MATHESON TRI•GAS
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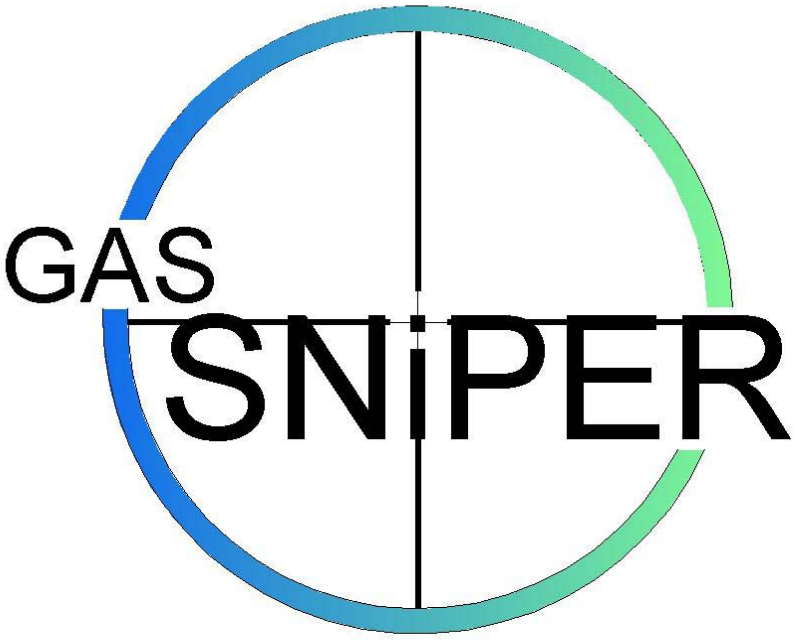
Instruction Manual

Portable Multi-Gas Detector

Standard Model Numbers: SNIPER-01 TO -05
Manual Part Number: MINT-0277-XX
Revision: 4
Released: 02/07/2007



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Warranty

Matheson Tri-Gas, Inc., warranties gas alarm equipment manufactured by Matheson Tri-Gas and sold by Matheson Tri-Gas to be free from defects in materials and workmanship for a period of one year from date of shipment from Matheson Tri-Gas Instruments, Inc. Any parts found defective within that period will be repaired or replaced, at our option, free of charge. This warranty does not apply to items that are subject to deterioration or consumption in normal service, and which must be cleaned, repaired, or replaced routinely.

Those items include, but are not limited to:

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Pump diaphragms and valves	Batteries
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Document Revision / ECO History

Document	Part No.	Revision	ECO	Status	Issued
Instruction Manual Gas Sniper Series	MINT-0277-XX	4	07-0041	OPEN	XX/XX/2007

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Gas Sniper Models - Standard

SNIPER-01 Gas Sniper Portable Gas Detector with LEL/PPM (Methane) Sensor *.

SNIPER-02 Gas Sniper Portable Gas Detector with O_2 Sensor.

SNIPER-03 Gas Sniper Portable Gas Detector with LEL (Methane), O_2, H_2S and CO Sensor.

SNIPER-04 Gas Sniper Portable Gas Detector with "1" Toxic Sensor.

SNIPER-05 Gas Sniper Portable Gas Detector with "2" Toxic Sensors **.

Gas Sniper Models – Special Configured

Note: For Special Configured Models, please consult Matheson Tri-Gas Customer Service Representative by calling 1.800.828.4313 for assistance.

* Gas Sniper-01 Model suitable for EPA Method 21 applications.

** The Gas Sniper can be ordered with up to "6" sensors installed.
For multi- sensor / special configured models please contact Matheson Tri-Gas Customer Service Representative by calling 1.800.828.4313 for assistance.

Introduction

Overview

The **Matheson Tri-Gas** Gas Sniper is the most advanced portable gas detection system available. The Gas Sniper is built for rugged reliability and ease of use and includes the latest innovations in gas detection technology:

- Simultaneous detection of one to six gases. Standard target gases include combustible gas (% LEL and ppm), oxygen deficiency, carbon monoxide, and hydrogen sulfide.
- Powerful sample-drawing pump with up to 100-foot range.
- Dot-matrix liquid crystal display (LCD) for complete, understandable information at a glance.
- Microprocessor control for all functions, including data logging and user-adjustable alarms.
- Visible and audible alarms for hazardous conditions and malfunctions.
- UL and CSA classified. Intrinsic safety for Class I, Division I, Groups A, B, C, and D hazardous atmospheres (standard 4-gas model and non-standard toxic gas versions). Consult **Matheson Tri-Gas**, Inc., for classification of other Gas Sniper versions.
- Tough case with a balanced, light-weight design.

WARNING: **The Gas Sniper detects a combination of combustible gas, oxygen deficiency, hydrogen sulfide and carbon monoxide, or other toxic gases which can be lethal. Users must follow the instructions and warnings in this manual to assure proper and safe operation of the Gas Sniper.**

About This Manual

This manual is intended for use with Gas Sniper models. Examples used in this manual Are for the standard four-gas model (combustible gas, oxygen, carbon monoxide, and hydrogen sulfide). Differences between the standard four-gas model and Other Gas Sniper models are noted where applicable.
This manual is organized as follows:

- The standard sections included in pages 1 through 49 decribe the Gas Sniper's specifications and internal/external components. These sections also decribe the operation, calibration, and maintenance of the Gas Sniper.
- Appendix A lists part numbers for the Gas Sniper's replacement parts and accessories.
- Appendix B describes the Gas Sniper's methane elimination feature.
- Appendix C through E describe the Gas Sniper's non-standard sensors.
- Appendix F describes the Gas Sniper's tank tester model.
- Appendix G describes the Gas Sniper's five- and six- gas models.
- Appendix H describes the Gas Sniper Transformer Gas tester model.
- Appendix I describes the procedure to install the Gas Sniper's optional Data Logger board.

Specifications

Table 1 lists physical and environmental specifications for the Gas Sniper.
Table 2 lists specifications for the Gas Sniper's standard sensors.

Table 1 Sniper Specifications

Target Gases[1]	Combustible gas: Oxygen (O_2), Carbon Monoxide (CO), Hydrogen sulfide (H_2S)
Case	High-Impact polycarbonate-polyester blend
Safety/Regulatory[2]	CSA/NTRL and UL classified instrinsically safe (Class 1, Division 1, Groups A, B, C, and D.
Dimensions	10.5 in. x 5.9 in. x 7.0 in. (26.7 cm x 15.0 cm x 17.8 cm)
Weight	5 lbs (2.25 kg)
Power	Four D-size batteries (Alkaline or Ni-Cd)
Continuous Operating Hours	Alkaline: 30 hours (minimum) Ni-Cd: 18 hours (minimum)[3]
Operating Temperature	14^{o} F to 104^{o} F (-10^{o} C to 40^{o} C)
Humidity	0 to 95% (non-condensing)
Standard Accessories	Shoulder strap; Alkaline batteries; Hydrophobic probe; 5-foot hose
Optional Accessories	Ni-Cd batteries; battery charger (115vac); continuous operation adapter (115 vac or 12vdc); Dilution fitting (1:1 or 3:1); Remote alarm; Data logger

1 Appendices C, D, and E describe the Gas Sniper's non-standard sensors.
2 Consult Matheson Tri-Gas inc. for regulatory classifications of versions other than the standard 4-gas and non-standard toxic gas versions.
3. Based on Matheson Tri-Gas Ni-Cd battery part number SNIPE-NCBATD.

Table 2 lists specifications for the Gas Sniper's standard sensors. Your Gas Sniper model may not include all of the sensors listed below. The alarm settings are user-adjustable (see "Updating the alarm point settings" on page 29).

Table 2 Standard Sensor Specifications

	Combustible Gas (%LEL[1])	Combustible Gas (PPM[2])	Oxygen	Hydrogen Sulfide	Carbon Monoxide
Range	0 to 100% LEL	Depends on target gas[4]	0 to 40% O_2	0 to 100 ppm	0 to 500 ppm
Alarm 1	10% LEL	5000 ppm	19.5% O_2 (decreasing)	10.0 ppm	25 ppm
Alarm 2	50% LEL	25,000 ppm	23.5% O_2 (increasing)	30.0 ppm	50 ppm
TWA Alarm	N/A	N/A	N/A	10.0 ppm	25 ppm
STEL Alarm	N/A	N/A	N/A	15.0 ppm	400 ppm
Detection Principle	Catalytic combustion	Catalytic combustion	Electro-chemical	Electro-chemical	Electro-chemical
Response Time (to 90%)[5]	30 seconds	30 seconds	30 seconds	30 seconds	30 seconds
Accuracy (of fullscale)	± 5%	± 5%	± 5%	± 5%	± 5%

1 LEL (Lower Explosive Limit)

2 PPM (Parts Per Million)

3 Alarms settings are user adjustable. See " Updating the Alarm Point Settings" on page† 32.

4 The PPM range represents the same range as 0 to 100% LEL for that gas. For example, 100% LEL for methane = 5% by volume = 50,000 PPM. Therefore, the PPM range for methane is 0 to 50,000.

5 With the Gas Sniper standard hose and probe attached.

Description

Case

The Gas Sniper has a plastic case with a full-sized handle. The high- visibility case is shielded to reduce radio frequency and electromagnetic interference (RFI/EMI). The system is light-weight and balanced, which makes the Gas Sniper easy to carry and use for extended periods. A foam rubber gasket between the top and bottom case components is water- and dust-resistant. You can set the case into 2.5 in. of water without damage.

Control Panel

The control panel is at the top of the Gas Sniper. The touch-pad buttons reduce the risk of accidental activation. The dot matrix display simultaneously shows the gas reading for all installed sensors. (For the 5- and 6-gas versions, the Gas Sniper displays the gas reading of four channels. Use the AIR/▲ and SHIFT/▼ buttons
to scroll to the non- displayed channels.) The display also shows information for each of the Gas Sniper's program modes.
Table 1 lists specifications for the Gas Sniper standard sensors. Your Gas Sniper model may not include all of the sensors listed below. The alarm settings are user-adjustable (see "Updating the Alarm Point Settings" on page 28.)

Buttons

The control panel includes the following six buttons.

Table 3 Gas Sniper Button Functions

Button	Function(s)
POWER/ENTER	Turns the Gas Sniper on and off. Used during setup and calibration.
RESET/SILENCE	Silences and resets audible alarm if the Gas Sniper is programmed for Latching alarms and the Alarm Silence option is on [1]
DISP/ADJ	Activates display modes Enters instructions into the Gas Sniper's microprocessor
LEL/PPM	Switches combustible gas detection ranges between %LEL (lower explosive limit) and PPM (parts per million)[2]
AIR/▲	Activates the demand-zero function (automatically adjusts the Gas Sniper in fresh-air conditions) Scrolls through the display and settings modes
SHIFT/▼	Scrolls through the calibration and settings modes Enters instructions into the Gas Sniper's microprocessor

1. The Gas Sniper's alarms are user-adjustable.
2. The LEL range is commonly used for safety applications; the PPM range can be used for environmental or other special applications.

Alarm Lights

Two ultra-bright, red, light-emitting diodes (LEDs) provide visual alarms for gas concentrations and malfunctions. They are mounted on the top rear of the case for greatest visibility.

Battery Charger Connector

The battery charger connector is mounted on the top right rear of the case. The external battery charger connects to this connector to recharge nickel-cadmium (Ni-Cd) batteries. The continuous operation adapter also connects to the battery charger connector.

Interface Port

The interface port is for the **optional** data logging or remote buzzer. The port is mounted on the top left rear of the case. When the Data Logging option is installed, the Gas Sniper records gas concentrations at programmed intervals and stores data on gas detected. You can download these measurements through the interface port to a PC-compatible computer for use in data analysis programs. Data retrieval requires the Gas Sniper Data Downloader Kit (with PC connection cable and software).

The optional remote buzzer also connects to the interface port. The remote buzzer is for use in applications where a remote alarm indication is required.

Buzzer

A solid-state electronic buzzer is mounted inside the top of the case. The buzzer sounds for gas alarms, malfunction, low battery voltage, and as an indicator during use of the Gas Sniper's many display and adjustment options.

Sample-Drawing System

The sample-drawing system includes the pump, sensor block and connections, internal filter and charcoal scrubber, and the external hose, probe, and hydrophobic filter. This system provides continuous flow of sampled air to the sensors while keeping out liquids and dust.

With proper setup, the system can draw a sample flow from up to 100 feet away from the Gas Sniper. Consult **Matheson Tri-Gas**, Inc., for sample flow distances longer than 100 feet.

Sensors

This section describes the Gas Sniper's standard sensors. Non-standard sensors are described in Appendices C, D, and E. Your specific Gas Sniper model may not include all of the sensors described below. Under normal conditions, the Gas Sniper's standard sensors have an operating life of approximately two years.

Combustible gas sensor

The combustible gas (LEL) sensor is mounted with the flame arrestor down in the sensor block to allow the sample flow to diffuse into the sensor. Five pins extend from the top of the sensor. The sensor cable connects to the pins on one end and terminates in a four-position connector, which plugs into the **COMB** socket on the analog print circuit board (PCB).

The LEL sensor detects combustible gas and vapors in the atmosphere with a catalytic platinum element. The reaction of gas with oxygen on the catalyst causes a change in the resistance of the element, which is converted by the Gas Sniper into a reading of combustible gas concentration.

Oxygen sensor

The oxygen (O_2) sensor is mounted face down in the sensor block to allow the sample flow to diffuse into the sensor. A multi-pin plug connects the O_2 sensor to the **CN2** socket on the analog PCB.

The O_2 sensor is an electrochemical cell, which reacts to the oxygen in the atmosphere and produces a voltage proportional to the oxygen concentration. This voltage is converted by the Gas Sniper into a reading of oxygen concentration.

Standard toxics (CO and H2S) sensors

The CO and H_2S sensors are physically very similar. They have cylindrical bodies and are mounted face down in the sensor block. A three-position connector from each sensor plugs into **EC1** or **EC2** socket on the analog PCB. The sensor connected to the **EC1** socket displays as channel 3; the sensor connected to the **EC2** socket displays as channel 4.

The toxics sensors are electrochemical cells, which react to the target gas in the atmosphere, producing a current proportional to the concentration of gas. The current is converted by the Gas Sniper into a reading of target gas concentration.

Circuit Boards

The Gas Sniper circuit boards analyze, record, control, store, and display the information collected.

The analog PCB is mounted perpendicular to the base of the instrument case. It is located in the same half of the case as the sensors and sample-drawing system. The sensor leads connect to the analog PCB.

The main PCB is mounted in the top half of the case. It includes the methane elimination and CAL/SETUP switches.

CAUTION: The circuit boards should be serviced only by authorized repair personnel.

Methane Elimination Switch

The methane elimination switch (SW1) is mounted near the top right corner of the main PCB.

For applications where methane is an interfering gas, you can set the methane elimination switch to eliminate most response to methane (see “ ” on page 46). An *external* methane elimination switch is available as an *option*.

CAL/SETUP Switch

The CAL/SETUP switch (SW2) is mounted near the middle left edge of the main PCB.

