

BFA FANWALL UNITS



FANWALL UNITS



Introduction

Cooling data centers and other critical environments is a taxing task which can have constantly varying requirements. Boreas' innovative BFA series comprising a total of 5 models with cooling capacities ranging from 100-500 kW rise up to this challenge by providing uninterrupted system security with a focus on energy efficiency. Selecting the right type of cooling system is one of the most critical decisions in data center design. For preventing malfunctions and extending the useful life of IT equipment, expulsion of the heat manufactured by such devices out of data centers is of critical importance.



General Features



- 5 models 100 kw to 500 kW,
- Allows customization based on capacity needs, simplifying backup and maintenance processes.
- It draws attention with its carcass structure, which is made of materials with high strength, long service life, and resistant to corrosion.
- Specially designed panel design, which does not create additional pressure loss, provides convenience to service and operation teams.
- Plug fans made of high-performance composite material and equipped with EC motor technology meet the high pressure and high air velocity needs optimally thanks to their special blade design.
- Thanks to the PLC controlled automation system, all internal equipment is controlled from a single point.

- With the help of energy analyzers, instant EER (Efficiency) value of the device can be obtained.
- Supports optional Automatic Transfer Switch (ATS) integration, enabling automatic switching to a backup power source during an outage.
- The unit is equipped with pressure-independent control valves to ensure a consistent and efficient water flow, optimizing system performance while contributing to energy savings.
- Optional integrated pumps can be used to compensate for pressure loss within the unit, enhancing system efficiency and ensuring optimal operating conditions.
- Optional integrated drainage pumps are available to efficiently manage condensate removal, preventing water accumulation and ensuring optimal performance of the unit. These pumps enhance system reliability by addressing potential drainage issues and maintaining consistent operating conditions.
- It provides uninterrupted communication with the building management system thanks to its compatibility with protocols such as Bacnet, Modbus, SNMP.
- It can be operated with minimum operation cost with its remote failure notification and management features.

Technical Specifications

BFA Series		BFA-100	BFA-200	BFA-300	BFA-400	BFA-500
Air Intake Temperature	°C	36	36	36	36	36
Air Intake Relative Humidity	%	25	25	25	25	25
Water Inlet Temperature	°C	20	20	20	20	20
Water Outlet Temperature	°C	30	30	30	30	30
Air Flow Rate	m ³ /h	25000	50000	75000	100000	125000
Air Flow Rate	m ³ /h	6.94	13.89	20.83	27.78	34.72
Total Cooling Capacity	kW	97.62	188.4	310	414	506
Sensible Cooling Capacity	kW	97.62	188.4	310	414	506
Net Sensible Cooling Capacity	kW	93.7	179.1	296.0	398.9	483.8
SHR		1.00	1.00	1.00	1.00	1.00
EER		24.9	20.2	22.2	27.4	22.8
Fan Type		EC Plug	EC Plug	EC Plug	EC Plug	EC Plug
Number of Fans		4	4	6	8	8
Energy Consumption of Fan(s)	kW	3.92	9.32	13.98	15.12	22.24
External Static Pressure	Pa	50	50	50	50	50
Filter Type		G4	G4	G4	G4	G4
Length	mm	1900	3750	3200	3600	4000
Depth	mm	1600	1600	1700	1600	1800
Height	mm	2000	2000	4000	4000	4800
Net Weight	Kg	500	900	1800	2100	2500

Panel Structure of BOREAS Fanwall Unit

Mechanical Performance

- **Panel Structure:** The panel structure forming the casing of the Fanwall unit is the most critical and effective component impacting the overall mechanical performance of the unit.
- **Thermal Bridge Prevention:** The panel structure of BOREAS is designed to prevent thermal bridging between the internal and external environments. The contact between the inner and outer surface sheet metals, which are mounted on PVC-based panel profiles, is completely avoided, ensuring a thermal bridge-free structure.

Insulation and Sealing

- **Panel Insulation:** Typically, 50 mm thick rock wool with a density of 70 kg/m³ is used as the panel insulation material.
- **Air Leakage Class:** The rigid panel structure greatly contributes to achieving an L1 class in the Casing Air Leakage Tests.
- **Thermal Transmittance Class:** With the standard PVC frame structure and insulation, the thermal transmittance class is T2 according to EN 1886. This class can be upgraded to T1 by using optional Polyurethane insulation material.

Aesthetic and Structural Features

- **Aesthetic Appearance:** The connecting screws used to attach the panels to the frame structure are hidden on the outer sheet metal, providing a smooth and aesthetic exterior. Screw caps on the screw heads prevent contact with the external environment to avoid corrosion and thermal bridging.
- **Material and Thickness Options:** PVC profiles are manufactured to operate within a range of -40 °C / +80 °C, offering high resistance to UV radiation. Standard panel sheet metals are 0.8 mm thick on the inside and 1.0 mm thick on the outside. Optionally, these can be applied in 0.8 mm and 1.2 mm thicknesses, respectively.
- **EPDM-Based Seals:** Custom-manufactured EPDM-based porous seals with a low thermal transmittance factor are used at the joints of panels and profiles.

