



# Air Check Advantage Carbonyl Sulfide Monitor

Instruction Manual

Part number 99156 (0-50ppm)



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## *Welcome to Pure Aire Monitoring Systems*

**I'd like to thank you for investing in our continuous life safety and process control toxic gas monitoring systems.**

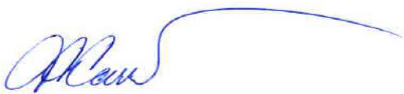
**PureAire offers an unbeatable combination of experience and innovation in solving the safety and environmental needs of our customers. We're capable of providing small systems of a few points to a total multi-point turnkey computerized package.**

**PureAire's proprietary sensor cell technology and state-of-the-art electronics are designed to interface with the latest distributive or PLC based control systems. We believe that our experience, innovative products and commitment to service will satisfy your specific monitoring needs now and in the future.**

**Our growth is a result of our total commitment to supporting our customers. We're available 24 hours a day, 7 days a week to help you when you need us. Our 24 hour Emergency phone number is 224-443-5445. We can provide field service, preventative maintenance programs and training to your technicians in the operation of our equipment. Our goal is to provide the best after sale service and support in the industry. That's just one way PureAire takes that extra step to ensure your complete satisfaction.**

**Thank you again for investing in PureAire Monitoring Systems for your monitoring needs and I'm proud to welcome you to our family of valued and satisfied customers.**

**Sincerely,**



**Albert A. Carrino  
President**

## Read Before Operating

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This gas monitoring system has been designed to provide long-term reliable performance. We recommend the following basic precautions while installing, operating and maintaining this device.

- Read this “Guide to Operation and Installation” carefully. Installation, maintenance, calibration and testing should be performed by qualified personnel only.
- Check if the power supply matches the specifications given in this guide and ensure that the system has been connected properly. This monitor must be powered by a regulated 24VDC power supply.  
**Please ensure the proper polarity. Reversing the polarity will damage the fuse on the drive PCB.**
- **After power up, please let the system equilibrate for one hour before making any adjustments. Note the monitor may read elevated concentrations of COS during the sensor warm up. Once the cell recovers, the monitors zero may need to be adjusted.**
- The COS monitor is designed for safety monitoring where normal use is defined as zero gas concentration with an occasional excursion. If the monitor is continuously exposed to carbonyl sulfide or if the monitor is exposed to very high short-term gas concentrations, it will require more frequent gas calibration or complete sensor cell replacement, and possible a new replacement pyrolizer filament .
- **The pyrolizer filament is fragile and must never be disturbed once inside the pyro tube. Never twist the filament inside the pyro tube.**
- **The COS sensor cell has a cross sensitivity to Isopropyl alcohol, (IPA). During wipe downs it is recommended to disable the alarm outputs to your central alarm system.**

**This system has a built-in pyrolizer. The pyrolizer insulation temperature can reach 150 F and can cause burns if touched. Use Caution when working near the pyrolizer.**

# Table of Contents

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<b>1: Introduction.....</b>	<b>4</b>
1.1 Component Identification.....	5
 <b>2: Specifications .....</b>	 <b>10</b>
2.1 Performance Specifications.....	10
2.2 Gas Detection System.....	10
2.3 Signal Outputs.....	11
2.4 Electrical Requirements .....	11
2.5 Physical Characteristics .....	11
2.6 Air Check Carbonyl Sulfide Default Settings.....	12
 <b>3: Installation .....</b>	 <b>13</b>
3.1 Site Requirements .....	13
3.2 Mounting.....	13
3.3 Sensor Installation.....	13
3.4 Wiring.....	13
3.5 Initial Startup .....	14
 <b>4: Air Check Carbonyl Sulfide Programming.....</b>	 <b>16</b>
4.1 Control Panel Overview.....	16
4.2 Joystick Operation .....	16
4.3 Program Flow Chart.....	17
4.4 Entering the Password.....	18
4.5 Changing the User Password .....	19
4.6 Entering the Menus .....	22
 <b>5: Maintenance &amp; Calibration .....</b>	 <b>33</b>
5.1 Routine Maintenance Schedule.....	33
5.2 Loss of Power Indication .....	33
5.3 Sensor Cell Removal and Installation.....	34
5.4 System Calibration.....	36
 <b>6: Appendix.....</b>	 <b>40</b>

# 1: Introduction

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The Air Check Carbonyl Sulfide Monitor is a compact extractive gas sampling system designed for the continuous detection and measurement of toxic gas leaks. It is capable of sampling over distances of up to 100 feet (33 meters).

The Air Check is a single point monitoring system built into a general purpose, Nema 2 housing that may be wall mounted. It's designed to require as little space for installation as possible.

The system has the following features:

- 24 VDC operation
- Built-in pyrolizer
- Integral digitally controlled sampling pump and flow system
- Local digital display
- User selectable dual level alarm and system fault relays
- Visual dual level alarm and fault LED
- 4-20 mA output
- Disposable electrochemical sensor cell
- Supervised electronics monitors sensor, pyrolizer and sample pump

➔ **NOTE: The Air Check Carbonyl Sulfide enclosure is NOT rated for Class 1, Division 1 Groups B, C & D**

## 1.1 Component Identification

### 1.1.1 Overall System Composition

The Air Check Carbonyl Sulfide Monitor may be integrated into the overall hazardous gas monitoring system. As a result, it may be remotely located for the monitoring of process areas and other environments where access to the instrument for maintenance or service may be restricted. It may also be used as a stand-alone detection system.



**Front Cover**— This permits accessing the inside of the sample and control system.

**Mounting Tabs**— Adjustable feet designed to connect the Carbonyl Sulfide enclosure to walls or another solid surface. There is one on each corner of the enclosure.

**Cover Fastening Screws**— Captive Philips head plastic screws used to fasten the front cover to the base of the Carbonyl Sulfide monitor. There is one on each corner of the front cover.

**NOTE: Please do not over tighten the screws as the Phillips head will strip.**

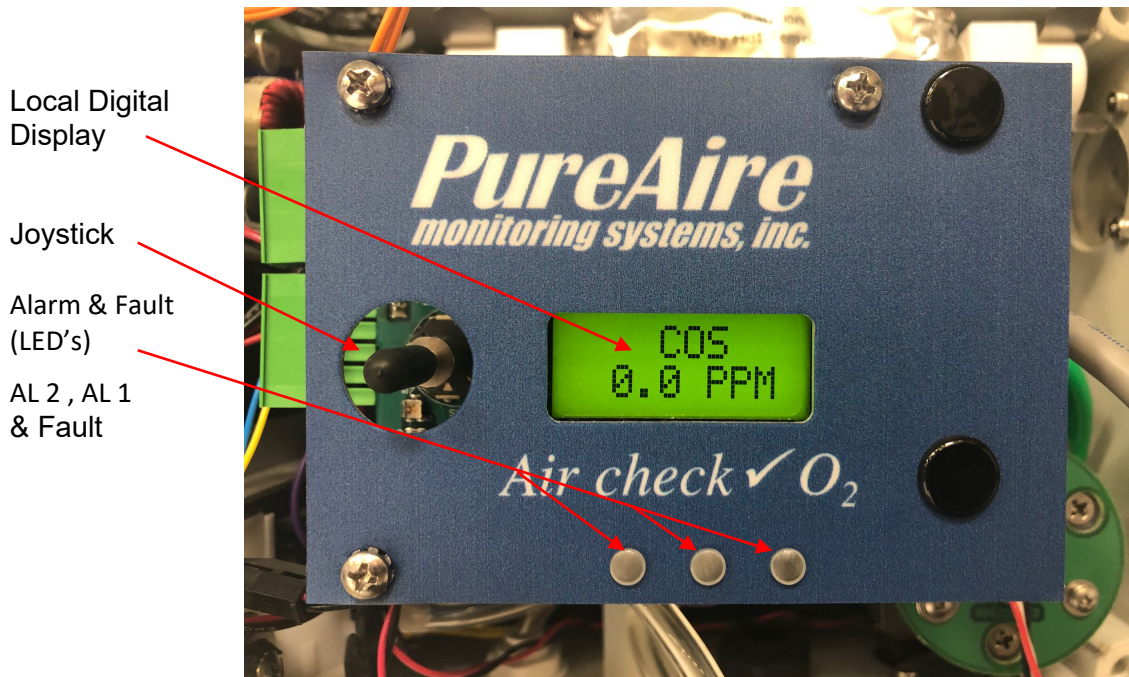
**Cable Strain Relief** — This is the opening in the transmitter housing for connecting the 4-20 mA output, 24 VDC power cable, and alarm relay wiring.

