PureAire Monitoring Systems
Electrochemical Pyrolizer Monitor

Instruction Manual

For models/series
99194 - Acrylonitrile (AN) 0-30PPM

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Rev 1.01, May 2025

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Welcome to PureAire Monitoring Systems

I would 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 can provide 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 are available 24 hours a day, 7 days a week to help you when you need us. Our 24-hour Emergency phone number is +1 (847) 541-1968. We can provide field service recommendations, preventative maintenance programs and training to your technicians in the operation of our equipment. Our goal is to provide the best after-sales service and support in the industry. That is 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 am proud to welcome you to our family of valued and satisfied customers.

Sincerely,

Albert A. Carrino
President

Notices

1140 Ensell Road
Lake Zurich, Illinois 60047

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PureAire monitoring systems, inc.

PLEASE READ BEFORE INSTALLATION

The following environmental conditions **WILL DAMAGE** the Monitor

1. The PureAire Monitor requires **24 VDC regulated power ONLY**. **DO NOT** connect the monitor to >24 VDC, or **ANY AC Voltage**.

2. **DO NOT power** the monitor **without the sensor attached** to the main assembly. **DO NOT disconnect/reconnect sensor** while monitor is powered.

3. Protect the monitor from physical impact and vibrations that exceed the specified limits.

4. Ensure installation complies with local safety regulations and standards. **INSTALLATION SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL**.

5. **AFTER POWER UP, PLEASE LET THE SYSTEM EQUILIBRATE FOR A FEW HOURS** before making any adjustments.

6. Continuous exposure to target gas or very high short-term exposure may require more frequent sensor recharges, and complete pyrolizer filament and pump replacement.

7. The pyrolizer filament is fragile and must never be disturbed once inside the pyro tube. **NEVER TWIST THE FILAMENT INSIDE THE PYRO TUBE**.

The Password for entering the menus is 557.

1: Introduction

The PureAire Electrochemical Pyrolizer Toxic Gas 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 up to 100 feet (33 meters).

The Pyrolizer Toxic Gas Monitor is a single point monitoring system built into a NEMA 4X water resistant housing designed to be wall mounted and require as little space for installation as possible.

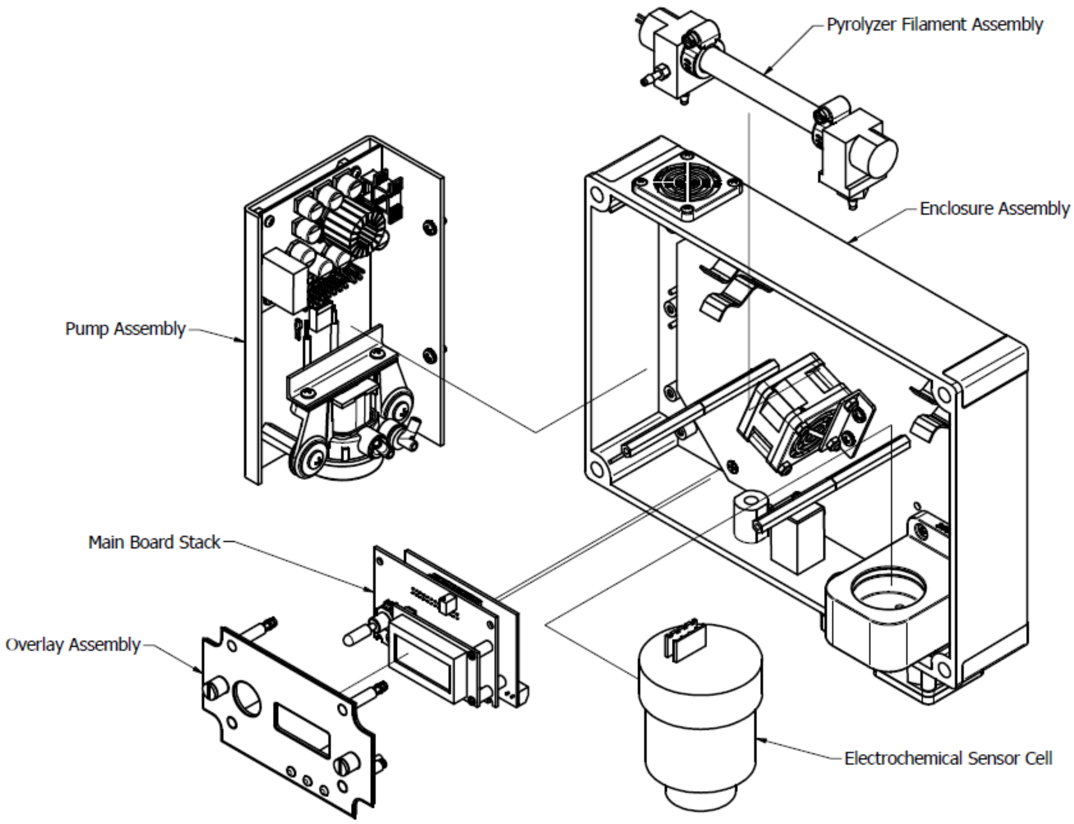
The system has the following features:

- 24VDC operation
- Built-in pyrolizer
- Integral digitally controlled sampling pump and flow system
- Local digital display
- User selectable dual level alarm and system fault relays
- 4-20 mA analog output
- Renewable long life electrochemical sensor cell
- Advanced electronic circuitry continuously monitors sensor, pyrolizer, and sample pump

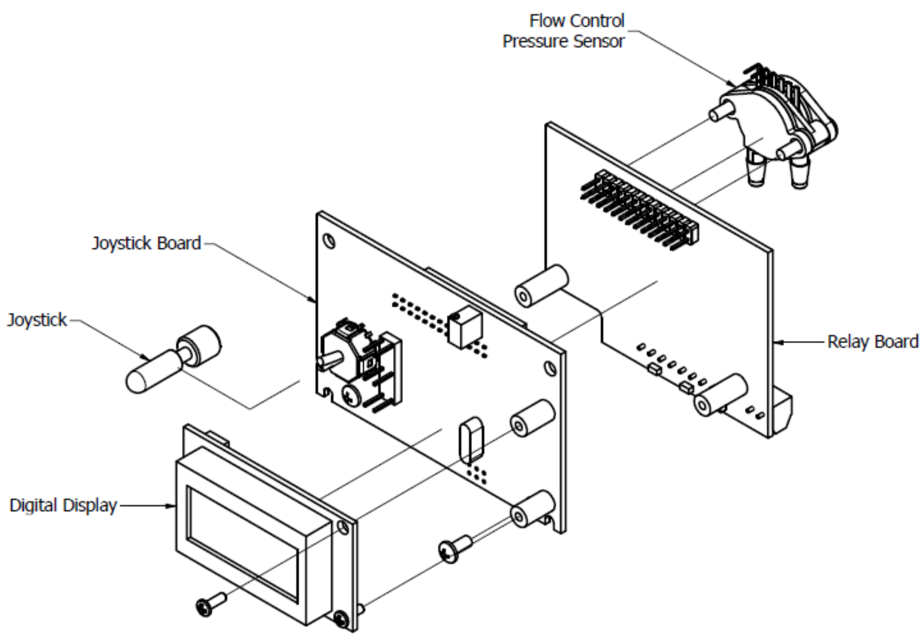
NOTE: The PureAire Electrochemical Pyrolizer Toxic Gas Monitor is NOT rated for hazardous environments.

