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VersaTox

Sensor/Transmitter with Optional Display & Relay Output

INSTRUCTION MANUAL

IMPORTANT:

Please read these installation and operating instructions completely and carefully before starting.

Filename: 3156405C02, Relay Manual Rev F.doc

The Armstrong Monitoring Corporation
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TABLE OF CONTENTS

FIGURES

1 WARRANTY

The AMC-VersaTox transmitter is warranted against defects in material and workmanship for a period of two years from date of delivery. Maintenance items are not warranted. During the warranty period, *The Armstrong Monitoring Corporation* will repair or replace components that prove to be defective in the opinion of AMC. Any equipment deemed to be defective by the user should be returned to *The Armstrong Monitoring Corporation* for evaluation (see product return below). **Site visits by Armstrong personnel, to evaluate/repair equipment, are not covered by this warranty.** AMC is not liable for auxiliary interfaced equipment, nor for consequential damage. This warranty shall not apply to any product, which has been modified in any way, which has been repaired by any other party other than a qualified technician or authorized AMC representative, or when failure is due to misuse or conditions of use.
Note: extended warranty mail in calibration programs are available (please call 1-800-465-5777).

1.1 LIABILITY

All AMC products must be installed and maintained according to instructions. Only qualified personnel should install and maintain the equipment.

AMC shall have no liability arising from auxiliary interfaced equipment, for consequential damage, or the installation and operation of this equipment. AMC shall have no liability for labour or freight costs, or any other costs or charges in excess of the amount of the invoice for the products.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE THEREOF.

WARNING

CHECK TO ASSURE THE WORKING AREA IS FREE FROM HAZARDS DURING INSTALLATION OR WHEN PERFORMING MAINTENANCE, AND USE PROPER PRECAUTIONS.

1.2 PRODUCT RETURN

All products returned for warranty or service should be shipped by prepaid freight. Please obtain a Return Material Authorization (RMA) number from AMC prior to shipping and ensure this RMA number is clearly visible on the outside of the shipping container. Material shipped without RMA will be rejected and returned. All products returned to the client will be shipped by freight collect.

1.3 MODIFICATIONS AND SUBSTITUTIONS

Due to an ongoing development program, AMC reserves the right to substitute components and change specifications at any time without incurring any obligations.

2 PRODUCT INFORMATION

2.1 SENSOR/TRANSMITTER MODULE

Sensor/transmitter unit order number. ……...	_____
Sensor/transmitter serial number..…….	_____
Sensor order number..……	_____
Sensor serial number……	_____
Power Supply Requirement……..	2 Wire 12 to 24 VDC @ 30 mA ☐ 4 Wire 14 to 24 VDC @ 100 mA ☐ Or 12 to 24 VAC @ 100 mA
Sensor Warranty……	_____
Operating Temperature ……	-20° to 50° C 0° to 40° C (120VAC Plug-in Power Supply)
Operating Pressure ……..	0.9 to 1.1 atm
Relative Humidity ……..	15 to 85% RH, non-condensing
Signal Linearity……...	Linear to the concentration of gas
Relay Contacts……...	SPST 0.50A @ 125 VAC, 1A @ 24 VDC

2.2 FACTORY CALIBRATION

Gas Type…….……...	_____
Zero Gas, at 4 mA Signal…….……	_____
Gas Concentration at 20 mA Signal……	_____
Calibration Adapter Part Number……	_____

Note:

All Armstrong Monitoring systems must be installed and maintained according to instructions to assure proper operation. Only qualified technicians should install and maintain the equipment. For re-calibration extended warranty program information please call 1-800-465-5777.

3 PRODUCT DESCRIPTION

The AMC-VersaTox sensor/transmitter unit is designed to provide continuous, reliable surveillance of surrounding air for the target gas listed in the Factory Settings (Section 2.2). This unit is powered by either AC or DC power source and provides a 4-20 mA, variable current signal, which is proportional to the gas concentration detected. Optional gas concentration digital display is available as well as a built-in alarm relay contacts. An optional 120VAC plug in power supply is also available with a relay controlled buzzer. Each sensor/transmitter unit is factory calibrated, and is ready for field installation and operation.

Each sensor module features alarm indicators, adjustment trimmers and connection terminal blocks, as listed and described below.

Overview:

1. HOUSING:	ABS plastic
2. TRANSMITTER BOARD:	4-20 mA transmitter with integral sensor
3. RELAY, POWER BOARD (OPTIONAL):	Optional, Relay contact and/or isolated power supply; AC or DC
4. DISPLAY BOARD (OPTIONAL):	Optional, Digital display output
5. 120VAC POWER SUPPLY WITH BUZZER (OPTIONAL):	Optional, 120VAC plug in power supply with alarm activated buzzer

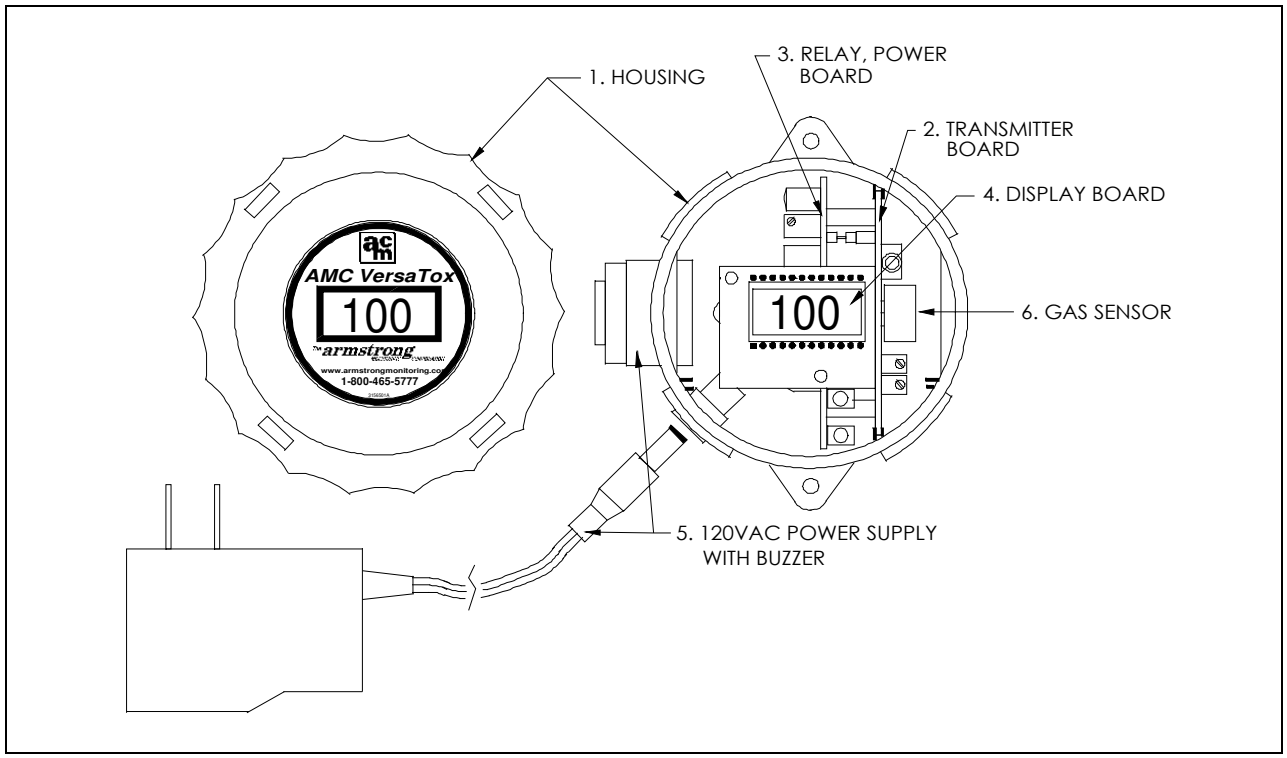

Figure 3-1 AMC-VersaTox Feature Overview (Non-Standard Variant)

TRANSMITTER BOARD:

6. GAS SENSOR:	Electrochemical cell, factory calibrated Some sensor maybe extruded, refer to Figure
7. SPAN ADJUST TRIMMER:	Span signal output adjustment
8. ZERO ADJUST TRIMMER:	Zero signal output adjustment
9. COMMON TEST POINT:	Reference point to measure signal
10. SIGNAL TEST POINT:	Measurement point for the output signal from the sensor
11. CAL JACK:	Used during calibration to connect Remote Calibration Lead
12. 2-WIRE 4-20mA TERMINAL BLOCK: (2-WIRE VERSION ONLY)	Connection point for wiring to the monitor, 2-wire transmitter only

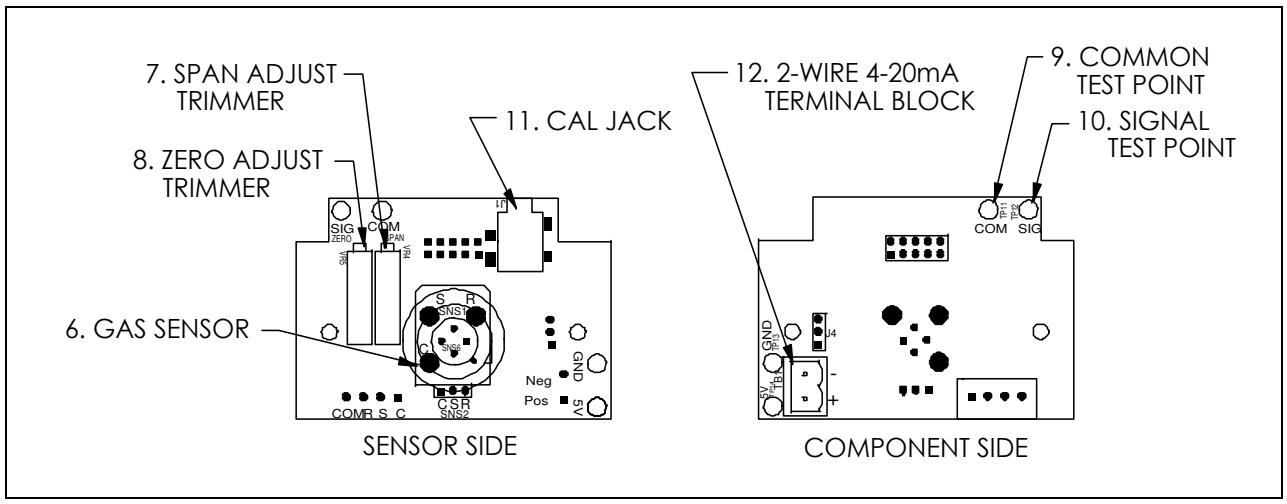

Figure 3-2 AMC-VersaTox Feature Transmitter Board

RELAY, POWER BOARD (OPTIONAL):

13. POWER TERMINAL BLOCK:	Connection point for wiring to the monitoring device and/or power source, AC or DC
14. SIGNAL TEST POINT:	Measurement point for the output signal of transmitter board
15. GROUND TEST POINT:	Reference point to measure signal and alarm
16. ALARM TEST POINT:	Measurement point for setting the alarm relay
17. ALARM ADJUST TRIMMER:	Alarm relay set point adjustment
18. ALARM RELAY TERMINAL BLOCK:	Connection point for wiring relay contacts

19. ALARM RELAY SELECTOR:	Allows selection between NO and NC alarm relay contacts
20. ALARM RELAY:	Relay that is activated when the alarm set point has been achieved
21. ALARM BUZZER CONNECTOR:	Connection point for optional Alarm Buzzer
22. ALARM RELAY OPERATION SELECTOR:	Allows selection between an energized 'FAILSAFE' relay or a de-energized 'NORMAL' relay operation
23. POWER LED	Illuminates to indicate power is on
24. ALARM LED	Illuminates to indicate alarm threshold has been reached

