

GreenLine 4000

Hand-Held Industrial Combustion & Emission Analyser



FLUE GAS ANALYSERS

- ▶ Combustion Analyser up to 4 Gases
- ▶ NO/NO_x & SO₂ Emission Analyser
- ▶ C_x H_y Uncombusted Hydrocarbons
- ▶ Draft & Differential Pressure Meter
- ▶ 2 Channel Thermometer
- ▶ Ambient CO Monitor
- ▶ Gas Velocity with Pitot Tube
- ▶ Gas Leak Detector
- ▶ Ionization Flame Tester
- ▶ Differential Thermometer

Built-in Impact Printer

Rechargeable Li-ION Battery

Industrial Probe and External Compact Cooler Unit

Stores up to 250 Samples



- O₂
- CO₂
- CO
- NO/NO_x
- SO₂
- Efficiency
- Excess air
- Differential pressure
- Tair Tgas
- Vgas
- Ambient CO monitor
- Gas leak detector



Designed to meet BS7927, TUV, ISO, Gastec QA Criteria, GOST, Qualigaz, and UNI 10389

All descriptions are related to a fully optional instrument. See last page for the different configurations.



Introduction

The handheld **GreenLine 4000** provides the latest technology in flue gas analysis. One instrument with many features:

- up to 4 gas sensors;**
- CO sensor with manual or automatic protection;**
- built-in impact printer;**
- water, air, surface temperature measurements;**
- searching for presence and location of gas leaks;**
- Differential pressure input for draft and gas velocity measurements;**
- operator safety with ambient CO continuous monitoring;**
- ambient temperature and relative humidity measurements.**

■ Easy replaceable gas sensors

GreenLine 4000 uses long life, low maintenance sensors. Alarm levels with audible buzzer on gases measurement.

■ CO sensor dilution

An automatic device protect the CO sensor in presence of high CO level. The measuring range will increase up to 10% CO.

■ Standard Report of Calibration

Each instrument is factory calibrated and certified against Eurotron Standard to ensure traceability, and shipped with a Report of Calibration.

■ Rechargeable battery operations

Ni-MH rechargeable batteries provide longer field use. Flue gas analyser and internal printer are powered by the same internal batteries.

■ Keyboard & Display

Text, menu, and keyboard available in most common languages (not icons) for simple and intuitive operations. Engineering units are selectable by keyboard. The large backlight graphic LCD can display 3, 6 or 12 values per page (ZOOM function) or with bargraph format.

■ Multi Fuel selection

GreenLine 4000 provides up to 10 fuels for calculating combustion values. Most used fuels for your country are pre-loaded from factory. Other fuels can be added using GasConfig PC software.

■ Built-in impact printer

The GreenLine 4000 can include an internal printer. It uses a low cost common roll of paper. Certainly more readable, long time and heat resistant than the thermal printout on chemical paper.

■ Pressure/Draft input

Differential pressure input to verify: low pressure, draft, gas pipework leak with pressure decay programme, pressure in gas pipework, pressure in combustion chamber, DP on filters and fan, pressure switches calibration.

■ Smoke index

Smoke index measurement is performed by using the optional external hand pump. The results can be stored in the internal memory and printed on the report.

■ Gas sampling probe

Flue gas sampling probes, with different lengths and shapes, are available to match each specific requirement. The sampling probe is connected to the instrument with a single or dual hose through a water trap and a suspended particle line filter.

■ Proprietary design trap

Patent pending to inhibit water into the instrument. External, to prevent risk of instrument damage. Large water tank capacity for condensation boiler. Small rubber cup for easy water purge. Long life paper filter.

■ Combustion air temperature sensor

A remote Pt100 probe is available for remote combustion air temperature measurement. This probe is strongly recommended mainly in forced air boiler to obtain an accurate efficiency measurement.

■ CO ambient monitoring

An external optional probe is available for continuous surveillance of the ambient and operator safety. Both acoustic and visual alarm are available.

■ Gas leak sniffer

An external probe is available to locate the position of a gas leak. This probe has a flexible stainless steel shaft to reach difficult locations.

■ Ionization flame tester

Checks the ionization current in flame control sensor.

