VERTIV.

Liebert®

DCD™

Installer/User Guide

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures. Visit https://www.VertivCo.com/en-us/support/ for additional assistance.

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1 IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important safety instructions that should be followed during the installation and maintenance of the Liebert® DCD. Read this manual thoroughly before attempting to install or operate this unit.

Only qualified personnel should move, install or service this equipment.

Adhere to all warnings, cautions, notices and installation, operating and safety instructions on the unit and in this manual. Follow all installation, operation and maintenance instructions and all applicable national and local building, electrical and plumbing codes.

WARNING! Arc flash and electric shock hazard. Open all local and remote electric power disconnect switches, verify with a voltmeter that power is Off and wear personal protective equipment (PPE) per NFPA 70E before working with the module. Failure to comply can cause serious injury or death. Follow all local codes.

WARNING! Risk of heavy module falling. Can cause equipment damage, injury and death. Two properly-trained and qualified people are required to move and install the module. The DCD™ weighs in excess of 210 lb (95 kg). Do not leave a DCD™ standing unattended on its side or its end without adequate support to prevent it from falling over. The module must be supported at all times or laid flat on protective material until it is installed. Read all instructions before attempting to move, lift, remove packaging from, or prepare the module for installation. See Table 4.2 on page 19, for unit weights based on model.

WARNING! Risk of improper operation and overpressurization. Can cause equipment or other property damage, injury and death. Only personnel properly trained and qualified in HVAC installation or service should install or service this equipment

WARNING! Risk of contact with high-speed, rotating fan impeller blades. Can cause injury or death. Open all local and remote electric power-supply disconnect switches, verify with a voltmeter that power is off, and verify that all fan impellers have stopped rotating before working in the unit cabinet.

CAUTION: Risk of contact with sharp edges, splinters, and exposed fasteners. Can cause injury. Only properly trained and qualified personnel wearing appropriate, OSHA-approved PPE should attempt to move, lift, remove packaging from or prepare the unit for installation.

CAUTION: Risk of improper repair and maintenance. Can cause reduced unit performance, equipment damage and injury.
All maintenance and repair jobs must be performed by properly trained and qualified personnel. All actions must be in accordance with regulations and the manufacturer's instructions. Use only Vertiv-approved tools and parts for maintenance and repair.

NOTICE

Risk of improper power-supply connection. Can cause equipment damage and loss of warranty coverage.

Prior to connecting any equipment to a main or alternate power source (for example: back-up generator systems) for start-up, commissioning, testing, or normal operation, ensure that these sources are correctly adjusted to the nameplate voltage and frequency of all equipment to be connected. In general, power-source voltages should be stabilized and regulated to within ±10% of the load nameplate nominal voltage. Also, ensure that no three-phase sources are single-phased at any time.

NOTICE

Risk of passageway interference. Can cause unit and/or structure damage. The unit may be too large to fit through a passageway while on or off the skid. Measure the unit and passageway dimensions, and refer to the installation plans prior to moving the unit to verify clearances.

NOTICE

Risk of damage from forklift. Can cause unit damage. Keep tines of the forklift level and at a height suitable to fit below the skid and/or unit to prevent exterior and/or underside damage.

NOTICE

Risk of improper storage. Keep the unit upright, indoors and protected from dampness, freezing temperatures and contact damage.

NOTICE

Risk of piping-system corrosion and freezing fluids. Can cause leaks resulting in equipment and very expensive building damage. Cooling coils and piping systems are at high risk of freezing and premature corrosion. Fluids in these systems must contain the proper antifreeze and inhibitors to prevent freezing and premature coil and piping corrosion. The water or water/glycol solution must be analyzed by a competent local water treatment specialist before start up to establish the inhibitor and antifreeze solution requirement and at regularly scheduled intervals throughout the life of the system to determine the pattern of inhibitor depletion.

The complexity of water/glycol solution condition problems and the variations of required treatment programs make it extremely important to obtain the advice of a competent and experienced water treatment specialist and follow a regularly scheduled coolant fluid system maintenance program.

Water chemistry varies greatly by location, as do the required additives, called inhibitors, that reduce the corrosive effect of the fluids on the piping systems and components. The chemistry of the water used must be considered, because water from some sources may contain corrosive elements that reduce the effectiveness of the inhibited formulation. Sediment deposits prevent the formation of a protective oxide layer on the inside of the coolant system components and piping. The water/coolant fluid must be treated and circulating through the system continuously to prevent the buildup of sediment deposits and or growth of sulfate reducing bacteria.

Proper inhibitor maintenance must be performed in order to prevent corrosion of the system. Consult glycol manufacturer for testing and maintenance of inhibitors.

Commercial ethylene glycol, when pure, is generally less corrosive to the common metals of construction than water itself. It will, however, assume the corrosivity of the water from which it is prepared and may become increasingly corrosive with use if not properly inhibited.

We recommend installing a monitored fluid-detection system that is wired to activate the automatic-closure of field-installed coolant-fluid supply and return shut-off valves to reduce the amount of coolant-fluid leakage and consequential equipment and building damage. The shut-off valves must be sized to close-off against the maximum coolant-fluid system pressure in case of a catastrophic fluid leak.

NOTICE

Risk of clogged or leaking drain lines and leaking water-supply lines. Can cause equipment and building damage.

This unit requires a water drain connection. Drain lines must be inspected at start-up and periodically, and maintenance must be performed to ensure that drain water runs freely through the drain system and that lines are clear and free of obstructions and in good condition with no visible sign of damage or leaks. This unit may also require an external water supply to operate.

Improper installation, application and service practices can result in water leakage from the unit. Water leakage can result in catastrophic and expensive building and equipment damage and loss of critical data center equipment.

Do not locate unit directly above any equipment that could sustain water damage.

We recommend installing a monitored fluid-detection system to immediately discover and report coolant-fluid system and condensate drain-line leaks.

NOTICE

Risk coil and piping rupture. Can cause equipment damage and major fluid leaks resulting in serious building damage, expensive repair costs and costly system down time.

Thermal expansion of the cooling fluid without means of expansion can cause the coil and piping to rupture, spilling cooling fluid in the conditioned space. This can be caused, among other ways, by closing the ball valves on both the supply and the return pipes. Always allow for thermal expansion either by leaving at least one of the valves open or by opening the DCD™ bleed valve.

NOTE: This document is intended to be used together with site-specific documentation and documentation for other parts of the system.

2 NOMENCLATURE AND COMPONENTS

This section describes the model number for Liebert® DCD units and components.

2.1 Model Number Nomenclature

Table 2.2 on the next page describes each digit of the model number.

Table 2.1 Liebert DCD Model-number Example

Model Number Digits 1 to 10										Model Details										Model Number Digits 11 to 14				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D	C	D	3	5	A	6	0	3	0	0	0	0	0	0	G	0	0	0	0	S	A	0	0	2

Table 2.2 Model-number Digit Definitions for Liebert DCD

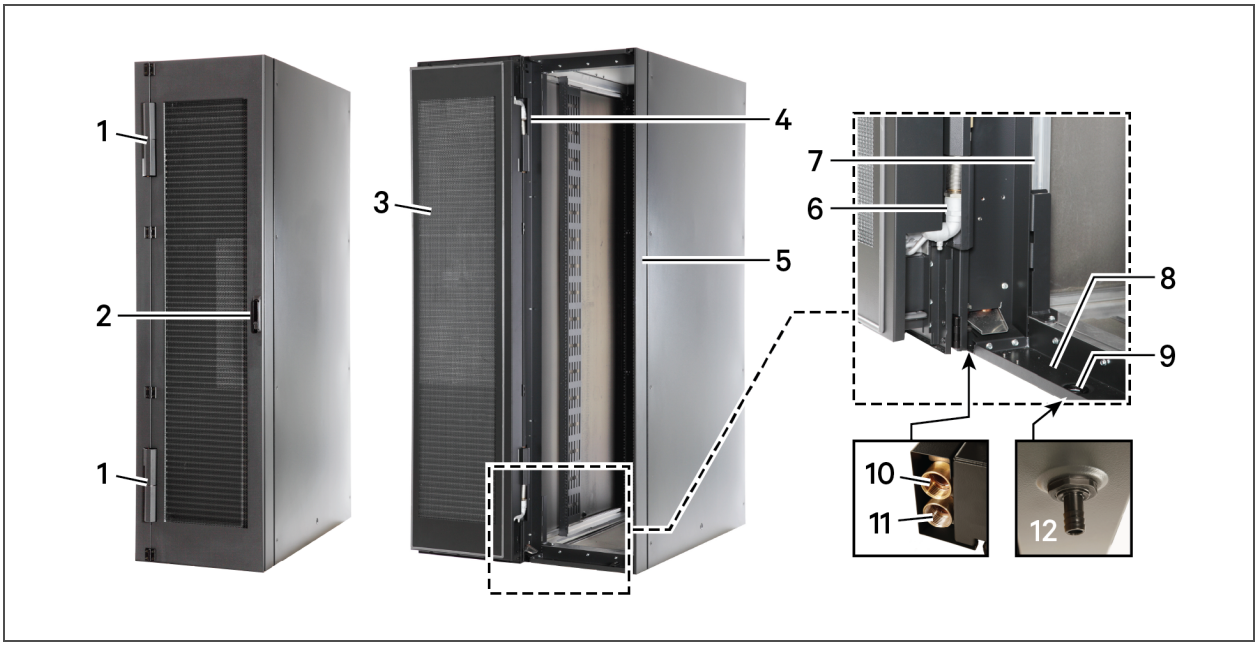
Digit	Description
Digits 1, 2, 3 = the base unit	DCD = Data Center Door
Digit 4, 5 = Nominal Capacity	35 = 35 kW 50 = 50 kW
Digit 6 = Rack Height	A = 42U, 78-6/8 in. (2000 mm)
Digit 7 = Rack Width	6 = 23-5/8 in. (600 mm), only available on 35 models. 8 - 32-1/2 in. (800 mm)
Digit 8 = Cabinet Type	0 = No aluminum frame
Digit 9 = Chilled-water Connection/Hinge Position	1 = Top connection/Hinges left 3 = Bottom connection/Hinges left
Digit 10 = Options	0 = None
Digits 11 to 15 = Not Used	0 = No options
Digit 16 = Color	G = RAL 7021 (dark gray)

Table 2.2 Model-number Digit Definitions for Liebert DCD (continued)

Digit	Description
Digits 17 to 20 = Not Used 0 = No options	
Digit 21 = Packaging Type S = Seaworthy (air freight), Long distance (wooden crate)	
Digit 22 = SFA (Special Features) A = Standard, no SFA X = SFA(s) included	
Digits 23 to 25 = Revision Identifier	

2.2 Component Locations

Figure 2.1 Liebert DCD Component locations



Item	Description
1	Upper and Lower swivel joints
2	Door handle
3	Door
4	Upper piping
5	DCD frame
6	Lower Piping
7	Aluminum profile

Item	Description
8	Condensate tray
9	Condensate drain plug
10	Chilled-water outlet
11	Chilled-water inlet
12	Condensate-hose adapter (on the bottom of the unit)

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3 GENERAL PRODUCT INFORMATION

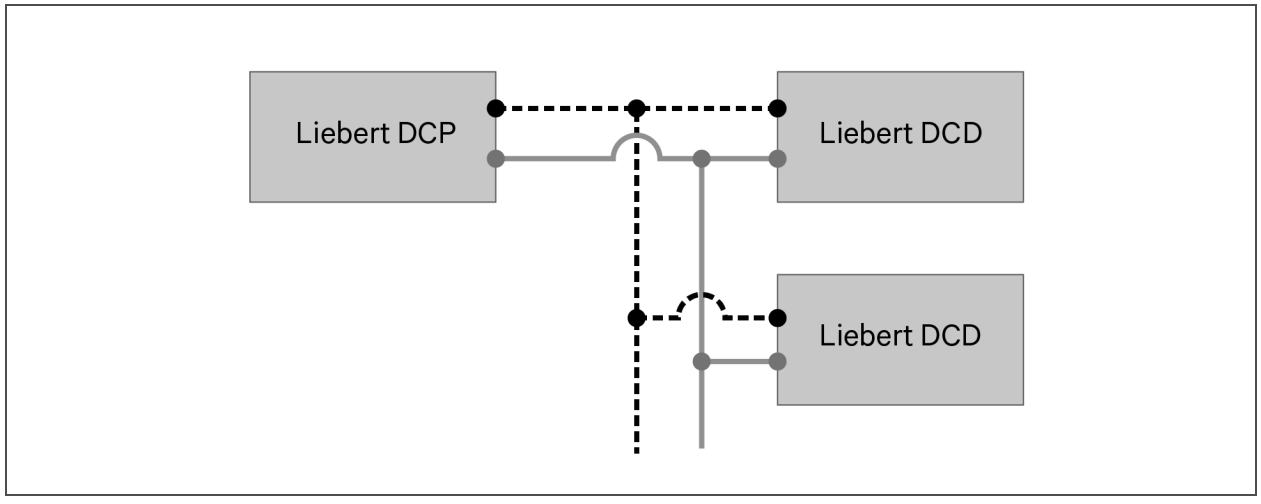
3.1 Product/System Description

The Liebert® DCD™ is an air-water heat exchanger that is integrated into the rear door of a server rack. The DCD™ meets the requirements of the EN 60950 standard. The design allows installation on the back of a server cabinet and maintains access to the back of the servers while the chilled water connections remain stationary. The DCD35 is suitable for absorbing up to 35-kW heat loads from server racks 24 in. (600 mm) x 42U. The DCD50 is suitable for absorbing up to 50-kW heat loads from server racks 31.5 in. (800 mm) x 42U. It can be configured so that no heat is released in the installation area with proper cabinet sealing.

Heat produced by internal components (for example, servers), is reliably removed by the door with a built-in chilled water system or a chilled-water distribution unit, such as the Liebert® DCP™ (see Figure 3.1 below). A chilled-water distribution unit provides these benefits:

- Isolates the building's chilled-water circuit from the chilled-water circuit in the data center. The DCP circulates chilled water to DCD while preventing condensation by maintaining the water temperature above the room dew point.
- Ensures the proper flow rate to the DCD. This is critical to achieve and maintaining the needed capacity.
- Minimizes the possibility of a leak within the data center by separating the data center from the building chilled-water circuit. Should a leak occur within the data center, the volume of water is limited to the amount in the secondary piping system instead of the amount in the entire-building chilled-water system.

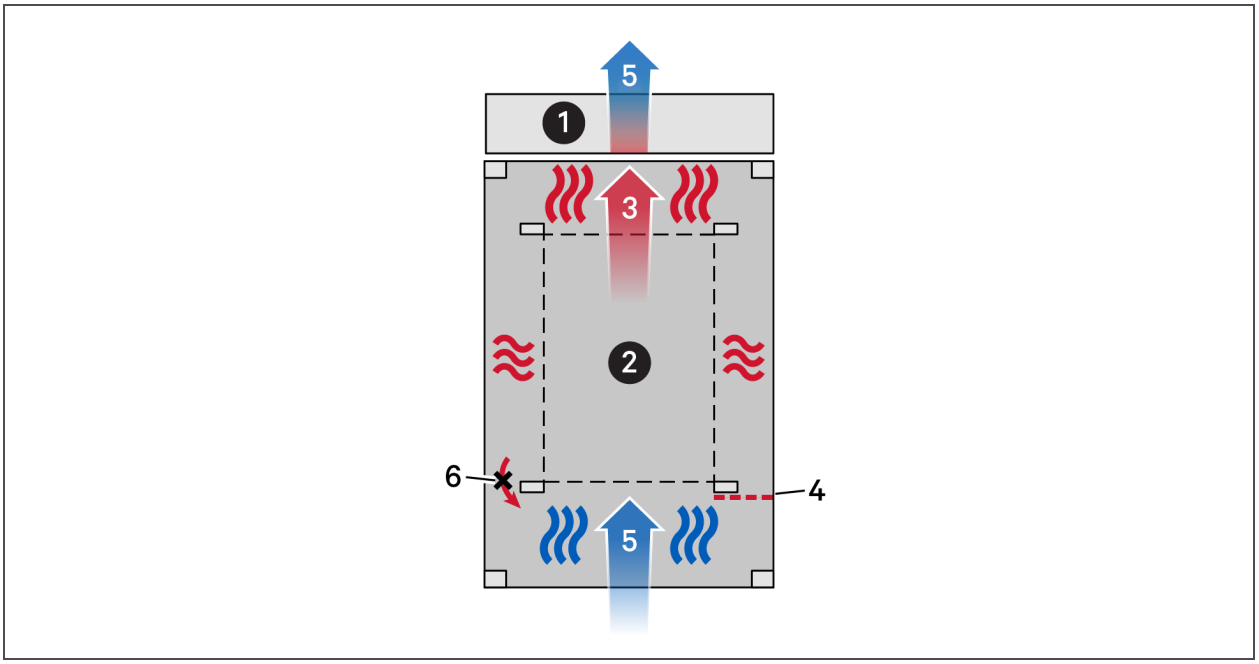
Figure 3.1 Generic piping layout



Room air is drawn in through the front of the rack and picks up heat from the servers. Cooling occurs when the server exhaust air passes through the DCD™ heat exchanger (see Figure 3.2 on the next page). The air is moved through the heat exchanger by the server fans.

The DCD™ is not expected to produce any condensation because of its location within the conditioned space and connected to a Liebert® DCP or if the chilled-water temperature is maintained above the dew point, A condensate pan is provided as a precaution. It has a drain fitting to allow any condensate to be emptied.

Figure 3.2 Top view of air flow and cooling of rack with Liebert DCD

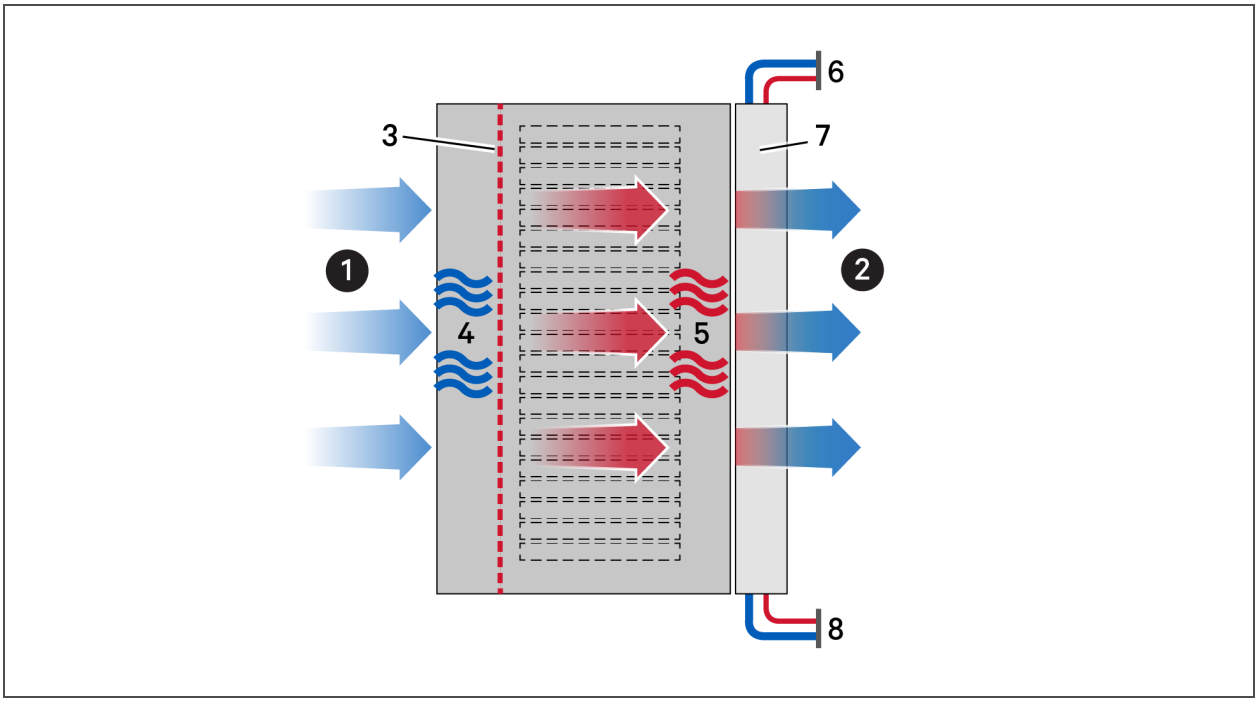


Item	Description
1	DCD unit
2	Server
3	Warm air
4	Air barrier
5	Cold air
6	Recirculation prevented

3.1.1 Cooling Principle

The server fans force air heated by the rack equipment through the unit's air-water heat exchanger where it is cooled. The air-side pressure-drop flow-rate dependency curve is shown in Figure B.7 on page 77.

Figure 3.3 Cooling principle shown in side-view diagram of rack/DCD



Item	Description
1	Air intake
2	Air outlet
3	Air barrier
4	Cold air
5	Warm air
6	Top cooling-water connections
7	DCD unit
8	Bottom cooling-water connections

NOTE: Before using the DCD™, check the system and rack equipment and make sure that they match hydraulically. In particular, the server fans must be able to generate sufficient pressure to drive the air through the DCD™.

NOTE: Cooling-water supply and return connections are supplied at each end of the DCD™, but connections must be made at only one end, either the top or the bottom of the DCD™.

NOTE: In case of chilled-water supply-system failure, the cooling is provided either by adjacent DCD™ modules and/or the room cooling system. In this example, the equipment waste heat is released into the room.

3.2 DCD Active with Fan Module

The DCD Active is an option which includes a fan module to be attached to the DCD cooling coil. See Table 3.1 on the facing page, for the physical and environmental data and requirements of the module. The active-fan module operates by measuring pressure differential between ambient pressure and the pressure inside the cabinet and modulating fan speed to reach a predefined pressure setpoint. The default setpoint is 0-Pa pressure differential. There are two versions of active-fan module:

- Standard—actively maintains a 0-Pa pressure differential by modulating fan speed, and indicates operating status via a green "operating" LED and a red "disturbance" LED.
- TFT—includes a touch-screen display and temperature sensors for precise control of the pressure differential and fan speed based on pressure and temperature readings. See Using the DCD Active TFT Display on page 61, for details.

Table 3.1 DCD Active Specifications

Item	Specification		
Power Supply	Single 110/230 V	A/B 230 V	A/B 110 V
Operating voltage	95 - 264 V, 47 - 63 Hz	190 - 264 V, 47 - 63 Hz	95 - 264 V, 47 - 63 Hz
Rated current	5/11 A (110/230 V)	5 A	11 A
Fuses	10/12 A T	10 A T	12 A T
External Temperature Sensors			
Output voltage	5 V		
Output current	maximum 5 mA		
Communication type	OneWire		
Usable types	Liebert® SN-T Maxim DS28EA00, DS18B20		
IP Interface			
Communication type	RS-485, 3.3 V		
Data rate	9600 baud		
Physical Data			
Dimensions (L x W x H) DCD35, in. (mm)	76.9 x 16.5 x 4.9 (1954 x 420 x 125)		
Dimensions (L x W x H) DCD50, in. (mm)	76.9 x 22.8 X 4.9 (1954 x 579 x 125)		
Weight DCD35, lb (kg)	77 (35)		
Weight DCD50, lb (kg)	88.2 (40)		
Degree of protection	IP20		
Degree of containment	2		
Ambient Conditions			
Operating temperature	50 to 104°F (10 to 40°C)		
Storage temperature	–13 to 176°F (–25 to 80°C)		
Relative humidity	0 to 95% non-condensing		

Table 3.1 DCD Active Specifications (continued)

Item	Specification
Altitude above sea level, ft (m)	maximum 6,562 (2000)
Pressure Connection	
Operating pressure,	–1.005 to 1.005 inAq (–250 to 250 Pa)
Maximum pressure permitted	± 14.5 psi (1 bar)
Tolerance	3% of the measured value ± 0.0008 inAq (0.2 Pa)
Working gases	Air, Nitrogen
Hose—outer diameter, in. (mm)	0.24 (6)

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4 PRE-INSTALLATION PREPARATION AND GUIDELINES

The Liebert DCD attaches to the rear of a computer cabinet with side panels. See the dimensional-data drawings in the Submittal Drawings on page 83.

