200 Series
Transmitter

INSTRUCTIONS

AMC-200 Series Transmitter

INSTALLATION AND OPERATING INSTRUCTIONS FOR THE AMC-200 SERIES 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-200 Series Transmitter is warranted against defects in material and workmanship for a period of two (2) years from date of delivery. 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

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.

2 PRODUCT INFORMATION

2.1 TRANSMITTER

Sensor/transmitter Unit Order Number …….	_____
Transmitter Part Number ……..	_____
Transmitter Serial Number ……	_____
Sensor Part Number ……..	_____
Sensor Serial Number ……..	_____
Power Supply Requirement …….	12 to 30 VDC @ 20 mA

2.2 FACTORY SETTINGS

Gas Type …….	_____
Range …….	_____
Zero Gas, at 4 mA signal ……..	_____
Gas Concentration at 20 mA signal ……	_____

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

3.1 GENERAL DESCRIPTION

The AMC-200 series sensor/transmitter unit is designed to provide continuous, reliable surveillance of surrounding air for traces of a specific hazardous gas (listed in section 2.2, Factory Settings). This unit provides a 4 to 20 mA, variable current signal which is proportional to the gas concentration detected. Each sensor/transmitter unit is factory calibrated and is ready for field installation and operation.

3.1.1 SENSOR SPECIFICATIONS

SENSOR TYPE:	Electrochemical cell
RESPONSE TIME:	Better than 90% step change in 60 seconds
DRIFT:	Less than 2% of full scale per month
SIGNAL OUTPUT:	Linear to the concentration of gas
OPERATING TEMPERATURE:	0°C to 40°C
HUMIDITY:	0 to 99% RH, non-condensing.
EXPECTED SENSOR LIFE:	Greater than 2 years
STORAGE LIFE:	6 months at 20°C

NOTE

Turn off power supply before removing or replacing the transmitter or sensor.

4 INSTALLATION

4.1 LOCATION AND MOUNTING

Mount the sensor/transmitter unit on a solid, non-vibrating surface or structure in an area where the local concentration of gas is unaffected by the presence of ventilation systems and away from sources of interference gases. The sensor housing SHOULD NOT touch the mounting surface. Some cases may require the use of a spacer between the mounting surface and the transmitter housing. (See FIGURE 1)

Note:

Mounting arrangement of transmitter housing depends on location of transmitter, and mounting surface. Mounting hardware NOT supplied.

