Model STX-PA
Gas Monitor

Instruction Manual

PureAire Monitoring Systems, Inc.
1140 Ensell Road
Lake Zurich, IL. 60047
Phone: 847-726-6000
Fax: 847-726-6051
Toll-Free: 888-788-8050
www.Pureairemonitoring.com
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Welcome to PureAire 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 1-224-443-5445. 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

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1: Introduction

STX-PA Chlorine Dioxide sensor head is a self-contained gas detection system. Each system consists of an amperometric electrochemical sensor cell and three-wire transmitter. The sensor cell can be either connected directly to the transmitter or remote between 10 and 30 feet. The Model STX-PA series sensor heads may be used as stand-alone gas detectors or linked to an optional controller or your own centralized control and surveillance system.

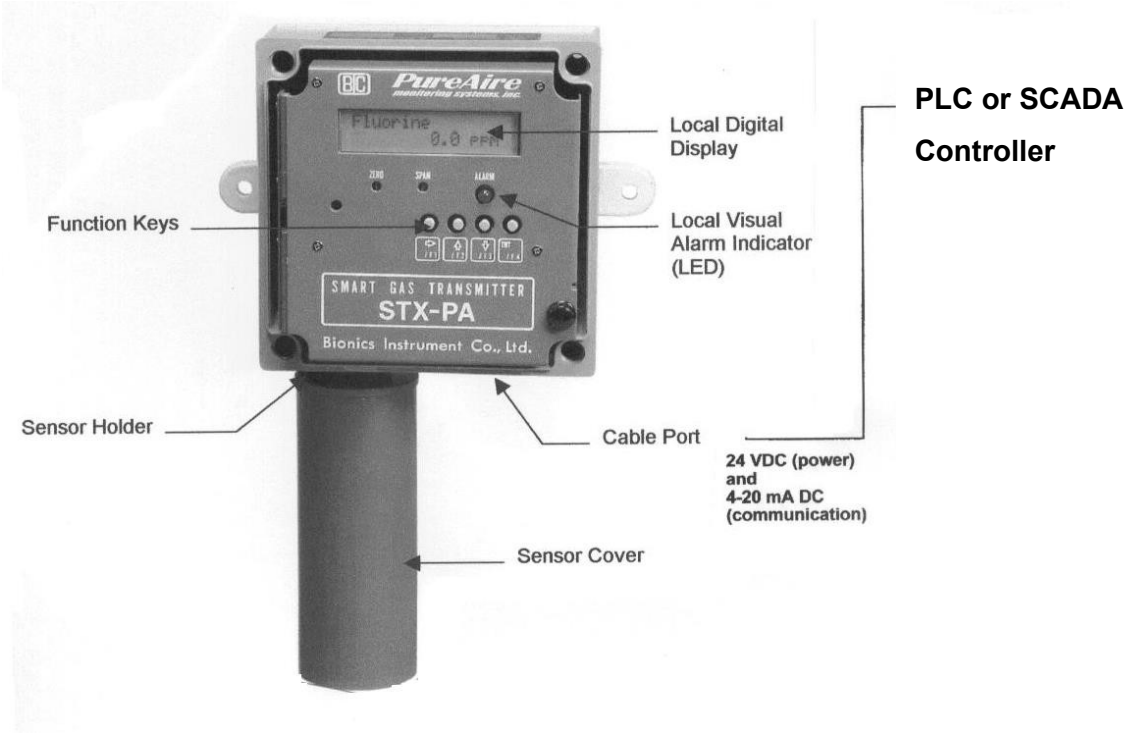
Standard features include:

- Local digital display
- Local audio and visual alarm indicators
- Built-in gas concentration and system fault relays
- Programmable, dual-level gas concentration alarms
- 4-20 mA output
- Self-monitoring operation
- Renewable, plug-in sensor cell
- 24 VDC operation

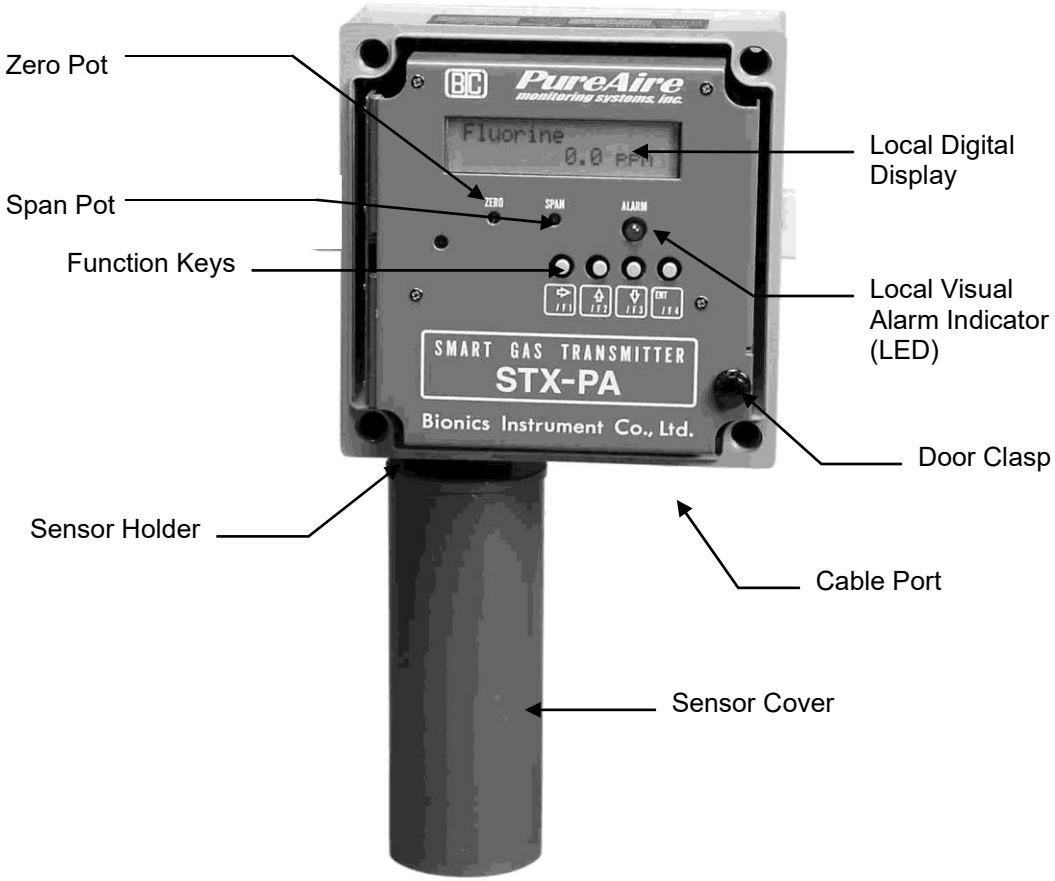
1.1 Component Identification

1.1.1 Overall System Composition

The STX-PA may be integrated into the overall hazardous gas monitoring system as shown in the following drawing. It may also be used as a stand-alone detection system.



1.1.2 Front View



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. **Sensor Holder** — Serves as a mounting bracket for the sensor cover.
3. **Sensor Cover** — This cover protects the gas sensor. It threads onto the sensor holder.
4. **Gas Sensor Model GS-161DF**— An amperometric, electrochemical sensor which 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.*

5. **Alarm LED** — This LED lights when an instrument or gas concentration alarm is detected.
6. **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).
7. **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.
8. **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.

9. **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.

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

1.1.3 Internal Connections

1. **Analog Output/ VDC Power Connection** — This connection serves as both the 4-20 mA output connection and 24 VDC power input connection. See section 3: Installation for more information.

2. **Alarm Relay Connections** — This terminal block is used to connect the instrument's gas concentration and system fault relays.

External connection

T1 Ex. Connector (Phoenix MCV1.5/16-G-3.5)

Pin#	Name	Description
1	EXT-IN(+)	External Reset Input
2	EXT-IN(-)	
3	SIG-OUT(+)	DC4-20mA output
4	SIG-OUT(-)	
5	NC	No connect
6	BUZ-OUT(+)	SCI / TTL
7	BUZ-OUT(-)	
8	AL-1 (NO)	Alarm 1 Relay Output
9	AL-1 (C)	
10	AL-1 (NC)	
11	AL-2 (NO)	Alarm 2 Relay Output
12	AL-2 (C)	
13	AL-2 (NC)	
14	ERROR (NO)	System Fault Relay Output (Fail-safe condition, pins 14 & 15 are energized when powered
15	ERROR (C)	
16	ERROR (NC)	

2: Specifications

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

2.1 Performance Specifications

Models:	**STX-161PA-R, STX-161PA-M**
Sensor Type:	**GS-161DF,** Diffusion type, plug-in electrochemical cell (3 electrode).
Response Time:	Within 30 seconds to T90.
Repeatability:	±10% of full scale.
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).
Operating Temperature:	14° to 113°F (0° to +40°C); consult PureAire for lower 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

Type:	Proprietary electrochemical gas monitor for the detection of Chlorine Dioxide
Sensor Life:	4 to 5 years under normal conditions.
Transmitter Type:	**STX-161PA-M** (Sensor cell is connected directly to the transmitter)
	STX-161PA-R (Sensor cell is remote from the transmitter. Standard length is 3 meters)
	GS-161DF Renewable sensor cell for the detection of Chlorine Dioxide, Range 0-1.0ppm
	630501-20 Remote sensor cable 20 feet long
	630501-25 Remote sensor cable 25 feet long
	630501-30 Remote sensor cable 30 feet long
	630501-50 Remote sensor cable 50 feet long
	T-1073-P5P-ND 115VAC / 24VDC regulated power supply, wall plug in type.
Spare Parts:	**El-160-1** Electrolyte for Chlorine dioxide sensor (provides 5 recharges)
	M-100M Membranes for Chlorine dioxide sensor (provides 5 recharges)
	1516-12W White O-rings, pack of 5. (only replace when broken)
	SC-2000 Silicon Sheet, pack of 5. (only replace when broken)

2.3 Signal Outputs

Local Display:	Digital display calibrated for the specific target gas.
Analog Output:	DC 4-20 mA (3-wire system).
Alarm Relays:	Two DPDT gas concentration alarm relays; One DPDT system fault relay (failsafe).
Relay Capacity:	AC 125 V, 0.3A max DC 30 V, 1.0A max. (resistive load)

2.4 Electrical Requirements

Power:	24 VDC external power. **NOTE: Must be a regulated 24VDC Power Supply**
Consumption:	Approximately 200mA

2.5 Physical Characteristics

Dimensions:	4.9 (W) x 6 (H) x 2.95 (D) inches; 125 x 177 x 75 mm
Weight:	2.1 pounds (1 kg)
Enclosure Type:	General purpose IP 65 NEMA 4X; not intended for explosive atmospheres.