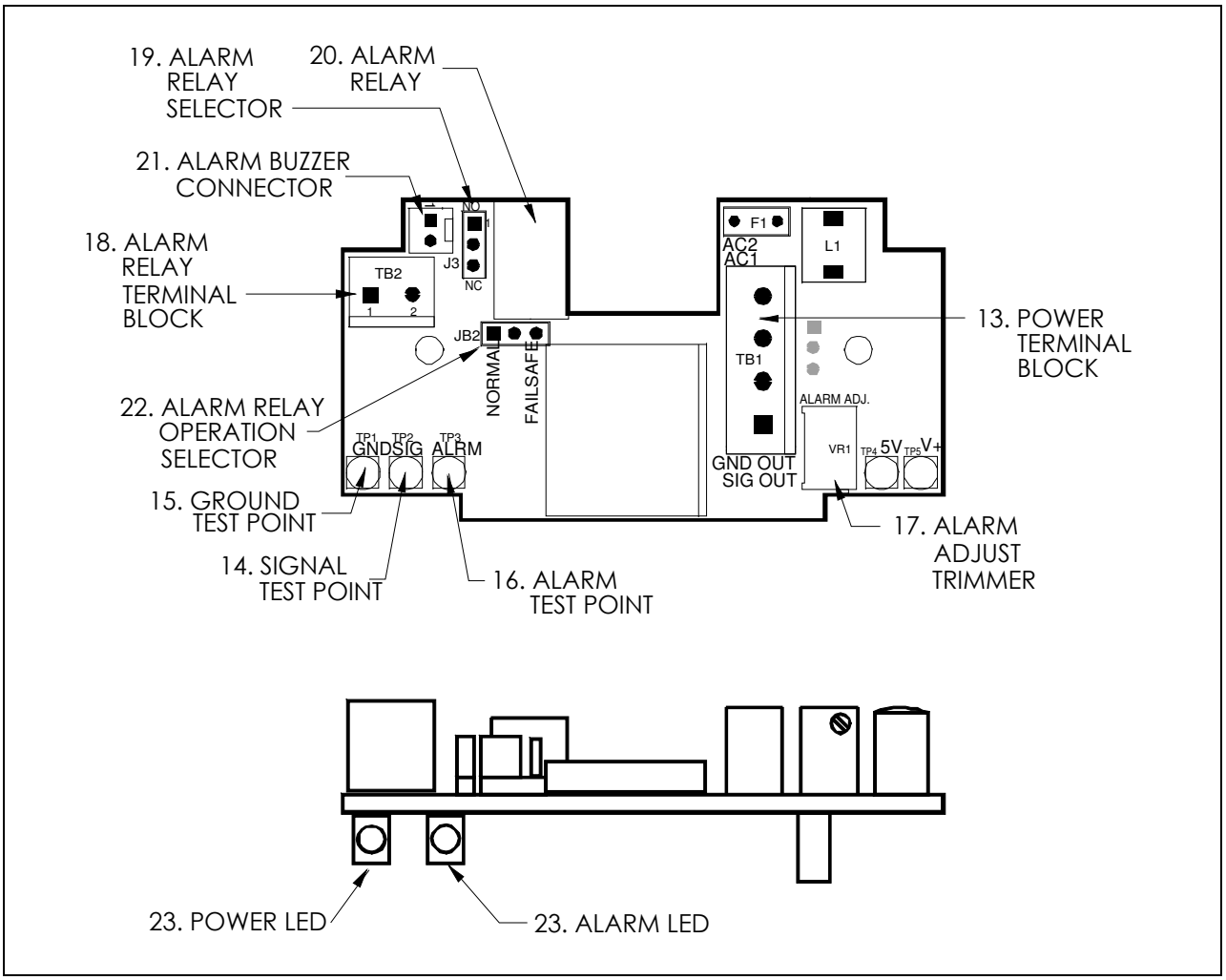

Figure 3-3 AMC-VersaTox Feature Relay, Power Board

DISPLAY (OPTIONAL):

24. LCD DISPLAY:	Gas concentration 3 digit display

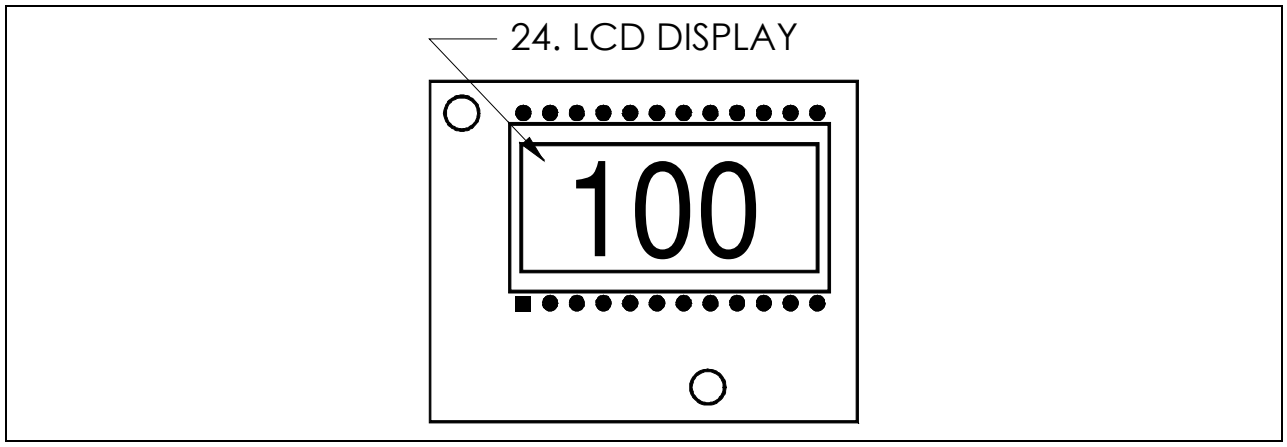

Figure 3-4 AMC-VersaTox Feature Display Board

120VAC POWER SUPPLY WITH BUZZER (OPTIONAL):

25. 120VAC PLUG IN ADAPTER: Plug in power supply with 120VAC primary and low voltage DC secondary

26. BUZZER: Piezo buzzer controlled by the alarm relay

27. JACK: Connects the plug in power supply to the AMC-VersaTox

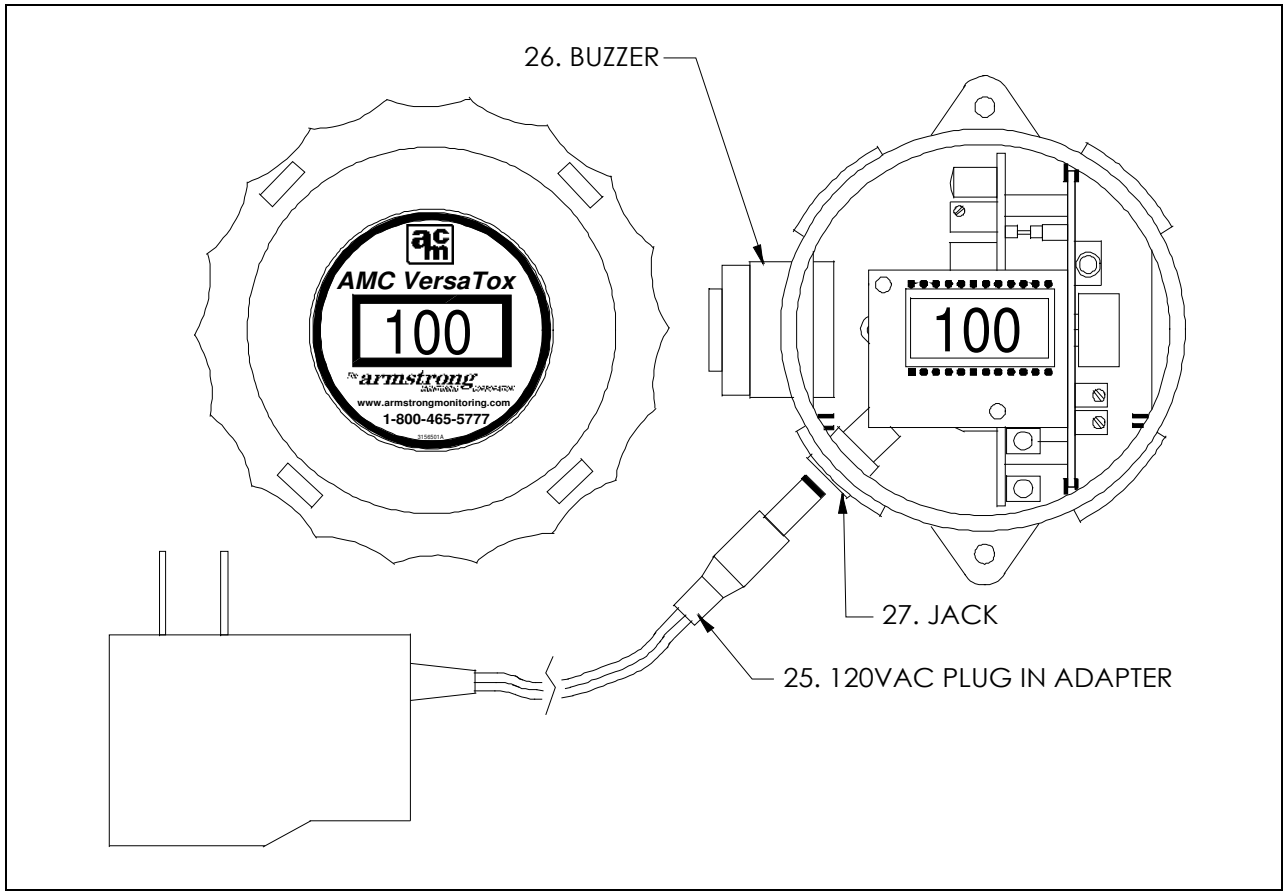

Figure 3-5 AMC-VersaTox Feature 120VAC Power Supply with Buzzer

4 INSTALLATION

The installation of the AMC-VersaTox is very important as the operational quality is a direct result of the quality of the installation. The following sections provide guidelines for installation; location, mounting, wiring, and cable selection.

4.1 LOCATION AND MOUNTING

Mount the AMC-VersaTox sensor/transmitter on a solid, non-vibrating surface or structure in an area where the ambient concentration of gas is not directly affected by the presence of clean air supply, ventilation systems, or blockage by surrounding articles and sources of interference gases. Please, refer to local codes for sensor/transmitter installation information. The installer is required to provide the necessary mounting hardware for the unit. It's recommended to remove the AMC-VersaTox sensor/transmitter circuit board(s) from the enclosure for easy installation of the unit. For anti-tamper and safety zone units Armstrong Monitoring Corporation will provide the necessary security hardware to secure the units.

Notes:

Mount enclosure with the sensor located as shown is Figure 4-1 and Figure 4-2. This will ensure correct orientation. It is recommended to turn off supply power before removing or replacing the transmitter or sensor.

