

SENTRY

Room Pressurization Monitor & Controller

Air Monitor's SENTRY Room Pressurization Monitor & Controller is designed to perform continuous monitoring and control of the differential pressure or rate of airflow between adjacent spaces in laboratories, operating rooms, and patient isolation areas to ensure the well being and safety of patients, medical staff, and laboratory personnel.

System Components

The SENTRY monitor system is composed of three primary components: Operator/technician keypad, combination transmitter I/O enclosure, and flow/pressure sensing ports. Also provided is the 14' interconnecting cable between the keypad and transmitter I/O enclosure, 25' of ½" diameter signal tubing, and all necessary mounting hardware.

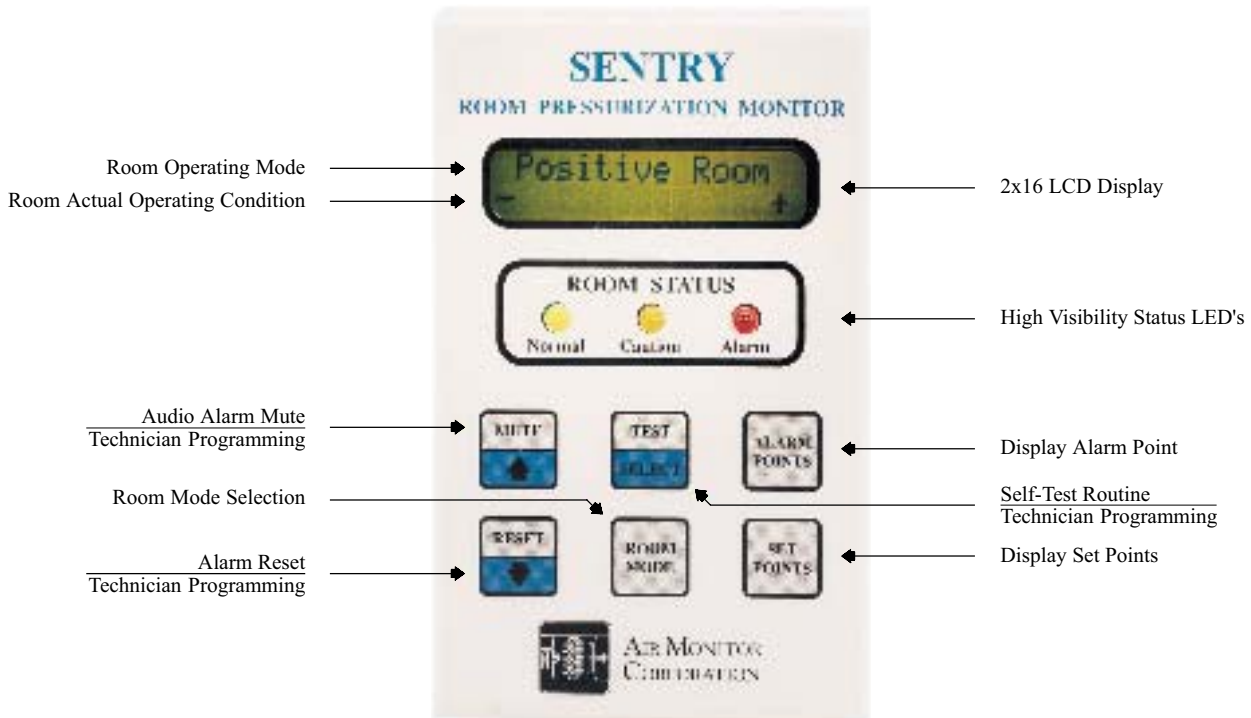
Operator/Technician Keypad – Features and Functions

