DISRUPTIVE
TECHNOLOGIES

Wireless Desk Occupancy Sensor

Product Datasheet

Description

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 created by the presence of people sitting at a desk. The result is wirelessly transmitted to nearby Cloud Connectors (gateways) via the SecureDataShot™ protocol. Cloud Connectors relay sensor data into the DT cloud infrastructure. From here, the data can be forwarded to other cloud services using Data Connectors, or viewed directly in DT Studio (web application).

Features

- 8-year battery life under normal use
- Small size (19x19x3.5 mm)
- Peel-and-stick mount for simple installation

Applications

- Desk occupancy rate monitoring
- Office space utilization

How it works

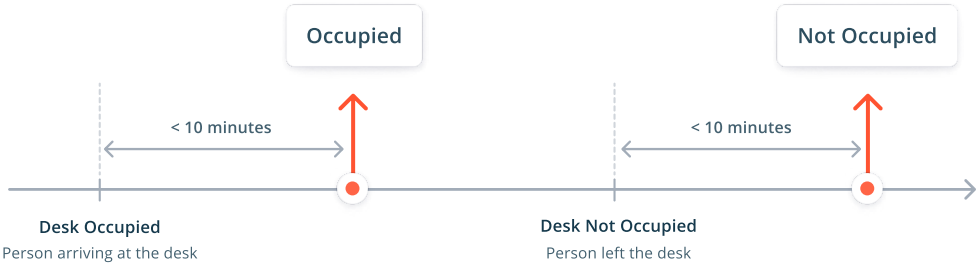
Default operation

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.

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. See the Expected Accuracy section under Technical Specification for more details about the accuracy.



Sensor events during default operation

Desk occupancy sensor in Studio

Technical Specification

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

Expected 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 similiar 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%

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

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	

Battery Specification

Battery	**Type**: BR1215 (non-replaceable)	
Lifetime	**Standard Mode**: Up to 8 years	**Boost Mode**: Up to 3 years

Wireless Communication

Radio Protocol	SecureDataShot™	
Radio Frequency	**EU**: 868 MHz ISM band	**US**: 915 MHz ISM band
Radio Range[1]	**Indoor**: 25 m (82 ft)	**Free Space**: 300m (980 ft)
Radio Range with Extender[1]	**Indoor**: 100 m (246 ft)	**Free Space**: 1200 m (2952 ft)

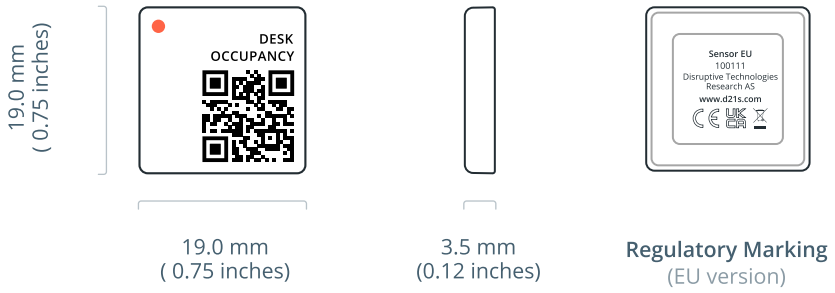
Certification & Compliance

Certification	**EU**: CE, UKCA, WEEE	**US/Canada**: FCC, ISED
	IC: 25087-100541	**FCC ID**: 2ATFX-100541

(1): Based on standard ITU-R P.1238 (indoor) and ITU-R P.525 (free-space).

Mechanical Properties

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



Regulatory Marking
(EU version)

