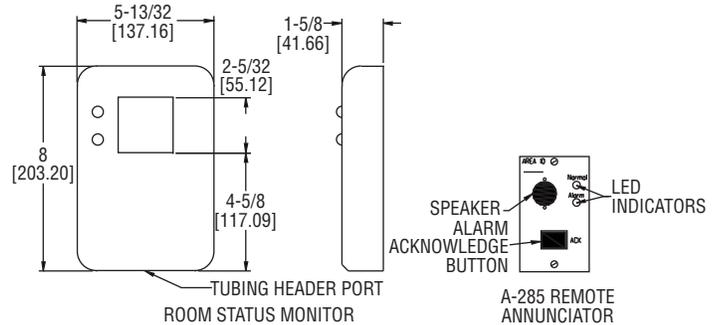




Series RSM Room Status Monitor

Specifications - Installation and Operating Instructions



The **Series RSM Room Status Monitor** is designed for critical low differential pressure applications that require stringent pressure monitoring and alarming. The Series RSM can be configured to monitor positive or negative pressure in protected environments and hospital isolation rooms per CDC guidelines. The RSM is a complete system that includes a backlit RGB LCD display with a graphic user interface which enables access to pressure, security, calibration, and alarm setup. The touch-screen displays menus that guide the user through setup, as well as setting up password protection. Red and green LED's and a local audible alarm (with time delay feature) alert personnel to system status. The RSM has a NEMA 1 (IP20) rated fire retardant plastic for indoor applications. True differential pressure is displayed with a resolution of 0.001 in w.c. The very low pressure capacitance is dead ended and avoids the potential for cross contamination of the room and reference space as well as eliminating drift that results from fouling of flow based sensors, which by nature have a flow path connecting the protected and reference spaces. Additionally, there are two levels of password protection available as well as optional BACnet MSTP communication.

1.0 INTRODUCTION

Congratulations, and thank you for purchasing Dwyer Instruments' Room Status Monitor (Series RSM). Its ease of operation and durable construction will provide years of reliable service. While the Series RSM is easy to operate, it is advisable to read this guide carefully before use. It is designed to help you take full advantage of the function and performance of the Series RSM.

1.1 INTENDED USE

The Series RSM is designed to monitor critical air environments, providing room static pressure indication, alarming, and communication functions. The applications include:

1. Hospitals - patient isolation and protection rooms, operating suites, intensive care and emergency rooms.
2. Pharmaceutical, semiconductor, precision, manufacturing and clean rooms.
3. Laboratories - medical research and BSLs (Bio-Safety Labs), radiation, toxic metals and chemicals.

SPECIFICATIONS

Service: Air or nonconductive, nonexplosive gases.

Accuracy: $\pm 0.5\%$ FS, $\pm 0.25\%$ FS (optional).

Temperature Limits: 32 to 120°F (0 to 50°C).

Humidity Limits: 5 to 95% Relative humidity (non-condensing).

Altitude: 6561 ft (2000 meters) max.

Thermal Effects: $\pm 0.03\%$ FS / °F ($\pm 0.05\%$ FS / °C).

Pressure Limits: 15 in w.c. (± 3.7 kPa).

Supply Voltage:

Order Code A (24 VAC): 18 to 32 VAC, 50 to 60 Hz.

Order Code B (120 VAC): 85 to 265 VAC, 50 to 60 Hz.

Main supply voltage fluctuations up to 10%.

Power Consumption (Voltage output): 5 W.

Output Signal: Selectable 4 to 20 mA (2-wire), 0 to 5 VDC (3-wire), or 0 to 10 VDC (3-wire).

Loop Resistance (4 to 20 mA output): 0 to 510 Ω .

Electrical Connection: Removable terminal block.

Process Connection: Barbed fittings for 3/16" I.D. tubing.

Enclosure Rating: NEMA 1 (IP20) rated for indoor app applications.

Housing: Fire retardant plastic.

Mounting: Mount to standard double gang metal electrical box using 4x4" plaster ring adapter.

Dimensions: 8" H x 5.4" W x 1.8" D (20.3 H x 13.7 W x 4.1 D cm).

Weight: 1.5 lbs (680 g).

Communications: BACnet MSTP ASC optional.

Agency Approvals: CE, CSA (RSM only).

