

# *Series B12*

## **2-Wire Gas Transmitter**

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# PRODUCT WARRANTY

Analytical Technology, Inc. (Manufacturer) warrants to the Customer that if any part(s) of the Manufacturer's products proves to be defective in materials or workmanship within the earlier of 18 months of the date of shipment or 12 months of the date of start-up, such defective parts will be repaired or replaced free of charge. Inspection and repairs to products thought to be defective within the warranty period will be completed at the Manufacturer's facilities in Collegeville, PA. Products on which warranty repairs are required shall be shipped freight prepaid to the Manufacturer. The product(s) will be returned freight prepaid and allowed if it is determined by the manufacturer that the part(s) failed due to defective materials or workmanship.

This warranty does not cover consumable items, batteries, or wear items subject to periodic replacement including lamps and fuses.

Gas sensors, except oxygen sensors, are covered by this warranty, but are subject to inspection for evidence of extended exposure to excessive gas concentrations. Should inspection indicate that sensors have been expended rather than failed prematurely, the warranty shall not apply.

The Manufacturer assumes no liability for consequential damages of any kind, and the buyer by acceptance of this equipment will assume all liability for the consequences of its use or misuse by the Customer, his employees, or others. A defect within the meaning of this warranty is any part of any piece of a Manufacturer's product which shall, when such part is capable of being renewed, repaired, or replaced, operate to condemn such piece of equipment.

This warranty is in lieu of all other warranties (including without limiting the generality of the foregoing warranties of merchantability and fitness for a particular purpose), guarantees, obligations or liabilities expressed or implied by the Manufacturer or its representatives and by statute or rule of law.

This warranty is void if the Manufacturer's product(s) has been subject to misuse or abuse, or has not been operated or stored in accordance with instructions or if the serial number has been removed.

Analytical Technology, Inc. makes no other warranty expressed or implied except as stated above.

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## INTRODUCTION

The Series B12 is a two-wire transmitter for use in monitoring hazardous gases in ambient air. It is designed to monitor gas concentration in areas around storage cylinders, process piping, or gas feed equipment in virtually any type of industrial plant environment.

Series B12 transmitters are available for monitoring a variety of gases and ranges as shown in Table 1. Each transmitter is manufactured for a specific gas and range, and cannot be modified for use with another gas sensor type.

**TABLE 1**

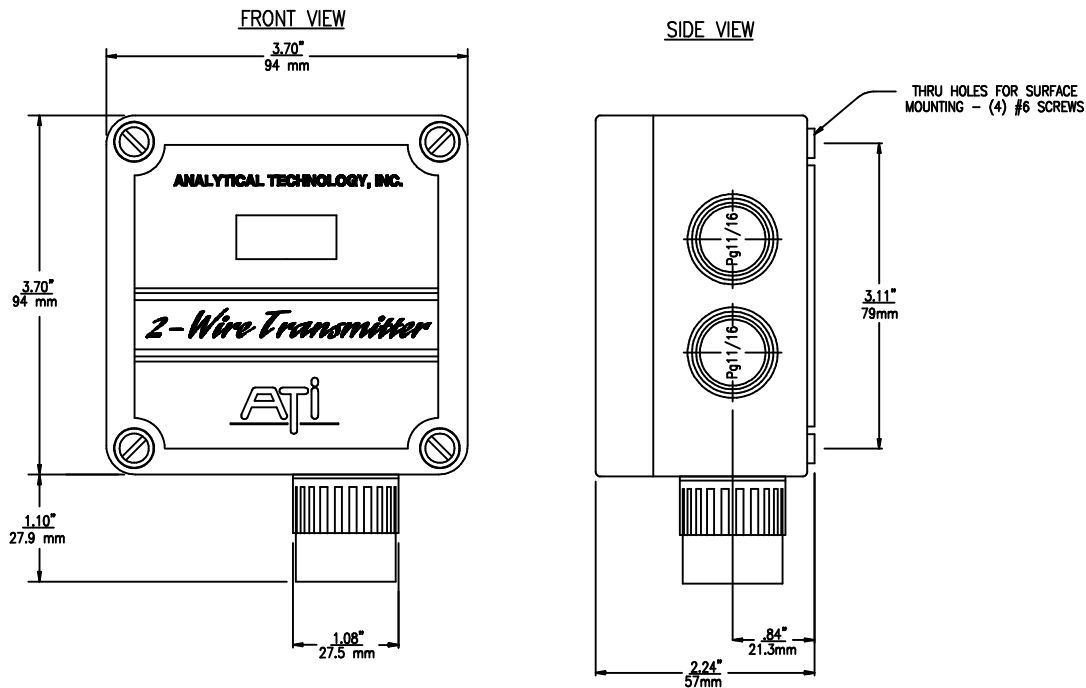
<b>GAS</b>	<b>CODE NO.</b>	<b>STD. RANGE</b>	<b>MIN. RANGE</b>	<b>MAX. RANGE</b>
<b>GENERAL GASES</b>				
Ammonia	15	0-100 PPM	0-50 PPM	0-1000 PPM
Carbon Monoxide	16	0-100 PPM	0-50 PPM	0-1000 PPM
Hydrogen	18	0-4 %	0-1000 PPM	0-10 %
Oxygen	19	0-25%	0-5%	0-100%
Phosgene	20	0-2 PPM	0-2 PPM	0-200 PPM
Nitric Oxide	25	0-50 PPM	0-25 PPM	0-500 PPM
Ethylene Oxide	37	0-20 PPM	0-20 PPM	0-200 PPM
Formaldehyde	38	0-20 PPM	0-20 PPM	0-200 PPM
Alcohol	39	0-500 PPM	0-500 PPM	0-2000 PPM
Ethyne	40	0-500 PPM	0-500 PPM	0-2000 PPM
Nitrogen Oxides	42	0-500 PPM	0-500 PPM	0-2000 PPM
Organic Vapors	45	0-500 PPM	0-500 PPM	0-2000 PPM
<b>OXIDANT GASES</b>				
Bromine	10	0-2 PPM	0-2 PPM	0-100 PPM
Chlorine	11	0-10 PPM	0-2 PPM	0-100 PPM
Chlorine Dioxide	12	0-2 PPM	0-2 PPM	0-100 PPM
Fluorine	13	0-2 PPM	0-2 PPM	0-100 PPM
Ozone	14	0-2 PPM	0-2 PPM	0-100 PPM
Hydrogen Peroxide	34	0-10 PPM	0-10 PPM	2000 PPM
Iodine	35	0-2 PPM	0-2 PPM	0-100 PPM
<b>ACID GASES</b>				
Hydrogen Chloride	21	0-20 PPM	0-10 PPM	0-200 PPM
Hydrogen Cyanide	22	0-20 PPM	0-10 PPM	0-200 PPM
Hydrogen Fluoride	23	0-20 PPM	0-10 PPM	0-200 PPM
Hydrogen Sulfide	24	0-50 PPM	0-10 PPM	0-500 PPM
Nitrogen Dioxide	26	0-20 PPM	0-5 PPM	0-200 PPM
Sulfur Dioxide	27	0-20 PPM	0-10 PPM	0-200 PPM
<b>HYDRIDE GASES</b>				
Arsine	28	0-1000 PPB	0-1000 PPB	0-100 PPM
Diborane	29	0-1000 PPB	0-1000 PPB	0-100 PPM
Germane	30	0-1000 PPB	0-1000 PPB	0-100 PPM
Hydrogen Selenide	31	0-1000 PPB	0-1000 PPB	0-100 PPM
Phosphine	32	0-1000 PPB	0-1000 PPB	0-100 PPM
Silane	33	0-10 PPM	0-1 PPM	0-100 PPM

B12 transmitters are loop-powered devices capable of operating from DC power supplies between 12 and 30 VDC. Normally, this transmitter will be powered from a 24 VDC supply from a plant wide monitoring computer, a data logger, or an alarm system that supplies the DC voltage. The output of the transmitter is a 4-20 mA signal which is linear with respect to concentration over the range of the sensing module.

