



SmartRow™ DCR™

Installer/User Guide

3 to 6 Rack 20-kW (N/(N + 1)) and 5 to 10 Rack 36-kW (N) Cooling Units,
60 Hz

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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 instructions that must be closely followed during installation of this unit to maintain compliance with agency listings. Read all safety and operating instructions before attempting to operate the SmartRow DCR. Adhere to all warnings on the unit and in this manual. Follow all operating and user instructions.

This product is designed for commercial / industrial use only. This product is not intended for use with life support or other U.S. FDA designated “critical” devices. Maximum loads must not exceed those specified in this manual.

Install in a clean environment, free from moisture, flammable liquids, gases and corrosive substances. Operate this product in an indoor environment at an ambient temperature between 35°F and 85°F (1.6°C to 29°C). Additionally, units using a remote condenser must be operated at outdoor ambient temperatures of:


- MC condensers—above 0°F (18°C)
- Lee-Temp™ condensers—above -20°F (-29°C)


This product must be connected to and powered by suitable AC supplies, rated in accordance with the unit’s serial tag. It must be properly grounded and protected by circuit breakers or fuses.

The SmartRow DCR must be installed on a flat, level surface for proper assembly and operation.

We recommend using shielded cables for all external communication interfaces.

Ensure that the SmartRow DCR has proper ventilation. Never block or insert objects into the ventilation holes or other openings. Maintain minimum clearances as specified in this manual (see [Clearance Requirements](#) on page 11 and [Unit Dimensions, Weights, and Wiring Tables](#) on page 72).

 **WARNING! Risk of top-heavy unit falling over. Improper handling can cause equipment damage, injury or death. Only properly trained and qualified personnel wearing appropriate OSHA-approved personal protection equipment (PPE) should attempt to move, lift, remove packaging from or prepare unit for installation. Read all instructions before attempting to move, lift, remove packaging from or prepare the unit for installation.**

 **WARNING! Risk of improper moving and handling. Can cause equipment damage, injury or death. The PDX/PCW weighs more than 600 lb. (272 kg). If a lifting device is used to move the PDX/PCW, ensure that it is rated to handle its weight. If personnel will move the unit manually, ensure that an adequate number of properly trained and qualified personnel wearing appropriate OSHA-approved PPE are used. Read all instructions before beginning.**









 **WARNING! Risk of top-heavy unit falling over. Improper handling, lifting, and moving can cause equipment damage, injury or death. The DCR Control Panel and Fire Suppression System weighs more than 413 lb (187 kg). If a lifting device is used to move the DCR Control Panel and Fire Suppression System, verify that it is rated for the combined system weight specified above. If personnel will move the unit manually, verify that an adequate number of personnel are used. Only properly trained and qualified personnel wearing OSHA-approved PPE should attempt to move, lift, remove packaging from or prepare the unit for installation. Read all instructions before attempting to move, lift, remove packaging from or prepare unit for installation.**

Table 1.1 Glossary of Symbols

Symbol	Description
	Hazardous voltage present
	Indicates caution followed by important instructions
	Requests the user to consult the manual
	Indicates weight
	Equipment grounding conductor
	Bonded to ground
	Alternating-current (AC) voltage

2 INTRODUCTION

The SmartRow DCR is an integrated component of the SmartRow™ offering from Vertiv. The system includes a closed-loop, integrated cooling system and fire suppression. Assembly is a matter of connecting the plenums and cabinets, then making electrical and piping connections.

The SmartRow DCR is available in three basic cooling configurations:

- 20-kW (N) Configuration—3- to 6-rack system capable of removing up to 20 kW of heat (single PDX/PCW).
- 20-kW (N+1) Configuration—3- to 6-rack system capable of removing up to 20 kW of heat (redundant PDX/PCW).
- 36-kW (N) Configuration—5- to 10-rack system capable of removing up to 36 kW of heat (dual PDX/PCWs).

Each configuration has different requirements and recommendations for setup and operation. Those requirements are integral to effective operation of a SmartRow DCR.

The SmartRow DCR must be installed in an indoor, climate-controlled environment. The unit will not protect electronic equipment if it is installed in an environment subject to extreme temperatures or humidity.

This manual is to be used in conjunction with existing Vertiv product manuals for each component and site-specific documentation and drawings. User and installation manuals ship with the equipment and are also available at <http://www.VertivCo.com/en-us/support/>.

2.1 Operational Overview

The SmartRow DCR is an enclosed system to house and cool electronic equipment. The DCR Racks house the critical IT equipment, optional Rack PDUs and optional rack-mounted UPS units.

Cooling air is supplied by an integral PDX/PCW and conveyed to the racks with bottom plenums. Heated exhaust air from the racks returns to the PDX/PCW through the top plenums. An emergency fan system is included to exhaust air in the event of excessive internal temperature or a primary cooling failure.

The DCR Control Panel and Fire Suppression System module contains the fire detection and suppression system, fire strobe light and audible horn, the power/fire control interface, fire-suppression-system abort and manual-release switches, emergency fan-reset controls, and the load-distribution center. The fire-detection system uses a smoke detector to monitor the air in the SmartRow DCR for evidence of combustion. If the smoke detector mounted in the return air plenum senses combustion products, the system control activates audible and visual alarms and releases a fire-suppression agent (see **Figure 7.1** on page 57). The load-distribution center distributes power to powered loads inside the SmartRow DCR.

2.2 DCR Control Panel and Fire-suppression System Commissioning and Training

A local qualified service representative will commission and arm the DCR Control Panel and Fire Suppression System after the SmartRow DCR is fully installed and operational. The representative will conduct training on the system during the same visit. The commissioning, arming and training cannot be performed before all items in [Cooling and Power Component Installation Checklist](#) on page 63, and [Fire Suppression System Installation Checklist](#) on page 64, have been completed.

2.3 SmartRow DCR Components

Required components differ based on whether the SmartRow DCR employs a single PDX/PCW or two PDX/PCWs.

- DCR Base Plenum-Rack (with Manual Air-flow Adjustment Damper)—one for each DCR Rack
- DCR Top Plenum-Rack (with Emergency Fan)—one for each DCR Rack
- DCR Base Plenum-PDX/PCW (with Back-draft Dampers)—installs under each PDX/PCW and DCR Control Panel and Fire Suppression System
- DCR Top Plenum-PDX/PCW—installs on each PDX/PCW and DCR Control Panel and Fire Suppression System

- DCR Control Panel and Fire Suppression System—consists of the fire detection panel, fire-suppression system, override timers, load-distribution center, fire strobe/horn and the power/fire control interface
- PDX/PCW—5-ton downflow unit specially configured for use in the SmartRow DCR
- DCR Rack—Plexiglas® front door, split solid rear door, sealed rack design; number varies. Standard configuration includes 1 networking rack, 800-mm wide, and the remaining quantity are server racks, 700-mm wide. See DCR 700-mm wide cabinet and DCR 800-mm wide cabinet in [Technical-installation Illustrations](#) on page 75.
- Redundant DCR Control Shell—attaches to the second PDX/PCW; houses the optional redundant load-distribution center

