User Manual

GasD® 8000 Series Portable Gas Analyzer

Note: This version of the User Manual applies to GasD 8000 instruments with the external Sensor Cartridge and FW 1.0.84 or newer.

I

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1 Introduction

Congratulations on your purchase of the INTERSCAN GasD® 8000 series portable gas analyzer. The GasD® 8000 series analyzer represents a new chapter in Interscan's longstanding reputation of reliability and accuracy in portable gas monitoring.

Your instrument combines field-proven electrochemical sensing technology with an all-new electronics package, intuitive controls, and a real-time graphics display.

1.1 Features

- Real time continuous sampling and monitoring.
- Automatic data logging downloadable in a .csv (comma-separated values) file.
- SD Card data storage.
- User adjustable flow rate with auto blockage detection.
- User adjustable Alarm set point with audible and display indications as well as voltage output at rear panel terminals.
- Voltage and current loop analog outputs available at rear panel terminals.
- Rechargeable Li-ion battery providing 5-8 hours of monitoring in the field.
- Instantaneous and accumulated measurement display (Monitor and Graph views).
- Quick connect sampling ports.
- Mini USB charging port.
- Simple sensor replacement reduces downtime; by means of a cartridge

1.2 Precautions

Read this manual fully and carefully before using your instrument. This manual should be read by anyone who will be operating the GasD® 8000 series portable analyzer to ensure accurate measurement and long life.

*NOTE 1: It is **not** necessary to calibrate the analyzer when received from the **Interscan** or an **authorized distributor**. All Interscan analyzers are calibrated at the factory prior to shipment.*

*NOTE 2: It is a good idea to charge the batteries in your instrument before initial operation. Connect the battery charger and run the instrument for 24 hours in OFF MODE to allow the batteries to fully charge and the sensor to fully stabilize. See section **4.3.2 – Charging The Batteries** for battery charging information.*

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NOTE 3: It is recommended that the GasD® 8000 series portable analyzer be connected to the power supply/battery charger during long term storage. See section **4.3.2 – Charging The Batteries** *for battery charging information.*

WARNING: High exposure of gas can adversely affect instrument readings and potentially damage the gas sensor. Be sure to read section 4.5 Gas Sensor Categories.

1.3 Instrument Packing Contents

Carefully remove the analyzer from its packing container along with the accessories. Inspect the instrument for any damage. Check that all accessories are included according to the contents list shown below:

- GasD® 8000 Series Portable Analyzer
- Mini USB Wall Charger/Charging Cable
- Sample probe assembly
- User Manual

Contact the Interscan Service Dept. immediately (see section **8 Customer Service**) to report any damaged or missing items.

Any items reported damaged or missing after 30 days from delivery will not be covered by INTERSCAN and the customer will be responsible for any replacement or repair expense.

2 Specifications

Weight	2.4 kg (5.3 lbs.) with Sensor Cartridge
Dimensions	5½ in H x 8¼ in W x 10 in D (140 x 210 x 254 mm) Includes body and legs
Accuracy	± 5.0% of reading, ± 1 least significant digit. (Limited to accuracy of calibration standard)
Repeatability	± 0.5% of full scale
Minimum Detectability	1.0% of full scale (chemistry and concentration dependent)
Linearity	± 1.0% of full scale
Calibration	Against NIST traceable standard gas mixture, or via Interscan's SENSOR EXPRESS®
Lag Time	~500 milliseconds per foot of tube
Range	0-500.0 ppm (Depends on target gas)
Resolution	0.1 ppm (gas range dependent)
Gas	Variable
Application	Portable
Zero Drift	± 1.0% of full scale (24 hours)
Span Drift	Less than ± 2.0% of full scale (24 hours)
Temperature Range	0-45C
SD Card	FAT32 formatted
Note	The zero and span drift specifications assume that the analyzer is equilibrated, and is at constant temperature, with a properly maintained sensor.

3 Instrument Description

3.1 Controls & Features

The picture below shows the GasD® 8000 series portable analyzer case and front panel features which are described in the table and sections that follow.

LCD DISPLAY – Displays all relevant numeric and text information related to sampling and menu navigation. Gas values can be displayed numerically or graphically. See section *3.1.1 – Display Fields And Indicators* for display details.

NOTE: Gas labels and units shown in this manual are for example only. Your displayed text may be different.

INLET FITTING – Quick connect socket for introduction of sample via sample inlet tubing. See section *3.1.3 – Sample Probe* for connection details.

OUTLET FITTING – Exhaust port for sample stream. No connection is necessary. *DO NOT BLOCK THIS PORT!*

MINI USB PORT – USB connector for battery charging and powered operation.

TILT-BACK FEET – Provides a slight tilt angle for table-top use. Feet are shipped in the collapsed or "flat use" position but can be engaged by simply rotating them forward until they lock in place.

SD CARD – Slot for data storage memory card. See section *4.5 Data Storage And Access* for details on data storage and accessing data.

CONTROL KEYPAD – Button cluster for unit operation. See section *3.1.2 – Control Keypad* for control details.

CARRY HANDLE – Enables easy carrying of the instrument between sampling locations. The handle can also be rotated 180° to the underside of instrument case for deeper angled tilt during table-top use as shown in the picture. To rotate handle, pull out on the handle mount on the left side of case and rotate handle towards the front of the instrument. It will lock into place when at the 180° position. Be sure to collapse the tilt back feet before rotating the handle.

3.1.1 DISPLAY FIELDS AND INDICATORS

The GasD® 8000 series portable analyzer display screen offers a variety of information as detailed below. Some elements may not be visible in some modes of operation. Gas label and units shown may be different on your unit.
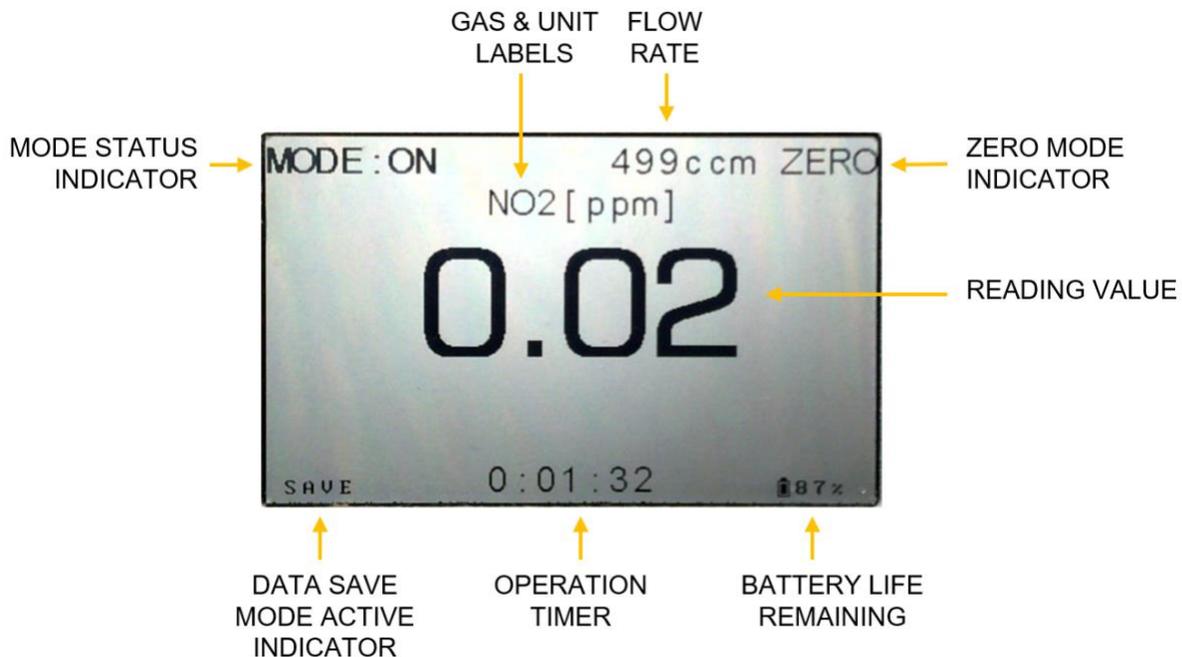
3.1.2 CONTROL KEYPAD

The analyzer's control keypad is detailed below. Each button is described in the table that follows.

POWER BUTTON – Press to turn power to instrument ON. Press from the MAIN MENU to turn power OFF.

ARROW BUTTONS – Used to navigate through the instrument's menus and enter values during numeric and text entry. Proper use is indicated in specific function descriptions.

ENTER BUTTON – Used to advance through the sequential menus and finalize certain functions.

STOP BUTTON – Used to back up in sequential menus or end a particular function.

SAVE BUTON – Press at any point during sampling to save current data to memory card.

