1040
Gas Monitor

INSTALLATION AND OPERATING INSTRUCTIONS

AMC-1040 WITH INTEGRAL ELECTROCHEMICAL SENSOR

IMPORTANT:

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

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Revised, 8/7/2002

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1 WARRANTY

The AMC-1040 monitor is warranted against defects in material and workmanship for a period of two years from date of delivery, for sensor element warranty see page iv. 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.

2 PRODUCT INFORMATION

Monitor Part Number ……	
Monitor Serial Number ……..……	
Power Supply Requirements ……	120 VAC, 60 Hz, 20 W max.
Operating Temperature Range ……	
Relative Humidity ……...	
Analog Output ……	4-20 mA 250 ohms load max.
Contact Rating ……	1/3 hp @ 120 VAC/240 VAC, 10 Amps @ 28 VDC/120 VDC/240 VAC
Sensor Warranty ……	
Sensor Life ……..	

SENSOR		Gas/Range	Low Alarm Trip Point	High Alarm Trip Point
Part No.	Serial No.			

TORQUE SPECIFICATIONS:

POWER SUPPLY:
Neutral terminal screw …… 7 pound-inches.
Hot terminal screw ……..…….. 7 pound-inches.
Ground Lug screw …… 15 pound-inches.

RELAY:
Relay socket terminal screws …… 7 pound-inches.

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-1040 is an all in one gas monitoring system incorporating a highly specific electrochemical sensor from AMC's broad selection of available types. It serves to continuously monitor the target gas (listed in Product Information Section). The monitor comes with the following features (see Figures 1, 2 and 3).

1. POWER ON INDICATOR:	Power is indicated by a green LED.
2. FAIL INDICATOR:	Sensor fail is indicated by an amber LED.
3. LOW ALARM INDICATOR:	Low levels of gas are indicated by a yellow LED.
4. HIGH ALARM INDICATOR:	High levels of gas are indicated by a red LED.
5. POWER TERMINAL BLOCK:	For line voltage connections (120 VAC, 60 Hz.)
6. TEST SWITCH:	The test switch is provided to electronically simulate alarms in order to test the low and high alarm indicators and relays.
7. LOW ALARM ADJUST:	Sets the Low alarm trip point.
8. HIGH ALARM ADJUST:	Sets the High alarm trip point.
9. 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.
9. a) TOP ACTUATOR:	Provides a TEN minute time delay, when the switch is ON, to eliminate unnecessary alarms caused by momentary exposure to high alarm conditions.
9. b) MIDDLE ACTUATOR:	Provides a FIVE minute time delay, when the switch is ON, to eliminate unnecessary alarms caused by momentary exposure to low alarm conditions.
9. c) BOTTOM ACTUATOR:	Controls the audio alarm indicator. When ON, the buzzer will activate when a high alarm condition occurs.
10. RELAYS:	There are up to 3 DPDT relays which work with high alarm, low alarm, and as an option fail.
11. TRANSFORMER:	Class II, step down transformer runs the internal circuitry at low voltages.
12. AUDIO ALARM:	When enabled, the buzzer will activate when a high alarm condition occurs.
13. ANALOG OUTPUT:	4-20 mA output 250 ohms load maximum.
14. ON-BOARD SENSOR:	Allows local detection of gas.

