



# 1022

## Standard Monitor

### **INSTRUCTIONS**

#### **Installation and Operation of the AMC-1022 Monitor with Integral Standard Sensor**

#### **IMPORTANT:**

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

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# 1 WARRANTY

The AMC-1022 monitor is warranted against defects in material and workmanship for a period of two years from date of delivery. During the warranty period, we will repair or replace components that prove to be defective in the opinion of *The Armstrong Monitoring Corporation*. We are not liable for auxiliary interfaced equipment, nor 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

**USING ELECTRICALLY OPERATED EQUIPMENT NEAR GASOLINE OR COMBUSTIBLE 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

Monitor Serial Number .....	_____
Power Supply Requirements .....	_____ 120 VAC, 60 Hz _____
Operating Temperature Range .....	_____ 0°C to 40°C _____
Relative Humidity .....	_____ 0 to 99% (non-condensing) _____
I/O Cards.....	_____

SENSOR or TRANSMITTER		Type of Gas	Low Alarm Trip Point	High Alarm Trip Point
Part No.	Serial No.			

**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

The AMC-1022 is a one sensor gas monitoring system designed to continuously monitor surrounding air for traces of hazardous gases (listed in Product Information Section). It can be calibrated to detect a wide variety of toxic gases. The monitor comes with the following features.

1. SENSOR: Long life solid state, low maintenance, factory calibrated.
2. POWER ON INDICATOR: Power is indicated by a GREEN LED.
3. FAIL INDICATOR: Sensor signal fail is indicated by an amber LED.
4. LOW ALARM: Low conditions of gas are indicated by a YELLOW LED.
5. HIGH ALARM: High conditions of gas are indicated by a RED LED.
6. TEST SWITCH: The test switch is provided to electronically simulate alarms in order to test the low and high alarm indicators, relays and audio alarm indicator.
7. LOW ALARM ADJUST: Sets the LOW alarm trip point.
8. HIGH ALARM ADJUST: Sets the HIGH alarm trip point.
9. SIGNAL ADJUST: Sets the sensitivity of the sensor.
10. THREE CIRCUIT MINIATURE SWITCH: Each actuator on the miniature switch controls a different circuit as shown in Figure 1. If the actuator is set in the UP position, its corresponding circuit is ON. If the actuator is set in the DOWN position, the circuit is OFF.
  10. a) LEFT ACTUATOR: Provides a TEN minute time delay, when the switch is ON, to eliminate unnecessary alarms caused by momentary exposure to high conditions of gases.
  10. b) MIDDLE ACTUATOR: Provides a FIVE minute time delay, when the switch is ON, to eliminate unnecessary alarms caused by momentary exposure to low conditions of gases.
  10. c) RIGHT ACTUATOR: Controls the audio alarm indicator. When ON, the buzzer will activate when a high alarm condition occurs.
11. AUDIO ALARM INDICATOR: When operational (see item 10), the buzzer will activate when a high alarm condition occurs.
12. RELAYS: There are two DPDT relays which work with high alarm and low alarm respectively.
13. TRANSFORMER: Class II, step down transformer runs the internal circuitry at low

voltages.

14. POWER TERMINAL  
BLOCK:

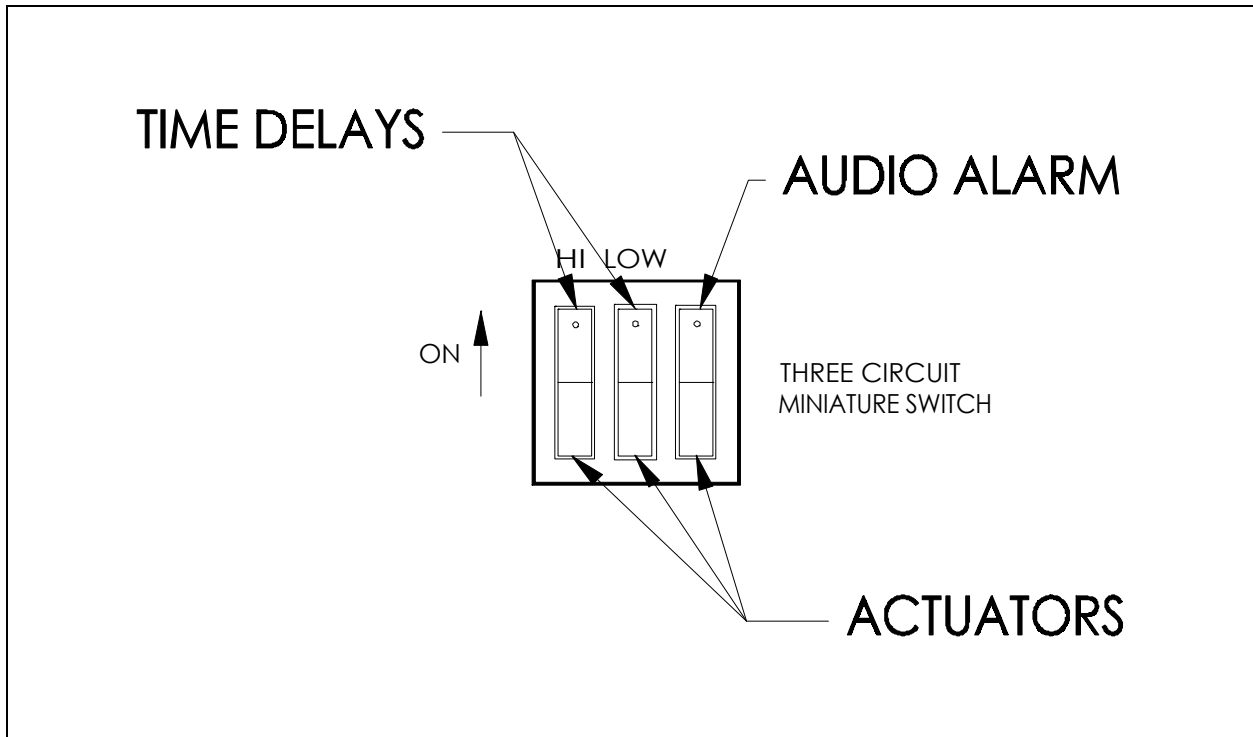
For line voltage connections (120 VAC, 60 Hz).

15. SCREW LOCK DEVICE:

To secure the front panel. Restricting access to the internal controls.

16. SENSOR TERMINAL  
BLOCK:

For sensor connections.



