

SF-ExplorIR™
Sulfuryl Fluoride Safe Entry Monitor

Instruction SI-3015-4403

Operation & Maintenance

Version 1.14 August 2005



Spectros Instruments, Inc.

4 Evergreen Lane, #12A

Hopedale, MA 01747

Tel: 508-478-1648 • Fax: 508-590-0262

Website: www.SpectrosInstruments.com

Notice:

Product improvements and enhancements are continuous; therefore the specifications and information contained in this document may change without notice.

Copyright © 2005, all rights reserved

Vikane[®] is a registered trademark of Dow AgroSciences LLC

Profume[®] is a registered trademark of Dow AgroSciences LLC

Zythor[®] is a registered trademark of Ensystem, Corp.

WARNING

Read Before Operating

- This unit is for determining worker safe entry only—not to be used for fumigation monitoring, or confined space entry
- Read manual before use
- Warm up unit for at least 15 minutes prior to use
- Evacuate area above 5 ppm
- Recharge battery after LOW BAT warning beep
- Unit automatically zeros itself every 4.5 minutes
- Operator is responsible for supplying clean air when refilling purge-air bag
- 30-plus minutes of operating time after purge-air bag is refilled

QUICK START INSTRUCTIONS (Read Operating Manual Before Use)

1. Turn ON unit by pressing red button in front of handle.
2. Wait for warm-up period to elapse (15 minutes – 900 second countdown).
3. When "PURGE AIR EMPTY" appears on display, first ensure unit is in a clean-air area, and then press the **ENTER** key to fill purge-air bag with clean air.
NOTE: To keep the unit warmed-up for long periods of time without using the air stored in the purge-air bag, place the unit into its 'STANDBY' mode by pressing the **ENTER** and **ESC** keys at the same time. Exit the 'STANDBY' mode the same way.
4. Begin taking measurements.
5. After approximately 30-plus minutes of operation the purge-air bag will become empty, causing the message "PURGE AIR EMPTY" to appear. Take the unit to a clean-air area and press the **ENTER** key to refill the purge-air bag, and then resume measuring.

FUNCTION KEYS:

To Access Control / Setup Menus:
Press **LEFT** and **RIGHT** arrow keys at the same time.

To Silence Audible Alarm:
Press **SILENCE** key. If alarm conditions still exists after 5 minutes, the audible alarm will reactivate.

CAUTION:

When shipping the instrument by air, deflate the purge-air bag to prevent it from bursting due to changes in air pressure. Deflate the bag by first accessing the Control / Setup Menus as described above, and then selecting the EMTYBAG function.

3015-4566

Notice Regarding Sulfuryl Difluoride (Sulfuryl Fluoride, SF, Vikane™, Profume™, Zythor™)

Sulfuryl Difluoride is an odorless gas that has no warning properties. There is a danger of serious damage to health by prolonged exposure through inhalation.

The **SF-ExplorIR™ Monitor** provides accurate, real-time sulfuryl difluoride concentration measurements. Only qualified and trained operators are, with proper use of the **SF-ExplorIR™ Monitor**, able to re-enter and provide final clearance of fumigated spaces.

Proper use of the **SF-ExplorIR Monitor** and certified training is always required.

Aeration and Re-entry

Fumigators who are re-entering fumigation and risk areas to check for sulfuryl difluoride gas concentrations must wear SCBA (Self Contained Breathing Apparatus) for respiratory protection until the concentration within the structure has been confirmed to be 3 ppm or less.

Table of Contents

INTRODUCTION	1
How to Use This Manual.....	1
Warning Statements.....	1
Caution Statements.....	1
Hazard Symbols on Monitor.....	1
Safety Precautions.....	2
Explosive Atmosphere.....	2
Misuse and Modifications to Monitor.....	2
Altitude Limit.....	2
Cleaning.....	2
Specifications.....	3
OPERATION	4
Front Panel Display and Controls.....	4
Inspection.....	4
General Operation.....	4
Battery – Testing and Charging.....	5
Testing the Battery.....	5
Charging the Battery.....	5
Display Screens.....	7
Initial Power Up.....	7
Filling the Purge-Air Bag.....	7
Data Display Screen.....	7
Function Screens.....	8
Standby Mode.....	10
Working with the Gas Alarm.....	10
Gas-Alarm Light.....	10
Silencing a Gas Alarm.....	10
Working with System Faults.....	10
Functional Overview.....	10
Viewing the Faults Log.....	11
Fault Codes.....	12
Clearing the PPM Log & Faults Log.....	13
Working with the DIAG Function.....	13
Overview.....	13
Keypad Functions.....	13
First Diagnostic Screen.....	13
Second Diagnostic Screen.....	14
Working with the P-CHK Function.....	14
Overview.....	14
Keypad Functions.....	14
Screen Display.....	14
Return Authorization.....	15
Routine Maintenance.....	15
Calibration Verification.....	15
Warranty.....	15
Part Numbers.....	16

Notes:

Introduction

How to Use This Manual

This manual provides important information on how to operate the **SF-ExplorIR™ Monitor**.