3.1.3 SAMPLE PROBE

In most cases, gas sample will be collected via a provided SAMPLE PROBE which consists of probe handle and tip, a 3 foot length of PTFE (Teflon) or polypropylene tubing and a quick disconnect tube adapater for connection to the INLET of the instrument. This assembly is shown below.
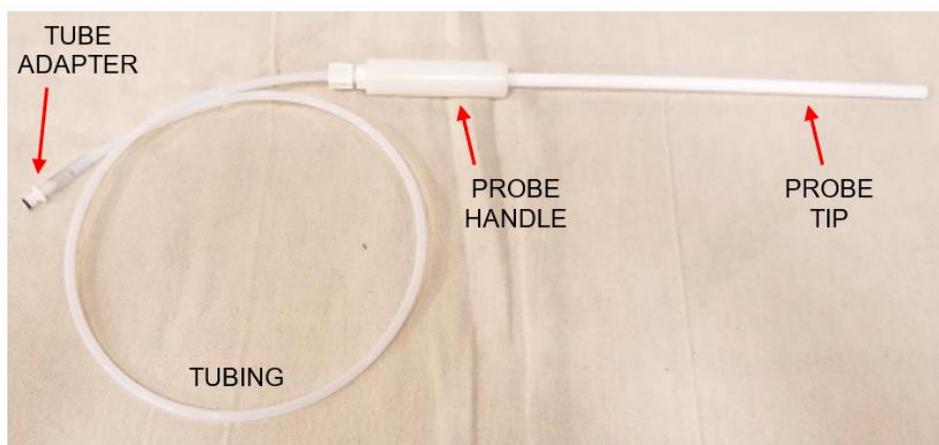
To connect the probe to the instrument INLET first push down on the metal locking tab of the inlet fitting then plug the tube adapter into the "IN" connector until you hear the locking mechanism click into place (below, left). To remove the tube adapter, press down on the metal locking tab on the top of the connector while pulling out on the tubing (below, right).
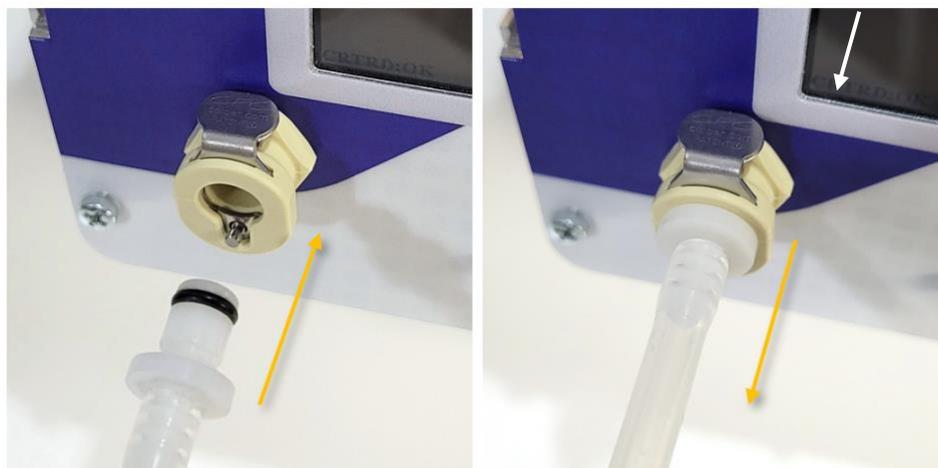
3.1.4 ANALOG OUTPUT CONNECTIONS

The GasD® 8000 Series analyzer is equipped with 0-100 mV** and a 4-20 mA analog output signals available at the 10 pin rear panel terminal block as shown in the table below.

For mV output, connect between terminals 1 or 2 (GND) as the negative reference and terminal 7 (AOUT2) as the positive output as shown in blue in the table below. For 4-20 mA output, use terminal 3 (VCC) as the output and terminal 8 (AOUT1) as the return, shown in green in the table below.

Connect to the terminal block by inserting wire conductor into the desired terminal and tightening the terminal's screw. The terminal block can be removed from the rear panel for ease of wiring by gently pulling the block away from the panel. Re-connect the block by gently pressing it back into the receptacle.
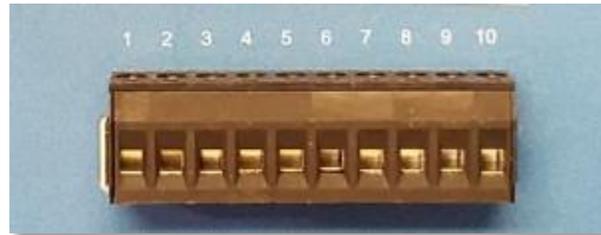
PIN	NAME	TYPE	DESCRIPTION
1	GND	Reference	Local Device Ground
2	GND	Reference	Local Device Ground
3	VCC	Reference	+5 Volts
4	-	N/C	-
5	-	N/C	-
6	ALM	Alarm Signal	+5V on alarm actuation
7	AOUT2	Analog Voltage Output	0-2500 mV corresponding to gas range**
8	AOUT1	Analog Current Output	4-20 mA corresponding to gas range
9	-	N/C	-
10	-	N/C	-

**NOTE – the mV analog output can be adjusted anywhere between 0 and 2500 mV at full scale. Contact the INTERSCAN SERVICE DEPT if you wish to modify the voltage output.

## 3.1.5 ALARM OUTPUT CONNECTION

The GasD® 8000 Series analyzer is equipped with an alarm output signal that will activate when gas concentration level exceeds the user set Alarm set point level. This is a 5V signal available at terminal pin 6 (Alarm Signal) referenced to terminal pins 1 or 2 (GND). See section *4.3 Alarm Setup* for steps on how to set this alarm.

4 Operation

4.1 Powering the Analyzer

To turn the instrument on, press the green power button. The MAIN MENU screen shown on the right will be displayed.
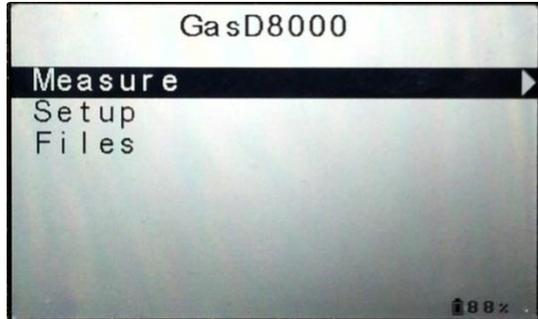
Check the battery life indicator in the lower right corner of the display and confirm that adequate battery life remains for use. Expected battery life is 5-8 hours on a full charge depending on nature of use. See section 4.3.2 for details on charging the batteries.

To power the unit down, navigate to the MAIN MENU screen shown on the right and press the green power button. The screen will prompt you to confirm power down as shown. Press the **RIGHT ARROW** button to confirm power down.
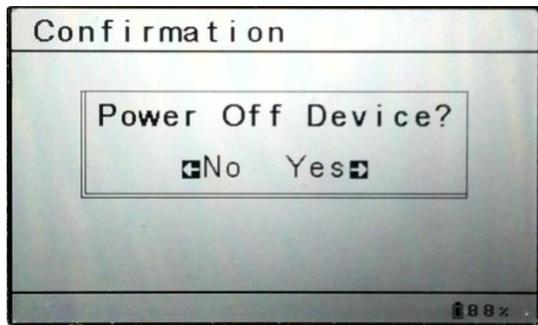
*NOTE: Normal power down only works from the MAIN MENU screen. Access the main menu screen from any of the operating modes or sub-menus by successively pressing the **STOP** button until the MAIN MENU is displayed.*

4.2 Main Menu Navigation

To navigate through the MAIN MENU, use the *UP* or *DOWN ARROW* buttons to highlight the desired menu selection then use the *RIGHT ARROW* button to open the highlighted sub-menu. This is the procedure for navigating any sub-menu in GasD® 8000 series portable analyzer.

The MAIN MENU offers 3 sub-menu selections that are detailed below:

MEASURE – Sequential sub-menu of primary operating modes as follows:

- STARUP MODE > OFF MODE > ON MODE.

See section *4.3 Measure Mode* for details on the MEASURE sub-menu.
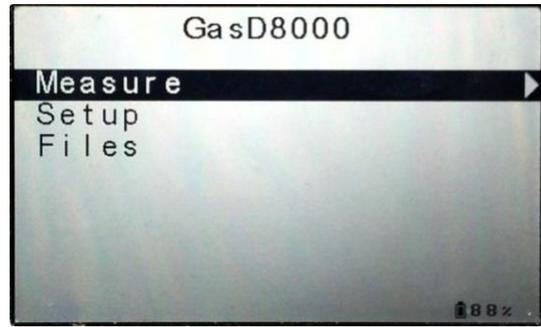
SETUP – Sub-menu of user adjustable parameters and functions including:

- FLOW RATE
- SAMPLING MODE
- DATE/TIME
- ALARM
- GAS CALIBRATION
- DIGITAL CALIBRATION
- SENSOR CARTRIDGE
- FACTORY SETTINGS

See section *4.4 Setup Menu* for details on the SETUP menu.
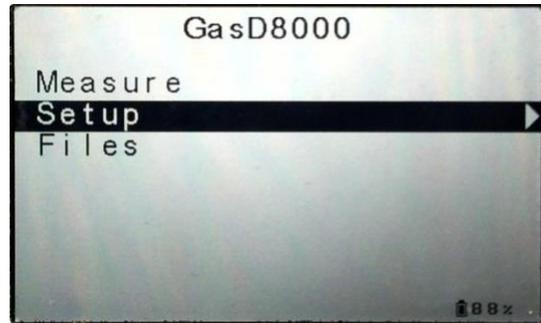
FILES – Sub-menu of data storage option:

- Create (create and name new data file)
- Delete (delete any existing data file)
- Select (select any existing data file for next sample storage)

See section *4.5 Data Storage And Access* for details on the FILES menu and accessing data.

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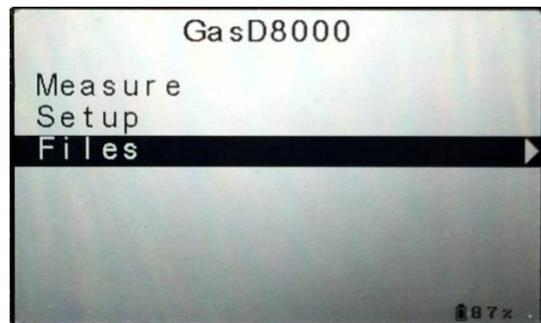
4.3 Measure Mode

MEASURE MODE is the primary operating mode for GasD® 8000 series portable analyzer. It is comprised of a sequence of 3 separate modes as detailed below.

