



Process &

Environmental
Analysis Solutions

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MultiGas™ 2030 CEM

GAS ANALYZER FOR CONTINUOUS EMISSIONS MONITORING

The MultiGas™ 2030 CEM is an FTIR-based gas analyzer designed for integration with complete continuous emissions monitoring systems (CEMS) to measure emissions from stationary sources such as waste incinerators, power plants and cement kilns. This analyzer is the core technology used in the TÜV and MCERTS certified MGS300 system produced by MKS Instruments.

The MultiGas 2030 instrument is capable of directly analyzing hot, wet effluent gas streams without the need for sample pre-treatment. Owing to its high resolution FTIR technology (0.5 cm^{-1}) the MultiGas 2030 CEM is capable of monitoring multiple gas components over a wide range of compositions with minimal cross-interference effects from either water (up to 40%) or other potentially interfering species. Furthermore, by using permanently stored internal reference calibration spectra, the need for costly calibration gas mixtures is all but eliminated.

Features & Benefits

- Single FTIR analyzer measures main target emission species including: NO, NO₂, N₂O, SO₂, CO, CO₂, CH₄, HCl, HF, NH₃ and H₂O – no additional analyzers required for these components
- Direct analysis of effluent streams containing up to 40% water – no sample preparation required
- Permanent reference calibration spectra – all but eliminates the need for costly calibration gas cylinders
- Patented, linearized detector response – ensures all instruments maintain the same calibration and can use the same reference calibration spectra
- Frequency and resolution diagnostics ensure instrument response, and therefore calibration, is maintained for maximum accuracy
- Heated gas cell with automatic temperature and pressure compensation – maximizes accuracy performance and eliminates sample component condensation
- Continuous monitoring capability with rapid response to changes in the sample composition - complies with t90 performance requirements
- Software with several communication protocol options for interfacing the MultiGas 2030 with a CEMS control platform – flexible system integration
- Easy to integrate, install and maintain – low cost of ownership



Description

The MultiGas 2030 analyzer is made up of a Process FTIR spectrometer, a patented, high-optical-throughput gas cell and a long wavelength, thermoelectrically (TE) cooled detector. Also included is the MG2000 software platform which offers several communication protocol options for interfacing to CEMS control systems.

The MultiGas 2030 instrument is housed in a rugged 19-inch rack mount chassis for convenient integration with most CEMS enclosures. The analyzer is easy to maintain and has a low cost of ownership (COO).

Applications

The MultiGas 2030 CEM is designed for integration with complete continuous emissions monitoring systems to measure gaseous emissions from stationary sources such as:

- Waste incinerators
- Power plants
- Cement kilns
- Large combustion plants
- Turbine engines

| Gas Component | Certification Range | Supplementary Range 1 | Supplementary Range 2 |
|------------------|---------------------|-----------------------|-----------------------|
| CH ₄ | 0 - 15 | 0 - 50 | 0 - 500 |
| CO | 0 - 75 | 0 - 300 | 0 - 1500 |
| HCl | 0 - 15 | 0 - 90 | 0 - 200 |
| HF | 0 - 3 | 0 - 10 | — |
| N ₂ O | 0 - 50 | 0 - 100 | 0 - 500 |
| NH ₃ | 0 - 10 | 0 - 75 | — |
| NO | 0 - 200 | 0 - 400 | 0 - 1500 |
| NO ₂ | 0 - 50 | 0 - 100 | 0 - 1000 |
| SO ₂ | 0 - 75 | 0 - 300 | 0 - 2000 |

Table 1 — Gas Components and Ranges in mg/m³

Addressed by the TÜV & MCERTS certified MGS300 system

Certification

The MultiGas 2030 CEM is the core technology used in the TÜV and MCERTS certified MGS300 system produced by MKS Instruments. MGS300 system certification was achieved in compliance with the DIN EN 15267-3 standard, which relates to automated measuring systems for the monitoring of emissions from stationary sources.

