

# Model 107 SGA Stack Gas Analyzer

## Introduction

The Model 107 comes with miniature combustible gas (CG) and electrochemical (EC) sensors. This instrument has up to 4 sensors: CG- 0-100%, LEL and 3 electrochemical sensors for ppm ranges depending upon the sensor. This Model 107 can be used for detecting concentrations of gases in power plant stacks containing combustion gases (CO, CO<sub>2</sub>, O<sub>2</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>,... . The analyzer also can be used in incinerators, effluents from cement plants (H<sub>2</sub>S), scrubbers (NH<sub>3</sub>) . This handheld analyzer is robust, weighs only 1.5 pounds, and is extremely easy to use or calibrate. It is an inexpensive but flexible safety analyzer. The Analyzer will operate for > 10 hours on a rechargeable Ni metal hydride battery.



Model 107 SGA+

## Theory of Operation

### Electrochemical

Two and three electrode systems are used for the electrochemical sensors. Sensor technology includes potentiometric (CO<sub>2</sub>, NH<sub>3</sub>), fuel cell (O<sub>2</sub>) and amperometric (O<sub>2</sub>, H<sub>2</sub>S, ...) where the sample is oxidized or reduced. Sensors are chosen to maximize performance and lifetime. The sensors can be easily interchanged via the sensor board and embedded software.

### Combustible Gas

Two heated catalytic elements are set in a block; one is sealed; the other is in contact with the sample. Each is in a leg of a Wheatstone Bridge circuit. If the sample contains hydrocarbons or combustible inorganic compounds, they will burn increasing the temperature of the sensors and changing the resistance. The change in resistance is proportional to the concentration.

### Controls for the Model 107

#### Ent-enter and change sensor

**On/Off**- Battery power

**Incr**-Function ON, scrolling menu up, increase number

**Decr**-Function OFF, scrolling menu down, decrease number

## Menus

### Log

Manual-Set site #, and manually log each pt.

Auto- Set ave. time (sec) and samples/hr. to

Auto log

Site # 1-7,000

Setup- Setup Auto; Ave. time sec., samples/hour

Exit- Return to Run

### Cal

Cal- Performs zero, set cal value, calibration, sensor for each channel

Cal Gas- Select name of cal gas

Resp as- Once the 105 is calibrated-change to direct reading on any of > 50 compounds (TCD)

Alarm- Set Alarm value for audible alarm

Exit- Return to Run mode

## Datalogging

The 107 has manual or automatic datalogging capability

for >7,000 points. The software for data logging is

included with the Model 107. It uses Windows

### Data From Hyperterminal

Site	Date	Time	ppm
495	5/12/2003	15:02:27	171.7
496	5/12/2003	15:03:27	171.6
497	5/12/2003	15:04:27	171.6

End Of Log Data

This data can be imported directly into MS Excel<sup>®</sup>

**SPECIFICATIONS**

- Single unit construction
  - 8.0" L x 3" W x 2.25"D
  - Weight 1.5 pounds
  - Simple 5 button operation
  - No keyboard-just keypad
  - "Resp as" to setup for direct reading for changing sensors (gases) cpds
  - Alphanumeric display for compound, detector, alarm, range, & logging
  - LCD digital display that is backlight selectable
  - Fast response
  - Datalogging for > 7,000 points
  - 5 Sensor inputs (CG-LEL + 3 other sensors)
  - Multiple heads
  - Low battery indicator & automatic shutdown
  - RS232 output
  - Analog output for recorder
  - Simple pushbutton sensitivity control
  - Alphanumeric scrolling
- Upper numeric display is the concentration: the lower scrolling display provides information on the type of sensor, and the status of logging and alarms.

**OPTIONS**

- Shoulder carry bag
- Hard carrying case
- Calibration kit
- 12 VDC charger with cigarette lighter adapter
- Sensors choose from CGS, electrochemical
- **Dilution probe**

**Applications:**

Stack Gas Analysis  
 Combustion performance- LEL/CO, LEL/O<sub>2</sub>

**Features**

- Easy to use
- Easy to calibrate
- LEL Range
- Fast response- Instant on electrochemical sensors
- Datalogging for 7,000 points

**Table I**  
**Specifications of Gas Sensors for the Model 107**

Sensor	Range ppm	Det. Limit	Response Time	Interferences
<b>LEL Mode</b>	0-100% LEL	50 ppm	15 sec.	NA
<b>Electrochemical</b>				
Ammonia	0-1,000	0.1	30 sec.	
Carbon Dioxide	0-1,000/-10%	ppm	90 sec.	
Carbon Monoxide	0-4,000	0.5	15 sec.	H2, C2H4
Hydrogen sulfide	0-2,000	0.05	40 sec.	
Nitric oxide	0-1,000	0.1	10 sec.	NO2
Nitrogen dioxide	0-200	0- 0.1	15 sec.	Cl2, H2S
Oxygen *	0-30%	0.1%	15 sec.	
Sulfur dioxide	0-2,000	0.1	20 sec.	NO2

A LEL **and** any three of the above sensors can be incorporated into the head. **Multiple Snap-On heads are available**; All EC sensors have appropriate chemical filters to minimize interferences.

**Other Instruments-** PID Analyzers manufactures continuous monitors such as: FIDs & PIDs for total hydrocarbons

\* For acid gases

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