



# 1032

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## INSTRUCTIONS

**INSTALLATION AND OPERATING INSTRUCTIONS  
FOR THE AMC-1032 TWO CHANNEL MONITOR  
WITH INTEGRAL CARBON MONOXIDE/REMOTE  
AMC-3700 PROPANE SENSORS**

### IMPORTANT:

**PLEASE READ THESE INSTRUCTIONS CAREFULLY  
BEFORE BEGINNING INSTALLATION AND/OR  
OPERATION OF THIS EQUIPMENT.**





# AMC – 1032 CO/PROPANE

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## WARRANTY

The AMC-1032 monitor is warranted against defects in material and workmanship for a period of two 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.

## 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.

## 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.

## 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.



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## PRODUCT INFORMATION

Monitor Serial Number..... \_\_\_\_\_

Power Supply Requirement ..... 120 VAC, 60 Hz

Operating Temperature..... 0° TO 40°C

Relative Humidity ..... 0 – 99% non-condensing

Sensor			Type of Gas	Alarm Trip Points		Signal Voltage (volts)
No.	Part No	Serial No.		LOW	HIGH	
S1			carbon monoxide			
S2			propane			

### NOTE:

ALL ARMSTRONG MONITORING SYSTEMS MUST BE PROPERLY INSTALLED AND MAINTAINED ACCORDING TO INSTRUCTION, TO ASSURE PROPER OPERATION. ONLY QUALIFIED TECHNICIANS SHOULD INSTALL AND MAINTAIN THE EQUIPMENT.



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## 1 PRODUCT DESCRIPTION

This section provides a general description of the features of the AMC 1032 monitor.

### 1.1 GENERAL DESCRIPTION

The AMC-1032 CO/PROPANE monitor is a two channel gas monitoring system designed to provide continuous, reliable surveillance of surrounding air for traces of carbon monoxide and propane, as detailed on page v. This unit provides independently adjustable alarms for increasing-level detection. Channel 1 indicates carbon monoxide alarms and channel 2 indicates propane alarms that are shown on the display (see Figure 1-1).

1. POWER TERMINALS: For line voltage connections of 120 VAC, 60 Hz.
2. TRANSFORMER: A Class II, step down transformer runs the internal circuitry and remote sensor at low voltages.
3. MAIN TERMINAL BLOCK: Provides wiring connection points as follows:
  - 1,2** - Audio alarm indicator
  - 3,4** - Acknowledge switch
  - 5,6** - 12 VAC power input
  - 7,8,9** - (Not used)
  - 10,11,12** - Sensor 2 input
4. AUDIO ALARM INDICATOR: The buzzer will activate for high alarm, low alarm and fail conditions, with a distinct tone for each one.
5. DISPLAY: Indicates status of sensor(s). During normal operation, a dash (-) is displayed. An alarm condition will display a letter, "A, L, or H" (indicating alarm) or "F" (sensor failure), followed by a number, "1" or "2" (indicating which channel).  
Example: If one sensor is in Low alarm and the other is in Fail, display sequence will be "L, 1, F, 2, blank".
6. RELAY SETUP JUMPERS: Used to independently configure the LO and HI relays as Energized or Non-Energized.
7. TEST SWITCH: The test switch is provided to electronically simulate alarms in order to test audio and relay functions.



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- 8. ALARM ADJUST: Sets the HI alarm of sensor 1/2 trip point. (See Figure 3-1)
- 9. SENSOR SIGNAL ADJUST: Sets the signal of sensor S1/S2 to match preset LO alarm trip point. (See Figure 3-1)
- 10. PROGRAMMING SWITCHES: Allows user to configure the alarm delay and timer circuits, audio alarm activation, and acknowledge switch function.
- 11. RELAYS: Three DPDT relays are provided, for Low alarm, High alarm, and for Fail.
- 12. ON-BOARD CO SENSOR: Allows local detection of gas on one channel.

