



AIR

User and Installation Guide

v.21.04

Welcome to use Thingsee

Congratulations on choosing Haltian Thingsee as your IoT solution. We at Haltian want to make IoT easy and accessible for everyone, so we have created a solution platform that is easy to use, scalable and secure. I hope our solution will help you achieve your business goals!

Pasi Leipälä
CEO, Haltian Oy

Thingsee AIR



Thingsee AIR is a state of the art, battery powered wireless IoT sensor for your indoor air quality monitoring. Together with CO₂, TVOC, temperature, barometric pressure, humidity sensors and ambient light sensor, it's a perfect device to provide an extensive overlook to both present air quality data and the data history.

Thingsee AIR is part of Haltian Thingsee IoT solution and product family.



Sales package content

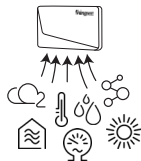
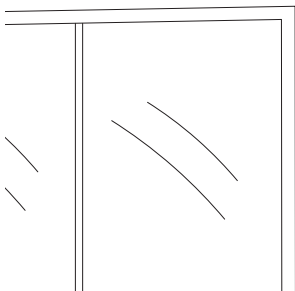
- Thingsee AIR sensor
- 2 x AA batteries
- Screw and anchor to attach the product to the wall
- 1 x Opening Key

Using Thingsee AIR sensor

Thingsee AIR detects carbon dioxide (CO₂), total volatility of organic compounds (TVOC), temperature, humidity, barometric pressure and ambient light. The product is installed on the wall in the space where air quality is measured.

Thingsee AIR is a perfect tool to measure indoor air quality (IAQ) in buildings and structures, especially as it relates to the health and comfort of the building's occupants. The sensor ensures real-time air quality data for, e.g. adequate ventilation in the premises.

Thingsee AIR uses event-based messaging where measurement is done every 5 minutes. In case there is a change to the previous measurement, the measured value will be reported immediately. In case the measurement value remains at the same level, it's reported every 1 hour.



General installation instructions

The sensor is for indoor use only.

The environment humidity should be <85 % RH at all time.

The usage temperature range is +5 °C to +50 °C, non-condensing environments only.

Please note that the correct TVOC and CO₂ data are available only after the sensor device has conducted baseline calibration for the environment.

- TVOC sensor conducts baseline calibration for the TVOC levels and valid data is available after 24h of continuous use.
- Accurate CO₂ baseline level is set by auto-calibration during the first 8 days of usage. The auto-calibration is based on the outdoor CO₂ level. CO₂ level in normal air pressure is 400 ppm.

Note: Thingsee AIR requires 'free of people' moments in the space, when the indoor air is fully changed, to set the correct 400 ppm baseline. This is why places such as schools and offices are good places to use the sensor, as the baseline can be set during the night.

Note before installation

Please make sure the Thingsee GATEWAY is installed before you install the sensor.

To ensure strong enough signal strength for data delivery, keep the maximum distance between installed sensors under 20 m.

If the distance between a measuring sensor and the gateway is > 20 m or if the sensors are separated by a fire door or other thick building materials, use extra sensors as routers to ensure adequate signal strength.



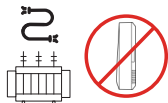
Things to avoid in installation

Avoid installing Thingsee products near the following:

Thick concrete structures or thick fire doors



Electrical transformers or thick electrical wires



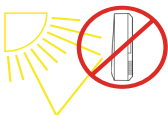
Escalators



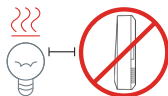
Nearby heating or cooling devices and/or vents



Direct sun light



Nearby halogen lamps, fluorescent lamps or similar lamps with hot surface



Nearby radio equipment like WiFi routers or any other similar high power RF transmitters

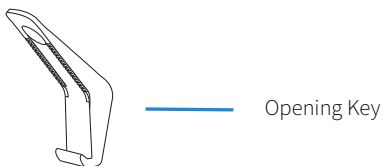


Avoid installing the sensor in close proximity to a spot where there's people presence constantly, such as right next to workstations.

