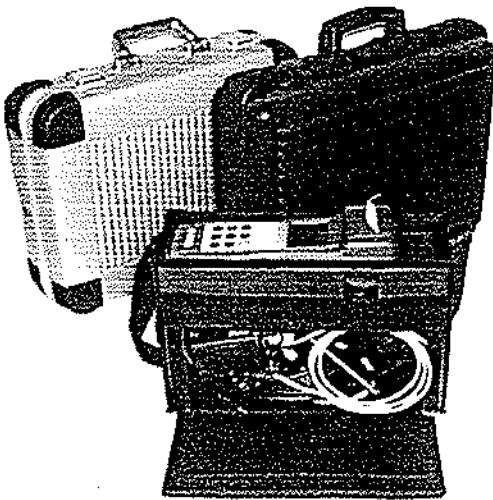


1 GENERAL DESCRIPTION

GreenLine 2000 is designed to satisfy the market needs; but it is the result of the advanced research and experience of Eurotron Instruments. Eurotron has been developing and manufacturing portable flue gas Analyzers since 1986. GreenLine 2000 is a multigas compact palm-top multifunction instrument. The microprocessor based instrument includes a flue gas Analyzer, and an ambient parameters indicator. Two internal electrochemical sensors read the Oxygen (O₂) and carbonic monoxide (CO) gas concentration. The gas temperature and air temperature are used in connection with the gas analysis to calculate the efficiency, excess air, and CO₂ concentration. A 10-gas parameters programmable table is used for calculations approved in accordance with DIN33962. External sensors are available for auxiliary measurements: ambient CO concentration (for operator's safety), gas network leakage procedure (pressure decay method) and natural gas leakage detector (sniffer).

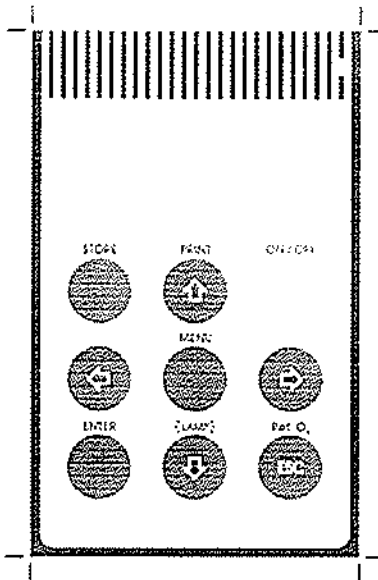
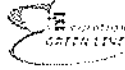
The instrument is completed with a differential pressure (draught) sensor, an internal printer, and an internal memory for storing data and a RS232 serial interface for configuration and data transfer from and to a PC.

- ◆ Draft measurement is possible using the internal pressure sensor and the Eurotron special gas sample probe.
- ◆ The optional internal printer is impact type and the generated document is very legible and has long time duration.
- ◆ The internal standard memory may store up to 250 complete gas analysis divided by Tag.
- ◆ The GreenLine has a standard IR serial interface for external HP 82240B thermal wireless printer.
- ◆ The optional RS232 cable and a configuration PC software are available to configure the Analyzer.



Features & Benefits

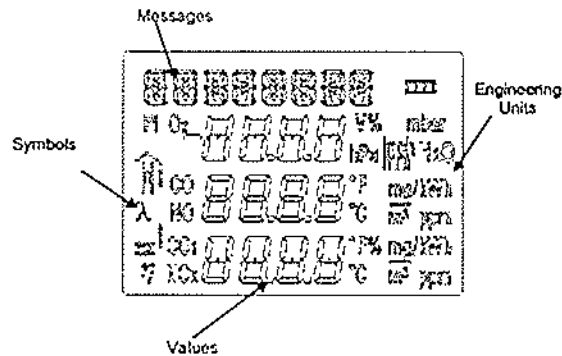
- **New user-friendly Interface:** very intuitive and easy to use the instrument without instruction manual.
- **Large dimensions and lighting LCD display:** very legible, large format, with automatic and manual backlight device.
- **Easy and quick upgrading:** hardware and software are made using modular design to upgrade the system yourself.
- **Differential pressure measurement:** pressure, draft, ΔP , etc.
- **Averaging** between three or more gas analysis.
- **Built-in Impact type printer:** more legible and long-time duration for you documents.
- **Single battery pack:** rechargeable to power both the instrument and the internal printer.
- **Internal memory:** up to 250 complete data analysis.
- **Wireless printer:** compatible with your HP 82240B thermal printer.



