



*Reverse Flow
Cabinet*



ContraFlo Cabinet

*Reverse Flow Cabinet for
Raised Floor Data Centers*



ContraFlo® Cabinet

Reverse Flow Cabinet



The ContraFlo cabinet turns airflow upside down to offer an alternative to hot aisle containment or chimney designs. Using a raised floor plenum as the return path, ContraFlo can simplify the isolation of hot exhaust air. Using any flooded room approach the cool air is supplied to the IT equipment through a typical perforated front cabinet door. ContraFlo then uses a solid roof and rear doors to channel the exhaust air down through a high volume airflow panel into the raised floor plenum, isolating it from the cool air in the room. Pressure differential monitoring is used at the rack level to maintain accurate airflow delivery at all times, ensuring no more energy than required is used for cooling the space.

Advantage over other hot air containment

Hot air containment requires additional components and considerations to realize the benefits. ContraFlo reduces costs and eliminates the obstructions created by chimneys or aisle containment systems and ductwork to air handling equipment simplifying the distribution of other services.

Benefits:

- No chimneys, rigid barriers or additional air handling ductwork required
- Eliminate potential service distribution coordination conflicts
- Allows for simple retrofit into existing raised floor down-flow spaces
- Low cost design compared to other rack and containment configurations
- Utilizes raised floor plenum for exhaust path maintaining data center flexibility
- Efficient design that prevents intermixing of exhaust air and supply air
- Multiple options for rack level pressure monitoring to efficiently manage airflow volume



Improve Cooling Efficiency

Tate's Reverse Flow Cabinet Optimizes Cooling Options and Flexibility

Using air side economization and flooding a room with high volumes of air is a very efficient method to cool a data center. However slab designs using hot aisle containment or chimneys limit flexibility and complicate overhead service distribution.

The ContraFlo Cabinet completely contains the exhaust air and funnels it into a raised floor return plenum. This allows for any cabinet configuration within the white space. Furthermore by eliminating the overhead containment structures there is more room for cable

distribution. Lastly the raised floor return plenum provides the perfect pathway for power distribution helping to segregate power and data cables.

Overall ContraFlo provides a cost effective alternative design solution for data centers considering slab designs.



Slab Design

Slab designs limit the flexibility and adaptability of a data center. By using aisle or chimney containment on a slab wire & cable service distribution becomes challenging due to the many overhead obstructions.