Figure 2.1 SmartRow DCR components

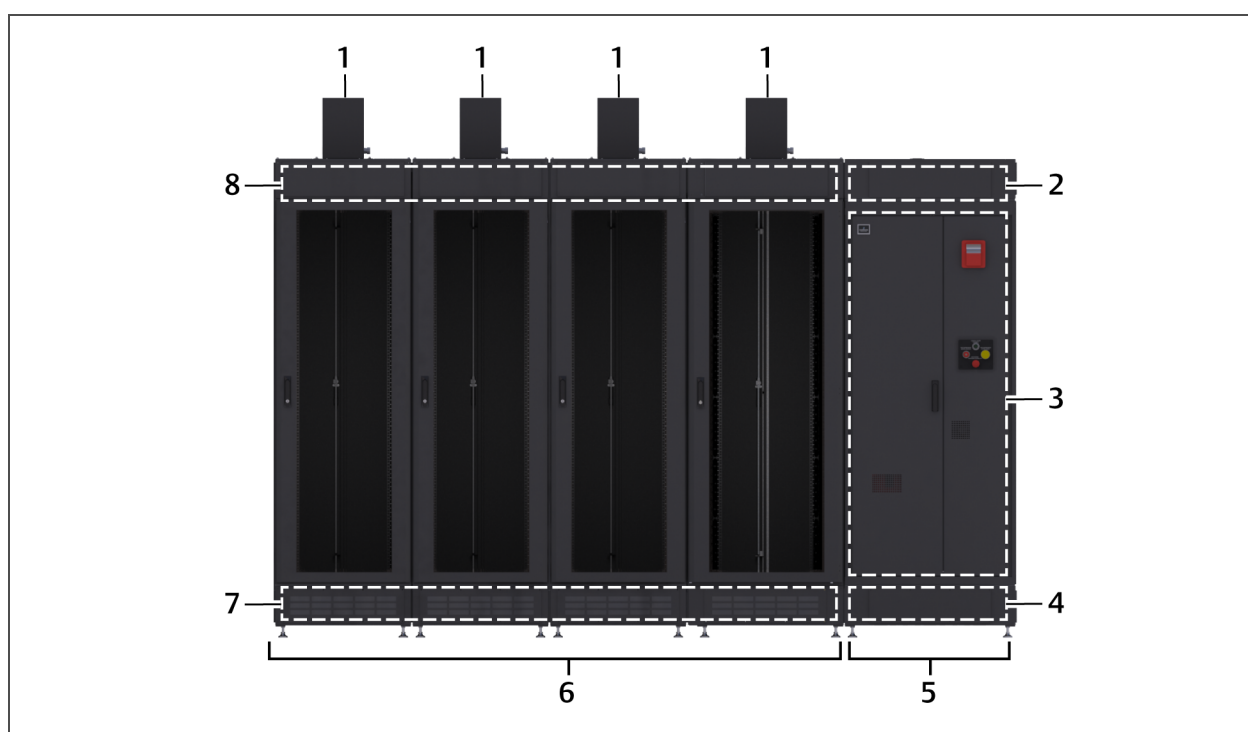


Table 2.1 SmartRow DCR Components

No.	Description	No.	Description
1	Emergency Fans	5	PDX/PCW cooling unit (a second cooling unit attaches at opposite end for 20-kW (N + 1) and 36-kW configurations)
2	DCR Top Plenum-PDX/PCW	6	4-rack 20kW (N) SmartRow DCR shown
3	DCR Control Panel and Fire-suppression System, PDX/PCW	7	DCR Base Plenum(s)-Rack
4	DCR Base Plenum-PDX/PCW	8	DCR Top Plenum(s)-Rack

2.4 Liebert PDX/PCW Notes

- Specially configured for SmartRow DCR applications
- Does not include reheat or humidifier

- Includes a condensate pump field-installed.
- PDX/PCW can be factory-configured for either top feed or bottom feed for piping/electrical feeds; this must be specified at time of order
- 5 ton, digital scroll, downflow unit
- Factory-installed, field-mounted leak detection
- Large iCOM with monochrome display

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3 PREPARATION

The application and installation location should be determined and prepared before the SmartRow DCR is delivered. Proper planning will permit installing the required power and coolant connections and ensuring proper clearances. The installation location must have:

- An indoor, climate-controlled environment free from moisture, flammable liquids, gases, and corrosive substances.
- An environment that is maintained year-round at an ambient temperature between 35°F and 85°F (1.6°C to 29°C) and a relative humidity between 50°F and 85°F dry bulb and less than 60°F dew point.
- Sufficient height and clearance from ceilings, walls, fixtures and overhead sprinkler nozzles for the SmartRow DCR, including its emergency fans

NOTE: The SmartRow DCR must be installed on a flat, level surface to maintain proper spacing and provide tight seals. Leaving gaps in the field-applied gaskets will reduce cooling efficiency, increase energy use and adversely affect fire-suppression system operation.

- Heat rejection coolant supply for the PDX/PCW
- Input power sufficient for:
 - Each PDX/PCW—one or two units; each requires a separate input power feed.
 - DCR Control Panel and Fire Suppression System, Emergency Fans and powered equipment installed in the DCR Racks

For details about any component’s requirements, refer to that unit’s user manual. The PDX/PCW installation manual is SL-19800; iCOM™ user manual is SL-18835. These are delivered with the unit and are available at <http://www.VertivCo.com/en-us/support/>.

3.1 Clearance Requirements

See SmartRow DCR dimension details in [Technical Data](#) on page 72.

Table 3.1 SmartRow DCR system clearances—Single or Dual Liebert PDX/PCWs

DCR Component	Minimum Clearance Requirement, in. (mm)
DCR Control Panel & Fire Suppression System	36 (914) front
PDX/PCW Cooling Unit	36 (914) front
Any DCR surface and the nearest building fire-suppression sprinkler head.	18 (457) per NFPA 13
DCR Emergency Fan discharge and nearest surface	16 (406) air-flow clearance

3.2 Inspection

Upon receiving a SmartRow DCR, examine the packaging for any signs of mishandling or damage. If any damage is noted, notify your local Vertiv representative and the carrier immediately.

3.3 Unloading the SmartRow DCR

Before unloading the SmartRow DCR, refer to the manual for each component, particularly the PDX/PCW and DCR Racks. These manuals are shipped with the SmartRow DCR and are available at <http://www.VertivCo.com/en-us/support/>.

Read these manuals thoroughly. They include handling instructions and safety notices that must be followed when unpacking, installing, operating and maintaining the SmartRow DCR.

Adhere to all warnings, cautions and installation, operating and safety instructions on the units and in their manuals. Only properly trained and qualified personnel should move, install, operate or service this equipment.

3.4 Required Set-up Tools and Equipment

The following tools are needed to set up a SmartRow DCR:

- 3/4-in. (19-mm) open end wrench or socket
- Ratchet to fit sockets
- Phillips-head screwdriver
- Flat-blade screwdriver
- Forklift or pallet jacks
- Scissors or knife
- Carpenter’s level, 3-ft long or longer

3.5 Heat Load Guidelines

Notice

Risk of exceeding cooling capability. Can cause equipment damage.

A SmartRow DCR 20-kW (N) configuration (one PDX/PCW cooling unit) or 20-kW (N + 1) configuration (two PDX/PCW cooling units) is capable of removing 20 kW of heat. A SmartRow DCR 36-kW (N) configuration (two PDX/PCW cooling units) can remove 36 kW of heat. Exceeding that heat load limit, such as by overloading the DCR Racks, can cause equipment in the cabinets to overheat, resulting in equipment damage and voiding warranties.

Refer to the values in **Table 3.2** below. The total system capacity and heat loads per cabinet must fall within these ranges. We recommend that higher-density loads be located in the center of the SmartRow configuration. This avoids the need to manually adjust the air dampers when thermal-management units switch in 2-unit configurations.

Table 3.2 Average heat load per cabinet

20-kW (N/N + 1) Configuration Heat Load per Cabinet			36-kW (N) Configuration Heat Load per Cabinet		
Number of Cabinets	Minimum, kW	Maximum, kW	Number of Cabinets	Minimum, kW	Maximum, kW
3	1.2	6	5	1.4	7
4	0.9	5	6	1.2	6
5	0.7	4	7	1.0	5
6	0.6	3	8	0.9	5
—	—	—	9	0.8	4
—	—	—	10	0.7	4

