350
Sensor/Transmitter

INSTRUCTIONS

Installation, Calibration & Maintenance of the AMC-350 Sensor/Transmitter

IMPORTANT:

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

Revised, 7/21/2004

Filename; Manual_amc-350_transmitter.doc

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NOTE

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1 WARRANTY

The AMC-350 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.

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 and will be accepted only with a repair number issued by AMC. 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

Sensor/Transmitter Unit Order Number……..	_____
Transmitter Part Number…….…….……..	_____
Transmitter Serial Number……..……	_____
Sensor Part Number……..	_____
Sensor Serial Number ……..	_____
Power Supply Requirement ……	12 to 26 VDC @ 250 mA
Signal Output Load ……..	maximum 250 ohms
Sensor Warranty ……..	_____

2.2 FACTORY SETTINGS

Gas Type. ……	_____
Range. ……	_____
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.

3 PRODUCT DESCRIPTION

3.1 GENERAL DESCRIPTION

The AMC-350 series sensor/transmitter unit is designed to provide continuous, reliable surveillance of surrounding air for traces of hazardous gases (listed in Factory Calibration, section 2.2). It 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 ready for field installation and operation.

3.1.1 SENSOR / TRANSMITTER SPECIFICATIONS

SENSOR TYPE:	Solid state.
RESPONSE TIME:	90% full scale in less than 30 seconds.
ZERO DRIFT:	Less than 5% per year.
SIGNAL OUTPUT LOAD:	250 Ohms maximum.
OPERATING TEMPERATURE:	-40 to +40 ºC (-40 to +104 ºF)
HUMIDITY:	0 to 99% RH, non-condensing.
OPERATING PRESSURE:	Ambient atmospheric pressure.
EXPECTED SENSOR LIFE	10 years (continuous operation).
ACCURACY/REPEATABILITY	Within 5% of full scale.

Note:

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

3.2 HOUSING OPTIONS

The AMC-350 series sensor/transmitter units are available in the following housings (see FIGURE 1). The explosion-proof housings are also available with a corrosion resistant finish.

- Explosion-Proof (rated for Class I, Groups B, C, D)
- Explosion-Proof (rated for Class I, Groups A, B, C, D)

