

# CODEL

Monitoring Solutions

GCEM 40 Range

Multi-species infrared absorption analyser

Suitable for difficult application measurements

In-Situ and Hot wet extractive low maintenance Systems

High temperature to below dew point measurements

Wide range of sample probe options



Tested AMS  
Regular  
Surveillance

www.tuv.com  
ID 000050624

ISO 9001:2008

Quality Certification

Monitoring Solutions

SmartCem

www.codel.co.uk

The GCEM40 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 superb 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 GCEM40 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.

## Extractive low cost, low maintenance device for continuous process and emissions monitoring



Environmental agencies demand that continuous emission analysers have the facility to prove their performance using known concentration audit gasses. The GCEM40 provides the facility to automatically check and control zero calibration point using clean, dry compressed air. Where independent span checks are required, bottled gases of known concentration can be injected directly into the measurement chamber.

The GCEM40 analyser is capable of measuring a range of CO, NO<sub>x</sub> (Expressed as NO<sub>2</sub>), SO<sub>2</sub>, CH<sub>4</sub>, HCl, CO<sub>2</sub>, H<sub>2</sub>O and O<sub>2</sub> simultaneously and with integral temperature and pressure sensors can compute fully normalised data directly in mg/Nm<sup>3</sup>.

The analyser can be easily incorporated into the CODEL SmartCEM system along with dust, flow and oxygen signals to deliver a complete emission monitoring solution capable of meeting today's tough legislative demands.

## Typical Applications

Emission Monitoring  
 Combustion Processes  
 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  
 Road Stone Coating  
 Cement Processing  
 Blast Furnace Off Gas  
 Land Fill Monitoring

- ✓ 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/Nm<sup>3</sup>
- ✓ Automatic verification using bottled audit gases
- ✓ Suitable for small or large ducts
- ✓ High temperature applications
- ✓ Optional integral monitor for local display
- ✓ Powerful data presentation software
- ✓ Variety of extractive probes for all applications
- ✓ EN14181 QAL3 reporting
- ✓ Simple installations

**Extractive low cost, low maintenance device for continuous process and emissions monitoring**

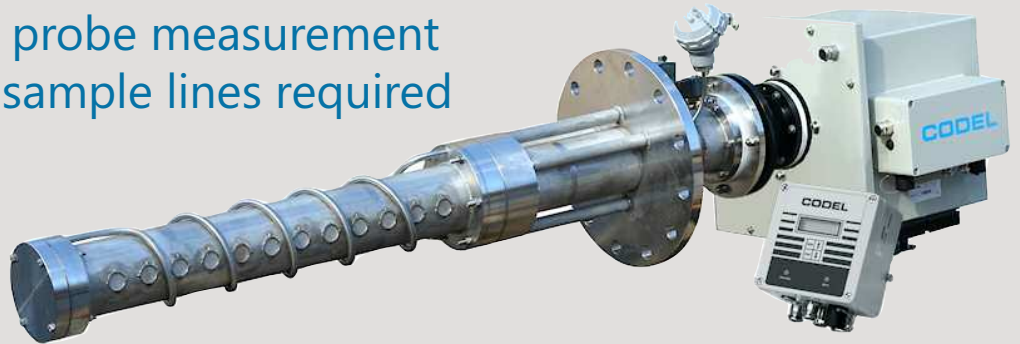


This product can be GSM enabled allowing online remote diagnostic information for technical support.

In-situ low cost, low maintenance analyser for continuous process and emissions monitoring providing accurate and reliable measurements

The GCEM40 Series can be configured with different probe sizes to suit difficult applications

In-situ stainless steel probe measurement  
Single unit install, no sample lines required



Suitable for a wide range of process applications and emission monitoring

The GCEM40 Series is suitable for a wide range of process and application where there is a requirement for gas monitoring.