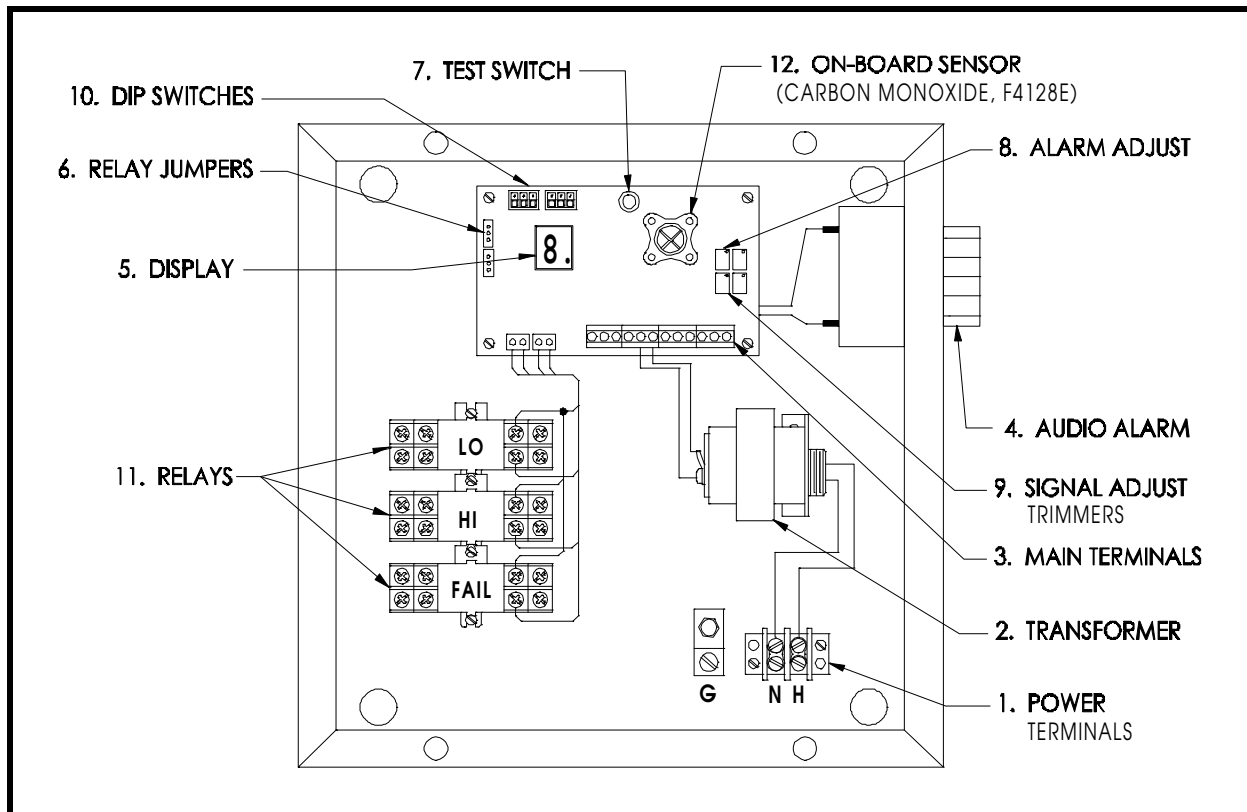


FIGURE 1-1: Internal features of the AMC-1032 monitor. (DWG# 2657)





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## 2 INSTALLATION

This section covers topics related to the installation location, mounting, cable selection and wiring instructions for the AMC 1032 monitor. Monitor function programming is also included in this section.

### 2.1 LOCATION AND INSTALLATION OF MONITOR

Care should be taken to securely fasten the AMC-1032 monitor unit on a solid, non-vibrating surface or structure at 2 feet 11 inches to 3 feet 11 inches from floor. Install the unit in an area where the local concentration of gas is unaffected by the presence of ventilation systems and away from sources of interference gases. Mount the monitor in a NON-HAZARDOUS area where the unit can be observed periodically. See Figure 2-1 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 IS NOT SUPPLIED.**



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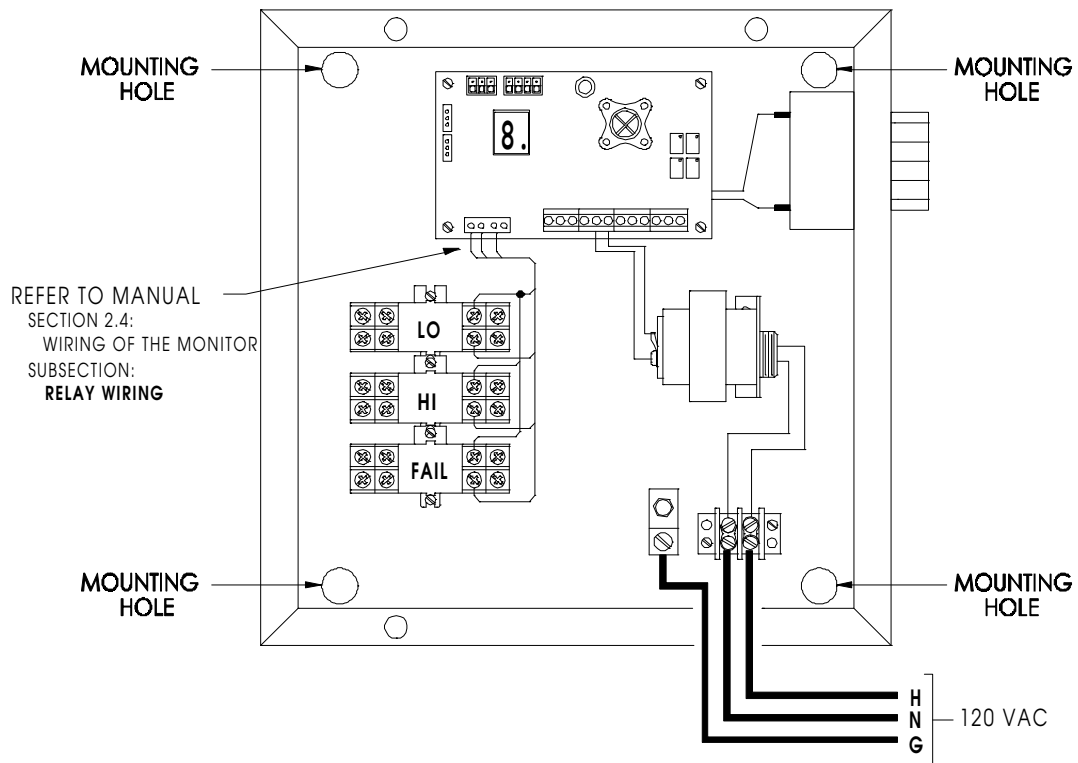


FIGURE 2-1: Locations of mounting holes for installation, and power supply connections.