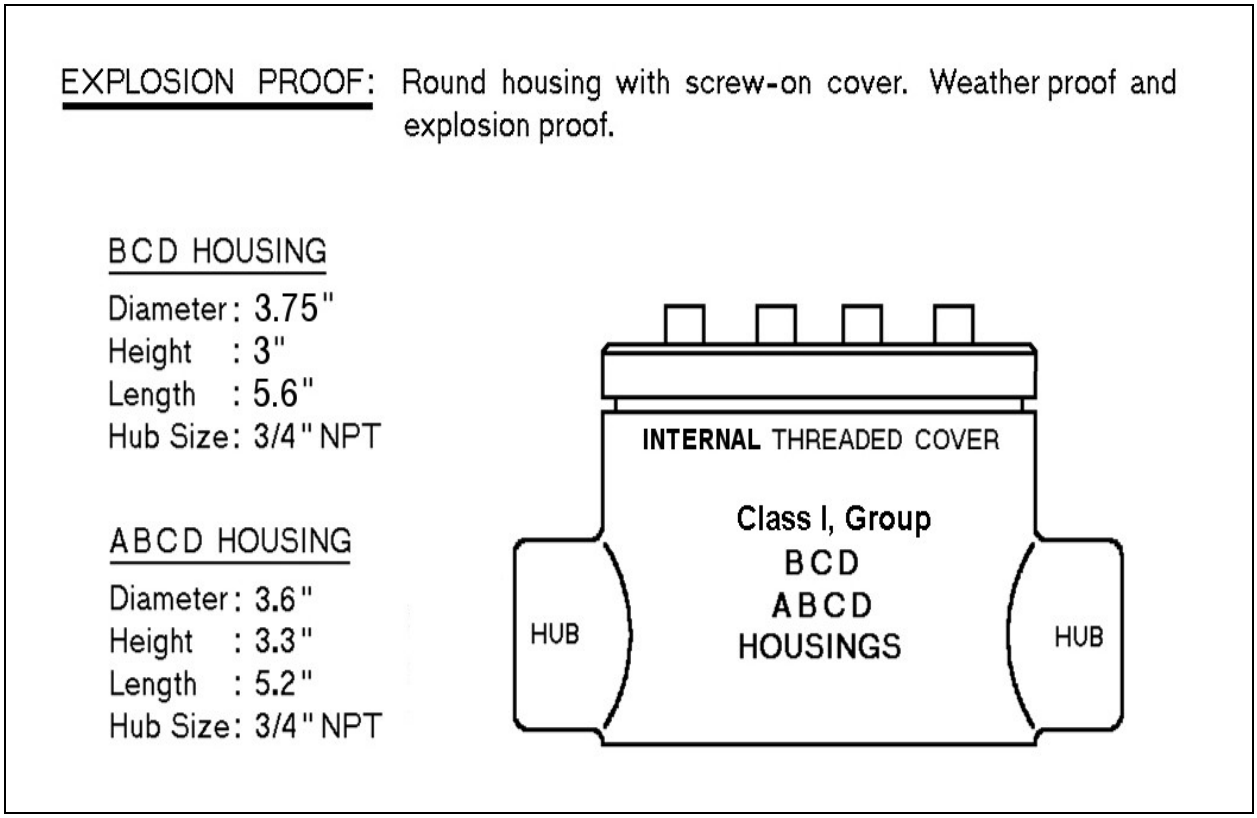

FIGURE 1: Explosion-proof housing options.

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. The sensor/transmitter housing SHOULD NOT touch the mounting surface. In some cases this may require the use of a spacer between the mounting surface and the sensor/transmitter housing. (See FIGURE 2).

Note:

Mounting arrangement of the transmitter housing depends on location of transmitter and mounting surface. Mounting hardware is not supplied.