1.2 RSM FUNCTION

The Series RSM senses very low differential pressure using high accuracy capacitive sensor technology. The pressure difference for these applications is the difference in static pressure between a critical environment room and its surrounding reference area (usually a hallway or another room). Maintaining and monitoring a static room pressure difference ensures that the critical environment room is either protected or isolated from a surrounding environment. Protection strategy requires a net positive room static pressure difference, while isolation requires a net negative static pressure difference. The RSM can be programmed to monitor either positive or negative room static pressure. The RSM low pressure sensing technology is coupled with multifunctional alarming and simple touch-screen user interface with password security protection. The BACnet communication option allows the device to communicate with other BACnet devices to allow the supervisory system to change configuration setups and monitor alarms in an open network.

User Interface: LCD display 128 x 128 COG module, with custom RGB LED backlight and custom 4-wire resistive touch screen.

RGB Backlight: The SRPM indicates the status of the room being monitored using visual backlight color.

Color status:

Green — Room pressure is within alarm limits.

Yellow — Door is open (door input must be enabled).

Red — Room pressure is outside alarm limits and alarm delay period has been exceeded.

Visual Feedback: LEDs, green for normal, red for alarm.

Audible Feedback: Buzzer will sound when pressure is out of range and alarm delay has timed out. Volume can be adjusted between 1 to 4 in relative sound levels up to the max level spec of the buzzer of 85 dB at 4". Audible alarm can also be disabled.

Quick Room Mode Change: Sometimes the room needs to be changed quickly from in use (Occupied) to out of use (No Isolation). This is accomplished by using two levels of password protection. The Operator level allows access to change room modes but no other changes. The Supervisor Level allows full access to all menus. In No Isolation mode no alarms are generated even if the pressure is outside limits. To change modes press the Menu key, press Setup Room key and press No Isolation.

2.0 PARTS LIST

2.1 RSM INCLUDED PARTS

Quantity

- 1 RSM assembly
- 2 Barbed Coupling, Brass
- 2 1/4" Tube, Silicone, Inter-Connect
- 4 6-32 x 1/2" Mounting Screws for RSM Base

2.2 OPTIONAL A-285 INCLUDED PARTS

Quantity

- 1 Annunciator Assembly

3.0 MOUNTING AND WIRING

To mount and install properly, the following components are required:

3.1 NOT INCLUDED RSM PARTS

Quantity

- 1 Double Gang Metal Electrical Box with Grounding Stud
- 1 4" x 4" Metal Plaster Ring
- 1 Door Switch SPDT or SPST, N.O., as needed

3.2 NOT INCLUDED A-285 PARTS

Quantity

- 1 Single Gang Electrical Box

Note: In the following wiring sections, abbreviations are used (e.g. J1, P3). Please see section 13.0 for complete wiring diagrams with abbreviations.

3.3 MOUNTING

⚠ CAUTION

(For 120/240 VAC Version Only): Do not open or remove RSM cover (flathead screwdriver required) with input power applied unless performed by a licensed electrician. "Hazardous Live" voltage is present at connector J3 when power is applied. Please observe the warning symbol (⚠) near the J3 power connector.

The RSM is designed to be mounted on a standard double gang metal electrical box using a 4" x 4" plaster ring adaptor. Remove the RSM cover and mount the baseplate to the plaster ring adaptor using four 6-32, 1/2" long mounting screws. Note: The plaster ring external mounting face needs to be positioned flush to recessed, relative to the surface of the wall. Also note the orientation of the 4 mounting screws in the plaster ring, as the plaster ring is rotated 90° from conventional mounting.

3.4 WIRING ELECTRICAL BOX (ROUGH IN)

Layout the system in terms of wiring: power, annunciator, analog output, BACnet, relay output and plumbing to connect to the monitored spaces (pressure taps). Bring all power, earth ground, signal communications and analog output wiring into the 4" x 4" electrical box. In order to conform to the CSA safety standard the electrical installer must comply with the following ground earth instructions. Pre-wire electrical box with power (24 VAC or 120/240 VAC depending on RSM model), and provide grounding to the electrical box and plaster ring adaptor. The safety ground path consists of the four 6-32 x 1/2" metal screws that connect the RSM metal base to the 4" x 4" metal plaster ring. The plaster ring is grounded to the 4" x 4" electrical box by 2 mounting screws. The 4" x 4" electrical box is grounded to the building earth ground. It is also highly recommended to use armored cable (Type AC) for all the wiring in applications where high levels of radio interference may be present.