To assure operator safety and the proper use of the monitor, please read, understand, and follow the contents of this manual.

If you have a working knowledge of gas monitors, you will find this manual useful as a reference tool. If you are new to the use of gas monitors, you can educate yourself about the principles of gas detection and the proper operation of this device by reading this manual thoroughly.

Warning Statements

The use of the word **WARNING** in this manual denotes a potential hazard associated with the use of this equipment. It calls attention to a procedure, practice, or condition, or the like, which if not correctly performed or adhered to, could result in personal injury or death.

Caution Statements

The use of the word **CAUTION** in this manual denotes a potential hazard associated with the use of this equipment. It calls attention to a procedure, practice, condition, or the like, which if not correctly performed or adhered to, could result in damage to the equipment.

Hazard Symbols on Monitor



This symbol indicates the need to consult this operating instruction manual when opening the enclosure.

WARNING: A potential risk exists if the operating instructions are not followed.



This symbol indicates the presence of electric shock hazards when the enclosure is opened.

WARNING: To avoid risk of injury from electric shock, do not open the enclosure when power is applied.

Safety Precautions

Explosive Atmosphere

Do not operate this equipment in the presence of flammable liquids, vapors or aerosols. Operation of any electrical equipment in such an environment constitutes a safety hazard.

Misuse and Modifications to Monitor

The protection provided by the monitor may be impaired if the monitor is used in a manner not specified by these instructions. Changes or modifications to this monitor will void the warranty.

Altitude Limit

6,562 ft (2,000 m)

Cleaning

To clean the outside of the case, **DO NOT** use soap and water. **USE** a dry cloth

Shipping Precaution

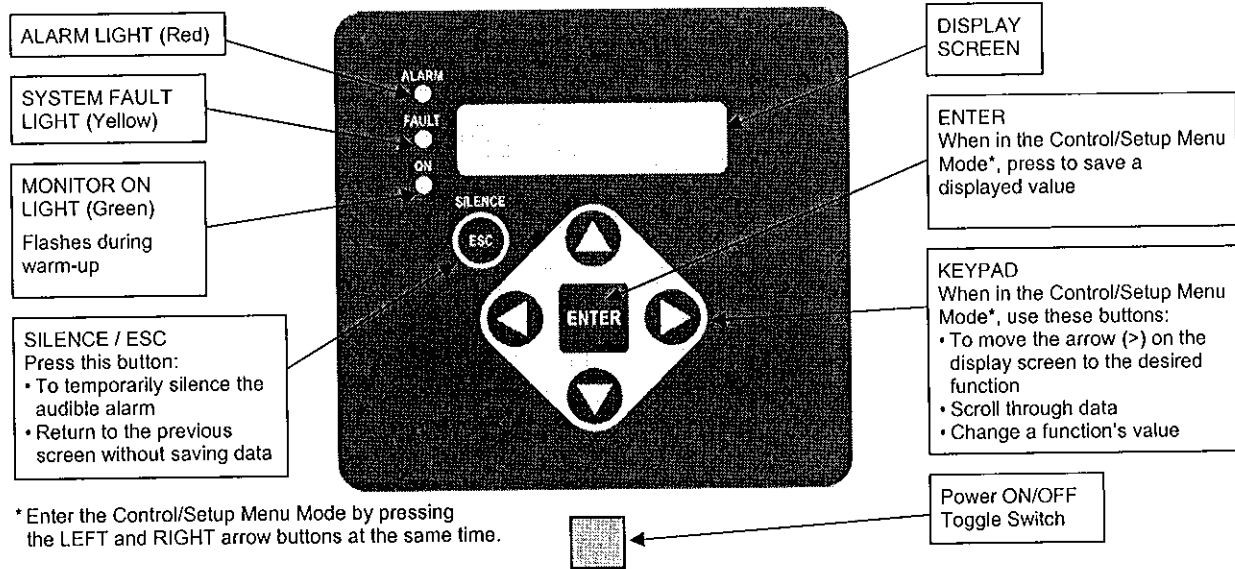
When shipping the instrument by air, deflate the purge-air bag to prevent it from bursting due to changes in air pressure. Deflate the bag by selecting the **EMPTYBAG** function as described on Page 8.