This switch controls the Gas Sniper functions available to the user by disabling the SHIFT/▼ button. Without the use of this button, the user is unable to enter Calibration or Setup mode. (Display mode is available with either switch setting.) See “ Setting User Access” on page 12 to change the switch setting.

Operation

The Gas Sniper has four operating modes: normal operating mode, display mode, setup mode, and calibration mode. This section describes the Gas Sniper in normal operating mode. It includes procedures to start up the Gas Sniper, set various detection options for the combustible gas channel, and shut down the Gas Sniper.

NOTE: The screens illustrated in this section are intended as examples only. The screens displayed by your Gas Sniper model may be slightly different.

Starting Up the Gas Sniper

1. Connect the sample hose to the Gas Sniper's quick connect inlet fitting.
2. Connect the hydrophobic filter and probe tip to the sample hose's quick connect fitting.
3. Press and briefly hold down the POWER/ENTER button. If the Lunch Break feature is on (see page 29), the Resume Datalog screen displays. (If the Lunch Break feature is off, the Battery Voltage screen displays.)

Press the AIR/▲ button to continue accumulating time- weighted average (TWA) and PEAK readings from the last time the Gas Sniper was used. (The short-term exposure limit [STEL] reading is reset each time the Gas Sniper is turned on.) The Battery Voltage screen displays.

- Press the DISP/ADJ button to restart these measurements. The Battery Voltage screen displays

If you do not press the AIR/▲ or DISP/ADJ button within 5 seconds, the Gas Sniper automatically resumes datalog readings and displays the Battery Voltage screen.

The Battery Voltage screen displays the minimum usable and actual battery voltage (for example, 6.0V). If the battery voltage is too low, the Gas Sniper will not continue.

NOTE: The following screen only displays if the data logging option is installed. If the data logging option is not installed, the Self Diagnosis screen displays after the Battery Voltage screen.

This message displays the date and time as set in Setup mode. The data logging option uses this information to record the time and date of sample and alarm events.

The following two screens display while the Gas Sniper checks itself for proper operation. The Gas Sniper alerts you if a malfunction occurs.

When the Gas Sniper successfully completes its self check, the **OK** message displays in place of the **STAND BY** message, then the normal operating screen displays. The normal screen displays fresh-air concentrations for all gases. The Gas Sniper sounds a double tone to indicate it is in normal operation.

Do not use gas from a cigarette lighter to test response to combustibles. Exposing the combustible gas sensor to uncontrolled high concentrations of gas will reduce response and sensor life.

- Verify that the Gas Sniper is operating correctly. Use the **Matheson Tri-Gas** Check Kit to easily verify correct operation of the Gas Sniper.

WARNING: If the Gas Snipper does not respond to verification, take it to a known "**fresh-air**" environment, then perform the demand zero procedure described in " Preparing for Calibration" on page 36. Repeat step 4 before using the Gas Sniper in a potentially hazardous location.

Normal Operation

The Gas Sniper continuously monitors the sampled atmosphere and displays the gas concentrations present for its target gases. In a low- light environment, press any button to turn on the display backlight. (See " Updating the Back Light Setting" on page 32 to program backlight duration.) If the Confirmation Beep option is turned on, the Gas Sniper beeps once every 15 minutes to verify that it's on the job.

To use the probe, insert it into the monitoring area and wait a few seconds for response.

NOTE: Response time increases with the length of the sample hose. Very long sample hoses may require several seconds to show response at the Gas Sniper.

Monitoring Combustible Gas in the PPM Range

1. Start the Gas Sniper in the LEL range as described in "Starting Up the Gas Sniper" on page 9.
2. Allow the combustibles sensor to stabilize (3 to 5 minutes). This stabilization period is required for the PPM range only.
3. Press the LEL/PPM button. The Gas Sniper displays **PPM** in place of **LEL%** for combustible gas, and the gas reading displays in parts per million.
4. If the PPM reading is not zero, take the Gas Sniper to a fresh air environment, then perform the demand zero procedure as described in " Preparing for Calibration" on page 37.

NOTE: For the data logging **option**, combustible gas readings are logged in %LEL regardless of the LEL/PPM setting.

Monitoring Combustible Gases Other than Methane

If the combustible gas sensor is calibrated to methane (CH_4), use Table 4 to determine the concentration of combustible gases other than methane. This table is based on Gas Sniper in full response mode (methane elimination switch set to **CH4**) and calibrated to methane. Multiply the display reading by the factor in the appropriate column in the table. For example, if you are using the Gas Sniper to detect hexane and the display reads 10% LEL, the actual hexane reading is 10% x 3.00 = 30% LEL hexane.

WARNING: **The Gas Sniper alarms are initiated by the DISPLAY reading not the FACTORED reading. If you are monitoring for hexane as in the example below and the low alarm is set for 10% LEL, the Gas Sniper will initiate a low alarm at 30% LEL hexane (display reading of 10% LE*L).***

To determine the concentration of other combustible gases with the Gas Sniper in methane elimination mode.

Table 4 Full Response Mode Conversion Factors (Methane Calibration)

Target Gas	LEL Factor (Methane Calibration)	PPM Factor (Methane Calibration)
Benzene	2.80	0.67
Ethane	1.40	0.84
Ethanol	2.25	1.5
Ethylene	1.58	0.4
Hexane	3.00	0.67
Hydrogen	1.65	1.4
IPA	2.83	1.13
Isobutane	1.93	1.21
MEK	3.00	1.08
Methane	1.00	1.00
Methanol	2.33	2.57
Propane	2.30	0.92
Propylene	2.00	0.80
Toluene	2.80	0.67

Setting User Access

The CAL/SETUP switch controls the Gas Sniper functions available to the user. The switch setting does not affect the Gas Sniper's ability to display gas readings and indicate gas and malfunction alarms.

1. Turn off the Gas Sniper.
2. Unscrew the two large screws on the top of the case.
3. Turn over the top half of the case, and locate the CAL/SETUP switch (SW2) near the middle along one edge of the main processor board.

CAUTION: The **Methane Elimination** switch (**SW1**) is on the opposite edge of the board near the front end. Do Not confuse these two switches.

4. Place the CAL/SETUP switch in the appropriate position.
5. To give the Gas Sniper access to all modes, place the switch in the ON position.
6. To limit the Gas Sniper to normal operating and display modes, place the switch in the OFF position. (The Gas Sniper prevents access to the setup and calibration modes by disabling the SHIFT/▼ button.)
7. Place the top of the case in its original position, then secure it with the large screws you loosened in step 2.
8. Turn on the Gas Sniper.

NOTE: Make sure the Gas Sniper calibration is current and the setup options appropriate and safe for the operating environment before placing the CAL/SETUP switch in the OFF position.

Turning Off the Gas Sniper

To turn off the Gas Sniper, press and hold down the POWER/ENTER button until **GOOD-BYE** displays, then release the button. You must wait for **GOOD-BYE** to disappear before you can turn on the Gas Sniper again.

Alarms

Alarm Indications

This section describes the Gas Sniper's audible and visual alarm indications for gas, over range, low flow, low battery, and sensor failure alarms. This section also describes how to reset gas alarms.

The default alarm settings are listed in Table 2, " Standard Sensor Specifications ". The alarm settings are user-adjustable as described in " Updating the Alarm Point Settings" on page 328.

NOTE: The screens illustrated in this section are intended as examples only. The screens displayed by your Gas Sniper model may be slightly different.

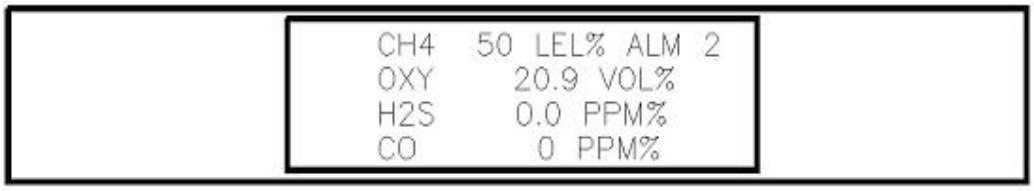
First gas alarm

If a channel's gas reading exceeds the first alarm setting (falls below for the oxygen channel):

- **ALM1** displays in the alarm field for that channel.
- The channel's display line flashes.
- The buzzer sounds a pulsed tone.
- The alarm lights flash.

Second gas alarm

If a channel's gas reading exceeds the second alarm setting:



- **ALM2** displays in the alarm field for that channel.
- The channel's display line flashes.
- The buzzer sounds a pulsed tone.
- The alarm lights flash.

STEL alarm (toxics only)

If a toxic gas channel's average gas reading for the past 15 minutes exceeds the STEL alarm setting:

- **STEL** displays in the alarm field for that channel.
- The channel's display line flashes.
- The buzzer sounds a pulsed tone.
- The alarm lights flash.

TWA alarm (toxics only)

If a toxic gas channel's average gas reading for the past 8 hours exceeds the TWA alarm setting:

- **TWA** displays in the alarm field for that channel.
- The channel's display line flashes.
- The buzzer sounds a pulsed tone.
- The alarm lights flash.

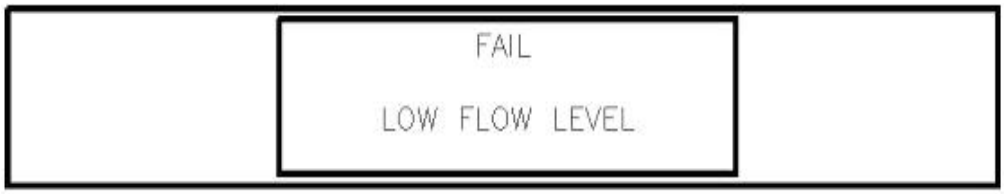
Over range alarm

If a channel's gas reading exceeds that channel's full-scale setting:

- **OVER** displays in the alarm field for that channel.
- The channel's display line flashes.
- The buzzer sounds a pulsed tone.
- The alarm lights flash.

Low flow alarm

If the Gas Sniper's sample system becomes restricted or blocked (for example plugged probe, fouled filter, pinched tubing):

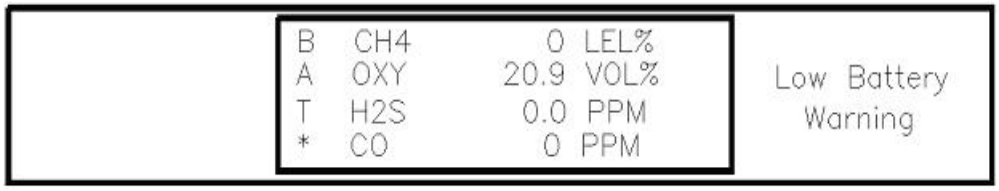


- The message **FAIL LOW FLOW LEVEL** replaces the normal screen.
- The buzzer sounds a steady tone.
- The alarm lights are on continuously.
- The pump automatically shuts off to prevent damage.

Correct the flow blockage. Press the **RESET/SILENCE** button to turn off the alarms and restart the pump. If low flow conditions still exist, the Gas Sniper will go into alarm again. If the condition cannot be corrected immediately, take the Gas Sniper out of service to a non-hazardous area.

Low battery alarm

When the battery charge drops near the lower limit, the Gas Sniper displays the following screen (**BAT** flashes). For alkaline batteries, you have approximately 3 hours of use remaining; for Ni-Cd batteries you have approximately 15 minutes of use remaining.



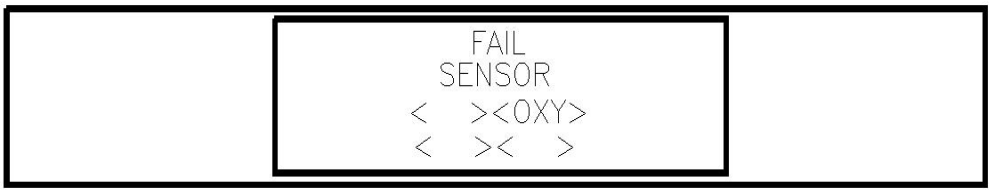
When the battery voltage drops to the minimum limit, the following screen displays, the alarm lights are on continuously, and the buzzer sounds a steady tone. The Gas Sniper is not operational as a gas monitoring device when this screen displays.

NOTE: If you are using the data logging accessory and the Gas Sniper goes into **Low Battery Alarm**, shut off the Gas Sniper in order to save the current data logging session.

Sensor failure alarm and emergency operation

The Gas Sniper continuously monitors itself for proper operation. If a malfunction occurs, the Gas Sniper alerts you with audible and visual alarms.

If a sensor fails during start-up or normal operation:



- The message **FAIL SENSOR** displays.
- The failed sensor displays in parenthesis.
- The buzzer sounds a steady tone.
- The alarms lights flash.

If the sensor failed during start-up, the Gas Sniper continues with the normal start-up sequence after the fail screen displays. When the normal screen displays, the Gas Sniper replaces the gas reading for the failed sensor with "**xxxxx"**.

If the sensor fails during normal operation and you want to continue monitoring for the remaining target gases, turn the Gas Sniper off, then follow the appropriate start-up sequence. When the normal screen displays, the Gas Sniper replaces the gas reading for the failed sensor with "**xxxxx"**.

Resetting Gas Alarms

You can set the Gas Sniper's gas alarms for latching or self-resetting alarms (see "Updating the Alarm Latching Setting" on page 30).

Self-resetting alarms

Self-resetting alarms automatically shut off and reset when the gas reading falls below (or rises above for oxygen) the alarm setting. You cannot silence or reset self-resetting alarms.

Latching alarms

You can set latching alarms with or without Alarm Silence (see " Updating the Alarm Silence Setting" on page 30).

With Alarm Silence on:

When the Gas Sniper goes into gas alarm, press the **RESET/SILENCE** button to silence the buzzer. The LEDs continue to flash, and the Gas Sniper continues to display the current alarm level.

The gas reading must fall below (or rise above for oxygen) the low alarm (ALM1) setting before you can reset the alarm. Press the **RESET/SILENCE** button to reset the alarm. The LEDs turn off and the Gas Sniper returns to the normal screen.

With Alarm Silence off:

The gas reading must fall below (or rise above for oxygen) the low alarm (ALM1) setting before you can reset the alarm. Press the **RESET/SILENCE** button to reset the alarm. The LEDs and buzzer turn off, and the Gas Sniper returns to the normal screen.

NOTE: With Alarm Silence off, you cannot silence the buzzer while the gas reading is above (below for oxygen) the low alarm (ALM1) setting.

Display Mode

The Gas Sniper has four operating modes: normal operating mode, display mode, setup mode, and calibration mode. With the Gas Sniper in display mode, you can:

- Set user and station IDs
- Display peak readings
- Display elapsed time
- Display TWA and STEL readings *(toxic gases only)*
- Display battery voltage
- Display date and time *(data logging option only)*
- Clear the data log *(data logging option only)*
- Display remaining log time *(data logging option only)*

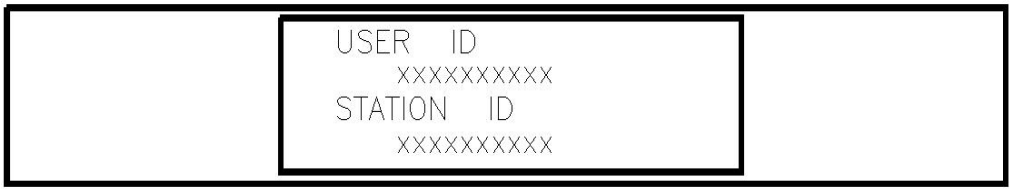
To enter display mode, from the normal screen press the **DISP/ADJ** button. To scroll from one screen to the next press the **DISP/ADJ** button.

