

**OPERATION & MAINTENANCE MANUAL**

***GUARDIAN***

**SPACE PRESSURE MONITOR**

WITH REMOTE AUXILLARY ALARM

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## 1.0 BASIC OPERATION

The Guardian is a complete system package consisting of space and reference pressure sensors and the central signal processing module. The central module measures and displays the pressure differential with a resolution of up to one ten thousandth of an inch water column. The LED display can be factory set for engineering units of either Inches Water Column or Pascals. An analog output which is linear to the pressure differential is provided for remote monitoring, control and data logging. An alarm condition will occur when the space pressure falls outside the preset operating range. During an alarm condition a local LED will illuminate, a local audible alarm circuit will be enabled, and an alarm relay shall energize for remote alarming purposes. An optional remote auxiliary alarm is available with an adjustable delay which will activate a local LED and the audible alarm. A key locked front panel allows for controlled access to the field configurable functions of the Guardian. These functions include pressure alarm setpoint adjustment, audible alarm on/off selection, adjustable delay of the pressure alarm to prevent nuisance alarms which would occur due to normal foot traffic, and differential pressure transducer calibration.

## 2.0 GUARDIAN FEATURES

### 2.1 POWER SUPPLY

The Guardian utilizes an isolated linear type power supply generating +15vdc and  $\nabla$ 5vdc to power the pressure transducer sensor, scaling and digit circuitry. Input power to the Guardian is 24VAC. The power supply is fused with a 3/8 Amp Slow Blow Pico fuse, located near the input power terminal.

### 2.2 ALARM STATUS

Both Normal and Alarm operating status is locally indicated via LED•s on the Guardian face plate.

### 2.3 ALARM SELECTION

The Guardian can be field configured to provide either Positive or Negative room pressure alarming function. In the Positive mode the alarm activates when space pressure falls below the alarm setpoint value. When in the Negative mode the alarm activates when space pressure rises above the setpoint value.

### 2.4 AUDIBLE ALARM ACKNOWLEDGE

Muting of the local audible alarm during a loss of the required pressurization level. The audible alarm circuit shall be reset once the monitored pressurization level is within the acceptable operating range.

### 2.5 REMOTE ALARM RELAY

A single-pole double-throw relay is energized whenever the space pressurization level is outside of the acceptable operating range.

### 2.6 REMOTE ROOM PRESSURE SELECT

The Room Pressure Monitor can be configured for positive or negative room monitoring remotely by the closure of a dry contact.

### 2.7 REMOTE AUXILIARY ALARM

The auxiliary alarm can be activated either by a contact closure or contact opening. The alarm can be delayed up to 30 seconds and will activate the audible alarm.

## 2.8 **DISPLAY**

The 3-1/2 digit LED is factory scaled to indicate the space pressurization level in engineering units of either Inches Water Column or Pascals.

## 2.9 **DISPLAY SELECTION**

The 3-1/2 digit LED space pressure indicating meter is also utilized for indicating and adjusting the Alarm Setpoint value by depressing a push button switch located under the access door on the cover plate. Pressing of this push button toggles the indicated value between space pressure and alarm setpoint. If the switch is not pressed for approximately 60 seconds the display will automatically default to indicate the measured space pressure.

## 2.10 **KEY LOCKED ACCESS DOOR**

The Key Locked Access Door allows for controlled access to Guardian configuration, alarm setpoint display and adjustment, alarm delay on activation adjustment, activation/deactivation of the local audible alarm, and differential pressure transducer calibration.

### **3.0 CENTRAL MODULE CONFIGURATION**

(Refer to Figures 2 and 3 for jumper locations)

#### 3.1 **Equipment Required**

3.1.1 Small Needle Nosed Pliers

#### 3.2 **Positive/Negative Space Pressure Alarming**

3.2.1 Positive space pressure alarming is established by placing jumper H3/ALARM SP in the + position, and jumper H4/SPACE in the POS position.