Specifications

Product Type	Portable sulfuryl fluoride (SO ₂ F ₂) (Vikane™) (Profume™) (Zythor™) gas monitor
Measuring Range	0 to 100 ppm
Warm-Up Time	15 minutes
Operating Time	30 plus minutes before the purge-air bag needs refilling
Detector Type	Infrared, Non-Dispersive
Sensitivity	1 ppm (minimum)
Accuracy	±1 ppm (0 to 10 ppm range)
Response Time	90% of response within 5 seconds; 100% in 7 seconds
Temperature Drift	1.5 ppm per °C between purge cycles
System Noise.....	Less than 40dB(A) at 10 ft (3 m)
Operating Temp	32 to 122°F (0 to 50°C)
Ambient Humidity.....	5 to 90% RH (non-condensing)
Altitude Limit	6,562 ft (2,000 m)
Power	DC power pack, provides at least 8 hours of operation
Power Consumption.....	15 Watts
Front Panel	3 Indicator lights: ON – Green light flashes during warm-up, and then glows steady during normal operation FAULT – Yellow light flashes when there is a system fault ALARM – Red light flashes when the detected gas level reaches the alarm level (alarm level factory set at 5 ppm)
Audible Alarm.....	Internal audible alarm activated when a gas-alarm (5 ppm) occurs
Dimensions.....	8D x 19L x 5W inches (203 x 483 x 127 mm)
Weight	Less than 9 lbs (4 kg) including battery
Valid Calibration Period to Specifications	6 months
Warranty	1 Year from date of shipment

Operation

Front Panel Display and Controls



Inspection

The **SF-ExplorIR™** unit has been thoroughly inspected and tested prior to shipment from the factory. Nevertheless, it is recommended that the monitor be re-checked prior to use. Inspect the outside of the enclosure to make sure there are no obvious signs of shipping damage. If damage is discovered, please contact your supplier for assistance.

General Operation

WARNING: Operate the monitor in its horizontal position (handle facing upwards). Tilting the monitor to a vertical position while in operation may cause inaccurate measurements to occur.

To turn ON the monitor, first lift up the shield located in front of the handle, and then press the red power ON/OFF toggle switch.

Once the monitor has been turned ON, allow it to warm up for 15 minutes; after which, press the ENTER button to fill the purge-air bag with **clean, fresh air that is of the same temperature and humidity as the area being checked for gas. DO NOT fill the purge-air bag in an area that is contaminated with sulfuryl fluoride gas.**

After the purge-air bag has been filled, the monitor will automatically start making measurements in the area being sampled. The results of those measurements are displayed on the front panel display.

MEASURE 2ppm SF Gas	MEASURE indicates when the monitor is actively measuring gas. The screen to the left shows that currently 2 ppm of sulfuryl fluoride gas is being detected. The measurement cycle runs for 4 minutes. A log of up to 200 previous measurements can be viewed using the PPM LOG function (Page 8).
-------------------------------	---

PURGE 2ppm SF Gas	PURGE indicates when the monitor is resetting its infrared detector to a baseline of 0 ppm using the air stored in the internal purge-air bag. The purge cycle runs for 10 seconds.
-----------------------------	--

PURGE AIR EMPTY
<ENTER> TO FILL

The monitor will operate approximately 30 plus minutes before the purge-air bag needs refilling. When the message "PURGE AIR EMPTY" appears, take the monitor to a **clean, fresh-air environment** and then press the **ENTER** button to refill the bag.

If the detected gas level exceeds the preset gas-alarm point of 5 ppm, the unit will respond by turning ON the front panel **ALARM** (red) light and activating the internal audible alarm. Pressing the front panel **SILENCE** button turns OFF the audible alarm, but the **ALARM** light will continue to flash as long as the detected gas level is above the alarm point. The audible alarm will reactivate if the gas-alarm condition is not cleared within the time period set by the **SILENCE** function (Page 9).

If a system fault occurs (see Fault Code list on Page 12), the monitor responds by turning ON the front panel **FAULT** (yellow) light. The **FAULT** light will automatically turn OFF after the cause of the fault has been eliminated.

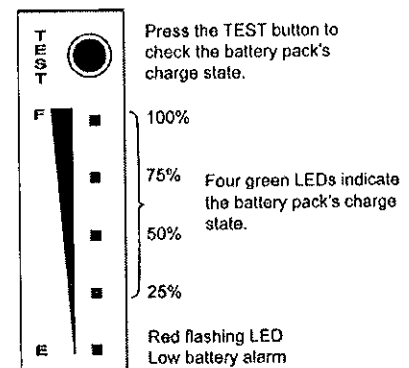
A log of the last 30 fault events can be viewed using the monitor's **FAULTS** function (Page 9).

Battery – Testing and Charging

Testing the Battery

The monitor is powered by a rechargeable battery pack whose charge state can be checked by pressing its **TEST** button and observing the number of LEDs that light. A fully charged battery pack will power the monitor **FOR AT LEAST 8 hours**.

A red flashing LED indicates that the battery pack needs to be charged.



Charging the Battery

The battery pack can be recharged at any time, regardless of the battery's current charge state.