4 INSTALLATION

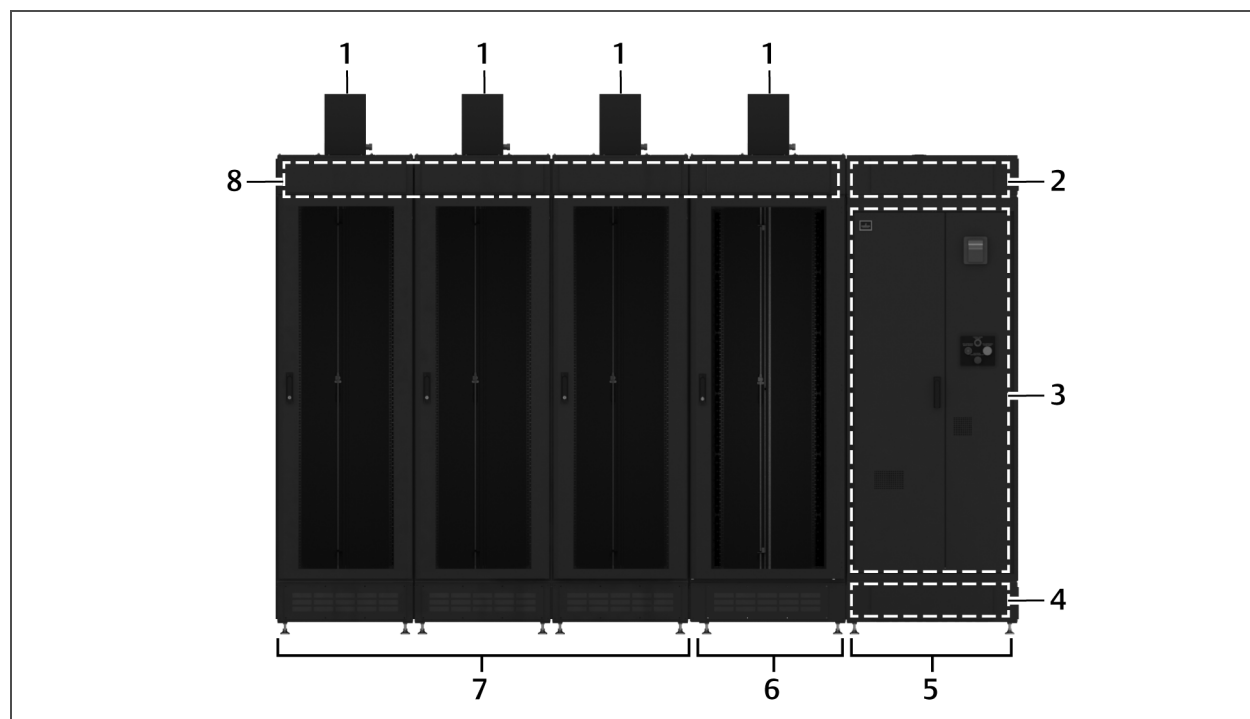
4.1 Assembly Sequence Overview

Typical SmartRow DCR assemblies with a single thermal-management unit are configured with the Control Panel and Fire Suppression system and the thermal-management unit on the right-hand side. To configure your assembly with the panel and unit on the left-hand side, start with [Configuring the SmartRow DCR for Left-to-Right Assembly](#) on page 13, then continue with the subsequent instructions.

4.1.1 SmartRow DCR with Single Liebert PDX/PCW (20-kW (N) Configuration)

Refer to **Figure 4.1** below components and follow the procedures in the subsequent sections to assemble the SmartRow DCR.

Figure 4.1 Components of single Liebert PDX/PCW system installation



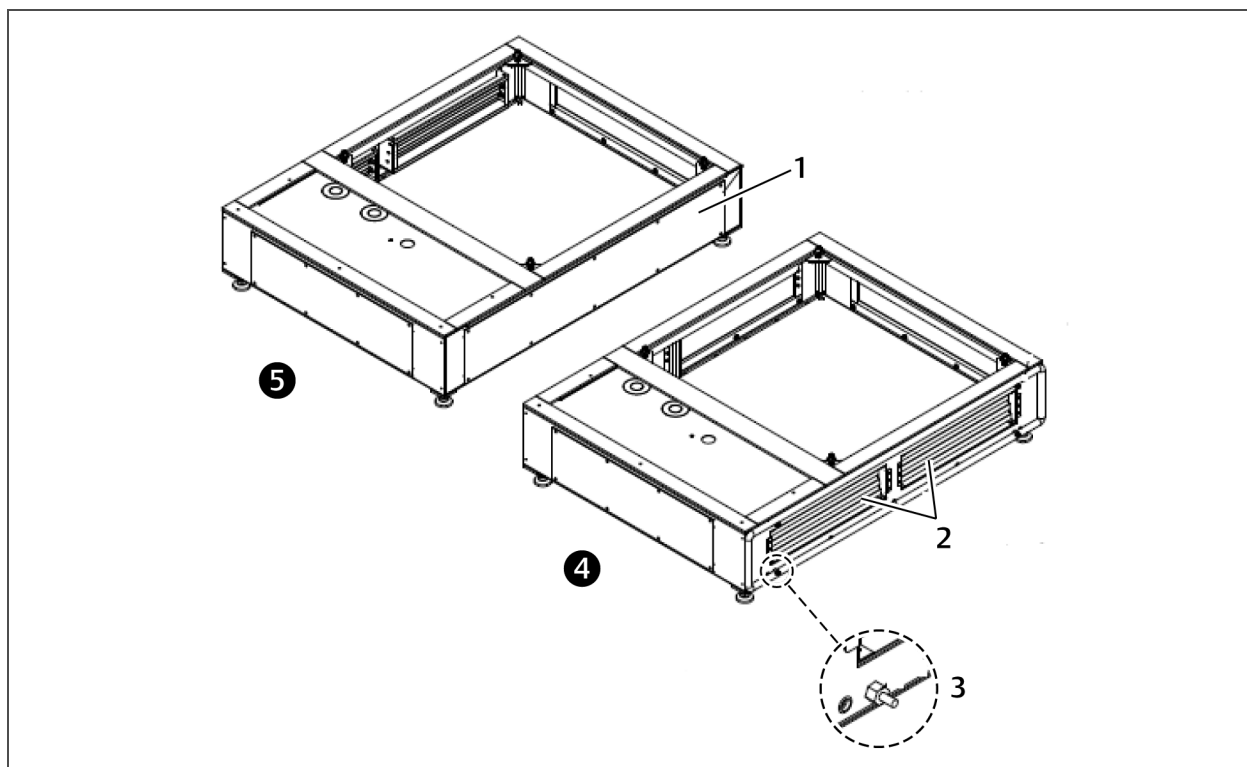
No.	Description	No.	Description
1	Emergency Ventilation Fans	5	PDX/PCW section (cooling unit behind control panel/fire-suppression system.)
2	DCR Top Plenum-PDX/PCW	6	DCR network rack
3	DCR Control Panel and Fire-suppression System	7	DCR server racks
4	DCR Base Plenum-PDX/PCW	8	DCR Top Plenum(s)-Rack

4.1.2 Configuring the SmartRow DCR for Left-to-Right Assembly

These steps are only needed if you have a single thermal-management-unit configuration and you want to mount the unit and the Control Panel and Fire Suppression system on the left-hand side of the SmartRow assembly. You are modifying the base and top plenums for the control panel/thermal-management unit for installation on the opposite end of the SmartRow.

1. Modify the Base Plenum-PDX/PCW (DCR-A-300 PDX):
 - a. Remove the cover plate on the right-hand side of the Base Plenum-PDX/PCW, and set it aside to be installed on the base plenum of the final rack on the opposite end of the row.
 - b. Move the (2) Back-draft Dampers on the left-hand side of the plenum to the right-hand side of the plenum as shown **Figure 4.2** below.
 - c. Move the (4) Hex stand-offs from the left-hand side of one of the Base Plenums-Rack (DCR-A-101) and install them on the right-hand side of the Base Plenum-PDX/PCW (DCR-A-300PDX), see **Figure 4.2** below.
The Base Plenum-Rack without the stand-offs is now the base plenum that will be positioned on the opposite end of the row with the cover plate installed on its right-hand side.

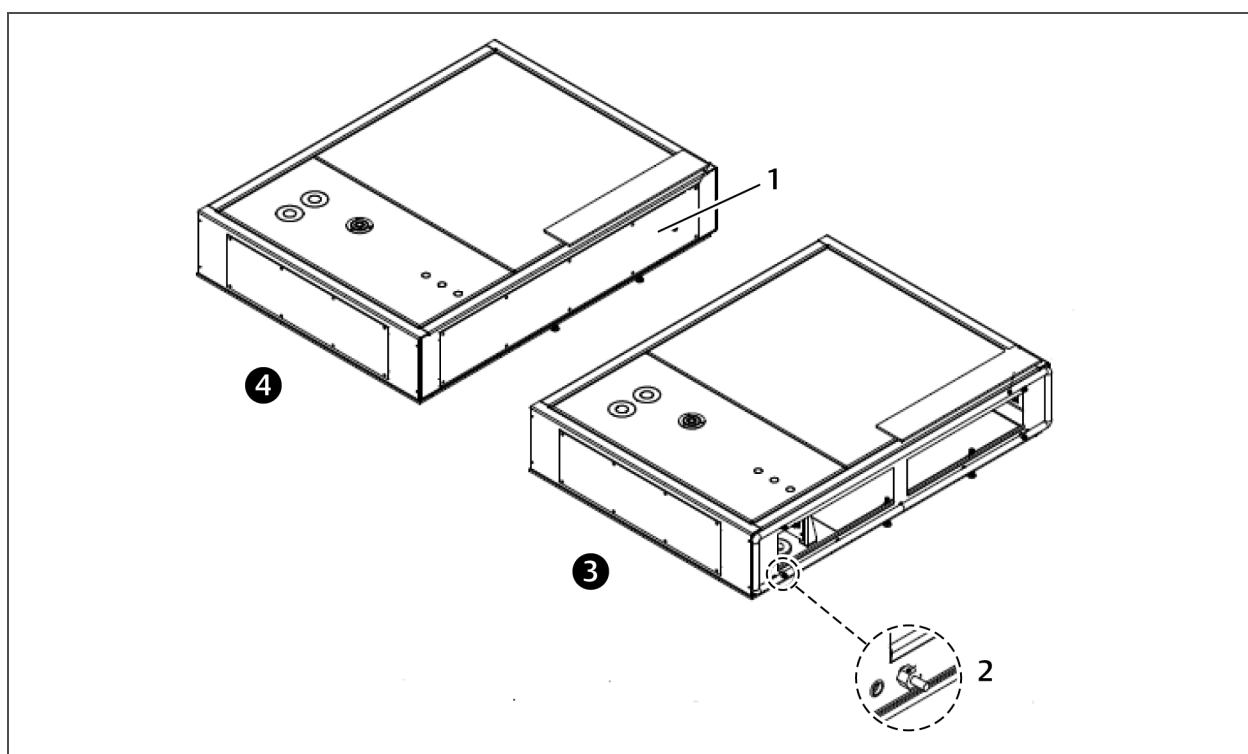
Figure 4.2 Modifying Base Plenum-PDX/PCW for installation on left-hand side of SmartRow



