Interscan Corporation

Instruction Manual

LD 2 POINT SERIES MONITOR

Table of Contents

Section

1

Introduction

1.1 Component Check

Check the contents list in each shipping container used to ship your system and ensure that all system accessories on the list(s) are included. Set all accessories aside until directed to install them later in the manual.

1.2 System Description

The Interscan LD 2 Point series Monitoring System consists of the Interscan gas sensor (one per sampling point), sample draw pneumatics, Digital meter/controllers (one per sample point) and various alarm output devices. The primary components/controls are shown in Fig. 1-1 below (Interior view).

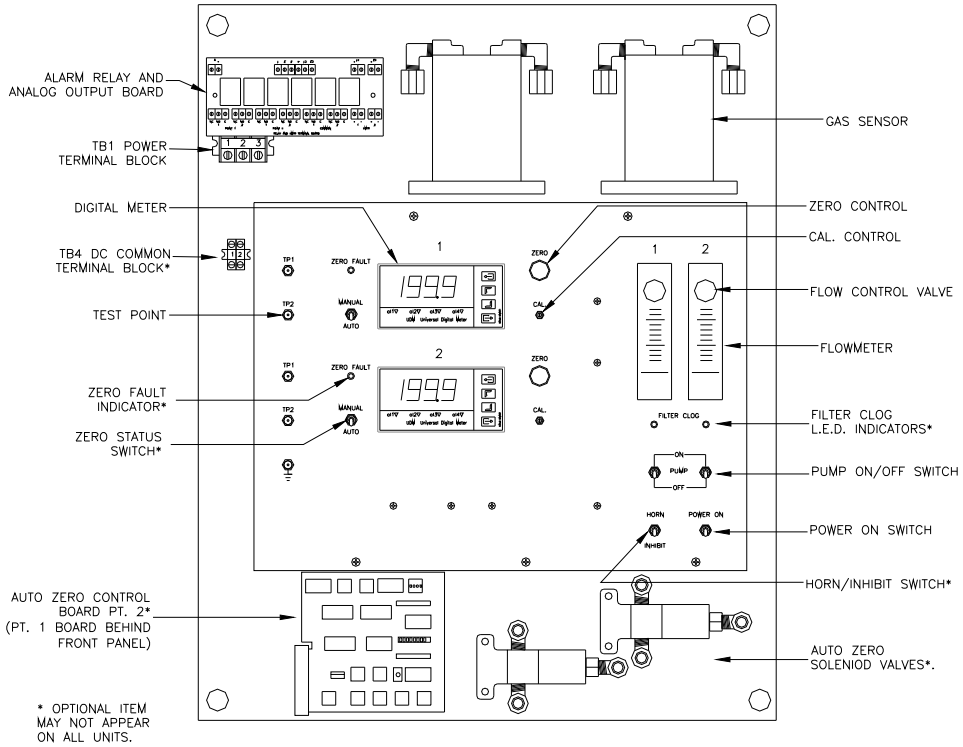


FIG. 1-1

In basic operation sample air is drawn through each sensor, via a diaphragm sample pump and related pneumatics. The sensor's electrical output is sent via the sensor circuit board to the digital panel meter which processes the sensor outputs and produces a digital readout in PPM (parts per million). The maximum readout will depend on the range ordered and is indicated in section 1.3 below.

The meter/controller also compares the current gas level to preset alarm levels and activates alarm indicators when gas levels exceed these user set levels, in addition to outputting a 4-20 mA analog signal in proportion to the full scale range of the system.

ALL INTERSCAN MONITORS ARE CALIBRATED AT THE FACTORY PRIOR TO SHIPMENT. Unless the **CAL** control is inadvertently changed, no calibration is required until the unit has seen considerable use.

1.3 Instrument Configuration

If your monitor contains special custom features, the operational details of those 0features are shown below:

GAS –
FULL SCALE RANGE –

OPTIONAL FEATURES INCLUDED

CUSTOM FEATUES

NONE

Section

2

Installation

2.1 Enclosure Mounting

The *Interscan* LD 2 Point series Monitoring System is housed in a NEMA 4X 20"W X 24"H X 8"D enclosure. The enclosure can be configured for wall mounting using the provided mounting flanges which attach to the back of the enclosure using the included screws.

The outer door is hinged on the left side, and the control panel is hinged on the bottom. For optimum access, enough room should be allowed to fully open the outer door. Secure the enclosure to the wall using 1/2" (12.7 mm) steel bolts. See figures 2-1 and 2-2 below for dimensional detail (only the furthest extruding exterior components are shown).

