Product Data Sheet
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Rosemount™ QX1400 Continuous Gas Analyzer



The Rosemount™ QX1400 is a hazardous area-certified, multi-component gas analyzer for cold/dry extractive applications, delivering accurate, continuous measurement with low cost of ownership. It is the first analyzer to combine quantum cascade laser (QCL) and paramagnetic technologies in a single flameproof enclosure.

- **Flexible measurement in Hazardous Areas:** Measures up to five gases in ppm or percent ranges, configured to meet application needs.
- **Broad application coverage**: Suitable for natural gas quality, process monitoring, carbon capture, utilization and storage, and continuous emissions monitoring (CEMS).
- **Low lifetime cost**: Robust design and long-term stability reduces maintenance consumable use.

Features and benefits

Built for hazardous areas. Measurements in natural gas and process monitoring or quality control applications often need to be made in classified locations. The QX1400's flameproof (Ex d) design brings combined, high-sensitivity laser measurement and paramagnetic detection directly into these areas, giving a versatile, future-ready solution for both gas quality and emissions monitoring.

Configurable measurement platform. The QX1400 can hold up to three QCL modules for measuring gases such as H_2O and CO_2 in natural gas quality applications, or NO, NO_2, CO, CO_2, and SO_2 for CEMS, plus a paramagnetic measurement cell for O_2. A wide choice of measurement ranges lets each analyzer be configured to the application.

Flexible operation, local or remote. The QX Web Application is included as standard, a browser-based interface for remote configuration, monitoring, calibration, and troubleshooting. This reduces the need for routine trips into the hazardous area. An optional local display shows key measurements and status through the enclosure window for quick onsite checks.

Multi-component hybrid gas analyzer

- Multi-component gas analyzer using laser spectroscopic and paramagnetic detection methods.
- Measures up to five components simultaneously and in real time.
- Designed for cold/dry applications and hazardous area applications.
- Embedded ARM processor for fully autonomous intelligent operation.
- Enhanced dynamic range from sub ppm to percentage.
- Accurate and sensitive gas measurements with on-board diagnostics and health monitoring.
- Configurable communication options.
- Remote web-based interface (QX Web Application) for configuration, monitoring, and operation.

Low maintenance and serviceable design

- Interchangeable modular configuration for servicing and upgrades.
- No regular maintenance.
- Low lifetime costs.
- Minimized downtime.

Hazardous certification

Hazardous area certification

- Europe: ATEX II 2G Ex db IIB+H2 T4 Gb
- Rest of the World: Ex db IIB+H2 T4 Gb
- North America: Class I, Division 2, Groups B, C, D, T4 (Certification pending)

Applications

The QX1400 can be configured to suit your application needs.

- Natural gas quality monitoring.
- Process monitoring and control.
- Continuous emissions monitoring systems (CEMS).
- Carbon capture, utilization and storage.
- Clean fuels quality monitoring.
- Ethylene production.
- Other applications available on request.

Specifications

Table 1: Analyzer specifications

Specifications	Value
Application	Continuous gas analysis
Measurement technique	Infrared absorption spectroscopy and O_2 paramagnetic detection
Mid infrared laser source	Quantum cascade laser (up to three)
Product laser classification	Class 1 IEC 60825-1: 2014 Edition 3 safety of laser products. Equipment classification and requirements.
Environmental	
Ambient operating temperature	-41 to 131 °F (-20 to 55 °C)
Sample gas temperature range	41 to 131 °F (5 to 55 °C)
Humidity range	Maximum 80 % relative humidity for temperatures up to 88 °F (31 °C) Decreasing linearly to 20 % relative humidity at 122 °F (50 °C)
Protection class	Type 3RX, IP66
Hazardous area classification	Europe: ATEX II 2G Ex d IIB H2 T4 Rest of the World: Ex db IIB+H2 T4 Gb North America: Class I, Division 2, Groups B, C, D, T4 (certification pending)
Communications	
Analog outputs & inputs	4–20 mA customer configurable (maximum 12)
Digital outputs	Relay outputs configurable to NAMUR alarms and valve control
Communication interface	Modbus® over transmission control protocol (TCP), 10/100 Base-T Ethernet
Inlet gas port connector	6 mm double ferrule compression fittings (6 mm tube to ¼-inch compression fitting will be supplied)
Outlet gas port connector	6 mm double ferrule compression fittings (6 mm tube to ¼-inch compression fitting will be supplied)
Electrical Rating	
Power supply	100 to 240 Vac (50 to 60 Hz)
Mechanical	
Size (L x W x H) door closed	18.82 x 13.1 x 24.9 in. (478 x 332 x 631mm)
Size (L x W x H) door open	22.0 x 27.83 x 24.9 in. (558 x 707 x 631mm)
Weight	163.2 lb. (73 kg)
Installation	Wall mounted

