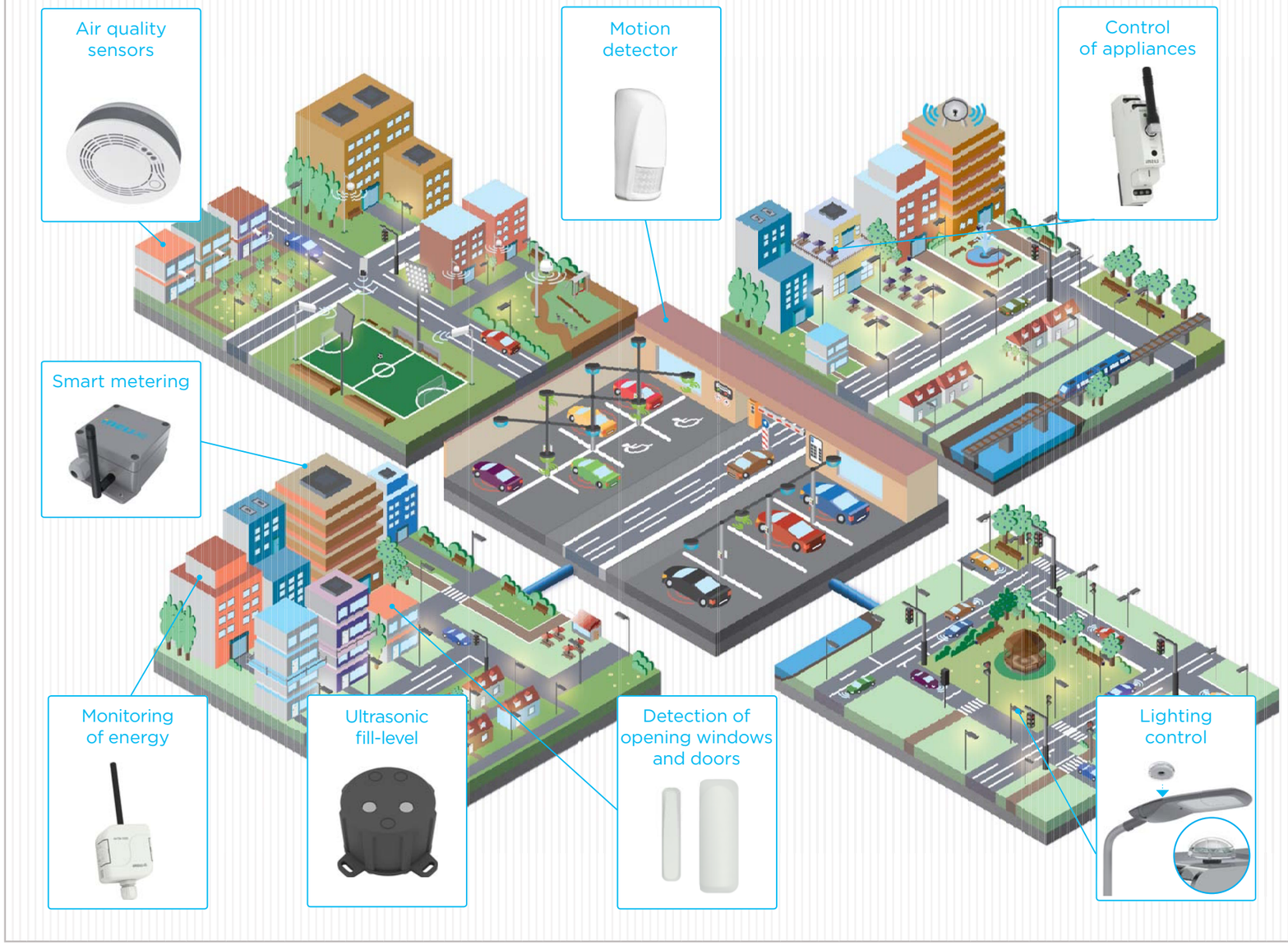
www.inelsair.com

About iNELS Air

iNELS Air was designed in response to the dynamically developing network for IoT (Internet of Things). The IoT wireless communications category describes the Low Power Wide Area (LPWA). This technology is designed to provide full coverage even inside buildings, with energy-saving and low-cost operation of individual devices.

The product group includes sensors and actuators for communication on the LoRa and NB-IoT protocol. Linking sensors with iNELS Air Cloud is ideal for a wide range of applications.

Individual products have the letter “L” or “NB” in their type designation. This distinguishes the way of communication. “L” stands for communication over the LoRa network, and “NB” uses communication via the NarrowBand network.



A bidirectional network using the free band of 868 MHz for its communications. The advantage of this network is the possibility of freely deploying the individual stations in local locations, thus strengthening their signal. It can therefore be used effectively in areas of companies or cities, for example. You can find current network coverage on the site www.lora-alliance.org.

The network is the only one that uses the LTE licensed band for its two-way communication. The advantage of NB-IoT is the use of the already built-in network to ensure adequate coverage both inside and outside buildings. It uses this technology with its SIM card devices. You can find current network coverage on the site www.iot-portal.cz/mapa-pokryti/.

Saving

The use of web-based networks ensures low energy consumption. Thanks to this, most of the sensors can be battery-powered and their capacity can last for an average of 2-5 years. The sensors are simple and affordable. The price for ongoing communication varies depending on the type of network you choose - but in general this communication is considered affordable.

Safety

All data from the sensors is encrypted before sending, which ensures their security. Access to the individual measured data can then be done in the iNELS Air Cloud under your login information. This can ensure safe and continuous supervision of your property.

