



Instruction Manual

Halimeter BLU

Model 4170BLU

PN 120-00010

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Introduction & Unpacking

Note: It is **not** necessary to calibrate the monitor when received from **Interscan** or an **authorized distributor**. All Interscan monitors are calibrated at the factory prior to shipment.

The 4170BLU is for the qualitative determination of **Volatile Sulfur Compounds (VSC)** emanating from the Oral, Nasogastric and Respiratory systems. It is not meant to be used as a laboratory monitor. Above normal VSC levels (normal: 150 ppb or less) may not be solely attributable to the Oral cavity (Mouth).

The 4170BLU operates on the principle of pulling a sample (**Sample draw**) through a sensor. The Electrochemical sensor is manufactured by Interscan. Electrochemical means that it produces an electrical current proportional to the level of gas passing through. The large size of the Interscan sensors results in larger reactive surface area which yields greater sensitivity.

Carefully remove the 4170BLU from its packing container along with the accessories. Inspect the 4170BLU for any damage. Check that all accessories are included according to the contents list shown below:

4170BLU AC/DC Wall Adapter
Sample Tube
4170BLU MANUAL
SAMPLE STRAWS (20 ea.)

Contact **Interscan** to report any damage or missing items immediately. Any items reported damaged or missing after 30 days from delivery will not be covered by **Interscan** and the customer will be responsible for replacement or repair expense.

Equipment Description

1.0 Front Panel

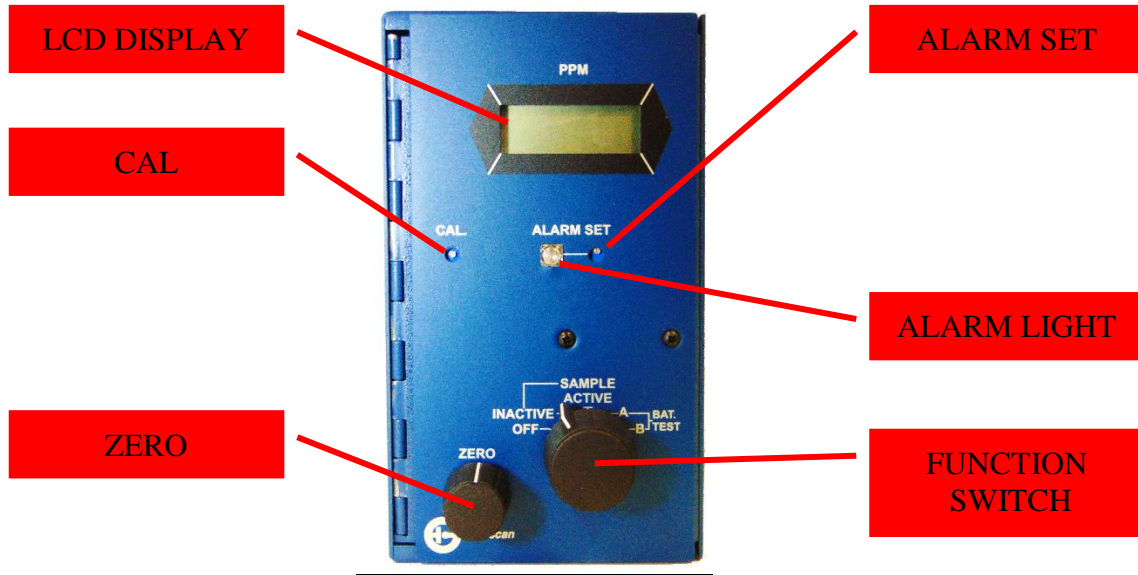


Fig. 1: Front Panel

<u>Designation</u>	<u>Function</u>
LCD Display:	Indicates gas level when function switch is in ZERO, SAMPLE INACTIVE or SAMPLE ACTIVE.
ALARM Light:	LED. Flashes ON/OFF when alarm set point is exceeded. (All though this feature is provided it is not necessary for oral breath measurement) See section 2.0
CAL:	25-Turn potentiometer with a screwdriver adjustment. Sets display to correspond to the concentration of the calibration gas used for calibrating the instrument or to the level specified on ECS certificate.