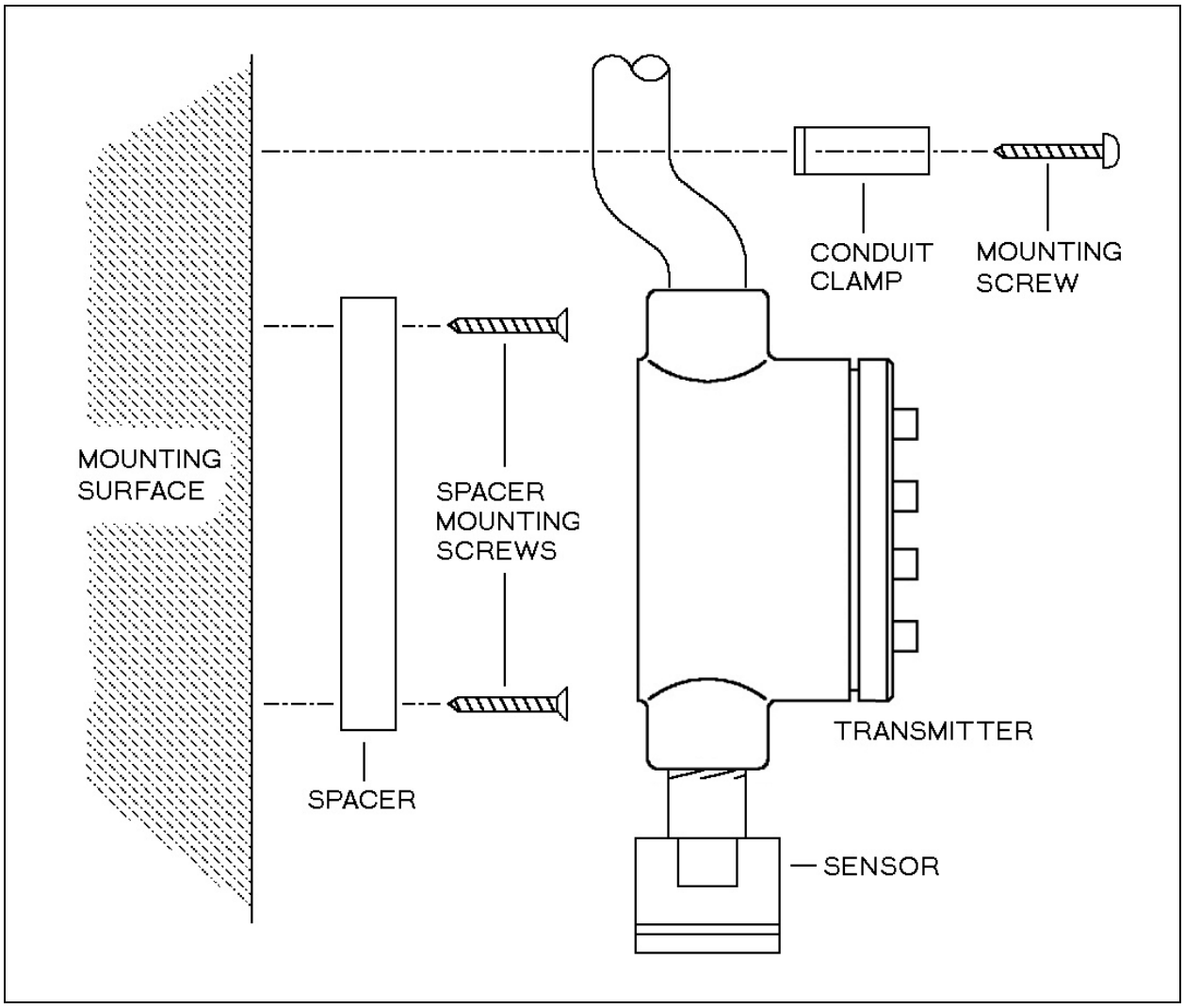

FIGURE 2: Mounting of the sensor/ transmitter.

4.2 CABLE SELECTION AND WIRING

The transmitter output (–, S, +) terminal block connects to the (–, S, +) connections on a channel terminal block of the monitor (one transmitter per channel), as shown in FIGURE 4. Connection should be made using 3-conductor, shielded cable (shield must be grounded at the monitor). Run cable through steel conduit for best signal transmission and maximum allowable distances. The maximum permissible distance between the transmitter and monitor is dependant on wire gauge as shown in the following **Cable Selection Chart** (FIGURE 3)