NOTE: The cooling with Liebert DCD works only if a strict air separation exists between server cold air intake and server warm air outlet. Unused rack spaces must be blocked with blanking plates. All bushings (network cables, piping, etc.) must be sealed to prevent air leakage. Racks must have side panels. The tops and bottoms of the racks must be sealed.

4.1 Planning Dimensions

Refer to site-specific drawings for exact placement. Efficient cooling depends on proper equipment placement, proper use of plates in any voids in the rack and good cable management.

Ensure that there is 25.6-in. (649 mm) clearance in the rear to allow the door to open fully.

The unit dimensions are described in the submittal documents included in the Submittal Drawings on page 83.

The following table lists the relevant documents by number and title.

Table 4.1 Dimension Planning Drawings

Document Number	Title
DPN004112	Dimensional Data, DCD35
DPN004113	Dimensional Data, DCD50

4.2 Unit Weights

Table 4.2 Liebert DCD unit weights

Model Number	Weight, lb (kg)
DCD35	210 (95)
DCD50	230 (104)

4.3 Room Preparation

The room should be well-insulated and must have a sealed vapor barrier. The vapor barrier in the ceiling and walls can be a polyethylene film. Paint on concrete walls and floors should contain either rubber or plastic.

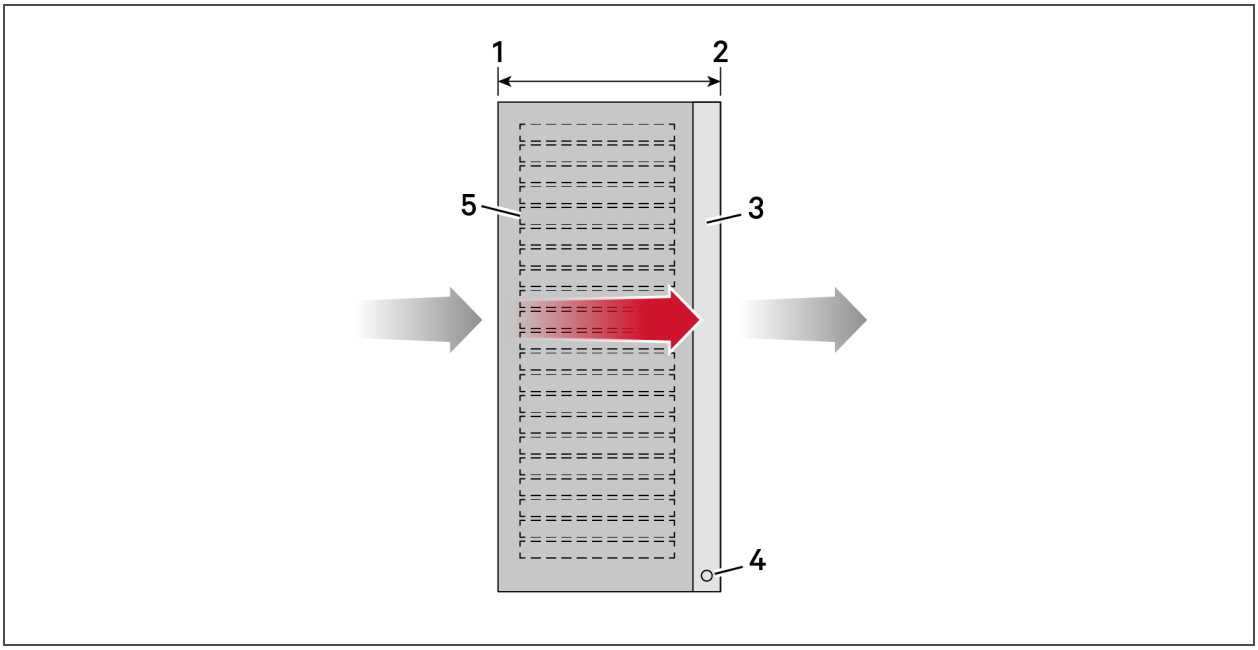
NOTE: The vapor barrier is the most important factor in maintaining environmental control in the conditioned space.

Outside or fresh air should be kept to a minimum when temperature and humidity must be tightly controlled. Outside air adds to the site's cooling, heating, dehumidifying and humidifying loads. Doors must be properly sealed to minimize leaks and must not contain ventilation grilles.

4.4 Air-flow Considerations

The server fans draw air into the rack where the equipment heats it. The server fans force the heated air across the DCD™ coil. The DCD™ has a low air-side pressure drop, similar to a rack with perforated doors.

Figure 4.1 Generic airflow diagram—enclosure/rack shown from side



Item	Description
1	Front of rack
2	Rear of rack
3	DCD
4	Cooling water connections
5	Critical equipment

NOTE: To provide optimal cooling, strict separation between the hot and cold air must exist within the rack and all the bushings (network cables, piping, etc.) must be sealed to prevent air leakage. Air bypass and recirculation can severely reduce the cooling effectiveness of the DCD™. Install blanking plates in any voids in the rack to prevent air bypass and air recirculation. Keep the coils clear of any obstructions that may block the airflow. Contact the factory for further information. Refer to the user manual supplied with the rack on which the DCD™ is mounted.

4.5 Water-supply Considerations

For reliable function of the DCD™, chilled water must be available in an appropriate amount, of the required quality, and at the appropriate temperature and pressure.

4.5.1 Water Quality Requirements

To safeguard the maximum lifetime of air/water heat exchangers, the water used for chilling purposes must meet the VGB Chilled Water Guidelines (VGB-R 455 P). The chilled water used must be soft enough to prevent deposits, but it must not be too soft because that would lead to corrosion of the heat exchanger.

Table 4.3 below, lists the most important impurities and measures for their removal.

Table 4.3 Water Impurity

Water Impurity or Condition	Corrective Method
Particles (dp < 0.3 mm)	Filter the water
Excessive hardness	Soften the water by ion exchange
Moderate level of particles and hardeners	Add dispersion or stabilization agents
Moderate level of chemical impurities	Add deadening agents and inhibitors
Biological impurities (bacteria and algae)	Add biocides

We recommend treating water to it get as closest as possible to the values in Table 4.4 on the next page.

Table 4.4 Hydrological data

Hydrological Data	Recommended Purity Levels
pH values	(7 - 10,5)
Carbonate hardness	(3 - 8) °dH
Free carbon dioxide	(8 - 15) mg/dm3
Combined carbon dioxide	8 - 15mg/dm^3
Aggressive carbon dioxide	0mg/dm^3
Sulfides	< 10mg/dm^3
Oxygen	< 50mg/dm^3
Chloride ions	< 250mg/dm^3
Sulphate ions	< 10mg/dm^3
Nitrates and nitrites	< 7mg/dm^3
COB	< 5mg/dm^3
Ammonia	< 5mg/dm^3
Iron	< 0.2mg/dm^3
Manganese	< 0.2mg/dm^3
Conductivity	< 30S/cm
Solid residue from evaporation	< 500mg/dm^3

Table 4.4 Hydrological data (continued)

Hydrological Data	Recommended Purity Levels
Potassium manganese consumption	< 25mg/dm^3
Suspended matter	< 3mg/dm^3
Partial Flow Cleaning Recommended	3 -15 mg/dm^3
Full Flow Cleaning	> 15mg/dm^3

4.5.2 Water Temperature Requirements

The cold water supply temperature must be higher than the dew point temperature of the cold space. Failure to maintain the cold water supply temperature above the room dew point will result in condensation. The DCD™ provides only for sensible cooling. You must avoid dehumidification of the room by the DCD™. The built-in condensate tray with condensate drain is designed only for a short-term condensation.

Table 4.5 Application conditions

Operating Ambient Temperature	50°F - 95°F (10°C - 35°C) (Other Temperatures on Request)
Maximum Absolute Air Humidity on Site	8g/kg
Chilled Water Temperature Intake	53.6°F (12°C) Other Temperatures on Request
Chilled Water Temperature Outlet	64.4°F (18°C) Other Temperatures on Request)
Water Temperature Difference	10.8°F (6°K)
Use of Glycol	On Request (Not Recommended)
Chilled Water Connection	Rack - Rear Side (Top or Bottom Connection)
Condensate Tray Drain Connection	Rack - Rear Side; 5/8"
Maximum Operating Pressure	145psi (10bar)

5 EQUIPMENT INSPECTION AND HANDLING

SAFETY INFORMATION

WARNING! Risk of top-heavy unit falling over. Improper handling can cause equipment damage, injury or death. Read all of the following instructions and verify that all lifting and moving equipment is rated for the weight of the unit before attempting to move, lift, remove packaging from or prepare the unit for installation. Unit weights are specified in Table 4.2 on page 19.

CAUTION: Risk of contact with sharp edges, splinters, and exposed fasteners. Can cause injury. Only properly trained and qualified personnel wearing appropriate, OSHA-approved PPE should attempt to move, lift, remove packaging from or prepare the unit for installation.

NOTICE

Risk of passageway interference. Can cause unit and/or structure damage. The unit may be too large to fit through a passageway while on or off the skid. Measure the unit and passageway dimensions, and refer to the installation plans prior to moving the unit to verify clearances.

NOTICE

Risk of damage from forklift. Can cause unit damage. Keep tines of the forklift level and at a height suitable to fit below the skid and/or unit to prevent exterior and/or underside damage.

NOTICE

Risk of improper storage. Keep the unit upright, indoors and protected from dampness, freezing temperatures and contact damage.

NOTICE

Risk of a leaking coil due to freezing during improper storage. Can cause equipment and serious building damage.

The heat exchanger and the supply pipes must be cleared of any water before the unit is stored, either before storage or after removal from a cabinet. Compressed air can be used to remove the water. Remove all the vents and the screws before storing.

Upon arrival of the unit and before unpacking:

- Verify that the labeled equipment matches the bill of lading.
- Carefully inspect all items for visible or concealed damage.
- Report damage immediately to the carrier and file a damage claim with a copy sent to Vertiv or to your sales representative.

Equipment Recommended for Handling the Unit:

- Forklift
- Pallet jack

5.1 Storing the Unit

- Keep the unit in its original packaging, protected from the weather and in dry conditions.
- Protect the unit's working parts from sand, rain, dust and other particles and contaminants.
- Store at temperatures between -22°F and +122°F (-30°C and +50°C). The chilled-water circuit must be empty during storage.
- After storage for a year or longer, the water-bearing hinges must be inspected for functionality.
- Remove all packaging before starting the unit.
- Chilled-water connections are not load-bearing. Do not use the connections as handles.
- When transporting the unit, always make sure the device is properly fastened and secured against slipping.

NOTICE

Risk of a leaking coil due to freezing during improper storage. Can cause equipment and serious building damage.

The heat exchanger and the supply pipes must be cleared of any water before the unit is stored, either before storage or after removal from a cabinet. Compressed air can be used to remove the water. Remove all the vents and the screws before storing.

5.2 Packaging Material

All material used to package this unit is recyclable. Please save for future use or dispose of the material appropriately.

5.3 Handling the Unit while Packaged

Transport the unit with a forklift or pallet jack.

When using a forklift or pallet jack:

- If multiple units are delivered, they ship on a pallet with up to 4 modules, and a pallet jack is required to move these to the installation location.
- Make sure that the fork tine length is suitable to move the packaged module.
- When moving the packaged unit, do not lift the unit any higher than 6 in. (152 mm). All personnel except those moving the unit must be kept 20 ft (5 m) or more from the unit while it is being moved.
- If the unit must be lifted higher than 6 in. (152 mm), all personnel not directly involved in moving the unit must be 20 ft (5 m) or farther from the unit.
- Do not use piping on the module to lift or move the unit.

5.4 Unpacking the Module

The following equipment is required to unpack the module:

- Utility knife
- Flat-blade screwdriver, claw hammer, pliers or crowbar
- Forklift, pallet jack or similar device

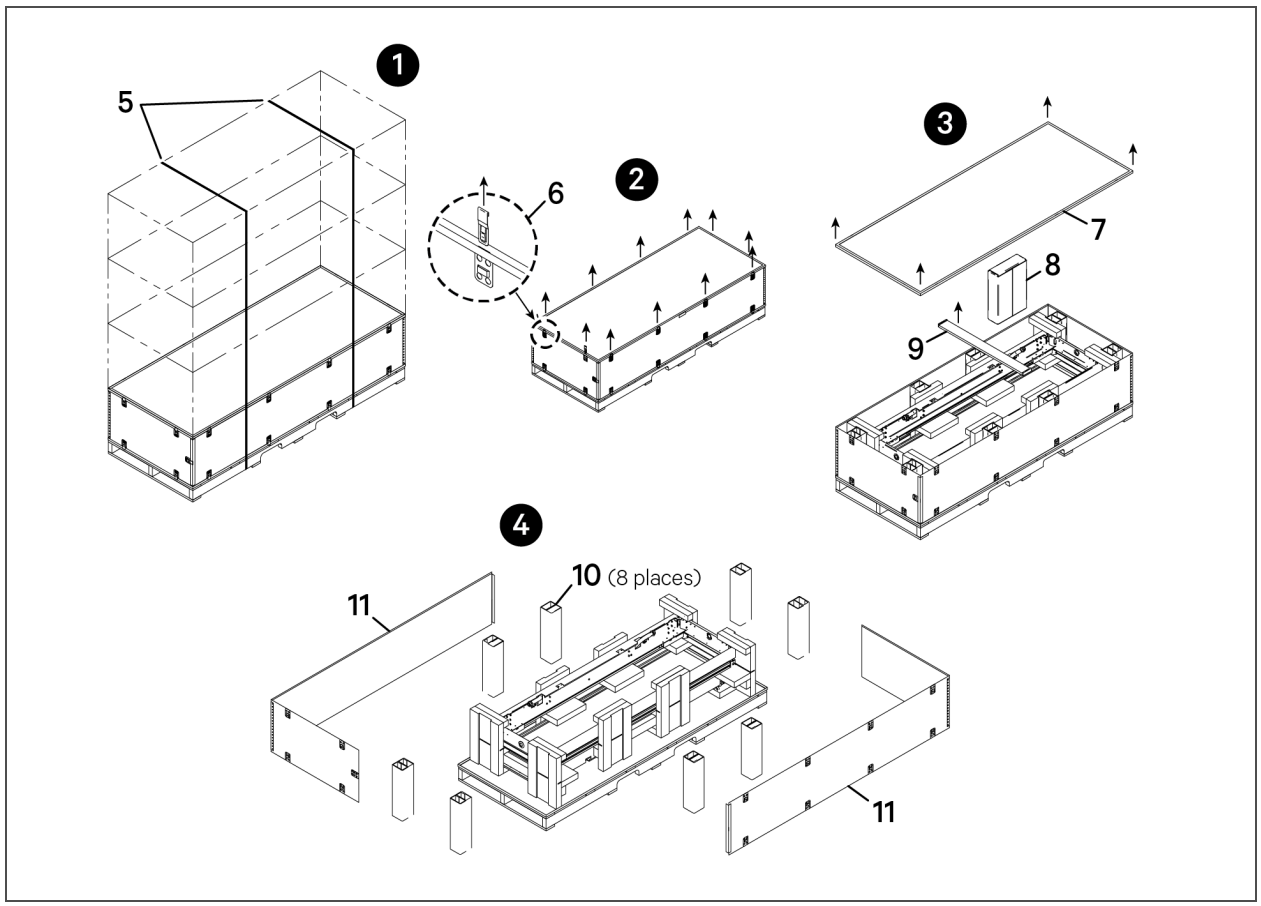
Do not unpack the unit before moving it to the installation location. Once at the installation point, refer to Figure 5.1 on the next page, and the following steps:

NOTE: Two properly-trained and qualified personnel must lift the unit.

1. For multiple-unit shipments, cut the bands and place all packaged modules on the floor for unpacking.
2. On each module, slide the upper row of spring clips upward and remove them.

3. Remove the top cover and cross brace from the package, then remove and set aside the hardware and key package.
4. Remove the remaining spring clips, side panels and any spacers from the package.

Figure 5.1 Removing packaging



Item	Description
1	Cut and remove shipping bands if necessary, and lay each module on the floor for unpacking.
2	Remove the top row of spring clips from the packaging.
3	Remove the cover and cross brace, then remove the hardware/key kit package and set aside.
4	Remove the remaining spring clips, side panels, and any spacers.
5	Shipping bands
6	Top spring clip
7	Top cover
8	Hardware/key kit
9	Cross brace
10	Spacer (8 places)
11	Side panel

5. Lay two pieces of protective material, each longer and wider than the module frame, on the floor.
6. Remove foam packaging from both sides of the unit.
7. Using two people, lift the module frame off the pallet and lay it on one piece of protective material.
8. Compare the serial tag information on the module to the bill of lading. If the information does not match the product specified, contact your Vertiv sales representative.
9. Using two people, lift the module and lay it on the second piece of protective material with the door handle facing up.

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6 INSTALLATION

These instructions apply only to installing the Liebert® DCD™ on a DCM™ rack by Knurr®. For racks built by other makers, refer to the instruction sheet shipped with the adapter kit to install the adapter and DCD™ frame. The rack-adapter kit is described in the drawing DPN004114 included in the Submittal Drawings on page 83.

WARNING! Risk of top-heavy unit falling over. Improper handling can cause equipment damage, injury or death. Read all of the following instructions and verify that all lifting and moving equipment is rated for the weight of the unit before attempting to move, lift, remove packaging from or prepare the unit for installation. Unit weights are specified in Table 4.2 on page 19.

NOTICE

Risk of improper installation and commissioning. Can cause equipment damage.

Installation and commissioning of the unit must be performed only by properly trained and qualified personnel. All actions must be in accordance with regulations and the manufacturer's instructions.

NOTICE

Risk of improper assembly. Can cause unit to malfunction.

The unit must be properly aligned and plumb with the rack to for the unit to function properly and without water leaks. Use a carpenter's level to make sure this requirement is met when commencing the installation.

The hot and cold air within the cabinet must be separated.

NOTICE

Risk of airflow obstructions. Can cause improper air circulation.

To ensure sufficient air circulation make sure there are no obstructions (for example: packaging materials, tools etc.) left in the unit or cabinet. In particular, check the DCD™'s grids, heat exchanger, air intake, and the air outlet.

6.1 DCD Frame Preparation

The DCD™ mounts on the rear of the rack.

- Before attaching the frame: remove the rear door from the rack. Refer to the rack's installation manual for details.

NOTE: If installing the DCD™ on any type of rack other than the DCM, an adapter kit is necessary. Follow the installation instructions included with the rack adapter kit for the specific rack. Once the adapter kit and frame are installed, continue the installation, following the steps in Installing the DCD Door on page 34.

6.2 Installing the DCD Frame on a DCM Rack

6.2.1 Required Tools

- Phillips screwdriver, PH3
- Adhesive-backed foam (factory-supplied)
- Utility knife
- 8 mm socket and driver
- Scratch awl
- Marker
- Adjustable wrench with a maximum adjustment size of 2 inches (51 mm)
- Torque wrenches, 1-1/2 in. (38 mm) and 1-7/16 (36 mm)

Table 6.1 Required factory-supplied parts

Part Name	Vertiv Part #	Quantity
Spring Nuts	000782699	16
Diamond Nuts	000770869	7
Self-Adhesive Foam	309894P3	1
Bolts	N/A	N/A
Condensate Drain Kit	N/A	N/A

1. After removing the packaging, lift the DCD™ from the pallet or from the protective material.
2. Align the frame of the DCD™ with the rear of the equipment rack.
   - Bottom Chilled Water Connections: ensure that the chilled-water connections are pointing down (see Figure 2.1 on page 10).
   - Top Chilled Water Connections: ensure that the chilled-water connections are pointing up.
3. Use a marker or scratch awl to mark the positions for the 17 bolts that will attach the frame to the DCM. Bolts will be inserted in:
   - Five frame holes on the aluminum frame member on the door handle side of the rack.
   - Three spring nuts near the top of the hinge side of the rack
   - Three spring nuts near the bottom of the rack
   - Three diamond nuts in the face of the rack's top frame member
   - Three diamond nuts in the face of the rack's bottom frame member
4. Lay the DCD™ frame on the protective material.
5. Insert the spring nuts into the groove of the vertical aluminum profile.
6. Move spring nuts to the marked positions using a scratch awl or similar tool.

7. Install the condensate drain assembly (refer to Figure 6.1 below).
    a. Get the condensate drain parts from the parts bag.
    b. Press the condensate-hose adapter into the top half of the drain assembly until it snaps into place. The top of the condensate-hose adapter will extend above the top half of the drain assembly.
    c. Put the O-ring seal on the insert.
    d. Insert the assembly in the top of the condensate drain hole.
    e. Screw the nut onto the top half of the assembly, tightening it firmly by hand.

Figure 6.1 Condensate drain assembly

Item	Description
1	Condensate-hose adapter
2	Bottom nut
3	O-ring
4	Top half of assembly
5	The condensate-hose adapter extends above the top half of the assembly.
6	The o-ring fits against the bottom of the DCD.

8. Connect the condensate-hose Adapter to the condensate tray.
9. Lift the DCD™ frame and align it with the server rack again.

Figure 6.2 Align the DCD frame with the rack

10. Insert and partly tighten bolts to hold it in place.

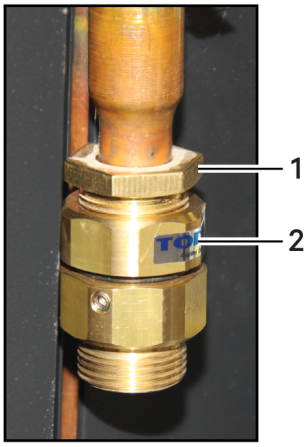
NOTE: Performing this step may be easier if a board or similar object is placed under the DCD™ frame to hold it in place.

11. Insert and lightly tighten the bolts, working all around the perimeter to prevent the frame from twisting and to ensure the parts fit properly (see Figure 6.3 below).
12. Torque the screws all around the perimeter to 2 ft-lb (3 Nm).
13. Verify that the frame is not twisting.

Figure 6.3 Tighten screws on frame

14. Thread the brass swivel fitting to the frame by hand to ensure the threads mate properly.
15. Hold the brass body so that it does not rotate and use a torque wrench to tighten to 64 ft-lb (85 Nm).

Figure 6.4 Brass swivel fitting threaded onto Liebert DCD pipe



Item	Description
1	Tighten with a torque wrench
2	Hold stationary (brass body)

6.3 Installing the DCD Door

Required Tools

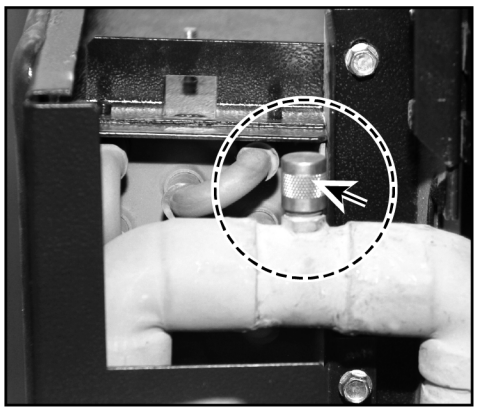
- Socket hexagonal screw driver - (Allen) 8 mm for M5 screws (5/16")
- Torque wrench
- Phillips screw driver PH3
- Utility knife

WARNING! Risk of heavy module falling. Can cause equipment damage, injury and death. Two properly-trained and qualified people are required to move and install the module. The DCD™ weighs in excess of 210 lb (95 kg). Do not leave a DCD™ standing unattended on its side or its end without adequate support to prevent it from falling over. The module must be supported at all times or laid flat on protective material until it is installed. Read all instructions before attempting to move, lift, remove packaging from, or prepare the module for installation. See Table 4.2 on page 19, for unit weights based on model.

1. Attach the three door hinges to the DCD™ door with the supplied screws.
2. Turn the DCD™ face down (handle side down) and lay it on the protective material.

3. Vent the low-pressure holding charge in the DCD™ by removing the cap on the Schrader valve and depressing the valve pin.
4. Replace and secure the cap on the Schrader valve.