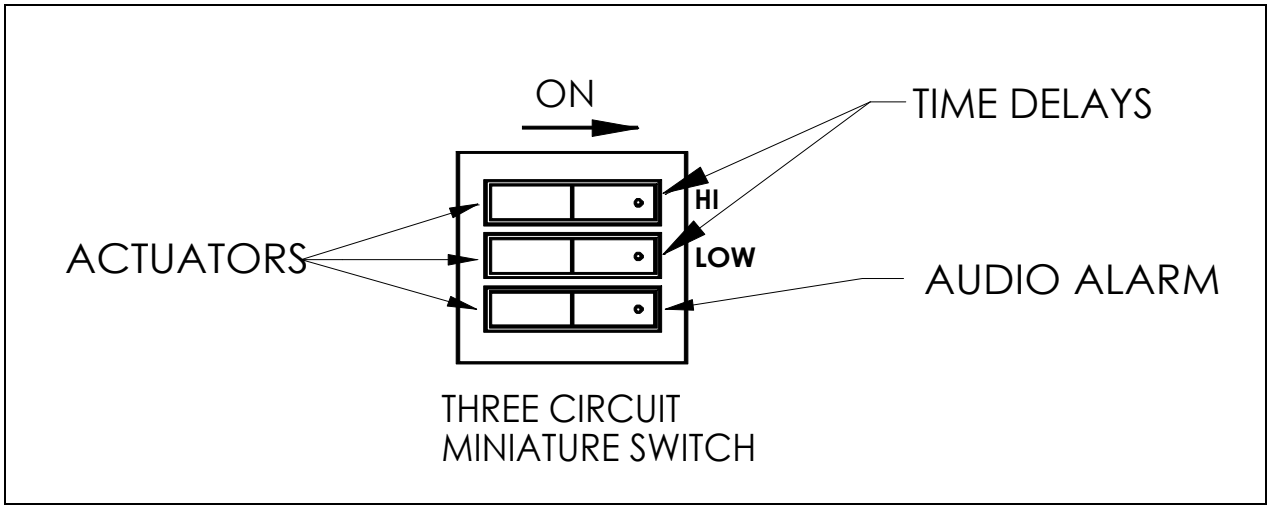


Figure 1: Three-circuit miniature switch.