3: Installation

3.1 Site Requirements

The STX-PA Sensor Head 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. Air flow 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.

WARNING: *The STX-PA is not designed for installation in hazardous areas. Consult PureAire for information on enclosures for use in hazardous environments.*

3.2 Mounting

IMPORTANT: *The STX-PA must be mounted with the sensor pointed directly down. Do not install with the sensor at greater than a 45° angle from vertical.*

The STX-PA is designed primarily for wall mounting. The transmitter should be mounted a minimum of 1 inch off the wall to permit clearance of the sensor protector and calibration cap. Install the transmitter at least 1 foot off the floor.

3.3 Sensor Installation

NOTE*: The following applies to type "DF" transmitter mounted sensors only. Consult PureAire for installation information on remote type sensors.*

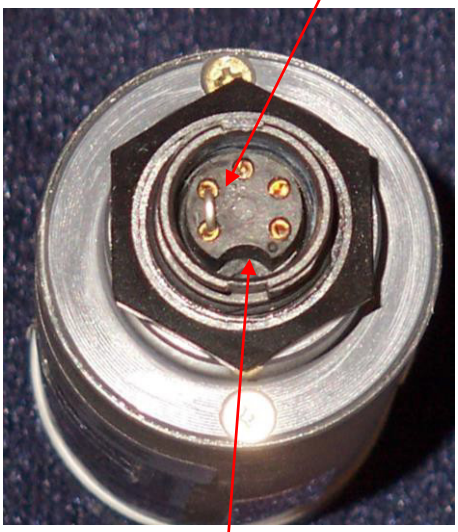
IMPORTANT: *Be careful not to turn the sensor or touch the membrane on the bottom of the sensor during installation.*

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.*

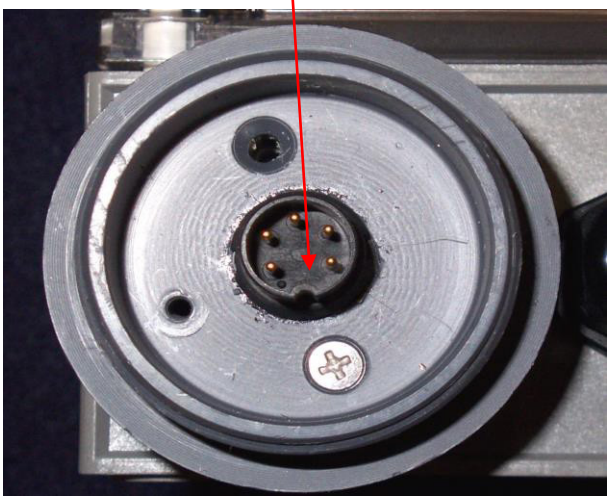
1. Unpack the DF sensor cell from the plastic packing
2. Remove the silver shorting pin from the DF sensor cell connector, located on the top of the sensor
   - **IMPORTANT*:* Remove the shorting wire or current generator from the sensor cell connector before connecting the sensor cell to the transmitter.**
3. Remove the sensor protector by rotating it counterclockwise. (For cell directly mounted to transmitter)
4. Align the female pins on the DF sensor cell to the male pins on the sensor cell holder attached to the STX-PA transmitter.
   - **NOTE: There is a locating pin on both sensor cell and transmitter connector. NEVER twist the cell inside the connector.**
5. Plug the sensor cell into the connector on the transmitter housing.
6. Install the sensor cell protector by rotating it clockwise

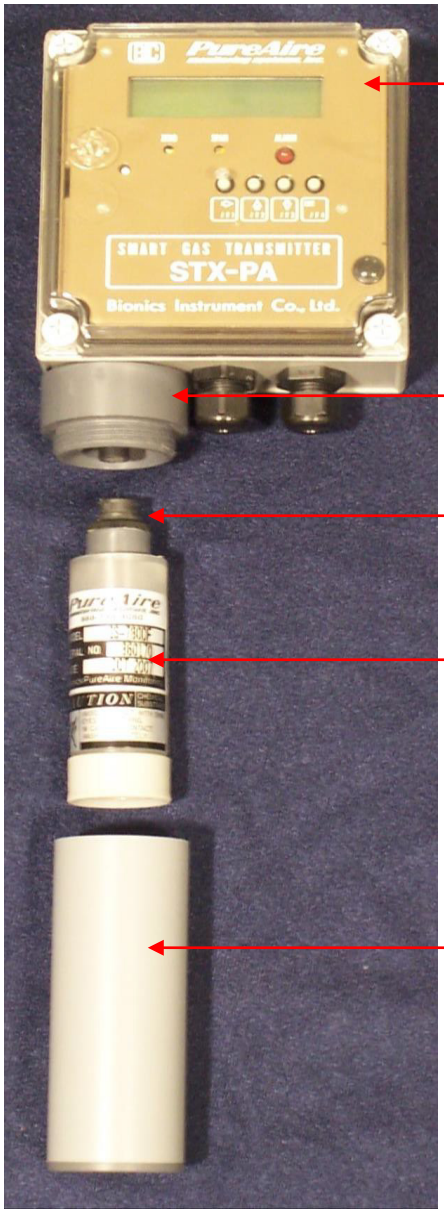
Silver Shorting Pin

Must remove before connecting sensor to transmitter



Locating Pin





STX- PA transmitter

Cell holder connector

DF cell connector

DF Sensor Cell

Sensor Cell Protector

3.4 Wiring

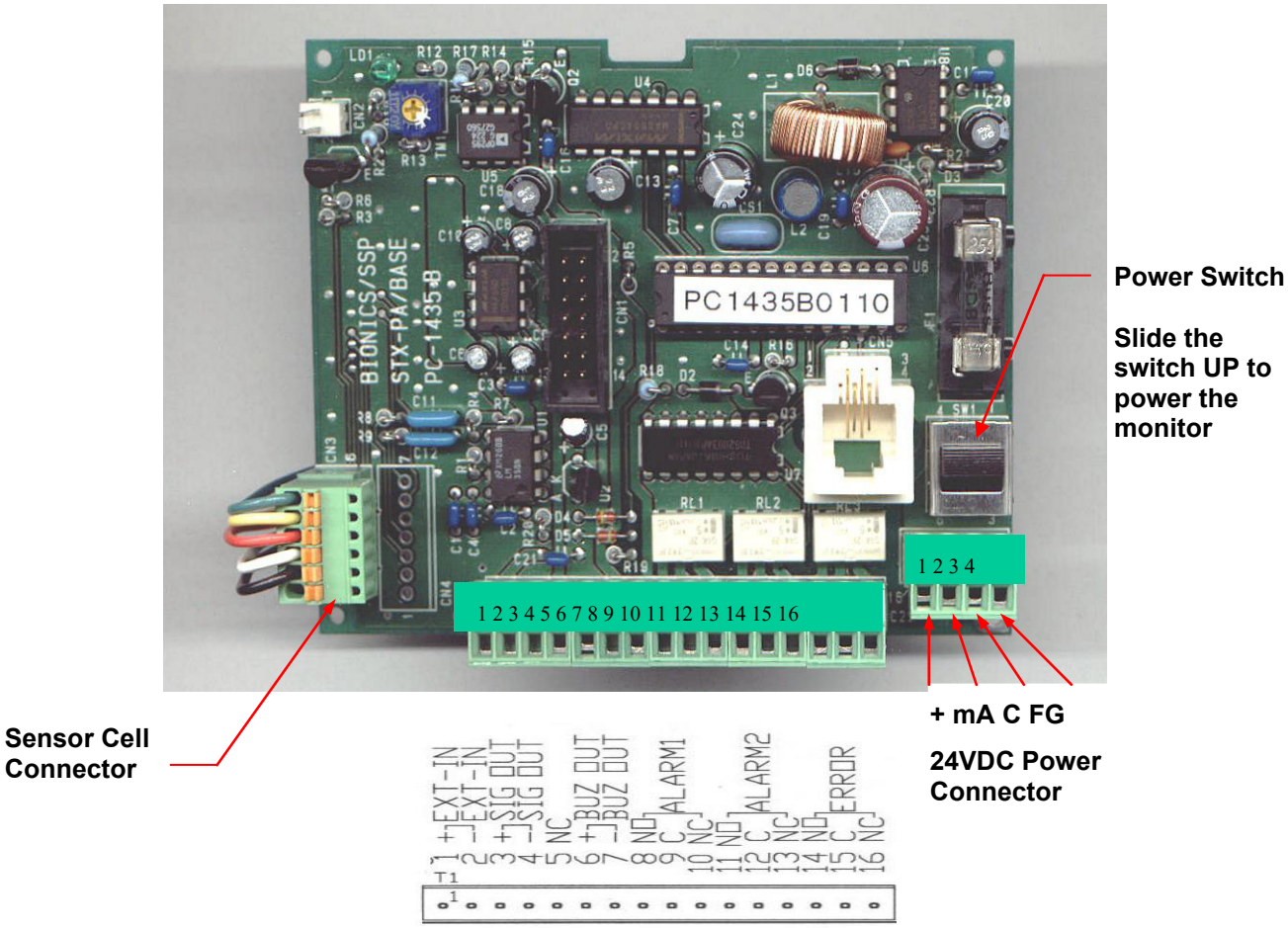
3.4.1 Analog Output/ 24 VDC Power

Connect the 24 VDC / Analog Output cable to the terminal block located on the inside of the instrument. The terminal connections are as follows: (1) +24V, (2) –0v mA, and (3) 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 STX-PA must only be powered using a regulated 24VDC Power Supply. Failure to use a regulated 24VDC power supply will void the warranty.

