Features

- **Used to determine the air quality, based on a mixed gas sensor (VOC sensor)**
- **VOC = Volatile Organic Compounds**
- **To measure the air quality in offices, hotels, meeting rooms, convention centres, schools, airports, apartments, stores, restaurants etc.**
- **0-10 Vdc or 4-20 mA output (selectable)**
  0-10 Vdc: 0 Vdc = clean air, 10 Vdc = polluted air
  4-20 mA: 4 mA = clean air, 20 mA = polluted air
- **Change-over contact for QDT S**
- **Including duct mounting flange**
- **IP65 enclosure with quick locking screws**

Detectable gases

- Cigarette smoke
- Automobile exhaust
- Breath air
- Carbon dioxide (CO_2)
- Carbon monoxide (CO)
- Solvent fumes
- Alcohol fumes
- Acetone
- Acrylonitrile
- Ammonia
- Benzene
- Chlorine
- Dimethyl amine
- Ethane
- Ethylene
- Ethylene oxide
- Formaldehyde
- Hydrogen
- Hydrogen sulfide
- Isobutane
- Methane
- Methanol
- Methyl chloride
- Methylene chloride
- Methy ether
- Methyl acetate
- Methyl ethyl ketone
- n-Hexane 2
- n-Petane
- Propane
- R-11
- R-12
- R-502
- R-123
- Sulfur dioxide
- Vinyl chloride

Ordering

Type no.	Description
Duct Air Quality (VOC) Sensor	
QDT	Output 0-10 Vdc, 4-20 mA (selectable)
QDT S	Same as QDT and with change-over contact (normally open)

Technical data

Sensor	VOC sensor (metal oxide) with automatic self-calibration
Sensor protection	sinter filter, exchangeable, screwed, easy to clean
Measuring range	0-100% air quality referred to calibration gas multi-range switching (selectable DIP switches) VOC: LOW - MEDIUM - HIGH
Measuring accuracy	+/- 20% EW of final value (referred to calibration gas)
Power supply	24 Vac/dc
Power consumption	< 3 VA at 24 Vdc
Current consumption	ca. 70 mA at 24V
Output(s)	0-10 Vdc, 4-20 mA or 0-20 mA (selectable)
Switch output (only QDT S)	potential-free changeover contact (24V) switch point adjustable from 0-100% of the output signal.
Ambient temp.range	0 to +50°C
Detection of gases	not selective
Long-term Stability	< 10% per year
Warm-up period	1 hour
Response time	< 10 s. minimum flow rate 0.2-0.5 m/s
Housing	Plastic, material polyamide 30% glass-globe-reinforced with quick-locking screws, 72 x 64 x 37.4 mm Cable gland M 16 x 1.5, incl. strain relief, max inner dia. 10.4 mm
Probe tube	Poliamide (PA6) dia 20 mm, lenght 202.5 mm, with torsion protection
Process connection	by mounting plastic flange (including in the scoope of delivery)
Protection type	IP 65 (according to EN 60529) enclosure only
Protection class	III (according to EN 60730)
Approval	CE-conformity, electromagnetic compatibility according to EN 61326, EMC directive 2004/108/EC

Description

The self-calibrating microprocessor-controlled duct air quality sensor QDT is used to determine the air quality on basis of a mixed gas sensor / VOC sensor
(VOC = volatile organic compounds).

It is used for:

- Air quality measurement in offices, hotels, meeting rooms and convention centres, apartments, stores, and restaurants, etc.

- Quantitative evaluation of room air pollution with contaminating gases (cigarette smoke, body perspiration, exhaled breathing air, solvent vapours, emissions from building members and cleaning agents).

- Adjustable sensitivity regarding the maximum air contamination to be expected.

- For room ventilation as-needed, enabled by air changes only taking place when air is polluted while conserving energy at the same time.

Room air quality is understood as subjective air quality, felt by human beings with their olfactory organs.

As perception varies from person to person and therefore, air quality is assessed differently, a general definition of criteria for room air quality is not possible.

By linearising and high operating temperatures, the air quality sensor achieves marginal drift and good stability.

The sensor is automatically self-calibrating.

The air quality sensor does not trace the concentrations of individual gases, but assesses the mixed gas as such, i.e. gas concentrations are not measured selectively.

Therefore, it is not possible to specify gas concentrations by the unit ppm.

Detectable gases: mixed gas, vapours of alcanoles, cigarette smoke, automobile exhaust gases, exhaled breathing air, combustion smoke (from wood, paper, plastics).

In addition, compounds of alkanes, alkenes, aromats, terpenes, halogenated hydrocarbons, esters, aldehydes and ketones as well as native VOCs such as terpenes and isoprene are ranking among volatile organic compounds VOC.