**Sample Inlet** — This serves as the connection for the incoming sample line.

**Sample exhaust** — This serves as the connection for the sample exhaust line.

**Cooling Fan** — This fan pushes air into the case for cooling. It exhausts on the top right side of the case

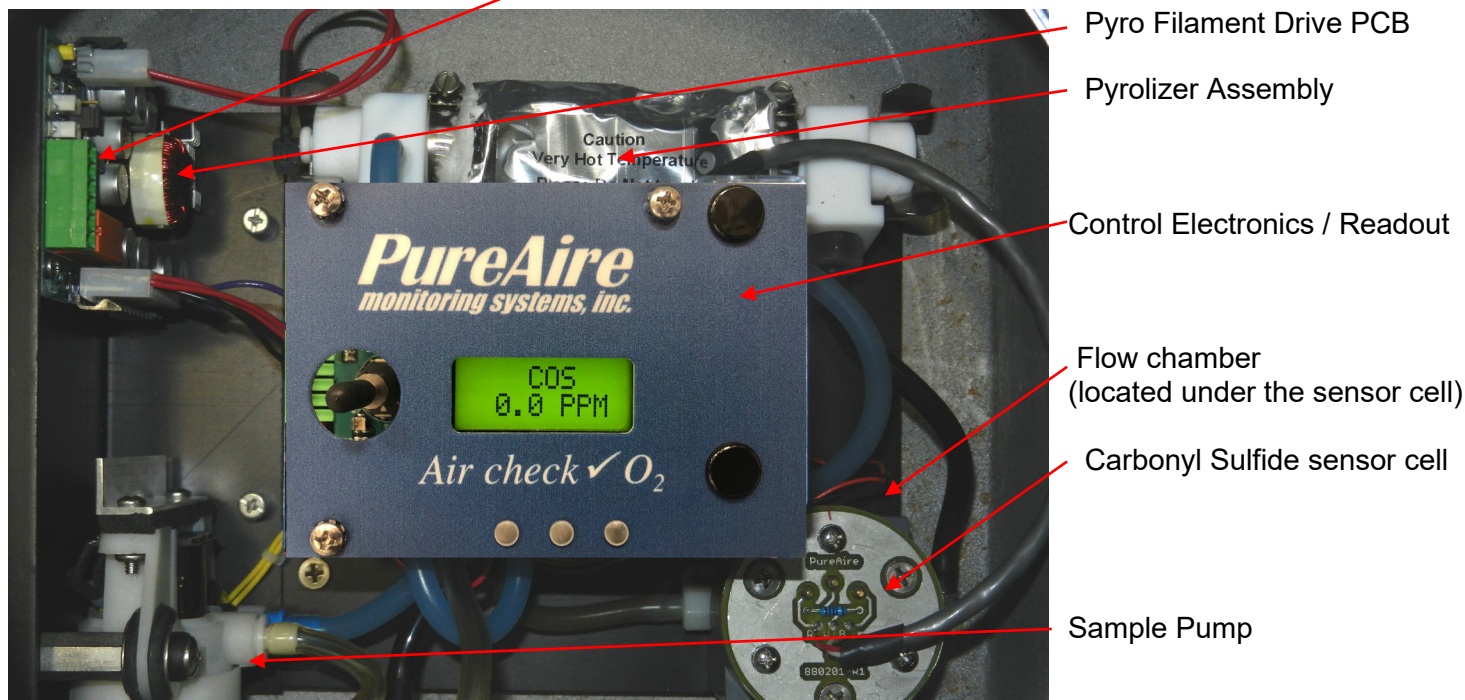
### 1.1.2 Front View Control Panel



1. **Local Digital Display** — During normal operation, displays the name and concentration of the target gas. Also displays alarm messages and programming/calibration menus and information.
  2. **Joystick** — Used for selecting and adjusting the built-in menus for alarm threshold settings, relay state, alarm delay etc.
  3. **Alarm & Fault LED's** — These LED's illuminate when a gas concentration alarm or instrument fault is detected.
- ➔ **NOTE** – *The flow rate is factory set and is continuously regulated via a built-in flow sensor. Flow rate is factory set for sampling distances up to 100 feet. Field adjustment cannot be performed.*



### 1.1.3 Internal View



1. **Main Power Connector** — Connector for 24VDC power input. See section 3: Installation for more information.
2. **Pyrolizer Assembly** — Converts Carbonyl Sulfide gas into Carbon monoxide gas prior to presentation to the gas sensor.

➔ **CAUTION** - *The pyrolizer insulation temperature is above 150 F and can cause burns if touched*

3. **Pyro Filament Drive PCB** — Controls power to the pyrolizer filament and signals the main control electronics if a fault occurs.
4. **Control Electronics and readout** — Controls the sample pump, converts the signal from the sensor cell and sends information to the local digital display and analog /relay terminal block.

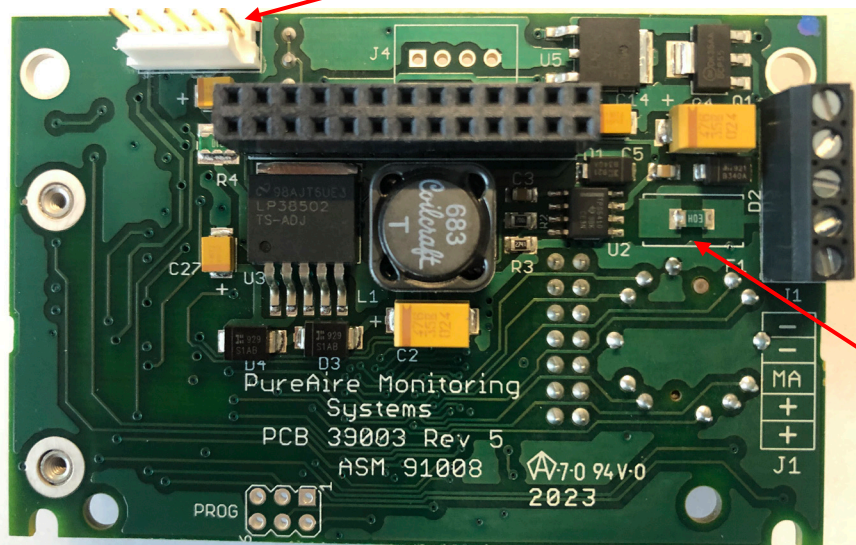
➔ **NOTE** – *The flow rate is factory set and is continuously regulated via a built-in flow sensor.*

5. **Flow Chamber** — The converted gas from the pyrolizer is introduced to the gas sensor in this chamber. Sample flow into the chamber is continually monitored. If the sample pump fails, the system fault relay is activated.
6. **Carbonyl Sulfide Sensor Cell** — A disposable electrochemical sensor cell. Typical life is 2 - 3 years under normal operating conditions.
7. **Sample Pump** — This internal sample pump is used to draw the gas sample from the area into the pyrolizer and flow chamber.
8. **Inlet & Exhaust** — These are connections for the incoming gas sample and outgoing exhaust sample



### 1.1.4 Transmitter Interior

#### 2. Sensor cell connector



1. Power Analog output Terminal Block

Common  
Common  
mA output  
+ 24 VDC  
+ 24 VDC

3. PTC Resettable Fuse

1. **Power Analog Terminal Block** — This terminal block is where the 24VDC power and 4-20 mA analog output connection is made.
2. **Sensor Cell Connector** — This connector is where the Oxygen sensor cell is connected.  
**NOTE: Never connect the oxygen sensor to this connector while the monitor is powered. This will damage the oxygen sensor**
3. **PTC Resettable Fuse** — The PCB is protected with a PTC Fuse that is resettable and Never needs to be replaced. If it trips, you will need to turn power off to the monitor. When power resumes the fuse will reset.

### 1.1.5 Alarm Relay Board

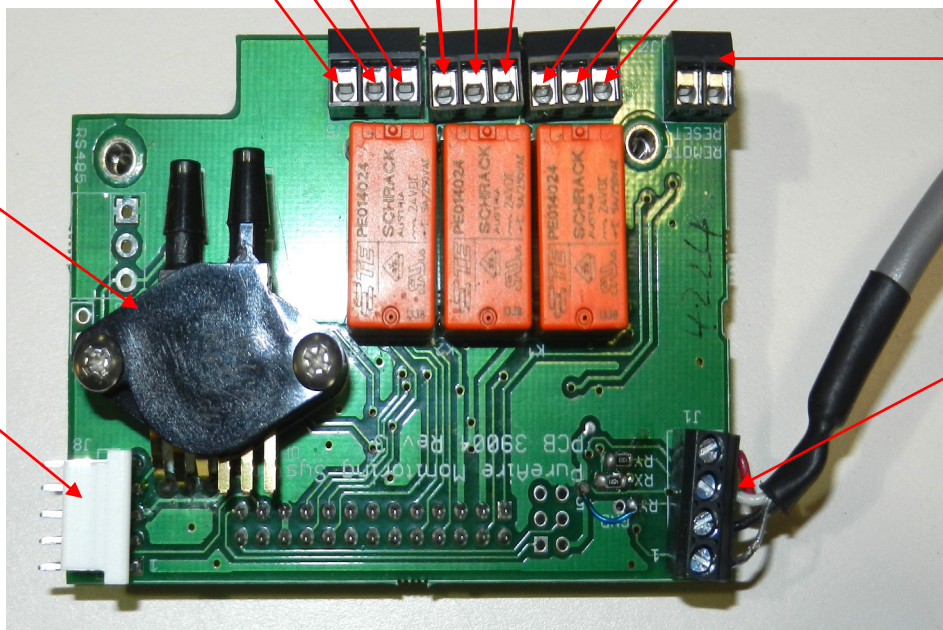
**Alarm Relay 2**  
NC C NO

**Alarm Relay 1**  
NC C NO

**Fault Relay**  
NC C NO

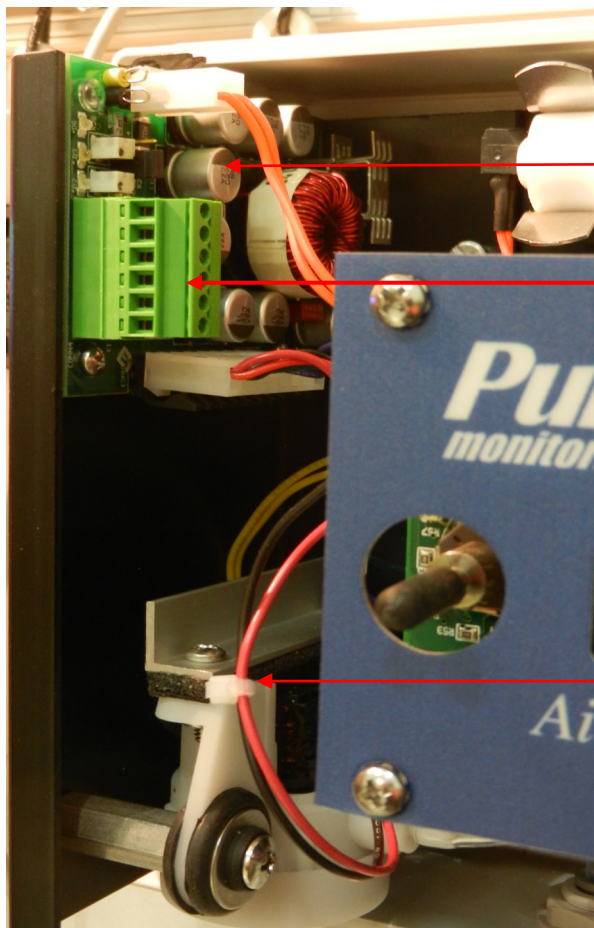
Flow Sensor

Pump Connector



Remote Reset

Sensor cell connector  
(terminated at the factory)



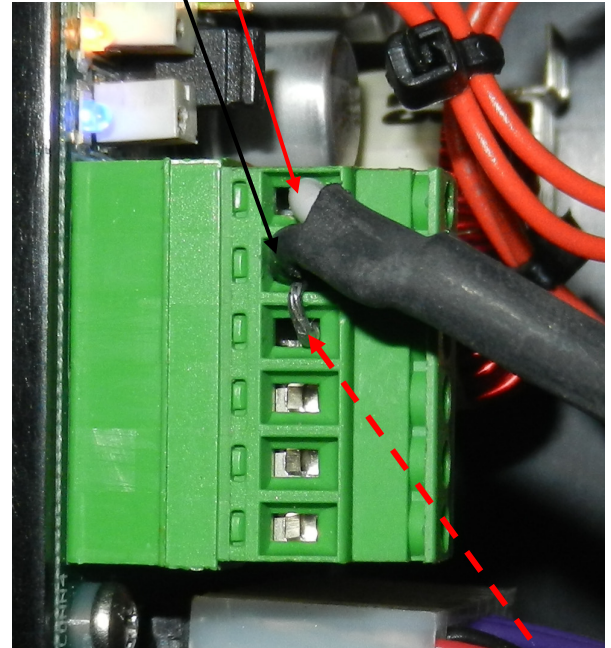
Pump and Pyrolizer Drive Assembly

Pyrolizer  
Drive Board

Main 24VDC  
Power  
Connector

Sample  
Pump

+ 24VDC Pin 6  
Common Pin 5



**NOTE: DO NOT Remove the shorting pin connected to pins 5 and 4.**

Main power connection

(Terminated by PureAire or can be terminated by the customer when using their own power supply)

### Status LED's

#### Green Power LED.

Confirms Power is being supplied to the monitor.