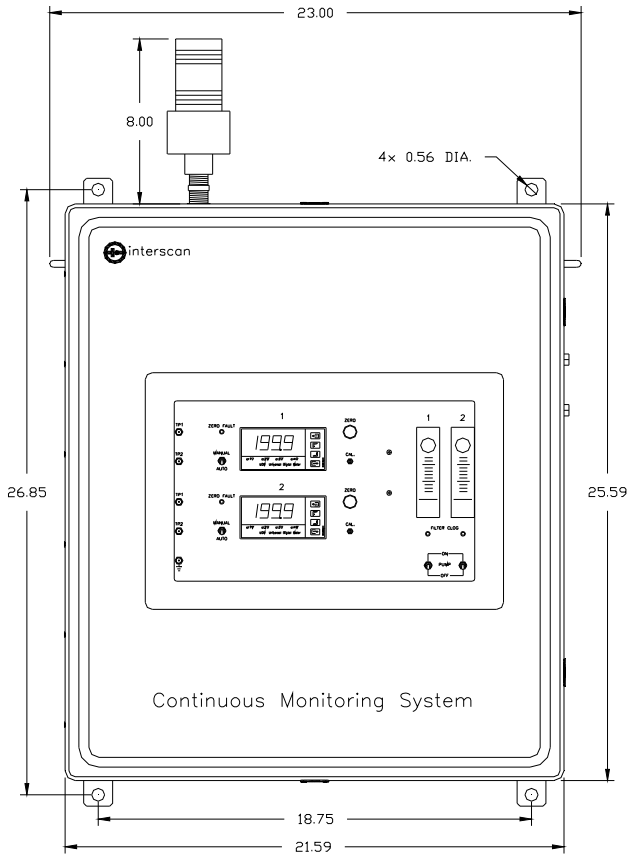


FIG 2-1

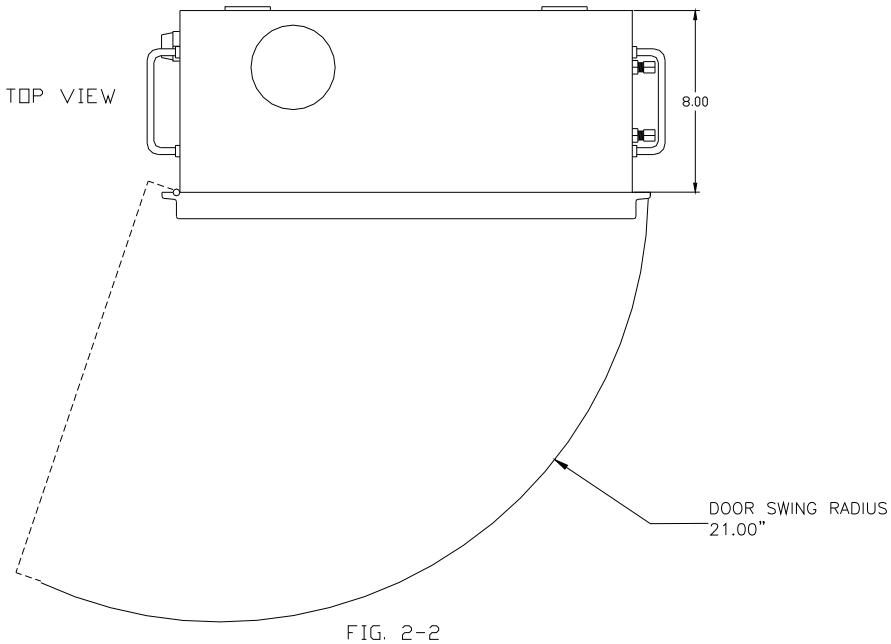


FIG. 2-2

2.2 Plumbing The System

2.2.1 SAMPLE POINT STATIONS

Each sensor has a remote sample point station that houses the inlet particulate filter for the associated sample inlet (see figure 2-3). Each station should be installed in the immediate area from which gas sample is to be taken for the given sample point. They are configured for wall or ceiling mounting using #10 or similar size screws. Ease of access should be considered for filter replacement.

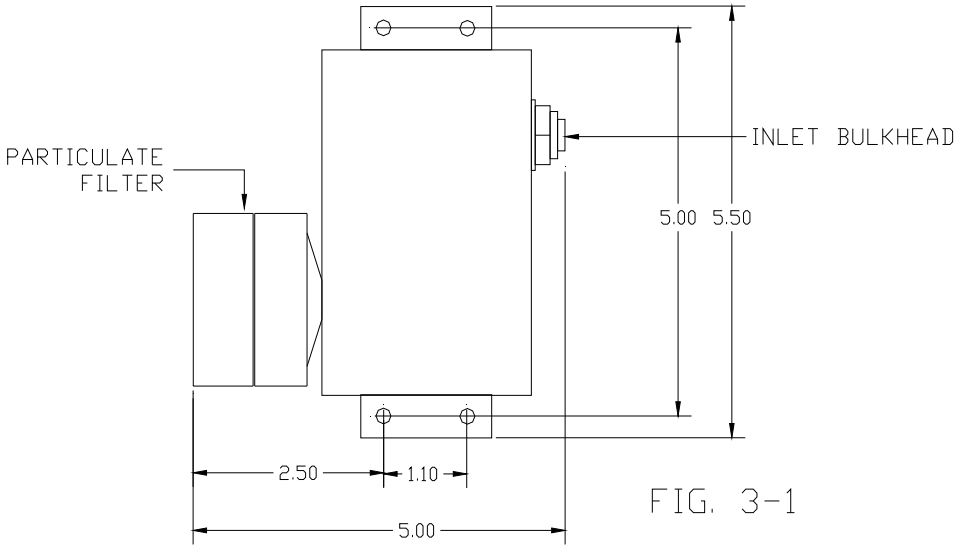


FIG. 3-1

2.2.2 ENCLOSURE FITTINGS AND CONNECTIONS

Sample air is drawn into and exhausted from the system via as series of ¼ inch (6.35 mm) OD compression type bulkhead fittings located on the right side of the system enclosure. The locations, and purposes of the various fittings are detailed below.

INLET 1-2 Upper row of fittings. These connect to sample point Inlet Filters described in the previous section.

EXHAUST 1- 2 Middle row of fittings. These should be connected to an exhaust vent or manifold. If an exhaust manifold is used, it must have a minimum of 3.5 inch (88.9 mm) ID.

ZERO AIR INLET **OPTIONAL FEATURE.** Lower row of fittings**.** Provided for intake of filtered ambient air for AUTO ZEROING. A charcoal filter attaches to the bulkhead fitting through which zero air sample is drawn during AUTO ZERO cycles. See section 4.5 for and explanation of AUTO ZERO.

2.2.3 SAMPLE TUBING

Each sample point station connects via its push-in bulkhead fitting to the associated sample inlet bulkhead on the right side of the system enclosure using an appropriate length of Bev-a-line sample tubing. *Interscan* generally provides 50ft. of Bev-a-line tubing for each sample point with additional tubing available by special order. **Recommended maximum tubing length per point – 300 feet.**

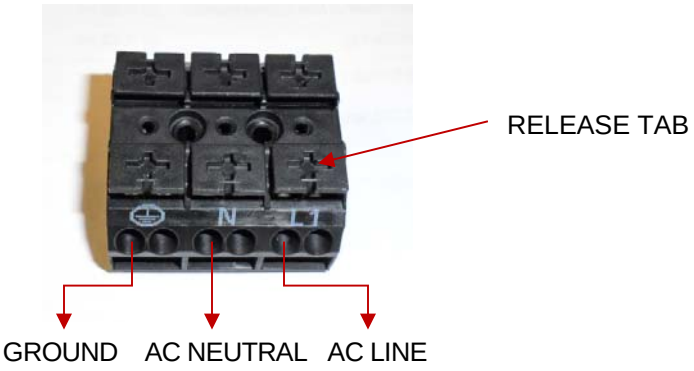
CONNECTION TO COMPERESSION FITTINGS – To connect tubing to compression fittings, loosen the compression nut, press tubing all the way in to the nut then pull back slightly approximately ¼". Tighten the nut snugly.

CONNECTION TO PUSH-IN FITTINGS – To connect tubing to push-in fittings, press tubing firmly into fitting port as far as possible then pull back firmly to confirm a complete seal. To release tubing, push in on the dark grey collett ring surrounding the tubing while gently pulling out on the tubing.