3.2.2 Negative space pressure alarming is established by placing jumper H3/ALARM SP in the -- position, and jumper H4/SPACE in the NEG position.

#### 3.3 **Remote Positive/Negative Space Pressure Selection**

3.3.1 To configure for remote space pressure selection, set H3 & H4 jumper to AUTO position.

#### 3.4 **Audible Alarm Activation/Deactivation**

3.4.1 To activate the local audible alarm function, place jumper H11/AUDIBLE ALARM in the ON position.

3.4.2 To deactivate the local audible alarm function, place jumper H11/AUDIBLE ALARM in the OFF position.

#### 3.5 **Analog Space Pressure Output Signal**

- 3.5.1 To provide a 0 to 10vdc analog output signal for remote monitoring of the space pressurization level place jumper H5/PROCESS in the V position.
- 3.5.2 To provide a 4 to 20mAdc analog output signal for remote monitoring of the space pressurization level place jumper H5/PROCESS in the I position.

3.6 Process Output

1) Process Output signal can be changed between voltage or current by positioning H5 jumper to I or V. The following table gives the jumper position and corresponding output selection.

H5 JUMPER SELECTION	OUTPUT SELECTION
I	4-20 MA
V	0-10VDC

TABLE 3.5 OUTPUT SELECTION

**4.0 PRE-STARTUP CHECK**

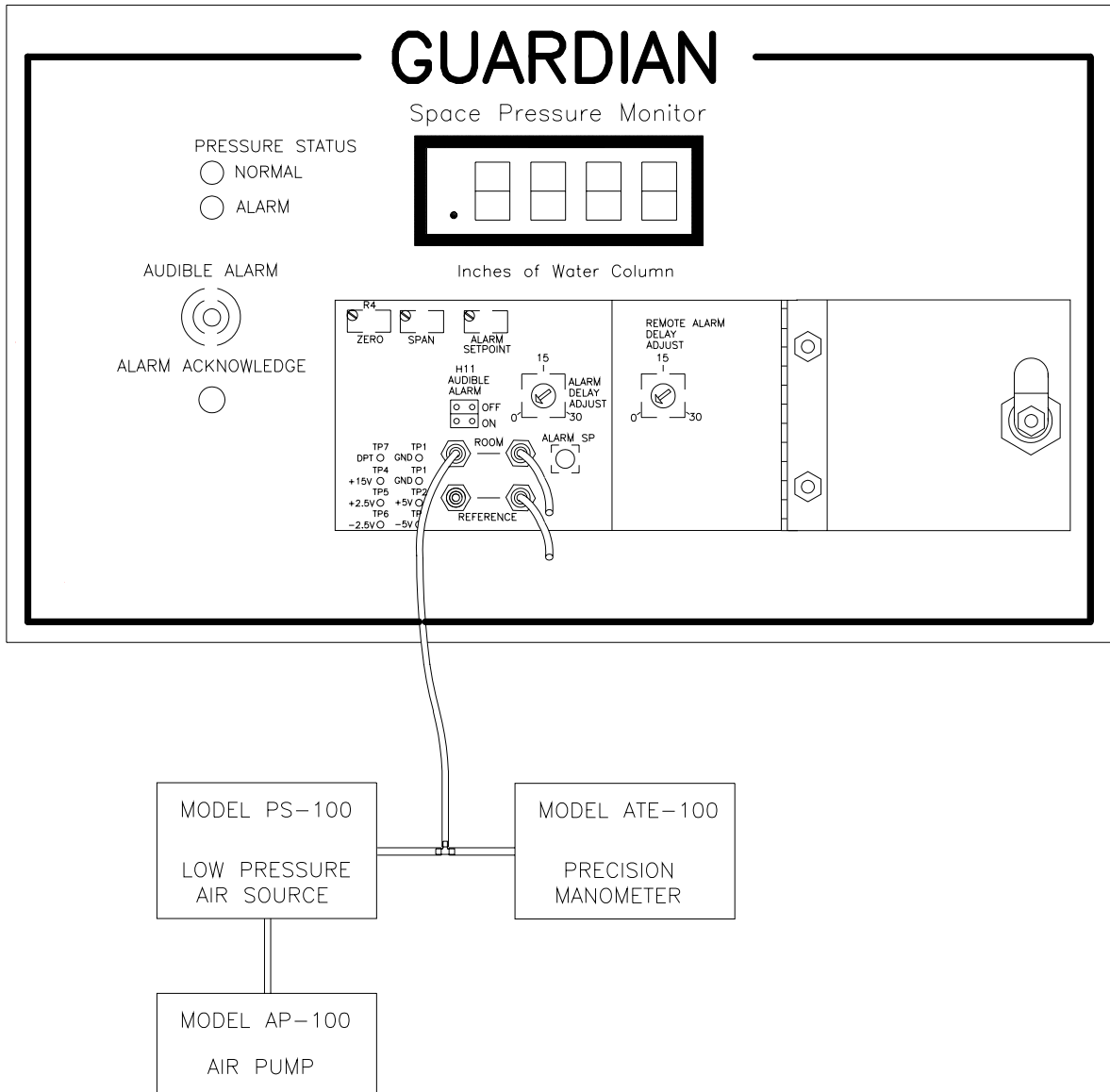
(Refer to Figure 1, 2 & 3 For Test Point and Adjustment Locations)