FUNCTION SWITCH: Rotary switch as follows:

OFF: Analyzer power is OFF.

**SAMPLE
INACTIVE:** Analyzer power is ON (pump is OFF),
Sampling is inactive.

**SAMPLE
ACTIVE:** Analyzer power and pump are on. Also, in this
position the analyzer is zeroed. Sample
measurements and calibration are
accomplished in the sample mode.

BAT. TEST A: Not applicable on this model

BAT. TEST B: Not applicable on this model

ZERO: 10-Turn Potentiometer. Allows the meter to be
adjusted to zero, by compensating for any
background signal.

1.1 Rear Panel

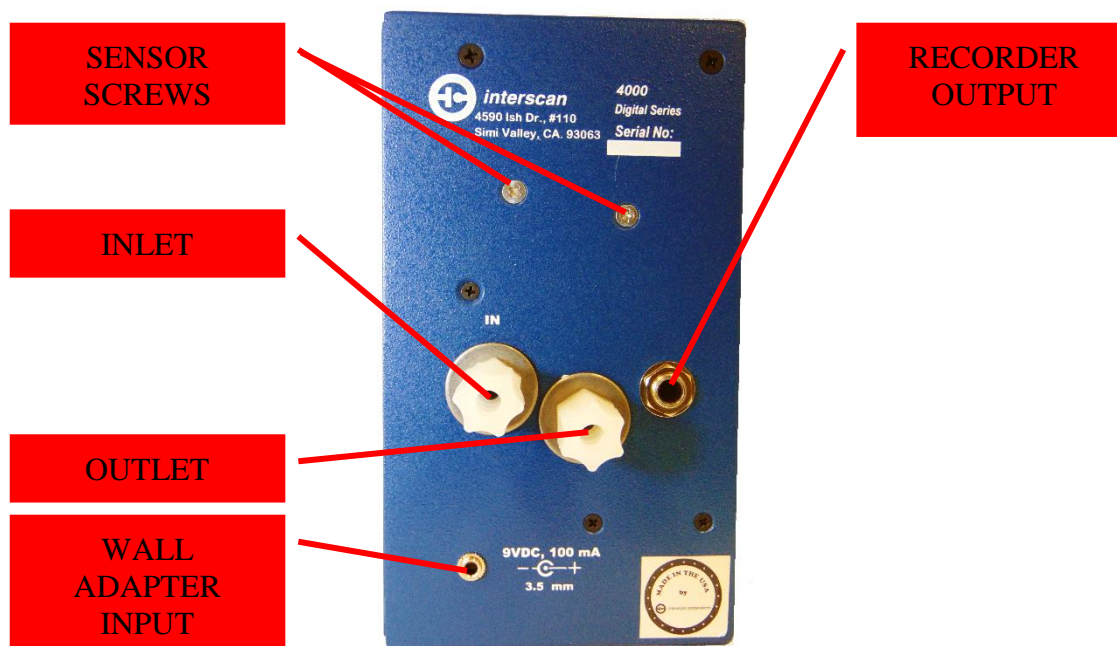


Fig. 2: Rear Panel

Designation

Function

- INLET:** 1/4" O.D. Quick connect or compression gas fitting.
- OUTLET:** 1/4" O.D. Quick connect or compression gas fitting.
- RECORDER OUTPUT:** 1/4" mono-phone jack for Analog recorder output connection. Typically, 0-100mVDC. Tip – positive, Ring – ground.
- WALL APAPTER**
- INPUT:** 3.5mm phone jack for 9VDC regulated, 1100mA Wall Adapter. Tip – positive, Ring – ground.
- SENSOR SCREWS:** Used to hold Sensor or Sensor base in place.