NOTE: Each screen displays for 20 seconds. If you do not press the **DISP/ADJ** button to scroll to the next screen within 20 seconds, the Gas Sniper automatically returns to the normal operating screen.

User and Station ID Screen

This screen displays only if the user ID function is activated (see “Turning the User ID Function On or Off” on page 31). Each ID contains 10 characters. Uppercase letters, numbers, asterisks (*), and a blank space are available characters.

Use this screen to identify user, location, or other information. If your Gas Sniper includes the data logging option, the User and Station ID provides a way to identify the user and location of exposure. The User and Station ID are saved to the data logger when you turn off the Gas Sniper, so you can update the IDs for each data logging session.



To enter a User and Station ID:

To scroll to the next screen at any time, press the **DISP/ADJ** button.

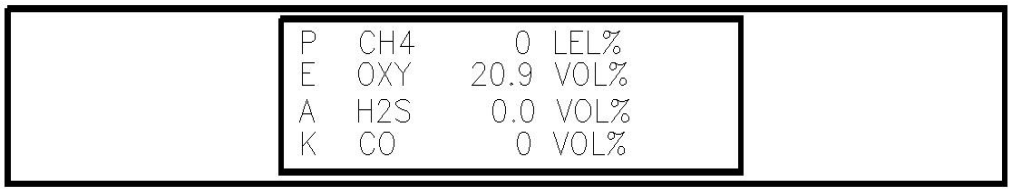
1. Press the **POWER/ENTER** button. The first character under USER ID flashes (***** is default).
2. Press the AIR/▲ and SHIFT/▼ buttons to scroll through the available characters. (The asterisk and blank space are between the set of letters and numbers.)
3. When the desired character displays, press the **POWER/ENTER** button to enter the character and go to the next character.
4. Repeat steps 2 and 3 for the remaining 19 characters.

   After you enter the last character, the Peak screen displays.

Peak Screen

The Peak screen displays the highest (lowest for O_2) concentrations detected since the Gas Sniper was turned on. Peak readings are stored in the Gas Sniper's memory until a higher level is detected or the Gas Sniper is turned off.

The Lunchbreak "**RESUME**" option enables the Gas Sniper to remember peak readings when it is turned off. See "Starting Up the Gas Sniper " on page 6.



Elapsed Time Screen

The Elapsed Time screen displays the time in minutes since the Gas Sniper was last turned on.

TWA/STEL Screen

The TWA/STEL screen displays the time-weighted average (TWA) and the short-term exposure limit (STEL) readings *for toxic gases only*.

The TWA reading is the average reading *during the last 8 hours*. If 8 hours have not elapsed since the last time the TWA/STEL reading was cleared, the average is still calculated over 8 hours. The missing time is assigned a 0 value for readings.

The STEL reading is the average reading *during the last 15 minutes*.

Battery Voltage Screen

The Battery Voltage screen displays the minimum operating voltage and present battery voltage. New alkaline batteries typically measure 6.0 V; fully-charged Ni-Cd batteries typically measure 5.2 V. This screen also displays when you turn on the Gas Sniper.

NOTE: The remaining screens only display if your Gas Sniper includes the data logging option. If your Gas Sniper does not include the data logging option, press the **DISP/ADJ** button to return to the normal screen.

Date/Time Screen

The date/time screen displays the current date and time. You can set the date and time in Calibration or Setup mode (see page 34).

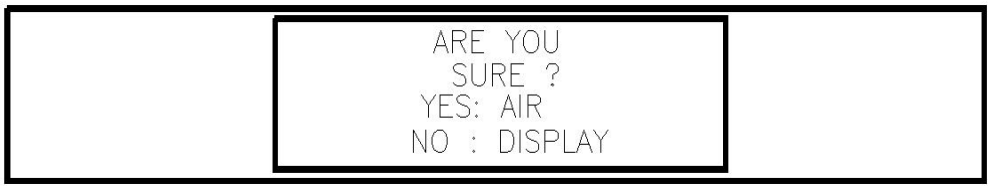
Clear Data Logger Screens

CAUTION: Once you clear the data logger, you cannot retrieve any data previously stored in the data logger.

The Clear Data Logger screens allow you to clear the data logger storage to accept new data. (Press the **DISP/ADJ** button to go to the **Remaining Log Time** screen). You can set the Gas Sniper to overwrite the oldest data when the data log is full (see page 33).

To clear the data log:

1. With the above screen displayed, press the AIR/▲ button.
   A confirmation message displays.



2. Press the AIR/▲ button to confirm that you want to clear the data log.
   The Gas Sniper displays **CLEARING DATA**, then displays **CLEARED OK**. The data log is cleared and the remaining log time value is reset.

Remaining Log Time Screen

The Remaining Log Time screen displays the time remaining until the Data Logger memory is full. The remaining time depends on how often the Gas Sniper stores data to the data log and how many channels are active.

Press the **DISP/ADJ** button once more to return to the normal screen.

Setup Mode

NOTE: The screens illustrated in this section are examples only. The screens displayed by your Gas Sniper model may be slightly different.

The Gas Sniper has four operating modes: **normal** operating mode, **display** mode, **setup** mode, and **calibration** mode. This section describes the setup mode. In setup mode, you can:

- update the battery type setting
- update channel settings
- update the combustible gas channel's units of measure
- update the alarm point settings
- update the Gas Sniper's serial number
- turn the lunch break function on or off
- update the alarm latching setting
- update the alarm silence setting
- turn the user ID function on or off
- update the auto calibration settings
- update the back light setting
- turn the auto fresh air function on or off
- update the data interval time setting *(data logging option only)*
- update the log data over write setting *(data logging option only)*
- update the time calibration setting *(data logging option only)*
- update the date and time settings *(data logging option only)*
- turn the zero follower on or off for each channel
- turn the confirmation beep on or off
- return to default settings (three default options)

The Gas Sniper is pre-set to suit most applications. Follow these instructions only if required.

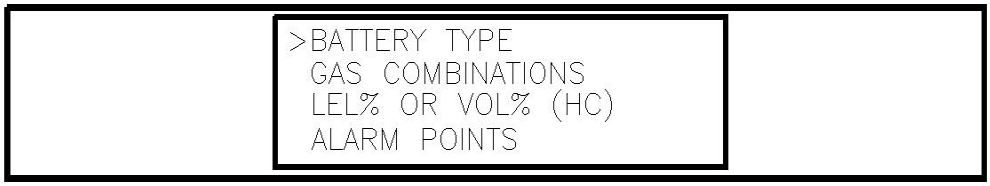
Tips for Using Setup Mode

- To select a menu option, use the AIR/▲ or SHIFT/▼ button to place the prompt next to the menu option, then press the **POWER/ ENTER** button to select the menu option.
- To exit setup mode, from the main menu place the prompt next to the last menu option, **START MEASUREMENT**, then press the **POWER/ENTER** button. The Gas Sniper begins its normal start-up sequence.

Entering Setup Mode

WARNING: **The Gas Sniper does not detect gas or display readings while in setup mode. The CAL/SETUP switch (SW2) must be in the ON position to enter setup mode.**

1. Take the Gas Sniper to a non-hazardous location, and turn the power off.
2. Press and hold down the AIR/▲ and SHIFT/▼ buttons, then press the **POWER/ENTER** button. The main menu displays. It displays four menu options at a time. Press the AIR/▲ or SHIFT/▼ button to view additional menu options.



Updating the Battery Type Setting

This setting allows you to select between alkaline and Ni-Cd batteries. The Gas Sniper uses this setting to make sure adequate time is given between the low battery *warning* and low battery *alarm*. This setting has no effect on battery charging.

1. From the main menu, select the **BATTERY TYPE** menu option.

2. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.

CAUTION: This setting should always match the type of batteries (alkaline or Ni-Cd) installed in the Gas Sniper. If this setting does not match the installed batteries, the time between low battery **warning** and low battery **alarm** may be less than expected.

3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

Updating Channel Settings

This procedure describes how to update channel settings for the combustible gas, oxygen, and toxic gas channels.

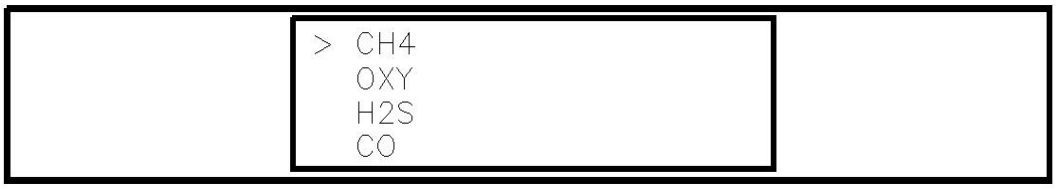
CAUTION: Verify that the correct sensor is installed before you update a channel's settings.

Updating combustible gas channel settings

This section describes how to update the target gas label, set a custom gas label, and update the fullscale PPM setting for the combustible gas channel.

Updating the target gas label

1. From the main menu, select the **GAS COMBINATIONS** menu option.



1. Use the AIR/▲ or SHIFT/▼ button to place the prompt next to the combustible gas channel (in this example CH4).
2. Press the **POWER/ENTER** button. The combustible gas target gas label flashes. This indicates that this setting can now be updated.
3. Press the AIR/▲ or SHIFT/▼ buttons to display the available combustible gas target gas labels (**CH4**, **HEX**, **H2**, *******, and **NOT USED**).

NOTE: Select the **HEX** or ******* setting for Methane Elimination (see "" on page 46 for more information.)

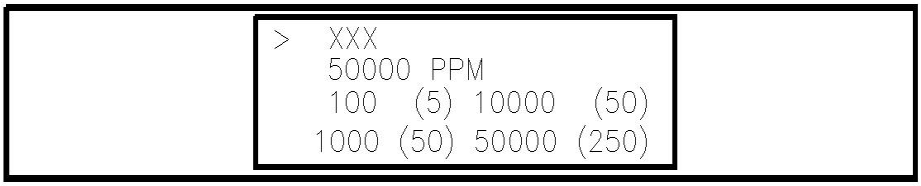
4. Press the **POWER/ENTER** button to enter the new target gas label. A screen displays that shows the fullscale PPM setting, which corresponds to 100% LEL, and display increments for the target gas label you selected. If you select ******* as the gas label, you must update the fullscale PPM setting to correspond to 100% LEL for the target gas.

The number in parenthesis indicates the display increment for that portion of the PPM range. In the example below, the PPM reading would display in increments of :

(5) PPM reading from 0 to 100 ppm

(50) PPM reading from 100 to 1000 PPM and 1000 to 10,000 PPM

(250) PPM reading from 10,000 to 50,000 PPM



If you entered a label other than ***, continue with step 6. If you entered ***, go to the next section, “Setting a custom target gas label.”

1. Press the **POWER/ENTER** button to return to the **Gas Combinations** menu.
2. To exit the Gas Combinations menu, press the SHIFT/▼ button until the prompt is next to Channel 4, then press the SHIFT/▼ button again. The **ESCAPE** message displays.
3. Press the **POWER/ENTER** button. The message **SAVING DATA** displays, then the main menu displays.

Setting a custom target gas label

1. With the prompt next to the target gas label setting (***), press the **POWER/ENTER** button. The first asterisk flashes.
2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired character. Available characters are A through Z, 0 through 9, and a blank space.
3. Press the **POWER/ENTER** button to enter the displayed character. The next character flashes.
4. Repeat steps 2 and 3 to enter the remaining characters. When you enter the last character, the prompt flashes.

Updating the fullscale PPM setting

CAUTION: The fullscale PPM setting must correspond to 100% LEL for the target gas in order for the Gas Sniper to display accurate PPM readings for the combustible gas channel.

1. Press the SHIFT/▼ button to place the prompt in the second line, then press the **POWER/ENTER** button to update the fullscale setting. The fullscale setting flashes.

   The maximum fullscale setting for the combustible gas channel is 50,000 PPM; the minimum setting is 1000 ppm. The default setting is 50,000 ppm.

2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired fullscale setting (see Table 5), then press the **POWER/ENTER** button to enter the setting. The prompt flashes.

Table 5 Fullscale PPM Readings Equivalent to 100% LEL

Target Gas	Fullscale Setting
Methane (CH_4)	50,000 ppm
Hexane	11,000 ppm
Hydrogen	40,000 ppm
Pentane	15,000 ppm
Styrene	9,000 ppm
IPA	20,000 ppm
Isobutane	18,000 ppm
Propane	21,000 ppm
Propylene	20,000 ppm
Toluene	11,000 ppm
Ethane	30,000 ppm
Ethanol	33,000 ppm
Benzene	12,000 ppm

Returning to the main menu

1. Press the SHIFT/▼ button. The **ESCAPE** message displays. (Press the AIR/▲ button to return to the previous screen.)
2. Press the **POWER/ENTER** button to save the new setting. The **OTHER GAS SET** message displays, then the **Gas Combinations** menu displays.
3. To exit the Gas Combinations menu, press the SHIFT/▼ button until the prompt is next to Channel 4, then press SHIFT/▼ again. The **ESCAPE** message displays.
4. Press the **POWER/ENTER** button. The message **SAVING DATA** displays, then the main menu displays.

Updating oxygen channel settings

This section describes how to update the target gas label, fullscale setting, and display increment setting for the oxygen channel.

Updating the target gas label

1. From the main menu, select the **GAS COMBINATIONS** menu option.

2. Use the AIR/▲ or SHIFT/▼ button to place the prompt next to the oxygen channel (in this example OXY).

3. Press the **POWER/ENTER** button. The oxygen target gas label flashes. This indicates that this setting can now be updated.

4. Press the AIR/▲ or SHIFT/▼ buttons to display the available oxygen target gas labels (**OXY**, *******, and **NOT USED**).

CAUTION: The ******* setting is not intended for customer setup. Contact Matheson Tri-Gas, Inc., before using this setting for the oxygen channel.

5. Press the **POWER/ENTER** button to enter the new target gas label.

6. To exit the Gas Combinations menu, press the SHIFT/▼ button until the prompt is next to Channel 4, then press the SHIFT/▼ button again. The **ESCAPE** message displays.

7. Press the **POWER/ENTER** button. The **SAVING DATA** message displays, then the main menu displays.

Updating the fullscale setting

1. Press the SHIFT/▼ button to place the prompt in the second line, then press the **POWER/ENTER** button to update the fullscale setting. The fullscale setting flashes.

   The maximum fullscale setting for the oxygen channel is 40.0 VOL%; the minimum setting is 25.0 VOL%. The default setting is 40.0 VOL%.

