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 CT5100 is available in two variants: a certified system, housed in a purged and pressurized enclosure for hazardous area installations (illustrated); and a non-certified system for use in non-hazardous areas. Both can house up to six lasers to measure multiple components in the gas stream simultaneously. The laser arrangement consolidates the measurement requirements into a single gas analyzer.

Rosemount™ CT5100 Continuous Gas Analyzer
(Illustration showing certified system)

Features and Benefits

Multi-component QCL/TDL analyzer

- Measures up to twelve gases simultaneously
- Accurate and sensitive gas measurements
- Excellent linearity of response and repeatability
- Low, long term drift, 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

- Europe: ATEX II 3G Ex p IIC T3
- North America: Class I, Division 2, Groups A, B,C,D, and T3

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 the meet the application's specifications which are rigorously tested before it ships to the customer.

Typical features include:

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

Applications

- Process Gas Analysis
- Continuous Emissions Monitoring
- Ammonia Slip

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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	CLASS 1 BS EN 60825-1:2007 Safety of laser products Equipment classification and requirements (identical to IEC 60825-1:2007)
Performance	
Repeatability	±1 %
Linearity	$R^2 > 0.999$
Measurement rate	1 Hz (up to 10 Hz on request)
Environmental	
Ambient temperature	-20 °C to 55 °C (-4 °F to 131 °F). Other ranges available upon request.
Sample gas temperature range	Up to 190 °C (374 °F) (factory set)
Humidity range	10–95 %, non-condensing
Protection class	IP66/NEMA 4X (main enclosure compartment)
Hazardous area classification	Europe: ATEX II 3G Ex p Group IIC T3 North America: Class 1, Division 2, Groups A,B,C,D, and T3
Communications	
Analog signal out	4–20 mA (1 per measurement)
Digital signal out	Modbus over TCP/IP or RS-232
Health monitoring	Digital healthline (1 per measurement) or NAMUR 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 inch or 10 mm
Electrical Rating	
Power supply	110 Vac 60 Hz / 240 Vac 50 Hz
Mechanical	
Size	575 x 291 x 781 mm 22.64 x 11.5 x 30.75 in.
Weight	53 kg (116.8 lbs.)
Installation	Wall mount

Table 2 - Measurement Performance - Continuous Emissions Monitoring (Other measurement ranges available on request.)

Component		Measurement Specification				
Name	Symbol	Range	LOD	Range	LOD	Repeatability (1)
Nitric oxide	NO	0–10 ppmv	0.1 ppmv	0–15 mg/Nm³	0.2 mg/Nm³	±1 %
Nitrogen dioxide	NO_2	0–10 ppmv	0.04 ppmv	0.04 mg/Nm³	0.1 mg/Nm³	±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/Nm³	0.05 mg/Nm³	±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/Nm³	0.6 mg/Nm³	±1 %

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

Table 3 - Measurement Performance - Fertilizer / Ammonia Slip (Other measurement ranges available on request.)

Component		Measurement Specification				
Name	Symbol	Range	LOD	Range	LOD	Repeatability (1)
Nitric oxide	NO	0–200 ppmv	0.2 ppmv	0–250 mg/Nm³	0.3 mg/Nm³	±1 %
Nitrogen dioxide	NO_2	0–100 ppmv	0.05 ppmv	0–200 mg/Nm³	0.1 mg/Nm³	±1 %
Nitrous oxide	N_2O	0–200 ppmv	0.2 ppmv	0–400 mg/Nm³	0.4 mg/Nm³	±1 %
Ammonia	NH_3	0–100 ppmv	0.1ppmv	0–75 mg/Nm³	0.1 mg/Nm³	±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. Please contact Rosemount for more information.