Optional Features

- **Corrosion Resistance:** Optional highly corrosion-resistant Magnel[®] sheet metal can be used to ensure trouble-free operations in extreme climate conditions.

Automation Part;

All internal equipment is commanded from a single point via the PLC controlled automation system.

- Discharge Air Temperature and Humidity Sensor
- Return Air Temperature and Humidity Sensor
- Pressure Differential Sensor (Discharge Fan)
- Differential Pressure Switch (For filter dirtiness information)
- Water Leakage Detector
- Energy Analyzer (Optional)
- ATS (Optional)

Components

Fan

Plug fans manufactured of high performance composite & aluminum material and equipped with EC motor technology meet high pressure and high air flow rate requirements in an optimum fashion by virtue of their special blade design. The special design of blades minimizes the operating noise of the fan, enabling the BFA series to operate quite silently. The rotation speed information can be proportionally adjusted from the control panel according to the cooling requirement. The unit can operate at ambient temperatures ranging from -20 to +40 °C. It can facilitate substantial reduction in annual power consumption by virtue of its fan efficiency of up to 70%.



Cooling Coil

The evaporators are manufactured with copper tubes and aluminum fins. Fin spacing is between 1.8 and 2.5 mm. Fins are treated with hydrophilic coating to combat condensation that can occur on the evaporator. The droplets of condensed water drain down from the hydrophilic coated fins to the drain pan manufactured of stainless steel material that is found at the bottom of the evaporator. Copper tubes are manufactured to increase turbulence during the flow of refrigerant inside the tube, thus increasing the efficiency of heat transfer by making sure the refrigerant comes into contact with the entire internal surface of the tube.



Filter

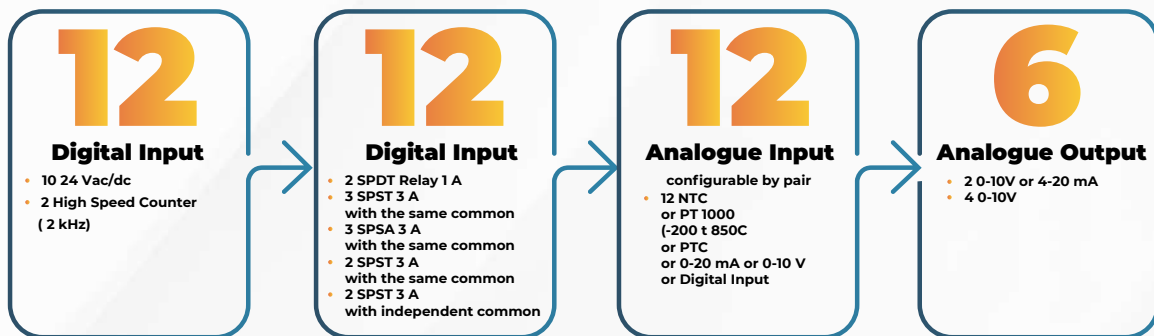
ePM10 panel filters conforming to the EN ISO 16890 standard are used, and have an average efficiency of 80% to 90%. Cassettes are manufactured from galvanized steel sheet as a standard for the BFA series. The flame resistance of the filter medium is class F1 according to the DIN 53438 standard. Maximum operating temperatures can reach +70 °C.



Electrical and Control Panel

All internal equipment is commanded from a single point via the PLC controlled automation system. The unit operation is managed by connecting the following equipment to the control system.

- Discharge Air Temperature and Humidity Sensor
- Return Air Temperature and Humidity Sensor
- Pressure Differential Sensor (Discharge Fan)
- Differential Pressure Switch (For filter dirtiness information)
- Water Leakage Detector
- Energy Analyzer (Optional)
- ATS (Optional)



The Fanwall control system delivers the necessary cooling capacity by modulating the airflow rate based on the return air temperature. In chilled water systems, the control system adjusts the fan speed to meet cooling demands efficiently.



To protect the cooling system, the discharge fan must be operational before allowing the chilled water flow, ensuring that the system operates safely. Pressure sensors monitor the system to prevent any potential issues.

In scenarios where multiple Fanwall units are deployed with redundancy, the units communicate and operate sequentially, ensuring balanced usage and co-aging.

For uninterrupted operation during power outages, optional redundant power systems can be implemented on panels, keeping the PLC powered and maintaining communication and control.

Touch Screen



Accessories

1. Energy Analyzer



2. Water Drainage Pump



3. Automatic Transfer Switch (ATS)



4. Damper



5. Circulation Pump



6. Pressure Independent Balancing Valve (For CW Units)



7. Shut OFF Valve



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