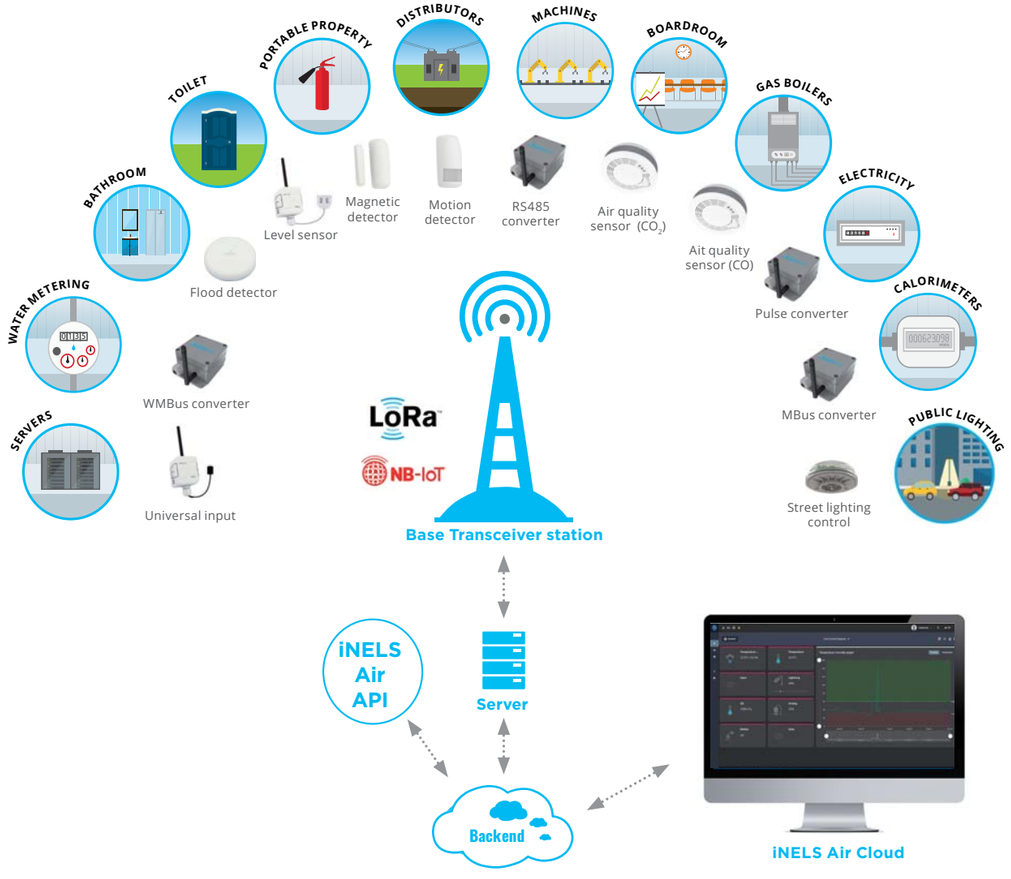
Design

The design of the individual products is tailored to their purpose - the design of the detectors is designed for placing into interior spaces, the modular devices into the switchgear and, on the other hand, the products for outdoor use are IP65 compliant. The wireless design of individual devices also enables easy installation and almost immediate use.

Principle function

Data from sensors and actors (further as an „devices“) is sent via transmitters (BTS station) to the control server, from where they are sent to Server. Depending on the user’s requirements, data can be integrated into the master system.

Installation of individual sensors and detectors is very simple. You will place unit randomly in range of the network. The activation of the sensor is achieved using a QR code, which is placed on each component. For the operation of individual products, it is necessary to have a secure connection with the network provider. This connectivity allows you to select individual intervals for sending messages according to your requirements.



iNELS Air Cloud

To use the iNELS Air device, registration is required to the iNELS Air Cloud that will collect the current data from these products, store the history and back up your settings.

The possibility of using iNELS Air Cloud: Cloud for customers of our company. User registration can be done at www.inelsair.cloud. An email contact is always required to set up your account, this will serve as your login name and your account will be authenticated, and your password can be selected.

iNELS Air Cloud is secured with the SSL protocol.

Uniform product type marking

(Type decoding)

Product line

Type of devices

- **MD** Motion detector
- **QS** Air Quality sensor
- **SF** Flood detector
- **TM** Pulse converter
- **WD** Magnetic detector
- **SLC** Street light controller
- **WS** Ultrasonic fill-level
- **CV** Universal converter

Network

- **L** - Lora
- **NB** - NB-IoT

Notification and control

Data from iNELS Air device can be displayed in several variants and combined with each other.

An important carrier of all information and the overall history of each device is the iNELS Air Backend. From this storage, all statement can then be displayed in your smartphone web browser, where you can set notifications in the form of an email.

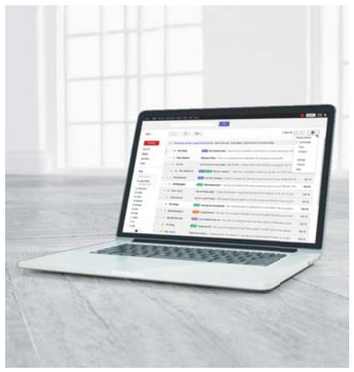
There are several ways to control iNELS Air products and view their data:

iNELS Air Cloud

To easily view data on computer/laptop, is used the iNELS Air Cloud, which in addition to current statuses also stores the history of sensor data.

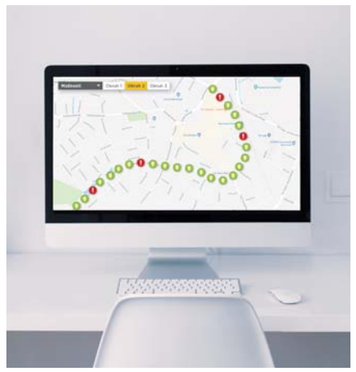
www.inelsair.cloud

E-mail



You can also be informed about important changes to the monitored devices by receiving a notification email message direct to your e-mail address. For each sensor, e-mail messages can be set separately.

Smart City Platform



The platform is designed specifically for displaying the status of individual sensors and actuators and at the same time control the switching devices in the Smart City. Using a laptop or computer, you can view the city plan and individual installed items to show their current status - for example, free parking spaces.

Product content

Measuring and monitoring temperature and humidity

Monitoring the required temperature and not exceeding the set limits is a major problem for many industrial, manufacturing and warehousing process.

The input module can monitor undesirable heating or cooling fluctuations, which are immediately reported. It informs at regular intervals about the actual temperature in the monitored areas. The simple solution is to ensure continuous supervision, thereby eliminating any financial loss caused by overheating or subcooling of the premises or devices.
With its IP65 cover along with battery power makes it ideal for placement in less accessible places.

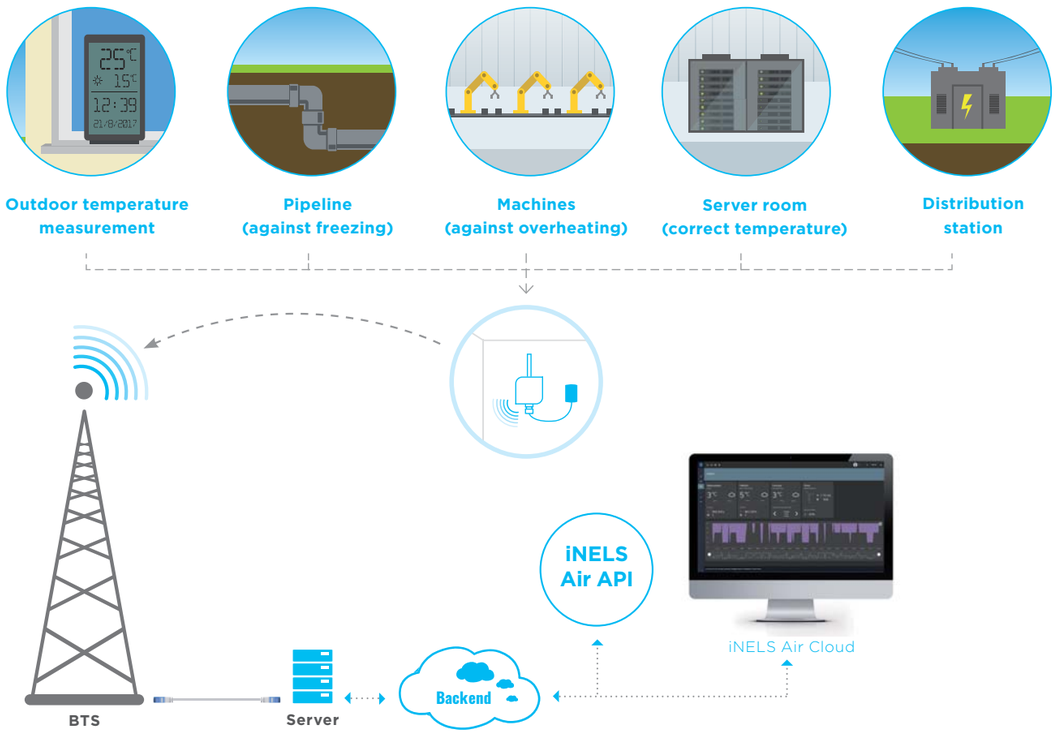
Universal input

AirIM-100

- In combination with a temperature / humidity sensor it measures and transmits the current data from these sensors
- in IP65 enclosure
- batteries or 230 V

LoRa NB-IoT

Examples of use:



Protection against flooding, level control

Flooding a room is one of the most common domestic accidents that you can easily avoid.