The analog out and VDC power in connections are made on the 4-20 mA signal output terminal inside the transmitter housing. These connections are made as follows:

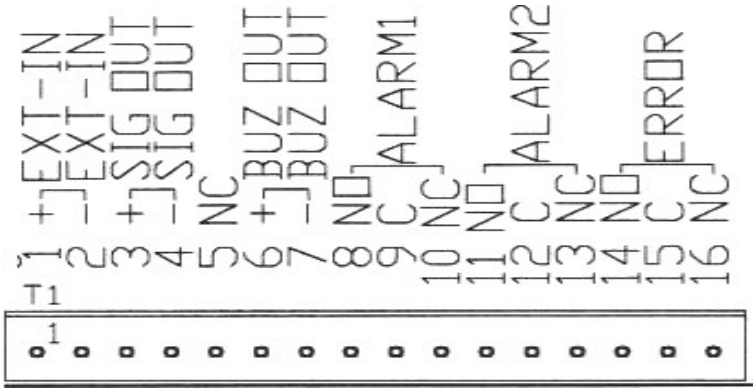
Pin #	Connection	Description
1	Power	DC +24V Input
2	Signal Out	4-20mA Output
3	Common (Signal Ground)	0V
4	FG	Earth Ground



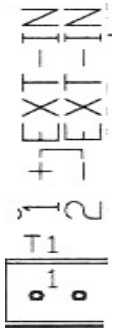
3.4.2 Alarm Relays

The STX-PA incorporates 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



3.4.3 Remote Alarm Reset



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 and apply 24 VDC power.

   NOTE: The STX-PA requires a regulated 24VDC power supply

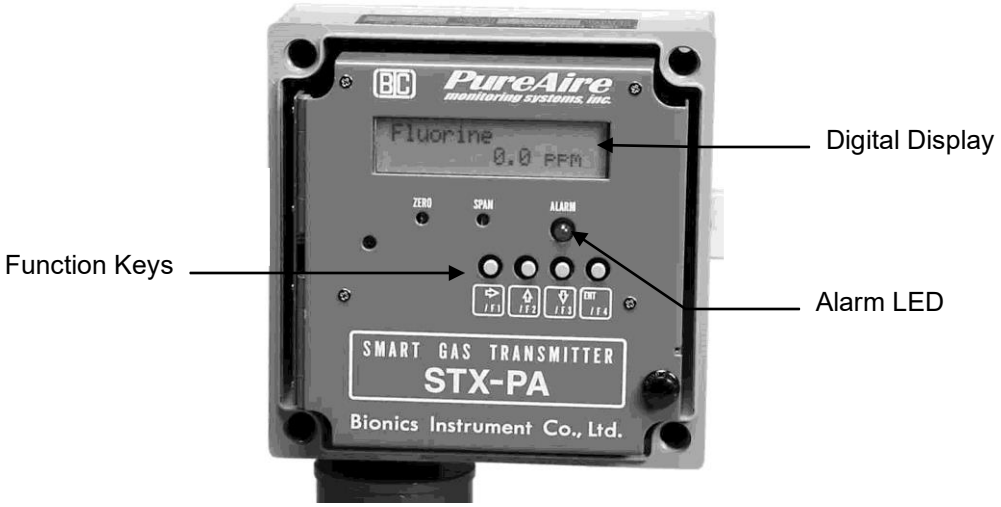
2. Turn on the Power by sliding the Power Switch UP.

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

4: Programming

4.1 Control Panel Overview

All instrument configuration and operational programming is performed from the front panel of the STX-PA Sensor Head.



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 STX-PA's four 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).

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

4.2 System Configuration

The STX-PA's system 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.

NOTE: The alarm delay must be set to a value greater that zero or the alarm relays Will Not Activate. A setting of 000. Seconds will disable both Alarm relay 1 and Alarm relay 2

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 (see Sections 5.1 for additional information).

5: Normal Operation

The Model STX-161PA Gas Monitor is a single point monitor designed for the continuous detection and measurement of hazardous chlorine dioxide 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 STX-PA 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).

```
NAME OF GAS
                    0.0 PPM
```

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.

```
NAME OF GAS  STD'BY
                    0.0 PPM
```

Test — This mode is used when testing the instrument. When the unit is in the "Test" 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). Depressing the F2 button continuously will drive the display to over full scale and activate the internal audible horn and alarm light and internal relays and mA output.

Depressing the F2 button continuously will drive the display to over full scale and activate the internal audible horn and alarm light.

NOTE: The F2 button is used to turn off the audible horn, therefore when testing the monitor in the TEST Mode, the audible horn will activate and turn off immediately. The red Alarm LED and Alarm display will still remain active until the F2 button is released.

```
NAME OF GAS  TEST
                    0.0 PPM
```

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.

```
NAME OF GAS  CALIBRATE
                    0.0 PPM
```

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.

```
OPERATING MODE
                    MEASURE
```

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

```
OPERATING MODE
                    STD'BY
```

```
OPERATING MODE
                     TEST
```

```
OPERATING MODE
                  CALIBRATION
```

Pressing the F4 places the STX-PA in the mode of operation that is shown on the display.

5.3 Alarm Messages and Indicators

The STX-PA incorporates 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
A1    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:

```
NAME OF GAS
            *SENSOR ERROR*
```

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

```
NAME OF GAS
            *NO SENSOR*
```

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

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

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.

NOTE: *Both Alarm 1 and Alarm 2 relay states are user selectable. The factory default for Alarm 1 is Non-latching, (AUTO RECOVER) and Alarm 2 is Latching, (RECOVER). See sections 4.2.4 and 4.2.5*

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 STX-PA may 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

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
System Fault Relay	Energized

5.6.2 Recommended Routine Maintenance Schedule

Routine Checks	Monthly
Electrolyte Replacement	Every 6 months*
Membrane Replacement	Every 6 months
Sensor O-ring and	Only when damaged
Sensor Calibration	Every 6 months

5.7 Loss of Power Indication

In the event the STX-PA Gas Monitor loses VDC power, the local display will go blank, 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.*

6: Maintenance & Calibration

Maintenance and calibration should be performed only by qualified personnel.

6.1 Sensor Cell Removal and Installation

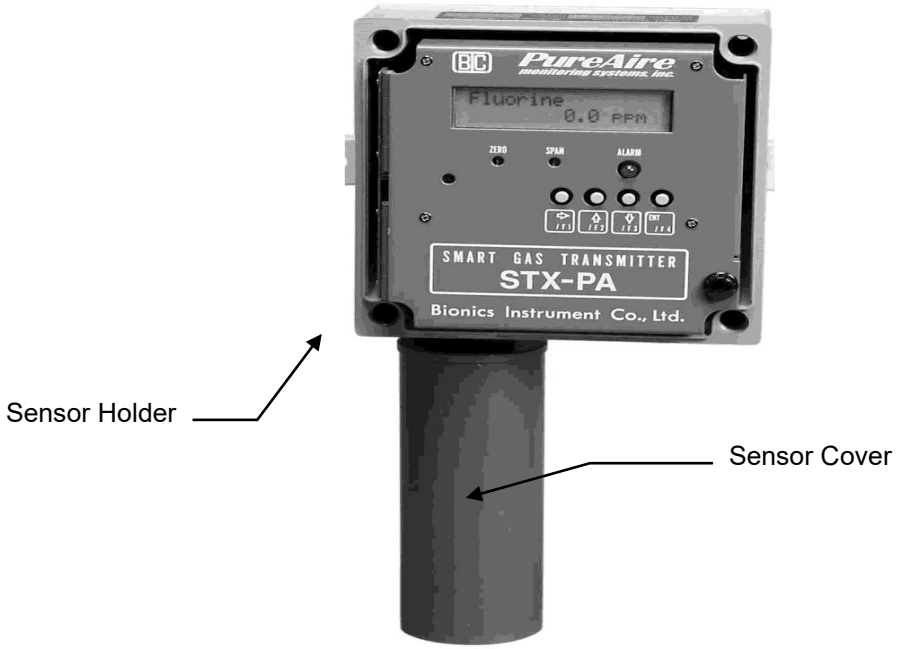
6.1.1 Sensor Removal (when sensor is connected directly to transmitter)

1. Remove the sensor cover by rotating counter-clockwise.
2. Unplug the sensor by pulling straight downward.

CAUTION: *Do not twist the sensor; this may damage the connecting pins and/or sockets.*

CAUTION: *Avoid spilling electrolyte out of the small opening on the side of the sensor.*

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

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

1. Remove the sensor cover by rotating it counterclockwise.
2. Plug the sensor into the receptacle on the transmitter housing.
3. Replace the sensor cover.

CAUTION: *Do not twist the sensor. This may damage the connecting pins or sockets.*

NOTE: *Some sensor cells have a white protective membrane, Miliseal, over the box nut.* **Under normal operation it should not be removed.**

6.2 Electrolyte Replacement

CAUTION: *Be sure to adhere to your facility's chemical handling guidelines and procedures.*

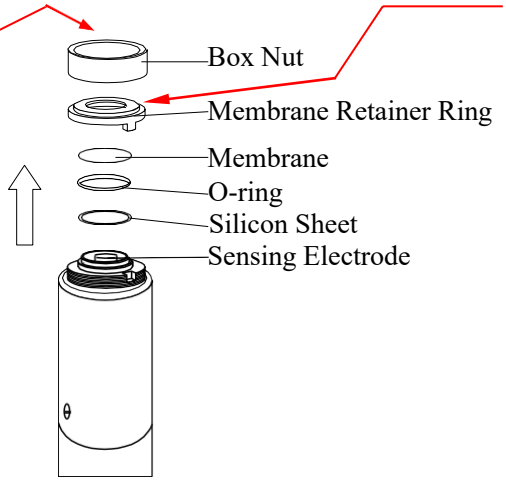
1. Remove the sensor as outlined in section 6.1.1.
2. Turn the sensor upside down. Remove the box nut, membrane retainer ring, membrane, O-ring, and silicon sheet (depending on sensor model).