Sample Gas Requirements	
Operating pressure range (abs) for continuous emissions monitoring systems [CEMS] applications	1.0 ± 0.10 bar (14.5 ± 1.45 psi) (1)
Operating pressure range (abs) for natural gas applications	0.25 ± 0.05 bar (3.63 ± 0.73 psi) (1)
Sample gas particulate density	≤ 5 mg/m^3
Sample gas particulate size	≤ 3 µm
Sample gas dew point (maximum)	41 °F (5 °C)
Sample flow rate	0.5 to 1.5 L/min

(1) Sample pressure must be within this range for accurate measurement; analyzer withstands up to 2 bar abs. Some specialized applications may require different input pressure which will be specified at quotation stage.

Table 2: Example gas component and measurement ranges for natural gas quality

Component name	Symbol	Ranges and limit of detection (LOD) (1)(2)			
		Min Range	Min Range LOD (2σ)	Max Range	Max Range LOD (2σ)
Water	H_2O	0 - 100 ppm	0.5 ppm	0 - 1400 ppm	2.5 ppm
Carbon Dioxide	CO_2	0 – 1000 ppm	5 ppm	0 - 20 %	0.025 %

(1) Not all ranges available on a single analyzer; exact specification dependent on configuration.

(2) Indicates the minimum and maximum available measurement ranges; additional intermediate ranges are also available.

Note

The performance provided for natural gas quality applications assumes a typical background gas composition of methane balance with ethane up to 20 percent, CO_2 up to 20 percent, C_3H_8 up to 10 percent, C_4H_{10} up to 5 percent, and H_2O up to 0.14 percent.

Table 3: Example gas component and measurement ranges for CEMS

Component name	Symbol	Ranges and limit of detection (LOD) (1)(2)			
		Min Range	Min Range LOD (2σ)	Max Range	Max Range LOD (2σ)
Nitric oxide	NO	0 - 10 ppm	0.15 ppm	0 - 2200 ppm	1.25 ppm
Nitrogen dioxide	NO_2	0 - 10 ppm	0.08 ppm	0 - 500 ppm	0.25 ppm
Carbon monoxide	CO	0 - 10 ppm	0.05 ppm	0 - 4500 ppm	2.5 ppm
Carbon dioxide	CO_2	0 – 1.5 %	0.005 %	0 - 100 %	0.05 %
Sulphur dioxide	SO_2	0 - 45 ppm	0.15 ppm	0 - 1100 ppm	0.8 ppm
Oxygen	O_2	0 – 5 %	0.025 %	0 - 25 %	0.025 %

(1) Not all ranges/gases available on a single analyzer; exact specifications dependent on configuration.

(2) Indicates the minimum and maximum available measurement ranges; additional intermediate ranges are also available.

Note
Other gases and ranges are available on request. The ranges and detection limits provided indicate typical analyzer performance but may change depending on your application. Contact Emerson for more information.

Table 4: Measurement performance specification

Measurement parameters	Measurement Technology	
	Laser	pO2
Detection limit (2σ)	See table above	≤ 0.25 % (1)(2)
Linearity (2)(3)	≤ 1 %	≤ 1 %
Zero drift (2)	Negligible, < 0.5 ppm per year	≤ 1 % per week
Span drift (2)	Negligible, < 1 % of reading per year	≤ 0.5 % per week
Repeatability (2)(3)	≤ 0.5 %	≤ 0.5 %
Typical response time (T_{90}) (4)(5)	< 5 s	< 5 s
Influence of gas flow (1)(2)	≤ 0.01 % per 10 mL/min	≤ 0.02 % per 10 mL/min
Influence of pressure at constant temperature (6)	≤ 0.005 % per mbar	≤ 0.05 % per mbar
Warm-up time	< 5 minutes	Approx. 50 minutes

(1) Related to full scale (minimum analyzer range).
(2) Typical performance at constant pressure and temperature.
(3) Related to full scale (maximum analyzer range).
(4) At gas flow of 1.5 L/min (averaging filtering = 0).
(5) Dependent on gas and analyzer configuration.
(6) Related to measuring value.

Lifecycle services and support

Our team of trained and certified field experts knows and understands the requirements needed to develop a customized service program to suit your application. We provide complete turnkey services and problem solving to assist you every step of the way. From pre-installation services to ongoing maintenance and support long after commissioning, we have the expertise to ensure your Rosemount QX1400 runs at ideal operating conditions during its lifecycle.

- Field services include, but are not limited to the following:
- Start-up and commissioning.
- Scheduled maintenance.
- On-site support.
- Field retrofits.
- Training.

Training services

Whether your goal is to reduce maintenance costs or maximize uptime, Emerson offers a complete list of training courses and continuous support programs to ensure your technicians know how to properly operate and maintain the analyzer during its lifecycle.