The wireless flood detector monitors for any leakage from your washing machine or dishwasher and warns you in timely fashion of any unwanted water leakage in the bathroom, kitchen, or cellar. If water is detected, you will be alerted by notifications on iNELS Air Cloud.

A universal float sensor or FP-1 external flood probe can be used to monitor the level and give early warning of critical values. Using a flood probe, it is possible to detect, for example, filling the sump while the float sensor reports the filling of the water or other liquid reservoir.

Flood detector

AirSF-100

- activation occurs after flooding the bottom contacts on the detector
- sound and vibration signalling
- battery power
- IP62 enclosure

LoRa NB-IoT

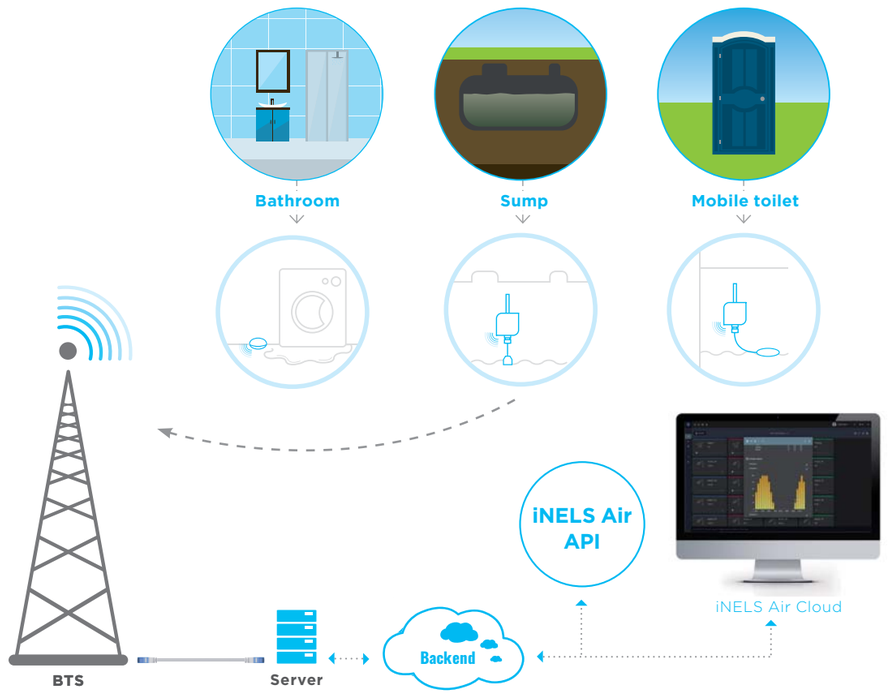
Level control

AirCV-100

- monitor the current level of liquid
- warns against critical values in time
- IP65 enclosure (Protection against water, dust, ...)

LoRa NB-IoT

Examples of use:



Opening detection

Windows and doors are an easy target for un-invited visitors, so it‘s good to have everything under control.

The detector consists of two parts – the main housing and magnetic. The main housing enables all communication and monitors the position of the magnet in the magnetic part. The alarm will be triggered when the magnet is removed from the main housing.
Although the detector is primarily designed for windows and doors in remote buildings, cellars, or substations, it can also be used to monitor movable property (cover, street furniture) or when you want to know that inventory is moving.

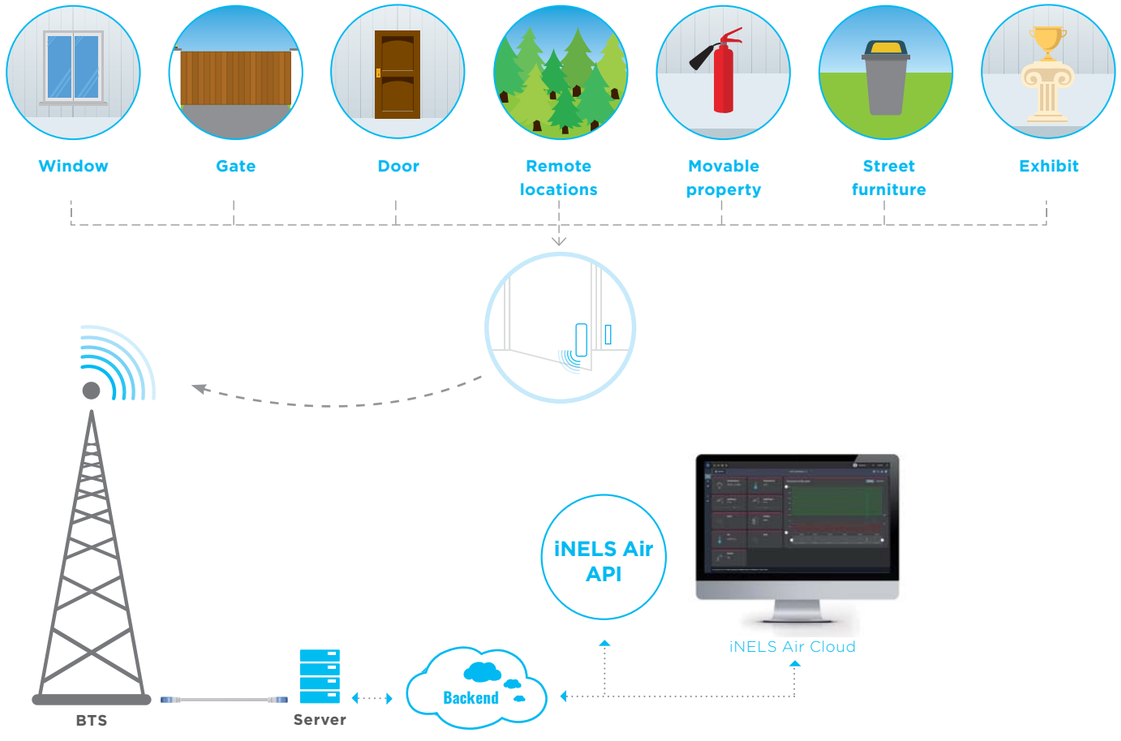
Magnetic detector (indoor)

AirWD-100

- activation occurs by removing the magnet from the sensor
- for indoor use
- status is displayed in a smartphone application or iNELS Air Cloud
- battery power

LoRa NB-IoT

Examples of use:



Motion detection

Keep control before the intrusion of strangers and cottages, barns, for example, the substation which you look into once in a while.

