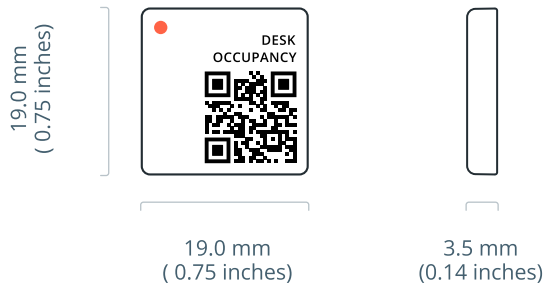
DISRUPTIVE
TECHNOLOGIES



Product Datasheet

Wireless Desk Occupancy Sensor

Overview



Description

The Wireless Desk Occupancy Sensor detects if a desk is occupied or not. If a person is detected, a message is wirelessly transmitted to the cloud through a Cloud Connector.

Cloud Connectors relay data from wireless sensors to the cloud via cellular or ethernet connectivity. From the cloud, the data can be integrated into other services using REST APIs and webhooks or viewed directly in Studio (web application).

Applications

- Desk utilization monitoring
- Demand based cleaning

Specifications

Desk Occupancy Sensor

Sensor Output	Occupied / Not Occupied
Detection Time	10 minutes*
Technology	Temperature (CMOS) + ML

*See Sensor Accuracy (Page 4)

Battery Specification

Battery Type	Lithium (Poly-Carbon-Monofluoride)
Battery Life	Up to 9 Years
Replaceable	No

Radio & Communication

Communication Protocol	SecureDataShot™
Radio Frequency	868 MHz / 915 MHz / 920 MHz
Radio Range	Up to 40 m / 131 ft indoors

Mechanical Properties

Sensor Size	19x19x3.5mm / 0.75x0.75x0.14 in
Weight	3.0 g (± 0.5 g) / 0.11 oz
IP Rating	IP68
Mounting Method	Adhesive

Product Name	Region	Product Number
Wireless Desk Occupancy Sensor EU	Europe	102553
Wireless Desk Occupancy Sensor US	North America	102554
Wireless Desk Occupancy Sensor APAC	Australia, New Zealand, Singapore	103119

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How it works

Default operation

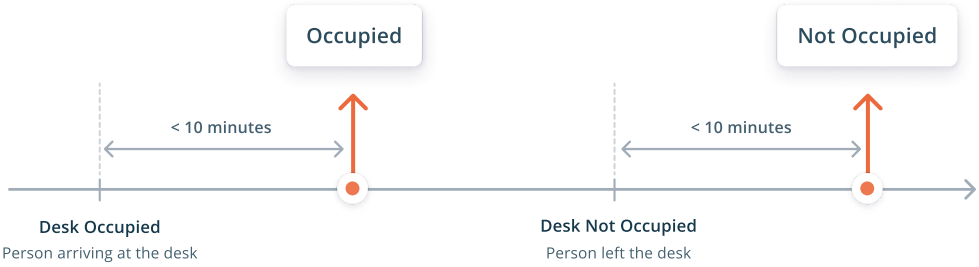
The Wireless Desk Occupancy Sensor uses a combination of temperature measurements and machine learning to determine if a desk is occupied or not based on changes in temperature caused by the presence of people sitting at a desk. A desk occupancy event with an **OCCUPIED** state is sent to the cloud when the desk becomes occupied. Similarly, a new event is sent to the cloud with a **NOT_OCCUPIED** state when a desk becomes available.

The sensor will typically detect if a desk is occupied within 5-10 minutes of the person arriving at the desk. Similarly, it will typically detect if a desk is not occupied within 5-10 minutes of the person leaving.

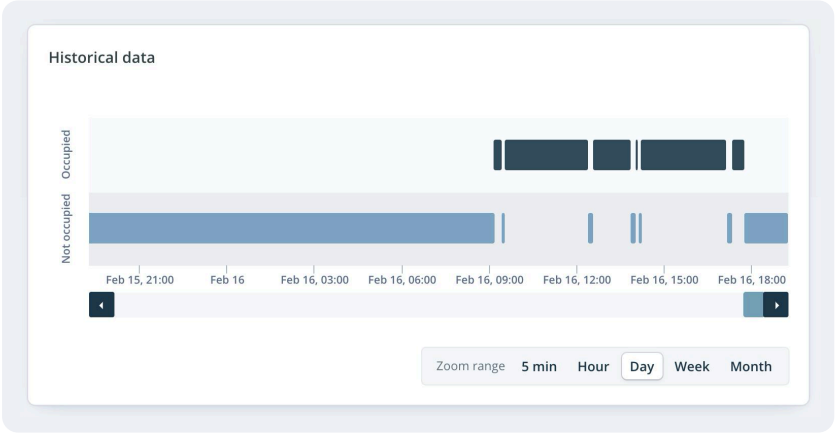
The radio protocol used is SecureDataShot™, and the data is relayed to DT cloud infrastructure using a SecureDataShot™ enabled gateway, also known as a Cloud Connector. Data can be viewed directly in Studio (web application) or sent to external services using webhooks or a REST API.