- [ON/OFF] Switch the analyzer on or off.
- [▲], [▼], [◀] and [▶] Increase or decrease numerical values.
- [ENTER] Accept and memory store modified parameter or variable. *Pressing this key from the analysis page, the internal pump will be switched on and off.*
- [PRINT] go to the Printout menu
- [STORE] Read or store the analysis data from or to the memory. Pressing this key from the pressure/draft menu will zeroing the sensor offset.
- [MENU] Go to the auxiliary function menu. Scroll between the menu options.
- [ESC] return to the gas analysis function.
- [LAMP] switch the backlight on and off.
- [Ref. O₂] Display the CO measurement as referred to the specified oxygen percentage.

2.2 Display

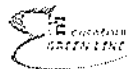
GreenLine is designed with a large (40x56 mm) graphical display using an automatic backlight system for the best reading in poor light conditions also.



Symbols

The display has graphical symbols to describe the actual operation mode of the GreenLine 2000.

	Battery status: fully black=charged; empty=discharged The symbol is flashing if battery are charging
	Flue gas temperature
	Ambient/combustion air temperature
λ	Excess air
η	Efficiency
PI	Poison Index.

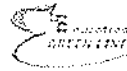


1.1 Ordering code

GreenLine 2000 7816 – A – B – C – D – E – F – G

Each GreenLine 2000 is standard equipped with differential pressure and draft sensor, internal 250 memory, Tc gas temperature input, Pt100 combustion air temperature input, IR printer port, real-time clock capabilities, rechargeable battery pack, battery charger and supplied with a Report of Calibration and an instruction manual.

Table A	Sensor n.1
1	O ₂ (0-25%)
Table B	Sensor n.2
0	None
2	CO (0-2000 ppm)
2H	CO (0-8000 ppm)
Table C	Flue gas probe (air filter and water trap included)
0	None
1L	(L=180 mm D=8mm) gas or draft measurements (single hose) max 800°C
1	(L=180 mm D=8mm) gas and draft measurements (dual hose) max 800°C
2	(L=300 mm D=8mm) gas and draft measurements (dual hose) max 800°C
3	90° probe (single hose)
4	(L=160 mm D=8mm) multipoint gas (single hose) probe for atmospheric boilers max 800°C
Table D	Option
0	None
1	Gas network leak test with pressure decay procedure
2	Internal gas sensor for leak test
3	External probe for gas leak test (sniffer)
4	External probe for CO safety ambient monitoring
6	GasConfig configuration software + DbGas 2000 software + RS232 adapter cable
7	External probes for ionization current
8	Remote Ambient/Combustion air temperature probe with adapting cone
9	Pressure connection kit (dual hose)
P	Built-in impact printer
Table E	Battery charger
1	115 Vac con spina USA
2	230 Vac con spina Schuko
3	230 Vac con spina UK
4	230 Vac con spina European
5	100 Vac con spina USA/Giappone
Table F	Accessories
0	None
1	Magnetic support
2	Rubber holster with magnetic support
3	Vinyl carrying case with shoulder strap for instruments and accessories
4	ABS carrying case for instruments and accessories
5	Aluminium carrying case for instruments and accessories
6	Hand shool pump for Smoke index measurement with fillers and comparing table
7	DC auto battery charger
Table G	Calibration certificate
1	Eurotron report