No.	Description	No.	Description
1	Cover plate	4	Base plenum-PDX/PCW after modification
2	Back-draft dampers	5	Base plenum-PDX/PCW before modification
3	Hex stand-off hardware (4 places)		

2. Modify the Top Plenum PDX/PCW (DCR-A-400PDX):
 - a. Remove the cover plate on the right-hand side of the Top Plenum-PDX/PCW, **Figure 4.3** below, and set it aside to be installed on the top plenum of the final rack on the opposite end of the row.
 - b. Move (4) Hex Standoffs from the left-hand side of one of the Top Plenums-Rack (DCR-A-200) and install them on the right-hand side of the Top Plenum-PDX/PCW (DCR-A-400PDX), see **Figure 4.3** below. This Top Plenum-Rack without the stand-offs is now the top plenum that will be positioned on the opposite end of the row with the cover plate installed on its right-hand side.
3. Continue with the installation procedures, starting with [Install the DCR Base Plenum-PDX/PCW First](#) on page 16.

Figure 4.3 Modifying Top Plenum-PDX/PCW for installation on left-hand side of SmartRow

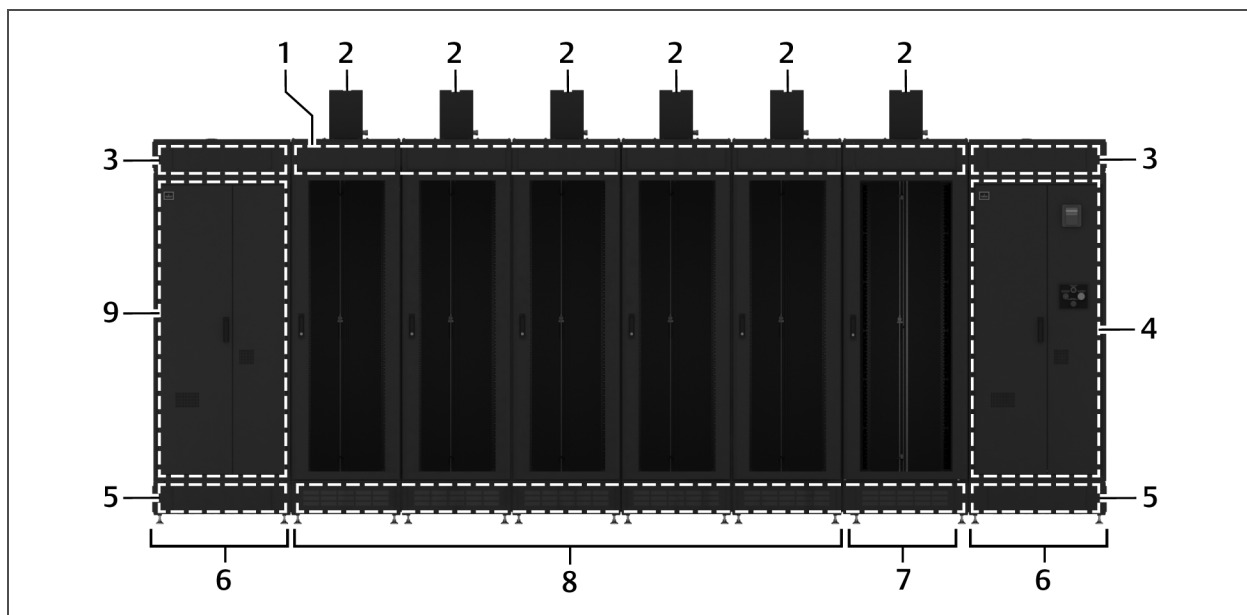


No.	Description	No.	Description
1	Cover plate	3	Top plenum-PDX/PCW after modification
2	Hex stand-off hardware (4 places)	4	Top plenum-PDX/PCW before modification

4.1.3 SmartRow DCR with Two PDX/PCW Units—20-kW (N + 1)/36-kW (N) Configurations

Refer to [Figure 4.4](#) below components and starting with [Install the DCR Base Plenum-PDX/PCW First](#) on page 16, follow the procedures in the subsequent sections to assemble the SmartRow DCR.

Figure 4.4 Components of two Liebert PDX/PCW installation



No.	Description	No.	Description
1	DCR Top Plenum(s)-Rack	6	PDX/PCW sections (thermal-management unit behind Control Panel and Fire-suppression system/DCR Control-panel shell)
2	Emergency Ventilation Fans	7	DCR network rack
3	DCR Top Plenum(s)-PDX/PCW	8	DCR server racks
4	DCR Control Panel and Fire-suppression System	9	DCR Control-panel Shell
5	DCR Base Plenum-PDX/PCW		

4.2 Install the DCR Base Plenum-PDX/PCW First

NOTE: This Base Plenum for the PDX/PCW must be installed first and positioning is critical to the remaining installation.

1. Position the DCR Base Plenum-PDX/PCW where the power and refrigerant connections can be made easily.

Connections will be made either through the DCR Top Plenum-PDX/PCW or the DCR Base Plenum-PDX/PCW, depending on the PDX/PCW system selected. This selection correlates with the selection of a top-fed unit/bottom-fed unit. (The top and base plenums for the PDX/PCW and DCR Control Panel and Fire Suppression System module are wider than the plenums for the DCR Racks (DCR Base Plenum-PDX/PCW or DCR Top Plenum-PDX/PCW).

2. Check the DCR Base Plenum-PDX/PCW installation position to ensure that it meets the required clearances; refer to [Clearance Requirements](#) on page 11.

NOTICE

Risk of severe cabinet and system stress. Can cause equipment damage and improper operation.

Do not move the SmartRow DCR after assembly. This unit is not designed to be moved after assembly. Movement without properly disassembling the SmartRow DCR can damage internal components, reduce unit stability and void the warranty.

Floor anchoring, if required, should not be performed until after the entire base plenum assembly has been completely assembled and leveled.

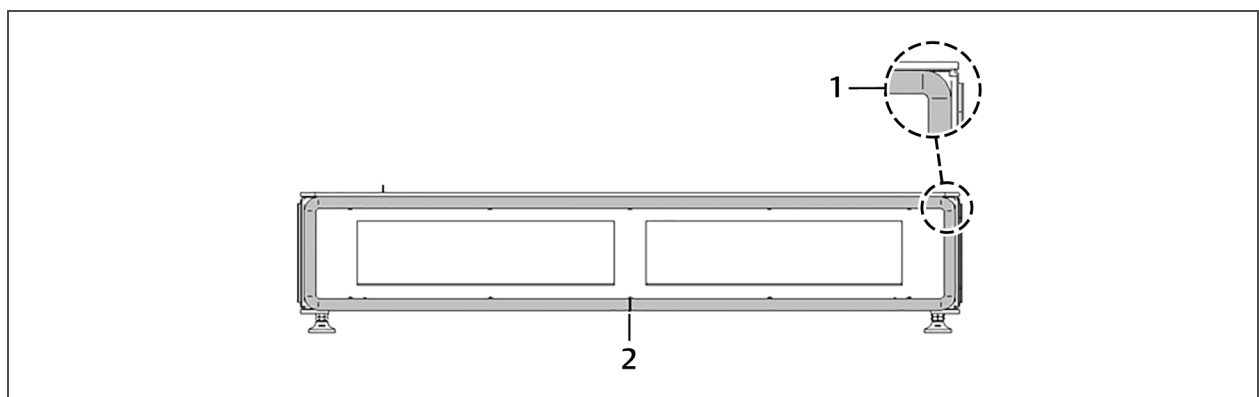
3. Remove the plenum side plate cover attached on the interior of the Primary DCR Base Plenum-PDX/PCW (DCR-A-300PDX). This will be installed on the last base plenum in the row.