2.3 Electrical Connections

2.3.1 POWER CONNECTION

The system power wiring connections are made to terminal block #1 (TB1) which is located at the upper left edge of the unit chassis underneath the blue cover labeled RELAY CONTACT AND ANALOG OUTPUT BOARD. For access, loosen the 2 screws securing the cover and slide the cover upward exposing TB1 and the relay board. Field wiring should be run into the lowermost 1/2 inch conduit hub located on the upper left outside of the Hoffman NEMA 12 enclosure**. Supply voltage should be rated @ 120 VAC / 60 Hz. / 5 Amps. Connections should be made using 18 AWG wire (minimum). Terminal ports will accept up to 12 AWG wire. Wiring connections to TB1 are labeled on the terminal block from left to right as noted in the photo below.



There are 2 wire entry ports for each connection. Either port may be utilized. To connect wires, strip about ½" of insulation off the end of each wire length then using a flat blade or Phillips head screwdriver, press down on the release tab above the terminal entry port and insert wire into port. Release the tab and pull gently on wire to confirm a snug connection.

**NOTE: For units supplied with an attached line cord, a strain relief cord grip will be provided in place of a conduit hub. If the unit ships with the line cord detached, insert the line cord into the cord grip bushing and connect the line cord conductors to the terminal block according to the legend below. Once connected, tighten the outer shell of the cord grip snugly to hold the cord in place.

Brown – AC Line / Blue – AC Neutral / Green - Ground

2.3.2 STROBE LIGHT ALARM INDICATOR (IF PROVIDED)

The blue strobe light indicator connects to the conduit hub, on the top left of the unit enclosure. The red wiring connectors at the end of the strobe light leads connect to the mating pair of red connectors on the black wires inside the monitor near the top of the system chassis.

2.3.3 ALARM RELAY CONTACTS AND ANALOG OUTPUTS

The alarm relay contacts and analog outputs are terminated at the RELAY CONTACT AND ANALOG OUTPUT BOARD. This board is situated under the blue protective cover located in the top left corner of the unit chassis. All outputs are labeled on the board as shown in Fig. 2-4 below.

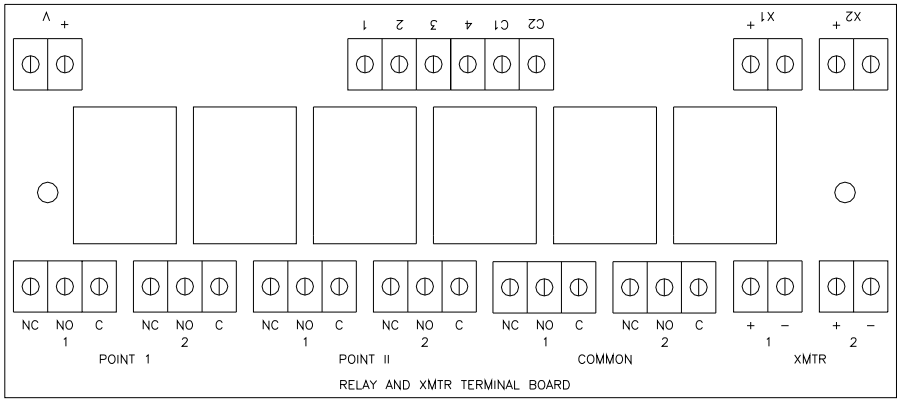


FIG. 2–4

By loosening the two screws securing the cover and sliding the cover upward, you will expose the output terminal blocks along the lower edge of the board (it is recommended the screws only be loosened and not removed). Field wiring should be run into the upper 1/2" conduit hub, located at the upper left side of the Hoffman NEMA 12 enclosure. All alarm relay contacts are Form C contacts rated @ 5 amps.

Detailed description of output designations are as follows:

* Common alarm relays are typically used to power the local visual and audible alarms. Consult with INTERSCAN before using these contacts for other devices.

**For units equipped with full DC powered alarm contacts (LD220-DC models), see the drawing #WD62-4154-1at the back of the manual for wiring details.

TERMINAL	DESCRIPTION
POINT I – 1C	Sample Point #1 Low Alarm Common
POINT I – 1NO	Sample Point #1 Low Alarm Normally Open
POINT I – 1NC	Sample Point #1 Low Alarm Normally Closed
POINT I – 2C	Sample Point #1 High Alarm Common
POINT I – 2NO	Sample Point #1 High Alarm Normally Open
POINT I – 2NC	Sample Point #1 High Alarm Normally Closed
POINT II – 1C	Sample Point #2 Low Alarm Common
POINT II – 1NO	Sample Point #2 Low Alarm Normally Open
POINT II – 1NC	Sample Point #2 Low Alarm Normally Closed
POINT II – 2C	Sample Point #2 High Alarm Common
POINT II – 2 NO	Sample Point #2 High Alarm Normally Open
POINT II – 2 NC	Sample Point #2 High Alarm Normally Closed
COMMON – 1C*	Sample Point #1 or 2 Low Alarm Common
COMMON – 1 NO*	Sample Point #1 or 2 Low Alarm Normally Open
COMMON – 1 NC*	Sample Point #1 or 2 Low Alarm Normally Closed
COMMON – 2C*	Sample Point #1 or 2 High Alarm Common
COMMON – 2 NO*	Sample Point #1 or 2 High Alarm Normally Open
COMMON – 2 NC*	Sample Point #1 or 2 High Alarm Normally Closed
XMTR 1 +	Sample Point 1, 4-20 mA Output
XMTR 1 -	Sample Point 1, 4-20 mA Return
XMTR 2 +	Sample Point 2, 4-20 mA Output
XMTR2 -	Sample Point 2, 4-20 mA Return

Section

3

Quick Start – Basic Functions and Features

This section gives a brief overview of the system's most basic functions and components. A full reading of the manual is recommended for a thorough understanding of all unit functions. Refer to Figure 3-1 below for control designations and locations.