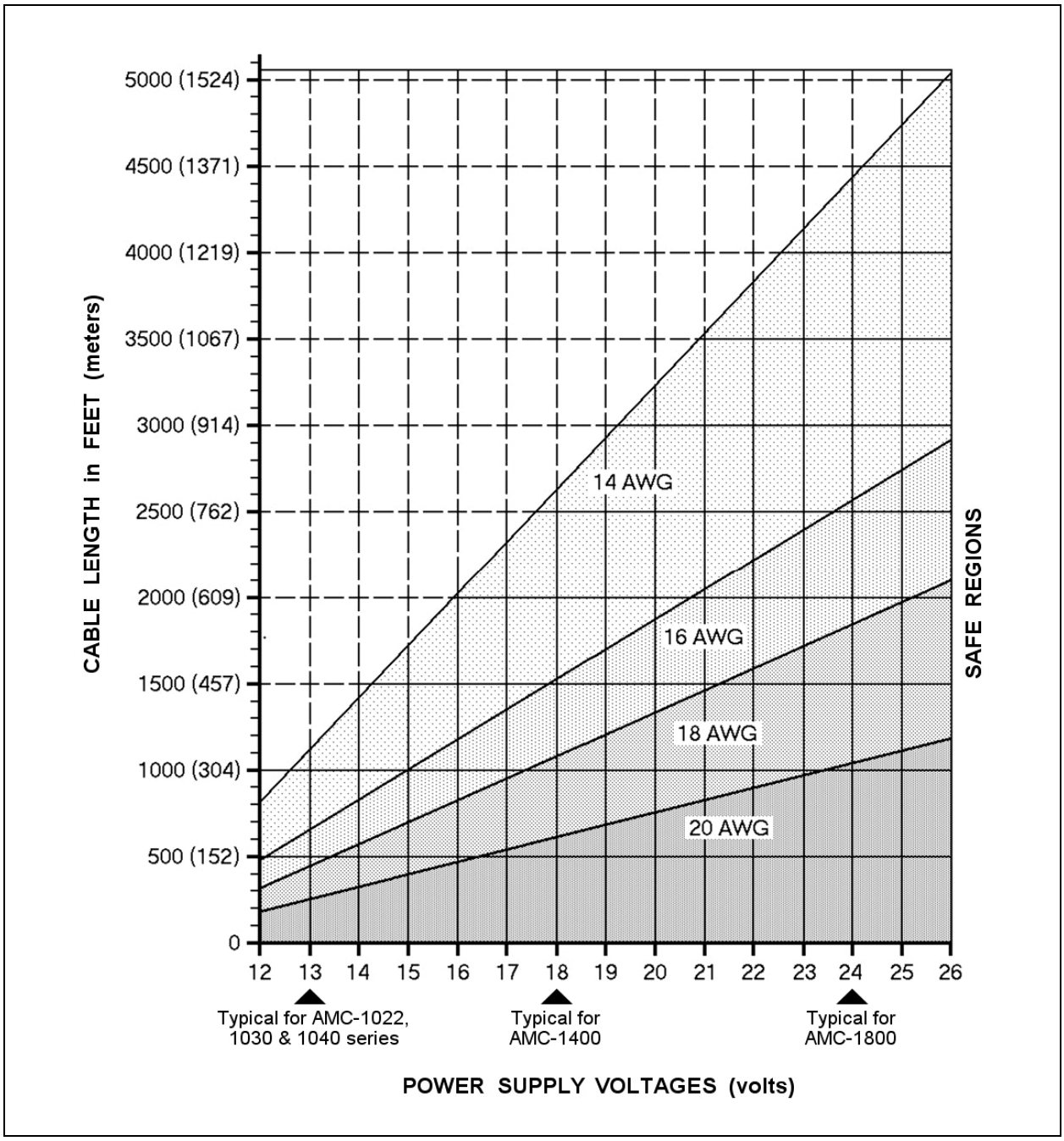

FIGURE 3: Cable Selection Chart.

