



1040 VC

Gas Monitor

INSTALLATION AND OPERATING INSTRUCTIONS

AMC-1040 VC

CO / NO₂ Vehicle Exhaust Monitor

IMPORTANT:

Please read these installations and operating instructions completely and carefully before installation and use.

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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 warranty on the sensors see page 3.

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	-10° C to 40° C	
Relative Humidity.....	10 - 95% RH, non condensing	
Contact Rating	1/3 hp @ 120 VAC/240 VAC, 10 Amps @ 28 VDC/120 VDC/240 VAC	
Sensor Type.....	CO	NO ₂
Sensor Warranty.....	_____	_____
Sensor Life.....	_____	_____

Chan. No.	Sensors/Transmitters		Type of Gas	Alarm Trip Points	
	Part No.	Serial No.		Low	High
1					
2					

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.
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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 a two-channel gas monitoring system designed with built-in sensors to continuously monitor surrounding air for traces of hazardous gases. Each channel 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.
 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 per monitor, which can work with high alarm, low alarm, and 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.
15. OPTIONAL DC INPUT: Used for battery backup or a 12 VDC supply.

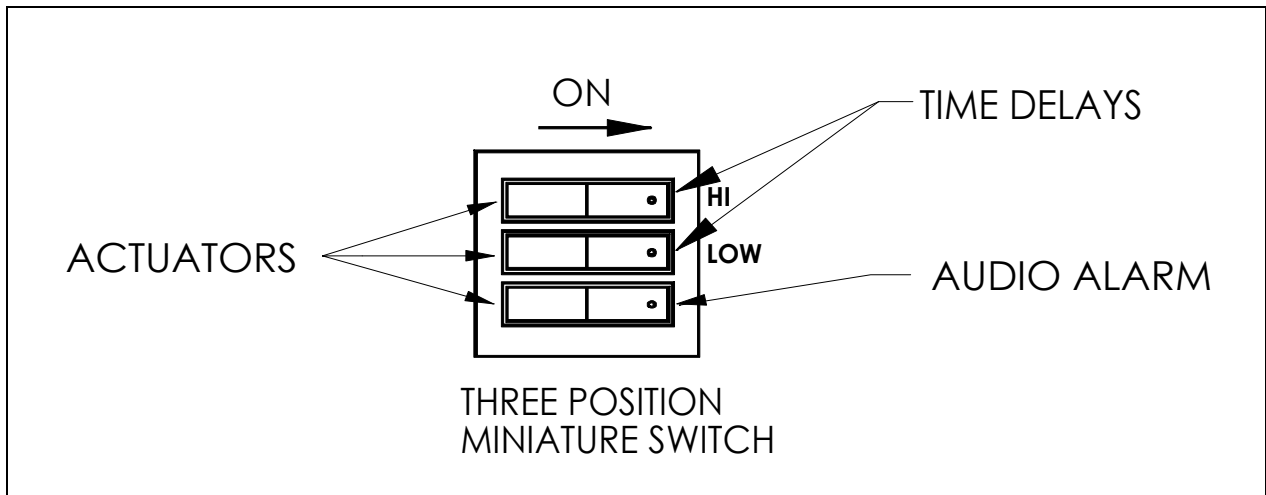


Figure 1: Three-circuit miniature switch.

