Read Before Operating

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 carried out 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 insure the proper polarity. Reversing the polarity will damage the fuse on the drive PCB.**

- **This monitor has a digitally controlled sample flow system.** On power up, the monitor will immediately go into a fault condition until flow stabilizes. This process could take up to 5 minutes. Do not block the inlet or outlet tubing of the system when the system is in operation.

- After power up, please let the system equilibrate a few hours before making any adjustments.

- If there are any signs of system damage or malfunctioning, please switch the alarm/controller unit (if applicable) to ‘standby mode’ and contact PureAire Monitoring Systems, Inc.

---

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.

---

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1: Introduction

The Air Check Methyl Bromide Ex 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 50 feet (15 meters).

The Air Check Methyl Bromide Ex is a single point monitoring system built into an explosion proof housing that may be wall mounted and is designed to require as little space for installation as possible.

The system has the following features:

- 24 VDC operation
- Built-in pyrolizer
- Integral sampling pump
- Local digital display
- User selectable dual level alarm and system fault relays
- 4-20 mA output
- Local alarm horn and indicator
- Renewable or disposable sensor cell
- Smart electronics monitors sensor, pyrolizer and sample pump
- Ex proof enclosure is rated for Class 1, Division 1 Groups B, C & D
1.1.1 Overall System Composition

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

Ex proof Cable Port — 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 is a Class 1 Div 1 Flame arrestor and serves as the connection for the incoming sample line.

Sample exhaust — This is a Class 1 Div 1 Flame arrestor and serves as the connection for the incoming sample exhaust line.

Front Cover — This permits accessing the inside of the sample and control system.
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. **Gas Sensor** — An amperometric, electrochemical sensor that detects and measures the target gas. Different gas sensors are required to detect different gases. When exposed to the target gas, the sensor outputs an electrical signal proportional to the gas concentration.

   **CAUTION:** The target gas is factory programmed and cannot be adjusted in the field. Failure to install the correct sensor in the instrument will adversely affect detection reliability and/or measurement accuracy.

3. **Alarm LED** — This LED lights when an instrument or gas concentration alarm is detected.

4. **Function Keys** — The function keys are used to access the various programming menus and make selections within those menus. They are also used to activate certain functions during normal operation (monitoring).

5. **Door Clasp** — This fastens the front panel door to the chassis. Pull the center button to open the clasp. Push the center button to lock the door.

6. **Span Potentiometer** — This potentiometer is used to adjust the sensitivity of the sensor cell. It should only be adjusted when calibrating the instrument.

7. **Zero Potentiometer** — This potentiometer is used to adjust the instrument’s 4 mA analog output signal to ensure that it is transmitting a 4 mA signal when the instrument is reading a zero concentration.

8. **Flow Meter** — This flow meter is used to register the flow to the sensor cell.

9. **Flow Meter Adjust** — This potentiometer is used to adjust the flow to the monitor.
1. **Pyrolizer Assembly** — Converts target gas into a more electrochemically active gas prior to presentation to the gas sensor.

   ➔ CAUTION - The pyrolizer temperature is above 300 F and can cause burns if touched.

2. **Transmitter / Control PCB** — Converts the signal from the sensor cell and sends information to the local digital display and analog /relay terminal block.

3. **Transmitter Power Switch** — Activates the 24VDC power to the gas monitoring system.

4. **Analog and Relay Output Connection** — This connection serves as both the 4-20 mA output connection and instrument’s gas concentration relays. See section 3: Installation for more information.

5. **Gas Sensor** — An electrolyte filled, electrochemical sensor. Depending on the monitored gas a disposable or renewable type cell is supplied.

6. **Flow Chamber** — The supplied air 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.

7. **Instrument Fault Relay** — This is a general instrument fault relay output. Can be connected either normally open or normally closed

8. **Main 24VDC Power Connection** — This connection serves as the 24 VDC power input connection. See section 3: Installation for more information.

   ➔ CAUTION: The Air Check Advantage EX must only be powered using a regulated 24VDC Power Supply. Failure to use a regulated 24VDC power supply will void the warranty.

9. **Heater Voltage Potentiometer** — This controls the voltage to the pyrolizer filament.