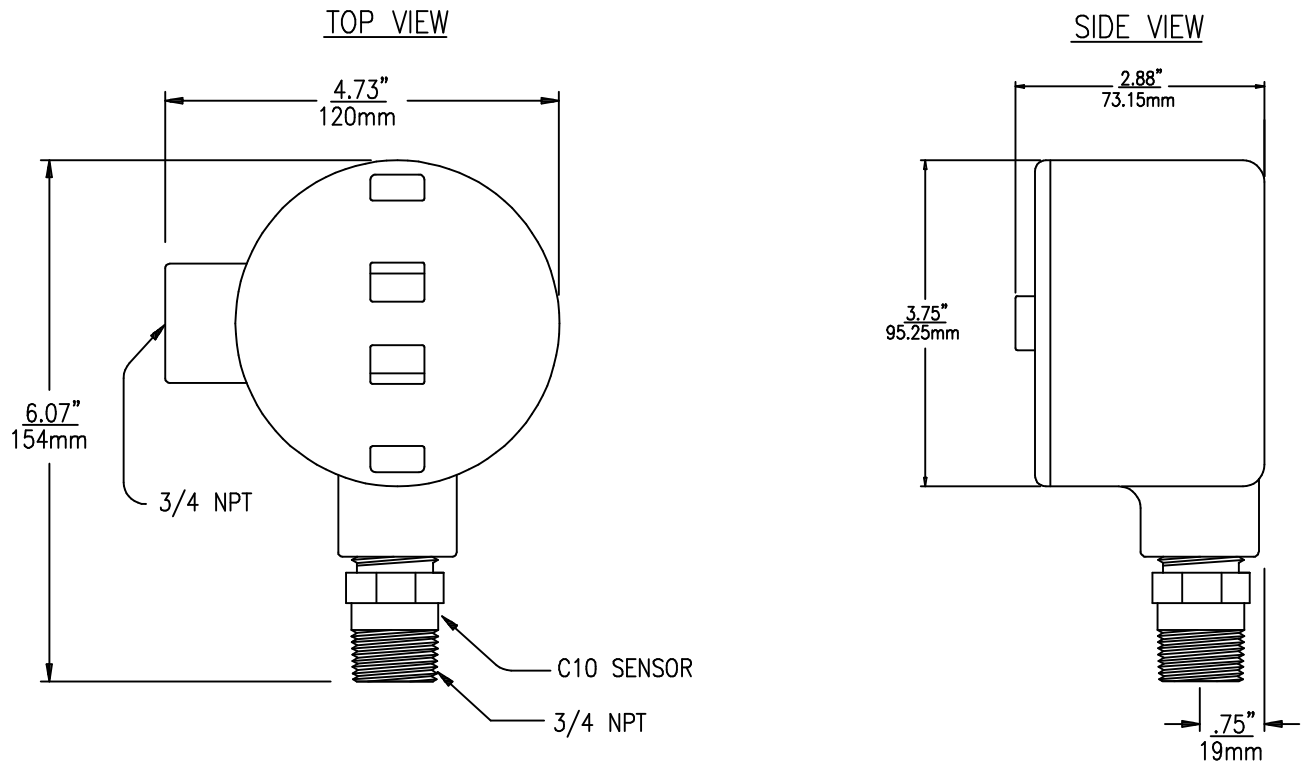
Transmitters are housed in a NEMA 4X polystyrene enclosure (Figure 1) suitable for installation in virtually any environment. The sensor is located in one of the enclosure knockouts, and one gland seal and one 1/2" conduit hub is supplied for customer installation. Knockouts are provided on all sides of the transmitter enclosure to simplify installation. An optional LCD display provides local indication of gas concentration on the front of the enclosure. The display is supplied only when specified on the order, and cannot be added in the field.

B12 Transmitters are also available in an explosion-proof version. The explosion-proof version is housed in a galvanized steel enclosure (Figure 2) rated for Class 1, Div. 1, Groups B, C, & D locations. Sensors for this type of transmitter are housed in a special stainless steel housing that screws into one hub of the transmitter enclosure. LCD display is not available on the XP version.

The sensing elements used in B12 transmitters are electrochemical sensors manufactured by ATI. These sensors are designed for use in ambient air or in ventilation ducts at temperatures of -30° to +50° C (some sensors rated to -40° C) and at relative humidities between 20 and 98% RH. Use of these sensors in extremely dry air or in condensing gas streams is not recommended.



**FIGURE 1 - SERIES B12 NEMA 4X TRANSMITTER DIMENSIONS**

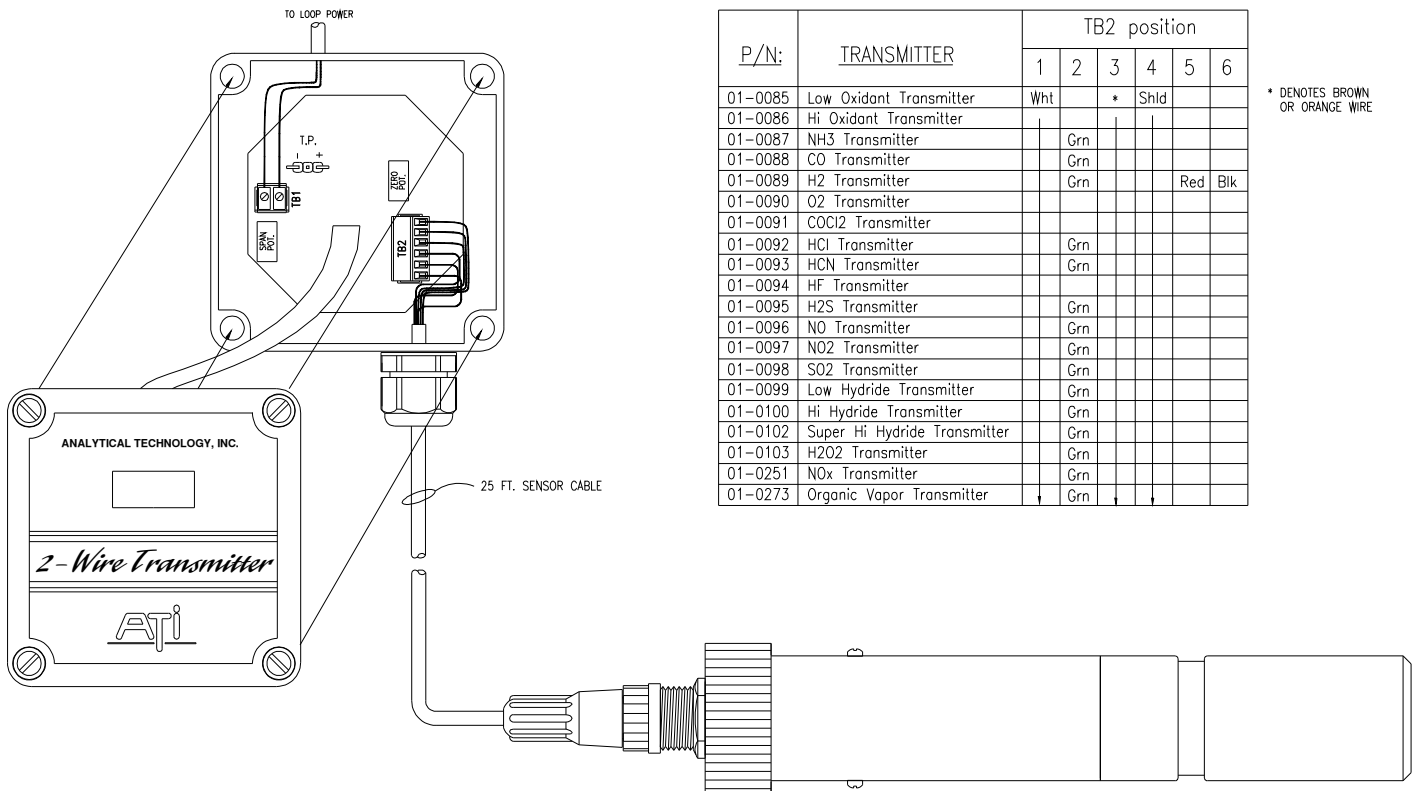


**FIGURE 2- SERIES B12 EXPLOSION-PROOF TRANSMITTER DIMENSIONS**

**DUCT MOUNTED SENSORS**

A special sensor design is available as an option that allows toxic gas sensors to be inserted into a duct or pipe through a special adapter. This system is designed to allow gas monitoring in enclosed spaces with easy removal of the sensor for service. The special mounting fitting provides a method for feeding calibration gas to the sensor without complete removal from the duct.

Duct mount sensors are provided with a special interface cable so that the transmitter electronics may be mounted up to 25 feet from the sensing location. Figure 3 below shows the components of the duct insertion version of the B12 gas transmitter.



NOTE: All conductors on cable only used on H2 sensors only, the RED and BLK conductors can be removed from cable for all other gas applications.

**FIGURE 3 – DUCT MOUNT SENSOR INSTALLATION, (ATI-0348)**

## SPECIFICATIONS

The following general specifications refer to all Series B12 transmitters. Because each transmitter contains a different sensor, there are specification differences for each gas. Gas specific information is provided with each transmitter.

