

E5000M air quality probe Installation manual

Ver	Date	Modification / Update
V1	15/06/2018	Initiale Version

Summary

1.	Security.....	3
2.	Positioning.....	3
3.	Flush mounting.....	4
4.	Wiring.....	4
5.	Installation.....	4
6.	Power on.....	4
7.	Indication of LEDs in normal operation.....	5
8.	Loading the database.....	5
9.	Closing.....	6
10.	Connections.....	6
10.1.	Power supply.....	6
10.2.	Connection to the ventilation.....	6
10.3.	Connection to heating and air conditioning.....	6
11.	Remote control.....	6
12.	NFC.....	6
13.	Bluetooth Low Energy.....	6
14.	Warning.....	7
	ANNEXES.....	8
1.	Installation of BUS connections.....	8
1.1	RS485.....	8
1.2	Programming the physical address.....	8
2.	Choosing Bus Cable.....	8
2.1.	RS485.....	8
2.1.1.	Topology.....	8
15.	Simplified technical specifications.....	9
15.1.	Sensors.....	9
15.2.	Terms.....	11
15.3.	Standards.....	11

1. Security



WARNING

Danger of death, risk of electric shock and fire!

The installation should only be undertaken by a qualified electrician!

To apply for correct bus and power cables and to activate the device, comply with the state of the art and standards.

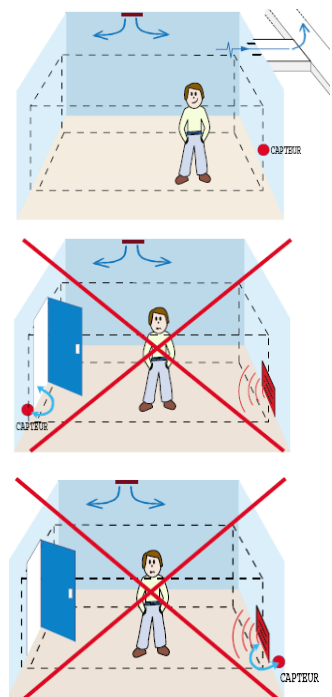
Any intervention or modification to the device will invalidate any warranty claim.

- Do not use this probe in environments with regular exposure to silicon vapors (HMDS) because this gradually alters the sensitivity of the VOC sensor.
- Do not use the sensors for measuring gas content relating to safety!
- Use the probe only with secured low voltages!

2. Positioning

The position of the probe is crucial vis-à-vis efficiency and energy savings for ventilation, heating and cooling.

- The probe is designed to ensure air quality; it must be placed in the area of occupancy of the premise served by outlet vents, on a wall at eyes level (breathing human level, between 1.5 and 1.8m).
- Avoid drafts (near openings, blowing air, doors, outlet vents) and dead zones (niche, shelves and curtains).
- Avoid orthogonal walls (corners of room in particular)
- Avoid heat sources and the proximity of occupants (radius of 1 m from workstation).
- Avoid direct exposure to sunlight.
- Position the probe vertically on a wall or partition.
This device is not intended for installation in duct or ceilings.



Any work not in accordance with this documentation or changes to the device will invalidate all warranty claims.

3. Flush mounting

Use an airtight insulating backbox with a waterproofing membrane through which the sheath passes. If the backbox passes through the sealing plane, seal between the backbox and the partition with a specific VOC and silicone-free sealant.

Make sure that the backbox doesn't contain Silicone.
The depth of the case must be at least 50mm.



4. Wiring

Be careful, wiring must be sealed. Incoming air, even slight, would seriously jam the temperature, humidity and air quality measures.

When the switchboard is located in the heated volume: caulk arrivals between cables and ducts at the switchboard level.

When the switchboard is out of the heated volume, caulk between cables and ducts before entering the heated volume. A sealing plug must also be placed between duct and cable reaching the E5000 probe to prevent air entry.

When the sealing of the duct is not possible, use a specific sealant without silicone and VOC.

In case of use of electrical box, select an airtight case with sealing membrane from which the duct passes through. If the case crosses through the sealing plane (plasterboard), seal between the casing and panel with a special sealant without silicone and VOC.