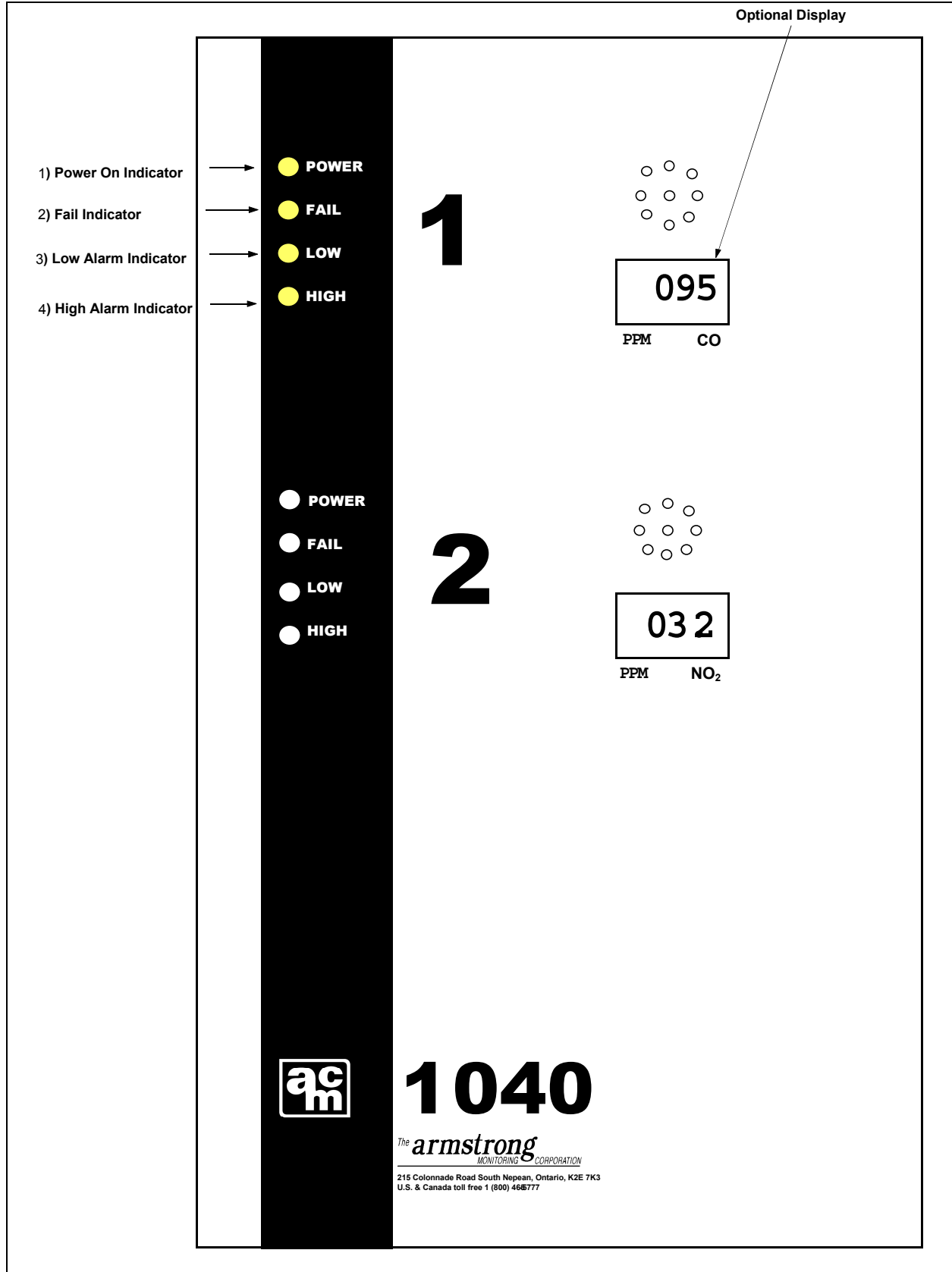


Figure 2: AMC-1040 monitor, front panel.



4 INSTALLATION

4.1 LOCATION AND MOUNTING

Care should be taken to securely fasten the AMC-1040 monitor unit (using four mounting holes provided) to a solid, vertical, non-vibrating surface or structure. (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.

4.2 WIRING OF THE MONITOR

POWER SUPPLY: The monitor operates on 120 VAC, 60 Hz. Class II step down transformers run 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: Up to 3 DPDT relays are optionally available which activate with high alarm, low alarm and 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 fail relay coil is normally energized.

ANALOG OUTPUT: The AMC 1040 comes standard with a 4-20 mA output per channel. This output corresponds to the gas range indicated on page 3. It can be used for connecting to an external recorder or other device. The maximum load is 250 ohms.