(DWG#2658)



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## 2.2 LOCATION AND INSTALLATION OF REMOTE PROPANE SENSOR

Mount the remote propane sensor 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 should be installed less than 12 inches above the ground. (See Figure 2-2)

### NOTE

**MOUNTING ARRANGEMENT OF REMOTE SENSOR HOUSING DEPENDS ON SENSOR LOCATION AND MOUNTING SURFACE. MOUNTING HARDWARE IS NOT SUPPLIED.**



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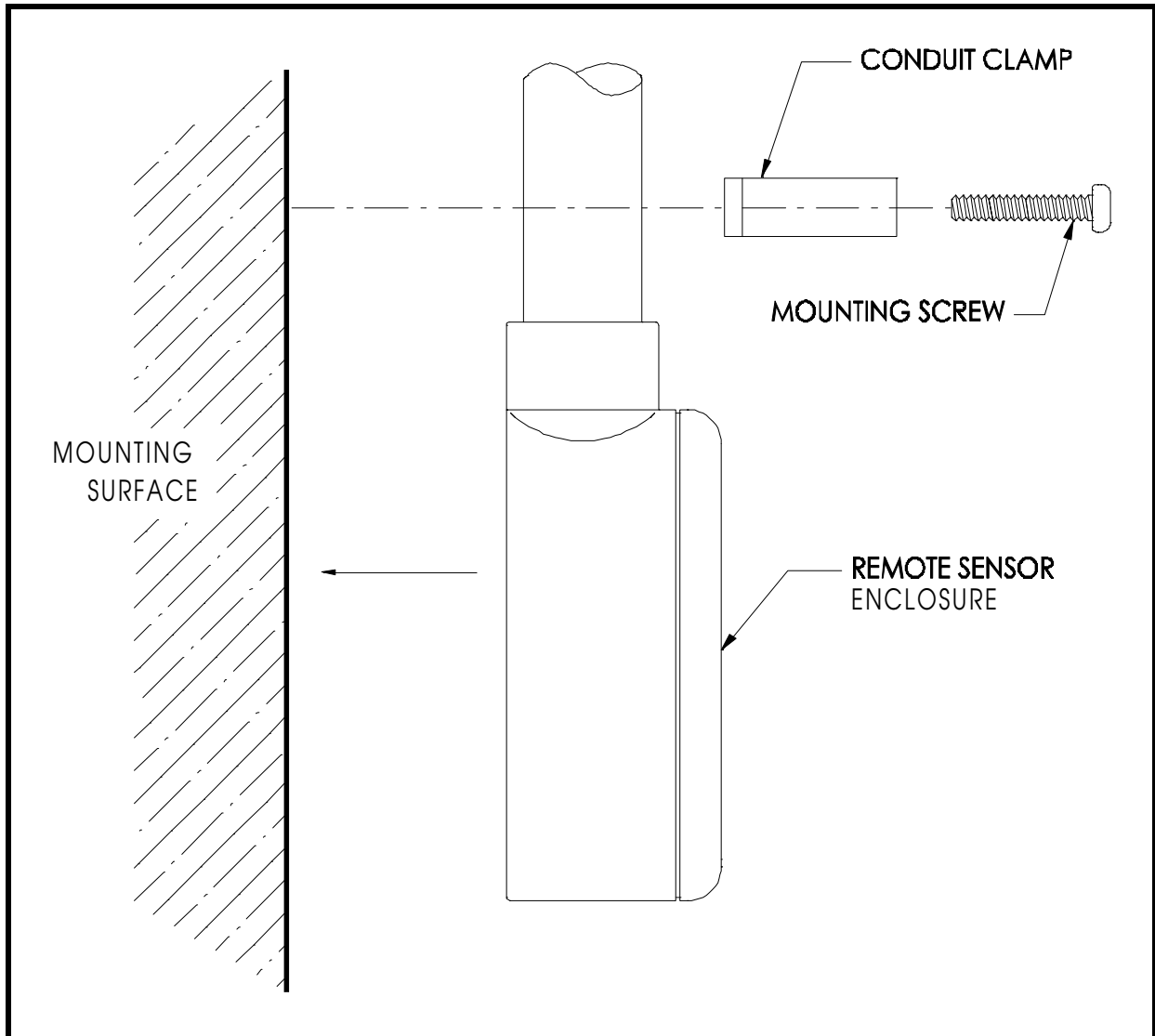


FIGURE 2-2: Installation of remote sensor housing (DWG# 2659)

## 2.3 CABLE SELECTION

Connections from monitor to sensor should be made using shielded, 2 or 3-conductor cable (depending on type of remote sensor or transmitter used). For best signal transmission and maximum noise rejection, run cable through steel conduit (cable



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shield must be grounded at the monitor). For basic selection of cable size and length (between monitor and sensor), refer to the cable selection chart in the appropriate remote sensor or transmitter manual(s).

## 2.4 WIRING OF THE MONITOR

**POWER SUPPLY:** The monitor operates on 120 VAC, 60 Hz. A Class II step down transformer runs the internal circuitry at low voltages. The power supply connections are made at the power terminal block located inside the monitor (See FIGURE 2-1).

