



1228

Multidrop Version

INSTRUCTIONS

Installation and Operation of the
AMC-1228 Electrochemical Sensor Module
For Use With Multidrop AMC Monitors

IMPORTANT:

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

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1 WARRANTY

The AMC-1228 Module is warranted against defects in material and workmanship for a period of two years from date of shipment (For sensor warranty see section 2.1). 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 a repair number issued by AMC. All products returned to the client will be freight collect.

WARNING

<p>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.</p>



2 PRODUCT INFORMATION

2.1 SENSOR MODULE

Sensor Module Part Number	_____
Sensor Module Serial Number	_____
Sensor Element Part Number	_____
Sensor Element Serial Number	_____
Sensor Warranty Period	_____ years
Wire Gauge	18 AWG @150 ft max between units
Power Supply Requirement	6 to 18 VDC
Operating Temperature	0° to 40° C
Operating Pressure	Ambient atmospheric pressure
Relative Humidity	0 to 99% RH, non-condensing
Sensor Warranty	_____

2.2 FACTORY CALIBRATION

Gas Type	_____
Low Alarm Setting	_____
High Alarm Setting	_____
Calibration Adapter Part Number.....	_____

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 a general product description is given followed by a detailed list of the AMC-1228 unit's internal features.

3.1 GENERAL DESCRIPTION

The AMC-1228 sensor unit provides continuous, reliable surveillance of surrounding air for traces of hazardous gases (listed in section 2.2 FACTORY CALIBRATION, page 4). This unit is designed to allow interconnection in series as in a "daisy chain" configuration (refer to Figure 2) to a single or multi-channel AMC 1AD Series monitor or so equipped inputs of other AMC monitors. A maximum of eight (8) sensor modules can be connected to each zone. The units can also be branched out from the central line allowing maximum flexibility. Each unit produces Low alarm, High alarm and sensor Fail signals, which are transferred from one sensor to the next up the line back to the monitor.

3.1.1 INTERNAL FEATURES

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

- 1) SENSOR: Electrochemical cell, factory calibrated.
- 2) HIGH ALARM INDICATOR: High conditions of gas are indicated by a red LED.
- 3) LOW ALARM INDICATOR: Low conditions of gas are indicated by a yellow LED.
- 4) POWER/FAIL INDICATOR: Power is indicated by an illuminated green LED. A sensor failure causes the green LED to turn OFF.
- 5) HIGH ALARM ADJUSTMENT: Sets the high alarm trip point.
- 6) LOW ALARM ADJUSTMENT: Sets the low alarm trip point.
- 7) SIGNAL ADJUSTMENT: Sets the sensitivity of the sensor.
- 8) TERMINATING JUMPERS: Jumper clips are supplied installed on the circuit card. When connecting additional sensor modules, the jumper clip corresponding to the terminal block must be removed. Refer to section 4.2.2 TERMINATION, for more details.
- 9) OUTPUT TERMINAL BLOCK: The output terminals (labeled -,s,+), connect to the (-,s,+) terminals in the monitor, or to the input (-,s,+) terminals of another sensor module.
- 10) INPUT TERMINAL BLOCKS: The input terminals (-,s,+), are used to connect additional sensor modules. Each unused input terminal block must be locked-out using a terminal jumper (see item 8).