4.1 Equipment Needed

- 4.1.1 4-1/2 Digit Digital Multi Meter (Fluke Model 8062A Or Equivalent DMM)
- 4.1.2 Potentiometer Adjustment Tool (Spectrol)

4.2 Pre-Startup Check

- 4.2.1 With 24VAC power applied to the Guardian, Verify LED displays illuminate.
- 4.2.2 Monitor TP2 and verify a reading of  $+5.5 \pm .6$  vdc.
- 4.2.3 Monitor TP3 and verify a reading of  $-4.8 \pm .6$  vdc.
- 4.2.4 Monitor TP4 and verify a reading of  $+15 \nabla .6$  vdc.
- 4.2.5 Monitor TP5 and verify a reading of  $+2.5 \nabla .1$ vdc.
- 4.2.6 Monitor TP6 and verify a reading of  $-2.5 \nabla .1$ vdc.
- 4.2.7 Open access door and connect the positive (+) probe of DMM to TP7 (DPT) and the common (-) probe to TP1 (GND). Disconnect one side of ROOM and REFERENCE pneumatic tubing from fittings. Verify a reading of  $\nabla 0.005$ vdc. If out of specification, adjust ZERO potentiometer (R4) for  $0.000$ vdc  $\pm .001$ vdc.



**FIGURE 1 TEST SET-UP**

**5.0 DIFFERENTIAL PRESSURE TRANSDUCER CALIBRATION PROCEDURE**

(Refer to Figure 1 For Test Set-Up)

5.1 Equipment Needed

- 5.1.1 4-1/2 Digit Multi Meter (Fluke Model 8062A Or Equivalent DMM)
- 5.1.2 Precision Manometer (Ashcroft Model ATE-100 Or Equivalent)
- 5.1.3 Compressed Air source (Paragon Model AP-100 Air Pump)
- 5.1.4 Low Pressure Signal Generator (Paragon Model PS-100)
- 5.1.5 Potentiometer Adjustment Tool (Spectrol)

## 5.2 Calibration

- 5.2.1 Disconnect the pneumatic tubing from the left hand fitting labeled ROOM and REFERENCE. This will produce a zero differential input pressure to the transducer. Adjust the ZERO (R4) potentiometer for a reading of 0.000vdc,  $\pm 0.001$ vdc at TP7.
- 5.2.2 Obtain the full scale input range from the label located on the back of the access door. With the pneumatic signal generator apply the required full scale pressure to the left side ROOM pneumatic port. Adjust the SPAN (R10) potentiometer for a reading of 1.00vdc,  $\pm 0.001$ vdc at TP7.
- 5.2.3 Repeat steps 1 and 2 to verify that they meet specification tolerances. Large adjustments to either zero or span may result in a slight shift in the other adjustment.