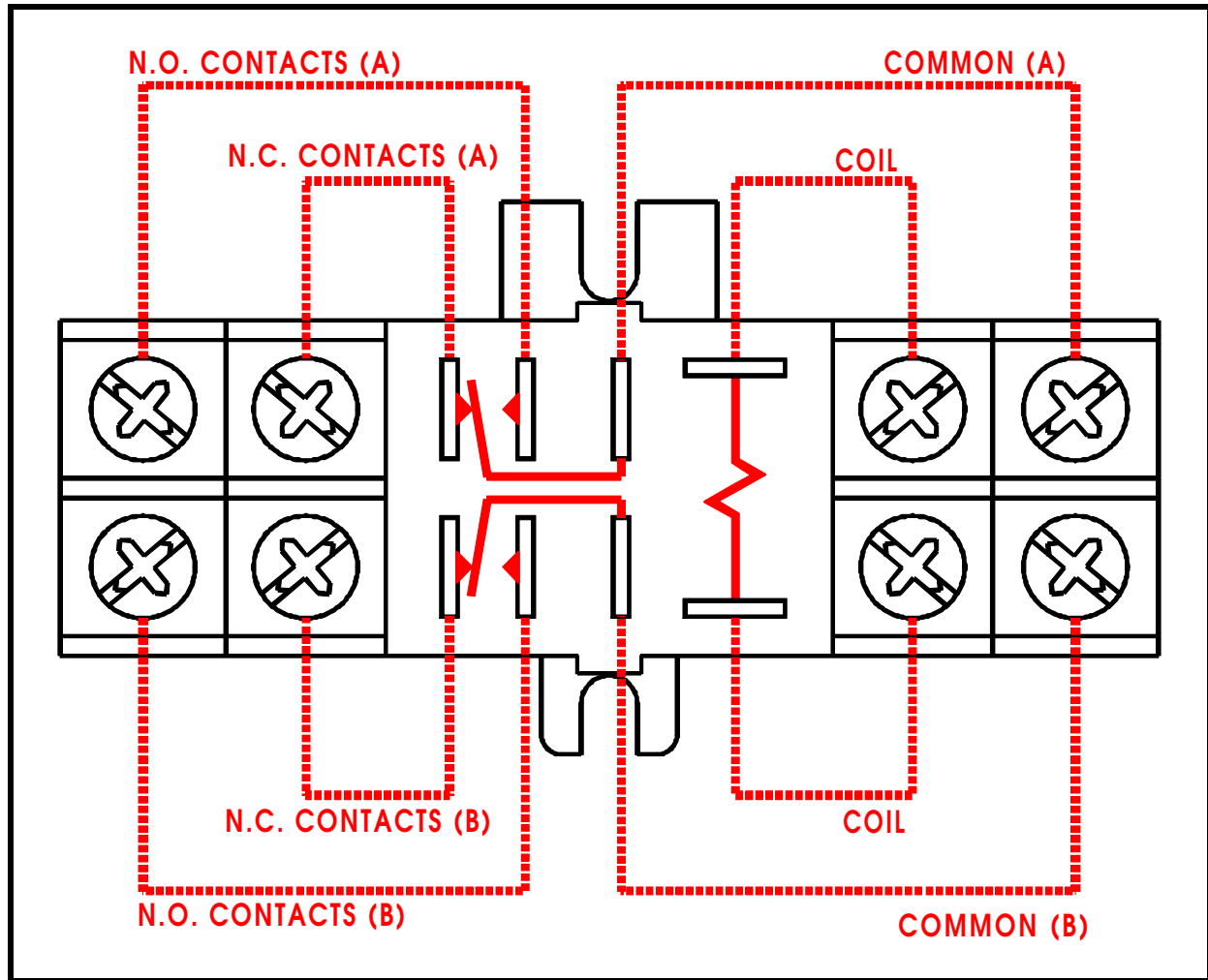
**RELAYS:** There are up to three DPDT relays provided that operate with High/Sensor-2 alarm, Low/Sensor-1 alarm, and Fail. The contacts are rated for 1/3HP@120VAC/240VAC, 10Amps@28VDC/120VAC/ 240VAC, resistive. For relay contact arrangement, see FIGURE 2-3.

**RELAY WIRING:** To safe guard against possible circuit damage, FIRST connect field wiring to relay contacts then connect polarized relay coil wiring connector to header on PCB. Also, disconnect this connector before servicing the unit.

**REMOTE PROPANE SENSOR:**The remote propane sensor connects to a set of sensor terminals (-, S2, +) on the main terminal block located on the circuit card. Refer to FIGURE 2-4.



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**FIGURE 2-3: Relay contact arrangement (DWG# 2679)**

The AMC 1032 is shipped with low and high alarm relays factory configured to be de-energized in the non-alarm state (as per diagram shown above). If the user prefers to have relays in a normally energized (failsafe) state, see section 2.6 for jumper configuration.

The fail relay is factory set in the energized (failsafe) mode, and is not programmable by the end user.