4.3 Assemble the DCR Base Plenums-Rack

The base plenum-rack assembly supports the SmartRow DCR and distributes supply air to the DCR Racks.

1. Apply the factory-supplied, D-shaped gasket material to the side of the DCR Base Plenum-Rack that faces the DCR Base Plenum-PDX/PCW as shown in **Figure 4.5** below.
 - The gaskets are cut to the correct length at the factory.
 - The gasket must be applied continuously along the profile edge of the plenum frame.
 - Apply pressure to the gasket to make sure it adheres to the frame.
2. At each corner, form a 1-in. to 1.5-in. radius, **Figure 4.5** below.
3. When you reach the starting point, form a sealed joint by butting the start and finish edges together, **Figure 4.5** below.

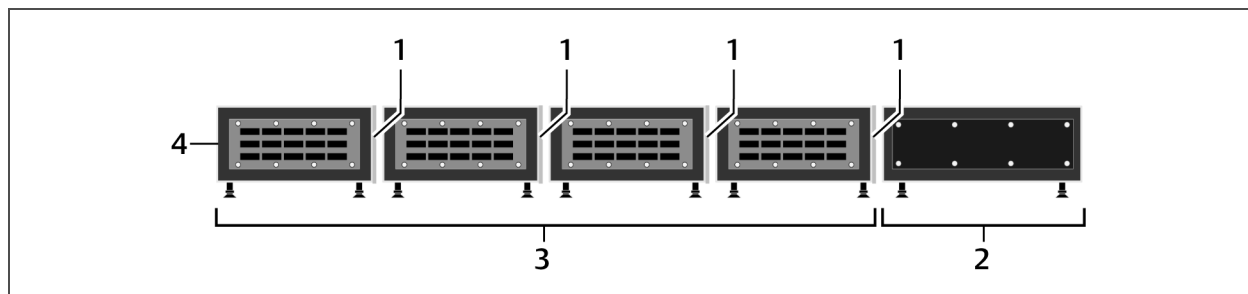
Figure 4.5 Gasket applied to side of base plenum



No.	Description
1	Gasket 1-in. to 1.5-in. corner radius
2	Gasket start and finish

4. Place the first DCR Base Plenum-Rack beside the DCR Base Plenum-PDX/PCW. Ensure that gasket side of the DCR Base Plenum-Rack faces the DCR Base Plenum-PDX/PCW, **Figure 4.6** below:
 - The front of each DCR Base Plenum-Rack must be oriented with the rack placement in mind.
 - The front of the DCR Base Plenum-Rack has louvers.
 - The front of the DCR Racks have a door with a transparent acrylic sheet.

Figure 4.6 Correct orientation of base plenum sections and required side gaskets



No.	Description
1	Gasket
2	DCR base plenum
3	Rack base plenums
4	Side plate cover (shipped loose)

5. Attach the DCR Base Plenum-Rack to the DCR Base Plenum-PDX/PCW with (4) 9-mm long spacers that are factory-installed on the right-hand side of each rack plenum.
6. Using the factory-supplied Nylock nut and washer, secure the plenum faces together but do not tighten them at this time.

IMPORTANT! Do not tighten any Nylock nuts at this time. The Nylock nuts must remain loose to permit additional assembly steps.

7. Apply gaskets to the remaining DCR Base Plenums-Rack, referring to **Figure 4.6** above, then attach each plenum to the adjacent plenum assembly with the factory-installed spacers and factory-supplied Nylock nuts and washers.
8. If installing system with a single PDX/PCW unit, attach the shipped-loose, side plate cover to the outside of the final base plenum (see **Figure 4.6** above).

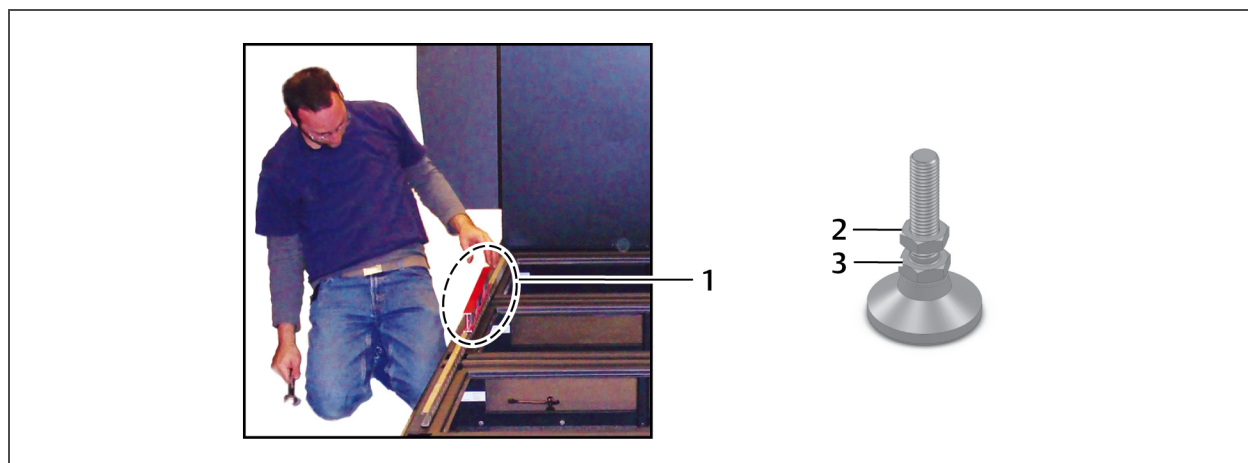
– or –

If installing a second PDX/PCW unit, do not install the side plate cover until instructed to do so in section [Installing a Second PDX/PCW \(20-kW \(N + 1\)/36-kW \(N\) Configuration\)](#) on page 33.

9. Use a 3/4-in. (19-mm) wrench to adjust the leveling feet so that the assembled base plenum is level. Use a carpenter's level to make sure the plenum assembly is completely level both front-to-rear and side-to-side, **Figure 4.7** on the facing page.

- When the complete base plenum assembly is level, use the 3/4" (19-mm) wrench to tighten the jam nuts against the bottom of the plenum assembly to secure the leveling feet, **Figure 4.7** below.

Figure 4.7 Level plenum using carpenter's level and wrench to adjust and lock feet



No.	Description
1	Carpenter's level
2	Jam nut
3	Height-adjustment nut

- Tighten all internal plenum Nylock nuts installed in step 5 using an M10 socket.

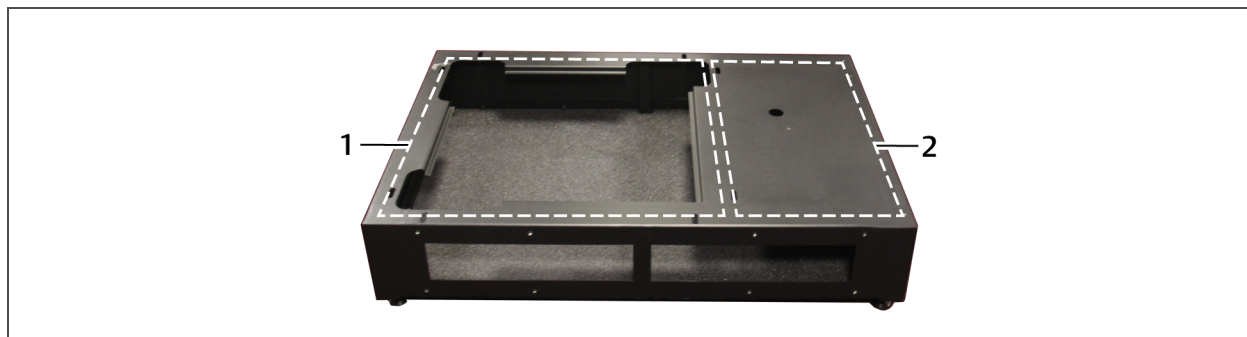
NOTE: Floor anchoring, if required, should not be done until after all steps above have been completed. Floor anchoring is optional. Hardware for this step is not included. For further information, contact your local Vertiv representative.