## 6.0 -2.5v REFERENCE, ANALOG OUTPUT AND DISPLAY SCALING CALIBRATION

- Notes:
- 1. Removal of Guardian from the wall will be required to perform the following calibration procedure.
  - 2. All voltage measurements will be performed with DMM common (-) probe attached to TP1.
  - 3. Refer to Figure 1.0 for test set-up and Figure 2.0 & 3.0 for test point locations.
  - 4. Analog output configuration (CURRENT or VOLTAGE) must be confirmed prior to calibration. To determine the output configuration, refer to the label on the back side of the access door and confirm by checking jumper H5/PROCESS.
  - 5. For CURRENT output configuration, disconnect field wiring from J2/PROCESS-OUT terminal. Place DMM in current mode, and install leads in series with field wiring.

## 6.1 Equipment Needed

- 6.1.1 4-1/2 Digit Multi Meter (Fluke Model 8062A Or Equivalent DMM)
- 6.1.2 Precision Manometer (Ashcroft Model ATE-100 Or Equivalent)
- 6.1.3 Compressed Air source (Paragon Model AP-100 Air Pump)
- 6.1.4 Low Pressure Signal Generator (Paragon Model PS-100)
- 6.1.5 Potentiometer Adjustment Tool (Spectrol)

## 6.2 Calibration

- 6.2.1 Monitor TP6 and adjust R106(-2.5v ADJ) for a reading of -2.5  $\nabla$ .001v.
- 6.2.2 With zero input pressure to the transducer
  - 6.2.2.1 **CURRENT (Uni-Polar Range)**- Adjust R89 (ZERO) for a reading of 4.0mA,  $\nabla$ .01mA. **CURRENT (Bi-Polar Range)**- Adjust R89 (ZERO) for a reading of 12.0mA,  $\nabla$ .01mA.

6.2.2.2 VOLTAGE (**Uni-polar Range**)- Adjust R75 (ZERO) for a reading of 0.00vdc,  $\nabla$ .01vdc between J2 PROCESS (OUT+) and (GND) terminals.  
VOLTAGE (**Bi-polar Range**)- Adjust R75 (ZERO) for a reading of 5.00vdc,  $\nabla$ .01 vdc between J2 PROCESS (OUT+) and (GND) terminals.