NOTE: Some sensor cells have a white protective membrane, Miliseal, over the box nut.

DO NOT REMOVE IT

The Miliseal is used on some gases that require an additional dust barrier.

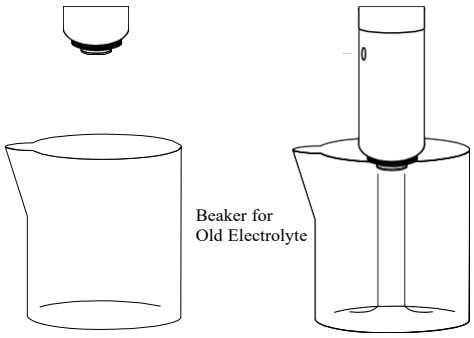
This miliseal can be replaced if it is dirty. Use P/N SC 2000



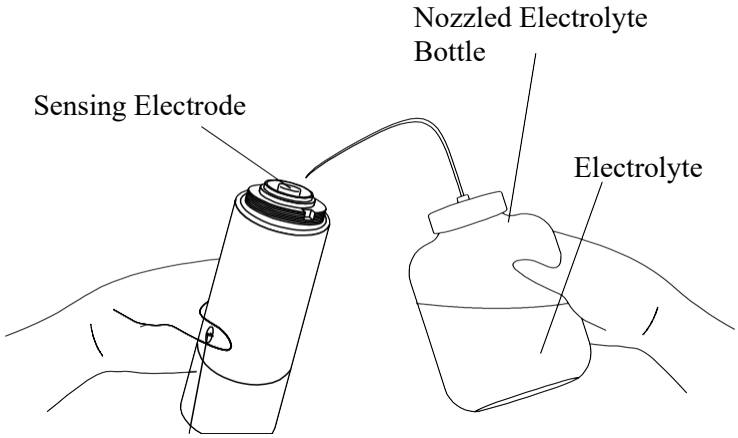
NOTE: Some sensor cells have a clear silicone diffuser installed inside the Membrane Retaining Ring.

DO NOT REMOVE IT

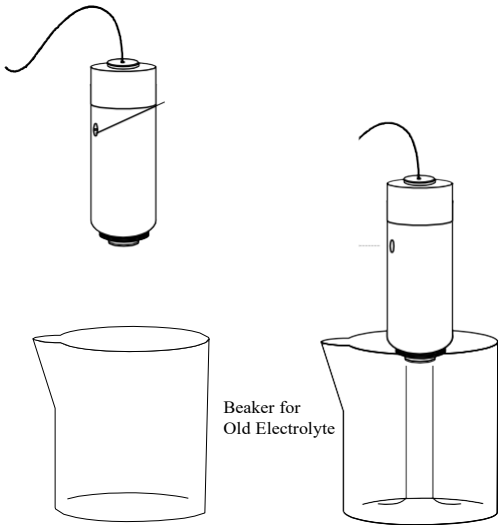
3. Place the sensor over the beaker as shown and pour the old electrolyte into the beaker.



4. Hold the sensor in your hand with the sensing electrode up. Pour 10 cc's of fresh electrolyte into the sensor and rinse. Discard into the beaker.

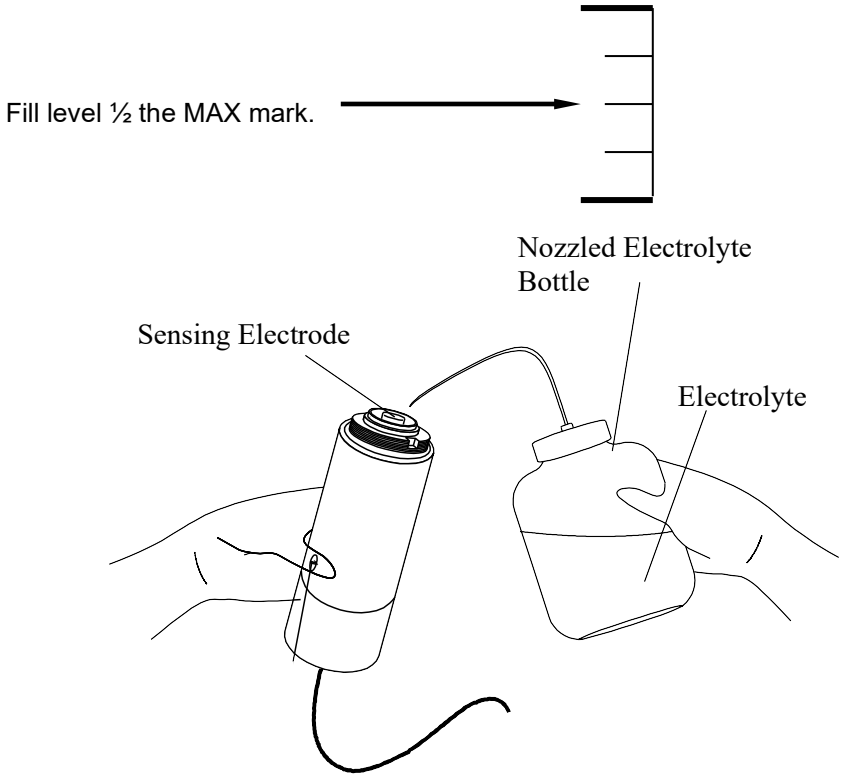


5. Place the sensor over the beaker as shown and pour the rinsed electrolyte into the beaker.

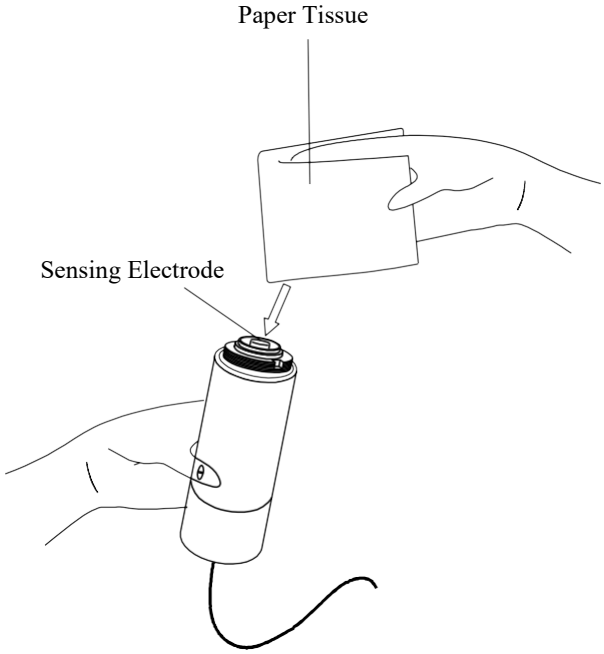


5. Refill the sensor cell with fresh electrolyte until it reaches ½ the MAX mark

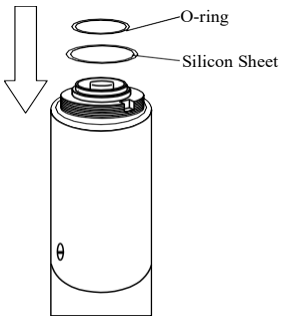
NOTE: The sensor cell is upside down when filling to the ½ mark. When the sensor is placed in it's normal position, the electrolyte level will register full.



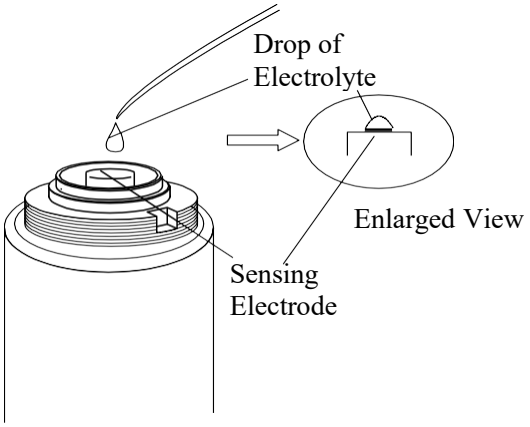
7. Wipe the sensing electrode and the surrounding area with a dry paper tissue.



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



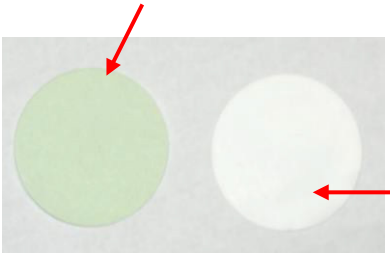
9. Apply a drop of electrolyte on the sensing electrode.



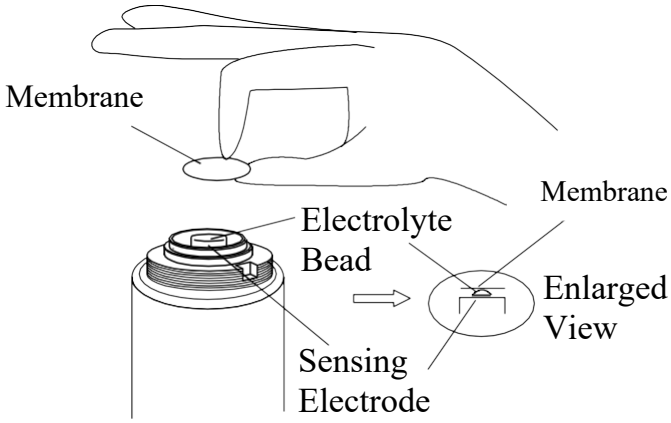
10. Place a new membrane on the sensor, with the bead of electrolyte between the electrode and the membrane.

Caution: A green paper separates each membrane.