Plug the charger's AC line cord into any convenient 100–240 VAC, 50/60 Hz outlet.

Plug the charger's output connector into the charge jack of the battery pack. Observe the following:

- The charger's power indicator lights red while the battery pack is being charged.
- The charger's power indicator lights green when charging is complete.
- Charging time is approximately 2.5 hours for a fully discharged battery pack.

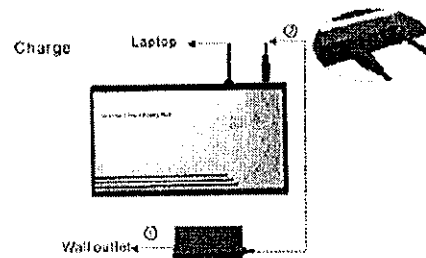
The factory has set the correct polarity of the tip connection (+). Operation of the unit with another tip will RESULT IN SEVERE DAMAGE TO THE UNIT! Monitor warranty is voided with use of non-factory battery.

Proper Battery Use

1. **Charge the Battery:** You can charge it from any 110V or 220V AC power source with the included AC charger. (Customer can also minimize battery drain with optional Car Charge Kit.

To charge the battery:

- a. Connect the power cord of the AC charger to an 110V or 220V AC power outlet. (Or connect to 12V car cigarette lighter in a vehicle with the optional Car Charge Kit.)



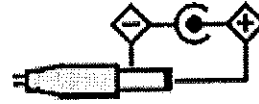
b. Connect the DC-out plug of the AC charger to the charger jack of the battery pack.

2. **Set DC Output Voltage:** This battery has a switch to set the voltage output at 16V. Do not operate at the 19V setting. Operation at the 19V setting **WILL VOID WARRANTY AND WILL RESULT IN SEVERE DAMAGE TO THE MONITOR.**

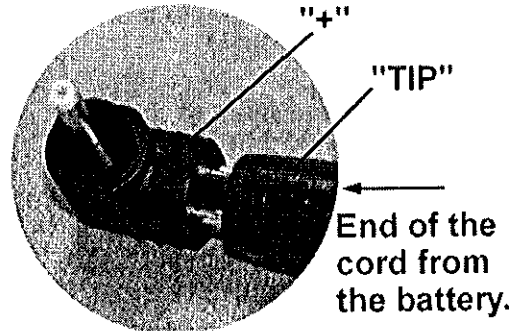
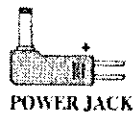
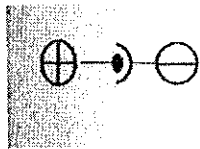


3. **Polarity:** The factory has determined and set the correct polarity needed. The correct tip—Blue tip (+)—is supplied and installed. Use of another connector **WILL VOID WARRANTY AND RESULT IN SEVERE DAMAGE TO THE MONITOR!**

There is a small plus (+) and minus (-) sign on the plastic part of the plug tip above the two pins where you plug the tip into the cord. On the battery's cord where you connect the plug tip - you should notice the word "TIP".



The polarity setting is Positive as below:



4. Battery Tips

- A new battery may require three to four charge/discharge cycles before achieving maximum capacity.
- When charging the battery for the first time the device may indicate that charging is complete after just 10 or 15 minutes. This is a normal phenomenon with rechargeable batteries. Remove the battery charger, reinsert it and repeat the charging procedure.
- It is normal for a battery to become warm to the touch during charging and discharging.
- A charged battery will eventually lose its charge if unused. It may therefore be necessary to recharge the battery after a storage period.
- Do not short-circuit. A short-circuit may cause severe damage to the battery.
- Do not drop, hit or otherwise abuse the battery as this may result in the exposure of the cell contents, which are corrosive.
- Do not expose the battery to moisture or rain.
- Keep battery away from fire or other sources of extreme heat. Do not incinerate. Exposure of battery to extreme heat may result in an explosion.
- Actual battery run-time depends upon the power demands made by the equipment.

5. Battery Warranty Information:

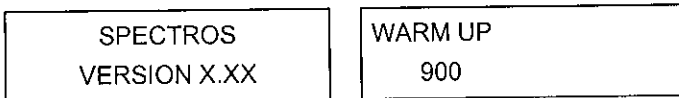
Six (6) month warranty against manufacturing and quality defects!

Proper care and use of the battery will assure a reasonable use time. Please contact Spectros Instruments, Inc. for any tech support and warranty issues.

Display Screens

Initial Power Up

When the monitor is first powered up, all front panel lights turn ON and a splash screen appears showing the monitor's current firmware revision level. After a brief moment the **Warm Up** screen is display along with the front panel ON light (green) blinking.

