Portable Flue Gas Analyser

Properties

Measurement of gas concentrations

- Gas concentrations measured with NDIR sensors: CO2, CH4
- Gas concentrations measured with electrochemical sensors: O2
- Toxic gas concentrations measured with electrochemical sensors: CO, NO, NO2, SO2. Please ask for quote for other gases.

Measurement of other parameters

- Measurement of gas and ambient temperatures
- Pressure, draft and differential pressure measurements with 1 Pa resolution
- Soot test according to Bacharach with a pump flow of 1.63 l/min
- Three analogue inputs (1current/voltage, 1 thermocouple, 1 thermistor)

Calculation

- CO2 concentration
- Calculation of absolute and relative mass concentrations & relative emissions
- Calculation of all relevant combustion parameters

Processing and presentation of measured data

- All results shown on display
- Averaging of all measured values. Averaging time: 10 sec - 60min
- Graphical presentation of all measured values as diagram
- Memory capacity for 1024 sets of data, organised into 10 data banks
- Up to 9 separate items in a data set
- User definition of the 9 items
- Memory capacity for 30 reports
- Data logger function for the analogue inputs
- All measured values, stored values or displays can be printed on the internal printer.
- Powerful PC program for analyser settings and data communication

Software capabilities

- International compatibility (language, date format etc.)
- Password protection for settings
- Automatic zeroing when the analyser is switched on
- Calibration of O2/CO2 during use
- All parameters programmable
- List of 22 common fuels
- 10 further freely programmable fuels
- Permanent automatic check of the instrument with acoustic warning and full information in the "control list"
- Compensation of cross sensitivity and temperature drift of gas sensors

Hardware capabilities

- CO measurement - separate from the other gas channels. If the freely programmable maximum is exceeded, then the sensor is purged with air, without interrupting the other measurements
- Electronic regulation of the pump flow rate
- Integrated clock/calendar
- Internal 57 mm dot-matrix printer
- Power from rechargeable battery or mains
- Big (75 x 64 mm) LCD display with backlighting (Graphics or 11 x 21 characters)
- Gas probe with thermocouple and condensate trap
- Power for heated probe holder during mains operation
- RS-232C interface and multifunctional PC program

Optional accessories

- Choice of soft carrying case or hard housing
- Mini Peltier gas dryer with peristaltic pump
- External ambient temperature sensor

The combustion gas analyser GA-21plus is designed especially for service technicians who are permanently employed in measuring emissions and carrying out adjustments on various burner and heating equipment. Using the optional NO and NO_2 sensors it is possible to calculate NOx simply as the sum of NO and NO_2. SO_2 can also be measured if needed. All parts of the combustion gas analyser are designed for a long and trouble-free operation. Using the optional Peltier dryer it is possible to carry out longer term measurements. Two extra analogue inputs allow the simultaneous measurement of a voltage or current signal and a temperature. This makes it ideally suited for measurements on district heating plants. Manufactured with EN50379 in mind.

Operating data

Parameter	Description
Size of case	WxHxD: 460 x 160 x 170 mm
Weight w/o probe	6,2 kg
Display size	Graphical - LCD, with backlighting and variable contrast, 128x112pixels, 75x64mm
Printer	high-speed dot matrix printer with graphics capability for 57 mm normal paper
Data memory	Memory for 30 reports and 10 banks containg a total of 1024 sets of data
CO - measurement channel	Separate from the other gas channels. If the freely programmable maximum is exceeded then the sensor is purged with air, without interrupting the other measurements
Interface	RS232C
Power supply	110/220V AC 50 ÷ 60Hz
Charging time	Lead-acid battery 12V / 2.2Ah, charging time 10 h, working time approx. 6h
Gas pump	Membrane pump, electronically regulated at 90l/h
Probe	Heated for soot test
Probe length	300 mm (other options available)
Length of gas line	3 m
Gas filter	In line filter 20 µm
Operating temperature	10 °C ÷ 50°C
Storage temperature	-20 °C ÷ +55 °C
Humidity	5 - 90 %, non-condensing