Figure 6.5 Schrader valve at the top of the door



5. Loosen the coil plug. This requires two adjustable wrenches in the wrench arrangement shown in Figure 6.6 below.

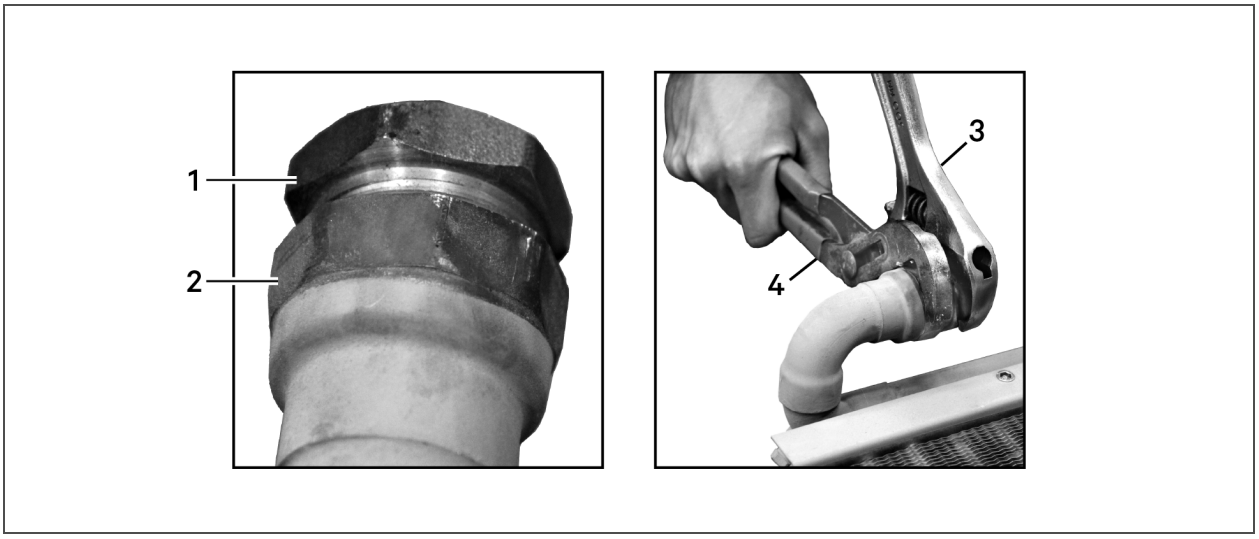
   One wrench holds the Coil Inlet Fitting stationary and the other turns the plug to remove it.

NOTICE

Risk of improper coil plug removal. Can cause damage to the coil.

It imperative that the coil inlet fitting held stationary and the coil plug is is turned. Turning the coil inlet fitting can damage the coil.

Figure 6.6 Loosen the coil plug



Item	Description
1	Coil inlet plug
2	Coil inlet fitting. Hold fitting stationary while removing plug.
3	Wrench removes plug.
4	Wrench holds fitting stationary.

6. Remove any debris and wipe the threaded surfaces clean.
7. Align the door to the frame (see Figure 6.7 below).
8. Set the door in the frame—Angle the bottom of the door toward the frame and insert the door (see Figure 6.7 below).

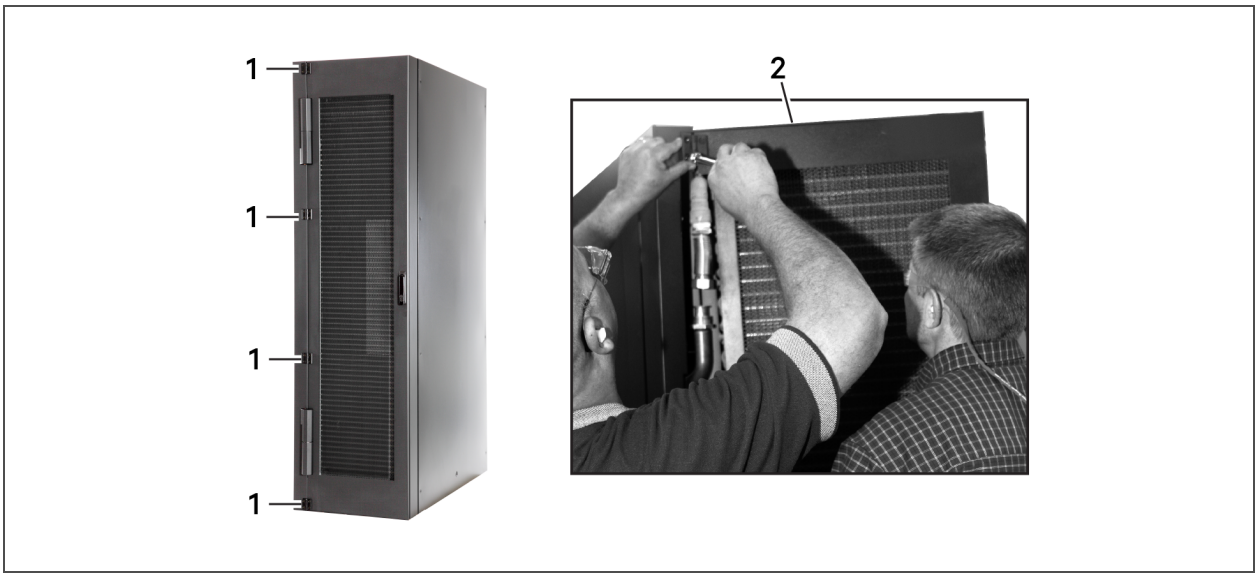
NOTE: Performing this step may be easier if a board or similar object is placed under the DCD™ frame to hold it in place.

Figure 6.7 Frame and door alignment

9. Fasten the door hinges to the frame, starting with the top hinge and finishing with the bottom hinge (see Figure 6.8 below).

NOTE: Tilting the door may ease installing the hinge bolts.

Figure 6.8 DCD door hinge location



Item	Description
1	Hinges, 4 screws in each hinge.
2	Tilt the door to make installing bolts easier.

10. Check that the door moves freely.

    If there are any irregularities or roughness in the movement of the door:

    - Check for obstructions or loosen screws of the hinges and adjust alignment.
    - Tighten any loose screws.

11. Apply pipe wrap or plumber's dope to the coil connection.
12. Thread one of the short, flexible pipes onto the coil connection by hand to ensure that the threads properly mate (see Figure 6.9 on the facing page).
13. Tighten to 350 in-lb (39.5 Nm).

NOTICE

Risk of improper tightening. Can cause equipment damage.

Turn only the nut on the flexible pipe when tightening this connection. Moving the coil connection may damage the coil.

14. Pull the flexible piping slightly to elongate it enough to connect the union nuts.

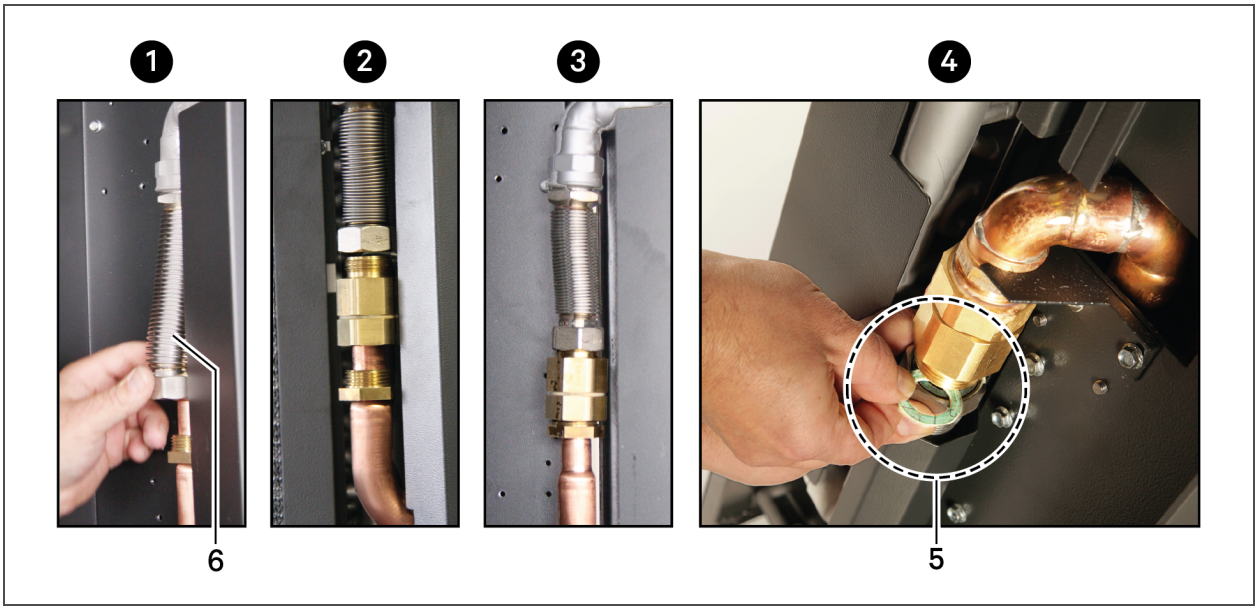
NOTICE

Risk of overextending the flexible pipe. Can cause equipment damage.

Pull the flexible piping slightly to elongate it. This makes the piping long enough to connect the union nuts. Only a slight elongation is necessary. Pulling too hard will overextend the pipe, making it hard to fit and possibly causing leaks.

15. Insert the sealing ring in the door's lower piping (see Figure 6.9 below).

Figure 6.9 Aligning pipes and Inserting the sealing ring



Item	Description
1	Flexible pipe threaded onto coil connection.
2	Flexible pipe connected to union nuts.
3	Upper pipe connection.
4	Insert sealing ring into lower pipe connection.
5	Sealing ring
6	Pull slightly on the flexible pipe to elongate it, but do not over-extend the pipe.

16. With the door fully open, use a torque wrench tighten the union nuts to 64 ft-lb (85 Nm). If a torque wrench is not available, use two wrenches to reduce the stress on the pipes (see **Figure 6.10** below).
    - Open-end wrench 1-5/8-in. (41-mm) or an adjustable wrench with maximum size of 2-in. (51-mm)
    - Open-end wrench 1-7/16-in. (36-mm) or an adjustable wrench with maximum size of 2-in. (51-mm)
17. Check to make sure the door swings freely.

Figure 6.10 Tightening piping

6.4 Installing the DCD Swivel-joint Covers

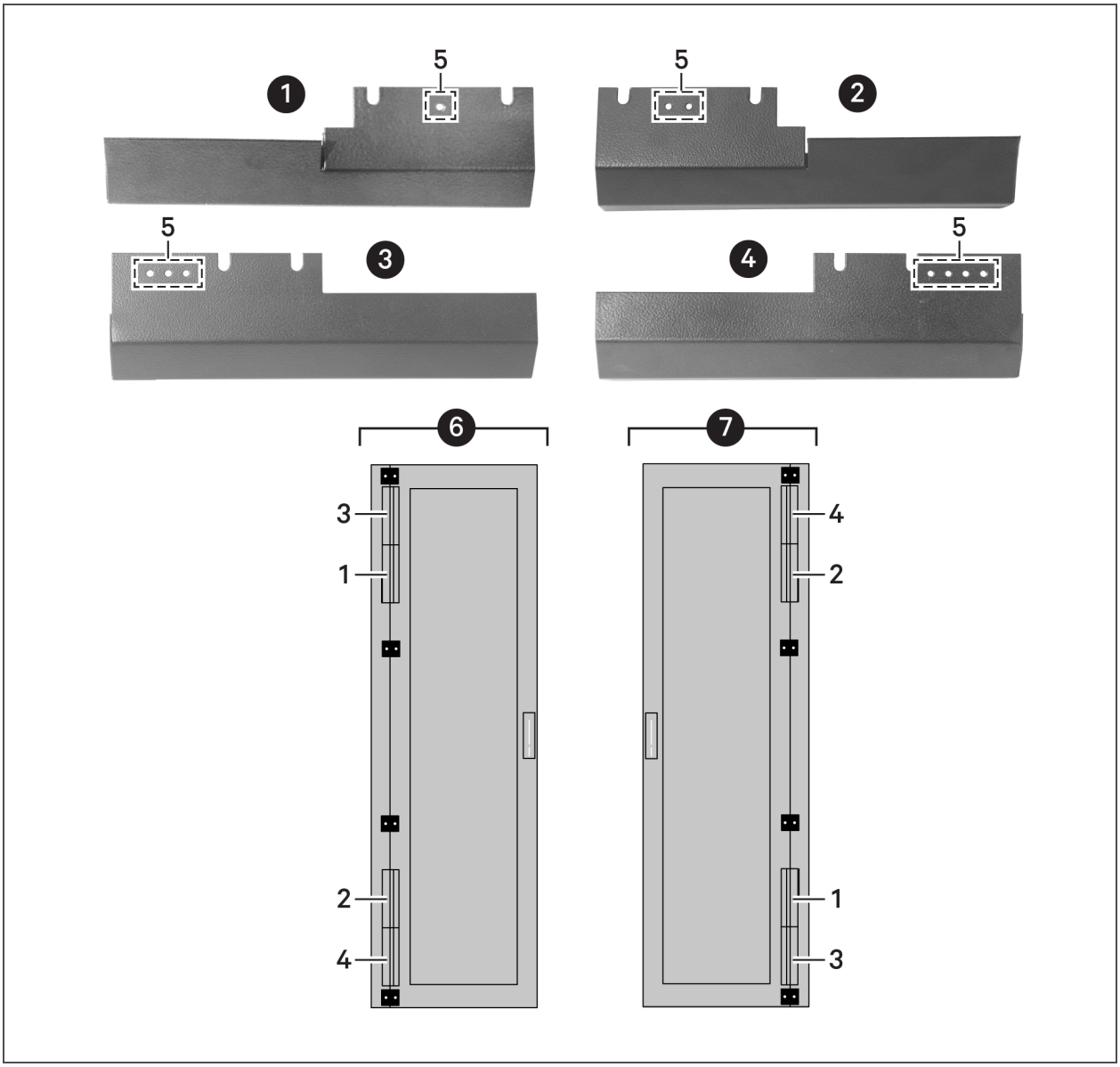
Tool Required

- Socket hexagonal screw driver - 5/16" Allen (8 mm) for M5 screws

The swivel-joint covers can be identified by the number of identification holes on each cover.

NOTE: The DCD™ is set up for left-side hinges. You can flip the door for right-side hinges.

Figure 6.11 Swivel-joint cover identification and location bottom connections

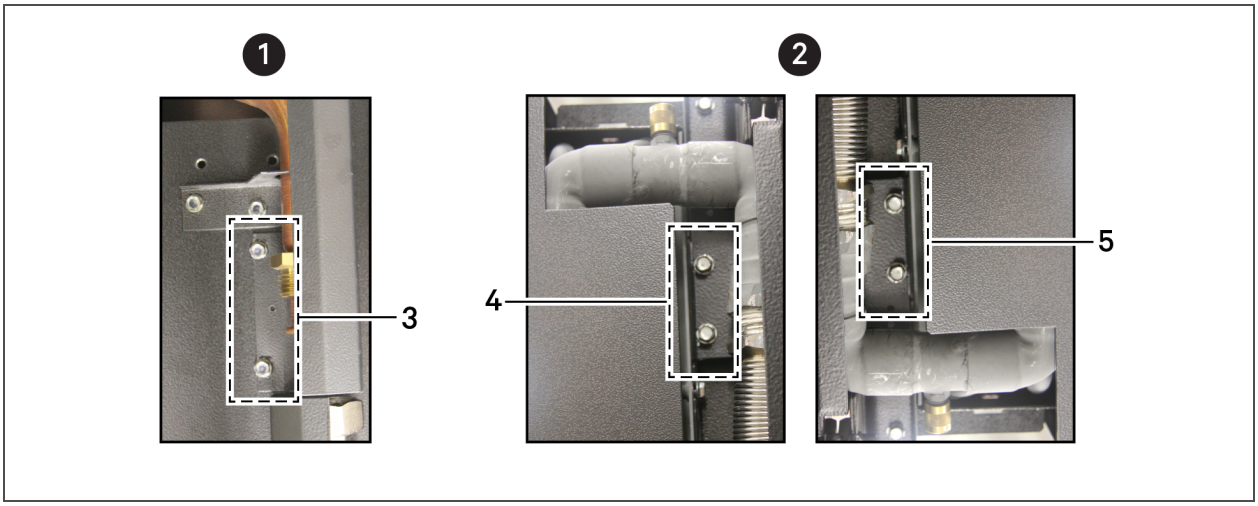


Item	Description
1	Swivel-joint cover 1
2	Swivel-joint cover 2
3	Swivel-joint cover 3
4	Swivel-joint cover 4
5	Identification holes
6	Left-side hinges
7	Right-side hinges

To install the covers:

1. Open the DCD™ door. The door must be open to install the covers.
2. Install the outer, then inner swivel-joint covers on the door (see **Figure 6.12** below)

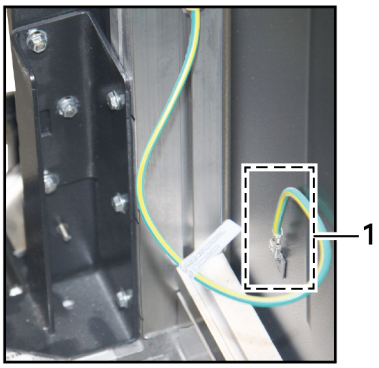
Figure 6.12 Swivel-joint cover locations



Item	Description
1	Inside cover location
2	Outside cover locations
3	Joint cover
4	Upper cover
5	Lower cover

3. Fasten screws using the hexagonal screwdriver or socket wrench.
4. Connect the earth (ground) wire of the door to the frame of the Liebert DCD (see **Figure 6.13** below).

Figure 6.13 Securing ground wire



Item	Description
1	Ground wire connected to bottom corner of DCD

5. Use a “diode” or multimeter to determine that the connection is properly grounded.
6. Check the function of the door lock. The DCD is equipped with a half-inch cylinder lock and keys.

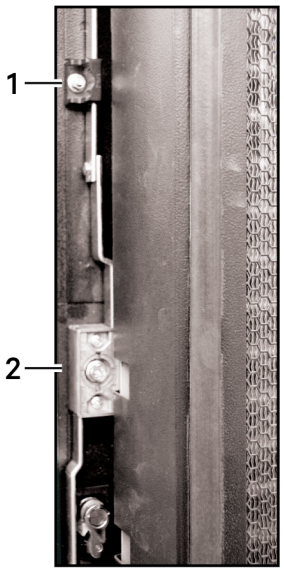
6.5 Reversing the Door Handle

If you are modifying a bottom-connection DCD™ to top connections, the handle can be reversed so that it will not be upside down.

To reverse the handle:

1. Open the door and remove all the bolts holding the door-handle and lock assembly, including the four brackets. Studs and nuts secure the brackets to the door frame.
2. Flip the door-handle and lock assembly 180 degrees and reattach it with the bolts and nuts.
3. Check the handle and lock to ensure they operate properly.

Figure 6.14 Reverse door handle



Item	Description
1	Bolt that secures door-lock assembly, 4 total: 2 above the lock and 2 below.
2	Door lock, secured with 3 bolts.

6.6 Installing the Active Fan Module

These instructions apply only to installing DCD Active fan module on a Liebert® DCD™. All materials required for installation come with the module.

Power-supply Connection Requirements

Standard DCD Active fan modules include a single, wide-range voltage-input port (110/230 V). An optional A/B power-supply transfer switch (110 V or 230 V) is available to provide back-up if one or the other supply fails.

WARNING! Arc flash and electric shock hazard. Open all local and remote electric power disconnect switches, verify with a voltmeter that power is Off and wear personal protective equipment (PPE) per NFPA 70E before working with the module. Failure to comply can cause serious injury or death. Follow all local codes.

WARNING! Risk of contact with high-speed, rotating fan impeller blades. Can cause injury or death. Open all local and remote electric power-supply disconnect switches, verify with a voltmeter that power is off, and verify that all fan impellers have stopped rotating before working in the unit cabinet.

NOTICE

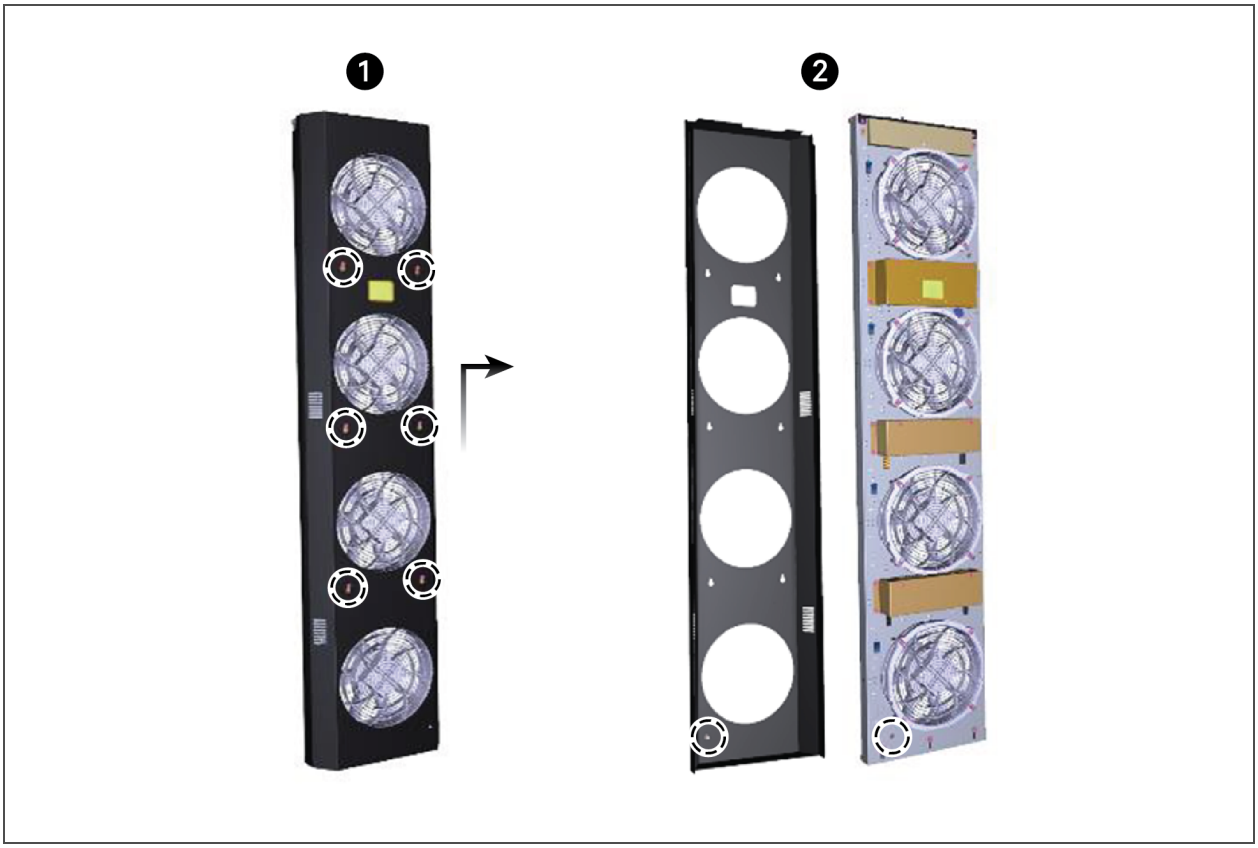
Risk of improper power-supply connection. Can cause equipment damage and loss of warranty coverage.

Prior to connecting any equipment to a main or alternate power source (for example: back-up generator systems) for start-up, commissioning, testing, or normal operation, ensure that these sources are correctly adjusted to the nameplate voltage and frequency of all equipment to be connected. In general, power-source voltages should be stabilized and regulated to within ±10% of the load nameplate nominal voltage. Also, ensure that no three-phase sources are single-phased at any time.

6.6.1 Mounting the Active Fan Module on DCD

1. Remove the module cover by lifting up then out, see Figure 6.15 on the next page.
2. Disconnect the Protective-earthing (PE) ground wire from the cover, see Figure 6.15 on the next page.

