

FLUE GAS ANALYSERS

Greenline 6000 and Greenline 8000 Portable Industrial Combustion & Emission Analysers

- Up to 9 Sensors
(Temperature Compensated)

O₂

- Remote Control Unit
with Built-In Printer

CO₂

- Full Compliance to
EPA Protocols

CO

- CO, CO₂ and C_x H_y
Built-In NDIR Sensors

CO%

- Built-In Peltier Gas Cooler and
Industrial Heated Probe

NO/NOX

- CO Sensor Automatic
Protection with Purge Pump

SO₂

- Long Term Monitoring
with Automatic Water
Condensation Drain

C_xH_y

- Electronic Flow-Meter

NO₂

- Aux 4-20mA Inputs

H₂S

- Graphic Display with Menu

- Easy Maintenance

Differential
Pressure

- 9000 Full Analysis Memory,
TM USB, & Windows Software

Tair
Tgaz

Gaz
Velocity

Ambient CO
Monitor



FLUE GAS ANALYSERS

Introduction

**Gas Analysis Main Control Unit (MCU) and Remote Control Unit (RCU).
Hand-Held Remote Control Unit with Reporting Printout Capability, Test
Memory and PC Communication.**

**Measurement capability for O₂ , CO, CO₂ , NO, NO₂ , SO₂ , C_x H_y with
Electrochemical Sensors.**

**Full Compliance to EPA (Environmental Protection Agency) Protocols
CTM-030 and CTM-034.**

**The Most Advanced Portable Emissions Analyzers with Stack Velocity
Measurement.**

GreenLine 8000 only:

**Optional Industrial Sampling Probe Including Heated Probe Head and
Heated Hose.**

**Built-In Peltier Gas Cooler and Automatic Water Condensation Drain.
Direct Measurements of CO, CO₂ , C_x H_y with Internal NDIR Sensors.**

PORTABILITY AND OPERATIVE FLEXIBILITY

The "Clean Air Act" was established in the USA in 1970. It was the first federal law regulating air emissions from certain areas, either by stationary or mobile sources. The EPA (Environmental Protection Agency) and other Federal or State Agencies verify affordable and reasonable methods of achieving environmental compliance under the set emissions limits. A number of "Protocols" have been created to verify industrial emissions using portable gas analysers to ensure air quality compliance. These "Protocols" are the set guidelines that prescribe the technical performances of the electrochemical sensor-based analysers to be used, as well as calibration and testing procedures which should be followed to completely ensure correct emissions data.

The instrument shows technical specifications and performance in compliance with the necessary protocols and therefore can be used in periodic testing in many different countries, states and regions. The AOIP's analysers are designed to meet the specific requirements, mainly related to gas sample conditioning, flow, and temperature control. Other operative modes allow the user to test, view, store, and print draft measurement, differential pressure, data logging, various other performance tests.

The built-in impact-type printer uses common, inexpensive, non-thermal, standard paper rolls. This allows the user to generate a full, comprehensive, & LONG LASTING data report.

The internal memory can store up to 9000 COMPLETE analysis data points (1000 data points on the EcoLine 6000). The digital interface (RS232) allows communication between the instrument and your Laptop or PC, for instrument configurations, data transferring, and data logging.

AOIP portable flue gas analysers **GreenLine 6000 & GreenLine 8000** represent the most powerful and advanced instruments on the market. The two units are designed using the new concept of split architecture. The gas analyser consists of two sections: the gas analysis Main Control Unit (MCU) and the Remote Control Unit (RCU). The communication between the two sections uses the industrial standard RS422.

flue gas laboratory analyser. The unit includes: aspiration pump, filters, condensation drain with peristaltic pump, gas sensors and the electronics. It can be positioned near the stack sampling point and it can work also as an independent instrument (black-box).

The **GreenLine 8000** model (only) additionally includes: an internal Peltier gas cooler, NDIR sensors, and heated industrial gas probe connection capability. The operator can easily monitor the overall operation at a distance from the unit using either the Remote Control Unit or Laptop or PC. The RCU is used to display the measured data, store the analysis in its internal memory, printout any data, and transfer data to your PC.

DBGas 2004 software package allows the operator to easily manage all of the data & analysis information.