6.2.3 With full scale pressure applied to the high port (See label on back of access door)

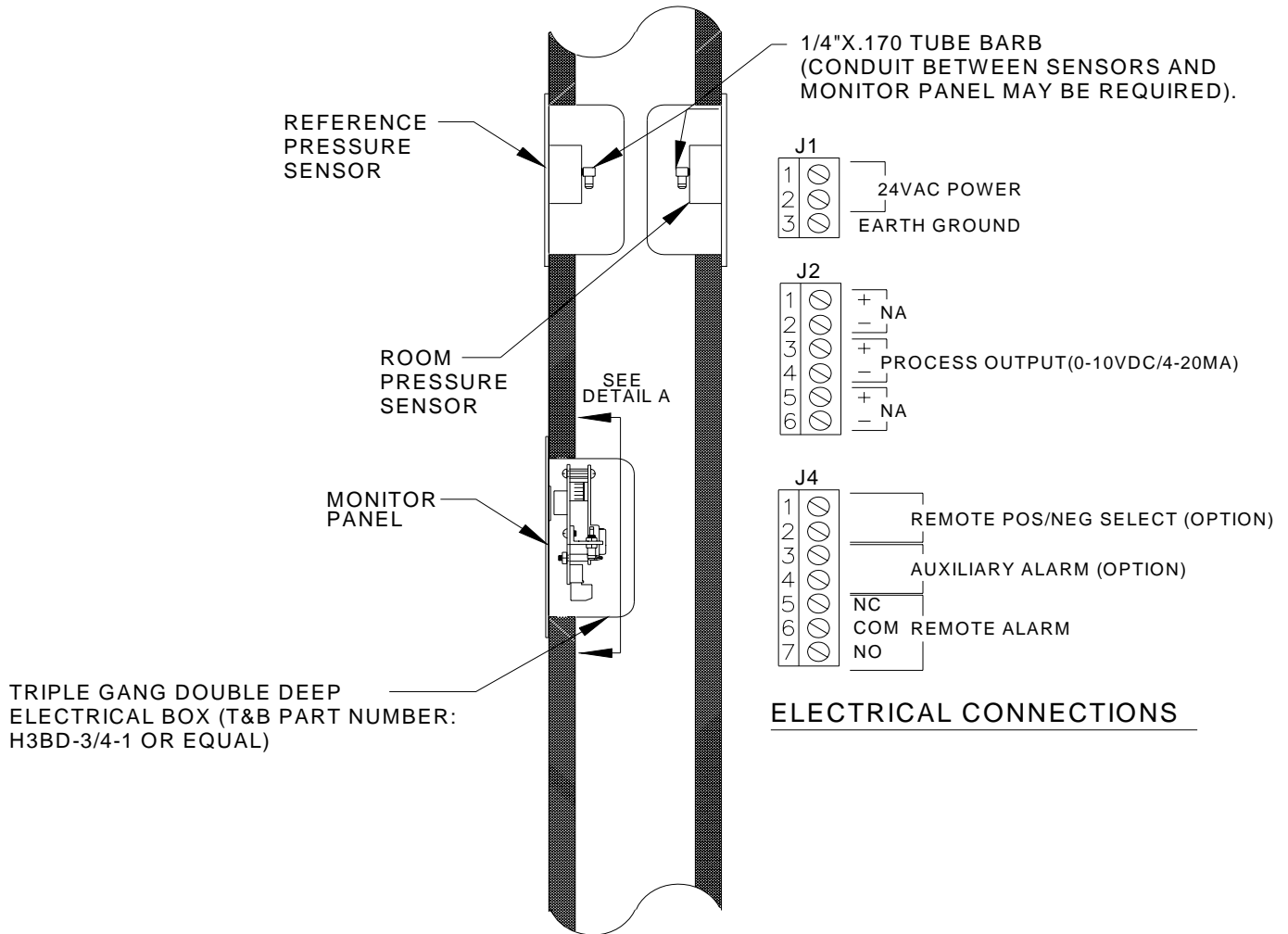
6.2.3.1 CURRENT - Adjust R87 (SPAN) for a reading of 20.0mA.

6.2.3.2 VOLTAGE - Adjust R84 (SPAN) for a reading of 10.00vdc between J2 (OUT+) and (GND) terminals.

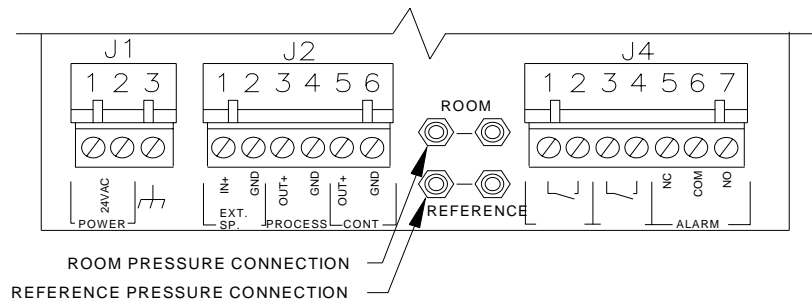
6.2.3.3 Adjust R38 (DISPLAY) for full scale value on the LED display.

6.2.4 Repeat steps 2 and 3 to verify that they meet specification tolerances. Large adjustments to either zero or span may result in a slight shift in the other adjustment.



