



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

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 Beacon Station to provide a professional-grade complete network solution with best-in-class accuracy and reliability.

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.

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⁾

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.

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

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 : 0.70	R ² : 0.75	R ² : 0.50	R ² : 0.85
Accuracy ⁴⁾	7 ppb	15 ppb	11 ppb	183 ppb
Unit-to-unit correlation ⁵⁾	R ² : 0.93	R ² : 0.96	R ² : 0.84	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 AQTS530 reading from average reading of AQTS530s.

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

- 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.

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

- 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.

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 AQTS530 reading from average reading of AQTS530s.

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 Directive (2014/30/EU) RoHS Directive (2011/65/EU)
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	IP65 ²⁾

- 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.
- 2) Specified for gas measurement device only.

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