

# **IR** INFRARED INDUSTRIES



## **IR208**

**Continuous Gas  
Monitoring Analyzer**



# Operator's Manual

**June 2010 © INFRARED INDUSTRIES**  
25590 Seaboard Lane  
Hayward, CA 94545  
Phone 800.344.0321 • Fax 510.782.8101  
[www.infraredindustries.com](http://www.infraredindustries.com)



# ***TABLE OF CONTENTS***

---

<b>TABLE OF CONTENTS</b> .....	<b>4</b>
<b>INTRODUCTION</b> .....	<b>6</b>
<b>SET-UP</b> .....	<b>8</b>
<b>Power UP</b> .....	<b>8</b>
<b>ANALYZER DESCRIPTION</b> .....	<b>10</b>
<b>Front Panel</b> .....	<b>10</b>
<b>rear Panel</b> .....	<b>11</b>
<b>CONFIGURING THE ANALYZER</b> .....	<b>12</b>
<b>Calibration</b> .....	<b>12</b>
<b>Serial Port</b> .....	<b>13</b>
<b>Display Settings</b> .....	<b>13</b>
<b>Solenoid Control</b> .....	<b>14</b>
<b>Alarm Settings</b> .....	<b>14</b>
<b>USING THE ANALYZER</b> .....	<b>16</b>
<b>Warm-Up</b> .....	<b>16</b>
<b>Measuring Gas</b> .....	<b>16</b>
<b>HOLD BUTTON</b> .....	<b>16</b>
<b>ZEROING</b> .....	<b>16</b>
<b>PC control information</b> .....	<b>17</b>
<b>MAINTENANCE</b> .....	<b>18</b>
<b>Calibration Information</b> .....	<b>18</b>
<b>Calibration Gas Regulator</b> .....	<b>18</b>
<b>Front Panel and Exterior</b> .....	<b>18</b>
<b>TROUBLESHOOTING</b> .....	<b>20</b>
<b>Analyzer Troubleshooting</b> .....	<b>20</b>
<b>Returning the Analyzer for Service</b> .....	<b>21</b>
<b>SPECIFICATIONS</b> .....	<b>22</b>
<b>WARRANTY</b> .....	<b>24</b>
<b>Notice to Buyer and/or user of the analyzer:</b> .....	<b>24</b>
<b>Warranty Exclusions</b> .....	<b>24</b>
<b>Limitations of Damage</b> .....	<b>25</b>
<b>INSTRUMENT ID SHEET</b> .....	<b>26</b>



# INTRODUCTION

---

The IR208 is capable of monitoring up to six individual gases within a single gas sample stream. The IR-208 takes advantage of shared components and subsystems within the analyzer to prepare and process additional infrared detectors as a cost saving multiplier. This enables Infrared Industries to offer a much more powerful and capable analyzer while at the same time keeping cost to a minimum. These saving multiply when more than one gas is required to be monitored and a substantial savings can be made when compared to separate analyzers.

The IR208 utilizes a multiple detector array, single infrared beam optical system. The analyzer infrared detector and optics are tailored to the customer's specified gases by limiting the infrared spectral energy using specially designed optical bandpass filters and comparing them to a specialized optical filter outside the bandwidth of the other gases in the sample stream. Comparing the absorption of the reactive gas filter to the comparator characterizes a measure of the gas concentrations. The measured transmittance levels are electronically processed to develop the displayed gas concentration readings.

Up to three gases may be measured using IR spectroscopy. In addition the IR-208 has the capability to utilize electrochemical, paramagnetic or other sensors to measure up to 3 additional gases.

A touch-screen LCD display and DC Voltage analog outputs are standard with the unit, as well as an RS232 port for printer connection and PC control.

