GENTICS®

IMR4000

The compact flue gas analyzer
for industrial applications

PRODUCT ADVANTAGES FROM A–Z

- **Analogue signal port**
  For 8 channels simultaneously, 0...10 V (4...20mA).

- **Battery**
  Rechargeable lead acid battery guarantees 6 hours of independence from main power. The battery is protected against overcharging.

- **Case**
  Built-in a robust, protective case.

- **Draft/Pressure* measurement**
  Integrated measurement of the draft/pressure in the flue, built-in differential pressure measurement in combination with the option for flue gas volume/flue gas velocity.*

- **Dust filter**
  Particle filter 4 µ.

- **Flue gas probe**
  Gas extraction probes with K-type thermocouple, heat insulated handle, stainless steel fixture cone.
  Standard length 270 mm, other lengths on request
  PtRh-Pt-probe (gas temperature up to 1500 °C) on request.

- **Flue gas velocity/Flue gas volume***
  Continuous measurement, displayed on the TFT-Display during the flue gas measurement.*

- **Fuel types (pre-programmed)**
  18 pre.programmed standard fuels, with the corresponding calculation factors, incl. O_2-ref. values. Pre-programmed fuel factors can be corrected by the operator.
  4 additional fuel types programmable.

- **Gas conditioning**
  Integrated condensate trap and peristaltic pump.

- **Gas temperature**
  NiCr-Ni (K-type) for continuous operation at 800 °C (1472 °F), permits short periods of 1200 ° C (2192 °F) PtRh-Pt (S-type) for continuous operation at 1500 °C (2732 °F)*.

- **Interface**
  RS 232 C serial interface, USB 2.0, Analogue signal port*.

- **Memory**
  Using an USB stick, the memory capacity is almost unlimited. Sample rate is user selectable.

- **TFT-Display**
  6,5"- VGA color-display, displays all parameters simultaneously. Display of readings in ppm, mg or mg (O2), mg/Btu.

- **Pitot tube**
  Pitot tubes for flue gas velocity measurement are available in various lengths.*

- **Power supply**
  230 V/50 Hz or 110 V/60 Hz mains power supply, 12 V from the built-in battery.

- **Printer**
  Integrated thermo printer for protocol printouts.

- **Probe tubing**
  Standard length 3.5 m. Extensions are available.

- **Protocol**
  Printout with date and time. Automatic interval can be programmed.

- **Service software**
  Integrated service software, information such as operating hours, battery capacity, sensor self-check, system-failures are displayed automatically on the display.

- **TabGraph***
  Windows software for data management on PC.
  Graphic-, tabular documentation of all measuring data.

- **Zero calibration**
  Automatic zero calibration with ambient air on every start of the system, optical and acoustical signal after finishing of calibration (3 min.).

Technical specifications and illustrations are without obligation, subject to modifications.

GENTICS®

THE BASICS

The use of flue gas analyzers in industrial applications has become more and more common over the past years.

The use of new furnace technologies can reduce the consumption of precious fuels, but makes maintenance and supervision of the plants more and more complicated. Portable flue gas analyzers can be helpful tools to reduce emissions and increase efficiency. At the end, the investment in a flue gas analyzer pays back in a short time.

THE APPLICATION

The IMR4000 is a complete portable flue gas analysis system for industrial applications.

Up to 12 gases can be measured simultaneously. Four additional components can be displayed. The physical dimensions of the analyzer permit the use even in hard-to-access areas.

The most common applications are:

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

THE PERFORMANCE DATA

IMR is using electrochemical sensors for the gas components O_2, CO, NO, NO_2, SO_2, H_2S and H_2. For the gases CO, CO_2 and C_xH_y NDIR (non-dispersive infrared absorption) sensors are used. Alternatively hydrocarbons can be measured with pellistor sensors in the range of the lower explosion limit (LEL) calibrated with methane.

The IMR4000 is a modular system and very easy to operate. All measured gas components are shown simultaneously on the integrated 6,5" VGA color display. Also indicated is the selected fuel type for calculation of the CO_2 content as well as ambient - and flue gas temperatures (if CO_2 is measured with an infrared sensor, 'CO$_2$ calculated' is not shown).

The oxygen content in the flue gas is necessary for calculation of variables such as excess air. The simultaneous measurement of flue gas volume and velocity is available as an option.