1.1 Component Identification

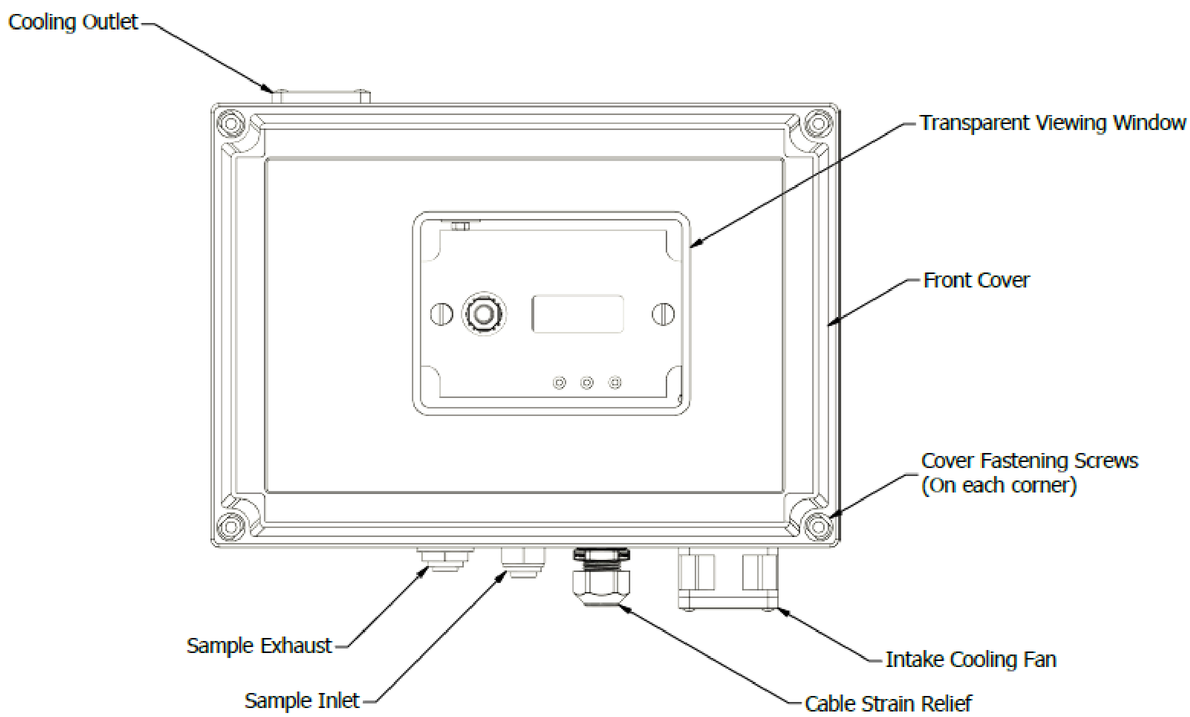
1.1.1 Major Component Overview



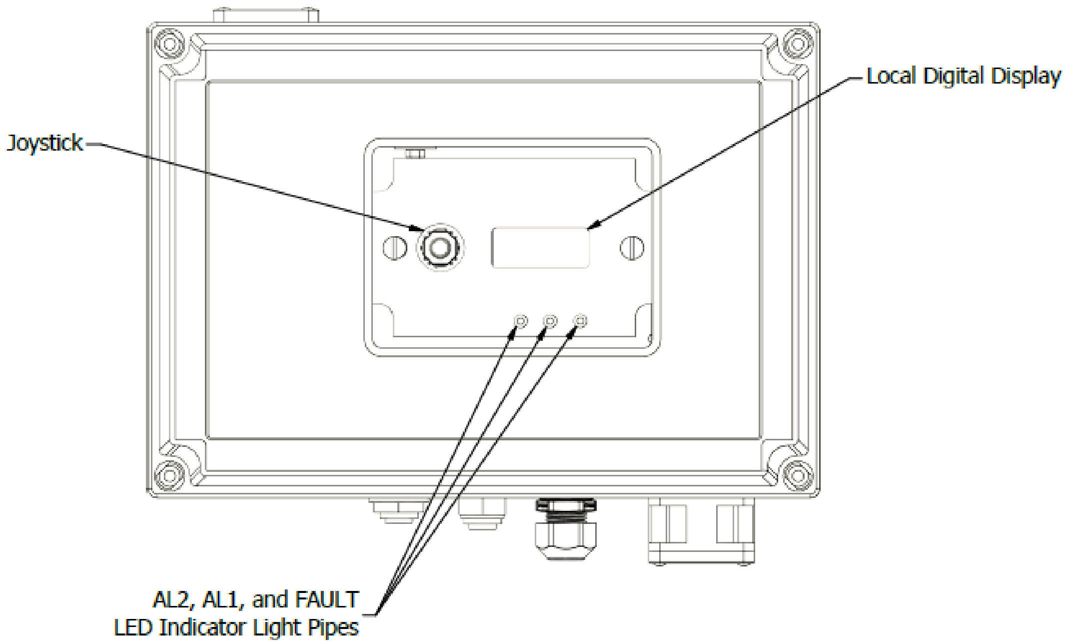
1.1.2 Main Board Stack Overview



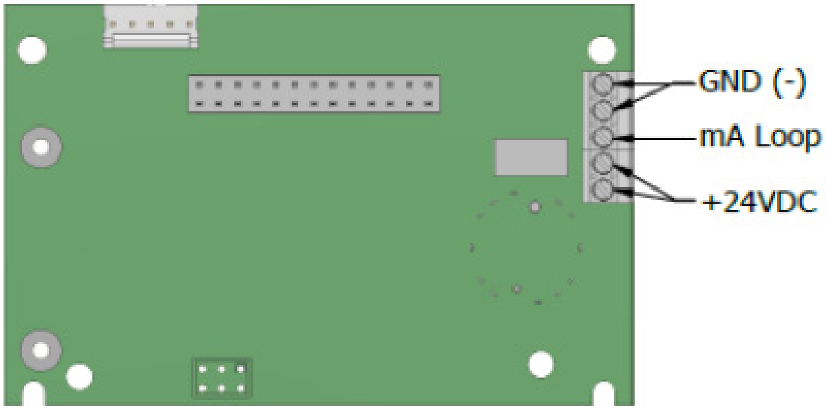
1.1.3 Outer Enclosure



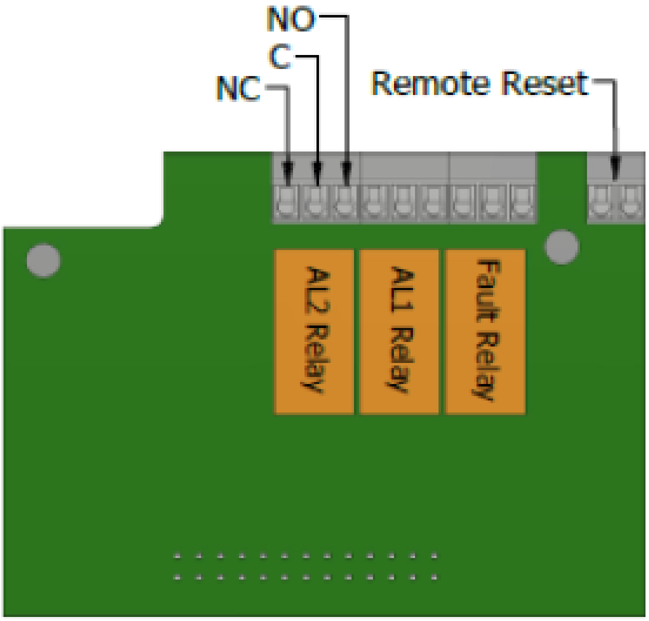
1.1.4 User Entry & Visual Feedback



1.1.5 Joystick Board

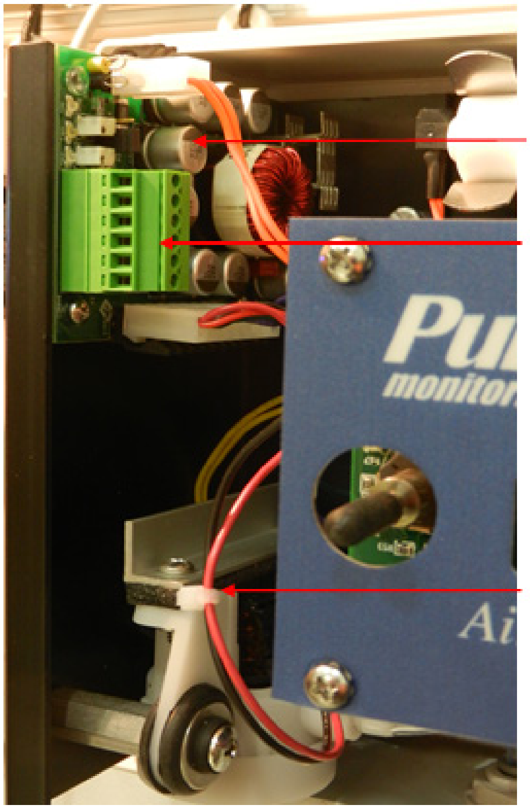


1.1.6 Relay Board

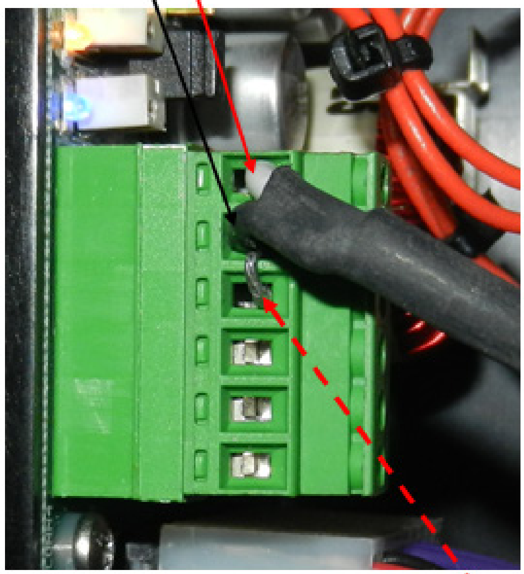


C: Common
NC: Normally Closed
NO: Normally Open

1.1.7 Pump & Drive Assembly

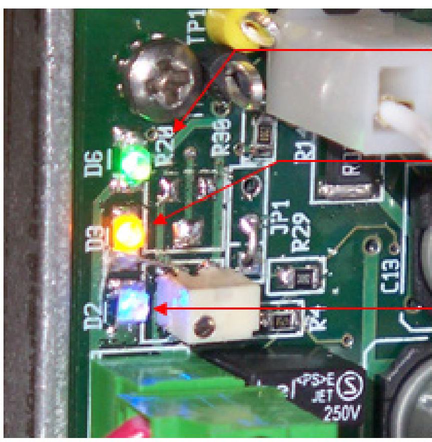


Pump and Pyrolizer Drive Assembly



Main power connection

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



2: Specifications

NOTE: *For our continual product improvement, all specifications are subject to change without notice*

2.1 Performance Specifications

Models:	PureAire Electrochemical Pyrolizer
Sensor Type:	Renewable electrochemical cell. Field Rechargeable.
Sensor Expected Life:	3 to 6 years under normal conditions.
Response Time:	Within 3 minutes to T90.
Accuracy:	±10% of full scale.
Fault Indicators:	Loss of VDC power (analog signal drops to 0 mA, system alarms de-energize). Loss of sample pump (4mA signal drops to 2, system fault alarm energizes). Loss of pyrolizer filament (4mA signal drops to 2, system fault alarm energizes). Loss of sensor cell (4mA signal drops to 2, system fault alarm energizes).
Operating Cond.:	+14° to +86°F (0° to +30°C); consult PureAire for lower or higher operating temps. Typically, 20-95% RH
Warranty:	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. **This warranty does not cover components considered expendable or consumable during normal use and thus have an unpredictable lifespan such as batteries, fuses, sample pumps, filaments, and sensor cell electrolyte & membranes.**

2.2 Signal Outputs

Local Display:	Offers a digital display, which can be accessed and managed via the joystick. In measurement mode, selecting ‘down’ will toggle between scrolling the description and just the gas.
Standard Analog:	Provides DC 4-20 mA output.
Relay Output:	Includes dual-level user-selectable alarm relays and one fault relay, all rated at ≤ 2amps @ ≤ 24VDC.

2.3 Electrical Requirements

Power:	24VDC external power. A regulated 24VDC power supply is required.
Consumptions:	Approx. 2A

2.4 Physical Characteristics

Dimensions:	10.0 (W) x 7.0 (H) x 7.0 (D) inches; 254 x 178 x 178 mm (Max w/ feet)
Weight:	10 pounds (4.5 kg)
Enclosure Type:	NEMA 4X wall mounted enclosure. **NOT RATED FOR USE IN HAZARDOUS ENVIRONMENTS.**

2.5 Default Factory Settings

The PureAire Electrochemical Pyrolizer Gas Monitor is shipped with factory defaults that are saved to the memory of the unit.

Menu	Factory Default	Definition
Set 4-20mA Loop	mA output is individually set at the factory using a calibrated Fluke meter.	Use this function to adjust the PureAire monitor's 4 mA (Zero), and 20 mA (Span) analog output
Set Formats	Alarm 1 = Normal Alarm 2 = Normal Fault = Normal	When alarm activates, the relays should energize (Normal), or de-energize (Inverted)
Set Polarity	Alarm 1 = Normal Alarm 2 = Normal	Alarm should activate above specified concentration (Normal), or when lower (Inverted) than the alarm thresholds
Set Latching	Alarm 1 = Non-latching Alarm 2 = Non-latching Fault = Non-latching	Automatic alarm reset (non-latching), or manual alarm reset (latching)
Alarm Delay	Alarm = 5 Seconds	Delay until alarm is activated
Set Alarm Thresholds	Alarm 1 = 2 PPM Alarm 2 = 4 PPM	Alarm levels
Set Alarm Hysteresis	Alarm 1 = 0 Alarm 2 = 0	Deadzone setting, more information in Section 5
Manage Passwords	Factory Default is **557**	For changing the password from factory default to a new password

The LED indicators on the front panel are connected directly to the alarm relays.

3: Installation

3.1 Site Requirements

The PureAire Electrochemical Pyrolizer Toxic Gas Monitor should ideally be placed in an area free from excessive vibration and electrical noise or interference. Areas with high temperatures or high humidity should be avoided. When installed on a wall, the monitor effectively covers an area of about 692 ft^2. This coverage is approximately a circle with a radius of around 15 ft, assuming an ideal and uniform gas dispersion in an open space.

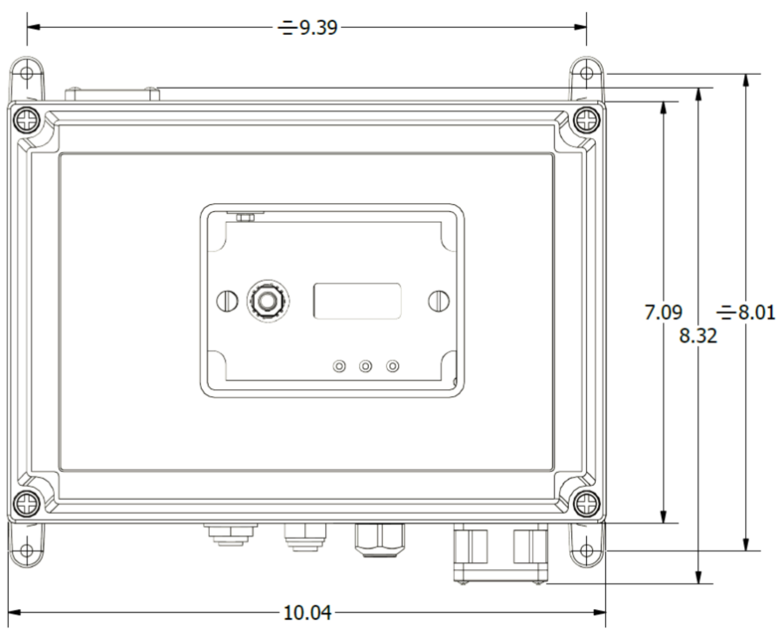
For optimal safety and effectiveness, the PureAire Electrochemical Pyrolizer should ideally be situated as close as possible to potential leak sources, such as gas lines, gas cylinders, or other areas prone to gas leaks. While the monitor should not be placed more than 21 ft away from these potential leak points, positioning it closer enhances its ability to promptly detect changes in gas levels. When considering placement, various factors may have to be examined such as expected gas dispersion patterns, the monitor’s sensitivity, and required safety margins. Therefore, the closer the monitor is to the potential source of a leak, the more effective it will be in providing timely alerts.

Furthermore, if multiple monitors are installed on the same wall, the maximum distance between two units should not exceed 30 ft for optimal safety and monitoring efficiency. However, actual coverage could be influenced by many environmental factors.

3.2 Mounting

3.2.1 EXR Enclosure Dimensions

The following is a drawing of the mounting dimensions for the monitor housing.



