

## COMTEC®

*O<sub>2</sub> / CO<sub>e</sub> InSitu analyzer systems*

DEVELOPED AND  
MANUFACTURED  
IN GERMANY



**THE COMBUSTION  
OPTIMIZER**



# ENOTEC® SENSOR TECHNOLOGY

The family of *ENOTEC* sensors are engineered for maximum durability. *ENOTEC* use only the most robust materials in creating sensors, giving them an operational life span superior to any comparative sensor on the world market.

The *ENOTEC* MLT sensor is the premium sensor for measurement of oxygen in harsh process conditions, such as with high dust loads, aggressive or corrosive flue gas compositions. The MLT O<sub>2</sub> sensors are produced with additional sacrificial layers, making them highly resilient and robust.

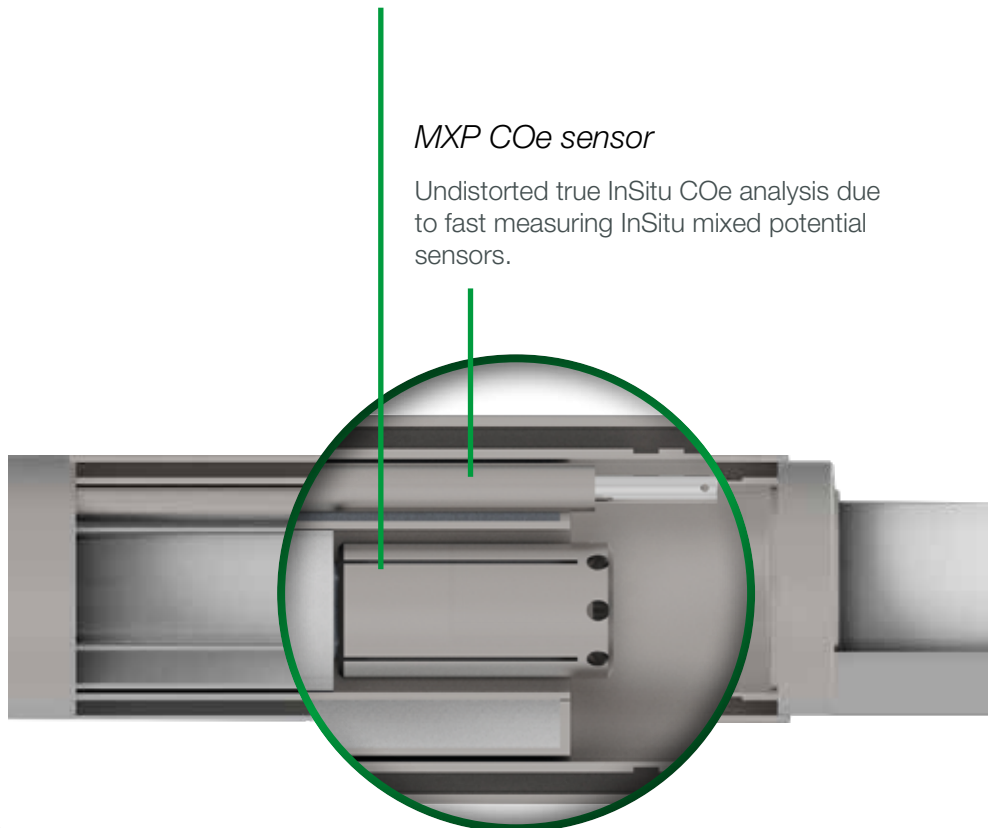
The *ENOTEC* MXP sensor installed in *COMTEC* probes provide a supplementary measurement of combustibles in addition to oxygen measurement from the MLT sensor. This additional measurement guarantees a safer combustion as the COe and oxygen content in flue gas are directly related to each other.

## *MLT O<sub>2</sub> sensor*

The best sensor for measurement of O<sub>2</sub>, which is just as reliable and robust in reducing atmospheres, thanks to integrated Cell Surface Protection (optional).

## *MXP COe sensor*

Undistorted true InSitu COe analysis due to fast measuring InSitu mixed potential sensors.



