

# MIR 9000 (CLD option)

## Multi-gas Infra-Red GFC Analyzer (CLD- Chemiluminescence option)



**Emission  
monitoring**

A unique analyzer for:  
NO, NO<sub>2</sub>, NO<sub>x</sub>, N<sub>2</sub>O, CO,  
CO<sub>2</sub>, SO<sub>2</sub>, HCl, HF, CH<sub>4</sub>,  
TOC and O<sub>2</sub>



MIR 9000 without CLD  
tightbox version



MIR 9000 with CLD



### Applications:

- Incineration
- Power plants
- Gas turbines
- Petrochemical industries
- Process control
- Accredited testing laboratories
- ...

### Exclusive features:

- Measuring principle:
  - Infrared absorption with Gas Filter Correlation
  - Chemiluminescence option (CLD) for NO, NO<sub>x</sub> and NO<sub>2</sub>
  - Built-in paramagnetic cell for O<sub>2</sub>
- External signals acquisition
- Remote access for maintenance and data retrieval
- 2 microprocessors for high speed signal processing
- Graphic LCD screen, with pop up menus
- Tight box or 19" rack mount version



MIR 9000 without CLD  
rack 19" version



# MIR 9000 (CLD option)

## Multi-gas infra red (chemiluminescence option) analyzer

### Specifications:

|                       | Smallest measurement ranges |
|-----------------------|-----------------------------|
| NO (CLD)              | 0-20 mg/m <sup>3</sup>      |
| NO <sub>x</sub> (CLD) | 0-20 mg/m <sup>3</sup>      |
| NO <sub>2</sub> (CLD) | 0-20 mg/m <sup>3</sup>      |
| NO (IR)               | 0-80 mg/m <sup>3</sup>      |
| NO <sub>x</sub> (IR)  | 0-200 mg/m <sup>3</sup>     |
| NO <sub>2</sub> (IR)  | 0-200 mg/m <sup>3</sup>     |
| CO                    | 0-75 mg/m <sup>3</sup>      |
| CO <sub>2</sub>       | 0-10 %                      |
| SO <sub>2</sub>       | 0-75 mg/m <sup>3</sup>      |
| N <sub>2</sub> O      | 0-20 mg/m <sup>3</sup>      |
| HCl                   | 0-15 mg/m <sup>3</sup>      |
| HF                    | 0-20 mg/m <sup>3</sup>      |
| CH <sub>4</sub>       | 0-10 mg/m <sup>3</sup>      |
| TOC                   | 0-50 mg/m <sup>3</sup>      |
| O <sub>2</sub>        | 0-10 %                      |

- Repeatability: <2% of Full Scale (F.S.)
- Zero drift: <2% F.S. / 30 days
- Span drift: <1% F.S. / 7 days
- Linearity: <1% F.S.
- Power supply: 80 - 230V, 50-60 Hz
- Consumption: 300 VA
- Serial link: RS232, RS 422
- Operating temperature: +5°C to +40°C
- **Version with CLD (tight box):**
  - Dim.: 200x600x600 mm (DxWxH)
  - Weight: 32 Kg
- **Version without CLD (tight box):**
  - Dim.: 200x400x600 mm (DxWxH)
  - Weight: 24 Kg
- **Version without CLD (rack 19") :**
  - Dim.: 490x483x177 mm (DxWxH)
  - Weight: 14 Kg

### Main options:

- Pressure, temperature & gas velocity measurements
- SEC<sup>®</sup> sampling system (permeation based)
- ESTEL board (1 or 2 boards) each including :
  - 4 analog I/O
  - 6 relays
- CONTACT<sup>™</sup> remote control software
- Rack cabinet, cubicle or shelter integration
- Transportation chassis for mobile version

### Operating principle:

Model MIR 9000 is a multi-gas Non Dispersive Infra-Red analyzer, using the Gas Filter Correlation technique (GFC). Version CLD of Model MIR 9000 includes a built-in chemiluminescence module for the measurement of nitrogen oxides (NO<sub>x</sub>).