Lifecycle Services & 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

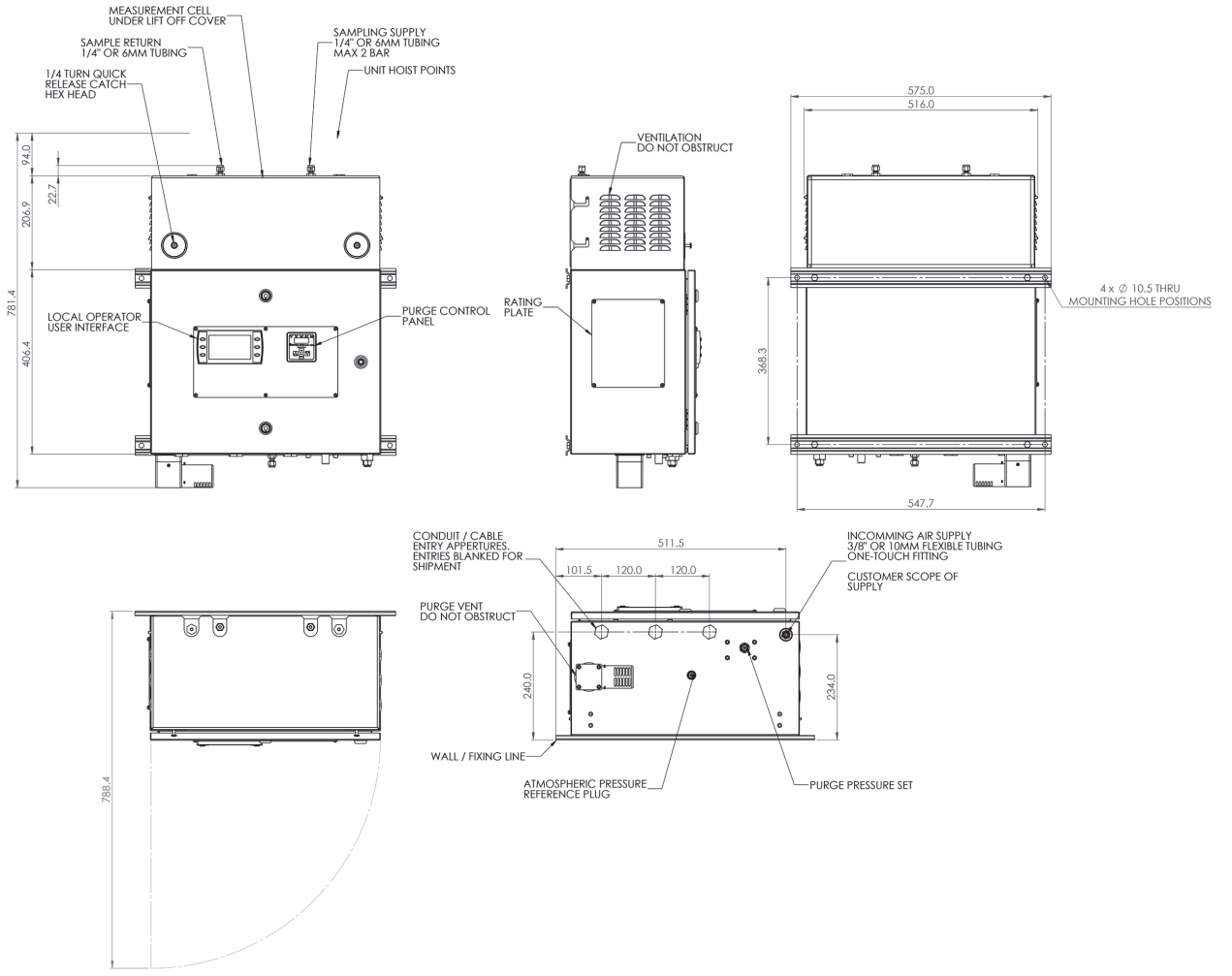
Whether your goal is to reduce maintenance costs, or maximize up-time, Rosemount offers a complete list of training courses and continuous support programs to ensure your technicians know how to properly operate and maintain the analyzer during its lifecycle.

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 CT5100 Continuous Gas Analyzer. Please consult Rosemount for detailed installation recommendations for your application.

Figure 1 - Rosemount™ CT5100 Continuous Gas Analyzer Dimensional Drawings (Certified version)



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