Power leads and wiring should be 14 to 22 AWG braided wire. 18 AWG braided wire is recommended for wiring J3 power connector to RSM. For 120/240 VAC the hot wire connects to L and neutral to N (See Section 13.0). BACnet suggested wiring is 22 AWG stranded wire in a shielded cable, a +, -, Gnd (S) and shield should be run. This can be two twisted pairs with a separate cable shield. One twisted pair is used for communications, the second twisted pair can be used for communications ground and the shield wire can be connected to the other device shield wires.



Mounting Screws [x 4]

3.5 ATTACHING PRESSURE TUBING

Typically a Room Pressure Snubber (RPS) is installed in the monitored room.

NOTICE Always attach tubing to the RSM header and then place Header onto RSM. This will prevent overpressure from crimped or collapsed tubes.

Use the following procedure for all room types positive, negative or neutral: Typically a Room Pressure Snubber (RPS) is installed in the monitored room. Often stiff nylon 3/4" tubing is used for running pressure signals from the SRPM to the monitored spaces. To prevent buckling and collapse of this stiff tubing inside the electrical box, use the supplied soft silicone tubing and tubing adapters to transition from the field tubing to the pressure fittings on the RSM. Attach pressure tubing as follows:

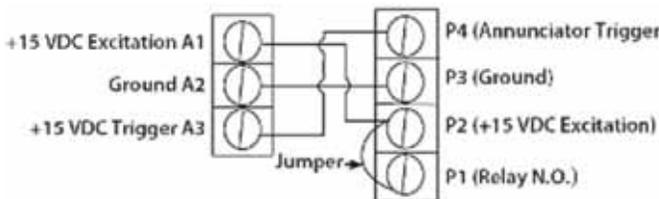
1. Connect the 1/4" O. D. tubing from the RPS to the 4" x 4" electrical box for the RSM by pushing the 1/4" tube onto one end of the barbed, male to male, tube adaptor, then push the silicone tube (supplied) onto the other end. Thread the tubes, with installed adaptor, through the conduit opening at the bottom of the electrical box.
2. Next push the open end of the silicone tubing onto the RSM pressure tube header (H1) port labeled "+". Note: The header is an Electro-Pneumatic (EP) assembly. "+" indicates (Positive) pressure, and "-" indicates negative or reference pressure.
3. For the most pressure stable operation, an RPS installed in the reference pressure area is also recommended. In this case, install the RPS in a hallway or anteroom. Attach the tube to the RSM in the same way as in step 2, except attach the tube to the "-" port on the pressure tube header. Tighten swivel fittings on the assembly if they become loose.

4.0 ALARM RELAY OUTPUT

The Single Pole Double Throw (SPDT) relay output can be used for remote signaling of alarm condition. A form "C" contact rated at 1A is available. Connect to J4, P1 and P4 (See Section 13.0).

4.1 OPTIONAL REMOTE ANNUNCIATOR WIRING

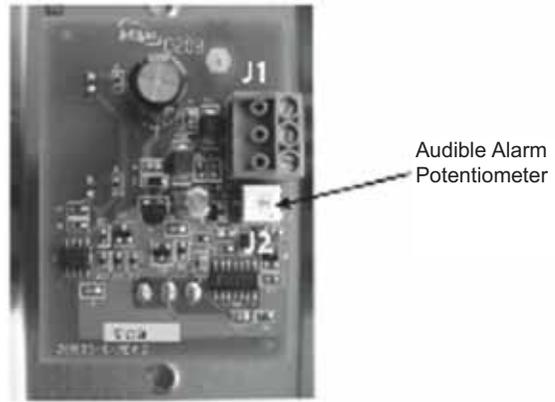
Dwyer offers an optional Remote Annunciator (Model A-285). In the figure



below, the remote annunciator connector is at left, and the RSM connector is at right: Connect P1 to P2, then connect P2 to A1 (Located on Remote Annunciator), finally connect P3 to A2 and P4 to A3.

4.2 AUDIBLE ALARM

Alarm potentiometer can adjust from 0 to 85 dB. Using a screwdriver, rotate potentiometer (on A-285 remote annunciator PC board) clockwise to increase volume and counterclockwise to decrease volume.