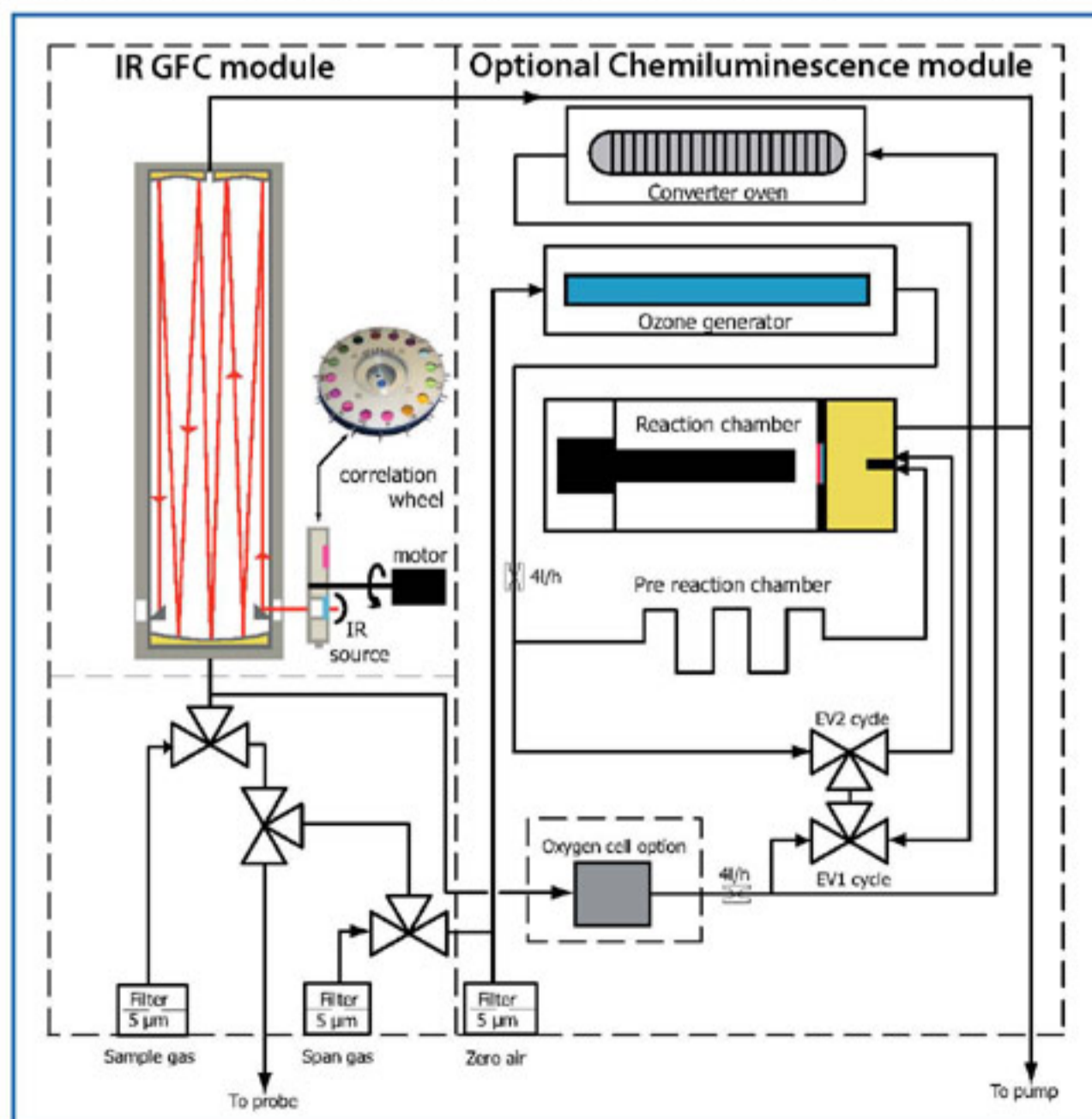
IR GFC principle: an optical ray, emitted by the IR source, passes through the measurement chamber and is focused on an IR detector. Each gas present on the path of the optical ray, absorbs the latter at defined wavelengths that are specific to it. An interference filter that defines a specific wavelength area is positioned on the optical path above the measurement chamber.

A cell filled with highly concentrated gas that needs to be measured and a cell filled with nitrogen, which does not absorb any wavelength, are positioned on the optical path alternately. The highly concentrated gas, which is in the cell called the reference cell, absorbs all wavelengths that are specific to it.

Some milliseconds later, the cell filled with nitrogen is positioned on the optical path. Absorption of the infrared energy is due to the gas in the measurement chamber, according to the Beer Lambert law.

Therefore, after absorption by the gas, the ratio between the reference energy and the "I" energy is known at any moment. Hence, the gas concentration can be deduced, using the following formula:  $C=f(I/I_r)$

Chemiluminescence principle: applied to the monitoring of nitrogen oxides, the principle consists in detecting the photons emitted during the reaction between nitrogen oxide (NO) and ozone (O<sub>3</sub>):  $NO + O_3 \rightarrow NO_2 + O_2$ . The energy (hv) generated is measured through a high-sensitivity photomultiplier, that delivers an electric signal which is proportional to the NO concentration in the sample.



Specifications subject to changes without prior notice - ref.: MIR9000-CLD\_uk\_s\_19/07/07