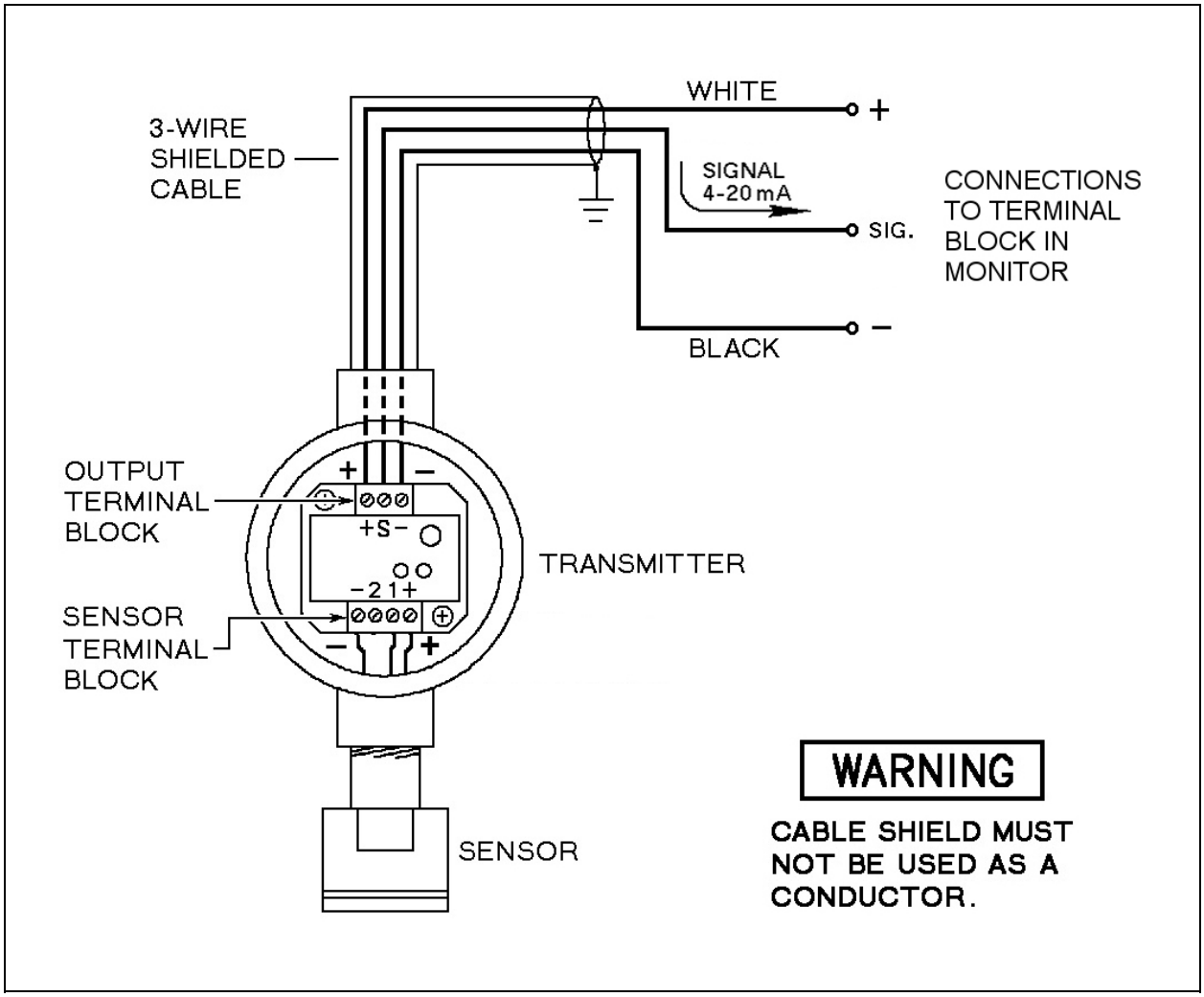

FIGURE 4: Transmitter wiring layout.

4.3 COMPUTER, DATALOGGER OR NON-AMC INTERFACE

Refer to FIGURE 5 for the following.

All Armstrong sensor/transmitter units can be interfaced with computers or dataloggers through analog-to-digital converters.

The signal output from the transmitter is a 4 to 20 mA DC current. This can be measured from the signal wire, or if a voltage measurement is needed, connect a load resistor (250 ohms max) between the transmitter signal output (S) and power supply ground (–).

