

DSVCX-R | MULTIFUNCTIONAL DUCT TRANSMITTER

Mounting and operating instructions

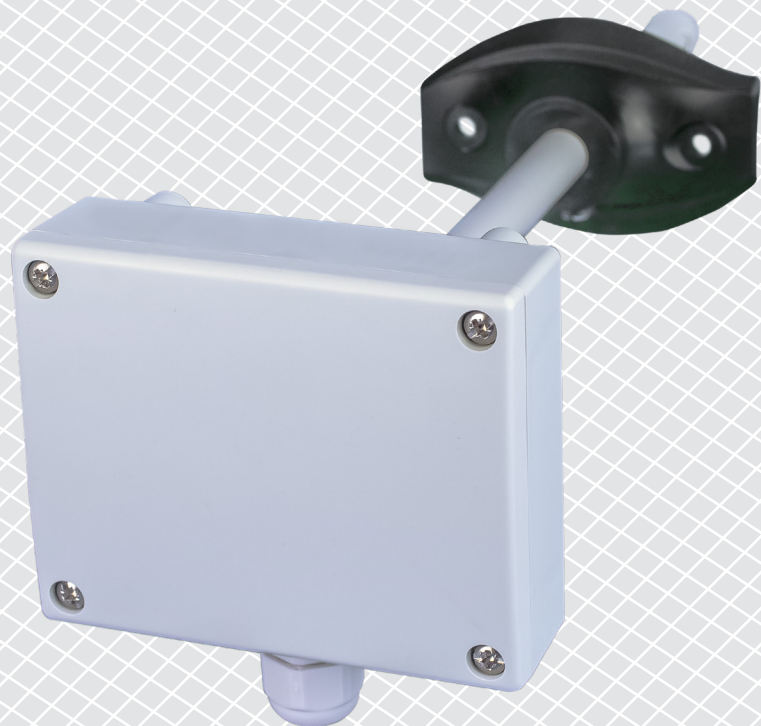


Table of contents

| | |
|---|-----------|
| SAFETY AND PRECAUTIONS | 3 |
| PRODUCT DESCRIPTION | 4 |
| ARTICLE CODE | 4 |
| INTENDED AREA OF USE | 4 |
| TECHNICAL DATA | 4 |
| STANDARDS | 4 |
| OPERATIONAL DIAGRAMS | 5 |
| WIRING AND CONNECTIONS | 6 |
| MOUNTING & OPERATING INSTRUCTIONS IN STEPS | 6 |
| OPERATING INSTRUCTIONS | 9 |
| VERIFICATION OF INSTALLATION | 10 |
| TRANSPORT AND STORAGE | 10 |
| WARRANTY AND RESTRICTIONS | 10 |
| MAINTENANCE | 10 |

SAFETY AND PRECAUTIONS



Read all the information, the datasheet, Modbus Register map, mounting and operating instructions and study the wiring and connection diagram before working with the product. For personal and equipment safety, and for optimum product performance, make sure you entirely understand the contents before installing, using or maintaining this product.



For safety and licensing (CE) reasons, unauthorised conversion and /or modifications of the product are inadmissible.



The product should not be exposed to abnormal conditions, such as extreme temperatures, direct sunlight or vibrations. Long-term exposure to chemical vapours in high concentration can affect the product performance. Make sure the work environment is as dry as possible; avoid condensation.



All installations shall comply with local health and safety regulations and local electrical standards and approved codes. This product can only be installed by an engineer or a technician who has expert knowledge of the product and the safety precautions.



Avoid contact with energised electrical parts. Always disconnect the power supply before connecting, servicing or repairing the product.



Always verify that you apply appropriate power supply to the product and use appropriate wire size and characteristics. Make sure that all the screws and nuts are well tightened and fuses (if any) are fitted well.



Recycling of equipment and packaging should be taken into consideration and these should be disposed of in accordance with local and national legislation / regulations.



In case there are any questions that are not answered, please contact your technical support or consult a professional.

PRODUCT DESCRIPTION

DSVCX-R are multifunctional duct transmitters which measure temperature, relative humidity and a broad range of total volatile organic compounds (TVOC). The TVOC concentration is an accurate indicator for indoor air quality. The series features 3 analogue / modulating outputs - one for temperature, one for relative humidity and one for TVOC. All the parameters and measurements are accessible via Modbus RTU.