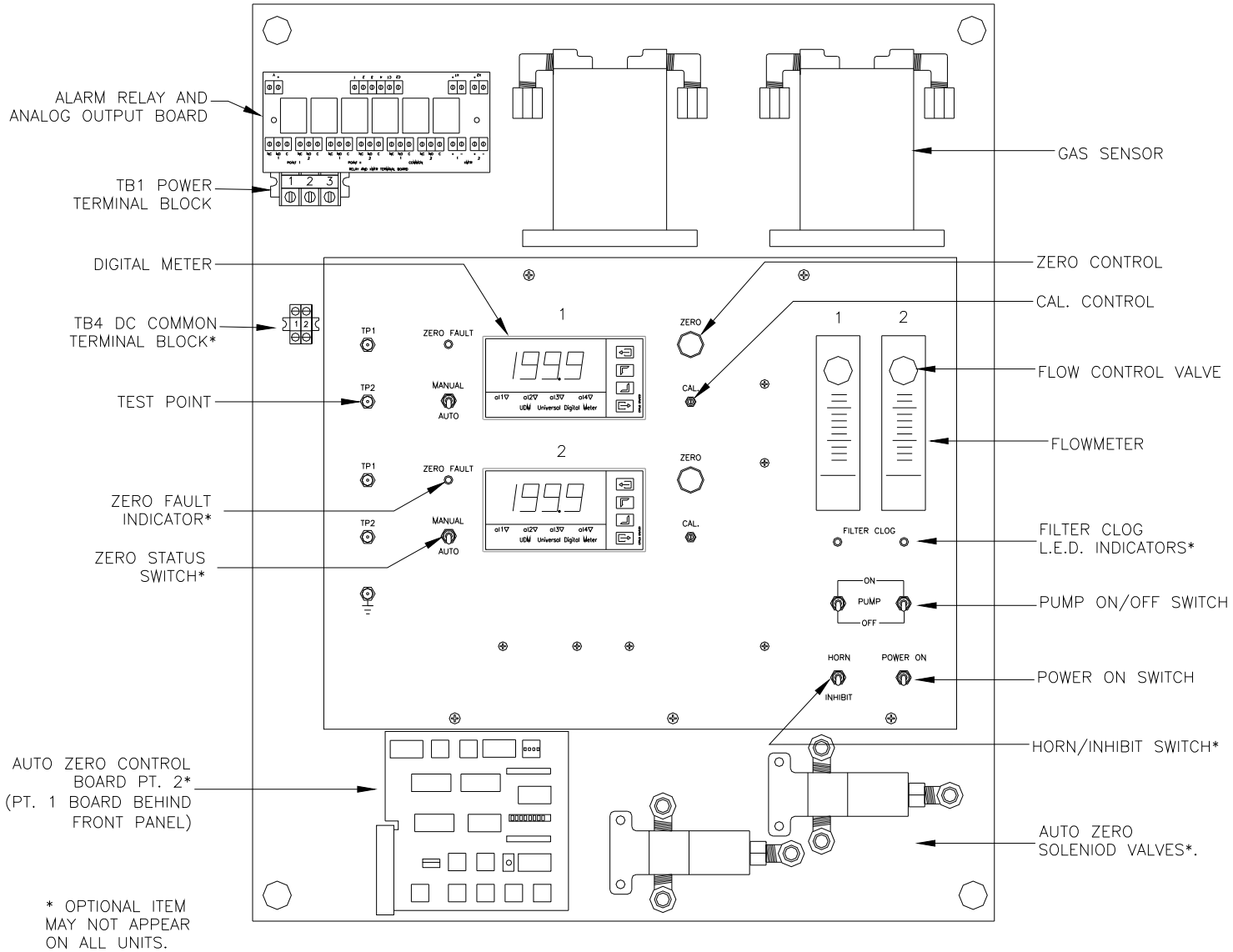


FIG. 3–1

3.1 Front Panel Controls and Indicators

Designation	Function
CAL CONTROL:	25-Turn potentiometer with a screwdriver adjustment located just to the right of each digital panel meter. Adjusts the meter to correspond to the concentration of the calibration gas used when calibrating the instrument. **This control should ONLY be adjusted when performing unit calibration.**
HORN/INHIBIT:	**OPTIONAL FEATURE.** Toggle switch located in the lower right corner of the front panel. In **HORN** position, the audible alarm will sound during any high alarm condition. **INHIBIT** deactivates the horn.
DIGITAL METER:	Digital display indicator/controller. Displays gas concentration in parts-per million (ppm) unless alternate units are specified. Provides for user adjustability of 2 alarm set points and controls the alarm relays and indicators. An LED indicates which alarm point has been exceeded, 1 (low alarm) or 2 (high alarm). PPM display will change color upon alarm level activation – Orange=Lo Alarm, Red=Hi Alarm. Outputs a 4-20 mA analog signal where 4 mA corresponds to **0.0 ppm** and 20 mA to the unit's full scale range (see section 1.3)**.**
FLOWMETER:	Located at the upper right side of the front panel. Measures and controls the flow-rate of gas sample through the sensor. Turning the flowmeter control valve clockwise decreases flow-rate while turning it counter-clockwise increases the flow-rate. Proper sampling flow rate for each unit is indicated on a yellow sticker next to the flowmeter.
POWER ON SWITCH:	Toggle switch located in the lower right corner of the front panel. Controls power to the monitor in the up position.

PUMP ON/OFF SWITCH: Toggle Switches located above the Power On switch. Switches the internal pumps ON or OFF. Disables alarm relays and indicators in the OFF position.

TP1 & TP2 Test points located along the left edge of the front panel. Used for troubleshooting and for electronic calibration. A GROUND test point is also provided.

ZERO CONTROL: 10-Turn Potentiometers located to the right of the digital panel meters. Used to compensate for sensor background current and adjust meter reading to **0.0 ppm** during the Manual Zero procedure. Also allows for manual simulation of sensor response during ECS calibration.

FILER CLOG INDICATOR: **OPTIONAL FEATURE.** L.E.D. indicator. When lit, indicates a clogged inlet filter requiring maintenance.

AUTO/MANUAL SWITCH: **OPTIONAL FEATURE.** Toggle switches located to the right of each meter. Enables the AUTO ZERO circuit in AUTO position and disables the circuit in MANUAL Position. See section 4.4 for more on this feature.

ZERO FAULT **OPTIONAL FEATURE.** L.E.D. indicator. Lights when the Auto Zero correction limit has been exceeded. See section 4.4 for more on this feature.

3.2 Other Components

3.2.1 GAS SENSORS

Black cylindrical devices located in the upper right corner of the unit above the front panel. Reacts with EtO when present in the sample stream, producing an electric current that is sent to the Digital meter and displayed as a PPM value.

3.2.2 SAMPLE PUMPS

Located behind the front panel on the right side. Each pump pulls sample air through its associated sensor and flowmeter and exhausts the air through the EXHAUST fitting on the right side of the enclosure.

3.2.3 STROBE LIGHT INDICATOR (OPTIONAL FEATURE)

The blue strobe light on the top left side of the enclosure will flash whenever either of the 2 sample point ppm levels exceeds the associated preset LOW ALARM level. It will continue to flash until the alarm condition ends and the ppm level drops below the set point level.

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3.2.4 PIEZOELECTRIC AUDIBLE HORN (OPTIONAL FEATURE)

Located on the right side of the unit enclosure below the pneumatic fittings. This horn will sound whenever either of the 2 sample point ppm levels exceeds the associated preset HIGH ALARM set point level. It will continue to sound until the alarm condition ends and the ppm level drops below the set point level.