Other options for the IR208 include:

- **High-current analog outputs ( 4-20 mA)** – provide high-current output of measured results
- **Zero Air Pump** – Adds built-in pump used for purging & zeroing the sample cell
- **Sample Conditioner** – Adds built-in sampling system conditioner (pump, filtering, and pneumatics)
- **Probe and Hose Assembly** – Sample hoses and probes are available for a verity of applications
- **PC Software** – Controls multiple IR-208 units via PC; captures data and presents graphs
- **AC/DC power / Integrated Battery**– Allows the analyzer to operate on either AC or DC or battery
- **Alarms** – provides Alarm outputs (relays) on the back of the unit with user-configurable hi and low values



This section provides a description of the set-up of the analyzer. When using the analyzer for the first time, check for any damage that may have occurred during shipping. We suggest now filling out the Instrument ID Sheet at the back of this manual for your permanent records.

Please familiarize yourself with the front and back panels of the unit by examining the unit and the pictures on the following pages.

## **P O W E R   U P**

The analyzer can be operated from AC power source (90 – 260 VAC). The AC power-input connection is a standard 3-wire recessed computer-type connector. Various types of power cords may be used to connect to wall power as needed to be compatible with the various supply voltages and wall sockets throughout the world.

Attach the power cord to the rear of the analyzer and plug the end of the cord into the appropriate main power.

Make sure that the sample probe has been placed in an area where there is only plain air to be drawn into the sample line or, if using an external sample conditioner, that the sampling selector switch is set to “ZERO”.

Connect the sampling conditioners output line to the inlet port on the back of the analyzer.

Tap a line off your Zero gas supply line going to your sampling conditioner and connect it to the “Zero” port on the back of your analyzer. This line will supply the Zero gas to the automated electronic solenoid valve located inside the analyzer.

Press the Power button to turn on the unit.

The front panel will then display Please Standby while the analyzer is warming up. The warm-up time will vary depending on analyzer’s internal temperature. The Zero enunciator will remain on for approximately 30 seconds after warm-up period. The Zero gas should flow continuously during warm-up; if not, the accuracy of the analyzer will be significantly reduced.

Once the analyzer is warmed-up, it is ready to begin measuring gas concentrations. Select the sample line you wish to measure and turn on the pump of your sample conditioner. Press the Measure button to begin measuring the sample stream gases. Allow a few seconds for the gases to reach the analyzer and for the displayed values to stabilize. While in measure mode, you can hold or “freeze” the display values by pressing the Hold button.

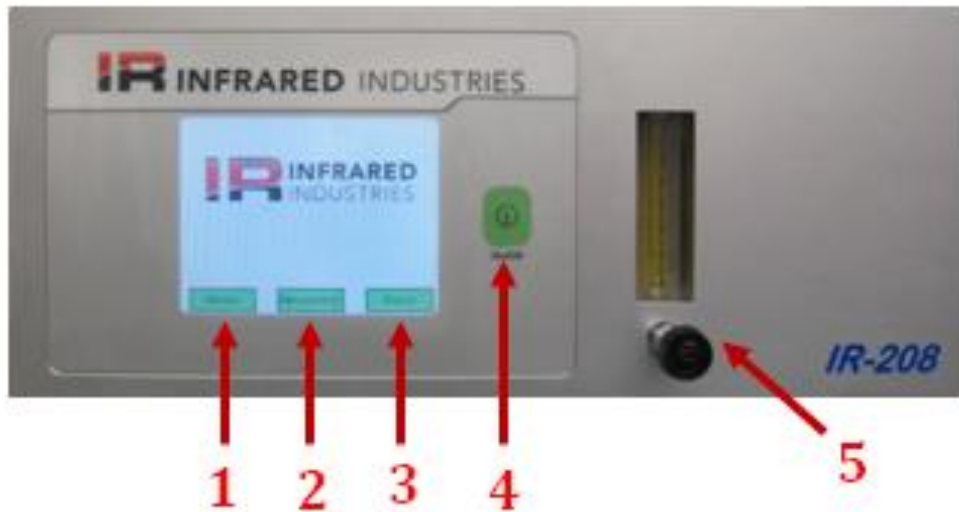


# ANALYZER DESCRIPTION

---

Before attempting to operate the analyzer, review the analyzer features described below as well as all warning labels. Identification and understanding of the physical features of the instrument will make operation easier.

