Air Quality Monitoring System (CS-AQMS1)

CredoSense Air Quality Monitoring System is a high-quality, research-grade device designed for precision and flexibility. With the freedom to choose up to **three gas sensors** from a **list of ten**, you can customize your air quality monitoring system to your specific needs. This air quality monitoring system excels in local data storage, making it perfect for remote and challenging environments, while also featuring cloud-based connectivity for real-time monitoring.

Specification

1.1 Particulate Matter (PM)

Measurement range	0 to 1000 µg/m^3.
Mass conc. measurement	PM1, PM2.5, PM4, and PM10
Measurement resolution	1 µg/m^3.
Sensor lifetime	10 years.
Mass conc. accuracy	PM1 & PM2.5: 5% (0-100 µg/m^3), 10% (100-1000 µg/m^3). PM4 & PM10: 25% (0-1000 µg/m^3).
Operating range	Temperature: -20 to 50°C. Relative humidity: 20-99% (non-condensing). Barometric pressure: 300-1200 mbar.
Startup time	$<$ 60s.
Response time	$<$ 30s.
Storage	Temperature: -40 to 70°C. Relative Humidity: 0-99%.
Acoustic emissions level	24 dBA at 0.2m.
Long term acoustic emission level drift	+0.5 dB(A)/ year.

1.2 Temperature, relative humidity, and barometric pressure

Operating range	Temperature: -40 to 85°C. Relative humidity: 0 to 99% (non-condensing). Barometric pressure: 300 to 1200 mbar (30 to 120 kPa).
Accuracy	Temperature: Typical ±0.1°C (0-60°C), max. ±0.3°C (-40 to 85°C). Relative humidity: ±1% typical and 2% max (0-90%) and ±3% (91-100%). Barometric pressure: ±1 mbar (0 to 65°C).
Resolution	Temperature: 0.01°C. Relative humidity: 0.01%. Barometric pressure: 0.01 mbar.
Response time	Temperature: 2s. Relative humidity: 4s. Barometric pressure: 1s.

1.3 Gas Sensor Specification

1.3.1 Volatile Organic Compound (VOC)

Sensor output	0-500 VOC Index.
Response time (τ63%)	$<$ 10s
Device-to-device variation	$<$ ±15 VOC Index points.
Repeatability	$<$ ±5 VOC Index points.

1.3.2 Nitrogen Oxide (NOx)

Sensor output	0-500 NO_x Index.
Response time (τ63%)	$<$ 30s
Device-to-device variation	$<$ ±50 NO_x Index points.
Repeatability	$<$ ±10 NO_x Index points.

1.3.3 Nitrogen Dioxide (NO_2)

Measurement range	0 - 50 ppm.
Maximum overload	100 ppm.
Accuracy	$\leq$ 0.5 ppm.
Response time	$<$ 30s.
Repeatability	$<$ 1%.
Resolution	0.1 ppm.
Expected lifetime	$>$ 3 years in air.
Logn-Term Drift	$<$ 1%.
Temperature range	-40°C to 55°C.
Pressure range	800 to 1200 hPA.
Operating humidity range	15-95%.
Cross sensitivity	Carbon Monoxide (3 ppm in 50 ppm concentration) Ozone (0.1 ppm in 0.25 ppm concentration) Sulfur Dioxide (-0.51 ppm in 1 ppm concentration)

1.3.4 Carbon Dioxide (CO_2)

Range	400-5000 ppm.
Accuracy	±(50 ppm + 2.5% of reading): 400 - 1000 ppm. ±(50 ppm + 3% of reading): 1001 - 2000 ppm. ±(40 ppm + 5% of reading): 2001 - 5000 ppm.
Repeatability	±10 ppm.
Response time	60 s.
Additional accuracy drift after five years	± (5 ppm + 0.5 % of reading)

1.3.5 Carbon Monoxide (CO)

Measurement range	0-1000 ppm.
Maximum overload	1000 ppm.
Accuracy	$\leq$ 2 ppm.