The Audible Alarm can be silenced at any time by switching the HORN INHIBIT switch to INHIBIT. Be aware that leaving this switch in the INHIBIT position will keep the horn from sounding during any future HIGH ALARM conditions.

3.2.5 158LD INTERFERENCE SCRUBBER (OPTIONAL)

The #158LD Interference Scrubber is provided for use in installations where interference gases may be present. An interference gas is one that can cause a false response in the gas sensor that can result in false readings and alarms. Use the scrubber when you suspect an interference problem. The scrubber attaches to the inlet filter port via the clear plastic tubing connected to one end of the scrubber. See section 6.4 for information on scrubber maintenance.

3.2 Initial Start-up

Once all installation has been completed, the system is ready for power-up. Set all front panel switches to their down positions. (**if the unit is equipped with the AUTO ZERO feature, be sure the AUTO/MANUAL switch is set to the MANUAL position on startup**). Turn power on by switching the **POWER ON** switch to the up position. You will likely notice high positive or negative PPM readings on the panel meters. This is normal and is part of the sensor stabilization after prolonged periods without power. The sensors should be allowed to stabilize for 24 hours prior to initial operation.

Any time the system has been powered down or the sensors have been disconnected (off bias) for 24 hours or more, it is recommended that the sensors be allowed to re-stabilize for a minimum of 12 hours upon re-applying power or re-connecting sensors before resuming or beginning sampling.

3.3 Zeroing The Instrument

All *Interscan* sensors exhibit a slight amount of output even when not exposed to gas or when they are exposed to true "zero" air (a sample free of any sensor reactive gases).

This output (called background current) can also fluctuate due to changes in temperature and sensor aging. If not compensated for, the background current would result in positive or negative display readings even though no gas was present. To compensate for this phenomenon, the unit should be "zeroed" before use for a true "zero" display reading. The ZERO procedure entails drawing sample air through a scrubbing device or filter that eliminates all reactants that the sensor could respond to and adjusting the ZERO control for a true zero reading on the PPM display. **After the initial start-up 12 hour sensor stabilization period, each sample point should be zeroed. Refer to section 4.3 for details on this procedure.**

3.4 Sampling

To begin sampling, merely turn the pumps on by switching the PUMP ON/OFF switches to ON and adjusting the flowmeter control valves for a flow rate of **0.50 lpm OR THE FLOW RATE INDICATED ON THE FLOW RATE STICKER NEXT TO THE FLOWMETER.** (For units equipped with **ccm** flowmeters, set the FLOW RATE for the equivalent reading of **500 ccm.**)

If the AUTO ZERO feature is to be utilized, switch the AUTO/MANUAL switch to the AUTO position. See section 4.4 for more on AUTO ZERO.

Section

4

Advanced System Functions

4.1 Programming Alarm Setpoints (Optional Feature)

Refer to figure 4-1 below for the following sections.

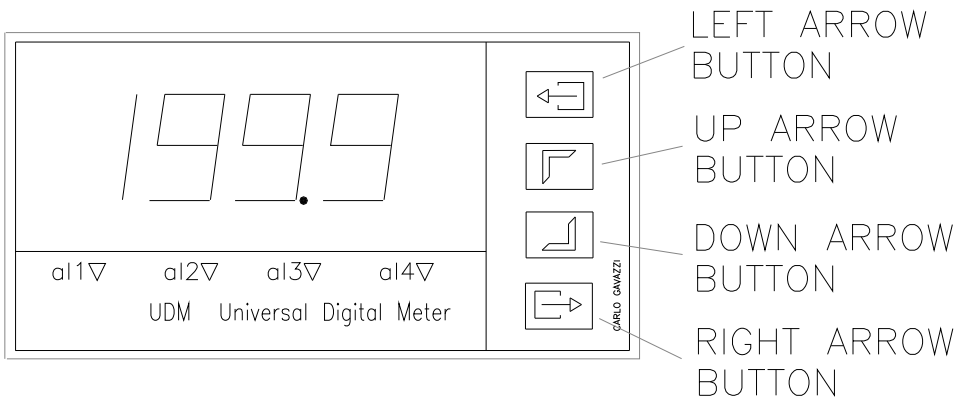

FIGURE 4–1

4.1.1 CHECKING ALARM SET-POINTS

NOTE: Alarm relays will not function when “Sample/Zero” switch is in “Zero” or pump off position. To test these relays, turn pump on. To set alarms, see Section 4.1.2.

Momentarily press the **up arrow** button on the panel meter. The display will show “**SP1**”. Press the **left arrow** button to display the current set point value for set point 1 (LO ALARM). Wait several seconds for the display to return to “**SP1**”.

Press the **up arrow** button to advance display to “**SP2**”. Press the **left arrow** button again to display current set point value for set point 2 (HI ALARM). The display will automatically return to the main display reading after a few seconds.

4.1.2 CHANGING ALARM SETPOINTS

Alarm set points for all Interscan monitors are factory set at **1/3 and 2/3 of the full scale range**. These values are arbitrary and for testing purposes only. Interscan does not recommend specific field values for alarm set points as proper values will depend on the application. The user is responsible for determining proper alarm set points for their application.

The alarms can be re-set to any desired level by following the simple procedure below.

Momentarily press the **up arrow** button on the panel meter. The display will show "**SP1**". Press and HOLD the **right arrow** button until the display changes to a numeric value. The left-most digit will be highlighted. Press the **left arrow** button successively to highlight the digit you wish to alter. Alter the digit by pressing the up **arrow button** to increase the value or the **down arrow** to decrease the value. Repeat this procedure for each digit as required. When satisfied with the value, press the **right arrow** button to lock the value into the memory. Display will return to "SP1".

Press the **up arrow** button to advance to "SP2" and repeat the entire procedure. When finished, allow the display to automatically return to the main display reading.

4.2 Sensor Protection Feature (EtO units only)

When provided, the pump will automatically shut off when the gas level for a given point exceeds a factory set level above the full scale range of the unit. The pump will be turned back on when the ppm level drops below approximately 85% of full scale**.** The pump shutoff will not affect the status of alarm indications.

4.3 Filter Clog Indication (Optional Feature)

The FILTER CLOG L.E.D. indicators will light whenever there is a drop in flow rate caused by an inlet line restriction. This could be the result of a clogged inlet filter or a kink in the inlet tubing. When this indicator is lit, the inlet filter and tubing lines should be checked for the associated sample point and maintained as described in section 6.1. If frequent or constant FILTER CLOG indications occur with no associated inlet blockage, it could be an indication of an improperly set FILTER CLOG vacuum switch. Contact the INTERSCAN service dept. if this should occur.