5.0 DOOR STATUS SWITCH WIRING

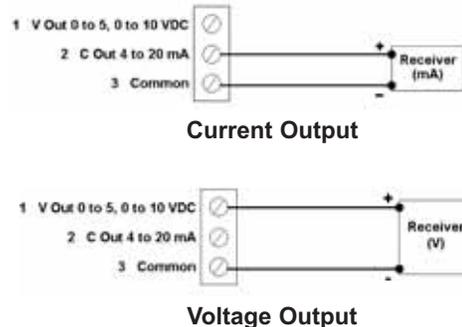
5.1 WIRING

Install the door switch into the door jamb. Wire to the normally open (N.O.) side of the door jamb contact switch. The SRPM will indicate the status of door position. A contact closure indicates that the door is closed. This is a low voltage circuit (5 VDC). Run two wires from the door switch to connector J6 on the SRPM. The door input status function is enabled in the ALARM SETUP SCREEN, section 7.5.

6.0 ELECTRICAL INSTALLATION

6.1 ANALOG OUTPUT

The RSM can be configured to have current (4 to 20 mA) or voltage (0 to 5 or 0 to 10 VDC) outputs. Voltage output--pin 1, Current output--pin 2, Common--pin 3. **Note: No external excitation is required.**



6.2 BACnet Communication

BACnet hardware is implemented as isolated RS485. Wire to Connector J2, labeled RS-485. Connect tx line to +(A), rx to -(B) and ground wires to S. Connect Shields together with wire nut. Hardware configuration is done using a 5 position dip switch located in the upper right hand section of the PCBA as well as through the touch screen interface.

Position Function	
1	MAC address enable
2	N/C Not Connected
3	Pull Up Resistor
4	Termination Resistor
5	Pull Down Resistor

Use a small flat blade screwdriver or pen to push the switch to the right to turn that function on, otherwise it is off. There is a BACnet setup screen that is enabled by pushing position 1 switch to the on position. After configuration the switch must be moved to the off position.

7.0 STARTUP AND OPERATION

The RSM is designed with an easy to use touch screen interface. In its normal state the Monitoring Screen displays the actual room static pressure. The buttons at the bottom of the screen give you access to the functions that can be performed.

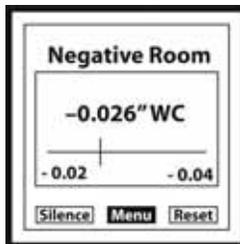
7.0.1. MENU TREE

See section 14.0.

7.1 POWER-UP

Apply power to the RSM and observe the welcome screen and subsequent transition to the pressure monitor screen. The actual room static pressure is shown as a number on the LCD and visually as a moving bar indicator operating between the preset alarm units. The vertical bar is an indicator of the pressure.

Button	Description
Silence	Shuts off Alarm
Menu	Access to Setup Functions
Reset	Resets the unit in "Latched" mode.

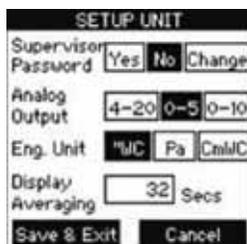


Monitoring Screen

7.2 MAIN MENU SCREEN



7.3 SETUP UNIT SCREEN



7.3.1 SETUP UNIT OPERATION

Press (or tap) button to select an output or engineering unit. Selected button background will change from clear to black.

7.3.2 ENTERING DATA

Press (or tap) button to select an output or engineering unit. Selected button background will change from clear to black.

7.3.2.1 PASSWORD PROTECTION

Lightly pressing (or tapping) the "Yes" button activates the "Data Entry Screen" (see 7.3.3 to enter your password). Enter password, then press "Enter". "Password Setting Screen" will pop-up. Enter a new password, and enter the new password again to confirm, then press "Save".

7.3.2.2 DISPLAY AVERAGING

Lightly pressing (or tapping) the "Display Averaging" box activates the "Data Entry Screen" (see 7.3.3). Enter from 0 to 60 seconds. Display averaging affects the analog output. Increase the display averaging time to smooth out the pressure readings.

7.3.3 DATA ENTRY SCREEN

Enter numbers by pressing each key in sequence until the desired character is displayed in the data entry box above the keypad. (Note: The cursor will blink for one to two seconds then stop and display the character.) Erase any mistakes by using the "Back Space" key. When finished entering data, press the "Enter" key to return to SETUP UNIT screen.

