CODEL
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Product Brochure

GCEM 40 Series Range

In-situ and Extracting Single or Multi-species Infrared Absorption Analysers

ISO 9001:2015 Quality Certification

ISO 14001:2015 Environmental Certification

Monitoring Solutions SmartCem **www.codel.co.uk**

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The GCEM40E hot extractive multi-channel gas analyser is CODEL's industry-proven continuous emissions monitor for difficult applications. Designed exclusively for use on a wide range of applications where the flue gas temperature is abnormally high, low or saturated.

Three decades of development, knowledge and practical experience have been utilised to produce this advanced technology gas analyser which gives complete flexibility of use on process or emissions applications whilst delivering super accuracy and repeatability at a competitive price.

Many conventional extractive systems require the sampled gas to be cleaned and dried to a very high standard prior to analysis, invariably resulting in a high maintenance demand. Such elaborate pre-conditioning is not required; the GCEM40E creates 'perfect' duct conditions in a temperature controlled chamber within a separate free-standing cabinet.

Process conditions are extracted using a heated probe system which has an option of compressed air blow-back for excessively dusty applications. Once the sample has been drawn it is simply cooled (or heated) then transferred along a heated sample line, without further conditioning, to be measured using a CODEL multi-channel analyser housed in the cabinet.

Features and Benefits

- Single or Multi-gas infrared analyser
- Analogue outputs, relay outputs and RS485 serial output
- Automatic normalisation to STP using integral sensors
- Optional Oxygen sensor for normalisation to mg/Nm3
- Automatic verification using bottled audit gases
- Suitable for small or large ducts

Typical Applications

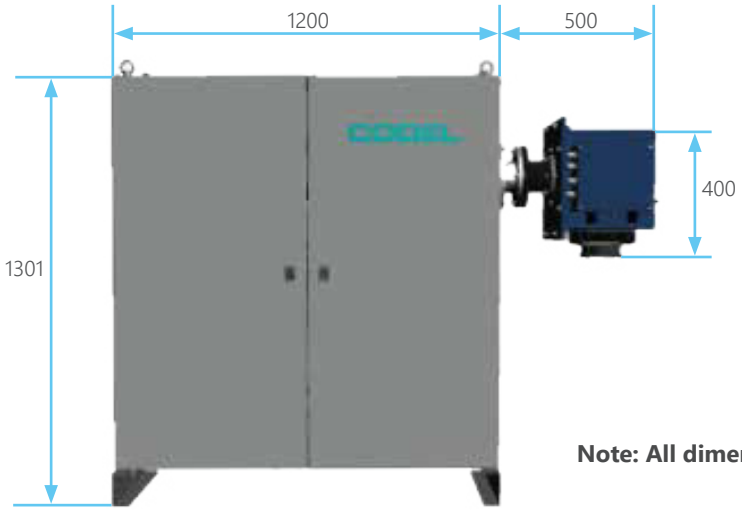
- Emission Monitoring
- Combusion Processess
- Gas Turbines
- Crematoria
- Steam Boilers to 50MW
- Thermal Oxidisers
- Animal Carcass Incineration
- Biomass Boilers
- Diesel Engine Sets
- Small Diameter Stacks
- High Temp Applications
- Silo Monitoring

Heated measurement chamber (PTFE coated 316L SS) with precise temperature control over 5 zones and integral pressure measurement

Environmental agencies demand that continuous emission analysers have the facility to prove their performance using known concentration audit gasses. The GCEM40E provides the facility to automatically check and control zero calibration point using clean, dry compressed air or nitrogen. Where independent span checks are required, bottled gases of known concentration can be injected directly into the measurement chamber.

The GCEM40E analyser is capable of measuring a range of CO, NO, NO2, NOx, SO2, CH4, HCl, CO2, H2O and O2 and with integral temperature and pressure sensors can compute fully normalised data directly in mg/Nm3.

Overall Dimensions



Note: All dimensions are in mm

Technical Specification

Sensor Unit

Gas Species Options	CO2, H2O & O2 as standard plus up to maximum 4 gases from: CO, NO, NO2, NOx, SO2, HCl, CH4		
Measuring units	ppm, mg/Nm^3, mg/m^3 , %		
Response Time	Less than 200 Seconds (T90)		
Gas Temperature	Below dewpoint to 1300°C		
Calibration	Automatic and manual zero/span verification		
Gas Species	CO, NO, NO2, NOx, SO2, HCl, CH4	02	CO2, H2O
Max Measuring Range	0 - 6000 ppm or 0 - 6000 mg/Nm3, higher ranges available on request	0.1 - 25%	0 - 25%
Accuracy	+/- 2ppm or 2% of span	0.5% O2	0.5% or 2% of span
Resolution	+/- 1ppm	0.1% O2	0.1%
Zero & span drift	+/- 2ppm or 2% of span per month	N/A	0.5% or 2% of span
Linearity	+/- 2% of span	N/A	2% of span
Repeatability	+/- 5ppm or 1% of span	0.5% O2	0.3% or 1% of span
Ambient Temperature	-20°C to +50°C		
Optical Path Length	2 Meters		
Construction	Corrosion resistant epoxy coated aluminium housing sealed to IP66		
	-20 to +50°C Certified		
	-20 to +55°C On request		
	up to 300°C (standard probe)		
	up to 400°C (high-temperature probe)		

Compliances

EMC	89/336/EEC directive compliant
Low Voltage	73/23/EEC directive compliant

Analyser Cabinet

Analogue Outputs	4-20mA current outputs for each gas channel supplied, isolated, 500Ω load max, fully configurable from software
Logic Outputs	up to 8 x volt-free SPCO contacts, 50V, 1A max, configurable as alarm and system status contacts
Inputs	4 x 4-20mA as standard (upto 8 total optional
Serial Data	RS232 / RS485 (modbus protocol)
Construction	Mild steel construction powder coated to IP55
Ambient Temperature	-20°C to +50°C
Power Supply	220 - 240VAC @ Min 2500W (With optional sample line add 66W/m + sample probe power consumption)
Air Dryer	Minimum 20L/min @ 6 Bar

Options

Heated Sample Line

Dual Core	Sample + span gas lines, self regulating heating up to 180°C. Mains supply for sample probe.