Measuring results can be printed on the built-in printer as 'standard protocol' or 'mean value'. Data can also be transferred via the RS232 serial interface, an USB 2.0 or a 0...10 V (0/4...20 mA) analogue signal port.*

THE SOLUTION

Available for the IMR4000 is a long list of options to customize the analyzer for a specific application. For wet stacks, cement kilns and other special applications, **Gentics** recommends the use of a gas conditioning system. In combination with the IMR600 gas conditioning system, the IMR4000 reaches accuracy levels usually achieved with CEM systems.

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

TECHNICAL DATA

COMPONENT	METHOD	SMALLEST MAESURING RANGE	LARGEST MEASURING RANGE	RESOLUTION	ACCURACY
O_2 (Oxygen)	electrochem. sensor	0 ... 20,95 Vol.-%	0 ... 20,95 Vol.-%	0,01 Vol.-%	± 0,3% absolute
CO (Carbon monoxide)	electrochem. sensor	0 ... 75 mg/m³	0 ... 5 Vol.-%	< 100 mg/m³: 0,1 mg > 100 mg/m³: 1,0 mg	max. ± 3% of range
NO (Nitric oxide)		0 ... 200 mg/m³	0 ... 5.000 mg/m³		
NO_2 (Nitric dioxide)*		0 ... 100 mg/m³	0 ... 500 mg/m³		
SO_2 (Sulphur dioxide)*		0 ... 75 mg/m³	0 ... 5.000 mg/m³		
H_2S (Hydrogen sulfide)*		0 ... 60 mg/m³	0 ... 300 mg/m³		
H_2 (Hydrogen)*	TCD	0 ... 20 Vol.-%	0 ... 100 Vol.-%	0,1 Vol.-%	± 3%
O_2 (Oxygen)*	Paramagnetic sensor	0 ... 20,95 Vol.-%	0 ... 100 Vol.-%	0,01 Vol.-%	± 0,3% absolute
CxHy (Hydro carbons)*	Infrared sensor	0 ... 0,2 Vol.-%	0 ... 100 Vol.-%	0,1 Vol.-%	± 2%
CO_2 (Carbon dioxide)*		0 ... 20 Vol.-%	0 ... 100 Vol.-%		
CO (Carbon monoxide)*		0 ... 20 Vol.-%	0 ... 100 Vol.-%		
CxHy (Hydro carbons)* (< LEL)	Pelistor sensor	0 ... 4,4 Vol.-% CH$_4$		10 ppm	< 5%
°C (flue gas temperature)	K-type thermocouple	0 ... 500 °C	0 ... 1.605 °C	1 K	± 1 K

Technical specifications and illustrations are without obligation, subject to modifications.

05.17
1.01.00

GENTICS®

VARIABLE	METHOD	SMALLEST MAESURING RANGE	LARGEST MEASURING RANGE	RESOLUTION	ACCURACY
°C (Ambient air temperature)	K-type thermocouple	-20°...120 °C -4° ... 248 °F	-20°...120 °C -4° ... 248 °F	1 K	± 1 K
hPa Pressure*/Draft	Semiconductor sensor	± 20 hPa (mm H$_2$O)	± 300 hPa (mm H$_2$O)	0,01	± 3%
CO$_2$ (Carbon dioxide)**	calculated	0...CO$_{2\,max.}$***		0,1 Vol-%	± 0,3% absolute
λ (Lambda)/excess air	calculated	1.00-9.99		0,01	± 2%
qA flue gas-losses	calculated	0...99,9%		0,01	± 0,5%
ETA efficiency	calculated	0...99,9%		0,01	± 0,5%
v (flue gas velocity)*	Semiconductor sensor	0...5 m/s	0...25 m/s	0,001 m/s	± 2%
Soot (soot number)*	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 approved

FURTHER TECHNICAL DATA	
Weight	15,5 kg
Dimensions	440 x 230 x 220 mm (W x H x D)
Reproducibility	± 1% of full range
Linearity	± 1%
Drift (electrochemical sensor)	< 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
Protection class	IP55/IP67 (in the closed case)

* Option
** No CO$_2$ calculation, if CO$_2$ sensor is installed
*** Depending on fuel

TÜV SÜD **CE** DIN EN 50379-2

Technical specifications and illustrations are without obligation, subject to modifications.

05.17
1.01.00