Product Variants

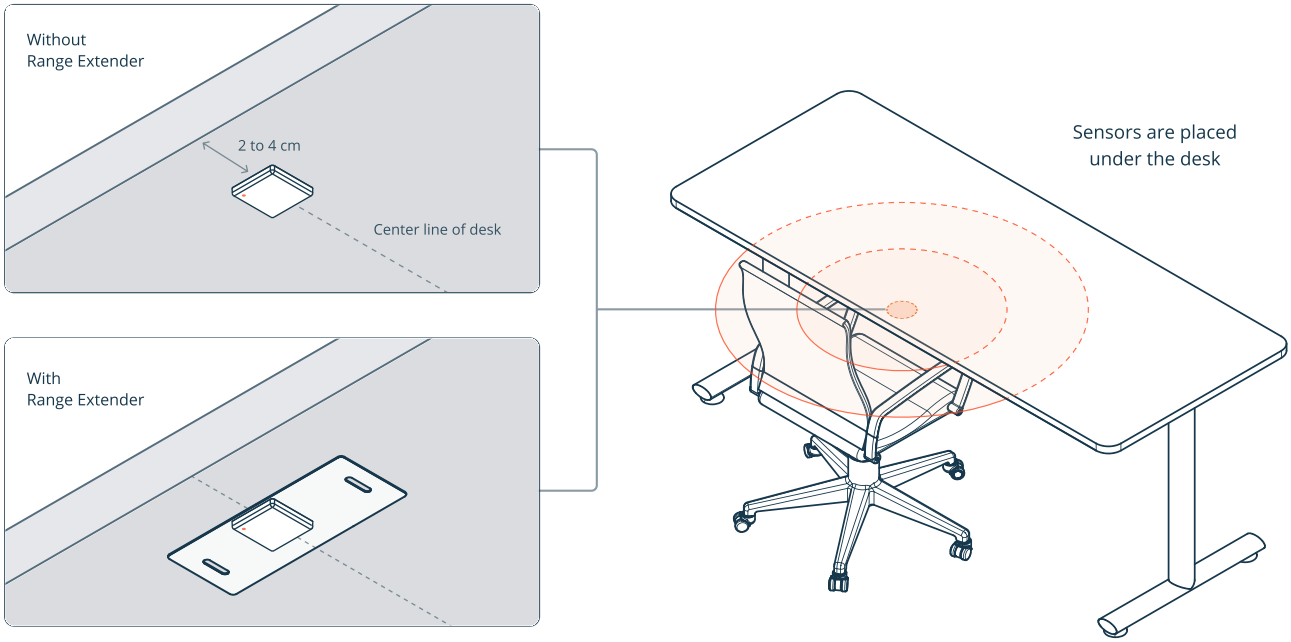
EU Version	**SKU**: 102553	**Region**: Europe
US Version	**SKU**: 102554	**Region**: North America

Installation Guidelines

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

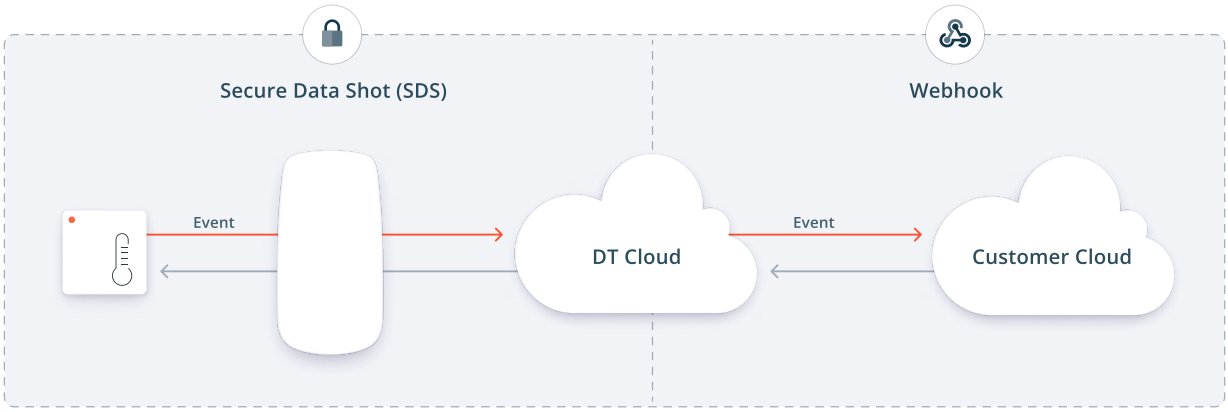
Clean the installation surface, peel the protective film from the back of the sensor, stick the sensor to the table, and press it firmly for a few seconds to ensure good adhesion.