3.2.2 Installation Guidance

The Electrochemical Pyrolizer monitor is designed primarily for wall mounting and should be installed at a height convenient for operation, maintenance, and viewing of the instrument's digital display.

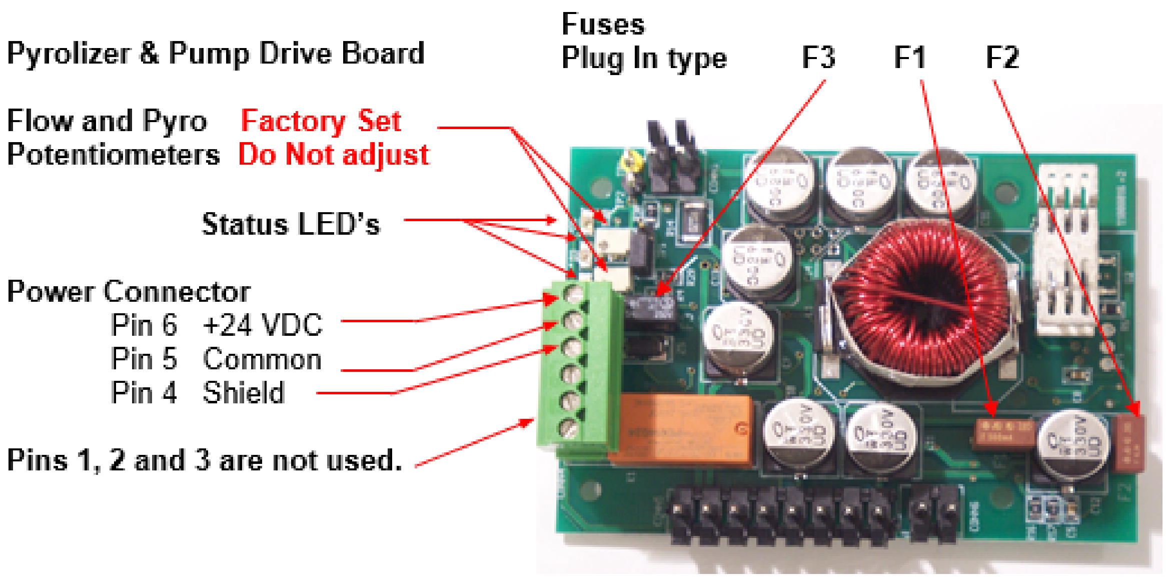
Choose a location for the transmitter and sensor where potential gas leaks could occur or where any released gases might tend to gather. The installation should not be less than 12 inches above the floor level. **Consider factors such as air circulation patterns within the area to be monitored, the properties of the gas (whether it's lighter or heavier than air), and the placement of workstations and staff when deciding on the optimal installation site.**

3.3 Wiring

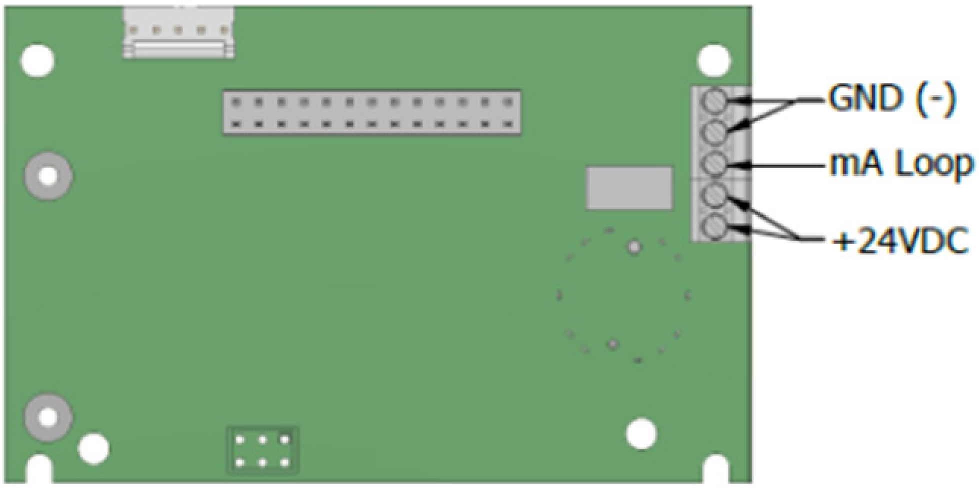
The Electrochemical Pyrolizer monitor necessitates a singular, triple-conductor shielded cable for the purpose of analog output and 24 VDC power input. It's recommended to employ a three-wire shielded cable, ideally of 18 AWG stranded, such as the General Cable E2203S.30.860 or an equivalent. The connections for analog output and VDC power input are to be made on the internal terminal block located within the transmitter housing.

Note that all PureAire monitors, except for explosion proof monitors, come with a pre-installed plug-in power supply.

3.3.1 Pyrolizer & Pump Drive Board



3.3.2 Monitor Power & Analog Output (Joystick Board)



Caution: DO NOT connect to a powered current loop receiver. The PureAire monitor supplies the current loop power.

DO NOT disconnect or reconnect the sensor when the monitor is powered on.

4: Normal Operation

The PureAire Electrochemical Pyrolizer monitor is a single point monitor designed for the continuous detection and measurement of toxic gas concentration levels in ambient air.

4.1 Signal Outputs

The PureAire Pyrolizer monitor consistently outputs an analog signal ranging from 4-20 mA, corresponding directly to toxic gas concentration. A 4-mA output signifies 0% of the full range, while a 20-mA output denotes 100% of the maximum value, representing the full operational range of the monitor. If a system fault occurs, a specific factory-designated code will appear on the local digital display, which will help identify the exact issue with the system, while the analog signal will be locked to 2mA.

CAUTION: DO NOT connect to a powered current loop receiver.
The PureAire monitor supplies the current loop power.

4.2 Instrument Faults

The PureAire Pyrolizer monitor incorporates several self-checking features to ensure reliable operation. If a fault condition is detected, the analog signal output is altered. Common error codes are displayed in the following table.

Condition	Error Code
Sensor Communication Error	1
EEPROM Fault	8
Supply Voltage Out of Range†	16

When the monitor is in a Fault state, the analog output will be locked to 2 mA.

† When using a non-PureAire power supply, please ensure that the voltage is regulated to 24±0.5VDC. If the voltage is outside the acceptable range, the “Supply Voltage Out of Range” fault will be activated and will disable the monitor.

*If a Fault condition clears itself, (Yellow LED is no longer illuminated) the Fault message will continue to scroll until manually cleared. To clear the fault message, select/toggle **down** ↓.*

4.3 Routine Maintenance Schedule

Continuous gas detection systems, crucial for identifying hazardous gas leaks in various environments, require routine maintenance to ensure proper functioning. The frequency of this maintenance largely hinges on the specific environmental conditions. However, as a general guideline, it is recommended to conduct visual inspections **every 1 year** to verify the physical integrity of the system. Similarly, testing the system with the target gas every 12 months is advisable to confirm the sensor's responsiveness. Please remember that your organization's maintenance policies, along with the unique conditions of your application, may necessitate adjustments to this recommended maintenance schedule.

During normal operation, the unit should be outputting a 4-mA signal when the toxic gas level is at 0% of the full scale. The LCD digital display should also indicate ‘0.0 PPM’ when there is no toxic gas detected.

4.4 Loss of Power Indication

In the event the PureAire monitor loses 24VDC power, the analog output signal will drop to 0mA, and the LCD display will be blank.

4.5 Alarm Reset

The PureAire Electrochemical Pyrolizer monitor comes equipped with alarm relays. When the monitor’s alarms are triggered, the built-in alarm relays, and panel-mounted LEDs will activate simultaneously. Depending on the relay settings, the alarm systems will either automatically reset (non-latching settings) or require manual reset (latching settings) upon coming out of alarm state.

To manually reset the alarms, you can use the user-interface or the remote reset function:

1. **User-Interface:** To use the user-interface for reset, you first need to enter the designated password to access the reset function. Once the password is accepted, you can toggle enter using the provided magnetic wand to reset the alarms.
2. **Remote Reset:** The alarm relay board includes a two-pin connector for wiring to a remote switch. When a switch is connected, this remote reset function allows you to reset the alarms without using the user-interface or needing to enter a password.

Please note: Before you can reset the alarms using either the remote reset switch or the user-interface, the measured gas levels must return to under alarm thresholds.

5: Monitor Programming

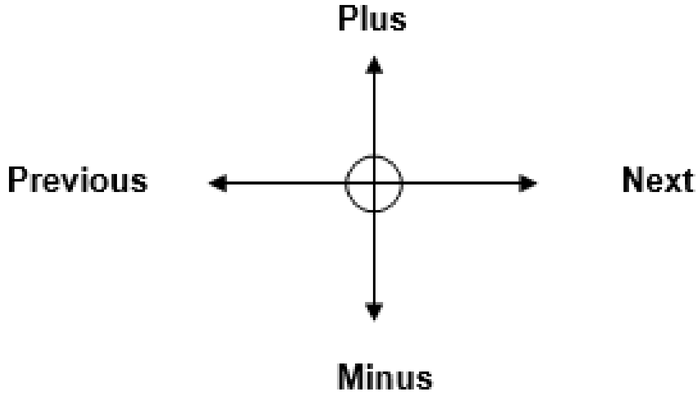
Only qualified personnel should perform programming, maintenance, and sensor verification.

The PureAire Electrochemical Pyrolizer Toxic Gas Monitor comes with customizable settings, allowing users to modify alarm settings, 4 and 20mA output, and minor sensor adjustments. These settings are organized within menus that can be navigated using the user-interface. Access to these menus is secured with a factory-set password.

Please note: Even while adjusting settings within these menus, the PureAire Electrochemical Pyrolizer monitor will keep monitoring gas levels. **The alarm, fault relays, and mA output remain active and online during any changes made within the menus.**

5.1 User-Interface Operation

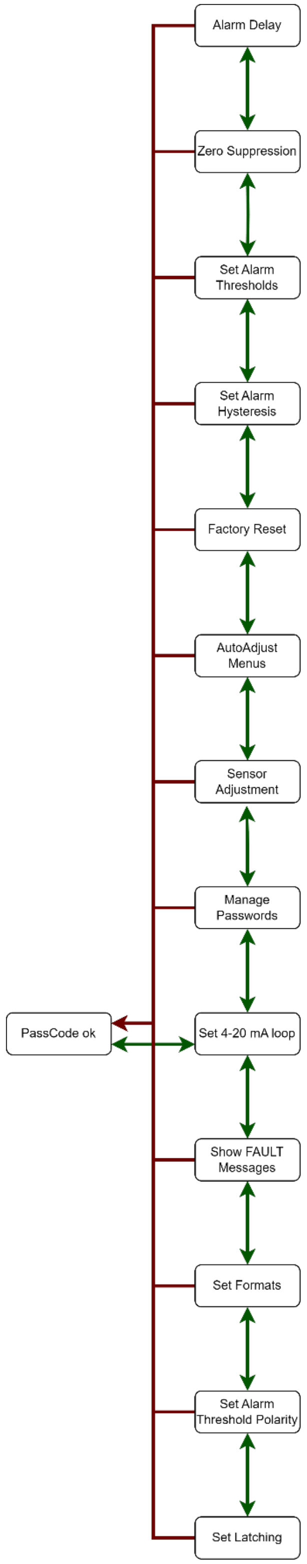
The PureAire Electrochemical monitor uses a toggle user-interface for selecting menus and changing values. The user-interface is programmed to standard protocol as follows:



Up – Increases the value
Down – Decreases the value
Right – Next level of menu hierarchy
Previous – Returns to previous level of menu hierarchy
Enter – Enters information into the microprocessor (Press directly in)

NOTE: The interface has a built-in delay to prevent accidental tampering of the menus.