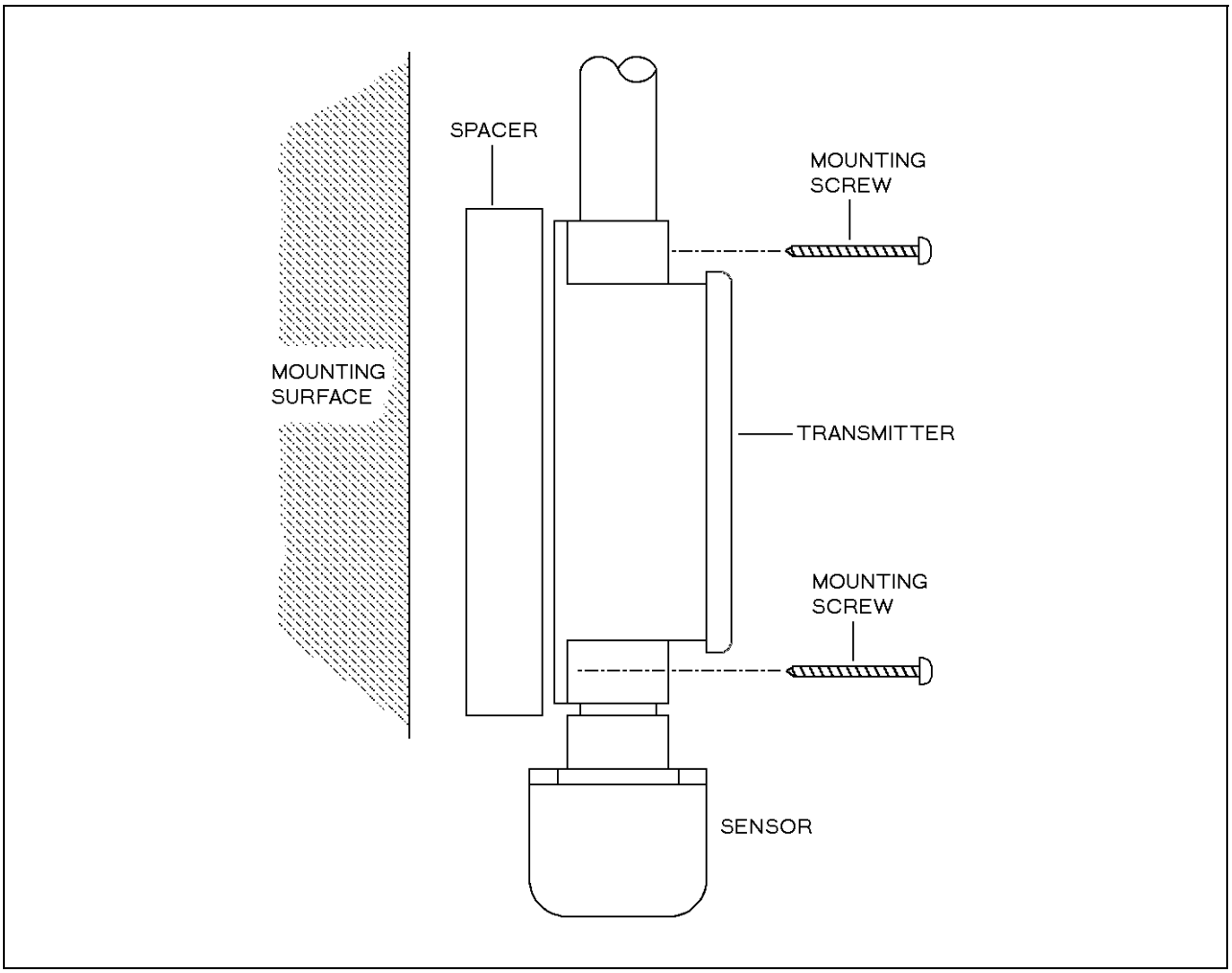


FIGURE 1: Mounting of the transmitter housing.

4.2 CABLE SELECTION AND WIRING

Connection should be made using 2-conductor, shielded cable. For best signal transmission and maximum noise rejection, run cable through steel conduit (cable shield must be grounded at the monitor or power supply). For basic cable selection (between monitor and transmitter) when using a 250 ohm load resistance, use the following chart:

Cable Selection Chart

Wire Gauge	Cable Length			
AWG	Feet		Metres	
	@ 12VDC	@ 24VDC	@ 12VDC	@ 24VDC
22	1000	15000	305	4732
20	1500	23000	457	7010
18	2500	38000	762	11582
16	3800	57000	1158	17373

For applications not covered by the above chart, an example is shown below for selecting the right cable, using the graph in FIGURE 2 and the following formulas (Remember that some non-AMC equipment may have the load resistance built-in).

EXAMPLE: (Refer to FIGURE 2)

Known data: Obtained from measurements, ratings or specifications.

Power supply ..... 17 VDC
Load resistance ..... 180 Ohms
Wire gauge ..... 20 AWG
Cable length / 1 Ohm resistance ..…... 43.6ft (13.3m) typical

Calculations on the graph: Using the power supply voltage as reference.

Maximum resistance ……. MR
Load resistance ..... LR

Formula 1: To determine remaining safe loop resistance.

Maximum resistance ……. 518 Ohms
Load resistance ……. – 180 Ohms
Remaining resistance ….. = 338 Ohms

Formula 2: To determine maximum safe cable length allowed.