Heartbeat Interval

The Heartbeat Interval is a user configurable interval that controls how often the sensor reports to the cloud that it is online and operational. The Wireless Desk Occupancy has a fixed 5 minute heartbeat interval.



Sensor events during default operation



Screenshot from Studio showing Desk Occupancy Sensor capturing data from a normal workday.

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Technical Specification

Responsiveness	**Occupied**: Up to 10 min (typical)	**Not Occupied**: Up to 10 min (typical)

Accuracy

The datasets used to train the machine learning algorithms have been collected from sensors in a normal office building environment (20-25°C, 15-60% RH). Given a 10 minute delay, in similar conditions, the following accuracy can be expected:

- Probability of detecting **OCCUPIED**, when the desk is occupied: 98%
- Probability of detecting **OCCUPIED**, when the desk is not occupied: 2%
- Probability of detecting **NOT OCCUPIED** when the desk is not occupied: 99%
- Probability of detecting **NOT OCCUPIED** when the desk is occupied: 1%

While the standard latency for detecting someone sitting down or leaving is approximately 10 minutes, variations in environmental conditions and specific scenarios may result in longer detection times.

For more information about the expected accuracy, contact Disruptive Technologies.

Important:
The machine learning model used to determine if a desk is occupied or not is trained based on data from a typical office environment (20-25°C, 15-60% RH). While the sensor can be used in environments outside this range, the detection accuracy might be affected. DT continuously improves the machine learning model to cover a broader range of environments.

Data Backfill

To avoid losing data, the sensor will store measurements locally if it loses the connection to the cloud. When the connection is re-established, occupancy events will gradually be backfilled, starting with the most recent events first. This process ensures timely and accurate data recovery for optimal operational analysis.

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Technical Specification

Operating & Storage Conditions

Operating Conditions

Temperature: 0°C to 50°C (32 - 120°F)

Humidity: 10 to 90% RH (non condensing)

Storage Conditions

Cool and dry, near normal room temperature. To maximize battery life, DT recommends storing sensors within range of an online Cloud Connector.

Wireless Communication

Radio Protocol

SecureDataShot™

Radio Frequency

EU: 868 MHz ISM band

US: 915 MHz ISM band

APAC: 920 MHz ISM band

Radio Range

The wireless range is dependent on the gateway the sensor is communicating with.

Product	Indoor		Free Space	
Cloud Connector (1st Gen)				
Standalone Sensor	25 m	82 ft	300 m	984 ft
Sensor with range extender	100 m	328 ft	2 km	6561 ft
Cloud Connector (2nd Gen)				
Standalone Sensor	40 m	131 ft	600 m	1968 ft
Sensor with range extender	150 m	492 ft	4 km	13123 ft

Estimates are based on standard ITU-R P.1238 (indoor) and ITU-R P.525 (free-space).

Certification & Compliance

Certification

EU: CE, UKCA, WEEE

US/Canada: FCC, ISED

APAC: RCM, IMDA

IC: 25087-100541

FCC ID: 2ATFX-100541

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Battery Specification

Battery	**Chemistry**: Lithium (Poly-Carbon Monofluoride)	
Lifetime	**Standard Mode**: 9 years	**High Power Mode**: Up to 3 years

There are three factors that contribute the most to the battery life of the wireless sensor:

1. Temperature Conditions
2. Radio Transmissions
3. Operating mode

Temperature Conditions

The battery's ability to hold and deliver energy is affected by its operating temperature. At high temperatures, the battery will have increased self-discharge, and at low temperatures, it has less ability to deliver the total amount of its stored energy.

Radio Transmissions

The wireless sensor's most energy-consuming activity is transmitting and receiving radio messages. The average number of radio transmissions per day impacts the battery life.

