



# V8500

## Sensor/Transmitter

### INSTRUCTIONS

#### **AMC-V8500 Infrared Sensor/Transmitter For Refrigerant Gas**

INSTALLATION AND OPERATING INSTRUCTIONS  
FOR THE AMC-V8500 INFRARED SENSOR TRANSMITTER

#### **IMPORTANT:**

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

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**NOTE**

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## **1 WARRANTY**

The AMC-V8500 transmitter is warranted against defects in material and workmanship for a period of one (1) year from date of shipment. During the warranty period, The Armstrong Monitoring Corporation will repair or replace components that prove to be defective in the opinion of AMC. We are not liable for auxiliary interfaced equipment, or 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 such failure is due to misuse or conditions of use.

### **1.1 LIABILITY**

All AMC products must be installed and maintained according to instructions. Only qualified technicians 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.

### **1.2 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.

### **1.3 PRODUCT RETURN**

All products returned for warranty service will be by prepaid freight and they will only be accepted with an R.M.A number issued by AMC. All products returned to the client will be freight collect.

### **WARNING**

<p><b>USING ELECTRICALLY OPERATED EQUIPMENT NEAR GASOLINE, OR GASOLINE VAPOURS MAY RESULT IN FIRE OR EXPLOSION, CAUSING PERSONAL INJURY AND PROPERTY DAMAGE. CHECK TO ASSURE THE WORKING AREA IS FREE FROM SUCH HAZARDS DURING INSTALLATION OR WHEN PERFORMING MAINTENANCE, AND USE PROPER PRECAUTIONS.</b></p>
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## 2 PRODUCT INFORMATION

### 2.1 SENSOR MODULE

Transmitter Part Number .....	_____
Sensor Warranty Period .....	One (1) year
Power Supply Requirement .....	14 to 24 VDC
Operating Temperature .....	5°c to 40° C
Operating Pressure .....	Ambient atmospheric pressure
Relative Humidity .....	5% to 95% RH, non-condensing

### 2.2 FACTORY CALIBRATION

Gas Type ..... \_\_\_\_\_

**Note:**

All Armstrong Monitoring systems must be installed and maintained according to instructions, to ensure proper operation. Only qualified technicians should install and maintain the equipment.



### 3 PRODUCT DESCRIPTION

In this section gives a general product description followed by a detailed list of the AMC-V8500 unit's internal features.

#### 3.1 GENERAL DESCRIPTION

The AMC-V8500 sensor/transmitter provides continuous, reliable surveillance of surrounding air for traces of refrigerant compounds. This sensor/transmitter sends a linear 4-20 mA variable current signal to the monitor. This unit is factory calibrated and is ready for field installation and operation.

##### 3.1.1 INTERNAL FEATURES

The sensor/ transmitter features alarm indicators, adjustment trimmers and connection terminal blocks, as listed and described below.

- |                              |   |
|------------------------------|---|
| 1) Sensing Method            | Non-Dispersive Infrared diffusion gas                               |
| 2) Calibration Gas           | R-22  |
| 3) Range:                    | 0-3000 ppm  |
| 4) Accuracy:                 | +/- 5% of reading from 1500- 3000 ppm<br>+/- 75 ppm from 0-1500 ppm |
| 5) Repeatability:            | +/- 1% of full scale  |
| 6) Power Requirement:        | 14.0 to 24.0 VDC, filtered  |
| 7) Available Output Signals: | 4-20 mA and 0-5 Volts   |
| 8) Operating Temperature:    | 5 to 40°C (41 to 104°F)   |
| 9) Ambient Humidity:         | 5% to 95% RH (non-condensing)                                       |
| 10) Weight:                  | Less than 2.5 pounds (1.1 kg)                                       |

#### NOTE:

<b>Turn off the power supply before removing or replacing the transmitter.</b>
--



## 4 INSTALLATION

This section relates to the proper installation of the AMC-V8500 Sensor/transmitter. The topics of proper location, sensor wiring selection, and unit interconnection is all discussed in detail.

### 4.1 LOCATION AND MOUNTING

Care should be taken to securely fasten the enclosure to a solid, vertical, non-vibrating surface or structure in an area where the local concentration of gas is unaffected by the presence of ventilation systems. Mount the unit via the four (4) holes in the base half of the enclosure.

