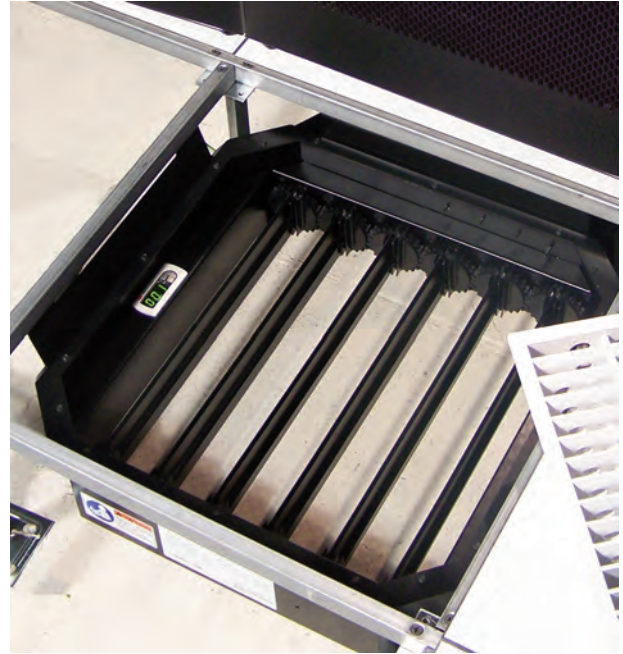


# SmartAire P

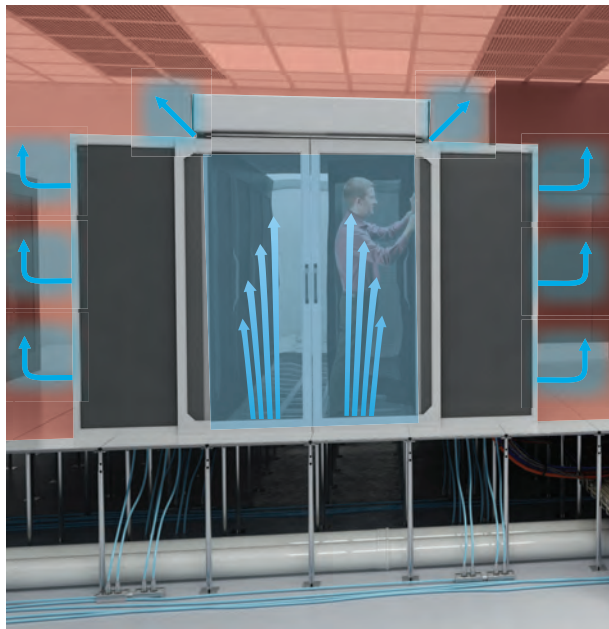
## Eliminate Server Leakage in Contained Cold Aisles

SmartAire P or (pressure sensing) variable-air-volume damper is ideal for contained aisles or enclosed racks with equipment that have a variable load profile. Using constant airflow into a contained system with variable loads will waste energy during times of non peak load performance from airflow being forced through spaces around the racks and containment structure. As static pressure builds the air will also be forced through servers even if the fans are idle or off. This wasted energy can be solved with the use of SmartAire P.

By installing SmartAire P under a portion of the airflow panels in the cold aisle the airflow can be varied based on a desired static pressure. When servers enter an idle state they will draw less air from the contained system causing the static pressure in the aisle to increase. The SmartAire P is daisy chained to SmartAire C units for a primary/secondary configuration that will automatically modulate all the dampers in the aisle to control the static pressure to maintain a user defined set point.