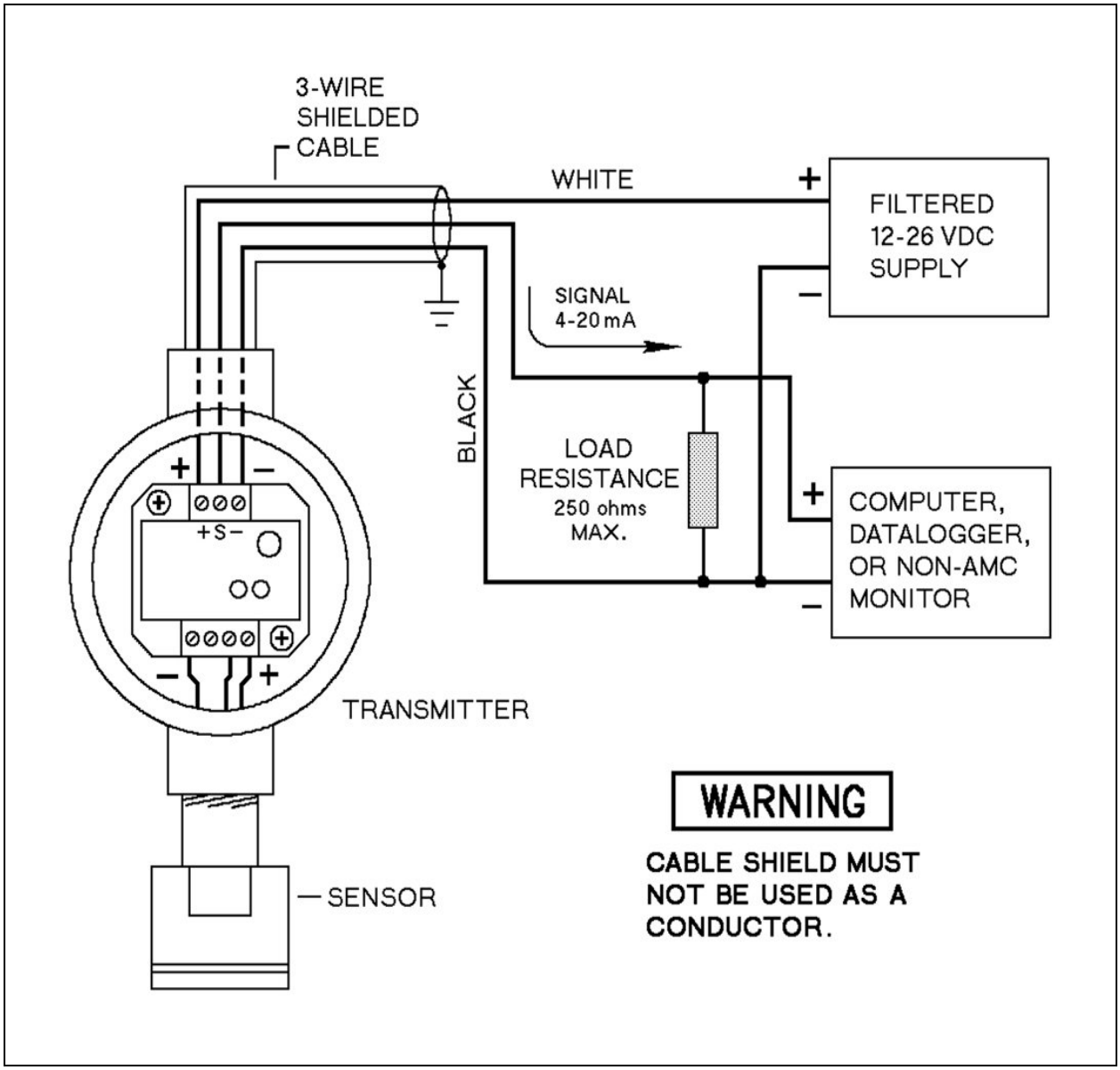

FIGURE 5: Interface to computer, datalogger or non-AMC monitor.

5 OPERATION AND CALIBRATION

5.1 OPERATION

The AMC-350 series sensor/transmitter unit is factory calibrated for the gas listed in Product Information (section 2). The unit should not need recalibration when first installed and powered up, but a test for correct operation is recommended. All testing should be done after a stabilization period.

In general, after the stabilization period, the transmitter should be sending (in a Zero gas 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 can be residual levels of 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 environment), check for an installation problem.

5.2 CALIBRATION

The sensor/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" 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/on-site calibration services, customer training and/or calibration adapter are available. Specify the sensor/transmitter Part Number & Serial Number listed in section 2.1 SENSOR/TRANSMITTER and refer to section 2.2 FACTORY CALIBRATION for Gas Type and calibration adapter when ordering 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 calibration procedure and recommended gas concentration for the application.

5.2.1 EQUIPMENT REQUIRED

- Digital multimeter
- Remote Calibration Lead (provided with the transmitter)
- Trimmer adjustment tool or miniature screwdriver
- Calibration adapter
- Zero & Span gases and Permeation tube (Contact factory for information)

5.2.2 TRANSMITTER CALIBRATION/VERIFICATION PROCEDURE

The calibration procedure may cause the monitoring equipment to give a false alarm; therefore appropriate precautions should be taken. Instructions for introducing the gas sample are included with every Calibration Kit or available separately on request (depending on type of gas or application). Refer to FIGURE 6 for the Calibration/Verification setup.

1. Remove cover from transmitter housing.

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

3. Switch ON multimeter and select a DC milliamp range greater than 20 mA full scale.

4. Insert plug end of “Remote Calibration Lead” fully into CAL jack on transmitter cover plate.

5. Apply a Zero gas sample or with the sensor in clean air or while covering the open end of the sensor, check for a stabilized zero signal of approximately 4 mA.

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.

5.2.3 RECALIBRATION

There are two adjustments to be made for periodic recalibration: Zero and Span.

Zero: With the sensor in Zero Gas, the transmitter output signal current should read 4 mA. This is obtained by adjusting the Zero trimmer on the transmitter for a voltage of 0.000 VDC at the test points in Figure 6. It is possible, under certain conditions that the Zero current will fall below 4 mA.

