



## Gas analyser for IR-absorbing gases and oxygen BA 5000

The BA 5000 gas analyser is suitable to continuously measure gas concentrations, e.g. CO, CO<sub>2</sub>, NO, SO<sub>2</sub>, CH<sub>4</sub>. The analyser can measure up to three of these components plus O<sub>2</sub> at the same time. For oxygen analysis purposes the BA 5000 can optionally be equipped with electrochemical or paramagnetic cell.

This gas analyser can be used in emission measurement equipment as well as for monitoring processes and safety.

TÜV-approved versions of the BA 5000 are available for measuring CO, NO, SO<sub>2</sub> and O<sub>2</sub>.

Use in non-explosive areas.

Sturdy 19" sheet steel housing.  
Option: Desktop version with handles

NAMUR-based operation

Quick and easy parametrisation and setup

AUTOCAL with ambient air for virtually maintenance-free operation

Adjustment with test gas only required every six to twelve months depending on application

Two measuring ranges per component

Automatically corrects fluctuations in barometric pressure

Monitors the sample gas flow rate

Two programmable limits

Up to four analogue outputs 4-20 mA, electrically isolated



## Application examples

- Optimising firing in packaged boilers,
- Monitoring the flue gas concentration in furnaces using any type of fuel (oil, gas and coal) as well as in-service measurement in waste incineration,
- Biogas plants,
- Monitoring ambient air,
- Monitoring air in fruit storage, greenhouses, fermenting cellars and warehouses,
- Monitoring process control.

## Technical Data

### General Technical Data

Measuring components:	maximum 4, with up to three IR-sensitive gases and oxygen
Analogue outputs:	maximal 4, potential-free, 0/2/4 to 20 mA, linearised
Load:	≤ 750 Ω
Characteristic:	linearised
Control panel:	LCD with LED backlight and contrast control, function keys
Display:	80 characters (4 lines/ 20 characters)
EMC immunity:	conforms to standard requirements of NAMUR NE21 (05/93) or EN 50081-1, EN 50082-2, EN 61010
Position of use:	Front panel vertical
Relay outputs:	8, for e.g. malfunction, maintenance request, limit, function control, AC/DC 24 V / 1 A
Binary inputs:	3, potential-free for pump ON/OFF, start AUTOCAL and synchronise
Serial port:	RS 485
Warm-up time:	approx. 30 min (at room temperature) (the technical specification is maintained after 2 hours)
AUTOCAL function:	automatic device calibration with ambient air, cycle time adjustable from 1 to 24 hours
Dimensions:	Portable unit: 170 x 465 x 392 mm (H x W x D) Frame 19", 4 HE: 177 x 483 x 360 mm (H x W x D)
Weight:	about 10 kg
Gas connections for sample gas inlet and outlet as well as reference gas:	Tube diameter 6 mm or 1/4"
Degree of protection:	IP 21 (EN 60529)
Auxiliary energy:	AC 100 V, +10% / -15%, 50 Hz AC 200 V, +10% / -15%, 50 Hz AC 230 V, +10% / -15%, 50 Hz AC 100 V, +10% / -15%, 60 Hz AC 120 V, +10% / -15%, 60 Hz AC 230 V, +10% / -15%, 60 Hz
Power input	about 60 VA

### Gas inlet conditions

Sample gas pressure:	without pump, pressure-free (< 1200 hPa, absolute) with pump, pressure-free suction, factory preset with 2 m hose at sample gas outlet, a different restrictor will require adjusting the end value (800 ... 1050 hPa, absolute)
Sample gas flow rate:	72 to 120 L/h (1.2 to 2 L/min)
Sample gas temperature:	0 to 50 °C
Sample gas humidity:	< 90% RH <sup>1)</sup> or varies by measuring task

### Climatic conditions

Permissible ambient temperature during operation:	+5 to +45 °C
Permissible ambient temperature during storage and transport:	-20 to +60 °C
Permissible ambient humidity:	< 90% RH <sup>1)</sup> , during storage and transport
Permissible pressure fluctuations:	600 to 1200 mbar

<sup>1)</sup> relative humidity

**Technical data for infrared measurement****Influencing variables**

– Drift	
with AUTOCAL:	negligible
without AUTOCAL:	< 2 % of smallest measuring range/week
– Temperature:	max. 2% of the smallest possible measuring range per type plate per 10 K at an AUTOCAL cycle time of 3 h
– Air pressure:	< 0.2% of span per 1% change in pressure, corrected by internal pressure sensor
– Residual gases:	minimised through selections
– Voltage:	< 0.1 % of the output signal range at a change of $\pm 10$ %
– Mains frequency:	$\pm 2$ % of span at a frequency variance of $\pm 5$ %
Response time ( $T_{90}$ time):	varies by dead time and parametrisable damping
Damping:	adjustable from 0 to 99.9 s (electric time constant)
Output signal noise:	< $\pm 1$ % of the smallest possible span (see type plate)
Display resolution:	varies by measuring range setting; the number after the decimal can be changed
Output signal response:	< 0.1 % of the output signal span
Characteristic:	linearised
Linearity deviation:	in the largest measuring range: < 1% of span in the smallest measuring range: < 2% of span
Repeatability:	$\leq 1$ % of smallest measuring range

**Technical data for oxygen measurement by electrochemical sensor**

Measuring range: 0 to 5 % or 0 to 25 % O<sub>2</sub>, parametrisable

**Influencing variables**

– Drift	
with AUTOCAL:	negligible
without AUTOCAL:	1 % O <sub>2</sub> / year in air, typical
– Temperature:	< 0.5 % O <sub>2</sub> per 20 K, based on a measurement at 20 °C
– Air pressure:	< 0.2 % of measuring range per 1 % change in pressure
– Residual gases:	Carrier gases containing heavy metal, H <sub>2</sub> S and halogen will cause failures; O <sub>2</sub> concentrations < 0.5 % only permissible briefly
O <sub>2</sub> error:	when measuring flue gases: < 0.05 % O <sub>2</sub>
Output signal noise:	< 0.5 % of span
Response time ( $T_{90}$ time):	varies by dead time and ( $T_{90}$ time) parametrisable damping, but not < 30 s at approx. 1 L/min sample gas flow rate
Display resolution:	< 0.2 % of span
Life:	approx. 2 years at 21 % O <sub>2</sub>
Repeatability:	$\leq 0.05$ % O <sub>2</sub>

**Technical data of paramagnetic oxygen measurement**

Measuring components: maximal 4, of which up to 3 IR-active gases and one oxygen component

Measuring range: 0 to 5 % or 0 to 25 % O<sub>2</sub>, parametrisable

**Influencing variables**

– Zero drift:	MB 2 %: max. 0.1 % with weekly zero point adjustment MB 5 %: max. 0.1 % with weekly zero point adjustment MB 25 % or greater 0.5 % with monthly zero point adjustment
– Temperature error:	< 2 % / 10 K based on 5 % measuring range < 5 % / 10 K based 2 % measuring range
– Humidity error for N <sub>2</sub> at 90% relative humidity after 30 min.:	< 0.6 % at 50 °C
– Air pressure:	< 0.2 % of measurement per 1 % change in pressure
Output signal noise:	< 1% of the smallest measuring range
Response time ( $T_{90}$ time):	< 60 s
Repeatability:	$\leq 1$ % of the smallest measuring range