

# Hand-held Flue Gas Analyser GA-12plus

## Standard equipment

### Measurement of gas concentrations

- Standard version with two gas sensors: O<sub>2</sub>, CO
- Two further optional sensors from: NO, NO<sub>2</sub>, SO<sub>2</sub>, H<sub>2</sub>S
- CO ambient measurement with a resolution of 0.1 ppm

### Measurement of other parameters

- Measurement of gas and ambient temperatures
- Pressure and draft measurements with 0.1 Pa resolution
- Relative humidity measurement probe - optional
- Soot/smoke test according to the Bacharach method - electronically regulated to 1.65 l

### Calculation

- CO<sub>2</sub> concentration
- Calculation of all relevant combustion parameters

### Processing and presentation of measuring data

- All results shown on display
- Averaging of all measured values. Averaging time: 2, 10, 20, 30, 60, 120, 180 seconds
- Long average measurements (XL mode single or triple) - 10, 20, 30 sec. or 1, 2, 5, 10, 15, 20, 30 mins.
- Graphical presentation of all measured values as diagram
- Storage for 64 measurements - "measure now, print later"
- Powerful PC program for analyser settings and data communication

### Software capabilities

- Automatic zeroing when the analyser is switched on
- All settings for the analyser carried out with PC program
- List of 6 common fuels (from DIN or OENORM)
- 4 further freely programmable fuels
- Permanent automatic check of the instrument with acoustic warning and full information in the "control list"

### Hardware capabilities

- Integrated clock/calendar
- IR interface for external printer
- Li-Ion accu; operating time 16 hours
- Full graphic display LCD 66 x 36 mm (with LED backlight)
- Gas probe with thermocouple and condensate trap
- RS-232C interface and multi functional PC program
- Updateable FLASH ROM program memory
- Simple, intuitive operation, like a mobile phone

## Options

- Differential pressure measurements with 0.1 Pa resolution
- Flow velocity measurement
- leather-look case for storage and rubber boot for protection of the instrument
- Magnetic plate to attach the instrument to steel surfaces
- External thermal printer with wireless IR communication



A further development from the tried and tested GA-12 hand-held analyser. This new analyser is equipped with the following extra features:

- Can be fitted with up to 4 electrochemical sensors.
- Suitable for a soot test using electronically controlled gas volume.
- Fitted with a powerful Li ion battery.
- Big memory capable of storing 32 measurement reports.
- Backlit graphic LCD
- Robust metal connectors

An attractive alternative to other, bigger analysers.  
Manufactured according to the principles of EN50379.

## Technical data

- Size 245 x 90/128 x 45mm
- Weight 700g
- Probe length 300mm
- Length of gas line 2m
- In line filter 20 µm
- Display 38x66mm with LED backlight
- Mains adapter or internal rechargeable battery (16 hours)
- External power supply 18VDC
- Membrane pump
- Operating temperature 10 °C ÷ 50°C
- Storage temperature -20 °C ÷ +55 °C