5.2 Overall Program Flowchart



5.2.1 Top Level Menu Navigation

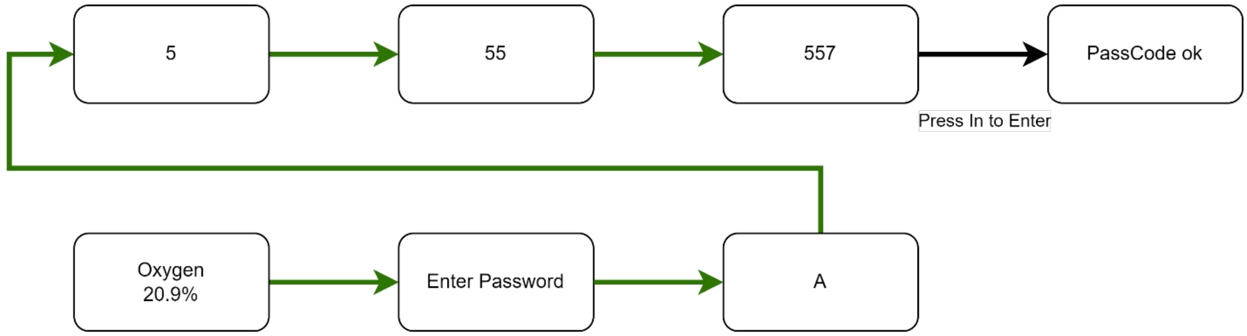
After entering the correct password, the monitor will display “PassCode ok”. To exit the password menu and return to the default screen, input ‘left’ on the user interface.

To access the internal settings, input ‘right’ to enter the ‘Set 4-20 mA loop’ top-level menu state.

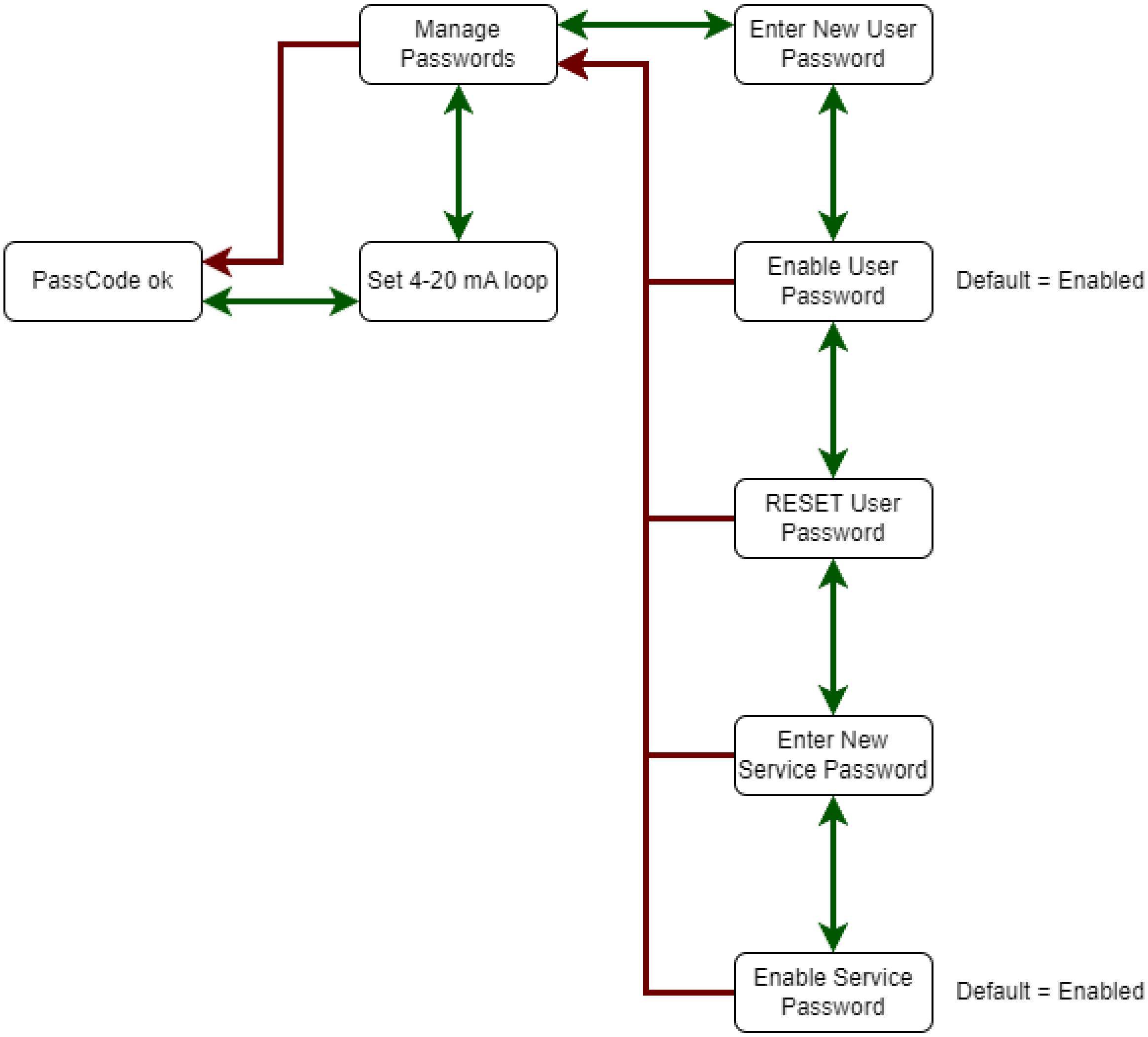
Once in this menu state, you can navigate through other top-level internal menus by inputting ‘up’ or ‘down’.

To return to the “PassCode ok” screen from any top-level internal menu, input ‘left’ on the user-interface. From sub-menus, toggle left until the “PassCode ok” menu state is reached.