4.4 Set the PDX/PCW on the Base Plenum-PDX/PCW and Install Condensate Pump and Liqui-tect Sensor

There is factory-installed gasketing around the perimeter of the top face of the DCR Base Plenum-PDX/PCW. The PDX/PCW will rest on the area highlighted in **Figure 4.8** on the next page. The iCOM screen must face the opposite side of where the DCR Control Panel and Fire Suppression System will sit, see **Figure 4.8** on the next page.

NOTE: Take care not to damage the gasket when setting the PDX/PCW and the Control Panel and Fire Suppression System on the Base Plenum.

Figure 4.8 Equipment locations on the Base Plenum-PDX/PXW



No.	Description
1	PDX/PCW location
2	DCR control panel and fire-suppression system location

To install the unit and pump:

1. Ensure the front, left, and right sides of the PDX/PCW are accessible by removing the panels of the unit.
2. Remove the Condensate Pump Box and the Pump components boxes located in the rear of the unit.

3. Verify that the condensate pump components box contains the items shown in Figure 4.9 below and listed in Table 4.1 below.

Figure 4.9 Condensate Pump Components Box

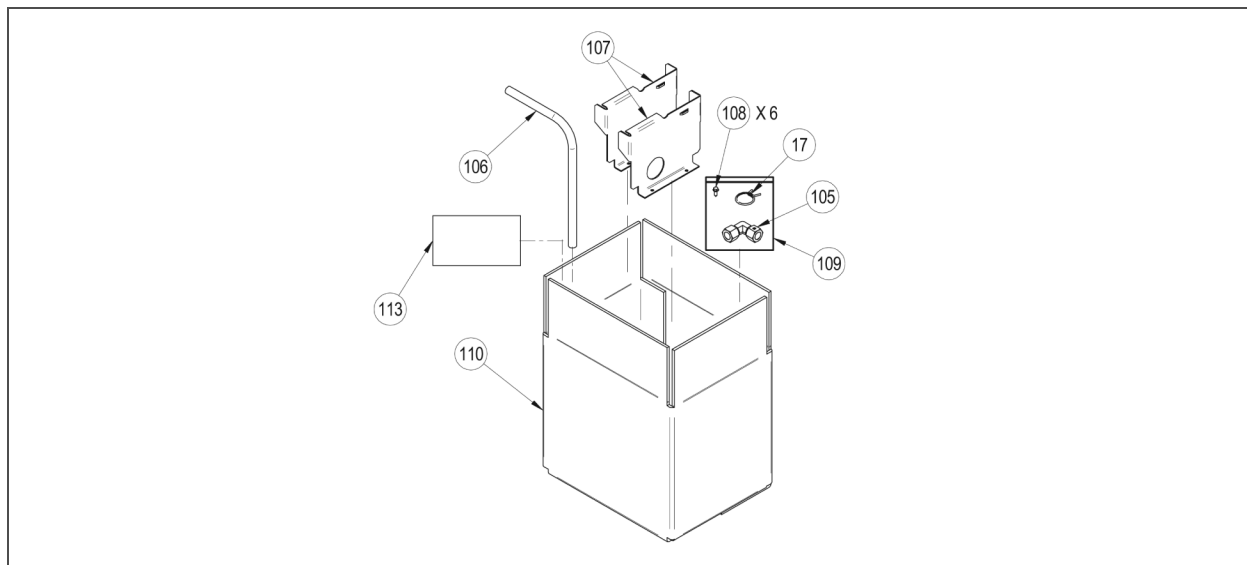
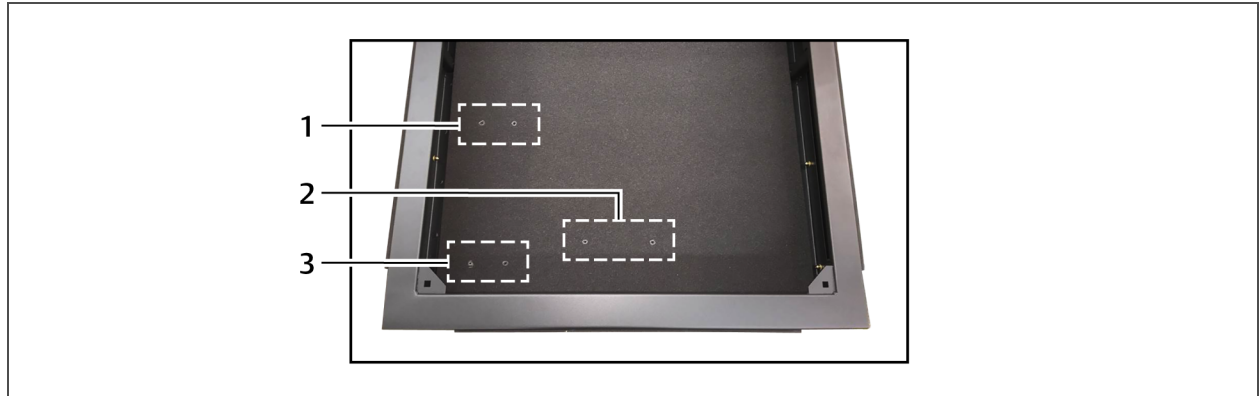


Table 4.1 Pump Components

Item No.	Description	Qty.
17	Clamp hose wire	1
105	E11 90 compression x compression 1/2" x 1/2"	1
106	1/2" tube form	1
107	Bracket, condensate pump	2
108	Screw self-driller 8-18 x 1/2"	6
109	Bag plastic zip-lock	1
110	Corrugated box	1
113	Instruction/Installation drawing	1

4. Remove one of the Condensate Brackets (107) and two of the Self-Driller 8-18x1/2" screws (108) from the box.
5. Use the two self driller screws to screw the bracket in to Position 1, **Figure 4.10** below. The hole positions are labeled on the foam with silver markings.

Figure 4.10 Condensate-pump brackets and Liqui-tect sensor installation locations



No.	Description
1	Position 1
2	Position 2
3	Position 3

6. Remove the condensate pump with the wire harness from the box.
7. Position the pump with the electric-box side of the condensate pump facing towards the bracket in Position 1.

NOTE: Lay the pump on its side so that the pump does not get damaged when installing the PDX/PCW unit on top of the Base Plenum.

8. Use pallet jacks or a similar lifting device to place the PDX/PCW on the Base Plenum-PDX/PCW so that the iCOM display is facing 180 degrees from where the DCR Control Panel and Fire Suppression system will sit (See [Components of single Liebert PDX/PCW system installation](#) on page 13).

The PDX/PCW must be aligned with the back of the base plenum that supports it. The PDX/PCW also should be flush with the side of the DCR Base Plenum-PDX/PCW.

! WARNING! Risk of improper moving and handling. Can cause equipment damage, injury or death. The PDX/PCW weighs more than 600 lb. (272 kg). If a lifting device is used to move the PDX/PCW, ensure that it is rated to handle its weight. If personnel will move the unit manually, ensure that an adequate number of properly trained and qualified personnel wearing appropriate OSHA-approved PPE are used. Read all instructions before beginning.

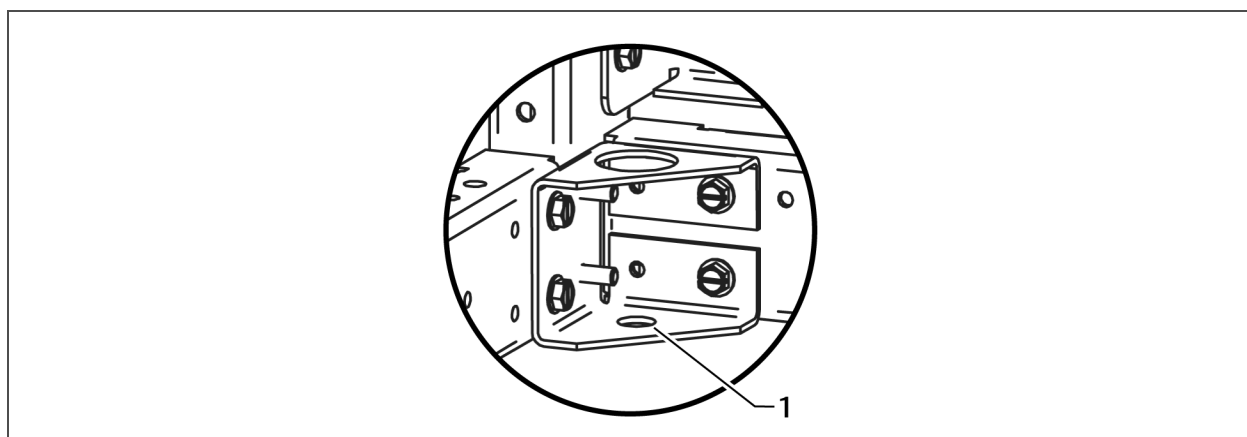
! WARNING! Risk of top-heavy unit falling over. Improper handling can cause equipment damage, injury or death. Only properly trained and qualified personnel wearing appropriate OSHA-approved personal protection equipment (PPE) should attempt to move, lift, remove packaging from or prepare unit for installation. Read all instructions before attempting to move, lift, remove packaging from or prepare the unit for installation.

