El-Watch Neuron Sensors: A sixth sense for IoT monitoring

The Neuron Sensor System is a complete solution for industrial IoT monitoring, launched by El-Watch in 2019. Using cutting-edge technology, we made industrial monitoring and predictive maintenance more accessible than ever.

Wouldn't it be great if we could sense anomalies in industrial systems just like we sense aches in our own bodies? Imagine if we could treat weakening parts of production before they cause real damage. That is what Neuron Sensors are all about.

Unlike your average monitoring systems, Neuron monitoring is not intrusive. Instead, it is quickly integrated with your operation. It allows you to sense how your machines are doing and apply upkeep before serious issues arise.

The Neuron System is more than just a monitoring system. It adapts to your routines and enhances production by using wireless sensors, IoT monitoring, and predictive maintenance.

We are not yet able to upgrade the human nervous system, but industrial super-senses are already here. The Neuron System optimizes industrial operations and gives your company the edge to stay ahead of the game.

Why is it called The Neuron System?

Nerve cells are also called neurons, and in essence, El-Watch IoT monitoring is a nervous system for industrial operations. Neuron Sensors are like nerve cells, and IoT makes the synaptic network that enables free signal flow throughout the system.

The Neuron System gives you total control of your machinery and equipment. More importantly, it is designed to streamline monitoring by inobtrusive and highly adaptable wireless and battery-powered technology.

The Neuron system's main components

The Neuron System is meant to become a natural part of any industrial operation. The idea is to enhance and optimize production without halting it, even when installing, adjusting, or upscaling. To achieve this, we've developed four main components.

1. The Neuron Sensors

The wireless Neuron Sensors are the heart of our operation and the nerve cells of yours. The robust design is made for enduring rigorous industrial conditions for years. The Neuron Sensors run on batteries expected to last up to ten years.

2. The Neuron Gateway

The Neuron sensors communicate locally with the Neuron Gateway. This device is the link between the sensors and the cloud. By strictly controlling data flow in both directions, as well as buffering and preprocessing the data, the Gateway is essential for making the Neuron system so simple and user-friendly.

3. The Neuron Cloud

The Neuron Cloud is like your long-term memory. This is where all data from The Neuron Sensors get stored. Arguably, The Neuron Cloud is better than our brain since it never forgets anything and has all info readily available by a simple search.

Neuron APIs are also located in the Neuron Cloud. These are useful for customers wanting to use the sensor data in their own structures.

4. The Neuron App

The Neuron App is your installation tool, administration site, control panel, and analysis tool. When your Neuron sensor network is up and running, this is the only tool you need to keep track of your assets' condition, consumption, and performance.

The benefits of Neuron IoT monitoring

The Neuron Systems offer a wide range of benefits. Perhaps most importantly, it enables predictive maintenance, which hinders production standstills, promotes efficiency, and enables massive savings in the industrial sector.

In short, predictive maintenance is continuous monitoring of equipment to determine two things: How much strain can your equipment take, and when is it advantageous to perform system maintenance? The former increases efficiency and the latter prevents unwanted production halts.

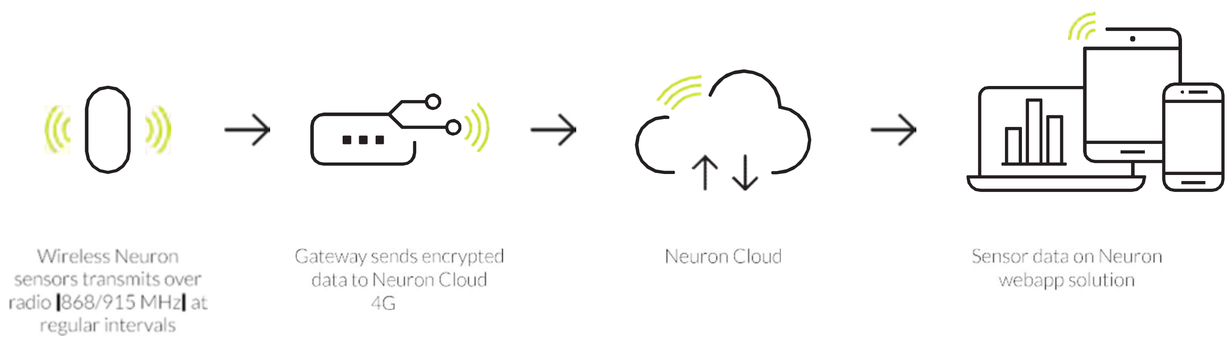
We are very excited about the vast potential of predictive maintenance in the industrial sector. So, you can find an entire article that tells you all you need to know on our website.