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## Measuring technology

Parameter	Method	Indication range	Display resolution	Accuracy	Detection limit	Response time (t90)
<b>Gases measured in standard configuration</b>						
<b>O<sub>2</sub></b> - oxygen, volumetric concentration	electrochemical gas sensor	0..25 %	0.01 %	± 0.2% or 2% rel.	0,01%	45 s
<b>CO<sub>2</sub></b> - carbon dioxide, volumetric concentration	calculated from volumetric concentration of O <sub>2</sub>	0..25 %	0.01 %	± 0.2% or 2% rel.	0,01%	45 s
<b>CO</b> - ambient carbon monoxide, volumetric concentration (only by 2000ppm range)	electrochemical gas sensor	0..100 ppm	0.1 ppm	± 0.5 ppm or 5 % rel.	0,1 ppm	45 s
<b>CO</b> - carbon monoxide, volumetric concentration	electrochemical gas sensor	0..2000 ppm	0,1ppm or 1ppm set by user	± 0.5 ppm or 5 % rel.	0,1 ppm	45 s
<b>CO</b> - carbon monoxide, volumetric concentration	electrochemical gas sensor	0..20000 ppm	1ppm	± 5 ppm or 5 % rel.	1 ppm	
<b>CO</b> - carbon monoxide, volumetric concentration	electrochemical gas sensor	0...10%	10ppm oder 0,001 %	± 50 ppm oder 5 % rel.	10 ppm	45 s
<b>CO<sub>mg</sub></b> - carbon monoxide, mass concentration	calculated from volumetric concentration of CO	0...	1 mg/Nm <sup>3</sup>	± 5 mg/Nm <sup>3</sup> or 5 % rel.	1mg/Nm <sup>3</sup>	45 s
<b>CO<sub>rel</sub></b> - carbon monoxide, mass concentration relative to O <sub>2</sub>	calculated from volumetric concentration of CO and O <sub>2</sub>	0...	1 mg/Nm <sup>3</sup>	± 5 mg/Nm <sup>3</sup> or 5 % rel.	1mg/Nm <sup>3</sup>	45 s
<b>Gases measured with optional electrochemical sensors</b>						
<b>NO</b> - volumetric concentration of nitrogen oxides	electrochemical gas sensor	0..1000ppm	0.1 or 1ppm set by user	± 5 ppm or 5 % rel.	1 ppm	45 s
<b>NO<sub>mg</sub></b> - mass concentration of nitrogen oxides	calculated from volumetric concentration of NO	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>NO<sub>rel</sub></b> - mass concentration of nitrogen oxides relative to O <sub>2</sub>	calculated from volumetric concentration of NO and O <sub>2</sub>	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>NO<sub>2</sub></b> - volumetric concentration of nitrogen dioxide.	electrochemical gas sensor	0..200 ppm	0.1 or 1ppm set by user	± 5 ppm or 5 % rel.	1 ppm	45 s
<b>NO<sub>2mg</sub></b> - mass concentration of nitrogen dioxide	calculated from volumetric concentration of NO <sub>2</sub>	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>NO<sub>2rel</sub></b> - mass concentration of nitrogen dioxide relative to O <sub>2</sub>	calculated from volumetric concentration of NO <sub>2</sub> and O <sub>2</sub>	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>SO<sub>2</sub></b> - volumetric concentration of sulphur dioxide	electrochemical gas sensor	0..2000 ppm	0.1 or 1ppm set by user	± 5 ppm or 5 % rel.	1 ppm	45 s
<b>SO<sub>2mg</sub></b> - mass concentration of sulphur dioxide	calculated from volumetric concentration of SO <sub>2</sub>	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>SO<sub>2rel</sub></b> - mass concentration of sulphur dioxide relative to O <sub>2</sub>	calculated from volumetric concentration of SO <sub>2</sub> and O <sub>2</sub>	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>Temperature measurements</b>						
<b>T<sub>gas</sub></b> - flue gas temperature	Thermocouple	-10..1000°C	0.1 or 1°C set by user	± 2 °C or 1.5 % rel.	1 °C	30 s
<b>T<sub>amb</sub></b> - ambient temperature	Thermistor	-10..100°C	0.1 or 1°C set by user	± 1 °C	1 °C	30 s
<b>Other measured values</b>						
<b>Pressure</b>	DMS bridge	-20hPa ... +20hPa	0.1 or 1Pa set by user	± 2 Pa or 5 % rel.	0.1 Pa	10 s
<b>Diff. Pressure</b>	DMS bridge	-20hPa ... +20hPa	0.1 or 1Pa set by user	± 2 Pa or 5 % rel.	0.1 Pa	10 s
<b>V</b> - flow velocity	Pitot tube	1..30m/s	0.1m/s	0.5m/s or 2% rel.	1 m/s	10 s
<b>rH</b> -relative humidity	capacitive sensor	5..95%	0.01%	2% rH or 2% rel.	5%	10 s
<b>Calculated parameters</b>						
<b>TI</b> (CO/CO <sub>2</sub> -Toxic Index)	calculated	0...1%	0.01%	0.01%		
<b>Lambda</b> - excess air number	calculated	1..10	0.01	0.01		
<b>qA</b> - combustion losses	calculated	0..100%	0.1%	0.1%		
<b>Eta</b> - efficiency	calculated	0..120%	0.1%	0.1%		