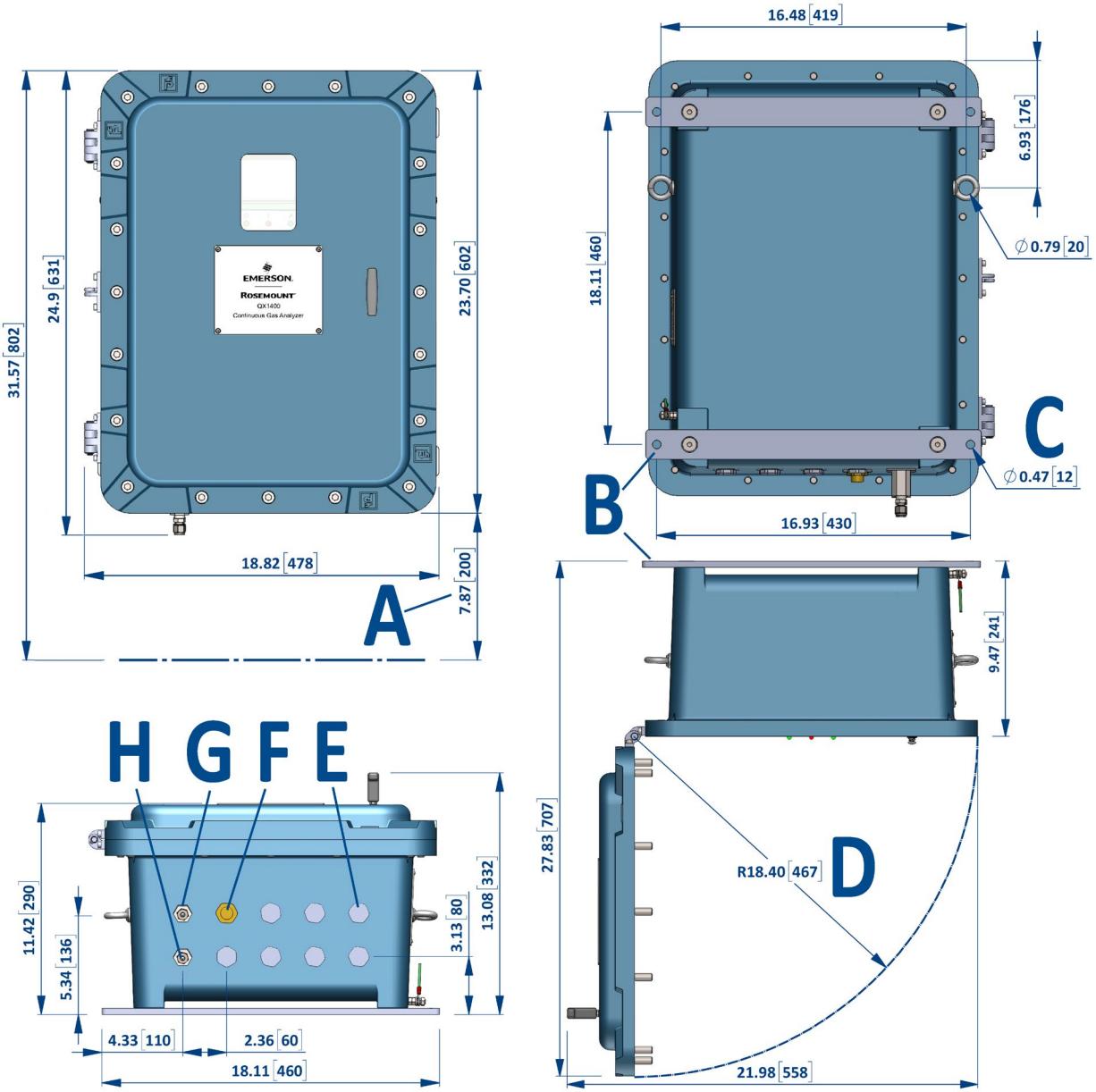
All training courses are taught by Emerson-certified instructors who provide the necessary hands-on training, theory, and conceptual knowledge needed to perform on-the-job functions safely and accurately.

Recommended installation

Figure 1 represents the minimum recommended installation guidelines for the Rosemount QX1400 Continuous Gas Analyzer.

Consult Emerson for detailed installation recommendations for your application.

Figure 1: QX1400 Continuous Gas Analyzer dimensional drawings



Dimensions are in inches (millimeters).

- *A.* Minimum required clearance for customer tube and cable runs
- *B.* Mounting brackets
- *C.* Ø 0.47 in. (12 mm) securing holes (for customer-supplied fasteners)
- *D.* Door opening clearance
- *E.* Plugged ports for customer supplied M20 cable glands for power and signal connections
- *F.* Breather
- *G.* Sample inlet connection
- *H.* Sample outlet connection

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