User-friendliness is another benefit of Neuron IoT monitoring. The Neuron Sensors and App are easy to install and start using. No training is required to streamline monitoring, increase production effectiveness, and keep your equipment safe from breakdowns.

Industrial application of Neuron Sensors

Robust wireless sensors can be used for many purposes in the industrial sector. Predictive maintenance is quickly becoming most prominent since it also increases productivity and workers' safety.

Maintenance is not the only industrial process that Neuron Sensors can streamline. They are used in a wide range of



automation processes. For instance, both indoor and outdoor farming use IoT monitoring to optimize plant growth.

Temperature sensors and IoT monitoring are also widespread in the food industry. Constant monitoring and customizable alarms, for instance, make it much easier to keep cold chains up to the standard of your local food authorities.

Neuron Sensors are also used for building automation to promote economic and environmental sustainability. IoT monitoring is applied to control buildingwide systems like HVAC, open/closed doors and windows, fire/smoke detectors, etc.

Resources

Cisco: What Is Building Automation?
Journal of Physics: Towards an intelligent HVAC system automation using Reinforcement Learning
Journal of Shipping and Trade: Internet of Things enabled real-time cold chain monitoring in a containerport
MDPI: Smart Farming: Internet of Things (IoT)-Based Sustainable Agriculture

Temperature sensors

Neuron Temperature IP21

The Neuron Temperature IP21 is a small wireless sensor with long batterylife that measures ambient air temperature every three seconds. It transmits measurements wirelessly through a Neuron gateway to the Neuron app. Typical applications are monitoring of temperature in all types of rooms and buildings, refrigerators, freezers and fuse boxes. The sensor is attached with double-sided tape or cable tie.

Measuring Range	-40 - 85 °C
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- HVAC
- Transformer stations
- Industry
- Storage
- Greenhouse

Neuron Temperature IP67

The Neuron Temperature IP67 is a small and compact sensor for measuring temperature and suited for a wide range of applications. Both surface temperatures when attached directly to the object, or as an air temperature sensor in wet or dusty areas due to IP67 encapsulation. The sensor is mounted using double-sided tape or cable ties.

Measuring Range	-40 - 85 °C
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Surface temperature on equipment
- Surface temperature on cables
- Ambient temperature in wet or dusty areas

Neuron Cabinet Safety

Neuron Cabinet Safety is a small and compact sensor developed especially for monitoring of temperature in electrical installations. The wireless sensor is mounted inside the electrical enclosure. The sensor also has an integrated magnetic sensor to detect if cabinet door is open. (Optional)

Measuring Range	-40 - 85ºC , Open/closed
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Temperature in electrical installations el·watch

Temperature sensors

Neuron Humidity

The Humidity sensor measures relative humidity in the air. In addition it measures the ambient temperature. Measuring frequency is twice a minute, and data is delivered wirelessly (868 MHz) through the Neuron gateway and directly online. Typical applications are an overview of the indoor environment in all types of rooms or outdoors (as long as it is not very exposed to the weather). The sensor is attached with double-sided tape or strips where you want an overview. IP21.

Measuring Range	0-100% RH, -40 - 85 °C
Measuring Frequency	Every 30 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- HVAC
- Transformer stations
- Industry
- Storage
- Greenhouse

Neuron Vibration RMS

The Neuron Vibration RMS measures vibration level and surface temperature every two minutes. The sensor has an embedded magnet at the back for easy installation. Temperature measurement is done through the magnet.