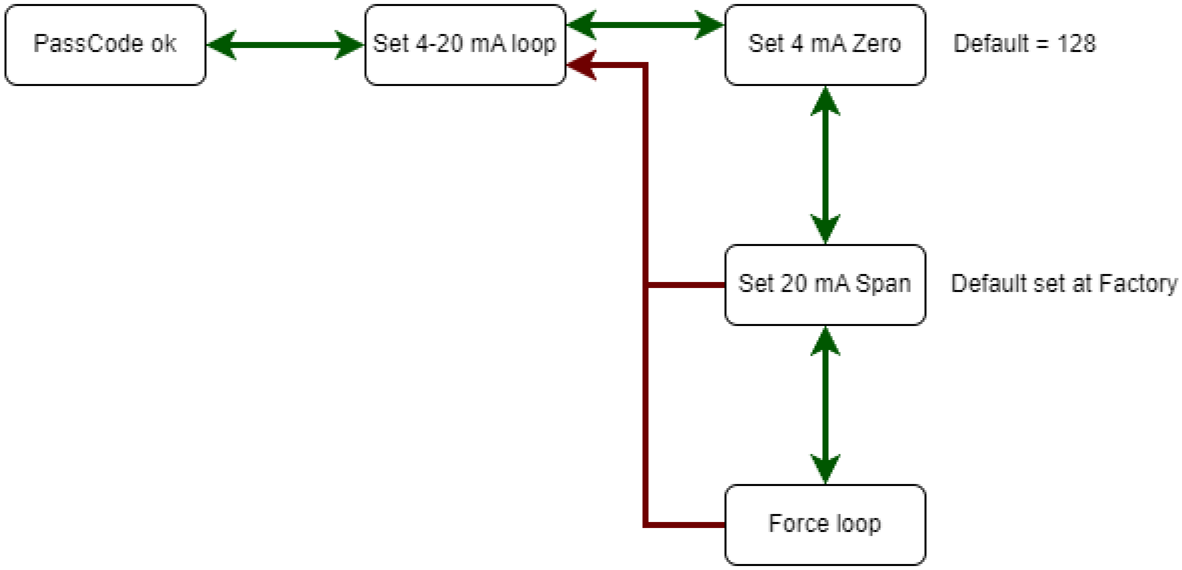
5.3 Entering Password



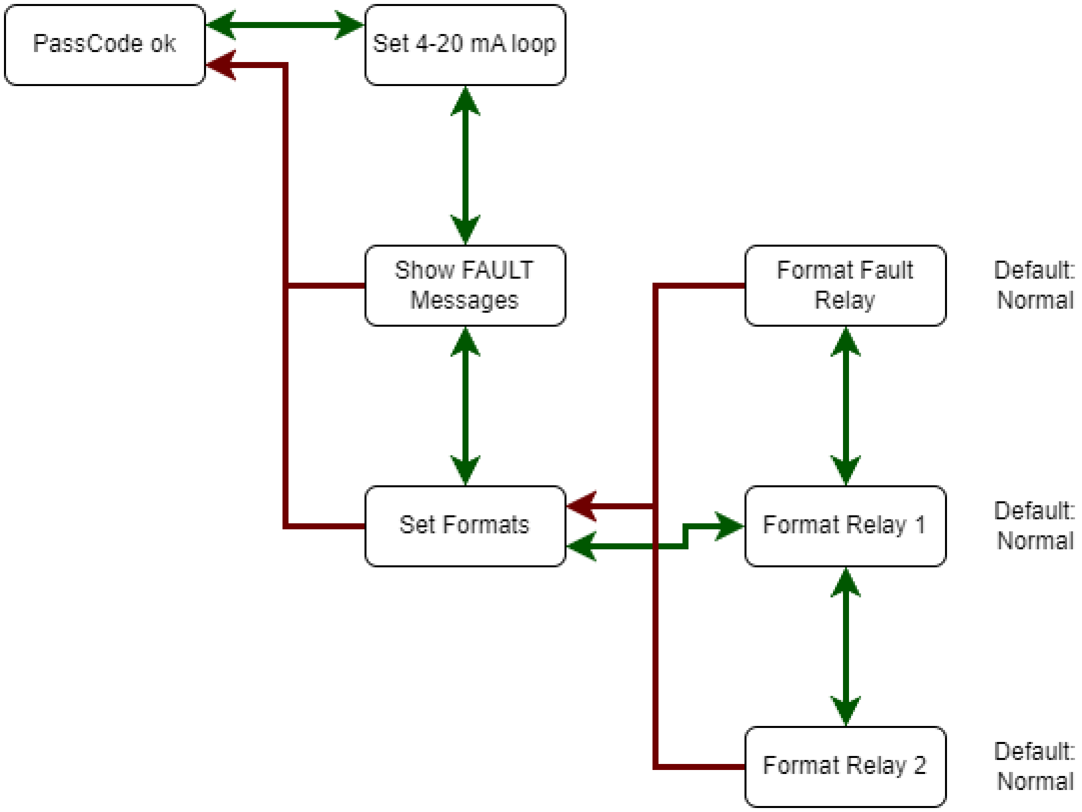
5.4 Changing the User Password



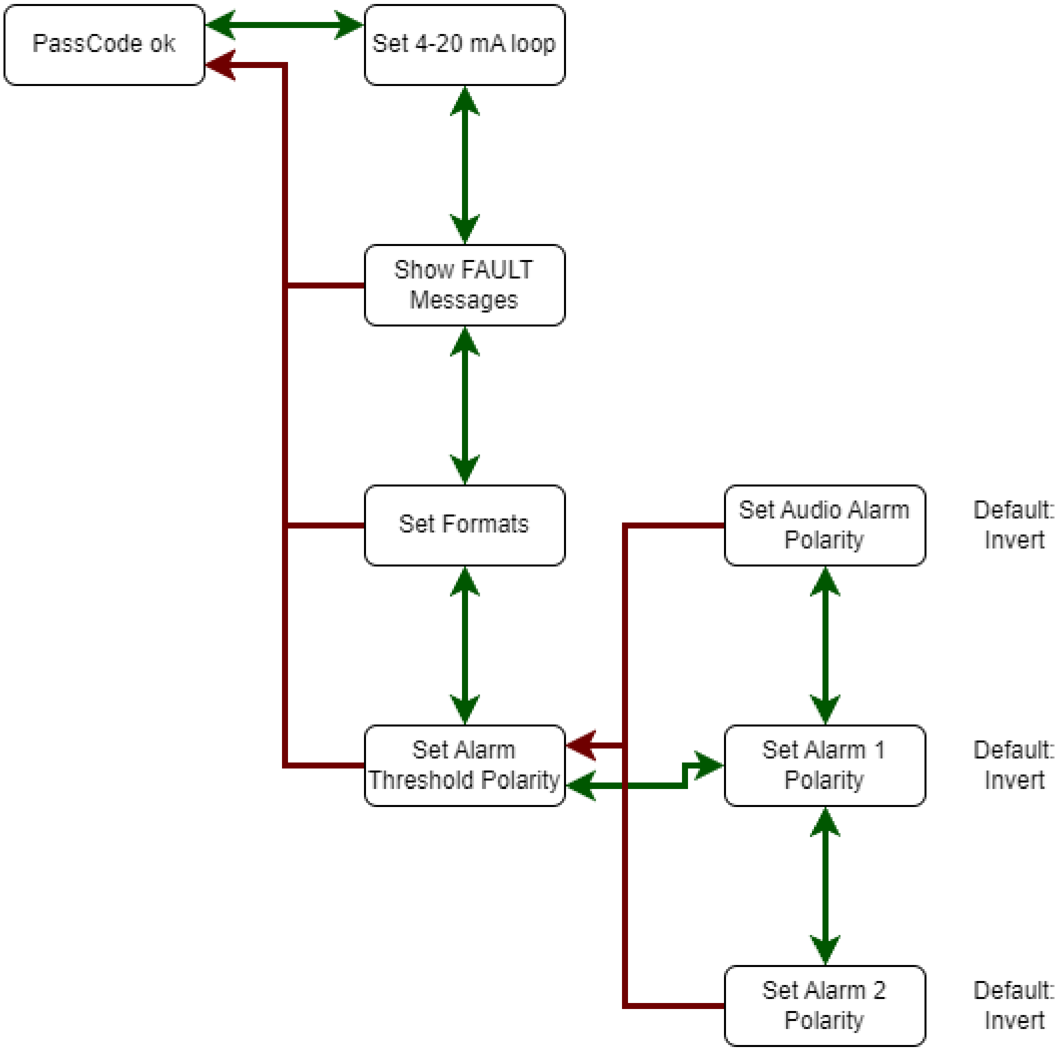
5.5 Setting 4-20mA Loop



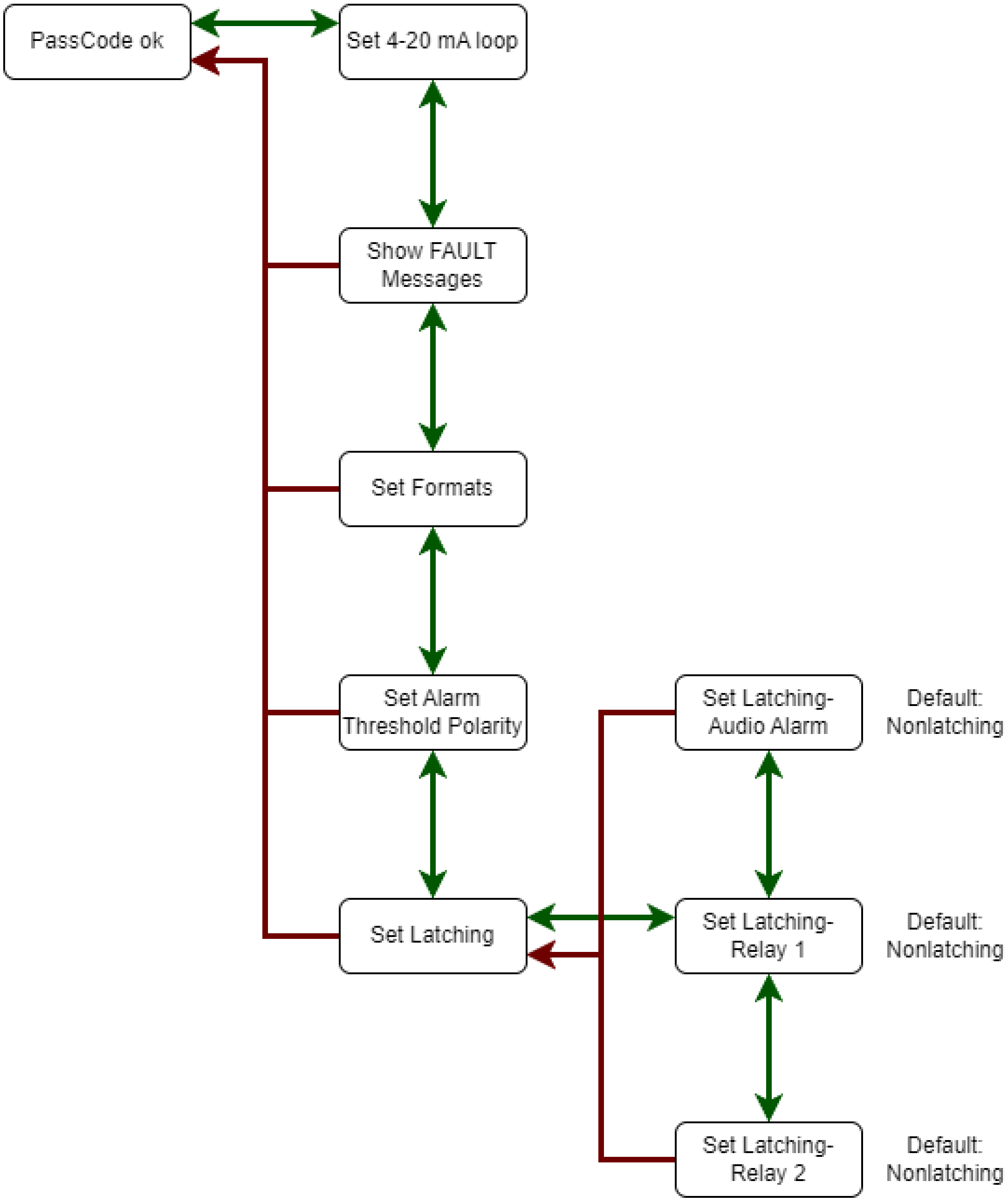
5.6 Setting Relay Formats



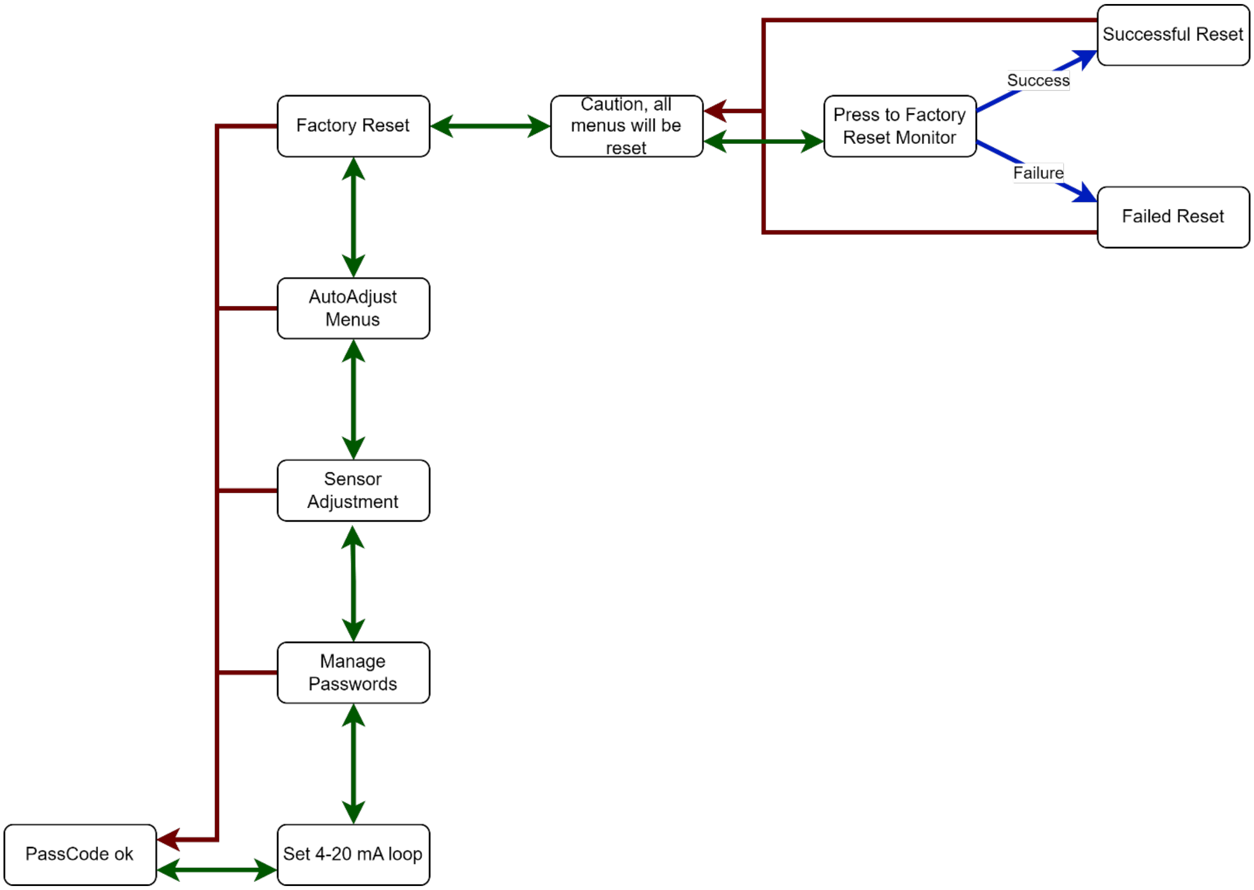
5.7 Setting Alarm Polarity



5.8 Setting Alarm Latching

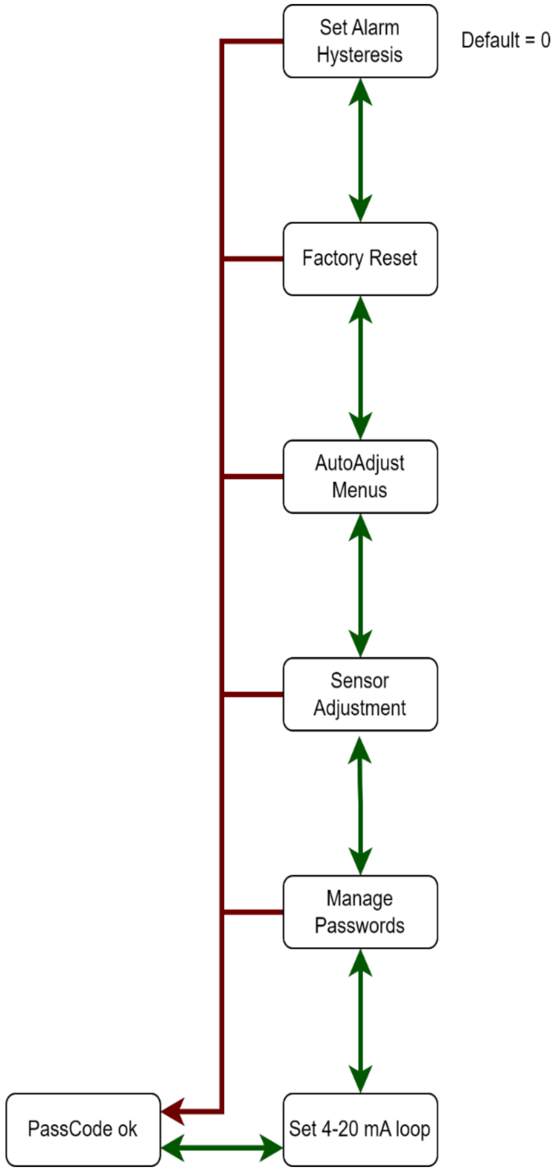


5.9 Factory Reset Menus



Please refer to Section 2.7 for Default Factory Settings and resettable settings.

