



## IMR2000

Flue gas analyser and gas conditioning system – the 2-in-1 model for industrial applications

### PRODUCT ADVANTAGES FROM A-Z

- **Accumulator**  
Rechargeable lead acid battery guarantees 6 hours of independence from main power. The accumulator is protected against over charging.
- **Case**  
Built in a robust, protective case.
- **Data software**  
IPC - data software for online data transfer to a personal computer. Data evaluation with Microsoft Excel. IPC is available as option for the IMR 2000.
- **Display**  
Illuminated 4 line display, operator guidance in clear text, display of all parameters simultaneously in ppm, mg or mg [O<sub>2</sub>] ref.
- **Draft/pressure, different pressure measurement**  
Integrated measurement of the draft/pressure and different pressure in the flue.
- **Dust filter**  
Particle filter 4 µ.
- **Flue gas probe**  
Gas extraction probes with K-type thermocouple, heat insulated handle, stainless steel fixture cone. Standard lengths on request. PtRh-Pt-probe (gas temperature up to 1550°C) on request
- **Fuels types**  
18 pre programmed standard fuels, with the corresponding calculation factors, incl. O<sub>2</sub>-ref. values. Pre-programmed fuel factors can be corrected by the operator.
- **Gas conditioning (option)**  
Gas conditioning system with Peltier controlled heat exchanger built in next to the flue gas analyzer. Gas volume 150 l / h, outlet dew point 5 °C, operating and status indication by colored LED´s on the front panel. The gas conditioning system is maintenance free.
- **Interface**  
RS 232 C serial interface
- **Keyboard**  
Easy to operate keyboard with self-explanatory markings.
- **Mean value calculation**  
Integrated automatic calculation of mean values with automated printout to generate time related average emission values.
- **Memory**  
Manual memory
- **Power supply**  
230V/50 Hz or 110 V/60 Hz mains power supply, 12V from the built-in battery.
- **Printer**  
integrated thermo printer.
- **Probe tubing**  
Standard length 3.5 m. Extensions are available.
- **Protocol**  
Print out with date and time. Automatic interval can be programmed (1-99 min.).
- **Service software**  
Integrated service software, information such as operation time, battery capacity, sensor self-check, system-failures are displayed automatically on the display.
- **Zero calibration**  
Automatic zero calibration with ambient air on every start of the system, optical and acoustical signal after finishing of calibration (3 min.).



## THE BASICS

The use of modern combustion technology has reduced the amount of pollutants continuously over the past decades. Lower concentrations of pollutants demand more sensitive flue gas analyzers to perform within these detection limits. Condensation losses of target substances that were previously summarized as "tolerance", today represent the majority of the total amount of pollutants. Accurate flue gas analysis in industrial applications, without sufficient flue gas conditioning to avoid condensation losses, becomes an almost impossible task.

## THE APPLICATION

The IMR2000 is now available with an optional gas conditioning system with Peltier controlled heat exchanger. To withstand even the most corrosive target substances, only material such as Teflon, stainless steel and glass are used for the components that are touched by the flue gas.

The IMR2000 is capable to measure up to six gases simultaneously.

The most common applications are:

- Emission analysis
- Furnace optimization
- Environmental monitoring
- Service revision i. e. in power stations

## THE PERFORMANCE DATA

**Gentics** uses electrochemical sensors for the measurement of O<sub>2</sub>, CO, NO, NO<sub>2</sub>, SO<sub>2</sub> and H<sub>2</sub>S. For CO<sub>2</sub> and Hydrocarbons NDIR (non dispersive infrared absorption) sensors. Alternative Hydrocarbons can be measured with a Pellistor sensor within the range of the lower explosion limit (LEL) calibrated with methane.

The IMR2000 is a modular system and easy to operate. All measured gas components are shown simultaneously on the illuminated LCD display. Also indicated is the selected fuel type for calculation of the CO<sub>2</sub> content as well as ambient - and flue gas temperature. (if CO<sub>2</sub> is measured with an infrared sensor, CO<sub>2</sub> calculated is not shown)

The oxygen content in the flue gas is used for the calculation of variables such as excess air.

The gas conditioning system in the IMR2000 has an independent power supply circuit and can be activated separately for long term measurements. For short single measurements the integrated lead acid battery offers 6 hours of duration.

Measuring results can be printed as standard protocol on the integrated printer or as mean values. Data can also be transferred to a personal computer, using the integrated RS 232 serial interface.