4.1.1 CONDUIT MOUNTING (WALL MOUNT)

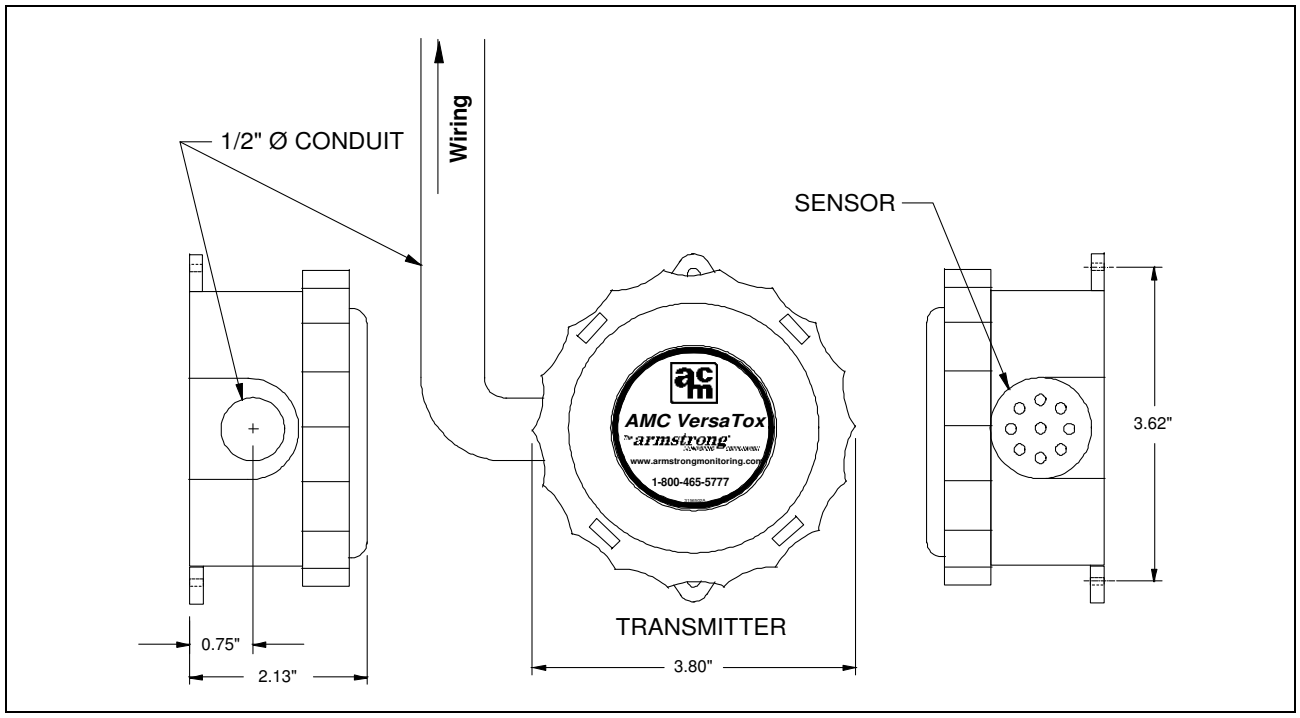

Figure 4-1 Conduit Mounting

4.1.2 120VAC POWER SUPPLY WITH BUZZER

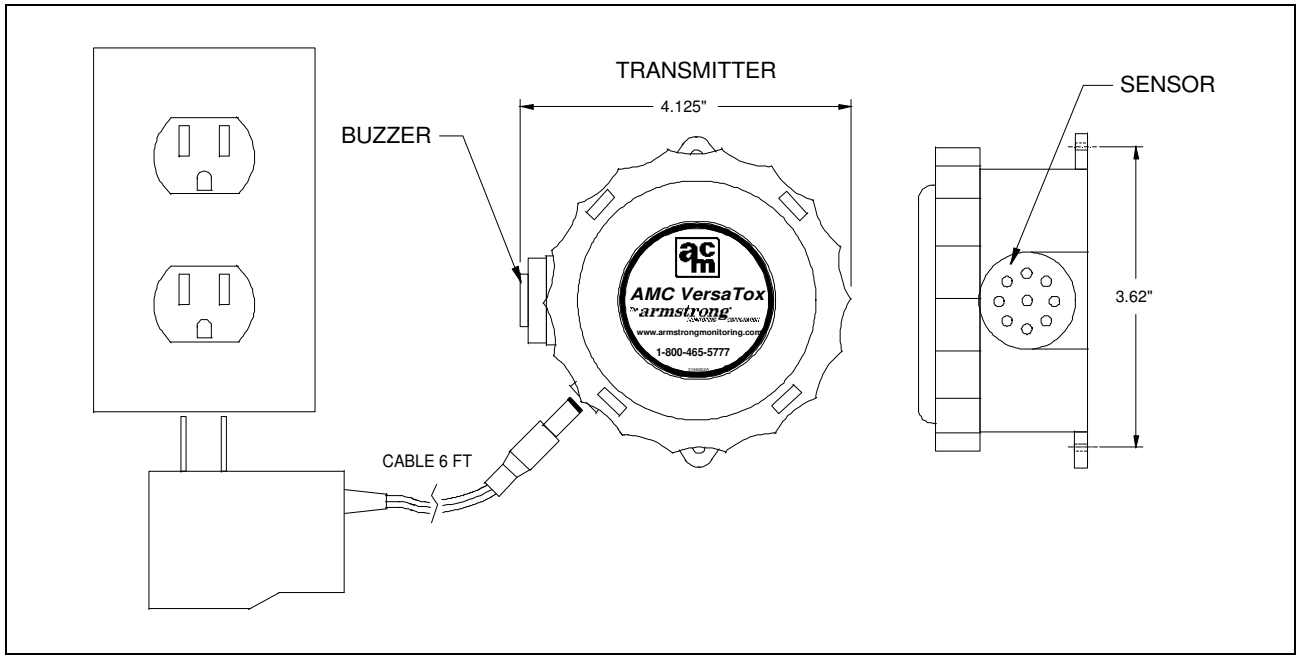

Figure 4-2 120VAC Power Supply with Buzzer Mounting

4.1.3 DUCT MOUNTING (OPTIONAL)

NOTE: The Duct mount version is available for CO or NO2 gas detection only.

The duct mount option is used to divert a portion of the duct airflow through the AMC-VersaTox. The difference between the total pressure in the duct and outside the duct propels the sample stream. The duct mount option can only be used in positive pressure ducts and is designed to be directly mounted to the outside of the duct. The sampling tube is attached to the AMC-VersaTox housing and inserted into the duct. The duct mount is assembled assuming the duct air flow direction from left to right. If the opposite direction is required, remove the duct mounting nut inside the housing, rotate the sampling tube 180º and reinstall the nut. Mount the sensor/transmitter in a straight section of duct where the airflow is unrestricted and does not interfere with any internal duct components. It is necessary to seal the conduit entry with Ducseal or with another sealant.

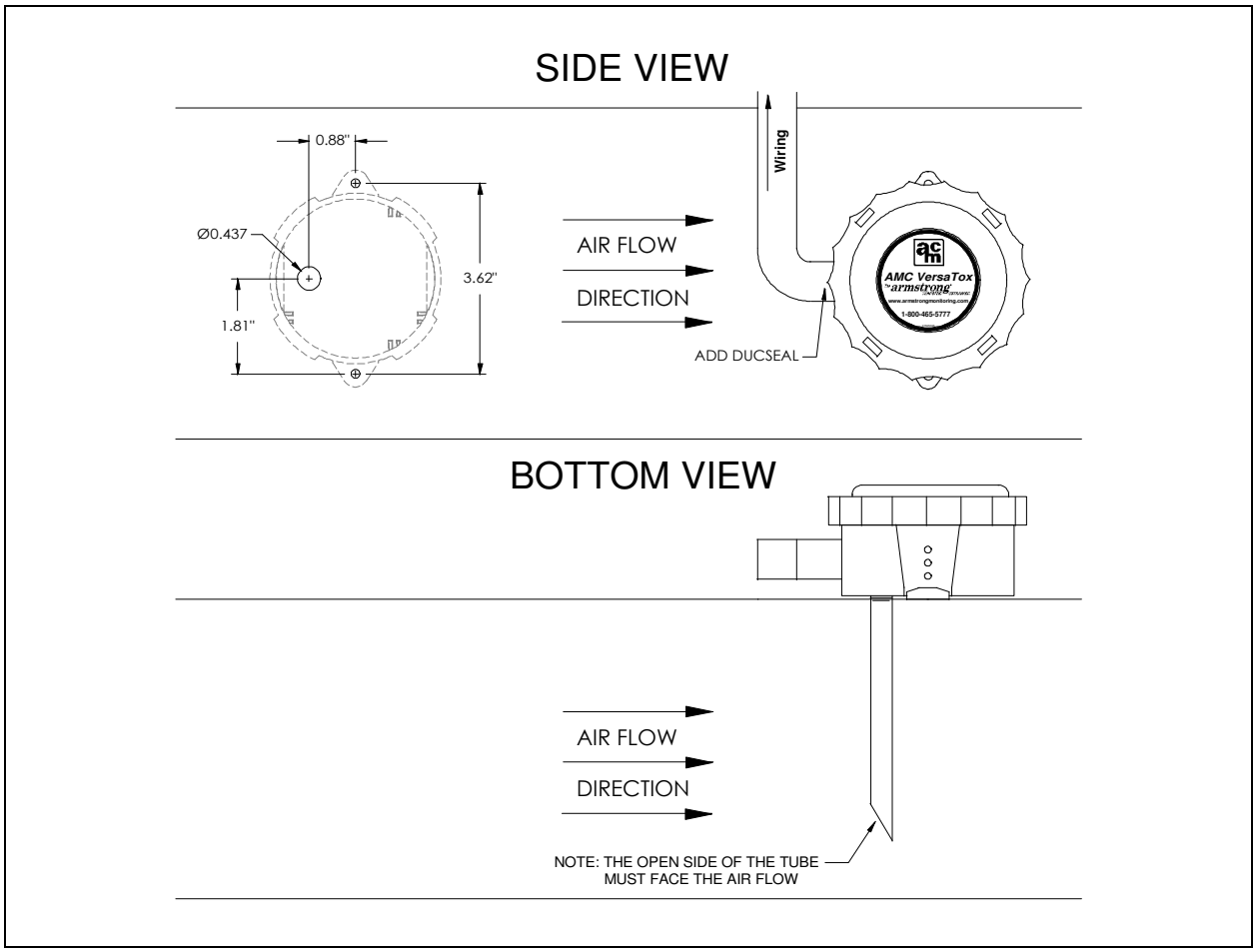

Figure 4-3 Duct Mounting Option

4.1.4 FLOW THROUGH (OPTIONAL)

NOTE: Flow through version is available for CO gas detection only.

The Flow through system uses a 7/16-20 SAE/MS swagelok assembly fitted to the front of the AMC sensor/transmitter housing. The swaglok assembly connects to a hose or tubing which is used to deliver a sample air to the CO sensor to detect the concentration of the CO in that particular sample of air from a given space

4.2 WIRING

The AMC-VersaTox has two main wiring systems: the monitor and power supply wiring and the relay wiring systems.

A two conductor, shielded cable is recommended to transmit the 4-20mA signal from the AMC-VersaTox sensor/transmitter to the monitor. In the 2-wire version, the same wire pair is used for both signal and power due to the low power current loop design of the AMC-VersaTox. For best signal transmission and maximum noise rejection, it is recommended to run the cable through steel conduit (the cable shield must be chassis grounded at the monitor or power supply).

4.2.1 MONITOR AND POWER SUPPLY WIRING

The AMC-VersaTox has different power inputs and in turn has different power and signal wiring schemes. The following sections describe each of these schemes.

4.2.1.1 DC Transmitter (1 board) to AMC Monitor

The simplest version of the AMC-VersaTox is the 2-wire transmitter with optional display. The AMC-VersaTox sensor/transmitter should be connected to an AMC monitor, as shown in the following figure, by a twisted pair shielded cable for the conduction of the 4-20 mA signal.

See the following connections going from the AMC-VersaTox to an AMC monitor:
AMC-VersaTox Terminal (+) -------- goes to ------- AMC Monitor Channel Terminal (+)
AMC-VersaTox Terminal (-) -------- goes to ------- AMC Monitor Channel Terminal (SIG)

For wiring selection, see section 4.3.1.

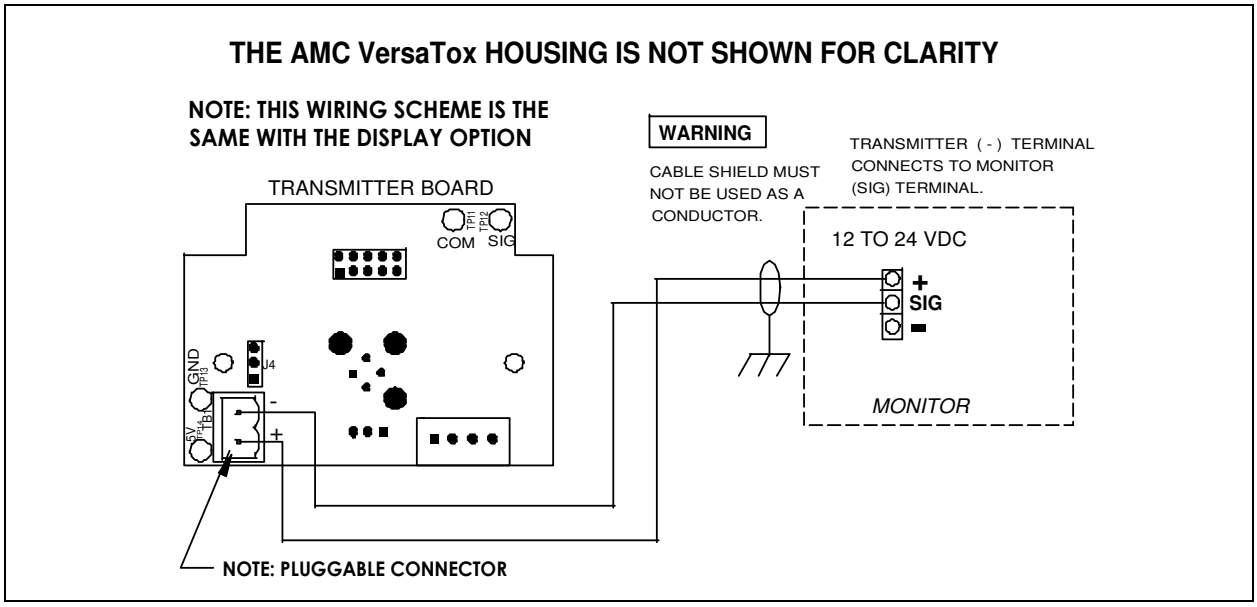

Figure 4-4 DC Transmitter (1 board) to AMC Monitor

4.2.1.2 DC Transmitter (1 board) to BAS

The signal output of the AMC-VersaTox sensor/transmitter is a 4-20 mA DC current, therefore it can be connected to BAS (building automation system) equipped with an analog-to-digital converter if required.