To increase the wireless range between the sensor and the Cloud Connector by up to 4x, we recommend installing the sensor with a Range Extender accessory (PN: 100644).



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

System Overview



Wireless Sensors

Wireless sensors instantly connects to the cloud via SecureDataShot™

Cloud Connectors

Cloud Connectors automatically connect to the cloud service when powered

Cloud Service

No servers, databases, or on-prem clients to manage - simply just install and consume data

Why use a cloud based sensor solution?

Zero-touch Connectivity

No pairing needed, sensors automatically communicate through all Cloud Connectors which results in a quick and easy installation process.

Easy to Scale

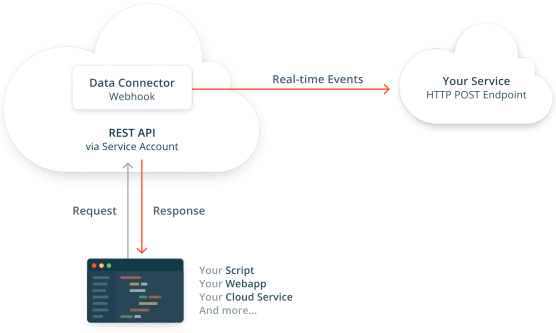
Cloud Connectors support thousands of sensors and the cloud service automatically scales for users with increasing number of sensors.

24/7 Monitoring

All Disruptive system components are instrumented and monitored 24 hours per day, 7 days per week. Anomalies trigger alarms and notifies our response team.

Centralized Management

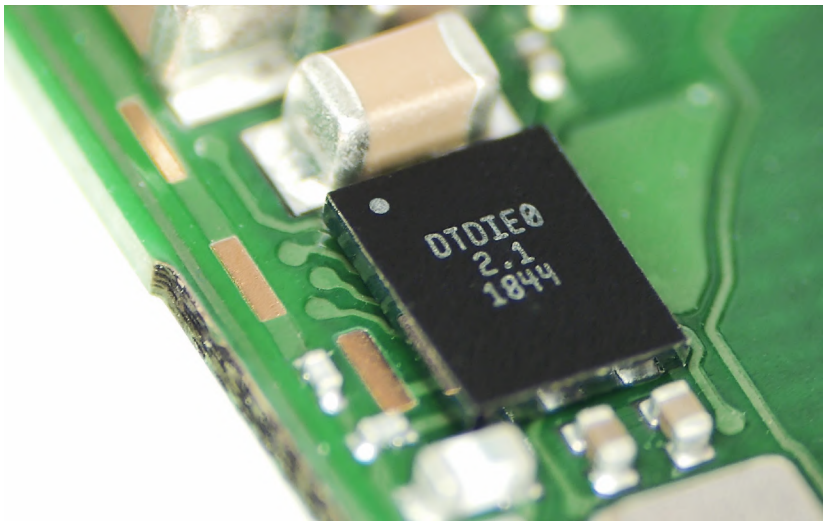
No servers, databases, or on-prem clients to manage. A modern cloud platform enables secure access on any device from anywhere in the world.



REST API & Webhooks

Easily integrate the sensor data into your own, or a third-party service, using our REST API or webhooks.

Take advantage of industry leading battery life with DT Silicon



DT Wireless Sensors are powered by DT Silicon - our very own proprietary chip technology that makes it possible to create sensors that use an order of magnitude less energy to operate than other wireless sensors. Paired with SecureDataShot™, DT sensors have superior battery life while maintaining the highest level of security and ease-of-use.

- Enables tiny sensors with long battery life
- Tailor made for the SecureDataShot™ protocol