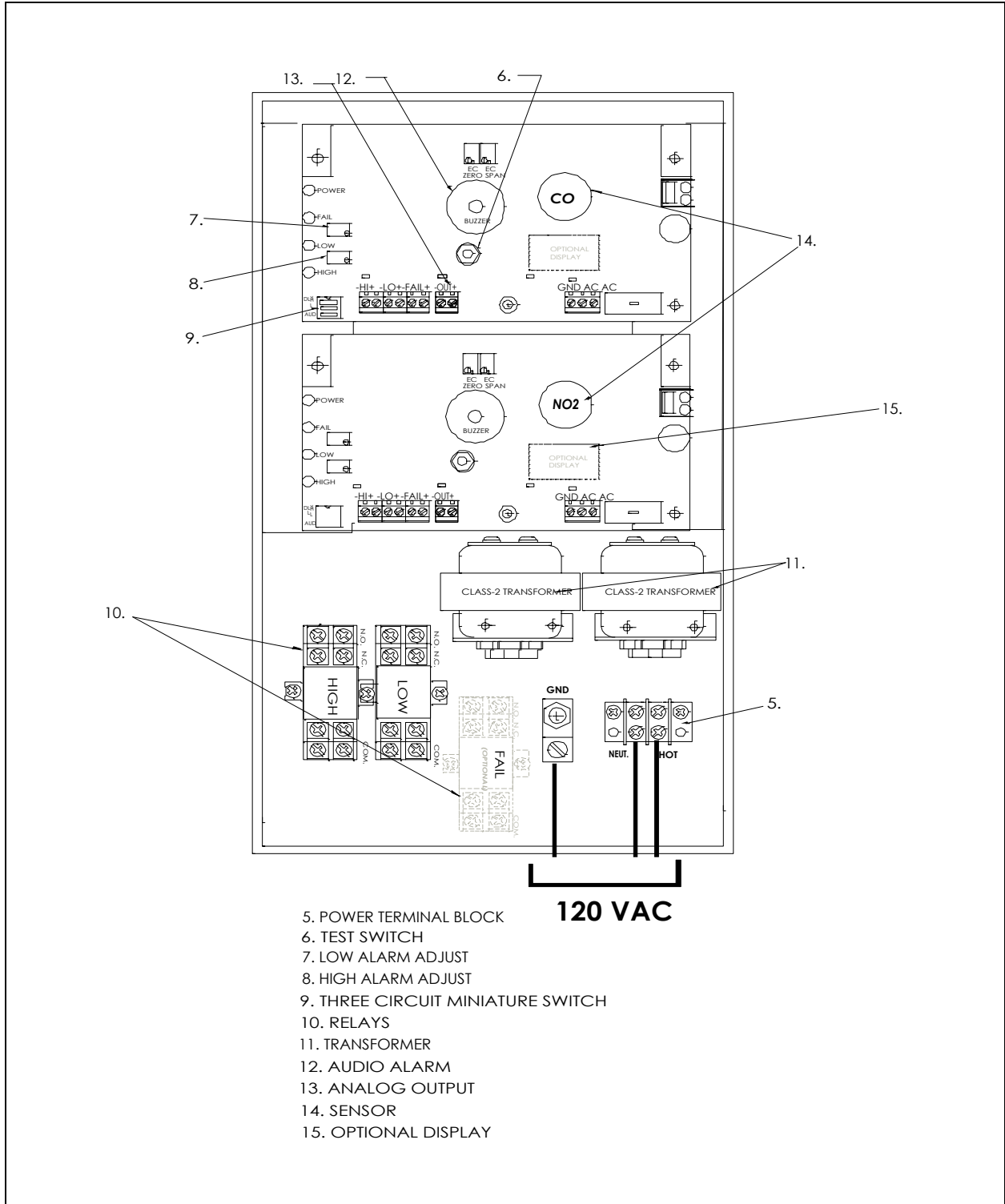


Figure 3: AMC-1040 VC monitor, power connections.