Cross section of filter head



COMTEC KEX-6001 probe

**ROBUST SENSORS,  
DESIGNED TO LAST**



# COMTEC®

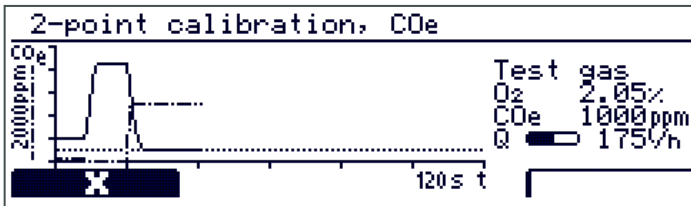
## CO<sub>e</sub> – THE INDICATOR OF SAFE COMBUSTION

The „e“ in CO<sub>e</sub> represents the word equivalent and refers to the sum of unburned molecules such as carbon monoxide (CO), methane (CH<sub>4</sub>) or hydrogen (H<sub>2</sub>) in the process gas.

This group of unburned molecules form, apart from oxygen molecules, the only gases in which by means of InSitu measurement, the quality of combustion can be analysed.

High CO<sub>e</sub> values are an indicator for an inefficient, climate harmful and plant hostile process control. From a safety point of view, monitoring the CO<sub>e</sub> values can also be used for recognition of smouldering fires.

### FAST RESPONSE TIME



Here a 2-point calibration is taking place showing the actual oxygen and CO<sub>e</sub> content - here 2.05 % O<sub>2</sub> and 1000 ppm CO<sub>e</sub>. The fast reaction to process gas after calibration (< 5 seconds) is evident and this speed of measurement is the same when the sensor reacts to changes of the oxygen concentration in flue gas. Efficient regulation of the combustion process is thus possible.



...and more interfaces available.

### DYNAMICS OF THE PROCESS

Calibration results	
O <sub>2</sub> volt.at test gas	49.48 mV
O <sub>2</sub> sensor life	0  ■■■■■■■■  100%
CO <sub>e</sub> volt.at test air	-0.90 mV
CO <sub>e</sub> volt.at test gas	34.08 mV

The possibility to refer to earlier calibrations enhances knowledge of the process conditions and reduces the risk of handling errors during future calibrations. The self-monitoring and self-diagnostic functions of ENOTEC analyzer systems include „O<sub>2</sub> Sensor Life“, which informs of the state of the O<sub>2</sub> sensor.



# COMTEC® 6000

## INSITU MEASUREMENTS IN SAFE AREAS

COMTEC 6000 measures O<sub>2</sub> and COe InSitu, this enables an increased ability for combustion control with high accuracy in real time. The COe sensor detects all unburned components (CO, H<sub>2</sub>, C<sub>x</sub>H<sub>y</sub>) for fine tuning of the process. As a result fuel consumption and emissions are reduced.

After combustion, H<sub>2</sub>, CH<sub>4</sub> etc. may be present in the exhaust gas and cannot be detected by a CO measurement alone.

These components in higher concentrations are the result of inefficient combustion. For this reason, it is important to measure COe, not only CO.

The COMTEC 6000 is a true InSitu measurement where both the O<sub>2</sub> and the COe sensors measure directly in the process.

No gas extraction takes place which makes the COMTEC 6000 perfect for high dust applications such as for ESP protection or for process control in coal fired power plants and cement plants.

### TECHNICAL DATA

INSERTION DEPTH OF PROBE	up to 1820mm
O <sub>2</sub> / COe RANGES	0 % O <sub>2</sub> to 100 % O <sub>2</sub> 1 range, min.: 0-1000 ppm COe max.: 0-5000 ppm COe (factory adjustable, other ranges on request)
MEASUREMENT ACCURACY O <sub>2</sub>	< 0.5 % of measured value or 0.02 Vol. % O <sub>2</sub>
MEASUREMENT ACCURACY COe	< 5.0 % of range end
REACTION TIME ON TEST GAS	0.5 s (process flow velocity > 10 m/sec.)
PROCESS GAS TEMPERATURE	max. 500 °C max. 1400 °C (with cooling protection tube)
AMBIENT TEMPERATURE	-40 °C to 80 °C (probe) -20 °C to 55 °C (electronic unit)
INTERFACE	HART, FIELDBUS, RS485, MODBUS RTU, RS232, ENOTEC Remote
IP CODE	probe - IP65 electronic unit - IP66



**MAINTAINS SAFE OPERATING CONDITIONS**



COMTEC 6000 O<sub>2</sub> / COe safe area analyzer



# COMTEC® 6000 Gas Ex

## INSITU MEASUREMENTS IN HAZARDOUS AREAS

Safe, reliable and accurate are the main characteristics of the ATEX certified COMTEC 6000 GasEx. The COMTEC 6000 GasEx is an Ex protected analyzer for safe measurement of oxygen and combustibles in gas hazardous environments (gas explosion Zones 1/2).

