

Rosemount™ CT5100 Continuous Gas Analyzer



- The Rosemount CT5100 Continuous Gas Analyzer is the first Quantum Cascade Laser (QCL) system developed for process gas analysis and emissions monitoring.
- The Rosemount CT5100 is available in two variants: a certified Rosemount CT5100(Ex) system, housed in a purged and pressurized enclosure for hazardous area installations and a non-certified Rosemount CT5100 system for use in non-hazardous areas.
- Both can house up to six lasers to measure multiple components in the gas stream simultaneously.

Features and benefits

Multi-component QCL/TDL analyzer

- Measures up to 12 gases simultaneously
- Accurate and sensitive gas measurements
- Excellent linearity of response and repeatability
- Low, long term drift, and minimizes calibration intervals
- Low maintenance and low lifetime costs
- Continuous health diagnostic reporting
- Embedded ARM processor for fully autonomous operation
- Intuitive, simple front panel user interface allows access to all instrument functions

Field serviceable and field configurable

- Interchangeable modular configuration for up to six lasers

Hazardous certification

- Not certified
- For hazardous applications, use the Rosemount™ CT5100(Ex)

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Applications

Applications type

- Process gas analysis
- Continuous emissions monitoring
- Ammonia slip

Engineered sample handling systems

A process gas analyzer is only as good as the quality of the sample it measures, which is why Emerson provides custom-engineered sample handling systems designed to meet the application's specifications which are rigorously tested before it ships to the customer.

Typical features include:

- Heated and open-panel designs
- Automatic calibration/validation available as an option
- Variety of sample probes to extract a reliable and stable sample from the process stream
- Other specifications are custom engineered as needed

Specifications

Specifications

Table 1: Rosemount™ CT5100 Continuous Gas Analyzer

Specifications	Value
Application	Process Gas Analysis/CEMS
Measurement technique	Mid-infrared optical absorption spectroscopy
Mid IR source	Quantum Cascade Laser
Near IR source	Interband Cascade Laser Diode Laser
Laser classification	CLASS1 BS EN 60825-1:2014 safety of laser products equipment classification and requirements (identical to IEC 60825-1:2014)
Performance	
Repeatability	±1%
Linearity	R ² > 0.999
Measurement rate	1 Hz (up to 10 Hz on request)
Environmental	
Ambient temperature	-20 to 55 °C (-4 to 131 °F). Other ranges available upon request.
Sample gas temperature range	50 to 190 °C (122 to 374 °F) (factory set)
Humidity range	10-95% ,non-condensing
Protection class	IP66/NEMA® 4X (main enclosure compartment)
Hazardous area classification	Not Suitable (for Hazardous Area applications the CT5100(Ex) Continuous Gas Analyzer must be used)
Communications	
Analog signal out	Optional 4-20 mA (one per measurement)
Digital signal out	Modbus® over TCP/IP or RS-232
Health monitoring	Digital healthline (one per measurement) or NAMUR NE107 status report
Inlet gas port connector	6 mm (¼-in.) Swagelok® type (specify on order)
Outlet gas port connector	6 mm (¼-in.) Swagelok type (specify on order)
Purge connector	Purge inlet (certified system only) ⅜-in. or 10 mm
Electrical Rating	
Power supply	110 Vac 60 Hz/230 Vac 50 Hz
Mechanical	
Size	575 x 300 x 714 mm 22.64 x 11.81 x 28.11-in.
Weight	53 kg (117 lb.)
Installation	Wall mount

Table 2: Measurement Performance – Continuous Emissions Monitoring (Other Measurement Ranges Available on Request.)

Component Name	Measurement Specification					
	Symbol	Range	LOD	Range	LOD	Repeatability ⁽¹⁾
Nitric oxide	NO	0–10 ppmv	0.1 ppmv	0–15 mg/Nm ³	0.2 mg/Nm ³	±1%
Nitrogen dioxide	NO ₂	0–10 ppmv	0.04 ppmv	0.04 mg/Nm ³	0.1 mg/Nm ³	±1%
Oxygen	O ₂	0–25%	0.03%	0–25%	0.03%	±1%
Carbon monoxide	CO	0–50 ppmv	0.04 ppmv	0–60 mg/Nm ³	0.05 mg/Nm ³	±1%
Carbon dioxide	CO ₂	0–12%	0–12%	0–12%	0.01%	±1%
Sulfur dioxide	SO ₂	0–200 ppmv	0.2 ppmv	0–600 mg/Nm ³	0.6 mg/Nm ³	±1%

(1) Repeatability is ±1% of reading or the limit of detection (LOD), whichever is greater.