1.2 Right Side Panel

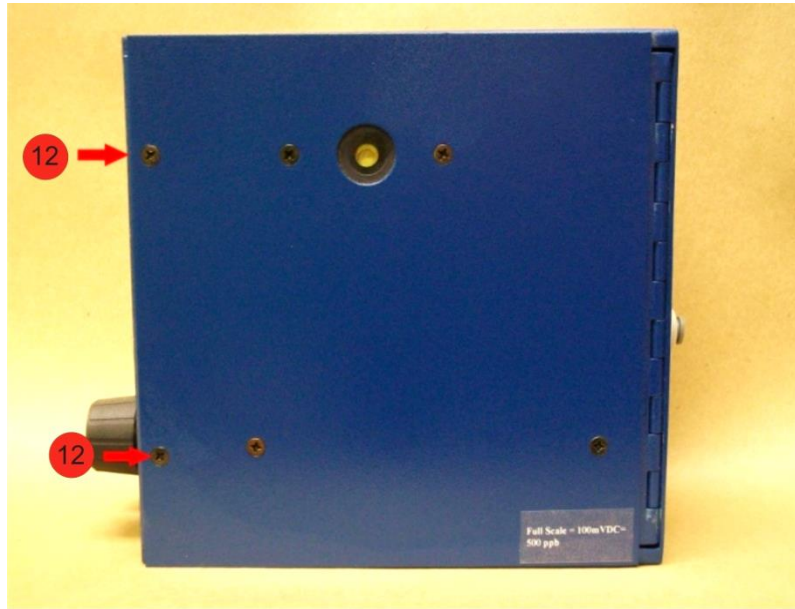


Fig. 3: Right side Panel

AUDIBLE ALARM: **Piezoelectric** Horn, sounds when alarm set point is exceeded. (see sec. 2.0)

Two #1 Phillips-head screws indicated by balloons 12 provide access to internal components when removed. Do not remove any other screws

1.3 Internal Components

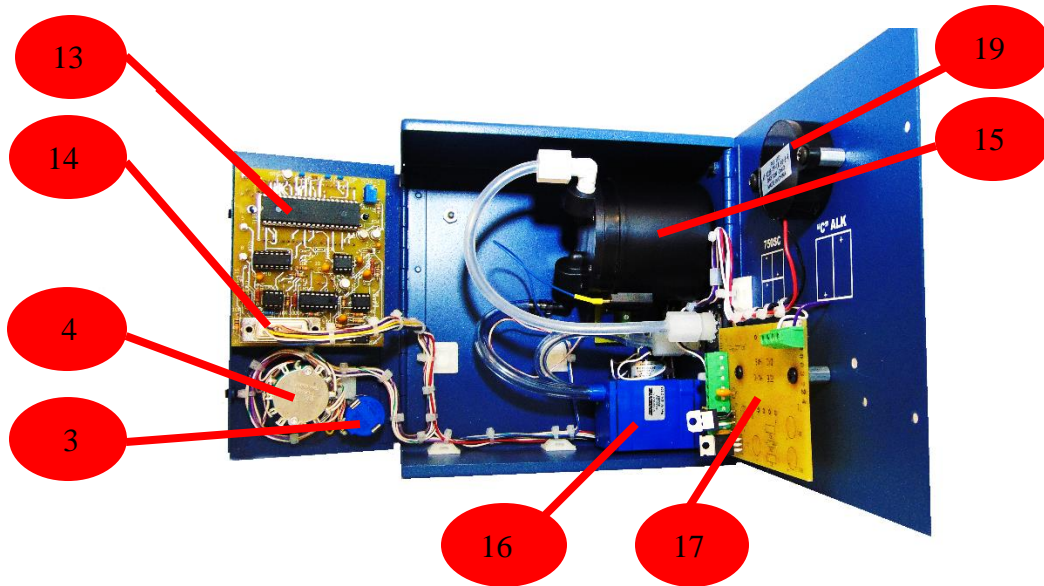


Fig. 4: Internal Components

- 3 Zero Potentiometer
- 4 Function Switch
- 13 Main Circuit board
- 14 15 Pin "D" Connector
- 15 Sensor
- 16 Pump
- 17 DC/DC power supply board
- 19 Piezo Audible Alarm

Operating Instructions

2.0 Setting the Alarm

NOTE: This feature is not necessary for oral breath measurements.