SENSOR STABILIZING MODE

Upon selecting MEASURE from the main menu, the unit will automatically advance to SENSOR STABILIZING mode. A 5-minute timer will count down while the sensor is allowed to stabilize following power up. The screen shown to the right will be displayed during SENSOR STABILIZING mode. When the startup timer elapses, the instrument will automatically enter OFF MODE. To bypass the stabilization period and manually advance to OFF MODE, press the **ENTER** button.
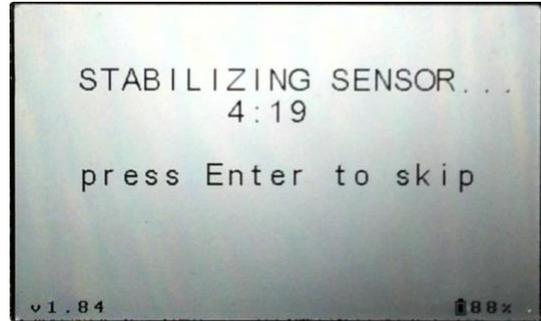
OFF MODE

In OFF MODE, the pump is turned off and the screen showed on the right will be displayed. The timer at the bottom of the display indicates how long the unit has been in an operational mode.

This is the mode the instrument should be kept in when powered but not in use. To advance to ON MODE from OFF MODE, press the **ENTER** button. To return to the main menu from OFF MODE, press the **STOP** button.

## ON MODE

ON MODE is the primary sampling mode for the analyzer. In this mode, the pump is turned on and the screen shown on the right will be displayed. The display will indicate the gas concentration while the active timer continues to display sample duration. Zeroing of the display can be accomplished from this mode as well (See section 4.4.1 - Zeroing The Analyzer for more on zeroing).

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GRAPH DISPLAY

A graphical display of the continuous reading is also accessible in ON MODE by pressing the *RIGHT ARROW* button. The current numeric reading value is displayed in the lower right corner.
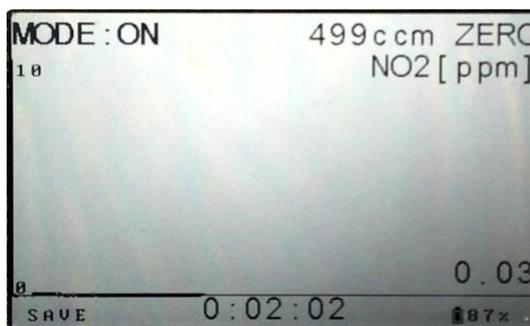
Advance forward through the mode sequence by pressing the *ENTER* button as needed. Advance backward through the mode sequence by pressing the *STOP* button as needed. Pressing the *STOP* button successively will return the display to the MAIN MENU where the SETUP and FILE menus can be accessed.
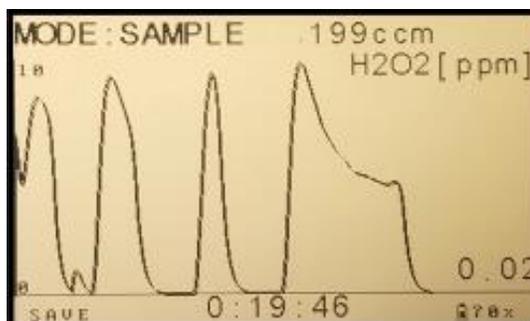
4.4 Setup Menu

The Setup Menu shown on the right offers access to user adjustable parameters and maintenance functions. This menu is detailed below.
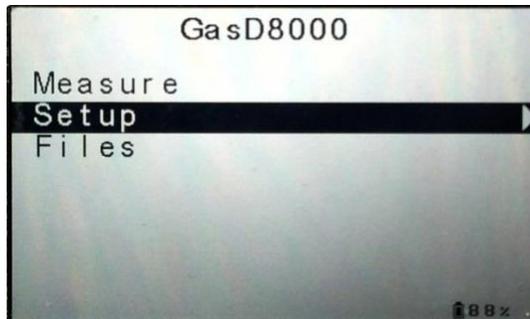
Flow rate – cc / min – Varies by chemistry, usually set between **200 and 800 ccm**. *Do not change this setting.*
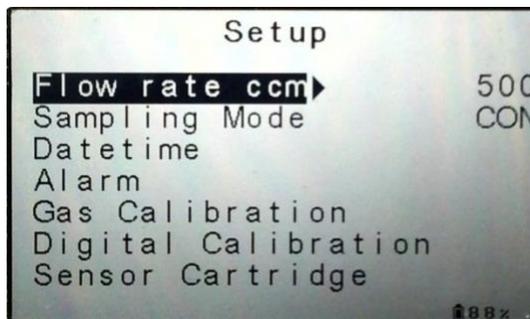
Sampling Mode – Nominal setting = **CON**. This setting controls the SAMPLE MODE procedure with 4 options as follows:

- **Continuous (CON)** - Sample is drawn continuously. This is the correct mode for use in the GasD® 8000 Series analyzer

- **HAL1** – N/A for 8000 Series analyzers

- **HAL2** - N/A for 8000 Series analyzers

- **HAL3** - N/A for 8000 Series analyzers
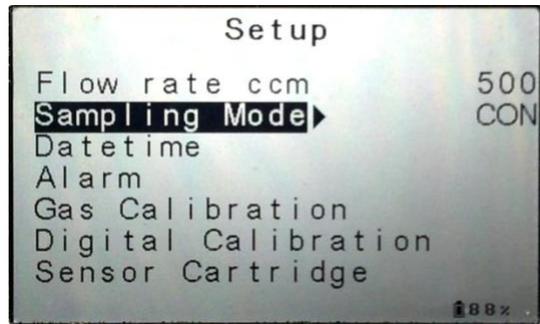
Datetime – Set the date and time according to the user's time zone.
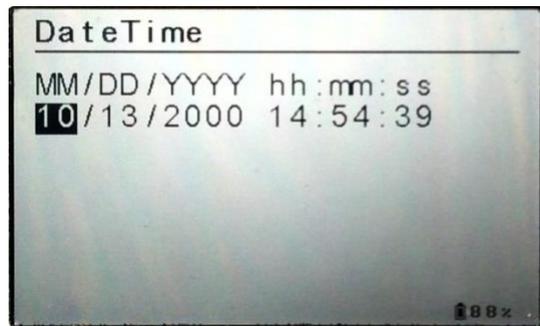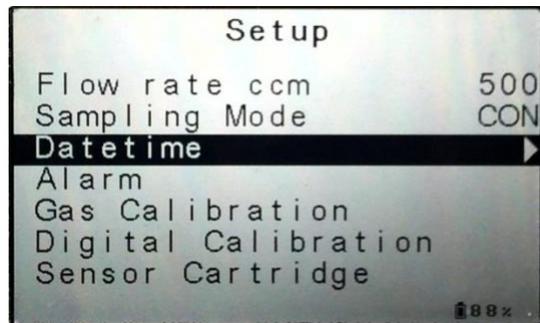
Alarm – Allows enabling of Alarm functionality and setting of Alarm set point above which Alarm indications will activate. (See section **4.3 Alarm Setup**).
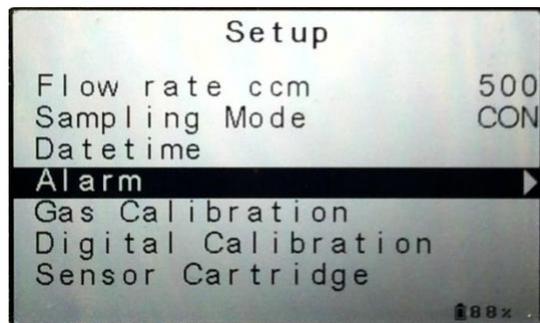
Gas Calibration – Allows for calibration using a calibration gas standard. See section **5.1 Gas Calibration**.

```
        Setup
Flow rate ccm        500
Sampling Mode        CON
Datetime
Alarm
Gas Calibration         ▶
Digital Calibration
Sensor Cartridge
                    🔋87%
```
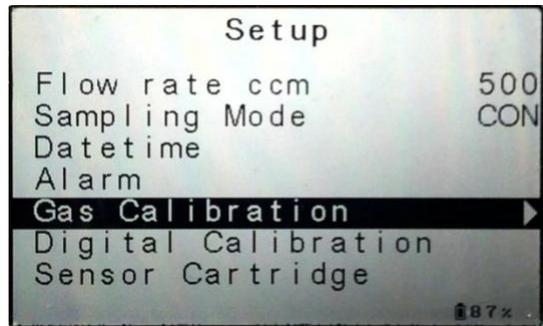
Digital Calibration – Allows for calibration without calibration gas via Interscan's Sensor Express Program. (See sections **5.3 Digital Calibration**.

```
        Setup
Flow rate ccm        500
Sampling Mode        CON
Datetime
Alarm
Gas Calibration
Digital Calibration     ▶
Sensor Cartridge
                    🔋87%
```
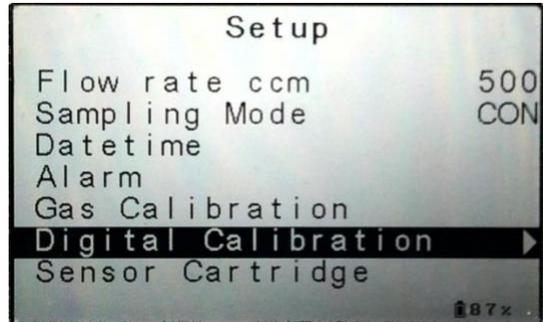
Sensor Cartridge – Lists values programmed into the cartridge's memory.

```
        Setup
Flow rate ccm        500
Sampling Mode        CON
Datetime
Alarm
Gas Calibration
Digital Calibration
Sensor Cartridge        ▶
                    🔋87%
```
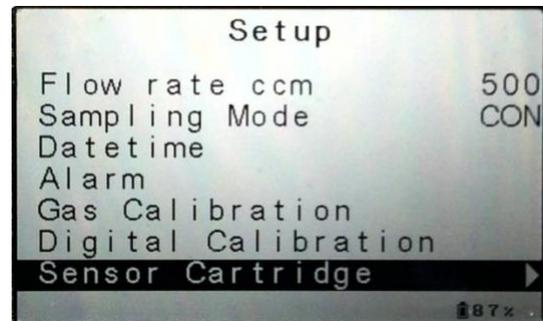
Factory Setup – A password protected setup sub-menu for factory setup only.

```
        Setup
Sampling Mode        CON
Datetime
Alarm
Gas Calibration
Digital Calibration
Sensor Cartridge
Factory Settings        ▶
                    🔋87%
```