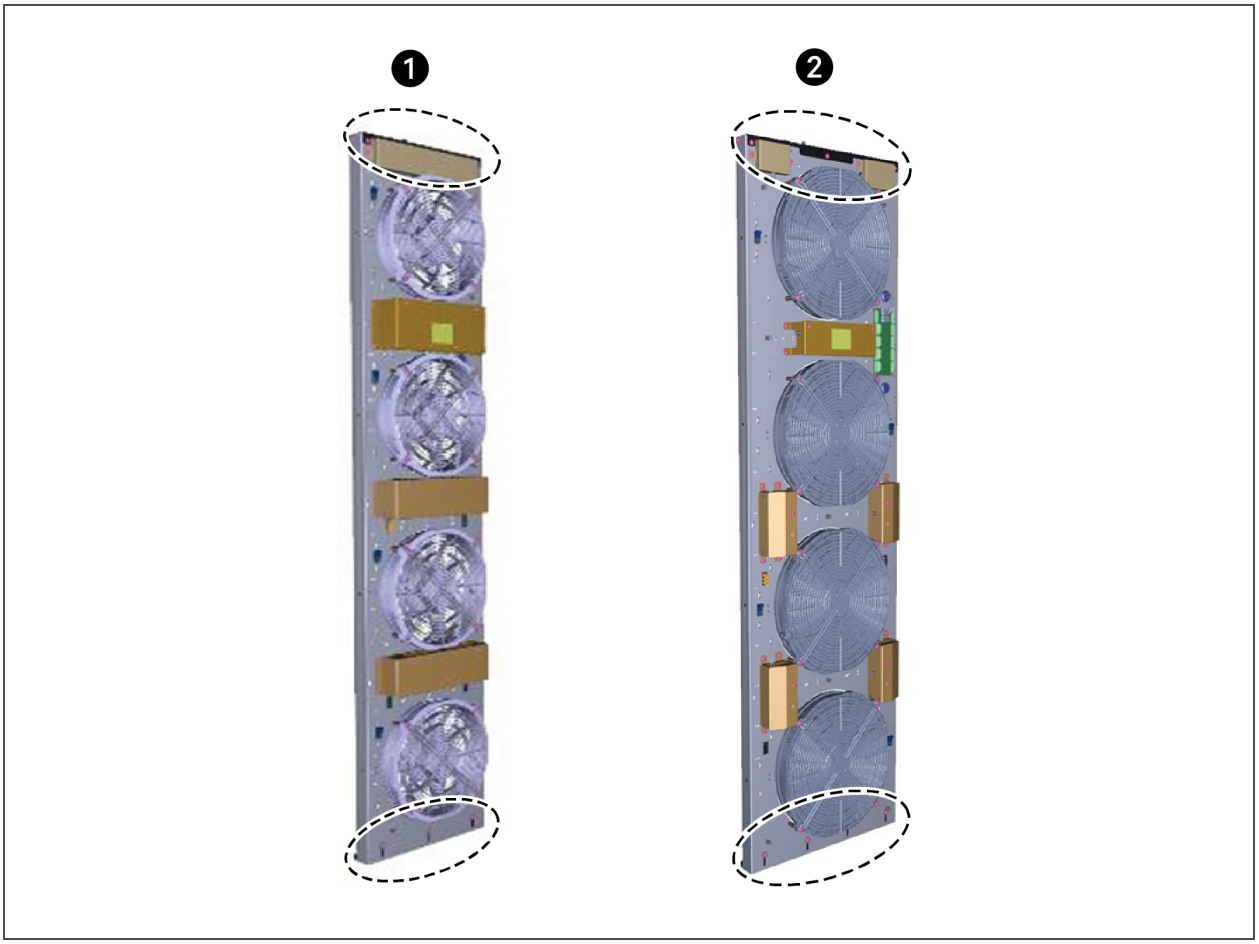
Figure 6.15 Removing cover and disconnecting PE wire



Item	Description
1	Key-hole mounting locations.
2	PE connector locations

3. On the fan module, locate and loosen the screws, but do not remove the screws, see Figure 6.16 below. Then, pull the lower mount downward until it stops.
4. Hang the upper mount of the module on the DCD, then secure the module but pushing the lower mount upward and tightening the screws.

Figure 6.16 Upper and Lower mounts on the fan module



Item	Description
1	DCD35 Active fan module
2	DCD50 Active fan module

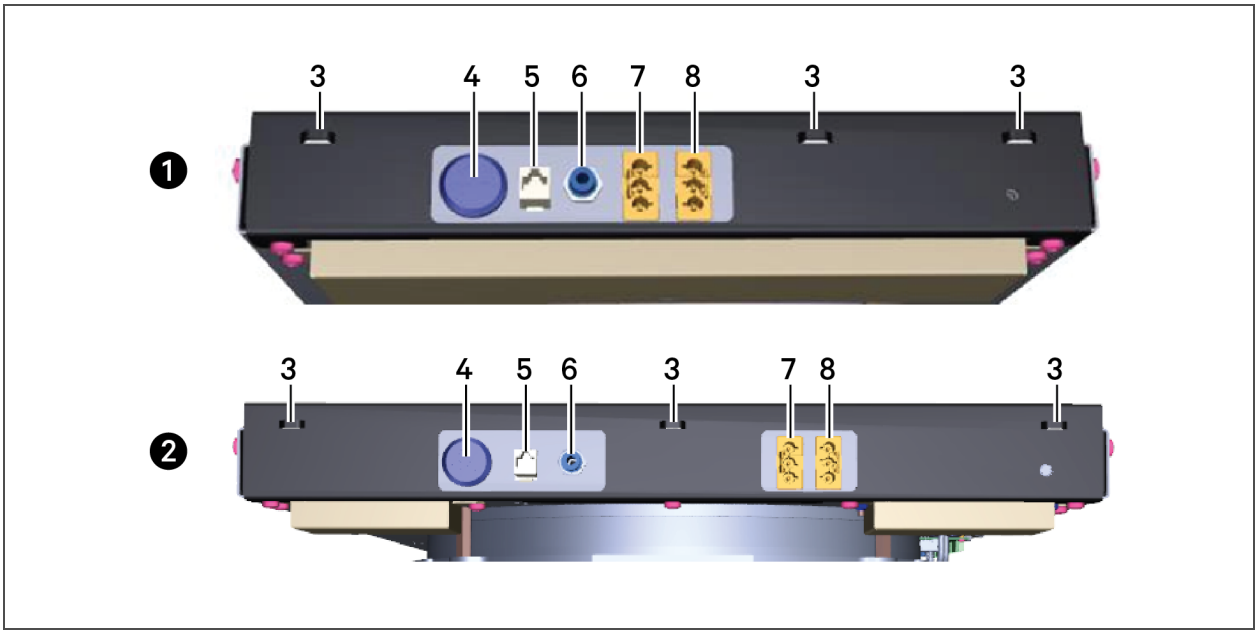
6.6.2 Connecting Supply Power and Sensors

NOTE: Before connecting the power supply, verify the supply and wiring per local electrical codes.

1. On the top of the module, route the wires/pressure hose through the wiring bridges to the connectors, see Figure 6.17 on the next page.
2. For modules with the optional TFT, route the temperature-sensor wires from inside the cabinet through the wire bridges and connect to the RJ-45 port, see Figure 6.17 on the next page.

The module begins operating immediately and begins controlling the pressure differential in a short time on both standard and TFT models. The green "operating" LED is lit on standard models during normal operation. On TFT models, the display shows the main screen after a brief start-up screen. If you have a TFT module, see Using the DCD Active TFT Display on page 61, to adjust setpoints and configure sensors.

Figure 6.17 Connectors on the Active fan module



Item	Description
1	DCD35 Active fan module, top view
2	DCD50 Active fan module, top view
3	Wire bridge
4	IP-interface bushing
5	RJ-45 connector
6	Pressure-hose connector
7	Power-supply A connectors
8	Power-supply B connectors

7 PIPING CONSIDERATIONS AND CONNECTIONS

Refer to site-specific drawings for general locations of the piping connections. The drawings should specify where the piping connects to the DCD™.

NOTICE

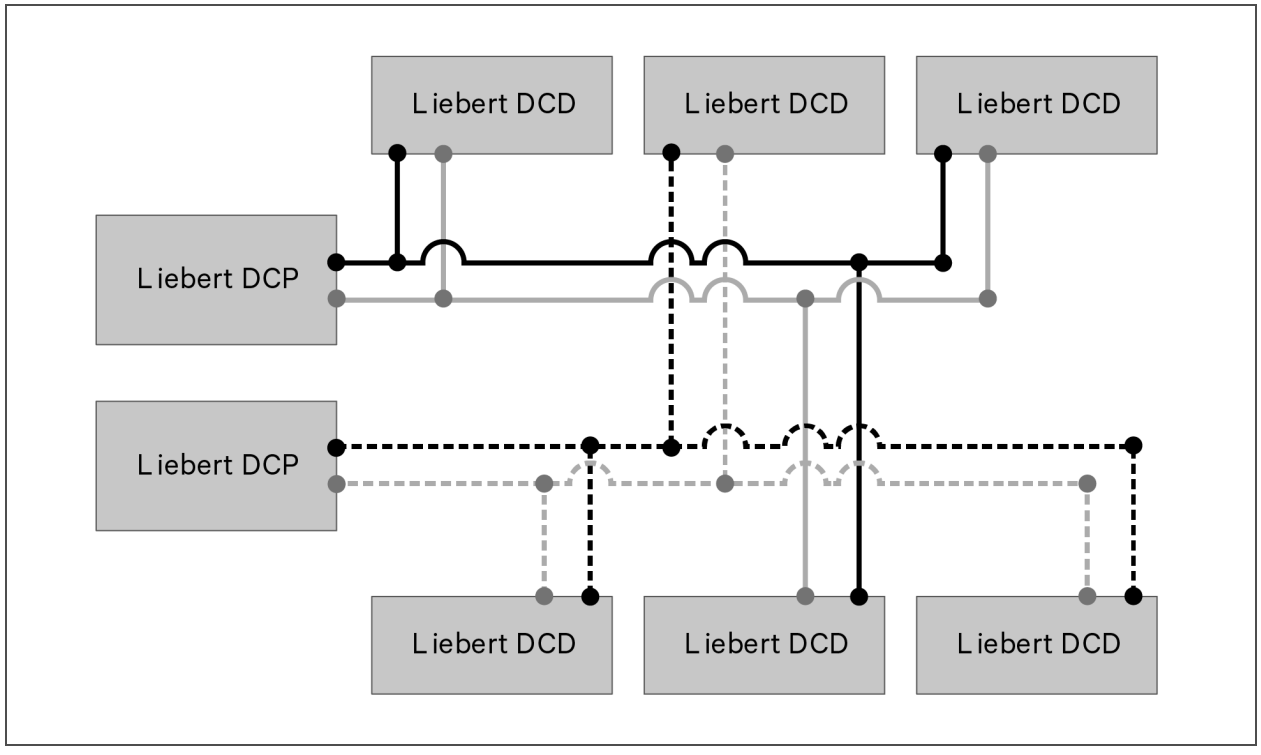
Risk of coil and piping rupture. Can cause equipment damage and major fluid leaks resulting in serious building damage, expensive repair costs and costly system down time.

Thermal expansion of the cooling fluid without means of expansion can cause the coil and piping to rupture, spilling cooling fluid in the conditioned space. This can be caused, among other ways, by closing the ball valves on both the supply and the return pipes. Always allow for thermal expansion either by leaving at least one of the valves open or by opening the DCD bleed valve (see Figure 7.8 on page 56).

7.1 System Connection Configuration

If possible, when using a chilled-water-distribution unit such as the Liebert® DCP™, connect the DCD™ in an interlaced configuration (see Figure 7.1 below). In an interlaced configuration, half the cooling modules in an aisle are connected to one chilled-water-distribution unit and the other half are connected to another chilled-water-distribution unit. Interlacing the connection piping will keep half the DCD™ units operating and maintain cooling in the conditioned space should one unit fail.

Figure 7.1 Typical DCD interlaced piping



When using a chilled-water-distribution unit such as the Liebert® DCP, you may employ a ring design (see Figure 7.2 below) or Tichelmann ring (see Figure 7.3 below) design. In these designs, the pressure drop for each of the units is approximately the same, which results in even cooling performance.

Figure 7.2 Ring piping

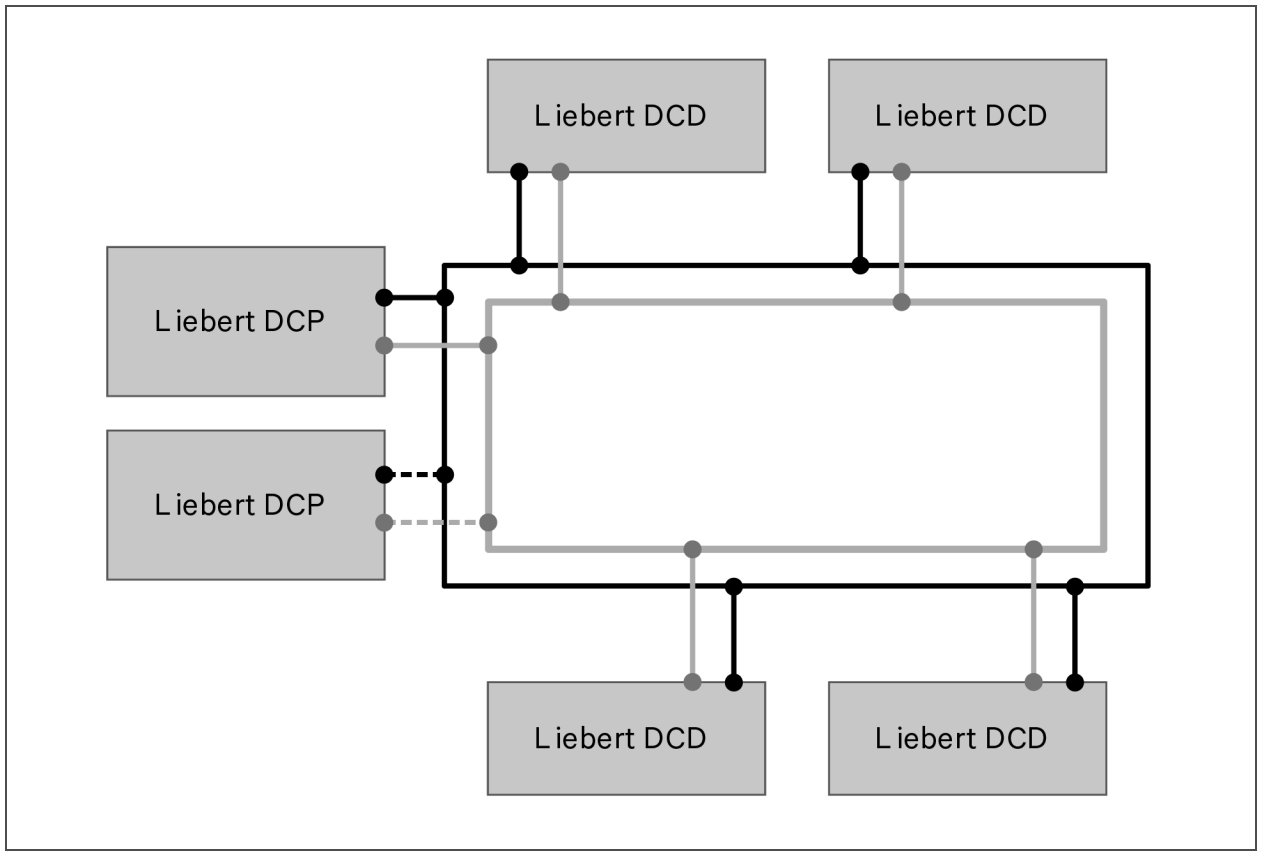
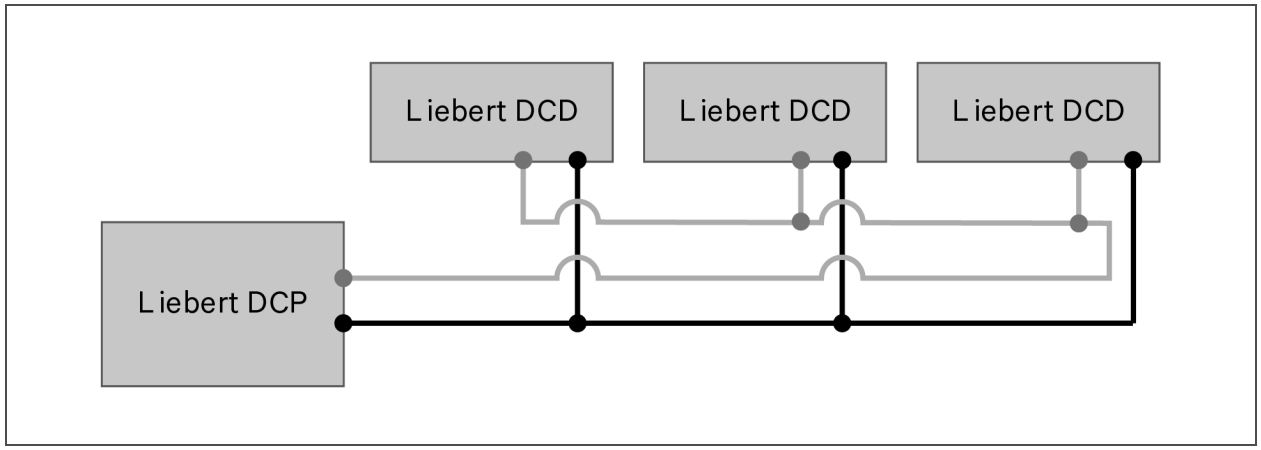
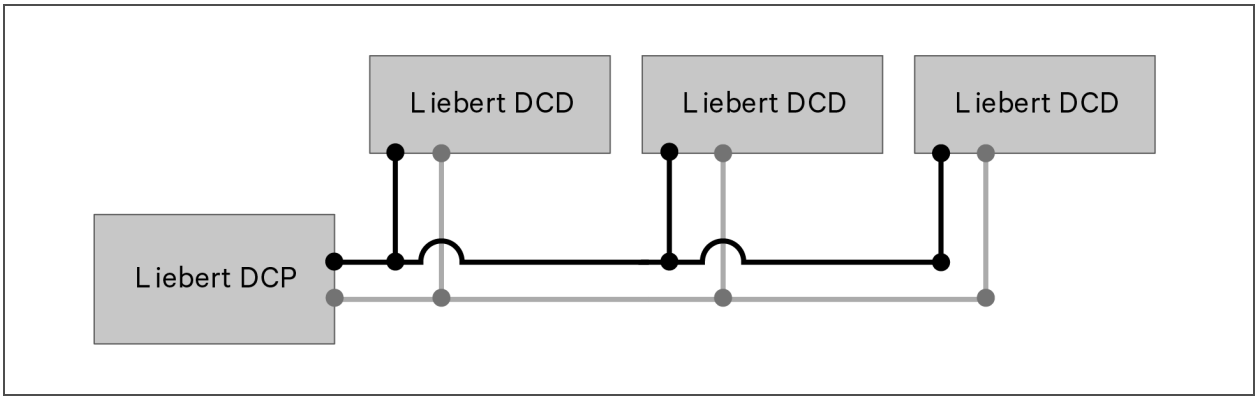


Figure 7.3 Tichelmann ring piping



However, if a ring configuration is not possible, connect the DCD™ units in a non-interlaced configuration as shown in Figure 7.4 below.

Figure 7.4 Typical DCD non-interlaced piping



7.1.1 Using Chilled-water Distribution Units

Using a chilled-water-distribution unit provides these benefits:

- Isolates of the building's chilled-water circuit from the chilled-water circuit within the data center. The Liebert® DCP™ circulates the chilled water to DCD while preventing condensation by maintaining the water temperature above the room dew point.
- Ensures that the proper flow rate to the DCD, a critical factor in achieving and maintaining the needed capacity.
- Separating the data center from the building chilled-water circuit also minimizes the impact of a leak within the data center. If a leak occurs, the volume of water is limited to the amount within secondary piping system instead of the entire building chilled-water system.

7.1.2 Using Open-loop Chilled-water Systems

Maintaining the proper chilled-water flow rate is critical in achieving the design capacity of the DCD. If you are not using a chilled-water-distribution unit, you must take steps to ensure the proper flow at the unit is maintained. You should incorporate an expansion tank or another method into the design to account for fluid expansion.

7.2 Connection Methods and Points

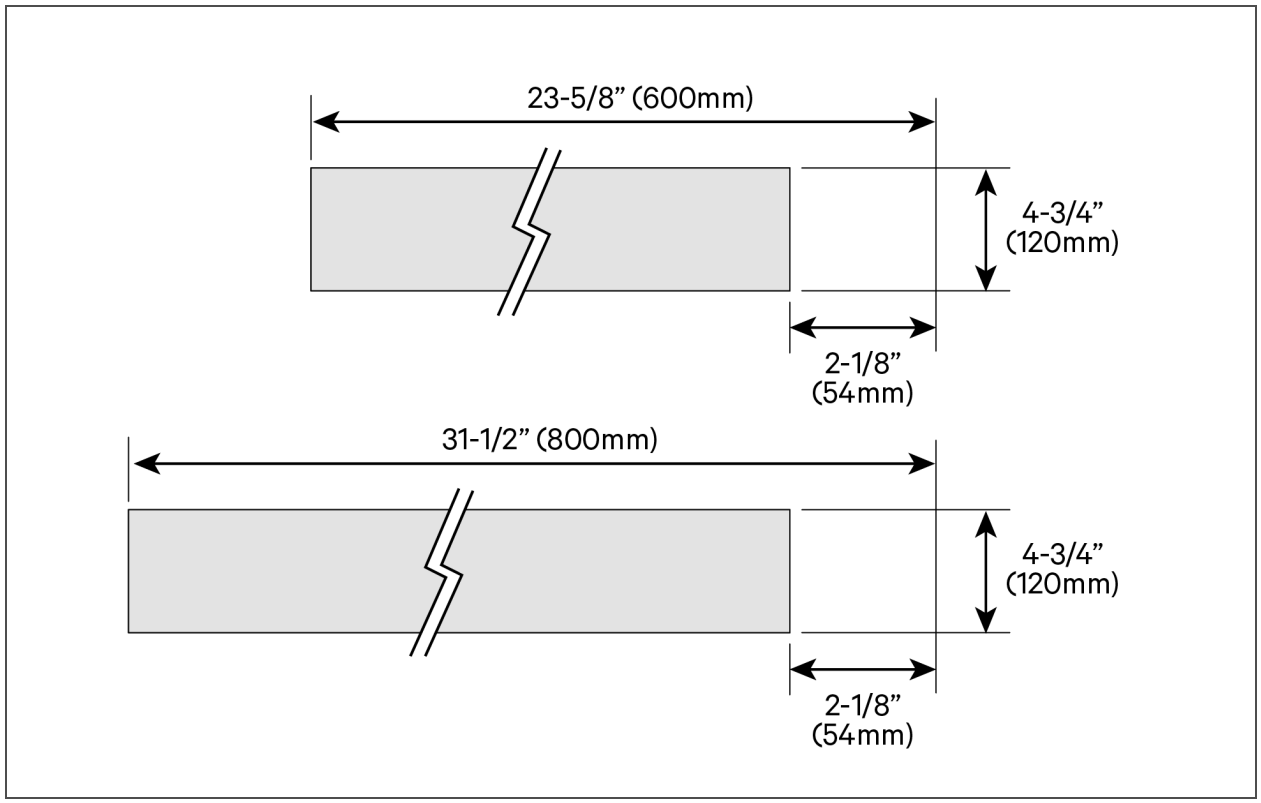
Refer to site-specific drawings for general locations of the piping connections. For connection locations, refer also to Figure 7.5 on the next page, and 7.3 on the next page.

The assembly and connection means used for piping the DCD system are the same as those used in conventional chilled-water systems. Observe all standard practices during installation and start-up to prevent damage and contamination. All piping must be ASTM Type L copper.

The DCD supply- and return-piping connections are described in the Submittal Drawings on page 83.

7.3 Floor Cut-out Dimensions for Units with Bottom Connections

Figure 7.5 Floor cut-out dimensions



7.4 Insulate Piping

Insulate all piping for the DCD to minimize the possibility of condensation.