THIS PAPER MUST NOT BE USED



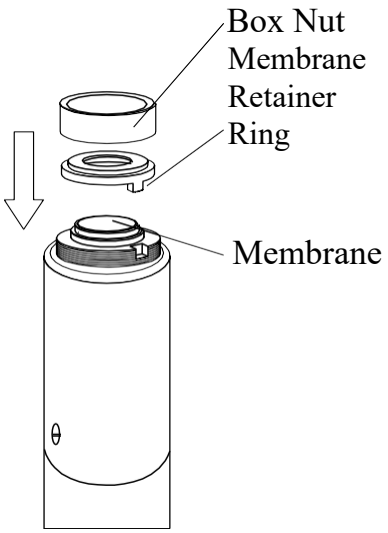
White membrane



NOTE: *Do not touch the center of the membrane with bare fingers. Oil from your fingers may adversely affect performance.*

11. Place the retainer ring over the membrane and then place the box nut over the retainer ring. Turn box nut clockwise until hand tight; continue tightening until the box nut can no longer be moved by hand.

CAUTION: Sensor cell response will be affected if box nut is too loose.



12. Turn the cell to the proper monitoring direction, (Box Nut is facing down) and confirm that the level of electrolyte is at the MAX mark. It is OK if the level is slightly aboveor below the MAX mark.

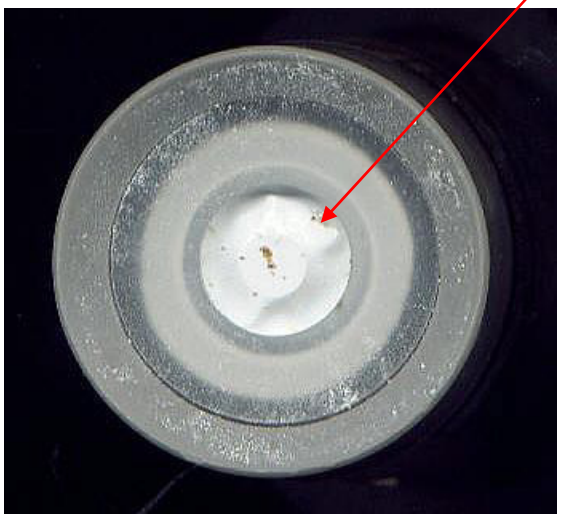
Reinstall the sensor cell into the transmitter or duct.

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

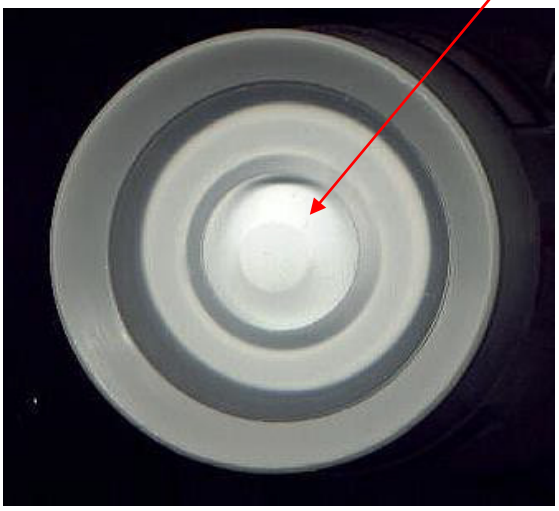
There should be no liquid above this level

The filler port has a breather hole in it and must not be covered with liquid

Example of a wrinkled membrane



Example of a proper membrane



6.3 Sensor Calibration

The STX-PA 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.

NOTE: for higher accuracy more frequent dynamic gas calibration is recommended

The Calibration Kit (optional) is recommended for calibration.

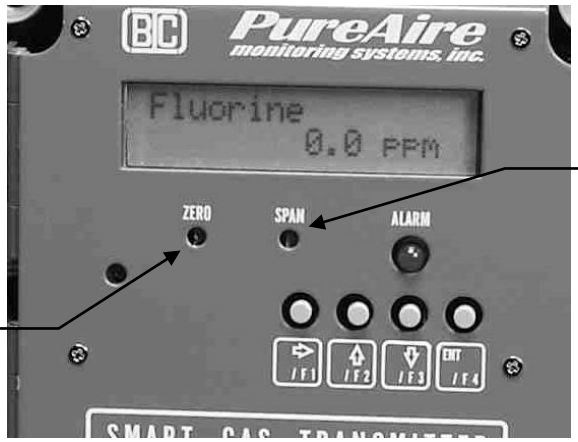
6.3.1 Gas Generation and Calibrating Kits

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

Calibration Kit Model	K-I PH_3	K-II Cl_2	K-III HCN	K-IV SO_3	K-V H_2S	K-VI NH_3	K-VII HCl	K-VIII HF
Gas generation tubes	1 box		1 box	1 box	1 box			
Gas generation solution (10 ml)	2 bottles		2 bottles	2 bottles	2 bottles			
Gas detection tube	1 box	1 box	1 box	1 box	1 box	1 box	1 box	1 box
Gas sampling bags (2 liter)	2	2	2	2	2	2	2	2
Double bellows	1	1	1	1	1	1	1	1
Calibration Cap 690100		1	1	1	1	1	1	1
Mini-pump MP-05 (optional)		1	1	1	1	1	1	1
Reagent 1		1 bottle				1 bottle	1 bottle	1 bottle
Reagent 2		1 bottle				1 bottle	1 bottle	1 bottle
Dispenser bottle (100 ml)		1 bottle				1 bottle	1 bottle	1 bottle

6.3.2 Initial Preparation

1. Place the STX-PA 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.
3. Remove the clear transmitter cover.



6.3.3 Zero Calibration

IMPORTANT: *This procedure should be performed under normal monitoring conditions, without any of the target gas present..*

1. Check the instrument's gas concentration reading on the local display.
2. If the display does not read a steady "0," adjust the zero potentiometer as required. A clockwise rotation increases the display value, a counter-clockwise rotation decreases the display value.

6.3.4 Span Calibration, using prepared gases from Sample bags.

CAUTION: *Be sure to observe all safety guidelines when generating and using calibration gases.*

NOTE: *Gas generation kits are available through PureAire. These kits include instructions and materials for generating calibration gases and precise methods for accurately measuring the concentration of these gases.*

NOTE: *The gas concentration should be close to, but never exceed, full scale.*

1. Connect the appropriate calibration cap to the inlet of the high flow sampling pump and connect the Tedlar "waste gas" bag to the outlet of the pump.
2. Open the valve on the waste gas bag.
3. Adjust the pump's flowrate potentiometer until a flowrate of 0.5 liters/minute is achieved. A clockwise rotation increases flow; a counter-clockwise rotation decreases flow.
4. Recheck the instrument's zero reading; adjust as required.
5. Generate the calibration gas within a Tedlar bag.

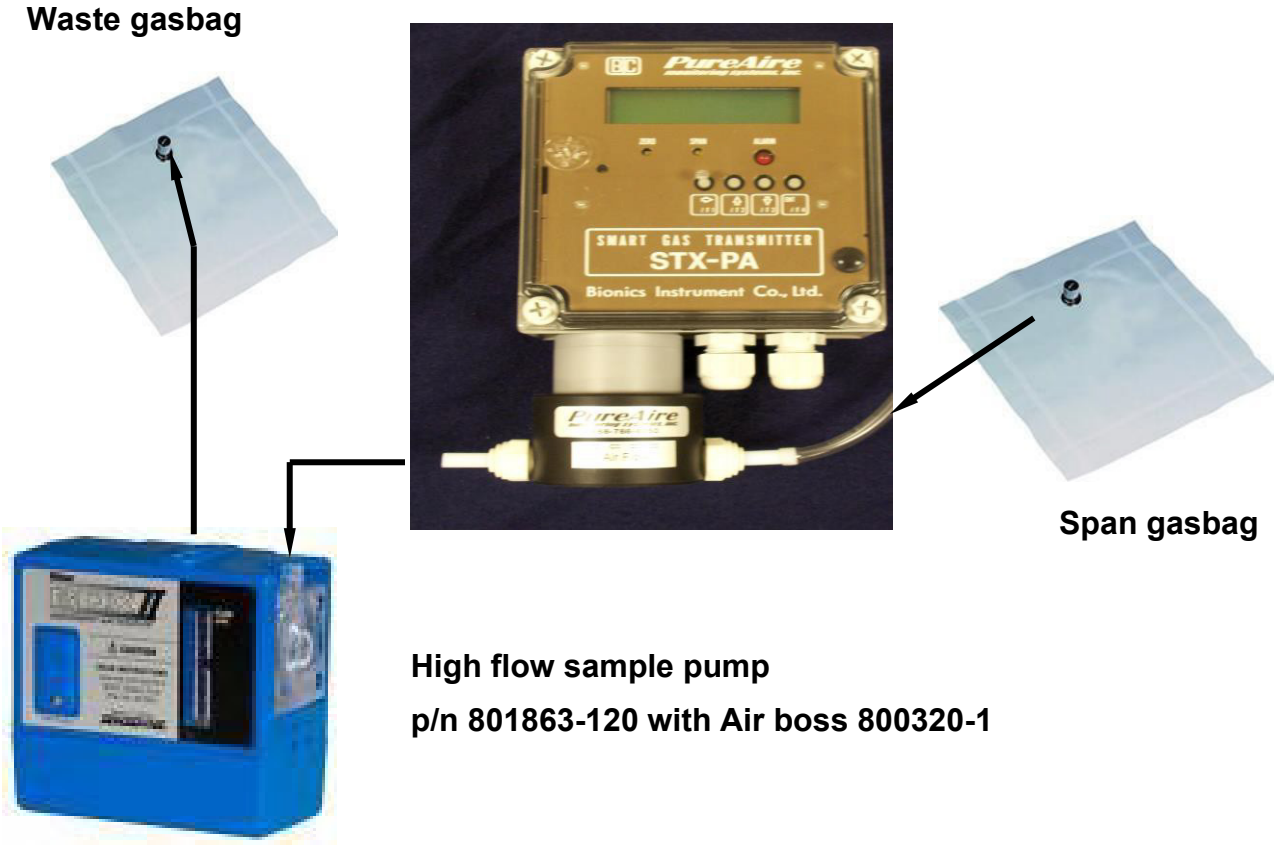
IMPORTANT: *Be sure to perform the calibration before the concentration of the gas changes.*

6. Disconnect the flowmeter and connect the Tedlar calibration gas bag to the inlet side of the calibration cap.
7. Open the valve on the calibration gas bag.
8. Expose the sensor cell to the span gas for 1 to 2 minutes until the gas reading stabilizes.
9. Adjust the instrument's span potentiometer until the displayed gas reading matches the concentration value of the calibration gas. A clockwise rotation increases the display value; a counter-clockwise rotation decreases the display value.
10. Remove the gas bag from the calibration cap and close the valve on the calibration gas bag. Permit the instrument to return to a zero reading.
11. Allow the instrument to return to a zero reading. If the instrument has not returned to zero after 5 minutes, readjust the zero potentiometer as required.
12. Close the valve on the waste gas bag and disconnect from the sampling pump.
13. Turn the sampling pump "off."
14. Remove calibration cap from the sensor cell by gently rocking the cap as you pull downward.