Measuring Range Temperature	-40 - + 85
Measuring Frequency	80ms every 2 min
Report Frequency	Every 2 min
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Anomaly detection and predictive maintenance
- Machine status and optimalization
- Uptime hours and usage-based maintenance
- Structural health monitoring

Neuron Vibration RMS High Temperature

The Neuron Vibration RMS HT measures vibration level and surface temperature every two minutes. The sensor comes with an extended probe enabling measurements on equipment up to 105 degree Celsius. The radio transmitter has an embedded magnet at the back for easy installation.

Measuring Range Temperature	-40 - + 105
Measuring Frequency	80ms every 2 min
Report Frequency	Every 2 min
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Anomaly detection and predictive maintenance
- Machine status and optimalization
- Uptime hours and usage-based maintenance
- Structural health monitoring

Temperature sensors

Neuron Infrared 380

The Neuron Infrared 380 sensor measures surface temperature on the object it is directed towards. It is designed for industrial temperature measurements, capable of measuring up to 380°C with an accuracy of up to ±1°C. It has a wide spectral range and 6° field of view.

Measuring Range	-40 - 380ºC
Measuring Frequency	Every 2 min
Report Frequency	Every 2 min
Expected Operating Time*	Up to 7 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Temperature on rotating machinery
- Saw blade temperature

Neuron PT100

The Neuron PT100 is designed to be connected to a PT100-element and will transfer the measured temperature to the Neuron Cloud.

The sensor comes with 40 cm wires and is easily connected to new or existing PT100-element/probe.

PT100 Measuring Range	-50ºC to +250ºC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after easurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Water temperatures
- Air temperatures
- Industry processes
- Cooling of transformers

Neuron PT100 25 cm Probe

The PT100 25cm Probe sensor comes ready to use out of the box and are fitted with a 25 cm stainless steel probe, perfect for measuring temperatures in cabinets and rooms with the PT100 element inserted thru the wall and leaving the sensor outside. The sensor comes with 100 cm cable between sensor and PT100 probe element. The probe is only 3 mm in diameter for easy installation.

PT100 Measuring Range	-50ºC to +250ºC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Cold rooms
- Freezers
- Heating cabinets
- Air ducts

Temperature sensors

Neuron PT100 Bolt M6

The PT100 Bolt M6 is perfect for measuring liquid temperatures in pipes and other applications.
The sensor comes ready to use out of the box and are fitted with a M6x10mm bolt sensor element for easy installation to many objects. Fitted with 2-meter cable between electronics and sensor. Suited for monitoring bearings and motor temperatures.

Measuring Range	-50ºC to +250ºC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Machine Monitoring
- Industry Processes
- Cooling liquid in transformers

Neuron PT100 Process Connection

The PT100 Process Connection sensor comes ready to use out of the box and are fitted with a 6x100mm sensor element and 1 meter cable between electronics and sensor. Suited for liquid temperatures in pipes.

PT100 Measuring Range	50ºC to +250ºC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Cooling water
- Industry Processes
- Cooling liquid in transformers

Neuron PT100 Ring Lug

The PT100 Ring Lug is perfect for measuring surface temperatures on objects and transmit the data to Neuron Cloud. The sensor comes with 1-meter cable between sensor and ring lug PT100 element, and the lug has a 6 mm hole for easy installation.

PT100 Measuring Range	-50ºC to +200ºC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Pipes
- HVAC
- Motors and transformers

Temperature sensors

Neuron PT100 Surface Patch

Neuron PT100 Surface Patch is perfect to measure surface temperature on objects and transmit the data to Neuron Cloud. The sensor comes with 2 meter cable between the sensor and the surface patch. The patch has adhesive on the back for easy installation.

PT100 Measuring Range	-50ºC to +150ºC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

Surface temperature on:

- Pipes
- Electronics
- Motors and transformers

Neuron PT100 Surface Strip

Neuron PT100 Surface Strip is perfect to measure surface temperature on objects and transmit the data to Neuron Cloud. The sensor comes with 1 meter cable between the sensor and the surface strip.