FLUE GAS ANALYSERS

	GreenLine 6000	GreenLine 8000
Cooler unit		Standard
Industrial probe		Optional
NDIR sensors		Up to 3
Internal Memory	1000	9000
Sensors	Up to 6	Up to 9
Built-in Impact Printer	Standard	Standard



The GreenLine 8000 uses a wireless communication between MCU and RCU



LARGE ACCESSORY VANE



DBGas 2004

Gas Analysis Data Manager

- Easy Programming & Data Transferring
- Plant, Customer, Boiler, Generator Registration & Management
- Compatible with Windows 98/2000/XP
- Easy to use
- The Ideal Tool to Manage Data quickly & Efficiently
- Graph & Report ANY Stored data
- Logman Module for On-Line Data
- Logging for Long-Term Data Records
- Driven by a PC with a Large Display & Bar Graph

The DBGas 2004 software is designed to allow complete & efficient data management of all measurements, activities, inspections, and analysis completed by AOIP's gas analyzers. The user can maintain an **UNLIMITED** customer base file on their PC or Laptop, which contains ALL customer, plant & boiler information.

After any completed analysis, the user can transfer the stored data from their analyzer to their PC,

which are automatically assigned and stored for quick & easy data recall. The DBGas 2004 software package includes the GasConfig program, which allows you to easily modify the configuration, reports, fuels, and more, on the instrument itself.

FLUE GAS ANALYSERS

SENSOR TECHNOLOGY

AOIP flue gas analyzers use long life temperature compensated EC (electrochemical) sensors.

NDIR SENSOR

CO sensor is protected against saturation by an electrovalve and clean air purge pump.

Only GreenLine 8000 uses a nondispersive Infrared (NDIR) dual wavelength ratioing to get long term stable response sensitivity. Compensation of ambient temperature and pressure is automatic.

EASY ACCESS SENSORS AND FILTERS

These analysers are easy to maintain. A quick access compartment allows the operator to easily view and change ALL of the sensors, filters, and pneumatic parts. The user is able to effortlessly change the unit's sensors or filters in the field if necessary.

CALIBRATION

A built-in procedure allows easy and automatic span sensor calibration using a standard gas cylinder. Periodic zero calibration doesn't require to remove the probe from stack; an internal electrovalve switch to an auxiliary pneumatic circuit for fresh air. A pneumatic connector for remote zero air is also available.

ELECTRONIC FLOW METER

An automatic built-in system measures a flow of sampling gas and adjusts the pump to obtain a constant sampling volume. A visual and acoustic alarm indicates a low rate.

MULTI FUEL SELECTION

The flue gas analysers provide up to 10 fuels for calculating combustion values.

Most used fuels for your country are pre-loaded from factory. Others fuels can be added using the GasConfig PC software.

GAS PROBE & SAMPLING SYSTEM

Flue gas sampling probes with different lengths, shapes and max. operating temperatures (1500°F and 1800°F) are available to match the various requirements of different applications. A sintered pre-filter is suggested for severe and heavy applications. The built-in water trap drains condensation moisture periodically from the system with a peristaltic pump. A dual filtering system (quartz + line) will clean the gas sample before the analysis.

INDUSTRIAL PROBE & HEATED HOSE

For GreenLine 8000 only, a heated sampling probe is available for industrial high temperature applications. A heated hose allows flue gas sampling without condensation. The internal cooler dries the flue gas and avoids dilution of NO₂ and SO₂ into the condensate.

SEMI-CONTINUOUS MONITORING

The industrial design and the advanced technology of the unit, allow it to perform long term gas analysis on a long time basis. The procedure acquires and logs the data after a programmable period of time. A "smart" procedure allows the unit to maximize the sensor life by switching the pump off, during the sleep phase.

KEYBOARD & DISPLAY

The RCU Keypad allows the operator to enter all operative modes following easy menu driven instructions.

The high contrast graphic LCD (44 x 62 mm) is equipped with an automatic backlight device.

It displays the measured and calculated parameters in your preferred format (Zoom function 3, 6 or 12 lines). Parameters can be also displayed in a bar graph mode.

BUILT-IN IMPACT PRINTER

The RCU is equipped with a built-in, rugged impact printer. It uses a low cost common roll of paper (58 mm large, 18 meters long).

Definitely more readable, and heat resistant overtime than the thermal printout on chemical paper.

PRESSURE & DRAFT

The instrument is equipped with an internal differential sensor to measure pressure and stack draft. Differential pressure could be used, e.g., for stack gas velocity measurement by using an optional Pitot tube.

AUXILIARY INPUTS

Two scalable 4-20mA are available to measure and store process parameters.

AMBIENT CO PROBE

An optional probe is available to monitor ambient CO concentration to keep the operator in a safe environment. The instrument gives acoustic and visual alarms if the set limits (according to the OSHA recommendation) are exceeded.