**Figure 1: Three circuit miniature switch.**



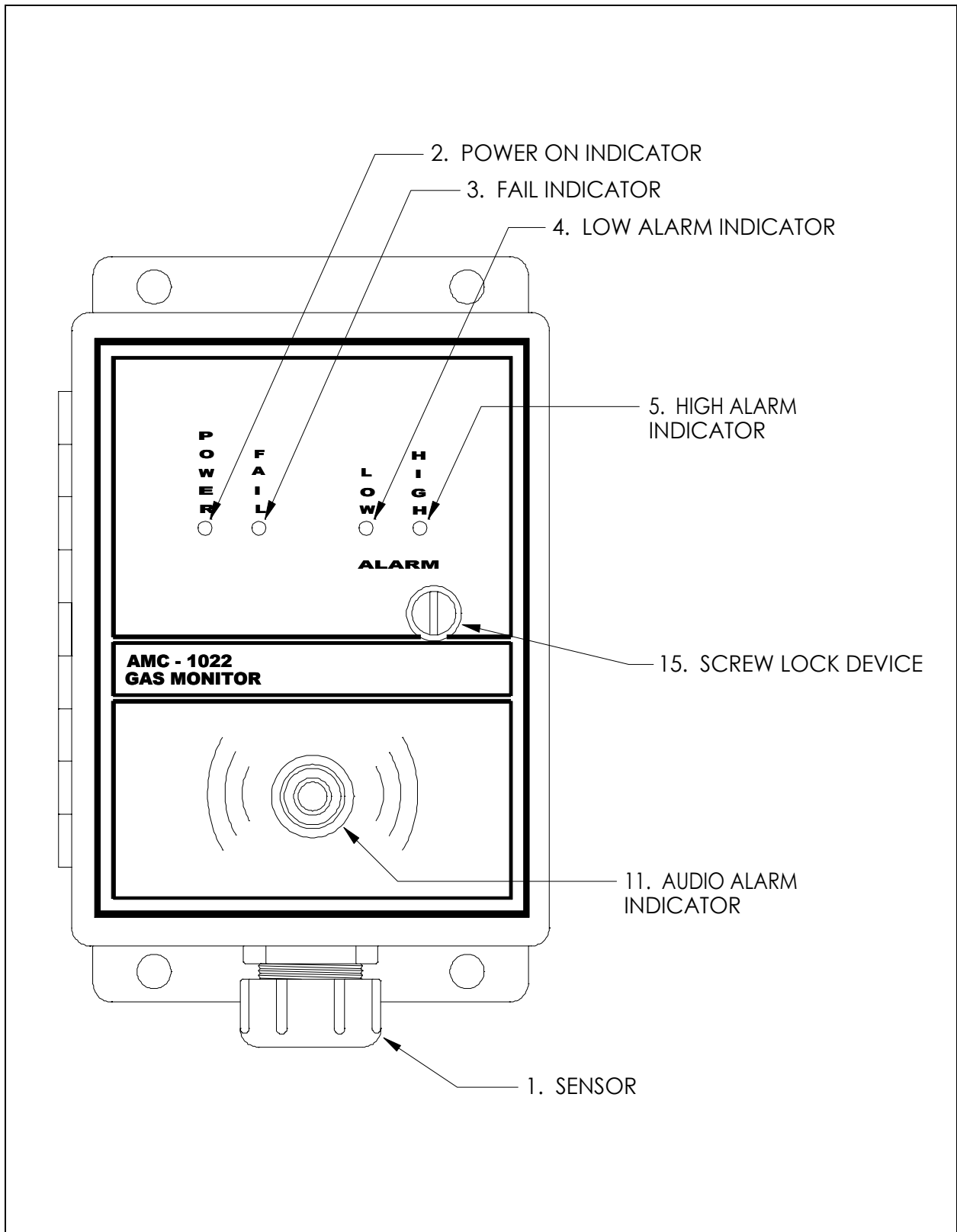


Figure 2: AMC-1022 monitor, front panel.

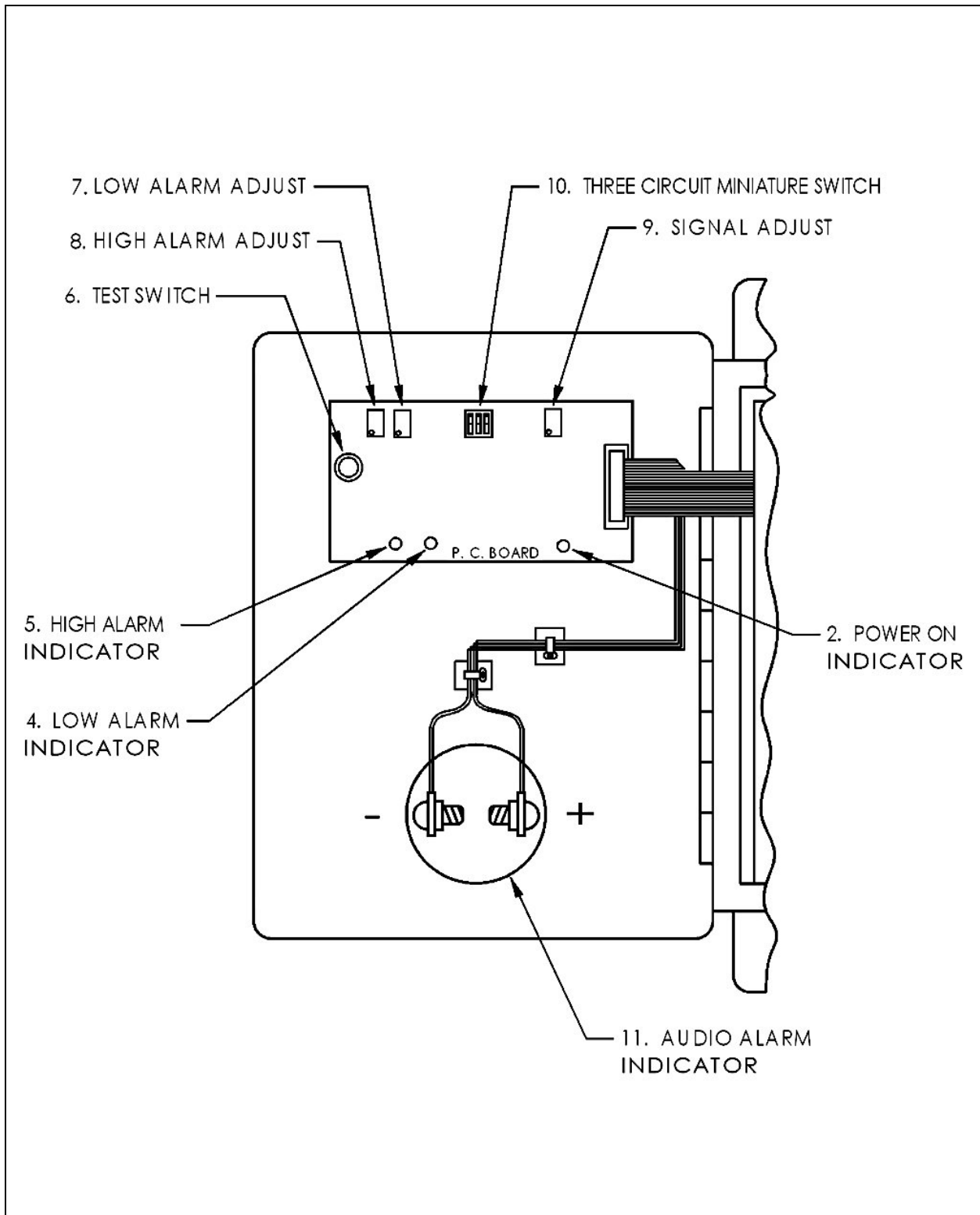


Figure 3: AMC-1022 monitor, inside front panel.