## THE SOLUTION

The IMR2000, in combination with the optional gas conditioning system, is the ideal flue gas analysis system for industrial applications. The system guarantees high accurate measurements without losing the mobility advantage of a portable system. An extensive range of various flue gas probes complete this unique system. For applications in the glass - and ceramic industry **Gentics** offers high temperature resistant probes made of metal and ceramic for temperatures up to 1550 °C.

The flue gas analyzers of **Gentics** are worldwide in use, and comply with current German environmental regulations and many national standards.

## TECHNICAL DATA

VARIABLE	METHOD	SMALLEST MEASURING RANGE	LARGEST MEASURING RANGE	RESOLUTION	ACCURACY
O <sub>2</sub> (Oxygen)	electrochem. sensor	0 ... 20,95 Vol.-%	0 ... 20,95 Vol.-%	0,01 Vol.-%	± 0,2%
CO (Carbon monoxide) H <sub>2</sub> compensated	electrochem. sensor	0 ... 75 mg/m <sup>3</sup>	0 ... 10 Vol.-%	< 100 mg/m <sup>3</sup> : 0,1 mg > 100 mg/m <sup>3</sup> : 1,0 mg	max. ± 2 % of full scale
NO (Nitric oxide)		0 ... 200 mg/m <sup>3</sup>	0 ... 5.000 mg/m <sup>3</sup>		
NO <sub>2</sub> (Nitric dioxide)*		0 ... 100 mg/m <sup>3</sup>	0 ... 500 mg/m <sup>3</sup>		
SO <sub>2</sub> (Sulphur dioxide)*		0 ... 75 mg/m <sup>3</sup>	0 ... 5.000 mg/m <sup>3</sup>		
H <sub>2</sub> S (Hydrogen sulfide)*		0 ... 60 mg/m <sup>3</sup>	0 ... 300 mg/m <sup>3</sup>		
H <sub>2</sub> (Hydrogen)*	TCD	0 ... 20 Vol.-%	0 ... 100 Vol.-%	< 100 mg/m <sup>3</sup> : 0,1 mg > 100 mg/m <sup>3</sup> : 1,0 mg	± 2%
CxHy (Hydro carbons)*	Infrared sensor	0 ... 0,2 Vol.-%	0 ... 100 Vol.-%	0,01 Vol.-%	± 2%
CO <sub>2</sub> (Carbon dioxide)*		0 ... 20 Vol.-%	0 ... 100 Vol.-%		
CO (Carbon monoxide)*		0 ... 20 Vol.-%	0 ... 100 Vol.-%		
CxHy (Hydro carbons)* ( < LEL)	Pellistor sensor	0 ... 4,4 Vol.-% CH <sub>4</sub>		10 ppm	< 10%
°C (flue gas temperature)	Thermocouple	0 ... 500 °C	0 ... 1605 °C	1 K	± 1 K



VARIABLE	METHOD	SMALLEST MEASURING RANGE	LARGEST MEASURING RANGE	RESOLUTION	ACCURACY
°C (Ambient temperature)	Semiconductor sensor	-20°...120°C	-20°...120°C	1 K	± 1 K
hPa Pressure/Draft <sup>1)</sup>	Semiconductor sensor	± 20 hPa (mm H <sub>2</sub> O)	± 60 hPa (mm H <sub>2</sub> O)	0,01	± 1 K
CO <sub>2</sub> (Carbon dioxide)**	calculated	0...CO <sub>2 max.</sub> ***		0,1 Vol-%	± 2
λ (Lambda)/excess air	calculated	1.00-9.99		0,01	± 0,2
qA flue gas-losses	calculated	0...99,9%		0,01	± 2
ETA efficiency	calculated	0...99,9%		0,01	± 0,5
Soot spot determination	Filter paper method according to DIN 51402	Volume-regulated suction pump 1,63 l/min ± 0,07 l/min			
The analyzer complies with EN 50379-2, TÜV registration N° By RgG 142					

#### FURTHER TECHNICAL DATA

Weight	14 kg
Dimensions	530 x 330 x 190 mm (W x H x D)
Consistency	± 1% of full range
Linearity	± 1%
Drift (electro chemicalsensor )	< 5%/year
Response time/T90	< 40 sec
Operating temperature	+5°C to +40°C
Pump capacity	120 l/h
max. draft	-0,3 bar
max. pressure	1,2 bar
Storage temperature	-20°C to +50°C

1) Ddifferential pressure measurement option

\* Option

\*\* No CO<sub>2</sub> calculation, if CO<sub>2</sub> sensor is installed

\*\*\* Fuel dependent



DIN EN 50379-2