**Gas Type:** Customer selected from available sensor list.

**Range:** Supplied with standard range for each gas unless otherwise specified.

**Accuracy:** Generally  $\pm 5\%$  of value, but limited by available calibration gas accuracy.

**Electronic Repeatability:**  $\pm 1\%$

**Electronic Linearity:**  $\pm 0.5\%$

**Zero Drift:** Sensor dependent, but generally less than 1% of full scale per month, non-cumulative.

**Span Drift:** Application dependent, but generally less than 3% per month.

**Output:** Loop-powered 4-20 mA, 750 ohms maximum at 24 VDC

**Power:** 12-30 VDC

**Display:** None. Optional LCD display available.

**Enclosure:** NEMA 4X Polystyrene  
Explosion-proof cast iron optional, Class 1, Div. 1, Groups B, C, & D.

**Controls:** Zero and span potentiometers mounted on transmitter circuit board

**Operating Temperature:**  $-30^{\circ}$  to  $+55^{\circ}$  C (except oxygen, which is  $-10^{\circ}$  to  $+55^{\circ}$  C)

**Sensor Pressure Limits:** 7-30 PSIA (0.5-2 Bar)

**Weight:** 0.25 Lbs (0.12 Kg.)



## INSTALLATION

Installation of a B12 Transmitter requires mechanically mounting the enclosure and connecting DC power to the system.

### MECHANICAL MOUNTING

Standard NEMA 4X transmitter enclosures are surface mounted using screws inserted through the blind mounting holes accessible by removing the transmitter cover. Figure 1 shows the center-to-center mounting hole dimensions for this enclosure. If rigid conduit is to be used for wiring the transmitter, the transmitter can be supported directly from the conduit system without the use of mounting screws. The transmitter weighs only 4 ounces, so normal conduit supports will be adequate. If conduit is to be used, be sure that the conduit is sealed at the point where it enters the transmitter. Otherwise, condensation in the conduit system can drain into the transmitter causing failure of the electronic circuit board.

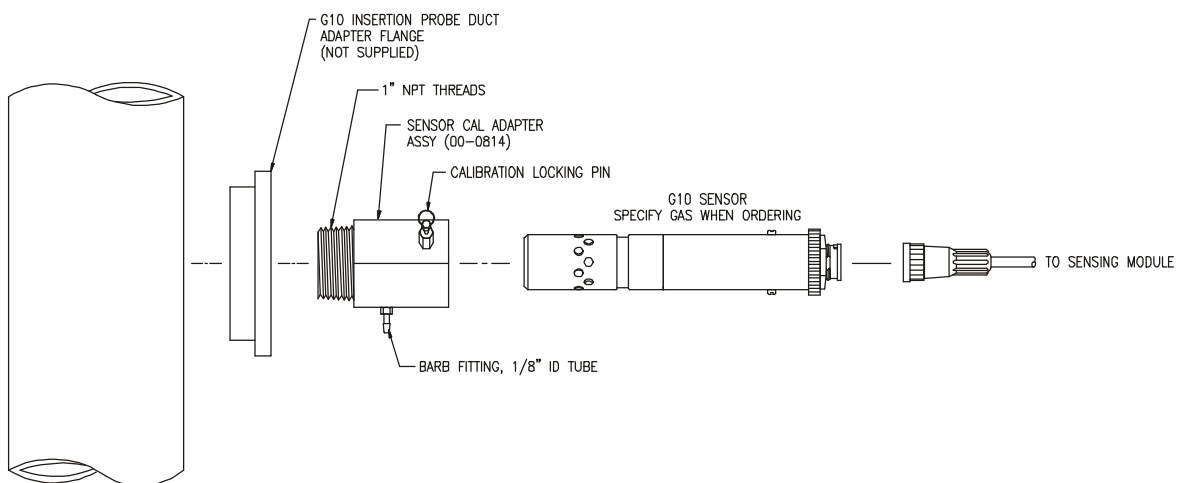
**CAUTION:** When removing the cover of a transmitter with the LCD display option, do not try to separate the cover from the enclosure base by more than a few inches. The LCD display is hardwired to the transmitter circuit board, and the display cable is only a few inches long.

Explosion-proof transmitter enclosures should be supported by the conduit system and the installation should include proper conduit seals as required by local electrical code.

### DUCT MOUNT SENSOR INSTALLATION

Duct mounted sensors are designed to be inserted into an air duct or pipe through a special adapter fitting (part number 00-0814). This fitting has a 1" MNPT thread on the front for adapting to the duct or pipe. The actual duct adapter is customer supplied.

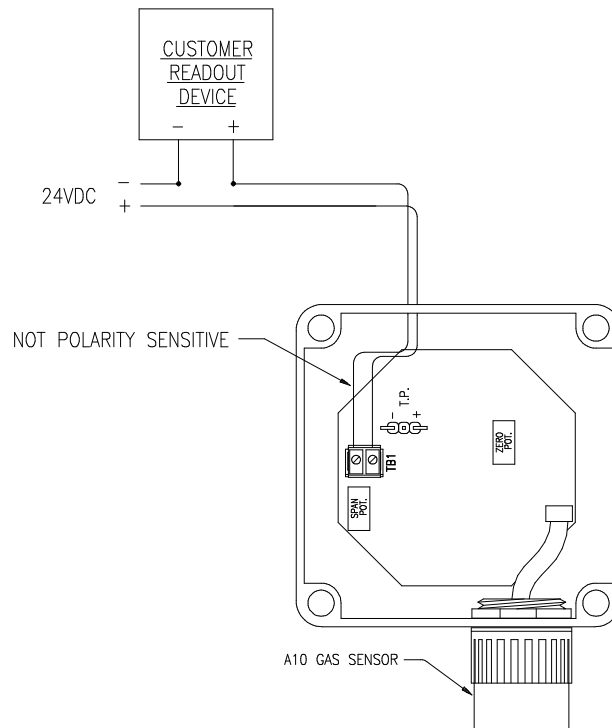
Installation of this sensor requires that the 00-0814 adapter be screwed into the customer supplied adapter as shown in Figure 4 below. Screw in the adapter so that the calibration gas inlet port is oriented in a direction that gas tubing can easily be connected. Once the adapter is in place, the sensor will slide into the adapter easily. However, it is recommended that the sensor not be installed in the fitting until you are ready to start up the transmitter. This is especially true during construction when dust and dirt may be blowing through the duct system. Fouling of the sensor may result.



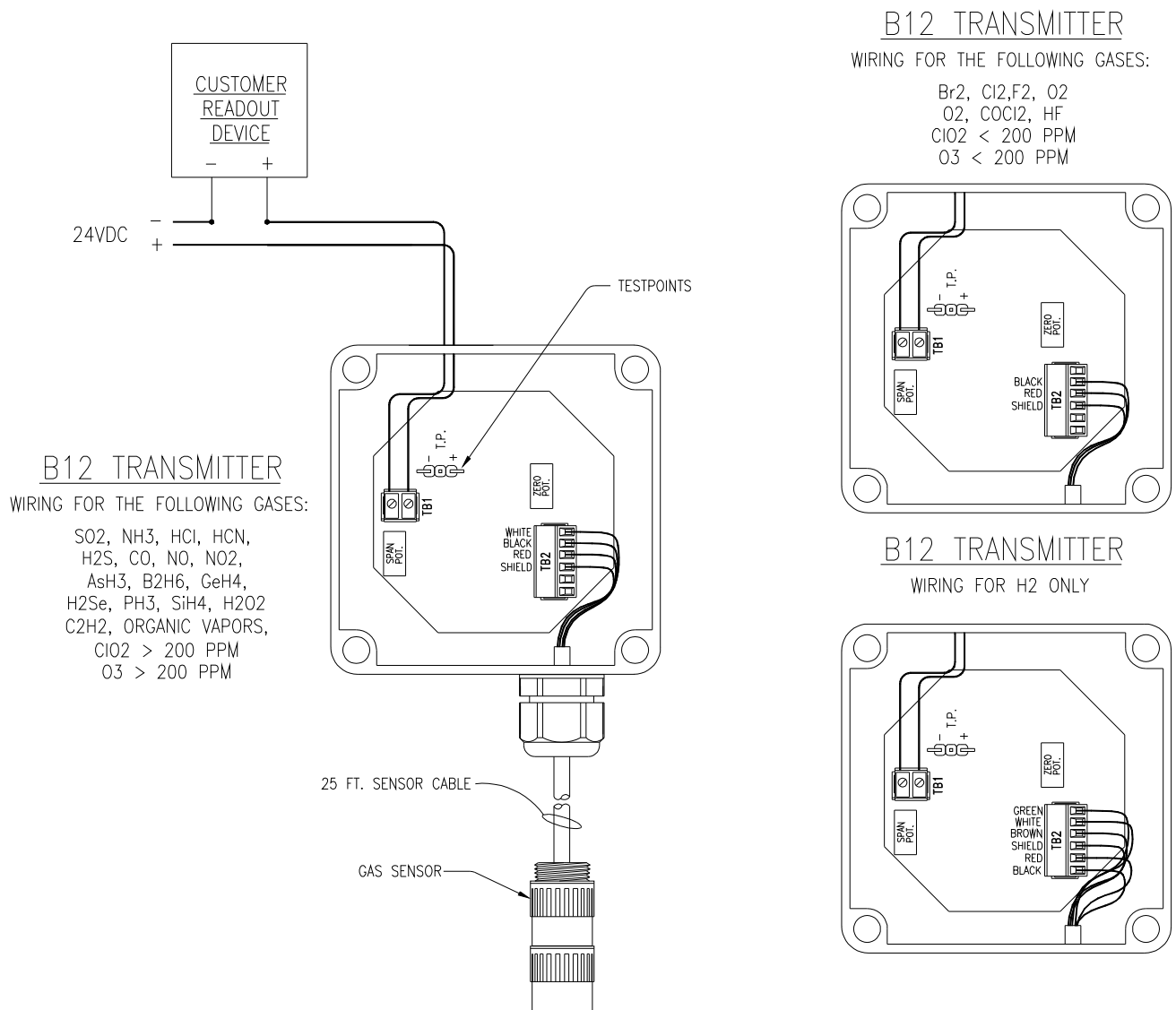
**FIGURE 4 – DUCT MOUNT SENSOR INSTALLATION, (ATI-0298)**

