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IEQ Sensor

Installation, maintenance & operation manual

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CONTENTS

1 INTRODUCTION

This document constitutes technical information regarding the operation of IEQ SENSOR devices.

IEQ SENSOR devices are used to monitor air quality parameters, environment and electromagnetic pollution.
In indoor environments different forms of pollution can occur, which can damage the health of individuals if they persist over time. The continuous monitoring of pollution parameters allows to analyze them and activate the appropriate control actions (alarms), in addition to having a traceability over time.

With the IEQ SENSOR devices it is possible to measure the well-being of indoor environments in order to carry out decisive actions to increase the productivity of the occupants and make a healthier environment.

The IEQ SENSOR can be integrated on exisitng Daikin monitoring tools as:

- Daikin on Site (DoS) plants related to AHU and Chillers. This function is called I4D, for details consult the available manual in DENV Business Portal (“Daikin On Site - I4D Quick Start”).
- Daikin Cloud Service (DCS) sites related to VRV and other commercial Units. For this function please refer to the available manual in DENV Business Portal (“Daikin Cloud Service_User reference guide_4PEN529062-1G”).

In order to allow a correct sampling of the measurements, the IEQ SENSOR must be connected to its power supply and it is recommended to place it a conventional height of about 160/170 cm, with a distance of about 40cm from other devices (e.g. fan coils, fans, electronic devices, paper, etc.).

As shown in the following paragraphs, the IEQ SENSOR device can be placed on a flat surface, or installed on the wall using the special kit provided.

2.1 Installation on a flat surface

Thanks to its minimal and compact design IEQ SENSOR can be placed on a flat surface (e.g. table, desk).
On the side is an example photo of installation on a desk.

2.2 Wall installation

It is possible to place the IEQ SENSOR device on a vertical wall thanks to the special kit provided in the package.

3.1 Connectivity

IEQ SENSOR device connects to the collection server through a Wi-Fi connection type 802.11 b/g/n (2.4GHz) or via Narrowband IoT network which is available in a limited list of european countries (check your local administrator for lates coverage list).

3.1.1 Wi-Fi

Standards: IEEE 802.11b/g/n - Band: 2,4GHz.
Security modes: None, WEP, WPA version 1 and 2 (AES-CCMP or TKIP encryption/integrity), with automatic selection based on Access Point configuration. Authentication Mode: None, WPA-PSK with automatic selection based on Access Point configuration. Captive-portal: Not supported.

3.1.2 Narrowband IoT

SIM M2M embedded – frequency band B1 (2100MHz), B3 (1800MHz), B5 (850MHz), B8 (900MHz), B20 (800MHz), B28 (700 MHz) - CoAP / UDP.

3.2 Switching On

To corectly use the IEQ SENSOR it is necessary to have a Wi-Fi connection or Narrowband IoT network coverage.
In case of Wi-Fi accreditation via captive-portal (e.g. hotels, restaurants, etc.) or protected Wi-Fi networks (e.g. MAC address filtering, etc) it is necessary to contact the relevant IT service and manually authorize the device to network before the configuration process via the Daikin AirSense application (APP).

3.2.1 Turning on the device for the first time

Before turning on the device you need to connect it to the power supply. Press and hold the power on/off button for 4 seconds, you will hear a beep and see a blue light on the crown (luminous ring on the top of the IEQ SENSOR) indicating the power on.

What should happen
You will hear an audible signal and on the IEQ SENSOR crown you will see a blue light, then the IEQ SENSOR crown will start blinking in blue light every second for 3 minutes. The IEQ SENSOR is in configuration mode and ready to be paired via APP (see the leaflet in the IEQ SENSOR box for details on configuration steps).

3.2.2 Check device on

Tap the crown on the top of the IEQ SENSOR for one second.

What should happen
If the device is turned on you will see a colored light for half a second, the light indicates the air quality status (green=ok, yellow=warning, red=critical, blue=value no present).

3.3 Power Off

3.3.1 Device Power Off

Press and hold the on/off button for 6 seconds, you will hear a beep and the IEQ SENSOR crown flashes blue until the power off is complete. To perform a new power on, it is necessary to wait until the IEQ SENSOR finishes flashing blue (power off complete)

What should happen
During the powering off procedure, you will see, after one second, colored light on the crown indicating the air quality status (green=ok, yellow=warning, red=critical, blue=value no present), after another 5 seconds you will hear the shutdown beep, the IEQ SENSOR will emit blue light until the shutdown is complete.

3.4 IEQ SENSOR factory reset

Perform the factory reset for re-pairing the IEQ SENSOR if a previous pairing has been already done in the past. First, turn off the IEQ SENSOR by pressing and holding the on/off button for 6 seconds, you will hear the shutdown beep and the IEQ SENSOR will emit blue light until the shutdown is complete.
At the end of the shutdown, turn on IEQ SENSOR by pressing and holding the on/off button for 4 seconds, you will hear a beep indicating power on. Continue to hold the power button for another 10 seconds until hearing a second beep.