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

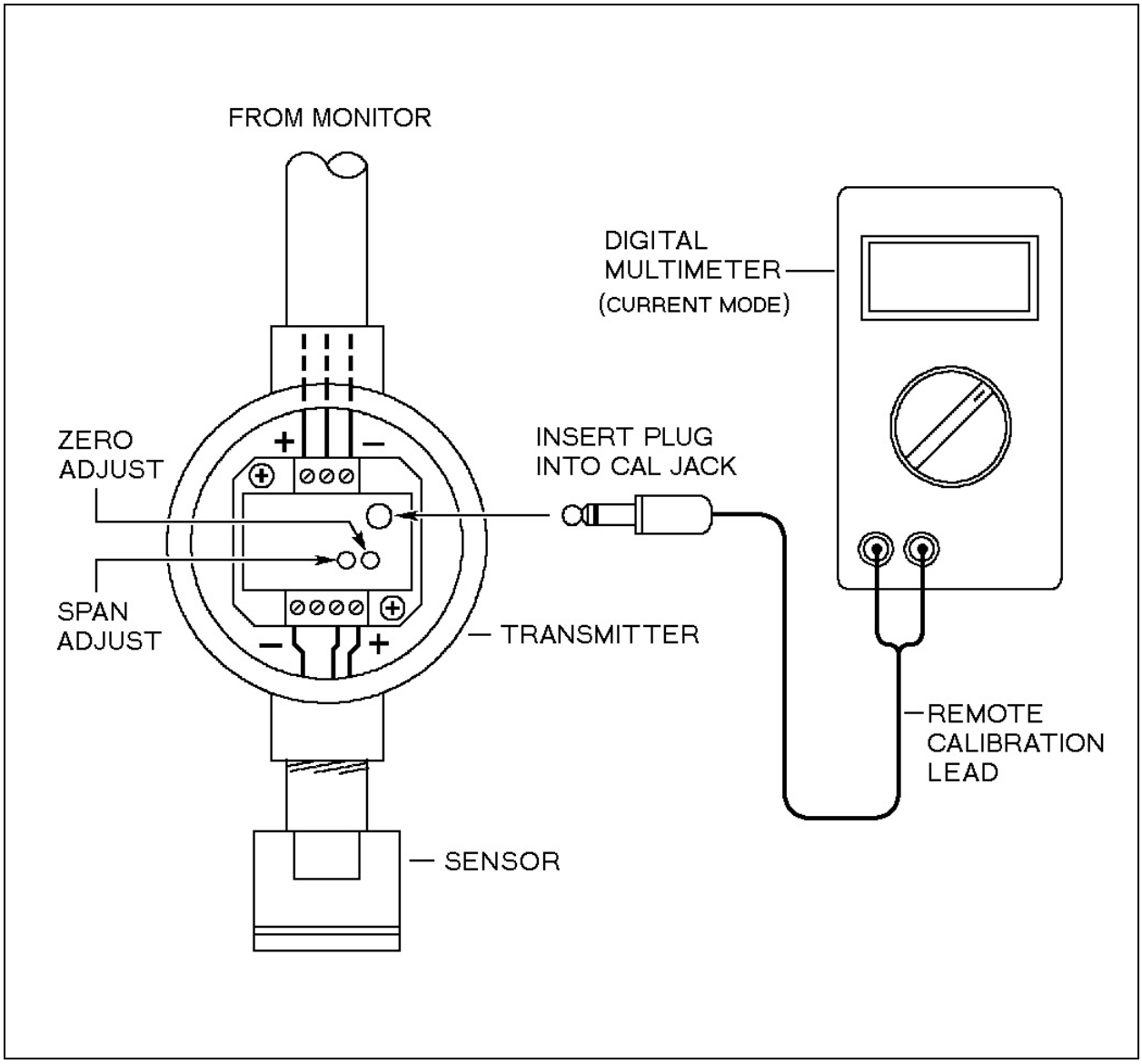

FIGURE 6: Calibration/Verification Set-up.

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 enclosure should be avoided.

6.2 VERIFICATION OF OPERATION

To verify the operation of the sensor/transmitter unit, make sure that is still responding to gas. This test should be performed every six (6) months, but for more demanding applications, verification should be performed on a monthly basis.

6.3 SENSOR REPLACEMENT

Caution:

Turn off the main power supply before attempting the following.