In many cases a load resistor is required to convert the 4-20 mA current signal to a voltage signal, as shown in Figure 4-5. Please refer to your BAS for instructions on how to connect a 4-20 mA loop transmitter.

For wiring selection, see section 4.3.1.

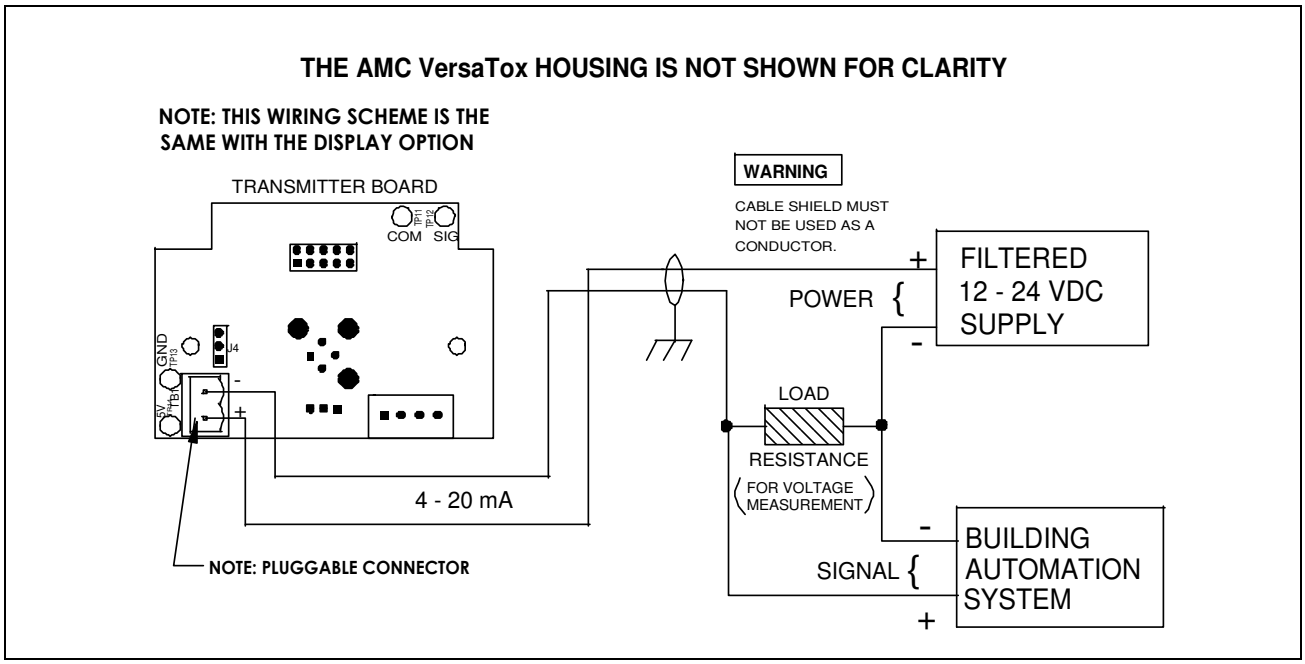

Figure 4-5 DC Transmitter (1 board) to BAS

4.2.1.3 DC Transmitter with Relay to AMC Monitor (Optional)

The AMC-VersaTox with relay, power board option employs an isolated ground. This feature reduces noise and damage which may be caused by ground loops. Figure 4-6 shows two wiring configurations which may be employed.

In the first configuration the usable grounds are shorted on the transmitter, making the wiring a 3 wire connection. A 3 wire connection like this will place noise from the power supply on the signal line.

In the second configuration separate cables are used for GND OUT and AC2, which are connected to the "-" on the monitor. This wiring scenario creates a 4 wire connection, which is recommended, to AMC monitors.

This optional board has an on-board relay, for relay wiring see section 4.2.2.

For wiring selection, see section 4.3.2.

Note:

USE TWISTED WIRES IN A SHIELDED CABLE FOR MAXIMUM NOISE REJECTION

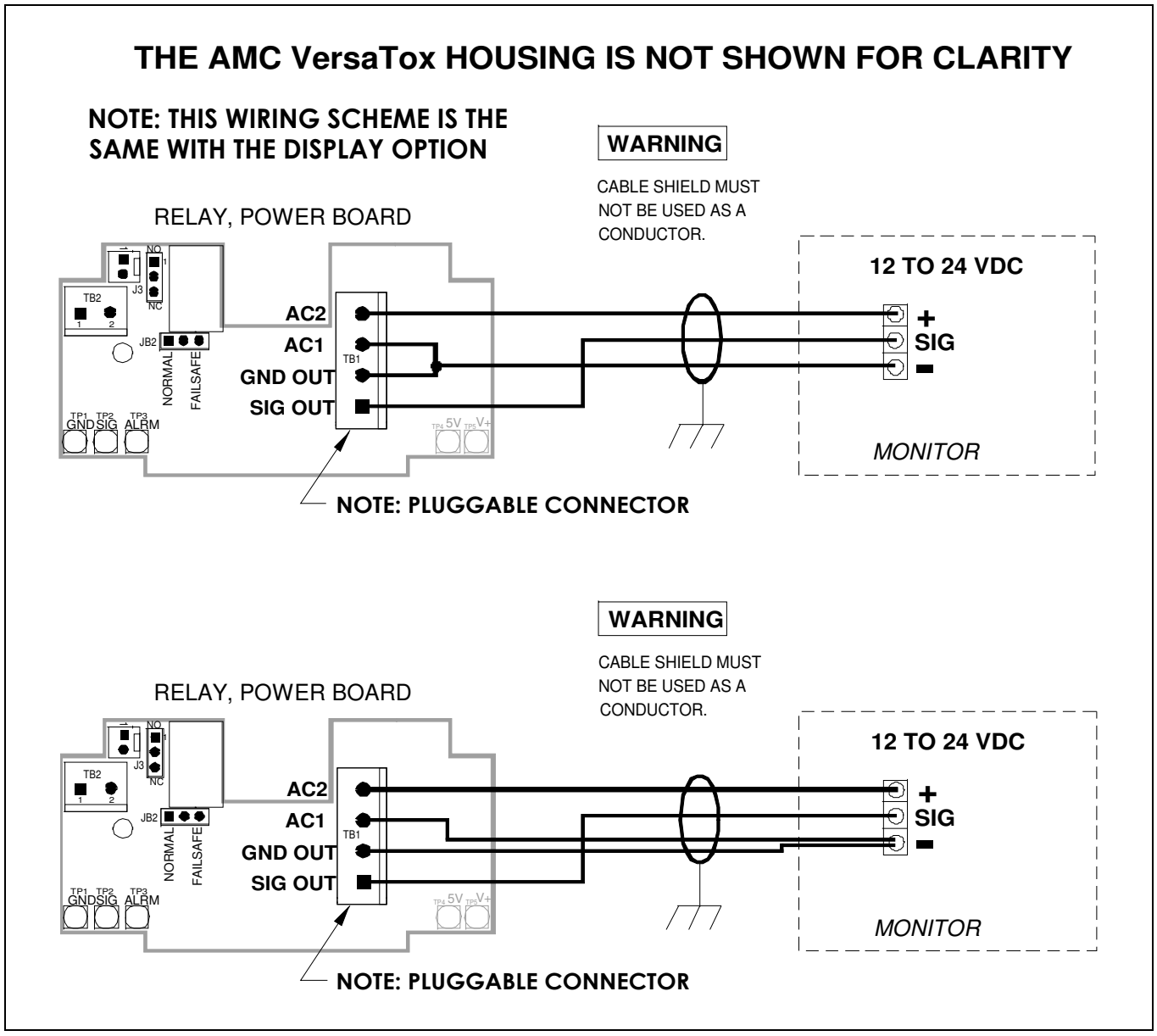

Figure 4-6 DC Transmitter with Relay to AMC Monitor

4.2.1.4 DC Transmitter with Relay to BAS with Power Supply

The AMC-VersaTox with relay, power board option requires a 4 wire connection when interfacing to a BAS. This optional board also has an on-board relay, for relay wiring see section 4.2.2 The AMC-VersaTox with optional display and relay should be connected as shown in Figure 4-7, by four twisted wires in a shielded cable.

For wiring selection, see section 4.3.2.

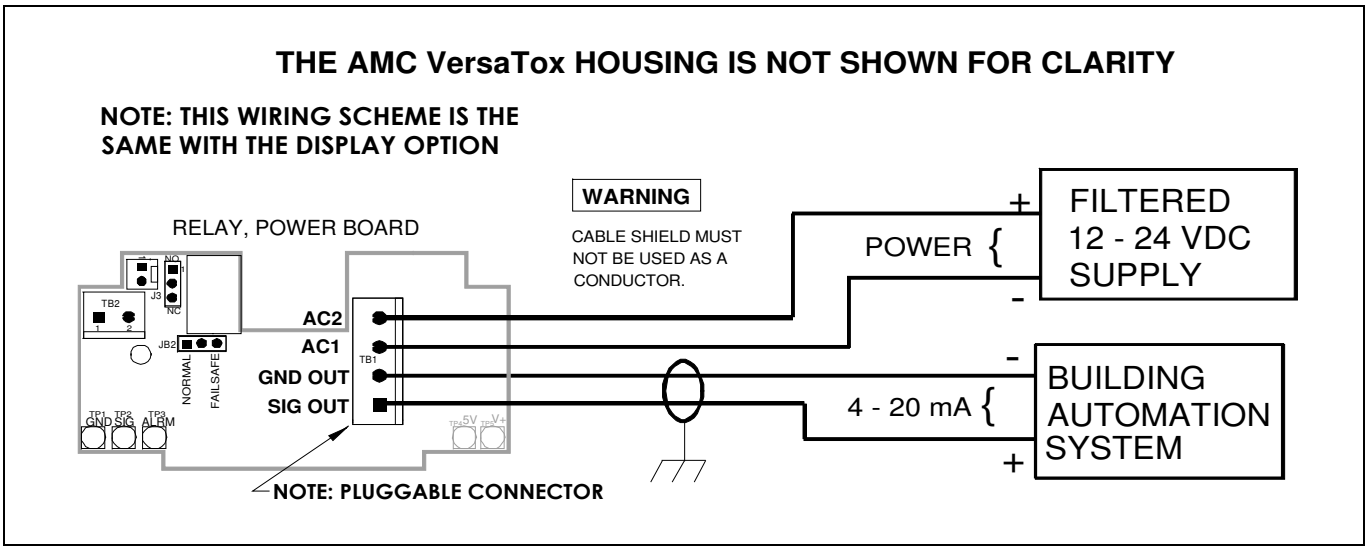

Figure 4-7 DC Transmitter with Relay to BAS with own Power Supply

4.2.1.5 DC Transmitter with relay to Power Supply only (Optional)

The AMC-VersaTox with relay, power board option requires a 2 wire connection when interfacing to a DC power supply. This optional board has an on-board relay, for relay wiring see section 4.2.2. The AMC-VersaTox with optional display and relay should be connected as shown in Figure 4-8, by a twisted pair of wires in a shielded cable.

For wiring selection, see section 4.3.2.

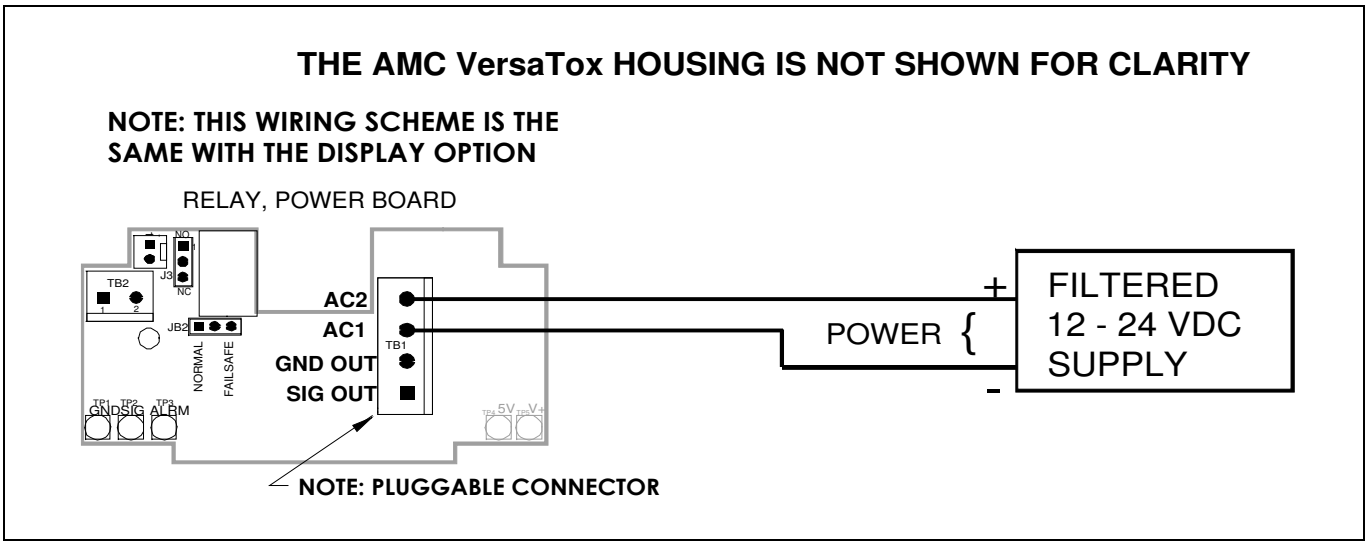

Figure 4-8 DC Transmitter with Relay to Power Supply

4.2.1.6 AC Transmitter with Relay to BAS (Optional)

The AMC-VersaTox can have a 4 wire connection to a BAS with the addition of the relay, power board. This optional board has an on-board relay, for relay wiring see section 4.2.2. The AMC-VersaTox with optional display and relay should be connected as shown in Figure 4-9, by four twisted wires in a shielded cable.