IMPORTANT: ***Do not twist the sensor cell inside the calibration cap. This will loosen the membrane land cause the cell to loose response.***

15. Replace the transmitter housing cover.
16. If the STX-PA sensor head is connected to a controller, return the controller to the monitoring mode.

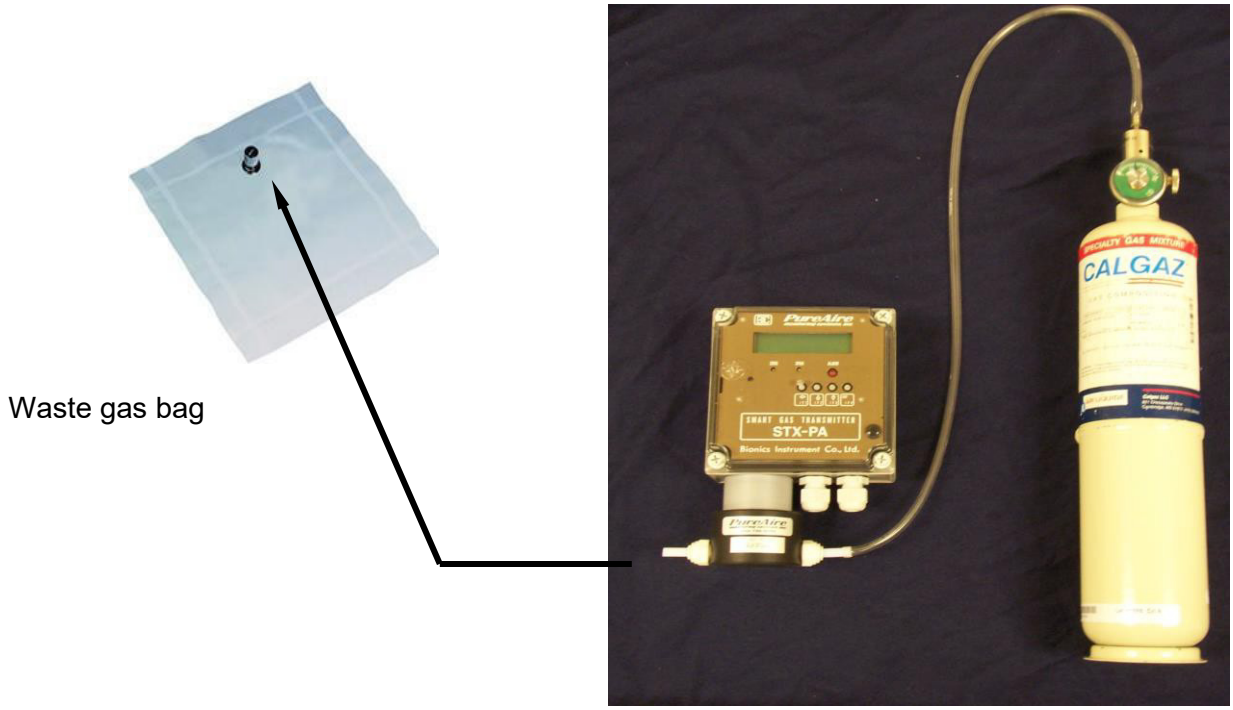
WARNING: *Be sure to dispose of the remaining calibration gas and waste gas properly.*



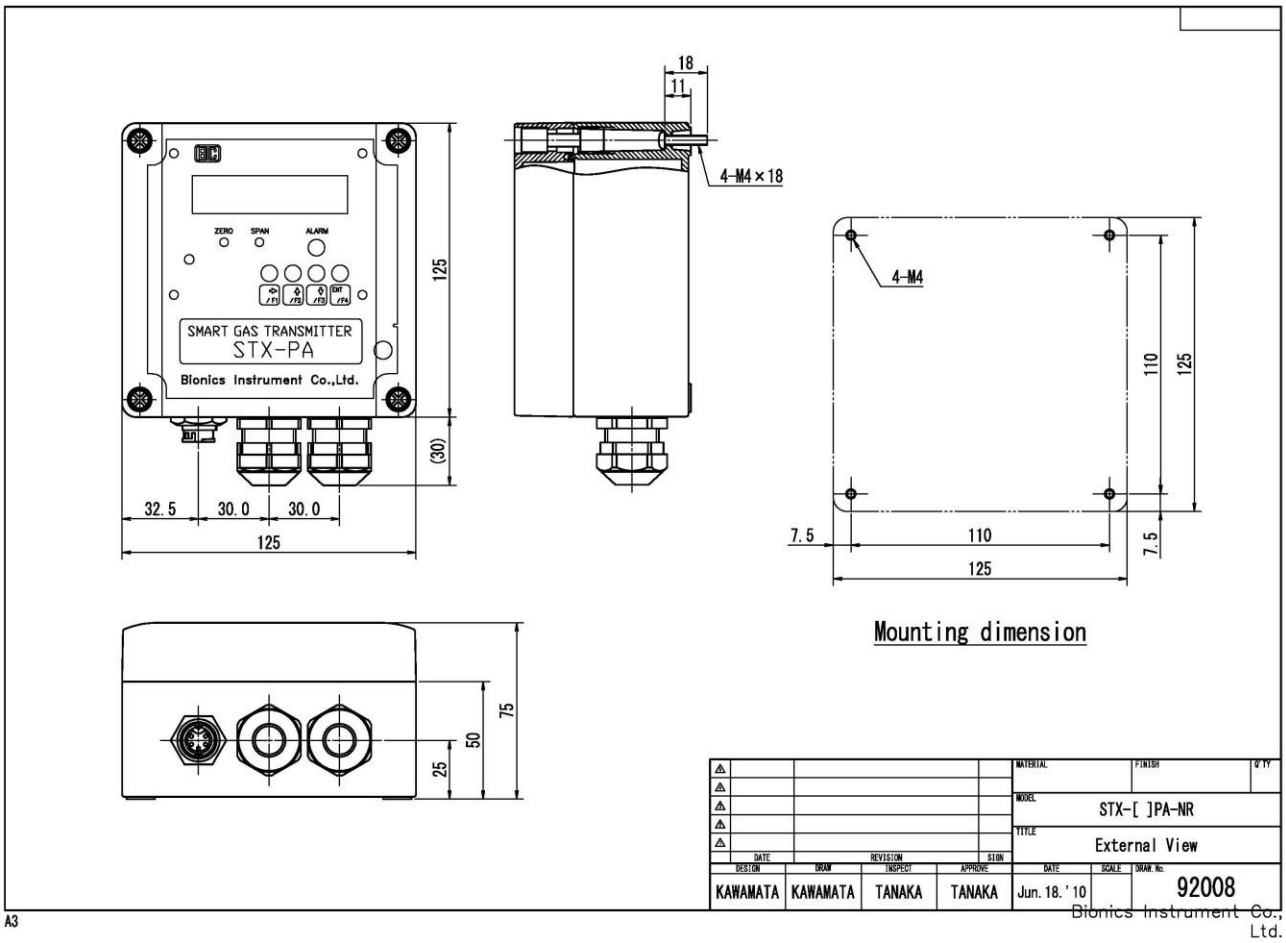
6.3.5 Span Calibration, using prepared gases from Cylinders.

NOTE: *Perform a Zero calibration before testing the STX-PA to span gas. Refer to 6.3.4*

1. Connect the appropriate calibration cap to the Span Gas Cylinder.
2. Connect the exhaust tube from the calibration cap to the valve on the waste gasbag and open the valve.
3. Open the flow regulator and expose the sensor cell to span gas for 1 to 2 minutes. When the display stabilizes, adjust the display to match the calibration span gas value by turning the span potentiometer. A clockwise rotation increases the display value, a counterclockwise rotation decreases the display value.
4. Close the flow regulator and disconnect the span gas and permit the transmitter to return the zero. Readjust the zero if necessary.
5. Remove the sensor cell from the calibration cap by gently rocking the cell as you pull it out of the cap. **NOTE: Never twist the sensor cell inside the calibration cap.**
6. Replace the transmitter cover and return the STX-PA transmitter into the monitoring mode.
7. If the STX-PA sensor head is connected to a controller, return the controller to the monitoring mode.