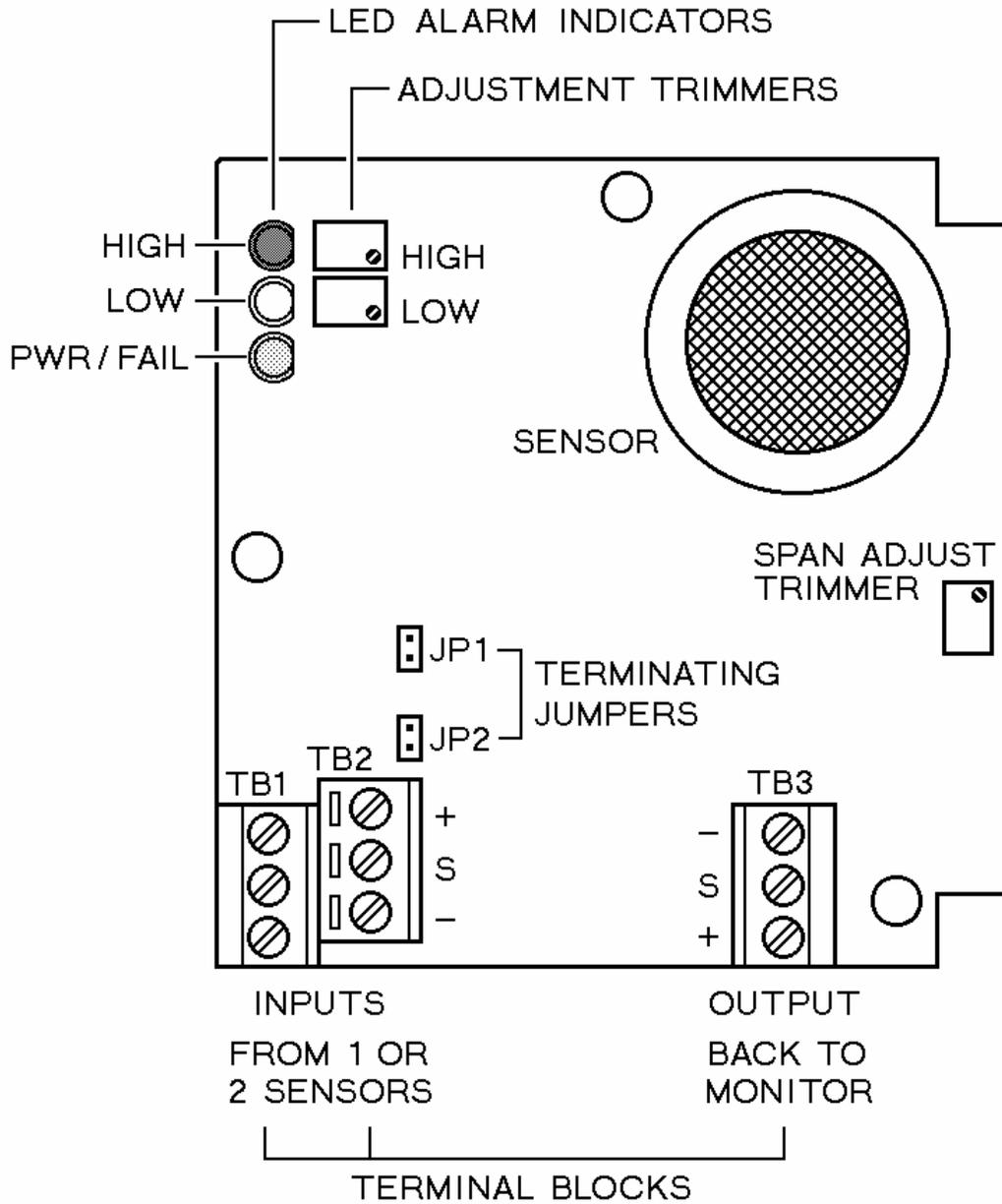


FIGURE 1: Internal Features of the AMC-1228 sensor module.



4 INSTALLATION

This section relates to the proper installation of the AMC-1228 unit. The topics of proper location, sensor wiring selection, and multi-unit interconnection are all discussed in detail.

4.1 LOCATION AND MOUNTING

Mount the sensor unit on a solid, non-vibrating surface or structure, easily accessible for status checking and calibration. The unit must be mounted in an area where the local concentration of gas is unaffected by the presence of ventilation systems.

NOTE:

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

4.2 CABLE SELECTION AND WIRING

To gain access to the terminal blocks, remove the four (4) screws and front panel from the housing. This will expose the field wiring terminals. The sensor module output (-,s,+) terminal block, connects to the input terminal block of the previous unit, or to the sensor/transmitter terminal block in the monitor, as shown in Figure 2.

NOTE:

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

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 noise rejection. A maximum length of 150 feet of 18 AWG size cable is allowed between each unit as well as between the monitor and first unit(s). For other distances or cable sizes, consult with The Armstrong Monitoring Corporation.

4.2.1 MULTI-UNIT INTERCONNECTION

Each sensor module is designed to interconnect to other units in series and/or branching configurations. Various typical configurations are shown in Figure 3, illustrating the versatility of this type of system. Because each unit is pre-calibrated, additional units can be added to a system without altering the monitor settings. When multiple units are interconnected, either one or both jumpers need to be removed (refer to section 4.2.2 TERMINATION and Figure 2).