ARTICLE CODE

| Article code | Supply | Maximum power consumption | Nominal power consumption | I _{max} |
|--------------|----------------|---------------------------|---------------------------|------------------|
| DSVCG-R | 18–34 VDC | 2,65 W | 1,66 W | 111 mA |
| | 15–24 VAC ±10% | | | |
| DSVCF-R | 18–34 VDC | | | |

INTENDED AREA OF USE

- Measurement of temperature, relative humidity and TVOC in ducts
- Monitoring of air quality in ducts

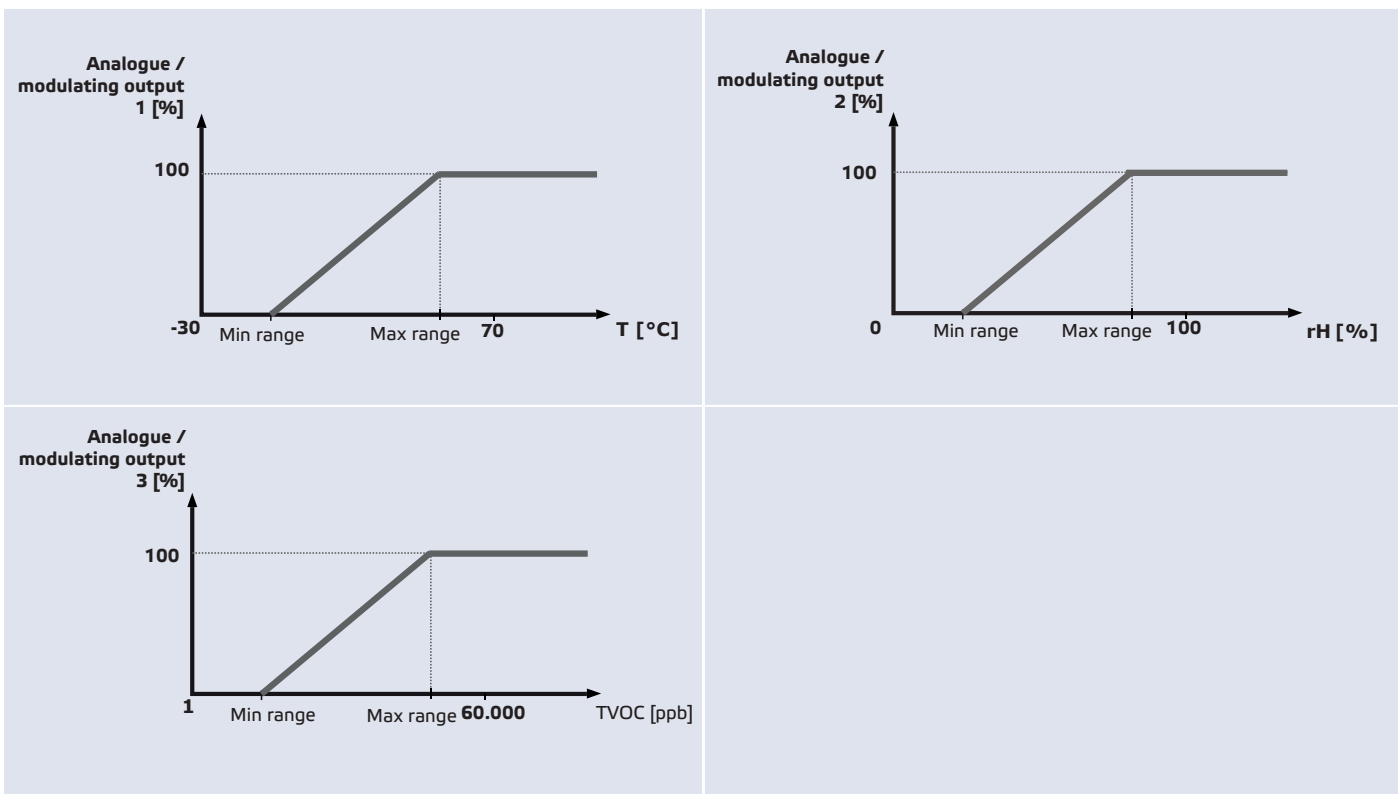
TECHNICAL DATA

- 3 analogue / modulating outputs:
 - ▶ 0–10 VDC mode: min. load 50 kΩ ($R_L \geq 50 \text{ k}\Omega$)
 - ▶ 0–20 mA: max. load 500 Ω ($R_L \leq 500 \Omega$)
 - ▶ PWM (open-collector type): PWM Frequency: 1 kHz, min. load 50 kΩ ($R_L \geq 50 \text{ k}\Omega$); PWM voltage level 3,3 VDC or 12 VDC
- Silicon based sensor elements for TVOC measurements
- Bootloader for updating the firmware via Modbus RTU communication
- Modbus RTU (RS485)
- Replaceable TVOC sensor module
- Selectable temperature range: -30–70 °C
- Selectable relative humidity range: 0–100 % rH
- Selectable TVOC range: 0–60.000 ppb
- Warm-up time: 15 minutes
- Accuracy: ±0,4 °C (-30–70 °C); ±3 % rH (0–100 % rH)
- Enclosure and probe material:
 - ▶ ASA, grey (RAL9002)
- Protection standard: enclosure: IP54, probe: IP20
- Operating ambient conditions:
 - ▶ temperature: -30–70 °C
 - ▶ rel. humidity: 0–100 % rH, (non-condensing)
- Storage temperature: -10–60 °C

STANDARDS

- EMC Directive 2014/30/EC: CE
 - ▶ EN 61000-6-1:2007 Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
 - ▶ EN 61000-6-3:2007 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments Amendments A1:2011 and AC:2012 to EN 61000-6-3
 - ▶ EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
 - ▶ EN 61326-2-3:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning
- Low Voltage Directive 2014/35/EU
- WEEE Directive 2012/19/EC
- RoHS Directive 2011/65/EC

OPERATIONAL DIAGRAMS



WIRING AND CONNECTIONS

| Article type | DSVCF-R | DSVCG-R | |
|--------------|---|---|----------------|
| VIN | 18–34 VDC | 18–34 VDC | 15–24 VAC ±10% |
| GND | Ground | Common ground | AC ~ |
| A | Modbus RTU (RS485), signal A | Modbus RTU (RS485), signal A | |