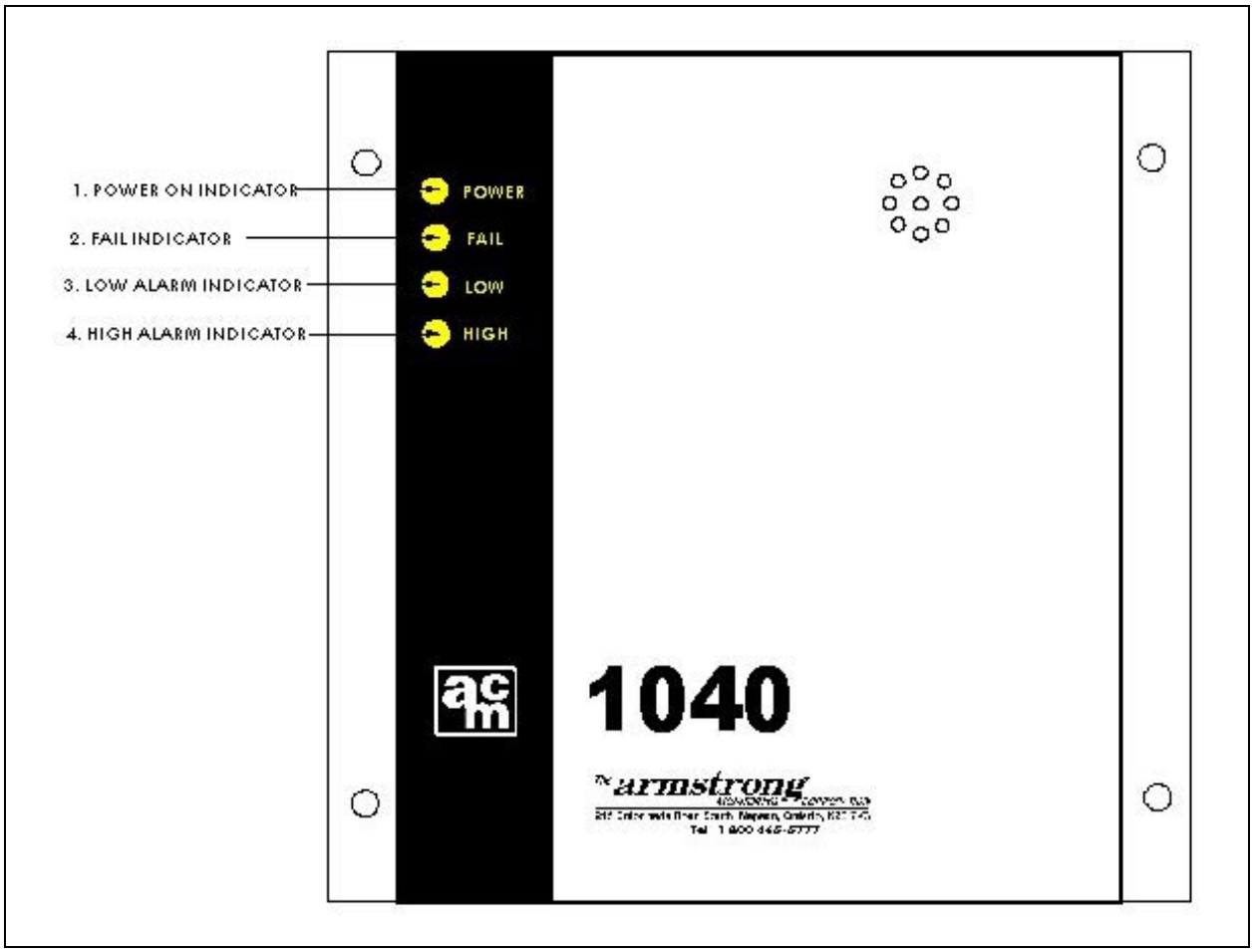
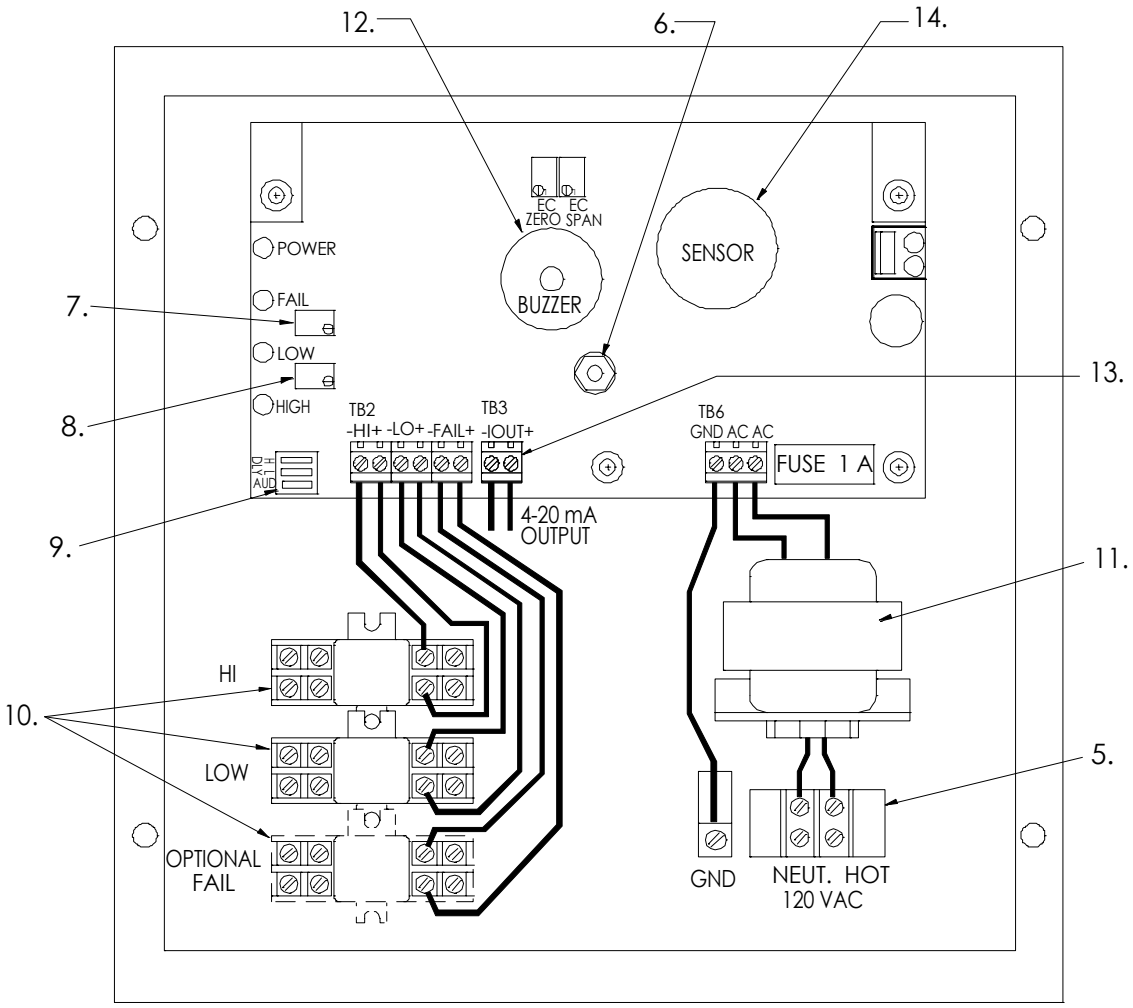


Figure 2: AMC-1040 monitor, front panel.



5. POWER TERMINAL BLOCK
6. TEST SWITCH
7. LOW ALARM ADJUST
8. HIGH ALARM ADJUST
9. THREE CIRCUIT MINIATURE SWITCH
10. RELAYS
11. TRANSFORMER
12. AUDIO ALARM
13. ANALOG OUTPUT
14. ON-BOARD SENSOR

Figure 3: AMC-1040 monitor, internal wiring.

