

Rosemount™ CT4400

Continuous Gas Analyzer



The Rosemount CT4400 is a multi-component QCL/TDL analyzer designed for gas processing applications. The analyzer is optimized for low maintenance, low cost of ownership, and easy integration. It can hold up to four laser modules and measure multiple components simultaneously with enhanced dynamic range from sub parts per million (ppm) to percent levels.

Overview

This new measurement platform is ideal for environmental monitoring applications measuring standard components, such as nitric oxide (NO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), carbon monoxide (CO), carbon dioxide (CO₂), and oxygen (O₂).

The Rosemount CT4400 offers an ideal means to upgrade your existing measurement solution and replace end of life technologies. A single half-rack system (shown on the front cover) can hold two laser sources to monitor a variety of gases and ranges. The systems can be expanded to a full-rack configuration for applications where a larger suite of gases and/or measurement ranges are required. Optimized for cold/dry applications running at ambient pressure, the Rosemount CT4400 platform offers a standardized, robust solution while maintaining the high performance and functionality of Rosemount analyzers.

Features and benefits

Multi-component QCL/TDL analyzer

- Accurate and sensitive gas measurements
- Excellent linearity of response and repeatability
- Low long term drift lengthens calibration intervals
- Low maintenance and low lifetime costs
- Continuous health diagnostic reporting
- Embedded processor for fully autonomous operation
- Intuitive, simple front panel user interface allows access to all instrument functions
- Standard gas measurement options with additional gases/ranges available on request (application dependent)

Engineered sample handling systems

A process gas analyzer is only as good as the quality of the sample it measures. This is why Emerson provides sample handling systems designed to meet the application's specifications. These systems are rigorously tested before they are shipped to the customer.

Contents

Overview.....	2
Features and benefits.....	2
Applications.....	3
Specifications.....	4
Lifecycle service and support.....	5
Training services.....	5
Recommended installation.....	6

Applications

- Air monitoring
- Continuous Emissions Monitoring Systems (CEMS)
- Food and beverage
- NO_x Selective Catalytic Reduction (SCR)
- Process gas analysis

Specifications

Table 1: Rosemount CT4400 Continuous Gas Analyzer

Value	
Measurement technique	Optical absorption spectroscopy
Mid IR source	Quantum Cascade Laser (QCL)
Near IR source	Tuneable Diode Laser (TDL)
Product laser classification	Class 1 BS EN 60825-1: 2014 Safety of laser products Equipment classification and requirements are identical to IEC 60825-1: 2014.
Performance	
Repeatability	±1%
Linearity	$R_2 > 0.99, \pm 2\%$
Zero drift (lifetime)	≤ Limit of detection (LOD)
Span drift (lifetime)	≤ 2% FS
Measurement rate	Up to 1 Hz
Environmental	
Flow rate	1 to 5 L/min (typical)
Sample gas pressure	Typically ±0.1 atm (abs)
Ambient operating temperature	41 to 122 °F (5 to 50 °C)
Sample gas temperature range	59 to 122 °F (15 to 50 °C) Non-condensing, typical value of 1.6% at 15 °C
Communications	
Analog signal out	4 - 20 mA (1 per measurement)
Digital signal out	Modbus® over TCP/IP
Health monitoring	NAMUR status report - dry contacts: 1A, 30 Vdc
Electrical rating	
Power supply	100 - 240 Vac, 50/60 Hz
Physical	
Size	Half-rack configuration: 8.5 x 24.5 x 6.8 in. (215 x 623 x 172 mm) Full-rack configuration (including handles): 19 x 25.9 x 6.8 in. (482.6 x 658 x 172 mm)
Weight	Half-rack configuration: 33.1 lb. (15 kg) Full-rack configuration: 66.1 lb. (30 kg)
Installation	19-in. (482.6 mm) rack mount (half or full-rack configuration dependent on application)
Inlet/outlet gas port connector(s)	0.2-in. (6 mm) Swagelok® type
Approvals	CE including EMC and LV Directives, cULus, and CB Scheme
Wetted materials	Stainless steel 316, PFA coated aluminum, protected gold, BaF2, and FKM

Table 2: Measurement Performance

Available gases ⁽¹⁾		Units	Available ranges (LOD) ⁽²⁾⁽³⁾⁽⁴⁾	
Name	Symbol		Minimum	Maximum
Nitric oxide	NO	ppmv	0-50 (0.3)	0-1500 (1.2)
Nitrogen dioxide	NO ₂	ppmv	0-50 (0.15)	0-300 (0.4)
Nitric oxide and nitrogen dioxide ⁽⁵⁾	NO _x	ppmv	0-75 (0.3)	0-1800 (1.2)
Oxygen	O ₂	Vol%	0-25 (0.15)	0-25 (0.15)
Carbon monoxide	CO	ppmv	0-120 (0.1)	0-1400 (3.0)
Sulfur dioxide	SO ₂	ppmv	0-300 (0.4)	0-750 (1.0)
Carbon dioxide	CO ₂	Vol%	0-12 (0.02)	0-30 (0.08)

(1) Not all gases/ranges available on a single Rosemount CT4400 system.