| /B | Modbus RTU (RS485), signal /B | Modbus RTU (RS485), signal /B | |
| AO1 | Analogue / modulating output 1 for temperature measurement (0–10 VDC / 0–20 mA / PWM) | Analogue / modulating output 1 for temperature measurement (0–10 VDC / 0–20 mA / PWM) | |
| GND | Ground AO | Common ground | |
| AO2 | Analogue / modulating output 2 for relative humidity measurement (0–10 VDC / 0–20 mA / PWM) | Analogue / modulating output 2 for relative humidity measurement (0–10 VDC / 0–20 mA / PWM) | |
| GND | Ground AO | Common ground | |
| AO3 | Analogue / modulating output 3 for TVOC measurement (0–10 VDC / 0–20 mA / PWM) | Analogue / modulating output 3 for TVOC measurement (0–10 VDC / 0–20 mA / PWM) | |
| GND | Ground AO | Common ground | |
| Connections | Spring contact terminal blocks, cable cross section: 1,5 mm ² | | |

ATTENTION

The -F version of this product is not appropriate for 3-wire connections. Power supply and analogue output have separate grounds. Making the connection between the two grounds could lead to inaccurate measurements. Connecting -F type sensors requires a minimum of 4 wires.

The -G version has a “common ground” and is designed for 3-wire connections. This indicates that the grounds of the power supply and the analogue output are internally connected. This makes it impossible to use the -G and -F types simultaneously on the same network. Never connect a device powered by a DC voltage to the common ground of a product of the -G type. This could harm the connected devices permanently.

MOUNTING & OPERATING INSTRUCTIONS IN STEPS

NOTE

Before you start mounting the unit read carefully **“Safety and Precautions”**.

The sensor is not designed, manufactured or intended for control or monitoring equipment in environments requiring life safety performance, in which the failure of the sensor could lead directly to death, personal injury, or severe physical or environmental damage.

Follow these steps:

1. When preparing to mount the unit, bear in mind that the probe opening must be positioned in the centre of the duct. Always use the flange to install the sensor on round ducts. It is possible to install the sensor without the flange on rectangular ducts (if necessary), see **Fig. 1** and **Fig. 2** below.