4.4 Zero Procedure

Zeroing of the ppm display is necessary from time to time to compensate for natural zero drift of the sensor output due to temperature fluctuations and sensor aging. The procedures for zeroing the system are described below.

Most monitors can be zeroed by merely adjusting the **ZERO** control for a reading of **0.0 ppm** on the meter display following the 24 hour start-up stabilization period. **For low range units (19.99 ppm full scale or less), and for all Ethylene Oxide, Formaldehyde and Hydrazine models**, the monitor should be zeroed with the pump on as described below.

Attach the *Interscan* C-12 Zero filter included in the original shipping contents to the inlet filter port using a short length of ¼" OD tubing. **If the 158LD interference scrubber is in use at the inlet port, either attach the C-12 filter to the end of the scrubber or TEMPORARILY replace the scrubber with the C-12 filter.**

Turn on the pump and adjust the flow rate to **0.5 lpm** (**500 ccm** on ccm flowmeters) **OR THE FLOW RATE INDICATED ON THE FLOW RATE STICKER NEXT TO THE FLOWMETER.** Allow several minutes for the reading to stabilize prior to making **ZERO** adjustments. Once the reading is stabilized, manually adjust the **ZERO** potentiometer knob until the display value reads **0.0 ppm** . Remove the C-12 filter from the inlet filter. **Be sure to remove the C-12 filter before resuming normal sampling as failure to do so will result in no sensor readings when gas is present. Re-attach the 158LD scrubber if utilized.**

4.5 Auto Zero (Optional)

4.5.1 AUTO ZERO FUNCTION

The AUTO ZERO feature allows for automatic zeroing of the system display to compensate for excessive sensor zero drift. This is usually incorporated in lower range units. The Auto Zero circuit will zero the ppm display in pre-set user programmed intervals. Setting the **Auto Zero / Manual Zero** switch to **Auto Zero** engages the Auto Zero circuit which will cycle the sensor between normal sampling and auto zeroing at a factory set interval of 2 minutes of zeroing every 4 hours. When in a zero cycle, a solenoid valve diverts the sample flow from the inlet fitting to the Zero air fitting and ambient air is drawn through a charcoal filter which scrubs out sensor reactant gases

yielding a true zero sample. The circuit then analyzes the current sensor output and adjusts the display reading to **0.0 ppm (**± 1% of full scale range). After the zero cycle times out the monitor will switch back to normal sampling mode. The Auto Zero cycle will be disabled if the unit is in an alarm condition.

To disable the Auto Zero circuit, set the **Auto Zero / Manual Zero** switch to **Manual Zero**. This will reset the Auto Zero compensation circuit and a sudden change in the display value will likely occur. To compensate, manually zero the monitor according to the procedure described in section 4.3.

4.5.2 ZERO FAULT INDICATION

The Zero Fault indicator will light whenever the Auto Zero compensation limit has been exceeded. If over consecutive zero cycles the sensor output has drifted beyond a factory preset value, the Zero Fault indicator will light indicating that the sensor may need maintenance or replacement.

Section

5

Instrument Calibration

5.1 Introduction

All *Interscan* instruments are calibrated at the Factory prior to shipment. Unless the CAL. adjustment knob is inadvertently changed, there is no need to calibrate the monitor until it has seen considerable usage

There is no easy answer as to how often zeroing and calibration should be performed. This is strictly a function of the application. Sensor zeroing compensates for signal drift and sensor calibration compensates for any possible decrease in sensitivity. The primary cause of sensitivity decrease is excessive loss of water by evaporation due to time and temperature.

The instrument is calibrated by introducing a known concentration of gas and adjusting the CAL. control to the proper ppm level. As such, the analysis of the calibration gas must be accurate. The sources of gas standards include commercially available gas mixtures diluted with air or nitrogen in cylinders or permeation devices.

Interscan offers “Electronic Calibration Service” (ECS – See section 5.5), which permits the user to calibrate the instrument without the use of gas. Calibration is accomplished by quick and simple adjustments of the ZERO and CAL. controls using a digital voltmeter.

5.2 Calibration Gas Standards

5.2.1 GAS BLENDS IN CYLINDERS

Low concentration gas mixtures (in air or nitrogen) are available with few exceptions, in pressurized cylinders. The major concern in using commercially available mixes of such active gases as EtO, is reliability. The analysis results shown on the label are applicable only at the time the analysis was
performed. Concentration stability with time varies widely as a function of the gas mix, its container, and the manufacturer. *Interscan* should be consulted for recommendations on commercially available gas mixtures.

5.2.1 PERMEATION DEVICES

An alternative calibration method is the use of permeation devices containing the gas liquefied under pressure. Permeation of the gas in nanogram-per-minute rates, permits the generation of a desired concentration in an air or nitrogen carrier.

Varying the temperature, flow rate, and emission rate characteristics gives a fairly wide range of gas concentrations. Many gases in a low ppm range, including ETO, are ideally suited to the permeation device technique. It is important to remember to keep the permeation device flow rate higher than the **0.50 liter/minute** rate required by the *Interscan* ETO system.

Consult the permeation device manufacturer for complete operation and procedure information.

5.3 Sample Bag

Whatever the source of calibration standard, the recommended method of gas collection and delivery is via a proper sample bag, which is then attached to the calibration inlet. The calibration gas is drawn through the sensor by the sample pump.

Contact *Interscan* for recommendations on the type of sample bag to use.

5.4 Calibration Procedure

1. Perform the MANUAL ZERO procedure as detailed in section 4.3.

2. Turn on the sample pump for the sample point being calibrated. Adjust the flowmeter control valve to the recommended flow rate of **0.50 lpm (500 ccm) OR THE FLOW RATE INDICATED ON THE FLOW RATE STICKER NEXT TO THE FLOWMETER IF DIFFERENT**.

3. Fill the sample bag with the calibration standard, and attach it to the inlet filter at the sample point station. This is best done by attaching a short length, 2 inches (50 mm) of 1/4 inch (6.350 mm) OD flexible tubing to the sample bag nipple, then attaching the tubing to the filter inlet.

4. After a 8 - 9 minute delay, adjust the CAL. potentiometer so that the meter display reads the same as the ppm value of the cal gas being used.