Remaining resistance …… 338 Ohms
Cable length (for 1 Ohm) …….. x 43.6 Feet
Maximum safe cable length …. = 14736 Feet

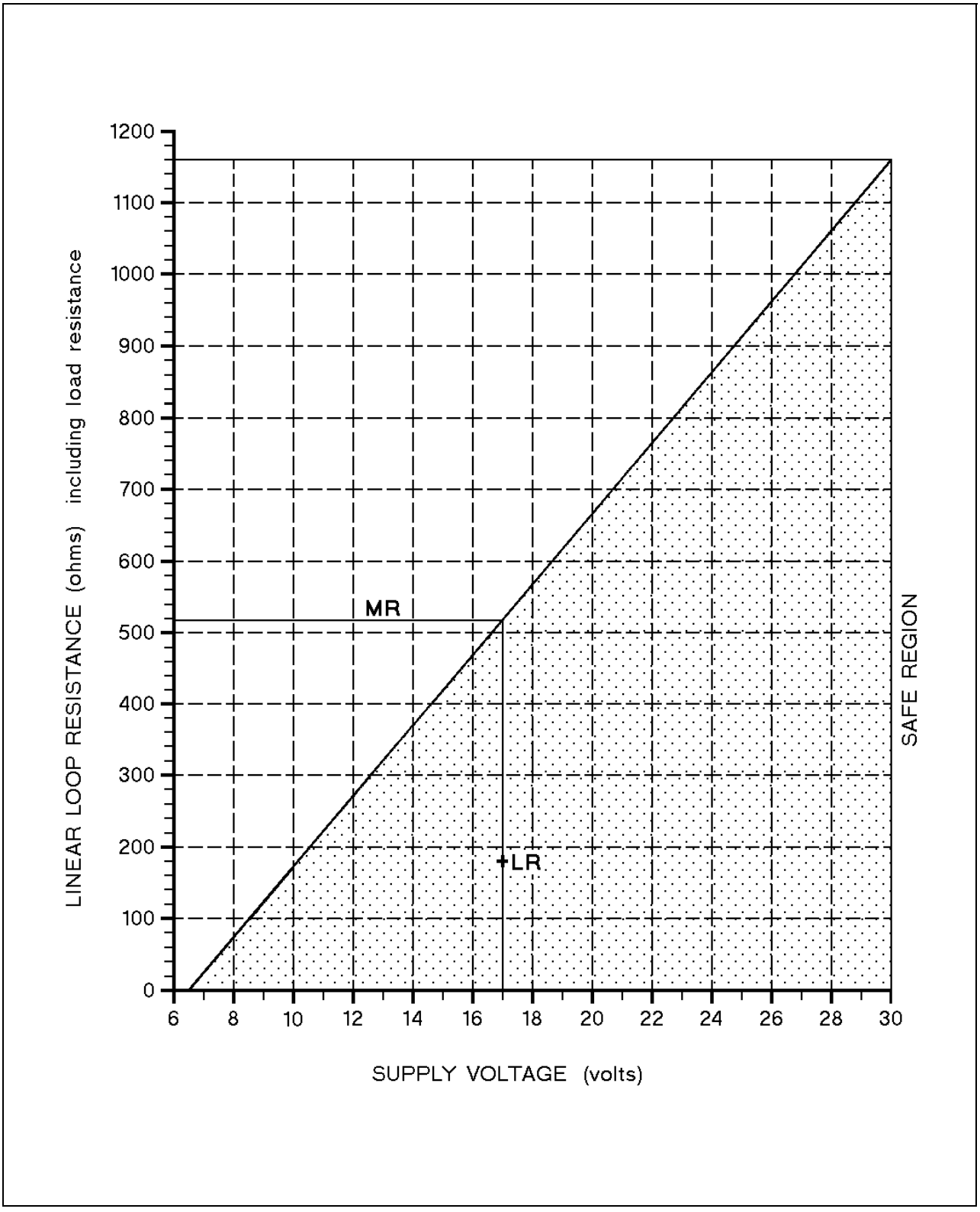


FIGURE 2: Cable selection graph.

4.3 TRANSMITTER TO MONITOR WIRING

The transmitter output (–,+) terminals connect to the (SIG,+) terminals on a channel terminal block of the monitor (one transmitter per channel), as shown in FIGURE 3. Each transmitter MUST BE CONNECTED TO ITS CORRESPONDING CHANNEL to retain factory calibration.