4 INSTALLATION

4.1 LOCATION AND MOUNTING

Care should be taken to securely fasten the AMC-1040 monitor unit (via four mounting holes provided) to a solid, vertical, non-vibrating surface or structure. Mounting height is dependent on gas type. (See Figure 4 for mounting dimensions.)

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.

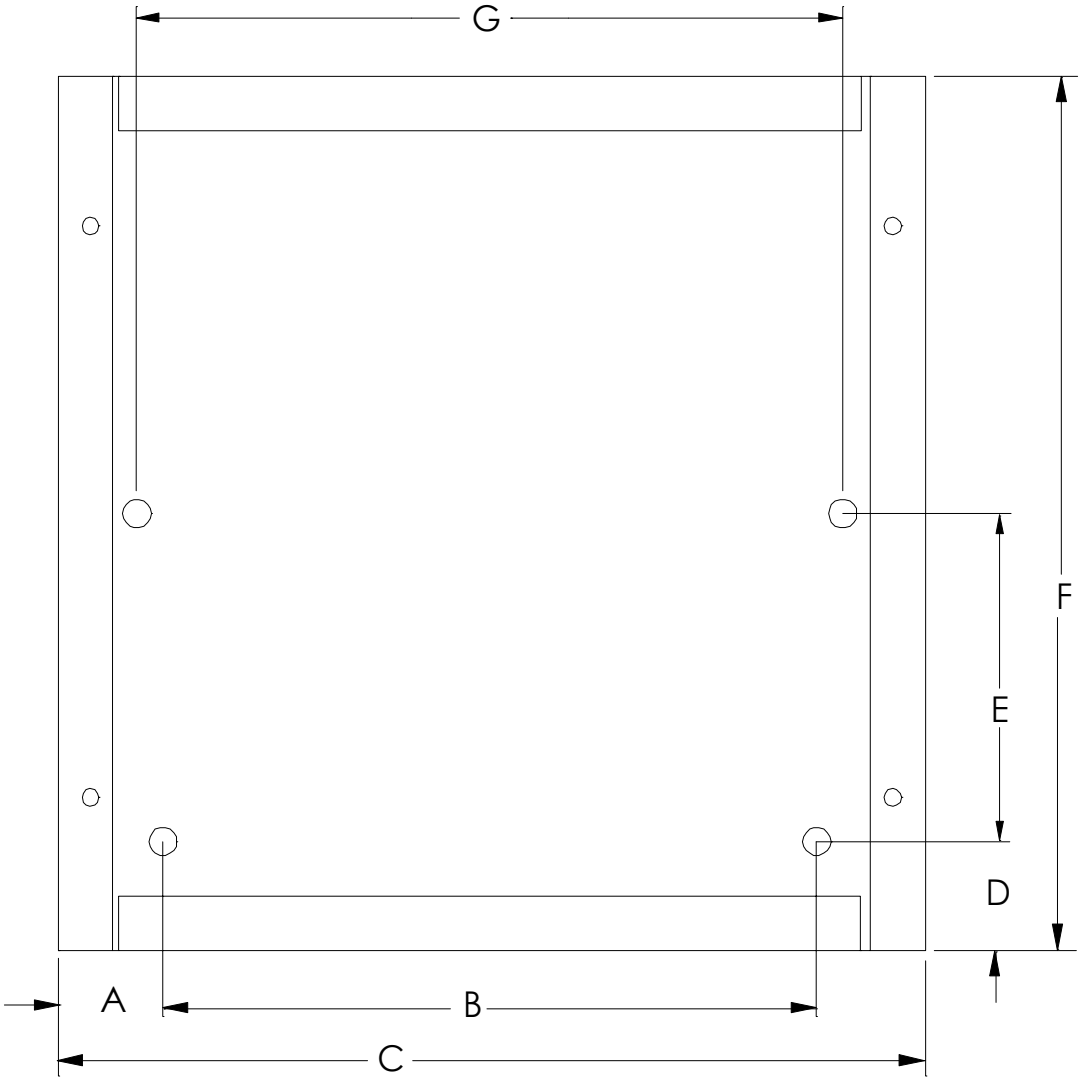
Mount the 1040 monitor in a NON-HAZARDOUS area where local concentrations of gases are unaffected by the presence of ventilation systems and where the unit can be observed periodically.