## FRONT PANEL



*Figure 1: Front Panel/Display*

1. **Menu** - Leads to setting the Configuration options.
2. **Measure** - Starts the Measurement mode.
3. **Zero** - Starts the Zero process for the analyzer.
4. **On/Off** - Turns power on and off.
5. **Flow Meter and Control**- Regulates flow to the sample cell and shows measured flow.

## REAR PANEL

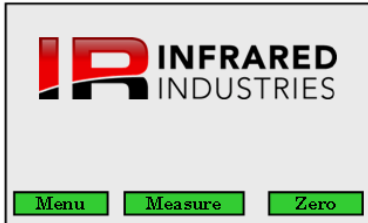


*Figure 2: Rear Panel*

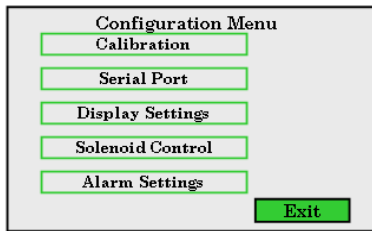
- 1. AC Power socket and Fuses** - Fuses installed below the AC power socket provide protection from electrical overload.
- 2. Analog Outputs** – Allow connection to a recording device. Output is DC voltage and the range is specified at the time of purchase.
- 3. Serial RS232 Connector**- The serial Communication Port allows the analyzer to be connected to a PC-compatible computer or a printer. Set the proper Configuration based on the device that will be attached (see Configuration Menu -> Serial Port).
- 4. Zero Port**
- 5. Sample Gas Inlet Port**
- 6. Sample Gas Exhaust Port**

# CONFIGURING THE ANALYZER

The IR-208 has various configuration choices that should be set by the operator before the first use. This section outlines the configuration screens.

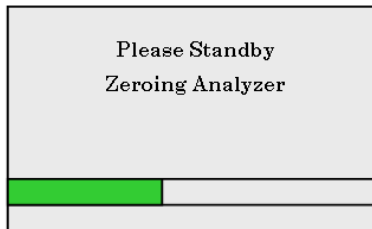


After powering on the analyzer you will see this screen, called the Home Screen. From this screen you can access the Configuration Menu by touching the MENU button.

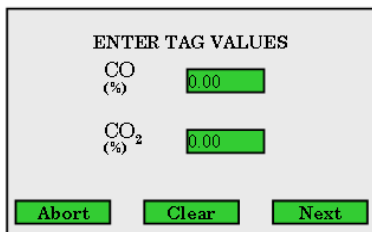


This is the Configuration Menu screen; from here you can select multiple items as shown. Press EXIT to return to the Home Screen at anytime.

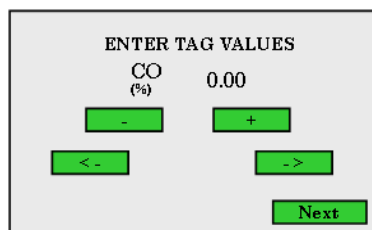
## CALIBRATION



By pressing the Calibration button from the main settings screen the analyzer goes into standby and begins to purge the gas lines. The bar at the bottom of the screen shows the progress of the process as it moves from left to right.

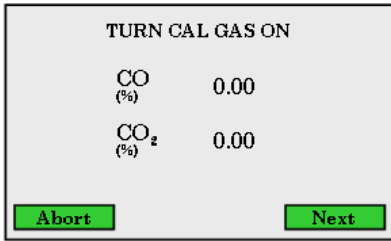


Once the purge is complete you will see this screen. Enter each gas tag value by pressing the corresponding box .

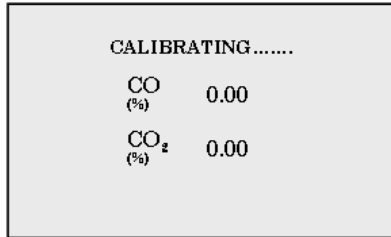


When entering the tag values you should enter them just as they are on the calibration bottle\*. Any gas you do not want to calibrate should be left with a value of zero. Oxygen(O<sub>2</sub>) does not get calibrated. Fields containing a decimal point require tag values to be entered as percentages. Fields without a decimal point should be entered as ppm. Once you have entered the data for each gas, begin calibration by pressing NEXT.