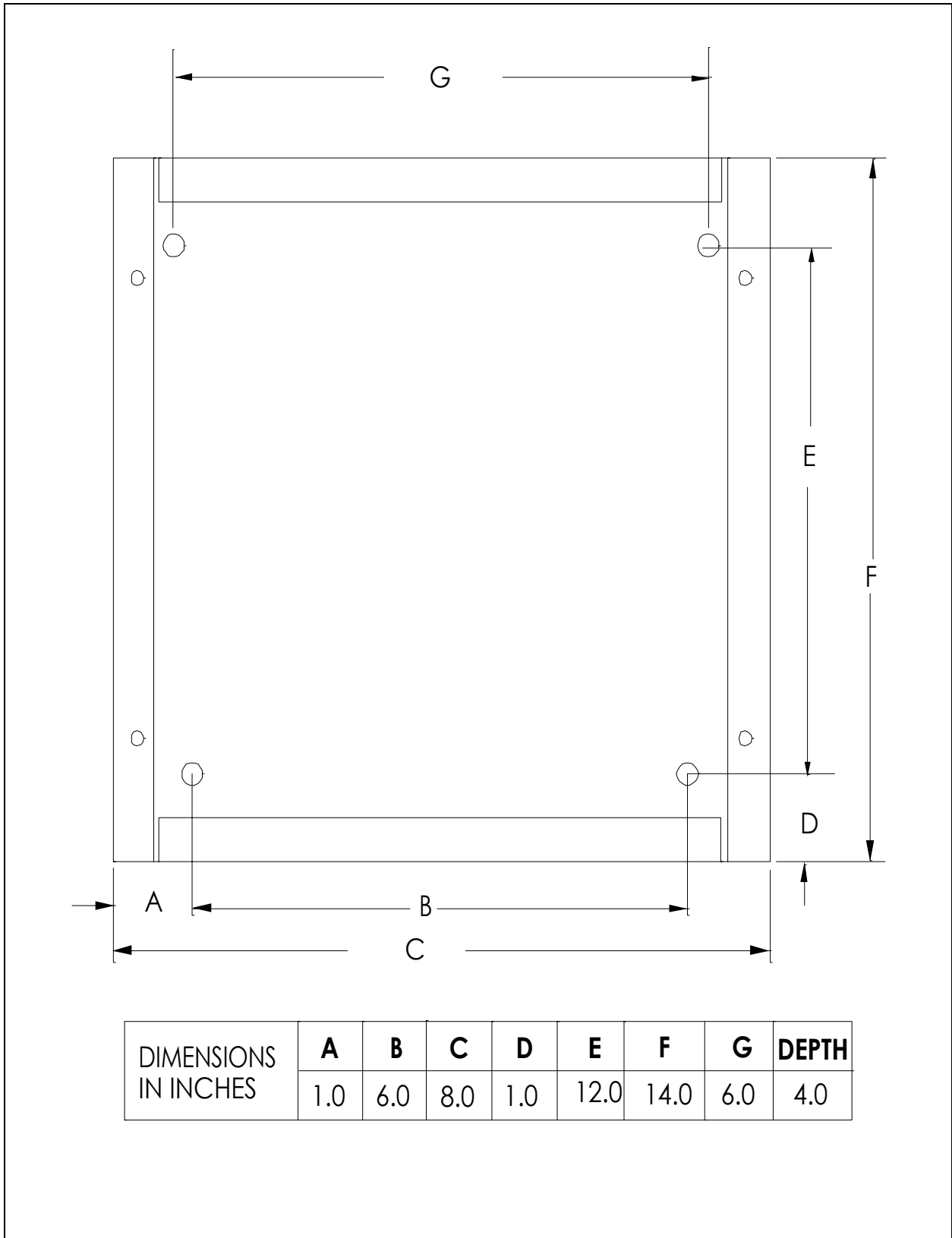


Figure 4: Monitor mounting dimensions.