- 2x16 character LCD display is used during set-up, and to provide operating status information. During operation the LCD display would show the room mode (positive, negative, unoccupied, purge) and digital display of actual room condition in Inches w.c. or FPM. LCD updated every 0.5 second.
- Room status LED's in green, yellow, and red depicting normal, caution, and alarm conditions. LED's protrude from the front of the keypad for extended visibility.
- Accepts dry contact input to "hold" controller output during entry into room.
- Alarm time delay selection range is 0 to 30 seconds, in one second increments.
- Keypad dimensions are 5.25"(h) x 6.38"(w) x 1.25"(d), and mounts directly to a standard 2x4 electrical junction box.
- Choice of operating in Inches w.c. or FPM.
- Local audio alarm with mute and reset buttons. Alarm active/inactive and latching/non-latching is technician selected during set-up via keypad DIP switch.
- A choice of four range selections are available, technician selected during set-up via DIP switch. For pressure, the choices are $\pm 0.005"$, $\pm 0.015"$, $\pm 0.035"$, and $\pm 0.10"$. For FPM, the choices are: ± 250 , ± 450 , ± 650 , and ± 1150 FPM.
- Auxiliary dry contact input to permit remote changing from a room pressurization control setpoint to "unoccupied". Separate unoccupied setpoints for positive room and negative room.
- Technician selectable control setpoints for positive and negative room modes, with individual HI and LO alarm points for each room pressurization control setpoint. Preset purge mode at maximum controller output.
- Choice of three different methods for selecting room mode. Local selection of room mode can be performed via the keypad (password protected) or optional three position key switch. External selection of room mode via the BAS or nurse's station can be accomplished by a three position switch.
- Two levels of password: Operator and Technician. Passwords are technician programmed via keypad during set-up. An internal keypad DIP switch permits bypass and resetting passwords if custom selections are forgotten. Passwords are four character alpha; usage is optional and can be bypassed via DIP switch.



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Keypad External Features



Transmitter I/O Enclosure – Features & Functions

- Contains a high accuracy, thermal massflow sensor capable of sensing transfer airflow rate bi-directionally.
- All field input and output wiring, flow signal port and power connections terminate in the transmitter enclosure.
- On-board microprocessor manages all monitor and controller functions; permits technician configuration and calibration via pushbutton programming.
- Transmitter range is technician selected via DIP switch.
- The analog output signals for the transmitter and controller are 4-20mA, self-powered, grounded load.
- The digital output for alarm transmission to the BAS is a Form C dry contact rated for 5 amps at 24VAC/VDC or 120VAC. Digital outputs are provided to activate alarm light and audio at a remote nurse's station.
- Digital inputs can be received from the BAS or nurse's station to permit remote change of the room mode to unoccupied, remote alarm mute/reset, and to remotely select positive, negative, or purge room mode.
- Standard power requirement is 24VAC. A 120VAC option is available via a stand-alone auxiliary transformer.
- Enclosure is 9½" x 9½" x 3", NEMA 1 rated.

Flow Sensors – Features & Functions

- Designed for ease of installation in the room and reference space ceilings.
- Small size is visually unobtrusive to permit selection of optimum location.
- Sensor inlet screen protects the massflow sensor from airborne particulate.
- Below ceiling access facilitates periodic cleaning.

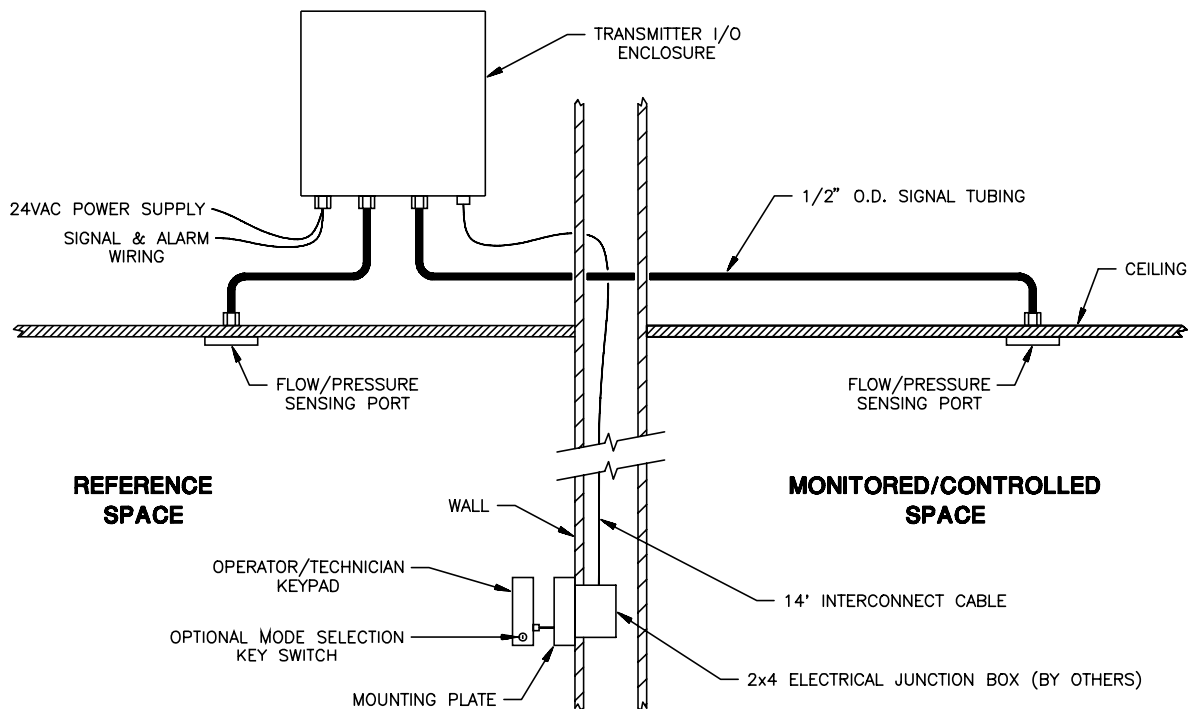
Nurse's Station (optional) – Features & Functions