## **ELECTRICAL CONNECTIONS**

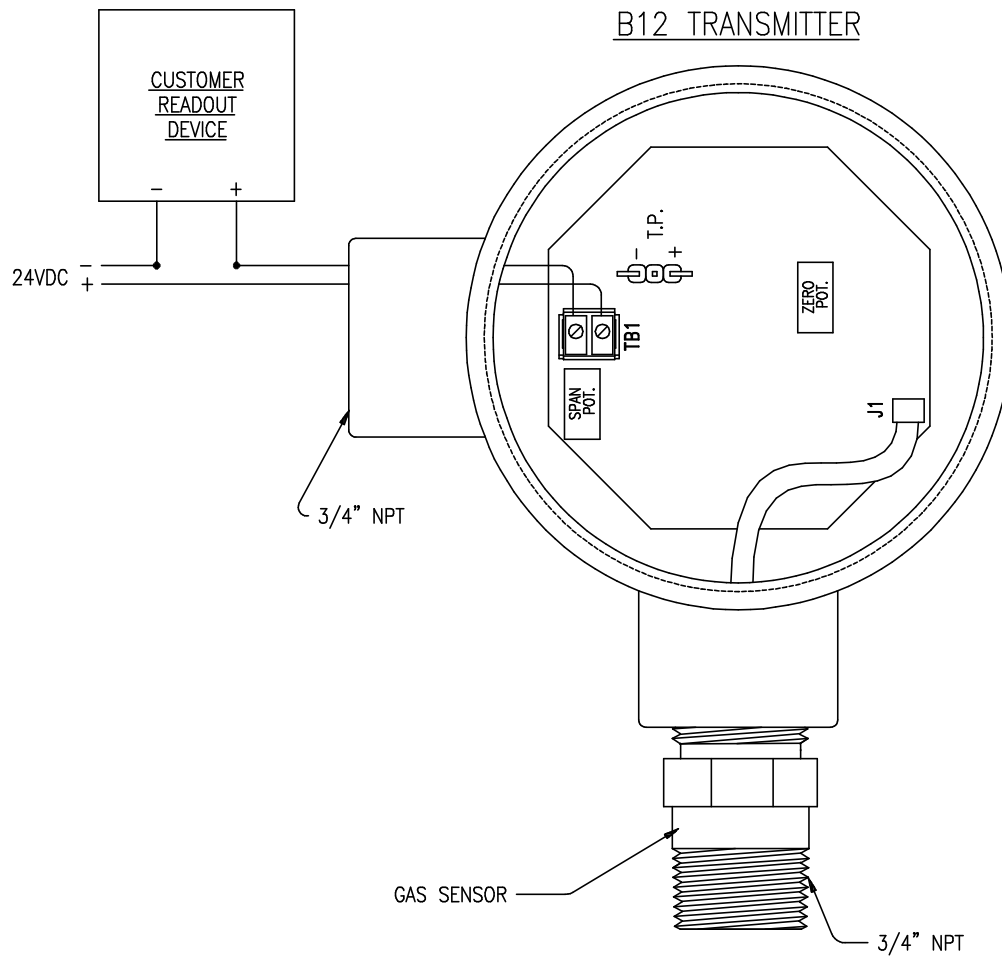
Standard transmitters are supplied with the sensor mounted to the transmitter. The sensor plugs into a connector on the transmitter circuit board. The only connections required for installation are the two loop connections. Figures 5 through 9 show the proper terminals for connecting the loop wiring.



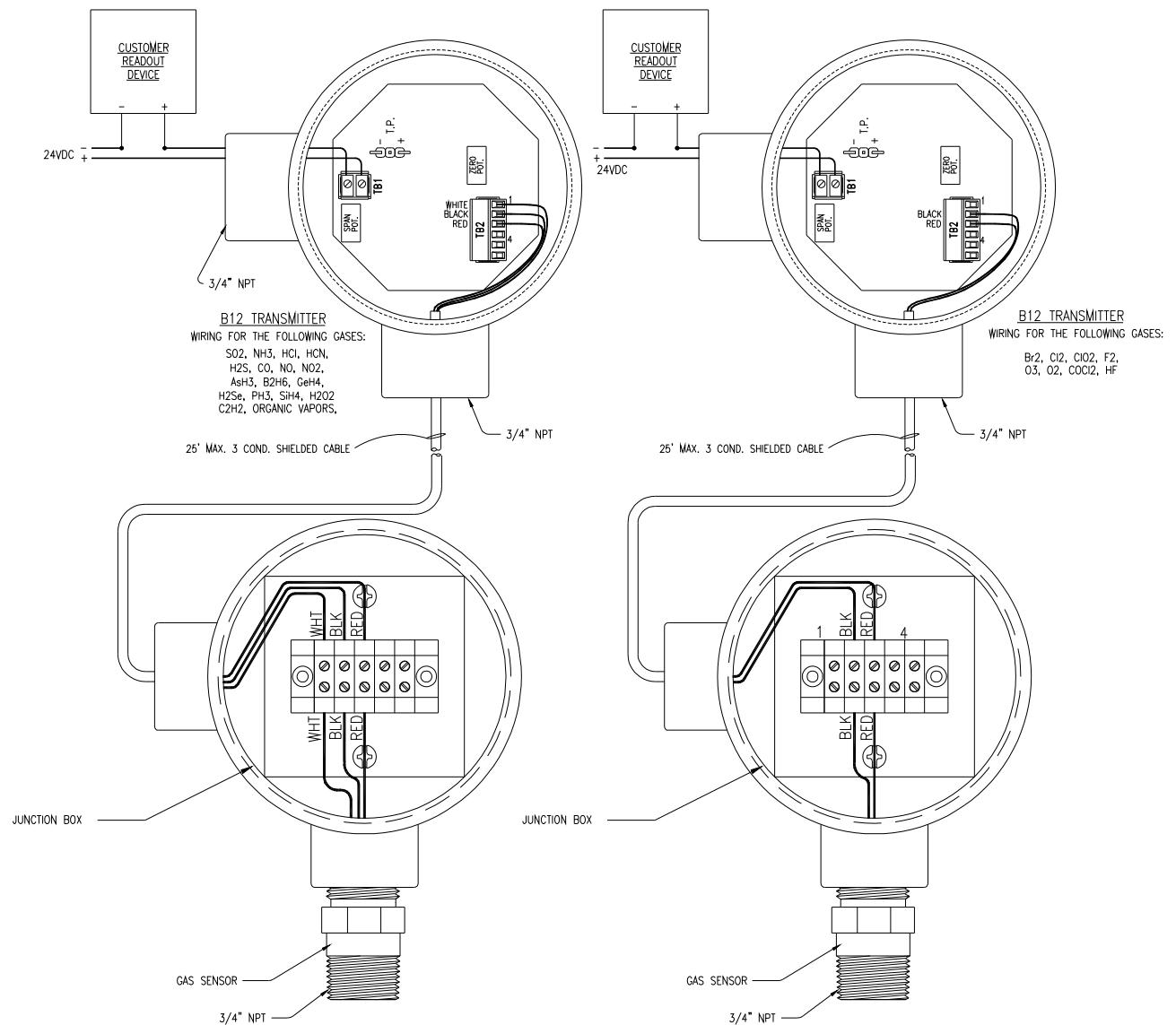
**FIGURE 5 - ELECTRICAL CONNECTIONS - STANDARD SYSTEM**