(2) Repeatability is $\pm 1\%$ of reading or the LOD, whichever is greater.

(3) The offered specification is only valid for typical CEMS stream compositions, i.e., maximum concentrations of gases, as listed in Table 2 and CH₄-100 ppm, N₂O-50 ppm, and NH₃-100 ppm. If other gases or higher maximum levels are present in the stream consult the factory.

(4) Current output ranges are customer configurable.

(5) For calibration of the NO_x reading, NO and NO₂ calibration gases are required.

Other gases and ranges are available on request. The number of gases, ranges, and detection limits provided indicate typical analyzer performance and may change depending on your application. Contact [Emerson.com/Rosemount](https://www.emerson.com/Rosemount) for more information. Not all gases/ranges requested may be achievable on a single analyzer.

For applications requiring heated gas samples, additional analytes, or enhanced sensitivity, please refer to our [Rosemount CT5000](#) product lines.

Lifecycle service 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 analyzer runs at ideal operating conditions during its lifecycle.

Field services include, but are not limited to the following:

- Startup and commissioning
- Scheduled maintenance
- On-site support
- Training

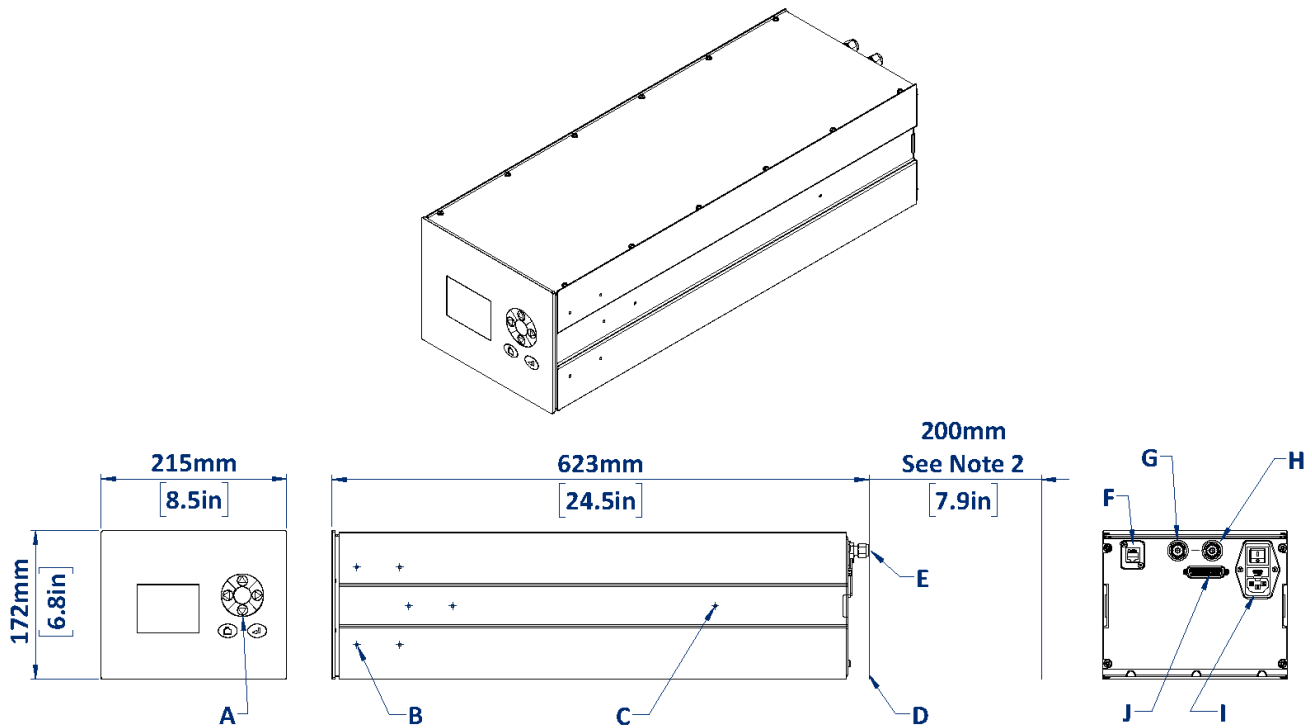
Training services

Whether your goal is to reduce maintenance costs or maximize uptime, Rosemount 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 Rosemount 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: Half Rack