Fig. 1 Mounting dimensions

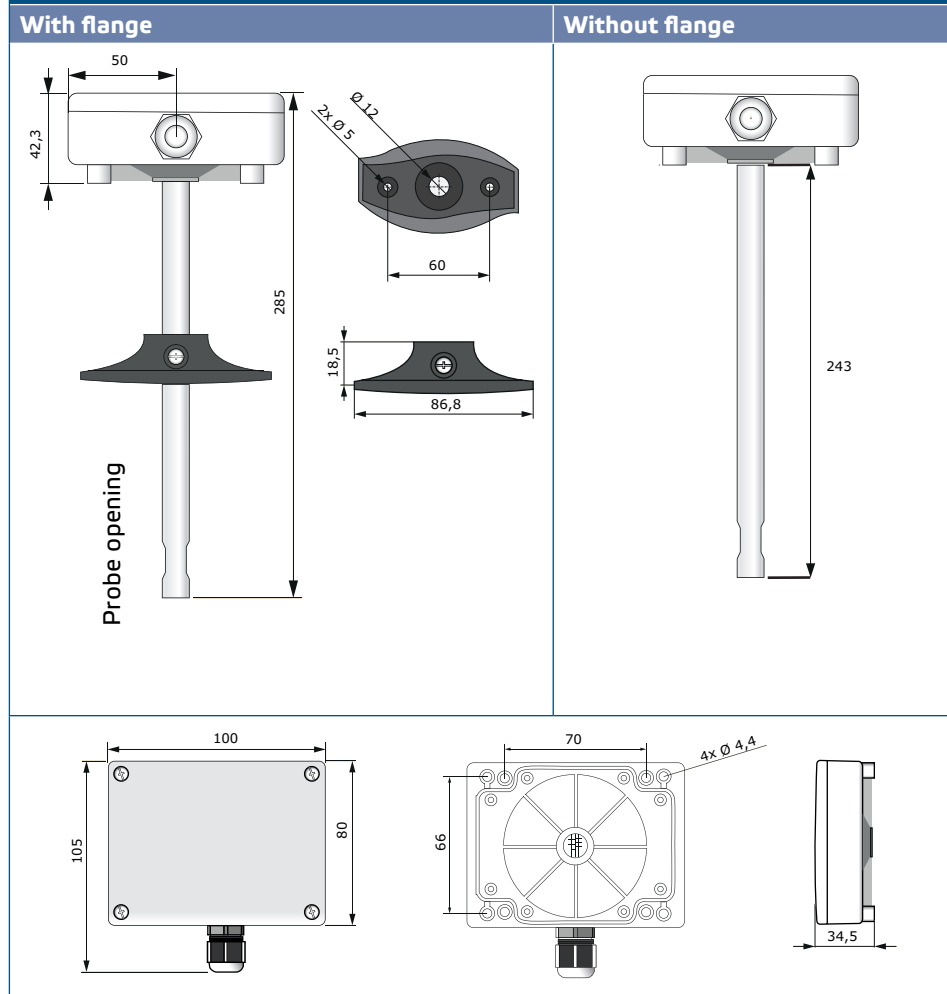
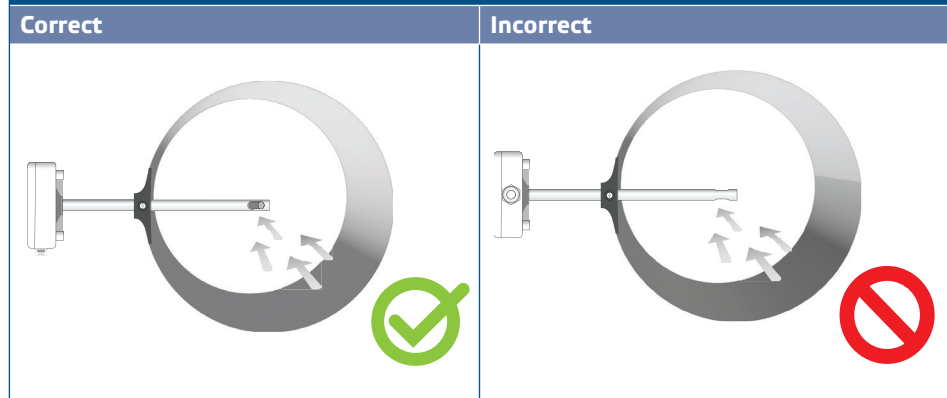