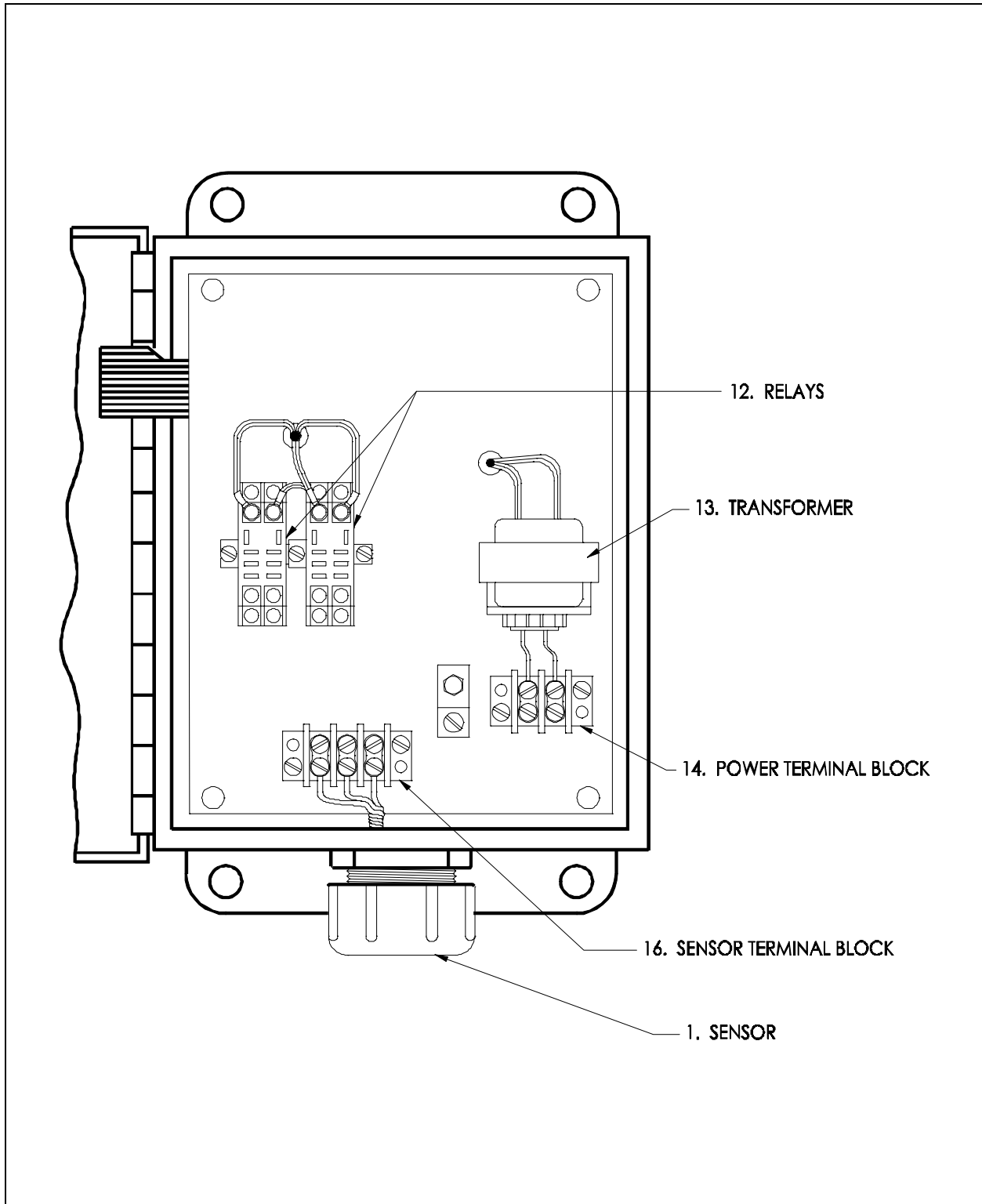


Figure 4: AMC-1022 monitor, inside power / relay panel.



## 4 INSTALLATION

### 4.1 LOCATION AND MOUNTING

Care should be taken to securely fasten the AMC-1022 monitor unit on a solid, non-vibrating surface or structure at eye level. Mount the monitor in a NON-HAZARDOUS area where the unit can be observed periodically. (See Figure 5 for mounting hole locations.)

#### Note:

All cable entry **MUST** be through the **BOTTOM** of the monitor enclosure only. Other entry locations will allow foreign materials to enter the enclosure, possibly causing damage to internal components. Mounting hardware and conduit connections are **NOT** supplied.

### 4.2 WIRING OF THE MONITOR

**POWER SUPPLY:** The monitor operates on 120 VAC, 60 Hz. An internal transformer runs the internal circuitry at low voltages. The power supply connections are made at the power terminal block located at the lower right inside the monitor. (See Figure 6)

**RELAYS:** There are two DPDT relays which work with high alarm and low alarm respectively. Alarms energize the relays causing contact transfer. The relay contacts are available for activating a remote alarm and/or an exhaust fan. Relays are rated 1/3 hp @ 120 VAC/240 VAC, 10 Amps @ 28 VDC/120 VAC/240 VAC resistive. (See Figures 4 and 7)

**SENSOR:** The sensor is wired to a sensor (-,sig,+) terminal block located on the inner panel of the monitor (see Figure 6). Refer to section 6.3 and Figure 12 for the sensor replacement procedure.