2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired fullscale setting, then press the **POWER/ENTER** button to enter the setting. The prompt flashes.

Updating the display increment setting

1. Press the SHIFT/▼ button to place the prompt in the third line, then press the **POWER/ENTER** button. The display increment setting flashes. The allowable settings are 0.2 VOL% (default) and 0.5 VOL%.

2. Press the AIR/▲ or SHIFT/▼ button to display the desired display increment setting, then press the **/ENTER** button to enter the setting. The prompt flashes.

Returning to the main menu

1. Press the SHIFT/▼ button. The **ESCAPE** message displays. (Press the AIR/▲ button to return to the previous screen.)

2. Press the **POWER/ENTER** button to save the new settings. The **OTHER GAS SET** message displays, then the **Gas Combinations** menu displays.

3. To exit the Gas Combinations menu, press the SHIFT/▼ button until the prompt is next to Channel 4, then press the SHIFT/▼ button again. The **ESCAPE** message displays.

4. Press the **POWER/ENTER** button. The message **SAVING DATA** displays, then the main menu displays.

Updating toxics channel settings

This section describes how to update the target gas label, set a custom gas label, and update the fullscale and display increment settings for a toxic gas channel.

Updating the target gas label

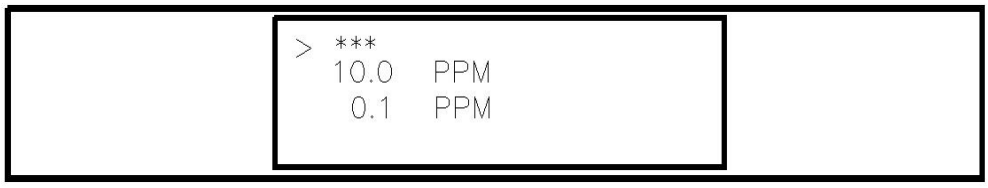
1. From the main menu, select the **GAS COMBINATIONS** menu option.
2. Press the **POWER/ENTER** button to display the **Gas Combinations** menu.

3. Use the AIR/▲ or SHIFT/▼ button to place the prompt next to the toxic gas channel (in this example H2S or CO).
4. Press the **POWER/ENTER** button. The toxic target gas label flashes. This indicates that this setting can now be updated.
5. Press the AIR/▲ or SHIFT/▼ buttons to display the available target gas labels for the toxic gas channel (**H2S**, **CO**, **SO2**, **Cl2**, **NH3**, **CO2 (5.00%)**, **CO2 (10000 PPM)**, **CO2 (5000 PPM)**, *******, and **NOT USED**).
6. Press the **POWER/ENTER** button to enter the new target gas label.

NOTE: If you entered a label other than *******, continue with step 7. If you entered *******, go to the next section, “Setting a custom target gas label.”

7. To exit the Gas Combinations menu, press the SHIFT/▼ button until the prompt is next to Channel 4, then press the SHIFT/▼ button again. The **ESCAPE** message displays.
8. Press the **POWER/ENTER** button. The message **SAVING DATA** displays, then the main menu displays.

Setting a custom target gas label



1. With the prompt next to the target gas label setting (***), press the **POWER/ENTER** button. The first asterisk flashes.
2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired character. Available characters are A through Z, 0 through 9, and a blank space.

3. Press the **POWER/ENTER** button to enter the displayed character. The next character flashes.

4. Repeat steps 2 and 3 to enter the remaining characters. When you enter the last character, the prompt flashes.

Updating the fullscale setting

1. Press the SHIFT/▼ button to place the prompt in the second line, then press the **POWER/ENTER** button. The fullscale setting flashes.

   The maximum fullscale setting for a toxic gas channel is 1000 PPM; the minimum setting is 1.00 PPM. The default setting is 10.0 PPM.

2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired fullscale setting, then press the **POWER/ENTER** button to enter the setting. The prompt flashes.

NOTE: The display increment setting automatically updates its default setting as you change the fullscale setting.

Updating the display increment setting

1. Press the SHIFT/▼ button to place the prompt in the third line, then press the **POWER/ENTER** button. The display increment setting flashes.

   The minimum display increment setting is 0.1 PPM; the maximum display increment setting is 2.5 PPM.

2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired display increment setting, then press the **POWER/ENTER** button to enter the setting. The prompt flashes.

Returning to the main menu

1. Press the SHIFT/▼ button. The **ESCAPE** message displays. (Press the AIR/▲ button to return to the previous screen.)

2. Press the **POWER/ENTER** button to save the new settings. The **OTHER GAS SET** message displays, then the **Gas Combinations** menu displays.

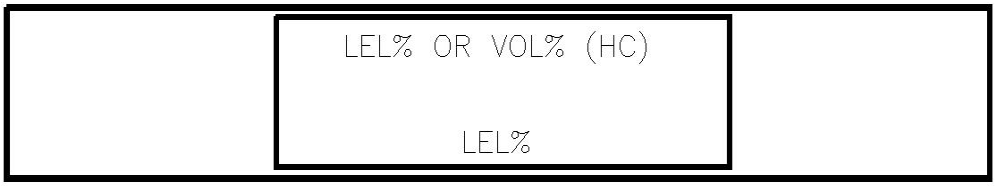
3. To exit the Gas Combinations menu, press the SHIFT/▼ button until the prompt is next to Channel 4, then press the SHIFT/▼ button again. The **ESCAPE** message displays.

4. Press the **POWER/ENTER** button. The message **SAVING DATA** displays, then the main menu displays.

Updating Combustible Gas Channel Units of Measure

This setting allows you to display the combustible gas reading in percentage of LEL or percentage of volume. The detection range remains the same. If 100% LEL equals 5% by volume, then fullscale on the volumetric display is 5%.

1. From the main menu, select the **LEL% OR VOL% (HC)** menu option.



2. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.

NOTE: The data logging option logs all combustible gas readings in LEL% regardless of this setting.

3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

Updating the Alarm Point Settings

Each of the Gas Sniper's gas detection channels includes low and high gas alarms. The combustible gas channel also includes low and high alarms for PPM readings; the toxic gas channels also include **STEL** and **TWA** alarms.

This screen allows you to update one or more alarm points (the reading at which the Gas Sniper recognizes the alarm).

1. From the main menu, select the **ALARM POINTS** menu option.

2. Select the channel of the alarm point you want to update. The channel's Set Low Alarm Point screen displays (in this example for the combustible gas channel).

NOTE: The Gas Sniper displays the set alarm point screens for each channel in the following sequence: low alarm, high alarm, TWA alarm (toxics only), and STEL alarm (toxics only).

If this is the alarm point you want to update, continue with step 3. If not, continue pressing the **POWER/ENTER** button until the correct set alarm point screen displays, then continue with step 3.

3. Use the AIR/▲ and SHIFT/▼ buttons to display the desired setting.

4. Press the **POWER/ENTER** button to enter the **new alarm point** and scroll to the next set alarm point screen. (Repeat step 3 and 4 to update another alarm point for this channel.)
5. Press the **POWER/ENTER** button to scroll to the last set alarm point screen for this channel, then press the **POWER/ENTER** button again to return to the Set Alarm Points menu.
6. Repeat steps 2 through 5 until all desired alarm points are updated. Make sure you return to the Set Alarm Points menu to continue.
7. To exit the Set Alarm Points menu, press the SHIFT/▼ button until the prompt is next to Channel 4, then press the SHIFT/▼ button again. The **ESCAPE** message displays. (Press the AIR/▲ button if you want to return to the Set Alarm Points menu.
8. Press the **POWER/ENTER** button to save the settings and return to the main menu.

Updating the Gas Sniper's Serial Number

Every Gas Sniper is programmed with a unique serial number. The Data Logging option includes the serial number in its log data for identification purposes. The serial number setting accepts numeric (0 through 9) and alpha (A through Z) characters.

NOTE: The serial number is factory set and should not need to be changed. However, if you "reset all defaults," the serial number is reset to ******.

1. From the main menu, select the **SERIAL NO.** menu option.

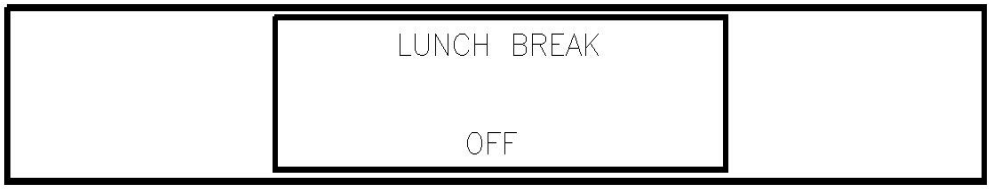
2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired character, then press the **POWER/ENTER** button to enter the character. The next character flashes.
3. Repeat step 2 to enter the remaining characters. The main menu displays after you enter the last character.

Updating the Lunch Break Setting

With Lunch Break OFF (default), the Gas Sniper automatically starts new TWA and PEAK reading collection at start up.

With Lunch Break ON, the **RESUME** screen displays during start up. From this screen, you can choose to continue accumulating TWA and PEAK readings from the last time the Gas Sniper was used or start collecting new readings.

1. From the main menu, select the **LUNCH BREAK** menu option.



2. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.
3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

Updating the Alarm Latching Setting

With Alarm Latching ON, the Gas Sniper remains in alarm condition until the alarm condition passes *and* the **RESET/SILENCE** is pressed.

With Alarm Latching OFF, the Gas Sniper automatically resets its alarm when the alarm condition passes.

1. From the main menu, select the **ALARM LATCHING** menu option.

2. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.
3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

Updating the Alarm Silence Setting

NOTE: This feature works only when Alarm Latching is turned on.

With Alarm Silence ON, pressing the **RESET/SILENCE** button silences the buzzer when the Gas Sniper goes into alarm. The LEDs continue to flash, and the display continues to show the level of alarm. When the gas concentration falls below the low alarm level, pressing the **RESET/SILENCE** button turns off the LEDs and removes the **ALM1** message.

With Alarm Silence OFF, you cannot silence the buzzer.

1. From the main menu, select the **ALARM SILENCE** menu option.

2. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.

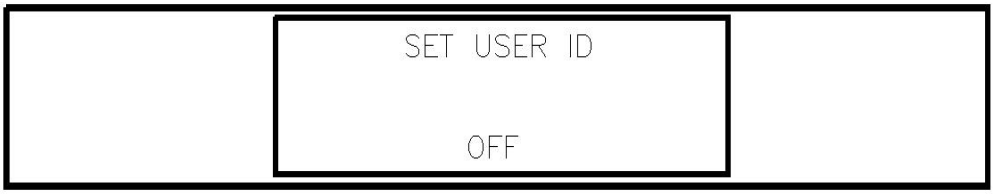
3. Press the POWER/ENTER button to enter the setting and return to the main menu.

Turning the User ID Function On or Off

With User ID Input ON, the **User and Station ID** screen displays during start up. From this screen, you can enter user, location, or other information at the beginning of each gas detection session (see page 19).

With User ID Input OFF (default), the **User and Station ID** screen does not display during start up.

1. From the main menu, select the **USER ID** menu option.



2. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.
3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

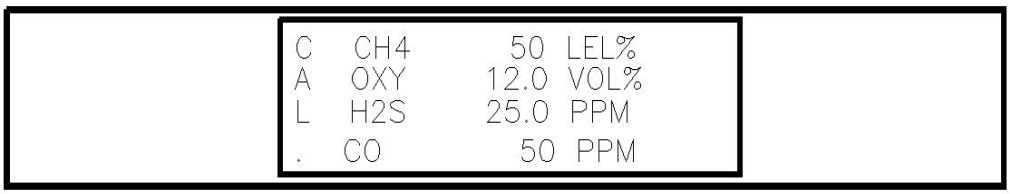
Updating the Auto Calibration Settings

The Gas Sniper stores default calibration settings. This allows you to calibrate all Gas Sniper channels simultaneously with a calibration cylinder that contains all required target gases.

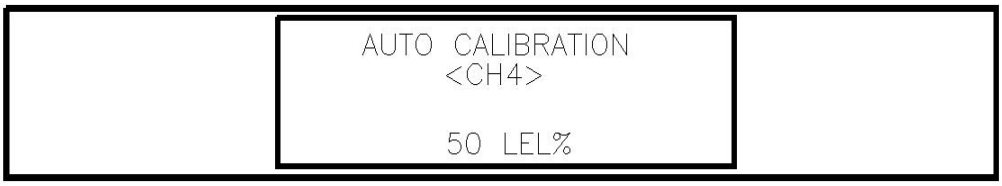
The Gas Sniper includes default auto calibration settings for most target gases. For gases without default auto calibration, the setting is 0.

NOTE: You can also update auto calibration settings in Calibration mode. If you update auto calibration settings in Calibration mode, you must continue with the calibration procedure. Updating these settings in Setup mode allows you to update the settings without calibrating the sensors.

1. From the main menu, select the **AUTO CALIBRATION** menu option. (To display the combustible gas channel in PPM, press the LEL/PPM button.)



2. Press and hold the SHIFT/▼ button, then press the DISP/ADJ button. The **Auto Calibration** screen for the combustible gas channel displays.

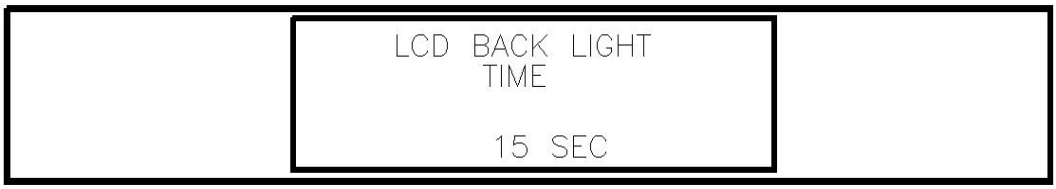


3. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.
4. Press the **POWER/ENTER** button to enter the new setting. The Auto Calibration screen for the next channel displays.
5. Repeat steps 4 and 5 for the remaining channels. (You must scroll through all remaining channels before you can exit the Auto Calibration screen.)
6. When the Auto Calibration screen for the last channel displays, press the **POWER/ENTER** button to return to the main Auto Calibration screen.
7. Press the **POWER/ENTER** button to return to the main menu.

Updating the Back Light Setting

This setting indicates the length of time the LCD illuminates when you press any button. The minimum setting is off; the maximum setting is 10 minutes. The default setting is 15 seconds.

1. From the main menu, select the **LCD BACK LIGHT TIME** menu option.



2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired setting.
3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

Turning the Auto Fresh Air Function On or Off

WARNING: **If Auto Fresh Air Adjust is ON, you must start the Gas Sniper in a "fresh-air" environment. If this setting is ON and the Gas Sniper is started in the presence of a target gas, the readings and alarms will not be accurate or reliable.**

With Auto Fresh Air Adjust ON, the Gas Sniper automatically set the fresh air reading for all channels during the start-up sequence.

With Auto Fresh Air Adjust OFF (default), you must press the AIR/▲ button to set the fresh air reading for all channels.