Custom nurse's station monitoring panels will be designed on a per application basis to meet customer specifications for wall or table mount, number of monitored units, color, etc. Each room could have any or all of the following at the nurse's station.

- Green/red light to indicate safe/alarm condition.
- Audio alarm.
- Pushbutton for alarm/mute, and reset.
- Engraved labels for room and function identification.
- 3-way key switch to change room mode between positive, negative, and purge.
- Pushbutton to change room between occupied and unoccupied modes.

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Physical Installation



System Operation

The 1/2" diameter tubing connecting the transmitter I/O enclosure to the flow/pressure sensors mounted in the room and reference space ceilings create an airflow pathway through the bi-directional thermal massflow sensor.

The differential pressure between the room and reference space creates a condition where the very low volume airflow occurring between the two flow/pressure sensors is directly measured by the massflow sensor and electronically converted into pressure units of Inches w.c. or velocity units in FPM. The measured flow and directional data is compared within the microprocessor to the technician programmed operating and alarm setpoints to determine whether the room operating condition falls within safe, caution, or alarm ranges.

During normal operation, the keypad provides three forms of visual data: The room operating mode (positive, negative, purge, and unoccupied); a digital display of the measured room operating point; and three high visibility LED's to indicate normal (green), caution (yellow), and alarm (red) conditions. Additionally, the keypad has an audio alarm that can be technician configured to be active or silent, latching or non-latching.

Available to the BAS for remote monitoring is a 4-20mA output of the room's operating condition in Inches w.c. or FPM, plus a Form C dry contact to provide failsafe alarm notification. If desired, a monitoring panel at the nurse's station can be sent signals to activate both audio and lighted alarms. Remote alarm mute and alarm reset can be accomplished from the BAS, nurse's station, or both via momentary dry contact input.

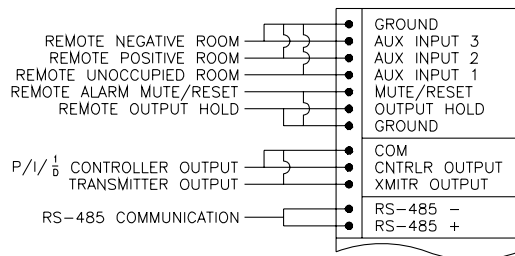
Switching of the room operating mode can be achieved in one of three ways: Locally, via password protected keypad MODE button or optional three-way keyed selector switch; remotely, via three-way selector switch at the BAS or nurse's station. When one of the room mode selector methods is designated via DIP switch, the other methods are disabled.

When the actual room pressure is between the control setpoint and the midpoint between the setpoint and alarm point, the green NORMAL LED will be lit; if the actual operating point is between the midpoint and alarm point, the yellow CAUTION LED will be lit; and in the event that the alarm point is reached and the alarm condition persists beyond the programmed delay period, the red ALARM LED will become lit and the optional local audio and/or remote alarms will be engaged. The keypad MUTE button or remote dry contact can silence the audio alarm. If alarm latching has been selected, the alarm condition must be corrected by the room pressure returning to CAUTION or NORMAL room status levels and the RESET button pushed, or a second remote dry contact received.