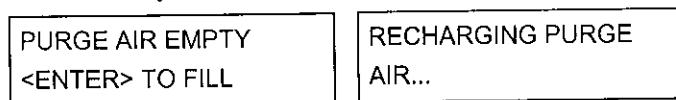


The monitor requires 900 seconds (15 minutes) to warm up (USER MAY VIEW LCD DISPLAY COUNT-DOWN FROM 900 SECONDS); after which, the ON light glows steady and the **Data Display** screen is displayed.

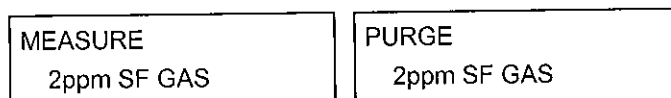
Filling the Purge-Air Bag

WARNING: Fill the purge-air bag in a clean, fresh-air environment that is at the same temperature and humidity as the area being check for gas. DO NOT fill the bag in an area that is contaminated with sulfuryl fluoride gas.

The following message is displayed when the monitor's purge air bag is empty and needs refilling. Press the **ENTER** button to start the refill process. After the air bag has been filled, the monitor will automatically resume normal operation.



Data Display Screen



During normal operation, the **Data Display** screen shows when the monitor is performing the following two functions:

MEASURE indicates that the monitor is actively measuring gas. In the screen shown above, 2 ppm of gas is currently being detected. The measurement cycle runs for 4 minutes.

PURGE is displayed when the monitor is resetting its infrared detector to a baseline of 0 ppm using the air stored in the internal purge-air bag. The purge cycle runs for 10 seconds. The monitor will operate for approximately 30 minutes before the purge-air bag needs refilling.

Function Screens

The Function screens are used to display stored data and to set up the monitor.

From the **Data Display** screen, press *both* **Keypad Left** and **Right** buttons to display the first **Function Menu** screen. Next, use the **Keypad** buttons to move the arrow (>) until it points to the desired function, and then press the **ENTER** button to select that function.

>FILLBAG EMTYBAG ALRMLVL AUDALRM	>PPM LOG LOG INT FAULTS DIAG	>SILENCE P-CHK GAS CLOCK
-------------------------------------	---------------------------------	-----------------------------

Once a function has been selected, use the **Keypad** to scroll through the displayed data or to change a parameter associated with that function. Press **ENTER** to save any newly entered parameters. Press the **ESC** button to return to the previous screen without saving.

Note that if no buttons are pressed within 90 seconds after selecting a function, the unit returns to the **Data Display** screen.

FILLBAG – Press **ENTER** to manually fill the purge-air bag. Normal fill time is less than 180 seconds. (3 minutes)

FILLING BAG...

WARNING: *Fill the purge-air bag in a clean, fresh-air environment that is at the same temperature and humidity as the area being check for gas. DO NOT fill the bag in an area that is contaminated with sulfuryl fluoride gas.*

EMTYBAG – Press **ENTER** to manually empty the purge-air bag. Use this function to drain the bag if it becomes contaminated with gas. **NOTE: THE BAG MUST BE COMPLETELY EMPTY PRIOR TO SHIPPING TO AVOID DAMAGE**

DRAINING BAG...

ALRMLVL – This is the detected gas level at which the unit goes into a gas-alarm state, as indicated by the front panel **ALARM** light turning ON. Factory set at 5 ppm.

ALARM LEVEL IS
5 ppm

AUDALRM – The monitor's internal audible alarm is factory set to activate at the gas-alarm level of 5 ppm. The audible alarm can be temporarily silenced by pressing the **SILENCE** button (Page 9).

AUDIBLE ALARM IS
ALARM

PPM LOG – Contains records of the last 200 measurements. Each record shows the measurement's date, time, and ppm level. Measurements are logged at an interval determined by the **LOG INT** function (Page 8).

#025 7PPM @
07/11/05 15:35

Use the **Keypad Up** and **Down** buttons to change the record number by a factor of 1. Use the **Right** and **Left** buttons to change the record number by a factor of 10. Press **ESC** to return to the previous screen.

To the right, record #025 shows that a gas level of 7 ppm was measured on 07/11/05 at 15:35.

The PPM Log can be cleared as described under the heading on Page 13.

LOG INT – Sets the interval at which measurements are logged to memory from 1 to 9999 minutes. Factory default is 1 minute. The logged measurements can be viewed using the **PPM LOG** function (Page 8). Use the **Keypad** to enter the desired value, and then press **ENTER** to save that value and return to the previous screen.

LOG INTERVAL IS
0001 min

FAULTS – Contains records of the last 30 fault events. The most recent event is displayed when the **Fault** screen is first displayed. After 30 events have been recorded, the newest record overwrites the oldest. Each record lists an event's numeric fault code (refer to *Working with System Faults* on Page 10) plus the date and time at which the event occurred. Use any of the **Keypad** buttons to scroll through the other fault events. Press **ESC** to return to the previous screen.

