

# *CTS - 7*

## **STATIONARY GAS ANALYSER**



The stationary gas analyser CMS-7 is installed in a robust metal housing with a lockable transparent door. It can be either wall-mounted or stand on a table. The instrument consists of three separate panels: power supply, Peltier gas conditioner and analyser. The sample gas is transported over a heated hose with integrated heated filter to the analyser. The measurement results can be read directly from the integrated screen, transported to a PC over RS232C or placed on the standard analogue current/voltage outputs.

## ***Main Features***

### ***Measurement of gas concentrations***

Gases measured with NDIR sensors (max 2 sensors): CO<sub>2</sub>, CH<sub>4</sub>

Gases measured with electrochemical sensors (max. 9 sensors): O<sub>2</sub>, CO, NO, NO<sub>2</sub>, SO<sub>2</sub>, H<sub>2</sub>, H<sub>2</sub>S. Other gases on request

### ***Measurement of other values***

Gas and ambient temperatures

Positive, negative and differential pressure with 1 Pa resolution

Atmospheric pressure (800...1200 hPa)

### **Calculations**

CO<sub>2</sub> concentration

Calculation of all relevant combustion parameters

### ***Display of Results***

All measured and calculated values can be shown on the display as current or average values

Averaging of all measured values. Averaging times: 2, 10, 20, 30, 60, 120 and 180 seconds

Display of all values as graphs

Data logger on MMC card

-Complete PC software for data processing and on-line communication

Voltage outputs: 8 channels 0...10 V

Current outputs: 8 channels 0/4...20 mA

### ***Software Features***

International compatibility (language, date format, units etc.)

Automatic zeroing after switching on.

Calibration of O<sub>2</sub>/CO<sub>2</sub> possible during measurement

All parameters can be programmed

Complete list of 22 fuels

Further fuels can be programmed by user

Automatic permanent check of instrument in the "control list". Acoustic and optical warning

Cross-sensitivity and temperature drift of sensors compensated automatically

### ***Hardware Features***

Peltier gas conditioner with condensate pump

Integrated clock/calendar

Large LCD display with backlighting

Gas probe with thermocouple

Heated inlet filter

Heated gas hose

PC interface RS 232 C

Component	Method	Range	Resolution	Accuracy	Detection Level	Time (T90)
<b>Standard gas measurements</b>						
O <sub>2</sub> - Oxygen, Volume concentration	electrochemical sensor	0..25 %	0.01%	±0.2 % or 2 % rel.	0.01%	45 s
CO <sub>2</sub> – Carbon dioxide, Volume concentration	Calculated from O <sub>2</sub> volume concentration	0..25 %	0.01 %	±0.2 % or 2% rel.	0.01%	45 s
CO – Carbon monoxide, Volume concentration	electrochemical sensor	0..2000 ppm	0.1 ppm or 1 ppm as set	±0.5 ppm or 5 % rel.	0.1 ppm	45 s
CO - Carbon monoxide, Volume concentration	electrochemical sensor	0..20000 ppm	1 ppm	±5 ppm or 5% rel.	1 ppm	45 s
CO Carbon monoxide, Volume concentration	electrochemical sensor	0..10 %	10 ppm or 0.001 %	±50 ppm or 5 % rel.	10 ppm	45 s
COmg – Carbon monoxide, mass concentration	Calculated from CO volume concentration	0...	1 mg/Nm <sup>3</sup>	± 5 mg/Nm <sup>3</sup> or 5 % rel.	1 mg/Nm <sup>3</sup>	45 s
COrel – Carbon monoxide, concentration relative to O <sub>2</sub>	Calculated from CO and O <sub>2</sub> volume concentrations	0...	1 mg/Nm <sup>3</sup>	± 5 mg/Nm <sup>3</sup> or 5 % rel.	1 mg/Nm <sup>3</sup>	45 s
NO – Nitric oxide, Volume concentration	electrochemical sensor	0..1000 ppm	0.1 or 1ppm as set	±5 ppm or 5 % rel.	1 ppm	45 s
NOmg – Nitric oxide, mass concentration	Calculated from NO volume concentration	0...	1 mg/Nm <sup>3</sup>	±10 mg/Nm <sup>3</sup> or 5 % rel.	2 mg/Nm <sup>3</sup>	45 s
NOrel – Nitric oxide, concentration relative to O <sub>2</sub>	Calculated from NO and O <sub>2</sub> volume concentrations	0...	1 mg/Nm <sup>3</sup>	±10 mg/Nm <sup>3</sup> or 5 % rel.	2 mg/Nm <sup>3</sup>	45 s
<b>Optional electrochemical sensors</b>						
NO <sub>2</sub> – Nitrogen dioxide, Volume concentration	electrochemical sensor	0...200 ppm	0.1 or 1 ppm as set	± 5 ppm or 5 % rel.	1 ppm	45 s
NO <sub>2</sub> mg – Nitrogen dioxide, mass concentration	Calculated from NO <sub>2</sub> volume concentration	0...	1 mg/Nm <sup>3</sup>	± 10 mg/Nm <sup>3</sup> or 5 % rel.	2 mg/Nm <sup>3</sup>	45 s
NO <sub>2</sub> rel - Nitrogen dioxide concentration, relative to O <sub>2</sub>	Calculated from NO <sub>2</sub> and O <sub>2</sub> volume concentrations	0...	1 mg/Nm <sup>3</sup>	±10 mg/Nm <sup>3</sup> or 5 % rel.	2 mg/Nm <sup>3</sup>	45 s
SO <sub>2</sub> – Sulphur dioxide, Volume concentration	electrochemical sensor	0...2000 ppm	0.1 or 1 ppm as set	±5 ppm or 5 % rel.	1 ppm	45 s
SO <sub>2</sub> mg – Sulphur dioxide, mass concentration	Calculated from SO <sub>2</sub> volume concentration	0...	1 mg/Nm <sup>3</sup>	± 15 mg/Nm <sup>3</sup> or 5 % rel.	3 mg/Nm <sup>3</sup>	45 s
SO <sub>2</sub> rel – Sulphur dioxide concentration, relative to O <sub>2</sub>	Calculated from O <sub>2</sub> and SO <sub>2</sub> volume concentrations	0...	1 mg/Nm <sup>3</sup>	±15 mg/Nm <sup>3</sup> or 5 % rel.	3 mg/Nm <sup>3</sup>	45 s
H <sub>2</sub> S – Hydrogen sulphide, Volume concentration	electrochemical sensor	0...2000 ppm	0.1 or 1 ppm as set	±5 ppm or 5 % rel.	1 ppm	45 s
H <sub>2</sub> Smg – Hydrogen sulphide, mass concentration	Calculated from H <sub>2</sub> S volume concentration	0...	1 mg/Nm <sup>3</sup>	±15 mg/Nm <sup>3</sup> or 5 % rel.	3 mg/Nm <sup>3</sup>	45 s
H <sub>2</sub> Srel – Hydrogen sulphide, mass concentration relative to O <sub>2</sub>	Calculated from H <sub>2</sub> S and O <sub>2</sub> volume concentrations	0...	1 mg/Nm <sup>3</sup>	±15 mg/Nm <sup>3</sup> or 5 % rel.	3 mg/Nm <sup>3</sup>	45 s
H <sub>2</sub> –Hydrogen, volume concentration	electrochemical sensor	0...1000 ppm	0.1 or 1 ppm as set	±5 ppm or 5 % rel.	1 ppm	45 s
H <sub>2</sub> mg – Hydrogen, mass concentration	Calculated from H <sub>2</sub> volume concentration	0...	1 mg/Nm <sup>3</sup>	±15 mg/Nm <sup>3</sup> or 5 % rel.	3 mg/Nm <sup>3</sup>	45 s
H <sub>2</sub> rel – Hydrogen, mass concentration relative to O <sub>2</sub>	Calculated from H <sub>2</sub> and O <sub>2</sub> volume concentrations	0...	1 mg/Nm <sup>3</sup>	±15 mg/Nm <sup>3</sup> or 5 % rel.	3 mg/Nm <sup>3</sup>	45 s
<b>Optional IR sensors</b>						
CO <sub>2</sub> – Carbon dioxide, Volume concentration	IR Sensor	0..25 % 0...100%	0.01%, 0.1%	0.20%	0.20%	45 s
CH <sub>4</sub> – Methane. Volume concentration	IR Sensor	0...5%, 0...100%	0.01%, 0.1%	0.20%	0.20%	45 s