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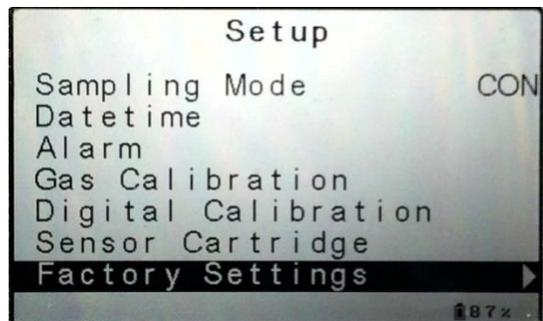
4.5 Files Menu

The Files Menu shown on the right provides the user the ability to Create, Delete or Select a file.
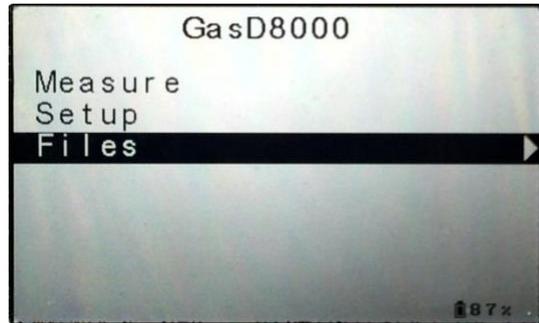
Create File: Creates a totally new file that the user can name. By default this file becomes the selected file. Press the **LEFT ARROW** to exit this menu.

Delete File: Deletes an existing file you don't need or want.

Select File: Selects the file to where to log the new data.

Note: *The data.csv file is the default file, and cannot be deleted.*
Note: *If the data.csv file does not exist in the SD card, it gets created at power-up.*
Note: *To know where your data will be logged into note which file is the Selected File.*

4.6 Alarm Setup

The GasD® 8000 Series portable analyzer is equipped with an alarm feature that provides visual and audible indication when the gas concentration level exceeds a user set alarm level. This section details alarm setup and functionality.

To access the Alarm settings menu, highlight "Setup" on the main menu then press the **RIGHT ARROW** button to select this sub-menu as shown to the right.
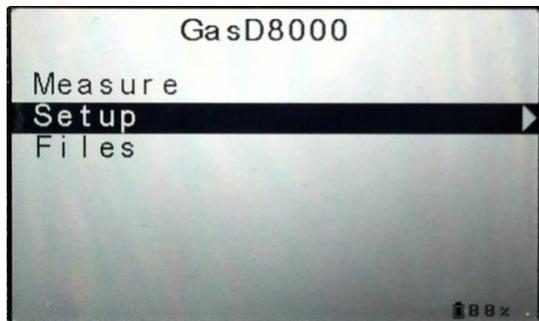
Use the **DOWN ARROW** button to highlight "Alarm" and press the **RIGHT ARROW** button to select as shown to the right.

```
              Setup
Flow rate ccm              500
Sampling Mode              CON
Datetime
Alarm                        ▶
Gas Calibration
Digital Calibration
Sensor Cartridge
                          📶88%
```
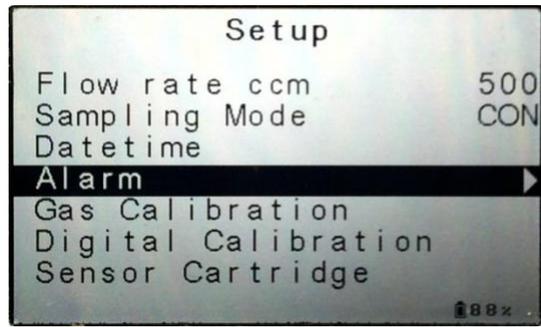
The "GAS HIGH" value is the alarm set point value above which alarm indication will occur.

```
              Alarm
GAS HIGH▶               000.10
ENABLE                      NO




                          📶88%
```

Highlight this parameter then use the **RIGHT ARROW** button to highlight the numeric field(s) you wish to change. Use the **UP** or **DOWN ARROW** buttons to change the numeric value of the desired fields. Once satisfied with the value, use the **LEFT ARROW** button to exit the parameter value field.

```
              Alarm
GAS HIGH              ⇕000.10
ENABLE                      NO



                          📶88%
```
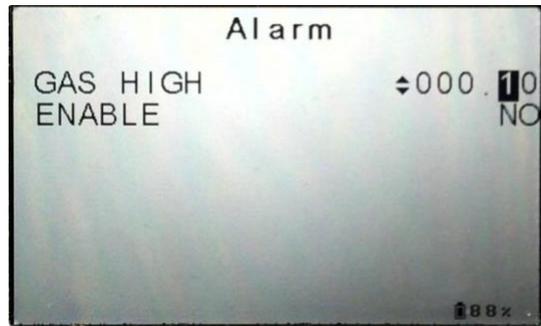
NOTE: Decimal places displayed in the Alarm numeric value field will mirror the decimal place count of the primary gas range.

Use the **DOWN ARROW** button to highlight the "**ENABLE**" parameter, then the **RIGHT ARROW** button to highlight the value.

```
              Alarm
GAS HIGH               000.10
ENABLE▶                     NO




                          📶87%
```
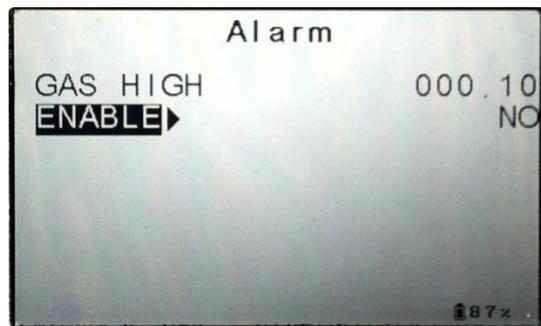
Using the *UP/DOWN ARROW* buttons, select "YES" to enable the alarm function or "NO" to disable it.

Press the *LEFT ARROW* button to exit the Alarm menu and press again to exit the Setup menu and return to the Main Menu.

```
                    Alarm
GAS HIGH                      000.10
ENABLE                         ⬍NO

                              ▌87%
```
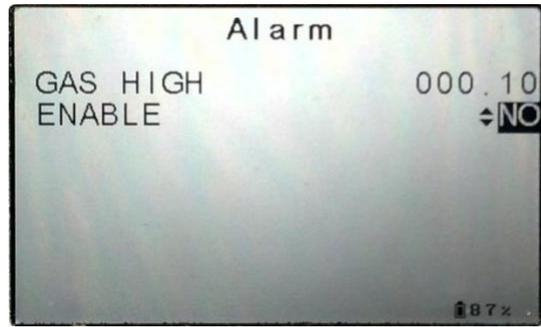
4.6.1 ALARM INDICATIONS

When enabled, the alarm feature will activate any time the displayed gas concentration level exceeds the user set alarm level.

During an alarm condition, "**ALARM THRESHOLD!"** will flash on the main display as shown on the right and a steadily repeating beep tone will sound indicating an active alarm condition. When the concentration value falls below the alarm set point, the alarm indications will deactivate.

```
MODE:ON          199ccm ZERO
            H2O2[ppm]

            3.70
         ALARM THRESHOLD!
SAVE        0:25:53      ▌83%
```

4.6.2 CHARGING THE BATTERIES

The GasD®8000 series portable analyzer includes a wall charger that can be used to recharge the instrument's batteries, as well as power the instrument during extended use. **The expected battery capacity on a full charge is 5-8 hours depending on nature of use.**

When the battery charge drops below 10%, the display will indicate "**Low Battery!**" at the bottom of the screen. Follow the procedure below to re-charge the batteries:

1. Select the desired plug type on the multi-region charger plug unit.
2. Plug the large USB connector end of the supplied charger cable into one of the charger's USB ports.
3. Connect the mini-USB connector into the mini USB port on the front panel of the instrument.
4. Plug the charger into the wall.
5. Charge until the battery life indicator on the instrument display reads "100%".

If charged with the power off, the GasD® 8000 series portable analyzer will automatically power up to the MAIN MENU as soon as the charger is connected to the USB port. If the instrument is then powered down the display will show a charging percentage indicator as shown on the right. The instrument can be charged with power on or off.

BATTERY: 65% CHARGING
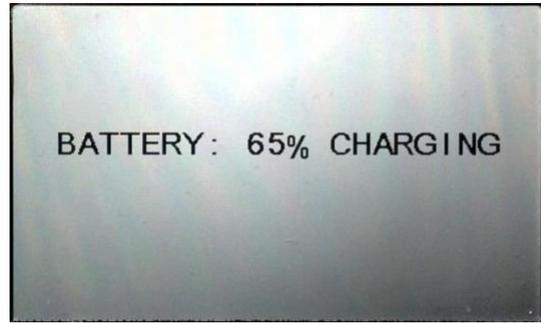
NOTE: **For fastest charging, do not connect any other USB devices to the charger.**

NOTE: **The internal batteries must have a charge to maintain the sensor bias voltage and minimize sensor warmup time. <u>It is recommended you keep the instrument connected to the power supply for long term storage or extended use.</u>**

4.7 Sampling

4.7.1 ZEROING THE ANALYZER

It is always a good idea to zero the analyzer prior to sampling. To accomplish this, ensure the unit is in ON MODE and has been allowed to stabilize in this mode for several minutes. Confirm that the flow rate has settled at the nominal flow rate (i.e.: 500 ccm) and the display value is not rising or falling significantly. Zero the instrument in an area where clean ambient air is present as follows:

- Press the *UP ARROW* button. The ZERO indicator will now be highlighted indicating ZERO MODE is active.