5. Installation

Screw down the plate holder on the backbox.

Take the wire pair out of the Modbus cable and connect both wires on the terminal block at the back of the product. Screw on the terminal block to hold the wires

Do the same for the power supply



6. Power on

20 seconds after power-up, the blue status LED and the orange status LED flash together gradually 15 times, at the end of the cycle, the orange LED remains fixed for few seconds, the time to interrogate all sensors then, only the blue LED "breathes" if the air quality does not require ventilation. If the probe has not been powered recently, the LEDs may stay orange "breathing" for several minutes until the VOC sensor stabilizes. The start-up cycle includes built in tests and preheating of the VOC sensor and visual checks of LEDs

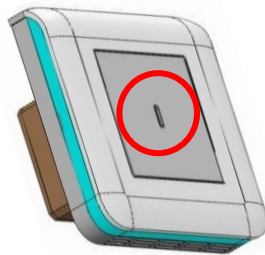
The cycle lasts about 5 minutes in total. During this time no message is sent on the bus except the status.

The LEDs indicate faults as follows:

	Led
Sensor failure after startup	Orange Fixed
End of Product Life (> 10 years)	Alternate Blue Orange
No ETS parameter integrity (ex HR min> HR max)	Off

7. Indication of LEDs in normal operation

LEDs are the global synthesis of IAQ and ventilation (Humidity, impact on health and brain by VOCs, impact on brain by CO₂) by a gradual rising and falling downwards regular or continuous breathing type.



LED state sensors	Description
Blue cyclic variation 5s	The air quality is ideal. The probe works perfectly
Blue cyclic variation 2s	100% <first set IAQ, except humidity <+ 130% And or Humidity > humidity setpoint + 5% RH
Orange cyclic variation 2s	> 130% above the IAQ setpoint except humidity and / or Humidity > humidity setpoint + 7% RH

The instructions are defined as follows:

- CO₂: The lowest setting value adjusted by the mode and the current exception.
- VOC: The lowest setting value adjusted by the mode and the current exception.
- T °: Not taken into account in the synthesis.
- Humidity: Without external sensor (3 points setting), the lowest value of the settings adjusted by the mode and the current derogation.
With external probe (4 points setting), the lowest value of the third setpoint (humidity threshold comfort zone) adjusted by the user and the current exception.

8. Loading the database

Download the NS mobile app with an android device with the NFC (Near Field Contact).

Link:

Launch the mobile app.

If not already done, get your installer access code.

Go to the installer Board to access the whole database; unless the modification concerns only IAQ, T° & RH threshold settings, in this case the modifications can be made in the standard user interface.

Get your mobile device close to the probe until the app detects the probe.

Read the probe database

Do your modifications on the copy of the database on the mobile device.

Approach a second time your mobile device to the probe until NFC detection. Press Write

9. Closing

Clip the probe bloc into the plate holder.

Plug the front panel and clip it on the plate holder until all edges touch the wall.

Clip the decorative plate on the front panel.



10. Connections

10.1. Power supply

Use a power supply between 12 and 24V AC or 15 and 33V DC with a fluctuation of max value of less than 10%, preferably a DIN rail regulated one.

Make sure the voltage does not overpass 24V AC or 33V DC before connecting to the probe.

Take into account the voltage drop in the cable to assess the consumption of each sensor.



10.2. Connection to the ventilation

The connection with the ventilation is done by the Modbus automat

10.3. Connection to heating and air conditioning

The connection with the heater and cooler is done by the Modbus automat

11. Remote control

The probe has a BLE communication to allow remote control function. It is thus possible to override (exemption) certain setpoints and to retrieve certain information (statuses, mode in progress, historic ..).

12. NFC

Refer to the NFC setting manual for detail

13. Bluetooth Low Energy

Refer to the BLE setting manual for detail

14. Warning

ATTENTION

After switching On!

The initial value of CO₂ * is normally close to 390ppm if windows are open, but much higher if there is human presence nearby. The initial value is reliable from the first measurement and does not need adjustment time.