Normally, the alarm is set at the Factory at a level greater than full scale. This in general will prevent the alarm from turning on. The alarm can be reset to any desired level by following the procedure below. Minimum alarm level must be greater than 100 ppb.

Set **FUNCTION** switch to **SAMPLE INACTIVE**. Advance the LCD display to the desired alarm set point using the **ZERO** control. Use *the span tool (provided)* to adjust the **ALARM SET** (*Fig. 1 pg. 5*) control until the alarm sounds. Adjust the **ZERO** control slightly counterclockwise until the alarm is silent. Slowly adjust the **ZERO** control clockwise until the alarm sounds to confirm setting. Re-adjust the **ALARM SET** control if necessary. Adjust the **ZERO** control for a reading of “0” on the display.

2.1 Sample Tube and Connector

The Sample Tube connects to the INLET fitting via a “compression” style connector that provides a leak-proof seal when connected properly. The tube is shipped disconnected. Connect to the INLET by inserting and tightening finger nut tight. **DO NOT EXCEED 20 INCHES IN SAMPLE TUBE LENGTH AS THIS MAY RESULT IN SAMPLE LOSS.**

2.2 Sample Straw

The length is not the critical specification. The diameter and wall thickness are critical. The diameter specified below produces an optimal sealing surface (between the straw and coupling), while the thickness provides structural integrity to prevent crimping. The diameter and wall thickness work in conjunction to achieve an optimum seal, thus preventing dilution due to air leaks.

Testing of lab samples recommends the use of the **Dixie JW7**. This is a 7.75 inch (196.85 mm) translucent polypropylene straw. Outside diameter is 0.217 in. (5.512 mm), with a wall thickness of 0.007 in. (0.1778 mm). No active chloride is present. The recommended straw assures no absorption of sulfur containing gases, (as would be expected in breath samples).

Connect the straw to the tube connector by pushing the straw gently into the end of the connector until it reaches the tube stop. Since the straw is more flexible than the inlet tubing, it can easily be removed from the connector merely by pulling gently on the straw. As such it is not necessary to pull on the straw to seal a connection.

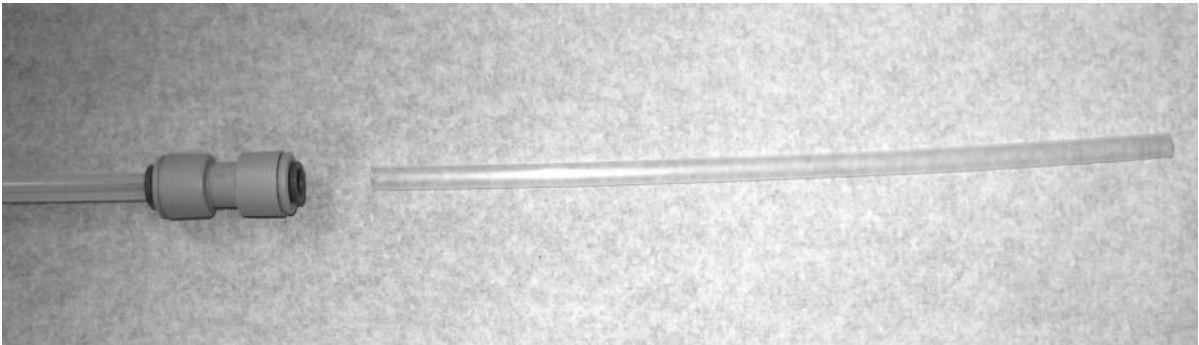


Fig 5: Straw to tube connector

NOTE: ALWAYS USE A NEW STRAW WHEN TAKING SAMPLES FROM A NEW PATIENT. DO NOT RE-USE STRAWS WITH PATIENTS.

2.3 Powering up the 4170BLU

Connect the AC/DC wall adapter to a live AC outlet. Plug the 3.5 mm mono phone plug into Wall Adapter Input (*Fig 2: Rear Panel, Page 7*). The 4170BLU will require up to 24 hours to stabilize when first connected to the powered AC/DC Wall Adapter.