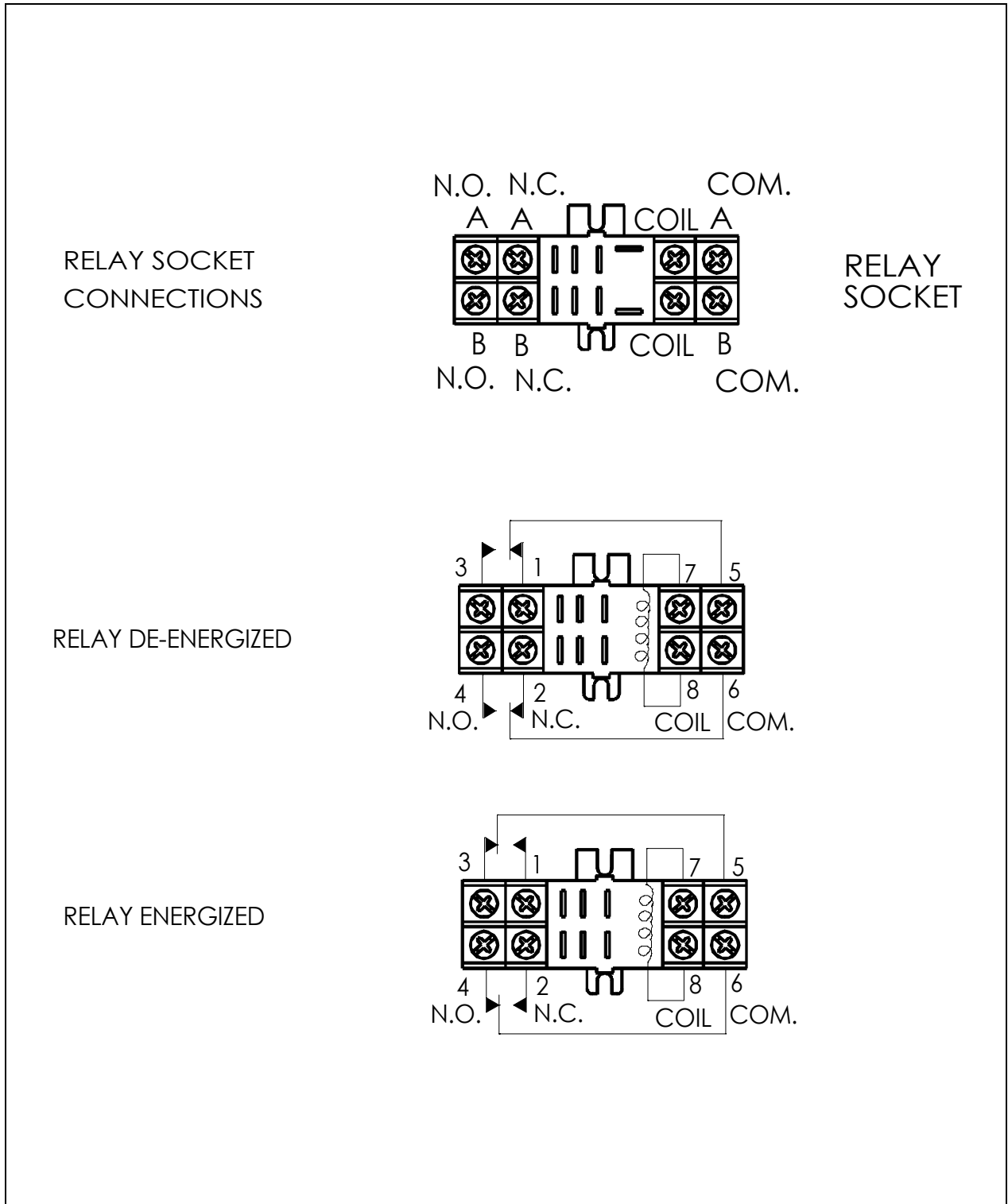


Figure 5: Relay contacts wiring diagram.



5 OPERATION AND CALIBRATION

5.1 OPERATION

Note:

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

Once power has been turned on, 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 (for non-display versions)
- Miniature screwdriver
- Calibration gas (es)
- Calibration kit

5.2.2 ADJUSTMENTS

For full recalibration adjustments, follow the Set-Up Procedure steps 1 to 8 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 than 1.00 VDC.