5.10 Setting Alarm Hysteresis



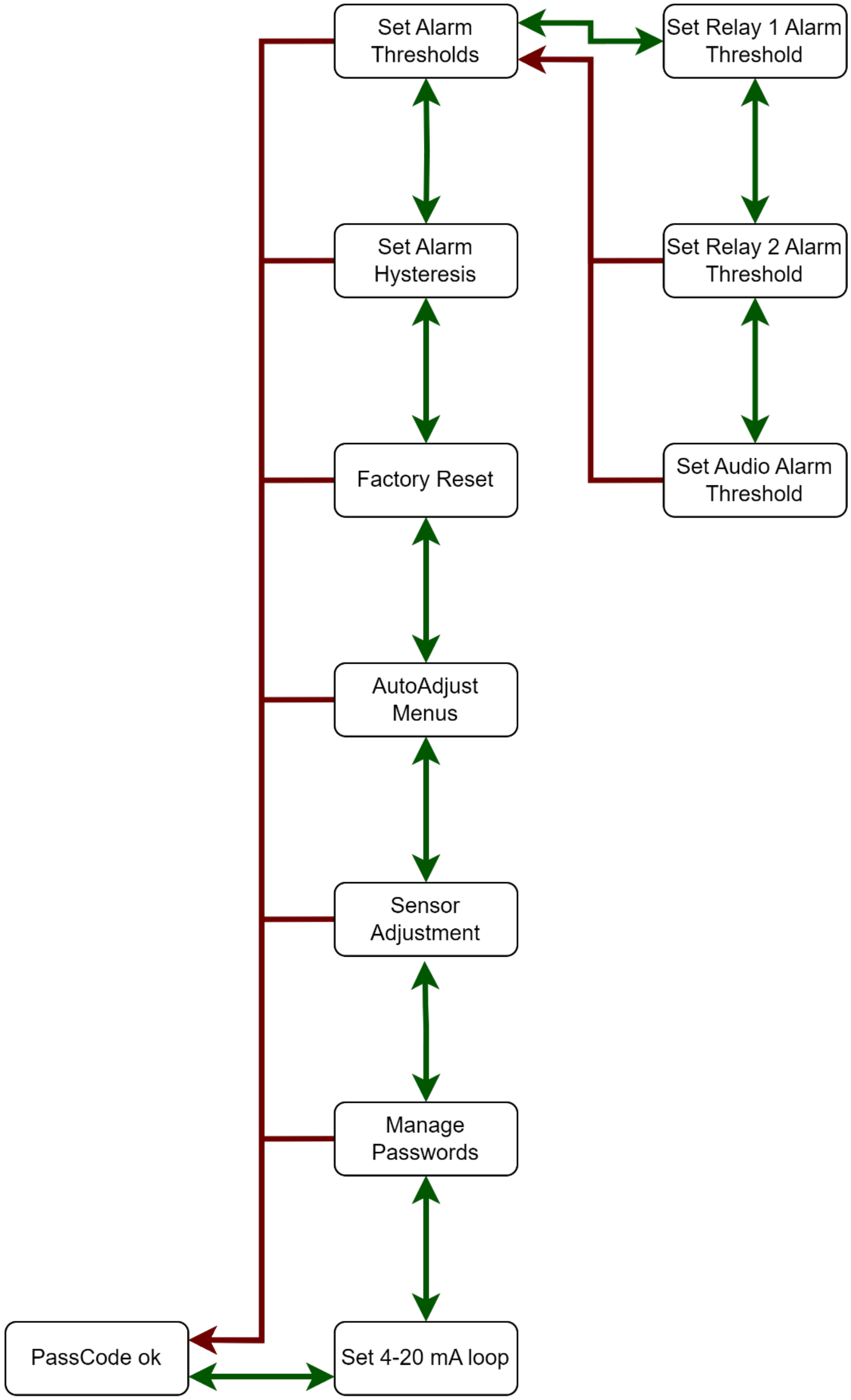
5.10.1 Hysteresis

Hysteresis refers to a system's dependency not just on its current input, but also on its past history of inputs. It's a fundamental concept employed in various scientific and engineering fields, often used to stabilize systems and prevent them from rapid fluctuations in response to minor changes in input, a phenomenon commonly referred to as "chatter". The application of hysteresis, thus, can provide more consistent and reliable system operation.

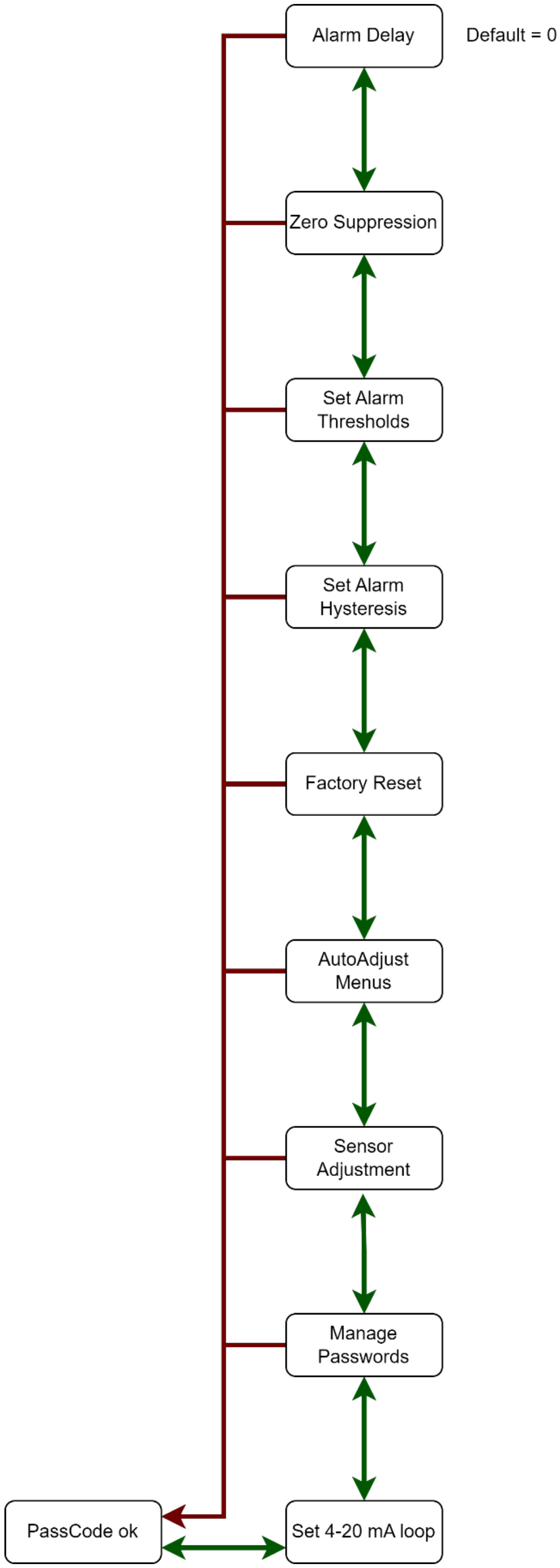
In control systems or sensors, hysteresis introduces a buffer zone of sorts, within which the system maintains its current state even as the input varies. This has the practical effect of preventing a system from overreacting to small or brief changes in the inputs.

Consider an example in an oxygen monitoring and control system where we want a valve to close when the flammable gas level drops to 14.9% and reopen when it reaches 15.5%. The implementation of hysteresis allows us to set the alarm threshold at 15.2%, with a hysteresis value of 0.3%. This means that when the oxygen level falls to 15.2%, the system will trigger the alarm, and the valve will close. However, the valve will not reopen immediately when the oxygen level rises back to 15.2%. Instead, it will wait until the oxygen level reaches the upper hysteresis limit of 15.5% (15.2% + 0.3%). This strategy prevents the valve from frequently opening and closing due to small fluctuations around the 15.2% level, ensuring more stable operation

5.11 Setting Alarm Thresholds



5.12 Setting Alarm Delay



6: Maintenance & Sensor Verification

Only qualified personnel should perform maintenance and sensor verification.

6.1 General Guidelines

Like all continuous gas detection systems that measure and detect hazardous gas leaks in the workplace, PureAire Electrochemical Pyrolizer Toxic Gas Monitors require periodic maintenance to ensure optimal performance and reliability. PureAire recommends customizing your maintenance schedule based on your specific environment, including factors such as temperature, humidity, gas concentration, and dust. The following guidelines provide a clear reference for routine checks and preventative maintenance procedures.

6.1.1 Routine Visual Checks

During normal operation, the following is expected given factory defaults:

- Local Display reads '0.0 PPM' to indicate no presence of target gas is detected.
- Analog output is held constant at 4mA from the monitor (4-20mA output).
- Monitor relays and alarms are de-energized (factory default).
- System fault relay is de-energized (factory default).

6.1.2 Recommended Routine Maintenance Schedule

Routine Visual Checks (Reading, Fault LED)		Quarterly
Flow Rate and Power Status		Continuously internally supervised. Flow is constantly monitored and adjusted by the internal CPU. Automatic system integrity verification.
Electrolyte Replacement	**(p/n 84200)**	Every 6 months.
Membrane Replacement	**(p/n #####)**	Every 6 months.
O-rings & Silicon Sheets	**(p/n 86001)** **(p/n 86002)**	Replace when damaged.
Sensor Calibration		Every 3 months under continuous exposure. Every 6 months under normal use.
Pyrolizer Filament	**(p/n 46003)**	Replace when damaged.
Sample Inlet Filter	**(p/n 23102)**	Replace when clogged.

6.2 Sensor Cell Removal & Installation

6.2.1 Sensor Removal

IMPORTANT SAFETY NOTICE: Always power down the monitor and allow the Pyrolizer filament to cool completely before beginning sensor maintenance to prevent burns or injury.

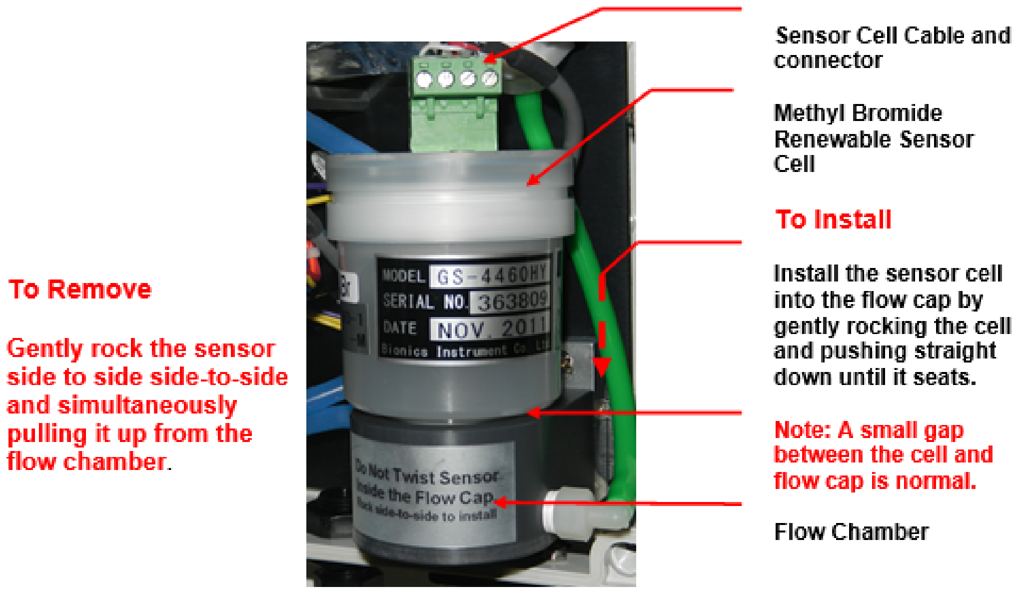
NOTE: After maintenance, the system will become depressurized and cooled, requiring approximately **30 to 60 minutes** after restart to return to stable operating temperature and conditions.

Follow these steps to safely remove the sensor:

1. Power down the monitor and wait until the Pyrolizer filament has cooled completely (typically 10-15 minutes).
2. Remove the sensor by gently rocking it side-to-side while simultaneously pulling straight up from the flow chamber.
3. Immediately cover the opening of the flow chamber with a flat business card or similar clean cover to prevent contamination or debris from entering the chamber.
4. Disconnect the sensor cable by carefully pulling straight upward.

⚠ **CAUTION:**

- **Do NOT twist the sensor.** Twisting may loosen the box nut, causing electrolyte leakage.
- **Avoid spilling electrolyte** through the sensor's small vent opening.



6.2.2 Sensor Installation

⚠ **CAUTION:**

- Avoid touching or twisting the sensor's membrane. Oil from your fingers can block the membrane pores and impair sensor function.