NOTE: IT IS IMPORTANT THAT THE 4170BLU ALWAYS BE CONNECTED TO UNSWITCHED AC POWER WHEN NOT IN USE SO THAT THE SENSOR IS ALWAYS “ON BIAS”. This helps eliminate the need for long stabilization periods between use.

Keeping the AC/DC wall adapter in a live AC outlet will allow for the monitor to be used within 30 minutes of being turned on to position **SAMPLE ACTIVE**.

2.4 Zeroing the Analyzer

The Analyzer must always be zeroed, prior to use. The pump may stall if the **INLET** or **OUTLET** is blocked.

Note: Running the Analyzer with blocked INLET or OUTLET may lead to the sensor leaking caustic electrolyte leading to analyzer damage. Power analyzer off and clear the blockage. To reset the pump, set the **FUNCTION** switch to **SAMPLE INACTIVE** momentarily and then switch again to **SAMPLE ACTIVE**.

Zero adjustments must be made in the **SAMPLE ACTIVE** mode, i.e. with the pump on, in air free of interfering gases. Allow reading to stabilize, before making final zero adjustment, (stabilization can take approximately 30 minutes). Adjust **ZERO** control until **LCD DISPLAY** reads 0 ppb.

2.5 Sampling

Breath Sample Considerations

The function of the 4170BLU is to serve as a reliable monitor for the measurement of VSC (Volatile Sulfur Compound) concentrations.

The 4170BLU can be utilized as part of a total program encompassing a thorough history and physical examination of the patient. Along with an organoleptic assessment, the quantitative nature of 4170BLU data can serve as an excellent tool for following the progress of treating halitosis, and for archiving hard copy records.

4170BLU data by itself cannot affirm whether a breath problem exists. The dental practitioner is required to include the assessment of other diagnostic procedures prior to making a positive conclusion.

Many practitioners have developed their own sampling techniques, some of which do not incubate the sample for as long as we recommend, and some of which might be more prone to dilution from the ambient air.

Are these sampling techniques “wrong”?

They are only “wrong” if one wishes to produce VSC readings conforming to the interpretations discussed below. However, if alternative sampling techniques are practiced with consistency, good results can be obtained, and will conform in a RELATIVE sense with our numerical scale. ***It is noted that alternative sampling techniques will usually produce lower readings***

- 1) Normal readings, for subjects with no oral malodor, are generally in the range of 80-140 parts per billion (ppb). Readings lower than this range are still indicative of no oral malodor, and otherwise clinically inconsequential.
- 2) At levels of 200-300 ppb, oral malodor is noticeable by an observer standing close to the patient.
- 3) At 350-400 ppb, the odor is noticeable by an observer standing several feet away from the patient.
- 4) At 500-700 ppb the odor is more noticeable not because it is “stronger,” but because it is fouler.
- 5) At over 1000 ppb, the odor will linger for several minutes after the patient leaves the room. In many of these cases, odor will continue to emanate from the tongue during the entire sampling process, and the Halimeter reading will keep climbing, and may not truly peak, as the sample pump seems to draw more VSC’s off the tongue surface. Removal of the tongue coating should eliminate this phenomenon.

Sample Interferences

Part of ensuring accurate sample readings is minimizing sensor interferences that may result in false readings. One of the most common interferences to the 4170BLU sensor are vapors present in MOUTHWASH.

The presence of residual mouthwash in the mouth will produce a false breath reading and can seriously limit sensor life. *The mouth must be rinsed thoroughly with water to clear out residual mouthwash solution if mouthwash is used prior to taking a breath reading. This must be done at least 30 minutes prior to using the 4170BLU .*

NOTE: THE SENSOR WARRANTY WILL BE VOIDED IF THE SENSOR IS CONTAMINATED BY MOUTHWASH VAPOR OR THAT OF OTHER CONTAMINANT LIQUIDS.

Other possible interference conditions include handling the sample tube connector while the sensor is stabilizing. This should be avoided as substances on the hands may cause false reactions and inhibit proper sensor stabilization.

Proper Sampling Technique

The Sample procedure is critical to obtaining accurate readings. The proper sampling technique is described in detail below.