- 4) Insert Test Probe Tips into test points of PCB in the Upper Left area (see Figure 6.)
- 5) Insert the BLACK probe into the "COM TP" test point and the positive RED probe into the "SIG TP" test point.
- 6) Apply a Zero gas sample, or with the sensor in clean air, adjust the Zero trimmer for a stabilized reading of 0.00 VDC measured at the test points.
- 7) 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.
- 8) Note: If required, calibration kits are available from AMC.

5.2.3 DIGITAL DISPLAY ADJUSTMENTS

For monitors equipped with a Digital Display calibration should be performed with the integral display instead of a digital multimeter.

1. Apply a zero gas sample, or with sensor in clean air, adjust the Zero trimmer for a stable reading of "0" on the display.
2. Apply a Span gas sample of the full scale or a fraction of full scale concentration and adjust Span trimmer to the corresponding output on the display.

5.2.4 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
 $35/100 \times 1 \text{ VDC}$
= 0.35 VDC

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



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 VERIFICATION OF MONITOR

A test should be performed to ensure that no transmitter failures are indicated and that output relays and auxiliary alarms 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

The sensor should be replaced under the following conditions:

1. When the sensor element becomes an open circuit, the unit outputs a fixed 1 mA signal.
2. When the sensor no longer responds to the presence of gas or has an unstable “zero” signal.

When the sensor needs replacing, reorder the “Sensor Part Number” listed in Product Information, page 3. See Figure 6 for sensor replacement and wiring procedure.

Note:

Allow 24 hours for the new sensor element to stabilize (burn-in) before recalibration, then follow instructions in the transmitter calibration section 5.2 of this manual.

