

## 1. GENERAL

The RPM-1 monitors either positive or negative room pressures (see the *Datasheet* for detailed specifications).

## 2. INSTALLATION

The instrument is designed for surface-mounting on a wall with three #10 (5 mm) screws. Select a wall area that is reasonably flat to prevent stressing of the enclosure. A mounting template is included with this document (see insert).

## 3. WIRING AND PIPING

### 3.1. Electrical Connections

#### !WARNING!

*Before applying power to the unit, be sure the 120/240 VAC selector switch is properly set for your power source. Note that there is no selector switch on units configured for 24 VAC operation.*

Make the following connections at **J1**, a 3/8" terminal barrier strip with #6 screws (see *Figure 1* below):

1. Connect the *power supply* to terminals **1** and **2**. [**DO NOT** connect the power supply to any other terminals!]
2. Connect an *alarm* to either of the following *Relay Out* terminals:
  - a. For *normally-open* operation - terminals **4 (NO)** and **6 (COM)**.
  - b. For *normally-closed* operation - terminals **5 (NC)** and **6 (COM)**.
3. Connect the *analog output* device to either of the following output terminals:
  - a. For a *0-10V* output - terminals **8 (COM)** and **9 (+)**. [These are **NOT** power supply input terminals!]
  - b. For a *0-5V* output - terminals **8 (COM)** and **10 (+)**. [These are **NOT** power supply input terminals!]
  - c. For a *4-20mA*, *sourcing* output - terminals **11 (+)** and **12 (-)**. [These are **NOT** power supply input terminals!]

**Note:** The voltage analog output signal wires should not exceed 18 ft (6 m). The length of the 4-20 mA analog output signal wires is not limited, but the total loop resistance must be less than 580  $\Omega$ .

4. A *15 V, 13 mA maximum, power supply* is available from terminals **8 (COM)** and **3 (+)**.
5. A *light indicator status signal* is available at terminals **8 (COM)** and **7 (+)**. The output is low (about 1 V) when the pressure is within the normal range (green LED ON).

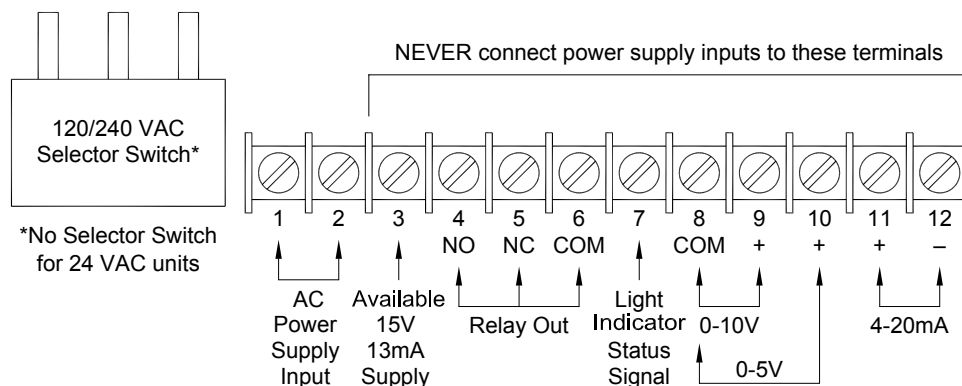


Figure 1: Electrical Connections - Terminal Strip J1



### 3.2. Pressure Connections

To monitor the differential pressure between a room and a selected reference, connect the air line from the room to be monitored to the fitting labeled **ROOM PRESSURE**, and the air line from the reference area to the fitting labeled **REFERENCE**. A positive reading on the digital display indicates that the pressure in the monitored room is higher than the reference pressure, and a negative reading on the digital display indicates that the pressure in the monitored room is lower than the reference pressure.

Three sets of barb fittings accommodate plastic tubing sizes from 1/8" to 7/32" I.D. (3 to 6 mm I.D.)

**IMPORTANT:** *Do not overtighten the fittings. Hand-tightening 1/4 turn is sufficient to ensure a leak-proof connection.*