The motion detector will guard these areas for you. Using a keychain, you simply unlock these areas when you are present, and when you exit you use the keychain again to activate the detector.

In addition, one detector can be paired with multiple key chains, so all members of your family or authorized person can have their own keychain.

Motion detector

AirMD-100

- detects people moving in a supervised area
- sensitivity adjustment
- battery power

LoRa NB-IoT

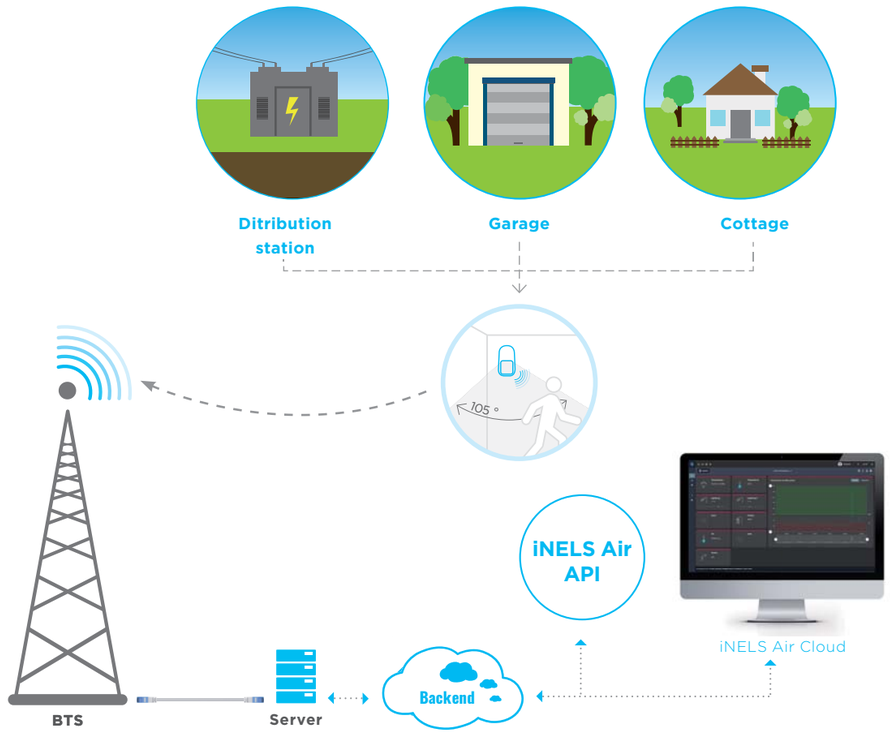
Mini Alarm

Motion detector & AirKey

- used to activate and deactivate the motion detector at the moment you leave or enter the guarded area
- acoustic signalization informs the user when AirKey is activated or deactivated

LoRa NB-IoT

Examples of use:



Surrounding Air quality

Impurities in the air are among one of the basic environmental problems. Some substances also have a negative effect on human beings.

Even one person in a poorly ventilated room, by breathing, will soon increase the carbon dioxide (CO_2) concentration to a detrimental level. Higher concentrations can cause headache, affect the ability to concentrate, drowsiness, or worse.
Conversely, carbon monoxide (CO) is produced by incomplete combustion and is very dangerous for human beings. This gas is also produced by cigarettes or aromatic rods.
Our sensors will allow you to easily measure these concentrations and react to an undesirable amount in a timely manner. They can also be part of a master system.

Air quality sensor
- carbon dioxide (CO_2)

AirQS-100

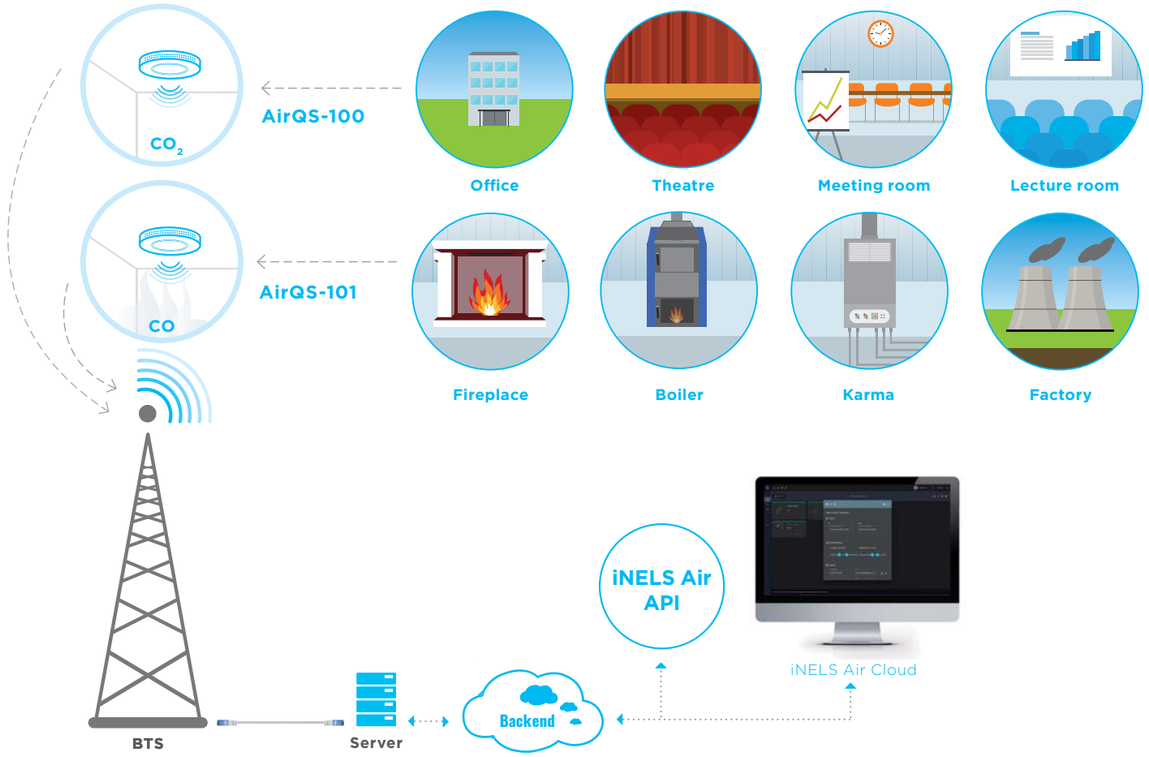
- measurement of the concentration of CO_2 which, in large quantities, can cause headache, affect the ability to concentrate, drowsiness, or worse
- information about actual temperature and humidity
- automatic testing of functionality
- data are sent to iNELS Air Cloud
- permanent power supply 110-240 V AC/DC

Air quality sensor
- carbon monoxide (CO)

AirQS-101

- a security component for monitoring the CO concentration resulting from incomplete combustion
- information about actual temperature and humidity
- data are sent to iNELS Air Cloud
- battery power 4x AA

Example of use:



Measurement and monitoring of energy

Monitoring of energy due to the ever increasing cost is among the important aspects of every object or property.