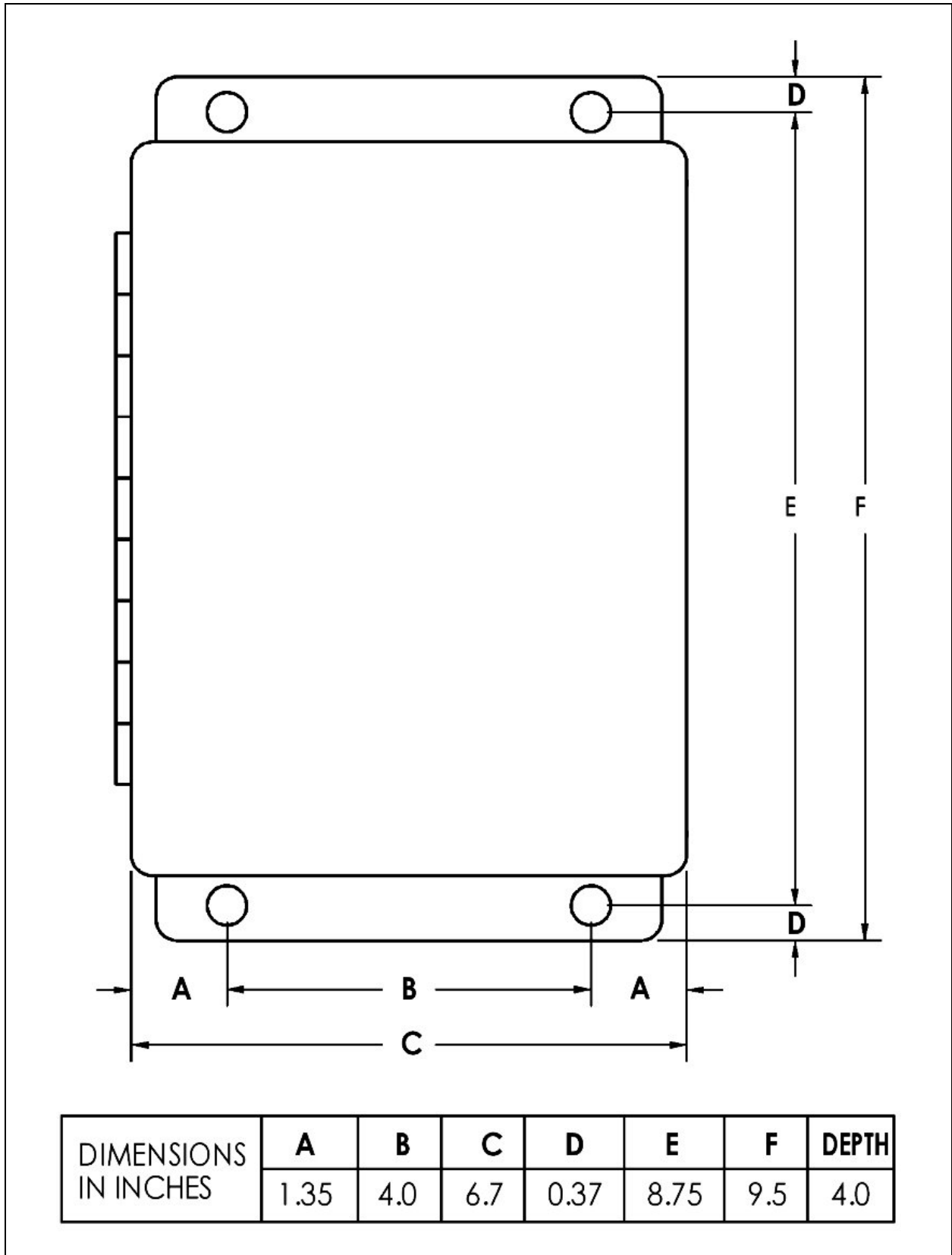


Figure 5: Monitor mounting dimensions.

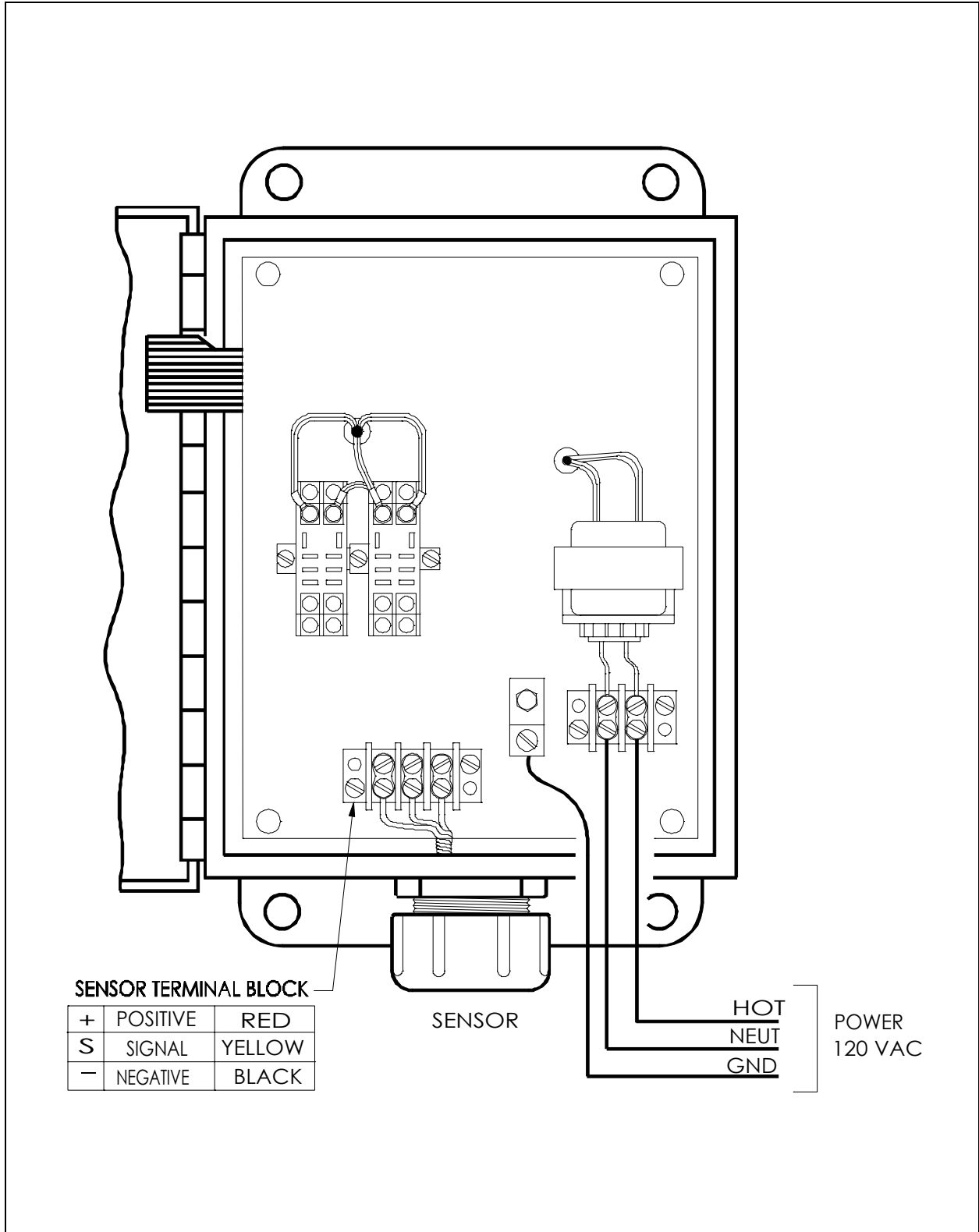


Figure 6: Monitor power connections and sensor wiring.