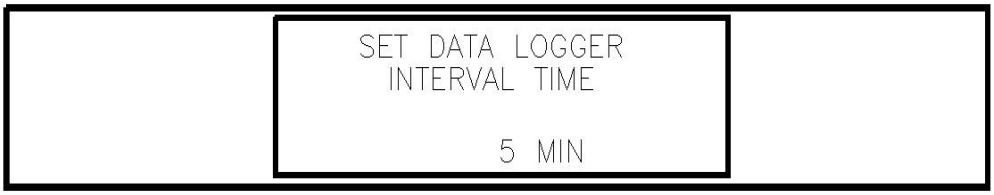
1. From the main menu, select the **AUTO FRESH AIR ADJ.** menu option.

2. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.
3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

Updating the Interval Time Setting *(data log option)*

This setting indicates how often the Gas Sniper records readings into the Data Logger. The minimum setting is 10 seconds; the maximum setting is 5 minutes. The default setting is 5 minutes.

1. From the main menu, select the **INTERVAL TIME** menu option.



2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired setting.
3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

Updating Log Data Over Write Setting *(data log option)*

With Data Over Write ON, the Gas Sniper writes over the oldest data with new data when the Data Logger memory is full.

With Data Over Write OFF, the Gas Sniper stops writing data when the Data Logger memory is full.

1. From the main menu, select the **LOG DATA OVER WRITE** menu option.

2. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.
3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

Updating the Time Calibration Setting *(data log option)*

This setting indicates how often the Gas Sniper alerts you to needed calibration. The minimum setting is 1 day; the maximum setting is 180 days. The default setting is “off”.

Tip: Press and hold the AIR/▲ or SHIFT/▼ button to rapidly scroll through settings.

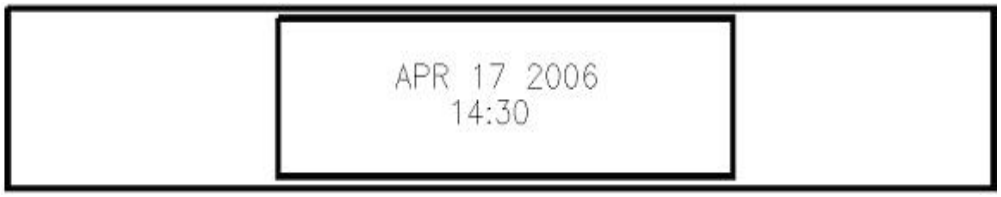
1. From the main menu, select the **TIME CALIBRATION** menu option.

2. Press the AIR/▲ and SHIFT/▼ buttons to display the desired setting.
3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

Updating the Date and Time Settings *(data log option)*

The Data Logger uses the data and time to identify entries.

1. From the main menu, select the **DATE/TIME** menu option.



2. Press the AIR/▲ or SHIFT/▼ button to display the desired month.
3. Press the **POWER/ENTER** button to enter the setting. The day setting flashes.
4. Repeat steps 2 and 3 to enter the day, year, hours, and minutes settings. The main menu displays after you enter the minutes setting.

Updating the Zero Follow Settings

The Zero Follow setting is not intended for customer setup. The default setting for most target gases is ON. The default setting for carbon dioxide sensors and some configurations of non-standard toxic gas sensors is OFF. The oxygen sensor does not include this feature.

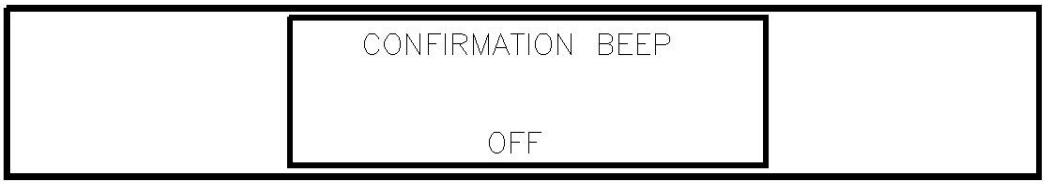
CAUTION: *Contact Matheson Tri-Gas Inc., before changing this setting.*

Updating the Confirmation Beep Setting

With Confirmation Beep ON, the Gas Sniper beeps once every 15 minutes to verify that it is operating.

With Confirmation Beep OFF (default), the Gas Sniper does not sound a confirmation beep.

1. From the main menu, select the **CONFIRMATION BEEP** menu option.



2. Press the AIR/▲ or SHIFT/▼ button to display the desired setting.
3. Press the **POWER/ENTER** button to enter the setting and return to the main menu.

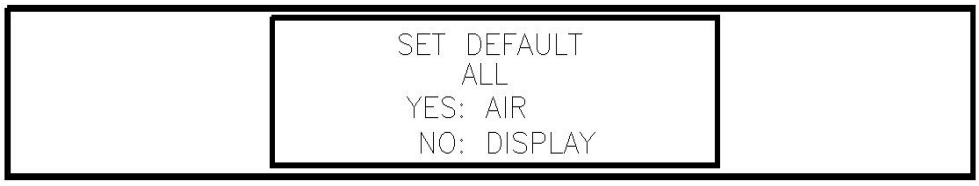
Returning to Default Settings

Each of the parameters in Setup mode has a default setting. The Gas Sniper includes three different options for returning default settings: reset all default settings, reset the default alarm point settings only, and reset the default oxygen zero setting only.

CAUTION: If you reset **all** default settings, any changes made in setup mode or normal operation, including calibration settings, will be lost.

To reset all default settings:

1. From the main menu, select the **DEFAULT** menu option.
2. Press the **POWER/ENTER** button to display the Set Default All screen.



3. Press the AIR/▲ button to reset all parameters to their default settings. The messages **SAVING DATA** and **END** display, then the main menu displays.

To reset all default alarm point settings:

1. From the main menu, select the **DEFAULT** menu option. The Set Default All screen displays.
2. Press the DISP/ADJ button to display the Set Default Alarm screen.

3. Press the AIR/▲ button to reset all alarm points to their default settings. The messages **SAVING DATA** and **END** display, then the main menu displays.

To reset the oxygen zero setting:

1. From the main menu, select the **DEFAULT** menu option. The Set Default All screen displays.
2. Press the **DISP/ADJ** button. The Set Default Alarm screen displays.
3. Press the **DISP/ADJ** button to display the Set Default Oxygen Zero screen.

4. Press the AIR/▲ button to reset the oxygen zero setting to its default value. The messages **SAVING DATA** and **END** display, then the main menu displays.

NOTE: Calibrate the Gas Sniper when you replace a sensor. Also calibrate the Gas Sniper periodically to assure proper sensor response.

You can program the Gas Sniper to notify you when it is due for calibration (see “Updating the Time Calibration Setting” on page34). The frequency of calibration depends upon the amount and type of use. A typical calibration frequency is once per month.

Calibration Supplies and Equipment

To calibrate the Gas Sniper, you need:

- Known calibrating samples of combustible and the appropriate toxic gases. The samples should have concentrations in approximately the middle of the range of detection.
- An oxygen-free source, such as 100% nitrogen or CO in a nitrogen balance
- A demand-flow regulator to provide adequate sample gas flow

For one-source, auto-calibration, you can use the Matheson Tri-Gas Four-Gas Cylinder to adjust all the sensors at the same time, automatically, with no need for a zero-oxygen source. This section includes instructions for calibration with the demand-flow regulator and Matheson Tri-Gas Four-Gas Cylinder. This section also includes instructions for calibration with individual gas sources.

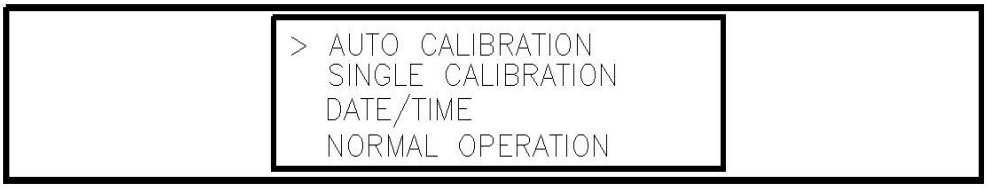
Preparing for Calibration

1. Take the Gas Sniper to a non-hazardous location with fresh-air conditions.
2. Turn on the Gas Sniper and allow one minute for warm up.
3. Press and hold the AIR/▲ button until a tone sounds.
   The Gas Sniper automatically sets the combustible gas and toxics circuits to zero and the oxygen circuit to 20.9%.
4. Screw the regulator to the calibration cylinder.
5. Connect the calibration tubing to the regulator.

Calibrating the Gas Sniper

Press and hold the SHIFT/▼ button, then press the DISP/ADJ button. The Calibration menu displays.

NOTE: The following screens illustrate a four-gas Gas Sniper with the data logging option and are intended as examples only. Your Gas Sniper may display slightly different screens.



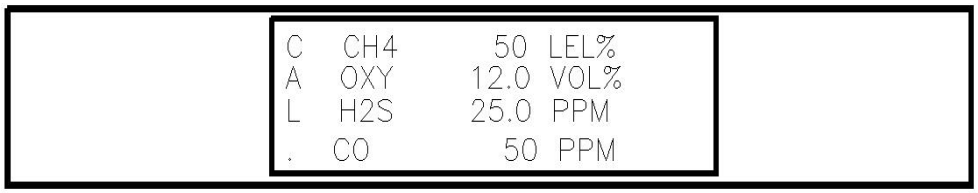
The Gas Sniper's Calibration menu includes two methods of calibration:
Auto Calibration and Single Calibration.

- **Auto Calibration:** This method allows you to calibrate all four sensors simultaneously. It is designed for use with the Matheson Tri-Gas Four- Gas Calibration Cylinder and is the quickest and easiest method to calibrate the Gas Sniper.
- **Single Calibration:** This method allows you to calibrate one sensor at a time. Use this method if you are only calibrating one or two sensors, if you are calibrating non-standard toxic sensors, or if you are not using the Matheson Tri-Gas Four-Gas Calibration Cylinder.

Calibrating with the Auto Calibration method

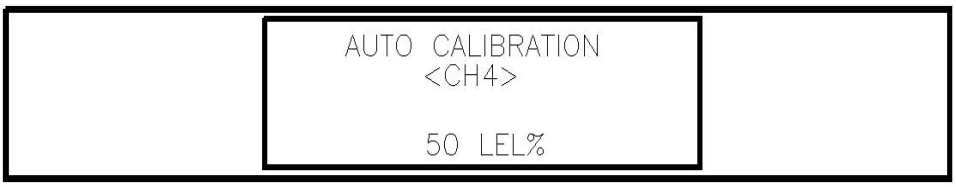
This section describes calibration using the Auto Calibration method.
To calibrate using the Single Calibration method, see " Calibrating with the Single Calibration method" on page 39.

1. Use the AIR/▲ and SHIFT/▼ button to place the prompt next to the **AUTO CALIBRATION** menu option.
2. Press the **POWER/ENTER** button to display the Calibration Values screen.



The gas concentrations displayed in the Calibration Values screen must match the gas concentrations listed on the Four-Gas Calibration Cylinder. If *all* concentrations match, go to step 7. If *one or more* concentrations do not match, continue with step 3.

3. To adjust the values on the screen, hold down the SHIFT/▼ button, and press the **DISP/ADJ** button. The Auto Calibration screen for the combustible gas channel displays.



4. Use the AIR/▲ (increase) and SHIFT/▼ (decrease) buttons to set the correct combustible gas value.
5. Press the **POWER/ENTER** button to enter the new setting. The Auto Calibration screen for the next channel displays.
6. Repeat steps 4 and 5 to set the correct values for the remaining channels and return to the Calibration Values screen.

NOTE: The Matheson Tri-Gas Four Gas Cylinder contains approximately 12% O_2 by volume. Be sure to set the “OXY” reading to agree with the concentration listed on the cylinder’s label, **not zero**.

7. With the Calibration Values screen displayed, press the **POWER/ENTER** button. The gas readings flash.
8. Connect the tubing from the regulator to the Gas Sniper’s probe.Wait approximately 1 minute or until the readings stabilize.
9. Press the **POWER/ENTER** button to set the calibration to the programmed values.

If a sensor(s) cannot calibrate to the proper value, **FAIL PUSH AIR KEY** displays and the Gas Sniper lists the sensor(s) that failed to calibrate. (The other sensors calibrate normally.) The buzzer and alarm lights activate. Press the AIR/▲ button to reset the alarm and return to the Calibration menu. Replace the failed sensor(s), then repeat calibration.

10. **AUTO CALIBRATION END** displays, then the Calibration menu displays.
11. Disconnect the tubing from the probe.

12. Unscrew the regulator from the calibration cylinder.

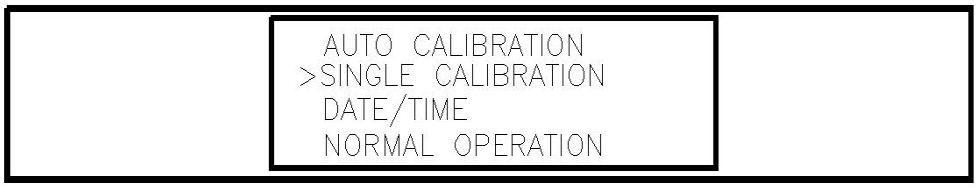
13. Press the SHIFT/▼ button to place the prompt next to the **NORMAL OPERATION** menu option, then press the **POWER/ENTER** button to return to the normal screen.

Calibrating with the Single Calibration method

This section describes calibration using the Single Calibration method.
To calibrate using the Auto Calibration method, see " Calibrating with the Auto Calibration method" on page 38.

CAUTION: The single calibration method does not have a "FAIL" notification. Replace sensors that cannot be set to agree with the calibration source, then recalibrate.

1. Use the AIR/▲and SHIFT/▼ buttons to place the prompt next to the **SINGLE CALIBRATION** menu option.



2. Press the **POWER/ENTER** button to display the Single Calibration menu.

3. Use the AIR/▲ or SHIFT/▼ button to place the prompt next to the channel to calibrate (in this example the combustible gas channel).

4. Press the **POWER/ENTER** button. The Single Calibration screen displays for the channel you selected. The gas reading flashes.

5. Connect the tubing from the regulator to the Gas Sniper's probe.

NOTE: The combustible gas sensor is a general hydrocarbon sensor that responds to most flammable vapors and gases; the response will vary depending upon the substance. For best results, calibrate the Gas Sniper to the target gas or vapor.

6. If necessary, use the AIR/▲ (increase) and SHIFT/▼ (decrease) buttons to adjust the reading to match the concentration listed on the calibration cylinder.
7. Press the **POWER/ENTER** button to set the span value. **SINGLE CALIBRATION END** displays, then the Single Calibration menu displays.
8. Disconnect the tubing from the probe.
9. Repeat steps 3 through 8 for any other channels you want to calibrate. Make sure you use an appropriate calibration cylinder for each channel.

CAUTION: When calibrating the oxygen channel, verify the concentration of oxygen isted on the cylinder's label. For oxygen-free samples (100% nitrogen for example), set the oxygen span setting to 0.0%.