5. Remove the sample bag and allow time for the meter reading to return to zero.

6. Repeat this procedure for the second sample point.

5.5 Electronic Calibration Service (ECS)

The factory recommended procedure for calibrating all *Interscan Corp*. sensors involves the use of calibration gas or permeation device. Besides being essential for calibration, having a known certified gas standard on hand allows the user to test the instrument at any time to verify that the sensors “really work”.

There will be times and circumstances in which calibration using calibration gas or permeation devices is inconvenient and/or impractical. For this reason Interscan Corp. developed the **E**lectronic **C**alibration **S**ervice (ECS).

ECS involves a “sensor rotation” regimen whereby a factory certified spare sensor is kept on hand to be rotated into the system when the original sensor is ready for re-certification. The original sensor is removed, the spare sensor is installed and the unit is calibrated according to ECS specifications that are detailed on the spare sensor’s ECS CERTIFICATE. The original sensor is then sent back to the factory for updated certification after which it becomes the new spare sensor.

The calibration is a simple 2 step adjustment process that requires only an adjustment tool and a digital voltmeter.

NOTE: When stored under the proper conditions, the expected shelf life of an ECS spare sensor is 12 months. The sensor should be stored at room temperature and no less then 30% relative humidity. More extreme conditions can significantly shorten the shelf life of the ECS sensor.

The ECS program verifies the integrity of the sensor sensitivity only, and does not guarantee the operation of the entire system. Most importantly, the ECS program is not a substitute for basic system maintenance, nor does it check for malfunction of system components.

Section

6

Maintenance

6.1 Inlet Particulate Filter

The inlet particulate filters housed on the sample point stations are provided to keep particulate matter from entering the sensors and pneumatics. These filters need to be inspected and changed on a regular basis with frequency depending on the nature of the environment in which the system operates. Drops in flow rate below the nominal **0.50 lpm (500 ccm)** rate may indicate a clogged filter and as such, the flow rate should be checked from time to time to ensure that it is maintained at the nominal rate. The filter should be checked and changed if frequent upward adjustment is necessary to keep the flow rate at or above **0.50 lpm (500 ccm)** or when the optional FILTER CLOG indicator is lit. Periodic replacement on a field-determined time interval (for your particular installation) is the best approach. If regular maintenance checks reveal heavily packed or clogged filters, more frequent inspection is indicated.

I your unit utilizes the white Millipore style filter housing, change the filter element as follows: Unscrew the outer section of the round filter housing attached to the sample point station revealing the filter element disc. If the disc is noticeably dirty or clogged, replace it with a new one. It is also a good idea to inspect the inside of the inlet port and clean as necessary. Insert the new filter element with the shiny side facing in toward the fixed part of the housing. Carefully screw the outer housing back on to the inner housing making sure the element stays flush against the inner housing surface.

6.2 Sensor Maintenance

For optimal performance, the gas sensor in the Interscan monitoring system requires periodic maintenance to address sensor hydration loss due to evaporation. Maintenance is performed by removing and weighing the sensor to determine the amount of weight/hydration loss and then injecting **distilled** or **deionized** water into the sensor to replace the lost water as directed in the following sections. **NOTE: Read each of the following sections completely before performing any maintenance on the sensor.**

6.2.1 MAINTENANCE INTERVAL

The degree of hydration loss can vary depending on operating conditions and sensor type. The factory recommended maintenance interval for most sensors in most applications is ***once every 6 weeks*.** Sensors should be removed and weighed every 6 weeks as detailed in section 6.2.3 below to determine the amount of weight loss and the amount of water to be added. For most sensors, weight loss should not exceed **50 grams** during maintenance intervals**.** More frequent maintenance may be indicated if this limit is exceeded in a 6 week period.

HYDRAZINE and **FORMALDEHYDE** sensors are more susceptible to rapid hydration loss due to their electrolyte makeup. As such, they require a different maintenance interval and approach. See section 6.2.2 below for details on maintaining **HYDRAZINE** and **FORMALDEHYDE** sensors.

6.2.2 HYDRAZINE AND FORMALDEHYDE SENSORS

The Interscan Hydrazine and Formaldehyde sensors contain an Alkaline based electrolyte and may require more frequent hydration than the Acid based sensors.

For optimum performance, Interscan recommends that Hydrazine and Formaldehyde sensors be weighed once every 2 weeks and hydrated according to the amount of weight loss.

Water should be added to the sensor as directed in section 6.2.3 below. Always add water to within **5 grams of the original sensor weight** (original weight is noted on the label affixed to the side of the senor body). It is extremely important to return the weight of the sensor to within **5 grams** of the original weight. **NEVER ADD WATER OVER THE ORIGINAL WEIGHT.**

6.2.3 SENSOR MAINTENANCE PROCEDURE

1) Turn power to the monitor OFF.

2) Remove the sensor from the monitor.
    a. Carefully disconnect the electrical connections to the sensor (1 blue wire and 1 white/blue stripe wire).

b. Disconnect the tubing from the sensor ports by unscrewing the elbow fitting nut counter-clockwise and pulling the nut and tubing away from the fitting.
c. Unscrew the 2 screws holding the sensor base to the slide in bracket and slide the sensor away from the bracket.

3) Weigh the sensor on a gram scale. Be sure to weigh the sensor with both elbow fittings and the red fill plug intact. Subtract the new weight from the sensor's original weight noted on the label affixed to the side of the sensor body. The difference is the weight loss. Weight loss should not be allowed to exceed **50 grams** for most sensors. For **FORMALDEHYDE** and **HYDRAZINE** sensors, weight loss should not be allowed to exceed **25 grams.** If weight *gain* under **5 grams** is observed, no action is required. If weight gain of **5 grams or more** is observed, contact the Interscan Service dept. for further advice.

4) Using the 10ml syringe supplied, restore the sensor to its original weight by injecting an amount of **distilled or de-ionized** water in ml. equal to the weight loss in grams. Ex: 10g weight loss requires 10 ml of water.

5) Always inject the water *SLOWLY*. Observe the fill hole as you inject the water. If you notice water draining from the fill hole, STOP FILLING as this means **the sensor can take on no additional water without damage**. Weigh the sensor and make note of the weight. Replace the fill plug when finished.

6) **NOTE: DO NOTOVERFILL! Overfilling the sensor can cause electrolyte to leak into the sample tubing during sampling, causing significant damage to the instrument.** It is always better to fill to *slightly under* the original weight than to overfill. **Never remove water from the sensor as this will remove the premixed electrolytes as well as damage the sensor.**

7) Re-install sensor and connect the tubing and electrical plugs. Assure that all connections are secure.

8) Turn power to the unit ON. The sensor should be allowed to re-charge with POWER ON and the **PUMP OFF** until the PPM reading appears stable. This should take no more than twice the amount of time the sensor was disconnected from the unit.