   NOTE: This is factory set and must not be disturbed in the field.

10. **Flow Control Potentiometer** — This is used to adjust the sample flow rate. For pyrolized gases the flow is set from 0.7 to 1.0 SCFM.

11. **Power Supply PCB** — This PC board supplies the main power to the sampling pump, and transmitter.
12. **Sensor Cell Connector** — This connects the sensor cell to the transmitter printed circuit board. This connection is terminated at the factory.

13. **Transmitter Main 24VDC Connector** — This connection serves as the 24 VDC power input to the transmitter / controller. This connection is terminated at the factory.

14. **Sample Pump** — This internal sample pump is used to draw the gas sample from the area into the pyrolizer and flow chamber. See Section 3: Installation for more information.

15. **Fault Relay** — This is the monitoring systems general fault relay. See Section 2: Specifications for more information.

16. **Fault Relay LED** — This LED is continuously illuminated in a non-fault condition. When the fault relay is activated the Fault LED will turn off and no longer illuminate. When the fault is corrected, the fault relay will automatically reset and fault relay LED will illuminate.
Status LED’s

**Green Power LED.** Confirms Power is being supplied to the monitor

**Yellow Flow Status LED.** Confirms the sample pump is operating and flow is being maintained at the proper flow rate

**Blue Fault Status LED.** Indicates various system faults.
- 6 quick flashes = Flow fault
- 3 quick flashes = pyrolizer fault

When not in fault the Blue LED remains illuminated continuously
2: Specifications

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

### 2.1 Performance Specifications

<table>
<thead>
<tr>
<th>Models:</th>
<th>Air Check Advantage Pyrolizer Ex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Type:</td>
<td>Plug-in electrochemical cell (3 electrode).</td>
</tr>
<tr>
<td>Response Time:</td>
<td>Within 60 seconds to T90.</td>
</tr>
<tr>
<td>Repeatability:</td>
<td>±10% of full scale.</td>
</tr>
</tbody>
</table>

**Fault Indicators:**
- Loss of VDC power (4 mA signal drops to 0, system fault alarm relay de-energizes);
- Loss of sensor signal (local audio/visual alarms, system fault alarm de-energizes);
- Loss of sample pump (4 mA signal drops to 0, system fault alarm relay de-energizes);
- Loss of Pyrolizer filament (4 mA signal drops to 0, 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:** Sensor dependent; typically 20 to 95% RH; consult PureAire for sensors which can operate in 100% condensing RH environments.

### 2.2 Gas Detection System

<table>
<thead>
<tr>
<th>Type:</th>
<th>Proprietary electrochemical gas sensor; renewable.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Life:</td>
<td>4 to 5 years under normal conditions for Renewable sensor cells</td>
</tr>
</tbody>
</table>

**Detectable Gases:**
- Nitrogen Triflouride (NF₃)
- Methyl Bromide (CH₃Br)
- Methyl Iodide (CH₃I)
- Methylene Chloride (CH₂Cl₂)
- Acrylonitrile (CH₂CHCN)
- Benzene, (C₆H₆)

* Consult PureAire for complete list of gases
2.3 Signal Outputs

Local Display: Digital display calibrated for the specific target gas.
Analog Output: DC 4-20 mA
Alarm Relays: Two SPDT gas concentration alarm relays.
One SPDT system fault relay (failsafe).
Relay Capacity: AC 125 V, 0.3 Amp max.
DC 30 V, 1.0 Amp max. (resistive load)

2.4 Electrical Requirements

Power: 24 VDC external power. ★ NOTE: Must be a regulated 24VDC Power Supply
Consumption: 2.0 amp.

2.5 Physical Characteristics

Dimensions: 12” W x 11” H x 7.5/8” D inches;
305 x 280 x 140 mm
Weight: 45 pounds (20.5 kg)
Enclosure Type: Explosion proof IP 65 NEMA 4X; Class 1 Division 1, Groups B, C & D
### 3: Installation

#### 3.1 Site Requirements

The Air Check Advantage Ex monitoring system should be mounted in an area free of vibration and electrical noise or interference. If possible, avoid areas with 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 work stations and personnel should all be considered in determining the most suitable installation location.