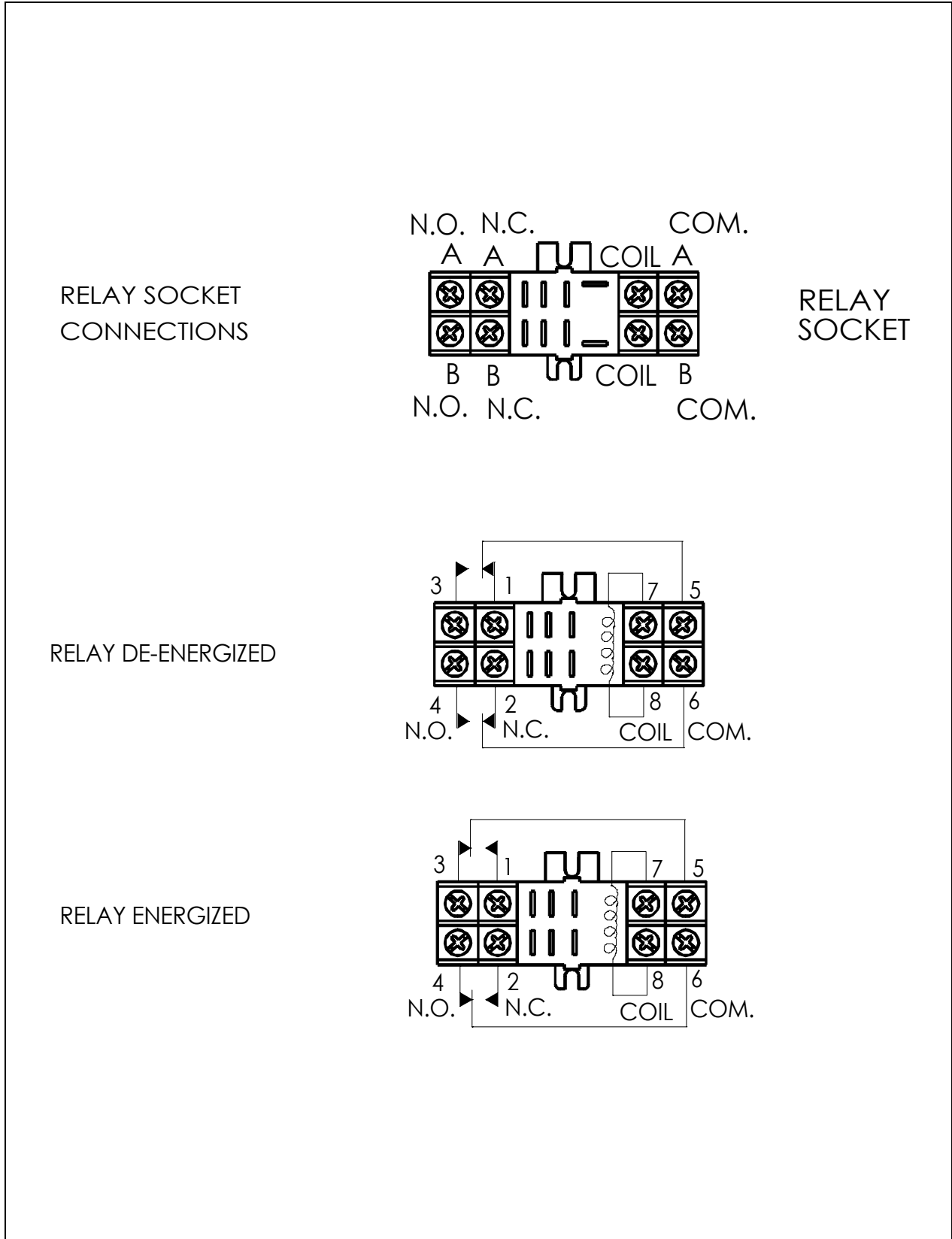


Figure 7: Relay contacts wiring diagram.



## 5 OPERATION AND CALIBRATION

### 5.1 OPERATION

When power is applied, the GREEN power LED will light. A one minute time delay eliminates false alarms from occurring during the sensor's warm up period. After this time delay, the unit becomes fully operational. If one or both time delays are required or the audio alarm indicator is not needed the three circuit miniature switch can be set accordingly. Refer to Section 3, Item 9 and Figure 1.

If any gas exceeds the low alarm trip point setting the yellow LED and low alarm relay will be activated. If any gas exceeds the high alarm trip point setting the red LED, high alarm relay and buzzer will be activated.

### 5.2 CALIBRATION

The AMC 1022 gas monitor is factory calibrated at levels based on set standards. Calibration of the monitor should be performed every 6 months unless the alarm trip point settings need to be changed. The monitor operates with a standard sensor assembly and all on site adjustments are made at the monitor. Recalibration is necessary when either replacing the sensor or changing the alarm trip point settings. Use Armstrong's calibration chamber AMC-CK2700.

#### Note:

**BEFORE MAKING ANY CHANGES TO ALARM LEVEL SETTINGS WE RECOMMEND CONSULTING AMC FOR ADVICE ON SETTING THE PROPER TRIP POINT VOLTAGE FOR A SPECIFIC GAS ALARM CHANGE. IF A GAS SAMPLE IS TAKEN FROM VOLATILE LIQUID VAPOURS ONLY THE CALIBRATION CHAMBER IS REQUIRED.**

#### 5.2.1 SETTING UP CHAMBER AND APPLYING GAS

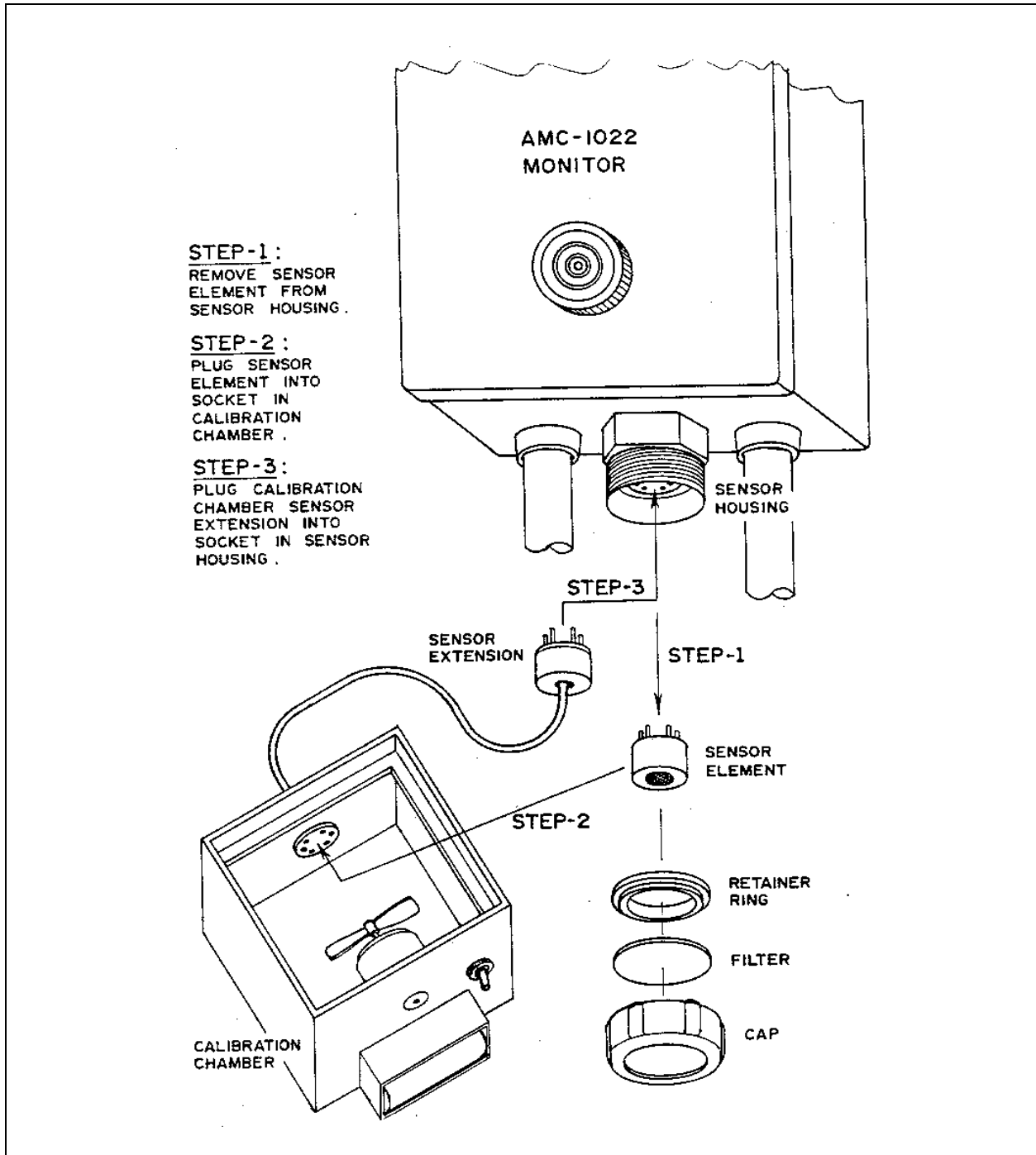
Prior to applying gas to the sensor follow the procedure shown in Figure 8 to set up the calibration chamber. Once the calibration chamber is set up a gas sample may be taken and injected into the chamber following the procedures shown in Figures 9 and 10. Measure the gas sample in the 1cc syringe to obtain the desired concentration. Please refer to the following gas concentration chart.

