

Operating Manual

EMS Desk



Important safety information



Read this manual before attempting to install the device!

Failure to observe recommendations included in this manual may be dangerous or cause a violation of the law. The manufacturer, Elektroniksystem i Umeå AB will not be held responsible for any loss or damage resulting from not following the instructions of this operating manual.

- The device must not be dismantled or modified in any way.
- The device is only intended for indoor use. Do not expose it to moisture.
- The device is not intended to be used as a reference sensor, and Elektroniksystem i Umeå AB will not be held liable for any damage which may result from inaccurate readings.
- The battery should be removed from the device if it is not to be used for an extended period. Otherwise, the battery might leak and damage the device. Never leave a discharged battery in the battery compartment.
- The device must never be subjected to shocks or impacts.
- To clean the device, wipe with a soft moistened cloth. Use another soft, dry cloth to wipe dry. Do not use any detergent or alcohol to clean the device.



Disposal note in accordance with ElektroG and WEEE Directive 2012/19/EU

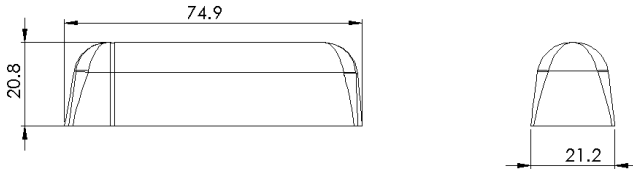
The device, as well as all the individual parts, must not be disposed of with household waste or industrial waste. You are obliged to dispose of the device at the end of its service life in accordance with the requirements of ElektroG in order to protect the environment and to reduce waste through recycling. For additional information and how to carry out disposal, please contact the certified disposal service providers. The sensors contain a lithium battery, which must be disposed of separately.

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Description

EMS Desk is a sensor slightly larger than an AA-battery and ideal for mounting under desks. It can be used for measuring desk occupancy or as a discrete indoor environment sensor. With the body heat sensor, it can detect when somebody is standing/sitting by a desk. EMS Desk is equipped with NFC (Near Field Communication) and can easily be configured from a smartphone.



The barcode contains DevEUI and sensor type. This label is located at the back of your device.



Main features of EMS Desk

- Compatible with LoRaWAN® specification 1.0.3
- Detects occupancy with an infrared temperature sensor
- Can detect occupancy even if people are sitting/standing still
- Measures ambient temperature
- Measures ambient humidity
- Detects acceleration
- Detects occupancy
- Easy installation
- Easy configuration
- May be installed on any flat surface
- Battery-powered
- Long-range communication
- Configurable over NFC
- Configurable over the air
- Ten years of battery life*
- Supported channel plans: US902-928, EU863-870, AS923, AU915-928, KR920-923, RU864, IN865 & HK923
- CE Approved and RoHS compliant

**Depending on settings and environmental factors*

Installation

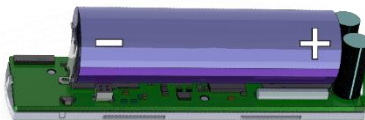
The EMS Desk should be mounted under a desk or table where the occupancy needs to be measured. When installing, place the device far enough from the edge of the table to make sure it is not possible to reach by the user. Mounting close to the edge may result in damage to the device. Make sure that the thermopile sensor is facing the front of the desk or desired area.

1. Remove the back panel of the sensor with a small screwdriver.



2. Install the battery. The EMS requires one AA battery. The battery type is 3.6V Lithium Battery (ER14505).

Caution: Using batteries other than the ones provided may result in loss of performance and battery life, and also damage to the device. Dispose of properly observing environmental protection rules.



3. Mount the back panel on the surface using the adhesive tape.
4. Attach the cover to the back panel.

Service and maintenance

No serviceable parts inside. If service is needed other than battery replacement, please contact your distributor.

Desk occupancy sensor

Mount the sensor under the desk or table where the occupancy should be measured. The sensor has 1m in range and 60° field of view. Ensure that armrests, chairs or other objects are not at risk of accessing the sensor and thus causing damage.

Temperature/humidity sensor

Place the device in an open space on a wall, under a desk, or on any other flat surface. Make sure that the sensor is not faced by direct sunlight or placed near air vents or other places where it may measure values that are not representative for the rest of the room.

Sensor configuration

All sensor settings can be configured via a smartphone application with NFC (Near Field Communication) or over the air via the network server and downlink data to the sensor. The sampling rate, spreading factor, encryption keys, port, and modes can be changed. All sensor settings can be locked from the server or NFC to make end-users unable to read or change settings on the sensor.

NFC Configuration

1. Download ELSYS "Sensor Settings" application from Google Play and install it on a smartphone or tablet. The device must support NFC.
2. Enable NFC on the device and start the application.
3. Place your device on top of the EMS sensor to connect with the NFC antenna. *You may need to remove the top cover and battery to get a connection.*
4. Remove the device. Current settings will be displayed in the application.
5. Use the application to change any settings if needed.
6. Quickly tap the device on top of the EMS to give the new settings to the sensor. Make sure that the application confirms your new settings.
7. Wait for the sensor to reboot (5 sec), indicated by the LED flashing. Sensor settings have been updated.