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Technical data

Parameter	Method	Indication range	Display resolution	Accuracy	Detection limit	Response time (t90)
Gases measured in standard configuration						
O2 - oxygen, volumetric concentration	electrochemical gas sensor	0…25 %	0.01%	0.2%	0.2%	45 s
CO2 - carbon dioxide, volumetric concentration	calculated from volumetric concentration of O2	0..25 %	0.01%	0.2%	0.2%	45 s
CO - carbon monoxide, volumetric concentration	electrochemical gas sensor	0….20,000 ppm	0.1 or 1ppm as set	± 5 ppm or 5 % rel.	5 ppm	45 s
COmg - carbon monoxide, mass concentration	calculated from volumetric concentration of CO	0...	1mg/Nm3	± 10 mg/Nm3 or 5 % rel.	10mg/Nm3	45 s
COrel - carbon monoxide, mass concentration relative to O2	calculated from volumetric concentration of CO and O2	0...	1mg/Nm3	± 10 mg/Nm3 or 5 % rel.	10mg/Nm3	45 s
Gases measured with optional IR sensors						
CO2 - carbon dioxides volumetric concentration	IR sensor	0...25 % 0...100%	0.01% 0.1%	0,5 % from Range or +/- 3 % rel.	0.2%	45 s
CH4 - Methane, volumetric concentration	IR sensor	0...5% 0...100%	0.01% 0.1%	0,5 % from Range or +/- 3 % rel.	0.2%	45 s
Gases measured with optional electrochemical sensors						
NO / NOx - volumetric concentration of nitrogen oxides.	electrochemical gas sensor	0...5000ppm	1ppm	± 5 ppm or 5 % rel.	1ppm	45 s
NOmg/NOxmg - mass concentration of nitrogen oxides	calculated from volumetric concentration of NO	0...	1mg/Nm3	± 10 mg/Nm3 or 5 % rel.	1mg/Nm3	45 s
NOrel / NOxrel - mass concentration of nitrogen oxides relative to O2	calculated from volumetric concentration of NO and O2	0...	1mg/Nm3	± 10 mg/Nm3 or 5 % rel.	1mg/Nm3	45 s
NO2 - volumetric concentration of nitrogen dioxide.	electrochemical gas sensor	0...1000ppm	1ppm	± 5 ppm or 5 % rel.	1ppm	45 s
NO2mg - mass concentration of nitrogen dioxide	calculated from volumetric concentration of NO2	0...	1mg/Nm3	± 10 mg/Nm3 or 5 % rel.	2mg/Nm3	45 s
NO2rel - mass concentration of nitrogen dioxide relative to O2	calculated from volumetric concentration of NO2 and O2	0...	1mg/Nm3	± 10 mg/Nm3 or 5 % rel.	2mg/Nm3	45 s
SO2 - volumetric concentration of sulphur dioxide.	electrochemical gas sensor	0...5000ppm	1ppm	± 5 ppm or 5 % rel.	1ppm	45 s
SO2mg - mass concentration of sulphur dioxide.	calculated from volumetric concentration of SO2	0...	1mg/Nm3	± 15 mg/Nm3 or 5 % rel.	3mg/Nm3	45 s
SO2rel - mass concentration of sulphur dioxide. relative to O2	calculated from volumetric concentration of SO2 and O2	0...	1mg/Nm3	± 15 mg/Nm3 or 5 % rel.	3mg/Nm3	45 s
Other measured values						
Tgas - flue gas temperature	Thermocouple	-10...1000°C	1°C	± 2 °C or 1. 5 % rel.	1 °C	30 s
Tamb - ambient temperature	Thermistor	-10...100°C	1°C	± 1 °C	1 °C	30 s
U/I - 1 external current/voltage input	A/D Wandler	0/4...+20mA -20...+20V	0.01mA 0.01V	±0.02mA ±0.02V	0.01mA 0.01V	10 s
T1 - 1 external input	Thermocouple	0...1600°C	1°C	± 2 °C or 1. 5 % rel.	1 °C	10 s
T2 - 1 external input	Thermistor	-20...100°C	1°C	± 2 °C or 1. 5 % rel.	1 °C	10 s
Pressure/diff. pressure	DMS bridge	-25hPa ... +25hPa	0.1Pa	± 2 Pa or 5 % rel.	1 Pa	10 s
flow velocity (Option)	Pitot tube	1...50m/s	0.1m/s	0.3m/s or 5% rel.	0.1m/s	10 s
Soot/smoke test	Bacharach method	0...9	0.5	0.5	0.5	
TI (CO/CO2-Toxic Index)	calculated	0...0.01	0.0001	5 % rel.	0	10 s
Lambda - excess air number	calculated	1...10	0.01	2 % rel.	0	10 s
qA - combustion losses	calculated	0...100%	0.1%	2 % rel.	0 %	10 s
Eta - efficiency	calculated	0...120%	0.1%	2 % rel.	0 %	10 s