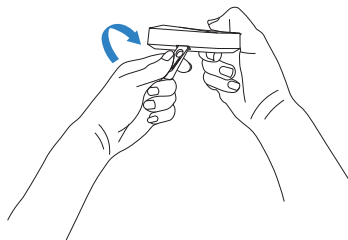


Installation

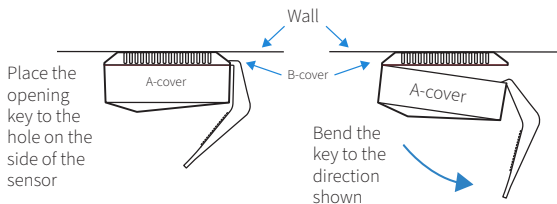
Open the box and follow the instructions of this user and installation guide. Take the product from the box and open it with the opening key. Select a place where to install Thingsee AIR (see 'Things to avoid in installation' before). The recommended height on the wall is between 1,4 m – 1,8 m.



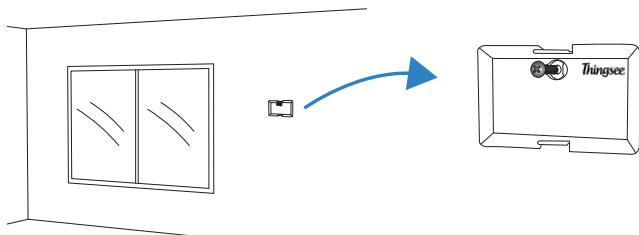
When holding the sensor in hand: Place the opening key in the hole on the side of the sensor and twist to open.



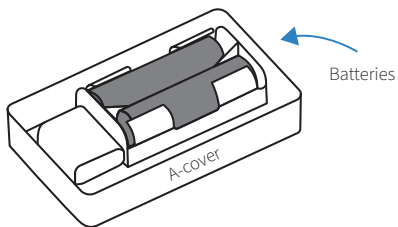
When the sensor is on the installed surface:



Take the B-cover and place it on the wall on the decided location.
Screw the B-cover to the wall (use anchor with concrete wall or gypsum board).

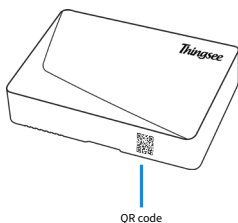


Place the batteries inside the A-cover.

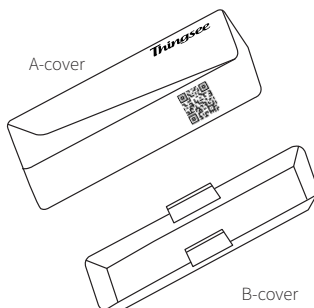


To identify the sensor, read the QR code on the side of the A-cover with a QR code reader or Thingsee installation application on your mobile device.

Identifying the device is not necessary, but it will help you keep track of your IoT installation and help Haltian support to solve possible issues.



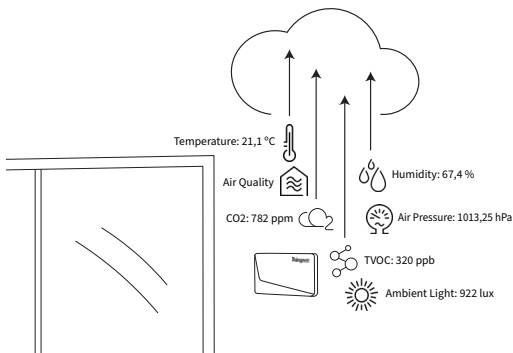
Attach the A-cover to the B-cover attached to the wall. (Make sure the Thingsee logo is the right way).



Note: Make sure the sensor is installed max. 20 meters from the next sensor or gateway. This is to ensure full coverage mesh network between the sensors and the gateway.

Detection capability

- CO₂ measurement range 400 – 5 000 ppm; extended range up to 10 000 ppm.
Accuracy $\pm 3\%$ (In extended range $\pm 10\%$).
- TVOC measurement range 0 – 60000 ppb.
Resolution 1 ppb at range 0 ppb - 2008 ppb, 6 ppb at range 2008 ppb – 11110 ppb, 32 ppb at range 11110 ppb - 60000 ppb.
- Temperature -40 °C to + 85 °C.
Please note recommended operation temperature +5 °C to +50 °C.
Accuracy $\pm 0,2\text{ }^{\circ}\text{C}$.
- Relative humidity can be measured between 0 -100% RH.
Accuracy $\pm 2\%$.
- Barometric pressure can be measured between 300 - 1200 hPa.
Absolute accuracy is $\pm 1\text{ hPa}$.
Pressure sensor precision is $\pm 0.002\text{ hPa}$ in high precision mode.
- Ambient light sensing between 0 - 100k nW/cm².
Light level measurement not calibrated. Only for indicative purposes.