7: Dimensional Drawing



8: Appendix

STX-PA for remote cabinet monitoring

Transmitter/Controller
Digital gas concentration display
Two User STX-PA selectable Alarm relays
Built-in audio/visual alarms
24VDC powered 100mA
NEMA 4X IP 65 enclosure
4-20mA datalog output
Smart, Renewable Sensor Cell
Wall mounted transmitter/controller
Cell can be remote up to 10 ft*
Longer lengths contact PureAire

Dual User Selectable Audio/Visual Alarr
24VDC 0.68 amps

Max 10

Supervised 4-20mA output to PLC
4mA = 0ppm
20mA = Full scale
2mA = System Fault
0mA = Loss of Power

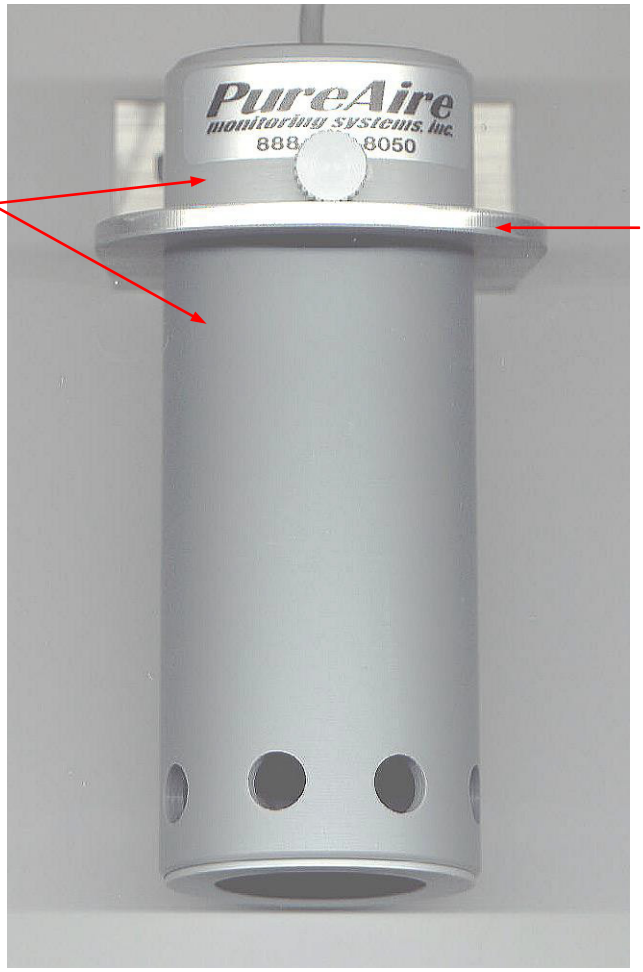
General Cable #E2203S.30.86
3 conductor18 awg stranded shielded
Max distance 3,000 ft.

Regulated PSU **p/n T1073-P5P-ND**
110VAC
24VDC 1.0 amp
Wall plug in type

Remote Mounting Bracket for STX-PA Sensor Cell

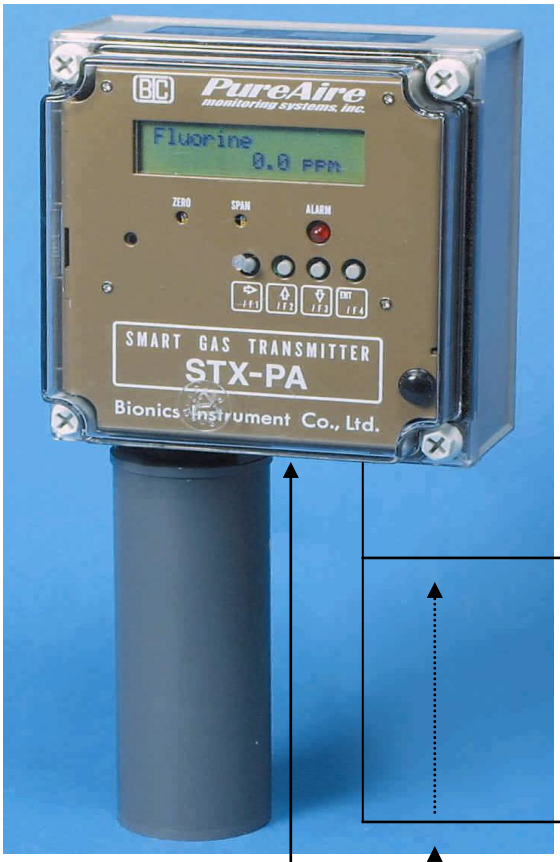
P/N TXSHA

Sensor Cell holder and protector



P/N 650100
Remote Mounting Bracket

STX-PA for Room Monitoring



STX-PA Transmitter/Controller
Digital gas concentration display
Two User selectable Alarm relays
Built-in audio/visual alarms
24VDC powered 100mA
NEMA 4X IP 65 enclosure
4-20mA datalog output
Smart, Renewable Sensor Cell
Wall mounted transmitter/controller
Optional Cell can be remote up to 10 ft

Dual User Selectable Audio/Visual
Alarm 30VDC 1 amp max
120VAC 0.3 amp max

Supervised 4-20mA output to
PLC 4mA = 0ppm
20mA = Full scale
2mA = System Fault
0mA = Loss of Power

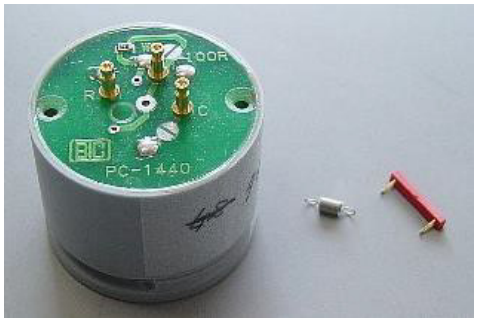
General Cable
#E2203S.30.86
3 conductor18 awg
stranded shielded
Max distance 3,000 ft.

Regulated PSU **p/n T1073-P5P-ND**
110VAC
24VDC 1.0 amp
Wall plug in type

How to install GS-( ) EP sensor to STX-PA

1. Unpack the EP sensor cell from the plastic packing.
2. Remove the Red shorting pin and shorting spring, (if supplied) from the EP cell
3. Align the holes with the EP cell holder on the STX-PA transmitter and carefully plug the cell into the STX-PA.

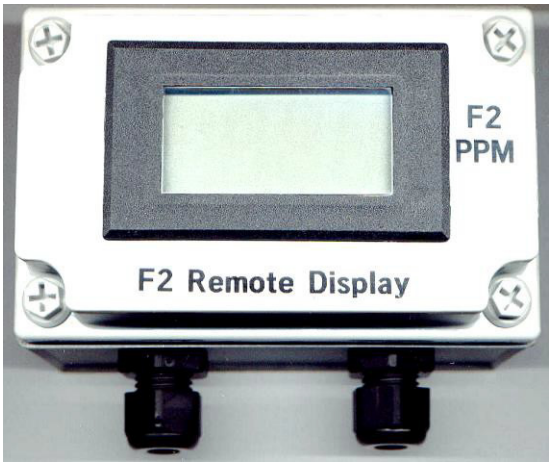
GS-( )EP Sensor
With shorting pins

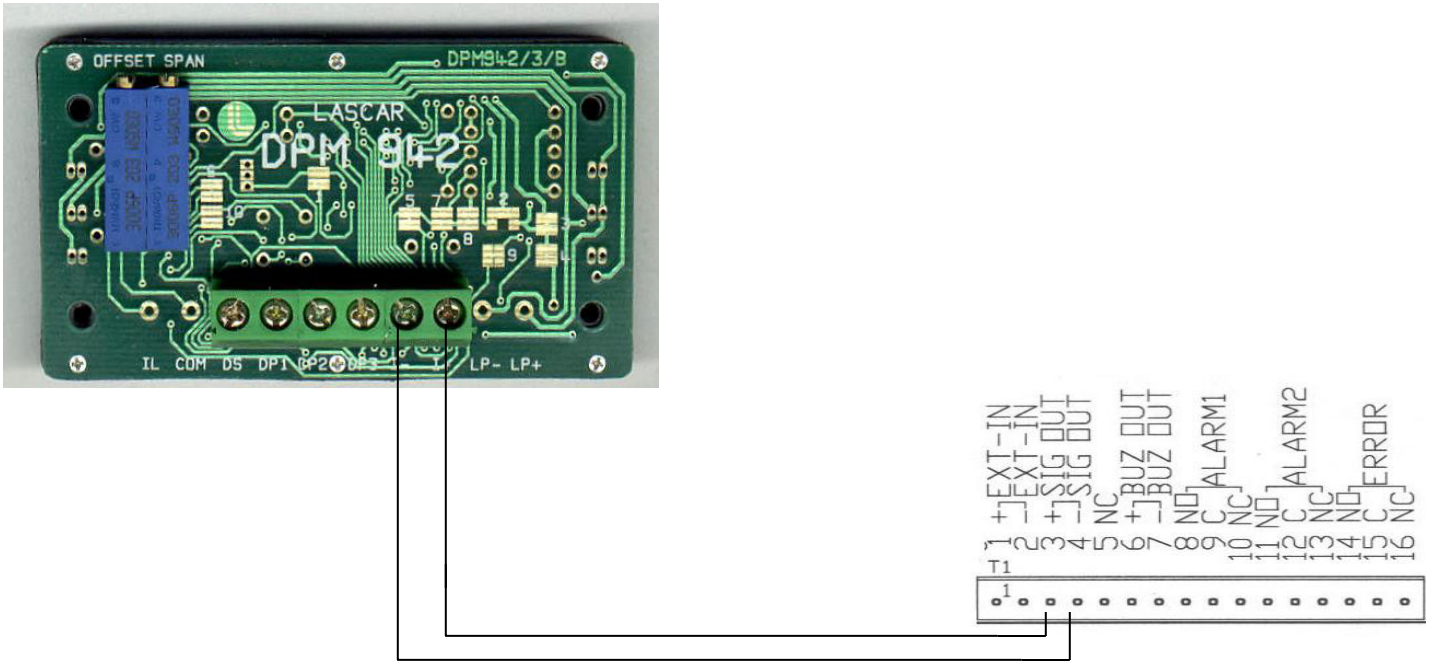


Remove Red shorting pin and
Spring, (if supplied) from sensor

NOTE: Failure to remove the shorting pins from the EP sensor will cause the STX-PA to operate erratically.

Remote Display Assembly





NOTE: To connect the Remote Digital display to the STX-PA:

Connect terminal **I +** to **+ SIG OUT**

Connect terminal **I -** to **- SIG OUT**

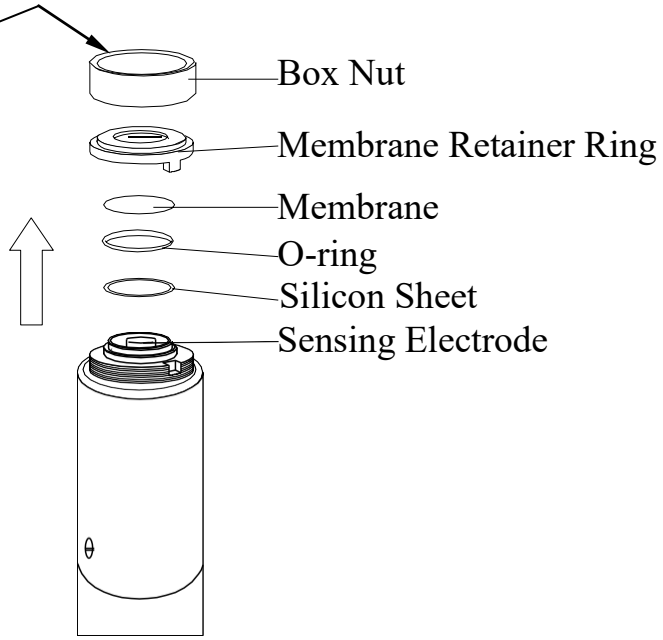
Components of PureAire Renewable Sensor Cell

NOTE: Some sensor cells have a white protective membrane, Miliseal, over the box nut.