Operating Mode

The sensor automatically selects and switches between the two following modes to optimise range and battery life:

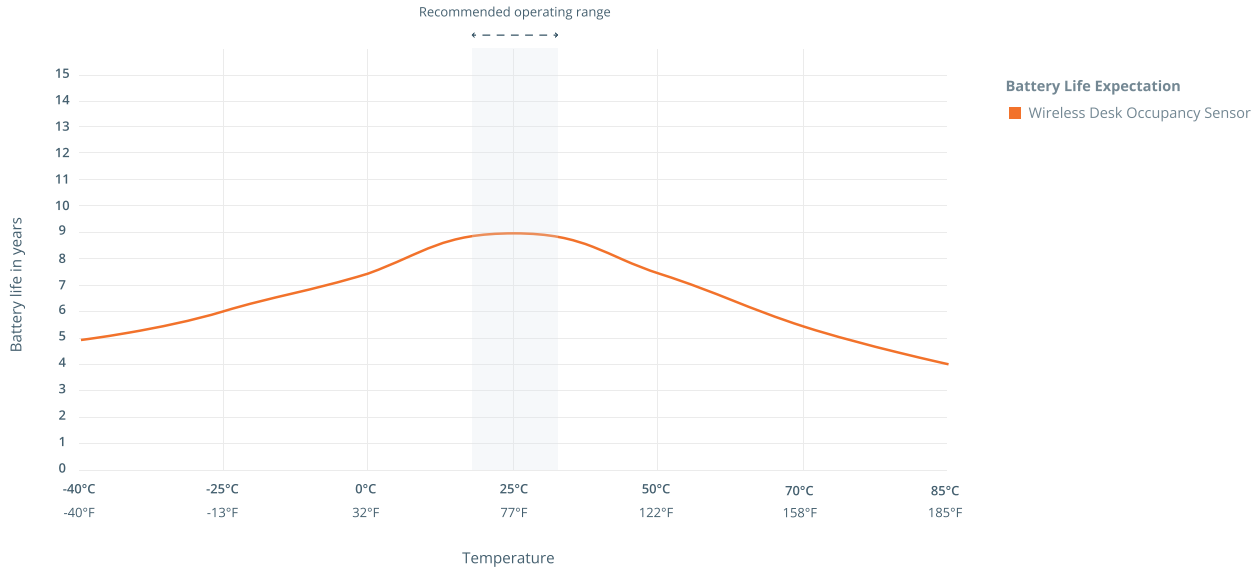
- **Standard Mode** (default)
- **High Power Boost Mode** (redundancy mode)

In Standard Mode, when the sensor transmits a message, it expects to receive a message back from the cloud acknowledging that the sensor message has been received.

As a redundancy feature, if there is something preventing the message from reaching the cloud, the sensor will re-transmit the message using more power, in what is called High Power Boost Mode.

High Power Boost Mode gives the sensor increased wireless range, at the expense of battery life. To extend the battery life, sensors should not be permanently operating in High Power Boost Mode. The sensor uses roughly 3x the amount of energy to use the radio in High Power Boost Mode vs Standard Mode.

To make it easy for users to see if a device is currently operating in Standard Mode or High Power Boost Mode, the mode is sent with each sensor event on the API and visible in the Studio user interface.

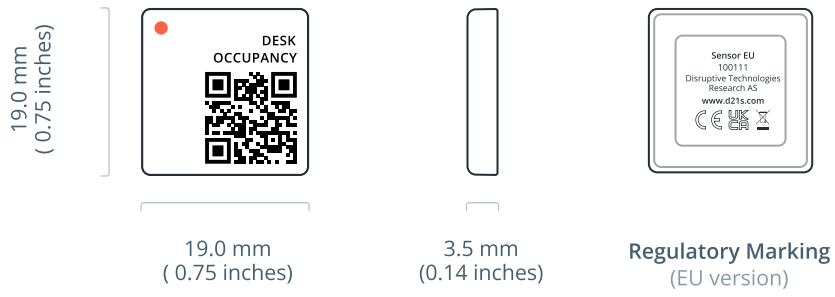


Please note: The battery lifetimes listed here are estimates and can vary from sensor to sensor depending on usage pattern, wireless coverage and other environmental variables.

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Mechanical Properties

Size	19 x 19 x 3.5 mm (± 0.2 mm) / 0.75 x 0.75 x 0.14 inches
Weight	3.0 g (± 0.5 g) / 0.11 oz
Material	Impact modified acrylic film
Mounting method	Adhesive
IP Rating	IP68



Regulatory Marking
(EU version)

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Installation Guidelines

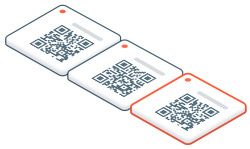
1. Install the Cloud Connectors in the locations found during planning.