To install the transmitter, remove the two (2) screws and pull out the cover/transmitter assembly. This will expose the terminal strip for wiring. Mount the base half of the enclosure and connect to the conduit. Make wiring connections to the transmitter using 3-conductor, shielded cable and run the wiring through steel conduit for best signal transmission and maximum noise rejection (connect shield to conduit at monitor). Knockouts are provided in the enclosure for conduit connection.

**NOTE: Mounting arrangement of the housing depends on the location and mounting surface. Mounting hardware is NOT supplied.**

### 4.2 WIRING OF THE UNIT

The system operates on 14 to 24 VDC. Signal output and 14-24VDC connections are made at terminal block TB1 (see Figure 1) located inside the enclosure at the top edge of the circuit board. The following chart shows the terminal block connections:

1. Positive (+) 14-24VDC Power input.
2. Ground Common, return for 14-24VDC.
3. Positive (+) 0-5V signal output.
4. Ground: Common, return for 4-20mA and 0-5V
5. Positive (+) 4-20mA Signal output.

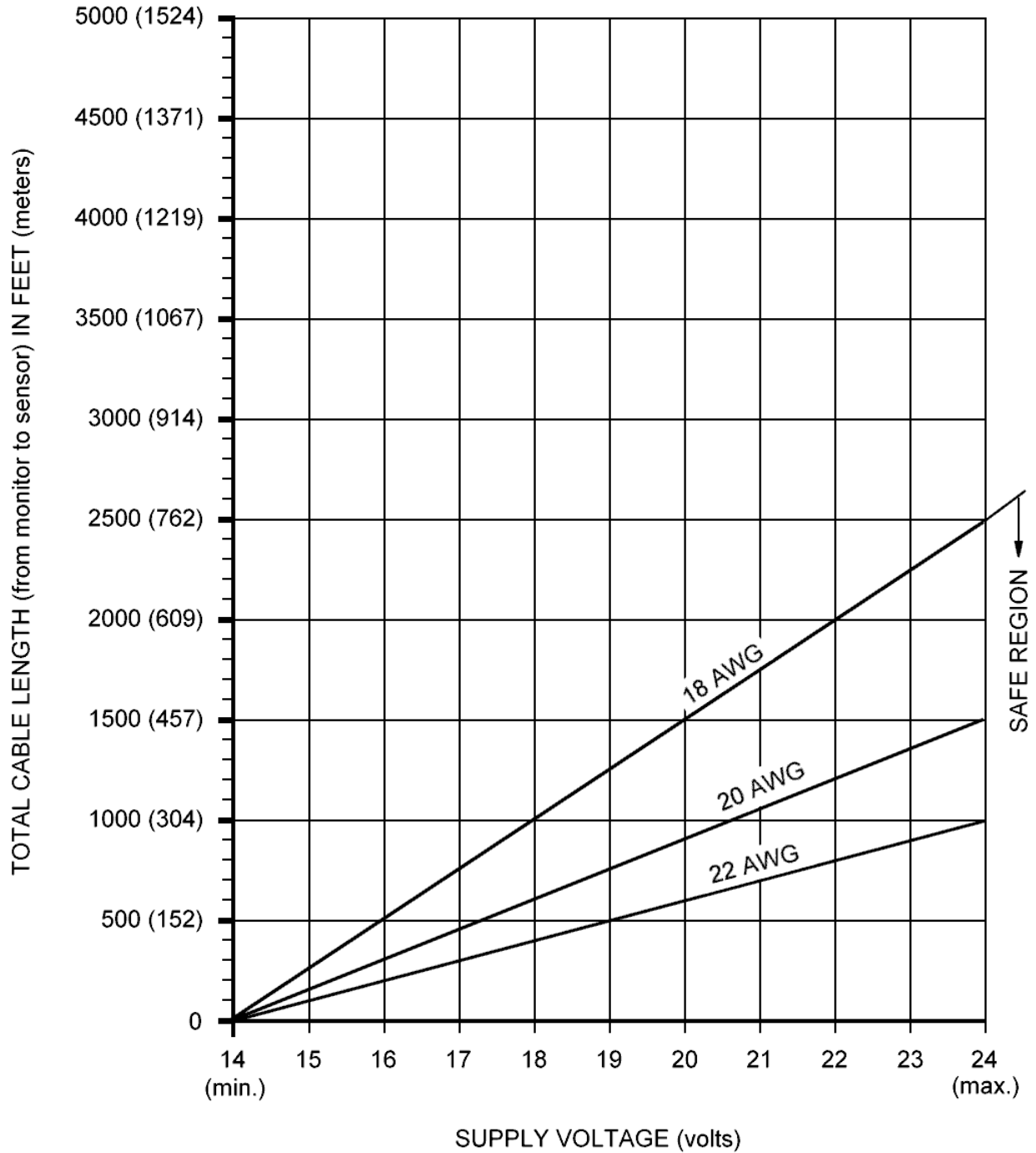
#### 4.2.1 CABLE SELECTION

Make connections using multi-conductor shielded cable. Run cable through steel conduit for best signal transmission and maximum noise rejection. (Connect cable shield to conduit at monitor). The following chart lists the maximum distances the transmitter may be located from the monitor for various cable sizes (Refer to the chart on the next page).





**V8500 @ 0.3 Amps**



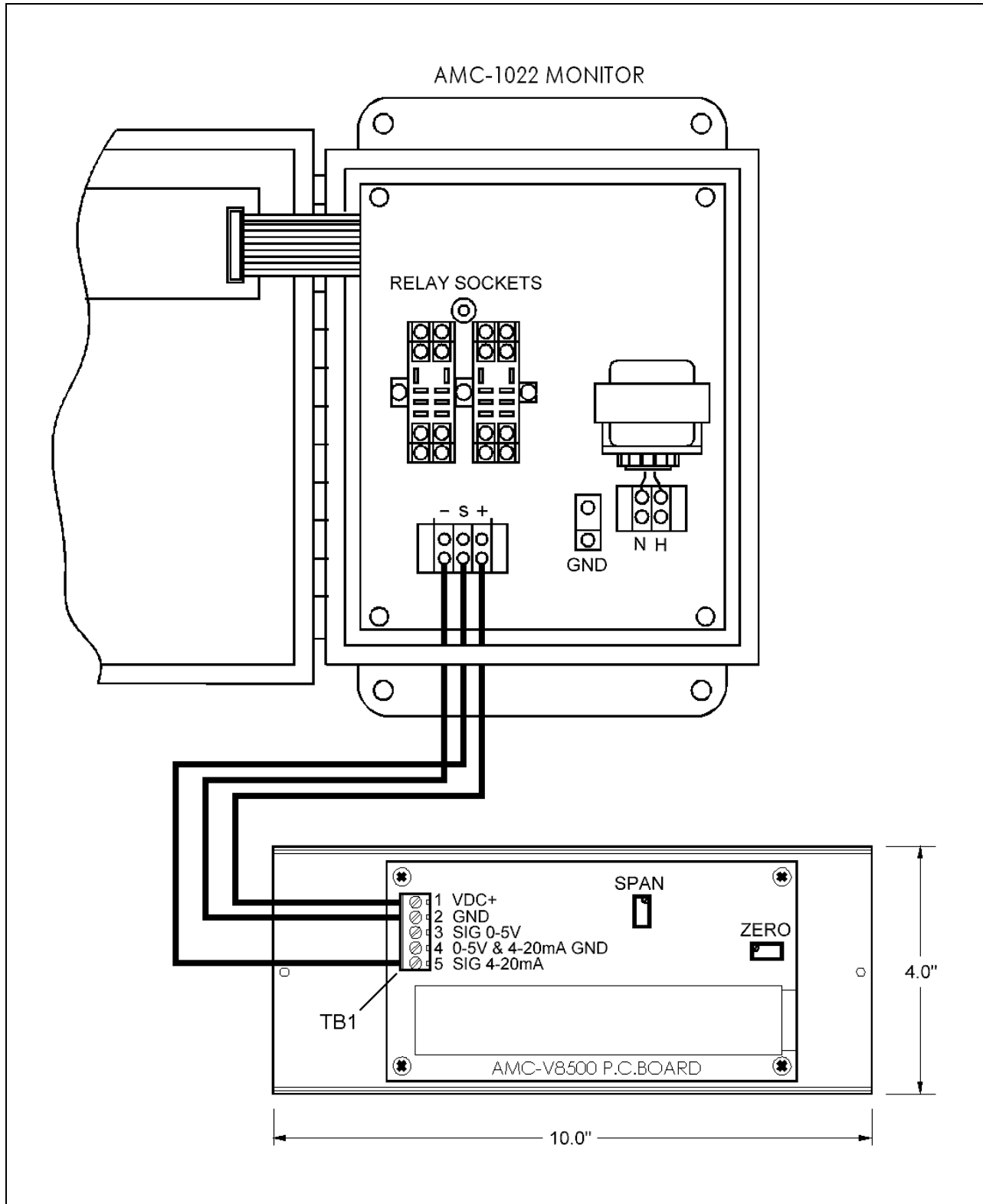


FIGURE 1: Wiring of the AMC-V8500 to an AMC-1022.