Example:

Enter number 3, press (or tap) 3/DEF key once.

Enter the letter T, press (or tap) the 8/STU key three times in succession.

Note: Use the eraser end of a pencil or back-end of a pen to press (or tap) box on screen to increase accuracy of inputs.

7.4 SETUP ROOM SCREEN



7.4.1 SETUP ROOM OPERATION

Setup alarm limits for "protective" positive room static pressure, "isolating" negative room static pressure or neutral (where the limits can be - to +).

7.4.2 ENTERING DATA

Press lightly or tap in the lower limit data entry box. Enter the lower limit pressure. Enter the Upper Limit pressure. The Room type box will change depending on the lower and upper limits. If both entries are positive, the room will be a Positive Room. If both are negative, the room will be a Negative Room and if the lower limit is negative and the Upper Limit is positive the room will be a Neutral Room.

Lightly pressing (or tapping) the "Yes" button activates Operator password protection. With Operator password protection enabled, room Occupied/No Isolation status can not be changed without entering a valid Operator password. Pressing "No" disables password protection. Pressing "Change" will open "Password Setting Screen". To change the password, enter the present password, followed by the new password in the "New Password" and "Confirm New Password" entry boxes, then press save.

7.4.3 ROOM MODE SCREEN



OCCUPIED/NO ISOLATION

Use these buttons to quickly change the room to standby or no isolation status. If No Isolation is used there will be no alarms generated if the room is outside pressure limits.

Press Save and Exit.

OPERATOR PASSWORD

The operator can only change the room from occupied to No Isolating and vice versa.

7.5 ALARM SETUP SCREEN



From this screen the user can access the following:

- Latched Alarm requires the pressure to return to normal and the alarm to be acknowledged before the alarm can be silenced and reset.
- Enable the audible alarm by selecting "Yes" or use visual only alarm by selecting "No".
- Provide a door "open" pre-alarm visual indication. When activated, the door status "open" condition is indicated by the touch screen display turning from green to yellow, and door open indicated on the monitoring screen.
- Set the time (in seconds) that the alarm can be silenced in the latched alarm mode before the alarm resumes. This assumes that the room static pressure is still outside the normal or set operating limits. The Mute Time Out can be set from 0 to 60 seconds.
- Set the Alarm Delay (in seconds) from the time that the room pressure goes out of the preset limits until the alarm activates. The alarm delay may be set from 0 to 60 seconds.
- Set the alarm volume or sound level. Using the Up and Down keys, the volume can be set at level 1-4. Level 4 alarm volume is the loudest and corresponds to a sound level of 85 dB at a distance of 4 inches.

7.5.1 ALARM SETUP OPERATION

Lightly press (or tap) button to select "Yes" or "No" for Latch Alarm, Audible Alarm, or Door Alarm Inputs. Selected box background will change from clear to black when selected.

7.5.2 MUTE TIME OUT/ALARM DELAY

Pressing (or tapping) the "Mute Time Out" or "Alarm Delay" box activates the Data Entry screen to set the time.

7.6 SELF TEST SCREEN



7.6.1 Self Test Operation

This screen identifies the Product Model Part Number and Software Version. User can also perform a Self Test of the unit to verify that the data in protected area of the EEPROM memory hasn't been corrupted and also test the alarm to verify the sound level and alarm setup.

Press "Self Test" button to initiate EEPROM memory checksum test sequence.

Press "Alarm Test" to test buzzer, visual Red LED Alarm, and relay output. This can be used to verify the system in alarm mode.

Press "Cancel Test" to stop the alarm test.

Press "Exit" to return to Main Menu.

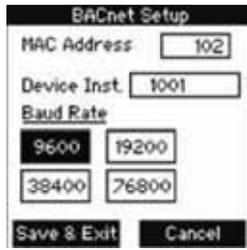
7.7 CALIBRATION SCREEN



7.7.1 CALIBRATION

To re-zero the device, disconnect the "room pressure" tube and lightly press (or tap) the "Zero" button. Then apply a steady full-scale pressure signal to the "+" or "room pressure" tube or fitting and press (or tap) the "Span" button. Reconnect the room pressure tube and calibration is complete. Calibration must be within $\pm 5\%$ of original calibration. The original factory pressure calibration can be restored, if desired, by pushing the "Restore Factory Setting" button.

