



Air Quality Transmitter AQT530

for measuring pollutant gases and particulate matter



Vaisala Air Quality Transmitter AQT530 measures the pollution content of ambient air. AQT530 is available in different models for measuring gases, particles, 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 gas sensor 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.

Particles are measured with a state-of-the-art proprietary laser particle counter (LPC). Single particles scatter light and based on the scattered intensity and number of pulses detected, the particle sizes and mass 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.

AQT530 can be paired with Vaisala Connected Compact Station BWS500 to provide a professional-grade complete network solution with best-in-class accuracy and reliability.

Features

- Measures important urban pollutant gases (NO₂, NO, O₃, and CO) and particles (PM₁₀, PM_{2.5}, PM₁)
- Proven laser particle counter (LPC) technology with pulse height analyzer for measuring particulate matter
- Intelligent humidity management for gas sensor elements
- Robust temperature and humidity sensor using Vaisala HUMICAP® technology
- Compact design and easy to deploy in the field
- Factory calibrated
- Field performance derived from global long-term multi-site and multi-continent field tests ¹⁾

¹⁾ Test locations include Beijing, China; Helsinki, Finland; Jakarta, Indonesia; Lapland, Finland; London, UK; New Mexico, Arizona, US; Paris, France; São Paulo, Brazil.

Product model	NO ₂	NO	O ₃	CO	PM ¹⁾
Gases	✓	✓	✓	✓	
Particles					✓
Gas and particles	✓				✓
Gases and particles	✓	✓	✓	✓	✓

¹⁾ Includes PM₁₀, PM_{2.5}, PM₁.

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
Correlation with reference ³⁾	R ² : 0.80	R ² : 0.75	R ² : 0.80	R ² : 0.85
Accuracy ⁴⁾	5 ppb	15 ppb	6 ppb	183 ppb
Unit-to-unit correlation ⁵⁾	R ² : 0.98	R ² : 0.96	R ² : 0.95	R ² : 0.97
Precision ⁵⁾	3 ppb	3 ppb	4 ppb	25 ppb

- 1) All values are based on 1-hour averages with factory calibration, no linear correction applied. Values are obtained from global field testing in major climate zones against reference instruments. The values represent typical values and may be different based on the location.
- 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 globally.
- 4) Mean absolute error against reference.
- 5) Mean absolute difference of AQT530 reading from average reading of AQT530s.

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	0.3 °C (0.17 °F) at +20 °C (+68 °F)
Resolution	0.1 °C

Pressure (indicative)

Accuracy	15 hPa
Resolution	1 hPa

Operating environment

Operating temperature	-30 ... +40 °C (-22 ... +104 °F) ¹⁾
Storage temperature	+20 ... +25 °C (+68 ... +77 °F)
Operating humidity	15 ... 100 %RH, non-condensing ²⁾ ³⁾
Storage humidity	20 ... 75 %RH
Operating pressure	800 ... 1150 hPa
IP rating	IP65 ⁴⁾

- 1) Optimal performance at -10 ... +30 °C (-14 ... +86 °F).
- 2) Optimal performance at 15 ... 90 %RH. Operation in low-humidity environments may weaken the gas measurement performance. Operation in high-humidity environments may weaken the particle measurement performance.
- 3) Water uptake of particles may result in PM overestimation. In most cases this is indicated by the sensor.
- 4) Specified for gas measurement device only.

Powering

Operating voltage	10 - 25 V DC, max. 1 A at 10 V DC ¹⁾
Power consumption, max. peak ¹⁾	10 W

Power consumption (average with default settings)

Gas and particle measurement	1.8 ... 4.4 W ²⁾
Gas measurement	1.4 ... 3.8 W ³⁾
Particle measurement	1.7 ... 2.0 W ⁴⁾

- 1) Humidity management active, particle measurement active, temperature < 0 °C (32 °F).
- 2) Maximum consumption when humidity > 85 %RH, temperature < 0 °C (32 °F), default particle measurement cycle.
- 3) Maximum consumption when humidity > 85 %RH.
- 4) Maximum consumption when temperature < 0 °C (32 °F), default particle measurement cycle.

Measurement performance – particles

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⁾	5 %	6 %
Precision ^{3) 4)}	2 %	2 %

- 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 ISO 12103-1, 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 150 µg/m³ and PM₁₀ at 1300 µg/m³. Accuracy and precision are defined with 2 standard deviations.
- 4) Unit-to-unit variation. Defined as difference of AQT530 reading from average reading of AQT530s.

Field performance – particles

Property ¹⁾	PM _{2.5}	PM ₁₀
Correlation with reference ²⁾	R ² : 0.65	R ² : 0.75
Accuracy ³⁾	9 µg/m ³	13 µg/m ³
Unit-to-unit correlation ⁴⁾	R ² : 0.97	R ² : 0.97
Precision ⁴⁾	2 µg/m ³	3 µg/m ³

- 1) All values are based on 1-hour averages with factory calibration, no linear correction applied. Values are obtained from global field testing in major climate zones against different reference equivalent methods. The values represent typical values and may be different based on the location and reference instrument. Majority of particle mass within size range.
- 2) Typical R² against a reference grade instrument derived from field tests globally.
- 3) Mean absolute error against reference.
- 4) Mean absolute difference of AQT530 reading from average reading of AQT530s.

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 and regulations	EMC Directive (2014/30/EU) REACH Regulation (EC 1907/2006) RoHS Directive (2011/65/EU) amended by 2015/863
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
Compliance marks	CE, China RoHS, FCC, RCM, UKCA

- 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.

**CLASS 1
LASER PRODUCT**

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