



MONITOR



In situ or Extractive  
Low running costs  
Certified performance

**CONTINUOUS EMISSION MONITORING**

## Cost effective & high performance Quantum Cascade Laser based gas analysing solution.

The Cascade instrument offers the versatility of measurements across a range of applications using Mid Infrared Laser technology.

The Cascade instrument is a versatile fully robust, multigas analyser suitable for a variety of applications. It incorporates Cascade's Mid Infrared Optical Absorption spectroscopy technology, which enables simultaneous measurements of multiple gases with unprecedented levels of accuracy and reliability.

The Analyser can be configured for easy installations and can be set up for insitu operation using a probe or conventional extractive measurements. In extractive mode, a gas cell option can be attached in order to increase the sensitivity of the

## Features & Benefits

- Multiple gas measurement
- Real time monitoring
- High dynamic range
- Insensitive to cross contamination
- Insensitive to vibrations
- Robust design
- Ease of installation
- Low maintenance & No consumables
- Low throughlife Cost
- Self calibration
- In-situ probe, gas manifold or sampling cell



*CT2100 multigas analyser*

## Applications

The instrument has been developed to offer versatile operation for a wide range of industries:

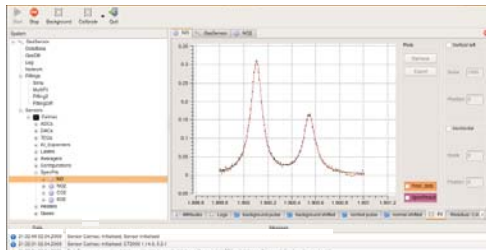
- Power Stations
- Incineration plants
- Ambient air monitoring (city, building, area...)
- Petrochemical & Chemical Industries
- Glass plants
- Drying plants
- Cement Plants
- Pulp & Paper
- Wood processing...

# Technology

The technology utilises Mid IR Quantum cascade Lasers (QCL) and highly sensitive detectors to sense changing light intensity as the laser beam passes through gases. When a current pulse of sub-micro-second duration is applied, the QCL exhibits a nearly linear wavelength scan. Cascade have patented this novel approach and refined the use of this phenomenon to produce instantaneous wavelength tuning across the absorption lines of gases. This enables a real time fingerprinting capability in a compact and robust package, capable of operating over a wide range of ambient conditions.

## Automatic Calibration

Calibration of the instrument is automatic and verified each time the lasers are pulsed. Additional external calibration can be generated by using samples of gases of known concentration.



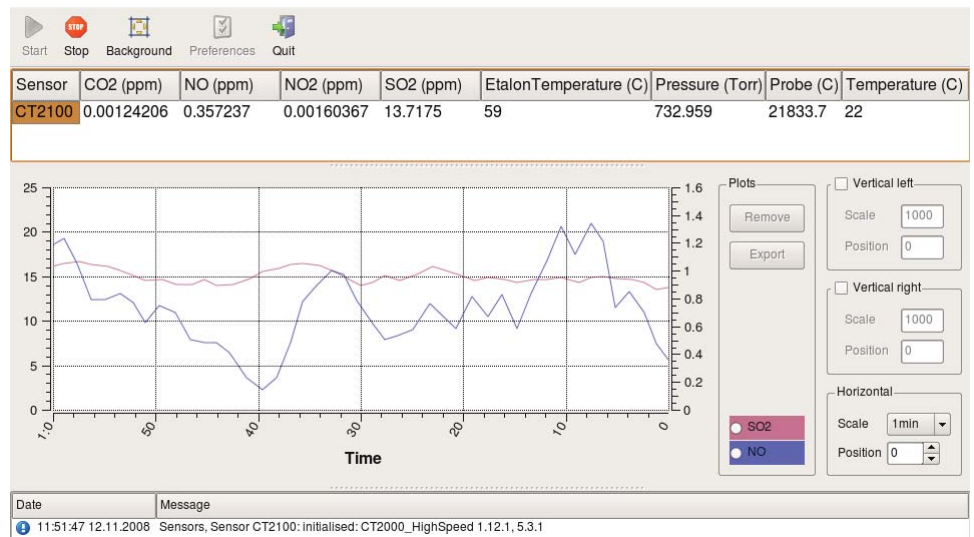
*IR Spectrum of exhaust stack*

## Multiple gas analysis

Cascade's system integrates analysis software that will retrieve quantitative information for multiple gases simultaneously.