Wireless sensors are installed directly on to the water meter, gas meter and electrical meter without damaging their seals. The pulses of these meters are counted and sent as data to the iNELS Air Backend, where they are further processed and evaluated.

In iNELS Air Cloud it is possible to set notifications when the set parameters are exceeded, so called “threshold”.

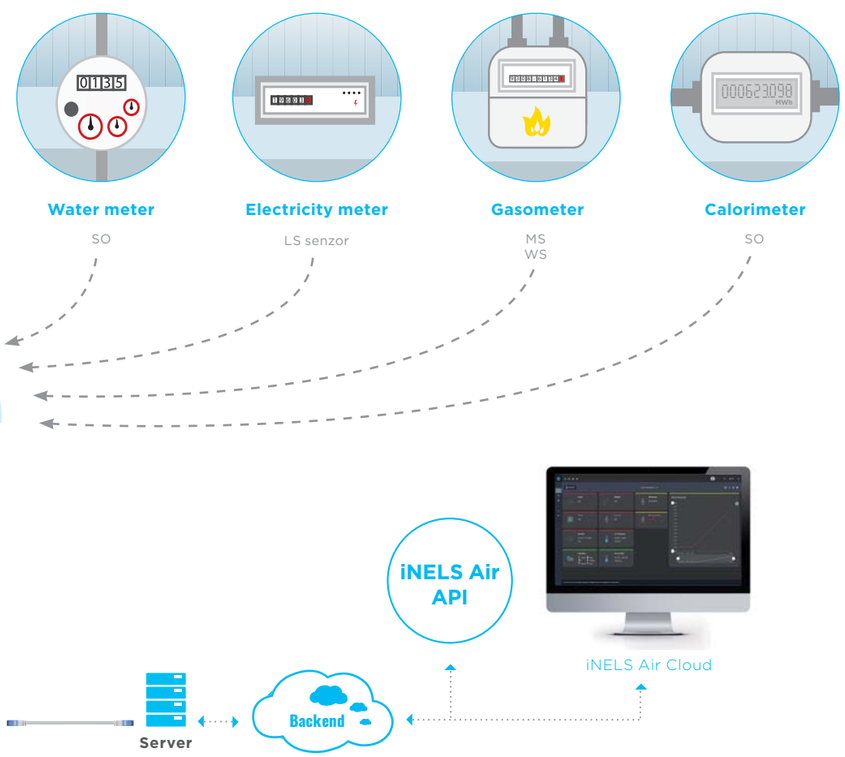
Pulse converter

AirCV-100

- a wireless pulse converter designed to scan data (pulse) from energy meters
- data are sent to the server and displayed in iNELS Air Cloud
- battery power
- in IP65 enclosure (protection dust, ...)
- 2 or 4 inputs

Supported sensors

- LS - LED sensor
- MS, WS - magnetic sensor
- S0 - pulse output (straight from the device - water meter, electricity meter ...)



Smart street lighting

Smart public lighting is environmentally friendly, as well as being kind to your wallet.

Replacing existing light sources with modern LED lights combined with intelligent control makes it possible to reduce the cost of electricity consumption by up to 80%. Thanks to the LoRa's modern network of communications, the lights can be controlled from up to 20 km. In addition to switching on and off, it is possible to control the intensity of lighting and also to diagnose a light defect. Using an oscilloscope, it can respond to ambient conditions. The component for public lighting simply attaches to the light or the mast and is immediately operational. Control can be performed from the control room by using cloud applications, in the field by tablet or smartphone.

PLUG-IN (socket)

Receiver actuator in a special box with a bayonet connector for easy installation into lights equipped with this socket.

AirSLC-100/LWES
AirSLC-100/NEMA

- two standards:
  4 pins - LUMAWISE ENDURANCE S.
  7 pins - NEMA
- „hat" is according to the type of luminaire on the bottom or top
- output: DALI or 0-10 V

LWES NEMA

LoRa NB-IoT

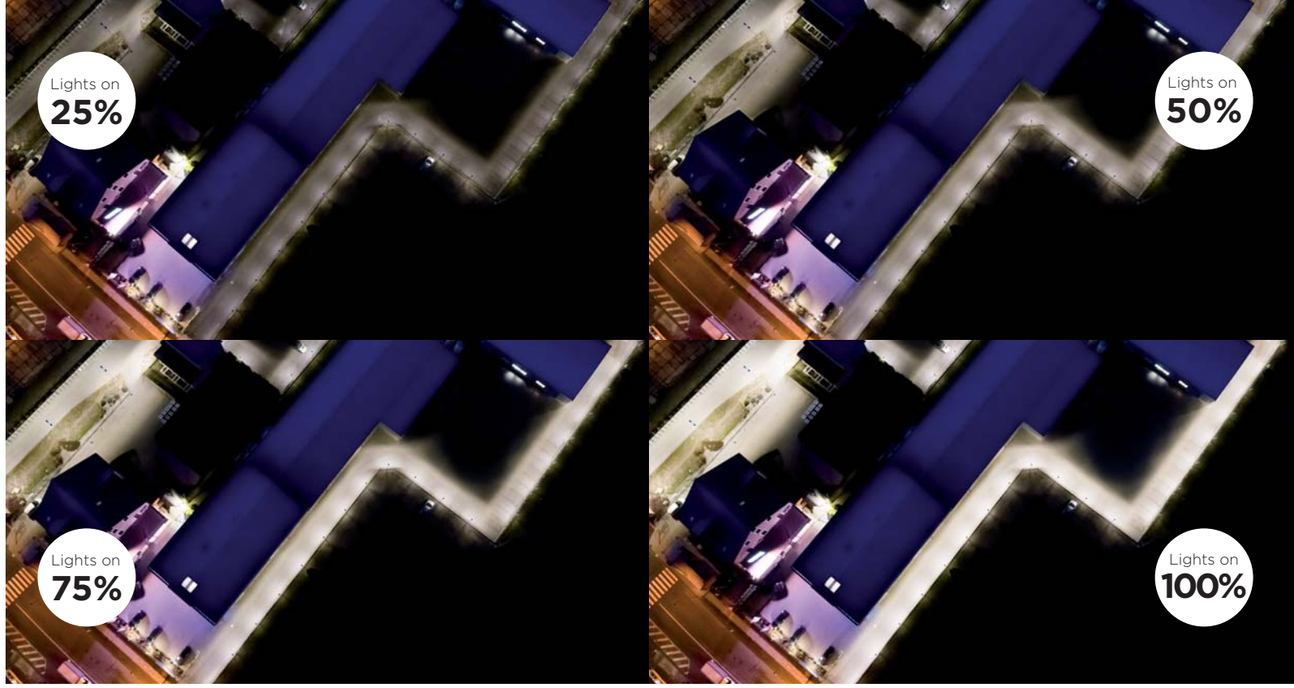
OEM (built-in) - Embedded

PCB board for direct integration into the power supply board.