- Press the *ENTER* button. "Set ZERO" will be indicated under the main display for 3 seconds indicating the value is being zeroed. The display value will gradually decrease toward 0. If zero is not attained, repeat the process by pressing *ENTER* again.

- When finished, press the *DOWN ARROW* button to exit ZERO MODE.

The instrument is now ready for sampling.

4.7.2 TAKING SAMPLES

While in ON MODE, direct the SAMPLE PROBE toward the desired sample location and allow sample to be drawn. The instrument will respond to any target gas in the area within a few seconds.

When finished with sampling, press the **STOP BUTTON** once from ON MODE to return to OFF mode. This stops the automatic data storage saving data space and battery life.

```
MODE:OFF          39ccm
        NO2[ppm]

        0.00

        0:14:32        871%
```

4.7.3 AUTO BLOCKAGE DETECTION

The GasD® 8000 series portable analyzer is equipped with flow rate detection to protect against unwanted blockages in the inlet line. In the event of a sudden drop in flowrate in ON mode, the screen shown to the right will be displayed. This indicates a blockage of the inlet probe, filter or sample tube that must be addressed before sampling can resume.

```
WARNING

    Tube blocked
Please clear tube.

    ENTER ▸

SAVE                886%
```
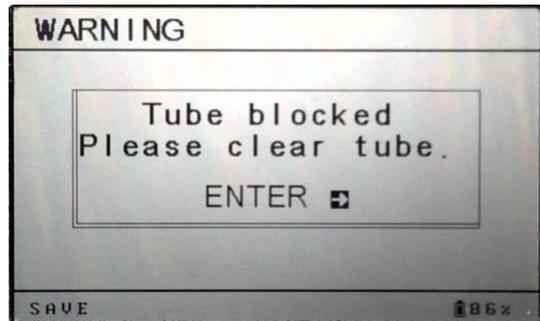
Should this message appear, check the probe, filter and sample tube for any blockages or kinks that might restrict flow. Clear this blockage then press the **ENTER** button to proceed.

4.8 Data Storage and Access

Sample data can be stored on standard SD card media (a 32 GB card is provided with the instrument). Data is saved to the SD card automatically in ON mode and SAMPLE mode at a rate of one sample per second when AUTO SAVE is enabled (this is the default status on power up).

"SAVE" will be displayed in the lower left corner of the display in ON and SAMPLE modes indicating that the AUTO SAVE feature is active. AUTO SAVE mode can be disabled by pressing the SAVE button in any mode. When disabled, "SAVE" will NOT appear on the display in ON and SAMPLE modes.

Leaving the instrument in AUTO SAVE mode is the surest way to ensure data storage is completed. The trade-off is the potential for storing long strings of unnecessary data every second in ON mode. For this reason the option is provided to disable AUTO SAVE when the instrument is idle and data storage is known to be unnecessary.

4.8.1 FILES MENU

Data is stored in user created files. The user must create a file for storage and then select the desired file as the data location for future data collection. All file management is executed from the FILES menu as detailed below.

File management is accessed from the MAIN MENU by selecting FILES and then pressing the **RIGHT ARROW** button to open the FILES sub-menu shown on the right.
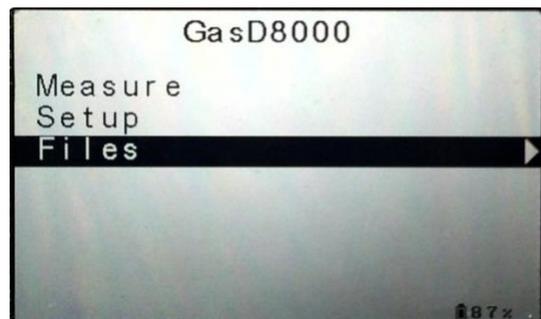
Highlight the desired option using the **DOWN and UP** ARROW buttons and select the desired option using the **RIGHT ARROW** button. FILES options are shown below.

Create file – Shown on the right. Use the *RIGHT ARROW* button to highlight the name field then use the *UP/DOWN* arrow buttons to change the character as desired and the *RIGHT/LEFT* arrow buttons to move the character position as desired. Press the *SAVE* button when finished to save the new file.

```
          Create file
Name▶      File00

    Press SAVE to create



                        📋87%
```
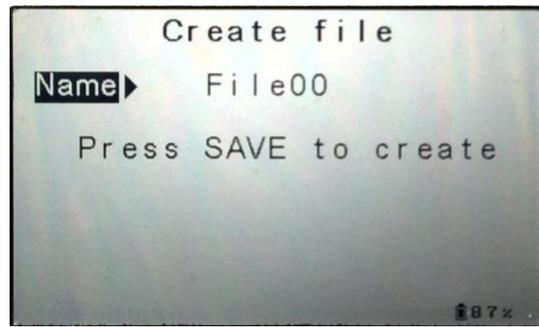
Delete file – Shown on the right. Delete existing files and their content. Highlight the desired file using the *UP/DOWN* arrows then press the *RIGHT ARROW* button to delete.

```
          Delete file
data.csv                    ▶
File00.csv
H2O2715.csv
Hal1028.csv
.~lock.Hal1028.csv#


                        📋87%
```

You will be prompted to confirm deletion with the *RIGHT ARROW* button.

```
Confirmation

        ┌─────────────────┐
        │  Delete file?   │
        │   ◀No   Yes▶    │
        └─────────────────┘


```
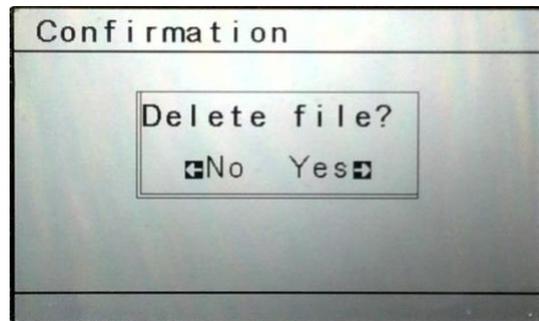
Select file – Shown on the right. Select the desired file in which to store the data for the next sample cycle(s). Highlight the desired file using the *UP/DOWN* arrows then press the *RIGHT ARROW* button to select. The currently selected file will be shown on the FILES screen.

```
          Select file
data.csv                    ▶
File00.csv
H2O2715.csv
Hal1028.csv
.~lock.Hal1028.csv#


                        📋87%
```

4.8.2 ACCESSING AND SAVING DATA

Data can be accessed and exported by removing the SD card and inserting it into an SD card slot on any computer. To remove the SD card, push the edge of the card into the slot until you hear a "click" and the card will eject. To re-insert, press the card all the way into the slot until you hear the "click".

The data files can be opened in Microsoft Excel or Notepad. Always save data files to a computer and perform any editing of the file to the saved version. **Do not edit files directly on the SD card as this may corrupt the file when read by the instrument!**

NOTE: *It is always a good idea to power the instrument down before removing or re-inserting the SD card from the SD card slot.*

	A	B	C	D
1	Time	NO2(ppm)	FLow(ccm)	
2	8/20/2025 10:04	0	29.52	
3	8/20/2025 10:04	0	291.05	
4	8/20/2025 10:04	0.01	516.16	
5	8/20/2025 10:04	0.02	540.94	
6	8/20/2025 10:04	0.03	550.95	
7	8/20/2025 10:04	0.04	550.25	
8	8/20/2025 10:04	0.05	545.48	
9	8/20/2025 10:04	0.05	543.14	
10	8/20/2025 10:04	0.05	538.2	
11	8/20/2025 10:04	0.05	535.97	
12	8/20/2025 10:04	0.07	531.72	

NOTE: *If the SD card is not inserted into the instrument's SD card slot on power up, "**NO SD Card**!" will be displayed in the lower left corner of the LCD display and AUTO SAVE will be disabled.*

MODE : OFF   0 c cm
NO2 [ppm]

0.00

No SDCard! 0:01:13   85%
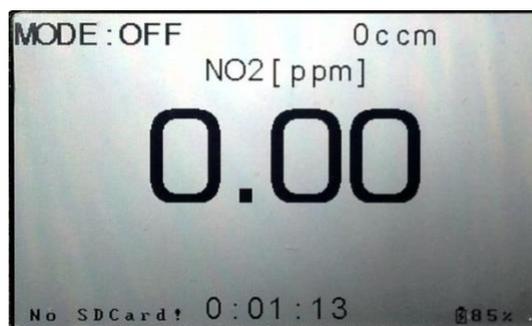
WARNING: *DO NOT CONNECT THE USB CABLE BETWEEN THE INSTRUMENT AND THE COMPUTER WHILE PERFORMING MEASUREMENTS AS THIS CAN LEAD TO DATA ERRORS AND FILE CORRUPTION.*

5 Calibration

Periodic calibration of the GasD® 8000 series portable analyzer is required to compensate for decreased sensor sensitivity and to maintain accuracy of readings. All instruments are factory calibrated prior to shipment. No calibration is necessary until after considerable use.

The frequency of calibration is a function of instrument use and the concentrations of sample gas to which the sensor is exposed. As such, no exact schedule of calibration can be recommended but a good rule of thumb is to calibrate every 6 months with regular use.

There are 2 calibration methodologies available which are detailed in sections 5.1 Gas Calibration and 5.2 Digital Calibration.

5.1 Gas Calibration

The factory recommended procedure for calibrating all INTERSCAN analyzers is the introduction of a certified calibration gas standard taken from a gas cylinder or a permeation device. Besides being essential for calibration, having a known certified gas standard on hand allows the user to test the analyzer at any time to confirm proper functionality.