This miliseal can be replaced if it is dirty. Order p/n SC2009

Under normal operation it should not be removed.

If punctured it must be replaced



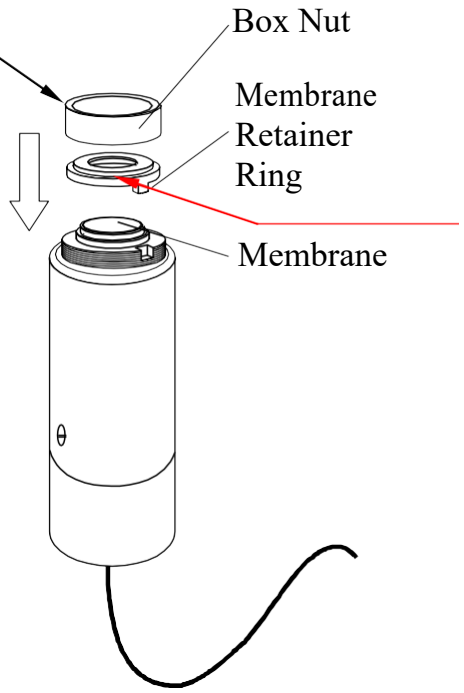
The factory assembles the box nut, and tightens it to hold the membrane in place while sealing the electrolyte inside the sensor.

CAUTION: During use, never loosen the box nut.

Sensor cell response will be affected if the box nut is too loose.

A loosened box nut will also cause the electrolyte to leak, which could cause damage to the electronics.

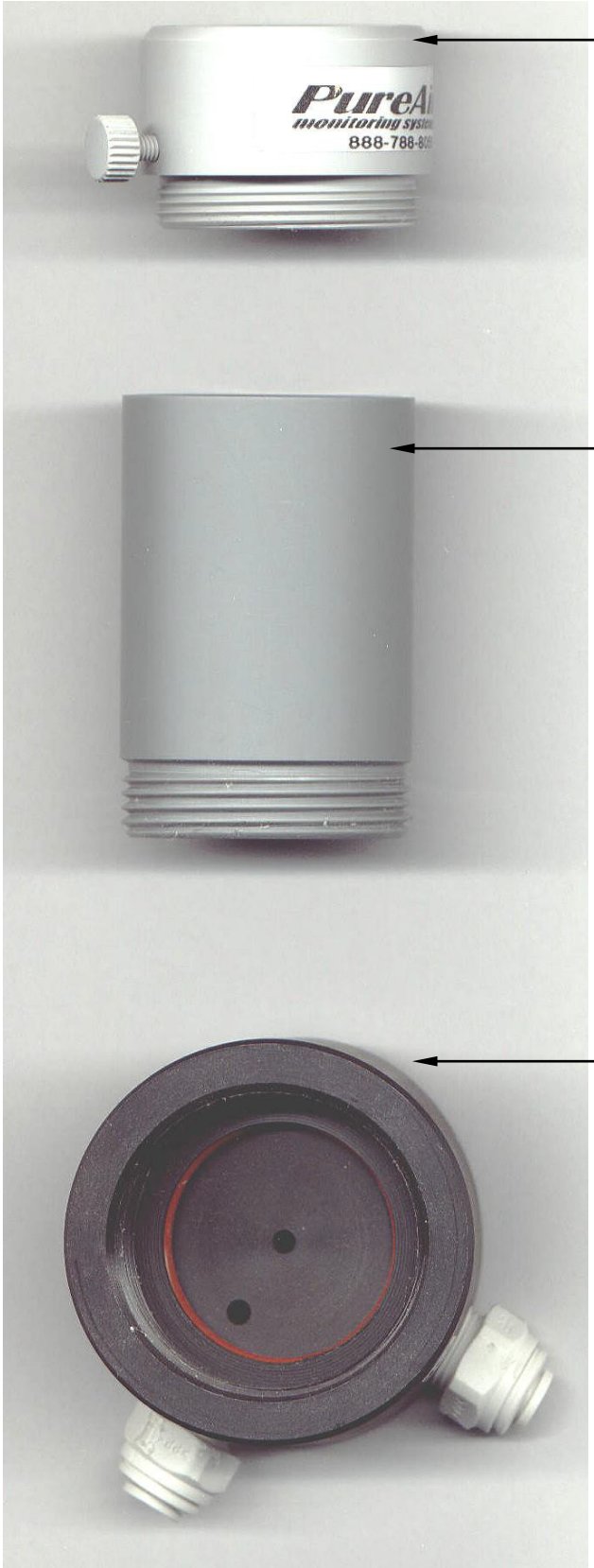
When using PureAire's calibration cap, never twist the cell inside the cap. To insert the cell, gently rock the sensor cell to seat inside the cap.



NOTE: Some sensor cells have a clear silicone diffuser installed inside the Membrane Retaining Ring.

DO NOT REMOVE IT

Process Flow Cap Assembly P/N 630800



Sensor holder

Step 3. Fasten the Sensor holder to the Cell protector and tighten the Fastening screw.

Be careful to not twist the sensor cell while fastening the sensor holder

Cell Protector

Step 2. After the DF cell has been inserted inside the Flow cap, Fasten the Cell protector to the Flow Cap.

Be careful to not twist the sensor cell while fastening the cell protector

Flow Cap for Process

Step 1. Insert the DF sensor cell into the Flow Cap by rocking it while pushing it down to seat it inside the O-ring.

NOTE: Never twist the sensor cell inside the Flow Cap. To remove the sensor, gently rock it while pulling it out of the flow cap

Sensor cell replacement parts

Sensors	Gas	Range	Electrolyte	Membrane	White O-ring	Flat O-Ring Silicon Sheet	Black O-Ring
Part Number					**1516-12W**	**SC2000**	**1516-12B**
GS-161DF	ClO_2	1 ppm	EL-160-1	M-100M	0	0	NR
GS-160DF	Cl_2	3 ppm	EL-160-1	M-100M	0	NR	NR
GS-170DF	ClO_2	1 ppm	EL-170-5	M-170M	0	0	NR
GS-261DF	H_2S	3 ppm	EL-260-1	M-260M	0	0	NR
GS-260DF	H_2S	30 ppm	EL-270-2	M-270M	0	0	NR
GS-361DF	HCN	3 ppm	EL-370-1	M-300M	0	0	NR
GS-360DF	HCN	30 ppm	EL-370-2	M-300M	0	0	NR
GS-480DF	HCl	15 ppm	El-468	M-400M	0	0	NR
GS-580DF	SO_2	15 ppm	El-568	M-500M	0	0	NR
GS-583DF	SO_3	6 ppm	EL-568	M-500M	0	0	NR
GS-780DF	HF	0～9 ppm	EL-768	M-700M	0	0	NR
GS-880DF	O3	0.3 ppm	EL-860-1	M-801G	0	0	NR
GS-961DF	Br_2 /I_2	0.3 ppm	EL-960-1	M-900M	0	0	NR
GS-960DF	Br_2 /I_2	3 ppm	EL-960-1	M-900M	0	NR	NR
GS-1250EP	CO	100 ppm	None required	None required			
GS-1461DF	F_2	1 ppm	EL-1460-1	M-1400M	0	0	NR
GS-1460DF	F_2	3 ppm	EL-1460-1	M-1400M	0	NR	NR
GS-1463DF	ClF_3	0.3 ppm	EL-1460-1	M-1400M	0	0	NR
GS-1551DF	H_2	1 %	EL-1555	M-1502B	NR	NR	0
GS-1550DF	H_2	4%	EL-1555	M-1502B	NR	NR	0
GS-1680DF	CH_3OOH	30 ppm	El-1668	M-1600M	0	0	NR
GS-1750DF	NO_2	15 ppm	El-1755	M-1700M	NR	NR	0
GS-1783DF	HNO_3	6 ppm	El-1768	M-1700M	0	0	NR
GS-1790EP	NO	100 ppm	None required	None required			

GS-2150EP	CH_3OH/IPA	600 ppm	None required	None required			
GS-2250EP	EtO	20 ppm	None required	None required			
GS-2460DF	NH_3	75 ppm	EL-2460-5	M-2400M	0	NR	NR

Sensors	Gas	Range	Electrolyte	Membrane	White O-ring	Flat O-Ring	Black O-Ring
Part Number					**1516-12W**	**SC2000**	**1516-12B**
GS-2460DF	NH_3	1,000 ppm	EL-2460-3	M-2400M	0	NR	NR
GS-2560DF	N_2H_4	1 ppm	EL-2570-7A	M-2500M	0	0	NR
GS-3180DF	General Acid	9 ppm	El-3168	M-3100M	0	0	NR
GS-3480DF	DCS	15 ppm	EL-3468	M-3400M	0	0	NR
GS-3780DF	Fluoride	9 ppm	EL-3768	M-3700M	0	0	NR
GS-4060DF	AsH_3	1 ppm	EL-4070-7A	M-4000G	0	0	NR
GS-4060DF	PH_3	1 ppm	EL-4070-7A	M-4000G	0	0	NR
GS-4060DF	SiH_4	15 ppm	EL-4070-7A	M-4000G	0	0	NR
GS-4060DF	H2Se	1 ppm	EL-4070-7A	M-4000G	0	0	NR
GS-5050EP	GeH4	0.6 ppm	None required	None required			

NR = Not Required