Vertiv™ Liebert® DCD
25-50kW Water-Cooled Rear Door Heat Exchanger
Guide Specification

1.0 GENERAL

1.1 Summary

These specifications describe the requirements for an environmental control system. The system shall be designed to maintain temperature conditions at the cooling air output of the rack.

1.2 Design Requirements

The environmental control system shall be a Vertiv™ Liebert® DCD rear door heat exchanger. The Liebert® DCD shall mount on the rear of the rack, replacing the original door of the rack, and includes a cooling coil with chilled water/fluid connections at the top or bottom. The unit shall be NRTL and CE certified.

The unit shall be designed to remove the IT heat load that is exiting the rack of IT equipment by utilizing the fans in the same equipment to force the hot air through the cooling coil, effectively cooling up to the nominal capacity to produce a non-condensing, room neutral environment. The units shall be available with an active fan module upon request to overcome any large pressure differential by drawing air through the rack using EC fans rather than relying on the IT equipment to force the air through the coil. The Liebert® DCD47 is the only model in which this fan module is required for operation in all applications.

1.3 Submittals

Submittals shall be provided with the proposal and shall include dimensional/installation, refrigerant – hydraulic and electrical connections data, refrigerant, and hydraulic circuit drawings.

1.4 Warranty

The system shall be provided with a warranty against defects in material and workmanship.

1.5 Serviceability

The system shall be designed so that all components are easily accessible for service and maintenance from the cabinet's rear side.

1.6 Quality Assurance

The specified system shall be factory tested before shipment and designed to meet UL and CE requirements. The system shall be designed and manufactured according to world class quality standards. The manufacturer shall be ISO 9001 certified.

2.0 PRODUCT

2.1 Passive Cooling Coil

Liebert® DCD is an air-water heat exchanger that is integrated into the rear door of a server cabinet. The heat exchanger serves to absorb heat loads from server cabinets of up to 50 kW. Thereby, it can be configured in such a way that no thermal loads are released to the installation area.

Cooling is achieved when the server exhaust air flows through the heat exchanger in the rear door of the server cabinet. The cooling air is moved through the heat exchanger by the server fans. Thus, Liebert® DCD supports a room neutral design in which the warm exhaust air from servers is forced through the cooling device where the temperature is reduced to the level of the server supply air (ambient room temperature). The supply air for cooling flows freely through the installation area.

By omitting the otherwise necessary fans for room cooling, the cooling principle of the Vertiv™ Liebert® DCD is particularly energy efficient. Furthermore, the design of the air-water heat exchanger permits the increase in the chilled water supply temperature, which also adds to an improved energy balance and large shares of free or adiabatic cooling. This yields a significantly improved Power Usage Effectiveness (PUE).

Due to low hydraulic pressure loss on the air side, the system suggests itself suit a wide range of server types. Prior to using Liebert® DCD, the system and servers must be checked whether they match hydraulically. In particular, it must be made sure that the pressure increase of the server fans is sufficient for the flow resistance of Liebert® DCD.

The low pressure loss on the water side minimizes the energy consumed by the pumps in the chilled water loop. The Liebert® DCD is designed exclusively for sensible cooling, any dehumidification of the room by means of Liebert® DCD should be avoided. The inclusive condensed water collection pan with a condensate drain is designed for occasional condensation only.

The Liebert® DCD passive door shall have a door opening angle of 180°.

Liebert® DCD35 and DCD50:

Both the Liebert® DCD35 and DCD50 shall be available as the passive cooling units and shall be capable of a net sensible cooling capacity rating of 35kW and 50kW respectively, based on the following operating conditions: 21°C (69°F) ambient air temperature, 12°C (53°F) entering water temperature, 50% RH.

Liebert® DCD47:

The Liebert® DCD47 shall only be available for use with the active fan module (see specification below). It shall have a net sensible cooling capacity of 47kW based on the following operation conditions: 21°C (69°F) ambient air temperature, 12°C (53°F) entering water temperature, and 50% RH.

2.2 Liebert® DCDactive Fan Module

The fan module for the Liebert® DCD supports the boost of cooling airflow across the heat exchanger. The fans are placed on the outside of the Liebert® DCD rear door heat exchanger and shall be designed for easy retrofitting of already installed Liebert® DCD units in the field. The integrated fan speed control shall adjust the fan speed according to the required airflow of the equipment mounted inside the server cabinet to overcome the pressure differential across the heat exchanger of the Liebert® DCD.

The door opening angle shall be 135°. The fan tray shall have an additional depth of 125mm.

A dry contact relay shall provide a common fan failure alarm. In case of a controller failure or sensor failure, the fan speed shall be set to 100%.

Liebert® DCDactive requires a single phase power supply 110 to 240VAC 50/60Hz 16A.

It shall be equipped with a MODbus TCP/IP communication interface to communicate operational data and alarms through BMS.

2.3 Frame

The frame shall be constructed of extruded aluminum.

2.4 Refrigerant

The Liebert® DCD utilizes chilled water as the primary cooling fluid. A water/glycol mixture can also be used for operation.

2.5 Frame Adapters

Vertiv™ Liebert® DCD shall be designed for use with DCM server cabinets, though it shall also be compatible with other Vertiv or third party cabinets using frame adapters. Compatible racks include the Vertiv™ VR and the Vertiv™ DCE. Other third party frame adapter designs can be requested but are subject to rejection based on order quantity and availability.