FLUE GAS ANALYSERS



Condensating drain

Tgas Input

Probe Heater connector

Gas inlet

Tair probe

Tflow and T return input

Fast Maintenance

Draft and Differential Pressure

4-20mA inputs

External Probe

Serial communication

Power supply

Impact Printer

Graphic display

Boilers

Utility & Power plants

Industrial boilers

Heaters & Dryers

Paint, Textile, Food, Paper,

Rubber, etc.

Process heaters

Kilns / Furnaces

Cement, Lime, Glass,

Ceramic

Stationary internal combustion engines

Gas compression

UPS power cogeneration

Oil fired pumping station

Turbines

Chemical analysis laboratory

Fuel additive

CEM backup & maintenance

ISO 14000

Auditing, Compliance

FLUE GAS ANALYSERS

GAS SNIFFER PROBE

To detect and locate the precise position of a gas leak in a pipe network.

SMOKE INDEX

Smoke index measurement can be obtained using a special heated probe, supplied on request, and through a dedicated internal procedure that computes the required volume of gas sample flowing into the specific filter. The results can be obtained by comparison with the Smoke Index Table and memory stored to be printed in the report.

Gas Velocity

An internal procedure allows gas velocity measurements using the differential pressure inlet combined with a pitot tube.

TRUE MASS EMISSION MODEL

GreenLine 8000 LBH is an Industrial TrueMass Emissions Gas Analyser. The instrument allows mass emissions measurement in LB\H or Kg\H using the special design gas sampling probe combined with a type 'S' Pitot tube (included as standard).

WIRELESS BLUETOOTH™ MODEL

The GreenLine 8000 WL includes wireless communication capability between the MCU and RCU.

REPORT OF CALIBRATION

Each instrument is factory calibrated and certified against AOIP GreenLine Standard, that is periodically certified by Internationally recognized Laboratory to ensure traceability. It is shipped with a Calibration Report stating the nominal and actual values, the acceptable error and the deviation error.

QUALITY SYSTEM

Research, development, production, inspection and certification activities are defined by methods and procedures of the AOIP GreenLine Quality System inspected for compliance and certified ISO9001 by GASTEC.

Parameter	sensor	Range	Resol.	Accuracy
O ₂	Electrochemical	0 - 25%	0.1%	±0.1% vol
CO	Electrochemical	0 - 8000 ppm	1 ppm	±10 ppm <300 ppm ±4% upto 2000 ppm ±10% >2000 ppm
CO	Electrochemical	0 - 20000 ppm	1 ppm	±10 ppm <300 ppm ±4% upto 2000 ppm ±10% >2000 ppm
CO	NDIR	0 – 2500ppm	0,1ppm%	±50 ppm ou ±2%FS
CO	NDIR	0 – 15,000%	0,001%	<0,66%=±0,02% upto ±15% =±3%
LOW CO	Electrochemical	0-500ppm	0,1ppm	<40ppm=±2ppm Upto 10%=±5%
CO%	Electrochemical	10%	0,01%	±100ppm<0,02% Upto 10%=±5%
NO	Electrochemical	0 - 4000 ppm	1 ppm	±5 ppm <125 ppm ±4% upto 4000 ppm
LOW NO	Electrochemical	0 - 500 ppm	0.1 ppm	±2 ppm <40 ppm ±5% upto 500 ppm
NO ₂	Electrochemical	0 - 1000 ppm	1 ppm	±5 ppm <125 ppm ±4% upto 1000 ppm
LOW NO ₂	Electrochemical	0 - 100 ppm	0.1 ppm	±2 ppm <40 ppm ±5% upto 100 ppm
NO _x	Calculated	0 - 5000 ppm	1 ppm	
SO ₂	Electrochemical	0 - 4000 ppm	1 ppm	±5 ppm <125 ppm ±4% upto 4000 ppm
CO ₂	Calculated	0 - 99.9%	0.1%	
CO ₂	NDIR	0-40,00%	0,01%	<10%=±5ppm Upto 4000ppm=±4%
C _x H _y	Pellistor	0 - 5%	0.01%	±5% Full scale.
C _x H _y	NDIR	0-50 000ppm	1ppm	<2500ppm=±100ppm Upto50000ppm=±4%
H ₂ S	Electrochemical	0-1000ppm	1ppm	±5ppm<100ppm Upto1000ppm=±4%
T air	Pt100	-10 - 99.9°C	0.1°C	±(0.2% rdg + 0.15°C)
T gas	Tc K	0 - 999.9°C	0.1°C	±(0.3% rdg + 0.3°C)
Δ T	Calculated	0 - 999.9°C	0.1°C	
T flux	Tc K	-10 - 99.9°C	0.1°C	±(0.3% rdg + 0.3°C)
T flow/T return	Pt100	-10 - 99.9°C	0.1°C	±(0.2% rdg + 0.15°C)
Pressure/Draft	Bridge	±100.00hPa	1hPa	±3Pa < 300Pa ±1% rdg. >300Pa
Excess air	Calculated	1.00 - infinite	0.01	
Gas Velocity	Calculated	0 - 99.9 m/s	0.1 m/s	
Efficiency	Calculated	1 - 99.9%	0.1%	
Smoke Index		0 - 9 Bacharach		
Auxiliary Inputs	2 channels	4-20mA	0,01mA	±1% FS