BACnet Setup Screen



To set up BACnet communications the MAC address enable switch (S1) on the dip switch must be enabled by pushing it to the right.

Set MAC address, input the address of the device.

Select Device Instance by inputting the device instance into the data entry box.

Select baud rate by press on the correct baud button, 9600 to 76800.

Save and Exit to save settings or cancel to cancel setting changes. Once complete disable the BACnet setup by moving the dip switch position 1 to off (left) position.

If the unit will be at the end of the line the pull up resistor can be enabled by pushing position 3 to on.

The termination resistor can be inserted by pushing position 4 switch on. The pull down resistor can be enabled by turning position 5 to on.

Save and Exit. After the unit returns to the main menu screen disconnect the power to the unit and re-connect in order to boot up with the proper MAC address and Device Instance.

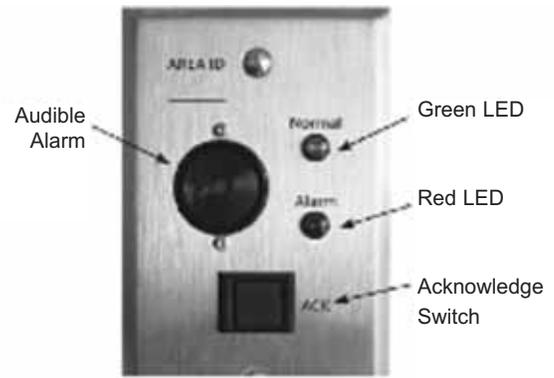
Position	Function
1	MAC address enable
2	N/C Not Connected
3	Pull Up Resistor
4	Termination Resistor
5	Pull Down Resistor

8.0 PRESSURE MONITORING SCREENS

The actual room static pressure is shown as a number on the LCD as well as a "Moving Bar" indicator operating between the preset pressure limits. Normal room pressure conditions within the preset pressure limits are verified by a green colored screen. When the door is opened under conditions within the preset pressure limits, the screen turns to yellow. Room static pressure outside of the preset limits is indicated by a Red screen after the alarm's time delay expires.

9.0 REMOTE ANNUNCIATOR (A-285)

The Remote Annunciator provides remote indication of room status.



(A-285)

Green LED	Visual indication of normal room condition.
Red LED	Visual indication of a breach in room pressure protection.
Audible Alarm	Buzzer sounds to indicate breach in room pressure protection.
Acknowledge Switch	Press to silence buzzer.

9.1 OPERATION

Under normal conditions, the green LED remains on. When an alarmed condition occurs (i.e., room pressure falls outside preset range), a signal is triggered by the RSM, the green LED shuts off, the red LED flashes, and the audible alarm sounds. The acknowledge button can be pressed to momentarily turn-off the audible alarm and the red LED will continue to flash until the alarmed condition is corrected. When the alarmed condition is corrected the annunciator will reset itself. The green LED will turn on, and the red LED and audible alarm will shut-off.

10.0 CLEANING

Important

Do not blow into the pressure tubing or fittings with mouth, compressed air, or canned air. Such actions may permanently damage the pressure sensor.

CLEANING YOUR RSM

Do not clean or wash-down the RSM with industrial cleaners or solvents. The housing may be wiped down with soap and water or isopropyl alcohol. The LCD may only be cleaned with isopropyl alcohol. Do not immerse unit.

CAUTION

(For 120/240 VAC Version Only): Do not open or remove RSM cover (flathead screwdriver required) with input power applied unless performed by a licensed electrician. "Hazardous Live" voltage is present at connector J3 when power is applied. Please observe the warning symbol (⚠) near the J3 power connector.

11.0 AGENCY ELECTRICAL STANDARDS

This device falls into CSA "Pollution Degree 2" for PCB insulation and CSA "Installation Category 2".