For wiring selection, see section 4.3.3.

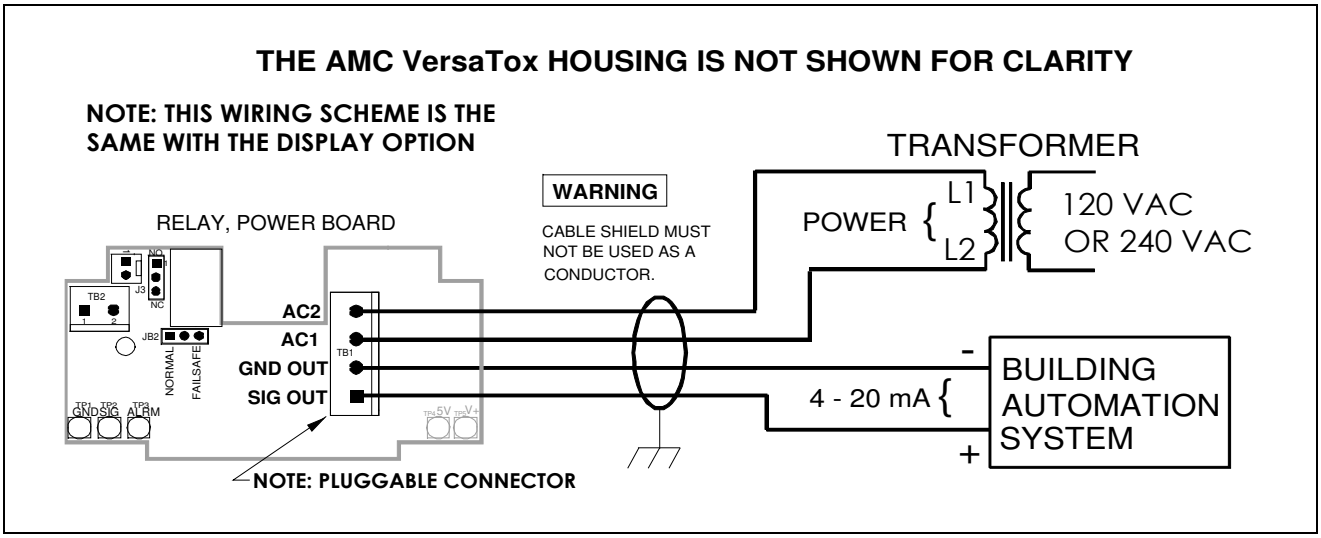

Figure 4-9 AC Transmitter with or without Relay to BAS

4.2.1.7 AC Transmitter with Relay to Transformer only (Optional)

The AMC-VersaTox can have a 2 wire connection to a transformer with the addition of the relay, power board. This optional board has an on-board relay, for relay wiring see section 4.2.2. The AMC-VersaTox with optional display and relay should be connected as shown in Figure 4-10, by a twisted pair of wires in a shielded cable. The transformer employed must be an isolated transformer, with low voltage on the secondary.

For wiring selection, see section 4.3.3.

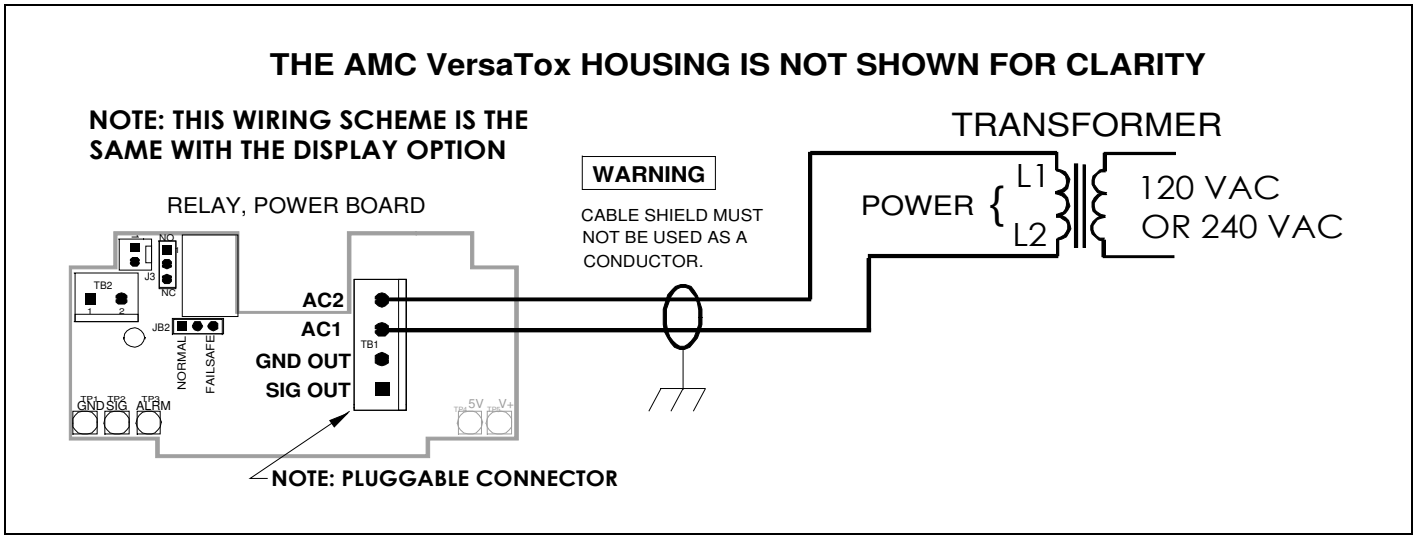

Figure 4-10 AC Transmitter with or without Relay to Transformer

4.2.1.8 120VAC Power Supply with Buzzer (Optional)

The AMC-VersaTox with optional display can be supplied with a RoHS compliant; 60Hz @ 120VAC plug in power supply. The plug in adapter is level V efficiency and outputs 12VDC @ 0.5A max. With this power supply, the relay, power board and buzzer header are included. The buzzer runs on 12VDC @ 20mA, it is factory wired to the buzzer header but can easily be removed by unplugging the connector. The internal wiring is shown in Figure 4-11.

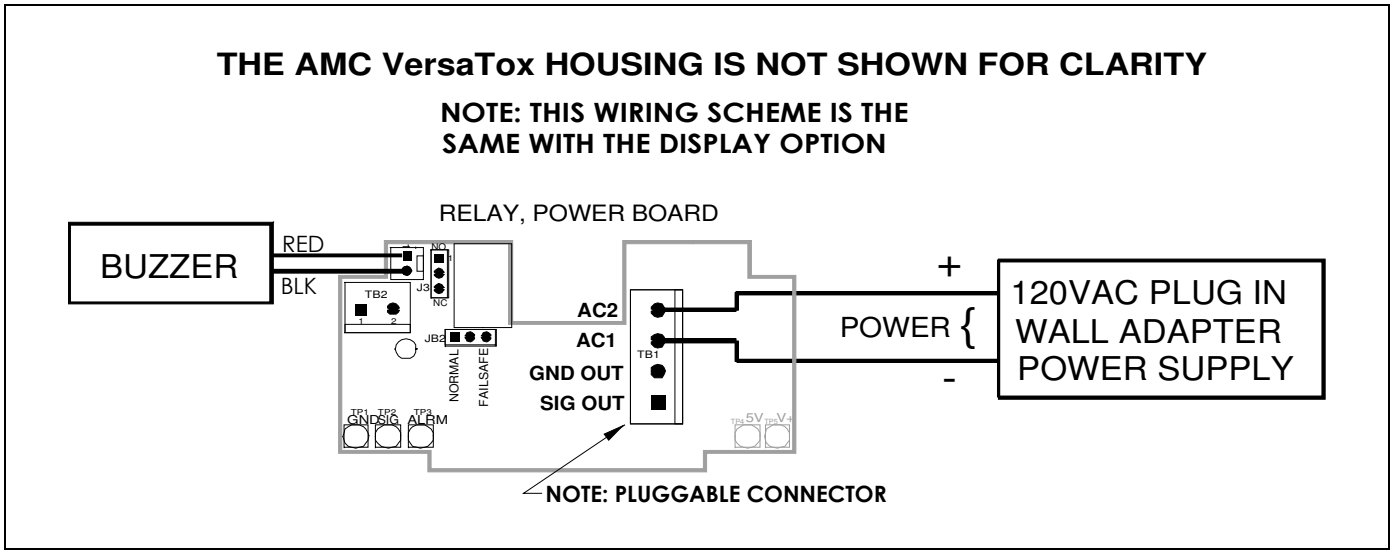

Figure 4-11 120VAC Power Supply with Buzzer

The optional BAS interface is shown in Figure 4-12. For wire selection, see section 4.3.1 and refer to the curve on the graph that matches the plug in power supply output.

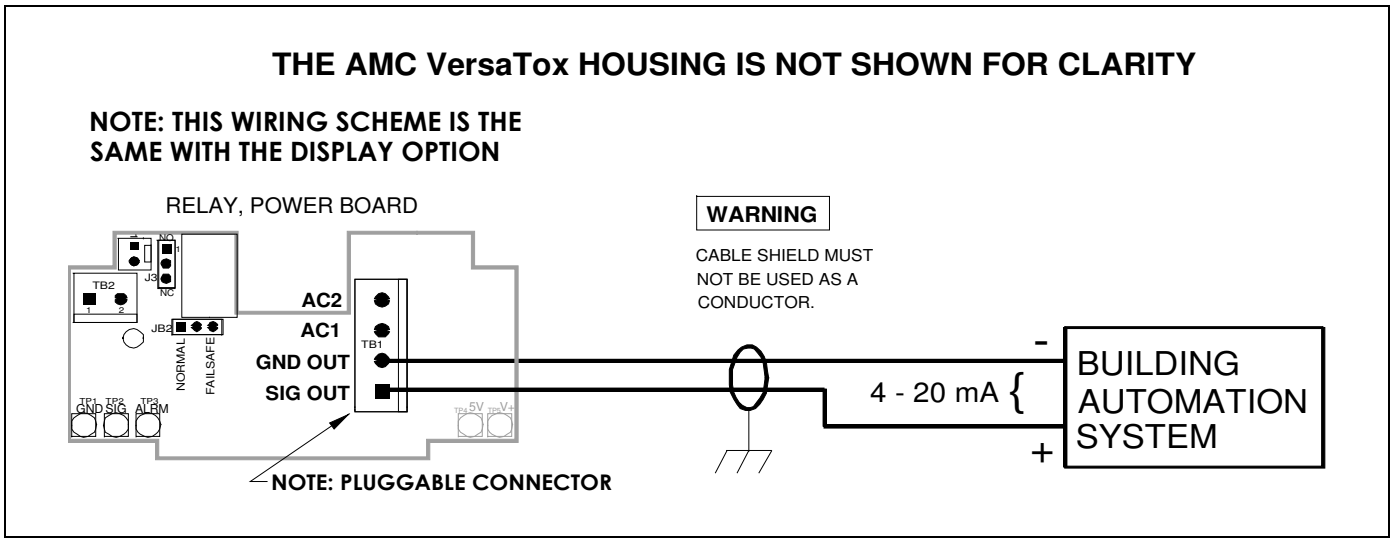

Figure 4-12 Optional BAS interface

4.2.2 RELAY WIRING (OPTIONAL)

When the optional Relay, Power board is added to the AMC-VersaTox, a SPST relay with a 0.50A @ 125 VAC, 1A @ 24 VDC resistive contact rating is included on the board. Figure 4-13 shows the general relay wiring scheme. Refer to Section 5.1.2 for straps settings.