Follow these steps to reinstall the sensor:

1. Ensure the monitor is powered down and the filament is cool.
2. Remove the sampling system front cover by unfastening the four plastic captive screws.
3. If supplied, remove any sensor shoring plugs or battery protection covers.
4. Plug the sensor cable firmly into the connector at the top of the sensor.
5. Carefully insert the sensor cell into the flow chamber by gently rocking side-to-side and pressing straight downward until it seats fully.
   NOTE: A small gap between the sensor cell and the flow chamber cap is normal.
6. Reinstall the sampling system front cover and secure it using the captive screws.
7. Restart the monitor. Allow approximately 30–60 minutes for the system to stabilize and reach optimal operational conditions.

⚠ **REMINDER: Do NOT twist the sensor inside the flow chamber.** Twisting may loosen internal seals, leading to leaks or damage.

6.3 Electrolyte Replacement

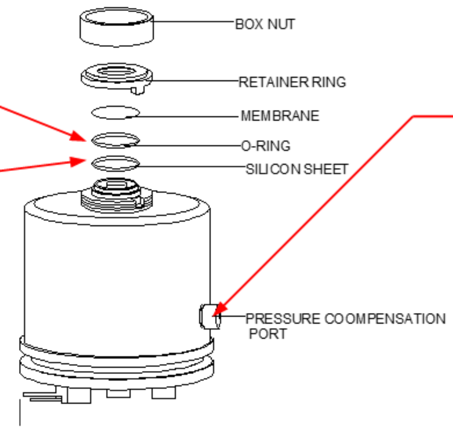
CAUTION: Always wear protective gloves and safety glasses when handling electrolyte. Follow your facility's chemical handling guidelines and procedures.

6.3.1 Electrolyte Replacement Procedure

1. Remove the Sensor:
   Refer to Section 6.2.1 ("Sensor Removal") for detailed instructions.

Rechargeable sensor cell uses a White O-ring, p/n 86001 and Silicon Sheet is p/n 86002

NOTE: Replace O-ring and Silicon sheet only if damaged



NOTE:

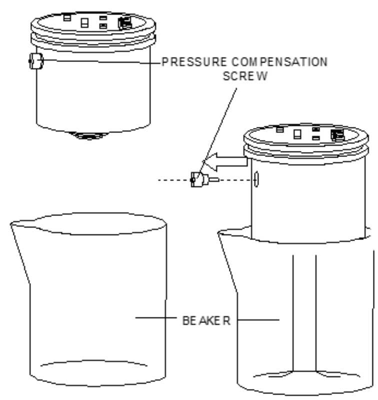
The Pressure Compensation Plug has a Teflon membrane fixed to the inside of the screw.

Never remove this membrane.

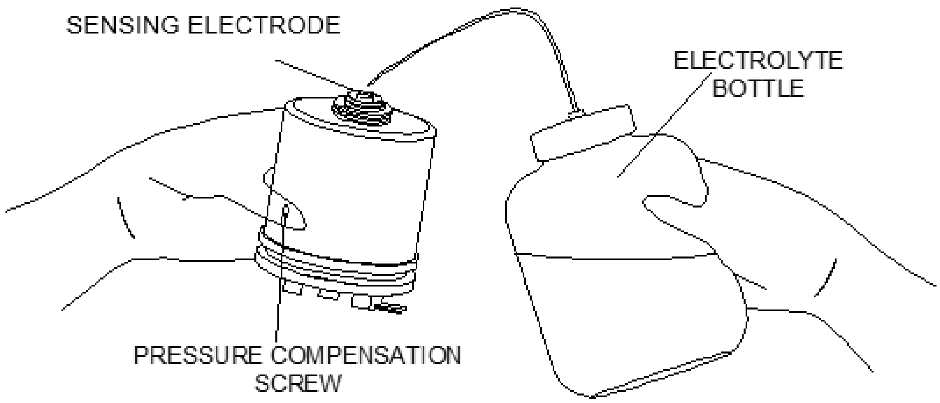
2. Prepare Sensor for Electrolyte Removal:
   Turn the sensor upside down. Remove the bottom nut, retaining ring, O-ring, and silicon sheet (if applicable).
   a. O-ring and Silicon Sheet (P/N 86001, 86002): Inspect and replace only if damaged.
   b. Pressure Compensation Plug: **Do NOT remove or damage the internal Teflon membrane** of the compensation plug.
3. Drain Old Electrolyte:
   Hold the sensor upside-down over a clean beaker. Remove the pressure compensation plug screw to release old electrolyte into the beaker.

NOTE: The sensor cell uses an 8mm diffuser that is inside the Retaining Ring

Please DO NOT REMOVE THIS DIFFUSER

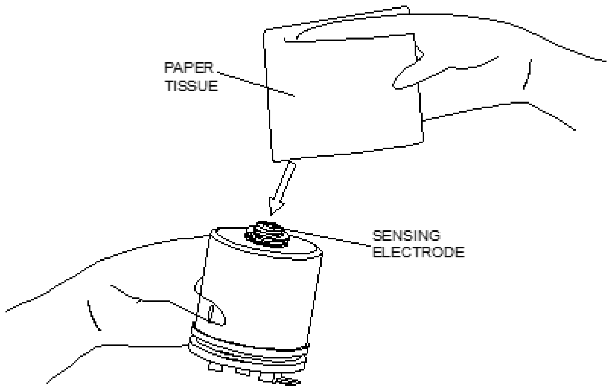


4. Flush Sensor Cell:
   With the sensor upright, place a clean paper tissue gently over the pressure compensation port. Carefully pour approximately 10 cc of fresh electrolyte (P/N 84200) into the sensor to rinse thoroughly. Discard used electrolyte safely.



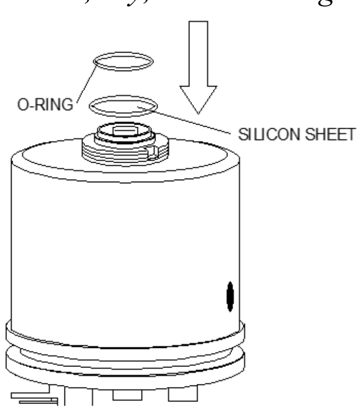
Electrolyte p/n 84200

5. Dry Sensing Electrode:
   Gently wipe the sensing electrode and surrounding areas using a dry, lint-free paper tissue.



6. Reassemble Sensor Components:
   a. Thoroughly dry and reinstall the silicon sheet and O-ring.
      (If reusing, ensure they are clean, dry, and undamaged.)

NOTE: If reusing the old O-ring and Silicon sheet, please dry them thoroughly before reinstalling.



CH_3Br sensor cell uses a White O-ring, p/n 86001 and Silicon sheet, p/n 86002

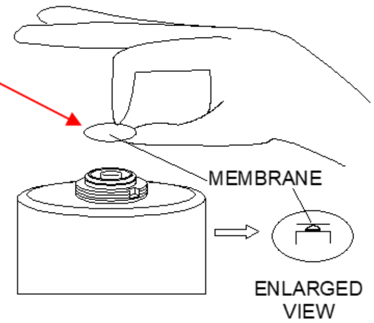
   b. Apply a single drop of fresh electrolyte (P/N 84200) onto the sensing electrode.

7. Install New Membrane:
   Carefully position a new white membrane (P/N M-4000M) over the electrode. The bead of electrolyte should sit evenly between the electrode and membrane.

White Membrane
P/N M-4000M

Caution: A GREEN tinted paper separates each membrane.

DO NOT USE THIS PAPER



M-4000M Membrane
Color is White

NOTE: *Never touch the center of the membrane with bare fingers. Oil on your fingers can block the membrane pores.*

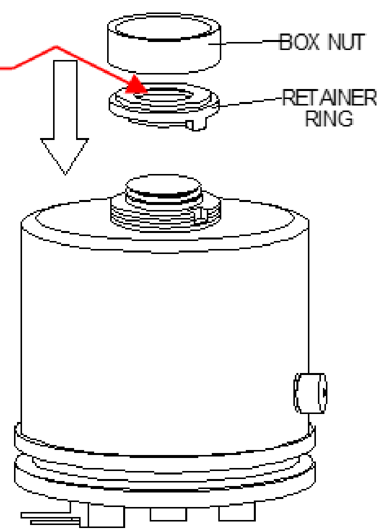
⚠ **CAUTION:**
   a. Never touch the membrane center with bare fingers. Oil from your skin can clog membrane pores.
   b. Each new membrane is separated by a green-tinted paper sheet. Do NOT use this green sheet. Discard it after removal.

8. Secure Membrane and Retainer Ring:
   a. Carefully place the retainer ring over the newly installed membrane.
   b. Thread the box nut onto the retainer ring. Tighten clockwise by hand until firmly secure.

   ⚠ **CAUTION:**
   - Ensure the box nut is sufficiently tightened. A loose nut may negatively impact sensor response.
   - **Do NOT remove the internal 8mm diffuser** located within the sensor cell.

NOTE: The electrochemical sensor cell uses an 8mm diffuser.

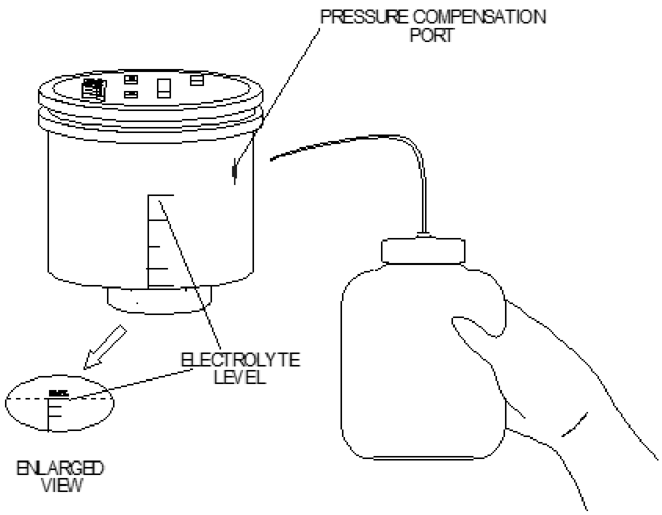
Please DO NOT REMOVE THIS DIFFUSER



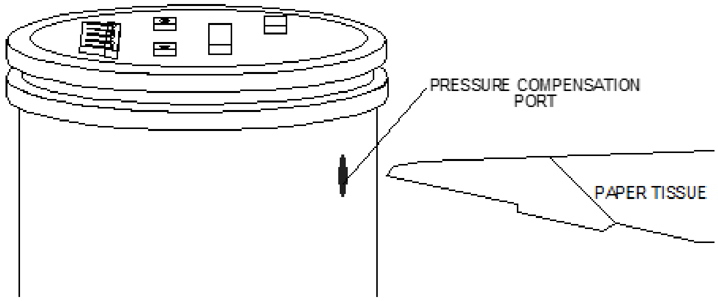
9. Fill Sensor with Electrolyte
    a. Hold the sensor upright with the electrode pointing downward.
    b. Fill with fresh electrolyte until reaching the **MAX fill line** indicated on your sensor.

⚠ **NOTE:**

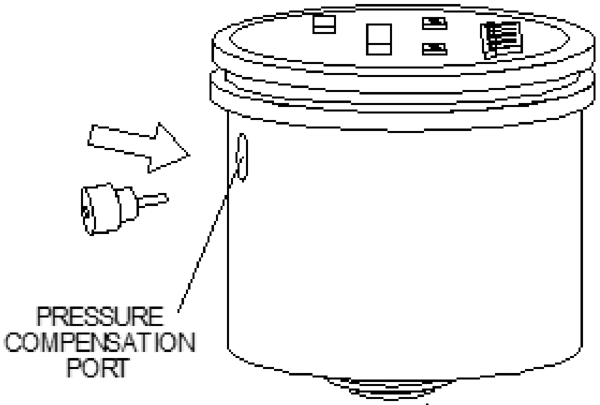
- MAX fill levels vary slightly between sensor models; always observe the marked level on your specific sensor.



10. Clean and Seal Pressure Compensation Port
    a. Carefully wipe around the pressure compensation port with a dry, lint-free paper tissue.



    b. Reinsert and securely tighten the pressure compensation plug into the port.