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

**NOTE:** The Air Check Advantage Ex is designed for installation in hazardous areas.

#### 3.2 Mounting

The Air Check Ex is designed primarily for wall mounting and should be installed no closer than 36 inches (915 mm) above floor level.

#### 3.3 Sensor Installation

**IMPORTANT:** Be careful not to turn the sensor or touch the membrane on the bottom of the sensor during installation.

**CAUTION:** The target gas is factory programmed and cannot be adjusted in the field. Failure to install the correct sensor in the instrument will adversely affect detection reliability and/or measurement accuracy.

**CAUTION:** Be sure to verify that the programmed measurement matches the measurement range of the installed sensor. See section 4.2.1.

1. Remove the sampling system front cover by rotating the glass window counter-clockwise.
2. Open the transmitter front panel by pulling the center door clasp pin out.
3. Remove the sensor shorting plug or battery if supplied.
4. Plug the H type sensor into the flow chamber inside the instrument housing. Mount the T type sensor into the flow chamber.

**NOTE:** Do not twist the gas sensor inside the flow chamber. This may loosen the sensor cell box nut on H type renewable sensor cells.

5. Plug the sensor cell connector into the HY sensor.

**IMPORTANT:** Remove the shorting wire from the sensor cell connector before connecting the sensor cell to the transmitter.
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 5) 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 Advantage Ex 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:

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>DC +24 Volt</td>
</tr>
<tr>
<td>5</td>
<td>common</td>
</tr>
<tr>
<td>4</td>
<td>Shield</td>
</tr>
</tbody>
</table>

![Diagram of Pyrolizer & Pump Drive Board with labeled components: Flow and Pyro Potentiometers, Status LED's, Power Connector, and Fault Relay Connector. Fuses are labeled as Plug in type F3, F1, F2.]
3.4.2 Alarm Relays

The Air Check Methyl Bromide Exincorporates two, gas concentration alarm 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:

- **Load:** Resistive
- **Rated Load:** 0.3 A at 125 VAC; 1 A at 30 VDC
- **Rated Carry Current:** 1 A
- **Maximum Switching Load:** 125 VAC, 60 VDC
- **Maximum Switching Current:** 1 A

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

   ✷ **NOTE:** The Air Check Methyl Bromide Ex requires a regulated 24VDC power supply
嗲 CAUTION - The pyrolizer temperature is above 300 F and can cause burns if touched.

3. Turn on the Transmitter Power Switch. The transmitter display will activate and start a 30 second countdown. The Air Check Methyl Bromide Extransmitter will automatically go into the measurement mode.

嗲 NOTE: For Benzene, the transmitter will go into immediate alarm. The audio alarm may be silenced by pressing the F2 key.

4. Adjust the sample flow rate to 1.0 SCFM. See section 3.5.1 for pump adjustment procedure

The instrument should now be operating properly and is ready for programming.

嗲 NOTE: After power up, please let the system equilibrate a few hours before making any zero and span adjustments.

3.5.1 Pump Adjustment

The Air Check Methyl Bromide Exhas a built in sample pump. The pump flow is controlled by the Flow Control Potentiometer on the front of the transmitter. Turning the Flow Control Pot clockwise increases the flow rate. Turning the Flow Control Pot counter clockwise decreases the flow rate.
4: Programming

4.1 Control Panel Overview

All instrument configuration and operational programming is performed from the front panel of the Air Check Advantage Ex.

**Digital Display** — Programming and operational information is displayed on the instrument’s LCD.

**Alarm LED** — This LED lights when an instrument or gas concentration alarm is detected.

**Function Keys** — The Air Check Methyl Bromide Exfour function keys are used to access the various programming menus and make selections within those menus. They are also used to activate certain functions during normal operation (monitoring).