See the section "Help" in the application for more information.

Over the air configuration

All settings may be configured over the air via your LoRaWAN® infrastructure. Please visit the support section on our webpage for more information regarding the downlink protocol.

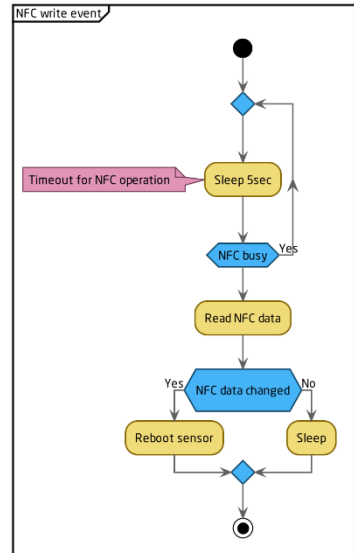
Application parameters

All parameters for the "Sensor settings" application can be found in our settings document. Please visit the support section on our webpage for more information.

Sensor behavior

NFC Read / Write

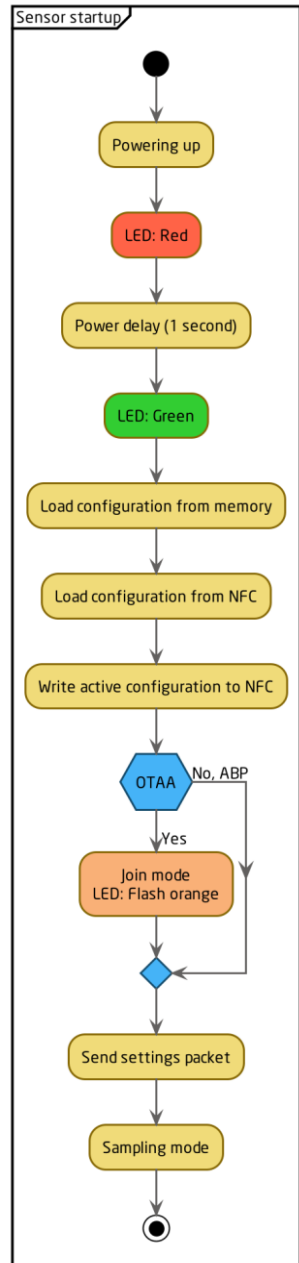
1. When reading or writing NFC configuration data to the sensor, it starts a timer and delays its action 5 seconds.
2. After the delay, the sensor determines if the NFC data has changed or not. If the data has changed, the sensor reboots and starts from power-up.
3. Write your settings in the application and then locate the NFC antenna of the phone and sensor. Keep the two devices close and don't move them to get the best connectivity as possible when writing or reading data to the sensor. A bad connection can be caused by long distance, wrong location, or rapid movement.
4. When you have written data to the sensor, let the sensor reboot and restart before trying to write again.



You should always validate your settings by reading the NFC data after the sensor has restarted.

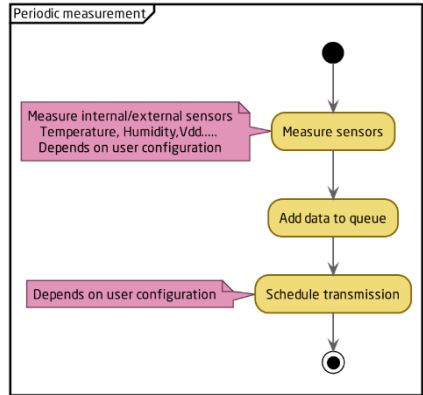
Sensor startup

1. When the sensor starts up, it loads configuration from the internal memory and merges it with user configuration.
2. When the configuration is done, the sensor writes the new settings to the NFC chip. The sensor always writes new configurations to the NFC chip when something changes in the sensor or if NFC data is corrupted by an NFC writer or phone. The sensor always writes the new configuration to NFC chip at startup.
3. When the configuration is done, the sensor tries to join the network if OTAA (Over the Air Activation) is enabled.
4. The sensor LED flashes orange when it tries to join a network. It will try to join every 10 seconds initially. This interval will increase to save battery, at most up to one time per hour.
5. After a successful connection to a network, the sensor sends a settings packet and enters sampling mode.



Sampling mode / Periodic measurement

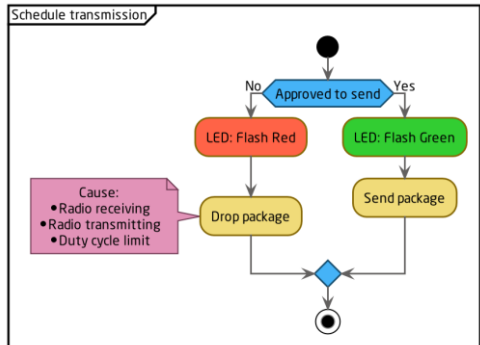
The sensor makes periodic measurements according to the user configurations.