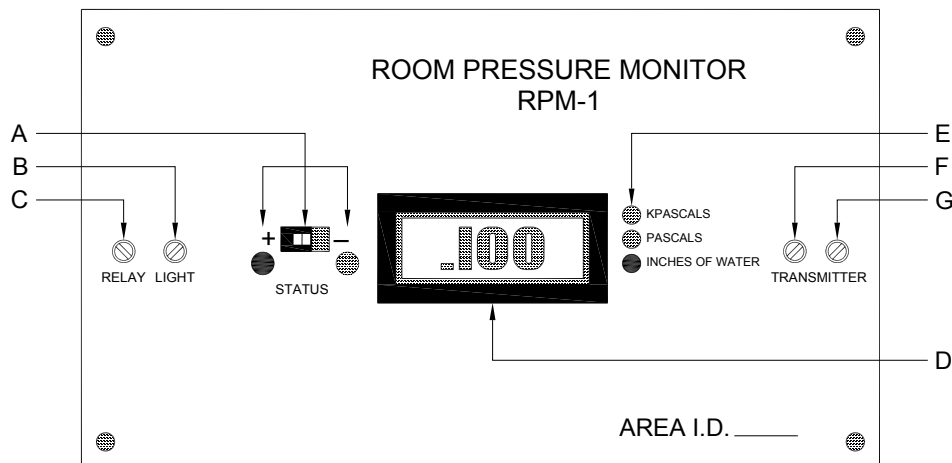
### 4. Display Panel

To open the clear polycarbonate cover, depress the ridged slot on the narrow side of the bicarbonate cover and pull. The cover can be installed to hinge from the left or from the right. To remove the cover, open the cover and place thumbs along the inside hinge of cover. Carefully push the cover forward (away from the case) while pushing the hinge down. Use the same technique to remove the latch.

To install the cover, align the cover to the desired side, left or right, of the body hinge retainers. Insert the centering pins in the cover through the two side retainers on the case and pull up; the cover will snap into place. To install the optional cover lock, remove the blank in the cover lock assembly, insert an optional key and press until the slotted end is flush with cover.

#### 4.1. Panel Description

Refer to *Figure 2* below to locate the panel components:



**Figure 2: Display Panel Components**

- A- Status selector switch and accompanying indicator lights:** The selector switch enables the user to program the red and green lights which indicate when the pressure in the room is above or below a preset pressure. When monitoring a positive pressure, set the selector switch to "+". The green LED is ON when the pressure is above the minimum set pressure. The red LED lights up if the pressure falls below the allowed minimum pressure. When monitoring a negative room pressure, set the selector switch to "-". The green LED is ON when the pressure is below the minimum set pressure. The red LED lights up if the pressure rises above the allowed minimum pressure.
- B- Light-adjust potentiometer:** To change the light set pressure, remove the plug marked **LIGHT** and turn the potentiometer (clockwise to raise the pressure setpoint) until the desired set pressure is reached. The setting may be determined by pressurizing the instrument until the **STATUS** indicator light activates. The pressure may be read from the display panel at the moment the light changes status. Refer to section 5.2.2 for a precise calibration procedure.
- C- Relay-adjust Potentiometer:** A SPDT relay output is available at terminals **4**, **5**, and **6** of connector **J1** (see Figure 1 on page 1). The contacts are rated 5 A at 30 VDC or 120 VAC, and 4 A at 240 VAC resistive. To adjust relay set pressure, use the potentiometer located behind the plug marked **RELAY**. Turn the potentiometer (clockwise to raise the pressure setpoint) until the desired pressure is reached. The relay is set at the factory to energize on falling pressure. To change the logic, see section 5.1.2 and refer to section 5.2.2 for a precise calibration procedure.

- D- **Digital Display:** The digital display shows the room pressure in either English or metric engineering units. To change the units of measurement, refer to section 5.2.1.
- E- **Unit Indicating Light:** One of three lights indicates the unit of measure being displayed.
- F- **Transmitter Span Adjust Potentiometer:** Should the pressure transmitter require recalibration, remove the plug to gain access to the potentiometer. It is recommended that the recalibration be performed in the field only if proper calibrating equipment is available. Refer to section 5.3 for calibration instructions.
- G- **Transmitter Zero Adjust Potentiometer:** Used during calibration of the instrument.

## 5. Additional Controls

Disconnect the AC power to the instrument, and remove the front panel to gain access to additional controls. Two interconnected PC boards are seen. One board is labeled **RPM MAIN BOARD** and the other is labeled **RPM DISPLAY BOARD**.

### 5.1. Main Board

The main board (see *Figure 3* below) consists of a power supply, a pressure-sensing element and associated electronics, alarm circuitry and a relay.

- 5.1.1 - To change the deadband of both the lights and the relay, locate potentiometer **R53**, labeled **DEADBAND**, and rotate the screw to the desired position. The deadband adjustment ranges from 0 to 20%. Fluttering indicator lights and a chattering relay output indicate that the deadband is set too low. Increase the deadband until the chatter stops.
- 5.1.2 - To change the relay logic from energizing on falling pressure to energizing on rising pressure, locate connector **J5**, remove both jumpers, rotate them 90° and re-insert.