<table>
<thead>
<tr>
<th>Function Key</th>
<th>Function</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>/F1</td>
<td>None</td>
<td>Toggles through the choices available within the displayed menu item or advances the cursor within a value field.</td>
</tr>
<tr>
<td>/F2</td>
<td>Silences/resets alarms</td>
<td>Increases the displayed value or returns to the previous menu once a value has been accepted.</td>
</tr>
<tr>
<td>/F3</td>
<td>Lights display back-light</td>
<td>Decreases the displayed value or advances to the next menu once a value has been accepted.</td>
</tr>
<tr>
<td>ENT/ON/F4</td>
<td>Exits monitoring mode</td>
<td>Accepts the displayed value; places unit back in monitoring from the Operating Mode</td>
</tr>
</tbody>
</table>
4.2 System Configuration

The Air Check Methyl Bromide Exsystem configuration functions are accessed from the main operational display by pressing the F4 function key for 4 seconds. The following display will appear:

```
OPERATING MODE
  MEASURE
```

Press the F3 key to advance to the first programming screen.

### 4.2.1 Measurement Range

```
FULL SCALE
  XX.X PPM
```

The instrument’s measurement range is programmed from this screen.

To change the displayed value, press the F1 key to advance to the first digit of the value field and then use the F2 and F3 keys to increase/decrease the value at the cursor position. Press the F1 key to advance to the next digit and repeat.

Press the F4 key to accept the displayed value and then press the F3 key to advance to the next programming screen.

### 4.2.2 Alarm 1 (Low)

```
ALARM – 1
  X.X PPM
```

This is the gas concentration at which the instrument’s low-level alarm will be activated.

To change the displayed value, press the F1 key to advance to the first digit of the value field and then use the F2 and F3 keys to increase/decrease the value at the cursor position. Press the F1 key to advance to the next digit and repeat.

Press the F4 key to accept the displayed value and then press the F3 key to advance to the next programming screen.

### 4.2.3 Alarm 2 (High)

```
ALARM – 2
  X.X PPM
```

This is the gas concentration at which the instrument’s high level alarm will be activated.

To change the displayed value, press the F1 key to advance to the first digit of the value field and then use the F2 and F3 keys to increase/decrease the value at the cursor position. Press the F1 key to advance to the next digit and repeat.

Press the F4 key to accept the displayed value and then press the F3 key to advance to the next programming screen.
4.2.4 Alarm 1 Relay State

| ALARM –1 Latch | AUTO RECOVER | HOLD |

This is the relay state when the monitor is in alarm. “Auto Recover” is a non-latching state where the relay will automatically reset when the gas concentration level goes below the alarm setting. “Hold” is a latching state where the relay will continue to activate until a manual alarm reset is selected.

To change from Auto Recover to Hold, press the F1 key to change the setting from Auto Recover to Hold.

Press the F4 key to accept the displayed value and then press the F3 key to advance to the next programming screen.

4.2.5 Alarm 2 Relay State

| ALARM –2 Latch | AUTO RECOVER | HOLD |

This is the relay state when the monitor is in alarm. “Auto Recover” is a non-latching state where the relay will automatically reset when the gas concentration level goes below the alarm setting. “Hold” is a latching state where the relay will continue to activate until a manual alarm reset is selected.

To change from Auto Recover to Hold, press the F1 key to change the setting from Auto Recover to Hold.

Press the F4 key to accept the displayed value and then press the F3 key to return to the Operating Mode screen.
4.2.6 Alarm Delay

| ALARM DELAY | XX SEC |

This is the amount of time an alarm level concentration of gas must be present before the instrument’s gas concentration alarm(s) will be activated.

To change the displayed value, press the F1 key to advance to the first digit of the value field and then use the F2 and F3 keys to increase/decrease the value at the cursor position. Press the F1 key to advance to the next digit and repeat.

Press the F4 key to accept the displayed value and then press the F3 key to advance to the next programming screen.

4.2.7 Suppress Level

| SUPPRESS LEVEL | XX % |

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 % level (% full scale).

**EXAMPLE:** If the measurement range of the instrument is 0 to 10 ppm, gas measurements below 0.5 ppm will be displayed and output as 0 (zero) when the suppress level is set at 5%.

**IMPORTANT:** PureAire recommends that you consult the factory before changing the factory programmed suppression level.

To change the displayed value, press the F1 key to advance to the first digit of the value field and then use the F2 and F3 keys to increase/decrease the value at the cursor position. Press the F1 key to advance to the next digit and repeat.

