

# CT4000

## OEM Gas Analyzer

Cascade's CT4000 system monitors in real time NO, NO<sub>2</sub>, SO<sub>2</sub>, CH<sub>4</sub>, H<sub>2</sub>O, CO and CO<sub>2</sub> levels in ambient environments of up to 70 °C and gas temperatures of 190 °C. Applications for this system include ship emissions monitoring, power plant emissions monitoring, engine management, engine combustion tools, engine health management and carbon trading.

The CT4000 Gas Analyzer provides OEM capability, utilizes modular components from the CT3000 and CT5000 platforms and is designed for durability in harsh environments. This newly available hybrid system is the most cost effective solution to meet the measurement needs in marine applications while at the same time providing a step change in performance and usability over the CT2100.



CT4000 OEM Gas Analyzer

## Features and Benefits

### High performance QCL CT4000 OEM Gas Analyzer

- Multicomponent - up to 10 gases
- Ambient temperature -20 °C to 70 °C
- Gas temperature up to 190 °C

### Field serviceable and field configurable

- Interchangeable modular configuration for up to 4 lasers (QCL or TDL)

### Low maintenance and low lifetime cost

- Robust all solid state

### Compact footprint for easy system integration

- Volume < 25 litres

### Typical applications

- Continuous Emissions Monitoring (CEMs)
- On board engine test
- Continuous Ambient Monitoring (CAMs)
- Process analytics
- DeNOx / SCR

### Other applications available on request

## Specifications

Table 1 - CT4000 OEM Gas Analyzer

Specifications	
Value	
Application	Ruggedized OEM Gas Analyzer
Measurement technique	IR Absorption Spectroscopy
IR source	Up to 4 QCL or 4 TDL
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	±2 %
Accuracy	±2 %
Linearity	R <sup>2</sup> > 0.999
Measurement rate	Up to 10 Hz
Environmental	
Temperature range	-20 to +70 °C
Sample gas temperature range	+20 to +190 °C factory set
Humidity range	10 to 95 %, non-condensing
Protection class	IP20
Hazardous area classification	n/a
Inputs and Outputs	
Analogue signal out	6 x 4–20 mA measurement output [option]
Analogue signal in	4–20 mA signal input [option]
Digital signal out	3 x normally closed contact fault relay outputs
Digital signal out	Modbus TCP, 10 / 100 Base T Ethernet
Inlet gas port connector	6 mm Swagelok type
Exhaust gas port connector	6 mm Swagelok type
Electrical Rating	
Power supply	120 VAC 60 Hz / 240 VAC 50 Hz 250 V/A
Dimensions	
Size	230 x 188 x 446 mm [H x W x D]
Weight	26 kg
Installation	For incorporation in third party enclosure

Table 2 - Measurement Performance

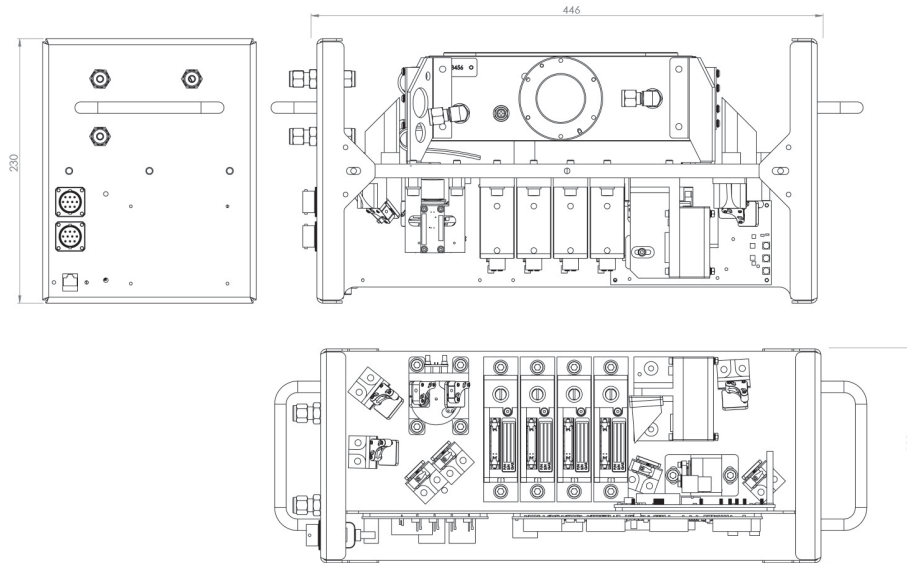
Name	Symbol	Units	Range	LOD
Nitric oxide	NO	ppm	10000	0.05
Nitrogen dioxide	NO <sub>2</sub>	ppm	2000	0.02
Carbon monoxide	CO	ppm	20000	0.2
Carbon dioxide	CO <sub>2</sub>	%	30	0.0005
Sulphur dioxide	SO <sub>2</sub>	ppm	4000	0.15
Methane	CH <sub>4</sub>	ppm	20000	0.15
Water	H <sub>2</sub> O	%	40	0.0015
Nitrous oxide	N <sub>2</sub> O	ppm	10000	0.0015
Ammonia	NH <sub>3</sub>	ppm	4000	0.03
Formaldehyde	HCHO	ppm	100	0.03
Hydrogen peroxide	H <sub>2</sub> O <sub>2</sub>	ppm	800	0.2
Ethyne	C <sub>2</sub> H <sub>2</sub>	ppm	200	0.1
Ethene	C <sub>2</sub> H <sub>4</sub>	ppm	60	0.001
Ethane	C <sub>2</sub> H <sub>6</sub>	ppm	60	0.015
Propane	C <sub>3</sub> H <sub>8</sub>	ppm	100	0.03
Butane	C <sub>4</sub> H <sub>10</sub>	ppm	150	0.05
Methanol	CH <sub>3</sub> OH	ppm	120	0.03
Nitromethane	CH <sub>3</sub> NO <sub>2</sub>	ppm	120	0.03

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 Analytical for more information.

## Recommended Installation

The drawings below represent the minimum recommended installation guidelines for the CT4000 OEM Gas Analyzer. Please consult Rosemount Analytical for detailed installation recommendation of your application.

Figure 1 - CT4000 OEM Gas Analyzer



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### HEADQUARTERS

**Emerson Process Management**  
Glendevon House  
Castle Business Park, FK9 4TZ  
T +44 (0) 1786 447721  
F +44 (0) 1786 475822  
[www.cascade-technologies.com](http://www.cascade-technologies.com)

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