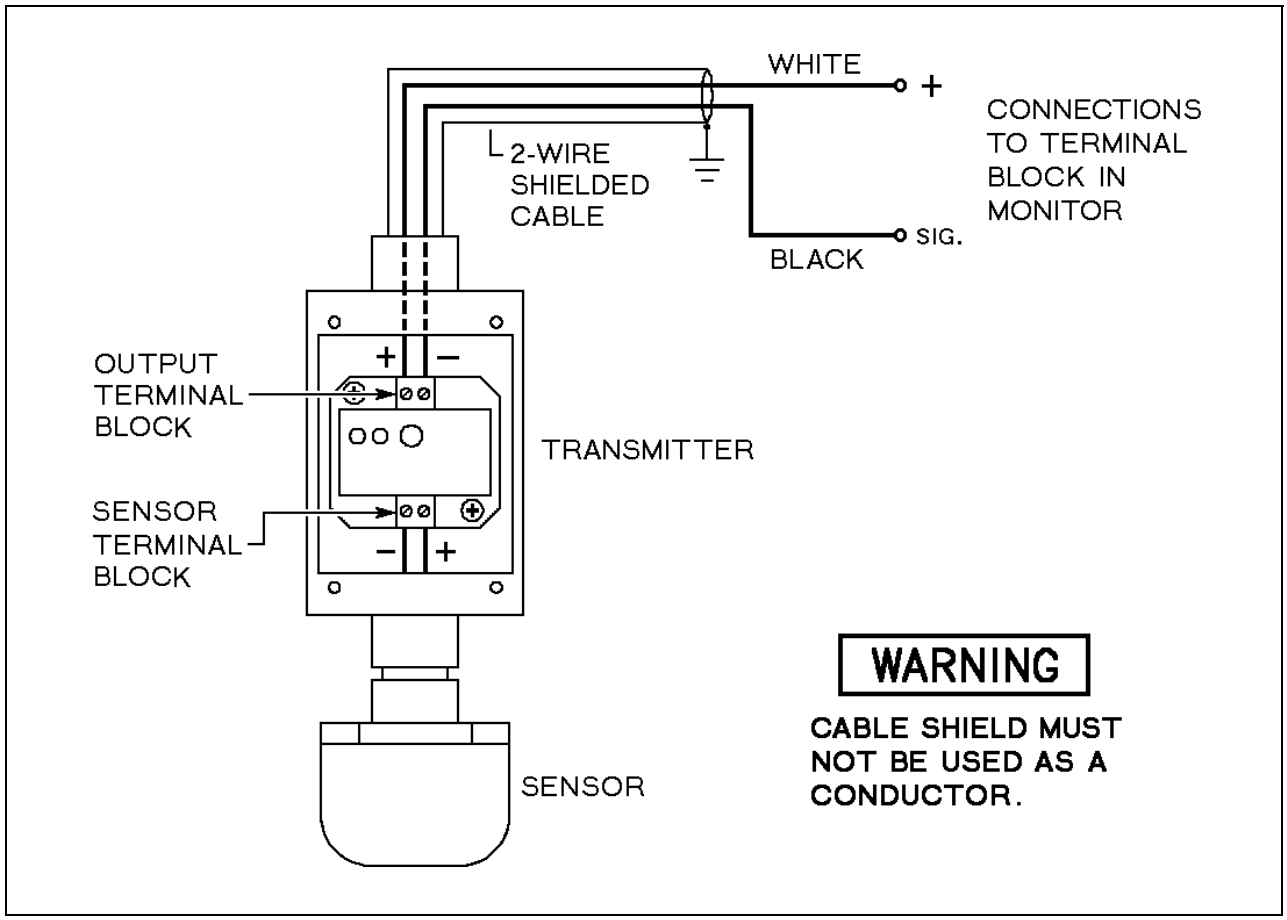


FIGURE 3: Transmitter to monitor wiring.