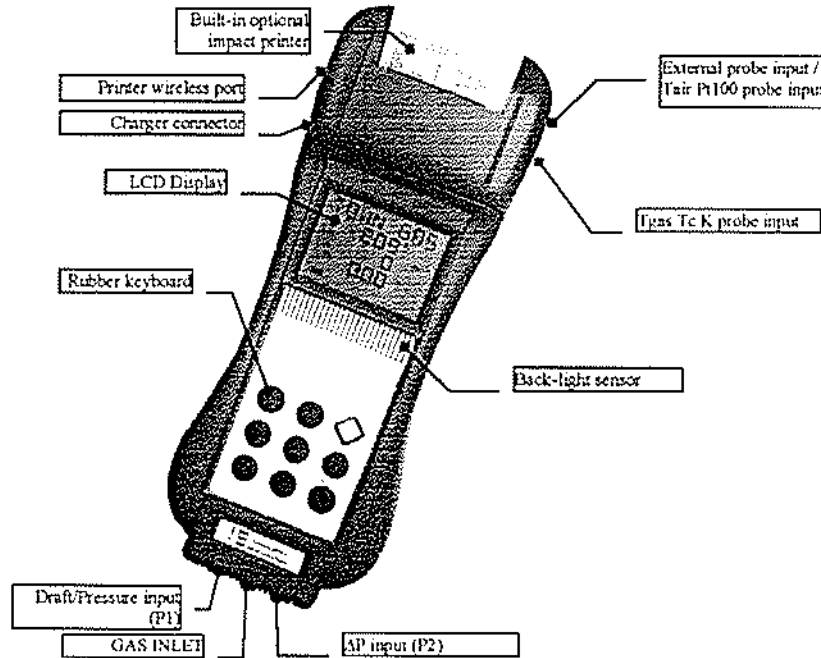


2 PHYSICAL DESCRIPTION

The GreenLine portable analyzer consists of a rugged and compact case, a mother board with all base function circuits, 1 or 2 electrochemical cells, a gas pump, a keyboard, an LCD backlit display, a Ni-MH rechargeable battery pack and, optionally, an impact printer.

8 screws joint the 2 pieces of the case. The batteries, the pneumatic circuit and the cells are positioned in the rear of the analyzer and 2 screws locked the lid.

A pressure lid allows removing the paper roll.



At the bottom of GreenLine 2000 you can see all sampling probe connectors: gas inlet, and differential pressure / draft inputs.

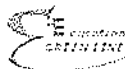
On the left side are the connectors for: line power charger and IR serial port for external wireless printer.

On the right side are the connectors for: the auxiliary probes (combustion air temperature, ambient CO monitoring probe, gas leak sniffer, etc.), the thermocouple type K for flue gas temperature and the RS232 for PC serial communication (an optional RS232 and software should be used to configure the instrument and to transfer the analysis data).

The operator interface is on the front of the instrument and it consists of: a high contrast LCD display and a 9-button keypad. An automatic backlight device makes easier the data reading on the display.

2.1 Keyboard

The front panel keys functions are the following:



1.2 Specifications

- **Type:** 1 or 2 cells palm-top flue gas Analyzer.
- **Calibration:** automatic calibration procedure at instrument switching-on.
- **Self-diagnosis:** Sensors efficiency test with anomalous status announcement.
- **Fuel types:** Up to 10 totally programmable.
- **Pump:** rate of flow 0.8 lit / head -70mbar - All data measured using 3 meters long probe and line filter connected. Load loss = 10 mbar using a 3 meters probe extension
- **Power supply:** High capacity Ni-MH rechargeable battery pack / external battery charger.
- **Charging time:** 8h at 90% with instrument off.
- **Battery life:** 6h continuous operation (without printer and back-light).
- **Built-in printer:** optional impact type 24 columns with 58 mm large and 10 meters long paper roll
- **Built-in Printer power supply:** using the Analyzer battery pack.
- **Built-in Print autonomy:** up to 40 reports with battery full.
- **Internal data memory:** up to 250 complete analysis data structured by Tags (max. 40).
- **Service and user data:** 3 programmable rows x 16 char for each programmed customer using a PC and GasConfig Software.
- **Report Header:** 4 rows x 16 char programmable from GasConfig Software
- **Display:** Large (40x56 mm) LCD display with automatic backlight device.
- **Serial Interface:** Infrared interface for wireless HP82240B thermal printer. External RS232 adapter cable available for PC communication.
- **Smoke measurement:** Using the optional external manual pump. Bacharach index memory store and printout capability as standard.
- **Flue gas Probe:** stainless steel with rubber handle and incorporated temperature sensor. 2 meters long rubber hose included.
- **Water trap:** external with purge plug.
- **Line filter:** with replaceable cartridge.
- **Optional probes:** ambient CO, explosive gas leak 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 maximum at temperatures exceeding the operational limits).
- **Dimensions:** 115x90x330 mm
- **Weight:** 1.1 kg battery and printer included

