



Air Quality Transmitter AQT530

for measuring pollution gases and particles



Vaisala Air Quality Transmitter AQT530 measures the pollution content of ambient air. AQT530 is available in different models for measuring gases, particulates, or both.

Applications

- Air quality networks supplementing existing regulatory stations
- Air quality measurements in smart city and urban applications
- Roadside monitoring
- Building automation
- Air quality research

New value in air quality measurements

The supplementary air quality measurement of AQT530 modernizes the way air quality can be monitored. It offers totally new value for money by measuring the most important pollutants in one compact package.

AQT530 is available in different models, and configurations can be selected based on the needs.

State-of-the-art technology

For gas measurements AQT530 utilizes industry standard electrochemical cell technology. By using proprietary advanced algorithms, individual factory calibration, and improved humidity

robustness, parts per billion (ppb) concentrations at different environmental conditions can be measured reliably in one compact package. Algorithms compensate for the impact of ambient conditions and aging of the sensor elements, removing the need for costly gas sampling and equipment.

Particulates are measured with a state-of-the-art proprietary optical laser particulate counter (LPC). Single particulates scatter light and, based on the intensity and number of pulses detected, the particle sizes and concentrations are calculated.

Easy to deploy in networks

AQT530 is specifically designed for air quality monitoring networks in areas with traffic, road networks, or around transportation hubs.

Thanks to its small weight, compact size, and good precision it is ideally suited for deployment especially in large air quality networks. The measurement data can be sent wirelessly to a web-based database with a gateway solution and it is also available locally through a serial interface.

Features

- Measures important urban pollutant gases (NO₂, NO, CO, and O₃) and particulates (PM₁₀, PM_{2.5})
- Contains built-in proven HUMICAP® temperature and humidity sensor
- Compact design and easy to deploy in the field
- Global R&D field tests and factory calibration ensure verified performance results in various environmental conditions

Technical Data

Measurement performance - gases

Property	NO ₂	NO	O ₃	CO
Concentration range	2000 ppb	2000 ppb	2000 ppb	10 000 ppb
Detection limit	5 ppb	5 ppb	5 ppb	10 ppb

Field performance - gases

Property ¹⁾	NO ₂ ²⁾	NO	O ₃ ²⁾	CO ²⁾
Correlation with reference ³⁾	R ² : 0.8	R ² : 0.8	R ² : 0.6	R ² : 0.8
Unit-to-unit correlation ⁴⁾	R ² : 0.9, 10 ppb	R ² : 0.9, 10 ppb	R ² : 0.8, 10 ppb	R ² : 1.0, 50 ppb
Accuracy without correction ⁵⁾	20 ppb	60 ppb	30 ppb	350 ppb – 40 %
Accuracy with correction ^{5) 6)}	20 ppb	45 ppb	20 ppb	200 ppb ± 60 %

- 1) All values are based on 1-hour averages.
- 2) At 10 V/m RF field test, the presence of electromagnetic interference in the range of 800 ... 900 MHz may cause additional deviation for NO₂ and O₃.
- 3) Typical R² against a reference grade instrument derived from field tests in an urban environment. Values represent a 12-month period in a temperate climate zone.
- 4) Defined as difference of AQTS30 reading from average reading of AQTS30s.
- 5) Typical accuracy against a reference grade instrument derived from field tests in a temperate climate zone in an urban environment. Represents 95 % of observations.
- 6) Linear correction with parameters slope and intercept.

Measurement performance - environmental parameters

Humidity	
Accuracy for sensor element	0 ... 90 %RH: ±3 %RH 90 ... 100 %RH: ±5 %RH
Resolution	0.1 %RH
Temperature	
Accuracy for sensor element at +20 °C (+68 °F)	0.3 °C (0.17 °F)
Resolution	0.1 °C
Pressure (indicative)	
Accuracy	15 hPa
Resolution	1 hPa

Operating environment

Operating temperature	–20 ... +40 °C (–4 ... +104 °F) ¹⁾
Operating humidity	15 ... 100 %RH, non-condensing ²⁾
Operating pressure	800 ... 1150 hPa

- 1) Optimal performance at –10 ... +30 °C (–4 ... +86 °F).
- 2) Optimal performance at 15 ... 90 %RH.