What should happen
You will hear a further audible signal and on the IEQ SENSOR crown you will see a blue light, then the IEQ SENSOR crown on the top will begin to blink with a blue light every second for 3 minutes. The IEQ SENSOR is in configuration mode and ready to be paired via APP (refer to next step).

3.5 Configuration and check

3.5.1 IEQ SENSOR configuration

After resetting, configure with the APP (see the leaflet in the IEQ SENSOR box for details on configuration steps).

What needs to happen

Once the IEQ SENSOR configuration with the APP is finished, if a new firmware version is available, the IEQ SENSOR will automatically perform the update. In case of firmware update, the IEQ SENSOR crown will flash purple until the updating is complete. Once the device turns on, it will beep and on the IEQ SENSOR crown, you will see a single blue light. After a few seconds, it will emit blue light, which indicates that it is taking a measurement.

3.5.2 Send measurement on demand

Press and hold the crown for a few seconds, until a double turquoise light is displayed.

What should happen

After a few seconds, the IEQ SENSOR will emit blue light. This indicates that it is taking the measurement. If after a few seconds a red light is emitted, it means that the IEQ SENSOR is not connected to the network. (On the CAELUM IoT portal server it is possible to check if the data has arrived).

3.5.3 Firmware upgrade

If a sensor is properly configured and connected, as soon as new firmware is available, the sensor will start automatically the update within 24h from the availability or after the first restart. During the firmware update, the IEQ SENSOR crown flashes purple, when the firmware upgrade procedure is finished IEQ SENSOR turns on again (a beep sound is emitted and the IEQ SENSOR crown flashes blue).

3.6 How often IEQ SENSOR sends data

The IEQ SENSOR, correctly plugged via its micro USB cable, performs the measurement every 5 minutes (mode: "Plugged"). In case it is not powered (mode: "Need Power"), it will take two measurements every 15 minutes before freezing (mode: "Plug To Restart").

Please note that the CO_2 and PMs measurement are disabled when the IEQ SENSOR is in Need Power mode because of the high power consumption of these sensors. If the IEQ SENSOR is not powered it will freeze (mode: "Plug To Restart") after the second measurement in "Need Power" mode and stop sending measurements until it will be powered again.

3.7 Use and storage

Operating temperature and humidity: 0 °C ÷ +40 °C / 0% ÷ 100% (non-condensing)
Storage temperature and humidity: -40 ÷ +70 °C / 10% ÷ 93% (without condensation)
Operating Atm. pressure 300 ÷ 1100 hPa

3.8 Normative references

Product conforms to the essential requirements of Directive 2014/53/EU and European Directives 2014/35/EU (ex 2006/95/EC) and 2014/30/EU (ex 2004/108/EC)
EMC: EN 61326 -ETSI EN 301 489-1 / 7 -EN 55022 -EN 55024 -EN 61000-3-2 -EN 61000-3-3
SAFETY: EN 61010-1
RADIO: EN 300 328

3.9 Power supply& status

The IEQ SENSOR must be powered by the USB adapter and micro-USB connector provided.
Thanks to the backup battery, in case the IEQ SENSOR loses power it will switch to "Need Power" mode.
The IEQ SENSOR will beep for 1 second and start flashing red on the crown every 10 seconds indicating the "Need Power" mode. After the second measurement in "Need Power" mode, the IEQ SENSOR will beep for 5 seconds and freeze (mode: "Plug To Restart"). Power the IEQ SENSOR to start sending data again (mode: "Plugged").

Please note that in "Need Power" mode the following functionalities will be disabled due to the high power consumption:

- CO_2 and PMs measurements;
- On-demand measurement;
- Firmware update;
- Air quality status led information

In case the connectivity is poor or absent or the backup battery is low, the IEQ SENSOR may not be able to deliver measurements in "Need Power" mode and may enter the "Plug To Restart" mode in advance. However, the IEQ SENSOR will still be able to reach the "Plug To Restart" mode and restart automatically when powered again.

4 SENSORS

The following table shows the sensors, their maximum and minimum limits within the IEQ SENSOR device:

Sensor_name	Unit	Type	Value_min	Value_max
TVOC	ppb	INCR	0	2000
CO_2e	ppm	INCR	400	6000
CO_2	ppm	INCR	0	5000
PM10	µg/m³	INCR	0	400
PM2.5	µg/m³	INCR	0	200
IEQ		INCR	0	500
Electrosmog_hf	V/m*	INCR	0	10
Electrosmog_lf	nT	INCR	0	20000
WiFi_level	dBm	INCR	-100	0
WiFi_n	N	INCR	0	100
Air_pressure	mbar	INCR	300	1100
Ambient_light	lux	INCR	0	120000
Sound	dB	INCR	35	120

5 DISPOSAL

The unit is made of metal, plastic and electronic parts. All of these components must be disposed of in accordance with local disposal laws and if in scope with the national laws implementing the Directive 2012/19/EU (RAEE).
Lead batteries must be collected and sent to specific waste collection centers.

For more information email **info@daikinapplied.uk** or visit **www.daikinapplied.uk**

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