4.3.1 INTERFACING TO COMPUTER, DATALOGGER, OR NON-AMC MONITOR

All Armstrong sensor/transmitters can be connected to computers or dataloggers through analog-to-digital converters, or to non-AMC monitors. The transmitter output (–,+) terminals connect to a filtered 12 to 30 VDC power supply, through field wiring (See FIGURE 4).

The signal output from the transmitter is a 4 to 20 milliamp DC current. This signal can be measured or recorded anywhere in the supply loop if required, or if a voltage measurement is needed, connect a resistor (see FIGURE 4) between the transmitter's negative (–) output terminal and the negative or common (–) of the power supply.

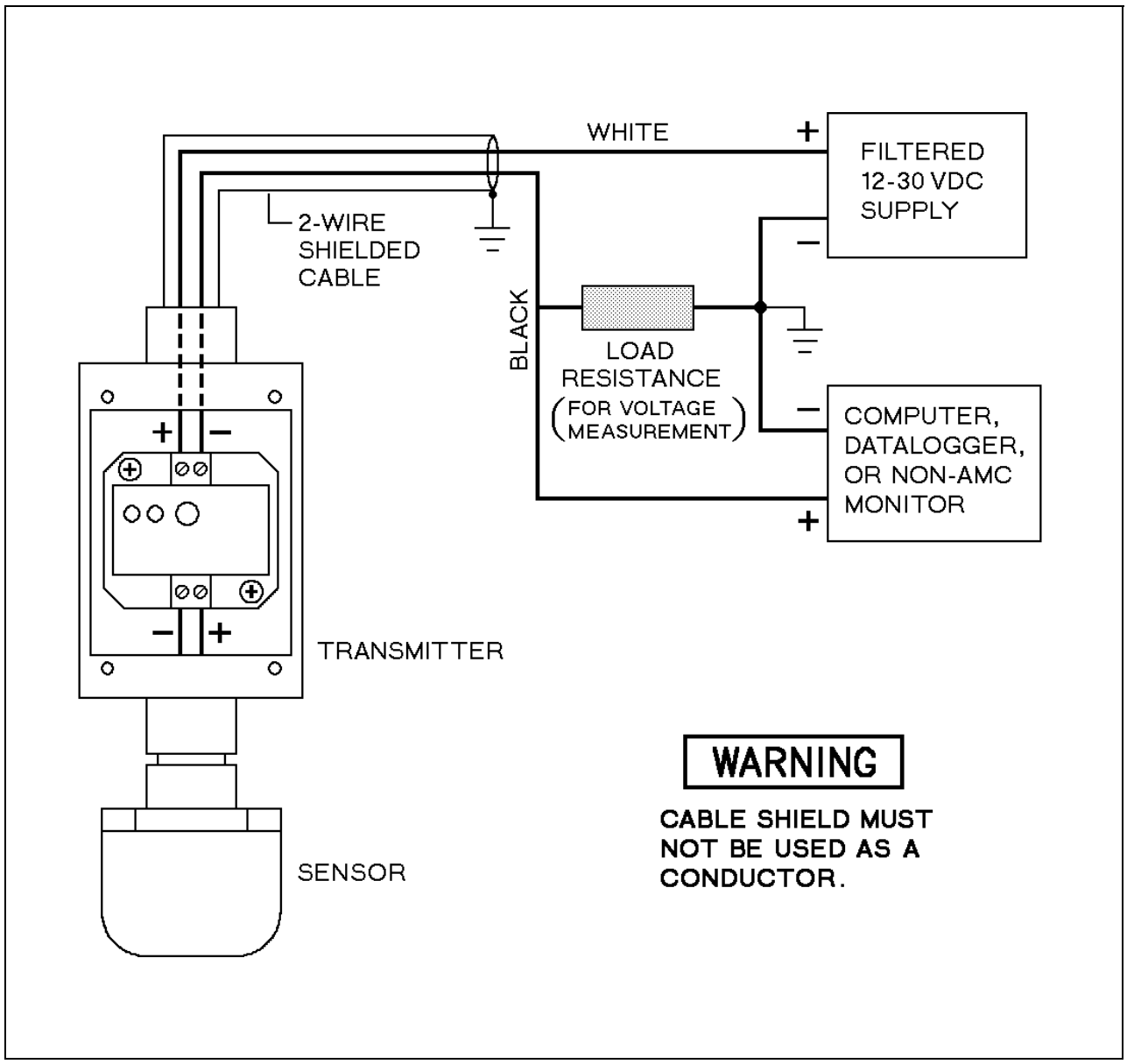


Figure 4: Interfacing to computer, datalogger or non-AMC monitor.

5 OPERATION AND CALIBRATION

5.1 OPERATION

The AMC-200 series sensor/transmitter unit is factory calibrated for the gas listed in section 2.2, Factory Settings, at the beginning of this manual. The unit should not need recalibration when first installed and powered-up, but a test for correct operation is recommended after a stabilization period of 10 minutes.

In general, after the stabilization period, the transmitter should be sending (in a clean air environment) a signal of approximately 4 mA to the monitor or controller. However, there are a few situations where a slightly higher or lower than normal signal may be noticed. In many facilities there are residual background gases (including the gas being detected) in the air at all times. These can cause a minor response from the sensor, normally causing a rise in signal. Other causes for minor signal variations include extremes in temperature.

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.

Although the electrochemical sensors are very selective, there are some interference gases which can also cause a response from the sensor. These gases are listed on the detailed Specifications sheet pertaining to the sensor in use.

5.2 CALIBRATION