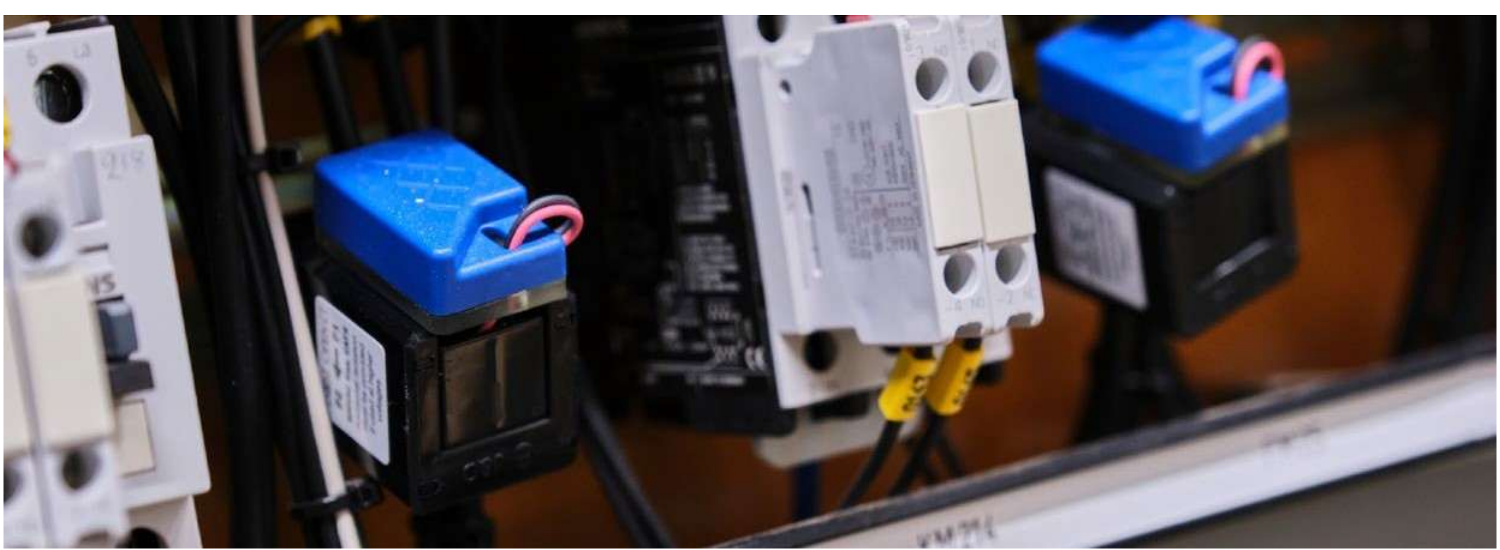
PT100 Measuring Range	-50ºC to +250ºC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

Surface temperature on:

- Pipes
- Electronics
- Motors and transformers



Temperature sensors

Neuron PT100 HT

The Neuron PT100 HT is designed to be connected to a PT100-element and will transfer the measured temperature to the Neuron Cloud. The sensor is optimized for high temperature applications and can operate in ambient temperatures up to 85ºC. The sensor comes with a standard IEC miniature connector for easy connection to any PT100 probe.

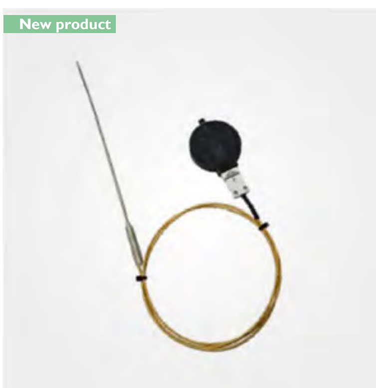
Measuring Range	-100 °C – +650 °C
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after easurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Collector bar monitoring
- Industry processes
- Predictive maintenance

Neuron PT100 HT 25 cm Probe



The PT100HT 25cm Probe sensor comes ready to use out of the box and are fitted with a 25 cm stainless steel probe, perfect for measuring temperatures in high temperature applications. The sensor comes with a 200 cm Fibre glass insulated wire. The probe is only 3 mm in diameter for easy installation.