7.5 Recommended Pipe Sizes

Elbows and restrictions should be minimized to establish sufficient fluid flow.

Table 7.1 Recommended pipe sizes

Piping Run	Nominal Pipe Size, in.
Supply or Return Mains	2-5/8 **NOTE: When using the DCD with a Liebert® DCP, refer to the pipe sizes in the *Liebert® DCP™ Installer/User Guide*.**
Supply or Return Branches >10 ft	1-3/8
Supply or Return Branches <10 ft	1-1/8

7.6 Chilled-water Connection Components

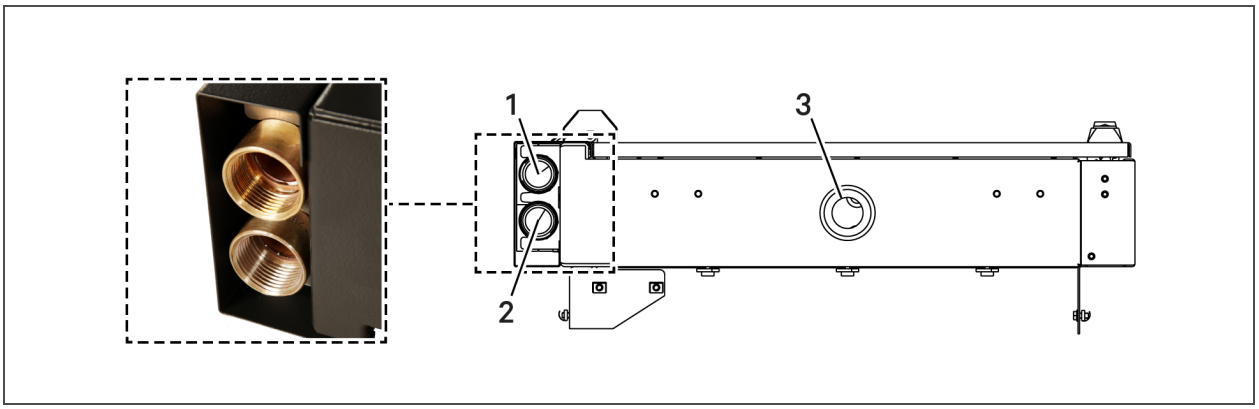
NOTICE

Risk of improper storage. Can cause frozen or damaged coil and piping, resulting in fluid leaks, equipment damage and serious building damage.

The heat exchanger and the piping must be cleared of any water before the unit is stored. Compressed air can be used to remove the water. Remove all the vents and the screws before storing. We recommend storing of the module indoors protected from freezing, dampness, and contact damage.

NOTE: Chilled-water connections are 1-in. Female BPT. A BPT to NPT adapter is required for installation in the United States.

Figure 7.6 Chilled water connections



Item	Description
1	Chilled-water outlet
2	Chilled-water inlet
3	Condensate drain

7.6.1 Strainer

Install a 20-40 mesh strainer on the chilled-water supply to the Liebert® DCP. The strainer is required to prevent particles in the chilled water from entering the DCP's heat exchanger. The strainer must be no more than 10 ft (3 m) from the DCP.

7.6.2 Service Valves

Install 1-in. ball valves (field-supplied/field-installed) on the supply and return lines to the DCD to allow service on the unit without shutting down the entire system.

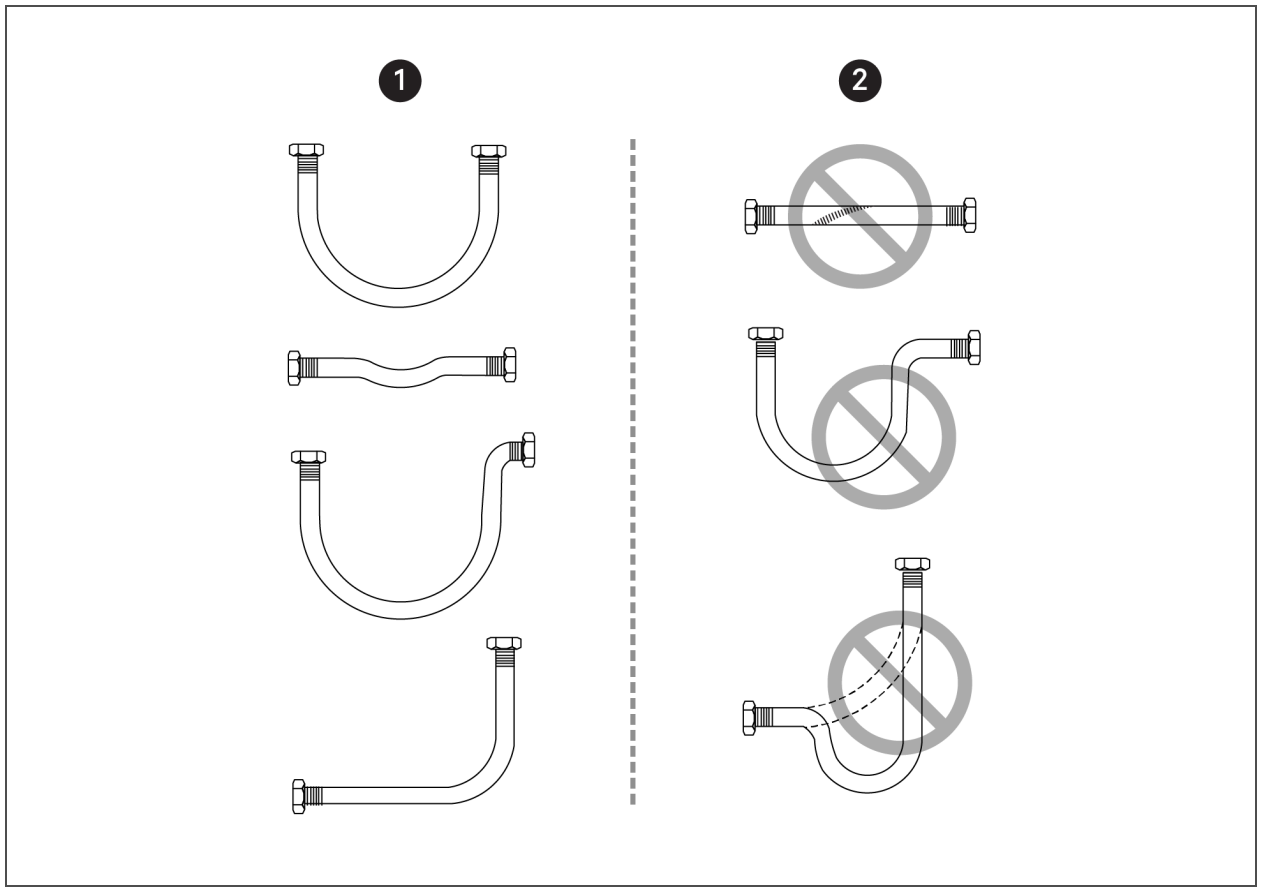
7.6.3 Balancing Valves

Install balancing valves (circuit setters) in the supply line to the unit. Refer to Capacity Performance for DCD35 Models on page 74, and Capacity Performance for DCD50 Models on page 78, for the proper flow rate required to achieve the site-specific capacity

7.6.4 Flexible Pipes

DCD™ Flex Pipe kits are available in 59-ft (1500-mm) nominal lengths. The kit consists of two hoses, manual commissioning valve, and shut off valve. The connections are described in DPN004233 included in the Submittal Drawings on page 83.

Figure 7.7 Acceptable and Unacceptable pipe-bend radius



Item	Description
1	Acceptable radii
2	Unacceptable radii

7.7 Leak Checking

NOTICE

Risk of leaking water. Can cause equipment damage and serious building damage.

Check the chilled water system for leaks before commissioning. Check the chilled water pipe connection to the heat exchanger regularly. Tighten this connection if necessary.

When setting up the heat exchanger for the first time, inspect the mechanical condition of the chilled water supply and connection thoroughly.

- Confirm that the flow directions of field-installed components are correct.
- Confirm that all isolating valves are open.
- Test the water quality when filling the system, see Water Quality Requirements on page 21.
- Set the pressure at 145 psig (10 bars) maximum for at least 30 minutes or according to local codes.
- Repair any leaks.

7.8 Filling the Unit

If using a chilled-water-distribution unit, such as the Liebert® DCP™, refer to its user manual for instructions on filling the DCD and starting the system.

7.8.1 Bleeding Air from the DCD

The DCD has two Schrader valves, one at the top and one at the bottom. The two valves provide flexibility for bottom or top chilled-water connections. Air trapped in the unit or piping must be bled from the valve at the top. Opening the lower valve releases water.

NOTICE

Risk of water release. Can cause equipment and building damage.

The Schrader valve at the top of the DCD must be used when bleeding air from the unit. Opening the lower Schrader valve will release water.

1. Find the Schrader valve at the top of the DCD, see Figure 7.8 below.
2. Depress the pin to open the valve.
3. Keep the Schrader valve open until the water coming out has no bubbles.

NOTE: When using a top connection, the commissioning valve in the hose kit is an additional bleed point. Use a bleeding apparatus to prevent water from spilling (available as a ship-loose item).

Figure 7.8 Schrader valve to bleed air from unit

8 INSTALLATION CHECKLIST AND SYSTEM FILL FOR START-UP

Checks to be Performed	Done (to be signed upon completion)	Remarks
Check device for damage upon receipt		
Install and align to server cabinet		
Flexible hoses connected (optional) properly		
Packaging removed from the Liebert DCD		
All assembly tools removed		
Bushings installed properly		
Chilled water connections leak-proof / pressure-tested		
Air bled from coil		
Chilled water flow adjusted to proper flow rate		
Condensate line connected (if applicable) and routed to a suitable drain		
Unused server space is blocked with blanking panels		
Top and bottom of server cabinet are blocked and any cable entries are sealed to minimize air leakage.		
Location	Date	Installer Signature

Customer Site Name	
Customer Site Address	
Site Contact	
Phone Number	
Installer Name	
Installer Address	
Ambient Room Temperature	°F (°C)
Room Humidity at Site of Commissioning	% Relative Humidity

Liebert DCD Serial #
Comments

Check of alignment		Yes		No
Shipping damage		Yes		No
If yes, has the shipper been notified		Yes		No
Residual packaging removed		Yes		No
Assembly tools removed		Yes		No

Building chilled water system

Chilled Water	With Glycol		Glycol Type	
	Without Glycol			
Liebert DCD				
Connected to	Building Chilled Water?		Liebert DCP™	
Chilled Water Temperature (primary)	Supply	°C	°F	
	Return	°C	°F	
Chilled Water Pressure	Supply	bar	Supply	psi
	Return	bar	Return	psi
Connection	Liebert DCD Flexible Hose			
	External Flow Regulator			
	External Isolation Valves			

Mechanical Functions

Damage to Heat Exchanger/ Connections/ Fins/Tubes/Surface		None		Existing
Remarks				
Thermodynamic Checks				
Pipe Duct Inlets/Cable Sealed		Yes		No
Remarks				
Condensed Drain Connected		Yes		No
Remarks:				
Thermodynamic Checks				
Condensate on Coil Surface		Yes		No
Remarks				
Chilled Water Entering Heat Exchanger		°F		°C
Chilled water leaving heat exchanger		°F		°C
Cabinet Temperature in Front of Heat Exchanger		°F		°C
Cabinet Temperature Behind of Heat Exchanger		°F		°C
Chilled Water System Bled		Yes		No

Chilled Water System Pressure Tested		Yes		No
Proper Chilled Water Flow Rate Set to Liebert DCD		Yes		No
Volume Flow		GPM		External
		l/m		External
Correctness of values above is hereby affirmed				
Start-up Performed By		Date	Signature	
Customer		Date	Signature	

9 USING THE DCD ACTIVE TFT DISPLAY

If the TFT model of the DCD Active fan module is installed on your DCD unit, the touch-screen provides real-time operating status details and lets you adjust and configure operational settings.

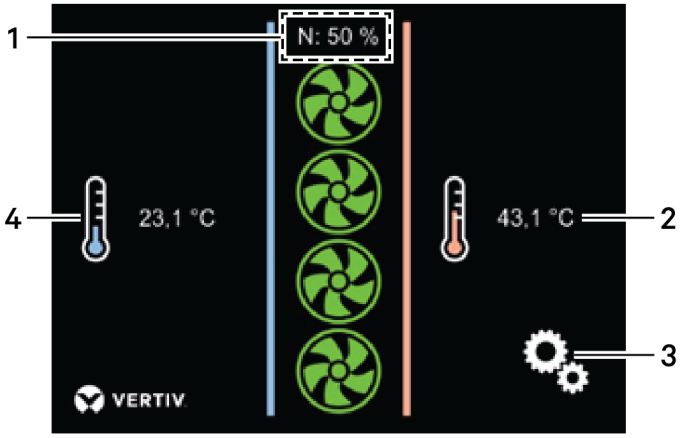
NOTE: The Standard model DCD Active offers no operating adjustments. When supplied with power, the Standard DCD Active automatically monitors differential pressure and adjusts fan speed to maintain a 0-Pa pressure differential.

9.1 Main Screen

When the DCD Active is powered, the TFT touch-screen displays the main screen, which provides a high-level status summary. Touch an area of the screen to display details of the summarized data.

Touch  on any screen to return to the previous screen.

Figure 9.1 Main screen

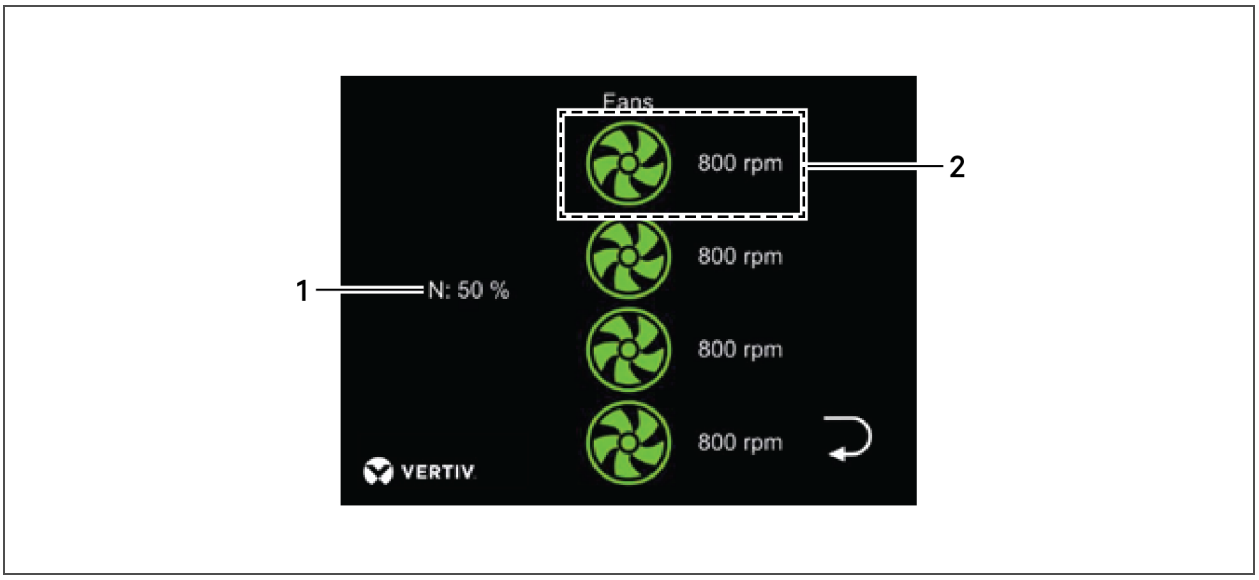


Item	Description
1	Fan-operation summary. Current fan-speed percentage and color-coded operating status. See Viewing Fan Status Detail on the next page.
2	Cabinet sensors summary. Average of temperature readings from all sensors on the hot side. See Viewing Cabinet Temperature-sensor Status on page 64.
3	Opens the settings menu. See Settings Menu on page 65
4	Exhaust-air sensors summary. Average of temperature readings from all sensors on the cold side. See Viewing Exhaust-air Sensor Status on page 63.

9.1.1 Viewing Fan Status Detail

Touch the fan-summary area on the main screen to view the fan details.

Figure 9.2 Fan Detail

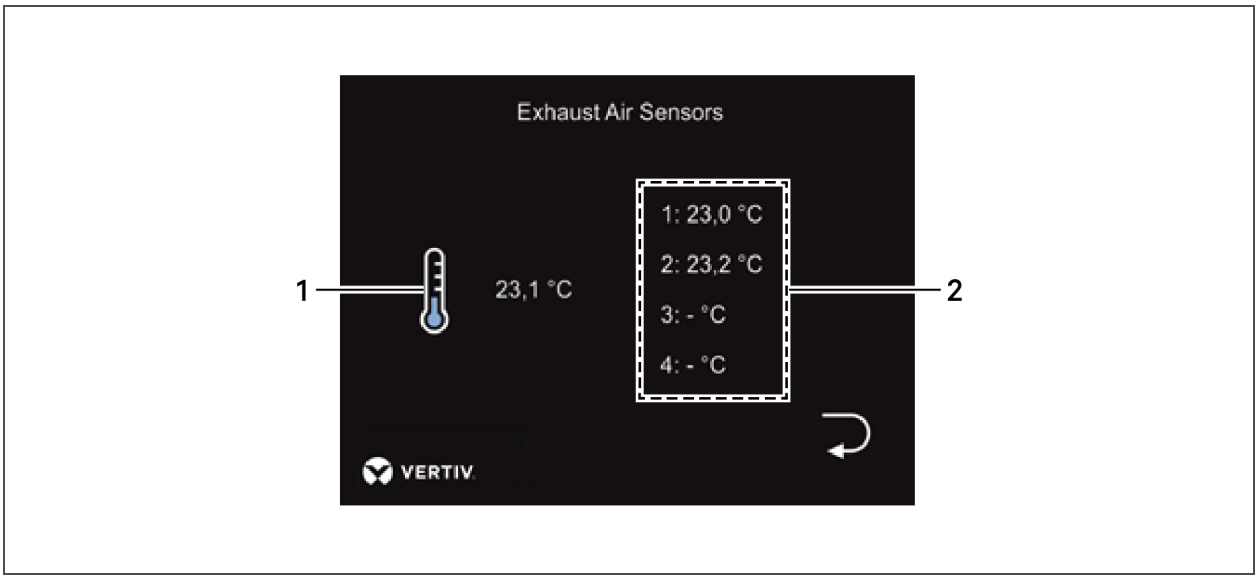


Item	Description
1	Current fan-speed operating percentage. All fans operate at the same speed.
2	Color-coded icon represents the operating status of each fan: • Green = OK • Red = Disturbance Also lists the current rotations-per-minute (rpm) for each fan.

9.1.2 Viewing Exhaust-air Sensor Status

Touch the exhaust-air-sensor summary area on the main screen to view the temperature-sensor details.

Figure 9.3 Exhaust Air Sensors detail

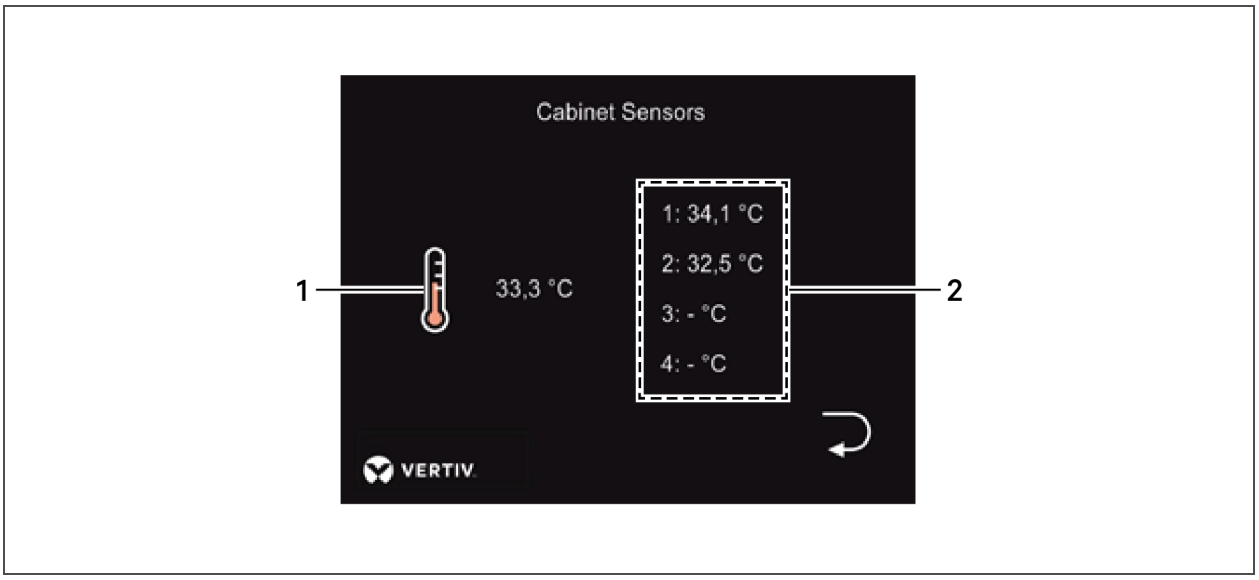


Item	Description
1	Average of all exhaust-air (cold side) temperature-sensor readings.
2	Current reading of each temperature sensor.

9.1.3 Viewing Cabinet Temperature-sensor Status

Touch the cabinet-sensor summary area on the main screen to view the temperature-sensor details.

Figure 9.4 Cabinet Sensors detail

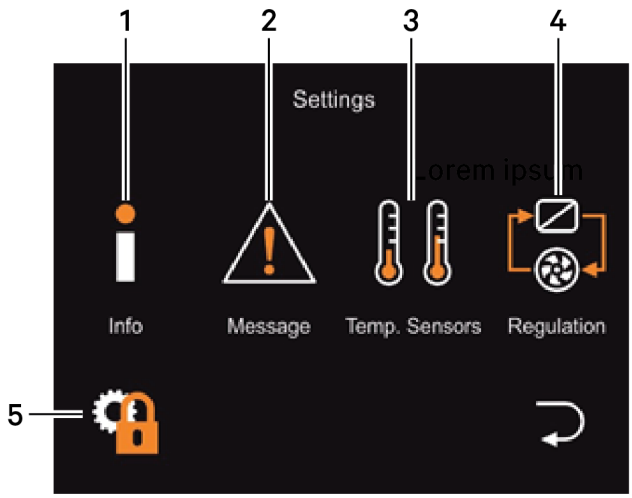


Item	Description
1	Average of all cabinet (hot side) temperature-sensor readings.
2	Current reading of each temperature sensor.

9.2 Settings Menu

The settings menu offers unit and system information and lets you configure operating parameters. Touch an icon to open the screen or sub-menu.

Figure 9.5 Settings menu



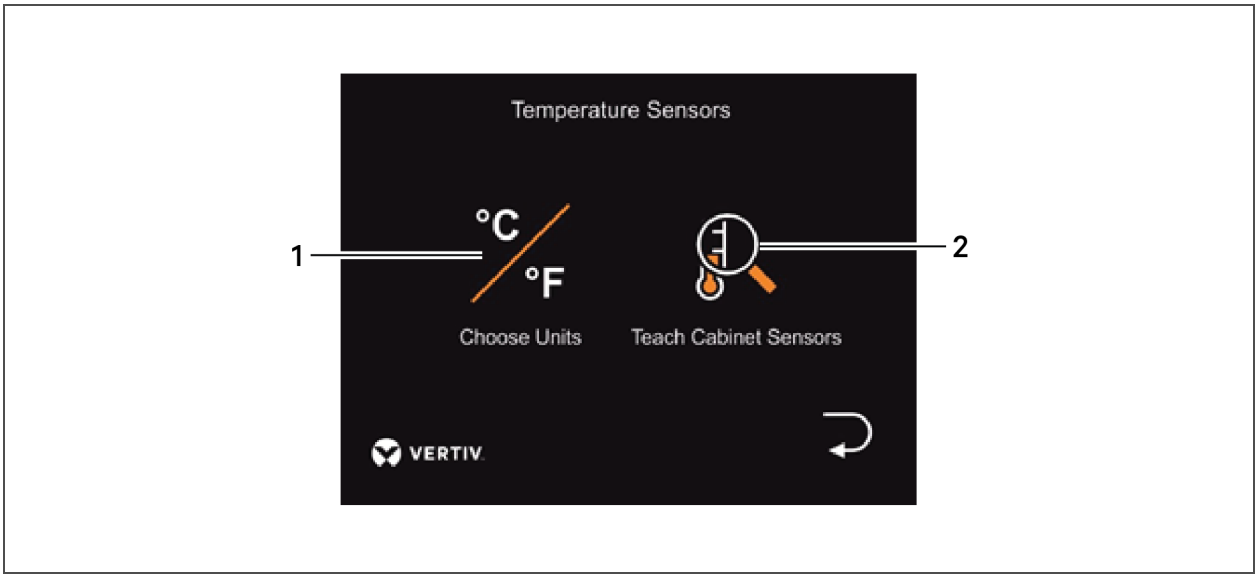
Item	Description
1	Info displays read-only system information.
2	Messages displays read-only system messages.
3	Opens the Temperature Sensors menu, see Temperature Sensors Menu on the next page
4	Opens the Regulation screen, which adjusts the differential-pressure setpoint, see Differential-pressure Regulation on the next page.
5	Opens the Set-up menu, see Set-up Menu on page 67.

