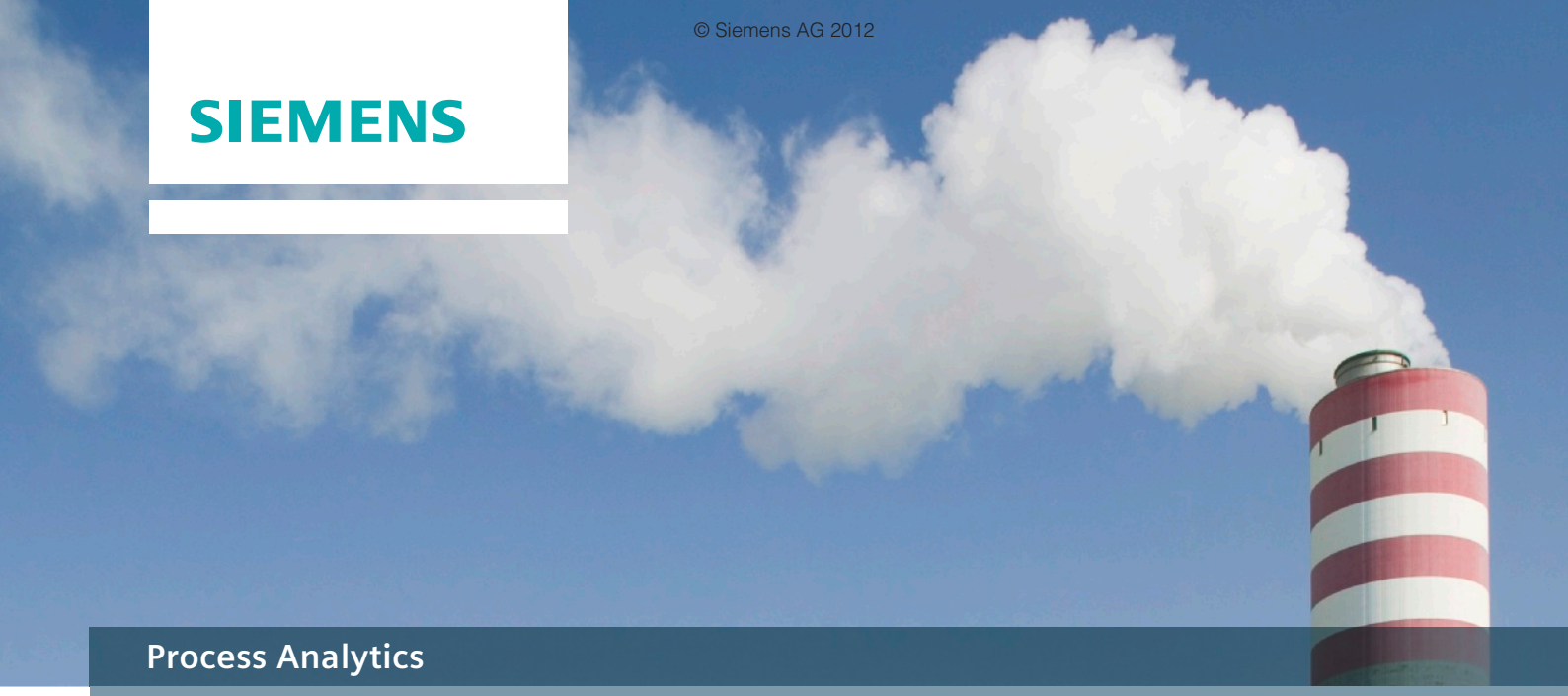
SIEMENS



Process Analytics

Gasmet CEMS

FTIR based individual or multi-component extractive gas analysis

The Gasmet CEMS FTIR measuring system is designed for continuous emissions monitoring measurements (CEM). Typical Fourier Transform Infrared (FTIR) spectroscopic based application is H_2O, CO_2, CO, N_2O, NO, NO_2, SO_2, HCl, HF, NH_3, CH_4, C_2H_6, C_3H_8 and C_2H_4 monitoring from waste incinerator or large combustion plants. Measured components and calibration ranges can be changed according to application.

The Gasmet CEMS is an ideal tool to use for measuring trace concentrations of pollutants in wet, corrosive gas streams. All parts of the Gasmet CEMS are heated up to 180 °C. It can be used for undiluted gases and the sample gases don't need to be dried before.