* NO concentration can be shown in terms of stack equivalent NO₂

Relative Accuracy limits are stated as absolute or % of reading with reference to the ambient temperature range from -5°C to 40°C. Additional ± 1 digit error has to be considered.

The pressure relative accuracy shown is valid only after the autozero procedure.

All emissions measurements are available also with a programmable O₂ reference value.

Measuring reading can be directly converted from ppm to mg/Nm³ mg/kWh, from hPa to mmH₂O, mbar, inH₂O and from °C to °F.

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A **Sensor N°1**

- 0 None
- 1 O₂ (0-25%)

B **Sensor N°2**

- 0 None
- 2 CO(0-8000ppm)+ + auto/manual sensor exclusion
- 2x CO(0-20 000ppm) dilution system
- 2LO CO(0-500ppm-0,1ppm)

C **Sensors 3**

- 0 None
- 4 NO(0-4000ppm)/Nox
- 4LO NO₂ (0-500ppm-0,1ppm)

D **Sensor 4**

- 0 None
- 5 NO₂ (0-1000ppm)
- 5LO NO₂ (0-100ppm-0,1ppm)
- 8 C_xH_y (0-5%) (Sensor 4 only)

E **Sensor 5**

- 0 None
- 6 SO₂ (0-4000 ppm)
- 8 C_x H_y (0-5%)

F **Sensor 6**

- 0 None
- 7 CO% (0-10%)
- 8 C H (0-5%)
- 9 H₂ S (0-1000ppm)

G **Sensor 7 NOT FOR GREENLINE 6000**

- 0 None
- A CO₂ (0-20%) NDIR

H **Sensor 8 &.9 NOT FOR GREENLINE 6000**

- 0 None
- B C_xH_y (0-2000ppm)
- E CO (0-15%) NDIR
- F CO (0-2500ppm) NDIR

L **GAS SAMPLING PROBE**

- 0 None (see industrial probe on next page)
- 1 Ø8mm/300mm gas probe + draft (dual hose) BB610058
- 2 Ø8mm/750mm gas probe or draft (single hose) BB610064 w/ removable shaft
- 3 Ø8mm/1500mm gas probe or draft (single hose) BB610065 w/ removable shaft
- 2P Ø10mm/750mm gas probe +draft (dual hose) BB610066 w/ removable shaft
- 3P Ø10mm/1500mm gas probe +draft (dual hose) BB610067 w/ removable shaft
- 2SP Ø10mm/750mm heated* gas probe+draft (dual hose) BB610068 w/ remov. shaft
- 3SP Ø10mm/1500mm heated* gas probe+draft (dual hose) BB610069 w/ remov. shaft
- F Sintered filter mounted on top

M **LINE CHARGER PLUG**

- 1 115 Vac with USA plug
- 2 230 Vac with Schuko plug
- 3 230 Vac with UK plug
- 4 230 Vac with European plug

MODELS

GreenLine 6000

7846 -A-B-C-D-E-F-L-M

GreenLine 6000 basic configuration includes:
O₂ and CO sensors, internal 1000 analysis data memory
Remote Control Unit, built-in impact printer, GasConfig PC software, RS232 adapter, Report of Calibration and instruction manual.

GreenLine 8000

7848 -A-B-C-D-E-F-G-H-L-M

GreenLine 8000-WL

7848 WL-A-B-C-D-E-F-G-H-L-M-N-P

GreenLine 8000 & 8000WL basic configurations includes: O₂ and CO sensors, internal gas cooler, internal 9000 analysis data memory, Remote Control Unit, built-in impact printer, DBGas 2004 and GasConfig PC software, RS232 adapter, Report of Calibration and instruction manual.