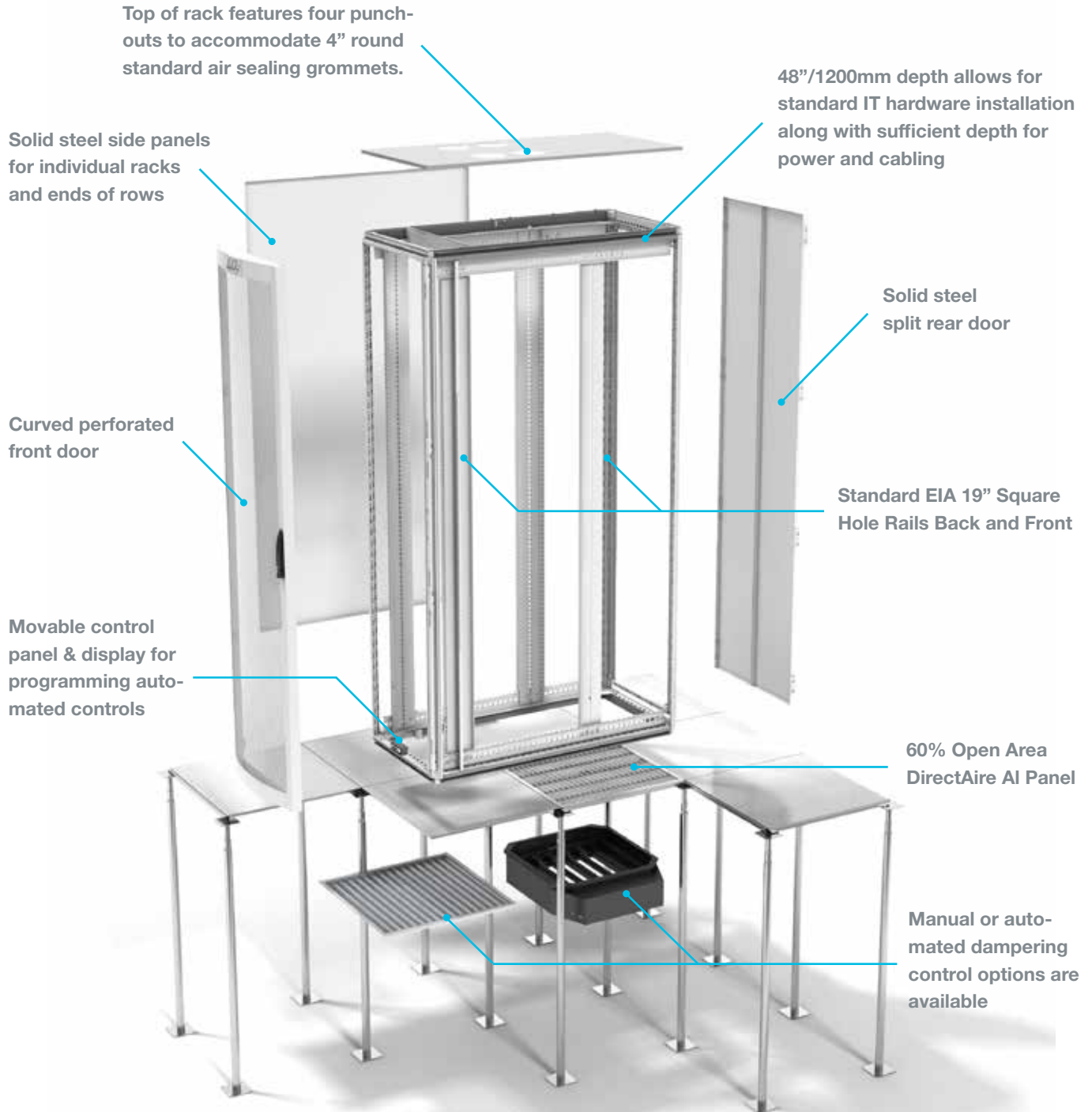


Reverse Flow Cabinet

Using a reverse flow cabinet with a raised floor offers many advantages over a slab design. A raised floor return plenum and reverse flow cabinet is more cost effective than a cabinet with a hot air containment solution. In addition, raised floors simplify the maintenance and distribution of other services.

Intelligent Cabinet Design

Flexible Design for High Performance





Standard Cabinet Configuration

	Dimensions (H x W x D)	Cooling Capacity	Max Load	Mounting Space
ContraFlo Cabinet	87" x 23.6" x 50.5"	0.7-12.5 kW	3200 (14.2kN)	47U

Cooling capacity per rack is based on: CFM/126 (CFM needed to cool 1kW @ 25° ΔT)

Managing Airflow through the Cabinet

Control Options for Improved Efficiency

Monitoring and adjusting the amount of airflow through the cabinet can improve the cooling systems performance.

In an existing or new data center which plans to use CRAC/CRAH units for cooling, supplying only the right amount of air needed to cool the equipment is critical to operating efficiently.

A fully economized solution using large fans can further reduce energy use by controlling the amount of airflow through the cabinet. Server power management techniques significantly change power consumption between peak and idle states. To meet the peak energy demands, while operating efficiently during less than peak loads, the airflow through the rack should be controlled by SmartAire.

Knowledge is Power

Using automated controls to manage the airflow through the ContraFlo Cabinet eliminates the need for manual rebalancing. Once the new equipment is powered on the automated controls will adjust to the new load density of the cabinet to maintain the proper airflow and the desired temperature.



Movable Control Panel

The control panel can be mounted anywhere inside the cabinet for easy access to the SmartAire/PowerAire programming controls and display monitor.



SmartAire® P

The SmartAire automatic variable-air-volume damper adjusts the amount of airflow through the cabinet for variable load conditions ensuring the proper amount of cooling is maintained.

Key Features

- Fail safe operation, opens to 100% during failure
- Optional BMS interface and DCIM integration
- User programmable control set point
- Six vane damper for large variable open area from 0-100%
- 23.1"X 26.7"X6.2"
- 19W/VA Peak – 5W/VA Typical



Opposed Blade Damper

The opposed blade damper features a wide range of adjustment and very little airflow resistance. Easy access through the panel's surface allows for manual airflow balancing for IT hardware with fixed airflow requirements.