Value	Method	Range	Resolution	Accuracy	Detection Level	Time (T90)
<b>Measured temperatures</b>						
<b>T<sub>gas</sub></b> – Temperature of the flue gases	Thermocouple	-20..2000°C	1°C	±2 °C or 1.5 % rel.	1 °C	30 s
<b>T<sub>amb</sub></b> – Ambient temperature	Thermistor	-20..100°C	0.1°C	±1 °C	1 °C	30 s
<b>Further values</b>						
<b>Atmospheric pressure</b>	DMS bridge	800 hPa ... 1200 hPa	1 hPa	±10 hPa	1 hPa	10 s
<b>Pressure/draught</b>	DMS bridge	-25 hPa ... +25 hPa	0.1 or 1 Pa as set	±2 Pa or 5 % rel.	0.1 Pa	10 s
<b>Diff. pressure</b>	DMS bridge	-20 hPa ... +20 hPa	0.1 or 1 Pa as set	±2 Pa or 5 % rel.	0.1 Pa	10 s
<b>V</b> – Flow velocity	Pitot tube	1..30 m/s	0.1 m/s	0.5 m/s or 2 % rel.	1 m/s	10 s
<b>Calculated combustion parameters</b>						
<b>TI</b> (CO/CO <sub>2</sub> -Toxic Index)	Calculated	0...1 %	0.01 %	0.01 %		
<b>Lambda</b> – Excess air	Calculated	1..10	0.01	0.01		
<b>qA</b> – Combustion loss	Calculated	0..100 %	0.1 %	0.1 %		
<b>Eta</b> -Efficiency	Calculated	0..100 %	0.1 %	0.1 %		

<b>Technical data</b>	
Size	W x L x H: 600 x 635 x 516 mm
Weight without probe	48 kg
Display size	Graphic LCD with backlighting. Contrast set by user, 320 x 240 pixels
Data logger	MMC 256 MB
Interface	RS232C
Supply	Mains 230 VAC 50 ÷ 60Hz
Gas pump	Membrane pump, set to 90 l/h
condensate pump	peristaltic pump, electronically controlled
Sampling	
Probe length	300mm (other lengths available)
Sample hose	Heated hose, 3 m
Gas filter	Heated filter 20 µm
Analogue outputs	
Voltage	8 channels: 0...10 V
Current	8 channels: 0/4...20 mA
Operating temperature	10°C ÷ 40°C
Storage temperature	-20 °C ÷ +55 °C
Humidity	5 - 90 %, non-condensing