Volume of Pure Gas (cc)	Equivalent Concentration (ppm)
0.1	50
0.2	100
0.3	200
0.4	400



**Note:**

**ALLOW 5 MINUTES WARM UP FOR SENSOR TO STABILIZE BEFORE INJECTING THE GAS SAMPLE.  
 FOR CO, MEASURE VOLUME x 4 TO OBTAIN DESIRED CONCENTRATION.  
 (i.e.: 0.1cc x 4 = 0.4 cc for 50 ppm)**



**Figure 8: Calibration chamber set-up procedure.**



### 5.2.2 ADJUSTMENTS

To observe immediate reaction during calibration, the low and high alarm time delays should be disabled. All calibration is made using the three trimmers along the top edge of the circuit board as shown in Figure 3.

The low alarm adjust is used to establish the low alarm trip point. This is done by exposing the sensor to the low alarm gas concentration and adjusting the LOW trimmer clockwise until the YELLOW LED just lights.

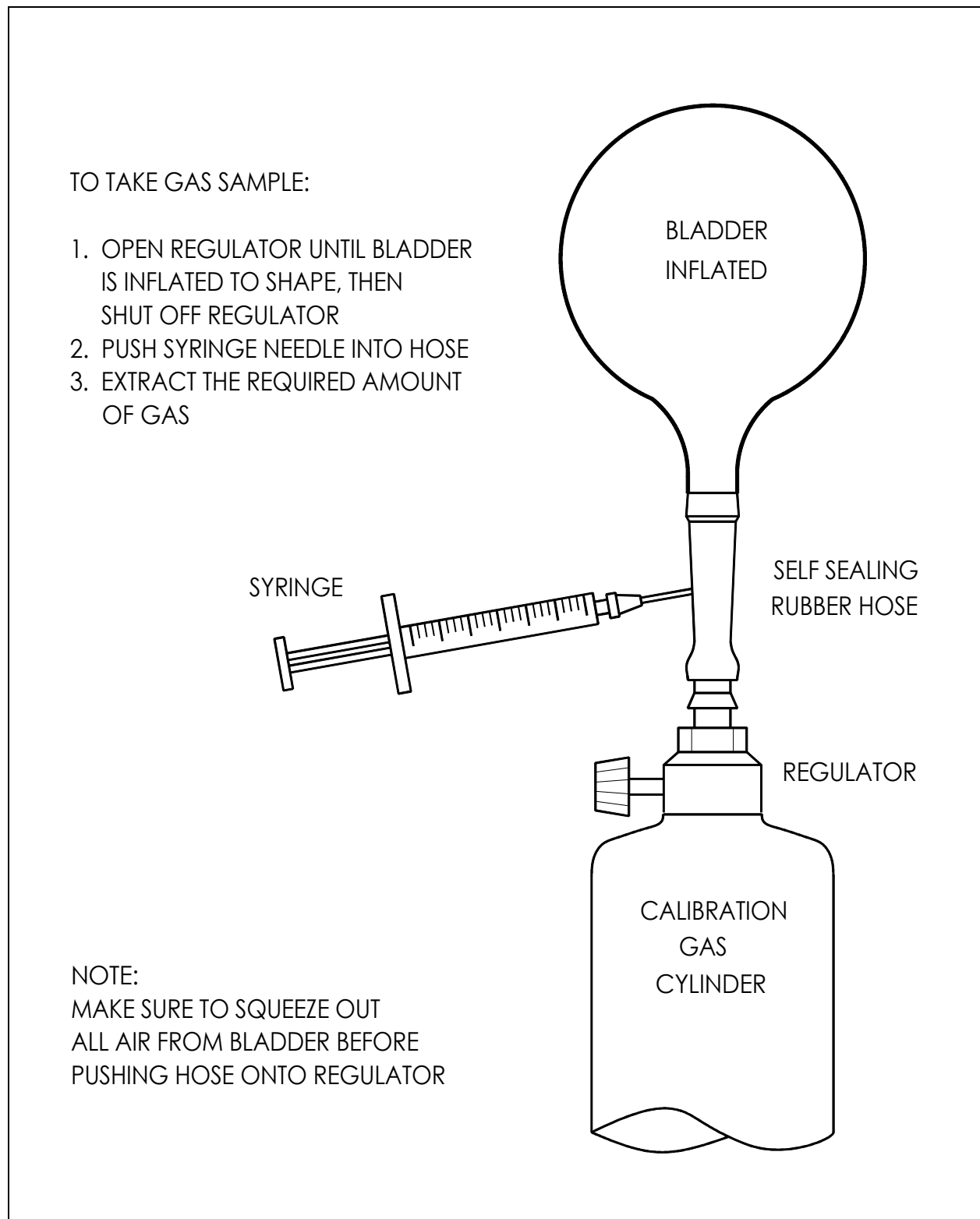
The high alarm adjust is used to establish the high alarm trip point. This is done by exposing the sensor to the high alarm gas concentration and adjusting the HI trimmer clockwise until the RED LED just lights.