The transmitter is equipped with a remote calibration feature allowing one-man calibration at the transmitter location. The transmitter output is measured using a plug-in type “Remote Calibration Lead” (p/n 2900-01) designed to be adaptable to most multimeters. Zero and Span adjustments are made at the transmitter. Recalibration is necessary when replacing the sensor. Verification of calibration should be done at least once every 6 months for safety reasons and for highly demanding applications, monthly verification is recommended.

Factory or on-site calibration services, customer training, and/or calibration kits can be provided. Specify the sensor/transmitter type and gas when requesting any of the above.

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.

5.2.1 EQUIPMENT REQUIRED

- Digital multimeter
- “Remote Calibration Lead” provided with the transmitter
- “Trimmer Adjustment Tool” or miniature screwdriver
- Calibration kit (AMC-CK2800)

5.2.2 TRANSMITTER CALIBRATION/VERIFICATION SET-UP PROCEDURE

The calibration procedure may cause the monitoring equipment to give a false alarm, therefore appropriate precautions should be taken. Instructions on introducing the gas sample are included with the calibration kit manual or available separately (depending on type of gas or application). Refer to Figure 5 for the following procedure.

1. Remove cover from transmitter housing

2. Connect “Remote Calibration Lead” to multimeter. BLACK lead to negative or common (–). RED lead to positive (+).

3. Switch ON multimeter and select the 200 mA DC milliamp range to allow readings greater than 20 mA full scale.

4. Insert plug end of “Remote Calibration Lead” fully into CAL jack on transmitter cover plate. This will block the outgoing signal, causing a “fail” at the monitor.

5. Apply a Zero gas sample or fill a garbage bag with clean outdoor air and apply to sensor. Check for a stabilized zero signal of approximately 4 mA. Set “zero” trimmer to 4.0mA.

6. Apply a Span gas sample. Since the transmitter output range is 4 to 20 mA, a full-scale concentration should register 20 mA after a few moments exposure. Proportionately, a half-scale concentration of gas should register 12 mA, and so on.