The database allows choosing between absolute measurement and relative VOC measurement. In relative measure, the value of VOC is forced to zero at startup. As CO₂ ventilation or minimum ventilation renews the air, the VOC zero will adjust automatically, especially at night or during periods of un-occupancy. Zero will automatically adjust to the healthiest air level over a 20-day period. Indeed if the outdoor air is not ideal, it would be vain and energy-consuming to over-ventilate unnecessarily. Attention, the accuracy of the VOC sensor is optimal after 3 days of operation.

*: The CO₂ sensor uses a NDIR (non-dispersive infrared) technology with two spectral bands: one band for measuring CO₂, the other in a band where no gas generates absorption. This channel serves as a reference to compensate for the aging of the infrared source. This sensor does not need auto zero which allows to be used in cases of permanent occupancy.

ANNEXES

1. Installation of BUS connections

1.1 RS485

RS485 Modbus connection is not optically isolated. Therefore, you must pay special attention during the installation procedures that they do not cause communication failures or does not damage the RS485 coupler. Follow the points in the table below to ensure proper operation of your communication.



- 1 Use a shielded bus cable and connect one end of the shield to ground. Make sure, wherever possible, that there is no break in the cables. If this is not possible, you must have shield continuity consistent with the EMC at the connection points.
- 2 Keep RS485 cables away from other cables like power cables for example.
- 3 Connect the shielding to one end grounded to ensure equipotentiality of the shield. No other grounding is required.

THE SHIELD BUS MUST NOT BE CONNECTED TO THE “-“ OF THE BUS.

Warning: If you do not comply with above, the interface may be destroyed.

- 4 Make sure electrical signals are correct for the bus cable. This sets the resting level of the signal between two posts and is important for identifying the beginning of a message. The probe produces a 3.3V electrical signal. The voltage between the data lines + (B) and - (A) should be between 0.5 and 1V.
- 5 For bus cable lengths over 100m, make sure to use a bus termination at both ends(same impedance as the bus itself). A bus termination on one side only is sufficient for shorter distances.
- 6 The polarization of the bus is also recommended. RS485 standard requires a differential level of 200 mV for the signal detection. If the RS485 is not polarized, this level will not be reached at rest (without communication on the line) and then the operation will not be guaranteed. For this, a bias is applied to only one point of the bus. It is preferably applied on the master side.

1.2 Programming the physical address

It is possible to program the probe address by using a NFC smartphone and a dedicated Apps (up to address # 255).

A default address is implemented and the probability that two sensors have the same address is 1 / 250 which prevent setting.

2. Choosing Bus Cable

2.1. RS485

The RS422 standard recommends 24AWG (0.23mm²) twisted pair cable with a capacity of 16 pF shunt per foot and 100 Ohm characteristic impedance. Although the standard does not specify anything for RS485 wiring, the cable can perfectly be used for RS485.

2.1.1. Topology

The topology of RS485 cabling must be observed. The cable must go to the first bus coupler device, leave the first device to the second, etc. ... until the last device.

The topologies in tree, branch or star are not allowed.

15. Simplified technical specifications

15.1. Sensors

- CO₂: NDIR double band (without auto zero, can be used in places with permanent occupancy)
- VOC: Digital sensor with metal oxide MEMS
- Humidity and temperature: Digital sensor

Lifetime

Gas sensors: 10 years under normal conditions of use. Beyond 10 years, an LED message is activated.

Humidity: Max drift 0.5% RH / year.

Temperature: Max drift of 0.04 ° C per year.

Measurement ranges and accuracies

CO₂: +/- 50ppm and 3% at 25°C and 1013mbar, measuring range: 390 to 5000 ppm, resolution 1ppm.