Whatever the source of calibration gas, the recommended delivery method is via a proper sample bag which is attached to the analyzer INLET. The calibration gas is drawn from the proper sample bag through the sensor. **USE AT LEAST A 2 LITER BAG TO ENSURE ADEQUATE CAL GAS SAMPLE VOLUME.**

Teflon® or Tedlar® bags are suitable for H_2S, SO_2, NO and NO_2. Several bag materials are suitable for CO. Gases that are easily chemisorbed (Cl_2, Hydrazine etc.) may require a different method of delivery. Contact the Interscan Factory for recommendations.

Alternatively, a regulated pressurized certified gas cylinder fitted with a tee-manifold and unrestricted vent is a viable source of calibration gas.

INLET

EXHAUST

PRESSURE REGULATOR

T-JUNCTION

GAS STANDARD
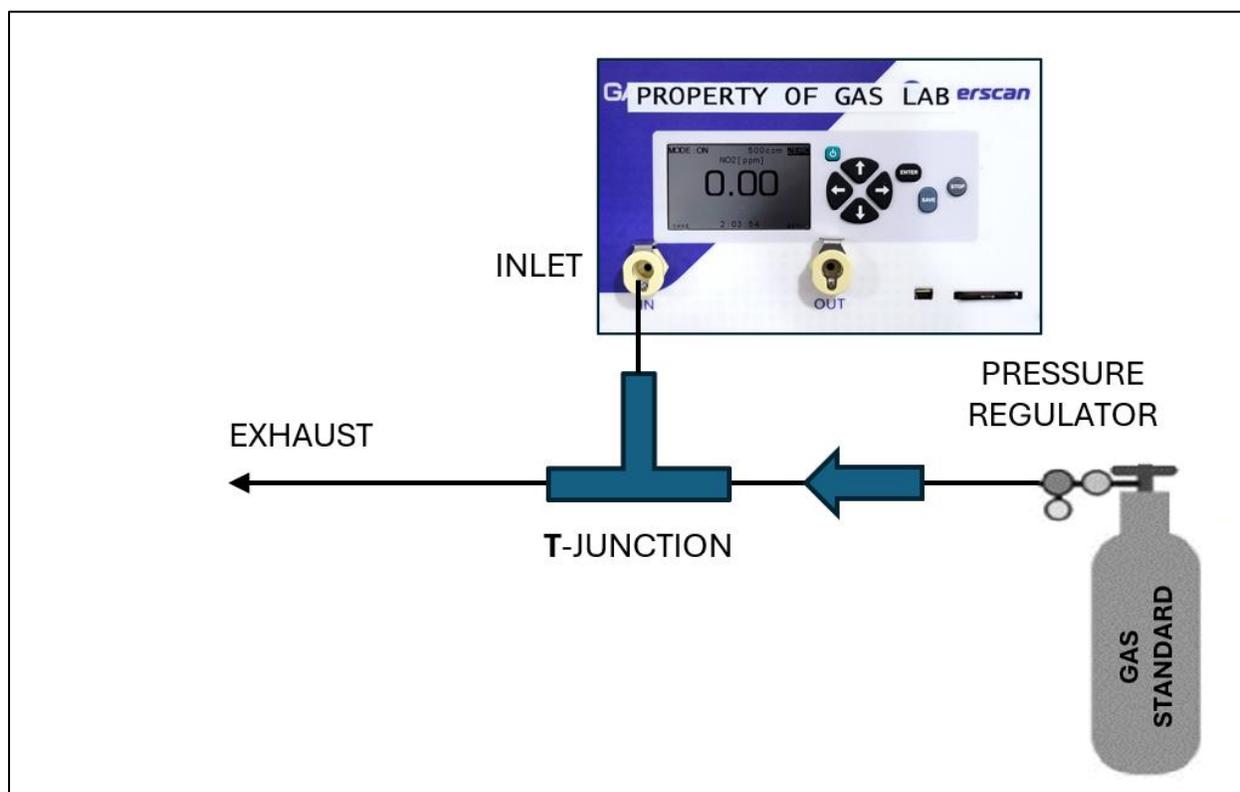
NOTE: PRESSURIZED SAMPLE MUST BE REGULATED TO <u>4 PSI OR LOWER</u>. OVER-PRESSURIZATION CAN DAMAGE THE SENSOR AND VOID THE WARRANTY!

5.1.1 GAS CALIBRATION PROCEDURE

Once the Calibration Gas delivery method has been determined, follow the procedure below to carry out Gas Calibration:

1) Navigate to the MAIN MENU by pressing the *STOP* button successively until the MAIN MENU shown to the right is displayed.

2) Press the *UP or DOWN ARROW* buttons to move the cursor to highlight "Setup" then press the *RIGHT ARROW* button to enter the SETUP MENU.
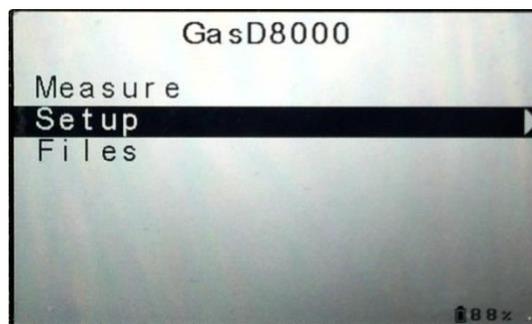
3) Use the **DOWN ARROW** button to move the cursor and highlight "Gas Calibration" as shown to the right and press the **RIGHT ARROW** button to enter the Gas Calibration Menu.

```
              Setup
Flow rate ccm              500
Sampling Mode              CON
Datetime
Alarm
Gas Calibration             ▶
Digital Calibration
Sensor Cartridge
                          ▮87%
```
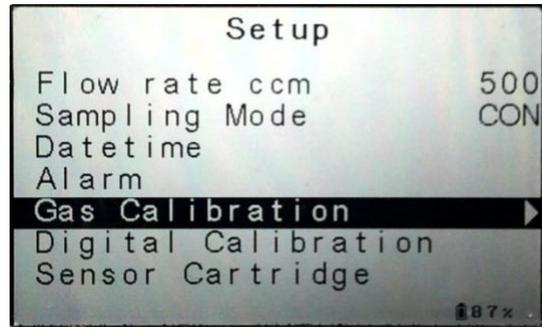
4) You will now be prompted to carry out zeroing as shown to the right. With the analyzer *drawing clean ambient* air, press the **ENTER** button to initiate zeroing.

```
Gas Calibration
─────────────────────────
Step 1: ZERO


    Press ENTER to Zero



No SDCard!                ▮89%
```
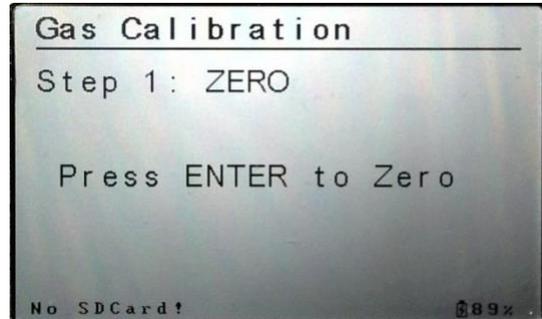
5) A 3-minute Zero timer will begin counting down as shown on the right after which the unit will automatically zero itself and jump to the Sensitivity input screen.

```
Gas Calibration
─────────────────────────
Step 1: ZERO

Zeroing        ... 3:00

Reading 0.00ppm
Flow      18ccm

No SDCard!                ▮89%
```
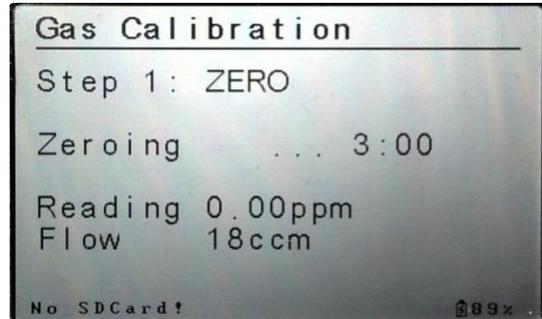
6) On the Sensitivity Input screen, enter the value of the Calibration Gas being used in the field indicated on the right. Use the **RIGHT** and **LEFT ARROW** buttons to move the cursor to the desired digit and the **UP** and **DOWN ARROW** buttons to change the value as needed. Double check that the value is accurate then press the **ENTER** button to proceed.

```
Gas Calibration
─────────────────────────
Step 1: ZERO

Zeroing        ... 1:18

Reading 0.00ppm
Flow      500ccm

No SDCard!                ▮89%
```
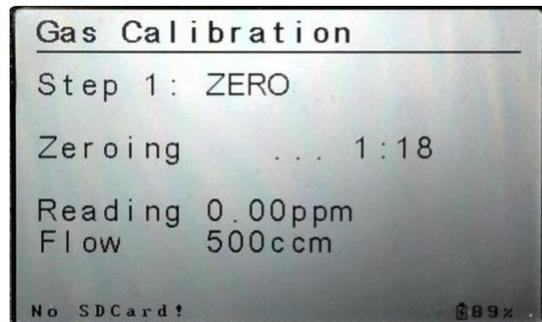
7) Connect the inlet to the CAL GAS source. A 2-minute Calibration timer will begin counting down as indicated on the right while Calibration gas is drawn through the sensor. The "Reading" indication shows the real time sensor response which can be compared to the "Cal Gas" value.

```
Gas Calibration
Step 2: SENSITIVITY

Calibrating     ... 0:14

Reading 0.77ppm
Cal Gas 5.00ppm
Flow       199ccm
                      83%
```
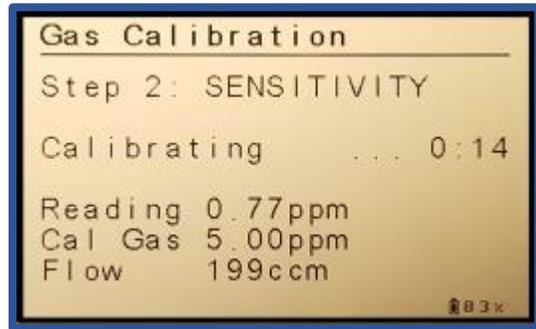
8) When the Calibration timer fully elapses, the "Confirm Calibration" screen shown on the right will be displayed. The "Cal Reading" field indicates the final reading at the end of the Calibration Timer period. The "Cal Gas" value is shown below the reading value and the final Sensitivity value is shown below that. Press the *SAVE* button to confirm calibration or press the *STOP* button to cancel calibration.
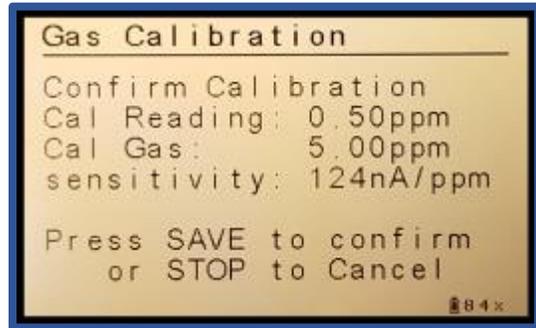
```
Gas Calibration
Confirm Calibration
Cal Reading: 0.50ppm
Cal Gas:     5.00ppm
sensitivity: 124nA/ppm

Press SAVE to confirm
   or STOP to Cancel
                      84%
```