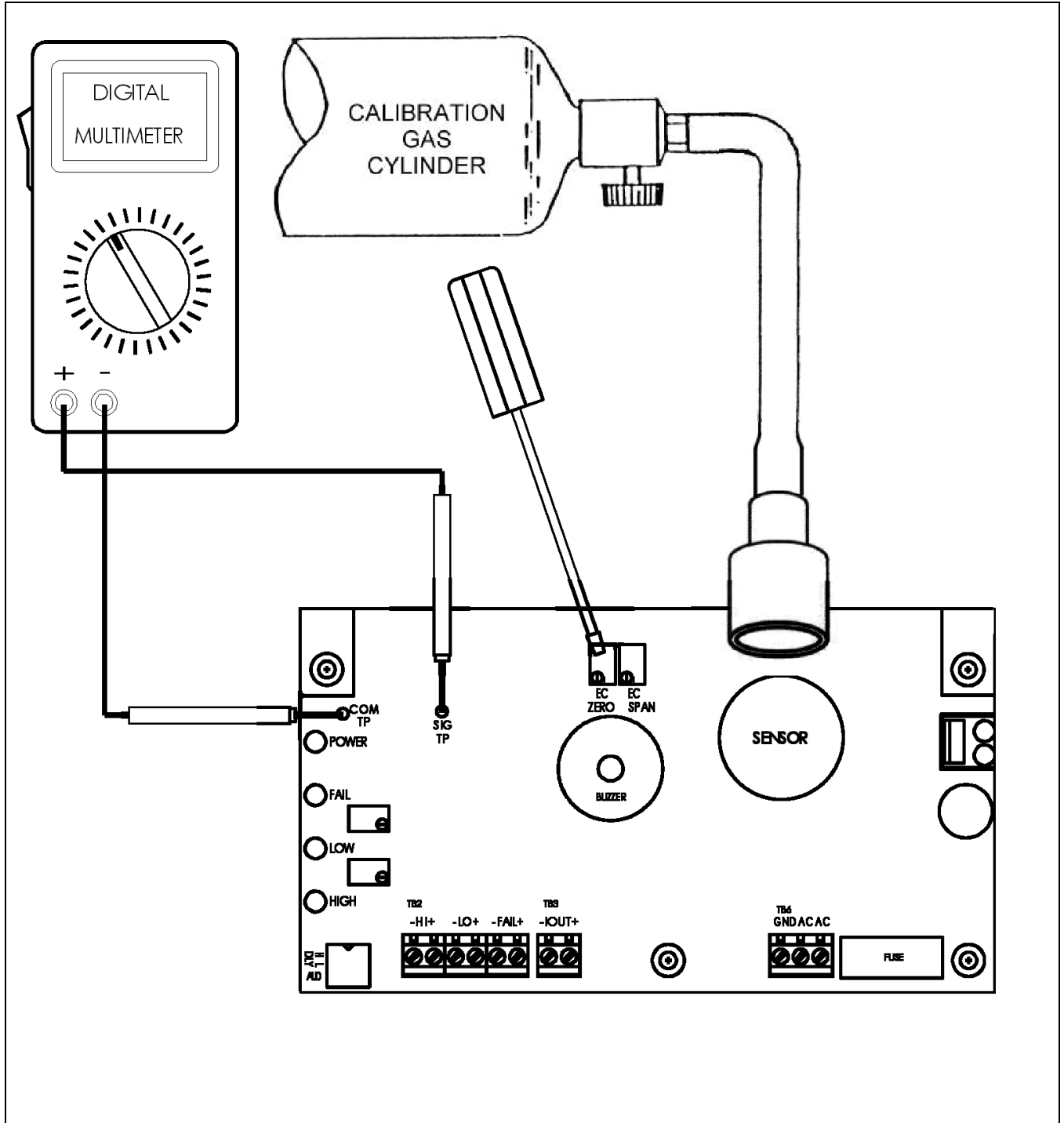


Figure 6: Calibration setup

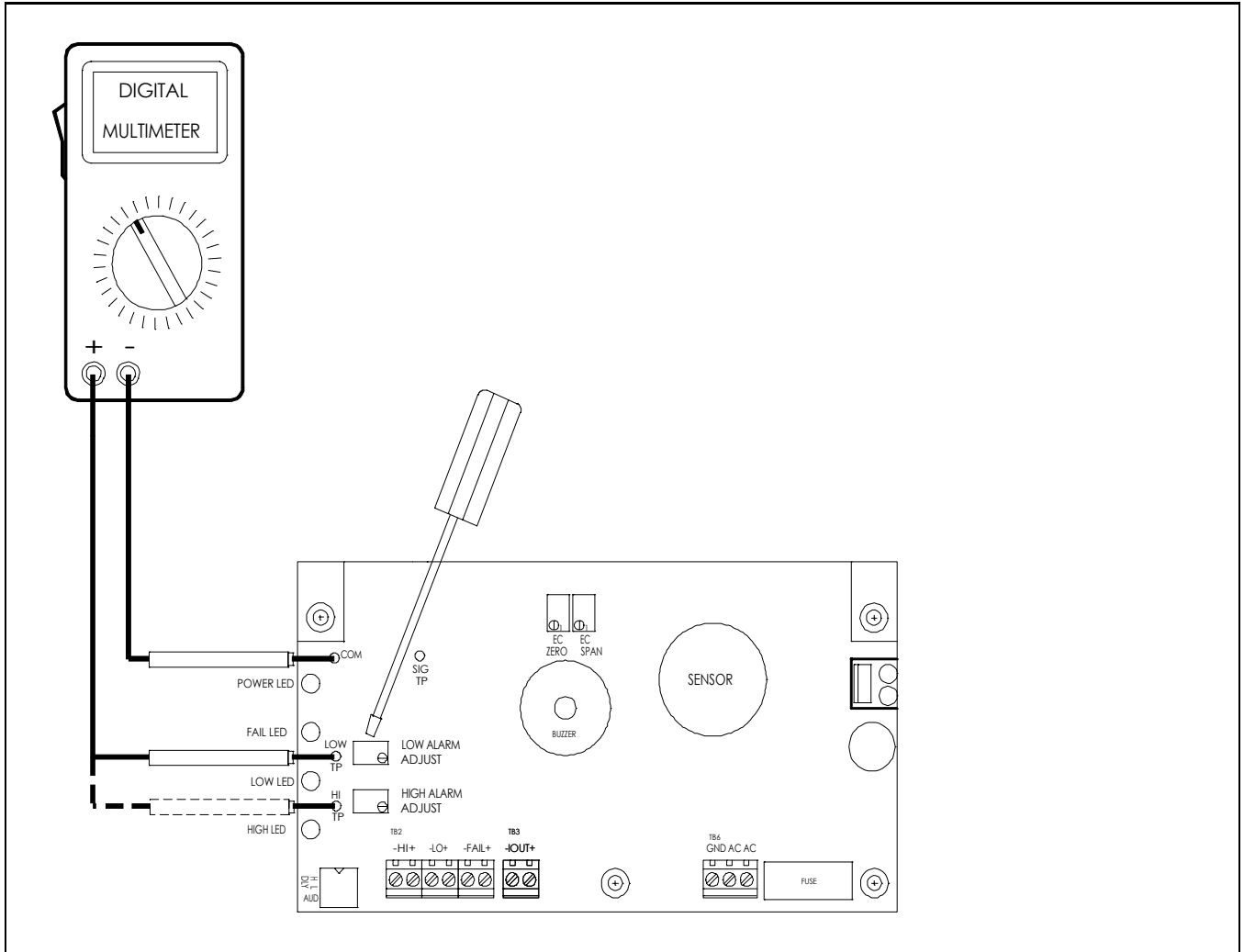