PT100 Measuring Range	-100ºC to +650ºC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Cold rooms
- Freezers
- Heating cabinets

Temperature sensors

Neuron PT100 HT Bolt M6

The PT100 HT Bolt M6 is perfect for measuring liquid temperatures in pipes and other applications.
The sensor comes ready to use out of the box and are fitted with a M6x10mm bolt sensor element for easy installation to many objects. Fitted with 2-meter cable between electronics and sensor. Suited for monitoring bearings and motor temperatures.

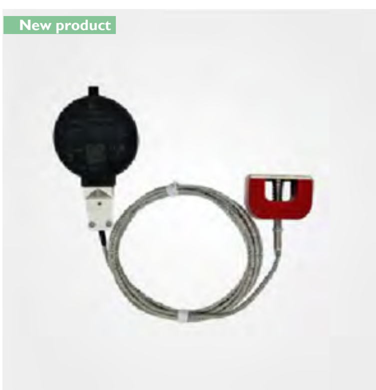
Measuring Range	-100ºC to +650ºC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Machine Monitoring
- Industry Processes
- Cooling liquid in transformers
- Cathode Collector bar temperature monitoring

Neuron PT100 HT Magnet



The Neuron PT100 HT Magnet sensor comes ready to use out of the box and are fitted with a magnet to enable easy installation on objects made of ferrous materials. This makes the sensor perfect for retrofit installation.

PT100 Measuring Range	-50°C to +400°C
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Machine Monitoring
- Industry Processes
- Cooling liquid in transformers
- Temporary Cathode Collector bar temperature monitoring

Neuron Thermocouple Type K

The Neuron Thermocouple measures a very wide range of temperature based on a type K thermocouple probe. The sensor has a standard IEC miniature connector for easy connection to any type K probe. It is designed for industrial temperature measurements with a rugged casing and wide temperature range from -250°C to 1350°C depending on choice of type K thermocouple probe.

Measuring Range*	-250 °C – 1350 °C
Measuring Frequency	Every 10 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time**	Up to 10 years

**Depends on choice of Type K probe.*
***Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- General purpose high temperature measurements
- Kiln, gas exhaust, engine- and motor temperatures
- Process & chemical industries

Digitizers

Neuron Precision mA Digitizer

The Neuron Precision mA Digitizer converts your analogue signal into a digital measurement. Integrated battery ensures up to 10 years of battery life. All measurements are easily accessible from web, app or API.

	Precision mA Digitizer
Measuring Range	0 - 25mA
Measuring Frequency	Every 10 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Digitization of existing sensors
- Industry processes
- Predictive maintenance
- 4-20mA current loops

Neuron Precision VDC Digitizer

The Neuron VDC Digitizer converts your analogue signal into a digital measurement. Integrated battery ensures up to 10 years of battery life. All measurements are easily accessible from web, app or API.

	Precision VDC Digitizer
Measuring Range	0 – 30VDC
Measuring Frequency	Every 10 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Digitization of existing sensors
- Industry processes
- Predictive maintenance
- DC voltage measurement

Neuron Precision mV Digitizer

The Neuron Precision mV Digitizer converts your analogue signal into a digital measurement.

The sensor is optimized for high temperature applications and can operate in ambient temperatures up to 85ºC. The sensor comes with a standard IEC miniature connector for easy connection.