#### Note:

**IF THE SENSOR HAS BEEN REPLACED, ADJUST THE SIGNAL FIRST THEN PROCEED WITH LOW ALARM AND HIGH ALARM ADJUSTMENTS. SIGNAL CALIBRATION IS PERFORMED USING A DIGITAL MULTIMETER SET TO MEASURE DC VOLTAGES TO TWO DECIMAL PLACES.**

The SIGNAL adjust is used to set the sensitivity of the sensor. This is done by exposing the sensor to the LOW alarm concentration of gas. The voltage associated with the signal can be measured at the test point immediately above and to the left of the SIG trimmer as shown in Figure 11. The voltage measured at the signal test point should be approximately 3.0 Volts.

When the calibration is complete remove the calibration chamber and replace the sensor element, retainer ring, filter and threaded cap in that order as shown in Figure 12.



(dwg # 2592)

**Figure 9: Taking gas sample**

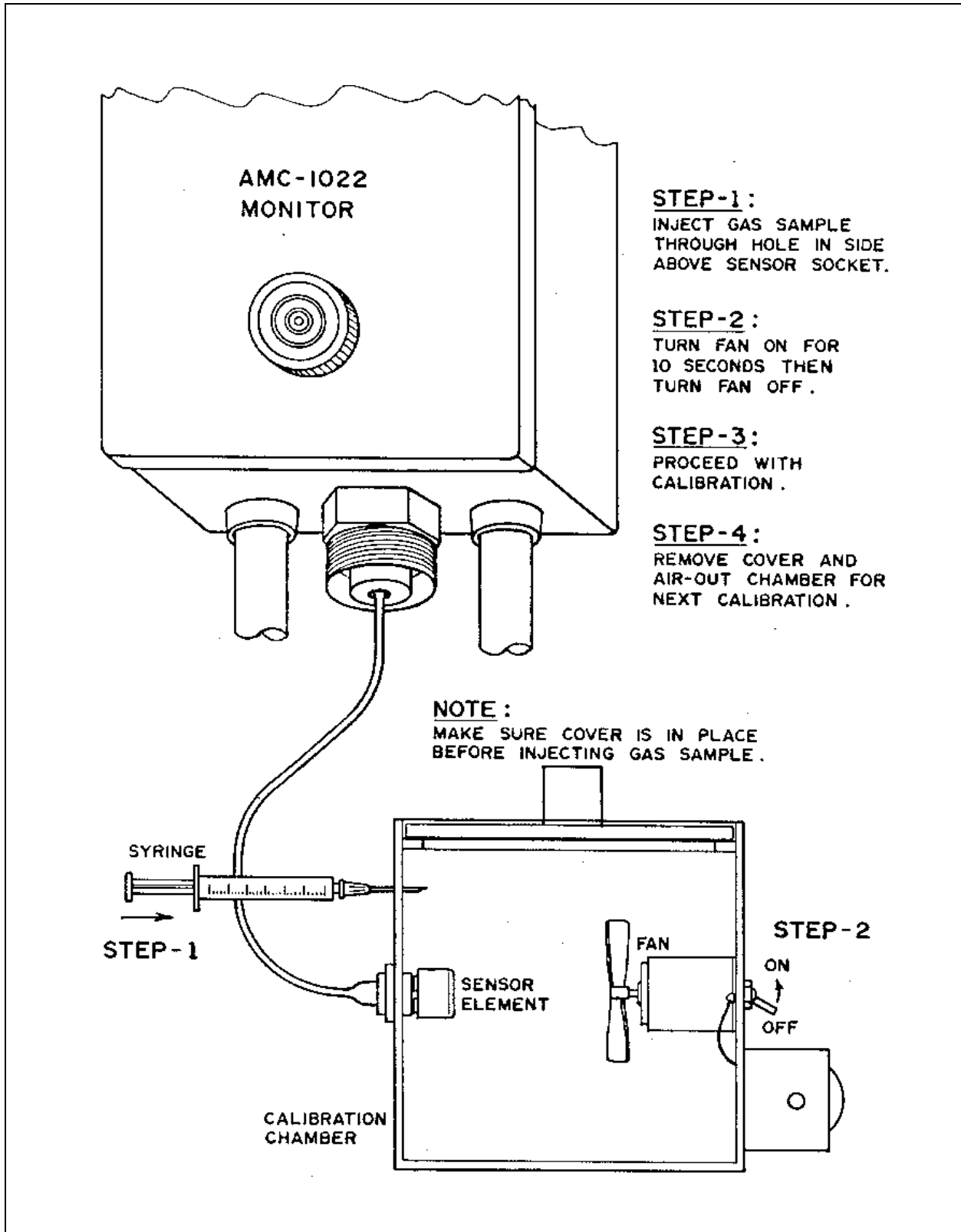
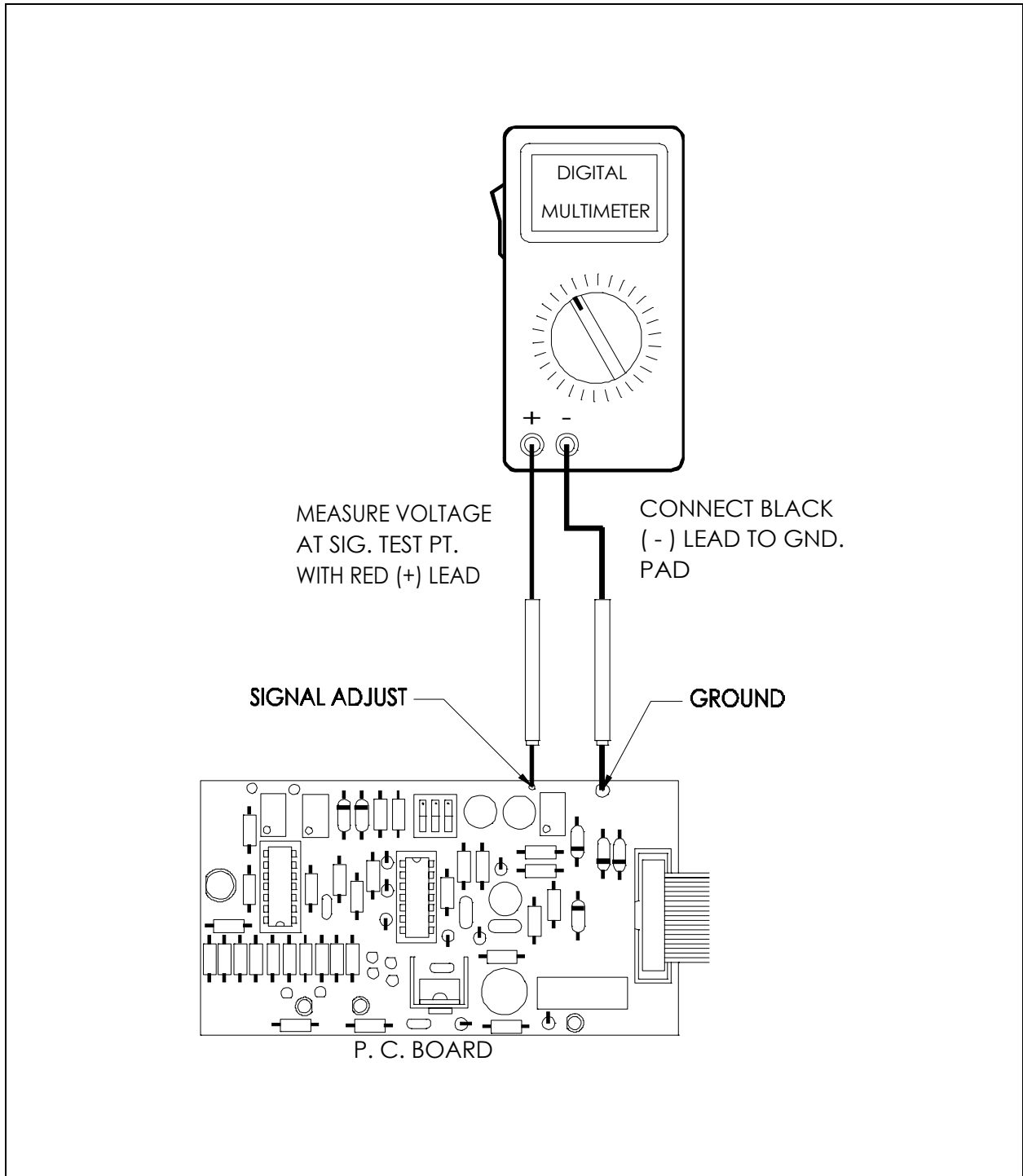