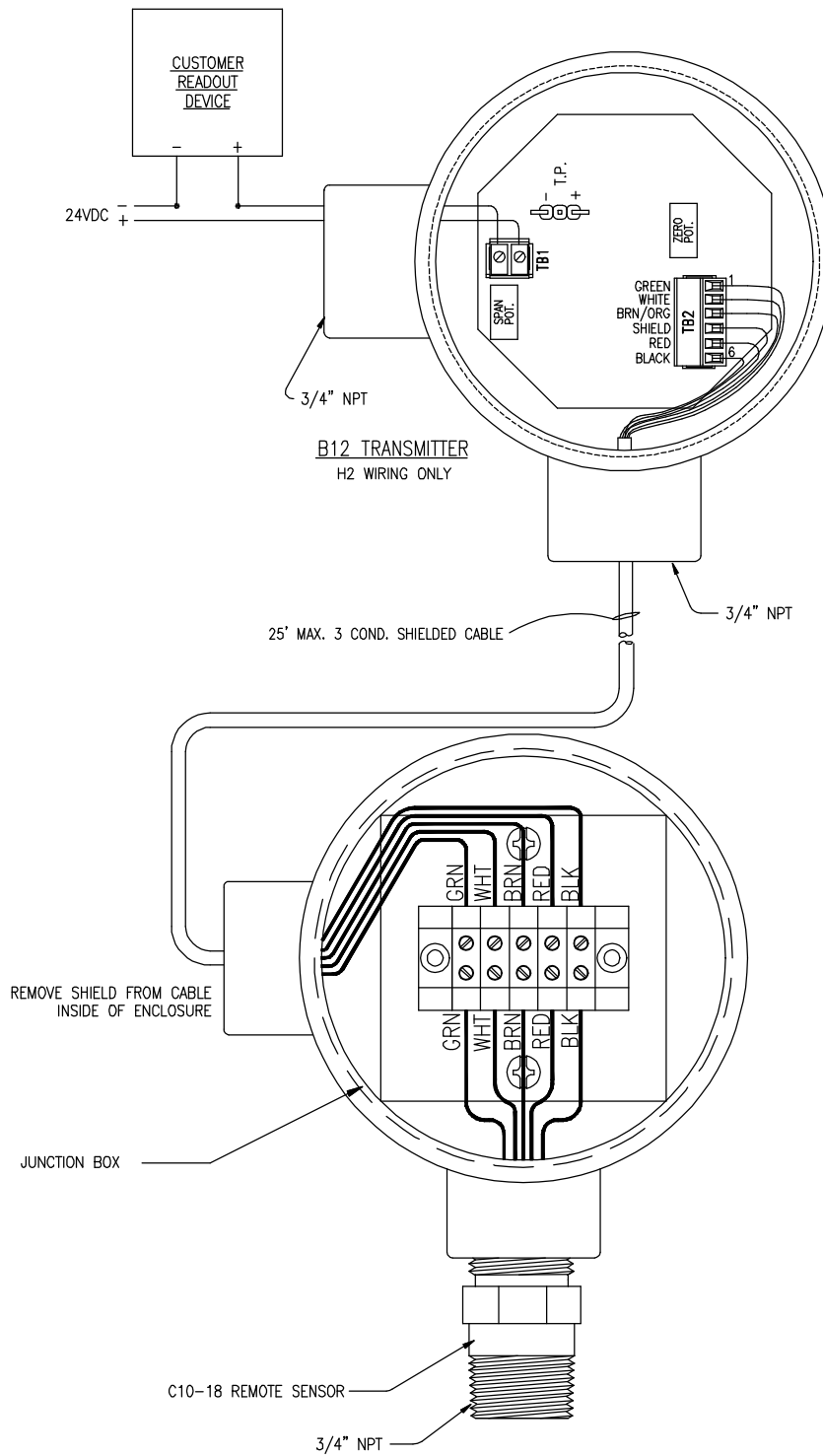
**FIGURE 6 - ELECTRICAL CONNECTIONS - REMOTE A10 SENSOR - (ATI-0147)**



**FIGURE 7 - ELECTRICAL CONNECTIONS - INTEGRAL C10 SENSOR**



**FIGURE 8 - ELECTRICAL CONNECTIONS – C10 DUAL CONDULET SENSORS (ATI-0101)**



**FIGURE 9 - ELECT CONNECTIONS – C10-18 ONLY DUAL CONDULET SENSORS (ATI-0101)**

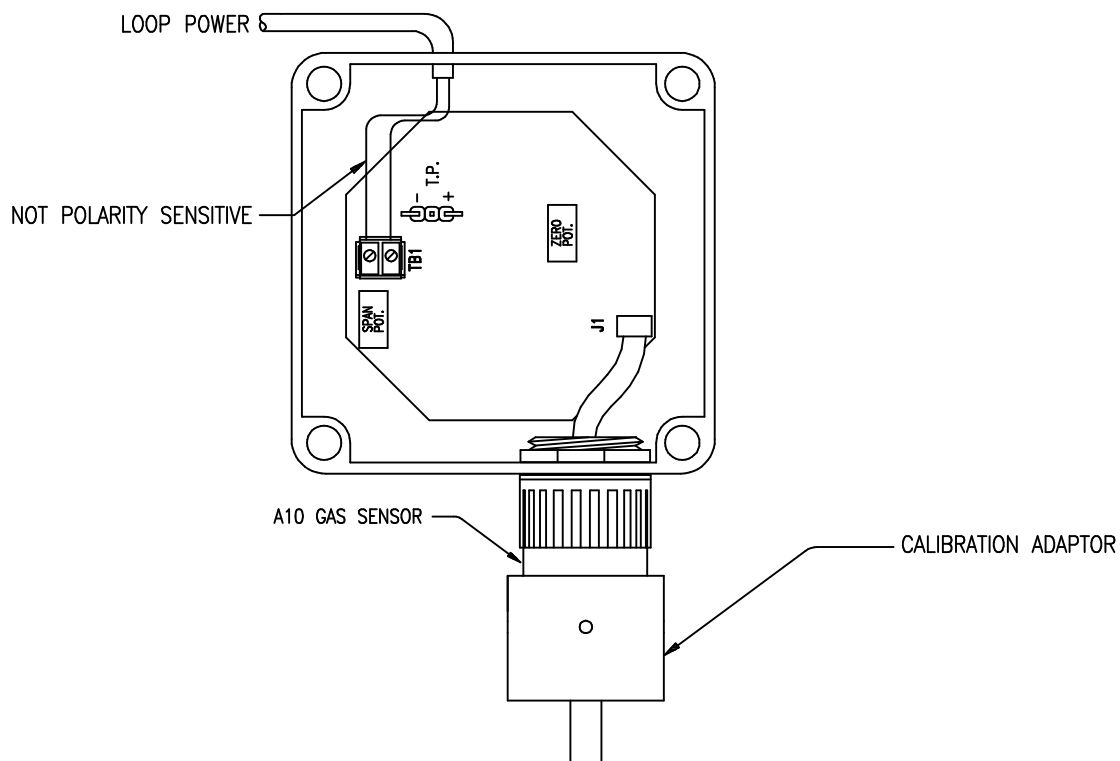
## OPERATION

After mechanical and electrical installation is complete, the transmitter is ready for operation. Prior to start-up, recheck the loop wiring connection to be sure it's correct. Reversing the loop wiring will not damage the transmitter, but other devices in the loop may be adversely affected.

As soon as DC loop power is applied, the transmitter will begin to operate, transmitting a 4-20 mA signal proportional to gas concentration. When first energized, many gas sensors will spike to a high value and then slowly begin to recover toward zero. This is normal, and transmitters should always be allowed to stabilize for at least a few hours before making any adjustments. Any receiving devices tied to the transmitter may show an alarm condition during this stabilization period. If possible, these alarm systems should be inhibited during this period.