9.2.1 Temperature Sensors Menu

The temperature-sensors menu lets you choose the units used for readings, and it lets you "teach" the DCD Active up to 4 cabinet temperature sensors to monitor and average, see Teaching Sensors to the DCD Active on the facing page.

NOTE: Exhaust-air temperature sensors in the DCD Active can also be "taught," but are accessed via the set-up menu. The teaching procedure is identical.

Figure 9.6 Temperature Sensors menu



Item	Description
1	Opens the Choose Units screen, see Choosing Temperature Units below.
2	Opens the Teach Cabinets Sensors screen, Teaching Sensors to the DCD Active on the facing page.

Choosing Temperature Units

To choose Celsius or Fahrenheit for the temperatures readings, open the Choose Units screen, and touch to check the box of the temperature unit to use.

9.2.2 Differential-pressure Regulation

Regulation lets you choose the way DCD Active manages the differential pressure by selecting a differential-pressure setpoint.

Touch the –/+ buttons to select one of the following pressure setpoints:

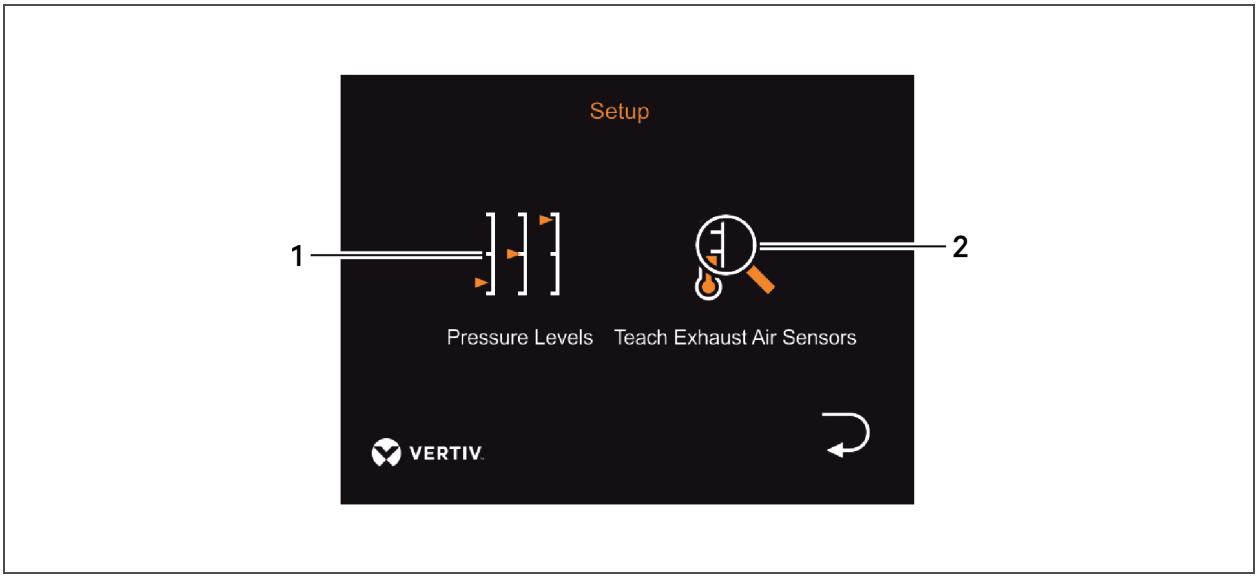
- Slight excess pressure
- Neutral
- Slight under pressure

9.2.3 Set-up Menu

The password-protected set-up menu lets you set the pressure level maintained by the selection for differential-pressure setpoint, see Differential-pressure Regulation on the previous page, and it lets you "teach" the DCD Active up to 4 exhaust-air temperature sensors to monitor and average, see Teaching Sensors to the DCD Active below.

Default password = 94424

Figure 9.7 Set-up menu



Item	Description
1	Opens Pressure Levels screen, see Setting Levels for the Differential Pressure Setpoint below.
2	Opens Teach Exhaust Air Sensors screen, see Teaching Sensors to the DCD Active below.

Setting Levels for the Differential Pressure Setpoint

Touch the –/+ buttons to select the pressure (Pa) that DCD Active maintains for the differential-pressure setpoint chosen in the Regulation screen, see Differential-pressure Regulation on the previous page:

- Low positive = Slight excess pressure
- Neutral = Neutral
- Low negative = Slight under pressure

Teaching Sensors to the DCD Active

The DCD Active can communicate with up-to 4 (optional) temperature sensors in the cabinet and up-to 4 (optional) exhaust-air temperature sensors inside the DCD Active. When taught, each sensor is assigned a number, 1 to 4, and DCD Active "learns" or "remembers" that sensor and uses it for averages and status readings.

Though accessed through separate menus, the teaching procedure is identical.

NOTE: Only the sensor being configured may be connected during the teaching procedure. Once taught, the may be disconnected, and will be recognized.

Figure 9.8 Teach-sensor screens

To teach a sensor to the DCD Active:

1. Disconnect all sensors, except the sensor to configure.
2. For a cabinet sensor, open the teach-sensor screen via the Settings > Temperature Sensors menu.
   – or –
   For an exhaust-air sensor, open the teach-sensor screen via the Settings > Set-up menu.
3. Use *–/+* to assign a number, 1 to 4, to the sensor, the touch the magnifying-glass to begin teaching.
4. Touch *OK* after confirming that a single sensor is connected.
   The DCD Active takes a few seconds to locate the sensor, and the temperature reading from the sensor displays when the connection is complete.
   - To delete a learned sensor, disconnect the sensor, select its number, and complete the teaching procedure. The number is no longer associated with the sensor.
   - To re-assign a number, connect a new/different sensor, select the number, and complete the teaching procedure. The number is assigned to the connected sensor.
5. Reconnect all the configured sensors, which begin communicating temperature data because the DCD active "remembers" them.

10 MAINTENANCE

CAUTION: Risk of improper repair and maintenance. Can cause reduced unit performance, equipment damage and injury.
All maintenance and repair jobs must be performed by properly trained and qualified personnel. All actions must be in accordance with regulations and the manufacturer's instructions. Use only Vertiv-approved tools and parts for maintenance and repair.

NOTICE

Risk of dirty heat exchanger. Can cause reduced unit performance (increased pressure drop or poor heat transfer).

Clean the heat exchanger fins with a vacuum cleaner, soft brush or compressed air.

10.1 General Maintenance

1. Check the heat exchanger for dirt and debris.
2. Check function of the isolation valves.
3. Check the chilled-water system for leaks.

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APPENDICES

Appendix A: Technical Support and Contacts

A.1 Technical Support/Service in the United States

Vertiv™ Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

Liebert® Thermal Management Products

1-800-543-2778

Liebert® Channel Products

1-800-222-5877

Liebert® AC and DC Power Products

1-800-543-2378

A.2 Locations

United States

Vertiv Headquarters

1050 Dearborn Drive

Columbus, OH, 43085, USA

Europe

Via Leonardo Da Vinci 8 Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

Asia

7/F, Dah Sing Financial Centre

3108 Gloucester Road

Wanchai, Hong Kong

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Appendix B: Specifications

Table B.1 Liebert DCD Specifications

Model:	35	50
Housing Material	Steel Plate	
Coil Material	Copper Tubes and Aluminum Fins	
Ambient Operating Temperature °F (°C)	50 - 95 (10 - 35)	
Maximum Capacity	35 kw	50 kw
Maximum Absolute Humidity	8 g/kg	
Dimensions, Door Only		
Height, in. (mm)	78-3/4 (2000)	
Width, in. (mm)	23-5/8 (600)	31.5 (800)
Depth, in. (mm)	6 (151)	
Shipping Dimensions		
Height, in. (mm)	24" (610)	
Width, in. (mm)	36" (914)	
Depth, in. (mm)	91 (2311)	
Weight, lb (kg)		
Unit Only	210 (95.2)	230 (104.3)
Shipping	325 (147.4)	355 (161.0)
Chilled Water Connections		
Chilled Water Supply	1" NPT *Connections at the door are 1" BPT. Connections to field-installed header are 1" NPT with required BPT/NPT adapter.	
Chilled Water Return	1" NPT	
Maximum Operating Pressure bar (psi)	145 (10)	
Exterior Finish	Black Matte, Heat-Fused Powder Coat	
Safety	CSA Approved	

Table B.2 Replacement parts

Part Name	Part #	Quantity Required per Unit
Replacement Parts		
Swivel cover with slotted hole labeled "1"	080142908000001	1
Swivel cover with slotted hole labeled "2"	08042908000001	1
Swivel cover with slotted hole labeled "3"	080142928000001	1
Swivel cover with slotted hole labeled "4"	08014292800002	1
Self-Adhesive Foam	080144909	1
Condensate Hose Adapter	080090620	1
Spring Nuts	000782699	16
Diamond Nuts	000770869	7
Grounding Wire	000797999	1
	000798169	1