Sensor life is in excess of 10 years. When the sensor needs replacing, reorder the Sensor Part Number listed in Product Information (section 2.1). The sensor should be replaced under the following conditions (see FIGURE 7 for sensor replacement procedure):

1. When the sensor element becomes an open circuit, the transmitter outputs a fixed 1 mA +/- 0.10 mA signal.

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

Note:

Allow 10 minutes for new sensor element to stabilize (burn-in) before recalibration, and then follow instructions in calibration section 5.2 of this manual.

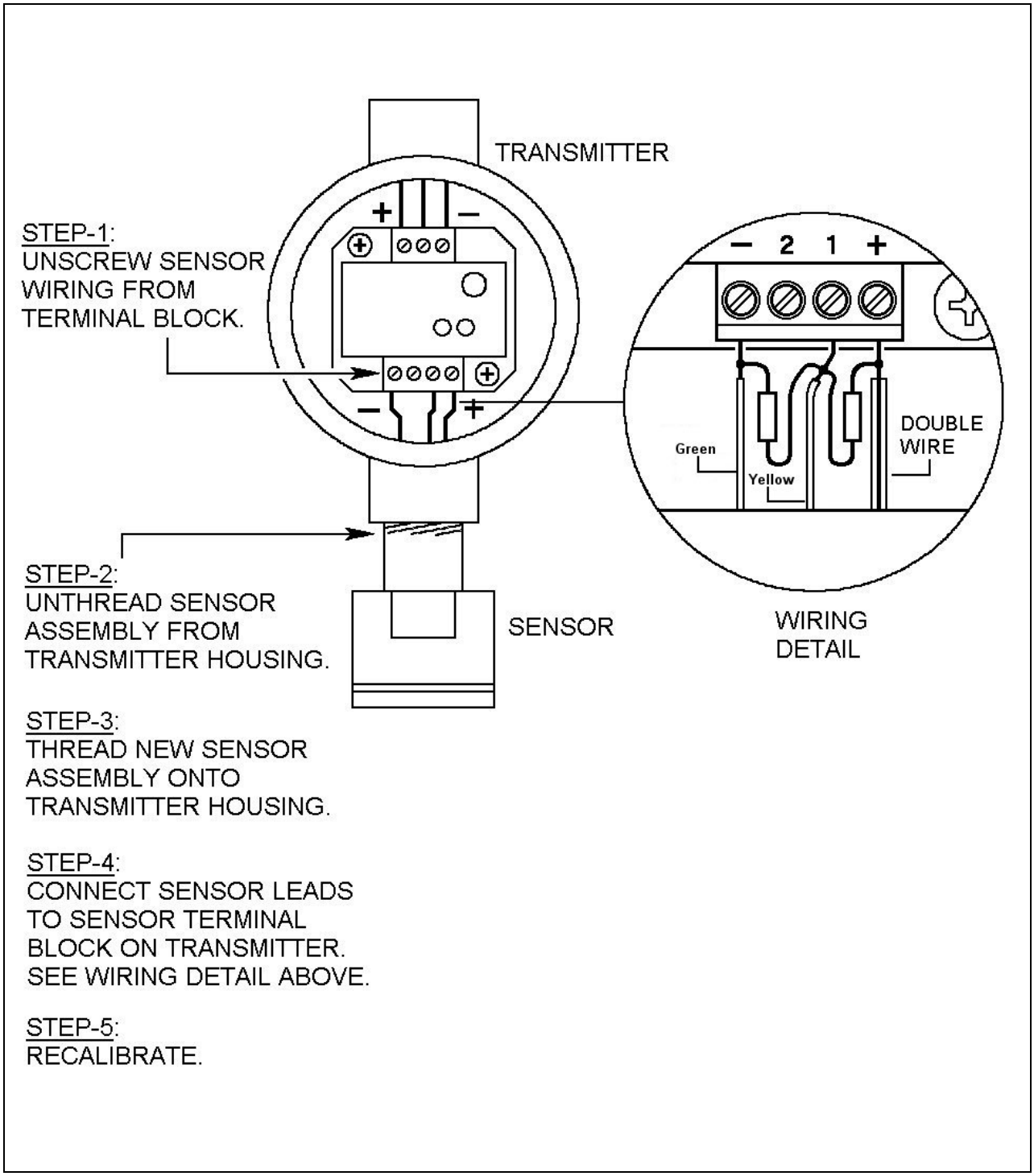

FIGURE 7: Sensor replacement procedure.