#### 4.2.2 ANALOG OUTPUT.

The V8500 sensor/transmitter unit can be interfaced with others controls equipment utilizing the analog output (consult AMC factory).

There are two (2) available signal outputs from the transmitter; a 4 to 20 milliamp DC current and a 0 to 5 volt DC voltage. They can be connected to measuring or recording devices if required. If both signal output are used, separate wires are necessary for connection.

## 5 OPERATION AND CALIBRATION

This section covers instructions for the proper operation and calibration of the AMC-V8500 unit. The operation principles are described in further detail, followed by different types of periodic adjustments that might be required throughout the lifetime of the equipment.

### 5.1 OPERATION

#### NOTE

<b>BEFORE turning on the main power to the monitor, MAKE SURE all connections are properly made.</b>
--

Only a few minutes are required for stable operation as each unit is fully calibrated at the factory.

### 5.2 CALIBRATION

The monitor contains NO user-serviceable parts. If for any reason the unit malfunctions, call the factory for troubleshooting or servicing instructions.

If the accuracy of the unit becomes suspect, calibration can be verified using Armstrong's calibration kit P/N AMC-2606.

This unit is normally calibrated for **R-22**. The following table provides relative responses to other refrigerant gases.

#### 5.2.1 CALIBRATION SET-UP PROCEDURE

Assemble the gas cylinder, control valve (0.5 Liters/minute) and hose, as shown in the in the CK2606 calibration kit. Then, insert the end of the sensor's calibration tubing into the end of the hose from the gas cylinder. The unit is now ready to calibrate.