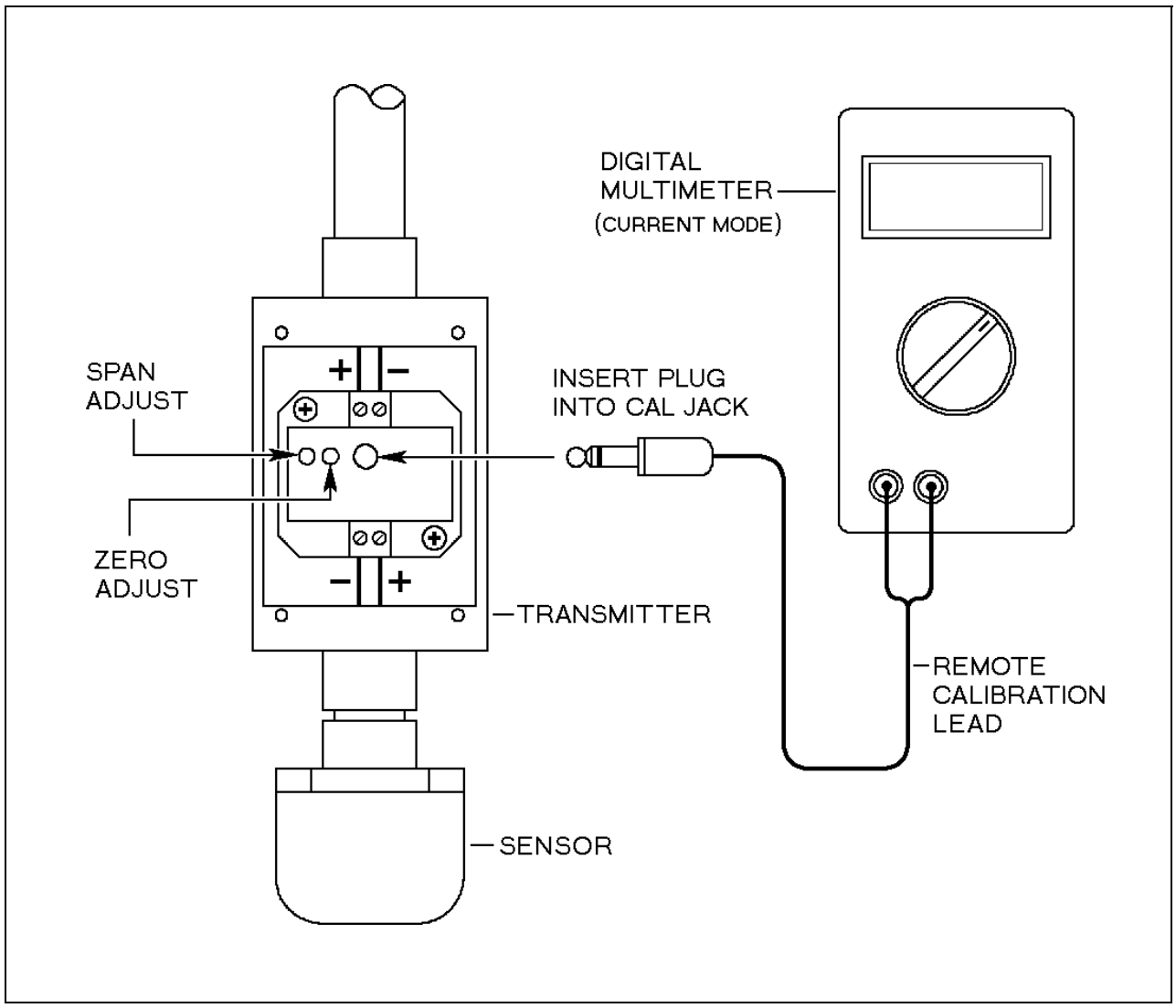


Figure 5: Calibration/verification set-up procedure.

5.2.3 ADJUSTMENTS

For full recalibration adjustments, follow the Set-Up Procedure steps 1 to 6 inclusive. There are two adjustments to be made for recalibration, Zero and Span.

Zero: When there is no gas present (clean air), the transmitter signal should be 4 mA. This is obtained by adjusting the Zero trimmer on the transmitter. It is possible, with certain conditions, that the “Zero” current will go below 4 mA.

Span: When the sensor is exposed to the calibration gas sample, adjust the span trimmer on the transmitter to set the output current proportional to the gas concentration applied.