11. Reinstallation of the Sensor Cell
    a. Reinstall the sensor as outlined previously in Section 6.2.2 (“Sensor Installation”).

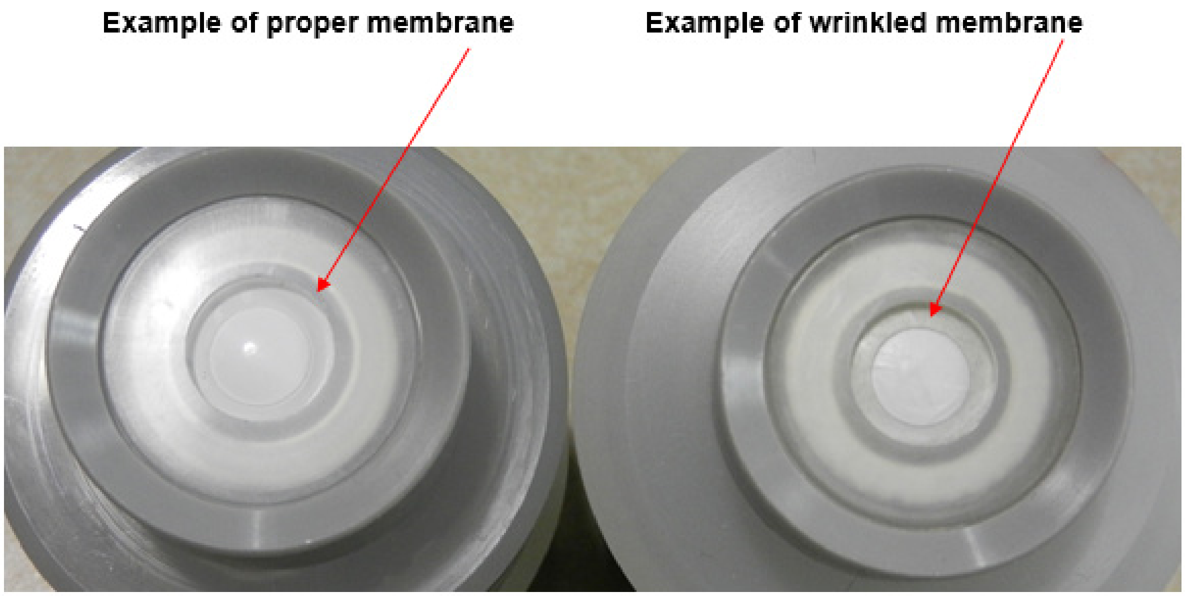
⚠ **NOTE:**

- **Do NOT store horizontally** with the pressure compensation plug facing downward.
- **Do NOT store upside down.**

Improper storage may result in electrolyte leakage through the compensation plug.

6.3.2 Membrane Condition Examples

- Proper Membrane: Smooth, even appearance without wrinkles.
- Wrinkled Membrane: Replace immediately, as wrinkles indicate improper installation, potentially affecting sensor accuracy.



6.4 System Calibration

Routine calibration ensures accurate readings from your PureAire Electrochemical Pyrolizer Toxic Gas Monitor. Perform calibration in these situations:

- At least every six (6) months.
- After sensor electrolyte replacement.

6.4.1 Calibration Supplies

Recommended Equipment for accurate calibration:

Item	Part Number	Description	Packaging
1	110213*	Acrylonitrile ≥99%	5 mL
2	128SD†	Kitagawa Gas Detector Tube AN 0.2-20 ppm	10 per box, 1 each
3	AP-20†	Kitagawa Sampling Pump Kit AP-20	1 kit
4	EG-ZP-5EA‡	Tedlar® Bag, 5 Liter, ZP Valve	1 each

* Purchase directly from Sigma-Aldrich +1 (800) 325-3010
† Purchase directly from Gas Detection Warehouse +1 (866) 451-2257
‡ Purchase directly from Zefon International +1 (352) 854-8080

NOTE: For all PureAire Electrochemical Pyrolizer Toxic Gas Monitors, select a span gas concentration approximately half of the full-scale value.

6.4.2 Initial Preparation

- If connected to a controller, set it to **Standby mode** to avoid accidental alarms.
- If the monitor was powered down, allow it **1–2 hours** to stabilize before calibration.

⚠ **Caution: Do NOT calibrate** unless the sensor has **stabilized** (operational for at least **one (1) hour** after installation or restart). Calibration before stabilization will result in inaccurate readings.

6.4.3 Setting Module Zero

⚠ **IMPORTANT:** Always perform zero adjustment in a gas-free atmosphere.

1. Enter the Sensor Adjustment Menu.

   …Sensor Adjustment…
   0.0ppm

2. Select submenu "**Set Module Zero**":
   a. Push the joystick **down** to scroll and select "**Set Module Zero**":
   b. Push the joystick **right** to enter zero adjustment mode.

   …Set Module Zero…
   00

   c. Press the joystick **in** to **ENTER** and confirm the zero setting.

3. Push joystick left twice to exit back to "**Sensor Adjustment**".
   The zero setting is now complete, and the monitor is ready for span calibration.

6.4.4 Gas Preparation (Acrylonitrile)

⚠ **CRITICAL SAFETY PRECAUTIONS:**

- **Acrylonitrile (AN) is carcinogenic, toxic, and hazardous**. Always handle in a chemical fume hood or well-ventilated area.
- AN is pyrolyzed by the monitor into **Hydrogen Cyanide (HCN),** a highly toxic gas **recognizable by its almond-like odor. If you detect this smell, leave the area immediately.**
- Always wear proper **protective equipment**, including **chemical-resistant gloves, goggles, and an appropriate respirator**.
- Use a **second Tedlar® bag** connected to the monitor's exhaust during calibration to **safely capture and contain any hazardous gases produced**.

Procedure:

1. Carefully aerosolize a very small amount (~0.1-0.5 mL) of Acrylonitrile into an empty 5-liter Tedlar® gas bag. Immediately seal securely.
2. Fill this bag with clean compressed air or lab-grade air. Gently mix by lightly shaking the bag.
3. Perform serial dilutions to achieve the target gas concentration (~15 ppm AN, approximately half the monitor's full-scale range):
   - Transfer measured amounts of gas into additional clean Tedlar® bags, diluting with clean air each time,
     OR
   - Exhaust most of the gas from the original Tedlar® bag and refill it with clean air, repeating this process until the concentration reaches the desired 0.2–20 ppm range detectable by the Kitagawa tube.
4. Confirm gas concentration using the Kitagawa AP-20 pump and AN detection tube (Part 128SD):
   - Draw a gas sample through the tube per kit instructions.
   - Verify gas concentration is approximately 15 ppm AN and adjust dilutions accordingly.

6.4.5 Span Calibration Procedure (Acrylonitrile)

Important: Ensure zero calibration (Section 6.4.3) is completed first.

1. In the Sensor Adjustment Menu, select "Set Sensor Span" to see the adjustable span value:

   114

   0.0 PPM

2. Attach an empty Tedlar® bag securely to the monitor's exhaust port to capture hazardous exhaust gases.
3. Connect the prepared Acrylonitrile calibration bag to the particulate filter inlet using flexible tubing.
4. Expose the sensor to calibration gas for three (3) minutes. Watch carefully for any almond-like odor indicating the presence of HCN gas; if detected, stop immediately and ventilate the area.
5. Adjust the monitor reading using the joystick:
   - **UP** increases PPM reading.
   - **DOWN** decreases PPM reading.

   Set display to the known span gas concentration (15 ppm AN).
6. Press **ENTER** to save calibration settings.
7. Disconnect calibration gas. Allow the monitor to stabilize back to zero.
8. Return to normal operation mode:
   - Push joystick left until operational screen appears.
   - Reattach front cover securely.

⚠ Dispose of waste gases, calibration bags, and materials safely according to your facility's hazardous waste protocols.

NOTE: It is recommended to warm up the PureAire Electrochemical Pyrolizer Toxic Gas Monitor for at least two hours before making any adjustments to the sensor.

7: Appendix

7.1 Front Cover Removal

The PureAire Electrochemical Pyrolizer Toxic Gas Monitor front cover is secured by four captive Phillips-head screws located at each corner.

- Use a Phillips screwdriver to loosen these screws.
- Carefully remove the front cover.
- Do NOT overtighten screws during reinstallation.

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.

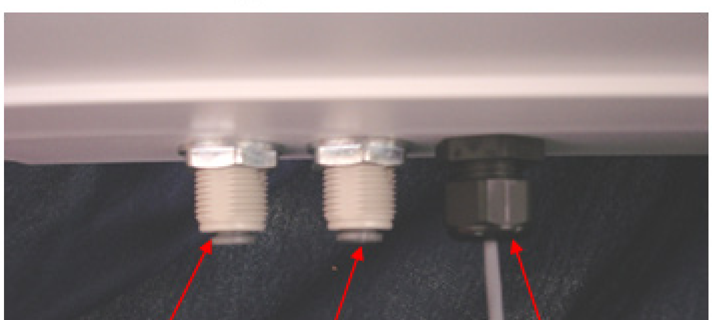
Please Do Not Over tighten

7.2 Connectors and Ports Identification

Clearly identify the key connectors located on the underside of the unit (in order left to right):

- Sample Exhaust: Port for exhaust gases and calibration waste collection.
- Sample Inlet: Connection for sampling gas stream input.
- Electrical Connector: For powering and interfacing with external controllers or systems.

Location of the Sample Inlet and Exhaust connectors

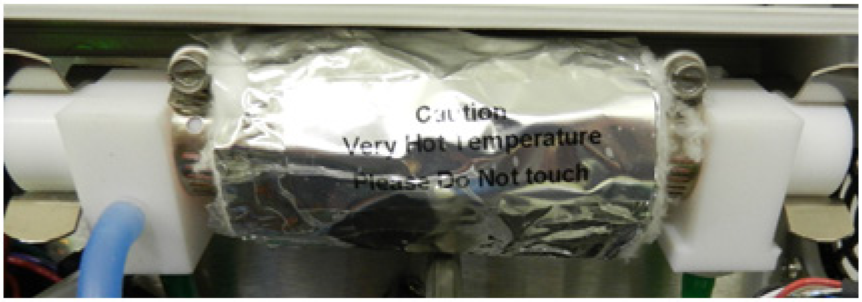


Sample Exhaust Sample Inlet Electrical Cable connector

7.3 Pyrolizer Assembly Safety

⚠ IMPORTANT SAFETY WARNING:

- The Pyrolizer insulation temperature can exceed 150°F (65°C).
- This component is extremely hot and can cause burns if touched.
- Always power down the monitor and allow it to cool before servicing or performing internal maintenance.



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

Please power down the system when working inside the enclosure.

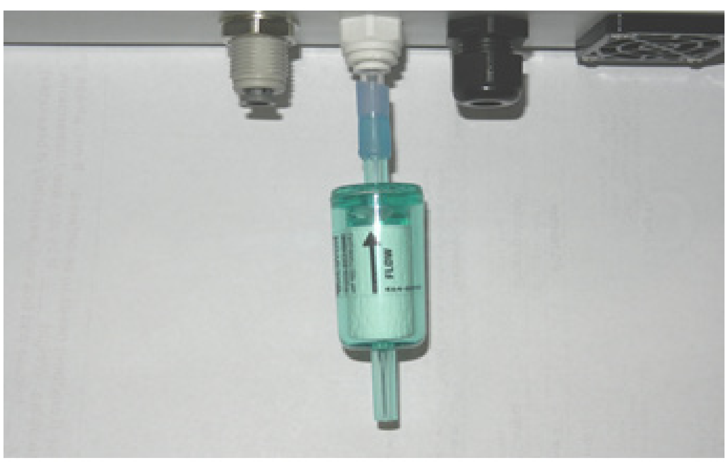
7.4 Sample Inlet Filter (P/N 23102)

The provided particulate filter protects the internal pump and Pyrolizer from contamination and debris:

- Connect the filter to the sample inlet port using the supplied Tygon tubing.
- Ensure the filter arrow points toward the inlet connector to indicate proper gas flow direction.

NOTE:

- Frequent replacement of filters is recommended, especially when sampling in cold or refrigerated environments, as moisture saturation reduces filter effectiveness and diminishes sensor response.



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