Heated Sample Line

Standard Probe	<2g/m3, dust load, no back purge (Optional filters for higher dust loads >2g/m3)
Standard Probe with Back Purge	<2g/m3, dust load, back purge (Optional filters for higher dust loads >2g/m3)

Stack Gas Temperature

Type K Thermocouple	0 - 300°C / 0 - 600°C / 0 - 900°C Options Availbale

Data Presentation (optional)

CODEL SmartCEM Software	Via integrated 15" Touch Screen Panel PC or external PC

The GCEM40E can be GSM enabled allowing online remote diagnostic information for technical support.

GCEM40 Series Gas Analyser

SmartCem

The GCEM40 series is the latest generation of CODEL's world renowned in-situ monitors. Our development, knowledge and practical experience have been utilised to produce this advanced technology gas analyser which gives complete flexibility of use on process or emissions applications whilst delivering superb accuracy and repeatability at a very competitive price.

The analyser uses a field proven in-situ 316 stainless steel probe designed for the harshest stack conditions to measure directly in the flue stream. The design of the probe enables accurate measurements to be made even in very high dust level processes exceeding several gram/m3.

All models are fitted with a probe mounted temperature sensor. Pressure, CO2 and H2O can be measured as an additional option to provide fully normalised data in mg/Nm3.

Designed for use primarily on combustion processes, the GCEM40 series measures key pollutants such as CO, NO, NO2, NOx, SO2, CH4, CO2 and H2O using an infra-red spectroscopy to ensure that there is no cross sensitivity from other contaminants in the gas stream.

Features and Benefits

- In-situ stainless steel probe measurement.
- CO, NO, NO2, NOx, SO2, CH4, HCl, CO2 & H2O
- Gas temperature and pressure sensors, on-board normalisation
- Export of data to SCADA, DCS and Data Acquisition System
- Analogue & serial digital output
- Certified to EN15267

Typical Applications

- Large Combustion Plants
- FGD Process
- Renewable Energy
- Steel Plant
- Small Combustion Plants
- Power Generation
- Power Generation
- SCR and SNCR Process
- Energy From Waste
- Metals Processes
- Glass Manufacturing
- Chemical Plant

The GCEM40 Series has both TUV and MCERT certification which signifies the accuracy and reliability of its measuring capabilities.

The GCEM40 series analysers can be configured in either single or multi-gas mode to give operators a full range of options. Fully automated zero and span calibrations are performed using clean dry compressed air and protocol gas mixtures to provide long-term accuracy along with minimal maintenance requirements.

Remotely mounted pneumatics in a panel allow zero air to be injected automatically to verify the zero calibration as well as clean and protect the filters on the probe. Span gas can be injected manually to verify the analyser response.

Technical Specification

Sensor Unit

Operating Principle	NDIR gas filter correlation
Span	0 to 3000ppm (CO, NO, SO2) 0 to 25% (CO2, H2O)
Certified Ranges	0-500ppm, 0-1000ppm for CO,NO & SO2 to EN15267
Response Time	<200secs
Accuracy	+/-2ppm, +/-2mg/Nm3 or +/-2% of span
Resolution	1ppm, 1mg/m3, 1mg/Nm3
Calibration	Zero - automatic every 24 hours Span - manually on demand
Probe Length	1m , 2m and 2.2m (NEW low weight 1m)
EMC	EN50270:2006,EN61000-3-2+A1&A2:2009,EN61000-3-3:2008
Low Voltage	61010-1 (Edition 3)
Analogue Ouput	5 x 4 to 20mA isolated, 500Ω load, fully configurable from keypad.
Logic Ouput	5 x volt-free SPCO contacts, 50V, 1A max, configurable as alarms 1 x volt-free SPCO contact, 50V, 1A max, for data valid
Serial Output	RS485 modbus configured
DDU display	32-character alpha-numeric back lit LCD
Keypad	4-key soft-touch entry
Construction	Probe - 316L stainless steel Head & DDU - Powder coated aluminium (IP66)
Ambient Temperature	-20 to +50°C Certified -20 to +55°C On request
Flue Gas Temperature	up to 300°C (standard probe) up to 400°C (high-temperature probe)
Power Requirements	24V DC @ 15A
Compressed Air Requirements	Dry & oil free, 20 litre/min @ 4bar for calibration and purging; 2 litre/min @ 4bar normal operation

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	up to 300°C (standard probe)
	up to 400°C (high-temperature probe)
	24V DC @ 15A
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	2 litre/min @ 4bar normal operation

Options

Dust Sheild	For applications with over 400mg of constant dust loading
Power Supply	110/220VAC , 50Hz +/- 10%, 400VA to 24V DC @ 15A

The GCEM40E can be GSM enabled allowing online remote diagnostic information for technical support.

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