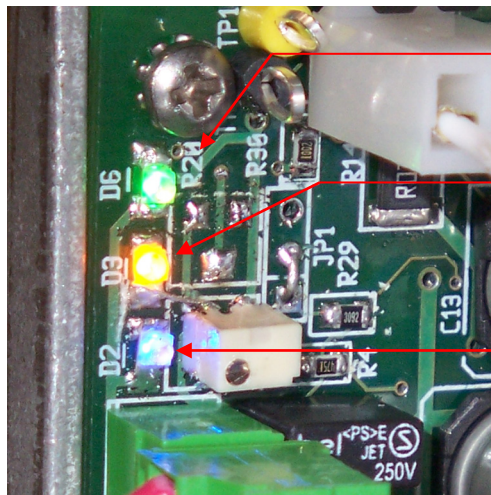
#### Yellow Status LED.

Confirms the filament drive board is operational.

#### Blue Fault Status LED.

Flashes to indicate various system faults.

When not in fault the Blue LED remains illuminated continuously



## 2: Specifications

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➡ **NOTE:** *Due to our commitment to continual product improvement, all specifications are subject to change without notice.*

### 2.1 Performance Specifications

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Models:	Air Check Carbonyl Sulfide Monitor
Sensor Type:	Disposable electrochemical cell.
Response Time:	Within 60 seconds to T90.
Repeatability:	±10% of full scale.
Fault Indicators:	Loss of VDC power (4 mA signal drops to 2, system fault alarm relay de-energizes); Loss of sensor signal (local visual alarms, system fault alarm de-energizes); Loss of sample pump (4 mA signal drops to 2, system fault alarm relay de-energizes) Loss of Pyrolizer filament (4 mA signal drops to 2, system fault alarm relay de-energizes)
Operating Temp:	14° to 86°F (0° to +30°C); consult PureAire for lower or higher operating temperatures.
Humidity:	Typically, 20 to 95% RH;
Warranty:	The warranty is limited to repairing or replacing the instrument or part thereof for a period of one (1) year after shipment, when in our opinion, the repair or replacement is covered by this warranty. Any defective equipment must be returned prepaid to the PureAire Monitoring Systems, Inc. factory or service. Field service is not included. <b>This warranty does not cover components that are expendable or consumable in normal use and thus have an unpredictable life such as batteries, fuses, sample pumps, filaments and sensor cell.</b>

### 2.2 Gas Detection System

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Type:	Proprietary disposable electrochemical gas sensor.
Sensor Life:	2-3 years under normal conditions.
Detectable Gas:	Carbonyl Sulfide Standard Range 0-50ppm

## 2.3 Signal Outputs

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Local Display:	Digital display calibrated for Carbonyl Sulfide. The range is stated on the model label and can also be accessed via the joystick on the front panel.
Analog Output:	DC 4-20 mA
Relay Output:	Dual level user selectable alarm relays and one fault relay Rated, 2amps @ $\leq 30\text{VDC}$ ; 2amps @ $\leq 250\text{VAC}$

## 2.4 Electrical Requirements

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Power:	24 VDC external power. ➡ <b>NOTE: Must be a regulated 24VDC Power Supply</b>
Consumption:	2.0 amps.

## 2.5 Physical Characteristics

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Dimensions:	10" W x 7.0" H x 7.0" D inches; 254 x 178 x 178 mm
Weight:	10 pounds (4.5 kg)
Enclosure Type:	NEMA 4X wall mounted enclosure. <b>Not for use in hazardous environments.</b> (Please contact PureAire for information on our Class 1 explosionproof enclosure)



## 2.6 AirCheck Carbonyl Sulfide Default Factory Settings

The Air Check Carbonyl Sulfide Monitor is shipped with factory defaults for the alarm relay settings. The following are the factory defaults:

Menu Function	Factory Default	Menu Defined
<b>Alarm Thresholds</b>	Alarm 1 = 5.0ppm Alarm 2 = 10.0ppm	At what level do you want to alarm?
<b>Set Alarm Threshold Polarity</b>	Alarm 1 = Normal Alarm 2 = Normal	Do you want to alarm at a level higher, (normal) or lower, (inverted) than the alarm threshold?
<b>Alarm Delay</b>	Alarm = 5 seconds	How long do you want to wait until the alarms activate?
<b>Zero Suppression</b>	2 ppm	At what level do you want to see the initial gas concentration reading?
<b>Set Alarm Hysteresis</b>	Alarm 1 = 0.0 ppm Alarm 2 = 0.0 ppm	For use when using the monitor for control. It is recommended to set both alarm hysteresis at 0.0ppm
<b>Relay Latching</b>	Alarm 1 = Non-latching Alarm 2 = Non-latching	Do you want the alarm to automatically reset? (non-latching) or do you want to manually reset the alarm? (latching)
<b>Format Relay - LED State **</b>	Alarm 1 = Normal Alarm 2 = Normal Fault = Normal	Do you want the relays to energize, (normal) or de-energize, (fail safe) when the alarm activates?

**NOTE:** The built-in relay settings may be changed by the user in the field. Refer to Section 4.5

**\*\* NOTE:** The LED indicators on the front panel are connected directly to the alarm relays.

## 3: Installation

### 3.1 Site Requirements

The Air Check Carbonyl Sulfide monitoring system should be mounted in an area free of vibration and electrical noise or interference. If possible, avoid areas with continuous high temperatures or relative humidity.

The unit should be installed in a location where gas leaks are likely to occur or where released gases may accumulate. Airflow within the monitored area, the characteristics of the target gas (lighter or heavier than air), and the position of workstations and personnel should all be considered in determining the most suitable installation location.

Allow enough space around the instrument to permit access for maintenance and calibration.

➡ **NOTE:** *The Air Check Carbonyl Sulfide Monitor is NOT designed for installation in hazardous areas.*

### 3.2 Mounting

The Air Check is designed primarily for wall mounting and should be installed no closer than 36 inches (915 mm) above floor level. If mounted outdoors, keep direct sunlight off the enclosure.

### 3.3 Sensor Installation

The Carbonyl Sulfide sensor cell is connected to the flow chamber at the factory. Please do not disturb the sensor during installation of the monitor.

### 3.4 Wiring

#### 3.4.1 24 VDC Power

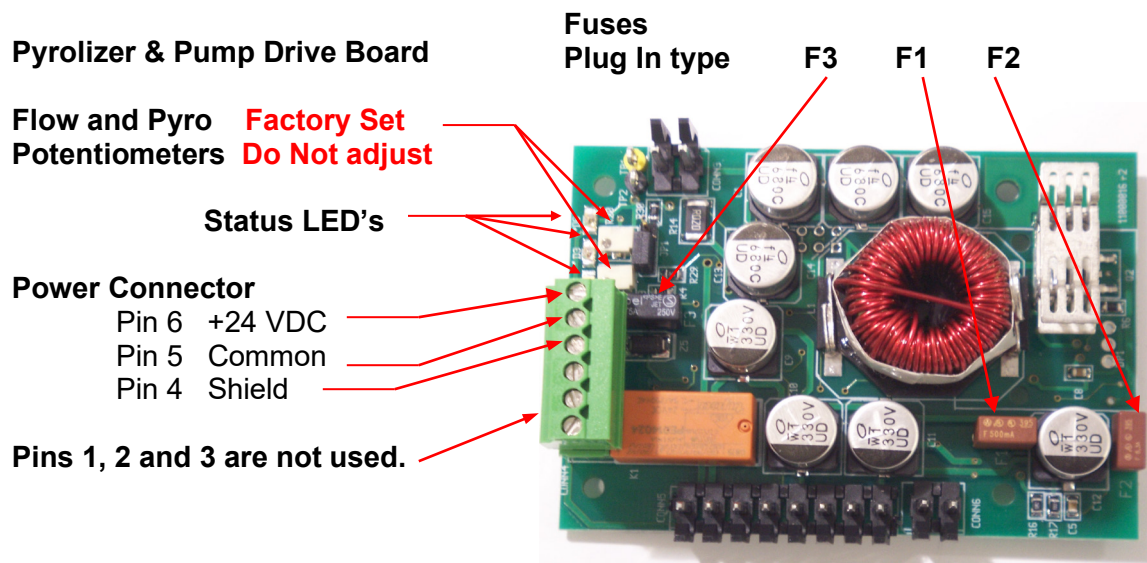
Connect the 24 VDC power cable to the terminal block located on the inside of the instrument. The terminal connections are as follows: (Pin 6) +24V, (Pin 5) Common, and (Pin 4) shield. A three-wire shielded cable (3-conductor, 18 AWG stranded shielded) General Cable #E2203S.30.86 or equivalent should be used for the connection. The total length of the cable between the gas detector and controller must not exceed 0.62 miles (1 km).

➡ **CAUTION:** *The Air Check Carbonyl Sulfide Monitor must only be powered using a regulated 24VDC Power Supply. Failure to use a regulated 24VDC power supply will void the warranty.*

The 24 VDC power in connections are made on the 6 pin terminal connection located on the Power Supply PCB. These connections are made as follows:

Pin #	Connection
6	DC + 24V
5	Common
4	Shield





### 3.4.2 Alarm Relays

The Air Check monitor incorporates two gas concentration alarm relays and one system fault relay. These relays may be wired for normally open (N.O.) or normally closed (N.C.) operation and are rated as follows: **Rated, 2amps @ 30VDC; 2amps @ 250VAC. See page 9.**

## 3.5 Initial Startup

Once installation of the gas detector has been completed, it is ready for startup. The following procedures should be performed before putting the instrument into operation:

1. Check the integrity of all wiring. Confirm the power polarity.
2. Run any sample tubing from the monitor to the risk site.