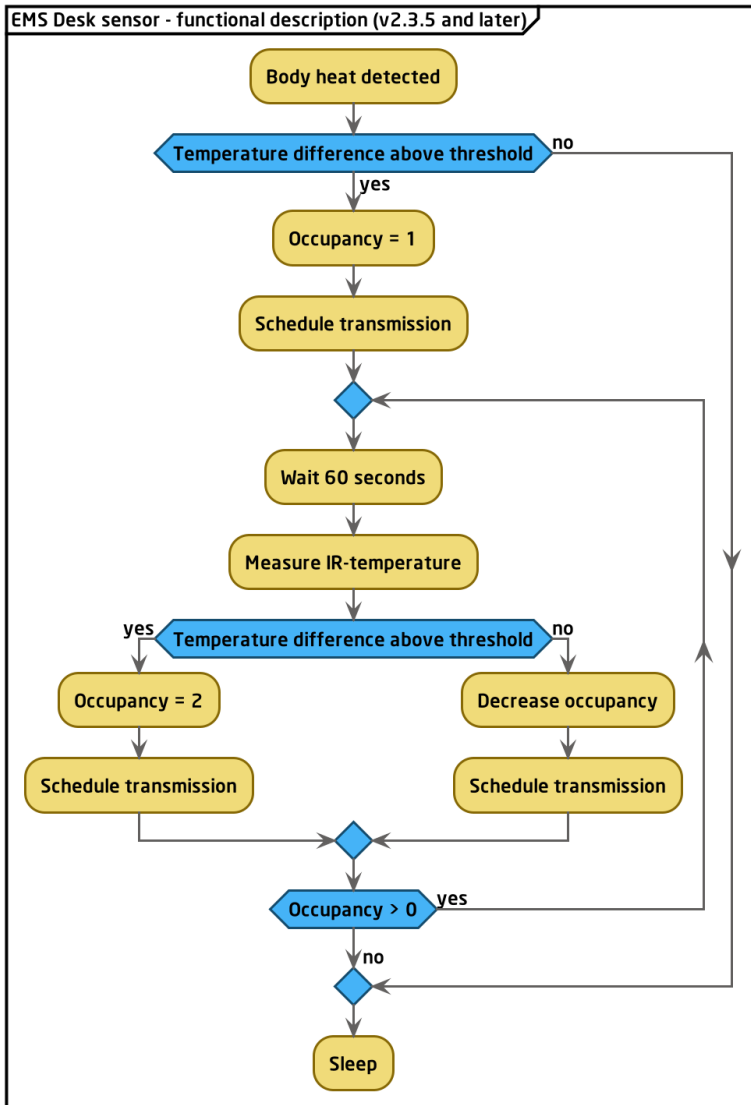
Schedule Transmission

The sensor transmits the data according to the user configurations.

Note: The configured sending interval can be overridden by network limitations. Due to this, the spreading factor and sending interval settings might result in longer intervals than intended.



Desk sensor



Specifications

Sensor payload format

The device uses the standard ELSYS payload format. Please see the specified document on our webpage.

Power supply	3.6V DC
Battery type	AA 14505 (Li-SOCl ₂)
EU directives compliance	RoHS 2011/65/EU WEEE 2012/19/EU
Radio protocol	LoRaWAN®
Radio frequency band	US902-928, EU863-870, AS923, AU915-928, KR920-923, RU864, IN865 & HK923
Range	8 km*
Operating conditions	0 to 50 °C 0 to 85 % RH (non-condensing)
Detection range	1 m, 60 ° field of view
Temperature range	0 – 40 °C
Temperature resolution	0.1 °C
Temperature accuracy	± 0.2 °C
Humidity range	0 – 100 %
Humidity resolution	0.1 % RH
Humidity accuracy	± 2 % RH
Accelerometer detection level	Configurable via NFC and downlink conf.
Dimensions	21.2 x 74.9 x 21.8 mm
Battery life	Up to 10 years**

**Measured with settings: SF10, 868 Mhz. The range can be greater or less, depending on terrain and building structure.*

***Depending on settings and environmental factors.*

Regulations

Legal Notices

All information, including, but not limited to, information regarding the features, functionality, and/or other product specification, are subject to change without notice. ELSYS reserves all rights to revise or update its products, software, or documentation without any obligation to notify any individual or entity. ELSYS and ELSYS logo are trademarks of Elektroniksystem i Umeå AB. All other brands and product names referred to herein are trademarks of their respective holders.

Declaration of conformity

Hereby, Elektroniksystem i Umeå AB declares that EMS Desk complies with the essential requirements and other relevant provisions of Directive 2014/30/EU and 2014/53/EU.