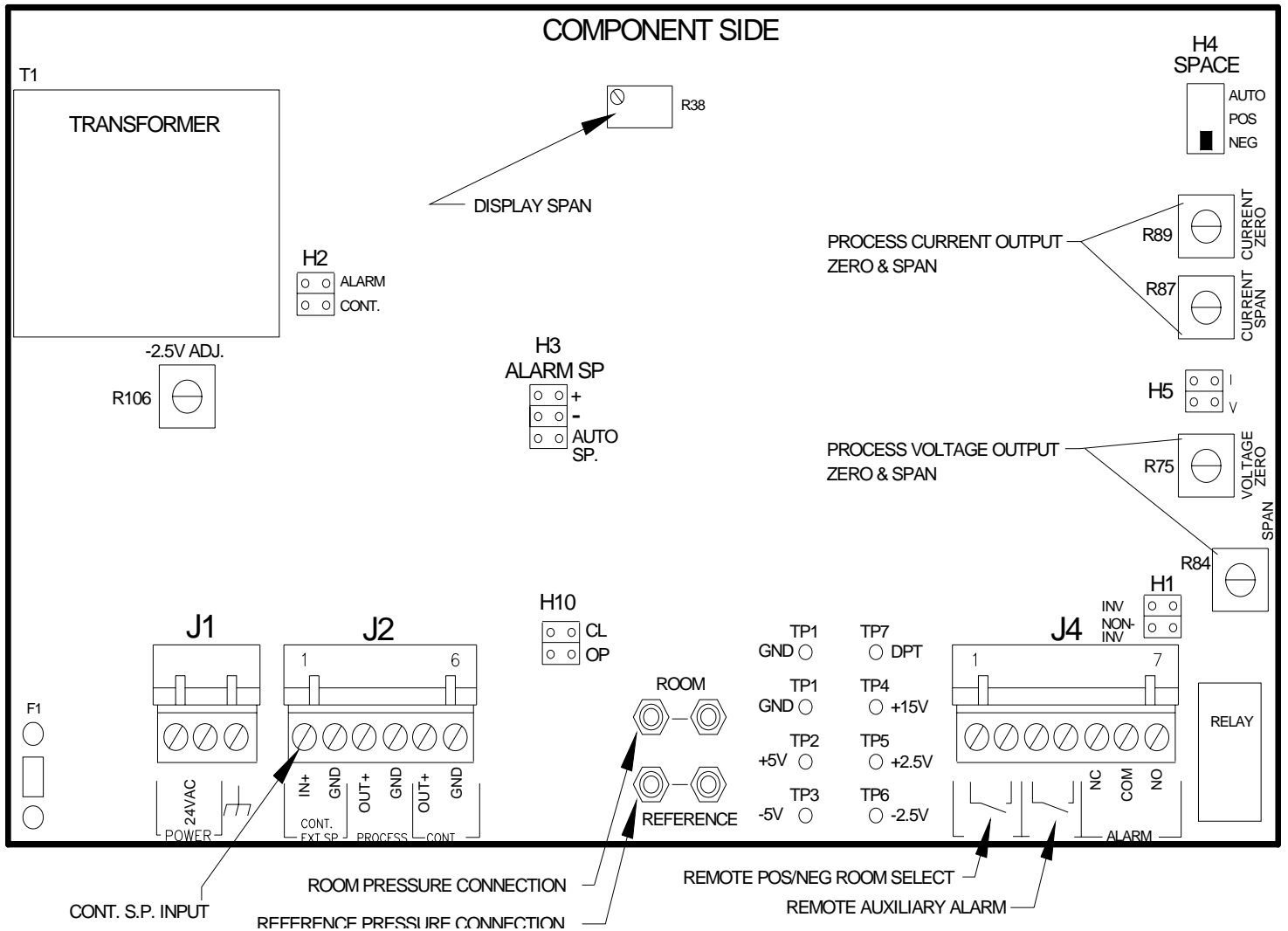


ELECTRICAL CONNECTIONS



DETAIL A

**FIGURE 2**



**FIGURE 3**