   Visit support.d21s.com to see best practices for Cloud Connector installations.

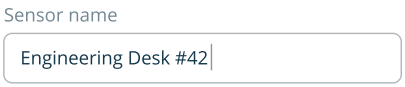


2. Claim the sensors in Studio by scanning the QR code found on the sensor packaging.

   If only a few sensors are needed, they can also be claimed individually in Studio.



3. To ensure that the coverage is sufficient, we recommend placing all the sensors on top of the desks before they are permanently installed.



4. Give the sensor a name or label in Studio for identification.

5. The connectivity status for all sensors can then be viewed in Studio to check if any of the sensors are in **High Power Boost Mode** or **not reporting data**.

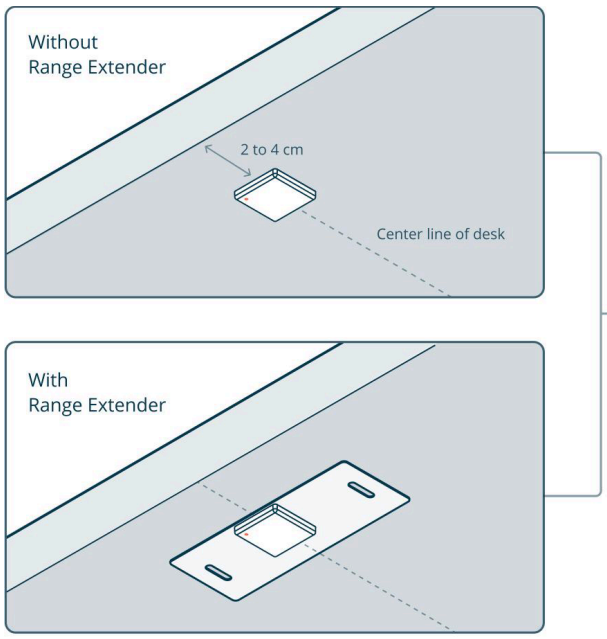
If a sensor is in **High Power Boost Mode**, the battery life will be reduced because the sensor is using more energy to reach the Cloud Connector.

Either move the Cloud Connector or consider using a Range extender accessory to amplify the sensor range.

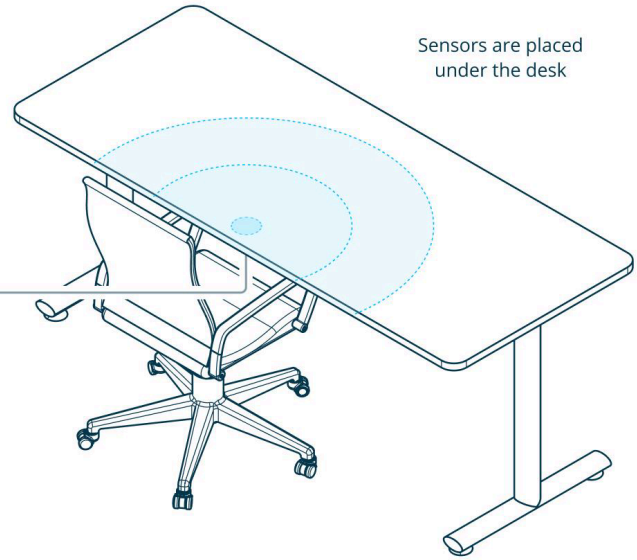
If the sensor is **not reporting data,** the sensor is outside the range of the Cloud Connector.

Install a second Cloud Connector to extend the coverage.

5. The sensor should be installed under the desk, approximately 2 to 4 cm from the edge of the desk, at the center where a person is usually sitting. Clean the installation surface, peel the protective film from the back of the sensor, stick the sensor to the table, and press it firmly for a few seconds to ensure good adhesion.



NB! The orientation matters. Align the dot on the sensor and with the dot on the Range Extender.



Do not place the sensor directly on a metal surface as it will affect the wireless range of the sensor.

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Revision History

Revision 1.0	**Change**: Initial release. **Date**: May 4th, 2022
Revision 1.1	**Change**: Updated document design **Date**: November 15th, 2022
Revision 1.2	**Change**: Updated document design **Date**: February 9th, 2024
Revision 1.3	**Change**: Added APAC variant **Date**: October 11th, 2026

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