Examples of reference values

CO₂ values reference

Level	Recommendation
250-400 ppm	Normal background concentration in outdoor ambient air
400-1000 ppm	Concentrations typical of occupied indoor spaces with good air exchange
1000-2000 ppm	Complaints of drowsiness and poor air
2000-5000 ppm	Headaches, sleepiness and stagnant, stale, stuffy air. Poor concentration, loss of attention, increased heart rate and slight nausea may also be present
> 5000 ppm	Workplace exposure limit (as 8-hour TWA) in most jurisdictions
> 40,000 ppm	Dangerous level: Exposure may lead to serious oxygen deprivation

TVOC values reference

Level	Hygienic Rating	Recommendation	Exposure Limit	TVOC (ppb)
1 Excellent	No objections	Target value	no limit	0 - 65
2 Good	No relevant objections	Ventilation - airing recommended	no limit	65 - 220
3 Moderate	Some objections	Intensified ventilation - - airing recommended Search for sources	< 12 months	220 - 660
4 Poor	Major objections	Intensified ventilation - - airing necessary Search for sources	< 1 month	660 - 2200
5 Unhealthy	Situation not acceptable	Use only if unavoidable - - intense ventilation necessary	Hours	2200 - 5500

Default measurement and reporting

Event based reporting

- Measures every 5 minutes:
 - CO₂
 - TVOC
 - Temperature
 - Humidity
 - Barometric pressure
 - Ambient light
- Reports immediately when measured value has changed more than the set threshold value from previous reported measurement
 - CO₂ default threshold value 10 ppm
 - TVOC default threshold value 30 ppb
 - Temperature when absolute change 0,5 °C
 - Humidity when absolute change 2 %
 - Barometric pressure when absolute change 20 hPa
 - Ambient light when absolute change 10000 nW/cm2

Time based reporting

- Reports all measurement values every 1 hour

Other default settings

- Battery reporting interval 6 hours
- Sensor is in routing mode

Changing the default settings

The following parameters are configurable remotely over Thingsee Operations Cloud

- Measurement interval
- Reporting interval
- Event based reporting thresholds
- Mesh network node role configuration
 - Routing
 - Non-routing



Device info

Operating temperature +5 °C ... +50° C

Operating humidity 0 % ... 85 % RH non-condensing

Storage temperature +5 °C ... +25 °C

Storage humidity 45% ... 85 % RH non-condensing

IP rating grade: IP30

Certifications: CE, FCC, ISED, RoHS and RCM compliant

Battery type: 2 x AA, replaceable

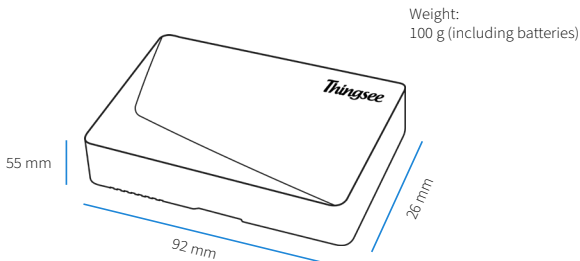
Expected battery life:

- Up to 2 years with 5 minute interval

Radio sensitivity: -95 dBm (BTLE)

More device info can be found at support.haltian.com

Device measurements



CERTIFICATION IN CERTIFICATION INFORMATION EU DECLARATION OF CONFORMITY

Hereby, Haltian Products Oy declares that the radio equipment Thingsee AIR is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: haltian.com

Haltian Products Oy vakuuttaa, että radiolaitetyyppi Thingsee AIR on direktiivin 2014/53/EU mukainen. EU-vaatimustenmukaisuusvakuutuksen täysimittainen teksti on saatavilla seuraavassa internetosoitteessa: haltian.com

Thingsee AIR operates at Bluetooth® 2.4 GHz frequency band. Maximum radio-frequency power transmitted is +4.0 dBm.