■ Gas velocity

Measure the gas speed using one Pitot tube connected to the differential pressure ports. Different tube lengths are available for different stack diameters. GreenLine 4000 calculate the gas velocity considering the gas density parameter.

■ Industrial probe & compact cooler unit

A special sampling probe is available for industrial high temperature applications. This probe can be used connected to an external gas conditioning unit (see related bulletins). This compact unit cools the gas sample to dry it. The cooler unit is strongly recommended for SO₂ and NO₂ long terms measurements.

■ Flash memory

The flash memory allows the instrument to be configured by updating the GreenLine firmware for any future legislation requirement or product performance upgrading.

APPLICATIONS

■ 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

Specifications

Type: palm-top combustion gas analyser with 1, 2, 3 or 4 gas sensors.

Calibration: automatic calibration procedure at instrument switch-On.

Self-diagnosis: Sensors efficiency test with diagnostic messages.

Fuel types: Up to 10 selectable from keyboard.

Power supply: High capacity Li-ION rechargeable battery pack / external battery charger.

Charging time: 3h at 90% with instrument Off.

Battery life: 10 hours (typical) continuous use (without printing and backlight).

Printer: Internal impact type 24 columns with 58 mm paper roll.

Printer power supply: from the analyser battery pack.

Print autonomy: up to 40 reports with full battery (typical).

Service and user information: 3 programmable lines.

Printed report header: 4 programmable lines

Display: 40x58 mm graphic LCD with backlight device.

Pump: 1.4 l/m @ 100 mbar

Flue gas probes: stainless steel shaft with incorporated temperature sensor.

Memory: up to 250 full analysis data structured by boilers (Tags).

Serial communication: standard USB serial port.

TÜV Testing / EN Norm

TÜV by RgG 258 EN 50379-2 and 1. BImSchV for O₂, CO-H₂, NO, °C, hPa.

Operating temperature: from -5°C to +45°C

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

Dimensions and Weight: 115x90x330 mm - 1.1 kg with battery and printer.

Parameter	Sensor	Range	Resol.	Accuracy
O ₂	Electrochemical	0 - 25%	0.1%	±0.1% vol
CO	Electrochemical	0 - 8000 ppm <i>H₂ <2000ppm comp.</i>	1 ppm	±10 ppm <300 ppm ±4% up to 2000 ppm ±10% >2000 ppm
CO	Electrochemical	0 - 20000 ppm	1 ppm	±10 ppm <300 ppm ±4% up to 2000 ppm ±10% >2000 ppm
NO	Electrochemical	0 - 4000 ppm	1 ppm	±5 ppm <125 ppm ±4% up to 4000 ppm
LOW NO	Electrochemical	0 - 500 ppm	0.1 ppm	±2 ppm <40 ppm ±5% up to 500 ppm
NO ₂	Electrochemical	0 - 1000 ppm	1 ppm	±5 ppm <125 ppm ±4% up to 1000 ppm
LOW NO ₂	Electrochemical	0 - 100 ppm	0.1 ppm	±2 ppm <40 ppm ±5% up to 100 ppm
NO _x	Calculated	0 - 5000 ppm	1 ppm	
SO ₂	Electrochemical	0 - 4000 ppm	1 ppm	±5 ppm <125 ppm ±4% up to 4000 ppm
CO ₂	Calculated	0 - 99.9%	0.1%	
C _x H _y	Pellistor	0 - 5%	0.01%	±5% F.S.
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)
T	Calculated	0 - 999.9°C	0.1°C	
T _{flow}	Tc K	-10 - 99.9°C	0.1°C	±(0.3% rdg + 0.3°C)
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 - infinity	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		

* NO_x 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.

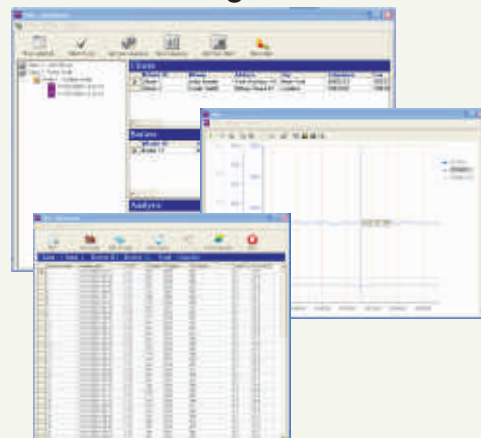
Consumable parts

EE650011	Filter paper set for smoke index measurements (40 pcs)
EE340005	Paper roll
EE490002	Printer ribbon cartridge
EE650074	Spare line filter cartridge

DBGas 2004 - Gas Analysis Database Manager












GreenLine 4000 can store 250 measured data records with address and system information. Using the optional **DBGas2004** Windows™ software package, you can organize and manage your inspection and maintenance activity. Select your boiler details from PC and download to your GreenLine.