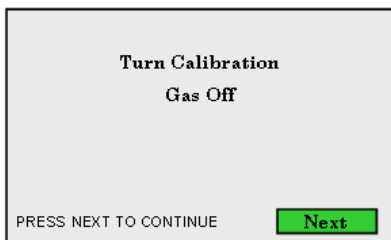
\*Use + and - to change the number that is currently highlighted. To move to the next digit or field use the <- or -> buttons. Press the NEXT button to move on to the next gas.



At this point , turn on your calibration gas. When the gas is on press NEXT; otherwise you can exit the calibration by pressing ABORT.

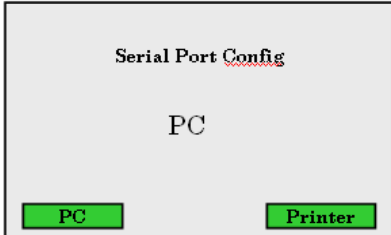


This window will now display the current concentration values for the gases. By watching this window you can see when the gas is stabilized within the analyzer.



Calibration complete. Turn off the calibration gas and press NEXT to complete the calibration sequence.

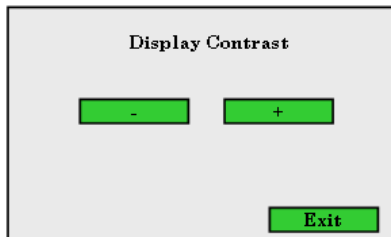
## SERIAL PORT



This selection defines the communications on the serial port. Select PC if remote control and display is desired. Note: contact IRI for information on the software required for PC control.

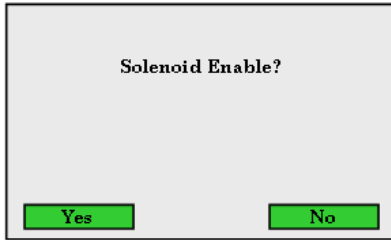
Printers are not supported at this time. The analyzer returns to the Home Screen after the selection is made.

## DISPLAY SETTINGS



This window allows the user to increase (+) or decrease (-) the contrast of the display.

## SOLENOID CONTROL

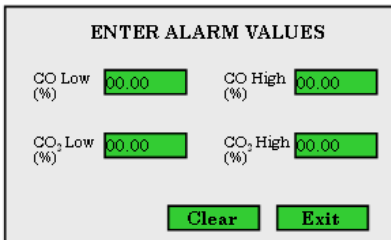


Solenoid Enable?

Yes No

At the factory, the solenoid to draw gas from the Zero Inlet is enabled and will turn on automatically when the analyzer is Zeroed. The solenoid can be disabled manually by selecting NO at this screen. The analyzer returns to the Home Screen after the selection is made.

## ALARM SETTINGS



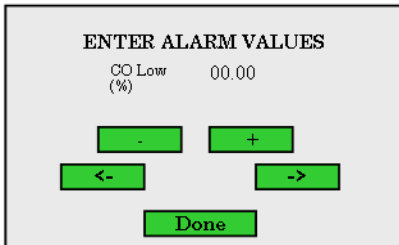
ENTER ALARM VALUES

CO Low (%) 00.00 CO High (%) 00.00

CO<sub>2</sub> Low (%) 00.00 CO<sub>2</sub> High (%) 00.00

Clear Exit

If the unit was purchased with the optional Alarms, there will be an Alarm output panel on the rear of the analyzer. For each gas measured configure the low and/or high alarms by pressing the value in the box to set it. If your unit does not have Alarm outputs, skip this step by pressing Exit.



ENTER ALARM VALUES

CO Low (%) 00.00

- +

<- ->

Done

Use - and + in increment/decrement to set currently selected digit. Then use the <- and -> to move to the next digit to be edited. When you have finished editing, press the DONE button to complete this step.