Figure 10: Injecting gas sample for calibration



(dwg # 2593)

Figure 11: Trimmer adjustment and test point locations



## 6 PREVENTIVE MAINTENANCE

### 6.1 GENERAL

The monitor and 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 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

A function test should be performed to ensure that the monitor and sensor are functioning properly. This test should be performed every 2 months, but for more demanding applications, verification should be performed on a weekly basis.

### 6.3 SENSOR REPLACEMENT

#### Caution:

<b>TURN OFF THE POWER SUPPLY BEFORE ATTEMPTING THE FOLLOWING PROCEDURE.</b>
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Sensor life is typically in excess of 10 years. The sensor should be replaced under the following conditions:

1. When the FAIL light activates, indicating the sensor element is an open circuit.
2. When the sensor no longer responds to the presence of gas.

When the sensor needs replacing reorder Part No. listed in the Product Information Section. To replace the sensor element unscrew the cap, including filter and retaining ring, from the sensor housing. Unplug the used sensor element from its socket and discard. Plug in the replacement sensor element. Reinstall the retainer ring, filter and threaded cap. See Figure 12 for sensor replacement procedure.

#### Caution:

<b>ALLOW 24 HOURS FOR THE NEW SENSOR ELEMENT TO STABILIZE (BURN IN) PRIOR TO RECALIBRATION. FOLLOW THE RECALIBRATION INSTRUCTIONS IN THE CALIBRATION SECTION 5.2 OF THIS MANUAL.</b>
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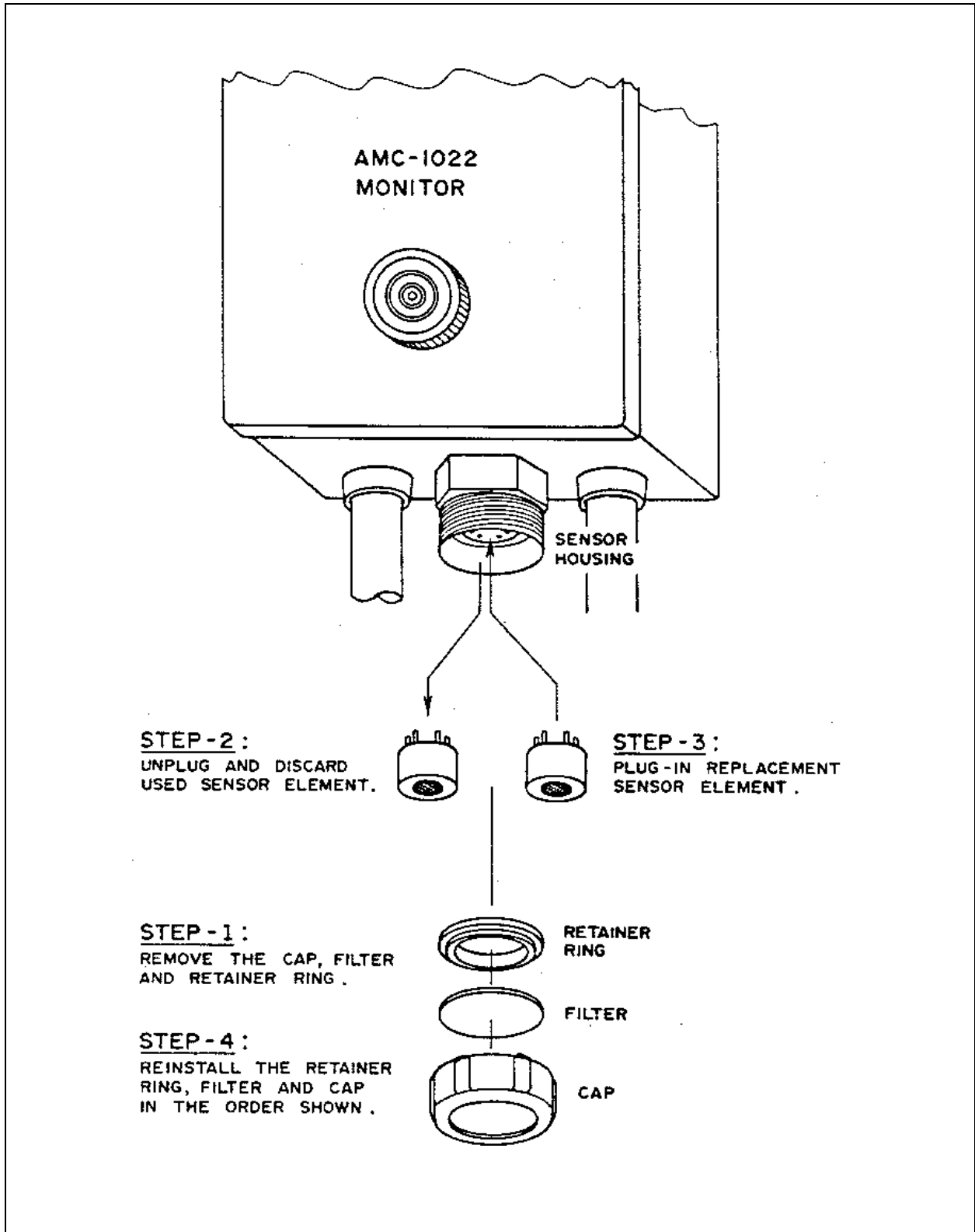


Figure 12: Sensor replacement procedure.