#15 <1000> @
07/11/05 12:37

To the right, record #15 shows that a Purge Flow Fault (fault code <1000>) occurred on 07/11/05 at 12:37.

DIAG – Enters the diagnostic function. Refer to the heading *Clearing the PPM Log & Faults Log*

4.2159v <0000>
29.05cD 14.58psi

Up to 200 gas measurements and 30 fault events are stored by the monitor.

To clear stored data, first display the data to be cleared by selecting the **PPM LOG** or **FAULTS** function (Pages 8 & 9). Next, press both the **ENTER** and **Keypad Right** buttons at the same time. A single, long tone should be heard when the data has been successfully cleared.

Working with the DIAG Function on Page 13.

SILENCE – Sets the length of time the internal audible alarm is turned OFF when the front panel **SILENCE** button is pressed. The factory default is 30 seconds. If the cause of the gas-alarm has not been cleared at the end of this time period, the internal audible alarm will reactivate. Use the **Keypad** to enter the desired time period, and then press **ENTER** to save that value and return to the previous screen.

SILENCE TIMEOUT
0030 sec

P-CHK – The **Pressure Check** function displays the current manifold pressure and the stored ambient pressure in psia, along with the difference between these two pressures and the current fault code. Refer to the heading *Working with the P-CHK Function* on Page 14.

14.07 * AMB14.05
-0.02dif <1000>

CLOCK – Sets the monitor's date and time. Use the **Keypad** to enter the correct date and time, and then press **ENTER** to save those values and return to the previous screen. Note that time is displayed in a 24 hour format, while the date is displayed as mm/dd/yy.

SET DATE & TIME
07/11/05 15:30

Standby Mode

After the monitor has been turned ON and allowed to warm up, the monitor can be placed into a Standby Mode, ready for operation without waiting an additional 15 minutes before using. While in standby, the monitor will stop taking gas samples and purging itself from the internal purge-air bag.

Place the monitor into its Standby Mode by pressing both the **ENTER** and **ESC** buttons at the same time.

STAND BY

Take the monitor out of standby by again pressing both the **ENTER** and **ESC** buttons.

When the monitor is taken out of standby, the operator must refill the purge-air bag by pressing the **ENTER** button. Refilling the bag after coming out of standby re-establishes the monitor's ambient pressure reading and ensures that the purge-air bag is filled at the start of taking gas measurements.

WARNING: *Fill the purge-air bag in a clean, fresh-air environment that is at the same temperature and humidity as the area being checked for gas. DO NOT fill the bag in an area that is contaminated with sulfuric fluoride gas.*

PURGE AIR EMPTY
<ENTER> TO FILL

RECHARGING PURGE
AIR...

As soon as the purge-air bag has been refilled with fresh air, the **Data Display** screen appears and the monitor resumes normal operation.

Working with the Gas Alarm

Gas-Alarm Light

If the detected gas level reaches the gas-alarm level of 5 ppm, the monitor will detect this alarm condition and turn ON the front panel **ALARM** light. The **ALARM** light will automatically turn OFF once the gas level drops below 5 ppm.

Silencing a Gas Alarm

The monitor's internal audible alarm will also activate when the gas level reaches the gas-alarm level. Pressing the **SILENCE** button while the alarm circuit is activated causes the internal audible alarm to turn OFF for a period of time as set by the **SILENCE** function (Page 9). The front panel **ALARM** light will continue to flash, however, as an indication that an alarm condition still exists. The audible alarm will reactivate at the end of the silence period if the detected gas level is still above the gas-alarm level.

Working with System Faults

Functional Overview

If a system malfunction occurs (see Fault Code list on Page 12), the monitor will detect the problem and turn ON the front panel **FAULT** light.

The **FAULT** light will automatically turn OFF after the cause of the fault has been eliminated.

Viewing the Faults Log

From the **Data Display** screen, press *both* **Keypad Left** and **Right** buttons to display the first **Function Menu** screen. Next, use the **Keypad** buttons to move the arrow (>) until it points to the **FAULTS** function, and then press the **ENTER** button to display the **Faults Log** screen.

```
#03 <0800> @  
07/11/05 08:17
```

```
#04 <0000> @  
07/11/05 09:00
```

```
FAULT CODE<1800>  
12 SAMPLE FLOW
```

```
FAULT CODE<1800>  
13 PURGE FLOW
```

The **Faults Log** screen shows the monitor's current fault status. If the fault is still present when the **FAULTS** function is selected, then the current cause of the fault is displayed along with the date and time it occurred. If the cause of the fault has been cleared, then the **Faults Log** screen will show <0000> along with the date and time the fault was cleared. Use the **Keypad** buttons to scroll through the faults log. In the screens shown to the left, record #03 shows that a Sample Flow Fault (fault code <0800>) occurred on 07/11/05 at 08:17, while record #04 shows that the fault was cleared on 07/11/05 at 9:00.