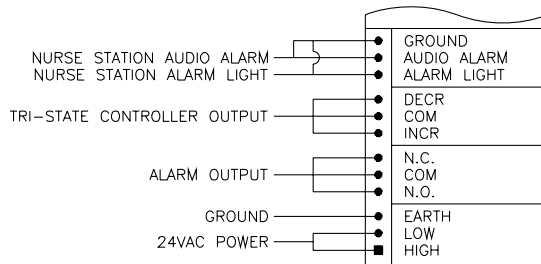
The optional controller function permits the SENTRY to perform single loop control as well as monitor the room operating condition. Two control options are available: Three-mode control providing a 4-20mADC output signal; or tri-state (floating point) control via separate decreasing and increasing output relay contacts. The choice of the controller mode and selection of tuning parameters is technician programmed via the keypad DIP switch.

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Wiring Connections



NU: TERMINALS NOT USED



Performance Specifications

Ranges.	Pressure Selections	Velocity Selections
	0 - ±.005 Inches w.c.	0 - ± 250 FPM
	0 - ±.015 Inches w.c.	0 - ± 450 FPM
	0 - ±.035 Inches w.c.	0 - ± 650 FPM
	0 - ±.100 Inches w.c.	0 - ±1150 FPM

Measurement Resolution. ±0.05% of full scale range (Inches w.c. or FPM).

Measurement Rate. 10 readings per second.

Sensor Response Time. 1 millisecond for a 10%-90% signal change; 3 milliseconds maximum.

Temperature Limits. -20 to 180°F storage; +32 to 120°F operating.

Displays. Standard 2 line x 16 character LCD provides operating mode and digital display of room operating point in Inches w.c. or FPM. Separate green, yellow, and red LED's indicate normal, caution, and alarm room status. Displays updated every 0.5 second.

Power Consumption. 6.0VA at 24VAC.

Digital Inputs. Individual dry contact remote input for alarm mute/reset, external output hold, room status select, and occupied/unoccupied. Six individual keypad push-buttons for MUTE/UP, RESET/DOWN, TEST/SELECT, ROOM MODE, SETPOINTS, and ALARM POINTS.

Analog Outputs. Transmitter and controller outputs are 4-20mA, self-powered, grounded load (800 ohm maximum load), 0.05% Full Scale resolution.

Digital Outputs. Form C dry contact for alarm output and dual Form A contacts for tri-state (floating point) controller output; contacts rated for 5 amps at 24VAC/VDC or 120VAC. Remote audio alarm and alarm light switching is rated for 100mA at 24VDC. RS-485 for digital communication.

Circuit Protection. Power input is fused. Polarity continuity must be maintained when multiple units are powered from the same source.

Power Supply. Standard 24VAC (20-28VAC). Optional 120VAC (100-132VAC) via stand-alone auxiliary transformer.

Suggested Specification

The room pressurization monitor shall be capable of monitoring [and controlling] the differential pressure between a room and reference area, and provide both pressurization and alarm outputs for remote monitoring.

The operator/technician keypad shall contain an integral 2x16 digital display for use during the configuration and calibration process, and display during normal use both the room operating mode (positive, negative, unoccupied, purge) and the actual room condition in Inches w.c. or FPM. The face of the keypad shall also have high visibility room status LED's in green, yellow, and red depicting normal, caution, and alarm conditions.

All monitor set-up, calibration, alarm configuration, [control loop tubing,] and password selection will be performed using the membrane pushbuttons with tactile feedback and LCD display to provide input to the on-board microprocessor.

The monitor's alarms shall provide the following technician configurable selections: Latching/non-latching, active/inactive, audible/muted, with time delay selectable in one second increments up to 30 seconds, and separate HI/LO alarm points for each room pressurization mode. Remote alarm notification will be via a Form C dry contact.

Three different methods for selecting room mode will be provided: Via password protected keypad access, optional three position key switch, or remotely via dry contact from the BAS or nurse's station.

[Optional] The controller function shall perform single loop pressurization control via a three-mode 4-20mA, or tri-state (floating point) output.

The monitor/controller shall be the SENTRY as manufactured by Air Monitor Corporation, Santa Rosa, California.