Press the F4 key to accept the displayed value and then press the F3 key to return to the Operating Mode screen.

| OPERATING MODE | MEASURE |

Press the F4 key to return to monitoring or press the F1 key to go to the Test or Standby modes.
5: Normal Operation

The Air Check Advantage Ex Gas Monitor is a single point sample draw monitor designed for the continuous detection and measurement of hazardous gas leaks. It may be used as either a stand-alone device or linked to a facility-wide life-safety surveillance system.

5.1 Modes of Operation

The Air Check Methyl Bromide Ex features three different modes of operation:

Measure — This is the standard operating mode. When the unit is in the “Measure” mode, all local and remote signal outputs are active. This includes the local audio/visual alarm indicators, concentration alarm and system fault relays, and 4-20 mA analog output signal).

<table>
<thead>
<tr>
<th>NAME OF GAS</th>
<th>0.0 PPM</th>
</tr>
</thead>
</table>

Standby — This mode is used to take the instrument completely off-line for maintenance, service, etc. When in the “Stdby” mode, all local and remote signal outputs are inactive.

<table>
<thead>
<tr>
<th>NAME OF GAS</th>
<th>STD’BY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0 PPM</td>
</tr>
</tbody>
</table>

Test — This mode is used when testing the instrument. When in the “Test” mode, only the instrument’s local alarm indicators are active. The gas concentration and system fault relays as well as the 4-20 mA analog output are inactive.

<table>
<thead>
<tr>
<th>NAME OF GAS</th>
<th>TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0 PPM</td>
</tr>
</tbody>
</table>

Calibration — This mode is used when calibrating the instrument. When in the “Calibrate” mode, the instrument’s local alarm indicators are inactive. The gas concentration and system fault relays as well as the 4-20 mA analog output are also inactive. The true zero and span are displayed in the calibration mode.

<table>
<thead>
<tr>
<th>NAME OF GAS</th>
<th>CALIBRATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0 PPM</td>
</tr>
</tbody>
</table>
5.2 Changing the Mode of Operation

The mode of operation is selected from the Operation Mode menu screen. This screen is accessed by pressing the F4 key when the instrument is in any of the four modes of operation.

<table>
<thead>
<tr>
<th>OPERATING MODE</th>
<th>MEASURE</th>
</tr>
</thead>
</table>

Once the Operating Mode Menu Screen is displayed, pressing the F1 key toggles the display through the available choices.

<table>
<thead>
<tr>
<th>OPERATING MODE</th>
<th>STD'BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATING MODE</td>
<td>TEST</td>
</tr>
</tbody>
</table>

| OPERATING MODE | CALIBRATION |

Pressing the F4 places the Air Check Methyl Bromide Exin the mode of operation that is shown on the display.

5.3 Alarm Messages and Indicators

The Air Check Methyl Bromide Exincorporates both gas concentration and system fault alarms. When an alarm condition is detected, an alarm message is displayed and the instrument’s audio alarm and appropriate alarm relay(s) activated.

5.3.1 Gas Concentration Alarms

In the event that a gas concentration that exceeds the user-programmed alarm setpoint(s) is detected, the alarm level which has been exceeded will be indicated on the LCD display.

| NAME OF GAS | 4.2 PPM |

The display shown above indicates that the low level (Alarm 1) setpoint has been exceeded. The audio alarm and Alarm 1 relay will both activate and stay in that state until the measured concentration drops below the Alarm 1 setpoint. The audio alarm may be silenced by pressing the F2 key.

| NAME OF GAS | A1 A2 8.5 PPM |

This display indicates that the high level (Alarm 2) setpoint has been exceeded. The audio alarm and both Alarm 1 and Alarm 2 relays will activate. They will stay in that state until (A) the F2 key is pressed to silence/acknowledge the alarm and (B) the measured concentration drops below the Alarm 2 setpoint.
5.3.2 System Fault Alarms

In the event a system fault is detected, the condition will be indicated on the LCD readout. The audio alarm will also sound and the system fault relay will be activated.

A sensor fault, such as low electrolyte, is indicated as follows:

<table>
<thead>
<tr>
<th>NAME OF GAS</th>
<th><em>SENSOR ERROR</em></th>
</tr>
</thead>
</table>

If the sensor is removed, the following message will appear:

<table>
<thead>
<tr>
<th>NAME OF GAS</th>
<th><em>NO SENSOR</em></th>
</tr>
</thead>
</table>

Pressing the F2 key silences the audio alarm and acknowledges the alarm condition. The system fault relay will remain active until the condition causing the alarm is corrected.