6 PREVENTIVE MAINTENANCE

6.1 GENERAL

The sensor/transmitter unit should be brushed or wiped clean once a year or more, of any dust or dirt which settles on it, depending on the accumulation.

The unit SHOULD NOT be submerged in water or other liquids. Also, hosing and other conditions that could cause a liquid to enter the transmitter or sensor should be avoided.

6.2 SENSOR REPLACEMENT

Sensor life is typically 2 to 5 years. The sensor should be replaced under the following conditions:

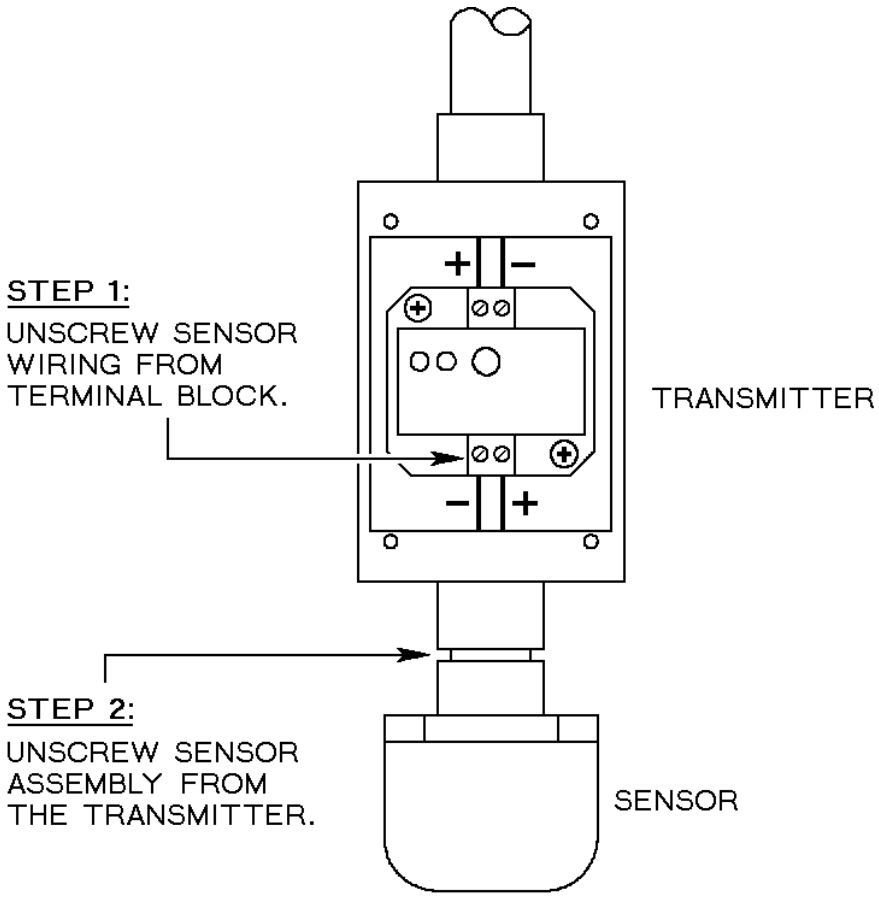
1. When the sensor element fails and becomes an open circuit, the transmitter outputs a fixed 1 mA signal.

2. When the sensor no longer responds to the presence of gas or produces an unstable "zero" signal.

When the sensor needs replacing, reorder the "Sensor Part Number" listed in section 2.1, Transmitter. See FIGURE 6 for sensor replacement and wiring procedure.

Note:

Allow 24 hours for the new sensor element to stabilize (burn-in) before recalibration, then follow instructions in the transmitter calibration section 5.2.2 of this manual.



STEP 3:

THREAD A NEW SENSOR ASSEMBLY ONTO THE TRANSMITTER HOUSING.

STEP 4:

CONNECT SENSOR LEADS TO THE SENSOR TERMINAL BLOCK ON TRANSMITTER.

BLACK LEAD TO NEGATIVE (–)
RED LEAD TO POSITIVE (+)

STEP 5:

RE-CALIBRATE.

Figure 6: Sensor replacement and wiring procedure.