**NOTE: PureAire recommends the use of polypropylene sample tubing with the dimensions of 1/4" OD by 3/16" ID. The total length of tubing should not exceed 100 feet.**

3. Apply 24 VDC power to the Power Supply PCB board. The sample pump and pyrolizer heater will operate.

**NOTE: The Air Check requires a regulated 24VDC power supply**

➡ **CAUTION - The pyrolizer insulation temperature is above 150 F and can cause burns if touched.**

The monitor is now ready for power up. On power up, the monitor will immediately start a 2-minute countdown and the green and yellow LEDs will be illuminated next to the power connector. It will then display **COS** on the top line and countdown from **120 to 0** and display **WARM** on the bottom line. Also, the **Yellow Fault LED** will be illuminated on the front panel.

After the 2-minute countdown, the blue LED will illuminate and **“Pyrolizer Heater Fault”** will scroll on the top line, **F02 00** will display on the bottom line and the **Yellow Fault LED** will remain illuminated.

Approximately 30 seconds later, the **“Pyrolizer Heater Fault”** and **F02 fault message** will clear and COS will display on the top line, a **ppm gas** concentration will display on the bottom line of the digital display and the **Yellow Fault LED** will turn off.

➡ **NOTE: After power up, please let the system equilibrate for one hour before making any zero and span adjustments. The Carbonyl Sulfide sensor may read a high ppm gas concentration on startup. The sensor’s zero will stabilize during this warm period.**

➡ **NOTE: The monitor is designed for continuous 24-7-hour operation. Do not power down the monitor unless you intend to store the monitor. Cycling the monitor on and off will diminish the performance of the Carbonyl Sulfide readings.**

After the warmup, if the monitor is reading a positive PPM, and you are sure that it is not being exposed to Carbonyl Sulfide then re adjust the zero. **Refer to section 5.4.3.**

### **3.5.1 Pump Adjustment**

The Air Check Carbonyl Sulfide Monitor has a built in digitally controlled flow-controlled sample pump. The pump flow is set at the factory and should not require adjustment. It has a range to accommodate tubing lengths up to 100 feet. Flow rate is between 0.2 and 0.25 cc/min. If flow adjustment is necessary, please contact PureAire.

## 4: Air Check Monitor Programming

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The Air Check Carbonyl Sulfide Monitor is supplied with user selectable settings to adjust the alarm settings, 4 and 20mA output and minor sensor adjustments. The settings are arranged in menus that are accessed by moving the joystick. To access the menus a factory set password is used.

**NOTE:** The Air Check Carbonyl Sulfide Monitor will continuously monitor Carbonyl Sulfide while accessing the menus. The alarm, fault relays and mA output are all active and on line while making any changes to the menus.

### 4.1 Control Panel Overview

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All instrument configuration and operational programming is performed from the front panel of the Air Check Monitor using the joystick.

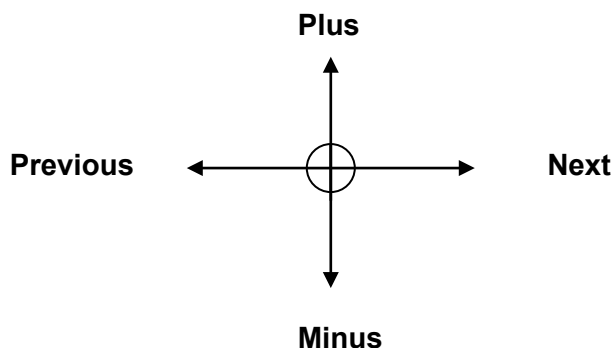


### 4.2 Joystick Operation

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The Air Check Carbonyl Sulfide monitor uses a 4-position joystick with a center pushbutton for selecting menus and changing values. The joystick is programmed to standard protocol as follows:

**NOTE:** The joystick has a built-in delay to prevent accidental tampering of the menus. Deliberate entries are required.



**Plus** – Pushing the joystick in this direction increases the value

**Minus** – Pushing the joystick in this direction decreases the value

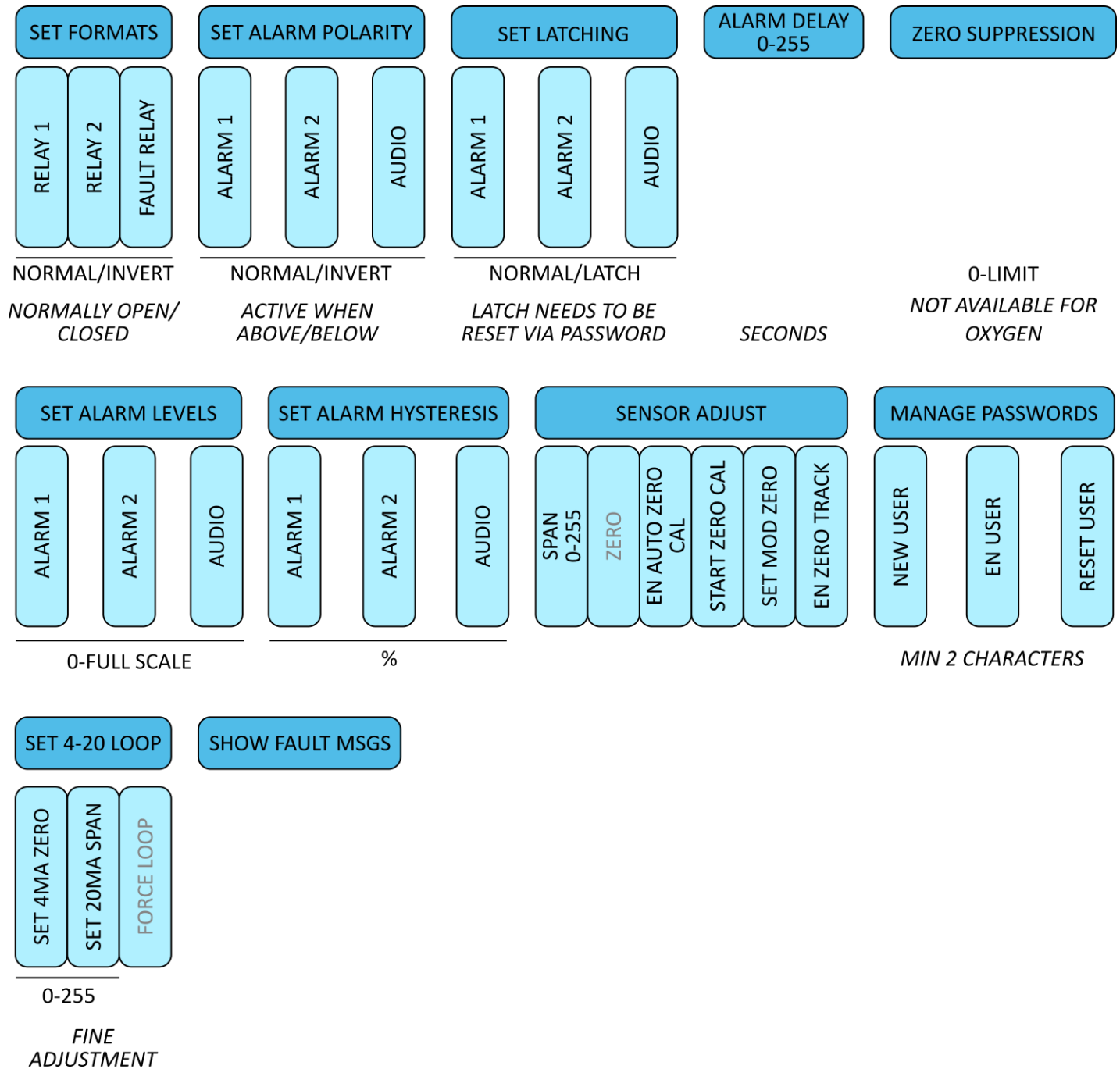
**Next** – Pushing the joystick in this direction moves you to the next level of the menu hierarchy.

**Previous** – Pushing the joystick in this direction takes you out to the last level of menu hierarchy.

**Enter** – Pushing the joystick directly in the center enters the information into the microprocessor

**NOTE:** The joystick has four other positions that are only used to only access factory menus. A separate factory password is required obtain entry.

## 4.3 Program Flowchart

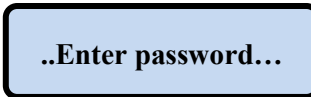


## 4.4 Entering the Password

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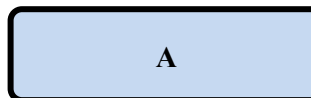
The Air Check Carbonyl Sulfide monitor is supplied with a factory set password to prevent unauthorized access to the menus. **The Password is 557.** The following explains how to enter the password.

1. Push the joystick once to the right. **Enter Password** will scroll on the first line of the digital display. The second line will still display the current oxygen level.



..Enter password...

2. Push the joystick again once more to the right to enter the input screen. **The letter A will appear and flash.**



A

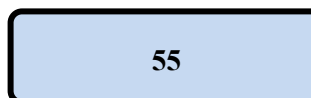
**NOTE:** *The display has characters that start with A through Z and 0 through 9. Pushing the joystick up or down will permit you to scroll through the alphanumeric characters.*

3. Push the joystick up or down to enter the first digit. The display is an alphanumeric display and toggles from A through Z followed by 0 to 9. The character to be entered will flash.



5

4. Push the joystick again to the right to select the second entry. Push the joystick up or down to select the second digit. The character being entered will flash and the first character entered will remain lit.



55

5. Push the joystick again to the right to select the third entry. Push the joystick up or down to select the third and final digit. The character being entered will flash and the first and second characters entered will remain lit. You are now ready to enter the 3-digit password.



557

6. Push the joystick in the center to enter the password. If you entered it correctly the display will scroll **Password OK**.

...Password OK.....

NOTE: If an incorrect password has been entered, the display will indicate Password Failed. Push the joystick to the left to access the monitoring mode. From this mode you can reenter the password again.

## 4.5 Changing the User Password

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The Air Check Carbonyl Sulfide monitor is supplied with a factory set password to prevent unauthorized access to the menus. The user can change this password and the following explains how to change the password.

1. Push the joystick down to access the **Manage Passwords Menu**. **Manage Passwords** will scroll on the first line of the digital display. The second line will still display the current oxygen level.

..Manage Passwords...