10. After the last channel is calibrated, disconnect the calibration tubing from the probe, then unscrew the regulator from the calibration cylinder.
11. With the Single Calibration menu displayed, press the SHIFT/▼ button until the prompt is next to the last channel, then press the SHIFT/▼ button again. The **ESCAPE** message displays.
12. Press the **POWER/ENTER** button to return to the Calibration menu.
13. Press the SHIFT/▼ button to place the prompt next to the **NORMAL OPERATION** menu option, then press the POWER/ ENTER button to return to the normal screen.

Maintenance

Displaying the Battery Voltage

Check the battery voltage periodically. Replace or recharge the batteries before the voltage drops to 4.5 V.

WARNING: **Take the Gas Sniper to a non-hazardous location before replacing or recharging the batteries.**

To display the battery voltage:

1. From the normal screen, press the **DISP/ADJ** button to enter display mode.
2. Press the **DISP/ADJ** button until the Battery Voltage screen displays.

3. To exit display mode, press the **DISP/ADJ** button until the normal screen displays.

Replacing Alkaline Batteries

1. Turn off the Gas Sniper.
2. Unscrew the two large screws on the top of the case, then carefully lift the top of the case and lay it aside.
3. Remove the batteries and verify that the battery compartment and electrical contacts are clean.
4. Insert fresh batteries following the label on the inside of the case.
5. Place the top of the case in its original position, then secure it with the large screws you loosened in step 1.

Recharging Ni-Cd Batteries

1. Turn off the Gas Sniper.
2. Plug the cord from the charger into the Gas Sniper's battery charger connector.
3. Plug in the AC line cord or 12 VDC supply to the charger. A full charge takes approximately 8 to 12 hours.
4. Unplug the supply and the charger before using the Gas Sniper. See the charger label for directions.

NOTE: Setup mode allows you to select between alkaline and Ni-Cd batteries. The two types of batteries have unique low battery alarm characteristics. To prevent unexpected low battery alarms, always make sure the battery type setting in Setup mode matches the type of batteries installed in the Gas Sniper.

Replacing Sensors

Electrochemical sensors (O_2, H_2S, and CO) gradually deteriorate, regardless of use, and require periodic replacement. Combustibles sensor life is typically related to usage, but certain conditions may affect duration.

The Gas Sniper sensors are easy to replace but do not contain user- serviceable components. For genuine Matheson Tri-Gas sensors, call Matheson Tri-Gas or your local distributor. All sensors are covered by a limited warranty; see warranty for details.

CAUTION: Avoid pulling on sensor wires. Always unplug at the connector.

Replacing the combustibles sensor

Replace the combustibles sensor when:

- The combustibles channel cannot be calibrated correctly.
- The LEL reading cannot be set to 0 by the Demand Zero command.

To replace the combustibles sensor:

1. Take the Gas Sniper to a non-hazardous location, and turn the power off.
2. Unscrew the two large screws on the top of the case, then carefully lift the top of the case and lay it aside.
3. Unplug the four-wire connector (red/white/green/black) from the circuit board.
4. Locate the combustibles sensor. With the batteries closest to you, the combustibles sensor is at the top left corner of the sensor block.
5. Remove the two screws in the oval keeper plate, and remove the sensor from the sensor block.
6. Unplug the cable socket from the top of the sensor. Retain the oval keeper plate for use with the replacement sensor.
7. Install the replacement sensor in reverse order.

Replacing the oxygen sensor

Replace the oxygen sensor when:

- The O_2 channel cannot be set to 00.0% on an oxygen-free sample.
- The O_2 display cannot be set to 20.9% by the Demand Zero command.
- The O_2 reading drifts noticeably. For example, if the O_2 reading varies from 20.5 to 21.5 while you view the display for a few seconds.

To replace the oxygen sensor:

1. Take the Gas Sniper to a non-hazardous location, and turn the power off.
2. Unscrew the two large screws on the top of the case, then carefully lift the top of the case and lay it aside.
3. Locate the oxygen sensor. With the batteries closest to you, the oxygen sensor is at the bottom left corner of the sensor block.
4. Unplug the cable leading from the oxygen sensor at the large multi-pin connector.
5. Loosen the screws on the metal strap that covers the oxygen sensor.
6. Push the strap toward the screw that is furthest away from the battery compartment.

7. Swing the strap aside.
8. Remove the oxygen sensor.
9. Install the replacement sensor in reverse order.

Replacing the H2S or CO sensor

Replace the H_2S or CO sensor when:

- The H_2S or CO channel cannot be calibrated correctly.
- The H_2S or CO reading cannot be set to 00 by the Demand Zero command.

NOTE: Allow up to 1/2 hour after you replace the H_2S or CO sensor, or if charged batteries have not been installed for an extended period, for the channel to show a normal response, then calibrate the sensor.

To replace the H_2S or CO sensor:

1. Take the Gas Sniper to a non-hazardous location, and turn the power off.
2. Unscrew the two large screws on the top of the case, then carefully lift the top of the case and lay it aside.
3. Locate the toxic gas sensor you intend to replace. With the batteries closest to you, the sensor for Channel 3 is at the top right corner of the sensor block, and the sensor for Channel 4 is at the bottom right corner of the sensor block. Note the color of the leads extending from the sensor you intend to replace.
4. Unplug the appropriate sensor connector from the circuit board. Use the color of the leads to determine the appropriate connector.
5. Remove the sensor from the sensor block. If necessary, wiggle the sensor to work it out of the seal.
6. Install the replacement sensor in reverse order.

CAUTION: *Verify that you install the H_2S or CO sensor in the appropriate flow block position. The Gas Sniper will display inaccurate H_2S and CO readings if the sensors are not installed in the correct flow block positions.*
The Gas Sniper continues to display H_2S and CO readings in the same channels as it did previously regardless of which socket (EC1 or EC2) the sensor is wired to or into which flow block position the sensor is installed. However, the H_2S and CO reading will be inaccurate due to the charcoal filter installed before the CO flow block position.

Appendix A: Parts List

Table 6 lists model numbers for the Gas Sniper's replacement parts and accessories.

Table 6 Parts List

Model Number	Product Description
SNIPE-SSPC	Shoulder strap w/ padded cushion
SNIPE-CCF1	Carrying case with foam for Gas Sniper and accessories
SNIPE-INFIT	Standard Inlet Metal Fitting – Quick Didconnect (Female)
SNIPE-PUMP	Pump (internal) with connector RP-GX-94
SNIPE-MSP10M	10" standard Hydrophobic sensing probe w/ metal fitting
SNIPE-MSP10P	10" Hydrophobic sensing probe w/ plastic fitting (Toxic Gases)
SNIPE-RFE5	Hydrophobic Filter Element (Set of 5)
SNIPE-DLB	Data logging board (Factory Installed) *
SNIPE-DLDK	Data logging Downloading Kit *
SNIPE-CHAR12	12 V-DC Battery Charger with cigarette lighter plug
SNIPE-ALKBATD	Set of 4 Alkaline battery, size D
SNIPE-NCBATD	Set of 4 rechargeable Ni-Cd batteries, size D
SNIPE-NCCHAR115	Ni-Cad Battery Charger, 115 VAC with alkaline recognition
SNIPE-CH115C	115 VAC Cont. Operation / Battery Charger with 20 ft cable
SNIPE- HT5	5 ft Teflon Sampling hose
SNIPE- HT10	10 ft Teflon Sampling hose
SNIPE- HP6	6 FT Polyurethane sampling hose with 1641 fittings
SNIPE- HP10	10 FT Polyurethane sampling hose with 1641 fittings
SNIPE- HP15	15 FT Polyurethane sampling hose with 1641 fittings
SNIPE- HP20	20 FT Polyurethane sampling hose with 1641 fittings
SNIPE- ORP-1	O-Ring for Hydrophobic sensing probe
SNIPE-RAA20	Remote audible alarm with 20-foot cable

* Data Logging feature requires both SNIPE- DLB and SNIPE-DLDK components; this feature is only available for up to "4" gases; this option is not available on Gas Sniper units with "5" or "6" gas sensors installed or more than "2" toxic sensors installed.

Note: Polyurethane hose recommended for standard gases and selected toxic gases; Teflon hose Required for the following gases: HF, HCL, & O_3.

Appendix B: Methane Elimination

For applications where methane is an interfering gas, you can set the Gas Sniper to eliminate most response to methane. The methane elimination switch is a standard feature on the circuit board inside the top of the Gas Sniper's case. An *external* switch is available as an *option*. For this type of detection, the combustible gas channel must be programmed to display **HEX** or ******* (see " Updating Channel Settings" on page 21.) Gas Sniper with the external methane elimination switch are factory-set with the correct display.

Setting up for methane elimination mode

1. Take the Gas Sniper to a fresh-air environment. Set the internal methane elimination switch to the **HEX ON** position or the external switch to Methane Response Off.

CAUTION: *If the Gas Sniper is equipped with an external methane elimination switch, do not adjust the internal switch. The internal switch should always be in the **CH4** position.*

2. Allow 2 minutes for the combustibles sensor to stabilize.
3. Perform the demand zero procedure as described in " Preparing for Calibration" on page 36.

WARNING: ***DO NOT adjust the switch after re-zeroing the Gas Sniper. Response to CH_4 is greatly reduced when the internal switch is set to "HEX ON" or the external switch is set to "Methane Response Off". If used for methane detection, the internal switch must be set to "CH4" or the external switch set to "Methane Response On".***

Operating with methane response off

Monitor for combustible gas as you normally would. When the Gas Sniper is operating in Methane Elimination mode, response to methane is reduced by 90% or more. Response to hexane is reduced slightly (approximately 15%). To convert readings for most common combustible gases (Table 6).

Returning to methane response mode

1. Take the Gas Sniper to a fresh-air environment. Set the internal methane elimination switch to the **CH4** position or the external switch to Methane Response On.
2. Allow 2 minutes for the combustibles sensor to stabilize.
3. Perform the demand zero procedure as described in " Preparing for Calibration" on page 41.

Monitoring combustible gases other than hexane

Use Table 7 to determine the concentration of combustible gases other than hexane. This table is based on Gas Sniper's in methane elimination mode (methane elimination switch set to **HEX ON**) and calibrated to hexane. Multiply the display reading by the factor in the appropriate column. For example, if you are using the Gas Sniper to detect toluene and the display reads 10% LEL, the actual toluene reading is 10% x 0.90 = 9% LEL toluene.

To determine the concentration of other combustible gases with the Gas Sniper in full response mode, see Table 7.

Table 7 Methane Elimination Mode Conversion Factors (Hexane Calibration)

Target Gas	LEL Factor (Hexane Calibration)	PPM Factor (Hexane Calibration)
Benzene	0.90	0.98
Ethane	Low response	Low response
Ethanol	0.75	2.25
Ethylene	0.53	0.57
Hexane	1.00	1.00
Hydrogen	0.55	2.00
IPA	0.98	1.77
Isobutane	0.74	1.21
MEK	0.91	1.49
Methane	No response	No response
Methanol	0.91	4.56
Propane	Low response	Low response
Propylene	0.69	1.26
Toluene	0.90	0.98

WARNING: ***The Gas Sniper alarms are initiated by the DISPLAY reading not the FACTORED reading. If you are monitoring for toluene as in the above example and the low alarm is set for 10% LEL, the Gas Sniper will initiate a low alarm at 9% LEL toluene (display reading of 10% LEL).***

Appendix C: Non- Standard Toxic Gas Sensors

Appendix C describes the Gas Sniper's non-standard, electrochemical toxic gas sensors. This appendix also offers information for calibrating and replacing non-standard toxic gas sensors. Non-standard electro-chemical toxic gas sensors are toxic gas sensors other than CO or H_2S.

Specifications

Table 8 lists specifications for the non-standard toxic gas sensors. The alarm settings are user-adjustable (see " Updating the Alarm Point Settings" on page 28).

Table 8 Non-Standard Toxic Gas Sensors Specifications

Target Gas	Range	Alarm 1	Alarm 2	TWA Alarm	STEL Alarm
Ammonia	0 to 75.0 ppm	12.0 ppm	25.0 ppm	25.0 ppm	35.0 ppm
Arsine	0 to 1.00 ppm	0.05 ppm	0.10 ppm	0.05 ppm	OFF
Arsine	0 to 200 ppb **(1)**	50 ppb	100 ppb	50 ppb	OFF
Chlorine	0 to 3.00 ppm	0.50 ppm	1.50 ppm	0.50 ppm	1.00 ppm
Fluorine	0 to 5.00 ppm	0.50 ppm	1.00 ppm	1.00 ppm	2.00 ppm
Hydrogen chloride	0 to 15.0 ppm	2.0 ppm	5.0 ppm	OFF	OFF
Hydrogen fluoride	0 to 9.00 ppm	1.00 ppm	2.00 ppm	1.00 ppm	2.00 ppm
Nitric oxide	0 to 100 ppm	10 ppm	25 ppm	25 ppm	50 ppm
Nitrogen dioxide	0 to 15.0 ppm	1.0 ppm	3.0 ppm	3.0 ppm	5.0 ppm
Ozone	0 to 1.00 ppm	0.10 ppm	0.30 ppm	0.08 ppm	0.10 ppm
Phosphine	0 to 1.00 ppm	0.10 ppm	0.30 ppm	0.30 ppm	1.00 ppm
Silane	0 to 15.0 ppm	2.0 ppm	5.0 ppm	5.0 ppm	5.0 ppm
Sulfur dioxide	0 to 15.0 ppm	1.0 ppm	2.0 ppm	2.0 ppm	5.0 ppm

1 **(1)** ppb (parts per billion)

Description

Non-standard toxic gas sensors are mounted in the front half of the instrument case. These sensors each include a dedicated amplifier with ZERO and SPAN controls. A bracket secures the sensor/ amplifier assembly to the instrument case. A flow adapter connected to the sensor allows the sample to flow through the non-standard toxic gas sensor. A seven-position connector plugs into the **EC3** (channel 3) or **EC4** (channel 4) socket on the analog PCB.

CAUTION: *Gas Sniper's equipped with non-standard toxic gas sensors include a special inlet fitting that requires a Teflon sample hose. Using a standard sample hose for these applications may result in inaccurate gas readings.*

Calibrating Non-Standard Toxic Gas Sensors

Recommended calibration frequency for non-standard toxics sensors is 3 to 6 months. Use the Single Calibration method to calibrate non- standard toxic gas sensors as described in the Calibration section of this manual with the following exception.

1. At the Single Calibration screen, press the SHIFT/▼ button to scroll down to the appropriate gas, then press the **POWER/ENTER** button.
2. Screw the regulator to the appropriate calibration cylinder.
3. Connect the tubing from the regulator to the Gas Sniper's probe. Allow 2 minutes for the reading to stabilize.
4. If necessary, use the AIR/▲ (increase) and SHIFT/▼ (decrease) buttons to adjust the reading to match the concentration listed on the calibration cylinder.

   Go to the next section, "Adjusting the sensor potentiometers," if you are unable to match the reading to the concentration of the cylinder.