DBGas 2004 software package includes **GasConfig** Windows™ software. With this software you can modify the configuration of the instrument.



Accessories

Ordering Code

	<p>BB880028 ABS rigid carrying case</p> <p>BB880033 Aluminum carrying case</p> <p>BB880043 Compact rigid carrying case with shoulder strap. GreenLine 4000, probes, and accessories need 1/3 of the classic carrying case space.</p>
	<p>BB610046 Ø8 mm - 300mm (TGD - Temperature, Gas, Draft) sampling probe.</p>
	<p>EE300088 Single hose burner pressure probe</p>
	<p>F7828000 Manual pump for smoke index measurements</p>
	<p>BB830006 Pt100 remote air sensor with positioning cone</p>
	<p>BB830009 Ambient CO probe</p>
	<p>BB830010 Gas sniffer probe</p>
	<p>F2139000 Pipe Velcro TC K-Type</p>
	<p>F2132100 130mm air TC K-Type</p>
	<p>F2137100 130mm Contact TC K-Type</p>
	<p>BB610032 300mm Pitot tube</p> <p>BB610033 750mm Pitot Tube</p> <p>BB610034 1000mm Pitot Tube</p> <p><i>(requires option E=2H)</i></p>

cat. 7824 - A - B - C C - D - E - F - G - H

Table A Sensor n.1

- 0 none
- 1 O₂ (0-25%)

Table B Sensor n.2

- 0 none
- 2 CO (0-8000 ppm) + auto/manual sensor exclusion
- 2X CO (0-20000 ppm) dilution system
- 2Y CO (0-10 %)

Table C Sensor 3/4

- 0 none
- 4 NO (0-4000 ppm) / NO_x (Sensor 3 only)
- 4LO NO (0-500 ppm) / NO_x
- 5 NO₂ (0-1000 ppm)
- 5LO NO₂ (0-100 ppm)
- 6 SO₂ (0-4000 ppm)
- 8 C_xH_y (0-5%) (Sensor 4 only)

Table D Sample probes (including water trap and line filter)

- 0 none
- 2 300mm flue probe + draft (dual hose) BB610046 (max 500°C)
- 5D 750mm flue probe + draft (dual hose) BB610080 (max 500°C)
- 5X 750mm flue probe (single hose) BB610081 (max 1000°C)
- 8 750mm flue probe (single hose without Tc) BB610082 (max 1200°C)
- F Sintered filter mouted on top (max. 800°C)

Table E Options

- 0 none
- 1 Built-in impact printer
- 2H Draft / differential pressure input with n.2 E300088 hoses
- 4 Graphic display capability (bargraph)

Table F Mains adapter / charger

- 1 115V ±10% 50/60Hz - USA plug
- 2 230V ±10% 50/60Hz - Schuko plug
- 3 230V ±10% 50/60Hz - UK plug
- 4 230V ±10% 50/60Hz - European plug
- 5 100V ±10% 50/60Hz - USA/Japan plug

Table G Accessories

- 0 None
- 1 Software GasConfig + DBGas2000 + IR/RS232 adapter
- 2 Magnetic support
- 3V Vinyl case with shoulder strap
- 3 ABS carrying case
- 4 Aluminum carrying case
- 5 Remote combustion air temp.sensor with 2m cable
- 8 External probe for CO operator safety
- 9 External probe for gas leak detector
- B Manual pump for smoke index measurement with filters and comparison table
- C External probe for ambient temperature and relative umidity
- D External probe for boiler ionization current
- E 300mm Pitot tube for gas velocity measurements (only with E=2H)

Table H Report of calibration

- 1 Eurotron report