VOCs also evaporate from chemical products used in construction such as coating compounds, adhesives, or sealing compounds, furnishing objects, cleaning and care products, office chemicals and floor carpeting.

The sensor's service life is depending on the type of burden and gas concentration and is more than 60 months under normal load conditions.

The new design implies the alternative to choose between three sensibility ranges by means of DIP switches, comparable to three measuring ranges:
LOW for low, MEDIUM
(default, equivalent to the hitherto existing type of this device) for medium, and HIGH for high noxious gas contaminations.

Wiring QDT

1 UB+ supply voltage 24V AC/DC
2 GND
3 Output air quality 0-10V / 4...20mA

Wiring QDT S

1 UB+ supply voltage 24V AC/DC
2 GND
3 Output air quality 0-10V / 4...20mA

4 Normally open contact
5
6 Breaker

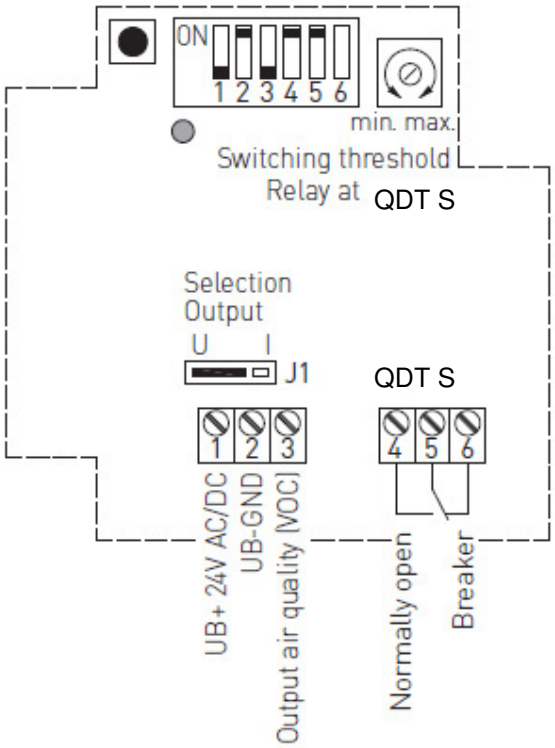
changeover (24V)

Schematic diagram QDT and QDT S

Pushbutton manual calibration air quality

LED calibration

Selection output:
Voltage (V), default
Current (mA)



VOC (sensitivity adjustable)	DIP 1	DIP 2	DIP 3
VOC LOW	**ON**	OFF	OFF
VOC MEDIUM (default)	OFF	**ON**	OFF
VOC HIGH	OFF	OFF	**ON**
VOC-Calibration mode			**DIP 4**
Automatic self-calibration			**ON**
Manual calibration			OFF
Selection output (I)			**DIP 5**
Output 4...20 mA			**ON**
Output 0...20 mA			OFF

Automatic calibration of air quality (default), except for UP

The minimum initial value for air quality is memorized within a period of ca. 4 weeks. After that period has lapsed, the output signal is standardised to zero-point (1.0 V). The maximum amount of correction is thereby limited to 1 V/interval. In this way, long-term drifts and operational aging effects of the sensor element are completely eliminated.

Manual calibration of air quality, except for UP

Manual calibration can be started independently from the position of jumper J3 by pushing the button. After connecting the device, a period of at least 2 hours of continuous operation of the device at „normal“ air quality is to be ensured. Manual calibration of the output signal to 1 V (zero-point) is started be pressing the button „Manual calibration“ (for ca. 5 seconds). Preparing for calibration is indicated by a blinking LED. Setting the output to 1 V at actual ambient conditions follows automatically thereafter. During this phase, the LED is permanently activated. After calibration is completed, the LED is deactivated.