# USING THE ANALYZER

---

## WARM - UP

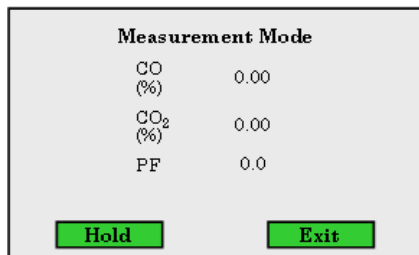
When power is first turned on, the analyzer will beep 5 times to indicate normal start-up, and then enter the WARM-UP phase. The analyzer remains in WARM-UP for approximately five minutes. The analyzer displays 'Warming Up,' then 'Checking Drift,' then 'Zeroing the Analyzer' with a progress bar.

During WARM-UP, purge any residual gases from the sample hose by providing Zero air or Nitrogen to the Sample Inlet. No other modes of operation can be initiated during WARM-UP. When complete, the Home Screen is displayed.

## MEASURING GAS

Pressing the MEASURE button will initiate measurement of the gases in the analyzer.

In the MEASURE mode, the analyzer is processing the detector signals, converting them to concentrations and displaying these measurements as well as sending data to the other outputs. The following screen is displayed:



Measurement Mode	
CO (%)	0.00
CO <sub>2</sub> (%)	0.00
PF	0.0

Hold      Exit

## HOLD BUTTON

If it is desired to "freeze" the readings in the MEASURE mode, you may do so by pressing the HOLD button. This will "freeze" the display; the measured values will not be updated while the displays are "frozen," however if output data is being sent to a PC, the PC will continue to receive fresh data. To go back to the Measurement mode, press Resume. To return to the Home Screen, press Exit.

## ZEROING

The operator may initiate the ZERO cycle from the Home Screen. The analyzer displays 'Please Stand By - Zeroing the Analyzer' and a progress bar. The process takes under 2 minutes, and the display will return to the Home Screen.

## **PC CONTROL INFORMATION**

The analyzer can be remotely controlled by a PC and data can be sent to the PC as well. It is necessary to have a compatible program running on the PC. Please contact IRI for information on the latest software that we offer. Alternatively, we will also provide protocol specifications so that you may write your own software.

If the proper software is running on a compatible PC, ensure that the Serial Port is set to PC. See Configuration Menu -> Serial Port.

# MAINTENANCE

---

## CALIBRATION INFORMATION

The analyzer has been calibrated at the factory and is designed to maintain calibration accuracy for extended periods of operation. We recommend a calibration about every three months to ensure the integrity of the analyzer. Some regulatory agencies specify the time intervals between calibrations based on your application. It is important to comply with the governing regulations for your industry.

## CALIBRATION GAS REGULATOR

For high-pressure cylinders of gas, a regulator is needed to monitor the pressure of the calibration gas bottle and to adjust it to the pressure required for testing and calibration. An external sample conditioner often is used to provide regulation and flow control.

*NOTE: When using calibration gas, the bottle should be kept at about 21°C [70°F] for 8 hours prior to use. Sudden temperature changes can condense some of the components in the bottle, changing their concentration.*

For detailed steps on the Calibration procedure, see Configuring the Analyzer herein.

## FRONT PANEL AND EXTERIOR

To maintain the appearance of the analyzer and prevent the build up of dirt on the touchscreen, periodically clean the exterior with a soft damp cloth. Use a mild detergent to remove grease.

**CAUTION: DO NOT USE CLEANERS SUCH AS ACETONE, BENZENE, CARBON TETRACHLORIDE, GASOLINE, OR TOLUENE, AS THEY CAN DAMAGE PLASTIC COMPONENTS AND AFFECT ANALYZER ACCURACY IF THEY CONTAMINATE THE SAMPLING SYSTEM.**



# TROUBLESHOOTING

## ANALYZER TROUBLESHOOTING

There are three failure modes that the analyzer might encounter: General Failure, Zero Failure, and Failure to Calibrate.