4.2 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 3)

RELAYS: There are up to 3 DPDT relays which activate with high alarm, low alarm and optional fail respectively causing contact transfer. The contacts are available for activating a remote alarm and/or, blower motors where moving parts are fully guarded, pumps or lighting circuits. Relays are rated 1/3 hp @ 120 VAC/240 VAC, 10 Amps @ 28 VDC/120 VAC/240 VAC resistive. For relay contact arrangement see Figure 5. The high and low alarms relay coils are normally de-energized and the optional fail relay coil is normally energized.

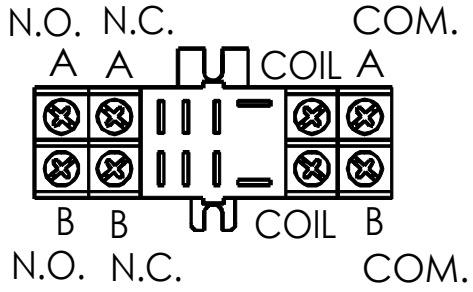
ANALOG OUTPUT: The AMC 1040 comes standard with a 4-20 mA output. This output corresponds to the gas range indicated on page iv. It can be used for connecting to an external recorder or other device. The maximum load is 250 ohms.



DIMENSIONS IN INCHES	A	B	C	D	E	F	G	DEPTH
	1.0	6.0	8.0	1.0	3.0	8.0	6.5	4.0

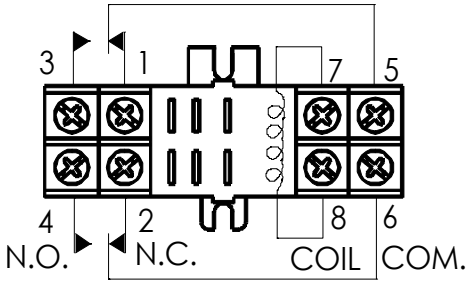
Figure 4: Monitor mounting dimensions.

RELAY SOCKET CONNECTIONS



RELAY SOCKET

RELAY DE-ENERGIZED



RELAY ENERGIZED

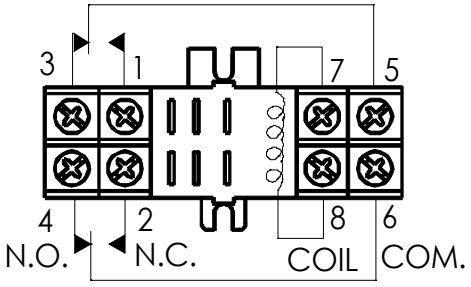


Figure 5: Relay contacts wiring diagram.

5 OPERATION AND CALIBRATION

5.1 OPERATION

Note:

BEFORE turning on the main power to the monitor, MAKE SURE all connections are properly made.

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 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 surrounding the sensor 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 audio alarm will be activated. An open sensor circuit is indicated by the amber fail LED.

5.2 CALIBRATION

As the calibration procedure may cause the monitoring equipment to give a false alarm, appropriate precautions should be taken. Instructions on introducing the gas sample are included with the calibration kit or available separately (depending on type of gas or application). To observe immediate reaction during calibration, the low and high alarm time delays should be disabled.

5.2.1 EQUIPMENT REQUIRED

- Digital multimeter
- Miniature screwdriver
- Calibration gas(es)
- Calibration Kit (number?)

5.2.2 ADJUSTMENTS

For full recalibration adjustments, follow the Set-Up Procedure steps 1 to 5 inclusive. There are two adjustments to be made for periodic recalibration: Zero and Span adjustments and the Alarm adjustments. Alarm adjustments are only required if the user wants to change alarms.

Refer to Figure 6 to perform the following procedure

1) Remove cover from monitor enclosure.

2) Plug in standard test leads fully into jacks on multimeter.

3) Switch ON multimeter and select the DC Volts range greater that 1.00 VDC.

4) For accurate calibration, ensure that the sensor is in clean air and allow a few minutes before adjusting the zero setting. Place the calibration adapter onto the sensor. Open the valve by turning it fully counter-clockwise to start the flow of gas and proceed with calibration. When this procedure is successfully completed, shut off the valve by turning it fully clockwise to stop the flow of gas. Adjust the Zero trimmer for a stabilized reading of 0.00 VDC measured at the test points (see Figure 6).

5) Apply a Span gas sample. The Span gas sample need not be of the full-scale concentration but may be a fraction of this. Since the monitor output range is 0 to 1 VDC, a full-scale concentration gas should read 1.00 VDC after a few moments of sensor exposure. Similarly, a half scale concentration gas should read 0.50 VDC.