Response time	< 30s.
Repeatability	< 1%.
Lower detectable limit (LDL)	≤ 2 ppm.
Resolution	0.1 ppm.
Expected lifetime	> 5 years in air.
Temperature range	-40°C to 55°C.
Pressure range	800 to 1200 hPA.
Operating humidity range	15-95%.
Cross sensitivity	Hydrogen (20 ppm in 100 ppm concentration).

1.3.6 Ozone (O_3)

Measurement range	0 - 5 ppm.
Maximum overload	10 ppm.
Accuracy	≤ 0.05 ppm.
Response time	< 60s
Repeatability	< 2%.
Lower detectable limit (LDL)	≤ 0.05 ppm.
Resolution	0.01 ppm.
Expected lifetime	> 24 Months.
Long-term drift	< 1% / month.
Temperature range	-20°C to 40°C.
Pressure range	800 to 1200 hPA.
Operating humidity range	15-95%.
Cross sensitivity	Sulfur Dioxide (1 ppm in 5 ppm concentration).

1.3.7 Sulfur Dioxide (SO_2)

Measurement range	0 - 50 ppm.
Maximum overload	100 ppm.
Accuracy	≤ 1 ppm.
Response time	< 60s
Repeatability	< 1%.
Lower detectable limit (LDL)	≤ 1 ppm.
Resolution	0.1 ppm.
Expected lifetime	> 3 years in air.
Long-term drift	< 1% / month.
Temperature range	-40°C to +55°C.
Pressure range	800 to 1200 hPA.
Operating humidity range	15-95%.
Cross sensitivity	Chlorine (-1 ppm in 10 ppm concentration) Nitric Oxide (< -3ppm in 25 ppm concentration) Hydrogen Cyanide (< 5ppm in 10 ppm concentration)

1.3.8 Formaldehyde (CH_2O)

Measurement range	0 - 5 ppm.
Maximum overload	10 ppm.
Accuracy	≤ 0.05 ppm.
Response time	< 120s

Repeatability	< 1%.
Lower detectable limit (LDL)	≤ 0.05 ppm.
Resolution	0.01 ppm.
Expected lifetime	> 3 years in air.
Long-term drift	< 1% / month.
Temperature range	-20°C to +55°C.
Pressure range	800 to 1200 hPA.
Operating humidity range	15-95%.
Cross sensitivity	Hydrogen Cyanide (< 1 ppm in 20 ppm concentration) Hydrogen (< 3 ppm in 100 ppm concentration) Sulfur Dioxide (<1 ppm in 10 ppm concentration)

1.3.9 Hydrogen Sulfide (H_2S)

Measurement range	0 - 100 ppm.
Maximum overload	200 ppm.
Accuracy	≤ 1 ppm.
Response time	< 20s
Repeatability	< 1%.
Lower detectable limit (LDL)	≤ 1 ppm.
Resolution	0.1 ppm.
Expected lifetime	> 3 years in air.
Long-term drift	< 1% / month.
Temperature range	-40°C to 50°C.
Pressure range	800 to 1200 hPA.
Operating humidity range	10-95%.
Cross sensitivity	Chlorine (-1.5 ppm in 10 ppm concentration) Carbon Monoxide (3 ppm in 50 ppm concentration) Hydrogen (3 ppm in 100 ppm concentration) Nitrogen Dioxide (-2.2 ppm in 10 ppm concentration)

1.3.10 TVOC

Measurement range	0 - 1000 ppm.
Maximum overload	2000 ppm.
Accuracy	≤ 1 ppm.
Response time	< 300s
Repeatability	< 1%.
Lower detectable limit (LDL)	≤ 1 ppm.
Resolution	0.1 ppm.
Expected lifetime	> 3 years in air.
Long-term drift	< 1% / month.
Temperature range	-40°C to 55°C.
Pressure range	800 to 1200 hPA.
Operating humidity range	15-95%.