LoRaWAN Modul OEM

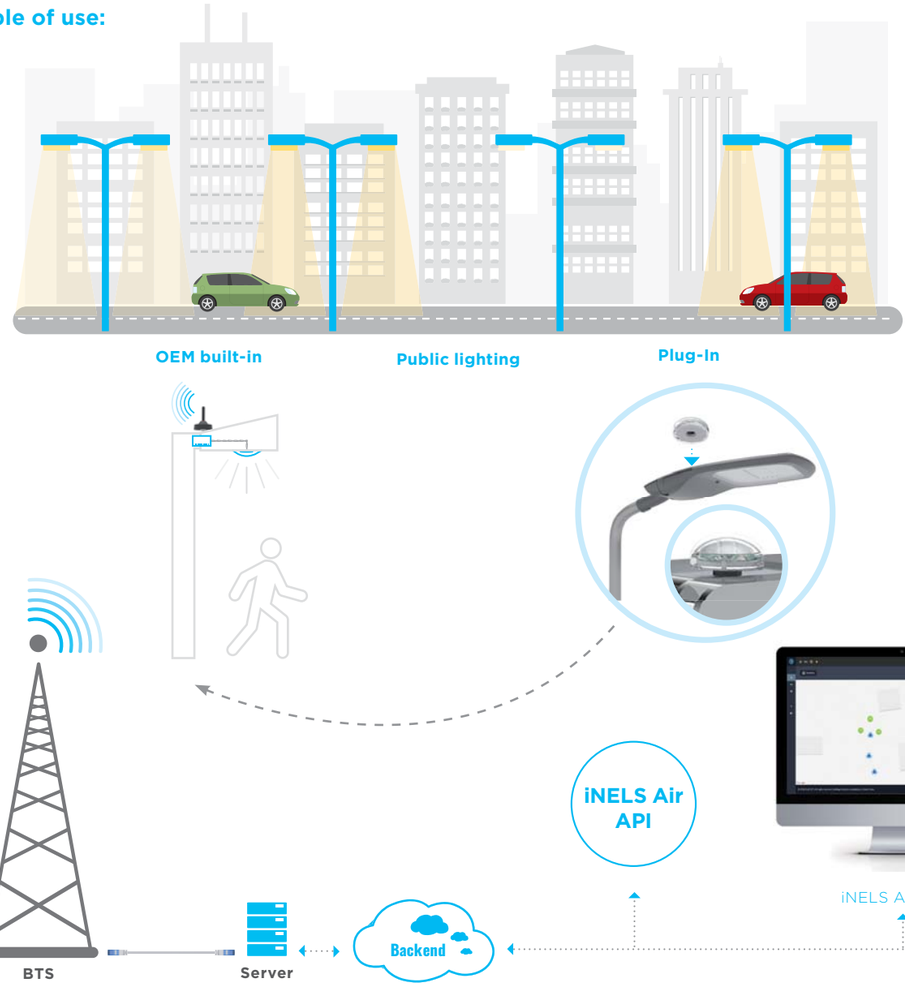
- connection: soldering pins
- power supply: 5-24VDC, after breaking source parts only stabilized 3V3 / 140mAh
- communication:
  - SPI 1x
  - Analog pins 8x (12-bit)
  - USART 1x
  - I / 0 digital pins 29x
- gain: + 2,12 dB
- communication: LoRa 868Mhz
- antenna: external ULF or SMA connector, internal bent parts of the product

LoRa



Industrial area lighting

Example of use:



Waste management

The primary idea of smart waste management is to streamline waste administration with the help of modern technologies and to directly reduce the costs of collection and disposal.

Ultrasound scans the “level” of the waste, and over the IoT wireless network it regularly transfers this information to the Server.
Battery power allows for up to 5 years of operation. The entire sensor is located in an anti-vandal box. The filled volume of the container can be viewed via the platform on-line, in a clear map background with color-coded icons. Built in artificial intelligence, collection history, and current period can predict the requirement for emptying. In this way, containers of recyclable secondary raw materials (paper, glass, PET) can also be monitored.

Ultrasonic fill-level*

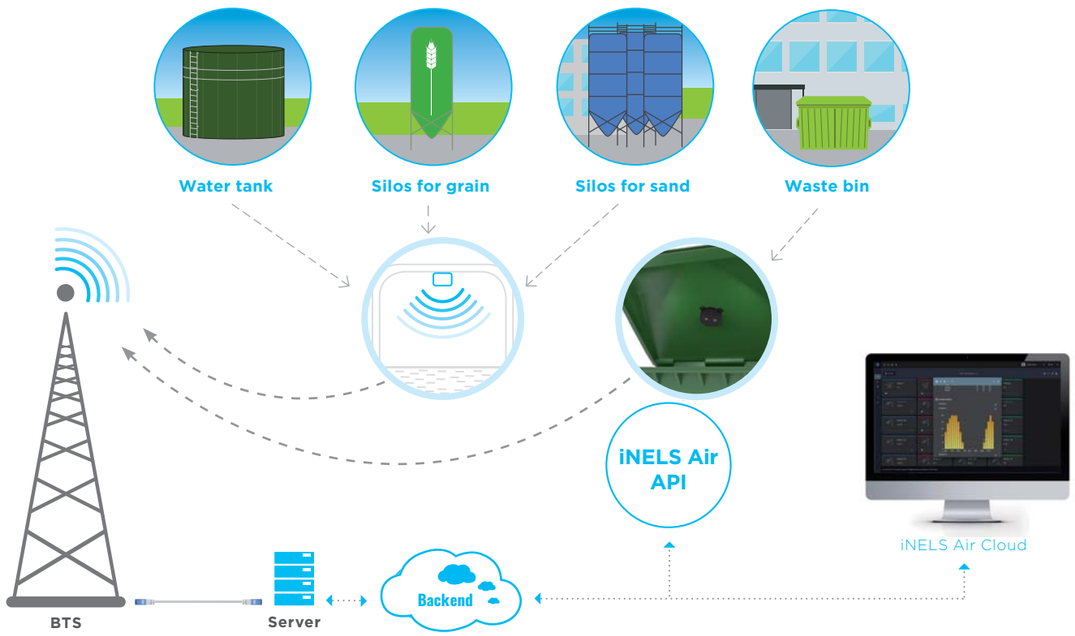
AirWS-100

- the ultrasonic sensor measures the level of filling
- it is usually placed on the lid or top of the container and informs the user of the level of filling - e.g. by waste
- this information is used for efficient waste collection planning or for use in other industries when planning tasks related to, for example, logistics
- temperature sensor informs about temperature in waste container
- built-in sensor for opening the lid or for tipping over the waste container
- battery power with a lifetime of about 8 years
- IP65 protection

LoRa NB-IoT

- Detector AirWS-100 can be used to detect free capacity of grain elevator, water tank level, etc.