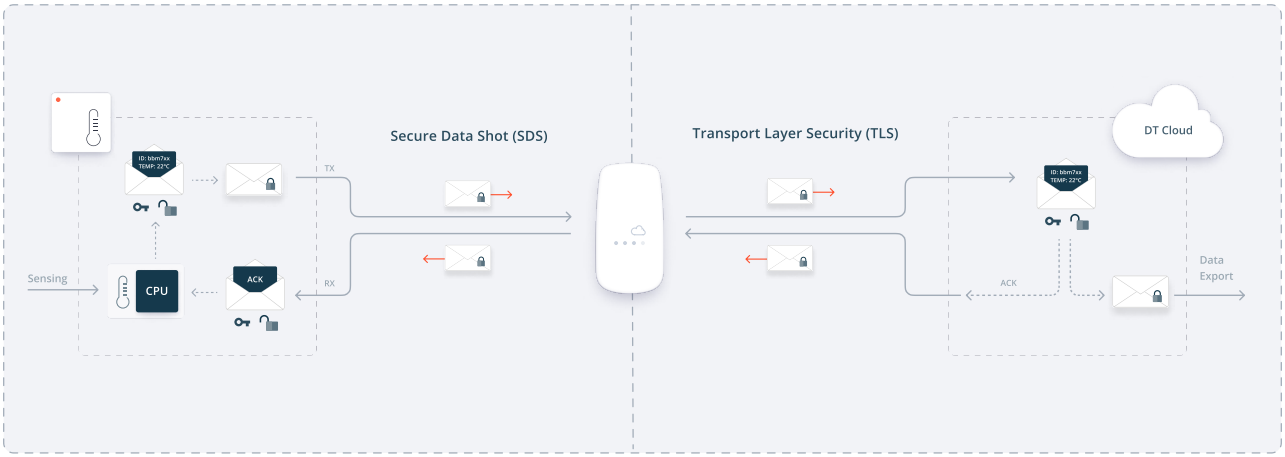
Secure by default with SecureDataShot™

SecureDataShot™ creates a secure communication channel between the sensor and the cloud instead of between the sensor and the gateway. This reduces the potential for a manipulator-in-the-middle attack by exploiting vulnerabilities in the security architecture of gateways.

- Cloud Connectors can forward data to and from sensors but cannot decrypt the sensor data.
- During manufacturing, each sensor is assigned a unique **256 bit assymmetric encryption key**, generated by a tamper-proof 140-2 Level 3 certified hardware security module.
- The public part of the asymmetric key is exchanged with Disruptive's cloud via encrypted channels.

The purpose of the keys is to allow sensors to communicate securely with the cloud. In addition to the keys assigned during manufacturing, the sensor and cloud also hold a unique SecureDataShot™ session key.

- Private keys are used to encrypt data on the sensor before transmitting it over the radio.
- The unique public part of the key is used to decrypt the data on the cloud side.
- Disruptive Cloud Connectors are provisioned with Transport Layer Security (TLS) certificates to establish a secure connection between the Cloud Connector and the cloud.



Fleetmanagement with Studio

Device Overview

Sort devices into projects for easy access and get an overview over data, health status and radio coverage

Flexible Dashboards

Get a quick overview of sensors and compare data with easy-to-use drag-and-drop dashboard cards

Access Control

Create role-based user accounts for people and services that need access to sensor data

Notifications

Set up simple rules for sensors and receive automatic sensor triggered notifications

Data Forwarding & API Integrations made simple

Data Connectors / Webhooks

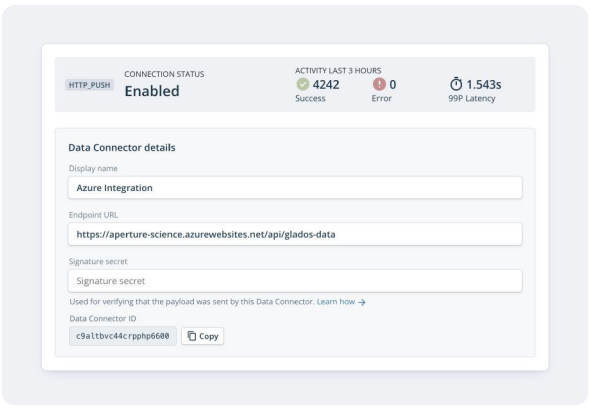
Easily configure secure webhooks to forward the data to your own service.

Service Accounts

Create and manage role-based service accounts to let your own cloud service authenticate with the REST API.

Sensor Emulators

Create emulated sensors to test your API integrations without access to phyical hardware.



Azure aws Google Cloud IBM Cloud

Revision History

Revision 1.0

Change: Initial release.

Date: May 4th, 2022