1) Ensure that the sample straw is inserted FULLY into the sample tube connector until it reaches the tube stop. If not fully inserted, sample may be lost to leakage at the connector.

2) The patient's mouth must remain closed prior to sampling for 180 seconds (3 minutes) to allow accumulation of any VSCs present in the breath sample.

3) Sampling requires the end of the sample straw to be inserted into the patient's mouth at a depth of approximately 1 inch (25 mm). The lips should be almost closed allowing for a slight gap between the lips and the sample straw. **DO NOT PRESS THE LIPS OR TEETH DOWN ON THE SAMPLE STRAW.** Breathing should continue THROUGH THE NOSE during sampling allowing sample to be drawn from the mouth into the 4170BLU by the pump rather than forced in by the lungs.

4) **DO NOT BLOW INTO THE SAMPLE STRAW AS THIS WILL AFFECT SAMPLE ACCURACY.**

5) Typically, the ppb level will rise during the sample period and reach a peak value after which the value will begin to fall. Note the maximum level when the sample ppb value begins to decrease, and then remove the sample straw. Best results are achieved by taking three samples and averaging.

Calibration

3.0 Introduction

All analyzers are factory calibrated prior to shipment.

There is no easy answer as to how often a monitor should be calibrated. This is a function of the application (*gas concentration and frequency of exposure to target gas*). The purpose for calibration is to compensate for any possible decrease in sensor sensitivity. The primary cause of sensitivity decrease is excessive loss of water by evaporation. A secondary cause may be by contamination from unknown sources.

3.1 INTERSCAN'S Sensor Express - Electronic Calibration Service

Interscan's SENSOR EXPRESS® program streamlines downtime by sending you a pre-calibrated sensor on a regular basis per your needs, without the burden of returning sensors to our factory for re-certification. The sensors are shipped to you either twice, three times, or four times per year at your discretion.

Note: A 3 ½ Digit, 10 MΩ Digital Voltmeter (DVM) is required for SENSOR EXPRESS®. Follow the instructions received with the Sensor, allow to stabilize, and the instrument is ready for use. The factory recommended procedure for calibrating all INTERSCAN analyzers, involves the use of certified calibration gas or a permeation device. Besides being essential for calibration, having a known certified gas standard on hand allows the user to test the analyzer at any time to determine that it "really works"

As indicated on the certification sheet, Sensor Express®, does not certify the analyzer as a whole. Most importantly, the Sensor Express® program is **not** a substitute for basic analyzer maintenance, nor does it check for malfunction of the analyzer components.

3.2 Sample Bag Calibration & Pressurized Cylinder Calibration

Whatever the source of calibration gas, the recommended method is to collect the gas in the proper sample bag (Teflon® or Tedlar®), which is then attached to the analyzer INLET. The calibration gas is drawn from the proper sample bag through the sensor.

The sample bag method is the factory-recommended method for calibration. Since an internal pump is used, the same flow rate conditions during the sample and the calibrate modes are assured, eliminating errors due to flow rate differences. For most applications, using a bag is the simplest procedure.

A regulated pressurized certified cylinder fitted with a tee-manifold (*Fig. 6*) and unrestricted vent is a good procedure in place of the sample bag, if the flow rate of the gas is at least 140 percent that of the sample pump.

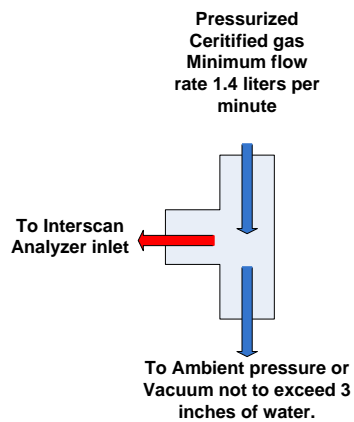


Fig. 6: Tee-manifold

3.3 Calibration Procedure

The Analyzer must always be zeroed, prior to Calibration. The pump may stall if the **INLET** or **OUTLET** is blocked.