2. Push the joystick to the right to enter the input screen. **Enter New User Password** will scroll on the first line of the digital display

...Enter New User Password...  
0.0 PPM

3. Push the joystick to the right to enter the input screen. **The letter A will appear and flash.**

A

**NOTE:** *The display has characters that start with A through Z and 0 through 9. Pushing the joystick up or down will permit you to scroll through the alphanumeric characters.*



4. Push the joystick up or down to enter the first digit. The display is an alphanumeric display and toggles from A through Z followed by 0 to 9. The character to be entered will flash.

2

5. Push the joystick again to the right to select the second entry. Push the joystick up or down to select the second digit. The character being entered will flash and the first character entered will remain lit.

25

6. Push the joystick again to the right to select the third entry. Push the joystick up or down to select the third and final digit. The character being entered will flash and the first and second characters entered will remain lit. You are now ready to enter the 3-digit password.

253

7. Push the joystick in the center to enter the password. This will display the next command,  
**Re-Enter New Password**

...Re-Enter New Password...  
0.0 PPM

8. Push the joystick to the right to enter the input screen. **The letter A will appear and flash.**

A

9. Push the joystick up or down to enter the first digit. The display is an alphanumeric display and toggles from A through Z followed by 0 to 9. The character to be entered will flash.

2  
0.0 PPM

10. Push the joystick again to the right to select the second entry. Push the joystick up or down to select the second digit. The character being entered will flash and the first character entered will remain lit.

25

11. Push the joystick again to the right to select the third entry. Push the joystick up or down to select the third and final digit. The character being entered will flash and the first and second characters entered will remain lit. You are now ready to enter the 3-digit password.

253

12. Push the joystick in the center to enter the password. If you entered it correctly the display will scroll “New Password Entry OK”.

...New Password Entry OK...

**NOTE:** If on the second entry the password entered was not the same as the first, the display will take you back to the “Re-enter Password Screen”. You’ll need to repeat steps 2 through 11. If you do not enter the password correctly, the monitor remembers the last password that was properly input.

**If you misplace or loose your password, contact PureAire with the monitors DTM# for instructions on recovering your password. The DTM# is displayed by moving the joystick to the left.**

#### 4.5.1 Enable User Password

This menu permits the user to activate or disable the password function on the Carbonyl Sulfide monitor. Push the joystick down. “Enable User Password” will scroll on the first line of the digital display

...Enable User Password...

Push the joystick right to display the status. If enabled it will display “Enabled”

Enabled

Push the joystick up or down to change the status. Once enabled or disabled is selected, Push the joystick in the center to enter the new status. If entered correctly the display will scroll “Enable User Password”

...Enable User Password...

0.0 PPM

## 4.6 Entering the Menus

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The Air Check Carbonyl Sulfide monitor is supplied with main menus with sub menus to adjust mA outputs, alarm relay settings, sensor adjustments and zero suppression.

### 4.6.1 Set 4-20mA loop

**.Set 4-20mA loop..**

This main menu will permit the adjusting of the 4mA and 20mA output from the Air Check Carbonyl Sulfide Monitor. It also provides a function that will send an actual output between 4mA and 20 mA to test any remote control and alarm system attached to the Carbonyl Sulfide monitor.

**NOTE:** *To read the mA output, Air Check monitor must either be connected to a remote PLC controller or SCADA system. You can also connect the Air Check monitor to a voltmeter to read the mA output. Please consult PureAire for more information.*

From this main menu, pushing the joystick to the right will select the sub menu and the digital display will scroll the following:

**..Set 4mA zero...**

This is the menu at which to adjust the 4mA output being sent from the Air Check Monitor.

To change this value, push the joystick right to display the 4-mA setting. The display will indicate a value between 0 and 255 counts. Pushing the joystick up increases the value and pushing the joystick down decreases the value. The 4mA output being sent from the Air Check Carbonyl Sulfide monitor will change as the number on the digital display changes. Press **ENTER** to accept the value.

**255**

Push the joystick to the left brings you back to the pervious Main menu. The digital display will scroll the following:

**...Set 4mA zero.....**

Push the joystick down to access the next sub menu; **Set 20mA Span will scroll.**

...Set 20mA Span...

This is the menu at which to adjust the 20mA output being sent from the Air Check Monitor.

To change this value, push the joystick right to display the 20mA span setting. The display will indicate a value between 0 and 255 counts. Pushing the joystick up increases the value and pushing the joystick down decreases the value. The 20mA output being sent from the Air Check monitor will change as the number on the digital display changes. Press **ENTER** to accept the value.

255

Push the joystick to the left brings you back to the pervious Main menu. The digital display will scroll the following:

...Set 20mA span.....

Push the joystick down to access the next sub menu; **Force loop will scroll.**

....Force Loop....

**NOTE:** *This menu item is not available on the Carbonyl Sulfide monitor.*

Push the joystick to the left brings you back to the pervious menu. The digital display Will scroll the following:

...Set 4-20mA loop.....

#### 4.6.2 Set Formats

This is the menu at which to adjust the relay states for the two gas alarm relays and the individual instrument fault relay.

Push the joystick down to access the next main menu, **Set Formats.** The display will scroll the following:

...Set Formats...  
0.0ppm

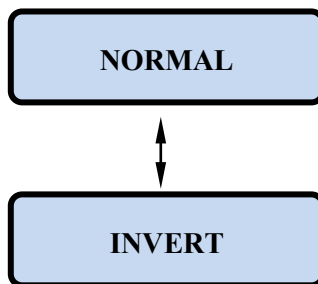
This menu will permit the setting of the two alarm relays and the fault relay settings from normally de-energized state, **Normal**, to normally energized state, **Inverted**.

From this main menu, pushing the joystick to the right will select the sub menu and the digital display will scroll the following:

..Format Relay 1...

This is the menu at which to adjust the first level alarm relay state on the Air Check AN Monitor.

To change this value, push the joystick right to display the relay state. The display will indicate **NORMAL**. Pushing the joystick down will change the relay state from **NORMAL** to **INVERT**. Press **ENTER** to accept the value.



After entering the relay state the display will default back to the Set Formats menu. The display will scroll the following:

..Set Formats...

From this main menu, pushing the joystick to the right will select the sub menu and the digital display will scroll the following:

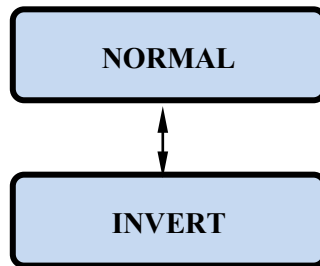
..Format Relay 1...

Push the joystick down to access the next main menu, **Set Formats**. The display will scroll the following:

... Format Relay 2..  
0.0ppm

This is the menu at which to adjust the second level alarm relay state on the Air Check Monitor.

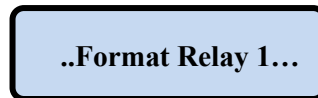
To change this value, push the joystick right to display the relay state. The display will indicate **NORMAL**. Pushing the joystick down will change the relay state from **NORMAL** to **INVERT**. Press **ENTER** to accept the value.



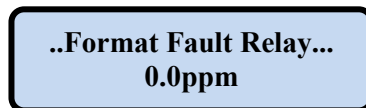
After entering the relay state the display will default back to the Set Formats menu. The display will scroll the following:



From this main menu, pushing the joystick to the right will select the sub menu and the digital display will scroll the following:

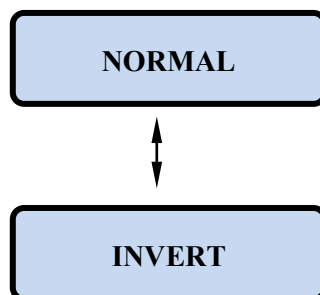


Push the joystick twice to select the fault relay to be adjusted. The display will scroll; **Format Fault Relay.**



This is the menu at which to adjust the fault alarm relay state on the Air Check Monitor.

To change this value, push the joystick right to display the relay state. The display will indicate **NORMAL**. Pushing the joystick down will change the relay state from **NORMAL** to **INVERT**. Press **ENTER** to accept the value.





After entering the relay state the display will default back to the Set Formats menu. The display will scroll the following:

..Set Formats...

#### 4.6.3 Set Alarm Threshold Polarity

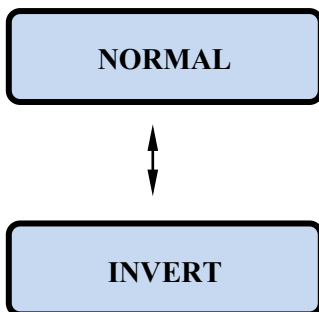
Alarm Threshold Polarity determines if an alarm concentration is set above or below a threshold value. For example, if an alarm of 2.0ppm is selected, the Alarm Threshold Polarity must be set to **Normal** for the monitors alarm to activate when the reading goes above 2.0ppm. Selecting an **Invert** setting for the Alarm Threshold Polarity means that the system will alarm when the gas concentration, goes below, an alarm set point. This menu will permit the selection of the alarm polarity. To access this menu from the “Set Formats” menu, push the joystick down to display the **Set Alarm Threshold Polarity** adjustment menu. This will scroll on the digital display.

..Set Alarm Threshold Priority..  
0.0ppm

Push the joystick right to access the first sub menu; **Set Alarm 1 Polarity** will scroll on the display. This is the menu at which to adjust the first level alarm polarity state on the Air Check Carbonyl Sulfide Monitor.

..Set Alarm 1 Polarity...  
0.0ppm

To change this value, push the joystick right to display the relay state. The display will indicate **INVERT**. Pushing the joystick down will change the relay state from **INVERT** to **NORMAL**. Press **ENTER** to accept the value.



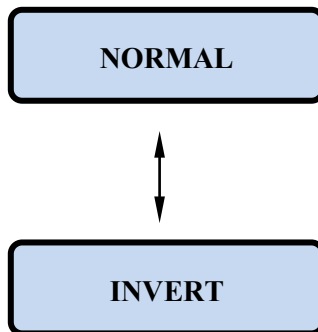
After entering the relay state the display will default back to the Set Alarm 1 Polarity menu. The display will scroll the following:

..Set Alarm Polarity..  
0.0ppm

Push the joystick down to access the next sub menu; **Set Alarm 2 Polarity** will scroll on the display. This is the menu at which to adjust the second level alarm polarity state on the Air Check Carbonyl Sulfide Monitor.

..Set Alarm 2 Polarity ..  
0.0ppm

To change this value, push the joystick right to display the relay state. The display will indicate **NORMAL**. Pushing the joystick down will change the relay state from **NORMAL** to **INVERT**. Press **ENTER** to accept the value.



