

X-STREAM - Ultra Low CO & CO₂ Gas Purity Analyzer

Applications for 0–5 ppm CO₂ / 0–10 ppm CO

X-STREAM gas analyzer is specially designed to measure ultra low carbon monoxide (ULCO) and carbon dioxide (ULCO₂) for gas purity applications.

For gas purity measurement new quality standards require ultra low CO measurement but not a high dynamic ranging and cross compensation compared to automotive or emissions monitoring measurements of low or ultra low CO. Therefore the 2nd bench can implement another channel, e.g. ultra low carbon dioxide (ULCO₂).

The lowest ranges for the photometric measurement of CO is 0-10 ppm with a detection limit (4σ) of 0.2 ppm, for CO₂ 0–5 ppm with a detection limit (4σ) of 0.1 ppm. These measurements require a daily zero calibration, but span calibration can be performed in longer time intervals. This reduces the consumption of expensive test gases. Due to our microflow detector and high measuring frequency of 30.5 Hz Emerson Process Management ULCO and ULCO₂ analyzers are quite immune against vibration and can handle even tough installation conditions, which was already proven in direct comparison with competition. These ultra low measurements can be done in different background like N₂, H₂. To avoid any preabsorption of ambient CO₂ the ULCO₂ analyzer cell is purged on the reference side with N₂ or clean instrument air.

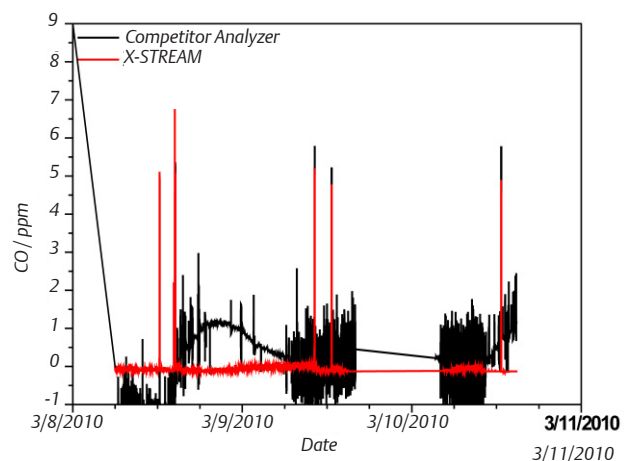
Features

- Gas Purity: up to four channels
- CO_{ultra low}
 - 0–10 ... 100 ppm
 - 0–20 ... 200 ppm
 - 0–20 ... 400 ppm
 - 0–50 ... 500 ppm
- CO_{2 ultra low}
 - 0–5 ... 100 ppm
 - 0–10 ... 100 ppm
 - 0–50 ... 100 ppm
 - 0–100 ... 100 ppm
- NDIR with microflow gas detector
- Auto calibration via digital I/O, serial interface, network, time-programmed interface
- Zero and span stability by means of autozero and automatic gain control
- Barometric pressure compensation
- Sample flow rate measurement
- Analog, digital and serial I/O (SIO/DIO) via man-machine



X-STREAM XE

Figure 1 - X-Stream Analyzer Noise Signal Comparison of Ultra Low CO Measurement



Applications

- Trace monitoring in gas purity and air separation measurement

Strength

- PSA plant; installation nearby compressor with strong vibrations
- Ultra low CO₂ needs flowing reference which is then used for case purge
 - To avoid pre-absorption
 - Only 0.1–2 l/min CO₂-free or constant concentration purge gas



Table 1 - Special Performance Specifications for Gas Purity Measurements (ULCO and ULCO₂)



	0–10...< 50 ppm CO	0–5...< 50 ppm CO ₂
Detection limit (4 σ) ⁽¹⁾⁽²⁾	< 2 %	
Linearity ⁽¹⁾⁽²⁾	< 1 %	
Zero-point drift ⁽¹⁾⁽²⁾⁽³⁾	< 2 % resp. < 0.2 ppm ⁽⁹⁾	
Span (sensitivity) drift ⁽¹⁾⁽²⁾⁽⁴⁾	< 2 % resp. < 0.2 ppm ⁽⁹⁾	
Repeatability ⁽¹⁾⁽²⁾	< 2 % resp. < 0.2 ppm ⁽⁹⁾	
Response time (t ₉₀) ⁽⁷⁾	< 10 s	
Permissible gas flow	0.2–1.5 l/min.	
Influence of gas flow ⁽¹⁾⁽²⁾	< 2 %	
Maximum gas pressure ⁽¹⁰⁾	≤ 1500 hPa abs. (≤ 7 psig)	
Influence of pressure ⁽⁵⁾		
– At constant temperature	≤ 0.1 % per hPa	
– With pressure compensation ⁽⁸⁾	≤ 0.01 % per hPa	
Permissible ambient temperature	+15 to +35 °C (59 to 95 °F)	+5 to +40 °C (41 to 104 °F)
Influence of temperature ⁽⁶⁾ (at constant pressure)		
– On zero point	< 2 % per 10 K resp. < 0.2 ppm per 10 K ⁽⁹⁾	
– On span (sensitivity)	< 2 % per 10 K resp. < 0.2 ppm per 10 K ⁽⁹⁾	
Thermostat control	none	60 °C (140 °F)

Note! 1 psi = 68.95 hPa

- (1) Related to full scale
- (2) Constant pressure and temperature
- (3) Within 24 h; daily zero calibration requested
- (4) Within 24 h; daily span calibration recommended
- (5) Related to measuring value
- (6) Temperature variation: ≤ 10 K per hour
- (7) From gas analyzer inlet at gas flow of 1.0 l/min
- (8) Barometric pressure sensor is required
- (9) Whichever value is higher
- (10) Limited to atmospheric if internal sample pump

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