- Large Coal Fired Power Plants
- Combustion Processes and control
- FGD
- Small Process Boilers



### Input & Output

Data can be exported to SCADA, DCS and Data Acquisition Systems

4-20mA current outputs as standard

Volt-Free SPCO contact outputs

4-20mA Input for oxygen

Volt free logic input for plant status or remote calibration initiation

RS-485 Bidirectional Modbus



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/m<sup>3</sup>.

All models are fitted with a probe mounted temperature sensor. Pressure, CO<sub>2</sub> and H<sub>2</sub>O can be measured as an additional option to provide fully normalised data in mg/Nm<sup>3</sup>.

Designed for use primarily on combustion processes, the GCEM40 series measures key pollutants such as CO, NO<sub>x</sub> (Expressed as NO<sub>2</sub>), SO<sub>2</sub>, CO<sub>2</sub> and H<sub>2</sub>O using an infra-red spectroscopy to ensure that there is no cross sensitivity from other contaminants in the gas stream.

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.



Tested AMS  
Regular  
Surveillance

www.tuv.com  
ID 0000050624



This product can be GSM enabled allowing online remote diagnostic information for technical support.

## Technical Specification

## Sensor Unit

Gas Species Options	Single or multi-gas measurements available: CO <sub>2</sub> , H <sub>2</sub> O & O <sub>2</sub> as standard plus up to maximum 3 gases from: CO, NO <sub>x</sub> , SO <sub>2</sub> , HCl, CH <sub>4</sub>	
Measuring units	ppm, mg/Nm <sup>3</sup> , mg/m <sup>3</sup> , %	
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 <sub>x</sub> , SO <sub>2</sub> , HCl, CH <sub>4</sub>	CO <sub>2</sub> , H <sub>2</sub> O
Max Measuring Range	0 - 6000 ppm, higher ranges available on request	0 - 25%
Accuracy	+/- 2ppm or 2% of span	0.5% or 2% of span
Resolution	+/- 1ppm	0.1%
Zero & span drift	+/- 2ppm or 2% of span per month	0.5% or 2% of span
Linearity	+/- 2% of span	2% of span
Repeatability	+/- 5ppm or 1% of span	0.3% or 1% of span
Ambient Temperature)	-20°C to +55°C	
Construction	Corrosion resistant epoxy coated aluminium housing sealed to IP66	

## Compliances

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

## Analyser Cabinet

Analogue Outputs	8 x 4-20mA current outputs for each gas channel supplied, isolated, 500Ω load max, fully selectable
Logic Outputs	up to 8 x volt-free SPCO contacts, 50V, 1A max, configurable as alarm 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 +55°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.
-----------	--

## Probe

Standard Probe	<2g/m <sup>3</sup> dust load, no back purge (Optional filters for higher dust loads >2g/m <sup>3</sup> )
Standard Probe with Back Purge	<2g/m <sup>3</sup> dust load, back purge (Optional filters for higher dust loads >2g/m <sup>3</sup> )

## 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
-------------------------	---

## Technical Specification

## Sensor Unit

Operating Principle	NDIR gas filter correlation
Span	0 to 3000ppm (CO, NO, SO <sub>2</sub> ) 0 to 25% (CO <sub>2</sub> , H <sub>2</sub> O) Ranges are fully site selectable. Higher ranges on request
Certified Ranges	0-500ppm, 0-1000ppm for CO,NO & SO <sub>2</sub> to EN15267
Response Time	<200secs
Accuracy	+/-2ppm or +/-2% of span
Resolution	1ppm
Calibration	zero - automatic every 24 hours span - manually on demand
Probe Length	1m , 1.8m and 2.3m (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

## Options

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

# CODEL

Monitoring Solutions

CODEL International LTD  
Station Building  
Station Road  
Bakewell, Derbyshire  
DE45 1GE

Tel : +44 (0)1629 814351  
Fax : +44 (0)1629 566307  
Web : [www.codel.co.uk](http://www.codel.co.uk)  
email : [Sales@codel.co.uk](mailto:Sales@codel.co.uk)



Distributor