5.2 Digital Calibration

There are circumstances in which calibration using calibration gas or permeation devices is inconvenient and costly. For this reason, INTERSCAN has developed the alternative sensor replacement program, **Sensor Express**®.

With **Sensor Express**®, a certified spare sensor is kept at the customer's site to be installed into the analyzer, replacing the older sensor. The sensor being replaced is preferably returned to Interscan, or discarded. For your records, the new sensor is accompanied by a certificate detailing its sensitivity value determined during the *Digital Calibration* process in manufacturing. The Sensitivity value comes already programmed into the cartridge where the instrument reads it from, so there is no need to type it in when swapping in a new cartridge. If ever this value needs to be restored, see section ***5.2.1 Digital Calibration Procedure*** for information on how to do so. See section ***5.4 Sensor Replacement Procedure*** for instructions on how to physically replace the sensor.

5.2.1 DIGITAL CALIBRATION PROCEDURE

From your records, reference the ECS certificate for the specific sensor you intend to run the digital calibration; the serial number on the sensor cartridge must match the serial number on the ECS certificate.

1) Insert the desired sensor cartridge onto the instrument. See section ***5.4 Sensor Replacement Procedure*** for removing and replacing the sensor.

2) Press the **UP or DOWN ARROW** buttons to move the cursor to highlight "Setup" then press the **RIGHT ARROW** button to enter the SETUP MENU.
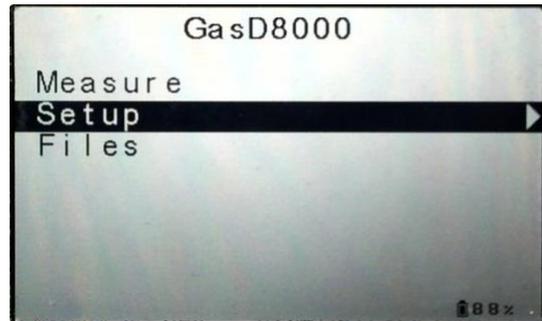
3) Use the **DOWN ARROW** button to move the cursor and highlight "Digital Calibration" as shown to the right and press the **RIGHT ARROW** button to enter the Digital Calibration Menu.

27
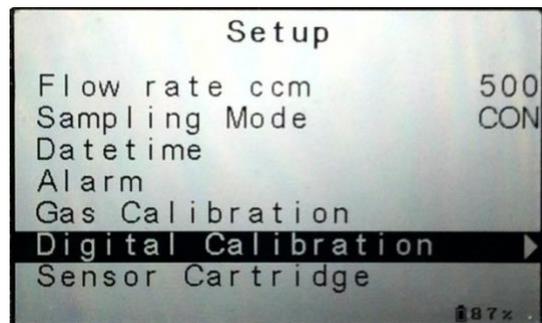
4) The Digital Calibration screen provides a single entry field for sensor sensitivity in nA/ppm. The correct value for this parameter is found on the **Sensor Express**® certificate that is provided with the spare sensor. Use the LEFT/RIGHT ARROW buttons to highlight the desired numeric field then use the **UP/DOWN ARROW** buttons to change the value. Do this for each applicable numeric place until the value shown matches the value on the ECS certification. When satisfied with the entry, press the **LEFT ARROW** button successively until the Main Menu screen is displayed.
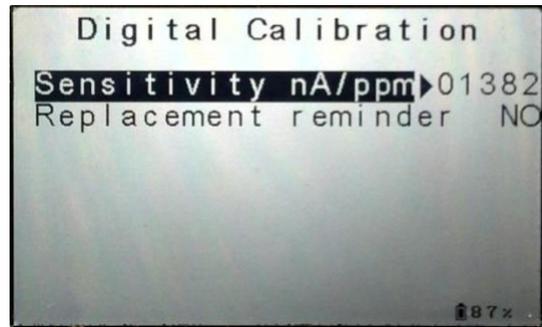
5) Power OFF the unit by pressing the green power button. A power off confirmation screen will be displayed as shown on the right. Press the RIGHT ARROW button to confirm power down.
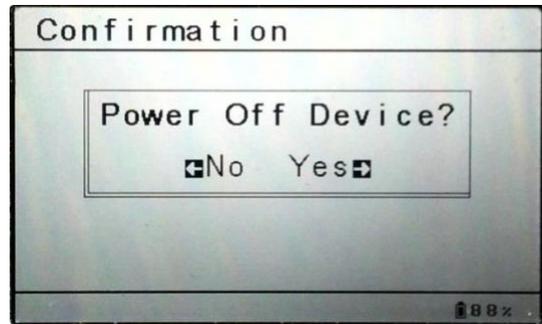
6) Power the unit back up and allow several hours for the sensor to stabilize. It is a good idea to leave the unit plugged into the AC Charger to re-charge the batteries while the new sensor is warming up.

5.3 Gas Sensor Categories

The durability of the GasD 8000 gas sensor cartridge can vary depending on its exposure to specific target gases. Continuous exposure to these gases may shorten the cartridge's effective lifespan, influencing how often their sensor cartridge need to be replaced. Below, we categorize sensors and gases according to their impact on sensor longevity and the recommended operational approach. For information on cartridge reordering and maintaining your sensor's calibration cycle and lifespan please refer to *5.5 Sensor Replacement Reminder*.

Sensors for the following gas types rapidly deplete by being exposed to continuous HIGH concentration levels. These are suitable in applications where continuous exposure of LOW concentration, or occasional spot measurements over the full measuring range of target gas is expected:

- CH_2O: Formaldehyde
- Cl_2: Chlorine
- ClO_2: Chlorine dioxide
- CS_2: Carbon disulfide
- NO_2: Nitrogen dioxide
- O_3: Ozone
- SO_2: Sulfur dioxide

These other gas types rapidly deplete by continuous exposure to the target gas at ANY level. These sensor types should only be used in detection applications where presence of target gas is brief or abnormal:

- C_2H_4: Ethylene
- H_2S: Hydrogen sulfide
- H_2O_2: Hydrogen peroxide
- HCl: Hydrogen chloride
- HCN: Hydrogen cyanide
- NH_3: Ammonia
- PH_3: Phosphine
- SiH_4: Silane

5.4 Sensor Replacement Procedure

The procedure detailed below addresses removing and replacing the instrument's gas sensor. **USE CARE WHEN WORKING INSIDE THE INSTRUMENT TO AVOID CONTACT WITH CIRCUIT BOARDS AND SURFACE MOUNT COMPONENTS!**

5.4.1 SENSOR CARTRIDGE REMOVAL / INSTALLATION

To remove the cartridge:

1) Using your thumb and finger, press inward on the quick-connect latches until you hear a click while firmly pulling the cartridge away from the device

To install the cartridge:

1) Align the inlets of the cartridge with the inlet latches on the sensor module.

2) Apply pressure and push until you hear a clicking sound. This sound indicates that the cartridge is securely installed

5.5 Sensor Replacement Reminder

At power up the instrument will display the Replacement Reminder if the sensor is due for replacement Dismissing the reminder takes you to the Measurement Mode window, as normal.

```
        WARNING
      ─────────
      NO2  sensor
   is  due  for  replacement!
       <01/03/2000>

        ▶DISMISS
         REPLACE
         ORDER
   v1.84                    ▯59%
```
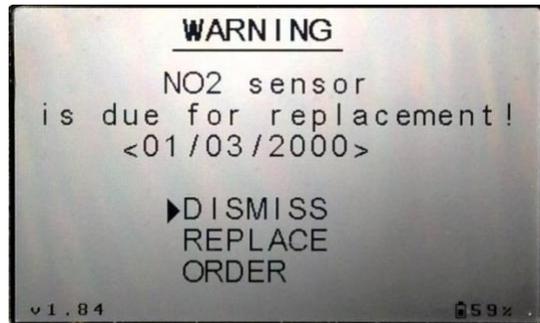
Pressing on Replace will advice the user to reference this manual for instructions on how to replace the sensor cartridge.

```
        WARNING
      ─────────
      NO2  sensor
   is  due  for  replacement!
       <01/03/2000>

         DISMISS
        ▶REPLACE
         ORDER
   v1.84                    ▯59%
```

```
   Please  turn  off  the
   instrument  and  follow
   the  instructions  in
   the  User  Manual  to
   replace  the  sensor.

                    ▶Exit
   v1.84                    ▯64%
```
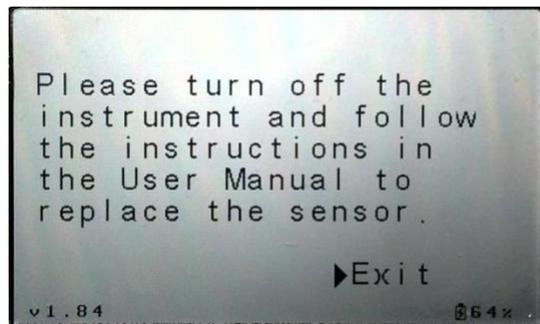
Pressing on Order will display the URL from where to order a new sensor cartridge.

```
        WARNING
      ─────────
      NO2  sensor
   is  due  for  replacement!
       <01/03/2000>

         DISMISS
         REPLACE
        ▶ORDER
   v1.84                    ▯59%
```