The Gasmet CEMS consists of Gasmet FTIR gas analyzer, an industrial computer, and a sampling system. As an option the system may be enhanced with a ZrO_2 oxygen analyzer and/or with a total organic carbon analyzer FIDAMAT 6. All parts of the system are 19" rack mounted and are installed on the pull-out shelves. The Gasmet CEMS includes all power connections and temperature controllers for heated lines and heated sample probe. The operation of the system is fully automatic and controlled by the Calcmet software. Additionally all functions of CEMS can be controlled manually.

siemens.com/processanalytics

Comprehensive I/O functions enables connection of CEMS to all kind of automation or reporting systems. Measuring data and alarms can be transferred from Gasmet CEMS to other systems with analog or digital format. Gasmet CEMS is also equipped with analog / digital inputs for external data from other analyzers or the process.

Gasmet CEMS provides different alarm functions such as System alarm, Service request, Maintenance on progress (can be set also manually), Concentration alarm, and Result valid. Each alarm can be set via Calcmet Software. If any of the critical alarms is activated, the system is automatically flushed with instrument air to prevent optics from condensation.

The Gasmet CEMS provides a various number of individual configurable automated maintenance possibilities. Standard CEMS is equipped with a two-solenoid valve to allow automated span/zero checks as required by the new legislation.

For example Gasmet CEMS carries out automatic „zero gas calibration" daily at definable times. With the help of controllable solenoid valves, the FTIR gas cuvette is flushed for several minutes with „zero gas", usually nitrogen, instead of sample gas.

An infeed of span gas using dry span gases is recommended at regular intervals, such as every 30 days, before infeed of the zero gas. Span gas infeed can also be automated via controllable solenoid valves. By use of optionally available solenoid valve extension sets even automated infeed of up to 4 span gases per valve set is possible for Gasmet CEMS.

For continuous measuring Gasmet CEMS FTIR recording of a new water spectrum using the FTIR unit of the analysis system is recommended once a year. Wet span gases for adjusting the system should also be supplied once a year for the gas components ammonia, hydrogen chloride and hydrogen fluoride.

You will be supported for such tasks - for QAL1 applications usually to be taken short in advance of yearly AST - by Siemens service solutions.

Gasmet CEMS is air conditioned with a compressor-cooling unit on rear (backdoor) of the cabinet. Cabinet includes ready made through-leading rubbers on each side and top of the cabinet for all cables and lines. Gasmet CEMS is also supported by full remote control.

The Gasmet CEMS FTIR provides a very low cost of ownership; the equipment is extremely well designed, and requires very little maintenance. The system also has a number of in-built failsafe devices to protect the instrument from potential damage.

The optionally available oxygen analyser for O_2 measurement of wet and dry exhaust gases and non-flammable gases has a ZrO_2 oxygen measuring cell inside, a microprocessor unit, analogue output, and digital I/Os. It may be controlled and operated completely via the Gasmet Calcmet software.

For QAL1 certified FID based measurement of TOC value Gasmet CEMS further may be enhanced by FIDAMAT6 analyzer.

Standard measuring components of Gasmet CEMS are:

- Water H_2O
- Carbon dioxide CO_2
- Carbon monoxide CO
- Nitrous oxide N_2O
- Nitrogen monoxide (Nitric oxide) NO
- Nitrogen dioxide NO_2
- Sulfur dioxide SO_2
- Ammonia NH_3
- Hydrogen chloride HCl
- Hydrogen fluoride HF
- Methane CH4
- Ethane C_2H_6
- Ethylene (Ethene) C_2H_4
- n -Propane C_3H_8
- n -Hexane C_6H_{14}
- Formaldehyde HCOH

Additional (optional) values derived from FTIR measurement by use of Calcmet software:

- NO_x concentration, calculated from N_2O, NO, and NO_2 measurement values
- TOC value (non-certified)

Certified components and measuring ranges for Gasmet CEMS, according to EN 14181	
CO	0 ... 75 mg/m³ 0 ... 300 mg/m³
SO_2	0 ... 75 mg/m³ 0 ... 500 mg/m³
HCl	0 ... 15 mg/m³ 0 ... 90 mg/m³
NO	0 ... 200 mg/m³ 0 ... 600 mg/m³
NO_2	0 ... 200 mg/m³
N_2O	0 ... 100 mg/m³
NH_3	0 ... 15 mg/m³
CO_2	0 ... 25 Vol%
H_2O	0 ... 30 Vol%
O_2	0 ... 25 Vol%[1)]
TOC	0 ... 15 mgC/m³[2)]