	Precision mV Digitizer
Measuring Range	0 – 250mV
Measuring Frequency	Every 10 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Collector current measurement
- Industry processes
- Predictive maintenance
- DC voltage measurement

Digitizers

Neuron Potentiometer Digitizer

The Neuron Potentiometer Digitizer sensor measures the middle pin resistance (wiper) of various potentiometers in the range of 1kΩ to 100kΩ and converts the analog signal into a digital measurement. Integrated battery ensures up to 10 years of battery life. All measurements are easily accessible from web, app or API

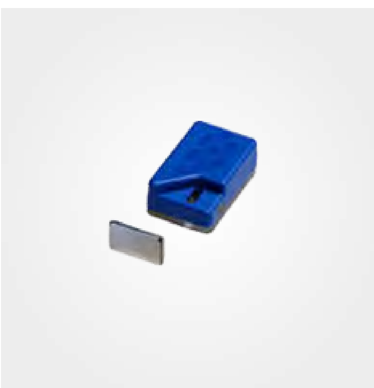
PT100 Measuring Range	1kΩ to 100kΩ potentiometers
Measuring Frequency	Every 10 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Draw wire distance measurement
- Valve position
- Linear actuator length

Neuron Open/Closed



The Neuron Open/Closed is a small and compact magnetic sensor suited to monitor status of doors, windows and gates among others. Area of use is an overview and notification of both unwanted and other traffic in doors and windows, as well as control of whether doors, windows and other mechanical devices have the desired position. The sensor is attached with double-sided tape or strips.

Measuring Range	Open/Closed
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after change in status open/closed
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Monitor doors and windows
- Position of industry gates
- Roof windows
- Count change in position

Neuron Water Detector

Neuron Wireless Water Detector alerts when water is applied to the sensor element. The sensor is fitted with a 50 cm water detection tape with adhesive for easy fastening. Integrated battery ensures up to 10 years of battery life. All measurements are easily accessible from web, app or API.

Measuring Range	0 – 100%
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Technical room
- Under the kitchen sink
- Underneath equipment connected to water

Digitizers

Neuron Hour Meter

Neuron Hour Meter enables you to digitize hour counting on use of equipment. The sensor comes with 40 cm wires and connects to 4-30VDC to measure elapsed time. The sensor stores elapsed time internally and will work even if out of range of a gateway. When within reach of a gateway the elapsed time will be sent to Neuron Cloud. All measurements are easily accessible from web, app. Due to IP67 encapsulation the sensor can be used in humid areas.

Measuring Range	Elapsed time when applied 4-30VDC
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Monitor use and up-time of equipment
- Leasing
- Maintenance

Neuron Dry Contact

The Neuron Dry Contact is a small and compact sensor for detecting Open/Closed electrical contact in potential free loops. The sensor can be used in humid areas due to IP67 encapsulation.

Measuring Range	Open/Closed Loop
Measuring Frequency	Every 3 sec
Report Frequency	Every 2 min, or immediately after change in status open/closed loop
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Position of valves, switches, circuit breakers etc.
- Open/Closed door and gate
- Motor Protection
- Count Status Changes

Vibration sensor

Neuron Vibration RMS

The Neuron Vibration RMS measures vibration level and surface temperature every two minutes. The sensor has an embedded magnet at the back for easy installation. Temperature measurement is done through the magnet.

Measuring Range	0 - 12 g RMS acceleration (sum of X,Y and Z axis)
Measuring Frequency	80ms every 2 min
Report Frequency	Every 2 min
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Anomaly detection and predictive maintenance
- Machine status and optimalization
- Uptime hours and usage-based maintenance
- Structural health monitoring

Neuron Vibration RMS High Temperature

The Neuron Vibration RMS HT measures vibration level and surface temperature every two minutes. The sensor comes with an extended probe enabling measurements on equipment up to 105 degree Celsius. The radio transmitter has an embedded magnet at the back for easy installation.

Measuring Range	0 - 12 g RMS acceleration (sum of X, Y and Z axis)
Measuring Frequency	80ms every 2 min
Report Frequency	Every 2 min
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Anomaly detection and predictive maintenance
- Machine status and optimalization
- Uptime hours and usage-based maintenance
- Structural health monitoring

Energy sensors

Neuron Ampere

The Ampere Sensor measures AC current and comes in several ranges from 10A to 500A RMS. The sensor comes with split core and is therefore easy to install onto existing powercables.

Integrated battery ensures up to 10 years of battery life. All measurements are easily accessible from web, app or API.