4.2.2 TERMINATION

For each unused input terminal block, the corresponding jumper **MUST** be left installed (as shown in Figure 2). Failure to do so may cause the system to malfunction.

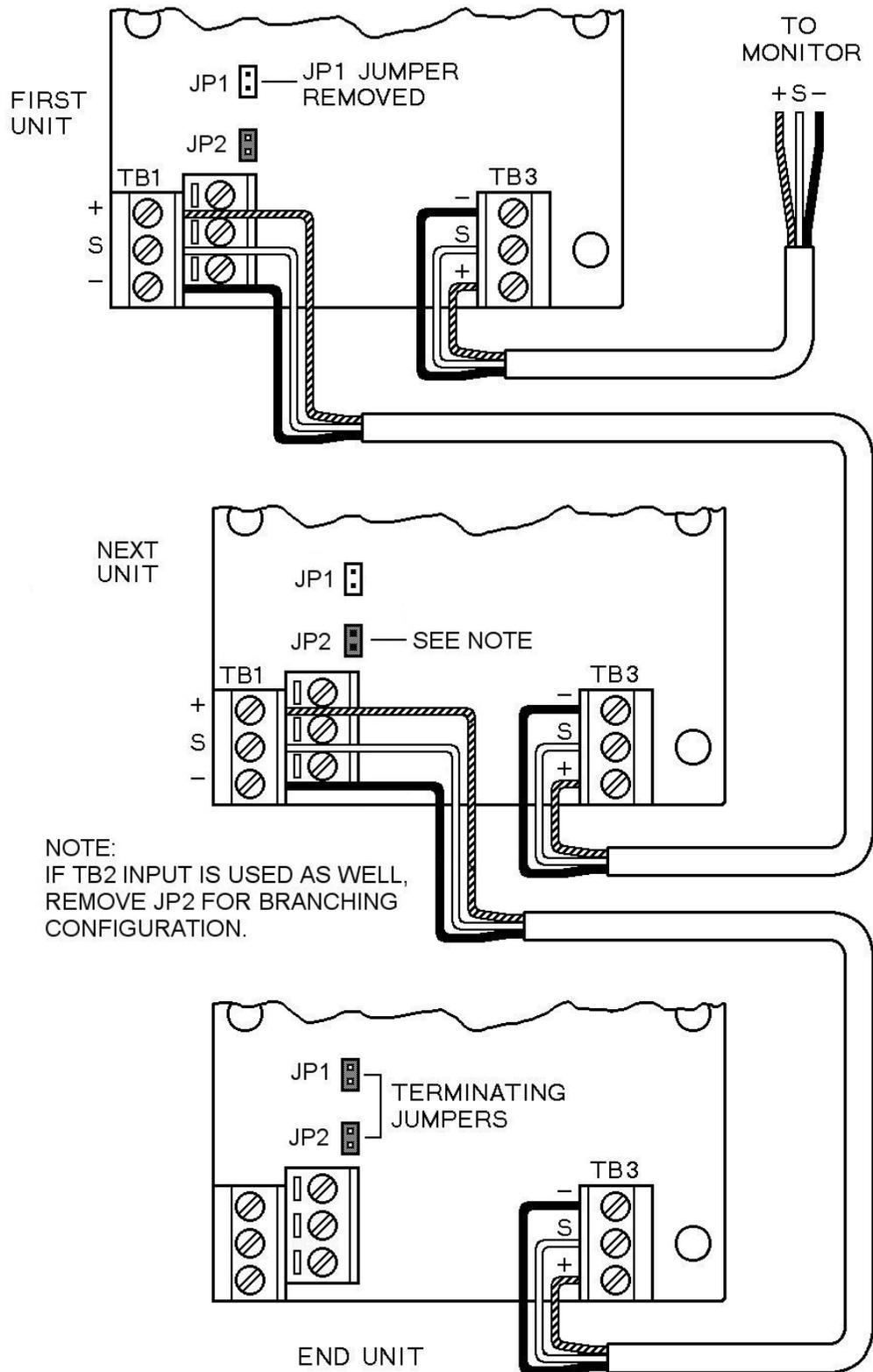


FIGURE 2: Detail wiring of sensor modules.

TYPICAL SYSTEM CONFIGURATIONS FOR ONE MONITOR AND 8 SENSORS.