Manufacturer name and address:

Haltian Products Oy
Yrteipellontie 1 D
90230 Oulu
Finland

FCC REQUIREMENTS FOR OPERATION IN THE UNITED STATES

FCC Information for the User

This product does not contain any user serviceable components and is to be used with approved, internal antennas only. Any product changes or modifications will invalidate all applicable regulatory certifications and approvals.

FCC Guidelines for human Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Radio Frequency Interference Warnings & Instructions

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following methods:

Increase the separation between the equipment and the receiver.

Connect the equipment into an electrical outlet on a circuit different from that which the radio receiver is connected

Consult the dealer or an experienced radio/TV technician for help

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

FCC compliance statement:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Innovation, Science and Economic Development Canada (ISED) regulatory information

This device complies with RSS-247 of the Innovation, Science and Economic Development Canada (ISED) Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Ce dispositif est conforme à la norme CNR-247 d'Innovation, Sciences et Développement économique Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable

Radiation Exposure Statement :

This device complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and used with a minimum distance of 20 cm between the radiator and your body.

NOTE IMPORTANTE: Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

FCC ID: 2AEU3TSAIR

IC: 20236-TSAIR

RCM-approved for Australia and New Zealand.

SAFETY GUIDE

Read these simple guidelines. Not following them may be dangerous or against local laws and regulations. For further information, read the user guide and visit www.haltian.com

Usage

Do not cover the device as it prevents the device from operating properly.

- This product is intended for indoor use only and shall not be exposed to rain.
- Do not modify the device. Unauthorized modifications may damage the device and violate regulations governing radio devices.
- Do not store the device in wet or humid conditions.
- Remove the batteries from the device if you are taking it inside an aeroplane (unless you have the pre-installed pull-out tape still in place). The device has a Bluetooth LE receiver/transmitter which must not be operational during a flight.
- Please take care that the used batteries are recycled by taking them to appropriate collection point.
- When changing batteries, replace both of them at the same time using identical brand and type.
- Do not swallow batteries.
- Do not throw batteries into water or fire.
- Do not short-circuit batteries.
- Do not try to charge primary batteries.
- Do not open or disassemble batteries.
- Batteries should be stored in a dry place and at room temperature. Avoid large temperature changes and direct sunlight. At higher temperature the electrical performance of the batteries may be reduced.
- Keep batteries away from children.

Care and maintenance

Handle your device with care. The following suggestions help you keep your device operational.

- Do not open the device other than as instructed in the user guide.
- Unauthorized modifications may damage the device and violate regulations governing radio devices.
- Do not drop, knock, or shake the device. Rough handling can break it.
- Only use a soft, clean, dry cloth to clean the surface of the device. Do not clean the device with solvents, toxic chemicals or strong detergents as they may damage your device and void the warranty.
- Do not paint the device. Paint can prevent proper operation.

Damage

If the device is damaged contact support@haltian.com. Only qualified personnel may repair this device.

Small children

Your device is not a toy. It may contain small parts. Keep them out of the reach of small children.

RECYCLING

Check the local regulations for proper disposal of electronic products. The Directive on Waste Electrical and Electronic Equipment (WEEE), which entered into force as European law on 13th February 2003, resulted in a major change in the treatment of electrical equipment at end-of-life. The purpose of this Directive is, as a first priority, the prevention of WEEE, and in addition, to promote the reuse, recycling and other forms of recovery of such wastes so as to reduce disposal. The crossed-out wheeler-bin symbol on your product, battery, literature, or packaging reminds you that all electrical and electronic products and batteries must be taken to separate collection at the end of their working life. Do not dispose of these products as unsorted municipal waste: take them for recycling. For info on your nearest recycling point, check with your local waste authority.



Innovation, Science and
Economic Development Canada

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Développement économique Canada



Get to know other Thingsee devices



Thingsee PRESENCE



Thingsee ENVIRONMENT



Thingsee BEAM



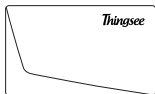
Thingsee ENVIRONMENT
RUGGED



Thingsee LEAKAGE
RUGGED



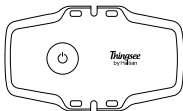
Thingsee ANGLE
RUGGED



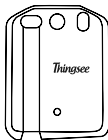
Thingsee AIR



Thingsee GATEWAY



Thingsee GATEWAY
GLOBAL



Thingsee GATEWAY
LAN

For all devices and more information, visit our website
www.haltian.com or contact sales@haltian.com

