Application Guide Series

Clean Room Pressurization

Benefits

- *Stable and accurate room pressure*
- *Lower operating costs*
- *Eliminate cross-contamination, improving yield and operational efficiency*
- *Ensure compliance with local codes*
- *Maintain product quality and worker safety*

Industries

- *Semiconductor*
- *Pharmaceutical*
- *Medical*
- *Food and Beverage*
- *Automotive*
- *Fiber*
- *Aerospace*

Applications

- *Positive or negative space pressurization*
- *Multi-room pressure control*
- *Aerospace and automotive paint booths*
- *LCD Glass Manufacturing*
- *Semiconductor Manufacturing*

Air Monitor
Precision Airflow Measurement

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What is Critical Space Pressurization for Clean Rooms?

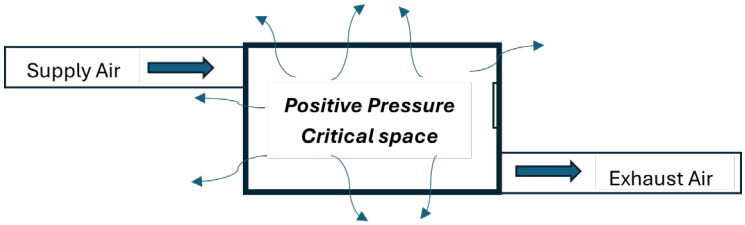
Space pressure control involves regulating the air pressure within a specific room or area to ensure it is either higher or lower than the surrounding spaces. This is essential for preventing the spread of contaminants and maintaining a safe and controlled environment. Space pressure control with airflow and air pressure measurement systems from Air Monitor is critical to maintain air quality, product quality, and worker safety in medical facilities, manufacturing plants, and commercial buildings.

Why Does Critical Space Pressurization Matter?

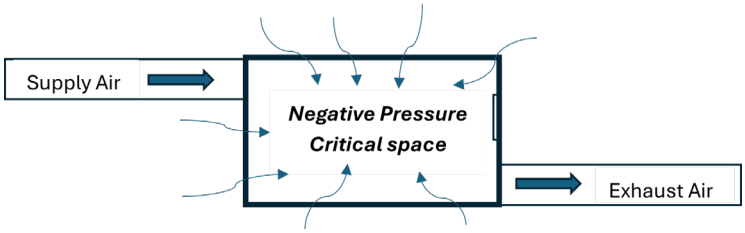
Protect product, equipment, process, and occupants from contamination between a critical space and the surrounding environment. Every space has access (doors) and leakage (space porosity) that create pathways for undesirable contaminates to migrate into or from an adjoining area. These critical spaces need pressurization controls to protect product, equipment, process and occupants from contamination.

What are the Methods for Achieving and Maintaining Critical Space Pressurization?

For applications where the goal is protection from contamination entering the critical space, positive pressurization control is implemented. Positive pressurization is achieved by having more supply air into the space than exhaust air leaving. The amount of additional supply air is determined by the space porosity characteristics and application specific requirements.. The measurement and control of the supply and exhaust air is critical to maintaining proper positive space pressure. Additional pressure measurement and controls are implemented to ensure positive pressure is maintained during excursion events, e.g., doors opening and cyclic events related to such things as filtration loading.



When the goal is protection from contamination leaving the critical space, negative pressurization control is implemented. Negative pressurization is achieved by having less supply air into the space than exhaust air leaving. Similar to positive pressurization, the space porosity characteristics and application specific requirements determine the amount of additional exhaust air necessary and additional pressure measurement and controls are implemented to ensure negative pressure during excursion events.



What Are the Key Challenges in Achieving and Maintaining Critical Space Pressurization?

- Depending on critical space, heavy filtration and treatment of the supply and/or return air is required
- Critical spaces use more air changes per hour, accelerating air filtration loading
- Air filtration loading requires frequent changes to the supply and return air volumes (damper and/or VFD control) to maintain proper space pressurization
- Critical space and/or filtration load can exceed the supply or exhaust capability
- Sudden loss of pressurization can occur upon entry or exit to critical space by personnel
- Critical space differential pressures are typically very low (+/-0.1" w.c. or less), standard industrial transmitters are not capable of accurate measurements due to drift and turndown inaccuracy
- Critical space supply and exhaust air volumes typically have short duct runs, very low velocities and must be accurately measured to ensure proper differential air volume and space pressure is maintained

Why Choose Air Monitor for Your Space Pressurization Needs?

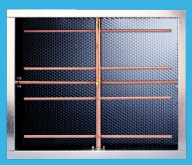
- Accurate and continuous measurement of critical space static pressure compared to adjacent space
- Accurate and continuous flow measurement for precise fan and/or damper control of critical space supply and exhaust air volumes
- Ensure proper flow synchronization and control based upon critical space design requirements (# of air exchanges, constant supply volume, positive or negative space pressure)
- Measure to verify positive (or negative) static pressure is correctly set up, overcoming space porosity (air leakage) and maintained throughout operational changes
- Implement precise ΔCFM control (supply – exhaust > 0 for positive critical space pressure); (supply – exhaust < 0 for negative critical space pressure)
- Reliable static pressure override control to reduce / increase exhaust and/or supply to maintain proper critical space pressure when doors are open

Supply and Exhaust Airflow Measurement by Air Monitor

VELTRON II Transmitter

The VELTRON II is an ultra-low differential pressure and flow "smart" transmitter. With its unparalleled accuracy of 0.1% and natural spans as low as 0.05" w.c., is intended for the most critical and demanding industrial airflow applications requiring the utmost accuracy and long-term stability. The VELTRON II is furnished with an automatic zeroing circuit capable of electronically adjusting the transmitter zero at predetermined time intervals while simultaneously holding the transmitter output signal. The AUTO-zero technology is essential for ultra-low differential pressure and low flow associated with critical space pressurization applications.

FAN-Evaluator Airflow Measurement Station



The FAN-Evaluator Station is a multi-point, self-averaging Pitot traverse station with an integral air straightening honeycomb cell. It's capable of continuously measuring fan discharges or ducted airflow with a certified accuracy of ±2% when tested according to AMCA Standard 610. The high degree of accuracy is a result of the sensor locations and sensing ports, the honeycomb airflow processing and the instantaneous pneumatic averaging of multiple pressure values. The FAN-Evaluator Station is designed for applications with very limited straight duct runs and/or highly disturbed airflow. Patent No. 3,748,901.

Pressure Measurement

S.A.P. Static Air Probes

The S.A.P. static air probes are designed for room or space pressurization applications where it is essential that the static pressure level within a room or space, and that of a reference pressure (corridor, adjacent space, outdoor location, etc.), be accurately sensed, free of pulsations or effects of air movement in the vicinity of the sensing probe(s). The S.A.P. probes can also be utilized to sense the static pressure at fan inlets and discharge plenums or large ducts, where the presence of multi-directional and turbulent airflows prohibit the use of flow sensitive static pressure tips or probes.