The cause of the fault is identified by a numeric fault code. To convert the fault code into a text description of the fault, first press the **ENTER** button and then use the **Keypad** buttons to scroll through the display until the text description of the fault appears. If the fault code is a combination of two or more faults, then continue to use the **Keypad** buttons until all fault text descriptions have been displayed. For example, the fault code <1800> represents the combination of both a Sample Flow <0800> and a Purge Flow <1000> fault as shown to the left.

The Faults Log can be cleared as described under the heading on Page 13.

FAULT CODES

FAULT CODES ARE ADDITIVE. For example: A fault code of <0003> indicates that both a Box Temperature Fault <0001> and a Bench Temperature Fault <0002> have occurred.

<0001> **Box Temperature Fault:** Enclosure temperature is outside normal range (or IR detector has failed). Check that the monitor is not being subjected to extreme temperatures. Use the **DIAG** function to check the Box Temperature.

<0002> **Bench Temperature Fault:** Optical bench is outside normal operating range (or IR detector has failed). Check that the monitor is not being subjected to extreme temperatures.

<0004> **Manifold Pressure Fault:** The manifold pressure is outside its normal operating range (or IR detector has failed). Enter the **DIAG** function and record ALL data. Call the factory with this information for further instructions.

<0040> **Fill Flow Fault:** The purge-air bag's pressure drop is outside expected limits. Check for a punctured bag or disconnected tubing.

<0080> **Over Range Fault:** Monitor exposed to a gas level that exceeded 65,000 ppm.

<0100> **Zero Filter Fault:** The air-purge bag is contaminated with gas. Take monitor to a clean-air area and use the **EMPTYBAG** and **FILLBAG** functions to decontaminate the air-purge bag.

<0200> **Gain Set Fault:** The digipot autotune sequence has failed. This fault will only occur on first boot up or after a firmware upgrade. Call the factory for further instructions.

<0400> **A/D Fault:** A fault has occurred in the analog-to-digital circuitry. Contact the factory with this information for further instructions.

<0800> **Sample Flow Fault:** Check for: A restriction in the gas-sample inlet or exhaust; a blocked internal filter; or a failed pump.

<1000> **Purge Flow Fault:** Check for: A restriction in the gas-sample exhaust; a blocked internal filter; or a failed pump. Once the purge air stream has been restored, the monitor will return to normal operation after it completes a purge cycle.

<2000> **Bag Fill Fault:** The purge-air bag did not fill within the expected time allotment. Check for a punctured bag or disconnected tubing.

<4000> **Zero Range Fault:** The IR detector's output voltage is out of tolerance. Enter the **DIAG** function and record ALL data. Call the factory with this information for further instructions.

<8000> **Clipping Fault:** The detector voltage may be out of tolerance. Use the **DIAG** function to check the IR detector voltage. Call the factory with this information for further instructions.

Clearing the PPM Log & Faults Log

Up to 200 gas measurements and 30 fault events are stored by the monitor.

To clear stored data, first display the data to be cleared by selecting the **PPM LOG** or **FAULTS** function (Pages 8 & 9). Next, press both the **ENTER** and **Keypad Right** buttons at the same time. A single, long tone should be heard when the data has been successfully cleared.

Working with the DIAG Function

Overview

The **DIAG** function displays sensor data and status information useful to a service technician for troubleshooting various fault conditions. Explanations of the data shown in these screens are given below.

Keypad Functions

From the **Data Display** screen, press *both* **Keypad Left** and **Right** buttons to display the first **Function Menu** screen. Next, use the **Keypad** buttons to move the arrow (>) until it points to the **DIAG** function, and then press **ENTER** to display the first of two **Diagnostic** screens.

Press the **Keypad Up** button to toggle between the **First** and **Second Diagnostic** screen.

First Diagnostic Screen

4.20885v <0000> 29.05cD 14.58psi	Bench Voltage Fault Code Detector Temperature °C * Pressure Reading
0.00075n <0000> 35.40cB 14.59psi	Noise Fault Code Box Temperature °C * Pressure Reading

In the **First Diagnostic** screen, the user can toggle between displaying Bench Voltage / Detector Temperature, and Noise / Box Temperature by pressing the **Keypad Right** button.

Bench Voltage – This is the current peak-to-peak output of the IR detector. In the absence of gas this value can range from 3.90000V to 4.50000V.

Noise – The Noise value is a 16 point running average of the noise portion of the IR detector's output. This reading is valuable mainly when gas is NOT present.

Detector Temperature – This is the current detector temperature in °C. Range is from 0 to 50 degrees Celsius.

Box Temperature – This is the current internal enclosure temperature in °C. Range is from 0 to 50 degrees Celsius.

Fault Code – Current fault code. A value of <0000> indicates that no faults are being detected.