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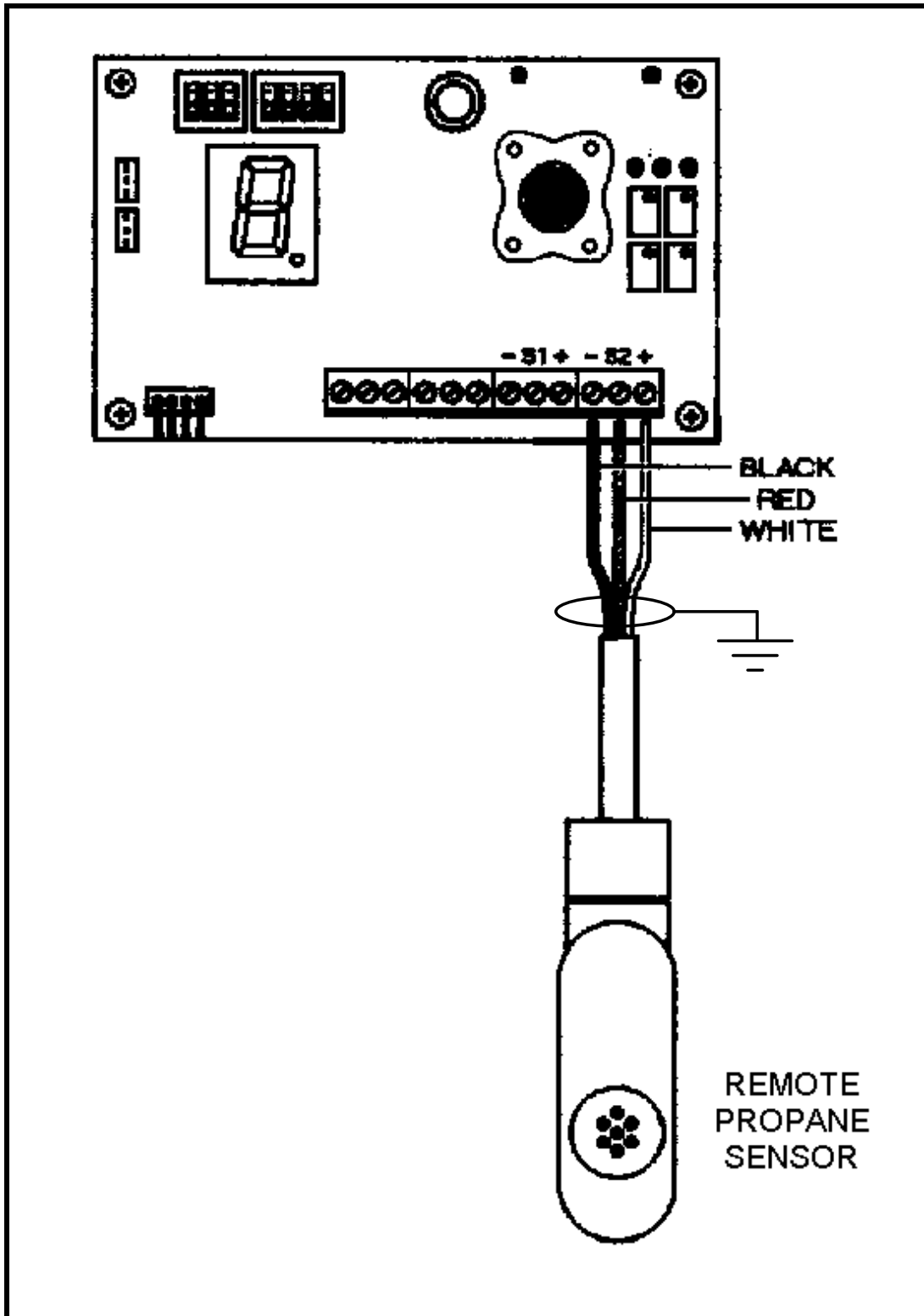


FIGURE 2-4: Wiring of remote sensors and transmitters.



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## 2.5 DIP SWITCH PROGRAMMING

The circuit card has two blocks of DIP switches for configuring the various functions. Each DIP switch can be set to OFF (down position) or ON (up position) depending on functions required.

**TABLE 2-1: DIP switch programming chart.**

SWITCH	POSITION	FUNCTION
SW1-1	OFF	No activation delay of LOW alarm conditions.
	ON	Five (5) minute activation delay of LOW alarm conditions. Sensor returning below alarm threshold resets delay timer.
SW1-2	OFF	No activation delay of HIGH alarm conditions.
	ON	Five (5) minute activation delay of HIGH alarm conditions. Sensor returning below alarm threshold resets delay.
SW1-3	OFF	Audio alarm indicator (buzzer) disabled.
	ON	Audio alarm indicator (buzzer) enabled.
SW2-1	OFF	Pressing the external ACKNOWLEDGE pushbutton switch silences the audio alarm indicator (buzzer) only.
	ON	Pressing the external ACKNOWLEDGE pushbutton switch silences the audio alarm indicator (buzzer), also resets the alarm and fail relays to normal (no-alarm state) subject to alarm timer (see SW2-2: ON).
SW2-2	OFF	Alarm relays return to normal state as soon as alarm condition is removed, or the ACKNOWLEDGE switch is pressed (If SW2-1 is ON).
	ON	Alarm relays are held in alarm state for a minimum of ten (10) minutes. A sensor level falling below the alarm threshold and recurring during this time resets the alarm timer.
SW2-3	OFF	Audio alarm is disabled for LOW alarm conditions (2-threshold sensor modes only).
	ON	Audio alarm is activated on LOW alarm conditions (2-threshold sensor modes only).





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<b>SW2-4</b>	OFF	Sensor fail threshold set at 100 mV (0.4 mA). Normal setting.
	ON	Sensor fail threshold set at 350 mV (1.4 mA). 3-wire transmitter only.

## 2.6 ALARM RELAY PROGRAMMING

Two sets of jumpers are provided, at the left edge of the circuit card, to configure each alarm relay as normally Non-Energized or Energized when not in alarm. Use the chart below to configure the jumpers to the function required.

**TABLE 2-2: Jumper alarm relay programming.**

JUMPER	POSITION	FUNCTION
JB3	1-2	High alarm relay is energized during normal operation (de-energized on alarm). Use this configuration to cause alarm in
	2-3	High alarm relay is de-energized during normal operation (energized on alarm). Use this configuration to reduce power
JB4	1-2	Low alarm relay is energized during normal operation (de-energized on alarm). Use this configuration to cause alarm in
	2-3	Low alarm relay is de-energized during normal operation (energized on alarm). Use this configuration to reduce power

## 2.7 AUDIO ALARMS

An audio alarm output is provided, which produces various alarm sounds, as shown in the chart below. The audio alarm can be disabled by turning OFF DIP switch SW1-3.