Powering

Operating voltage	10 - 25 VDC Max. 0.8 A at 10 VDC
Power consumption	
Typical, gas measurement	1.2 W
Typical, gas and aerosol measurement	2.4 W
Gas and aerosol measurement in subzero conditions	3.6 W
Maximum	8 W

Measurement performance - particulates

Property	PM _{2.5}	PM ₁₀
Size range ¹⁾	0.6 ... 2.5 µm	0.6 ... 10 µm
Concentration range ²⁾	0 ... 1000 µg/m ³	0 ... 2500 µg/m ³
Detection limit	0.1 µg/m ³	0.1 µg/m ³
Accuracy ³⁾	4 %	5 %
Precision ^{3) 4)}	2 %	4 %

- 1) Spherical equivalent size of DEHS particles. Lower detection limit of 0.6 µm defined as 50 % detection efficiency for DEHS particles.
- 2) Specified with ISO12103-1, A1 ultrafine test dust.
- 3) Measured against a certified reference grade instrument at room temperature using Arizona dust equivalent (ISO 12103-1, A1 Ultrafine test dust). PM_{2.5} measured at 170 µg/m³ and PM₁₀ at 1400 µg/m³. Accuracy and precision are defined with 2 standard deviations.
- 4) Unit-to-unit variation. Defined as difference of AQTS30 reading from average reading of AQTS30s.

Field performance - particulates

Property ¹⁾	PM _{2.5}	PM ₁₀
Correlation with reference	R ² : 0.7 ²⁾	R ² : 0.8 ²⁾
Unit-to-unit correlation ³⁾	R ² > 0.95, 0.2 µg/m ³ or 3 %	R ² > 0.95, 1 µg/m ³ or 4 %
Accuracy without correction ^{4) 5)}	2 µg/m ³ or 70 %	5 µg/m ³ or 55 %
Accuracy with correction ^{5) 6)}	5 µg/m ³ + 15 %	5 µg/m ³ + 10 %

- 1) All values are based on 24-hour averages. Values are obtained from global field testing in temperate climate zone against different reference equivalent methods. The values represent typical values and may be different based on the location and reference instrument. Unit-to-unit correlation and accuracy are defined with single standard deviation.
- 2) Average PM_{2.5} concentration > 10 µg/m³ and average PM₁₀ concentration > 15 µg/m³. Majority of particle mass within size range.
- 3) Defined as difference of AQTS30 reading from average reading of AQTS30s.
- 4) With factory calibration.
- 5) Accuracy defined as difference between reference equivalent method and AQTS30 reading.
- 6) Linear correction with parameters slope and intercept.

Data connection specifications

Data output	Modbus® ASCII, Modbus® RTU, ASCII CSV
Serial data interface	RS-485
Maintenance interface ¹⁾	RS-232

- 1) Recommended Vaisala USB maintenance cable kit (253163SET).

Mechanical specifications

Dimensions (H × Ø)	335 × 133 mm (13.19 × 5.24 in)
Weight, with mounting kit	2.4 kg (5.29 lb)
Color, radiation shield	White (RAL9003)
Material, base module	Anodized aluminum
Material, radiation shield	Polycarbonate (PC)
Power and data connector	Standard 8-pin M12 male

Compliance

EU directives	EMC, RoHS
Compliance marks	CE, China RoHS, FCC, RCM, UKCA
EMC immunity ¹⁾	EN 61326-1, industrial environment
EMC emissions	CISPR 32 / EN 55032, Class B
Cold	IEC 60068-2-1
Dry heat	IEC 60068-2-2
Damp heat	IEC 60068-2-78
Eye safety	IEC 60825-1:2014 Class 1 laser product
IP rating, gases	IP65
IP rating, particulates	–

- 1) At 10 V/m RF field test, the presence of electromagnetic interference in the range of 800 ... 900 MHz may cause additional deviation for NO₂ and O₃.

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