5.4 Output Status Under Various Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Alarm 1 Relay</th>
<th>Alarm 2 Relay</th>
<th>System Fault Relay</th>
<th>Alarm Display</th>
<th>Audio Alarm</th>
<th>4-20 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure Mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas concentration below Alarm 1</td>
<td>De-energized</td>
<td>De-energized</td>
<td>Energized</td>
<td>Off</td>
<td>Gas value</td>
<td></td>
</tr>
<tr>
<td>and 2 setpoints.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas concentration below Alarm 1</td>
<td>Energized</td>
<td>De-energized</td>
<td>Energized</td>
<td>A1</td>
<td>On</td>
<td>Gas value</td>
</tr>
<tr>
<td>and 2 setpoints.</td>
<td>(non-latching)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas concentration above Alarm 1</td>
<td>Energized</td>
<td>Energized</td>
<td>Energized</td>
<td>A1, A2</td>
<td>On</td>
<td>Gas value</td>
</tr>
<tr>
<td>and Alarm 2 setpoint.</td>
<td>(non-latching)</td>
<td>(latching)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Electrolyte</td>
<td>De-energized</td>
<td>De-energized</td>
<td>De-energized</td>
<td>Sensor Error</td>
<td>On</td>
<td>0 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(latching)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor Unplugged</td>
<td>De-energized</td>
<td>De-energized</td>
<td>De-energized</td>
<td>No Sensor</td>
<td>On</td>
<td>0 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(latching)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of Power</td>
<td>De-energized</td>
<td>De-energized</td>
<td>De-energized</td>
<td>Display off</td>
<td>Off</td>
<td>0 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standby Mode</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Inactive</td>
<td>4 mA</td>
</tr>
<tr>
<td>Test Mode</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Active</td>
<td>Active</td>
<td>4 mA</td>
</tr>
</tbody>
</table>
5.5 Resetting Alarms

5.5.1 Gas Concentration Alarms

Alarm 1 — The low level gas concentration alarm is a non-latching alarm. The audio and visual indicators and the alarm relay will automatically reset once the measured gas concentration falls below the Alarm 1 setpoint. The audio alarm may be silenced by pressing the F2 key.

Alarm 2 — The high level gas concentration alarm is a latching alarm. It is reset by pressing the F2 key once the gas concentration has fallen below the Alarm 2 setpoint. If the F2 key is pressed before the gas concentration has fallen below the Alarm 2 setpoint, only the audio alarm will be deactivated; the Alarm 2 relay will remain energized.

5.5.2 System Status Fault

The system status alarm is a latching alarm. It is reset by pressing the F2 key once the fault causing the alarm has been corrected. If the F2 key is pressed before the fault condition has been corrected, only the audio alarm will be deactivated; the system status fault relay will remain de-energized.

5.5.3 Remote Alarm Reset

The Air Check Methyl Bromide Exmay be wired so that a remote contact closure mimics the operation of the F2 key under alarm conditions. See section 3 for wiring information.
5.6 Routine Maintenance Schedule

Continuous gas detection systems depended upon to measure and detect hazardous gas leaks in the workplace require 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 particular application, as well as your organization’s maintenance policies, will ultimately determine the best routine maintenance schedule for your equipment.

5.6.1 Routine Visual Checks

<table>
<thead>
<tr>
<th>Item</th>
<th>Status With No Gas Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Display</td>
<td>Display should read “0.0”</td>
</tr>
<tr>
<td>4-20 mA Output</td>
<td>Output should be 4 mA</td>
</tr>
<tr>
<td>Gas Concentration Alarm Relays</td>
<td>De-energized</td>
</tr>
<tr>
<td>System Fault Relay</td>
<td>Energized</td>
</tr>
</tbody>
</table>

5.6.2 Recommended Routine Maintenance Schedule

Routine Checks: Monthly
- Flow rate and power status: Continuously supervised. Flow is constantly monitored and adjusted by the internal CPU

For Renewable “H” type cells only
- Electrolyte Replacement (p/n El-4460-1): Every 6 months
- Membrane Replacement (p/n M-4400M): Every 6 months
- O-rings and silicon sheets (p/n 1516-12W) (p/n SC-2000): Replace when damaged
- Sensor Calibration: Every 6 months

5.7 Loss of Power Indication

In the event the Air Check Methyl Bromide ExGas Monitor loses VDC power, the local display will 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.
6: Maintenance & Calibration

Maintenance and calibration should be performed only by qualified personnel.