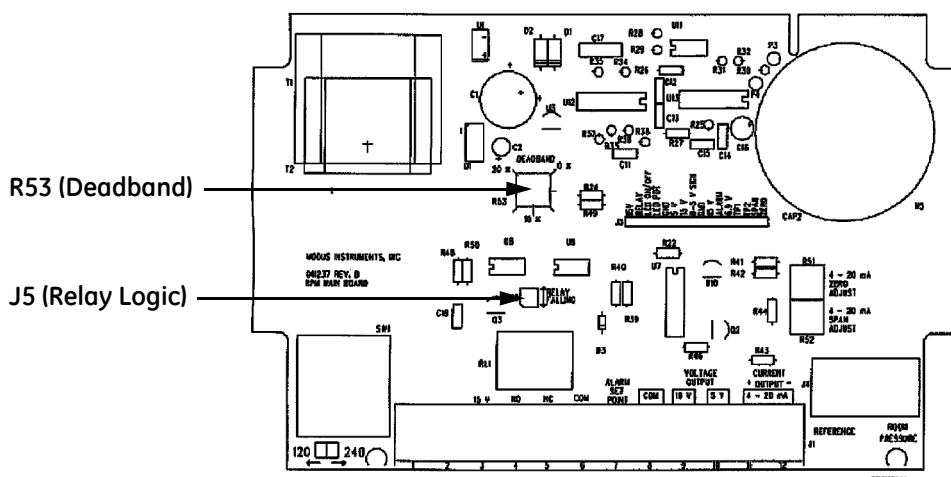


Figure 3: Main Board

### 5.2. Display Board

- 5.2.1 - To change from English to metric unit, locate the selector switch **SW2** on the display board (see *Figure 4* below) and select either **METRIC** (Pascals and kPascals) or **ENGLISH** (inches of water).

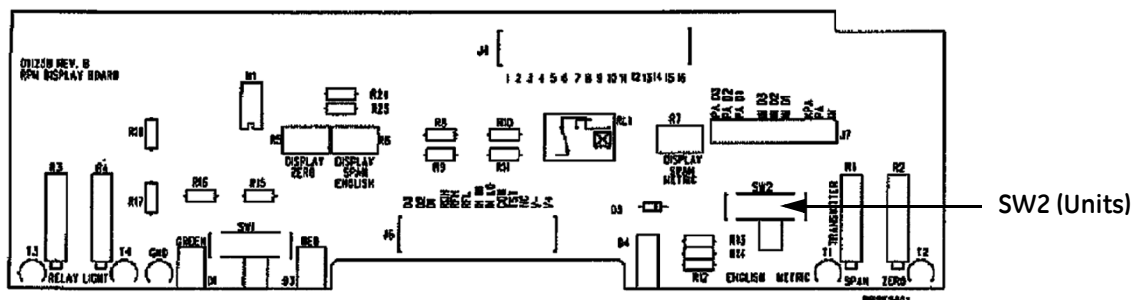


Figure 4: Display Board

### 5.2.2 - Apply the AC power to the unit.

- To obtain a precise **LIGHT** adjust or **RELAY** adjust setting, locate test points **GND**, **T4** and **T3** on the display board.
- The telescoping voltage range is 0-5.0 volts.
- To adjust the light set pressure, connect a voltmeter across **GND** and **T4** and adjust potentiometer **R4**.
- A reading between 2.5 and 5.0 volts will activate the light when the room pressure is higher than the reference pressure. A reading between 0 and 2.5 volts will activate the light when the room pressure is lower than the reference pressure.
- To adjust the relay set pressure connect the voltmeter across **GND** and **T3** and adjust potentiometer **R3**.
- A reading between 2.5 and 5.0 volts will energize the relay when the room pressure is higher than the reference pressure.
- A reading between 0 and 2.5 volts will activate the relay when the room pressure is lower than the reference pressure.

## 5.3. Calibration

To calibrate the transmitter, proceed as follows:

### 5.3.1 - Connect a voltmeter across terminals **8** (ground terminal) and **10** (5.00 Volt Output) of connector **J1** on the Main Board (refer to Figure 1 on page 1).

- Locate the **ZERO** potentiometer **R2** and the **SPAN** potentiometer **R1** on the display board (see Figure 4 on page 3).
- With no pressure applied to the pressure ports, adjust the **ZERO** potentiometer **R2** until the output signal between terminals **8** and **10** of **J1** is 2.50 volts.
- Apply full pressure to the positive pressure port and adjust the **SPAN** potentiometer **R1** until the output signal is 5.00 volts.
- Check the zero pressure output again and repeat the above steps if necessary.
- When the instrument is fully calibrated, pressurize the reference port. When full pressure is applied to the reference port, the voltmeter should read 0 volts. No adjustment is necessary.

### 5.3.2 - To check the 10 Volt output, connect the positive side of the voltmeter to terminal **9** (10.00 Volt Output) of connector **J1**.

- The output signal should read 5.00 volts when no pressure is applied and 10.00 volts at full pressure.
- No adjustment is necessary if the instrument has been calibrated as specified above.

### 5.3.3 - To check the current output, first proceed with the calibration steps above, then connect an ammeter across terminals **11** and **12** of connector **J1**.

- Locate the **4-20 mA ZERO ADJUST**, **R51**, and the **4-20 mA SPAN ADJUST**, **R52** potentiometers on the main board, (see Figure 3 on page 3).
- With no pressure applied to the pressure ports, adjust the **ZERO** potentiometer **R51** until the output signal reads 12 mA.
- Apply full pressure and adjust the **SPAN** potentiometer **R52** until the output signal is 20 mA.
- Check the zero pressure output again and repeat the above steps if necessary.

### 5.3.4 - Disconnect the AC power to the instrument and replace the front panel by carefully inserting the digital panel meter terminals into the display socket J6.

- The digital display is calibrated at the factory and should not require recalibration.