Measuring Range	10A	20A	50A	100A	150A	250A	500A
Measuring Frequency	Every 10 sec						
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached						
Expected Operating Time*	Up to 10 years						

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- HVAC & pumps
- Refrigeration
- Industrial motors
- Fans
- Lighting
- Energy audits

Neuron kWh Energy Meter

Neuron kWh Energy Meter enables you to monitor and track the energy consumption of your assets. The sensor measures AC currents accumulated as amperehour and comes in several ranges from 10A to 500A RMS. With the highly customizable Neuron App, this sensor can calculate consumed kilowatt-hour (kWh) on all variations of power grid voltages. Integrated battery ensures up to 10 years of battery life. All measurements are easily accessible from web, app or API.

Measuring Range	10A	20A	50A	100A	150A	250A	500A
Measuring Frequency	Every 10 sec						
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached						
Expected Operating Time*	Up to 10 years						

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Energy monitoring
- HVAC & heating
- Refrigeration
- Industrial motors
- Fans
- Lighting

Neuron Pulse Counter

Neuron Pulse Counter enables you to accumulate and monitor signal pulses from your assets. The sensor stores accumulated pulses internally and will work even if out of range of a gateway. When within reach of a gateway the accumulated value will be sent to Neuron Cloud.

All measurements are easily accessible from web, app or integrations. Due to IP67 encapsulation the sensor can be used in humid areas.

Measuring Range	0-5V Binary
Measuring Frequency	Pulse dependent
Report Frequency	Every 2 min
Expected Operating Time*	Up to 10 years

**Sensor battery lifetime is heavily dependent on measured pulse frequency*

Typical Applications

- Flow Measurement (water, gas or liquid flow meters)
- Energy Metering (S0-pulse interface)
- Event counting

Pressure sensor

Neuron Gauge Pressure

Neuron Gauge Pressure Sensor is available in several pressure ranges up to 250 Bar and is therefore suitable for a wide range of applications. The wireless sensor comes in a rugged, compact stainless steel housing with an external radio transmitter. Integrated battery ensures up to 10 years of battery life. All measurements are easily accessible from web, app or API.

Measuring Range	0-1 bar, 0-16 bar, 0-50 bar, 0-250 bar
Measuring Frequency	Every 30 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Water pressure
- Compressed air pressure
- Water level
- Hydraulic pressure
- Industry processes

Neuron Differential Pressure

The Neuron Differential Pressure sensor measures the differential air pressure between two ports. In addition, it also measures the ambient temperature. The sensor is well suited for HVAC systems and has an embedded magnet for easy installation on magnetic surfaces.

Measuring Range	+/-500 Pa, -10 -85ºC	+/- 7500 Pa, -10 - 85ºC
Measuring Frequency	Every 30 sec	
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached	
Expected Operating Time*	Up to 10 years	

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- HVAC
- Air filters
- Fume Cabinets
- Clean Rooms
- Air Flow

Neuron Vacuum Pressure

The wireless vacuum pressure sensor measures from -1 bar to +1 bar.

The pressure transducer comes in a rugged stainless steel housing and can be used in a wide range of applications.

Measuring Range	-1 - + 1 bar
Measuring Frequency	Every 30 sec
Report Frequency	Every 2 min. Or immediately if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- Industry processes

Humidity sensor

Neuron Humidity

The Humidity sensor measures relative humidity in the air. In addition it measures the ambient temperature. Measuring frequency is twice a minute, and data is delivered wirelessly (868 MHz) through the Neuron gateway and directly online. Typical applications are an overview of the indoor environment in all types of rooms or outdoors (as long as it is not very exposed to the weat her). The sensor is attached with double-sided tape or strips where you want an overview. IP21.