The patented probes are highly robust and withstand even the harshest flue gas conditions.

Using the COMTEC 6000 GasEx, plant safety is enhanced while lowering emissions by controlling the fuel/air ratio in the combustion process.

### TECHNICAL DATA

INSERTION DEPTH OF PROBE	up to 863 mm
O <sub>2</sub> / COe RANGES	0 % to 21% O <sub>2</sub> 1 range, min.: 0-1000 ppm COe max.: 0-5000 ppm COe (factory adjustable, other ranges on request)
MEASUREMENT ACCURACY O <sub>2</sub>	< 0.5 % of measured value or 0.02 Vol. % O <sub>2</sub>
MEASUREMENT ACCURACY COe	< 5.0 % of range end
REACTION TIME ON TEST GAS	0,5 s (process flow velocity > 10 m/sec.)
PROCESS GAS TEMPERATURE	max. 500 °C max. 1400 °C (with cooling protection tube)
AMBIENT TEMPERATURE	-40 °C to 70 °C (probe) -20 °C to 55 °C (electronic unit)
INTERFACE	HART, FIELDBUS, RS485, MODBUS RTU, RS232, ENOTEC Remote
IP CODE	probe - IP66 electronic unit - IP66

Certified in operation for realistic process conditions by an independent German ATEX test house.



II 2G Ex db IIC T3 Gb (probe)  
II 2G Ex db IIC T6 Gb (electronic unit)  
II 2D Ex tb IIIC T85°C Db



**ATEX APPROVED  
FOR YOUR PROCESS  
CONDITIONS**

COMTEC 6000 Gas ATEX  
O<sub>2</sub> / COe analyzer system

# COMTEC® 6000 Dust $\epsilon_x$

## INSITU MEASUREMENTS IN HAZARDOUS AREAS

The COMTEC 6000 DustEx provides permanent and reliable gas analysis in processes with potentially explosive dust.

The probe design used for the DustEx is extremely robust and withstands the abrasive forces of dust laden process gases. The ATEX certification for the DustEx is for dust explosion protection zones 21/22.

These characteristics are the foundation for energy optimisation and fuel reduction, as well as safe operation by means of accurate process control.

### TECHNICAL DATA

INSERTION DEPTH OF PROBE	up to 960 mm
O <sub>2</sub> / COe RANGES	0 % to 21 % O <sub>2</sub> 1 range, min.: 0-1000 ppm COe max.: 0-5000 ppm COe (factory adjustable, other ranges on request)
MEASUREMENT ACCURACY O <sub>2</sub>	< 0.5 % of measured value or 0.02 Vol. % O <sub>2</sub>
MEASUREMENT ACCURACY COe	< 5.0 % of range end
REACTION TIME ON TEST GAS	0,5 s (process flow velocity > 10 m/sec.)
PROCESS GAS TEMPERATURE	max. 600 °C
AMBIENT TEMPERATURE	-20 °C to +40 °C / +70 °C* (probe) -20 °C to 55 °C (electronic unit)
INTERFACE	HART, FIELDBUS, RS485 MODBUS RTU, RS232, ENOTEC Remote
IP CODE	electronic unit - IP66 probe - IP66

Certified in operation for realistic process conditions by an independent German ATEX test house.



II 2D Ex tb IIIC T133°C/T141°C Db

\* The ATEX certificate must be used to determine the permissible temperature range.



COMTEC 6000 Dust ATEX  
O<sub>2</sub> / COe analyzer system



# COMTEC®

## SAFE AND CLEAN COMBUSTION

### COMPANY

ENOTEC has provided gas sensing solutions since 1980, producing products with a high degree of accuracy, quality and durability - Made in Germany.

Our flexibility allows us to quickly develop solutions individually designed to meet your problems.

On request, we also offer after delivery service concepts - the world over.

### SYSTEM FEATURES

- > InSitu measurement in real-time
- > Overview of calibration history
- > Overview of calibration
- > Low-maintenance design
- > Self-monitoring
- > Sensor life expectancy on display
- > Gas tight sensor construction

### CONTACT

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Simple control of ENOTEC analyzers



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