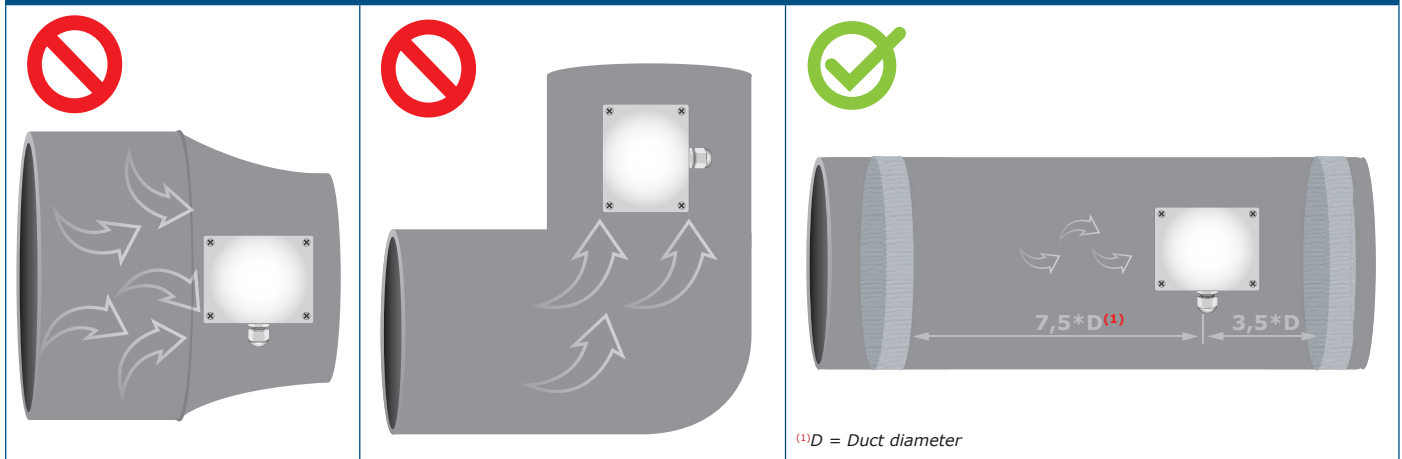
Fig. 2 Mounting position



2. Having selected the appropriate mounting location, proceed with the following steps:

- 2.1 Drill a tight-sealing \varnothing 13 mm hole into the duct.
- 2.2 Fix the flange onto the duct outer surface using the self-drilling screws delivered with the unit. If you do not intend to use the flange, insert the probe and fix the enclosure onto the duct. Mind the airflow direction (see **Fig. 2** and **Fig. 3**).

Fig. 3 Mounting requirements



ATTENTION

Installation requirements: The unit must not be installed in turbulent air zones. Ensure sufficiently long settling zones upstream and downstream of the tapping point. A settling zone consists of a straight section of pipe or duct with no obstructions. Avoid installation near filters, cooling coils, fans, etc. The sensor will achieve the optimal result when the measurement is taken at least 7,5 duct diameters downstream and at least 3 duct diameters upstream from any turns or flow obstructions.

ATTENTION

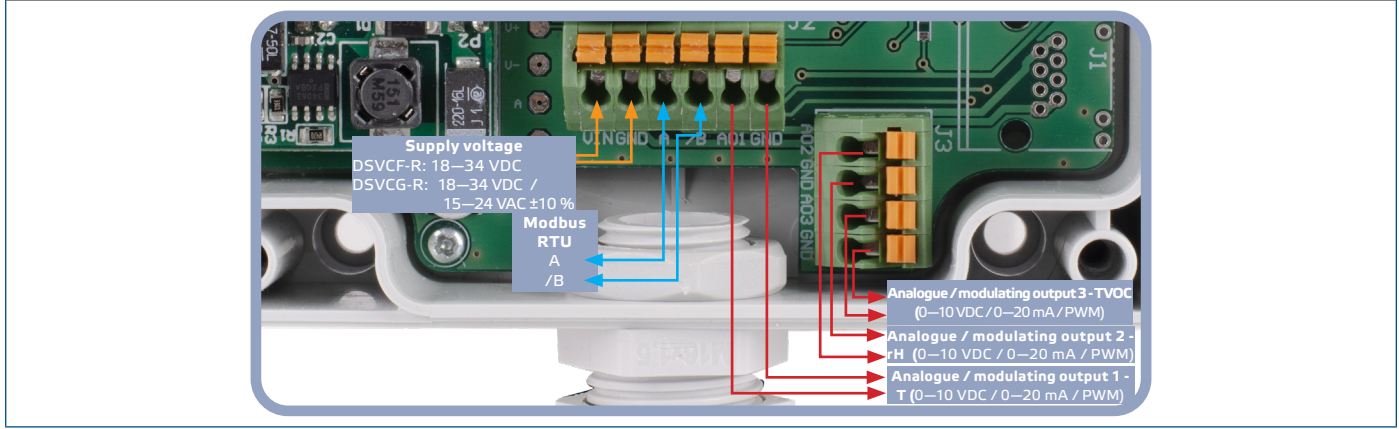
Installation of the unit near high EMI-emitting devices may lead to faulty measurements. Use shielded wiring in areas with high EMI.