## TRANSMITTER TEST POINTS

In order to read the transmitter output locally, a digital volt (DVM) meter is recommended for transmitters without display. The transmitter circuit board contains test points marked TP1 (see Figure 10) that allow an operator to read the 4-20 mA output without breaking the loop wiring. The test points are across a precision 10-ohm resistor that is part of the current output circuit. Therefore, any changes at the test point are a direct indication of changes in the output signal. The test point voltage will be 40 - 200 mv. Proportional to 4-20 mA. This test point is used for zero and calibration functions.



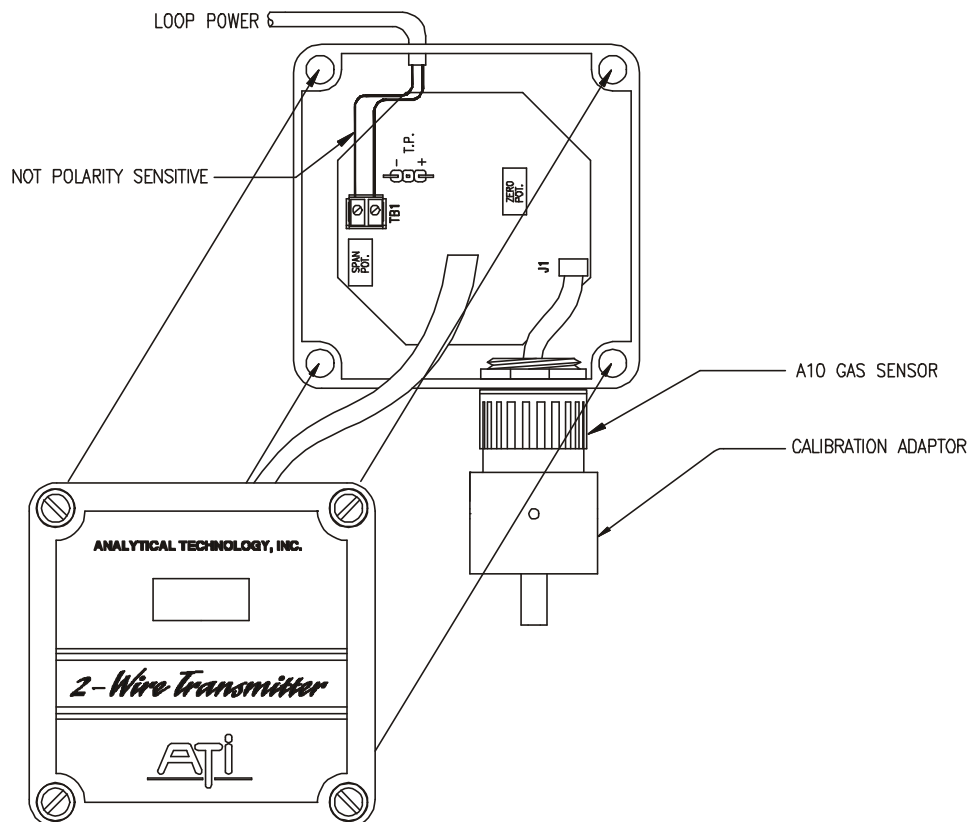
**FIGURE 10 - TRANSMITTER CONTROLS & TEST POINTS**

## **DIGITAL DISPLAY OPTION**

Series B12 transmitters supplied with the optional LCD display has the display mounted to the enclosure cover with a clear lens protecting the display from dirt and moisture. The display is connected to the cover with a short ribbon cable soldered to the transmitter circuit board. The digital display is factory scaled to the transmitter range specified on the order.

The LCD display indicates gas concentration directly in PPM or % depending on the range. It is directly in the 4-20 mA output circuit so that it is a very accurate indicator of the signal being transmitter to remote equipment. The display should be used for zeroing and calibration instead of the test points described in the calibration section of this manual.

When removing the cover of a transmitter with the LCD display, be careful not to pull on the display interconnect cable. When you remove the cover, it can be temporarily fastened to the enclosure base as shown in Figure 11.



**FIGURE 11 - TRANSMITTER CONTROLS & TEST POINTS (ATI-0205)**



## CALIBRATION

B12 transmitters should be calibrated every 3-6 months. The frequency of calibration is dependent on the operating environment (sensors exposed to dirt, oil mist, or vapors need more frequent calibration) and the degree to which accuracy is important. Generally, more frequent calibration is done if the gas transmitter is located where personnel are working regularly.

Transmitter calibration requires adjustment of both zero and span. Zero is adjusted when the sensor is exposed to zero air. Adjusting the span requires a source of span gas with a known concentration of the particular gas. Calibration kits, containing both zero air and span gas, are available from ATI for many toxic gases. Contact ATI or your local ATI representative if you have any questions on calibration gas sources.

### ZERO ADJUSTMENT

As previously mentioned, adjusting the transmitter zero requires that the sensor be exposed to air that is free of the target gas or any other gases that might cause either negative or positive interference to that sensor.

If the area in which the sensor is operating is known to be gas free, then the transmitter can be zeroed without further equipment. If not, use of "zero air" from a gas cylinder is recommended. Zero air is available as part of all ATI calibration kits, or may be obtained from any specialty gas supplier. When zero air is to be used, a calibration adapter (part no. 00-0118 for standard sensors or 00-0258 for explosion-proof sensors) must be used. The calibration adapter provides a confined space around the sensor into which the zero air can flow. Calibration adapters provide tube fittings at the bottom to connect air tubing as shown in Figure 10. The flow rate used should be 500 cc/minute.

To zero the transmitter, remove the cover and connect a DVM to the test points shown in Figure 10. If the transmitter is supplied with the LCD option, no DVM is required. Place the calibration adapter on the sensor and allow zero air to flow to the sensor for 5 minutes. If the sensor is located in air known to be gas free, simply observe the DVM voltage to be sure that it is stable  $\pm 1$  mv. Use the zero potentiometer (Figure 10) to adjust the value to 40 millivolts or adjust the LCD to read 0 PPM or %.

## **SPAN ADJUSTMENT**

Adjusting the span requires a source of reliable span gas. If possible, a span gas with a gas concentration above 25% of the full scale transmitter range is recommended. Many span gases are available in convenient disposable cylinders, while other gases require a permeation system to generate a reliable standard. **DO NOT ATTEMPT TO ADJUST THE SPAN OF A TRANSMITTER WITHOUT A RELIABLE SPAN GAS.**

To adjust the span, connect the span gas to the calibration adapter at the end of the sensor and allow the gas to flow for 5 minutes at 500cc/minute. Adjust the span potentiometer (Figure 10) until the proper voltage is displayed on the DVM. If the transmitter contains an LCD display, simply adjust the span potentiometer until the display indicates the value of the span gas.

**NOTE:** Some types of gas sensor have a slower response than others and may take more than 5 minutes to stabilize when span gas is applied. For HCN, HCl, COCl<sub>2</sub>, HF, and NH<sub>3</sub> sensors, allow span gas to run for 10 minutes before adjusting the span if you want to get close to 100% response. However, 5 minutes is normally enough to get to 95% response, so an alternative is to adjust the span to 95% of the gas concentration after 5 minutes. This will conserve span gas, which can be expensive in some cases.