NOTICE

Risk of improper condensate-pump positioning. Can cause pump damage. Lay the condensate pump on its side to ensure that the pump does not get cracked or damaged during the installation of the PDX/PCW unit.

9. Locate the hole(s), shown in **Figure 4.11** below, in the bottom of PDX/PCW, and insert the four supplied carriage bolts (3/8"-16 x 1-1/2"). Then from underneath the base-plenum, install and tighten the hex nuts and washers.

Figure 4.11 Secure the Liebert PDX/PCW to the DCR Base Plenum-PDX/PCW



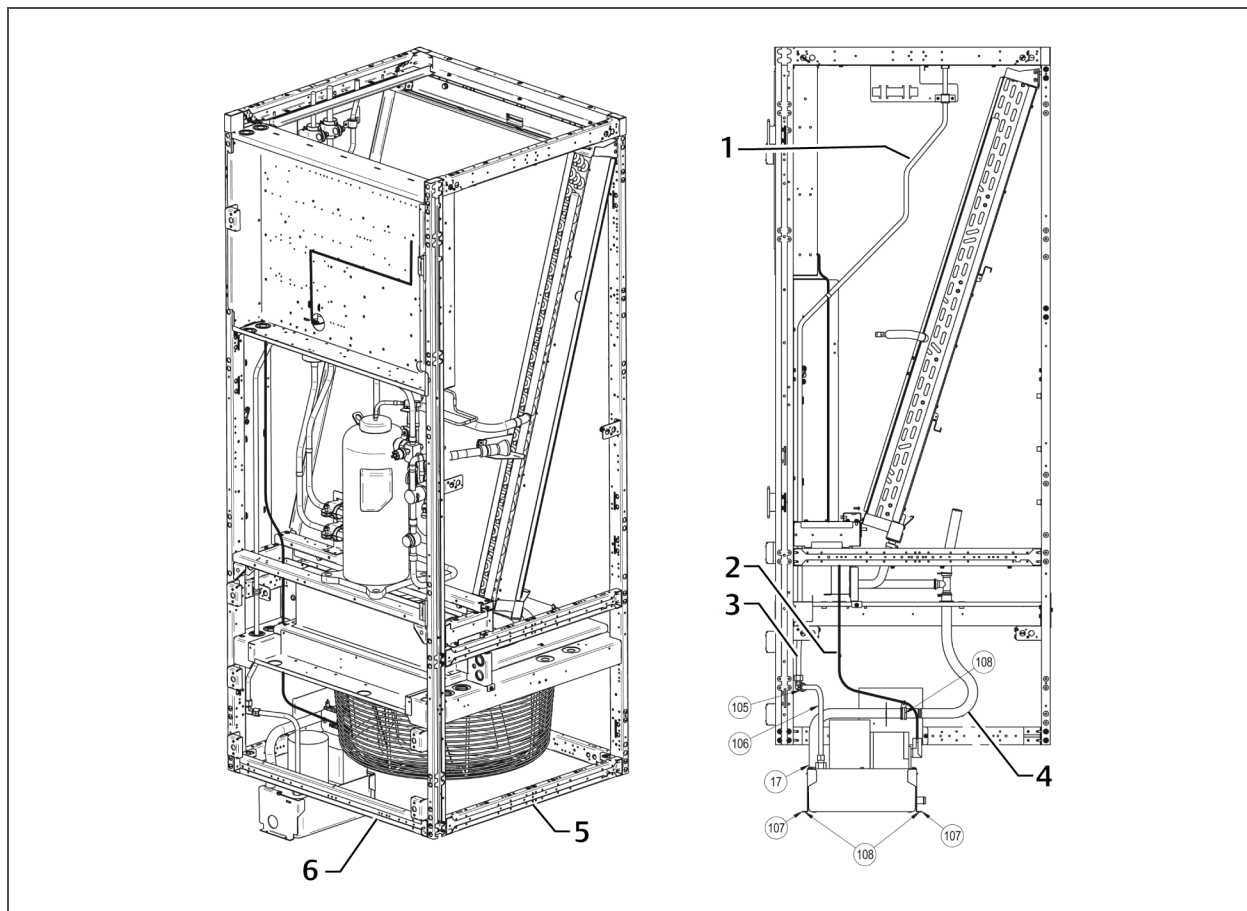
No.	Description
1	Hole (in each corner)

10. Remove the panel on the rear of the Base plenum-PDX/PCW.
11. Locate the Liqui-tect Sensor cable tied to the PDX/PCW EC-motor impeller wheel, cut the cable ties, and place the Liquitect 410 sensor in Position 2 (shown in **Figure 4.10** on the previous page).

12. Remove 2 of the 8-18 x ½” self-driller screws from the pump components box, and screw the LT410 sensor into Position 2.
13. Re-position the condensate pump right-side up and place it against the condensate-pump bracket in Position 1 (installed in step 5 and shown in **Figure 4.10** on page 22).
14. On the left-hand side of the PDX/PCW, un-clamp the rubber drain line from the drain-line bracket.
15. Remove the clamp-hose wire from the pump-components box, slip it onto the drain line, and insert the rubber drain line on to the barbed end connection of the condensate pump. (See **Figure 4.12** on the facing page for proper positioning.)
16. Re-clamp the drain line to the drain-line bracket referenced in step 14.
17. Remove the 90° compression fitting elbow (105) from the pump components box and install it onto the ½-in. Copper drain line that routes to the top of the unit. (See **Figure 4.12** on the facing page for proper positioning.)
18. Remove the ½” tube form (106) from the pump components box. Install the tube form into the 90° compression fitting on the condensate pump. (See **Figure 4.12** on the facing page for proper positioning.)
19. Remove the remaining condensate-pump bracket (107) and two 8-18x1/2” self driller screws (108) from the pump-components box, position the bracket against the condensate pump, and screw the bracket into Position 3 (shown in **Figure 4.10** on page 22) using the self-driller screws.

20. Refer to **Figure 4.12** below as a final check of your condensate pump installation.
21. Route the wire harness from the condensate pump to the electric box, and connect it to the condensate-pump fuse block.

Figure 4.12 Condensate-pump installation



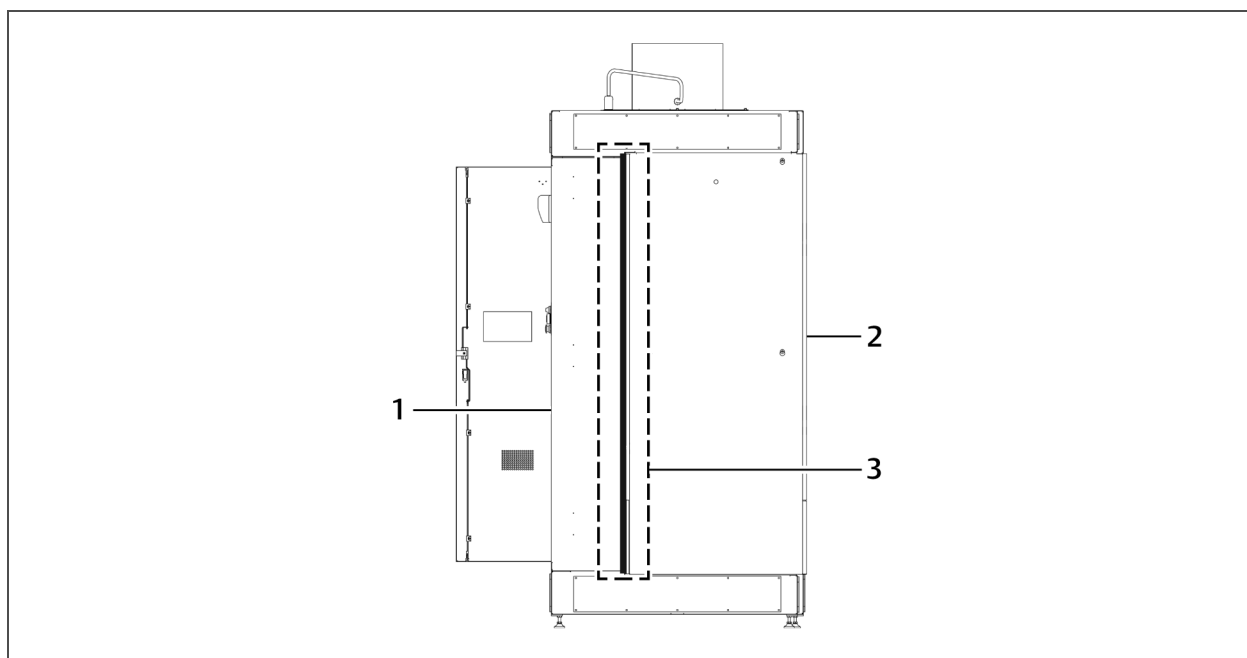
No.	Description	No.	Description
1	1/2-in. copper drain line	4	Rubber drain line
2	Condensate pump wire harness	5	Right side
3	1/2-in. copper drain line	6	Front of unit