LEGEND:
M = MONITOR
S = SENSOR MODULE

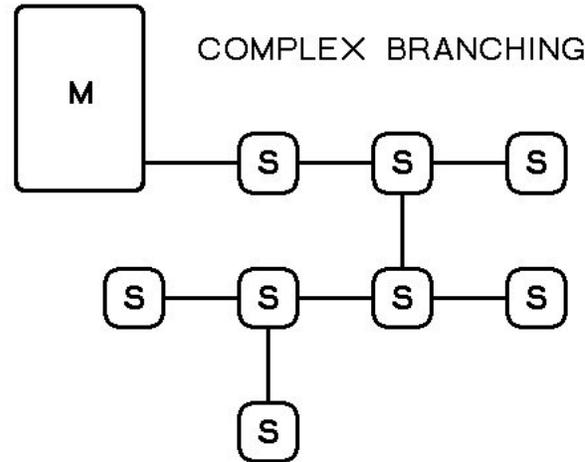
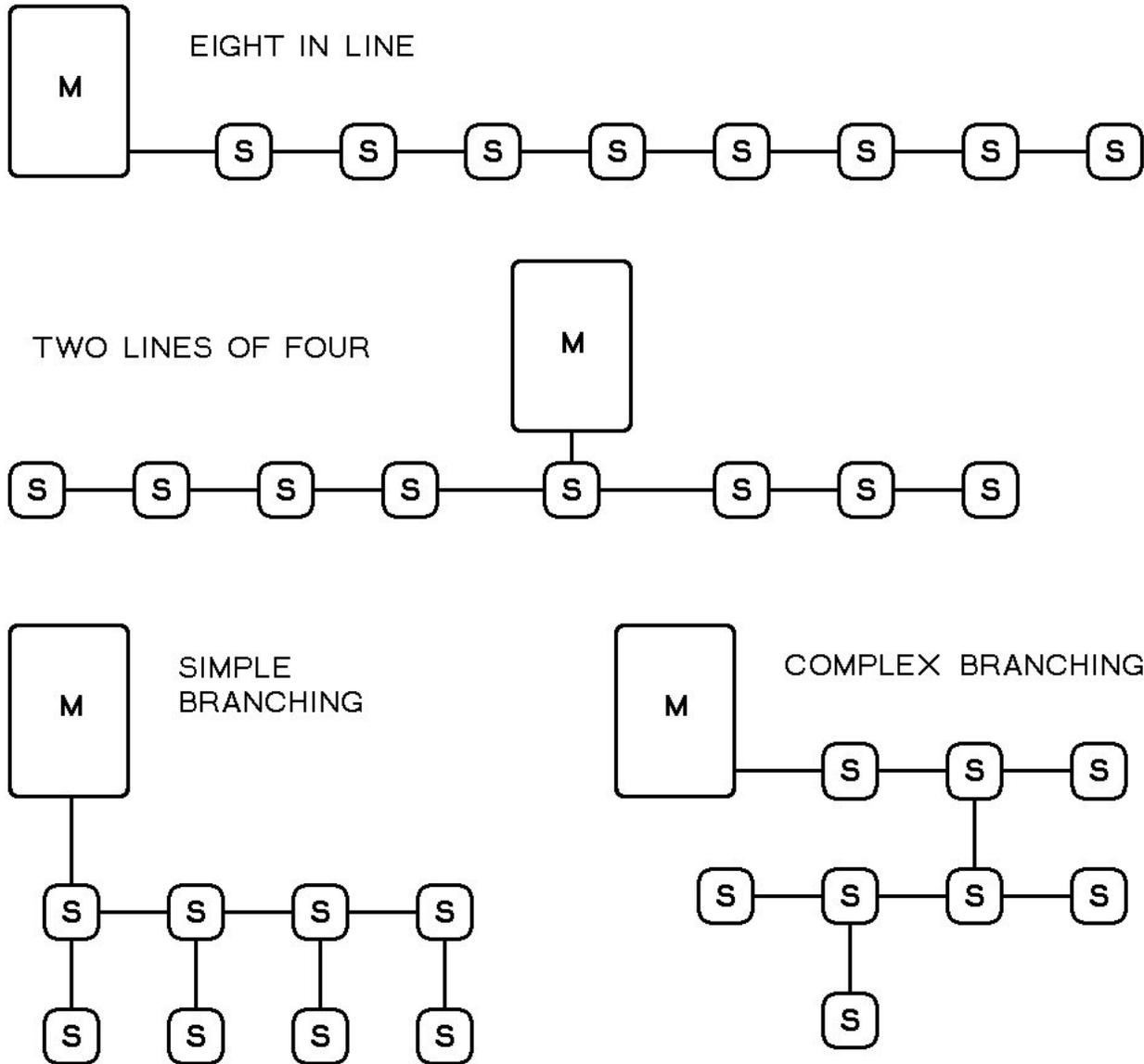


FIGURE 3: Typical system configuration layouts.