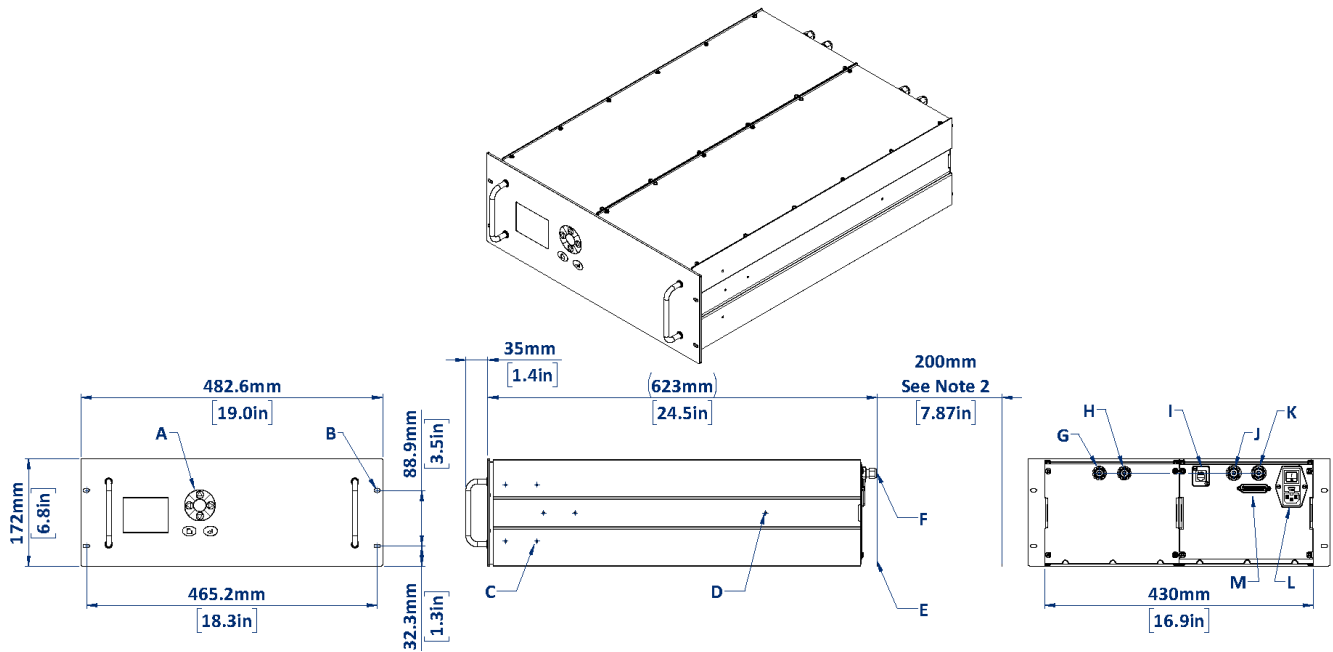


- A. User interface
- B. 4-off M4 mounting holes for customer supplied mounting ears (if required)
- C. 3-off M4 mounting holes for customer supplied rail (if required)
- D. Customer scope of supply
- E. Connections
- F. LAN port
- G. Sample outlet
- H. Sample inlet
- I. Mains inlet (includes power switch)
- J. Analog and digital output

Note

1. Analyzer to be rack mounted and weighs approximately 33.1 lb. (15 kg).
2. Minimum clearance for tube and cable connections.
3. Double ferrule stainless steel compression fittings: 0.2-in. (6 mm) tube diameter to be used.
4. All dimensions are nominal.

Figure 2: Full Rack



- A. User interface
- B. 4-off Ø5.5 mounting slots
- C. 4-off M4 mounting holes for customer supplied mounting ears (if required)
- D. 3-off M4 mounting holes for customer supplied rail (if required)
- E. Customer scope of supply
- F. Connections
- G. Sample outlet 2
- H. Sample inlet 2
- I. LAN port
- J. Sample outlet 1
- K. Sample inlet 1
- L. Mains inlet (includes power switch)
- M. Analog and digital output

Note

1. Analyzer to be rack mounted and weighs approximately 66.1 lb. (30 kg).
2. Minimum clearance for tube and cable connections.
3. Double ferrule stainless steel compression fittings: 0.2-in. (6 mm) tube diameter to be used.
4. All dimensions are nominal.

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