After entering the relay state the display will default back to the Set Relay 2 Alarm Threshold menu. The display will scroll the following:

..Set Alarm 2 Polarity..  
0.0ppm

Push the joystick down to access the next sub menu; **Set Audio Alarm Polarity** will scroll on the display. This is the menu at which to adjust the second level alarm polarity state on the Air Check AN Monitor.

..Set Audio Alarm Polarity...  
0.0ppm

**NOTE:** *The audio alarm option module is not available for Carbonyl Sulfide*

#### 4.6.4 Set Latching

This is the menu at which to adjust the relay alarm state for the two gas alarm relays and the individual instrument fault relay. The selection permits setting the relays to a latching or non-latching state. In a latching state, the relay will remain activated until the user manually selects the Enter Key. In a non-latching state, the alarm relay will automatically reset once the gas concentration has returned to 0.0ppm Carbonyl Sulfide.

**.Set Latching...  
0.0ppm**

This menu will permit the setting of the two alarm relays and the fault relay settings from a latching to a non latching state when they are activated.

From this main menu, pushing the joystick to the right will select the sub menu and the digital display will scroll the following:

**..Set Latching Relay 1...  
0.0ppm**

This is the menu at which to adjust the first level alarm relay state on the Air Check Monitor.

To change this value, push the joystick right to display the relay state. The display will indicate **LATCH**. Pushing the joystick down will change the relay state from LATCHING to NON-LATCHING. Press **ENTER** to accept the value.

**LATCHING  
0.0ppm**



**NONLATCH**

After entering the relay state the display will default back to the **Set Latching** menu. The display will scroll the following:

**..Set Latching....  
0.0ppm**

From this main menu, pushing the joystick to the right will select the sub menu and the digital display will scroll the following:

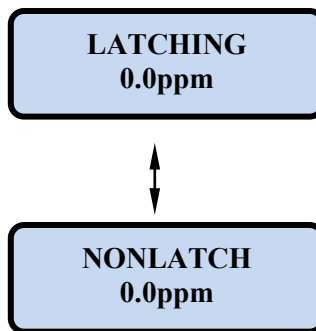
**..Set Latching Relay 1...  
0.0ppm**

Push the joystick down to select the next relay to be adjusted. The display will scroll the following, **Set Latching Relay 2.**

..Set Latching Relay 2...  
0.0ppm

This is the menu at which to adjust the second level alarm relay state on the Air Check Monitor.

To change this value, push the joystick right to display the relay state. The display will indicate **LATCHING**. Pushing the joystick down will change the relay state from LATCHING to NONLATCH. Press **ENTER** to accept the value.



After entering the relay state the display will default back to the **Set Latching** menu. The display will scroll the following:

..Set Latching....  
0.0ppm

From this main menu, pushing the joystick to the right will select the sub menu and the digital display will scroll the following:

..Set Latching Relay 1...  
0.0ppm

Push the joystick twice to select the Audio Alarm relay to be adjusted. The display will scroll; **Set Latching Audio Alarm.**

**NOTE:** *The audio alarm option module is not available for Carbonyl Sulfide.*

#### 4.6.5 Set Alarm Delay

Push the joystick down to access the next main menu, **Alarm Delay**. The display will scroll the following:

...Alarm Delay...  
0.0ppm

This is the amount of time an alarm level concentration of oxygen must be present before the instrument's gas concentration alarm(s) will be activated. This menu will permit setting a user selected time delay for activating alarm relays 1 and 2. You can select from 0 seconds up to 255 seconds after an alarm level has been exceeded before the alarm relays to activate.

To change this value, push the joystick right to display the time screen. The display will indicate a value between 0 and 255 seconds. Pushing the joystick up increases the value and pushing the joystick down decreases the value. Press **ENTER** to accept the value.

005  
0.0ppm

After entering the alarm delay, the display will default back to the Alarm Delay menu and the display will scroll the following:

...Alarm Delay...  
0.0ppm

**NOTE:** *The alarm delay is only available for alarms 1 and 2. There is no delay for the fault relay. Any system fault will immediately activate the Fault Relay.*

#### 4.6.6 Set Zero Suppression

This setting is used to decrease the sensitivity of selected gas sensors. It essentially programs the instrument to ignore gas measurements that are below the programmed ppm level.

**EXAMPLE:** *If the measurement range of the instrument is 0 to 30 ppm, gas measurements below 0.5 ppm will be displayed and output as 0 (zero) when the suppress level is set at 0.5ppm.*

...Zero Suppression...  
0.0 PPM

To change this value, push the joystick right to display the Zero Suppression screen. The display will indicate a value between 0 and 100%. Pushing the joystick up increases the value and pushing the joystick down decreases the value. Press **ENTER** to accept the value.

0.5 PPM  
0.0 ppm

After entering the zero suppression value, the display will default back to the **Zero Suppression** menu and the display will scroll the following:

...Zero Suppression...  
0.0ppm

#### 4.6.7 Set Alarm Thresholds

..Set Alarm Thresholds..  
0.0ppm

This main menu will permit adjusting the Carbonyl Sulfide concentration ppm level that will activate alarm levels 1 and 2.

From this main menu, pushing the joystick to the right will select the first sub menu and the digital display will scroll the following: **Set Relay 1 Alarm Threshold.**

..Set Relay 1 Alarm Threshold...  
0.0ppm

This is the gas concentration at which the instrument's first level alarm will be activated. To change the displayed value, push the joystick to the right to display the first level alarm setting. The display will indicate a value between 0.0ppm and full scale.

Pushing the joystick up increases the value and pushing the joystick down decreases the value. Press **ENTER** to accept the value.

1.0 PPM  
0.0ppm

After entering the relay state the display will default back to the **Set Relay 1 Alarm Threshold** Menu. The display will scroll the following:

..Set Relay 1 Alarm Threshold...  
0.0ppm

Push the joystick down to access the next sub menu; **Set Relay 2 Alarm Threshold**, will scroll on the digital display.

..Set Relay 2 Alarm Threshold...  
0.0ppm



This is the gas concentration at which the instrument's second level alarm will be activated. To change the displayed value, push the joystick to the right to display the second level alarm setting. The display will indicate a value between 00.0% and full scale.

Pushing the joystick up increases the value and pushing the joystick down decreases the value. Press **ENTER** to accept the value.

**5.0 PPM**  
**0.0 PPM**

After entering the relay state the display will default back to the **Set Relay 2 Alarm Threshold** Menu. The display will scroll the following:

**..Set Relay 2 Alarm Threshold...**  
**0.0ppm**

Push the joystick down to access the next sub menu; **Set Audio Alarm Threshold**, will scroll on the digital display.

**NOTE:** *The audio alarm option module is not available for Carbonyl Sulfide.*

#### 4.6.8 Set Alarm Hysteresis

This function was designed for PureAire's Oxygen deficiency monitor when used as a control system.

**NOTE:** The Hysteresis function is permits a user to set the dead band for both Alarms 1 and 2 and is not applicable to the Carbonyl Sulfide toxic gas monitor. The Hysteresis setting is factory set at 0.0 ppm

**It is recommended to set both alarm hysteresis at 0.0ppm. Changing it will affect when the alarm relay deactivates after tripping.**

#### 4.6.9 Sensor Adjustment

**..Sensor Adjustment...**  
**0.0ppm**

**NOTE:** Refer to Section 5.4 Sensor Calibration for complete instructions on the use of this menu.

## 5: Maintenance & Calibration

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**Only qualified personnel should perform maintenance and calibration.**

### 5.1 Routine Maintenance Schedule

---

Continuous gas detection systems depended upon to measure and detect hazardous gas leaks in the workplace requires periodic maintenance to ensure proper operation. The frequency with which this routine maintenance is required depends on the environment, since temperature, humidity, gas concentrations, and dust all affect system operation.

The following table is intended to serve as a general guideline for routine maintenance. The conditions in your application, as well as your organization's maintenance policies, will ultimately determine the best routine maintenance schedule for your equipment.

#### 5.1.1 Routine Visual Checks

Item	Status with No Gas Present
Local Display	Display should read "0.0"
4-20 mA Output	Output should be 4 mA
Gas Concentration Alarm Relays	De-energized (factory default)
System Fault Relay	De-energized (factory default)

#### 5.1.2 Recommended Routine Maintenance Schedule

Routine Visual Checks (flow, fault LED)	Quarterly
Flow rate and power status	Continually supervised. Flow is constantly monitored and adjusted by the internal CPU Automatic hourly system integrity verification
Replacement Sensor cell ( p/n 48002 )	Every 2 to 3 years
Sensor Calibration	Every 6 months under normal use
Pyrolizer Filament ( p/n 46003)	Replace when damaged.
Sample Inlet Filter (p/n 23102)	Replaced when clogged

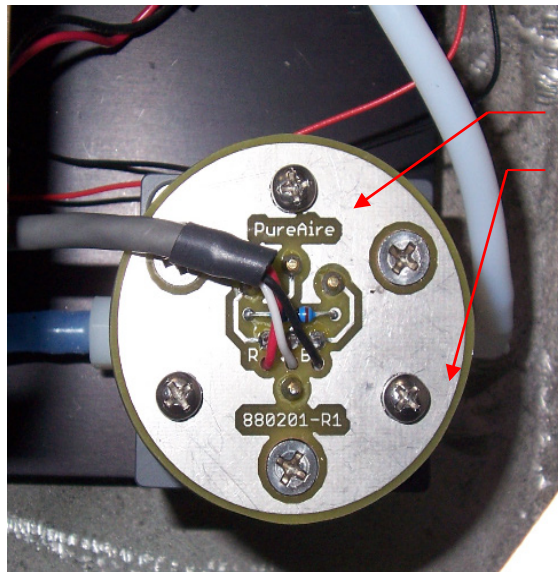
### 5.2 Loss of Power Indication

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In the event the Air Check Carbonyl Sulfide Monitor loses VDC power, the local display will go blank and the 4-20 mA analog output signal drops to 0 and the system status alarm relay de-energizes.