Performance

The TÜV and MCERTS “certification” and “supplementary” ranges achieved for the different gas components are shown in Table 1 below. Table 2 shows the same certification ranges, but this time in ppm, along with additional ranges and estimated detection limits calculated as three times the standard deviation in 25% water.

| Gas Comp. | Cert. Range | Supplementary Range 1 | Supplementary Range 2 | Additional Ranges | Detection Limit |
|------------------|-------------|-----------------------|-----------------------|-------------------|-----------------|
| CH ₄ | 0 - 21 | 0 - 70 | 0 - 700 | Upon request | 0.3 |
| CO | 0 - 60 | 0 - 240 | 0 - 1200 | 0-4500 | 0.5 |
| HCl | 0 - 9 | 0 - 55 | 0 - 123 | Upon request | 0.20 |
| HF | 0 - 3.4 | 0 - 11 | — | 0-20 | 0.25 |
| N ₂ O | 0 - 26 | 0 - 51 | 0 - 255 | Upon request | 0.1 |
| NH ₃ | 0 - 13 | 0 - 99 | — | 0-300 | 0.35 |
| NO | 0 - 149 | 0 - 299 | 0 - 1119 | 0-3000 | 0.5 |
| NO ₂ | 0 - 24 | 0 - 49 | 0 - 488 | 0-2000 | 0.4 |
| SO ₂ | 0 - 26 | 0 - 105 | 0 - 699 | 0-2500, 0-5000 | 0.6 |

Table 2 — Gas Components and Ranges in ppm



Specifications

Analyzer

| | |
|-----------------------------|--|
| Measurement Technique | FTIR Spectrometry |
| Gases and Ranges | Refer to the Gas Components and Ranges Table |
| Spectral Resolution | 0.5 cm ⁻¹ |
| Scan Time | 60 seconds |
| Infrared Source | Silicon Carbide @ 1200°C |
| Reference | Helium Neon Laser (15798.2 cm ⁻¹) |
| Detector | Thermoelectrically (TE) cooled MCT (Hg Cd Te) |
| Certified Temperature Range | +5°C to +40°C |
| Purge Pressure | 20 psig (1.5 bar) max. |
| Spectrometer Purge Flow | 0.2 L/min of dry N ₂ or CO ₂ free clean, dry air with dewpoint below -70°C |
| Optics Purge Flow | 0.2 L/min of dry N ₂ or CO ₂ free clean, dry air with dewpoint below -70°C |
| Purge Connection | ¼" Swagelok® quick connect |
| Pressure Transducer | MKS Baratron® capacitance manometer |
| Dimensions | 444.5 W x 317.5 H x 647.7 D mm (17.5"W x 12.5"H x 25.5"D) |
| Enclosure | 19" Rack mount chassis |
| Power | 230VAC/50Hz or 115VAC/60Hz, 3 amps |
| Weight | 50 kg (110 lbs.) |
| Compliance | CE |
| Laser Safety | Class 1 laser product contains a Class 3R laser with continuous wave output at 633 nm |

Sampling Parameters

| | |
|--------------------|--------------|
| Sample Temperature | 191°C |
| Sample Flow | 1 to 2 L/min |
| Sample Pressure | 1 atm ±0.05 |

Gas Cell

| | |
|--------------|--|
| Construction | Ni coated Al |
| Mirrors | Ni plated Al substrate with corrosion resistant MgF ₂ coated gold surface |
| Path Length | 5.11m |
| Fittings | ¼" threaded Swagelok® |
| Tubing | Heated ¼" stainless steel |
| Windows | BaF ₂ |
| O-rings | Viton® |

Computer Requirements and Communication Options

| | |
|--------------------------------|---|
| Computer Requirements | Desktop or notebook (1024 x 768 resolution) Intel Pentium® PC, Microsoft® Windows® XP or Windows® 7 OS |
| Minimum Specification | Intel Pentium III, 850 MHz, Microsoft Windows XP, 256MB |
| Computer/FTIR Communications | RJ-45 Crossover Ethernet |
| Communication Protocol Options | TOOLweb® (HTML based), OPC, Modbus TCP/IP |



Ordering Information

Ordering Code

| | |
|-------------------|---------------------------|
| MultiGas 2030 CEM | Model No. 2030DD92FBKS13T |
|-------------------|---------------------------|

Spares and Accessories

| | |
|--|-----------|
| Gas Cell Window Kit (BaF ₂ /Viton®) | 133525-G3 |
| Filter Assembly | 134838-G1 |
| Replacement HeNe Laser | 001-8446 |
| Replacement IR Source Fan | 001-8498 |



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MKS Instruments, Inc. Global Headquarters

2 Tech Drive, Suite 201
Andover, MA 01810
Tel: 978.645.5500
Tel: 800.227.8766 (in USA)
Web: www.mksinst.com

MKS Instruments, Inc. Process & Environmental Analysis Solutions

651 Lowell Street
Methuen, MA 01844
Tel: 978.645.5500

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