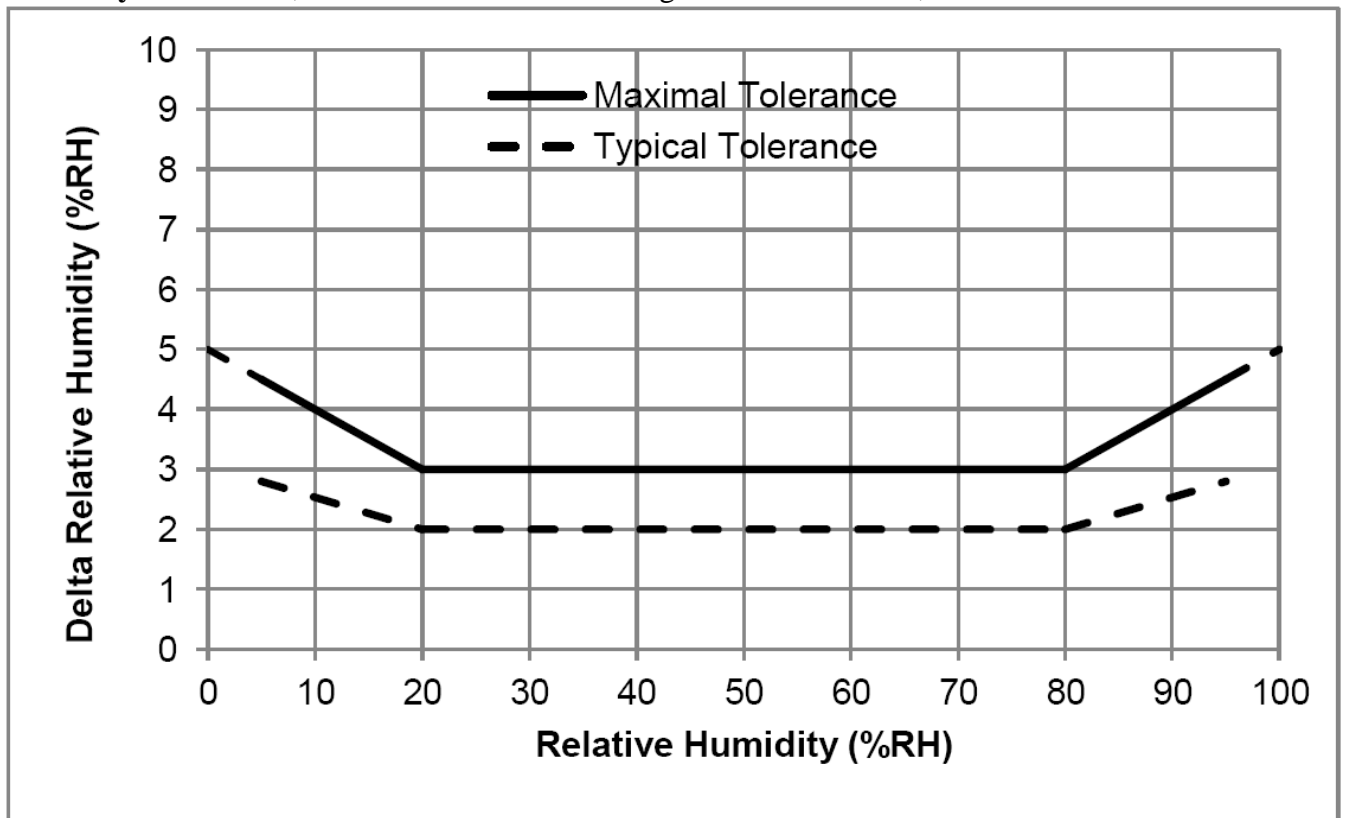
TVOC: +/- 0.1mg / m³ and 15% (Total VOC according to ISO16000-29). Max 180 mg / m³, resolution 10µg / m³.

Absolute measurement setting (not recommended to control ventilation, only for monitoring).