**TABLE 2-3: Audio sounds for various alarms.**

SENSOR STATUS	SOUND OUTPUT
Normal Operation (no alarms)	Off (no sound)
Low Alarm (SW2-3 OFF, two-threshold modes only)	Off (no sound)
Low Alarm (SW2-3 ON, two-threshold modes only)	Two (2) long beeps followed by a short pause.



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Any sensor alarm (one-threshold modes) or High Alarm (two-threshold modes)	Four (4) short, fast beeps followed by a short pause
Any sensor fail (with no unacknowledged alarms on the other sensor)	Two (2) short beeps followed by a long pause.

The controller's circuit operation ensures that Low alarm, High alarm and Fail conditions will not occur simultaneously on the same sensor. An alarm condition on a sensor will override a Fail condition on the other sensor.



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## 3 OPERATION AND CALIBRATION

This section covers the operation and calibration procedures pertaining to the AMC 1032 monitor. Self-test and diagnostics instructions are followed by a section on alarm activation delays. The use of the optional acknowledge function are also described in detail. The final topics covered in this section are the descriptions of the alarm and fail thresholds as well as alarm and signal adjustments instructions.

### 3.1 POWER-ON SELF-TEST AND DIAGNOSTICS

The controller features an on-card circuit that continuously monitors display activity. If the display stops for more than one second, indicating a controller failure, the controller is reset. This circuit also monitors the on-card 5 VDC power supply for instability, and will hold the controller in a reset condition until the 5 VDC power supply stabilizes.

On controller power up or reset, the internal memory is checked. If a fault is detected, the display will show "E" (error) with the Decimal Point OFF and the controller is reset.

Following this test, the software is calculated and compared with a stored checksum value.

If the calculated checksum is incorrect, the display will show "E" (error) with the Decimal Point

ON and the controller is reset.

During operation, if an error is detected in the analog-to-digital (ADC) converter circuit, the ADC is reset. If the fault remains, the display will show "H" (halt) with the Decimal Point ON and the controller is reset.

The fail relay stays de-energized (fault condition) until all self-tests have been successfully completed, and if the controller is reset.



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## 3.1.1 POWER-ON DELAY

Following successful completion of all self-tests, the detection of sensor alarm and fail conditions is disabled for 30 seconds. This delay allows the sensors to stabilize. During this delay, the display shows the "sensor normal" condition (cycling dash), with a flashing Decimal Point. The audio alarm is silent, the alarm relays are held in the no-alarm condition, and the fail relay is energized (non-fail state). After this delay, the unit becomes operational and shows the "sensor normal" condition, a dash (-) cycling up and down the display.

## 3.1.2 TEST SWITCH FUNCTION

While the on-card test switch is pressed, it will cause continuous activation of all three relays and audio alarm indicator, and the display shows a "†" (test) and decimal point. Processing of sensor signal(s) and internal functions continues. When the test switch is released, the controller returns to normal operation.

## 3.2 ALARM ACTIVATION DELAYS

If required, an activation delay of five (5) minutes may be independently enabled for Low/High alarm conditions (see DIP switch Programming chart). While enabled (ON), a sensor signal exceeding the alarm threshold momentarily then returns to normal before the delay expires will be ignored and the delay timer will reset. If a sensor signal exceeds the alarm threshold and maintains this level, the alarm will activate after the delay expires. When an active alarm condition returns to normal (no-alarm) the alarm activation delay timer will reset.

## 3.3 ACKNOWLEDGE FUNCTION

An option exists for an "ACKNOWLEDGE" pushbutton switch. When this switch is pressed, all alarm and fail conditions will be silenced (audio alarm off) for 30 minutes. If any



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alarm or fail condition remains after 30 minutes, the audio alarm will reactivate. Any new alarm, fail condition occurring or those returning to normal then reactivating, will cause an immediate audio alarm.

During an acknowledged alarm or fail condition, the display shows the Decimal Point ON.

When the acknowledge timer ends or alarm and fail conditions have returned to normal the Decimal Point will be turned OFF.

If DIP switch SW2-1 is ON, the alarm and fail relays are returned to normal when alarms are acknowledged. If the alarm timer is active (DIP switch SW2-2 ON), the alarm relays will remain in their current state until the alarm timer ends.

## 3.4 ALARM AND FAIL THRESHOLDS

The High alarm thresholds are individually adjustable using adjustment trimmers RV1 and RV2. The adjustment voltages can be measured at the three test points labelled GND, HI/1 and HI/2 located directly above the trimmers. The adjustment range is from 0 to 5 volts. The LOW thresholds are internally set to 2.5 VDC.

The fail threshold is set internally at either 100 mV or 350 mV, selectable using DIP switch SW2-4, below which level the sensor will indicate a fail condition.

## 3.5 ALARM AND SIGNAL ADJUSTMENTS

### 3.5.1 FOR ON-BOARD CO OR REMOTE PROPANE SENSORS

To observe immediate reaction during calibration, the Low and High alarm time delays should be disabled (DIP switches SW1-1 and 1-2). All adjustments are made using trimmers RV1, RV2, RV3 and RV4 directly below the test points (refer to Figure 3-1). This



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calibration procedure should be used in conjunction with AMC-CK2700 calibration kit and instructions.