B.1 Capacity Performance for DCD35 Models

Figure B.1 DCD35 Performance @ 5.2 m^3/h

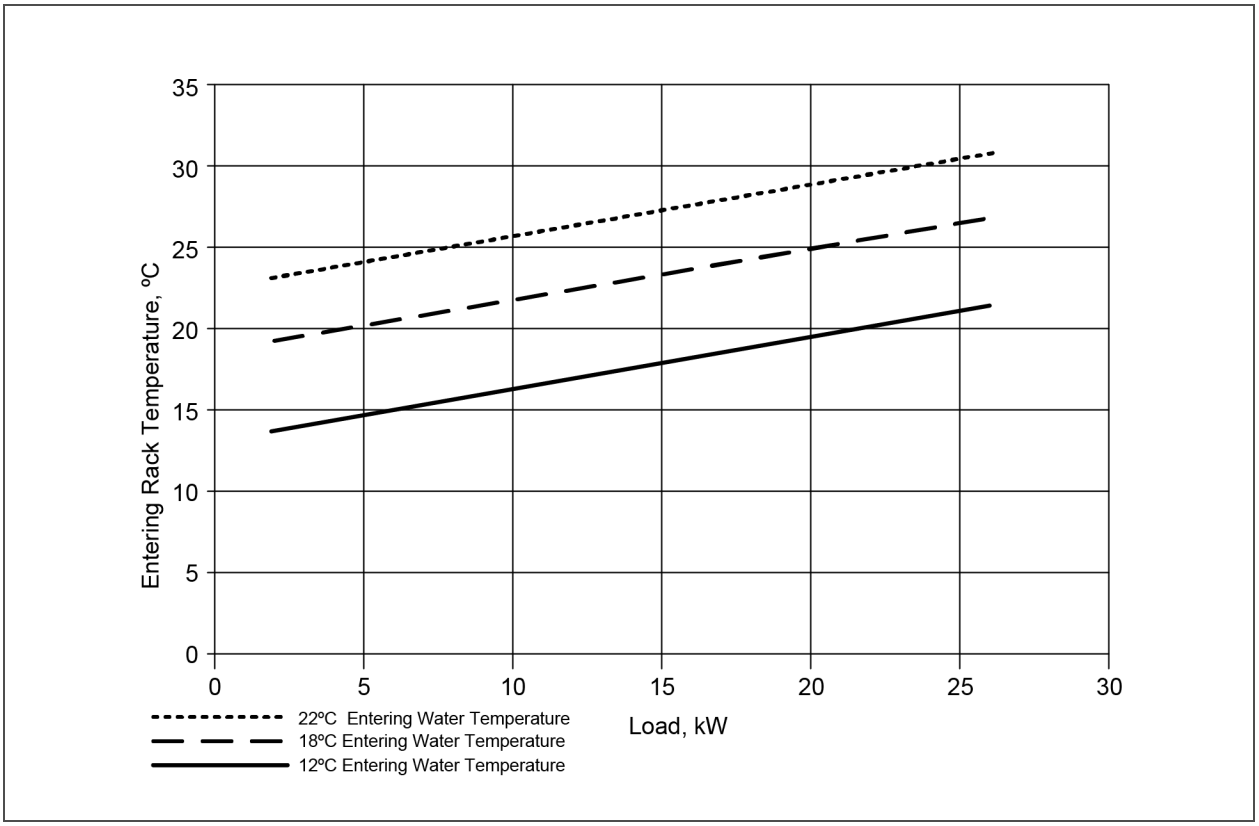


Figure B.2 DCD35 Performance @ 22.9 US GPM

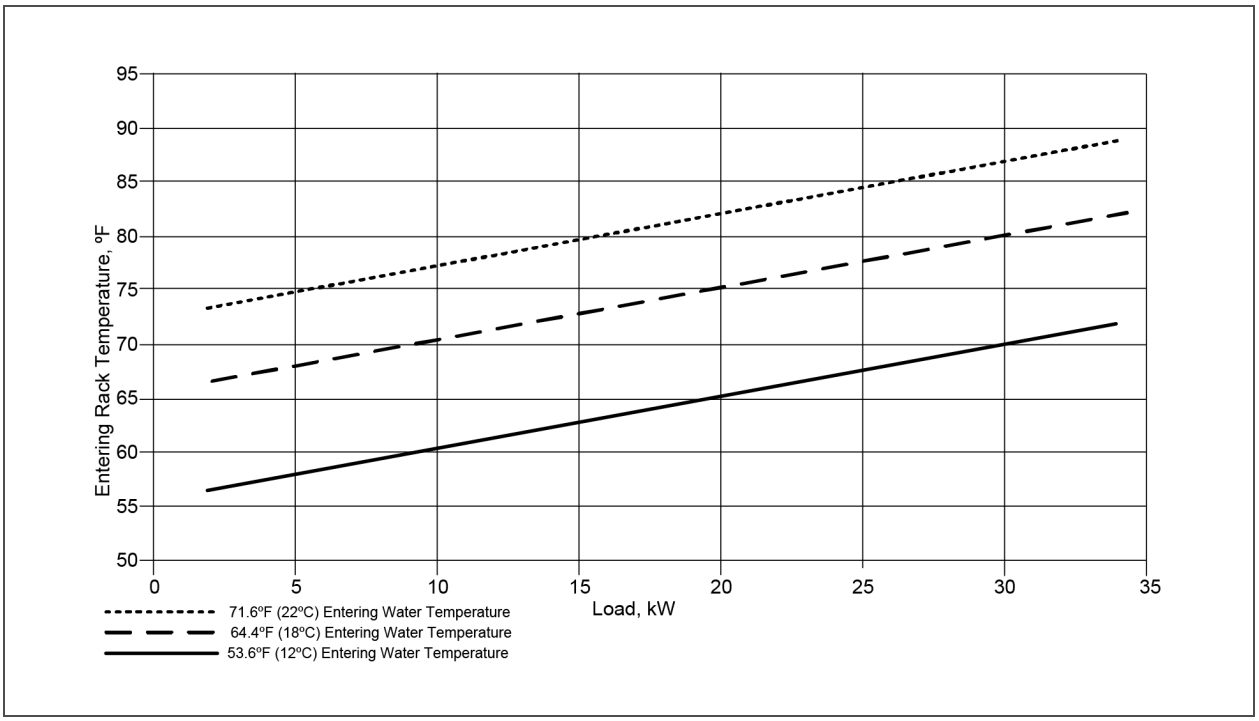


Figure B.3 DCD35 Performance @ 3.5 m^3/h

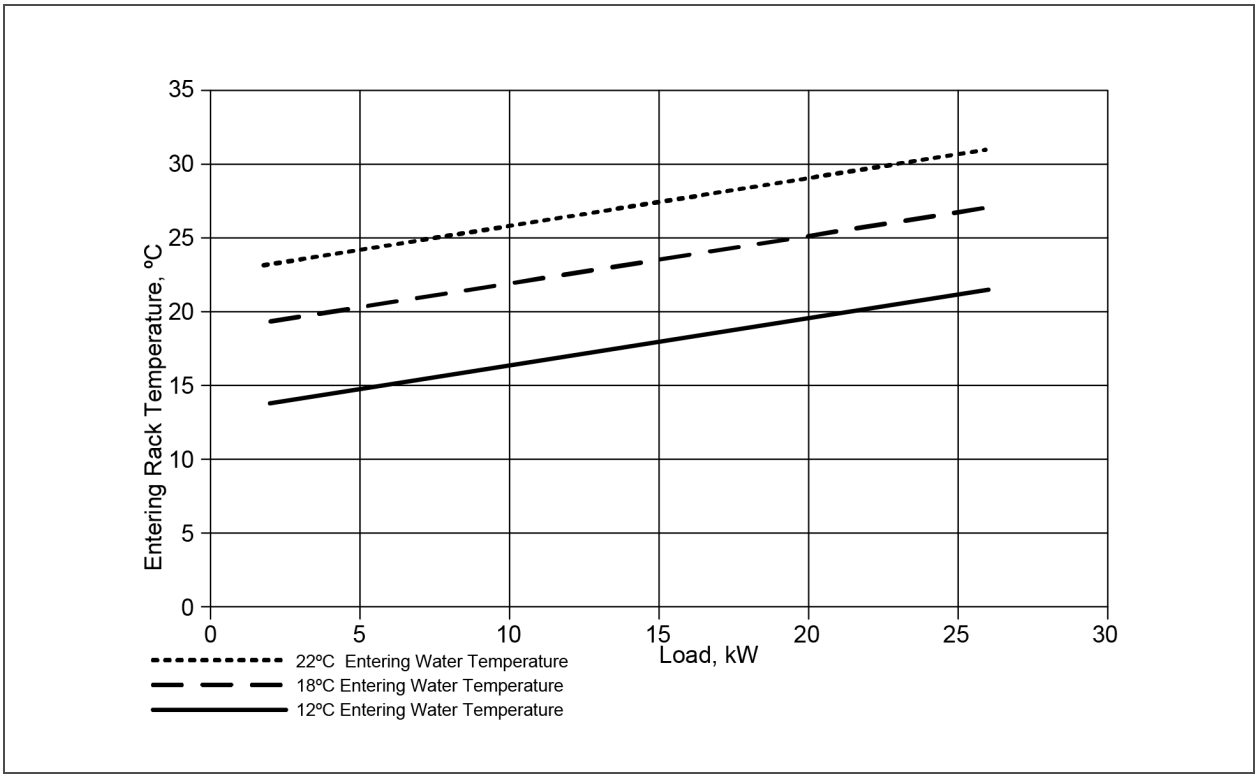


Figure B.4 DCD35 Performance @ 15.4 US GPM

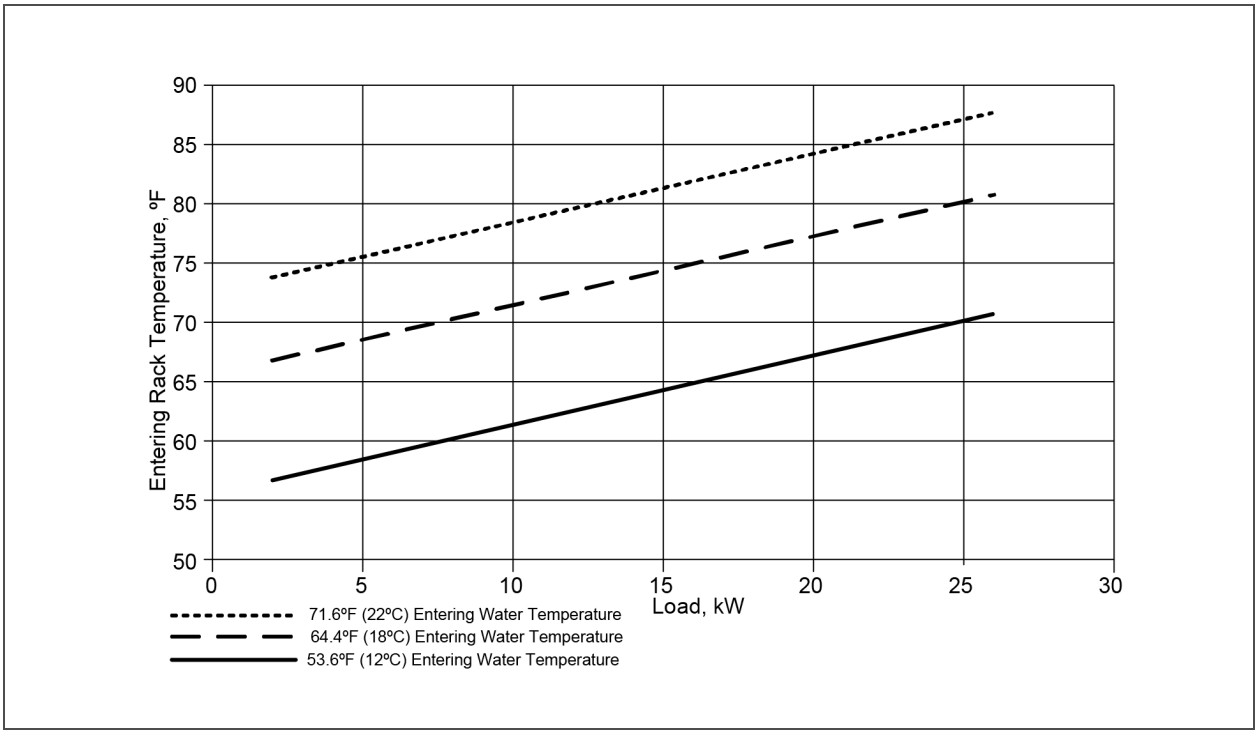


Figure B.5 DCD35 Performance @ 1.8 m^3/h

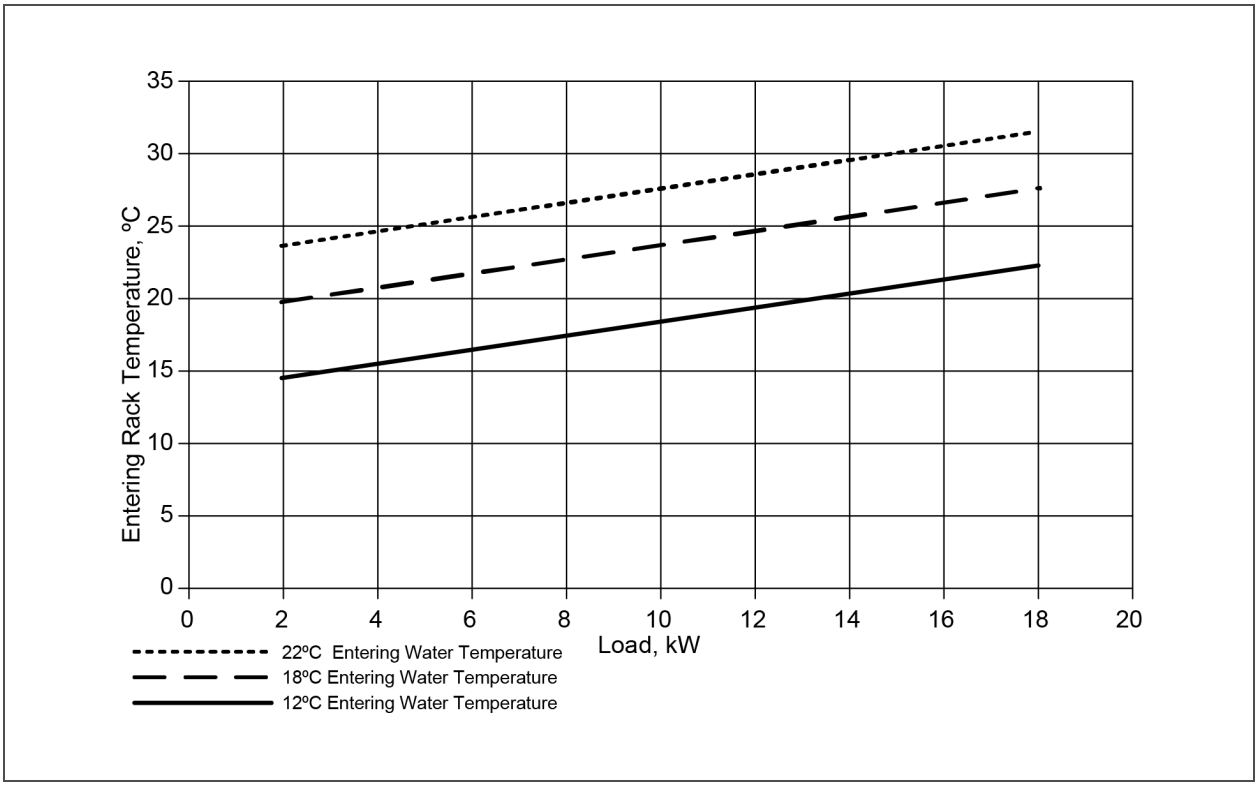


Figure B.6 DCD35 Performance @ 7.9 US GPM

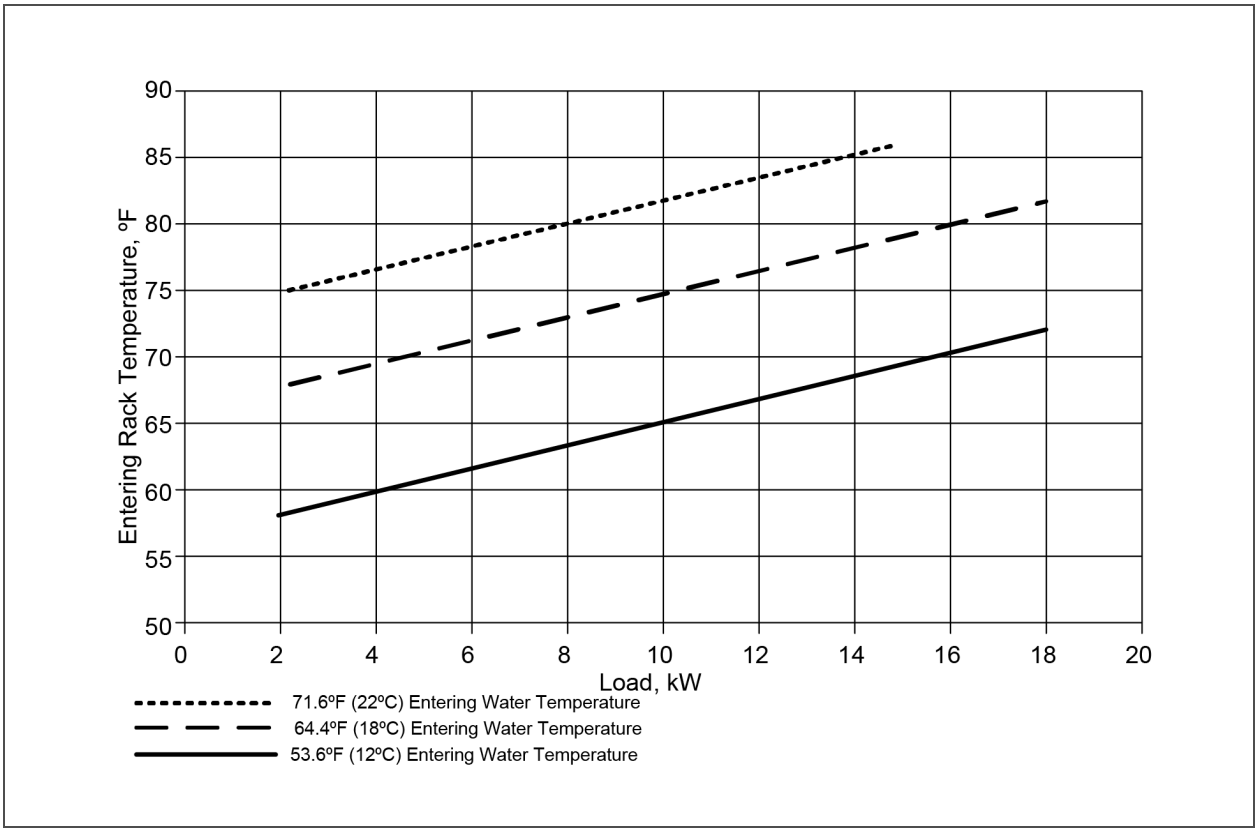


Figure B.7 DCD35 Air-side pressure drop

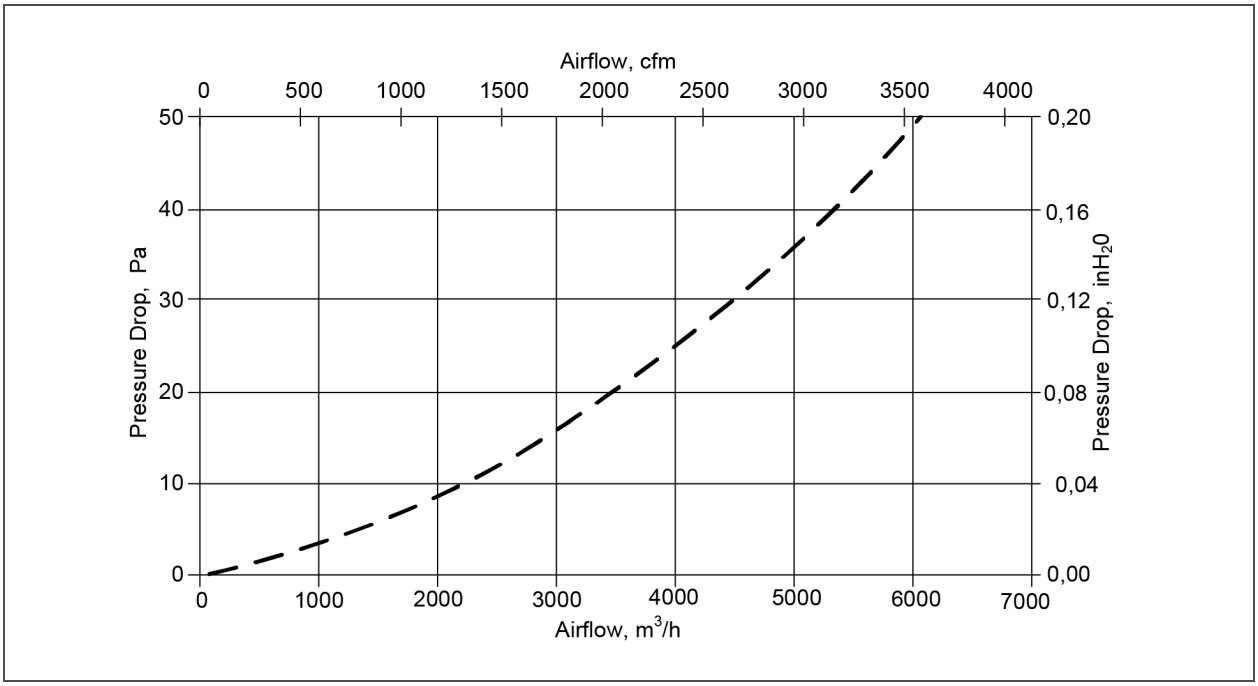
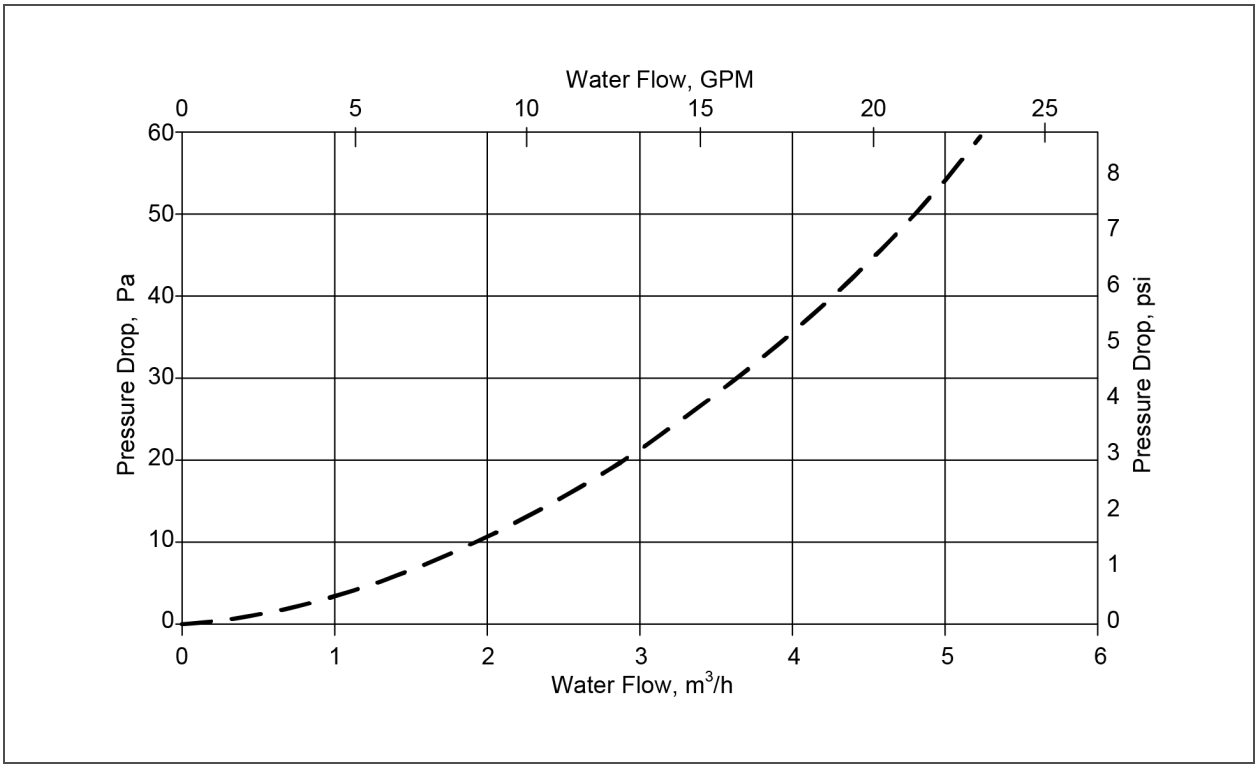


Figure B.8 DCD35 Water-side pressure drop



B.2 Capacity Performance for DCD50 Models

Figure B.9 DCD50 Performance @ 31.7 US GPM

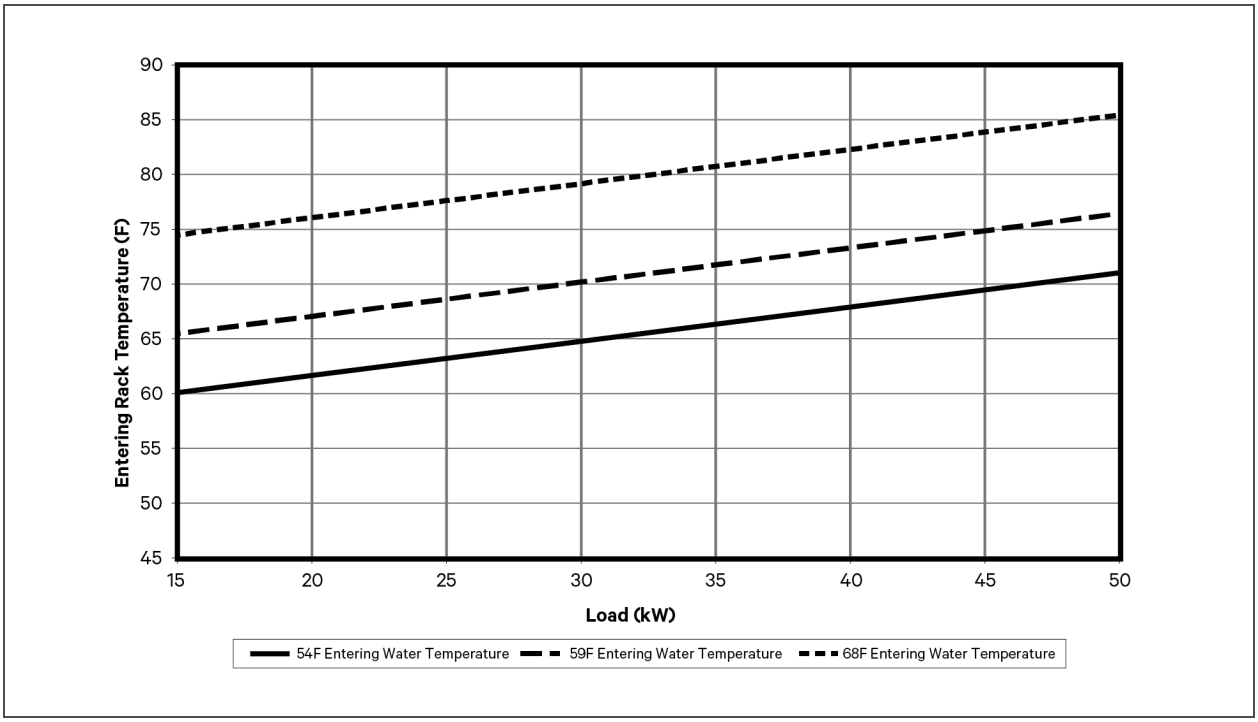


Figure B.10 DCD50 Performance @ 22.0 US GPM

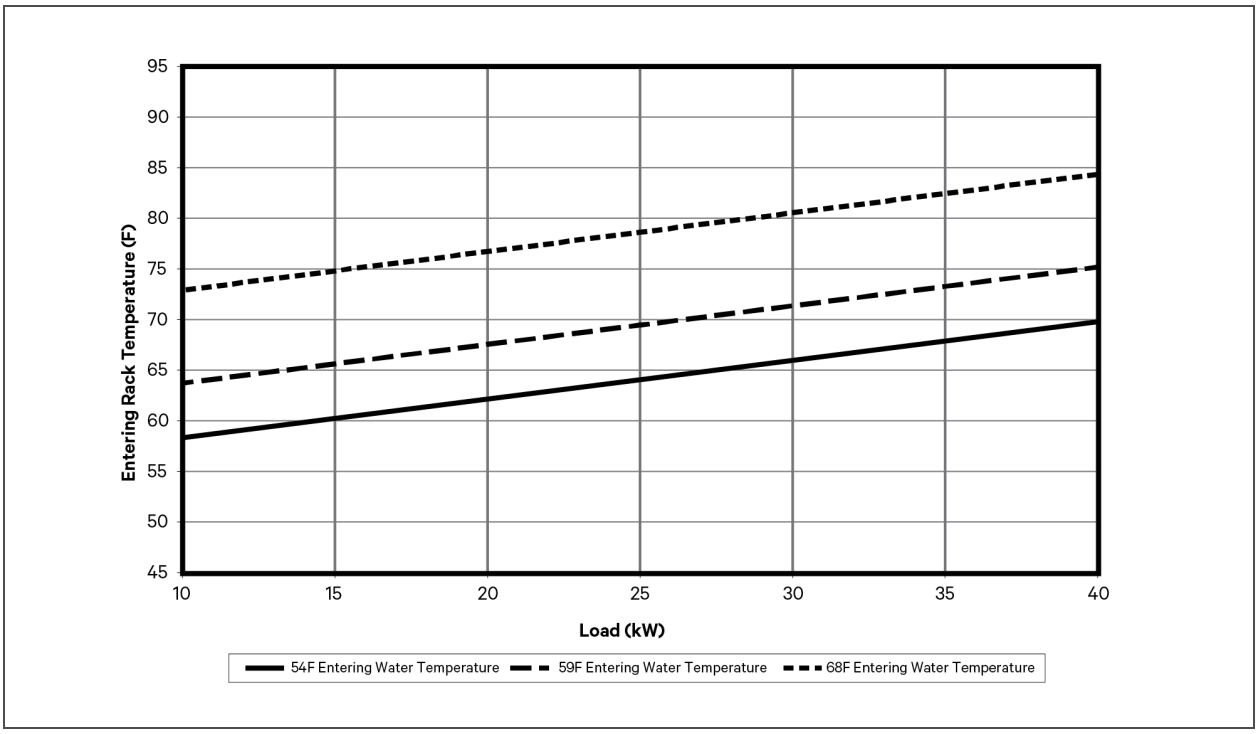


Figure B.11 DCD50 Performance @ 12.9 US GPM

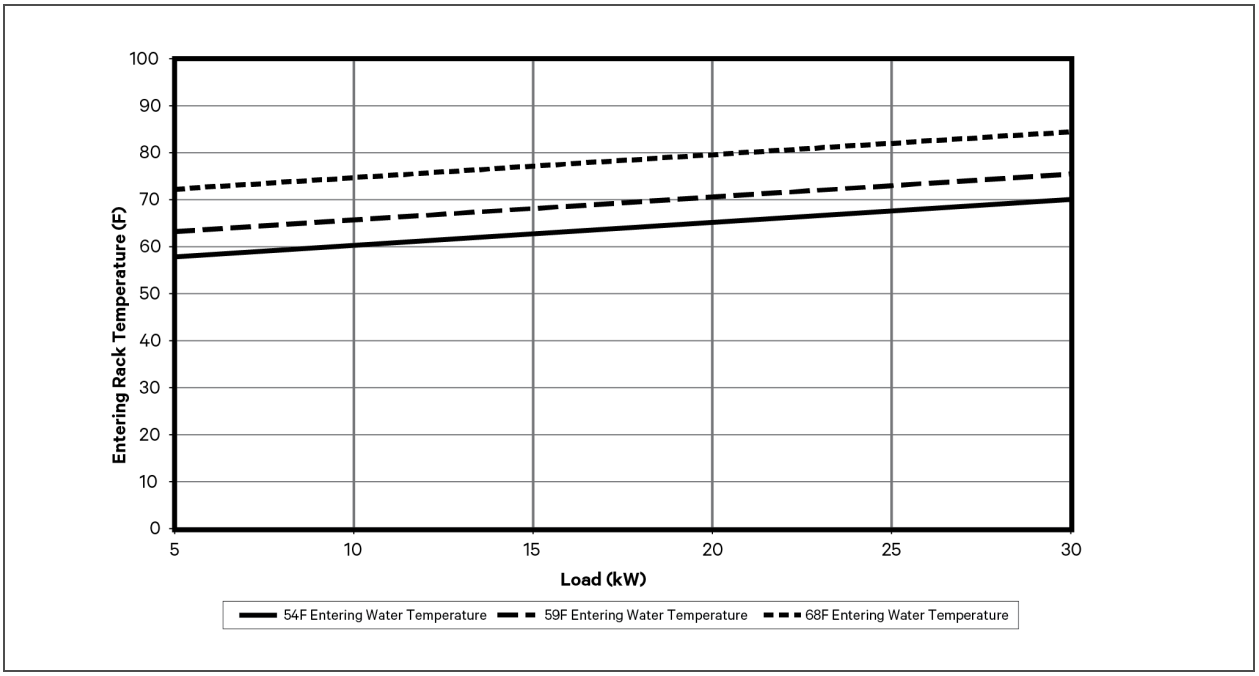


Figure B.12 DCD50 Air-side pressure drop (H2O)

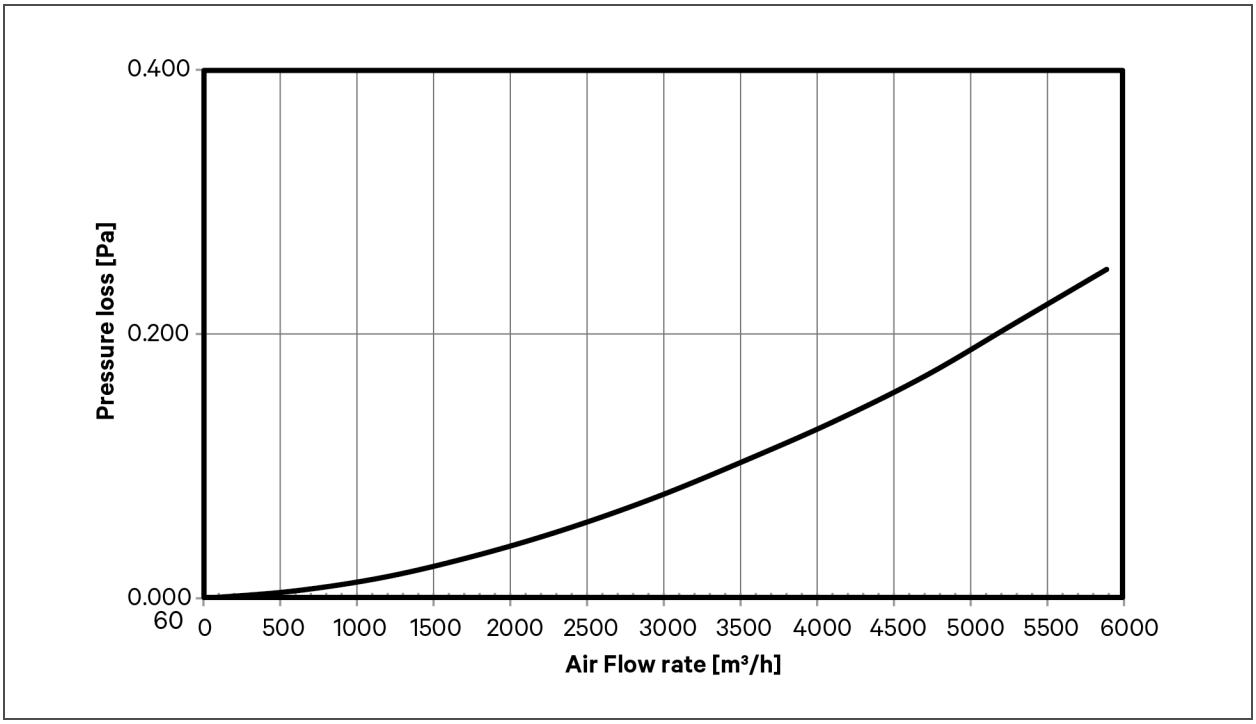


Figure B.13 DCD50 Air-side pressure drop (Pa)