If required, calibration kits are available from AMC. Each kit consists of the following items (as shown in Figure 6):

1. Carrying case for the control value regulator, hose, adapter, two gas cylinders (not included) and the instruction manual.

2. Control valve regulator with 0.5 LPM rate.

3. Calibration adapter with hose.

To order calibration gas cylinders, specify the gas concentration required. Each cylinder contains the proper mixture to calibrate for the gas being detected. Each cylinder contains approximately 15 liters of gas at 240 PSI, which lasts approximately 30 minutes.

5.2.3 ALARM ADJUSTMENTS

Alarms are set at the factory and do not need to be adjusted unless a change in alarms is required.

Low alarm adjust is used to establish the low alarm trip point. This is done by adjusting the voltage to the appropriate fraction of full scale at test points COM and LOW TP (see Figure 7).

Example: Full scale = 100 ppm

Low alarm trip = 35 ppm

35/100 x 1 VDC

= 0.35 VD

High alarm adjustment is done in the same manner as above, using the high alarm adjust and measuring between COM and HI TP.

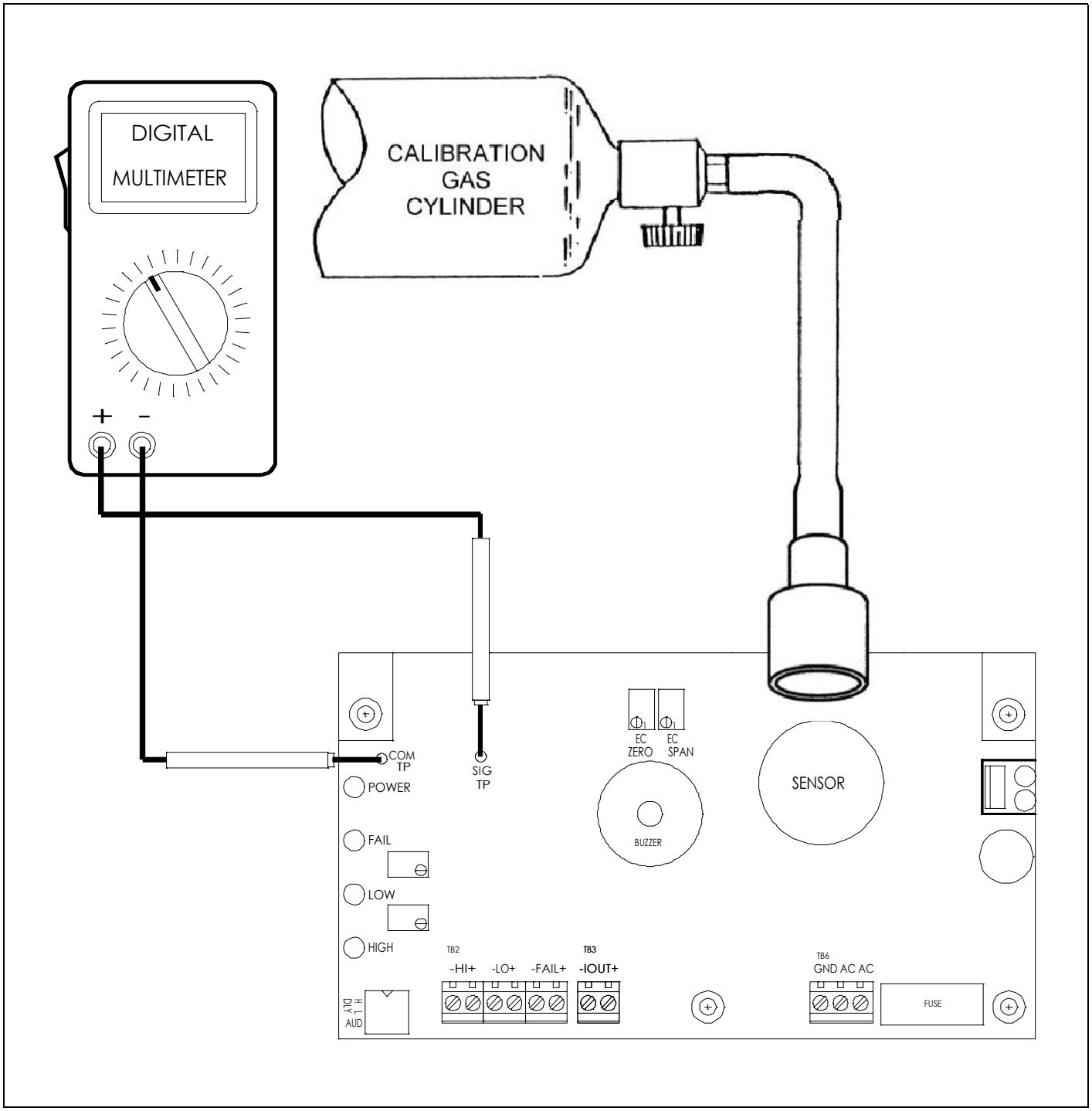


Figure 6: Test point locations

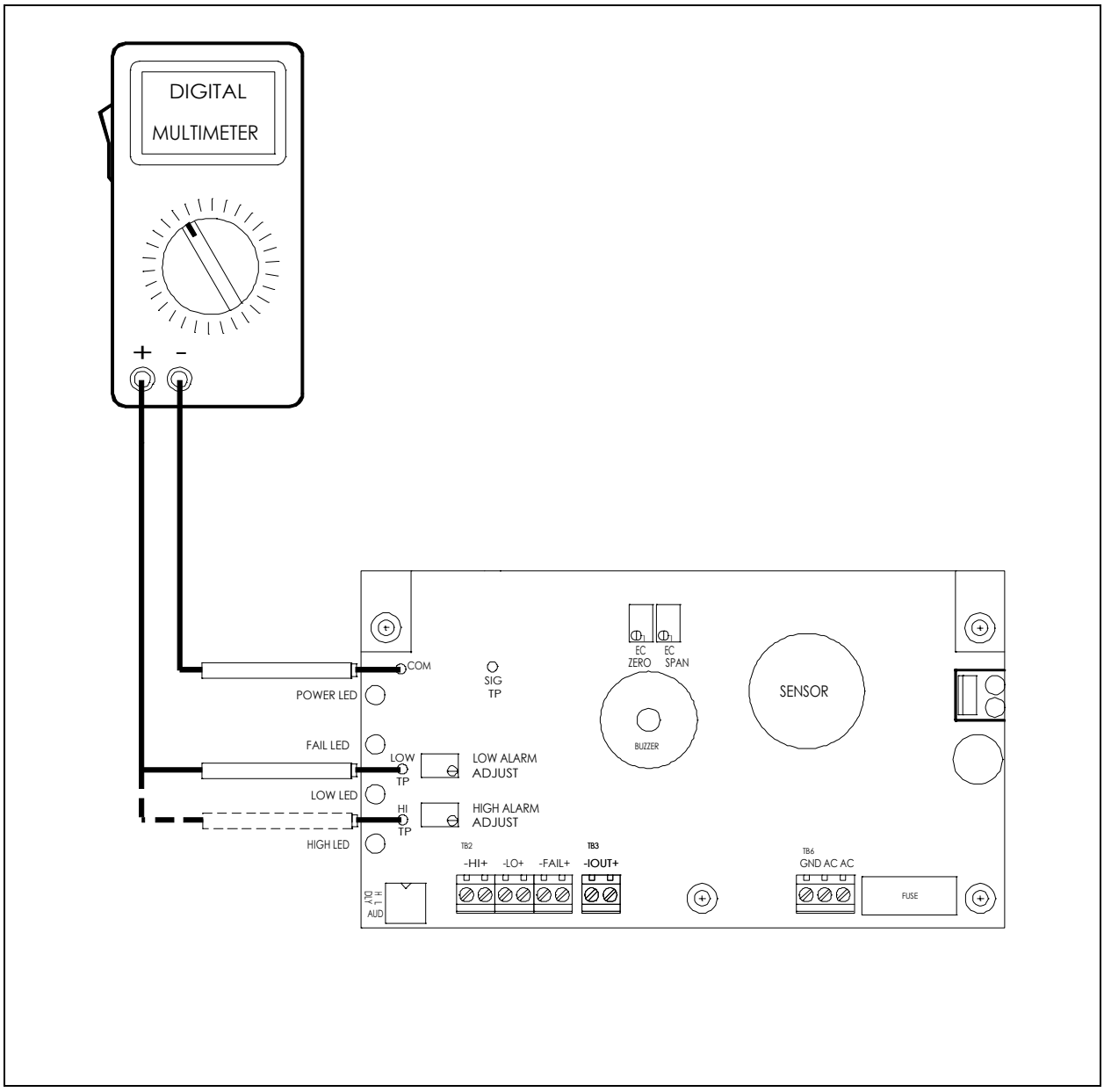


Figure 7: Alarm adjustments

6 PREVENTIVE MAINTENANCE

6.1 GENERAL

The monitor should be wiped clean with a damp cloth following a regular maintenance program. Avoid spraying, submersion and other conditions that could cause a liquid to enter the monitor and cause possible intrinsic damage to internal components.

