RPS-Radar Parking Sensor NB-IoT

Terms of use

Detection limitations

- RPS NB-IoT sensor is designed for precise detection of vehicle presence. Larger vehicles such as vans, buses or trucks can cause interference and false detection in adjacent parking spots due to their size and the electromagnetic field they generate.
- A motorcycle parked directly above the sensor can be detected as a car due to its similar electromagnetic properties.
- A line of vehicles which is moving across parking spots, such as taxi vehicles in a taxi parking spot, may cause false detection due to the continuous arrival of metal objects from above the sensor.
- After the sensor is installed, it must be activated via the mobile app. When activating, it is important to remove all metal or magnetic objects from the sensor to avoid interference. This includes mobile phones, tools, machines and any other objects within 1 meter of the sensor. This step is the key to ensure accurate and reliable sensor control.
- During installation and activation, vehicles must not be parked in the current parking spot or in any of the adjacent parking spot (left or right of the current spot). This is crucial to avoid interference and to ensure accurate sensor calibration.
- The sensor will not detect the presence of vehicles that are not parked directly above it, as it is designed for precise detection within a limited area.
- A parking spot less than 2.5 metres wide reduces the precision of the parking position due to the limited space for correct positioning of the vehicle above the sensor.
- Vehicles with a very strong magnetic field can affect the detection of the presence of vehicles in adjacent parking spaces. This can cause electromagnetic interference that reduces detection accuracy.
- In marked parking spots, vehicles must park within the marked area in order to be detected. Clearly visible marking lines help drivers correctly position vehicles above the sensors.
- Placing metal objects in the parking spot, such as traffic signs, bicycles or motorcycles, can affect detection by creating additional electromagnetic interference.
- If vehicles are often not properly parked, the accuracy of the system will decrease.
- To detect the occupancy of a parking spot, the car must be stationary - parked above the sensor for at least 5-10 seconds.
- Detection accuracy may drop to 95% if the sensor is heavily covered with water or snow.

General

The RPS NB-IoT sensor has a detection accuracy of 99%.
Detection accuracy is calculated as the ratio between the number of detected vehicles and the total number of vehicles parked above the sensor. This ratio can be higher if all system requirements are met, or lower if they are not.

It is recommended to follow all installation requirements to ensure maximum accuracy.

Sensor warranty is 2 years.

The RPS NB-IoT sensor is protected by a compact and extremely solid housing. When installed correctly, it can withstand a maximum pressure of 1,000 kg on the sensor cover.
You can find more detailed instructions related to snow removal machines and street machines in general in the installation instructions.

Important

Please read and follow the installation instructions provided in the User Manual.

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Network communication

• Signal coverage: The sensor must be Installed in an area with an available NB-IoT signal to function properly.

• SIM card: The SIM card must be activated and correctly configured. A 4FF Nano SIM card is used with an NB-IoT tariff that allows monthly traffic of 1MB, and the PIN must be deactivated.

• Registration to the network: The sensor must be able to register to the NB-IoT network in order to be able to send and receive data.

• Coverage: RPS NB-IoT sensor requires good NB-IoT coverage. This means that ECL (Extended Coverage Level) level 0 is required for the sensor to work properly. CE level 0 represents the area around the GSM base station with optimal signal.

• ECL level 1: In some cases, the sensor can work in an area with CE level 1, but this may affect the number of attempts to send packets due to a weaker signal. This can result in increased battery consumption, reduced battery life, and during a prolonged loss of communication, some packets may be lost.

• ECL Level 2: For CE Level 2, there is no guarantee in terms of communication or battery life, which means that the sensor may not work reliably under these conditions.

Technical and installation prerequisites

• Positioning: The sensor must be installed exactly in the middle of the parking space to ensure optimal vehicle detection.

• Qualified personnel: Only qualified and trained personnel should be involved in the installation and activation of RPS sensors.

• Safety Regulations: When installing this equipment, all national, provincial and local safety regulations must be followed. This includes adhering to all relevant occupational safety standards and guidelines.

• Temperature conditions: The sensor must not be installed at temperatures lower than + 10 °C.

• For any additional information and detailed installation instructions, please read the user manual.

Degree of protection

• Certification: The RPS sensor is certified according to the IP68 protection standard, which means that it can withstand immersion in water up to a depth of 1200 mm for 60 minutes without affecting functionality.

• Operating conditions: If the RPS sensor is used in conditions beyond its certified parameters, the warranty will be void. This includes exposure to extreme temperatures, pressures, or any other conditions that do not align with the sensor's technical specifications.

Battery

• The RPS sensor uses a Li-SOCl2 lithium battery with a capacity of 17Ah and a voltage of 3.6 V. In sleep mode, the sensor consumes between 40-50 µA.

• If the sensor detects more than 80 parking sessions per day, it goes into battery saving mode. In this mode, each parking "enter" event is sent with a 60 second delay. Battery saver mode remains active until the number of parkings falls below 80 per day or is manually turned off.

Sensor parameters for the active range

• Typical waking up per day: 300 times, alarm over 350 times a day

• Typical battery consumption per day: 7mAh, alarm over 12mAh

• Total packages per day: alarm over 80 packages

• Usual total work per day: 50 minutes, alarm over 70 minutes per day

• RSSI network signal: alarm over -120 dBm

Network signal and battery life

• The calculations were made at a battery temperature of 22°C and a voltage of 3.6V, and under the following network conditions:

ECL zone 0 (signal quality):

• RSRP: -112 dBm
• SINR: 9dB (downlink)
• Expected battery life: 5 years with 15 to 30 parks per day and 1 to 2 RPS network searches per week.

ECL zone 1 (weak signal):

• RSRP: -122 dBm
• SINR: 1dB (downlink)
• Battery life: No estimated life. It depends on the network registration time and the number of packet repetitions. It can be reduced by 20 to 80%.

ECL zone 2 (very weak signal):

• RSRP: -129 dBm
• SINR: -8 dB (downlink)
• Recommendation: It is not recommended to install the sensor in areas with this network coverage.