Putting in operation

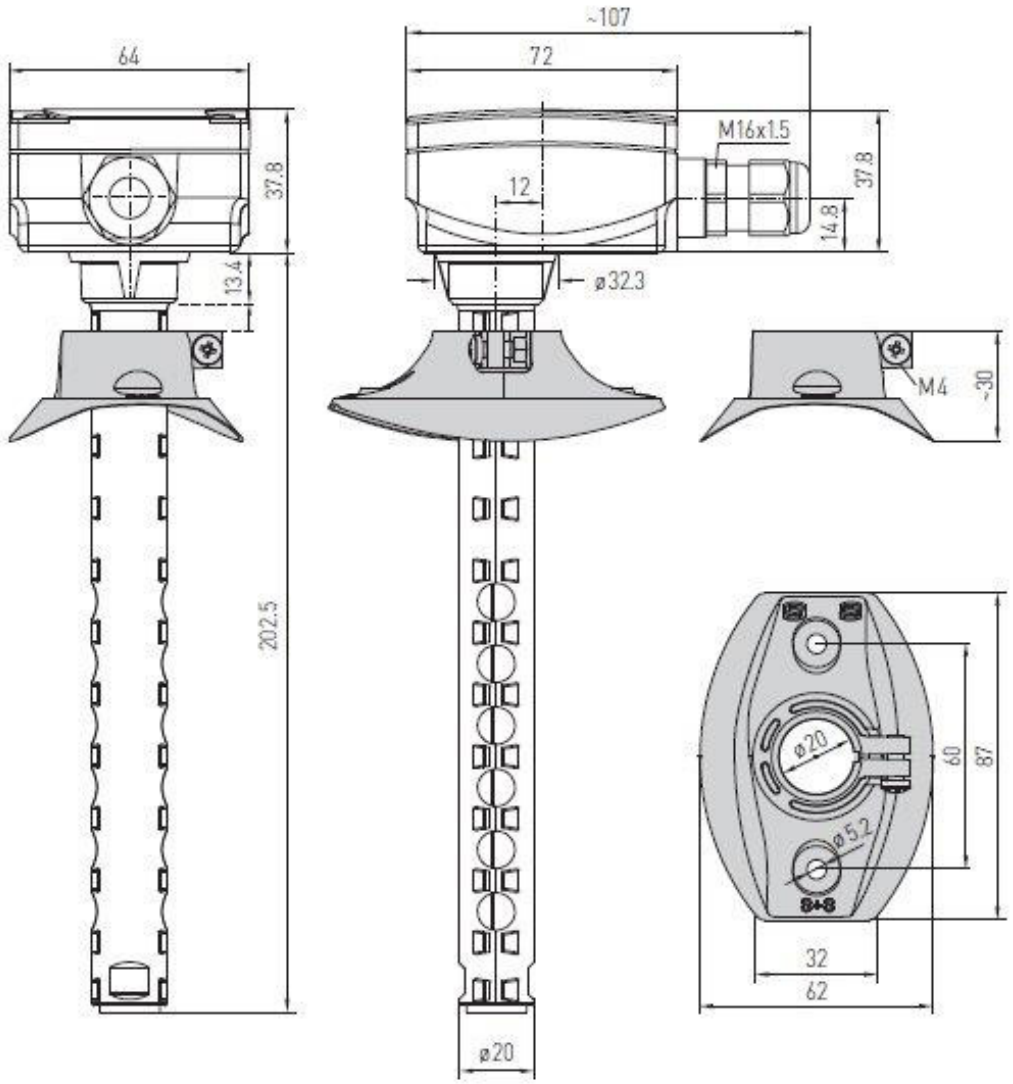
Upon energizing the device, a self-test and tempering takes place. Depending on ambient conditions, this process takes 3 to 5 minutes. During that time, the output analog voltage deviates from the actual measured value.

Air quality is measured through a VOC sensor (metal oxide). Due to its functional principle, the lifetime of the sensor depends on nature and concentration of the pollutant gas burden. The sensitive layer of the sensor element reacts with all volatile organic compounds and is thereby modified in its electrical properties or “exhausted“. This process results in a displacement of the characteristic curve. Such characteristic curve displacement however amounts to less than 15 % /year under normal burden. In measuring air quality, the general condition of air quality is detected. Whether air quality is “good“ or “bad“ is differently interpreted by each person.

Different pollution burdens and concentrations influence the air quality signal in different ways. Examples for this are cigarette smoke, deodorant sprays, cleaning agents, or also various adhesive materials for floor and wall coverings as well as dyestuffs. Increased burdens e.g. by solvents, nicotine, hydrocarbons, aerosol propellants etc. intensify consumption / aging of the sensor element. Particularly under high pollutant gas burdens – also during non-operational idle state periods of the devices (transport and storage) – zero-point drift will occur. Consequently, this must be corrected at site according to the respective circumstances or basic burdens.

Air quality measuring instruments of different manufacturers cannot directly be compared because of different functional principles, preset basic burdens (zero-point), and permitted burdens (amplification/sensitivity). Devices are preset respectively calibrated according to the sensor manufacturer‘s specifications. Here, a zero-point and a final value is determined and thus a maximum burden. In particular cases, exceeding measuring ranges or excessive basic burdens on the devices will occur (outgassing floor carpeting, wall paint, etc.). In order to enable distinguishing different air qualities, devices need to be adjusted by the customer according to the conditions existing on site that do not correlate to the factory-preset definition range and calibration. Please note that factory calibration is thereby lost and compliance with technical data can no longer be guaranteed

Dimensions


64
37.8
13.4
202.5
~107
72
M16x1.5
12
37.8
14.8
ø32.3
ø20
M4
~30
ø20
60
87
ø5.2
8+8
32
62

Mounting