The RSM meets the following requirements:

CSA Standard C22.2 No 0-M 91: General Requirements - Canadian electrical code, Part 1

CAN/CSA C22.2 No. 0.4-04: Bonding of Electrical Equipment

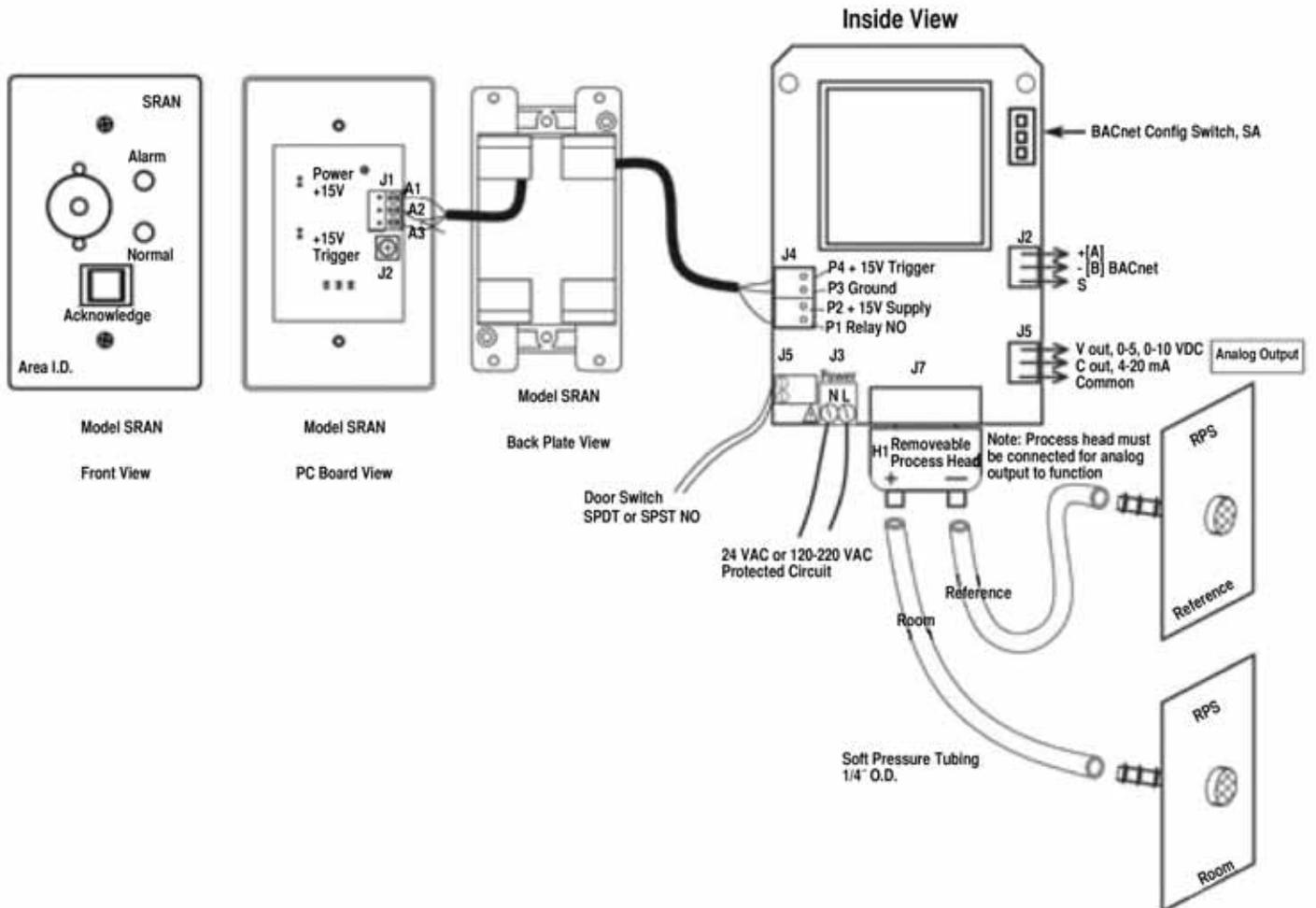
CAN/CSA-C22.2 No. 61010-1-04: Safety requirements for electrical equipment for measurement, control and laboratory Use Part-1: General Requirements

ANSI/UL61010-1 (Second Edition): Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General Requirements.

12.0 MAINTENANCE

The RSM is designed to operate in an indoor environment, monitoring clean, dry air. Upon final installation of the RSM Room Status Monitor, no routine maintenance is required. A periodic check of system calibration is recommended. The RSM is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

13.0 LOCATION OF COMPONENTS AND ACCESSORIES



14.0 MENU TREE