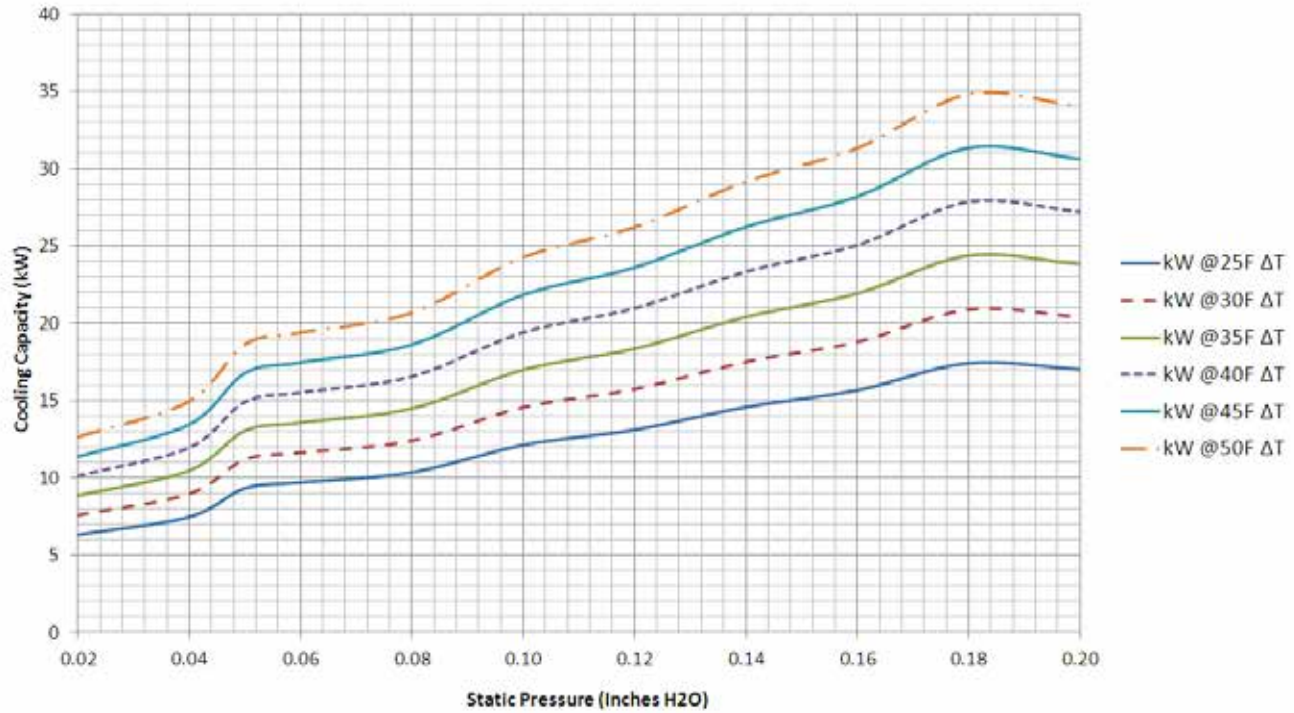
Key Features

- Unlimited range of airflow settings
- Easily adjustable from above without grate removal
- Mounts directly to the DirectAire airflow panel
- Extruded aluminum construction



Charts & Capacities

Cabinet Cooling Capacity at Varying ΔT 's



Cooling capacity per rack is based on the Opposed Blade Damper fully open under the ContaFlo Cabinet. The following equation was used: CFM/126 (CFM needed to cool 1kW @ 25° ΔT)

Cabinet Cooling Capacity with Different Control Devices

DirectAire AI Airflow Panel	0.02" H ₂ O (5 Pa)		0.04" H ₂ O (10 Pa)		0.06" H ₂ O (15 Pa)		0.08" H ₂ O (20 Pa)		0.10" H ₂ O (25 Pa)	
	CFM (L/s)	(kW/Rack)	CFM (L/s)	(kW/Rack)	CFM (L/s)	(kW/Rack)	CFM (L/s)	(kW/Rack)	CFM (L/s)	(kW/Rack)
No Controls										
	795 (375)	6.3	940 (444)	7.5	1220 (576)	9.7	1301 (614)	10.3	1526 (720)	12.1
Opposed Blade Damper										
100% Open	805 (380)	6.4	944 (446)	7.5	1260 (595)	10.0	1278 (603)	10.1	1576 (744)	12.5
0% Open	87 (41)	0.7	129 (61)	1.0	162 (77)	1.3	191 (90)	1.5	217 (102)	1.7
SmartAire										
100% Open	769 (363)	6.1	870 (411)	6.9	1103 (521)	8.8	1126 (531)	8.9	1376 (649)	10.9
0% Open	250 (118)	2.0	230 (109)	1.8	352 (168)	2.8	261 (123)	2.1	306 (144)	2.4

Cooling capacity per rack is based on: CFM/126 (CFM needed to cool 1kW @ 25° ΔT)



Tate has been an industry leading global provider of innovative next generation products for data center applications for over 50 years. Our world-class manufacturing plants have the flexibility to create modular solutions quickly with up-front cost optimization and Tate's in-house engineering team has the experience and industry knowledge to design the best solutions from concept to completion.

Our wide range of custom manufactured data center products include raised access floors, structural ceilings, and containment, as well as, airflow panels and controls which work together to maximize your data center's performance. Tate is your single source solution builder for your data centre.

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