Measuring Range	0-100% RH, -40 - 85 °C
Measuring Frequency	Every 30 sec
Report Frequency	Every 2 min, or immediately after measurement if trigger for critical data transmission is reached
Expected Operating Time*	Up to 10 years

**Depends on measurement frequency, amount of critical data transmissions and ambient temperature*

Typical Applications

- HVAC
- Transformer stations
- Industry
- Storage
- Greenhouse

Actuator

Neuron Actuator

The Neuron Actuator is a DIN-mounted, easy-to-use device that controls a SPDT relay remotely using the Neuron app. The app provides real-time status updates and notifications. The relay is capable of switching loads at 250VAC/30VDC up to 10A, has an input voltage range of 24VDC and has a maximum power consumption of 5W. This device is suitable for a wide range of applications such as industrial control and monitoring, and remote-control systems.

Relay rated current	10A @ 25 ºC (8A @ 75 ºC) resistive-inductive load, PF=0.75
Relay rated voltage	30VDC, 250VAC
Response time	Approx 5 sec
Update Frequency	Reports status every 15 min. Or immediately if activated

Typical Applications

- Reset electric equipment
- Open/Close gates
- Light management
- Small to medium size motors
- Industrial fans
- Valves

Gateways

Neuron Cellular Gateway

Neuron Cellular Gateway connects your Neuron sensors to Neuron Cloud. The gateway comes with integrated eSIM and connects both to cellular network and Neuron Cloud automatically. The robust IP67 enclosure enables you to install it in rough wet and dusty environments.

Operating voltage	10-32 VDC, Max. 5W
Operating Environment	Temperature: -40 - 75 ºC Relative humidity: 0-100% Altitude < 2000m above sea level Pollution degree 4 IP67, wet conditions, indoor use
Radio Frequency	863-870 MHz (902-928 MHz)

Typical Applications

- For mounting in dusty, damp or wet conditions
- For easy installation without the need to set up an Ethernet connection

Neuron Ethernet Gateway

The Neuron Ethernet Gateway is a device designed to provide a bridge between Neuron Sensors and the Neuron Cloud. The gateway sends sensor data using an ethernet connection to the cloud to be viewed in the Neuron app. This is beneficial in locations that do not have cellular coverage such as tunnels, underground facilities or on ships. The gateway is DIN-rail mounted, powered from 10-32 VDC and has two sub-GHz antennas to maximize sensor coverage.

Operating Voltage	10-32 VDC, Max. 10W
Operating Environment	Temperature: -40 - 75 ºC Relative humidity: 0-80% (non-condensing) Altitude < 2000m above sea level Pollution degree 3 Indoor use, not for wet locations
Relay Rated Current	Resistive load: 5A@25ºC, 2.5A@75ºC
Radio Frequency	Sensor communication: 863-870 MHz (902-928 MHz) Cellular connection: LTE/3G GNSS: GPS, Galileo, Beidou, GLONASS

Typical Applications

- Locations with no/ limited cellular coverage
- Undergroung facilities, tunnels, on board ships/vessel etc.

Mounting

Neuron sensors are ready for use out of the box and will start logging data after registering the sensor in the app. Even though Neuron sensors deliver great range and long battery life, following some simple guidelines for mounting of the sensor and gateway can greatly improve signal coverage and lifetime of the sensor.

To ensure optimal antenna performance and signal strength, the sensor should be placed elevated with some distance to fixed objects. Keep in mind that RF-signals are greatly affected by close metallic surfaces.

For sensors with an external antenna, the antenna should be clear off the metallic surface.

For sensors operating in environments with greatly varying temperatures, care should be taken to avoid putting the sensor in unnecessary stress. Very high or low temperatures will affect the battery life and the signal strength of the sensor. While some sensors must be close to the source of heat or cold, other sensors have external probes which allow the sensor to be placed at a distance.

Fastening

The small, compact blue Neuron sensors are fitted with fastening holes for use with cable ties. The sensors are also delivered with double-sided tape that may be used for fastening of the sensors.

All the black/grey Neuron sensors, like the Neuron IR380 and Neuron Vibration, are fitted with a strong magnet at the back for easy fastening. If there is no magnetic surface, then double-sided tape is a good solution.

Place elevated with distance to fixed objects

Keep antenna clear off the metallic surface

Open/Closed mounting

Vibration - magnet mounting

Sensors with IP21 Enclosure

Sensors with IP67 Enclosure

Cellular Gateway mounting