The proper voltage to set when adjusting transmitter span will vary depending on the range of the transmitter and the concentration of the gas used to set the span. The following formula is used to calculate the proper span voltage for any transmitter.

$$\mathbf{V = 0.040 V + 0.160 X (Span\ Gas\ Concentration \div Transmitter\ Range)}$$

As an example, suppose you are calibrating a hydrogen sulfide transmitter with a range of 0-50 PPM using an H<sub>2</sub>S gas standard of 25 PPM. The above formula would then become:

$$\mathbf{V = 0.040 V + 0.160 X (25 \div 50) = 0.120 V.}$$

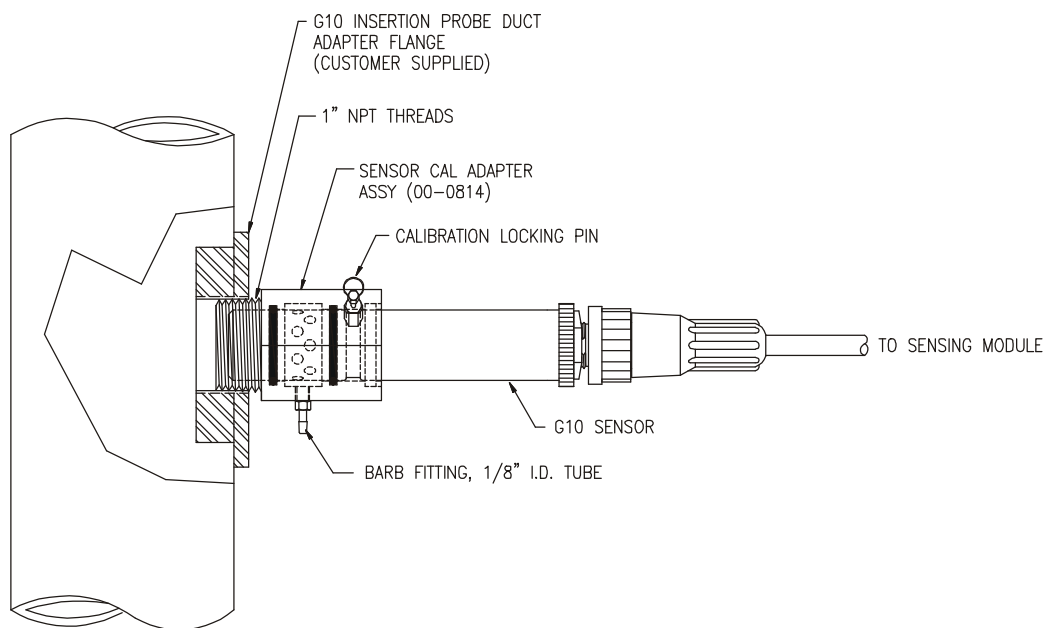
Therefore, adjusting the transmitter to a reading of 120 mv. at the test point would properly calibrate the transmitter.

**NOTE: Newly installed systems or replacement sensors could take up to 12 hours to stabilize.**

## CALIBRATION OF DUCT MOUNT SENSORS

The procedure for zeroing and calibration of duct mounted gas sensors is similar to that described on pages 16 and 17 except that the calibration is done with the sensor still mounted inside the mounting adapter fitting. This fitting contains a calibration gas connection on the side. See figure 12 below for the sensor orientation when in the calibrate position. ( *This procedure is applicable to all insertion sensors with the exception of special Hydrogen Peroxide. These special H<sub>2</sub>O<sub>2</sub> sensors require calibration **outside** of the duct adapter* )

To zero and calibrate the duct sensor, pull the sensor out of the duct until the retaining pin clicks into the retaining slot. If you pull the sensor back slowly, the retaining pin will drop into place and automatically locate the sensor in the proper position opposite the gas inlet port. Connect your zero or span gas to the gas connection port and follow the zero and span adjustment procedures this as well as the previous page.



**FIGURE 12 - DUCT MOUNT SENSOR CALIBRATION (ATI-0299)**

## PERIODIC RESPONSE TEST

While gas transmitters do not need frequent calibration, they should be checked regularly for proper sensor response. The purpose of regular response tests is to detect a sensor failure that does not affect the transmitter output. For instance, if a sensor membrane became coated with oil, the transmitter output might seem normal while the sensor might not respond to a gas leak.

Sensors should be tested at least once a week using a simple "puff test" to verify proper operation. Most gas sensors can be tested easily and quickly using readily available chemicals. Contact ATI for recommended "puff test" procedures for a specific gas sensor.

## SPARE PARTS LIST B12

<u>Part Number</u>	<u>Description</u>
01-0068	Low Range Oxidant transmitter circuit board
01-0069	Hi Range Oxidant transmitter circuit board
01-0070	NH <sub>3</sub> transmitter circuit board
01-0071	CO transmitter circuit board
01-0072	H <sub>2</sub> transmitter circuit board
01-0073	O <sub>2</sub> transmitter circuit board
01-0074	COCl <sub>2</sub> transmitter circuit board
01-0075	HCl transmitter circuit board
01-0076	HCN transmitter circuit board
01-0077	HF transmitter circuit board
01-0078	H <sub>2</sub> S transmitter circuit board
01-0079	NO transmitter circuit board
01-0080	NO <sub>2</sub> transmitter circuit board
01-0081	SO <sub>2</sub> transmitter circuit board
01-0082	Low Range Hydride transmitter circuit board
01-0083	Hi Range Hydride transmitter circuit board
01-0084	H <sub>2</sub> O <sub>2</sub> Low range transmitter circuit board
01-0085	Low Range Oxidant remote transmitter circuit board
01-0086	Hi Range Oxidant remote transmitter circuit board
01-0101	Super Hi Range Hydride transmitter circuit board
01-0148	H <sub>2</sub> O <sub>2</sub> High range transmitter circuit board
01-0251	NO <sub>x</sub> transmitter circuit board
01-0255	C <sub>2</sub> H <sub>2</sub> transmitter circuit board
01-0273	Organic Vapors transmitter circuit board
01-0087	NH <sub>3</sub> remote transmitter circuit board
01-0088	CO remote transmitter circuit board
01-0089	H <sub>2</sub> remote transmitter circuit board
01-0090	O <sub>2</sub> remote transmitter circuit board
01-0091	COCl <sub>2</sub> remote transmitter circuit board
01-0092	HCl remote transmitter circuit board
01-0093	HCN remote transmitter circuit board
01-0094	HF remote transmitter circuit board
01-0095	H <sub>2</sub> S transmitter circuit board
01-0096	NO remote transmitter circuit board
01-0097	NO <sub>2</sub> remote transmitter circuit board
01-0098	SO <sub>2</sub> remote transmitter circuit board
01-0099	Low Range Hydride remote transmitter circuit board
01-0100	Hi Range Hydride remote transmitter circuit board
01-0102	Super Hi Range Hydride remote transmitter circuit board
01-0103	H <sub>2</sub> O <sub>2</sub> Low range remote transmitter circuit board
01-0150	H <sub>2</sub> O <sub>2</sub> High range remote transmitter circuit board
01-0252	NO <sub>x</sub> remote transmitter circuit board
01-0256	C <sub>2</sub> H <sub>2</sub> remote transmitter circuit board
01-0302	Organic Vapors remote transmitter circuit board
81-0002	NEMA-4X enclosure (top and bottom)
38-0002	Terminal block plug, 2 position
92-0005	Self-tapping screw (#8-1/2")

## SPARE PARTS LIST (cont'd)

<u>Part Number</u>	<u>Description</u>
44-0017	1/2" NPT conduit hub
44-0018	Seal ring (required for NEMA-4X rating on conduit hub)