- ➡ **IMPORTANT:** *If the instrument was in the Measure mode when power was lost, it will automatically return to the Measure mode when power is restored.*

## 5.3 Sensor Cell Removal and Installation

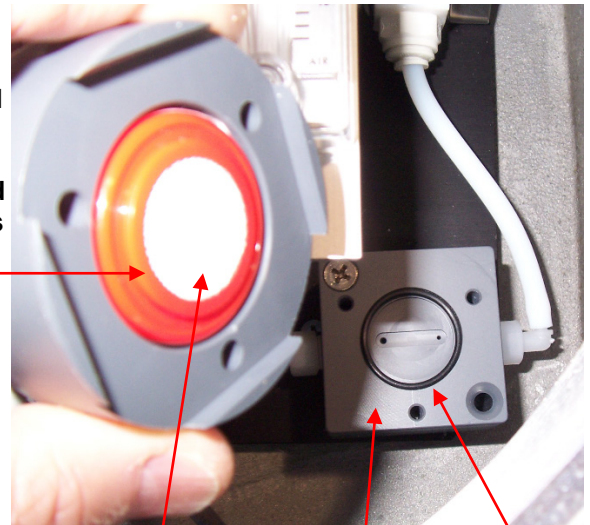


Sensor cell assembled in the flow cap

Sensor Cell  
Connector board

Sensor Cell  
connector board  
fastening screws

COS Sensor  
PN 48002



COS sensor

Flow Cap

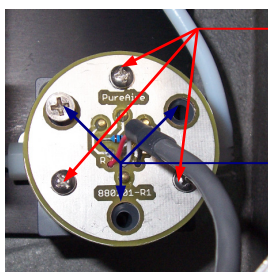
O-Ring

### 5.3.1 Carbonyl Sulfide Sensor Cell Assembly

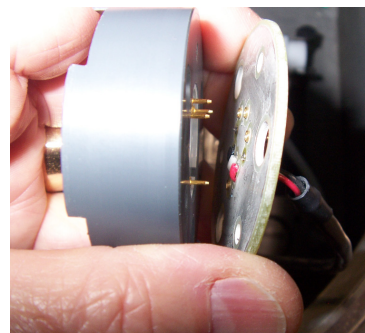
The Carbonyl Sulfide sensor has four male pins that plug into the sensor cell connector board. The sensor cell connector board is held to the top of the flow cap using 3 ea. 6-32 pan head screws. The top of the flow cap and sensor cell along with the sensor cell connector board is fastened to the flow cap using 3 ea. 10-32 flat head screws. The Carbonyl Sulfide cell is supplied with an O-ring used to seal the cell inside the flow chamber.

**NOTE: The Carbonyl Sulfide cell will not seal properly without the O-ring. Replacement Carbonyl Sulfide cells are shipped with a new O-ring.**

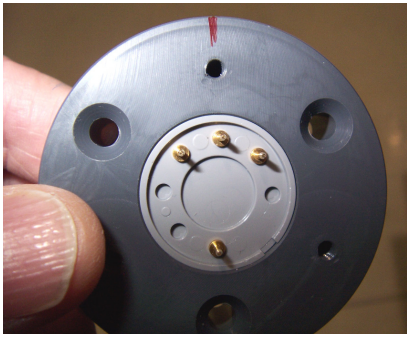
### 5.3.2 Removal of Sensor Cell



Remove the **3 ea. 6-32** screws that hold the sensor connector board and the **3 ea. 10-32** screws that hold the top of the flow cap to the flow chamber

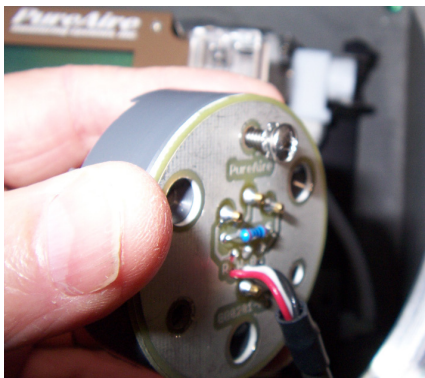
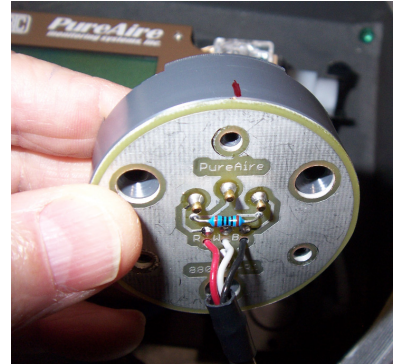


Carefully unplug the Carbonyl Sulfide sensor from the sensor connector board



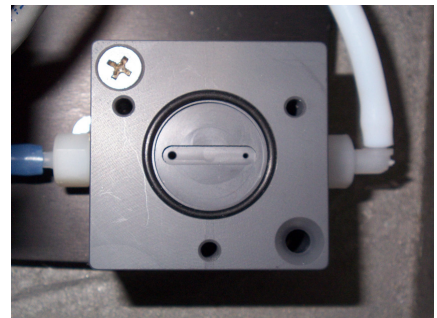
Carefully insert the new Carbonyl Sulfide sensor into the top of the flow cap. Please verify that the center pin is aligned with the locator mark

Carefully plug the Carbonyl Sulfide sensor into the sensor connector board.



Insert the **3 ea. 6-32** screws that hold the sensor connector board.

Add the new O-ring to the flow cap. Confirm that the O-ring is inserted properly into the O-ring groove



Carefully seat the new Carbonyl Sulfide cell and top flow cap to the flow chamber. Insert the **3 ea. 10-32** screws that hold the top of the flow cap to the flow chamber. Tighten until the screws meet resistance and can no longer turn.

## 5.4 System Calibration

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The Air Check Carbonyl Sulfide Monitor requires periodic calibration with the appropriate standard gas. Calibration should be performed whenever:

- Six months has passed without calibration
- **NOTE:** *For higher accuracy more frequent dynamic gas calibration is required.*

### 5.4.1 Gas Generation and Calibrating Kits

For generating a calibrating gas, the following supplies are recommended. They are available by separate order.

ITEM	PART NUMBER	DESCRIPTION	PACKAGING
1	* <b>HX G2699770</b>	Span gas 50ppm Carbonyl Sulfide blended with air	1 bottle 105 liters
2	* <b>SEQRFM0030180CGA180</b>	RMF Regulator 0.5 SLPM preset flow rate	1 ea.
3	** <b>232-05A</b>	Tedlar Sample Bag, 5-liter polypropylene fitting	2 each

\* Purchase directly from: Matheson Tri-Gas Ph: 800-416-2505

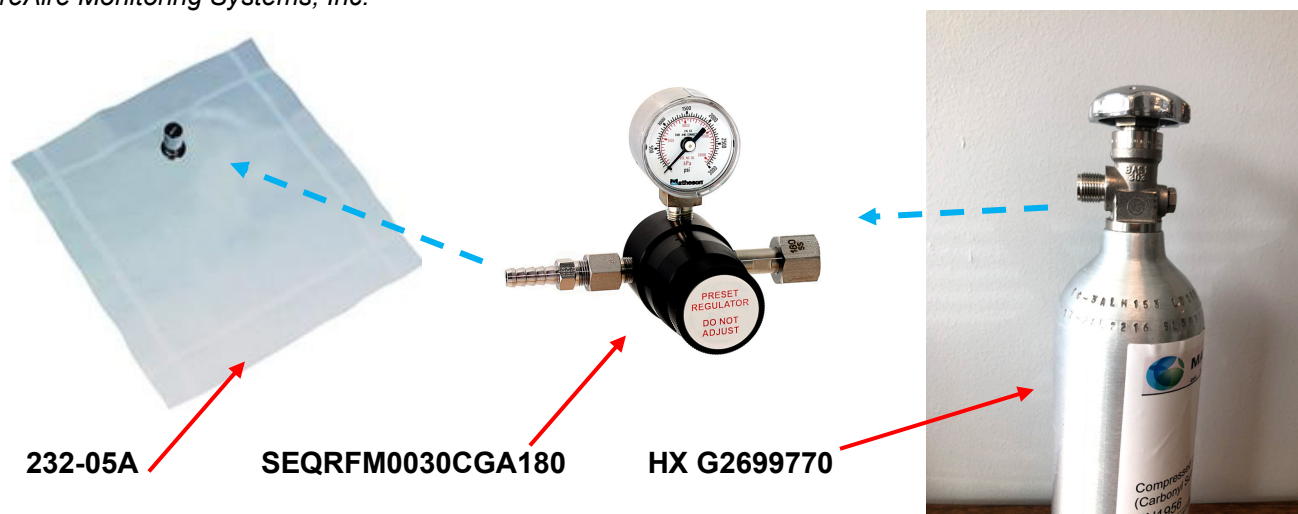
\*\* Purchase directly from SKC Ph: 724-941-9701

### 5.4.2 Initial Preparation and span gas preparation

**NOTE:** If the instrument is connected to a controller, set the controller to Standby mode to avoid accidental alarms.

**NOTE:** If the monitor was powered off, it is recommended to warm up the Carbonyl Sulfide monitor for 1 hour before making any adjustments to the sensor.





#### 5.4.2 Initial Preparation and span gas preparation

1. Connect the RMF regulator to the COS span gas cylinder.
2. Connect the Tedlar gas sample bag to the regulator.
3. Turn on the regulator and fill the span gas bag.

#### 5.4.3 Set Module Zero

**NOTE:** This procedure should be performed in a gas free atmosphere.

**NOTE:** *Do not make any zero or span adjustments until the monitor has been operating for a minimum of 1 hour with a fresh new Carbonyl Sulfide Sensor cell. Failure to do so will affect the calibration.*

This is the menu at which to adjust the true zero reading on the Carbonyl Sulfide monitor. This procedure must be performed before challenging the monitor to a calibrated span gas. To perform this function, (after entering the password), push the joystick to the right and “Set 4-20mA’ will scroll. Push the joystick up twice and “Sensor Adjustment” will scroll.

...Sensor Adjustment...  
0.0ppm

Push the joystick to the right once and “Set sensor Zero” will display.

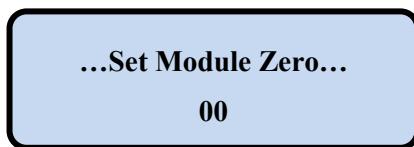
Note that there are 6 sub menus in the Sensor Adjustment Menu. Menus 2, 3, 4 & 6 are not used for the Carbonyl Sulfide monitor. Menu 4 is the only menu used during calibration and sensor adjustment.

- |                           |   |
|---------------------------|---|
| 1. “Set Sensor Span”      | <i>Used to adjust the monitor reading to a known span gas concentration</i> |
| 2. “Set Sensor Zero”      | (Not Used)  |
| 3. “Enable Auto Zero Cal” | (Not Used)  |
| 4. “Start Zero Cal”       | (Not Used)  |
| 5. “Set Module Zero”      | <i>Used to zero the monitor</i>   |
| 6. “Enable Zero Tracker”  | (Not Used)  |

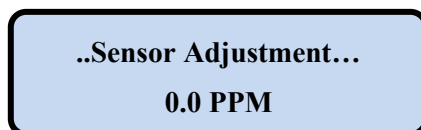
To adjust the monitors zero reading Push the joystick down to select the “**Set Module Zero**” menu.  
**Set Module Zero** will scroll on the top line of the digital display and a 2-digit number will display below.