1. Press the **POWER/ENTER** button to set the span value. **SINGLE CALIBRATION END** displays, then the Single Calibration menu displays.
2. Disconnect the tubing from the probe.
3. Unscrew the regulator from the calibration cylinder.
4. With the Single Calibration menu displayed, press the SHIFT/▼ button until the prompt is next to the last channel, then press the SHIFT/▼ button again. The **ESCAPE** message displays.
5. Press the **POWER/ENTER** button to return to the Calibration menu.
6. Press the SHIFT/▼ button to place the prompt next to the **NORMAL OPERATION** menu option, then press the **POWER/ ENTER** button to return to the normal screen.

Adjusting the sensor controls

CAUTION: *Only perform the following steps if you are unable to set the correct calibration reading with the AIR/▲ and SHIFT/▼ buttons.*

1. Use the AIR/▲ and SHIFT/▼ buttons to set the reading to the middle of the range in which you can currently adjust the reading. For example, if you can set the reading from a minimum of 1.0 ppm to a maximum of 3.0 ppm, set the display to 2.0 ppm.
2. Unscrew the two large screws on the top of the case, then carefully lift the top of the case and lay it aside.
3. Locate the sensor in the front half of the bottom case. The sensor with wires connected to **EC3** on the analog PCB displays its reading on the third line of the

screen. The sensor connected to **EC4** on the analog PCB displays its reading on the fourth line of the screen.

4. Adjust the sensor's **SPAN** control one turn and observe the display reading. Continue to adjust the **SPAN** control until the display reading matches the concentration of the calibration cylinder.

The SPAN control is located next to the sensor on the side closest to the front of the instrument.

1. Press the **POWER/ENTER** button to set the span value. **SINGLE CALIBRATION END** displays, then the Single Calibration menu displays.
2. Place the top of the case in its original position, then secure it with the large screws you loosened in step 2.
3. Disconnect the tubing from the probe, then unscrew the regulator from the calibration cylinder.
4. With the Single Calibration menu displayed, press the SHIFT/▼ button until the prompt is next to the last channel, then press the SHIFT/▼ button again. The **ESCAPE** message displays.
5. Press the **POWER/ENTER** button to return to the Calibration menu.
6. Press the SHIFT/▼ button to place the prompt next to the **NORMAL OPERATION** menu option, then press the **POWER/ ENTER** button to return to the normal screen.

NOTE: If a non-standard toxics channel displays **Zero Fail** after the Demand Zero procedure, adjust the ZERO control (next to SPAN) until the reading displays the smallest increment above 0.0. For example, 0.01 or 0.1. Repeat Demand Zero.

Replacing Non-Standard Toxic Gas Sensors

Replace the non-standard toxic gas sensor when:

- The toxic gas channel cannot be calibrated correctly.
- The toxic gas reading cannot be set to zero by the Demand Zero command or zero potentiometer.

NOTE: Matheson Tri-Gas, Inc., recommends that you return the Gas Sniper for replacement of the non-standard toxic gas sensor. The following procedure is provided to allow you to replace the sensor if necessary.

1. Take the Gas Sniper to a non-hazardous location, and turn the power off.
2. Unscrew the two large screws on the top of the case, then carefully lift the top of the case and lay it aside.

3. In the front half of the bottom case, locate the sensor you want to replace. The sensor with wires connected to **EC3** on the analog PCB displays its reading on the third line of the screen. The sensor connected to **EC4** on the analog PCB displays its reading on the fourth line of the screen.
4. Remove the two screws at the base of the bracket.
5. Lift the sensor assembly up enough to remove the flow adapter (two screws). The flow adapter is attached to the sensor.

CAUTION: Avoid pulling on sensor wires. Always unplug at the connector.

6. Disconnect the connector from the analog PCB. Note to which socket (**EC3** or **EC4**) the connector is connected.
7. Remove the sensor assembly from the instrument case.
8. Remove the two screws that secure the sensor assembly to the bracket.
9. Remove the two screws that secure the sensor to the amplifier, then remove the sensor from the amplifier. Retain the amplifier for use with the replacement sensor.
10. Install the replacement sensor in reverse order.

NOTE: Allow up to 4 hours after you replace a non-standard toxic gas sensor, or if charged batteries have not been installed for an extended period, for the channel to show a normal response, then calibrate the sensor.

Parts List

Table 9 lists part numbers for replacement parts and accessories of the Gas Sniper's non-standard toxic gas sensors.

Table 9 Parts List: Non-Standard Toxic Gas Sensors

Model Number	Product Description
SGS-NH3-75	Sensor Ammonia (NH3) 0-75 ppm
SGS-AsH3-1	Sensor Arsine (AsH3) 0-1 ppm
SGS-AsH3-2	Sensor Arsine (AsH3) 0-0.2 ppb
SGS-Br-1	Sensor Bromine (Br2) 0-1 ppm
SGS-CO-150	Sensor Carbon Monoxide (CO) 0-150 ppm
SGS-CO-500	Sensor Carbon Monoxide (CO) 0-500 ppm
SGS-CL2-3	Sensor Carbon Dioxide (CL2) 0-3 ppm
SGS-CLO2-1	Sensor Chlorine Dioxide (CLO2) 0-1 ppm
SGS-B2H6-03	Sensor Diborane (B2H6) 0-0.3 ppm
SGS-B2H6-30	Sensor Diborane (B2H6) 0-30 ppm
SGS-F2-5	Sensor Fluorine (F2) 0-5 ppm
SGS-N2H4-5	Sensor Hydrazine (N2H4) 0-5 ppm
SGS-HC-L/AR *	Sensor Hydrocarbons (HC) $^{+}$ 100% LEL
SGS-HBR-9	Sensor Hydrogen Bromide (HBr) 0-9 ppm
SGS-HCL-15/R **	Sensor Hydrogen Cloride (HCL)** 0-15 ppm
SGS-HCL-15	Sensor Hydrogen Cloride (HCL) 0-15 ppm
SGS-HCN-30	Sensor Hydrogen Cyanide (HCL) 0-30 ppm
SGS-HF-9	Sensor Hydrogen Fluoride (HCL) 0-9 ppm
SGS-H2S-1	Sensor Hydrogen Sulfide (H2S) 0-1 ppm
SGS-H2S-30	Sensor Hydrogen Sulfide (H2S) 0-30 ppm
SGS-H2S-100	Sensor Hydrogen Sulfide (H2S) 0-100 ppm
SGS-CH4-L/AR*	Sensor Methane (CH4) $^{+}$ 0-100% LEL
SGS-NO2-15	Sensor Nitrogen Dioxide (NO2) 0-15 ppm
SGS-NO-100	Sensor Nitric Oxide (NO) 0-100 ppm
SGS-O3-1	Sensor Ozone (O3) 0-1 ppm
SGS-PH3-1	Sensor Phosphine (PH3) 0-1 ppm
SGS-SiH4-15	Sensor Silane (SiH4) 0-15 ppm
SGS-SO2-10	Sensor Sulfer Dioxide (SO2) 0-10 ppm

NOTE: The Gas Sniper can be configured with up to "6" sensors; only a maximum of "2" toxic sensors may be used in the Gas Sniper with any configuration.

$^{+}$ = Flammable gas.

* "AR" denotes gas sensor has "autoranging" capability; the sensor automatically ranges from % LEL to % VOL in concentration.

** "R" indicates sensor also has capability to detect CL_2.

If a gas or detection range is not listed above for a specific gas detection application, please consult with a Customer Service Representative by calling 1.800.828.4313 to determine product availability.

Appendix D: Carbon Dioxide Sensors

Appendix D describes the Gas Sniper's non-standard, infrared carbon dioxide (CO_2) sensors. It also offers additional information for calibrating and replacing CO_2 sensors.

Specifications

Table 10 lists specifications for the carbon dioxide sensors. The alarm settings are user-adjustable (see " Updating the Alarm Point Settings" on page 28.)

Table 10 Carbon Dioxide Sensor Specifications

Range	Alarm 1	Alarm 2	TWA Alarm	STEL Alarm
0 - 5000 ppm	OFF	OFF	OFF	OFF
0 - 10,000 ppm	5000 ppm	OFF	5000 ppm	OFF
0 - 5.00% CO_2	0.50% CO_2	3.00% CO_2	0.50% CO_2	3.00% CO_2
0 - 20.0%	OFF	OFF	OFF	OFF
0 - 50.0%	OFF	OFF	OFF	OFF

Description

The Gas Sniper uses an infrared sensor to detect carbon dioxide. The carbon dioxide sensor includes a dedicated amplifier with ZERO and SPAN controls. A bracket secures the sensor/amplifier assembly to the instrument case. A four-position connector plugs into the **EC3** (channel 3) or **EC4** (channel 4) socket on the analog PCB.

A carbon dioxide scrubber is mounted to the exterior front of Gas Sniper that are factory-shipped with carbon dioxide sensors for the ranges

0 - 5,000 ppm, 0 - 10,000 ppm, and 0 - 5%.

Table 2: Gas Sniper with a range of 0 - 20% and 0 - 50% CO_2 do not include a scrubber since the normal background of CO_2 in air is negligible when compared to the full scale of these units.

This scrubber is for use when setting the carbon dioxide sensor's zero reading only. Replace the scrubber when it turns from white to a violet color.

CAUTION: Do not connect the probe to the scrubber during normal operation or when setting the span reading during calibration.

Normal Operation of Carbon Dioxide Sensors

Carbon dioxide is a background gas in fresh air. Table 11 indicates typical gas readings for each of the Gas Sniper's carbon dioxide sensors.

Table 11 Carbon Dioxide Fresh Air Readings

Range	Approximate Fresh Air Reading
0 - 5000 ppm	400 ppm
0 - 10,000 ppm	400 ppm
0 - 5.00%	0.04%
0 - 20.0 & 0 - 50.0%	0.0%

Demand Zero for Carbon Dioxide Sensors

When setting the zero reading, the carbon dioxide scrubber mounted to the front of the Gas Sniper allows you to eliminate carbon dioxide normally found in fresh air.

NOTE: When performing a demand zero with a 0 - 20% or 0 - 50% CO_2 unit, the use of a scrubber is not required.

1. Connect the carbon dioxide scrubber directly to the Gas Sniper's inlet fitting.
2. Wait one minute for the fresh air sample to flow through the carbon dioxide scrubber, then press the AIR/▲ button to set the zero reading.

   If the carbon dioxide sensor fails when you press the AIR/▲ button, use the zero control (marked **F. ZERO**) on the amplifier to adjust the reading to zero.

CAUTION: Do not adjust the coarse zero potentiometer (marked **C.ZERO**).

3. Remove the tubing from the carbon dioxide scrubber and probe.

Calibrating Carbon Dioxide Sensors

Recommended calibration frequency for carbon dioxide sensors is once every 3 months. Enter Calibration mode and calibrate carbon dioxide sensors as described in the Calibration section of this manual. Use the Auto Calibration method if a calibration cylinder is available that includes all target gases for your Gas Sniper. Use the Single Calibration method if you are using a carbon dioxide calibration cylinder.

NOTE: If you are using the Auto Calibration method, go the Calibration Values screen, verify that the carbon dioxide value matches the concentration of carbon dioxide in the four- gas calibration cylinder, then proceed with step At the Single Calibration screen, press the SHIFT/ button to scroll down to the carbon dioxide channel, then press the POWER/ENTER button.

1. Screw the regulator to the appropriate calibration cylinder.

2. Connect the tubing from the regulator to the Gas Sniper's probe. Allow 1 minute for the reading to stabilize.

3. If necessary, use the AIR/▲ (increase) and SHIFT/▼ (decrease) buttons to adjust the carbon dioxide reading to match the concentration listed on the calibration cylinder.

   Go to the next section, "Adjusting the sensor potentiometers," if you are unable to match the reading to the concentration of the calibration cylinder.

4. Press the **POWER/ENTER** button to set the span value. **SINGLE CALIBRATION END** displays, then the Single Calibration menu displays.

5. Disconnect the tubing from the probe, then unscrew the regulator from the cylinder.

6. With the Single Calibration menu displayed, press the SHIFT/▼ button until the prompt is next to the last channel, then press the SHIFT/▼ button again. The **ESCAPE** message displays.

7. Press the **POWER/ENTER** button to return to the Calibration menu.

8. Press the SHIFT/▼ button to place the prompt next to the **NORMAL OPERATION** menu option, then press the **POWER/ ENTER** button to return to the normal screen.

Adjusting the sensor controls

CAUTION: Only perform the following steps if you are unable to set the correct calibration reading with the AIR/▲ and SHIFT/▼ buttons.

1. Use the AIR/▲ and SHIFT/▼ buttons to set the reading to the middle of the range in which you can currently adjust the reading. For example, if you can set the reading from a minimum of 1.00% CO_2 to a maximum of 3.00% CO_2, set the display to 2.00% CO_2.

2. Unscrew the two large screws on the top of the case, then carefully lift the top of the case and lay it aside.

3. Locate the carbon dioxide sensor in the front half of the bottom case. A sensor with wires connected to **EC3** on the analog PCB displays its reading on the third line of the screen. A sensor connected to **EC4** on the analog PCB displays its reading on the fourth line of the screen.

4. Adjust the carbon dioxide sensor's **SPAN** control one turn and observe the display reading. Continue to adjust the **SPAN** control until the display reading matches the concentration of the calibration cylinder.

   The SPAN control is located on the top edge of the amplifier and is the control closest to the front of the instrument. (The front of the instrument has the scrubber attached to it.)

5. Press the **POWER/ENTER** button to set the span value. **SINGLE CALIBRATION END** displays, then the Single Calibration menu displays.
6. Place the top of the case in its original position, then secure it with the large screws you loosened in step 5.
7. Disconnect the tubing from the probe.
8. Unscrew the regulator from the calibration cylinder.
9. With the Single Calibration menu displayed, press the SHIFT/▼ button until the prompt is next to the last channel, then press the SHIFT/▼ button again. The **ESCAPE** message displays.
10. Press the **POWER/ENTER** button to return to the Calibration menu.
11. Press the SHIFT/▼ button to place the prompt next to the **NORMAL OPERATION** menu option, then press the **POWER/ENTER** button to return to the normal screen.

Replacing Carbon Dioxide Sensors

Return the Gas Sniper to Matheson Tri-Gas, Inc., for replacement of the carbon dioxide sensor when:

- The carbon dioxide channel cannot be calibrated correctly.
- The carbon dioxide reading cannot be set to zero by the Demand Zero command or zero potentiometer.

Parts List

Table 12 lists part numbers for replacement parts of the Gas Sniper's carbon dioxide confined space sensors.

Table 12 Parts List: Carbon Dioxide Sensors

Part Number	Description
SGS-CO2-5K	Sensor Carbon Dioxide (CO2) 0-5000 ppm
SGS-CO2-20V	Sensor Carbon Dioxide (CO2) 0-20% VOL
SGS-CO2-60V	Sensor Carbon Dioxide (CO2) 0-60% VOL

Appendix E: Infrared Methane Sensors

Appendix E describes the Gas Sniper's non-standard, infrared methane sensor. This appendix also offers additional information for calibrating and replacing the infrared methane sensor.