6.3 Interference Scrubber (optional)

The #158-LD scrubber is used in some installations where interference gases may be present. An interference gas is one that can cause a false response in the gas sensor. For EtO, sources of interferences include steam sterilizers, ultrasonic baths, and floor strippers & waxes. One of the most troublesome interference gas sources is Isopropyl Alcohol (IPA). IPA, extensively used in areas where EtO is monitored, is a **MAJOR** interference to the EtO monitor. Sources include certain cleaning agents, perfumes and hand lotions. Frequent exposure to IPA results in sensor contamination, indicated by a permanent zero up-shift in the sensor readings, extremely slow sensor response & recovery, and/or very low PPM readings. **No satisfactory scrubber for IPA is yet available**. If IPA must be used in an area being monitored, shut OFF the instrument's sample pump before using IPA. Leave the pump off for 15 to 20 minutes after using IPA. Switch the sample pump back ON to resume monitoring.

The 158LD Scrubber if included is a cylindrical clear plastic tube containing violet pellets and when used is attached to the inlet filter port. As the scrubber ages and its effectiveness is depleted, the pellets contained inside will begin to change color. From their original violet color, the scrubber pellets change to a light brown then to a darker brown which later deepens to almost black. Even if all the pellets show the brown-black exterior, the scrubber may still retain high efficiency. Infrequent inspection requires the removal of ten pellets from a thoroughly mixed lot, breaking them open and examining their inner cores. If only two of these retain the violet core, the scrubber is only 75% efficient and should be replaced.

It is a good idea to check the scrubber pellets when doing routine sensor maintenance. When depleted, simply discard and replace with a new scrubber.

Section

7

Troubleshooting

A high percentage of service problems often result from little things you can find and fix yourself. Always consult with the INTERSCAN service department for problems not on this list or if suggested corrective actions fail to fix the problem. ALWAYS turn power off before working inside the unit.

Symptom	Corrective Action or Probable Cause
No power	• Check that power switch is on. • Turn power off and check main fuse (F1) located in the middle of the unit chassis behind the front panel. If fuse is blown, replace with AGC-2A and turn power back on. If fuse continues to blow, contact the *Interscan* Service Dept.
Can't achieve 0.50 LPM flow rate.	• Check inlet filter for blockage. • Check the pump's speed control knob on the back side of pump. This should be turned fully clockwise. • Check all tubing for kinks.
Liquid in flowmeter or tubing.	• Sensor has leaked electrolyte. Consult with Interscan service dept. for sensor, and affected component replacement.

Symptom	Corrective Action or Probable Cause
No response to gas	• Check all sensor connectors for firm connections. • Check for solid connection of circuit board connectors to circuit boards (Circuit boards are located on the inside surface of the front panel next to the flowmeters and under the meters). • Check that Cal/Span control is not turned all the way down (full counter-clockwise).
Cannot Zero	• Check the Bias voltage with a DVM at TP1 on the front panel. This voltage should be within the range shown in table 7-1 below for the type of sensor being used. If not within the range shown, contact the *Interscan* service dept. • Sensor may be bad. Contact the *Interscan* service dept.

TABLE 7-1 BIAS VOLTAGES

GAS	BIAS VOLTAGE RANGE
CO	665 - 687 mV
EtO	390 - 410 mV
HCl / HCN	480 - 500 mV
MMH / HZ	240 - 260 mV
HCHO	190 - 210 mV
SO_2	540 - 560 mV
Cl_2	-790 - -810 mV
ClO_2	-790 - -810 mV
NO_2	-790 - -810 mV
NO / NO_X	340 - 360 mV
H_2S	490 - 510 mV

Section

8

Warranty

Interscan Corporation warrants continuous monitoring systems 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.

This warranty does not apply to any of our products, that have had any program and/or software changes incurred, without written authorization from *Interscan Corporation*.

Additionally, warranty on any component shall not exceed the manufacturer's warranty given to *Interscan Corporation*.

Section

9

Customer Service

The INTERSCAN Customer Service Department can be reached at the numbers listed below:

Toll-Free **800-458-6153 x121**
So. Cal. **818-882-2331 x121**
FAX **818-341-0642**
e-mail: service@gasdetection.com

Return Authorization

All units being returned for repair or service require a RETURN AUTHORIZATION NUMBER issued by the INTERSCAN Customer Service Department upon request. This is required to ensure the problem truly needs factory service.

In many cases, problems can be resolved in the field by the user. As such, before contacting Interscan with service questions, consult the TROUBLESHOOTING section of this manual (section 7, page 23) as this may help you to resolve any problems without returning the unit.

Should consulting the TROUBLESHOOTING section of the manual not address your problem, contact the INTERSCAN Customer Service Department as noted below to acquire a RETURN AUTHORIZATION NUMBER. The RMA will expedite prompt return of the repaired unit.

The RMA request form can be found at the following link on line…

http://www.gasdetection.com/contact-interscan/rma-request/

Spare Parts

Contact the Interscan Customer Service Department for inquiries regarding consumable spare parts for your monitor. Have your monitor's serial number at hand when calling.

Section

10

Connection Tables / Wiring Diagrams

USER WIRING CONNECTIONS
ALARM CONTACTS

ALARM OUTPUTS ("Relay and XMTR Terminal Board" located at upper left of unit chassis)		
ALARM 1 (LO)	POINT I	POINT II
COMMON	POINT I – 1C	POINT II – 1C
NORMALLY OPEN	POINT I – 1NO	POINT II – 1NO
NORMALLY CLOSED	POINT I – 1NC	POINT II – 1NC
ALARM 2 (HI)		
COMMON	POINT I – 2C	POINT II – 2C
NORMALLY OPEN	POINT I – 2NO	POINT II – 2NO
NORMALLY CLOSED	POINT I – 2NC	POINT II – 2NC
COMMON ALARM**	ALARM 1 (LO)**	ALARM 2 (HI)**
COMMON	COMMON 1C	COMMON 2C
NORMALLY OPEN	COMMON 1NO	COMMON 2NO
NORMALLY CLOSED	COMMON 1NC	COMMON 2NC

ANALOG OUTPUT		
4-20 mA* OUTPUT	XMTR 1 +	XMTR 2 +
4-20 mA* RETURN	XMTR 1 -	XMTR 2 -
*Transmitter Output Is ISOLATED		

POWER	
ACH	TB1-L1
ACN	TB1-N
GROUND	TB1-GND

**** If unit is equipped with local alarm indicators, common alarm outputs may NOT be used for other devices.**