Example of use:



Wireless MBus reading

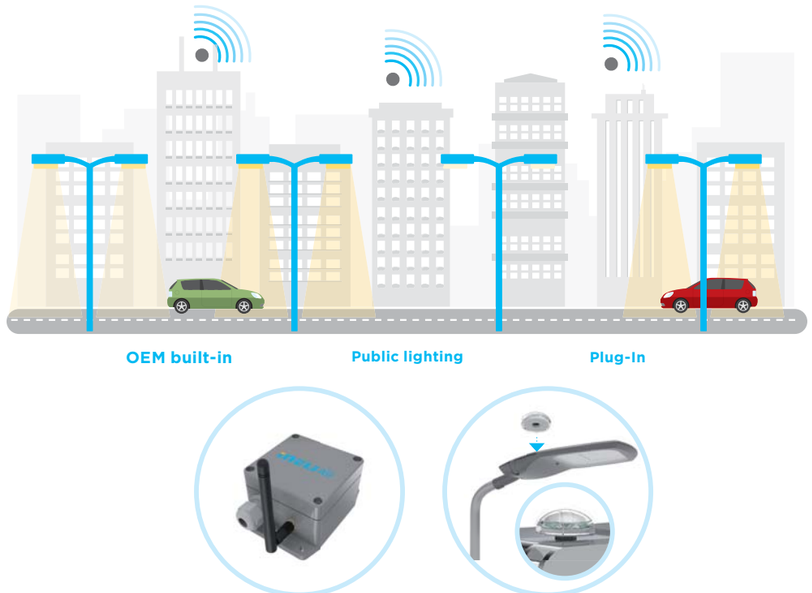
Product descritpion:

- WMbus technology makes it possible to read data from several sensors simultaneously with one device. Placing on a street lamp post will allow you to combine domestic readings with street light control.
- The WMbus converter communicates with water meters using the Wireless M-Bus protocol, thanks to which it can read up to 10 water meters at a time. The collected data are then sent via the NB-Iot or LoRa network to the iNELS Air backend, where they are further processed and evaluated. In iNELS Air backend you can set sending notifications when set parameters are exceeded.

Example of use:

Product characteristics:

- WMbus converter designed to convert WMbus input to NB / LoRa
- battery or AC power
- ability to read up to 10 sensors at a time
- setting of converter logic using integrated LUA scripts
- industrial design for maximum durability
- option to add reading function to Smart AirSLC-100L / LWES smart lighting



Universal IoT converter

Product description:

- The universal converter is used as a solution of your applications. With a wide range of options it can be used in industry 4.0, smart metering, and remote reading or as the basis for your application-specific equipment.
- The IoT converter is a device capable of interconnecting various kinds of communication interfaces with each other and sending data via the resulting data channels.
- Supported technologies include M-Bus, RS-485 (Modbus), Wireless M-Bus, pulse inputs, LoRa WAN and NB-IoT. Inside the converter LUA scripting interface is implemented, which serves for algorithmic processing of measured data directly by the converter. The converter can be operated both on battery and with mains connection up to 305 VAC.

Example of use:

Water meters

Machines

Calorimeters

Product characteristics:

- wireless Mbus, Mbus or RS485 to NB-IoT / LoRa converter
- setting of converter logic using implemented LUA scripts
- durable enclosure with IP 65 protection
- battery powered up to battery size D
- power supply up to 305 VAC

Designation

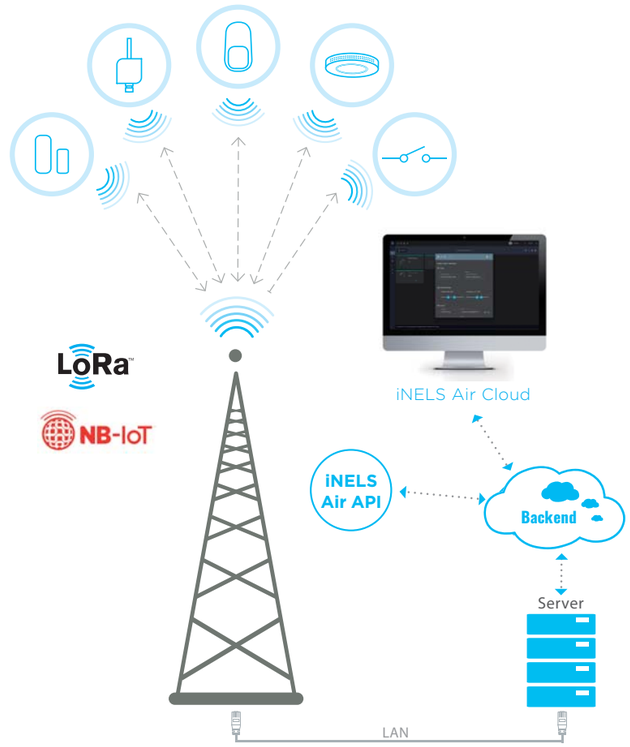
AirCV-100L/M/D

- L – connectivity
  - L – LoRa
  - N – NB-IoT
- M – input label
  - M – Mbus
  - W – Wireless Mbus
  - I2 – 2 pulse inputs
  - I4 – 4 pulse inputs
  - R – RS485
- D – power supply
  - A – batteries
  - D – batteries
  - E – external power supply

IoT Networks

This term includes the concept of connecting appliances, machines, sensors to an existing internet structure. This structure utilizes a specially designed network for small data transfer and low power consumption over long distances. For our concept, we use the LoRa and NB-IoT networks.
Data from the device is sent via the BTS to the control server from where it is sent to the iNELS Air Cloud network. Depending on user requirements, data may be integrated into the main system.

iNELS Air was designed in response to the dynamically developing networks for IoT. This technology is designed to provide full coverage, is energy-saving and has low operating costs.



	sigfox	LoRa	NB-IoT
Low purchase price	●	●	●
Extended battery life	●	●	●
Degree of coverage of areas	●	●	●
Wide indoor coverage	●	●	●
Bandwidth of 868 MHz	●	●	●
Two-way communication	●	●	●
Create your own network	●	●	●
Upgrade your own network	●	●	●
Cellular security	●	●	●
Roaming	●	●	●
Function without SIM card	●	●	●
Backend (B2B)	●	●	●
Custom Portal (B2C	●	●	●

General instrucions

Internet of Things (IoT)

- The IOT wireless communications category describes the Low Power Wide Area (LPWA). This technology is designed to provide full-range coverage both inside and outside buildings, energy-saving and low-cost operation of individual devices. Individual networks - LoRa, NarrowBand - are available to use this standard.

LoRa network information

- Síť je obousměrná a pro svou komunikaci využívá volné frekvenční pásmo.
  - 865 - 867 MHz India
  - 867 - 869 MHz Europe
  - 902 - 928 MHz North America, Japan, Korea
- The advantage of this network is the possibility of freely deploying individual stations in local locations, thus strengthening their signal. It can therefore be used efficiently in company premises or, for example, in local parts of cities.
- For more information on this technology, please visit www.lora-alliance.org.