Push the joystick to the right to enter the Zero adjustment mode.

To reset the zero Press, **ENTER**, (**push in like a doorbell**) to reset the zero and accept the new zero value.



Push the joystick to the left **once** to exit this submenu and return to the Sensor Adjustment Menu.

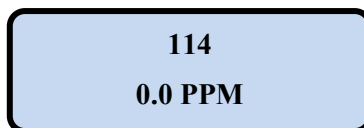


The Carbonyl Sulfide monitor zero has been adjusted and the monitor is now ready for calibration.

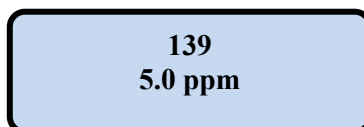
#### 5.4.4 Span Calibration

- \* **CAUTION:** *Be sure to observe all safety guidelines when generating and using calibration gases.*
- \* **NOTE:** Ensure that the span gas is within certification period
- \* **NOTE:** When using cylinder span gas, gas must be a mixture of the target gas blended with air.

To access the span function, while in the Sensor Adjustment Menu, push the joystick right until the "Set Sensor Span" menu appears. Push the joystick to the right to display the span menu.



1. Connect the waste bag to the exhaust and open the valve on the waste bag and connect the system exhaust tubing to the gas waste tedlar bag. Inspect the flow rate to confirm flow is not blocked.
2. Connect the ¼" flexible tubing from the regulator to the inlet of the particulate filter. Expose the Carbonyl Sulfide monitor to span gas for three (3) minutes. Adjust the display reading to the span gas by pushing the joystick up or down to set the concentration value on the PPM display.





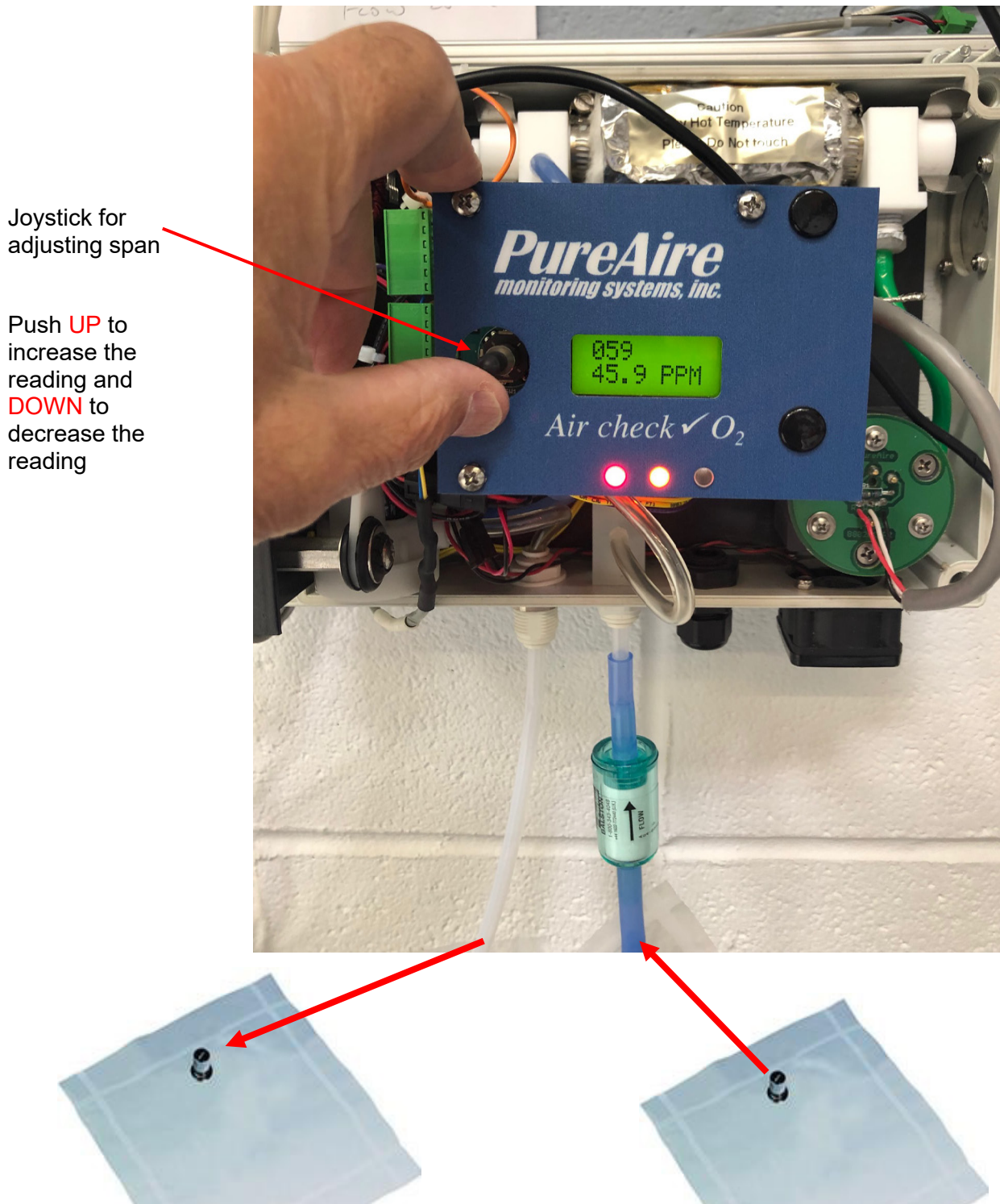
*PureAir Monitoring Systems, Inc.*

3. Press **ENTER** to accept the calibration value.
4. After calibration, disconnect the span gas from the monitor and permit the digital display to return to zero.

**NOTE:** The Air Check Carbonyl Sulfide monitor has an internal pyrolyzer that converts the gas to bromine. Typical fall times can range from 1 to 4 minutes depending on the exposure concentration. The higher the concentration, the longer the fall time to zero.

5. Return the system to the monitoring mode by pushing the joystick to the left until the “CH<sub>3</sub>Br ” appears on the top line of the display. Reattach the front cover to the sampling system.

**Note: The remaining span gas and collected waste gas should be properly exhausted.**



## 6: Appendix

### Location of 4ea. Front Cover Fastening screws

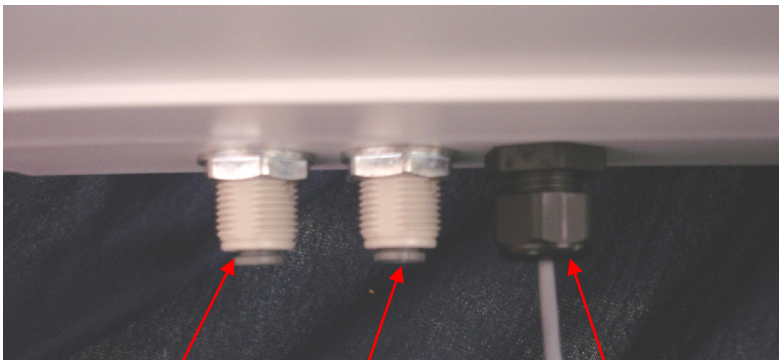
The Air Check monitor has 4 ea. Front Cover captive fastening screws on each corner of the front cover.

Use a Phillips head screwdriver to unfasten the screws to remove the front cover.

Please Do Not Over tighten



### Location of the Sample Inlet and Exhaust connectors

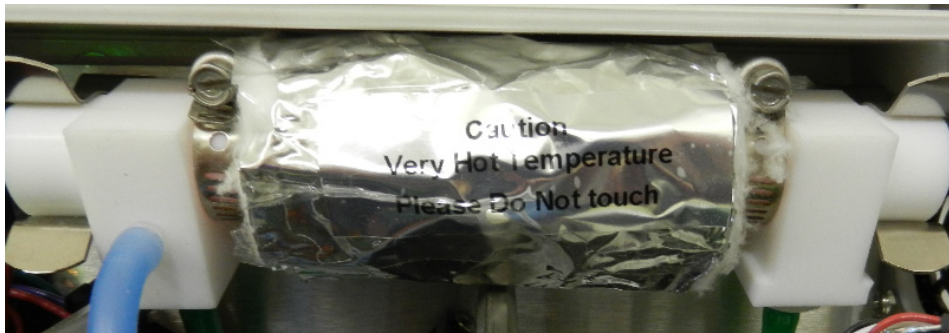


Sample Exhaust

Sample Inlet

Electrical Cable connector

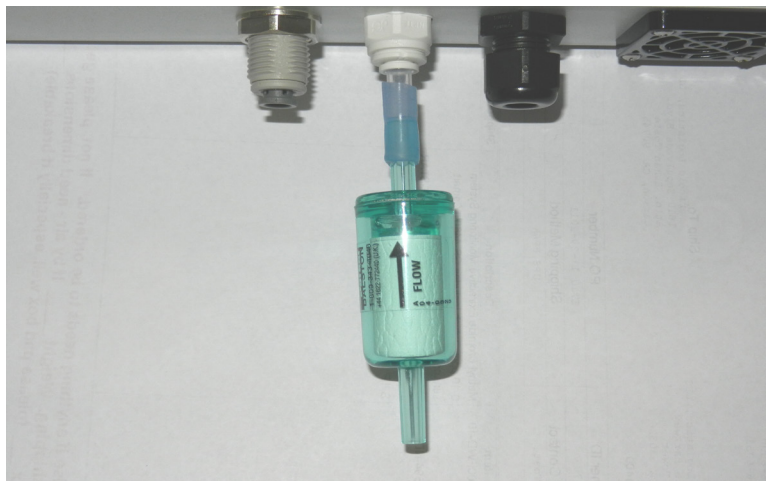
### Pyrolizer Assembly



The pyrolizer insulation temperature can exceed 150F and can cause burns if touched.

Please power down the system when working inside the enclosure.

### Air Check ✓ Sample Inlet Filter (p/n 23102)



To protect the pump and pyrolizer from dust, the use of a particulate filter is supplied. On installation, attach the particulate filter to the inlet using the tygon sample tubing supplied. Ensure the correct flow by aligning the arrow towards the inlet connector.

**NOTE:** *If the filter gets saturated with water droplets, it will diminish the response of Carbonyl Sulfide.*