## NOTE:

**IF A SENSOR HAS BEEN REPLACED ALLOW 24 HOURS FOR SENSOR ELEMENT TO STABILIZE. AFTER THE STABILIZATION PERIOD, ADJUST THE SIGNAL FIRST AND THEN PROCEED WITH LOW ALARM AND HIGH ALARM ADJUST.**

### LOW SIGNAL ADJUSTMENT FOR INTEGRAL CO AND REMOTE PROPANE SENSORS

The signal S1 (RV3) and S2 (RV4) are used to adjust signal sensitivity to match the internal low alarm reference of 2.5 VDC when sensor is exposed to a low concentration of gas. The voltage associated with the signal can be measured at the two test points located at the top edge of the circuit card with reference to ground (see Figure 3-1). This is done by exposing the sensor being calibrated to the low alarm gas concentration (see page v for levels) and adjusting the sensor signal until it equals the internal reference of 2.5 VDC or until the display shows "L,1, L,1, Blank".

### HIGH ALARM ADJUSTMENTS, ONE SENSOR ONLY:

The H1/H2 alarm adjust trimmer are used to establish the high alarm trip points. This is done by exposing the sensor being calibrated to the high alarm gas concentration (see page v for details) and adjusting the H1/H2 trimmers until the display starts to show "H, #, H, #, blank".



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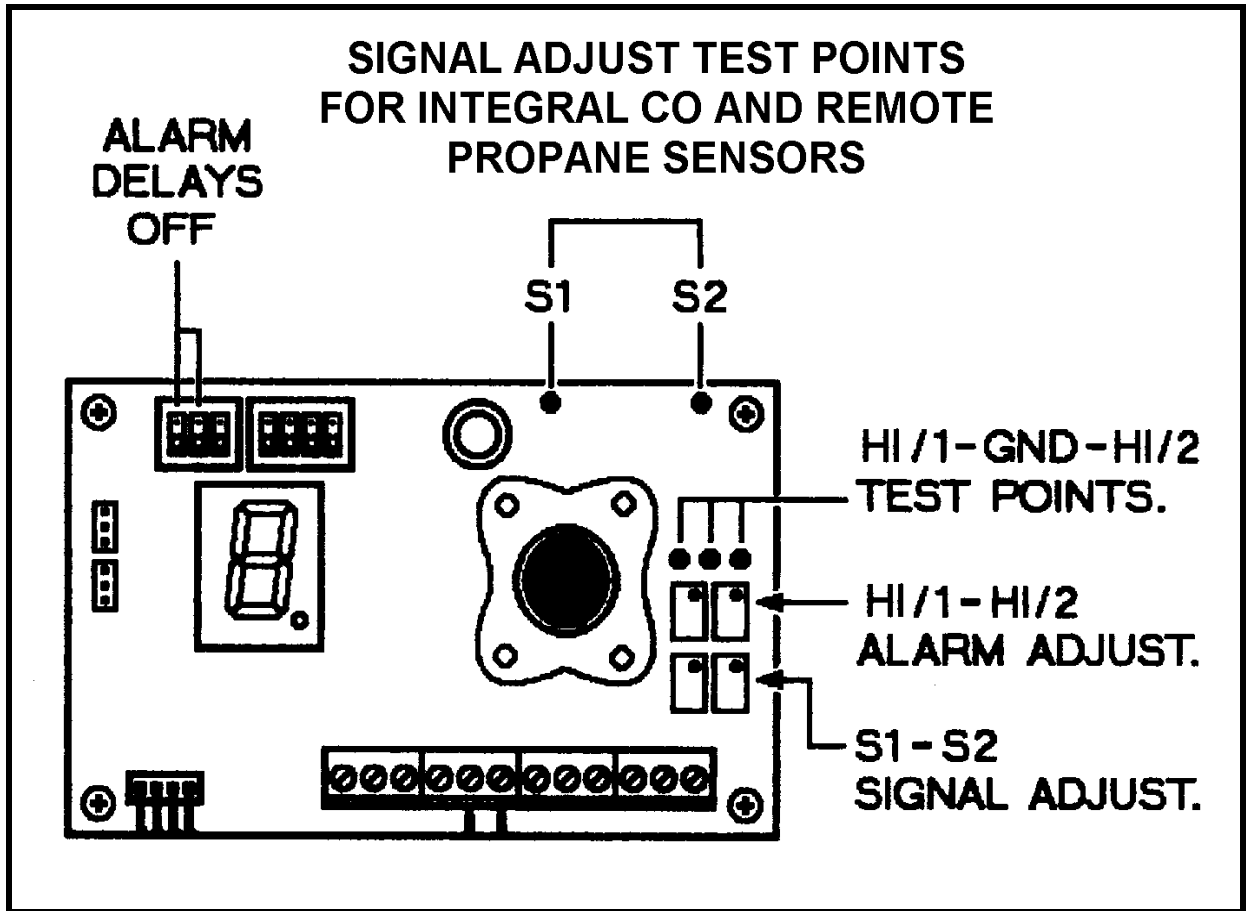


FIGURE 3-1: Trimmer and test point locations and functions



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## 4 PREVENTIVE MAINTENANCE

This section covers all aspects of required maintenance for the AMC 1032 monitor. First, a description of general maintenance is given followed by a verification of operation and sensor replacement.

### 4.1 GENERAL

The monitor unit should be brushed or wiped clean, once a year or more, of any dust or dirt that 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.

### 4.2 VERIFICATION OF OPERATION

To verify the operation of the system, make sure that each sensor is still responding to gas and that the correct condition is shown on the display. This test should be performed every 2 months, but for more demanding applications verification should be performed on a weekly basis.

### 4.3 SENSOR REPLACEMENT

#### CAUTION

**TURN OFF THE MAIN POWER SUPPLY BEFORE ATTEMPTING THE FOLLOWING PROCEDURE.**

The sensor should be replaced when the display shows the letter "F" followed by the number "1" or "2" (depending on which channel it is configured on).