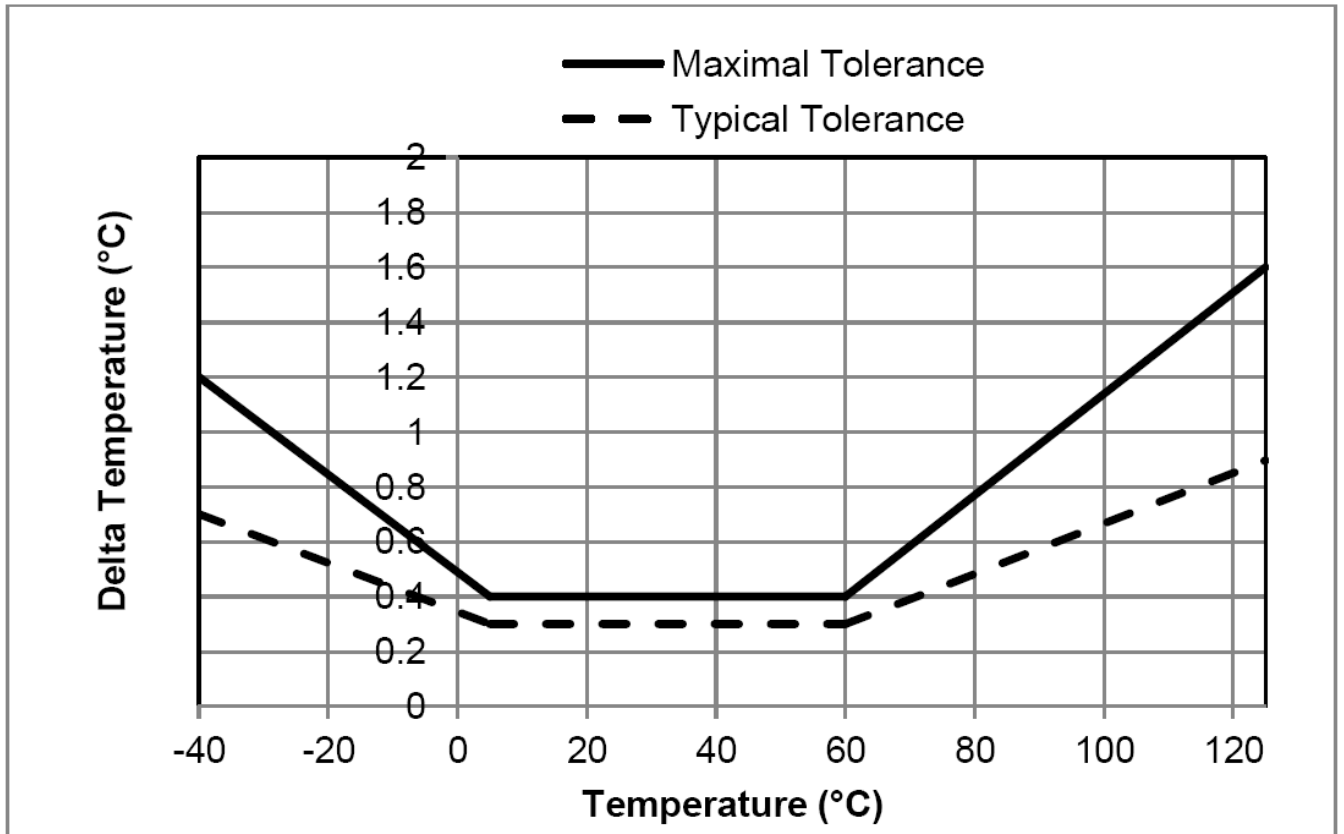
Relative measurement setting: The lowest possible value achievable by ventilation or air treatment becomes the zero.

The accuracy of the relative VOC measurements indicated above requires that the probe be associated with an active ventilation.

Humidity: +/- 3% RH, minimum measurement range: 0% to 100% RH, resolution 1%.



Temperature: +/- 0.3°C, measuring range from 0° to + 50°C, resolution 0.1°C.



15.2. Terms

Operation:

- Temperature: 0 to +50°C
- Relative humidity: 0 to 99% non-condensing

Storage and transport:

- Temperature: -30 to +70°C
- Relative humidity: from 0 to 99% without condensation.

15.3. Standards

Protection class: III

Ingress Protection Rating: IP 30

Device standard: according to EN 60730-1 (Automatic electrical control devices for household and similar purposes)

The device complies with the European Standards 73/23 / EEC (Low Voltage Directive) and 89/336 / EEC (EMC Directive).