### 5.3 CALIBRATION CHART

3000 ppm & 5 volt full scale

Gas in ppm	Output in volts	±5% of Reading		4-20 mA output	±5% of Reading		Gas in ppm	Output in volts	±5% of Reading		4-20 mA output	±5% of Reading	
		Max.	Min.		Max.	Min.			Max.	Min.		Max.	Min.
0	0.000	0.125	-0.125	4.00	4.40	3.60	1550	2.583	2.708	2.458	12.27	12.67	11.87
50	0.083	0.208	-0.042	4.27	4.67	3.87	1600	2.667	2.792	2.542	12.53	12.93	12.13
100	0.167	0.292	0.042	4.53	4.93	4.13	1650	2.750	2.875	2.625	12.80	13.20	12.40
150	0.250	0.375	0.125	4.80	5.20	4.40	1700	2.833	2.958	2.708	13.07	13.47	12.67
200	0.333	0.458	0.208	5.07	5.47	4.67	1750	2.917	3.042	2.792	13.33	13.73	12.93
250	0.417	0.542	0.292	5.33	5.73	4.93	1800	3.000	3.125	2.875	13.60	14.00	13.20
300	0.500	0.625	0.375	5.60	6.00	5.20	1850	3.083	3.208	2.958	13.87	14.27	13.47
350	0.583	0.708	0.458	5.87	6.27	5.47	1900	3.167	3.292	3.042	14.13	14.53	13.73
400	0.667	0.792	0.542	6.13	6.53	5.73	1950	3.250	3.375	3.125	14.40	14.80	14.00
450	0.750	0.875	0.625	6.40	6.80	6.00	2000	3.333	3.458	3.208	14.67	15.07	14.27
500	0.833	0.958	0.708	6.67	7.07	6.27	2050	3.417	3.542	3.292	14.93	15.33	14.53
550	0.917	1.042	0.792	6.93	7.33	6.53	2100	3.500	3.625	3.375	15.20	15.60	14.80
600	1.000	1.125	0.875	7.20	7.60	6.80	2150	3.583	3.708	3.458	15.47	15.87	15.07
650	1.083	1.208	0.958	7.47	7.87	7.07	2200	3.667	3.792	3.542	15.73	16.13	15.33
700	1.167	1.292	1.042	7.73	8.13	7.33	2250	3.750	3.875	3.625	16.00	16.40	15.60
750	1.250	1.375	1.125	8.00	8.40	7.60	2300	3.833	4.025	3.642	16.27	16.88	15.65
800	1.333	1.400	1.267	8.27	8.48	8.05	2350	3.917	4.113	3.721	16.53	17.16	15.91
850	1.417	1.488	1.346	8.53	8.76	8.31	2400	4.000	4.200	3.800	16.80	17.44	16.16
900	1.500	1.575	1.425	8.80	9.04	8.56	2450	4.083	4.288	3.879	17.07	17.72	16.41
950	1.583	1.663	1.504	9.07	9.32	8.81	2500	4.167	4.375	3.958	17.33	18.00	16.67
1000	1.667	1.750	1.583	9.33	9.60	9.07	2550	4.250	4.463	4.038	17.60	18.28	16.92
1050	1.750	1.838	1.663	9.60	9.88	9.32	2600	4.333	4.550	4.117	17.87	18.56	17.17
1100	1.833	1.925	1.742	9.87	10.16	9.57	2650	4.417	4.638	4.196	18.13	18.84	17.43
1150	1.917	2.013	1.821	10.13	10.44	9.83	2700	4.500	4.725	4.275	18.40	19.12	17.68
1200	2.000	2.100	1.900	10.40	10.72	10.08	2750	4.583	4.813	4.354	18.67	19.40	17.93
1250	2.083	2.188	1.979	10.67	11.00	10.33	2800	4.667	4.900	4.433	18.93	19.68	18.19
1300	2.167	2.275	2.058	10.93	11.28	10.59	2850	4.750	4.988	4.513	19.20	19.96	18.44
1350	2.250	2.363	2.138	11.20	11.56	10.84	2900	4.833	5.075	4.592	19.47	20.24	18.69
1400	2.333	2.450	2.217	11.47	11.84	11.09	2950	4.917	5.163	4.671	19.73	20.52	18.95
1450	2.417	2.538	2.296	11.73	12.12	11.35	3000	5.000	5.250	4.750	20.00	20.80	19.20
1500	2.500	2.625	2.375	12.00	12.40	11.60							

Accuracy = ±5% of reading from 1500 to 3000 ppm gas and ±75 ppm gas from 0 to 1500 ppm

Chart revised on 3-30-95

Normalized to R-22	
Compound	Relative Response
1-1-1 Trichloroethane	0.20
R-11	0.49
R-21	0.50
R-507	0.52
R-123	0.75
R-134a	0.97
R-22	1.00
R-125	1.04
R-113	1.13
R-12	1.18
R-13B1	1.34
R-114	1.47



## 5.4 ADJUSTMENTS

Adjustments are made using the ZERO and SPAN adjust trimmers, located on the circuit board next to the sensor housing, at the opposite end from the terminal block. Connect a digital multimeter to one of the signal output (5 volt or 4-20 mA) and use the following procedure:

1. For ZERO adjustment, either assure there is no background gas or set up the calibration kit as described above using the appropriate Zero gas cylinder.
2. Turn the ZERO adjust screw as necessary to obtain a meter reading of 0.0 Volts or 4 mA at the selected signal output.
3. For SPAN adjustment, set up the calibration kit the appropriate Span gas cylinder.
4. Turn the SPAN adjust screw as necessary to obtain a meter reading of 5 volts or 20 mA for 3000 ppm of SPAN gas.
5. To verify, repeat the ZERO procedure and readjust if necessary. For concentration of SPAN gas other than 3000 ppm, use the following chart for calibration.

**CAUTION: Only qualified personnel should perform the actual calibration. Users are advised to consult The Armstrong Monitoring Corporation as to the recommended calibration gas concentration for the application, and any other questions.**

## 6 PREVENTIVE MAINTENANCE

The sensor/ transmitter enclosure should be wiped clean with a damp cloth following a regular maintenance program. Avoid spraying, submersion and other conditions that could cause a liquid to enter the monitor and cause possible intrinsic damage to internal components.

### 6.1 VERIFICATION OF OPERATION

To verify the operation of the transmitter, make sure it is responding to gas. This test should be performed regularly every 3 months, but for more demanding applications, verification should be done on a weekly basis.