Table 3: Measurement Performance – DeNOx/Ammonia Slip (Other Measurement Ranges Available on Request.)

Component Name	Measurement Specification Range					
	Symbol	Range	LOD	Range	LOD	Repeatability ⁽¹⁾
Nitric oxide	NO	0–200 ppmv	0.2 ppmv	0–250 mg/Nm ³	0.3 mg/Nm ³	±1%
Nitrogen dioxide	NO ₂	0–100 ppmv	0.05 ppmv	0–200 mg/Nm ³	0.1 mg/Nm ³	±1%
Nitrous oxide	N ₂ O	0–200 ppmv	0.2 ppmv	0–400 mg/Nm ³	0.4 mg/Nm ³	±1%
Ammonia	NH ₃	0–100 ppmv	0.1 ppmv	0–75 mg/Nm ³	0.1 mg/Nm ³	±1%

(1) Repeatability is ±1% of reading or the Limit of Detection (LOD), whichever is greater.

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 Rosemount for more information.

Lifecycle services and support

Our team of trained and certified field experts know and understand the requirements needed to develop a customized service program to suit your application. We provide complete turn-key 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
- Field retrofits
- Training

Training services

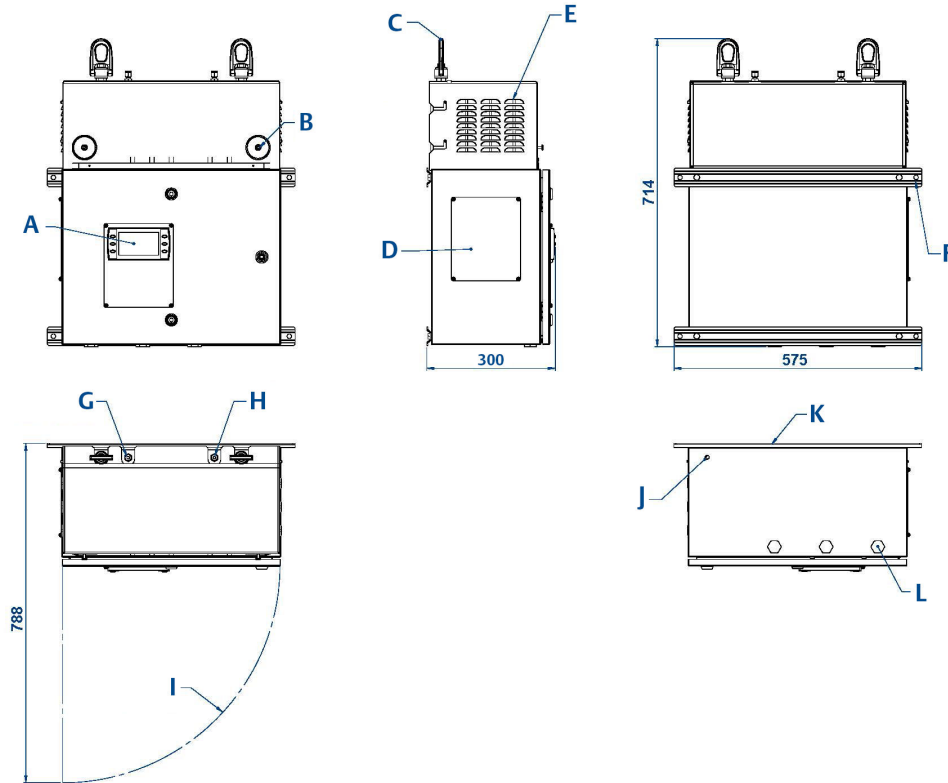
Whether your goal is to reduce maintenance costs, or maximize up-time, Rosemount™ offers a complete list of training courses and continuous support programs to ensure your technicians know how to properly operate and maintain the analyzer during its lifecycle.

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

Recommended installation

The drawings below represent the minimum recommended installation guidelines for the Rosemount™ CT5100 Continuous Gas Analyzer. Consult Rosemount for detailed installation recommendations for your application.

Figure 1: Rosemount CT5100 Continuous Gas Analyzer Dimensional Drawings (Non-Certified Version)



- A. Operator interface panel
- B. 1/4 turn quick release catch
- C. Removable lifting points
- D. Ratings plate
- E. Ventilation
- F. Four off mounting hole positions
- G. Sample entry port
- H. Sample return port
- I. Door opening
- J. Earthing point
- K. Wall
- L. Cable entry points

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