6.1 Sensor Cell Removal and Installation

6.1.1 Sensor Removal “H” Type Sensor Cell

1. Remove the sensor cover by rotating the glass window counter-clockwise.
2. Open the transmitter front panel by pulling the center door clasp pin out.
3. Unplug the sensor cable by pulling straight up.
   ➤ CAUTION: Never Twist the sensor cell inside the flow chamber
4. Unplug the sensor cable by pulling up.
   ➤ CAUTION: Avoid spilling electrolyte out of the small opening on the side of the sensor. (Applies to Renewable “H” type sensors only)
   ➤ IMPORTANT: Do not touch the membrane at the bottom of the sensor. Oil from your hands or fingers will adversely affect performance.

6.1.2 Sensor Installation “H” Type Sensor Cell

➤ IMPORTANT: Be careful not to turn the sensor or touch the membrane on the bottom of the sensor during installation.
1. Remove the sampling system front cover by rotating the glass window counter-clockwise.
2. Open the transmitter front panel by pulling the center door clasp pin out.
3. Remove the sensor shorting plug or battery if supplied.
4. Plug the H type sensor into the flow chamber inside the instrument housing.
   CAUTION: Do not twist the gas sensor inside the flow chamber. This may loosen the sensor cell box nut on H type renewable sensor cells.
CAUTION: Always wear protective gloves and safety glasses when replacing sensor electrolyte. Be sure to adhere to your facility’s chemical handling guidelines and procedures.

1. Remove the sensor as outlined in section 6.1.1.

2. Place your finger over the pressure compensation port and turn the sensor upside down. Remove the box nut membrane, retainer ring, O-ring and silicon sheet (depending on sensor model).

3. Place the sensor over the beaker as shown and pour the old electrolyte into the beaker. Some will remain in the sensor until the pressure compensation plug is removed. Remove the plug to release the electrolyte into the beaker.

4. Hold the sensor in your hand with the sensing electrode up. Hold a piece of paper tissue over the pressure compensation port with your thumb. Pour 10 cc’s of fresh electrolyte into the sensor and rinse. Discard into the beaker.

NOTE: Replace only if damaged

Methyl Bromide cell uses a White O-ring p/n 1516-12W and Silicon Sheet p/n SC 2000

NOTE: The Pressure Compensation Plug has a Teflon membrane fixed to the inside of the screw. Never remove this membrane.

Electrolyte P/N EI-4460-1
5. Wipe the sensing electrode and the surrounding area with a dry paper tissue.

6. Place a new silicone sheet (if used) and O-ring on the sensor. Make sure that the area is dry of electrolyte.

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

Apply a drop of electrolyte on the sensing electrode.

Electrolyte  
P/N El-4460-1

7. Place a new membrane on the sensor, with the bead of electrolyte between the electrode and the membrane.

White Membrane  
P/N M-4400M

**Caution:** A tinted paper separates each membrane.

**THIS PAPER MUST NOT BE USED**

➤ **NOTE:** Never touch membrane with bare fingers.
8. Place the retainer ring over the membrane and then place the box nut over the retainer ring. Turn clockwise until hand tight; continue tightening until the box nut can no longer be moved by hand.

⇒ **CAUTION: If the box nut is too loose, the sensor cell response may be affected.**

![Diagram showing the placement of the retainer ring and box nut]

Hold the sensor in your hand with the electrode down. Pour fresh electrolyte in until it reaches the MAX. mark.

⇒ **NOTE: MAX. level differs from sensor to sensor.**

9. Wipe the pressure compensation port and its surrounding area with a dry paper tissue.
10. Insert the pressure compensation plug into the port.