GreenLine 8000-LBH

7848 LBH-A-B-C-D-E-F-G-H-L-M-N-P

GreenLine 8000LBH basic configurations includes: O₂ and CO sensors, type "S" Pitot tube with Sampling probe and temperature sensor, internal gas cooler, internal 9000 analysis data memory, Remote Control Unit, built-in impact printer, DBGas 2004 and GasConfig PC software, RS232 adapter, Report of Calibration and instruction manual

ACCESSORIES



BB610046

Ø8 mm - 300mm (TGD - Temperature, Gas, Draft) sampling probe.



BB830010

Gas sniffer probe



F2132100

Thermocouple type K 130mm for T°air

F2137100

Thermocouple type K 130mm for contact T°



BB610031 Pitot 300 mm

BB610033 : Pitot 750 mm

BB610034: Pitot 1000 mm

FLUE GAS ANALYSERS

SPECIFICATIONS

Main Control Unit

Models:

GreenLine 6000 - up to 6 sensors flue gas analyser

GreenLine 8000 - up to 9 sensors flue gas analyser

Zero Calibration: automatic calibration procedure at instrument power-on. Fresh air inlet with electrovalve and separate pneumatic circuit

Self-Diagnosis: sensor efficiency test with diagnostic page

Gas Level Alarms: programmable from PC with GasConfig software

Sampling Pump: 2.2 l/min - -220mbar with electronic flow controller

Battery Life: 10 hours continuous operation (without heating probe)

Power Supply: 110/230 Vac 50/60Hz / 7.2Ah capacity rechargeable battery.

Internal Test Memory: up to 9000 (1000 on GreenLine 6000) complete analysis data points structured by Tags

Smoke Measurement: Using the heated probe or the optional external manual pump. Index memory store and printout capability as standard

Optional Probes: ambient CO, explosive gas and leakage sniffer

Working Temperature: from -5°C to +45 °C (up to 50°C for short time)

Storage Temperature: from -20 to +60°C (3 months max. at temperatures exceeding the operational limits)

Carrying Case: Aluminium

Dimensions: 455 x 205 x 365 mm

Weight: 10 kg

TÜV Testing / EN Norm

TÜV by RgG 259 EN 50379 part 2 and 1.

BlmSchV for O₂, CO-H₂, NO, °C, hPa.

Hand-Held Remote Control Unit

Standard MCU-RCU Connection Cable: standard 5 m. (custom on request)

Integrated Printer: impact type 24 columns with 58 mm large and 18 meters long paper roll

Printer Power Supply: using the controller battery pack

Print Autonomy: up to 40 reports.

Fuel Types: Up to 10 totally programmable.

Service and User Data: 3 programmable lines for each Tag using a PC and DBGas Software.

Report Header: 4 rows x 16 characters programmable from keyboard

Display: large (40 x 56 mm) graphic LCD display with automatic backlight device. Bar graph capability.

Serial Interface: bi-directional standard RS422.

Dimensions: 115 x 90 x 330 mm

Weight: 0.9 kg



REMOTE CONTROL UNIT

INDUSTRIAL PROBE VINYL CASE



INDUSTRIAL PROBE

The internal gas conditioning system with cooler (available on GreenLine 8000 as a standard) may not be enough if you need long term measurement of NO₂ and SO₂. The drop of temperature between the stack and the ambient could generate water condensation along the hose, diluting NO₂ & SO₂ gases, resulting in incorrect readings and measurements.

To prevent the water condensation, AOIP provides an industrial heated probe and hose. The hose temperature is controlled from the GreenLine base unit in order to maintain the correct gas temperature above the Dew Point.

Industrial probe & hose without heating can be used for long term analysis if the temperature flue gas is high.



7852 - A - B - C - D

Ordering Code

Table A Probe Handle

- 1 Basic probe handle with pneumatic connector
- 2 Heated probe handle with pneumatic connector

Table B Probe Tip

- 2 Ø8 / 750 mm tip 800°C
 - 3 Ø8 / 1500 mm tip 800°C
 - 6 Ø8 / 1000 mm tip 1200°C
- F Sintered filter on top of the probe

Table C Hose

- 1 2 mt long NOT heated hose
- 4 2 mt long Heated hose
- 5 3 mt long Heated hose
- 9 Heated hose (special length)

Table D Power Supply

- 1 110 V 50/60 Hz
- 2 220 V 50/60 Hz



AOIP

BP 182

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The above mentioned characteristics are subject to change without prior notice

SOFIMAE laboratory on our premises of Ris-Orangis

*Ranges available on www.cofrac.fr