BLACK BOX®
NETWORK SERVICES

Cold Front™ Planning Guide

Use liquid cooling to cut power and cooling costs in your data center by 50% or more!

Use this guide to plan your Cold Front Heat-Transfer Door and Transiiton Frame application.

Customer Support Information

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax 724-746-0746
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Part 1: General

1.1 Summary

The Black Box® Cold Front™ Heat-Transfer Door (HTD) is a passive air-to-liquid heat exchanger designed to mount to the rear frame of an IT enclosure and neutralize heat from equipment exhaust air. Each HTD consists of a coil, a door frame, and supply/return
connections. A Transition Frame might be required to attach the HTD to the IT enclosure.

1.2 Design Requirements

The HTD is described under the following Black Box part numbers.

Table 1-1. Heat-Transfer Door model descriptions.

Product Code	Product Name	Description
CFD42UBF24	Cold Front Heat-Transfer Door, 42U	24"W, bottom feed
CFD47UBF24	Cold Front Heat-Transfer Door, 47U	24"W, bottom feed
CFD42UTF24	Cold Front Heat-Transfer Door, 42U	24"W, top feed
CFD47UTF24	Cold Front Heat-Transfer Door, 47U	24"W, top feed
CFD42UBF29	Cold Front Heat-Transfer Door, 42U	29" W, bottom feed
CFD47UBF29	Cold Front Heat-Transfer Door, 47U	29" W, bottom feed
CFD42UTF29	Cold Front Heat-Transfer Door, 42U	29" W, top feed
CFD47UTF29	Cold Front Heat-Transfer Door, 47U	29" W, top feed

1.3 Quality Assurance

The HTD is factory tested before it's shipped to you.

1.4 Warranty

The HTD is warranted for a period of 3 years (36 months).

Part 2: Product

2.1 Standard Components

2.1.1 HTD Construction

1. The HTD is no deeper than 4.6" (11.7 cm), and its width is no greater than the IT enclosure the HTD is mounted to.

2. The HTD's dry weight is no more than 90 lb. (41 kg).

3. All exterior surfaces are powder-coated for durable and attractive finish.

4. The HTD mounts on hinges to allow access to rear of IT equipment within the enclosure.

5. The HTD is equipped with a keyed lock to secure access to the equipment mounted in the enclosure.

2.1.2 Transition Frame Assembly

1. A transition frame assembly is factory supplied for adapting to third-party IT enclosures when necessary based on the HTD model.

2. The transition frame connects the HTD to the rear frame of the IT enclosure.

3. The transition frame is powder-coated for a durable and attractive finish, and matches the color of the HTD's powder-coated surfaces.

4. The transition frame is no deeper than 2.4" (6.1 cm), and its width will be no greater than the IT enclosure the transition frame is mounted to.

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5. The transition frame weighs no more than 40 lb. (18 kg).

2.1.3 Connections and Piping

1. Supply and return connections on the HTD are brass ¾" or 1" ID quick-release couplings conforming to ISO 7241-1 Series B. The female socket is used for supply water connection, and the male nipple is used for return water connection.

2. Bottom or top entry for the supply/return connection is available.

3. Supply/return headers on bottom-fed models have Schrader® valves for manual air bleeding.

4. Drain valve is on bottom of the HTD to allow the coil to drain completely.

5. Piping is copper, bent to minimize joints; any joints should be brazed.

2.1.4 Heat Exchanger Coil

1. Coil is constructed of copper tube and aluminum fin, 2 rows deep, 12 FPI.

2. Heat transferred by coil divided by initial temperature difference is no less than 440 W/°C at 2548 m³⁄ₕ (1500 CFM) and 30 L/min (8 GPM) water flow.

3. Coil will be designed to minimize air-side and water-side pressure drops.

4. Maximum air-side pressure drop will not exceed 27 Pa (0.11 in H_2O) at 4077 m³⁄ₕ (2400 CFM) including coil and perforated sheets.

5. Maximum liquid-side pressure drop will be 53 kPa (7.7 psi) at 38 L/min (10 GPM) including coil, piping, and quick connects.

6. Coil is protected by perforated sheets, no less than 79% open, on both air inlet and air outlet sides.

7. Coil is UL® Registered (UL207).

2.1.5 Environmental

1. The HTD doesn't require electrical power connections.

2. The HTD is a completely passive device and has no fans or other active air movement components.

2.2 Optional Components
2.2.1 Flexible Hose Kits

1. Optional Hose Kits are available to provide for connection between the water distribution manifold and the supported HTD units and consist of a matched pair of hoses with connections.

2. Hoses will be factory assembled; factory pressure tested, constructed of double-walled reinforced Ethylene Propylene Diene Monomer (EPDM) rubber and have brass ¾" or 1" ISO 7241-1 Series B quick-release couplings on one or both ends to facilitate rapid installation and reconfiguration. Hoses with a single quick-release coupling will have ¾" MPT connection on opposite end.

3. Hose material is ¾" or 1" ID with minimum wall thickness of 0.14" (0.36 cm), minimum bend radius of 4" (10.2 cm), and minimum burst pressure of 12.4 MPa (1800 psi).

4. Hose material meets flammability rating of UL® 1581 VW-1 or greater.

5. Hose Kits are pressure tested as an assembly to 1.7 MPa (250 psi).

6. Hose Kits are available with either straight connections or right-angle connections. External right-angle Hose Kits require a minimum clearance of 2.125" (5.4 cm) between the bottom of the HTD/Enclosure and the floor.

7. One (1) hose kit (with a supply and a return hose) shall be supplied per HTD.

2.2.2 Pre-Mixed Treated Water

1. A secondary loop is filled with particulate-free, DI/RO water with appropriate controls to prevent corrosion, fouling, scaling, and bacterial growth.

2. Water is treated with azole, molybdate, and isothiazoline.

3. Treated water is pre-mixed in the factory without the need to further dilute or enhance it in the field prior to initially filling the system.

4. Treated water is supplied in containers suitable for easy transportation.

5. Containers are either 5 U.S. gallons or 55 U.S. gallons.

2.2.3 Air Purge Tool

1. Tool consists of two (2) unequal lengths of ¼" refrigerant hose with maximum working pressure of 5.5 MPa (800 psi) and burst pressure rating of 27.6 MPa (4000 psi).

2. Hoses are 6" (15.2 cm) and 72" (182.9 cm) in length.

3. Hoses are UL® Recognized.

4. One (1) air purge tool is supplied per project site.

3. Service
3.1 General
3.1.1 Installation

1. Install the HTD in accordance with the installation instructions in the user's manual.

2. Maintain recommended service clearances as outlined in the installation instructions.

3. Installation services will be provided by factory authorized personnel.

4. Each enclosure using an HTD will have all openings blocked wherever possible to ensure that exhaust air is directed through the HTD. Open U spaces on the front mounting rails should have blanking panels attached. Any cable access holes or other openings in the enclosure roof, base, or side should be blocked off to avoid any leakage of exhaust air.

3.1.2 Startup and Commissioning

1. Start up the unit in accordance with the manufacturer's startup instructions.

2. Commissioning services will be provided by factory-authorized personnel.

About Black Box

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