***For a General Failure and Zero Failure, perform the following procedure:***

1. Verify that all the back panel ports are unobstructed, including:
  - Cal gas
  - Zero
  - Sample hose
  - Drain hose
2. Check the sample conditioner filters and pneumatics.
3. If a failure is still indicated, service is required by an authorized Infrared Industries service center.

***For a Failure to Calibrate, perform the following procedure:***

1. Repeat calibration.
2. If the analyzer still fails to be calibrated, the analyzer can still be used but it will be at reduced accuracy. It should be sent in for service when convenient.

When the default cal values are in use, the analyzer can still be used but the displayed values will be less accurate. It is recommended that the gas calibration procedure be performed to ensure accuracy.

SYMPTOM	PROBABLE CAUSE	SOLUTION
Low sample flow	<ol style="list-style-type: none"><li>1. Restrictions in sample hose or probe</li><li>2. Restrictions in sample filter</li></ol>	<ol style="list-style-type: none"><li>1. Check for kinked, plugged or pinched hose or probe. Clean probe tip with a small pointed tool. Disconnect hose from sample inlet and clean out if necessary</li><li>2. Change filter elements</li></ol>
Low sample flow during zeroing.	Restriction in Zero port	Check for obstructions in zero port on the back of the analyzer. (Zero port is under the CAL port)
No output to PC	<ol style="list-style-type: none"><li>1. No compatible program running on the PC. Please contact IRI for information on the latest software</li><li>2. PC is not selected in the Serial Port menu</li></ol>	<ol style="list-style-type: none"><li>1. Ensure PC is selected in the Config Menu - &gt; Serial Port.</li><li>2. Please contact IRI for information on the available software (required for PC control). The protocol is proprietary.</li></ol>
No output to printer	Printers are not supported at this time	
All function keys inoperative.	Unspecified error.	Turn analyzer power switch OFF and then back ON
No response when powered on	AC power problem	Check power cord and check fuses that are located under the AC power socket

## RETURNING THE ANALYZER FOR SERVICE

If the analyzer needs service, contact your dealer for complete instructions. If you need to ship the analyzer, pack it in its original container. We recommend that you insure the shipment.

Follow all instructions in this manual to be sure that the problem is with the analyzer and not with other equipment, sample purity, or cable connections.

If you determine that repair is required, contact Infrared Industries at (800)344-0321 to receive Return Materials Authorization (RMA) number and form. This is required prior to sending the unit in for repair.

### **Ship to:**

Infrared Industries

25590 Seaboard Lane

Hayward, CA 94545

Phone - 510-782-8100 • Fax - 510-782-8101

# ***SPECIFICATIONS***

---

**Repeatability/Accuracy\*:** ..... +/- 1% of Full Scale  
**Linearity:** ..... +/- 1% of Full Scale  
**Noise Level:** ..... 1% of Full Scale  
**Zero Drift\*\*:** ..... +/- 1% of Full Scale /24 hr.  
**Span Drift\*\*:** ..... +/- 1% of Full Scale /24 hr.

## **Speed of Response**

**Display:** ..... 90% of Reading in 1 sec (updated every 1 sec)  
**Output:** ..... 90% of Reading in 1 sec (updated every 1 sec)

## **Outputs**

**Digital:** ..... Data RS 232  
**Analog – Recorder:** ..... 0-100 mV Standard, 4-20mA Optional (others available)

**Power:** ..... 120/240 VAC; 50/60 Hz.  
**Operating Temperature:** ..... 0° - 50 ° C (32 ° - 122 ° F)  
**Storage Temperature:** ..... 40 ° - 75 ° C (-40 ° - 166 ° F)  
**Warm-up Time:** ..... 5 Minutes  
**Power Consumption:** ..... < 20 Watts

## **Physical**

**Cabinet:** ..... 9" X 11" X 24.6"  
**Display:** ..... 3.6" X 4.75" – Graphic LCD  
**Rack Mount:** ..... 19" Rack; 4U high

Specifications are subject to change without notice.