11. Reinstall the sensor as outlined in section 6.1.2.

**NOTE:** When storing the sensor cell never store the sensor cell horizontal with the Pressure Compensation Plug positioned down or store the sensor cell upside down. This can cause the electrolyte to leak from the sensor cell pressure compensation plug.

Example of wrinkled membrane  
Example of proper membrane
6.3 Sensor Calibration

The Air Check Methyl Bromide Ex requires periodic calibration with the appropriate standard gas. Calibration should be performed whenever:

- The membrane or electrolyte is replaced;
- The entire sensor is replaced;
- Six months has passed without membrane, electrolyte, or sensor replacement.

The PureAire Calibration Kit (optional) is recommended for calibration.

6.3.1 Gas Generation and Calibrating Kits

For generating a calibrating gas, the following PureAire Gas Generation Kits are recommended. They are available by separate order.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NUMBER</th>
<th>PRODUCT</th>
<th>PACKAGING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contact Air Liquide*</td>
<td>Cylinder Span gas 5 ppm CH₃Br blended with air</td>
<td>1 bottle 105 liters</td>
</tr>
<tr>
<td>2</td>
<td>Contact Air Liquide*</td>
<td>Regulator 500cc/min flow</td>
<td>1 each</td>
</tr>
<tr>
<td>3</td>
<td>PureAire p/n 232-05</td>
<td>Tedlar gas-sampling bag, 5 liter capacity</td>
<td>2 each</td>
</tr>
</tbody>
</table>

*Air Liquide can be reached at 248-589-2950

6.3.2 Initial Preparation

1. Place the Air Check Methyl Bromide Ex in the Calibration mode (see section 5).
2. If the instrument is connected to a controller, set the controller to Standby mode to avoid accidental alarms.
6.3.3 Zero Calibration

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

1. Remove the cover over the sampling system. Place the monitor into the Calibration Mode. This will disable the remote alarms. NOTE: The true zero can only be displayed and adjusted in the Calibration Mode.
2. Inspect the flow rate on the flow meter and adjust to the proper flow rate indicated on the front panel.
3. Inspect the zero reading on the sampling system display, and turn the zero adjustment potentiometer until the display indicates a steady zero. A clockwise rotation increases the display value; a counterclockwise rotation decreases the display value.

6.3.4 Gas Preparation

⇒ CAUTION: Be sure to observe all safety guidelines when generating and using calibration gases.
⇒ IMPORTANT: Due to the different flow rates of the Methyl Bromide monitor and the regulator of the span gas, do not connect the span gas directly to the monitor.
⇒ NOTE: The gas concentration should be close to, but never exceed, full scale.

1. Fill the calibration gas Tedlar bag with the Methyl Bromide cylinder span gas.

IMPORTANT: Be sure to perform the calibration before the concentration of the gas changes. Also, verify that the concentration of the calibration gas is the same after calibration as it was before.

6.3.5 Span Calibration

⇒ NOTE: When using cylinder span gas, gas must be a mixture of the target gas blended with air. Never connect the gas cylinder directly to the sampling system. Exhaust the gas from the cylinder into a Sample gas Tedlar bag.

1. Open the valve on the waste bag and connect the system exhaust tubing to the gas waste Tedlar bag. Inspect the flow rate again on the flow meter and adjust to the proper flow rate.
2. Insure that the sensor cell is firmly seated into the sampling system flow chamber by pushing the cell into the cap.

⇒ NOTE: Never twist the cell inside of the flow chamber.

Open the valve on the calibration span gas Tedlar bag and connect it to the sampler inlet and expose the sensor cell to gas for 2 minutes. When the display stabilizes, adjust the display to the span gas reading by turning the span potentiometer located on the sampling system front panel. A clockwise rotation increases the display value; a counterclockwise rotation decreases the display value.

After calibration, disconnect the span gas Tedlar bag and permit the sampling system display to return to zero. Readjust the zero if necessary.
3. Recheck the zero reading and adjust to 0.0 if necessary.
4. Return the monitor to the Measure mode.
5. Attach the front cover to the methyl bromide monitor.

NOTE: The remaining span gas and collected waste gas should be properly exhausted.
Sample Exhaust flame arrestor
Sample Inlet flame arrestor

_Air Check Ex_ Sample Inlet Filter