Information about the NB-IoT network

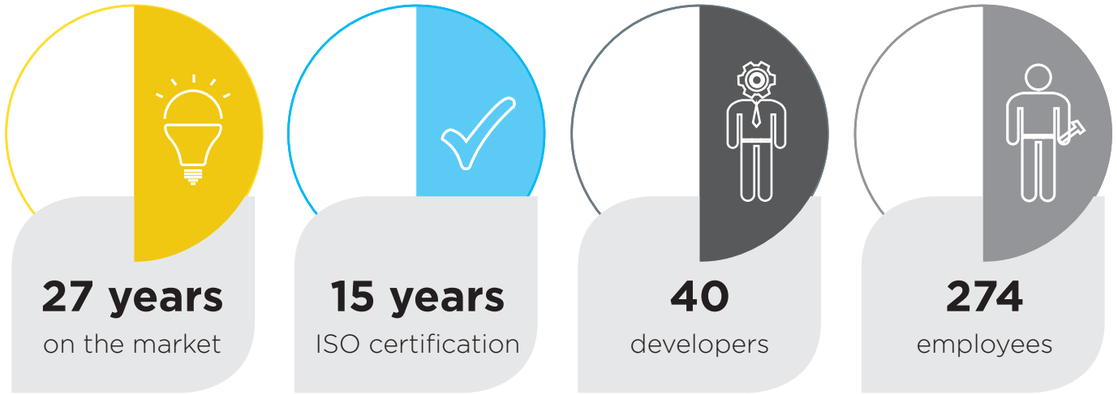
- The network provides two-way communication and the only one to use the licensed LTE band. Our devices allow band 1 (2100MHz), Band 3 (1800MHz), Band 8 (900MHz), Band 5 (850MHz), Band 20 (800MHz) and Band 28 (700MHz).
- It uses this SIM card technology for each device.
- The advantage of NarrowBand is the use of already built-up grids, which ensures sufficient reception outside and inside buildings.
- For more information on this technology, please visit www.vodafone.cz

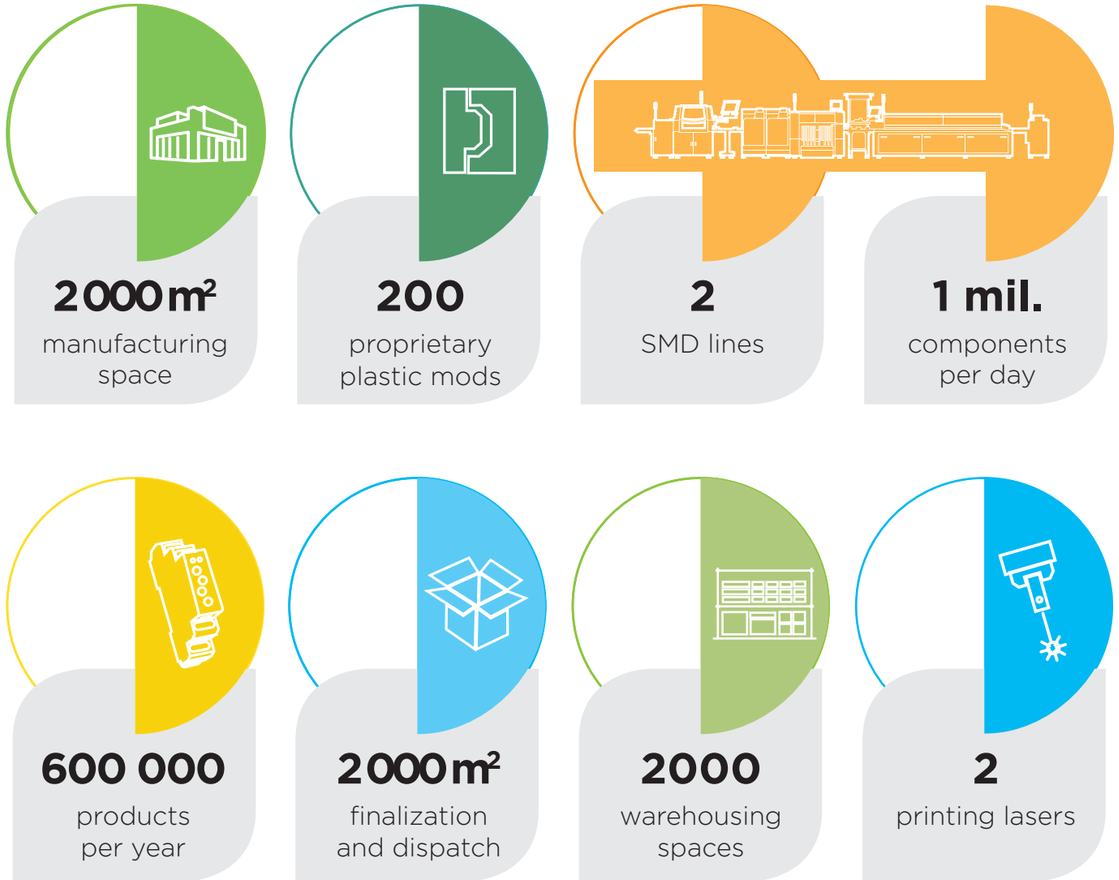
Caution for proper operation:

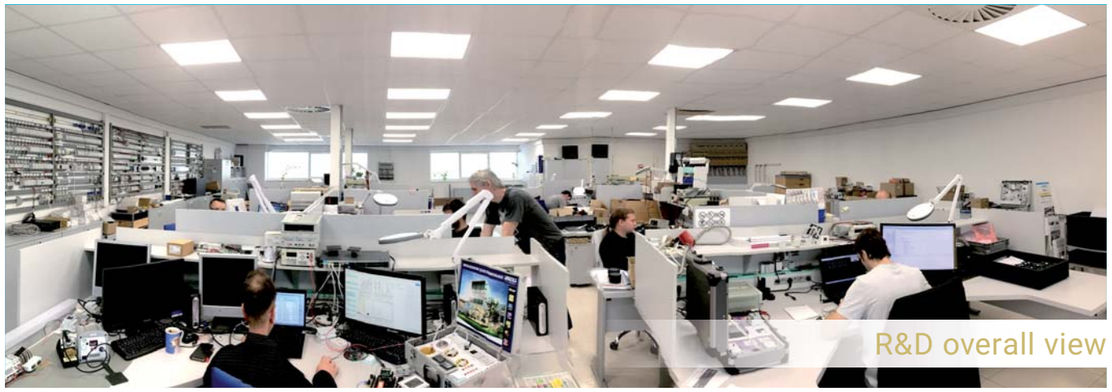
- Products are installed according to the wiring diagram given for each product.
- For proper device functionality, it is necessary to have sufficient coverage of the selected network at the installation site.
- At the same time, the device must be registered in the network. Successful device registration on a given network requires a charge for traffic.
- Each network offers different tariff options - it always depends on the number of messages you want to send from your device. Information on these tariffs can be found in the current version of the ELKO EP pricelist.

Others just resell

HOWEVER, WE DEVELOP AND MANUFACTURE PRODUCTS OURSELVES!







R&D overall view

Manufacturing hall

Testing lab

Finalization and dispatch

Notes

ELKO EP Holding

www.inelsair.com

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