Pressure Reading – This is the pressure as measured every purge cycle with the sample pump off and the gas-sample inlet open. Its value is weather and altitude dependent and can range from 10.0 to 15.5 PSIA.

Purge Valve Asterisk (*) – The purge valve can be opened and closed by pressing the **Keypad Left** button. An asterisk appears on the display when the purge valve is *open* causing the monitor to draw air from the purge-air bag.

Second Diagnostic Screen

0.1ppm 0.01	PPM Level	μMole/Liter
0.00004au 4.210v	Avg. Absorption Unit	* Purge Voltage

PPM Level – Parts Per Million Level is the current detected gas level, and is the volume concentration referenced to standard temperature and pressure.

Average Absorption Unit – This is the optical absorbency. In the absence of gas the absorbency is 0.00000 au. When sampling gas, its value varies proportionally with the gas concentration.

μMoles/Liter – This is the absolute concentration in micro-moles per liter of gas.

Detector Voltage – This is a running average of the IR detector's bench voltage.

Purge Valve Asterisk (*) – The purge valve can be opened and closed by pressing the **Keypad Left** button. An asterisk appears on the display when the purge valve is *open* causing the monitor to draw air from the purge-air bag.

Working with the P-CHK Function

Overview

The P-CHK function (Pressure Check Function) (Page 9) is useful to a service technician for troubleshooting a flow-fault problem. The monitor will trigger a flow fault if the pressure drop from ambient is less than 0.2 psi during a purge cycle, and 0.5 psi during a measurement cycle.

Keypad Functions

From the **Data Display** screen, press *both* **Keypad Left** and **Right** buttons to display the first **Function Menu** screen. Next, use the **Keypad** buttons to move the arrow (>) until it points to the **P-CHK** function, and then press **ENTER** to display the **Pressure** screen.

The **Keypad Left** button toggles the purge valve open and closed. Note that an asterisk (*) appears when the purge valve is *open* causing the monitor to draw air from the purge-air bag.

The **Keypad Down** button toggles the pump ON and OFF.

Pressing the **ENTER** button stores the current manifold pressure shown on the left to the ambient pressure shown on the right (must be done with the pump OFF).

Screen Display

14.59 AMB14.75	Current Manifold Pressure	* Stored Ambient Pressure
-0.16dif <0000>	Pressure Difference	Fault Code

Current Manifold Pressure – Current manifold pressure in psia.

Stored Ambient Pressure – Stored ambient pressure in psia.

Pressure Difference – The difference between the current manifold pressure and the stored ambient pressure.

Fault Code – Current fault code (Page 12).

Purge Valve Asterisk (*) – The purge valve can be opened and closed by pressing the **Keypad Left** button. An asterisk appears on the display when the purge valve is *open* causing the monitor to draw air from the purge-air bag.

Return Authorization

All returns for repair require a RETURN AUTHORIZATION NUMBER issued by Spectros Instruments Service Department upon request.

The user is advised to consult the “Working with System Faults” (P-10-12 of manual) prior to contacting the factory.

For Service information please contact

Spectros Instruments Inc

Service Department

Tel: 508-478-1648

Fax: 508-590-0262

Email: Service@spectrosinstruments.com

Routine Maintenance

Spectros Instruments requires a routine maintenance check of the SF-ExplorIR every 6 months. This may be performed either by the Spectros Instruments Service Department or an Authorized Service Representative. Please contact Spectros Instruments for a list of Authorized Service Representatives for the SF-ExplorIR.

The non-warranty routine maintenance will include:

- Calibration verification
- Battery power test
- Replacement of internal hydroscopic filter
- Replacement of internal zero purge fresh air bag

Failure to perform Routine Maintenance every 6 months will immediately void the standard warranty.

Calibration Verification

Calibration verification may be performed either by the Spectros Instruments Service Department or an Authorized Service Representative. Please contact Spectros Instruments for a list of Authorized Service Representatives for the SF-ExplorIR.

Warranty

Spectros Instruments warrants the SF-ExplorIR Monitor to be free from defects in material and workmanship for a period of 2 years from Spectros Instruments receipt of warranty card from customer. Spectros Instruments also warrants battery for 6 months from receipt of customer warranty card.

Part Numbers

SI-ExplorIR™	Sulfuryl Fluoride Clearance Monitor
SFSEM-MAN	Users Manual
SFSEM-BAT	DC Battery
SFSEM-CIG	Cigarette Lighter Adapter
SFSEM-BAG	Custom Nylon Bag with Strap
SFSEM-CASE	Hard Shell Shipping Case with Foam Cut -out
SFSEM-AIR	Replacement Internal Fresh Air Bag
SFSEM-DISC	Internal Hydroscopic Filter
SFSEM-FIL	External Particulate Filter
SFSEM-PWR	AC Mains Power Cord
SFSEM-3RD	Extended Warranty to 3 rd Year