External optional ambient CO probe

- **Range:** from 0 to 500ppm
- **Accuracy:** ±5ppm up to 100ppm; ±5% up to 500ppm
- **Resolution:** 1ppm
- **Response time:** 30s (190)
- **Waiting starting time:** 30s
- **Working temperature:** from -5°C to +45 °C

External optional natural gas leak detection probe

- **Pre-heating time:** 30s minimum
- **Alarms Indication:** visual with 5 steps
- **5 alarms levels:** 100, 200, 300, 400, 500 ppm
- **Acoustic Alarm indication:** respectively 1, 2, 3, 5 bip/s, continuous
- **Response time:** 5s (190)
- **Alarm levels Accuracy:** ±10% at 90 days



Accuracies and ranges

Parameter	Sensor type	Range	Resol.	Max response	Accuracy
O ₂	electrochemical	from 0 to 25.0%	0.1%	20 sec.	±0.2% Vol.
CO H ₂ compensated up to 1000ppm	electrochemical	from 0 to 8000 ppm	1 ppm	50 sec.	±20 ppm up to 300 ppm ±4% rdg. up to 2000 ppm ±10% rdg. >2000 ppm
CO	electrochemical	from 0 to 2000 ppm	1 ppm	50 sec.	±20 ppm up to 400 ppm ±5% rdg. up to 2000 ppm
CO ₂	Calculated	from 0 to 99.9 %	0.1 %		
Tair	Pt100	from -10 to 99.9 °C	0.1 °C		± 0.5 °C
Tgas	Tc K	from -10 to 600.0 °C	0.1 °C		± 1 °C
ΔT	Calculated				
Pressure / draft	Piezo	±100.00 hPa	0.01 hPa		±3 Pa up to 300 Pa ±1% rdg elsewhere
Excess air	Calculated	from 1.00 to infinite	0.01		
Efficiency	Calculated	from 0 to 99.9%	0.1 %		
Smoke Index	External pump	from 0 to 9			

• Technical units and ranges can be converted directly from ppm to mg/Nm³, mg/kwh and from hPa to mmH₂O, mbar or inH₂O.
 • The relative accuracy shown are expressed as absolute or % of rdg errors at -5°C to +40°C ambient temperature.
 • The maximum response time shown is referred to 90% signal changes.
 • The pressure relative accuracy shown is valid only after the auto-zero procedure.

Specifications may change without notice.

Fuel technical data

The instrument includes as standard the technical data for 4 of the most common fuels. Using the optional GasConfig software, it is possible to modify or add data of up to 10 different fuels.

UNI 10389 Fuel coefficients

A ₁	A ₂	B	Fuel
0,66	0,38	0,010	Natural gas
0,63	0,42	0,008	LPG
0,68	0,50	0,007	Diesel oil
0,68	0,52	0,007	Fuel oil

1.3 Calibration certificate

Each GreenLine 2000 portable gas analyzer is factory calibrated and certified against Eurotron Standards that are periodically certified by an International recognised Laboratory, and shipped with a Report of Calibration stating the nominal and actual values and the deviation errors.

1.4 Electromagnetic compatibility

The instrument case, made in shock-resistant injection moulded ABS + polycarbonate has designed to fulfil the directive 89/336/CEE Electromagnetic Compatibility. See Appendix A1 for EMC declaration of conformity.