[1)] By use of optionally available ZrO_2 analyzer

[2)] By use of optionally available FIDAMAT 6

General parameters	
Measuring principle	FTIR (Fourier Transform Infrared) Spectroscopy Optionally: • for O_2: ZrO_2 measuring cell • for TOC: - FTIR (only for non-certified measurement) - FIDAMAT 6 (also for certified measurement acc. EN 14181)
Performance	Simultaneous analysis of up to 50 gas components
Operating temperature	20 ± 20 °C, non-condensing,
Temperature during transport and storage	-20 ... +60 °C
Response time, T90	< 180 s, 20 m heated line
Gas cell temperature (FTIR and O_2 measurements)	180 °C
Sample gas	Non-condensing, particle free
Flow rate	~ 4 liters per minute
Sample gas pressure	Ambient
Installation place	Dust free and clean ambient air, without external vibrations

Measuring parameters	
Zero point calibration	24 hours, calibration with nitrogen (5.0 or higher N_2 recommended).
Zero point drift	< 2 % of measuring range per zero point calibration interval.
Sensitivity drift	none
Linearity deviation	< 2 % of measuring range
Temperature drifts	< 2 % of measuring range per 10 K temperature change
Pressure influence	1 % change of measuring value for 1 % sample pressure change. Ambient pressure changes measured and compensated.

Signals (standard)	
Analog output	
• Output range	4 ... 20 mA, isolated
• Channels	16 freely programmable
Analog input	
• Input range	4 ... 20 mA, isolated
• Channels	8 freely programmable
Digital output	
• Output range	24 V DC
• Channels	16 freely programmable
	System alarm, Service Request, Maintenance, Concentration alarm, Results valid
Digital input	
• Control	By potential free contacts
• Channels	16 freely programmable
	Probe temp alarm, Zero gas pressure alarm, Cabinet temp alarm, Cabinet cooler alarm, Activate System Standby, Activate span test

Signals (optional)	
Up to 255 terminals can be connected	
Analog output	
• Output range	4 ... 20 mA, isolated
• Channels	4 or 8 channels / terminal
Analog input	
• Input range	4 ... 20 mA, isolated
• Channels	1, 4, or 8 channels / terminal
• Input range	0 ... 10 V, isolated
• Channels	8 channels / terminal
Digital output	
• Output range	24 V DC, isolated
• Channels	8 channels / terminal
Digital input	
• Control	By potential free contacts
• Channels	4 or 8 channels / terminal

Interfaces (optional)
Modbus, Modbus TCP/IP, PROFIBUS, ASCII, DDE link. RS 232 or RS 422/485

Air conditioning	
Cooling capacity	A 35 °C / A 35 °C 1 500 W A 50 °C / A 35 °C 1 100 W
Internal circulation	500 m^3/h

Electrical connections	
Main supply	400 V AC = 3 Phases 230 V / 50 Hz, 3 x 16 A, 3xL+N+PE (TN-S) Alternatively (at time of order placement): 3 Phases 115 V AC / 60 Hz, 3 x 32 A, 3xL+N+PE (TN-S)
Power consumption	~7.5 kW, for full Gasmet CEMS including sample probe and heated lines (21 m)

Instrument Air	
Instrument air inlet	6 mm tube
Instrument air quality	Dry, oil & particle free
Consumption	1 l/min, Continuous instrument purge
	15 l/min, Safety flushing (error mode)
	50 l/min, Waste gas dilution (optional)

Enclosure	
Material	Bake painted steel
Dimensions (mm)	2 100 x 600 x 800+250 mm (+250 mm is A/C unit on backdoor) Dimensions H x W x D in mm
Weight	~ 320 kg (System including FTIR and O_2 analyzers)[1)]
Protection	IP 54

[1)] Gasmet CEMS usually will be delivered in several packages.

Further information

For additional information, please contact us by e-mail:
processanalytics.automation@siemens.com

Siemens AG
Industry Sector
Sensors and Communication
Process Instrumentation
76181 KARLSRUHE
GERMANY