**PART NO.**

**DESCRIPTION**

**SENSORS**

00-0002	A10-xx Low Oxidant (0-3 PPM and below)(Cl <sub>2</sub> , F <sub>2</sub> , Br <sub>2</sub> , ClO <sub>2</sub> )
00-0101 <sup>1</sup>	C10-xx Low Oxidant, explosion-proof (Cl <sub>2</sub> , F <sub>2</sub> , Br <sub>2</sub> , ClO <sub>2</sub> , O <sub>3</sub> )
00-0758 <sup>2</sup>	C10-xx DC Low Oxidant, explosion-proof (Cl <sub>2</sub> , F <sub>2</sub> , Br <sub>2</sub> , ClO <sub>2</sub> , O <sub>3</sub> )
00-0606	A10-xx Low Oxidant, Remote Sensor w/25ft cable (Cl <sub>2</sub> , F <sub>2</sub> , Br <sub>2</sub> , ClO <sub>2</sub> )
00-0081	A10-xx High Oxidant (0-5 PPM and above)(Cl <sub>2</sub> , F <sub>2</sub> , Br <sub>2</sub> , ClO <sub>2</sub> )
00-0100 <sup>1</sup>	C10-xx High Oxidant, X-proof (0-5 PPM and above)(Cl <sub>2</sub> , F <sub>2</sub> , Br <sub>2</sub> , ClO <sub>2</sub> )
00-0759 <sup>2</sup>	C10-xx DC High Oxidant, X-proof (0-5 PPM and above)(Cl <sub>2</sub> , F <sub>2</sub> , Br <sub>2</sub> , ClO <sub>2</sub> )
00-0607	A10-xx High Oxidant, Remote Sensor w/25ft cable)(Cl <sub>2</sub> , F <sub>2</sub> , Br <sub>2</sub> , ClO <sub>2</sub> )
00-1097	A10-14 Low Range Ozone Gas Sensor
00-1102 <sup>1</sup>	C10-14 Low Range Ozone, Explosion Proof
00-1303 <sup>2</sup>	C10-14 DC Low Range Ozone, Explosion Proof
00-1103	A10-14 Low Range Ozone, Remote Sensor w/25ft. cable
00-1099	A10-14 High Range Ozone Gas Sensor
00-1101 <sup>1</sup>	C10-14 High Range Ozone, Explosion Proof
00-1304 <sup>2</sup>	C10-14 DC High Range Ozone, Explosion Proof
00-1104	A10-14 High Range Ozone, Remote Sensor w/25ft. cable
00-0085	A10-15 Ammonia
00-0103 <sup>1</sup>	C10-15 Ammonia, explosion-proof
00-0761 <sup>2</sup>	C10-15 DC Ammonia, explosion-proof
00-0608	A10-15 Ammonia, Remote Sensor w/25ft cable
00-0092	A10-16 Carbon Monoxide
00-0110 <sup>1</sup>	C10-16 Carbon Monoxide, explosion-proof
00-0768 <sup>2</sup>	C10-16 DC Carbon Monoxide, explosion-proof
00-0609	A10-16 Carbon Monoxide remote Sensor w/25ft cable
00-0252	10-17 Combustible Gas, explosion-proof
00-0134	A10-18 Hydrogen
00-0135 <sup>1</sup>	C10-18 Hydrogen, explosion-proof
00-0766 <sup>2</sup>	C10-18 DC Hydrogen, explosion-proof
00-0610	A10-18 Hydrogen, Remote Sensor w/25ft cable
00-0089	A10-19 Oxygen
00-0611	A10-19 Oxygen, remote Sensor w/cable
00-0107 <sup>1</sup>	C10-19 Oxygen, explosion-proof
00-0765 <sup>2</sup>	C10-19 DC Oxygen, explosion-proof
00-0136	A10-20 Phosgene
00-0612	A10-20 Phosgene, Remote Sensor w/25ft cable
00-0137 <sup>1</sup>	C10-20 Phosgene, explosion-proof
00-1305 <sup>2</sup>	C10-20 DC Phosgene, explosion-proof
00-0087	A10-21 Hydrogen Chloride
00-0613	A10-21 Hydrogen Chloride, Remote Sensor w/25ft cable
00-0105 <sup>1</sup>	C10-21 Hydrogen Chloride, explosion-proof
00-0763 <sup>2</sup>	C10-21 DC Hydrogen Chloride, explosion-proof
00-0088	A10-22 Hydrogen Cyanide
00-0614	A10-22 Hydrogen Cyanide, Remote Sensor w/25ft cable
00-0106 <sup>1</sup>	C10-22 Hydrogen Cyanide, explosion-proof
00-0764 <sup>2</sup>	C10-22 DC Hydrogen Cyanide, explosion-proof
00-0086	A10-23 Hydrogen Fluoride
00-0615	A10-23 Hydrogen Fluoride, Remote Sensor w/25ft cable
00-0104 <sup>1</sup>	C10-23 Hydrogen Fluoride, explosion-proof
00-0762 <sup>2</sup>	C10-23 DC Hydrogen Fluoride, explosion-proof

00-0091	A10-24 Hydrogen Sulfide
00-0616	A10-24 Hydrogen Sulfide, Remote Sensor w/25ft cable
00-0109 <sup>1</sup>	C10-24 Hydrogen Sulfide, explosion-proof
00-0767 <sup>2</sup>	C10-24 DC Hydrogen Sulfide, explosion-proof
00-0093	A10-25 Nitric Oxide
00-0617	A10-25 Nitric Oxide, Remote Sensor w/25ft cable
00-0111 <sup>1</sup>	C10-25 Nitric Oxide, explosion-proof
00-0769 <sup>2</sup>	C10-25 DC Nitric Oxide, explosion-proof
00-0094	A10-26 Nitrogen Dioxide
00-0618	A10-26 Nitrogen Dioxide, Remote Sensor w/25ft
00-0112 <sup>1</sup>	C10-26 Nitrogen Dioxide, explosion-proof
00-0770 <sup>2</sup>	C10-26 DC Nitrogen Dioxide, explosion-proof
00-0084	A10-27 Sulfur Dioxide
00-0619	A10-27 Sulfur Dioxide, Remote Sensor w/25ft cable
00-0102 <sup>1</sup>	C10-27 Sulfur Dioxide, explosion-proof
00-0760 <sup>2</sup>	C10-27 DC Sulfur Dioxide, explosion-proof
00-0096	A10-xx Low Range Hydrides (0-1000 PPB)*
00-0620	A10-xx Low Range Hydrides, Remote Sensor w/25ft. cable *
00-0114 <sup>1</sup>	C10-xx Low Range Hydrides, explosion-proof (0-1000 PPB)*
00-0773 <sup>2</sup>	C10-xx DC Low Range Hydrides, explosion-proof (0-1000 PPB)*
00-0095	A10-xx Hi Range Hydrides (5-100 PPM)*
00-0621	A10-xx Hi Range Hydrides, Remote Sensor w/25ft cable *
00-0113 <sup>1</sup>	C10-xx Hi Range Hydrides, explosion proof (5-100 PPM)*
00-0771 <sup>2</sup>	C10-xx DC Hi Range Hydrides, explosion proof (5-100 PPM)*
00-0621	A10-xx Super Hi Range Hydrides (500-1000 PPM)*
00-0622	A10-xx Super Hi Range Hydrides, Remote Sensor w/25ft cable
00-0713 <sup>1</sup>	C10-xx Super Hi Range Hydrides, explosion proof (500-1000 PPM)*
00-0772 <sup>2</sup>	C10-xx DC Super Hi Range Hydrides, explosion proof (500-1000 PPM)*
00-0142	A10-34 Hydrogen Peroxide
00-0623	A10-34 Hydrogen Peroxide, Remote Sensor w/25ft cable
00-0143 <sup>1</sup>	C10-34 Hydrogen Peroxide, explosion proof
00-0925	A10-37 ETO
00-1052 <sup>1</sup>	C10-37 ETO, explosion proof
00-1307 <sup>2</sup>	C10-37 DC ETO, explosion proof
00-1045	A10-38 Formaldehyde
00-1053 <sup>1</sup>	C10-38 Formaldehyde, explosion proof
00-1308 <sup>2</sup>	C10-38 DC Formaldehyde, explosion proof
00-0727	A10-39 Alcohol
00-0730 <sup>1</sup>	C10-39 Alcohol, explosion proof
00-1306 <sup>2</sup>	C10-39 DC Alcohol, explosion proof
00-0964	A10-40 C2H2
00-1413	A10-40 C2H2 Remote Sensor w/25' cable
00-1202 <sup>1</sup>	C10-40 C2H2, explosion proof
00-1417	A10-42 NOx
00-1496	A10-45 Organic Vapors (specify gas)
00-1524 <sup>1</sup>	C10-45 Organic Vapors, explosion proof (specify gas)

NOTE:

<sup>1</sup> - Ribbon Cable Style Sensors

<sup>2</sup> - Leaded Style Sensors

**INSERTION SENSORS**

00-0815	G10-xx Lo Oxidant
00-0816	G10-xx Hi Oxidant
00-1109	G10-14 Low Range Ozone
00-1110	G10-14 High Range Ozone
00-0817	G10-15 Ammonia
00-0818	G10-16 Carbon Monoxide
00-0819	G10-18 Hydrogen
00-0820	G10-19 Oxygen
00-0821	G10-20 Phosgene
00-0822	G10-21 Hydrogen Chloride
00-0823	G10-22 Hydrogen Cyanide
00-0824	G10-23 Hydrogen Fluoride
00-0825	G10-24 Hydrogen Sulfide
00-0826	G10-25 Nitric Oxide
00-0827	G10-26 Nitrogen Dioxide
00-0828	G10-27 Sulfur Dioxide
00-0829	G10-xx Lo Range Hydride
00-0830	G10-xx Hi Range Hydride
00-0831	G10-xx Super Hi Hydride
00-0832	G10-34 Hydrogen Peroxide, Low range
00-1087	G10-34 Hydrogen Peroxide, High range
00-1454	G10-34 Hydrogen Peroxide, Special high range
00-1309	G10-37 ETO
00-1310	G10-38 Formaldehyde
00-0833	G10-39 Alcohol
00-1202	G10-42 NOx
00-1303	G10-45 Organic Vapors (specify Gas)

**Note:** 1. Asterisk indicates Hydrides (AsH<sub>3</sub>, B<sub>2</sub>H<sub>6</sub>, GeH<sub>4</sub>, H<sub>2</sub>Se, PH<sub>3</sub>, SiH<sub>3</sub>)