5 OPERATION AND CALIBRATION

This section covers instructions for the proper operation and calibration of the AMC-1228 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

In general, after the stabilization period and in a clean air environment, the sensor module should be displaying a GREEN Power ON LED. This green indicator, as well as the yellow and red alarm indicators, are all visible through windows on the front panel.

5.1.1 ALARM CONDITIONS

If any gas exceeds the LOW alarm trip point setting, the yellow LED will turn ON and the unit will transmit a signal and also turn ON the yellow LED at the monitor. Likewise, if any gas exceeds the HIGH alarm trip point setting, the red LED's will turn ON.

5.1.2 FAULT SUPERVISION

The AMC-1228 is equipped with fault detection circuitry. This condition is indicated by turning OFF the green Power LED viewed through the front panel. The condition will exist until the fault is corrected.

5.2 CALIBRATION

The AMC-1228 sensor module is factory calibrated at levels based on set standards. Calibration of the unit should last for the life of the sensor, with few periodic adjustments, unless the alarm trip point settings need to be changed. All on-site adjustments are made at each sensor module. Recalibration is necessary when replacing the sensor or changing the alarm trip point settings. Factory or on-site calibration services, customer training, and/or calibration adapter can be provided, refer to section 2.2 FACTORY CALIBRATION, page 4. Specify each sensor module's model number and gas when requesting any of the above.

Equipment Required:

- Digital Multimeter,
- Miniature slot screw driver,
- Calibration adapter
- Calibration gas and regulator (Contact factory for information)

5.2.1 Span Adjustment

1. Signal is measured from TB3 (-) to 20K resistor (see Figure 4 for location).
2. Apply calibration gas to sensor.

3. Using Span Adjust Trimmer adjust signal voltage to proportional calibration gas concentration.

I.E. Full Scale = 10ppm NO₂ = 3VDC/Full Scale X Calibration Gas
 Calibration Gas = 5ppm NO₂ = 3VDC/10ppm X 5ppm
 = 1.5VDC

5.2.2 Alarm Adjustment

Alarm Adjustment can be made with the corresponding High or Low Trimmer. Adjust the corresponding Alarm Voltage to the appropriate fraction of full-scale gas concentration. Alarm Voltage can be measured from TB3(-) to Low test point and high test point. (see Figure 4 for location).

I.E. Full Scale 10ppm = 3VDC/Full Scale X alarm Trip Point
 Alarm Trip Point 1ppm = 3VDC/10ppm X 1ppm
 = .3VDC