6.2 SENSOR REPLACEMENT

Caution:

Turn off the power supply before replacing sensor.

The signal from the sensor will be greatly reduced when its replacement is required. The sensor should be replaced when it no longer responds to the presence of gas or has an unstable zero signal.

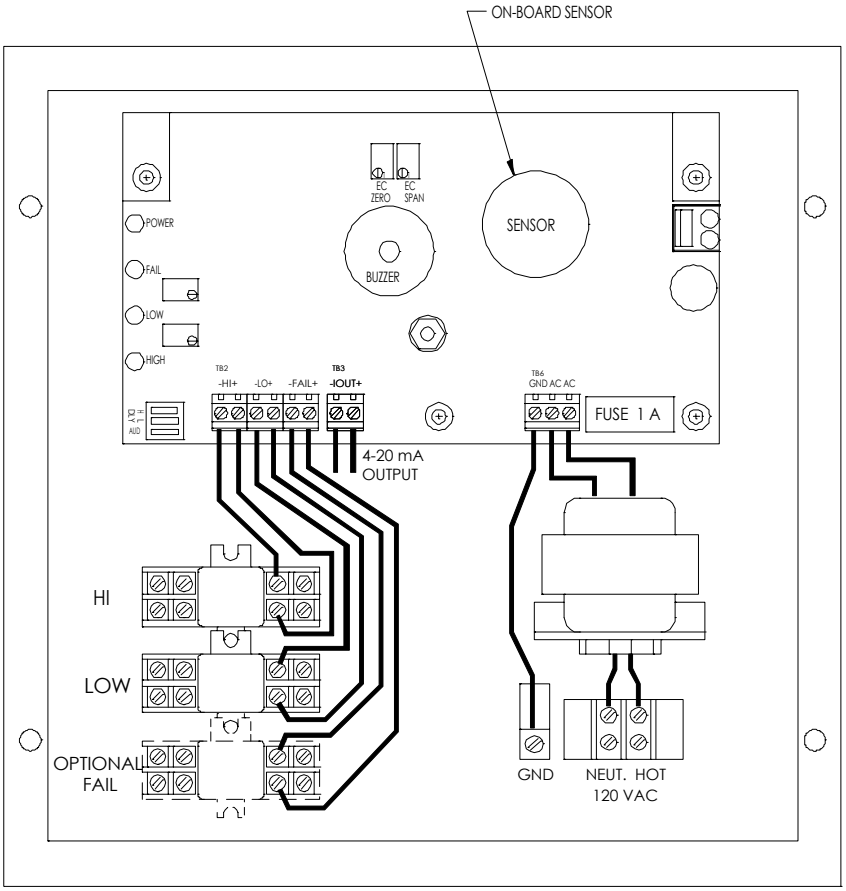
Sensor life as well as the “Sensor Part Number” that is needed to reorder the replacement sensor are found in the Product Information on page IV.

To replace the sensor:

- disconnect power
- remove the four cover screws and cover from the unit
- unplug the used sensor element from the board and dispose of it properly
- plug in the replacement element onto the board, making sure sensor pins are aligned with the pin sockets
- connect the power perform the calibration procedure
- following calibration, reinstall the cover plate
- refer to Figure 8 for sensor replacement.

Note:

Allow 10 minutes for the new sensor to stabilize before performing section 5.2 calibration procedure.



STEP 1: DISCONNECT POWER.

STEP 2: REMOVE THE FOUR COVER SCREWS AND COVER PLATE FROM UNIT.

STEP 3: UNPLUG USED SENSOR ELEMENT FROM THE BOARD AND DISPOSE OF IT PROPERLY.

STEP 4: PLUG IN A NEW SENSOR ELEMENT ONTO THE BOARD, MAKING SURE SENSOR PINS ARE ALIGNED WITH THE PIN SOCKETS.

STEP 5: CONNECT POWER AND RE-CALIBRATE.

STEP 6: REINSTALL COVER PLATE ONTO THE UNIT.

FIGURE 8: Sensor replacement.