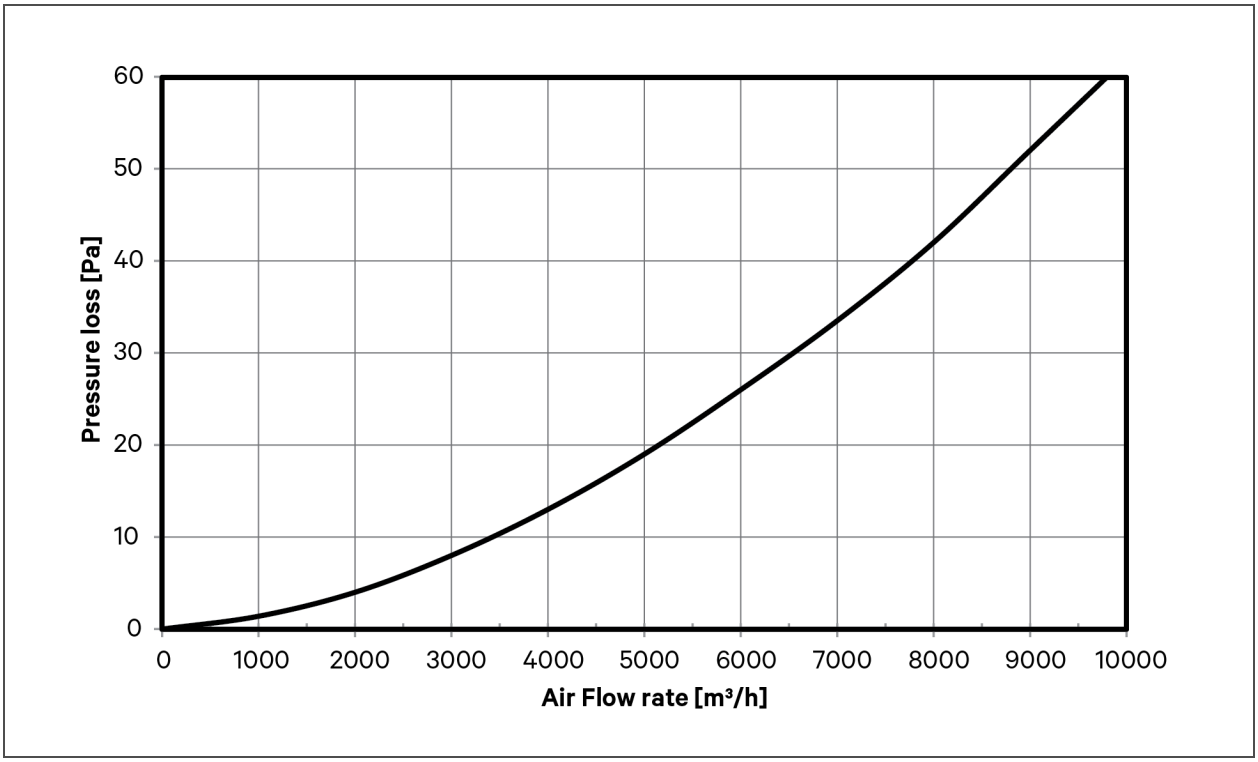


Figure B.14 DCD50 Water-side pressure drop (psi)

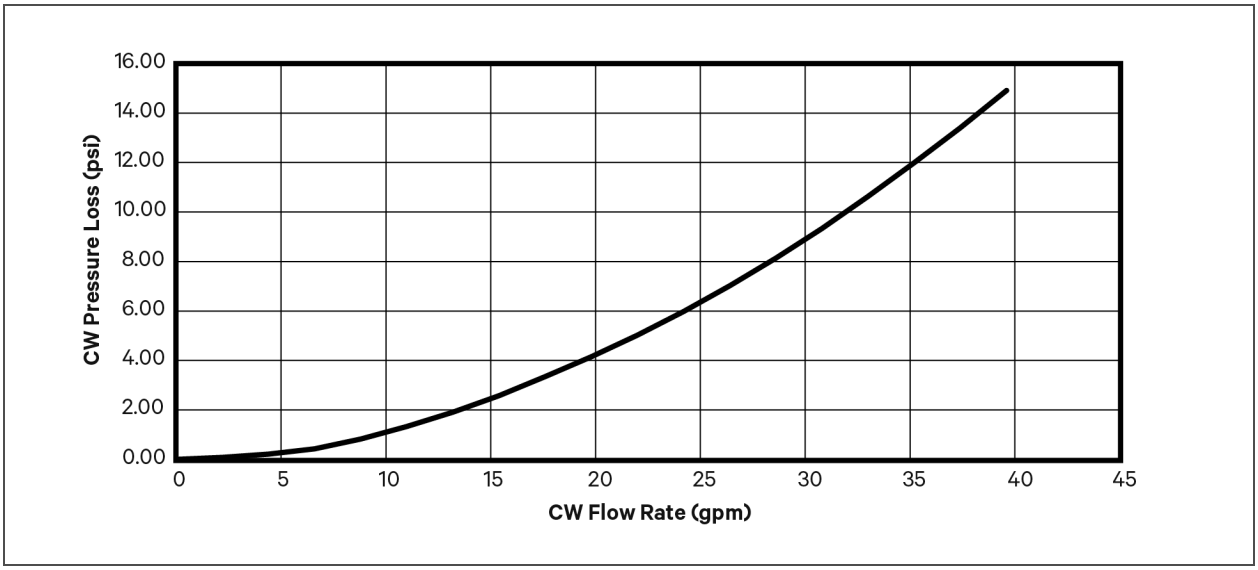


Figure B.15 DCD50 Water-side pressure drop (kPa)

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Appendix C: Submittal Drawings

The submittal drawings are in the order of document part number (DPN). Table C.1 below, groups the drawings by topic/application.

Table C.1 Submittal-drawings Contents

Document Number	Title
Planning Dimensions	
DPN004112	Dimensional Data, DCD35
DPN004113	Dimensional Data, DCD50
DPN004114	Rack-adapter kit components
Piping Connections	
DPN004233	Supply-/Return-hose kit

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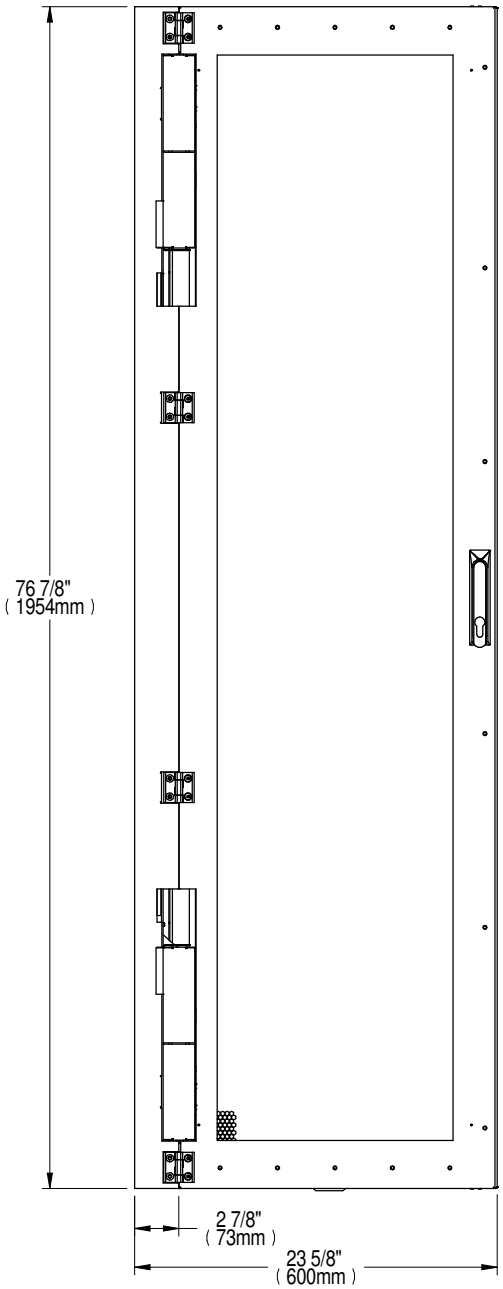
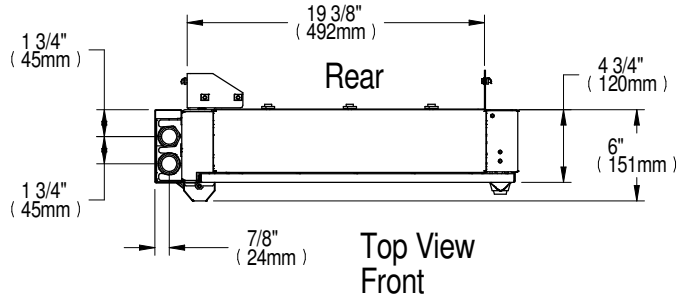
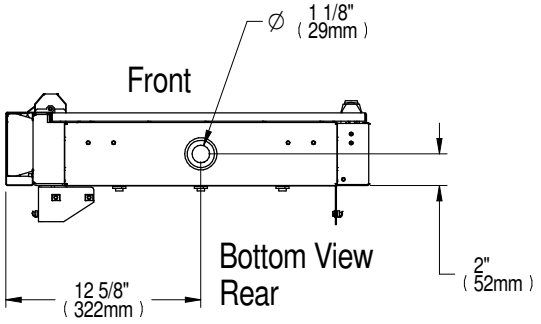
DIMENSIONAL DATA
REAR RACK COOLER DCD35 PASSIVE

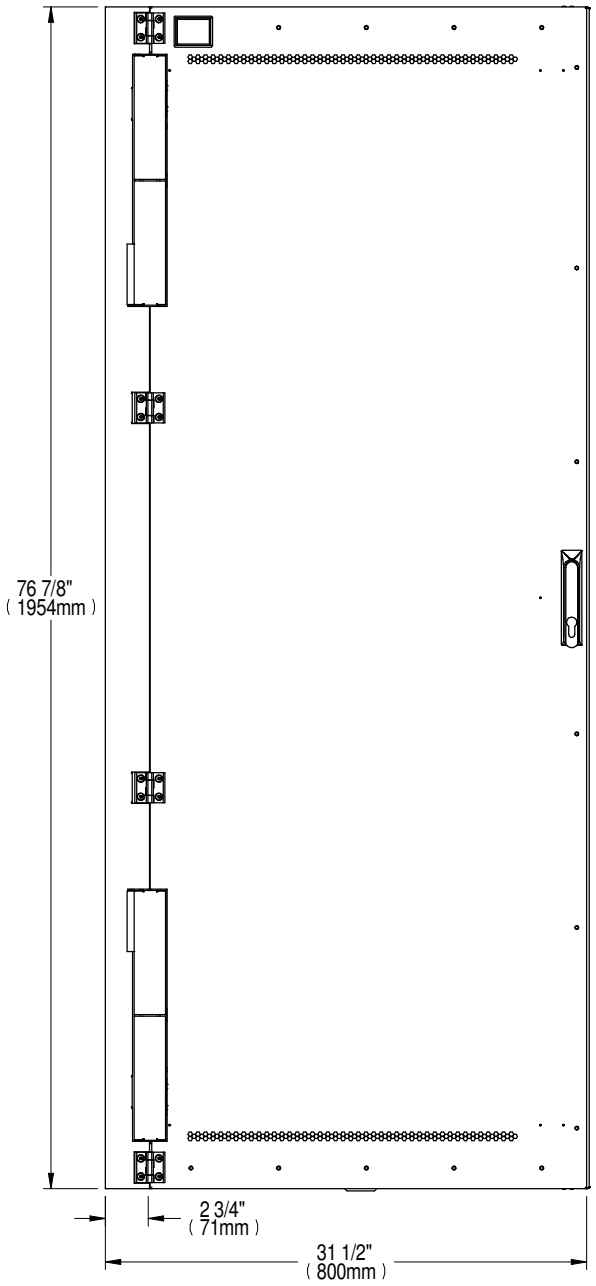


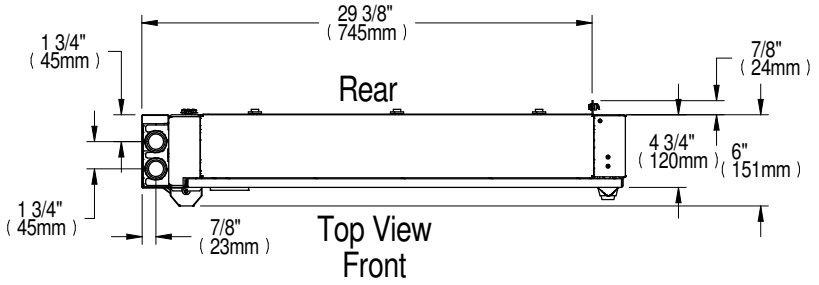


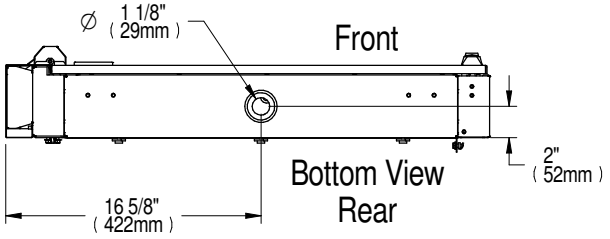


FRAME DIMENSIONAL DATA

REAR RACK COOLER DCD50 PASSIVE

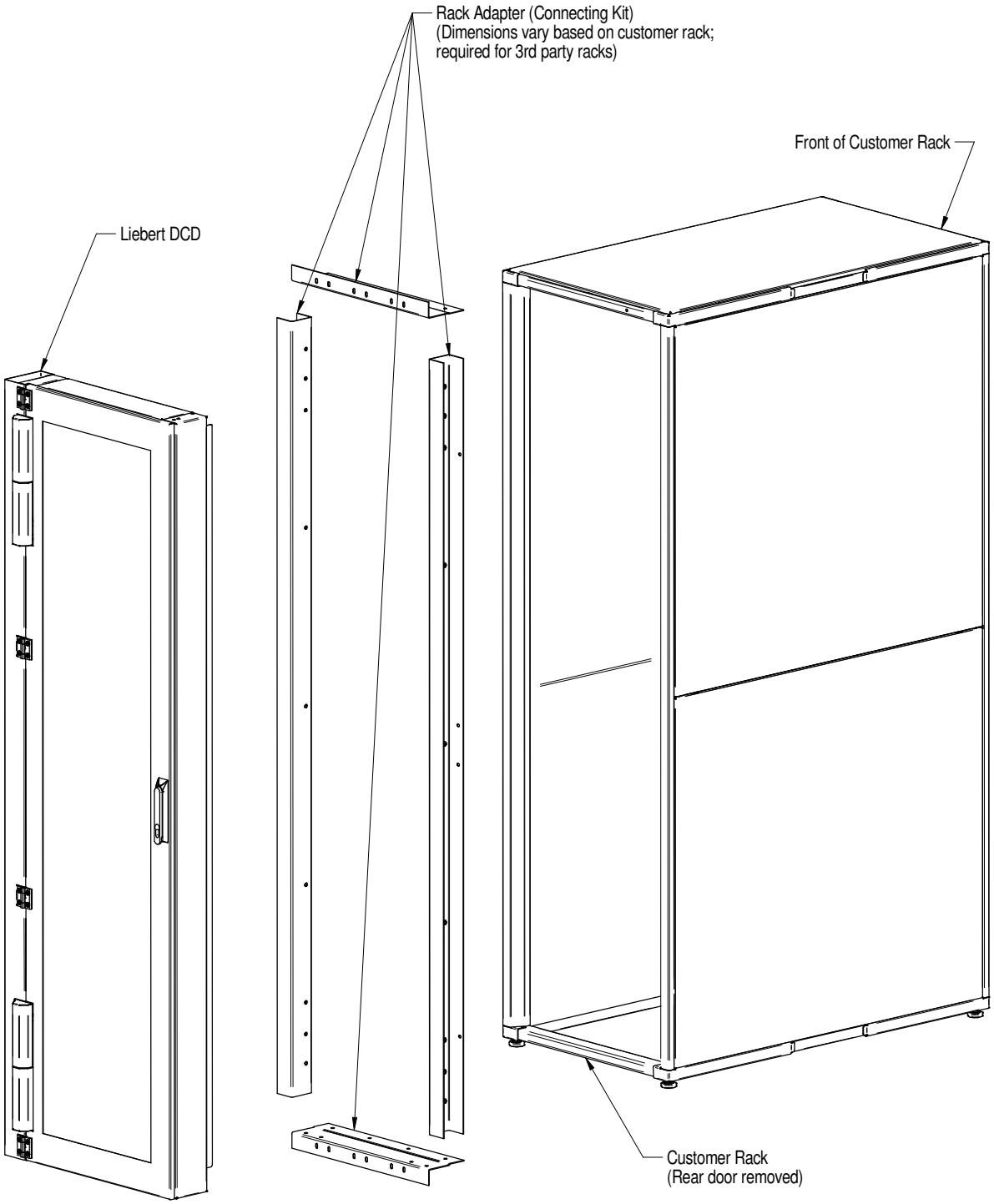






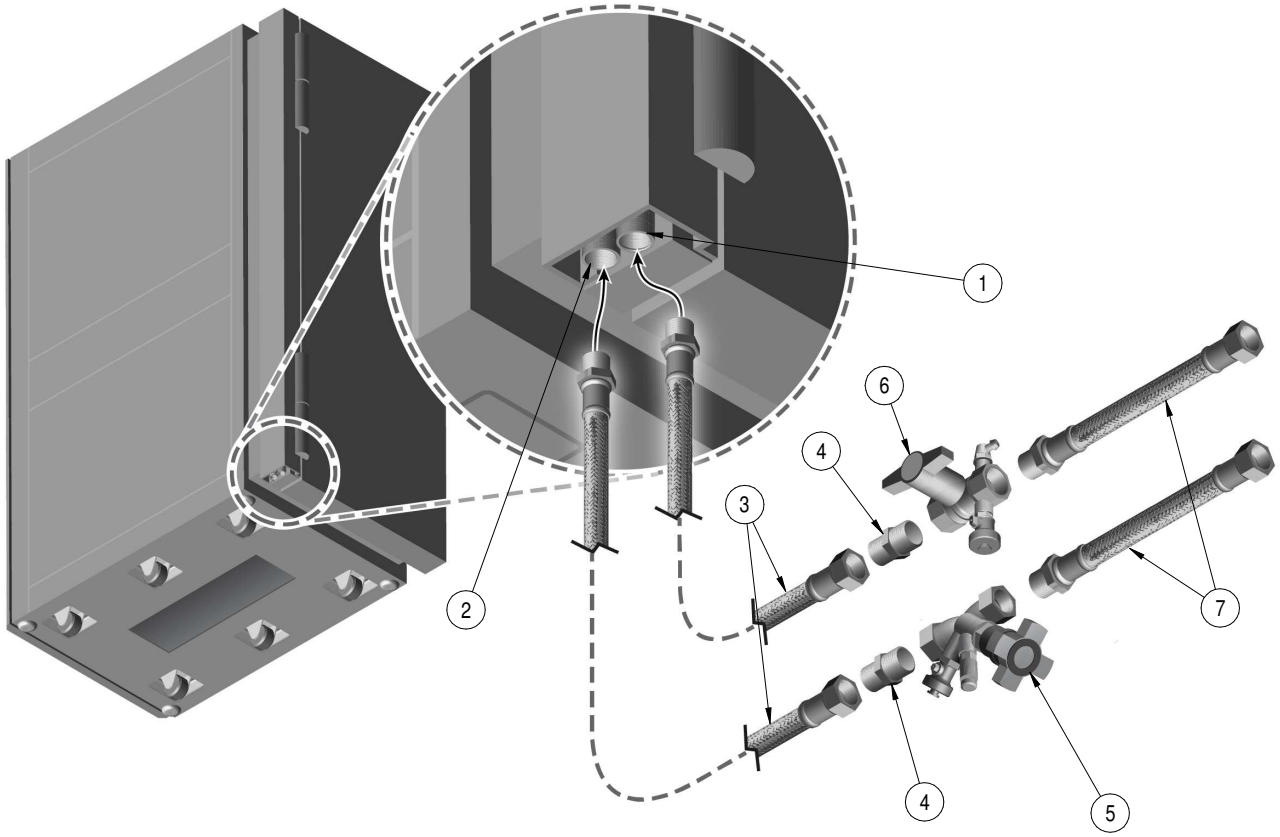
LIEBERT DCD

CUSTOMER RACK ADAPTER KIT
REAR RACK COOLER



LIEBERT DCD

COMPONENT LOCATION
SUPPLY AND RETURN HOSE KIT BOTTOM PIPING CONNECTIONS (LEFT HINGE)

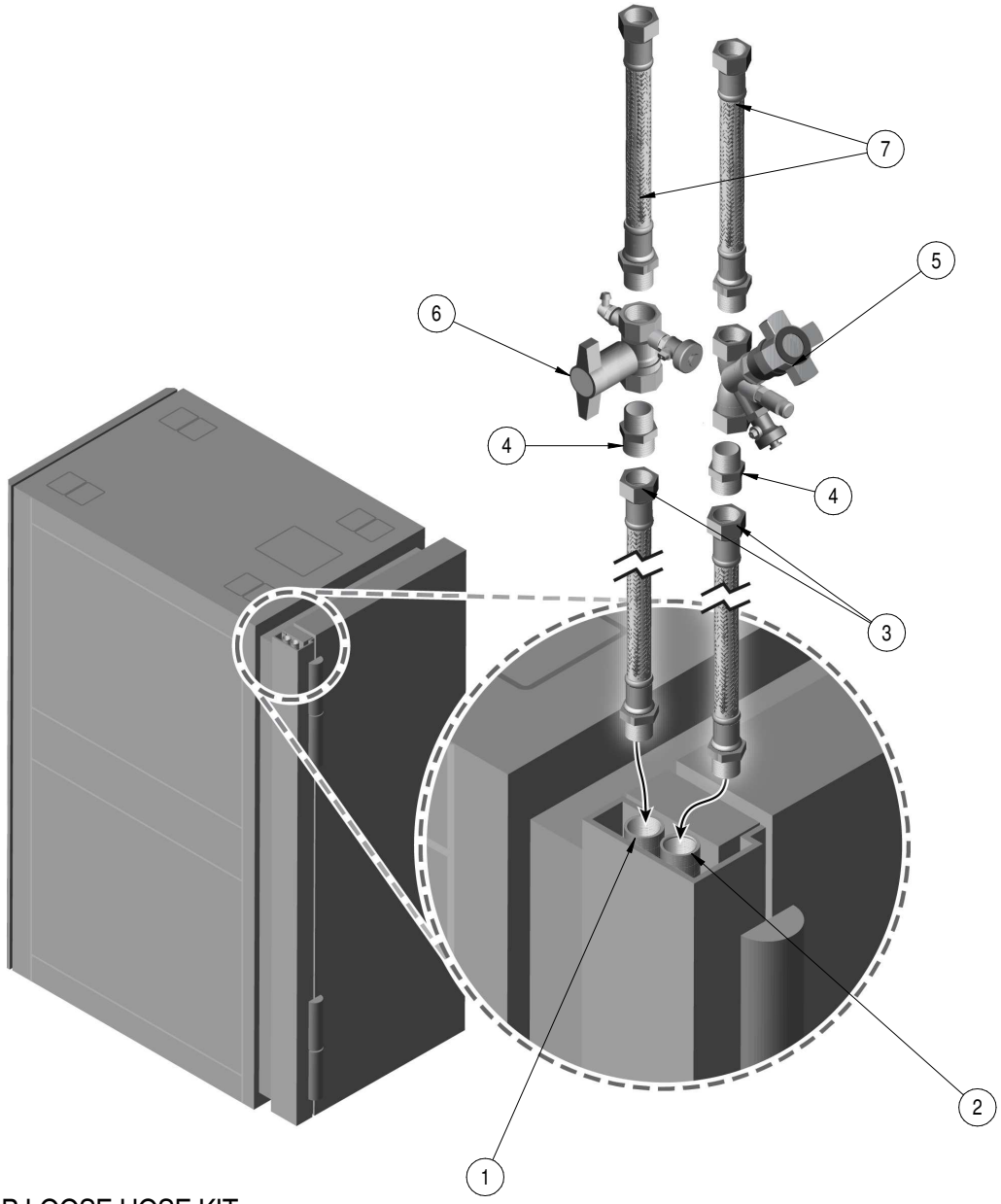


INCLUDED IN SHIP LOOSE HOSE KIT
1. DCD Supply Water Connection
2. DCD Return Water Connection
3. Flex Metal Hose (Available in 59"(1500mm))
4. Male to Male Nipple (Loctite 5776 is required to seal adapter [items 4 & 5, and 4 & 6])
5. Manual Valve Assembly (Return Side)
6. Shut Off Valve Assembly (Supply Side)

ADDITIONAL SHIP LOOSE ITEM
7. BPT to 1" NPT nipple adapter or optional 300mm (12") hose adapter (Connect to field installed supply and return header)

COMPONENT LOCATION

SUPPLY AND RETURN HOSE KIT TOP PIPING CONNECTIONS (LEFT HINGE)



INCLUDED IN SHIP LOOSE HOSE KIT
1. DCD Supply Water Connection
2. DCD Return Water Connection
3. Flex Metal Hose (Available in 59"(1500mm))
4. Male to Male Nipple (Loctite 5776 is required to seal adapter into [items 4 & 5, and 4 & 6])
5. Manual Valve Assembly (Return Side)
6. Shut Off Valve Assembly (Supply Side)

ADDITIONAL SHIP LOOSE ITEM
7. BPT to 1" NPT nipple adapter or optional 300mm (12") hose adapter (Connect to field installed supply and return header)

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