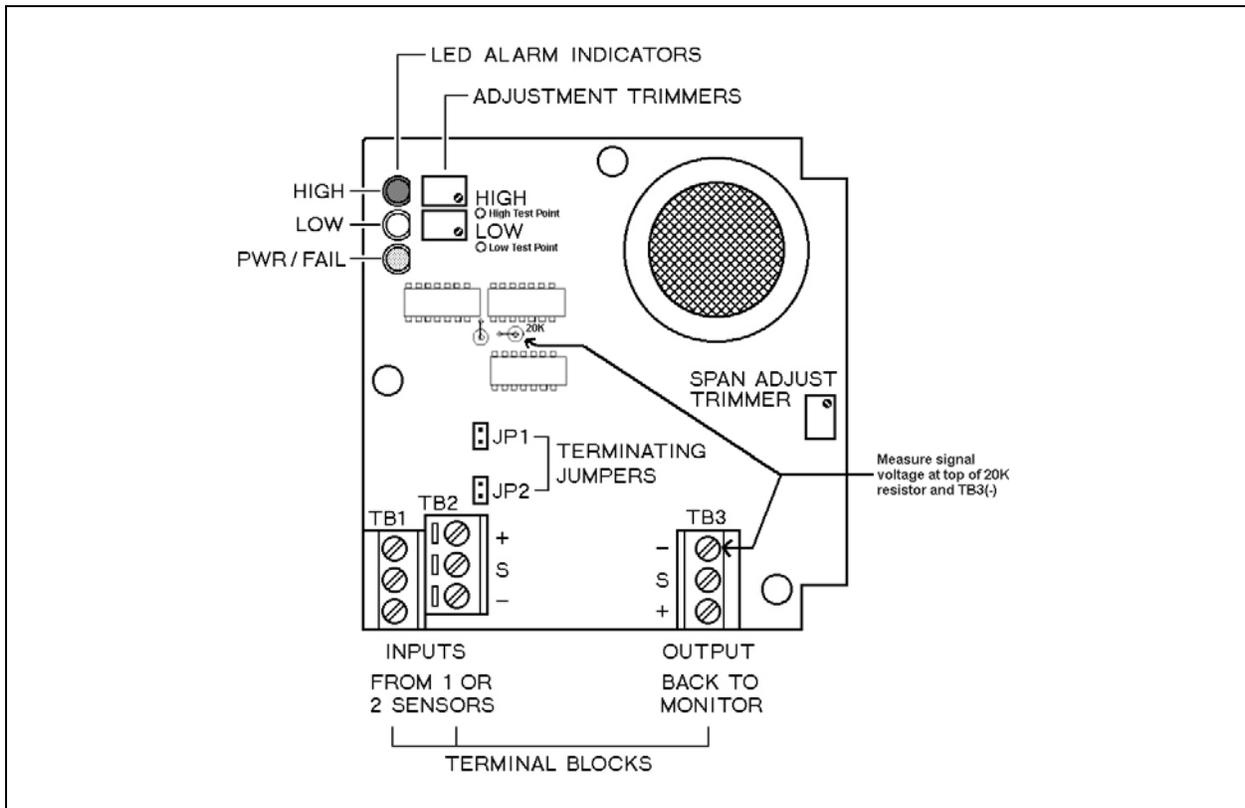


FIGURE 4: Span and alarm adjustment.

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 MAINTENANCE

This section covers topics related to the maintenance of the AMC-1228 unit. A general description of maintenance to be carried out is followed by a verification of operation and then details about the sensor replacement.

6.1 GENERAL

The sensor 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 or placed under conditions where water or other liquids would be able to enter the transmitter.

6.2 VERIFICATION OF OPERATION

Verification of operation and calibration should be done at least once every 6 months for safety reasons and for highly demanding applications, monthly verification is recommended.

6.3 SENSOR REPLACEMENT

The sensor should be replaced when the green LED turns OFF while the unit is powered, or when the sensor no longer adequately responds to test gas.

CAUTION:

Turn off the power supply before attempting the following.

When the sensor needs replacing, reorder the Part Number listed in section 2.1 SENSOR MODULE (page 4). To replace the sensor element, remove the four screws and cover plate from the housing. Unplug the used sensor element from its socket and discard then plug in the replacement sensor element. Reinstall the cover plate and screws.

NOTE:

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

7 ADDENDUM

7.1 AMC MULTIDROP WITH HIGH ALARM LATCHING OPTION

7.1.1 OVERVIEW

For the AMC Multidrop there is a latching alarm option available. This may be used where one would like to know if there has been a high alarm level of gas overnight, or other period when unattended. The latching option includes the AMC Multidrop, latching module, the latching LED and the reset switch, plus the installation and connections.

For this option there is a latching red LED with a short time delay and reset switch on the front panel. The latching module itself is located inside the Multidrop under the main circuit board.

7.1.2 OPERATION

The unit will operate as per a standard Multidrop with the additional feature. When there is a high alarm the latching high alarm red LED will turn ON and stay on. To turn this LED OFF, the reset button has to be pushed.

NOTE: When first powered up, the latching high alarm LED may have to be reset.

7.1.3 LATCHING MODULE SPECIFICATIONS

Power – Non alarm:	5 VDC @ 2 μ A
Power – Alarm:	5 VDC @ 7 mA
Operating temperature:	-10 to +40 °C
Wiring to Multidrop PCB:	Red (+), yellow (signal), green (ground)
Wiring to reset switch:	Brown, brown
Wiring to latching LED:	Black, orange