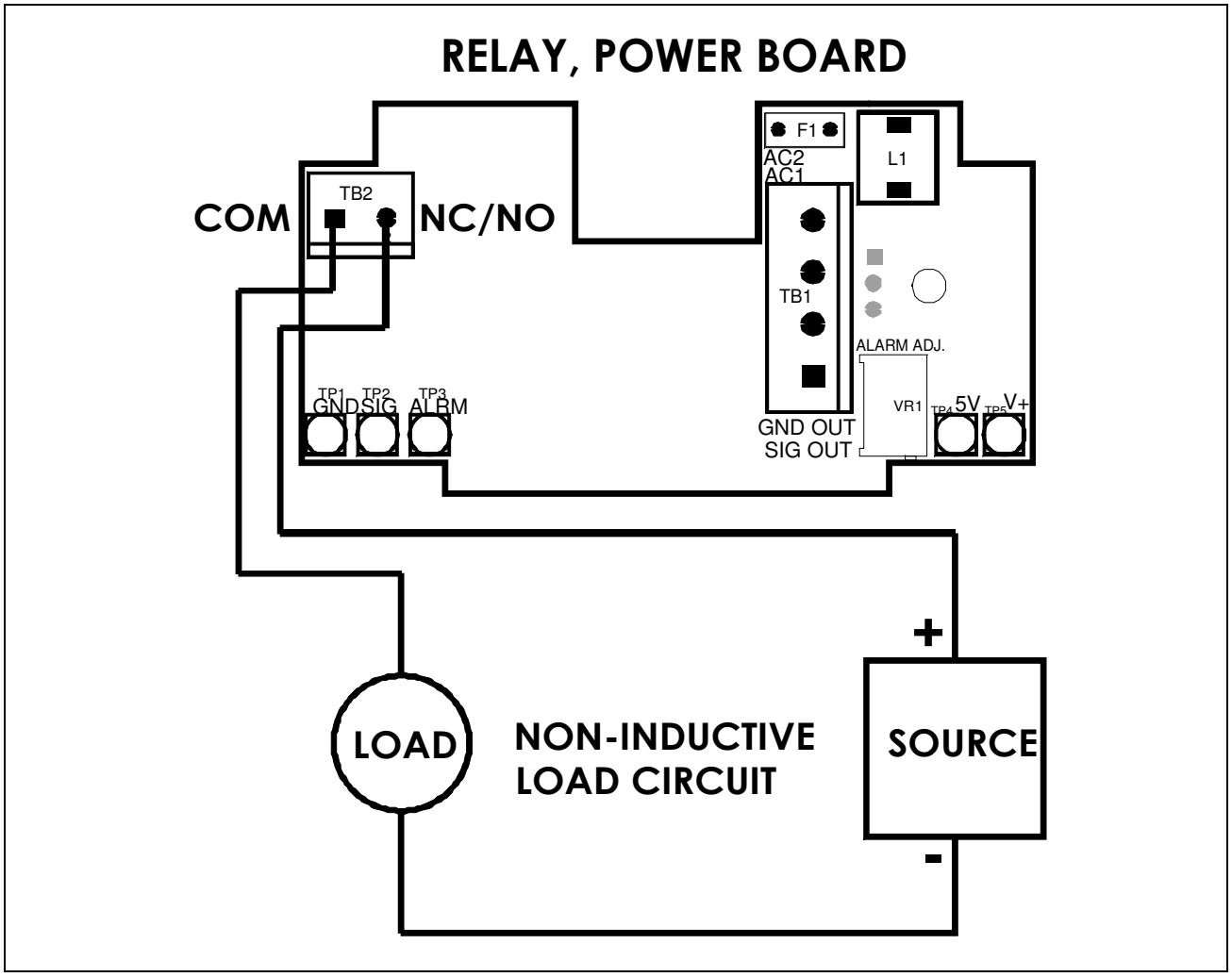

Figure 4-13 Relay Wiring

4.3 CABLE SELECTION

There are three occasions when cable selection is needed; they are explained in the following sub-sections.

4.3.1 2-WIRE 4-20 mA DC POWER LOOP

A two wire conductor, shielded cable is recommended to transmit the 4-20mA signal from the AMC-VersaTox sensor/transmitter to the monitor. The same wire pair is used for both signal and power due to the low power current loop design of the AMC-VersaTox. For best signal transmission and maximum noise rejection, it is recommended to run the cable through steel conduit (the cable shield must be grounded at the monitor or power supply).

Figure 4-14 is an aid for wire selection. There are three variables that determine the maximum cable length; wire gauge, power supply voltage, and load resistor. The purpose of the load resistor is to covert the current signal into a voltage signal. Three common load resistors, 100Ω, 250Ω, 500Ω are used in the graph with 12 and 24VDC power supplies and a wire gauge range from 22 to 16 AWG. All the curves include a safety margin of 0.5VDC. The user must take responsibility for the selection of wire gauge, power supply voltage and load resistor used as the values shown may not be suitable for all applications.

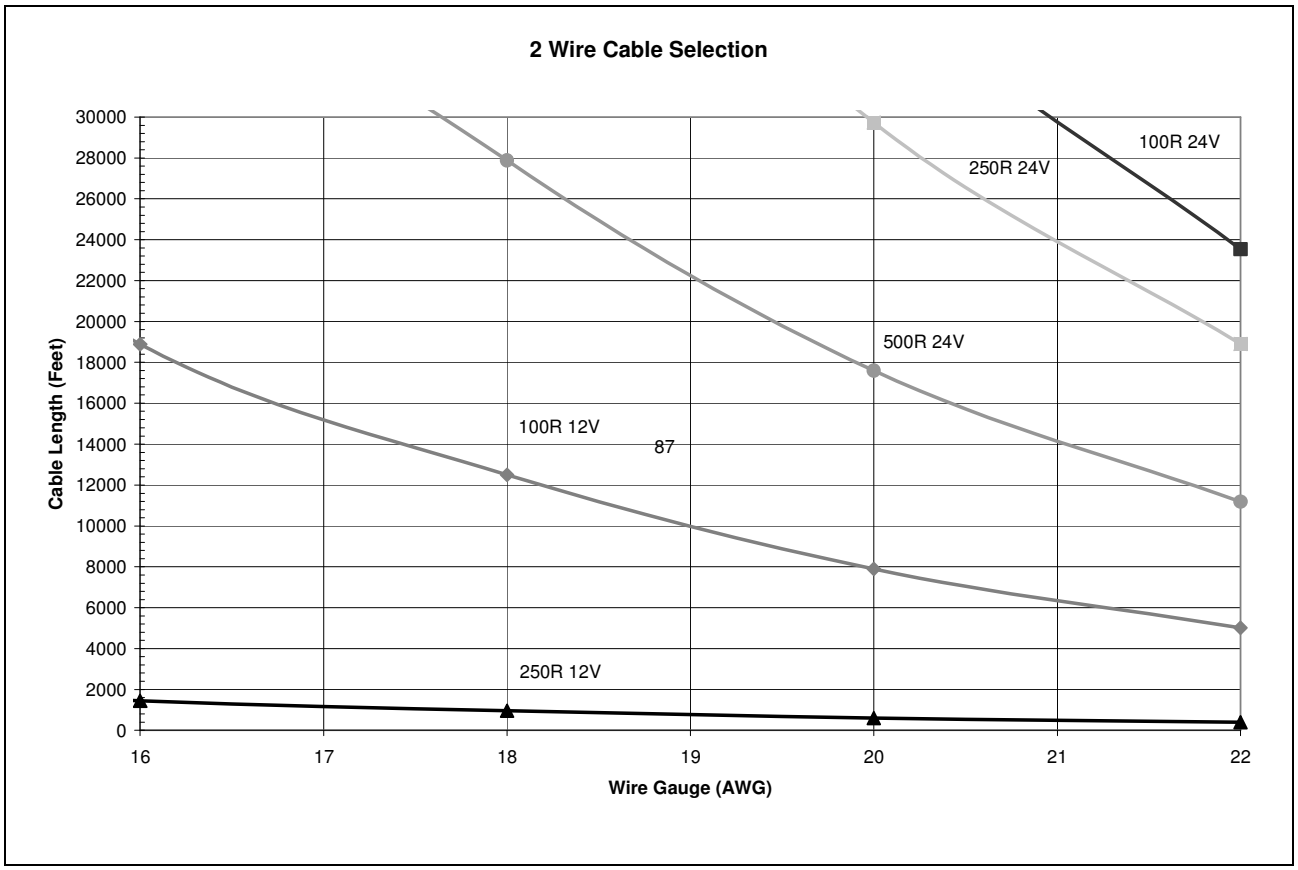

Figure 4-14 2-Wire Cable Selection Graph (Based & V_{SM} = .5 V)

4.3.2 3 or 4 WIRE DC POWER ONLY (OPTIONAL)

Figure 4-15 is an aid for wire selection. It illustrates how short the maximum cable length is when operating at the minimum voltage compared to the much larger cable lengths at higher operating voltages. There are two variables that determine the maximum cable length; wire gauge and power supply voltage. The graph contains min and max DC power supplies and a wire gauge range from 22 to 16 AWG. All the curves include a safety margin of 0.5VDC. The user must take responsibility for the selection of wire gauge and power supply voltage used as the values shown may not be suitable for all applications.

Note: The maximum 4-20mA load is 300Ω.

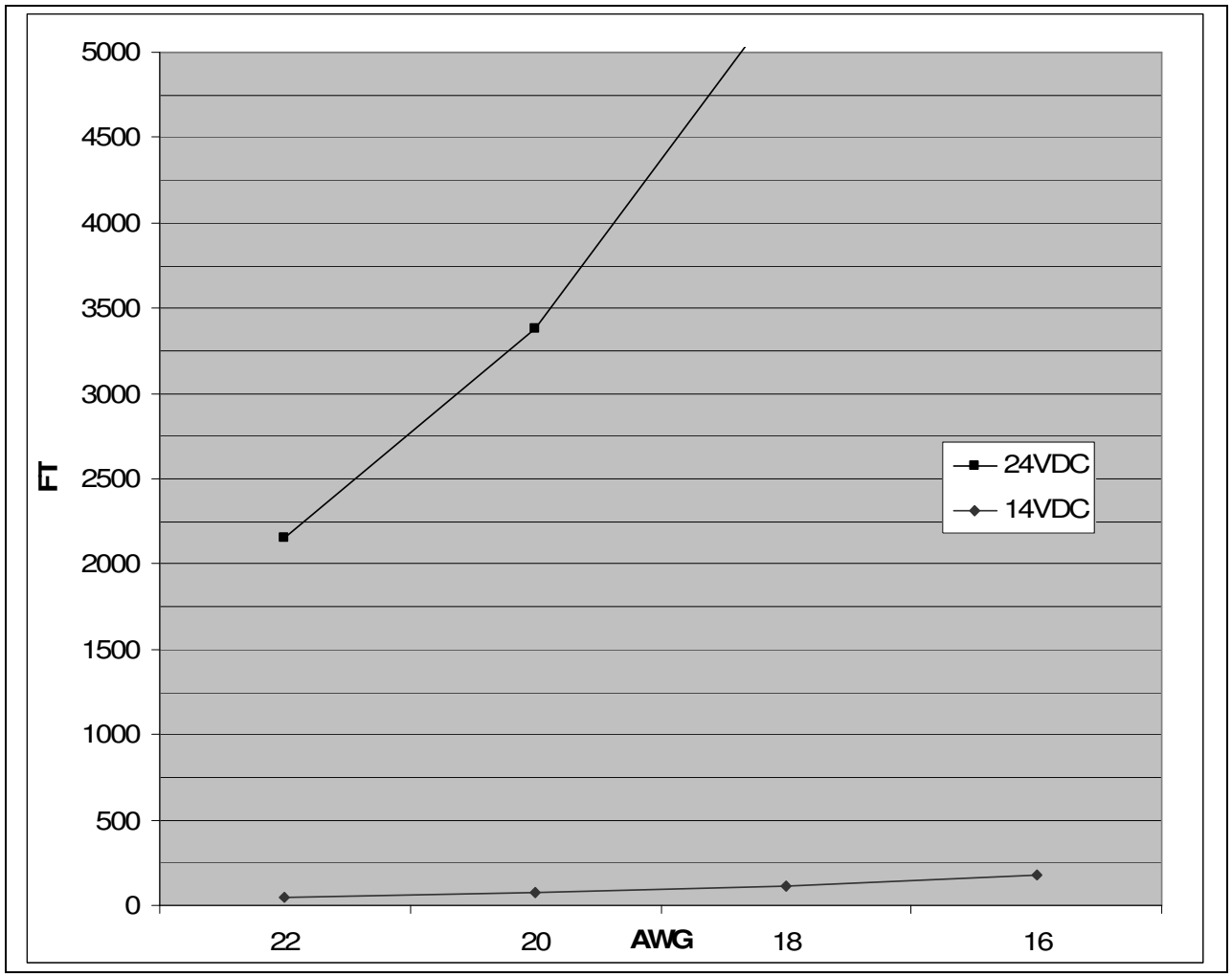

Figure 4-15 4 Wire Cable Selection Graph (Based & V_{SM} = .5 V)

4.3.3 4 WIRE AC POWER ONLY (OPTIONAL)

An AC transformer can either be employed with multiple AMC-VersaTox or have a transformer for every AMC-VersaTox. The maximum wire length for AC power is longer then expressed in the previous figure and is not discussed in this manual.