ATTENTION

Keep at least 15 cm distance between the sensor lines and the 230 VAC power lines.

- 2.3 Install the probe at the desired depth and; in case you use the flange, fix it via the plastic white screw in the flexible flange.
- 2.4 Unscrew the cover of the unit to remove it and insert the connecting cables through the cable gland of the unit.
- 2.5 Do the wiring according to the wiring diagram (see **Fig. 4**) adhering to the information from section **“Wiring and connections”**.

Fig. 4 Wiring and connections



- 3. Close the enclosure and secure it with the screws. Tighten the cable gland to retain the IP rating of the enclosure.
- 4. Switch on the power supply.

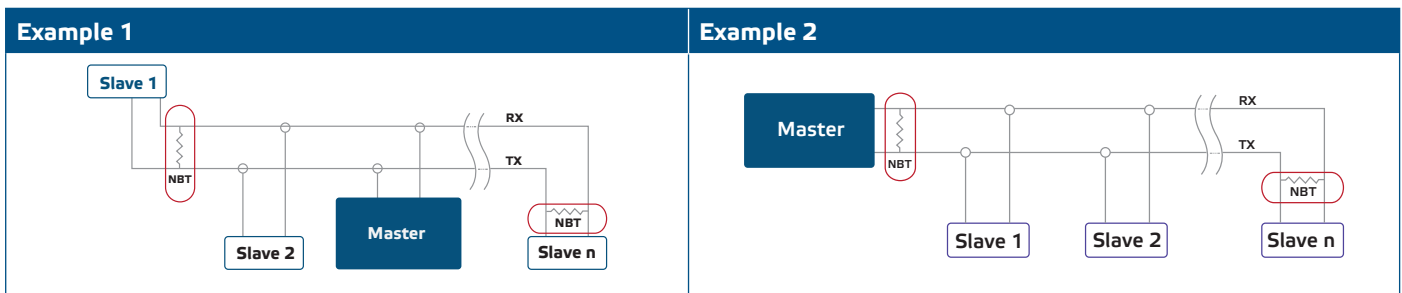
5. Customise the factory settings to the desired ones via the 3SModbus software or Sensistant (if necessary). For the default factory settings, see the *Modbus register map*.

NOTE

For the complete Modbus register data, refer to the product Modbus Register Map, which is a separate document attached to the article code on the website and contains the registers list. Products with earlier firmware versions may not be compatible with this list.

Optional settings

To assure correct communication, the NBT needs to be activated in only two devices on the Modbus RTU network. If necessary, enable the NBT resistor via 3SModbus or Sensistant (*Holding register 9*).



NOTE

On a Modbus RTU network, two bus terminators (NBTs) need to be activated.

CAUTION

Do not expose to direct sunlight!

NOTE

The compounds released from plastics may influence the sensor readings. Please allow several days for the sensor to stabilize before you obtain the accurate values.

OPERATING INSTRUCTIONS

NOTE

For detailed information and settings, refer to the product Modbus register map, which is attached to the article code on our website.

NOTE

The warm-up time for the sensor to attain its highest accuracy and performance level once the voltage supply has been applied is 15 minutes. During the warm-up period, TVOC measurements will return 0 ppb.

Calibration procedure

Sensor calibration is not necessary. In the unlikely event of TVOC sensor element failure, this component can be replaced. All sensor elements are calibrated and tested in our factory.

Bootloader

Thanks to the bootloader functionality, the unit firmware can be updated via Modbus RTU communication. With 3SM boot Application (part of 3SM center software suite), 'boot mode' is automatically activated and the firmware can be updated.

NOTE

Make sure the power supply does not get interrupted during "bootload" procedure, otherwise you risk losing unsaved data.

VERIFICATION OF INSTALLATION

If your unit does not function as expected, please check the connections.

TRANSPORT AND STORAGE

Avoid shocks and extreme conditions; stock in original packing.

WARRANTY AND RESTRICTIONS

The warranty against manufacturing flaws is valid for two years starting from the date of delivery. Any alterations or adjustments to the product absolve the manufacturer of all liability. The manufacturer disclaims all liability for typographical or other errors in this document.

MAINTENANCE

In normal conditions this product is maintenance-free. If soiled, clean with a dry or damp cloth. In case of heavy pollution, clean with a non-aggressive product. In these circumstances the unit should be disconnected from the supply. Pay attention that no fluids enter the unit. Only reconnect it to the supply when it is completely dry.