\*Accuracy specifications dependent upon absolute accuracy of the certified calibration gas.

\*\*Performance specifications based on stable ambient conditions, and a sample stream that is clean, dry, and regulated to a flow rate of 2-6 SCFH.



# WARRANTY

---

## NOTICE TO BUYER AND/OR USER OF THE ANALYZER:

Exclusion of warranties and limitation of damages and remedies

This analyzer is warranted against defects in materials and workmanship under normal use and service for one year from the date of delivery to the original purchaser.

The sole obligation of the seller and/or manufacturer under this warranty is limited to repairing or replacing as the seller or manufacturer may elect, free of charge at the place of business of the seller or manufacturer, any parts that prove, in the seller or manufacturers judgment, to be defective in materials or workmanship within one year after delivery to the original purchaser.

This warranty shall not apply and is void if, in the opinion of the seller and/or manufacturer, the portable analyzer or any component thereof has been damaged by accident, other causes not arising out of defects in materials or workmanship.

Before purchasing and using this analyzer, the user should determine the suitability of the product for his or her intended use and, the user assumes all risks and liabilities whatsoever in connection therewith.

If a product malfunction should occur, you may contact the seller or the manufacturer at:

**Infrared Industries, Inc.**  
**25590 Seaboard Lane**  
**Hayward, Ca. 94545**  
**Voice: 510-782-8100 or 800-344-0321**  
**E-mail: [service@infraredindustries.com](mailto:service@infraredindustries.com)**

## WARRANTY EXCLUSIONS

THIS WARRANTY AND THE SELLER AND/OR MANUFACTURER'S OBLIGATION HEREUNDER IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER REPRESENTATIONS CONCERNING THE SALE, USE AND/OR PERFORMANCE OF THE ANALYZER.

No person is authorized to give any other warranties or to assume any other liability on behalf of the seller or manufacturer. This warranty shall not be extended, altered or varied except by written agreement signed by the seller and the buyer.

## **LIMITATIONS OF DAMAGE**

IN NO EVENT SHALL THE MANUFACTURER OR SELLER OF THE PORTABLE ANALYZER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH ANY OBLIGATION IMPOSED UPON THE SELLER OR MANUFACTURER IN CONNECTION WITH THIS WARRANTY. SUCH INCIDENTAL AND CONSEQUENTIAL DAMAGES SHALL INCLUDE, WITHOUT LIMITATION, LOSS OF USE, LOSS OF INCOME, LOSS OF PROFIT (INCLUDING LOSSES TO BUSINESS INTERRUPTION), LOSSES SUSTAINED AS THE RESULT OF INJURY (INCLUDING DEATH) TO ANY PERSON, AND LOSS OF OR DAMAGE TO PROPERTY. THE LIABILITY OF THE SELLER AND/OR MANUFACTURER ON THIS WARRANTY IS LIMITED TO ACCEPTING RETURN OF THE PORTABLE ANALYZER, REFUNDING ANY AMOUNT PAID THEREON AND CANCELING ANY BALANCE STILL OWING ON THE EQUIPMENT. THIS REMEDY IS EXCLUSIVE-REPAIR OR REPLACEMENT PROCEDURE

# ***INSTRUMENT ID SHEET***

---

**MODEL NUMBER:** \_\_\_\_\_

**SERIAL NUMBER:** \_\_\_\_\_

**CONFIGURATION:**                      **GAS**                      **FULL SCALE VALUE**

<b>CH1</b>	_____	_____
<b>CH2</b>	_____	_____
<b>CH3</b>	_____	_____
<b>CH4</b>	_____	_____
<b>CH5</b>	_____	_____

**RECORDER OUTPUT:** \_\_\_\_\_

**SPECIAL DATA:** \_\_\_\_\_

**RECOMMENDED CALIBRATION GAS:** \_\_\_\_\_

**ORIGINAL PURCHASER:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**DATE OF ORIGINAL SHIPMENT:** \_\_\_\_\_

---