OPERATION AND CALIBRATION

This section describes how the functionalities of the AMC-VersaTox are operated and performed. There are three sections that follow.

5.1 OPERATION

The operation of this product is quite straight forward and user friendly. The operation is divided into three main sections discussed below.

5.1.1 TRANSMITTER

The AMC-VersaTox sensor/transmitter is factory calibrated for the gas listed in the Product Information (Section 2) at the beginning of this manual. The sensor/transmitter should not require re-calibration when first installed and powered up, but a test for correct operation is recommended after a stabilization period of 30 minutes.

In clean air, after the stabilization period, the transmitter should be sending a signal of approximately 4 mA to the monitor or controller (except oxygen). Although the electrochemical sensors are very selective, there are some interference gases, which can cause a response from the sensor. In the case of large signal variations (in a clean air environment), check for an installation problem or the possibility of an interference gas being present.

5.1.2 RELAY, POWER BOARD (OPTIONAL)

In the 4 wire AC or DC power interfaces the relay power board is required; it also contains an on-board relay. The power LED indicates that the board is powered on. The wiring for all the variances are described in sections 4.2.1.3 to 4.2.1.8 and the wiring for the relay is found in section 4.2.2. The relay has a user selectable alarm trip point; see section 5.3 for setup instructions. Once the detected gas concentration goes over the selected alarm trip point, the relay is energized and the alarm LED is illuminated. The relay will only go out of alarm when the gas concentration is below the trip point. The alarm trip point hysteresis size is ±2.5% of the selected trip point. This hysteresis window allows the alarm relay to fluidly switch between on and off, without chattering, when the gas concentration is within the desired trip point. The version of the AMC-VersaTox with the 120VAC plug in power supply is equipped with a factory installed alarm controlled buzzer.

The Alarm Relay's operation can be set by strapping JB2 for either 'normal' or 'failsafe'. Normal operation starts with the relay de-energized and energizes upon alarm. Failsafe operation sets the relay energized, then de-energizes with an alarm signal. The Failsafe feature is desirable for use if a power outage occurs the relay will be in an alarm condition.

The Alarm Relay Terminal Block's contacts can be configured for normally-open (NO) or normally-closed (NC), using the alarm relay selector. The alarm relay selector is a pin header with a moveable strap for selecting the contact configuration. There are two positions on the selector; move the strap to the center of the board for NC and to the edge of the board for NO.

Refer to Figure 5-1 for layout of straps.

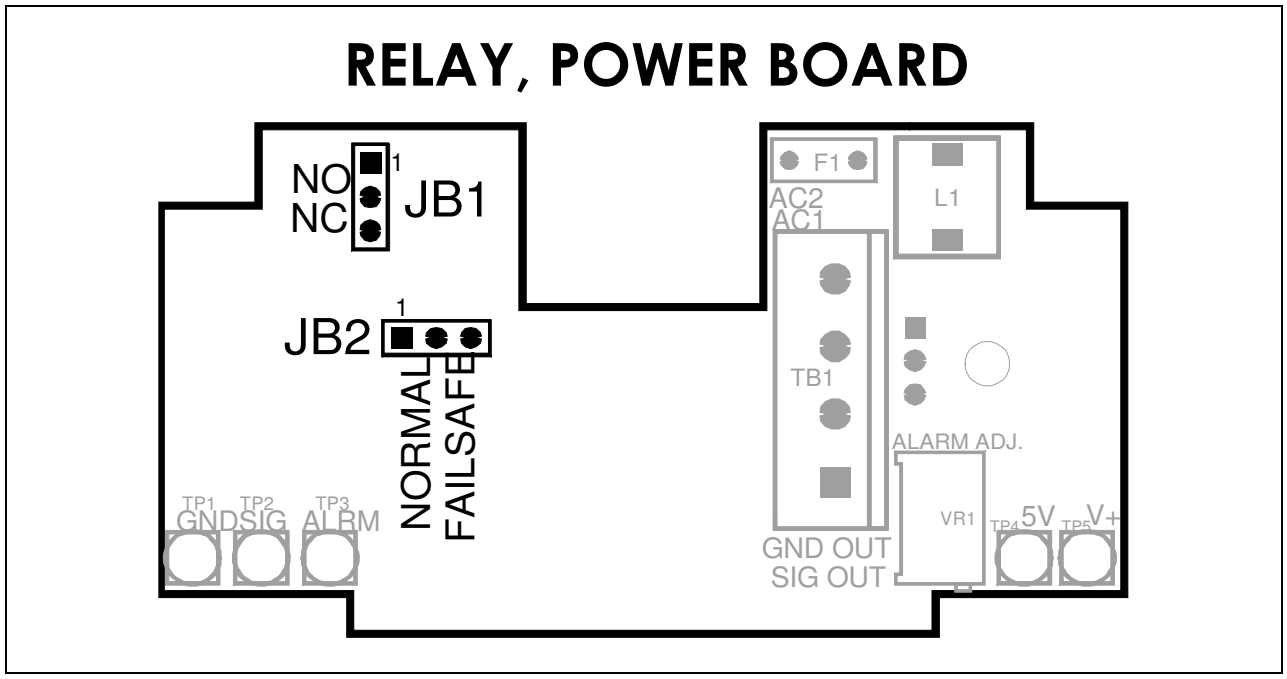

Figure 5-1 Relay Board Straps

5.1.3 DISPLAY BOARD (OPTIONAL)

The AMC-VersaTox is available with an optional display. The display depicts the gas concentration with a 2 second delay in the assigned engineering units.

At power up, the display runs through the following sequence:

- Indicates the software version
- Performs a segment test by counting from 0 to F for each of the three digits
- Displays the configured range
- Displays the detected level
- Zero Buffer of 5%
- 2 second averaging function

Again, it is recommended to have a 30 minute stabilization period before a test for correct operation is performed.

Note:

When the gas concentration exceeds the calibrated range then the display will alternate between the reading value and the letters "OFL" for overflow.

5.2 CALIBRATION

This calibration procedure is suitable for all versions of the AMC-VersaTox.

Every AMC-VersaTox sensor/transmitter is factory calibrated, so each unit should be ready for operation after installation and a 30 minute stabilization time.

Subsequent calibration is required as a part of regular maintenance, and when replacing the sensor. See the Maintenance section of this manual for the recommended calibration schedule.

Caution:

- Only qualified personnel should perform the actual calibration.
- Users new to gas calibration are advised to consult with Armstrong Monitoring

The Armstrong Monitoring Corporation offers the following calibration plans:

1. Factory pre-calibrated replacement sensor/transmitter units
2. On site installation and calibration by Armstrong Monitoring
3. On site calibration by Armstrong Monitoring
4. Training by Armstrong Monitoring
5. Extended warranty calibration program

5.2.1 ON SITE CALIBRATION EQUIPMENT REQUIRED

For qualified personnel, the following is a recommended list of calibration equipment required.

- A digital multi-meter with ranges of 20.0 mA or more and 200 mV or more.
- A “Remote Calibration Lead” (P/N 2900-01) for the above meter (available from AMC)
- A set of “clip on” type test leads for the above meter
- Miniature screwdriver trimmer adjustment tool
- Calibration adapter, available from AMC
- Zero & Span gases (contact AMC for information)
- Clean, low static cloth or tissue to cover sides of sensor during calibration

5.2.2 CALIBRATION PROCEDURE

The transmitter is equipped with a remote calibration feature allowing for one-man calibration at the transmitter location. The transmitter output is measured using the plug-in type “Remote Calibration Lead”. In most cases it is only Zero and Span adjustments that are made in field calibrations.

Note:

The calibration procedure may cause false alarm and/or signal loss to the monitor. Appropriate precautions may be required.

Refer to Figure 5-2 to perform the following calibration procedure:

1) Remove cover from transmitter housing.

2) Plug in “clip on” type test leads fully into jacks on multi-meter and clip onto the edge of the transmitter board on the test points COM TP11 and SIG TP12 as shown in figure.

3) Switch-ON multi-meter and select DC volts range to read greater than 1.00 VDC.

4) Cover the sides of sensor with a clean cloth or similar to prevent a draft on the sensor.

5) Apply a Zero gas sample or with the sensor in clean air, with a calibration adapter cup firmly and completely over the sensor opening on side of AMC-VersaTox for 2 minutes with a flow rate of 0.5 to 1 liters per minute.

6) After 2 minutes adjust the Zero trimmer for a stabilized zero reading of 0.00 VDC measured at the test points (TP11, TP12.) see Figure 5- (except oxygen).

7) Unplug test leads and connect “Remote Calibration Lead” to multi-meter. The BLACK lead to negative or common (-) and the RED lead to positive (+)

8) Insert plug end of “Remote Calibration Lead” fully into CAL jack on the transmitter.

9) Select DC milliamp range on the multi-meter to read greater than 20 mA full scale.

10) Apply the Span gas sample, with a calibration adapter cup firmly and completely over the sensor opening on side of AMC-VersaTox for 2 minutes with a flow rate of 0.5 to 1 liters per minute. The span gas sample need not be the full scale concentration but could be a fraction of this. Since the transmitter output range is 4-20 mA, a full scale concentration should register 20 mA after a few moments exposure. A half scale concentration, accordingly, should provide 12 mA and so on.

11) After 2 minutes adjust the Span trimmer for the correct Span current reading.

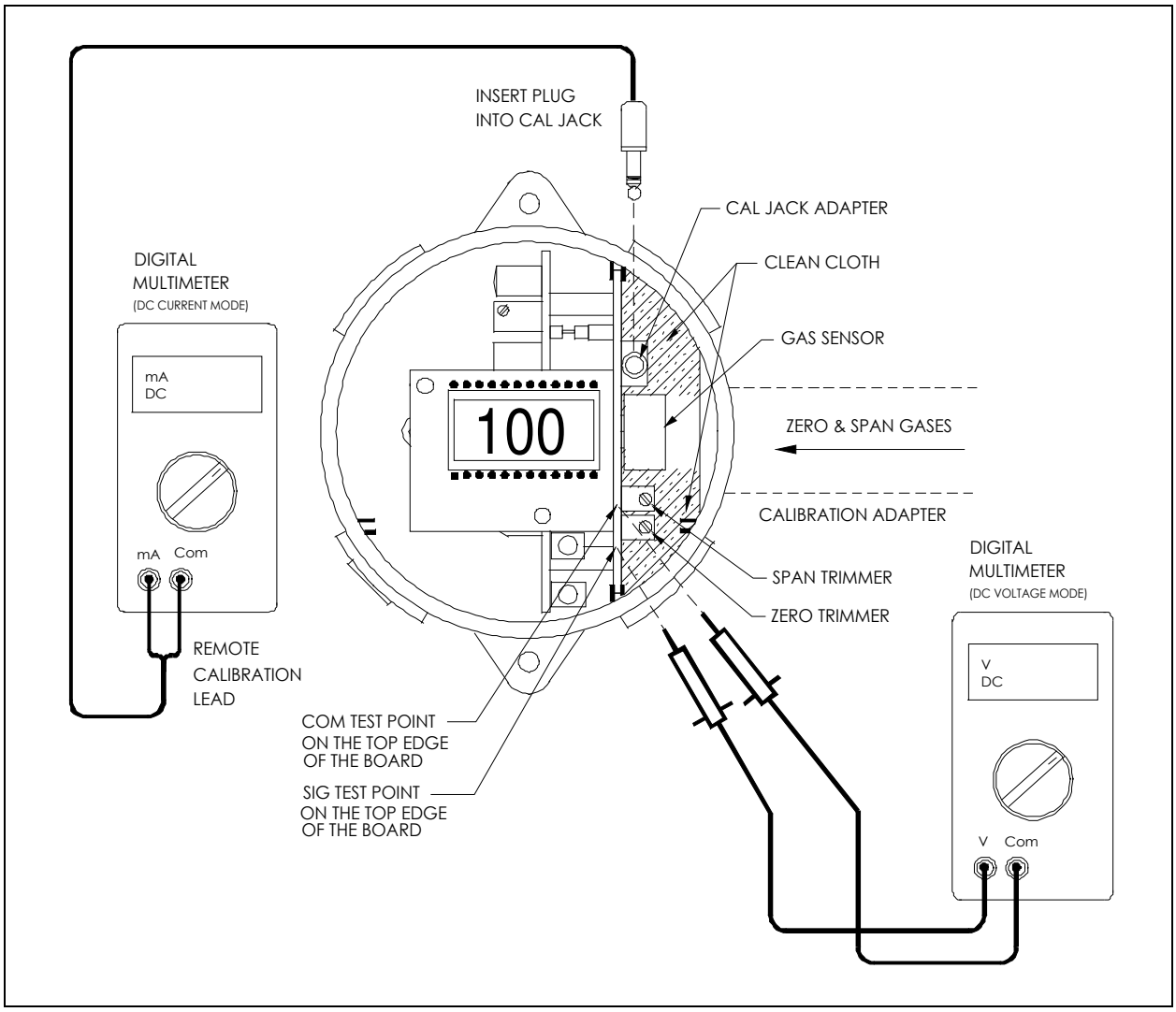

Figure 5-2 Calibration Procedure

5.3 ALARM RELAY TRIP POINT SETTING

The alarm relay trip point is user settable. The trip point is settable within the full range for the sensor. Zero concentration is 0.4 VDC and full scale concentration is 2.0 VDC. If the desired trip point is half scale, the alarm would be set at 1.2 VDC. Below are a table and a graph that depict commonly used PPM ranges.