Note: Running the Analyzer with blocked INLET or OUTLET may lead to the sensor leaking caustic electrolyte leading to analyzer damage. Power analyzer off, and clear the blockage. To reset the pump, set the **FUNCTION** switch to **SAMPLE INACTIVE** momentarily and then switch again to **SAMPLE ACTIVE**.

Zero adjustments must be made in the **SAMPLE ACTIVE** mode, i.e. with the pump on, in air free of interfering gases. Allow reading to stabilize, before making final zero adjustment, (stabilization can take approximately 30 minutes). Adjust **ZERO** control until **LCD DISPLAY** reads 0 ppb.

1. Fill a 5 liter sample bag (Teflon® or Tedlar®) with calibration gas, and attach it to the external **INLET** fitting. This is best done by attaching a short length 4 inch (101.6mm) of 1/4 inch (6.35 mm) O.D. Teflon tubing to the sample bag, then inserting into the inlet fitting.
2. Set the **FUNCTION** switch to **SAMPLE ACTIVE**.
3. Allow 2 to 3 minutes for the reading to stabilize, and by using the **CAL** control, set the display to match the calibration gas concentration being used.
4. Remove the sample bag from the analyzer and allow the display to stabilize.
5. The analyzer is now calibrated and set up for operation.

NOTE: If you require additional information on Calibration procedures, please contact the Service Department at 1-800-458-6153 ext 121 or e-mail service@gasdetection.com

4.0 Troubleshooting

No power.	<ul style="list-style-type: none">• Ensure the FUNCTION switch is not in the OFF position.• Is the AC/DC Wall Adapter plugged into live AC socket?
Pump won't run.	<ul style="list-style-type: none">• Ensure the FUNCTION switch is not in the OFF, or SAMPLE INACTIVE position.• Is the AC/DC Wall Adapter plugged into live AC socket?• Are INLET/OUTLET fittings plugged? Is any tubing kinked?
Erroneous Low Readings	<ul style="list-style-type: none">• Undersized Straws (see Section 2.2)• Improper Sampling Techniques (see Section 2.5)• Instrument out of calibration
Erroneous High Readings	<ul style="list-style-type: none">• Interfering compounds• Blowing into sampling straw

Warranty

5.0 INTERSCAN's Warranty Policy

INTERSCAN CORPORATION warrants portable analyzers of its manufacture (*sensors, batteries, fuses, lamps, tubing, fittings, filters, and scrubbers excepted*) to be free from defects in material and workmanship for a period of **one year** from date of shipment. INTERSCAN CORPORATION warrants sensors of its manufacture to be free from defects in material and workmanship for a period of **six months** from date of shipment.

INTERSCAN CORPORATION'S sole obligation under this warranty is limited to repairing or replacing, *at its option*, any item covered under this warranty, when such item is returned intact, prepaid to the factory (or designated service center).

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons, or which have been subject to misuse, negligence, or accident, incorrect wiring by others, installation or use not in accordance with instructions furnished by the manufacturer, or which have had the serial numbers altered, effaced or removed. The sensors are factory sealed and must not be opened or modified in the field for the warranty to remain in effect. This warranty is in lieu of all other warranties, whether expressed or implied.

Additionally, in a custom system, warranty on any component shall not exceed the manufacturer's warranty given to INTERSCAN CORPORATION.

Return Authorization

6.0 INTERSCAN's Return Authorization Policy

All returns for repairs require a "RETURN AUTHORIZATION NUMBER" issued by the INTERSCAN Service Department upon request. Below is the link to the RMA form:
<http://www.gasdetection.com/contact/index.php>

This is done primarily to cause the user to contact the factory directly. The reason for this is that a high percentage of service problems are resolved over the telephone, avoiding the need for returning the analyzer or part.

Should return of the analyzer or part be advised by the Service Department, the "RETURN AUTHORIZATION NUMBER" will expedite prompt return of the repaired unit.

For service information, please contact:

INTERSCAN CORPORATION

Service Department

(800) 458-6153 ext. 121

(818) 882-2331 ext. 121

FAX (818) 341-0642 E-mail: service@gasdetection.com