Link to order placement.

```
Please visit
http://gasdetection.com
/ordersensor

to place an order for
a new sensor.
                  ▶Exit
v1.84              🔋59%
```
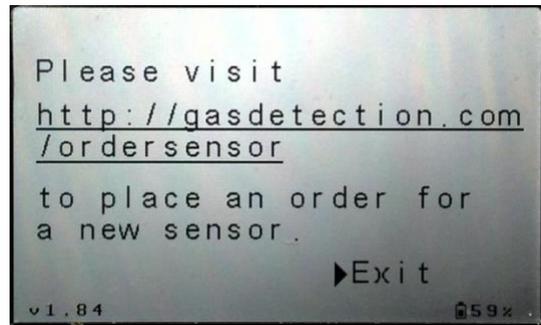
The Replacement Reminder can be enabled or disabled from the Digital Calibration menu.

```
  Digital Calibration
Sensitivity nA/ppm 01382
Replacement reminder⇕YES




                   🔋87%
```
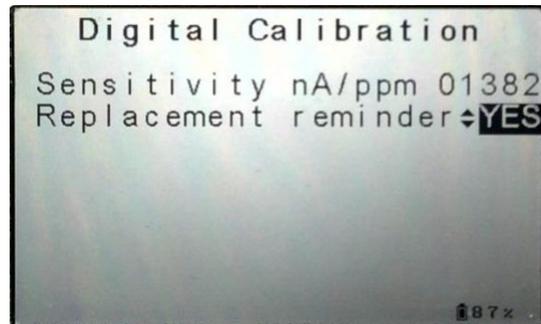
5.6 Sensor Cartridge

Display values programmed into the Sensor Cartridge

```
Sensor Cartridge

SN: 24010101-23101701
NO2 10200-PPM
Sensitivity:1382
Cal.date: 103
500ccm        Filter:10
Bias:0        Offs:500
Output:(-)  VREF:2.5
RLOAD:10     RGAIN:14000
```
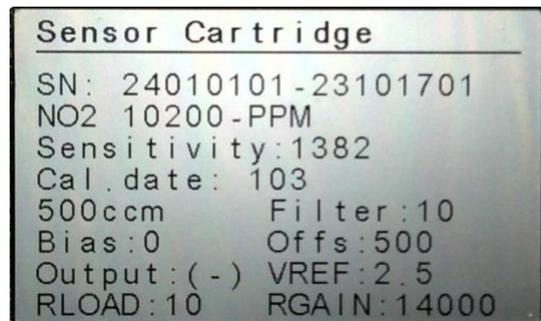
5.7 Factory Settings

The Factory Settings menu is passcode protected as information herein may affect the calibration and performance of the instrument

```
        Setup
Sampling Mode          CON
Datetime
Alarm
Gas Calibration
Digital Calibration
Sensor Cartridge
Factory Settings        ▶
                   🔋87%
```
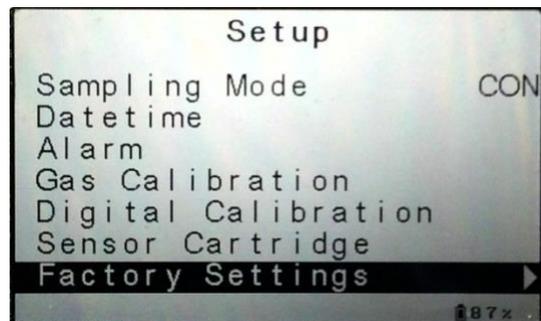
Enter "1111" to gain access to the menu.
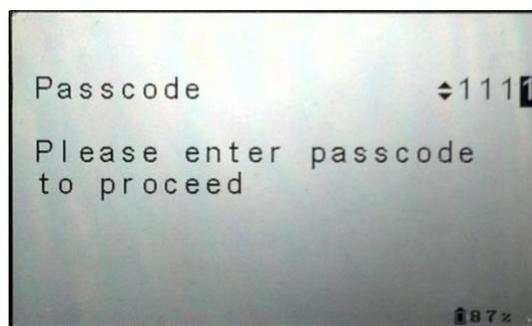
Note: *It's highly advised not to change these values in the Factory Settings as it may likely affect the calibration.*

**Device:** The name of the instrument.

Gas: The chemistry of the gas.

Range Unit: ppm (parts per million) or ppb (parts per billion).

**Range Maximum:** The highest value the graph will chart.

Display Precision: Number of decimal places, usually "XX.XX" for ppm, "XXXX" for ppb

Full Scale Vout mV: Full scale voltage, 2500 mV

Stabilizing (min): Time the instrument waits after power-up before it's ready for measuring, to allow the sensor to stabilize.

Zero timer (min): Time the instrument is given to determine the Zero level.

Gas timer (min): Time the instrument is given to determine the span of a known standard gas.

Digital Filter: An averaging for stability.

Flow Calibration: Done in production.

Terminal Pump Ctrl: OFF

AOUT1 Output: GAS
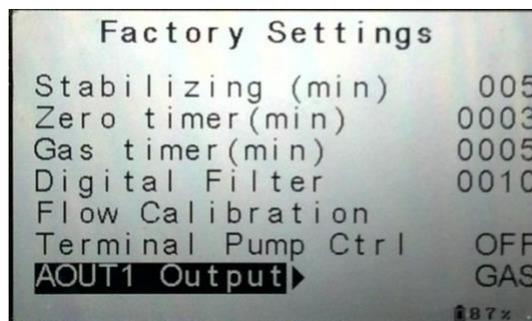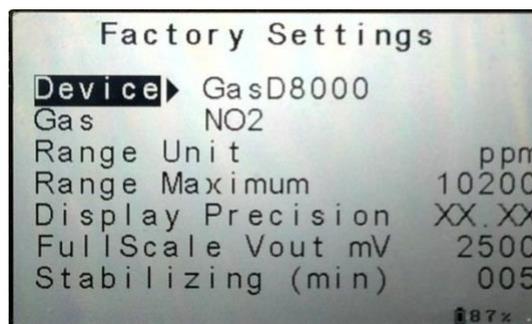
6 Troubleshooting

The chart below addresses common troubleshooting issues and provides probable causes and corrective actions to take. Always consult with the *INTERSCAN service department* for problems not on this list or if suggested corrective actions fail to address the problem.

Symptom	Probably cause / Corrective action
No response to gas	• Check all connection points in the probe lead to ensure there are no leaks or blockages. • Unit may require calibration.
Unit will not power up	• Batteries may need charging. Use the charger cable to connect the wall charger to the charging port on the unit. The display should indicate charging in progress. • Eject the SD card and/or remove the mini USB cable from the USB port and re-attempt power up. Re-insert the SD card or re-connect the USB cable after successful power up.
Trouble with menu navigation or powering down	• Should the instrument "lock up" or if menu navigation functionality is compromised, the user can perform an emergency shutdown by pressing and holding the **POWER** button for 10 seconds to power the unit down from any screen. *This should only be done if normal MAIN MENU screen power down is not possible.*
Sensor Cartridge won't go in all the way	• Press again on the quick-connect latches to get their internal mechanics to reposition for reception

7 Warranty

INTERSCAN CORPORATION warrants any GasD® 8000 series instrument and the gas sensor cartridge to be free from defects in material and workmanship for a period of one year from date of shipment.

INTERSCAN CORPORATION's sole obligation under this warranty is limited to repairing or replacing, at its option, any item covered under this warranty, when such item is returned intact, prepaid to the Factory (or designated service center).

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons, or which have been subject to misuse, negligence, or accident, incorrect wiring by others, installation or use not in accordance with instructions furnished by the manufacturer, or which have had the serial numbers altered, effaced, or removed. The sensors are factory-sealed and must not be opened or modified in the field for the warranty to remain in effect. This warranty is in lieu of all other warranties whether expressed or implied.

This warranty does not apply to any of our products, that have had any program and/or software changes incurred, without written authorization from *INTERSCAN CORPORATION*.

Additionally, warranty on any component shall not exceed the manufacturer's warranty given to *INTERSCAN CORPORATION*.

8 Customer Service

The INTERSCAN Customer Service Department can be reached at the numbers listed below:

Toll-Free **360-833-8835 x215**
FAX   **360-833-1914**
e-mail: service@gasdetection.com

8.1.1 RETURN AUTHORIZATION

All units being returned for repair or service require a RETURN AUTHORIZATION NUMBER issued by the INTERSCAN Customer Service Department upon request. This is required to ensure the problem truly needs factory service.

In many cases, problems can be resolved in the field by the user. As such, before contacting Interscan with service questions, consult the TROUBLESHOOTING section of this manual (section *6 Troubleshooting*) as this may help you to resolve any problems without returning the unit.

Should consulting the TROUBLESHOOTING section of the manual not address your problem, contact the INTERSCAN Customer Service Department as noted below to acquire a RETURN AUTHORIZATION NUMBER. The RMA will expedite prompt return of the repaired unit.

The RMA request form can be found at the following link on line…

http://www.gasdetection.com/contact-interscan/rma-request/

8.1.2 SPARE PARTS

Contact the Interscan Customer Service Department for inquiries regarding consumable spare parts for your instrument. Have your instrument's serial number at hand when calling. A list of such parts for your instrument is listed below:

- Gas Sensor – model varies with target gas.