Target Gases

The infrared methane sensors are setup for and factory-calibrated to methane. This section lists other combustible gases known to respond and to not respond to the infrared methane sensor. Consult Matheson Tri-Gas, Inc., for combustible gases not listed below.

The following combustible gases are also known to respond to the infrared methane sensors.

- ethane
- hexane
- IPA
- isobutane
- MEK
- propane
- toluene

The following combustible gases are known to **not** respond or respond poorly to the infrared methane sensor.

- acetylene
- hydrogen
- styrene

Specifications

Table 13 lists specifications for the infrared methane sensor. The alarm settings are user-adjustable (see " Updating the Alarm Point Settings" on page 28.)

Table 13 Infrared Methane Sensor Specifications

Range	Alarm 1	Alarm 2	TWA Alarm	STEL Alarm
0 to 100% LEL CH4	10% LEL	50% LEL	N/A	N/A
PPM **(1)**	5000 ppm	25,000 ppm	N/A	N/A
0 to100% Volume CH_4	10% VOL	20% VOL	N/A	N/A
(1) The PPM range for CH4 is 0 to 50,000 ppm.				

Description

The infrared methane sensor is mounted in the front half of the instrument case. The sensor is attached and wired to a dedicated amplifier, which includes ZERO and SPAN controls. A bracket secures the sensor/amplifier assembly to the instrument case.

Gas Sniper's with an infrared methane sensor that has a 0 to 100% LEL range do not include the standard catalytic combustible gas sensor. In these models, the infrared

methane sensor is wired to the **EC4** socket on the analog PCB and the gas reading is displayed in channel

This sensor is also capable of measuring in the PPM range.

Gas Sniper's with an infrared methane sensor that has a 0 to 100% Volume CH_4 range may also include the standard combustible gas sensor. Table 14 lists the sensor configuration for Gas Sniper's that include this sensor. Not all channels may be active in your Gas Sniper.

Table 14 Sensor Configuration for Infrared Methane Sensors (0 to 100% Volume)

Channel	Sensor	Analog PCB Socket
1	Standard combustible gas (0 to 100% LEL)	COMB
2	Infrared methane (0 to 100% Vol. CH_4)	EC4
3	Oxygen	CN2
4	Toxic gas or infrared carbon dioxide	EC1, EC2, or EC3

Calibrating Infrared Methane Sensors

Recommended calibration frequency for the infrared methane sensor is once every 3 months. Enter Calibration mode and calibrate the infrared methane sensor using the same procedure as the standard combustible gas sensor (see ""on page 37).

NOTE: The 0 to 100% Volume CH_4 version of the infrared methane sensor requires the use of a sample bag due to the type of calibration cylinder used.

Adjusting the sensor controls

CAUTION: Only perform the following steps if you are unable to set the correct calibration reading with the AIR/▲ and SHIFT/▼ buttons.

1. Use the AIR/▲ and SHIFT/▼ buttons to set the reading to the middle of the range in which you can currently adjust the reading. For example, if you can set the reading from a minimum of 10% LEL to a maximum of 40% LEL, set the display to 25% LEL.
2. Unscrew the two large screws on the top of the case, then carefully lift the top of the case and lay it aside.
3. Locate the infrared methane sensor in the front half of the bottom case. It is connected to the **EC4** socket on the analog PCB.
4. Adjust the sensor's **SPAN** control one turn and observe the display reading. Continue to adjust the **SPAN** control until the display reading matches the concentration of the calibration cylinder.

The SPAN control is on the top edge of the amplifier and is the control closest to the front of the instrument.

5. Place the top of the case in its original position, then secure it with the large screws you loosened in step 5.

6. Continue with the normal calibration procedure.

Replacing Infrared Methane Sensors

Return the Gas Sniper to Matheson Tri-Gas, Inc., for replacement of the infrared methane sensor when:

- The infrared methane channel cannot be calibrated correctly.
- The infrared methane reading cannot be set to zero by the Demand Zero command.

Parts List

Table 15 lists part numbers for replacement parts and accessories of the Gas Sniper's infrared 100% volume methane sensor.

Table 15 Parts List: Infrared Methane Sensor

Product Number	Description
SGS-CH4-L/AR *	Sensor Methane (CH4)* 0-100% LEL

* "AR" denotes gas sensor has "autoranging capability; the sensor automatically ranges from % LEL to % VOL in concentration.

Appendix F: Gas Sniper Tank Tester Model

The Gas Sniper Tank Tester model is intended for checking tanks or vessels that may contain residual hydrocarbon vapors or water or may have been purged of oxygen. You can also use this model as a standard Gas Sniper gas monitor by connecting the standard hose and probe and updating the oxygen alarms to the default settings.

Description

The tank tester model has an additional socket on the front on the housing to accommodate connection of the float probe assembly. This model includes the following non-standard components.

Float probe assembly

The float probe assembly helps prevent liquid from being drawn into the Gas Sniper. The float probe assembly is 12-feet long. A quick disconnect fitting at one end of the assembly connects to the Gas Sniper's inlet fitting. The same end of the probe also includes a short wire that terminates in a jack. This jack connects to the float probe socket that is adjacent to the Gas Sniper's inlet fitting. The float probe switch at the opposite end of the 12-foot cable shuts off the pump if the probe begins to be submerged into a liquid.

To use the float probe assembly:

CAUTION: Drawing water, gasoline, or other liquids into the Gas Sniper will cause damage.

1. Attach the quick disconnect fitting to the Gas Sniper's standard inlet fitting.
2. Attach the jack to the socket that is adjacent to the inlet fitting.
3. Lower the probe into the tank or vessel. Lower the probe *very slowly* to allow the float switch to activate if necessary.

Dilution fitting (1:1)

CAUTION: When measuring oxygen readings, remove the dilution fitting or use your finger to seal the small dilution hole on the side of the dilution fitting.

The standard combustible gas sensor requires oxygen to operate. In environments where there is not enough oxygen to operate the combustible gas sensor, (for example a tank purged with an inerting gas), the 1:1 dilution fitting adds sufficient oxygen by blending ambient air with the incoming sample.

The standard dilution fitting dilutes at a ratio of 1:1 (one part air to one part sample).

To attach the dilution fitting:

1. Attach the dilution fitting's quick disconnect fitting to the Gas Sniper's inlet fitting.
2. Attach the hose to the opposite end of the dilution fitting.

NOTE: When using the dilution fitting, multiply the combustible gas reading (LEL or PPM) by 2 to determine the actual combustible gas concentration. Always remove the dilution fitting or seal the dilution hole to measure for oxygen.

Alarms

The Gas Sniper Tank Tester model has two alarms for oxygen. They are factory-set at 5.0% by volume (increasing) and 19.5% by volume (decreasing).
The *increasing* alarm is used to monitor a purged vessel to alert you to a rising oxygen condition. The *decreasing* alarm is generally used for confined space entry to warn you of dangerously low breathing levels.
Any oxygen level is either above or below one of these alarm levels, so the Gas Sniper Tank Tester version *will* go into alarm when first turned on. To silence the alarm, press the RESET button. The audible alarm silences, but the alarm lights continue to flash and the display screen continues to indicate an oxygen alarm. If one of the alarm levels is newly exceeded, the audible alarm sounds again.

To eliminate an oxygen alarm that is not being used:

Either the increasing or decreasing oxygen alarm can be turned off in Setup mode (see " Updating the Alarm Point Settings" on page 28.) Turning off the alarm clears the alarm lights and display of an unnecessary alarm.

Calibration

Use a hexane calibrating source to calibrate the combustible gas LEL range. Use a 100% nitrogen calibrating source to set the zero reading for the oxygen channel. Matheson Tri-Gas, Inc., recommends using the Single Calibration method to calibrate the Gas Sniper Tank Tester model. See "" on page 37.

Parts List

Table 16 lists part numbers for replacement parts and accessories of the Gas Sniper's Tank Tester model.

Table 16 Parts List: Gas Sniper Tank Tester Model

Part Number	Description
*	Dilution fitting (1:1)
*	Float probe (12-foot)

*** For Parts and Accessories to facilitate operation of the tank tester model, please consult Matheson Tri-Gas Customer Service Representative by calling 1.800.828.4313 for assistance.**

Appendix G: Five-Gas and Six-Gas Models

Overview

The standard Gas Sniper gas monitor includes one to four channels and displays gas readings for all channels simultaneously. Some Gas Sniper models include five or six channels; however, the Gas Sniper is only capable of displaying gas readings for four of the channels at any one time.

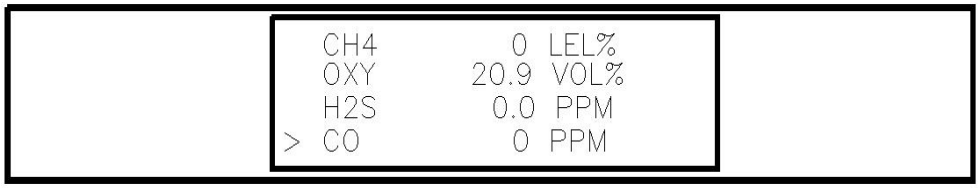
Five- and six-gas Gas Sniper models include up to four sensors in the standard sensor block. The additional sensor(s) are mounted in the front half of the instrument case and are wired to sockets **EC3** (channel 5) and **EC4** (channel 6) on the analog PCB.

NOTE: The data logging accessory is not available for the Gas Sniper's five- and six-gas models. This is also true for five- and six-gas models with four or less *active* channels.

Displaying Additional Channels

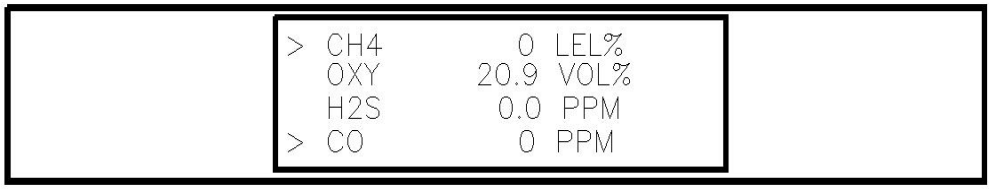
The normal screen displays a cursor (**>**) at the far left to indicate that additional channels can be displayed.

- A cursor to the left of the *last* channel displayed indicates that additional channels are available *after* the currently displayed channels. Press the SHIFT/▼ button to display the remaining channels.



- A cursor to the left of the *first* channel displayed indicates that additional channels are available *before* the currently displayed channels. Press the AIR/▲ button to display the remaining channels.

- Cursors to the left of the *first and last* channels displayed indicate that additional channels are available *before and after* the currently displayed channels. Press the AIR/▲ and SHIFT/▼ buttons to display the remaining channels.



Alarms

If the Gas Sniper recognizes an alarm condition for a non-displayed channel, the cursor flashes and the standard audible and visual alarms initiate.

- If the alarm occurs for a channel before the top displayed channel, the cursor in the first line flashes. Press the AIR/▲ button to display the channel in alarm.
- If the alarm occurs for a channel after the bottom displayed channel, the cursor in the last line flashes. Press the SHIFT/▼ button to display the channel in alarm.

Calibration, Display, and Setup Modes

For screens in these modes that display all active channels, a cursor displays:

- In the top line if channels are available before the top line. Press the AIR/▲ button to display the additional channel(s).
- In the bottom line if channels are available after the bottom line. Press the SHIFT/▼ button to display the additional channel(s).
- In the top and bottom lines if channels are available before the top line *and* after the bottom line. Press the AIR/▲ and SHIFT/▼ buttons to display the additional channels.

Appendix H:
Gas Sniper Transformer Gas Tester Model

This Gas Sniper Transformer Gas Tester Model is specially set up for electrical transformer gas testing. Large electrical transformers are filled with oil which surrounds

the transformer coils, and they have an inert gas head space above the oil. When a transformer begins to fail, electrical arcing between the conductors of the coils can cause flammable gases to form in the head space. By testing the head space for these gases, and recording trends of the readings, an early warning of transformer failure can be determined, and the transformer can be removed from service before it explodes.

Description

This combustible sensor, which is a catalytic combustion type, is calibrated to and the instrument is setup for hydrogen with a range of 0 - 5.00% volume. Since the headspace being tested is filled with nitrogen, there is not oxygen in the test sample. The catalytic sensor requires oxygen in order to operate, so the instrument is supplied with a snap-on dilution fitting with a dilution ratio of 1:1 (one part air to one part sample). This fitting blends the sample with ambient air before entering the instrument, which provides sufficient oxygen for the sensor to work. The instrument is also supplied with a sample bag.

Operation

1. Turn instrument on and allow it to warm up.
2. Attach the dilution fitting directly to the front of the instrument, and the plastic probe to the dilution fitting.
3. Press the “AIR” button in fresh air to zero the instrument.
4. Connect the deflated sample bag to the sample valve on the transformer, and open the valve slightly to fill the sample bag. Close off the sample bag and remove it from the transformer valve.
5. Attach the sample bag to the Gas Sniper probe, and open the sample bag. The sample will now be drawn into the instrument. After about 45 seconds note and record the display reading. Compare this reading to historical data to determine the condition of the transformer.

NOTE: The Gas Sniper can be calibrated either with or without the dilution fitting in place. If calibrated without the dilution fitting in place, then display readings must be doubled to determine the actual gas concentration. If calibrated with the dilution fitting in place, then the sample bag must be used during calibration, and the display readings will be the actual gas concentrations.

CAUTION: *If the dilution fitting is in place for calibration, do not use a demand flow regulator. Use a sample bag. The use of a demand flow regulator with a dilution fitting when calibrating will result in an inaccurate calibration.*

Alarms

All the gas alarms on the Transformer Gas Tester are set to OFF.

Table 17 Parts List: Gas Sniper Tank Tester Model

Part Number	Description
*	Dilution fitting (1:1)
*	Sample bag, 9” x 9”, tedlar

*** For Parts and Accessories to facilitate operation of the tank tester model, please consult Matheson Tri-Gas Customer Service Representative by calling 1.800.828.4313 for assistance.**

Appendix I: Installing the Data Logger Board

Appendix H describes the procedure to install the Gas Sniper’s data logger board. The data logging feature is an *optional* accessory.

NOTE: Although the data logger board may be installed in the field, Matheson Tri-Gas, Inc., recommends that you return the Gas Sniper to the factory for data logger board installation.

1. Take the Gas Sniper to a non-hazardous location, and turn the power off.
2. Unscrew the two large screws on the top of the case., then carefully lift the top of the case and lay it aside.
3. Unplug the ribbon cable from the main circuit board in the top case.
4. Remove the two screws, flat washers, and lock washers that hold the main circuit board in the top case.
5. Slowly pull the main circuit board from the top case far enough to allow room to install the Data Logger board. Avoid pulling so far that you disconnect any of the four cables on the main circuit board.
6. Plug the Data Logger board into the main circuit board at **CN1A**, **CN1B**, **CN1C**, and **CN1D.**
7. Reassemble the main circuit board to the top case with the screws and lock washers removed in step 4.
8. Plug in the ribbon cable.
9. Reassemble and secure the top case to the bottom case.
10. Start the Gas Sniper and program the Data Logger functions as described in “” on page 19.