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## ON-BOARD CO SENSOR:

Sensor life is typically in excess of 10 years. When the sensor needs replacing, reorder the part number listed in under Product Description (see page v). Verify the sensor signal at the S1 or S2 test points (See Figure 3-1) and replace the sensor element if required.

Remove the front panel by unscrewing the four (4) retaining screws. Unplug the used sensor element from its socket (on the circuit card) and discard, then plug in the replacement sensor element. Allow 24 hours for the new sensor element to stabilize (burn-in) then follow instructions in section 3.5. When finished, reinstall the front panel and retaining screws.

## REMOTE PROPANE SENSOR:

Sensor life is typically in excess of 10 years. The sensor should be replaced under the following conditions:

1. When the sensor element becomes an open circuit.
2. When the sensor no longer responds to the presence of gas.

When the sensor needs replacing, re-order the part number listed on page v. To replace the sensor element, remove the cover screws, cover and rubber gasket, from the sensor housing. Unplug the used sensor element from its socket and discard, then plug-in the replacement sensor element. Reinstall the cover with rubber gasket, and cover screws. See FIGURE 4-1 for the sensor replacement procedure. Allow 24 hours for the new sensor element to stabilize (burn-in) then follow instructions in section 3.5.



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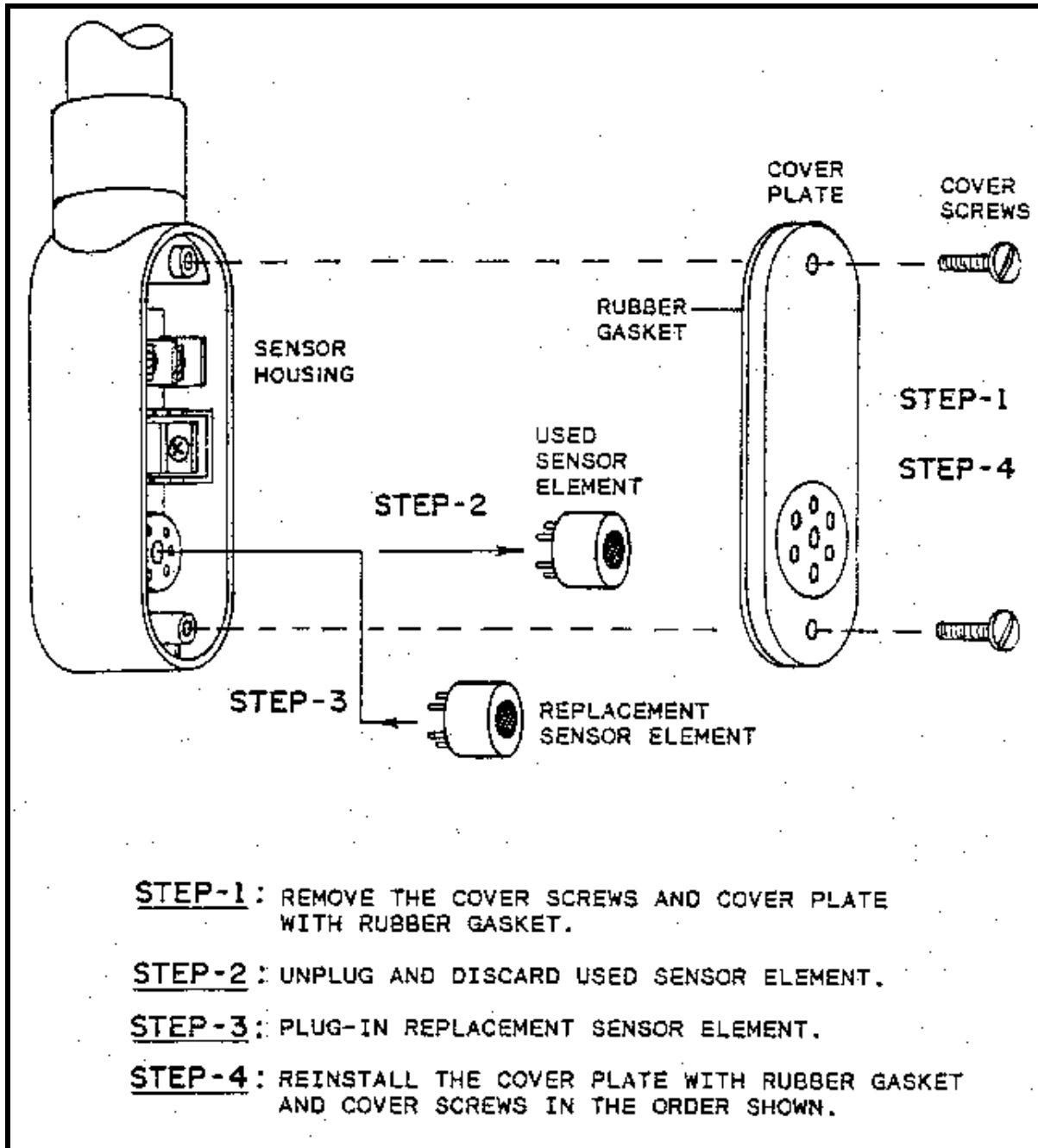


FIGURE 4-1: Remote Sensor replacement



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## HOW TO CONTACT US

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Filename: Manual AMC 1032 CO\_Propane  
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Template: C:\Program Files\Microsoft Office\Templates\Letters  
& Faxes\AMC\_Manuals.dot  
Title: AMC 1030 standard instruction manual  
Subject: AMC 1030 unit operation and maintenance  
Author: Todd Willoughby  
Keywords: 1030, gas, monitor  
Comments:  
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Change Number: 33  
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