The software will take into account temperature and pressure variations to automatically correct gases measurement values.

The software is also capable of managing multiple analysers remotely.



*Power plant gas measurements over time*



## Low cross interferences

The core detection platform is a rugged and compact analysis instrument, perfectly suited to environmental monitoring applications. With spectral resolution better than 0.1 cm<sup>-1</sup>, and extremely efficient fitting routines, it promises low cross interference issues in saturated environments.

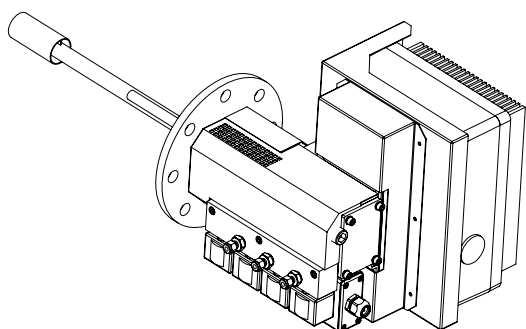
Cascades Monitor product range is targeted at Continuous Emissions Monitoring applications. Exploiting the latest developments in Quantum Cascade Lasers (QCL's), the product has been shown to meet and surpass the rigorous legislative requirements associated with these markets.

Configured to be installed at the measurement point (stack, or duct), is easily mounted on a stabbing. It is designed to maintain a flow of gas at constant high temperature and pressure within a multipass cell (165 degree C), thereby avoiding condensation and allowing for accurate and highly sensitive measurements to be obtained.

A simple and highly efficient filtering system prevents any particulates from clogging the cell and thereby altering the readings. The On Stack filter can be easily cleaned via air vent or swapped in minutes. The robust On Stack design has been tested and proven to resist the most extreme of industrial environments eg. heat, vibration, particulate build up, water condensation and acidic mist.

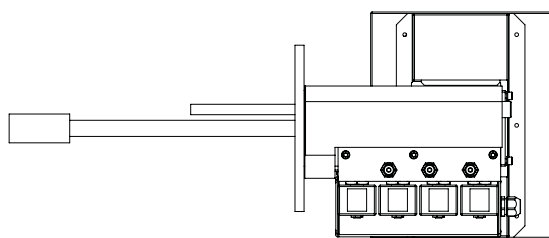
## Dimensions

Dimensions in mm: 875 x 495 x 420



## On Stack solution

For use in harsh environments or on stacks. The On Stack system can cope with stack gases temperature up to 450°C



## Operating Environment

Operating temperature range	
for Sensor unit	-20...+60°C
for Gas Cell	Up to 450° C
Compliances pending	Marine type approval
	MCERTS
Laser Safety	Class 1a

## Technique & Performance

Measurement Technique	MidIR Absorption Spectroscopy
Mid IR Source	Quantum Cascade Laser
Number of gases	4 gases
Measurement frequency	1 Hz
Zero drift	<2%
Span drift	<2%
Linearity error	<2%

## Inputs and Outputs

Power Supply	
Input Range	110-230 VAC, 50/60Hz
Sensor Power Consumption	
Max	450W
Data output	Ethernet

## Mechanics

Weight	12 kgs sensor unit
	10 kgs mounting
Mounting flange	Standard flange is PN10 4"
Protection classification	IP65
Unit frame & structure	Stainless Steel
	Electroless Nickel coated Aluminium

## Typical Gases\*

CO2	Carbon Dioxide	NO2	Nitrogen Dioxide
NO	Nitric Oxide	SO2	Sulphur Dioxide
CO	Carbon Monoxide	NH3	Methane

\*Please note that the measuring range and resolution varies depending upon applications gases.