Alarm Relay Trip Point Procedure

1. Determine the trip point in volts using either the table or graph below.
2. Switch-ON multi-meter and select DC volts range to read greater than 1.00 VDC.
3. Connect multi-meter to relay, power board as shown in Figure 5-.
4. Adjust the Alarm Adjust trimmer to the desired trip point.

Alarm Relay Trip Point Selection Table

	Volts	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
100% Full Scale	2.0	1	3	10	25	50	100	200	300	400	500	999
75% Full Scale	1.6	0.75	2.25	7.5	18.75	37.5	75	150	225	300	375	749.25
50% Full Scale	1.2	0.5	1.5	5	12.5	25	50	100	150	200	250	499.5
25% Full Scale	0.8	0.25	0.75	2.5	6.25	12.5	25	50	75	100	125	249.75
0% Full Scale	0.4	0	0	0	0	0	0	0	0	0	0	0

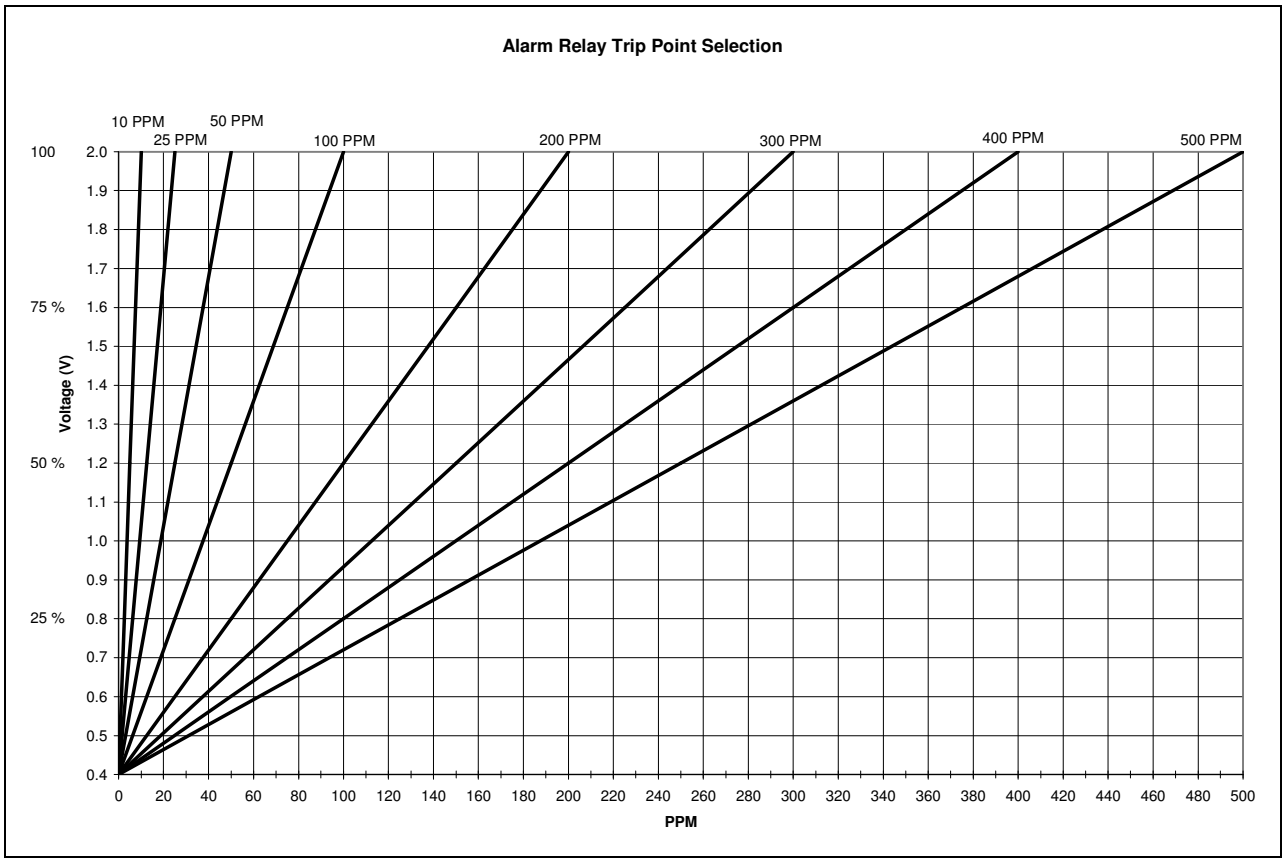

Figure 5-3 Alarm Relay Trip Point Section Graph

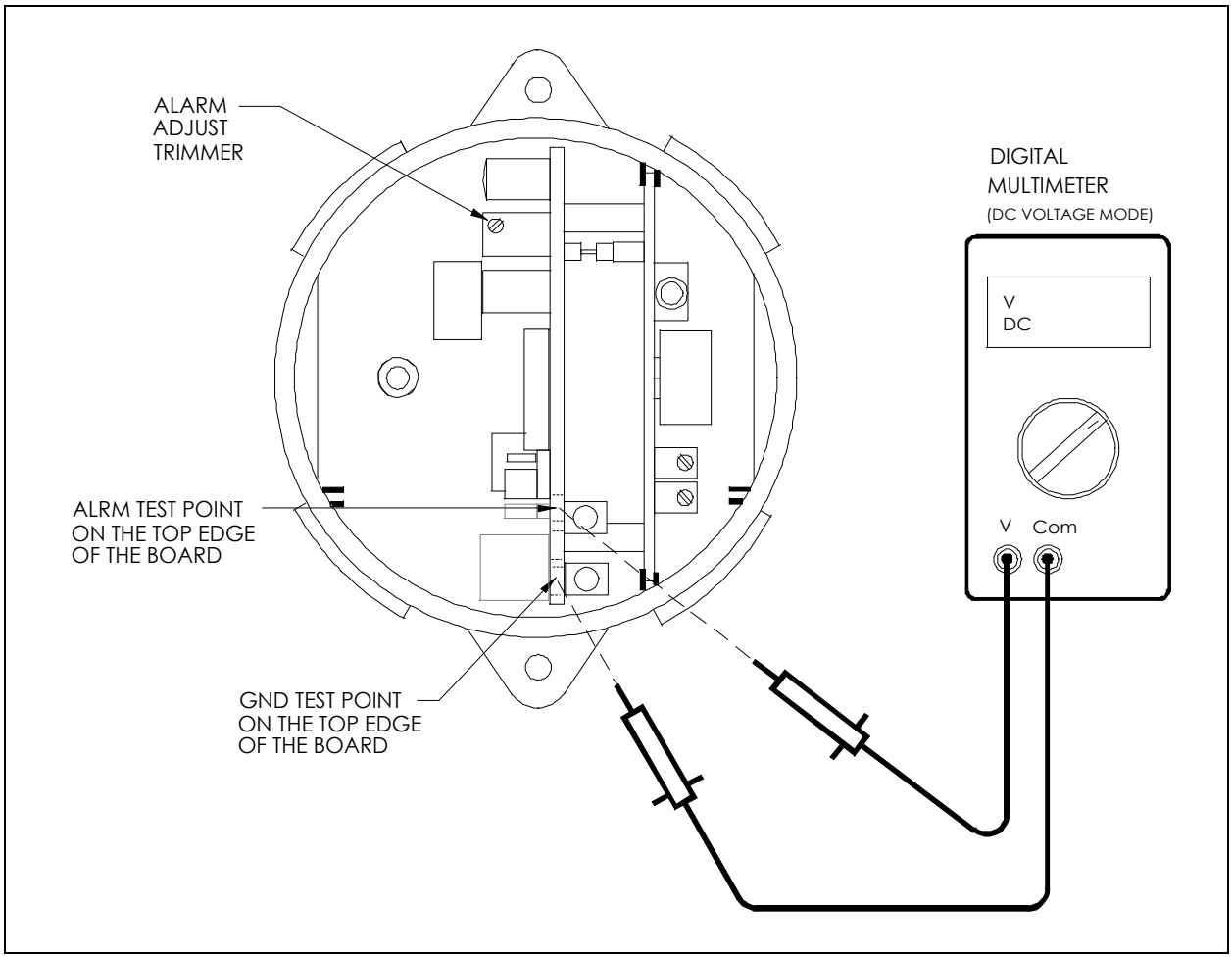

Figure 5-4 Alarm Relay Trip Point Procedure

6 MAINTENANCE

Maintenance is a very important activity that should be done at the proper time intervals, which are discussed below.

6.1 GENERAL

Verification of operation should be done at least once every 6 months. For highly demanding applications more frequent verification is recommended.

The AMC-VersaTox sensor/transmitter unit should be brushed or wiped as required, depending on the rate of accumulation of any dust or dirt.

To avoid sensor damage, the unit MUST NOT be submerged in any liquids. Hosing or splashing of the unit with any liquids must also be avoided.

6.2 SCHEDULED CALIBRATION

Scheduled calibration is critical in maintaining proper function of gas sensor/transmitters.

It is recommended that the AMC-VersaTox be calibrated a minimum of twice a year.

As mentioned, Armstrong Monitoring offers a number of different maintenance plans to suit your requirements see section 5.2.

6.3 SENSOR/TRANSMITTER REPLACEMENT

When its signal is greatly reduced or unstable, the sensor/transmitter replacement is required; see section 2.1 for replacement sensor P/N.

6.3.1 Installation/Replacement of extruded sensors

To access field wiring for the VersaTox

1. Remove AMC VersaTox Lid
2. Unscrew Terminal Adapter Housing for Sensor
3. Remove sensor with needle-nose pliers, or equivalent

Note: Use extreme caution when handling sensor, sensor should be removed with ease as to not bend/break the pins

4. Remove VersaTox Transmitter/Display/Relay Module from housing, refer to section 4.2 for wiring

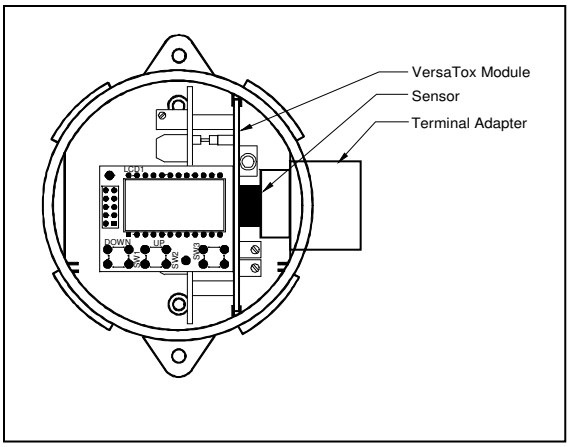

Figure 6-1 VersaTox Transmitter with an extruded Sensor

Please note that in some instances the sensor itself is not replaceable. The circuit card with the sensor is replaced, please contact the factory.

Caution:

It is recommended to turn off the power to the sensor/transmitter before replacing the board.

Note:

30 minutes is required for a new sensor to stabilize before calibration.