2.6 Standard Features

2.6.1 Swivel Joint

The Liebert® DCD shall be designed with a swivel joint chilled water inlet connection. This allows the door to swing open while remaining connected to the chilled water supply and return loops without the need to disconnect the unit to service the IT equipment housed inside the cabinet. The swivel joint shall be designed in a way that prevents any leakage while in normal operation or when opening the door. The swivel joint avoids flexible hoses or twisting pipes between the gate part of the Liebert® DCD and the frame.

2.6.2 Top or Bottom Connections

The Liebert® DCD shall be designed to have chilled water inlet connections on the top or the bottom of the door. This allows for installation in rooms with or without raised floors. In addition, the Liebert® DCD shall be designed to have the connection on the left or the right side of the unit.

2.7 Optional Features

2.7.1 A/B Transfer Switch

The unit can be equipped with a power transfer switch. The unit is then powered by two independent power supplies. In case of power supply failure, the other power supply takes over the powering of the unit, maximizing the cooling availability.

2.7.2 Monitoring Package

The monitoring package for the Liebert® DCDactive includes (four) temperature sensors, a door contact switch, a leakage detector, and a display unit. There shall be two temperature sensors for monitoring the cooled air on the air outlet side of the Liebert® DCD and two temperature sensors for the warm air plenum between the air outlet from the server and air inlet to the Liebert® DCD. The touchscreen display is used to show the operating parameters, such as fan speed, temperatures, and fan status. The minimum and

maximum fan speed is set on the display. In addition, a choice can be made between temperature and differential pressure fan speed control.

2.7.3 External Valve Kit

The external valve kit with spring loaded actuator to control the water flow through the unit shall be available as an accessory. This accessory can be used with both the Passive and Active versions of Liebert® DCD. Connection to the active module however adds a few more benefits such as monitoring of the valve position, or the chilled water return temperature through the display of the Liebert® DCDactive. This accessory shall be shipped loose and shall be installed on site on the return CW piping close to the DCD unit.

2.7.4 Hose Connection Kit

The hose connection kit shall consist of an armored hose with stainless steel covering, a ball valve with fill and drain connections, and an isolation and control valve with drain and bleed connection. Each hose connection kit will come as a set of (two), one supply line and one return line. The armored hose is available in two lengths, 1.5m (5ft) and 2.5m (8.2ft), and comes with 1“male and female nickel plated connections on each end. Both the ball valve and isolation and control valve provide measurement access for temperature and pressure and has a 1“female thread connection. This accessory is available for both Passive and Active versions of the Vertiv™ Liebert® DCD and shall be installed by the end user on site.

3.0 TECHNICAL SPECIFICATIONS:

Technical Specifications:	
Coil Depth	• Liebert® DCD35 and DCD50: 120mm (incl. hinges 150mm) • Liebert® DCD47: 190mm (incl. hinges 220mm)
Liebert® DCD35	
Cooling capacity	up to 35kW (sensible cooling)
Available Rack widths	600mm, 800mm
Available Rack Heights	2000mm, 2200mm
Pressure loss (air)	35Pa (at 4,900m³/h) (0.005 psi @ 2885 CFM)
Pressure loss (water)	54kPa (at 5m³/h) (7.8psi @ 22 GPM)
Chilled water supply	12°C (53.6°F)
Chilled water return	18°C (64.4°F)
Chilled water volume flow	5m³/h (22 GPM) at 35kW
Liebert® DCD47	
Cooling capacity	up to 47kW (sensible cooling)
Available Rack widths	600mm, 800mm
Available Rack Heights	2000mm, 2200mm
Pressure loss (air)	35Pa (at 4,900m³/h) (0.005 psi @ 2885 CFM)
Pressure loss (water)	54kPa (at 5m³/h) (7.8psi @ 22 GPM)
Chilled water supply	12°C (53.6°F)
Chilled water return	18°C (64.4°F)
Chilled water volume flow	7.2m³/h (31 GPM) at 47kW
Liebert® DCD50	
Cooling capacity	up to 50kW (sensible cooling)
Available Rack widths	800mm
Available Rack Heights	2000mm, 2200mm
Pressure loss (air)	42Pa (at 8000m³/h) (0.006 psi @ 4708 CFM)
Pressure loss (water)	67kPa (at 7.2 m³/h) (9.7 psi @ 31 GPM)
Chilled water supply	12°C (53.6°F)
Chilled water return	18°C (64.4°F)
Server supply air temperature	23°C (73.4°F)
Chilled water volume flow	7.2m³/h (31 GPM) at 50kW
Water connection	1“female thread from below (optionally from above)
Condensate drain	5/8“ (Note: Not for dehumidifying the installation area)
Absolute humidity/ room air	max. 8g water per 1 kg of air (others on request)
Dew point temperature	max. 10.5°C (51°F)

Material	Sheet steel
Heat exchanger	Copper piping with aluminum fins
Benefits	• Improved PUE • Room neutral cooling (no hot air in the room) • Low pressure drop on the air side means no fans are needed in most cases • No fans mean higher reliability and minimize power consumption • Operation with higher chilled water supply temperature to maximize free cooling and energy efficiency • Reliable operation guaranteed by water conducting hinges
Active Module Technical Specification	
Power Supply	95 to 264 VAC, 50Hz
Operational Current	5A
Communication interface	M0DBus TCP/IP, RJ45
Active Module for Vertiv™ Liebert® DCD35 and DCD47	
Airflow	6300m³/h (3708 CFM) – N+1 fan redundancy 7400m³/h (4355 CFM) – no redundancy
Max Power Input	980W
Power input during normal operation	40 – 500W
Active Module for Liebert® DCD50	
Airflow	9000m³/h (5297 CFM) – N+1 fan redundancy 10800m³/h (6356 CFM) – no redundancy
Max Power Input	1185W
Power input during normal operation	50 – 570W