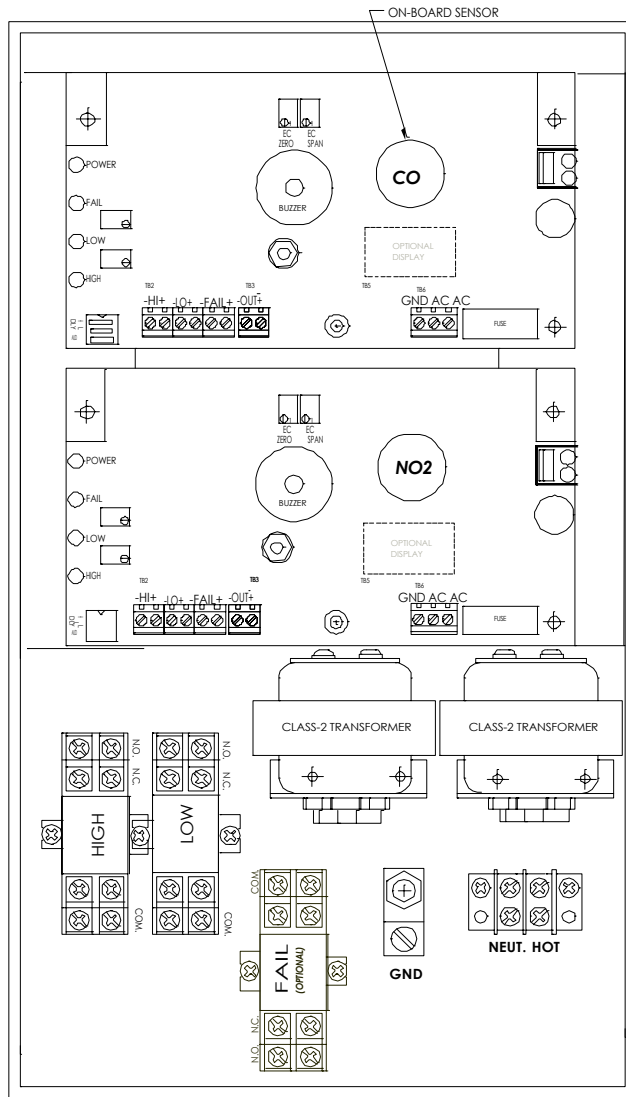


Figure 7: Alarm adjustments



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.