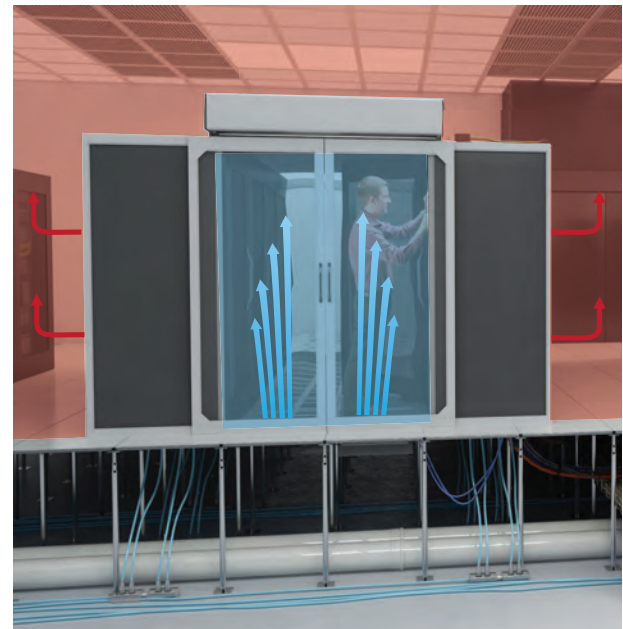


### Cold Aisle Containment Air Leakage



Without SmartAire P Dampers in the cold aisle to maintain a neutral static pressure in the cold aisle, conditioned air will leak through idle servers and other gaps in the containment structure.

### Cold Aisle Containment with SmartAire P



SmartAire P monitors the static pressure differential from the contained cold aisle to the hot aisle in order to maintain a balance when rack loads vary. This balance reduces bypass airflow through servers, racks and other containment structures.

# SmartAire P

## Application Example

The example below is based on the adjacent diagram.

### Given:

A customer has a contained cold aisle using Tate's Retracting Roof and sliding aisle end framed doors. The customer initially equipped the aisle with DirectAire panels, and is operating on a raised floor with a static pressure of 0.05". Each DirectAire panel provides 1844 CFM, resulting in a total airflow supply of 36,880 CFM. During peak load the IT equipment draws approximately 32,000 CFM, but during idle conditions, the total draw is only 20,000 CFM. The current design will bypass approximately 16,880 CFM of air during idle conditions through a combination of leakage through the containment system, through the racks themselves, and through the IT hardware. The customer would like to keep a constant static pressure relative to the outside space of 0.01" maximum to minimize bypass air.

### Solution:

Determine how many airflow panels should have their flow controlled by the SmartAire P units. Given that each DirectAire flows 1844 CFM without the SmartAire P installed, 1590 CFM when the SmartAire P is installed and 100% open and 204 CFM when SmartAire P is closed, we can determine the required number of units. The minimum airflow required during idle conditions is 20,000 CFM. Based on the data in the DirectAire/SmartAire chart, we will need 10 DirectAire panels without SmartAire units and 10 with SmartAire units to supply the minimum requirement. As a secondary check, we must determine if sufficient airflow will be available during peak conditions.

#### Minimum Airflow:

10 x DirectAire's at 1844 CFM each = 18,440  
 10 x DirectAire's with SmartAire P or C at 0% = 2,040  
 Total minimum flow = 20,480 CFM

#### Maximum Airflow:

10 x DirectAire's at 1844 CFM each = 18,440  
 10 x DirectAire's with SmartAire P or C at 100% = 15,900  
 Total CFM available peak = 34,340 CFM

The required bill of material:

20-DirectAire Airflow Panels    1-16 Power Module (PM)  
 1-SmartAire P (SA-P)            10-4' Power Cable  
 9-SmartAire C (SA-C)

Static Pressure	DirectAire (CFM)	SmartAire P (CFM @ 100%)	SmartAire P (CFM @ 0%)
0.02	1151	1018	126
0.04	1626	1426	181
0.05	1844	1590	204
0.06	2007	1738	224
0.08	2318	1998	260
0.10	2594	2226	292
0.12	2823	2432	321
0.14	3027	2620	347
0.16	3217	2795	372
0.18	3378	2960	396
0.20	3433	3114	417