4.5 Set the DCR Control Panel and Fire Suppression System on the Base Plenum

! **WARNING!** Risk of top-heavy unit falling over. Improper handling, lifting, and moving can cause equipment damage, injury or death. The DCR Control Panel and Fire Suppression System weighs more than 413 lb (187 kg). If a lifting device is used to move the DCR Control Panel and Fire Suppression System, verify that it is rated for the combined system weight specified above. If personnel will move the unit manually, verify that an adequate number of personnel are used. Only properly trained and qualified personnel wearing OSHA-approved PPE should attempt to move, lift, remove packaging from or prepare the unit for installation. Read all instructions before attempting to move, lift, remove packaging from or prepare unit for installation.

1. Apply gasket (1/2-in. thick x 2-in. wide; factory-supplied, Part # 8694K89) along the outside edge of the PDX/PCW that the DCR Control Panel and Fire Suppression System will rest against (see **Figure 4.13** below). Use a lifting device to place the DCR Control Panel and Fire Suppression System onto the DCR Base Plenum-PDX/PCW.
 - The DCR Control Panel and Fire Suppression System must be aligned with the front of the DCR Base Plenum-PDX/PCW.
 - The fire-suppression section will be flush against the PDX/PCW and the end of the DCR Base Plenum-PDX/PCW.
2. Bolt the DCR Control Panel and Fire Suppression System to the base plenum with the (6) factory-supplied 1/4-in. - 20 x 1-in. Hex Head Cap screws and washers.

Figure 4.13 Gasket application between PDX/PCW and DCR Control Panel/Fire-suppression System

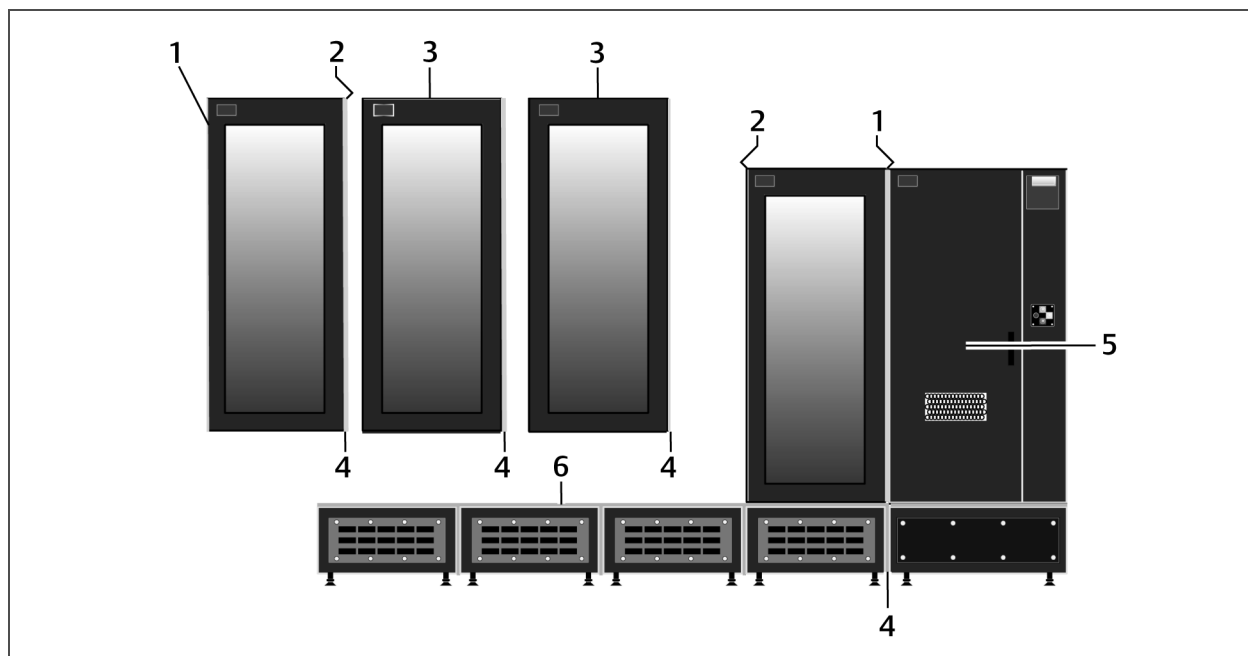


No.	Description
1	Control panel and fire-suppression system
2	PDX/PCW
3	Gasket

4.6 Install the DCR Racks on the Base Plenums

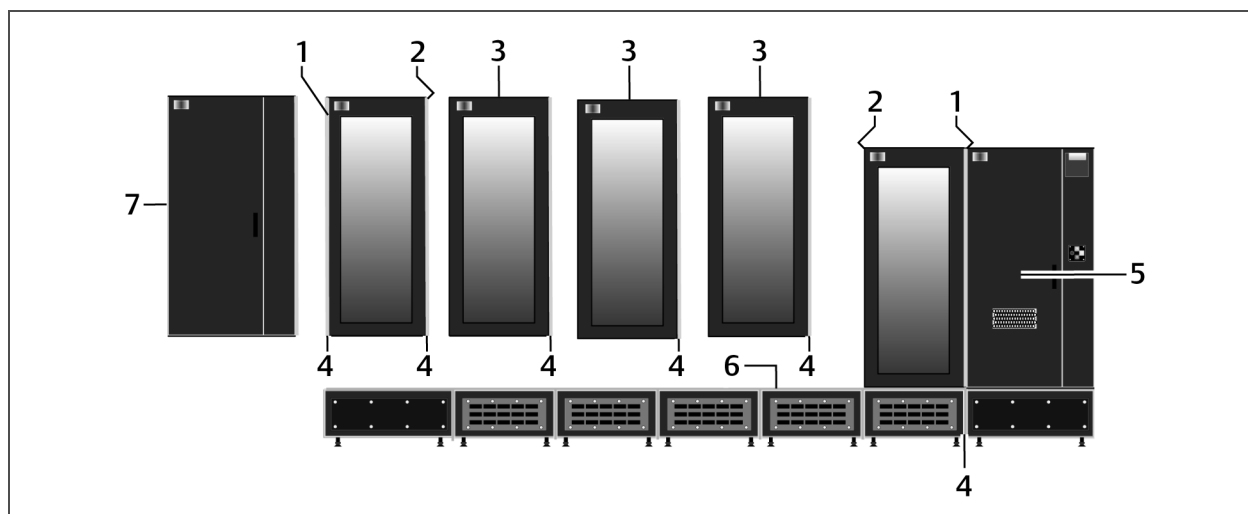
The SmartRow DCR Network rack, 800-mm wide, and one of the server racks, 700-mm wide, ship with both solid and cable-pass-through split-side panels. The remaining DCR server racks ship with cable-pass-through split-side panels on both sides. When you choose rack orientation, make sure that the solid split-side panels are on the ends of the rows. The figures in this manual are shown with the Network Rack, 800-mm wide, next to the primary PDX/PCW system.

Figure 4.14 Panel and Gasket placement—one PDX/PCW (20-kW (N) Configuration



No.	Description	No.	Description
1	Solid split-side panel	4	Gasket, field-installed
2	Cable-pass-through split-side panel	5	PDX/PCW, Control Panel and Fire-suppression System
3	Cable-pass-through split-side panels on both sides of rack	6	Gasket, factory-installed around each base plenum

Figure 4.15 Panel and Gasket placement—two PDX/PCW units (20-kW (N + 1)/36-kW (N)) Configuration



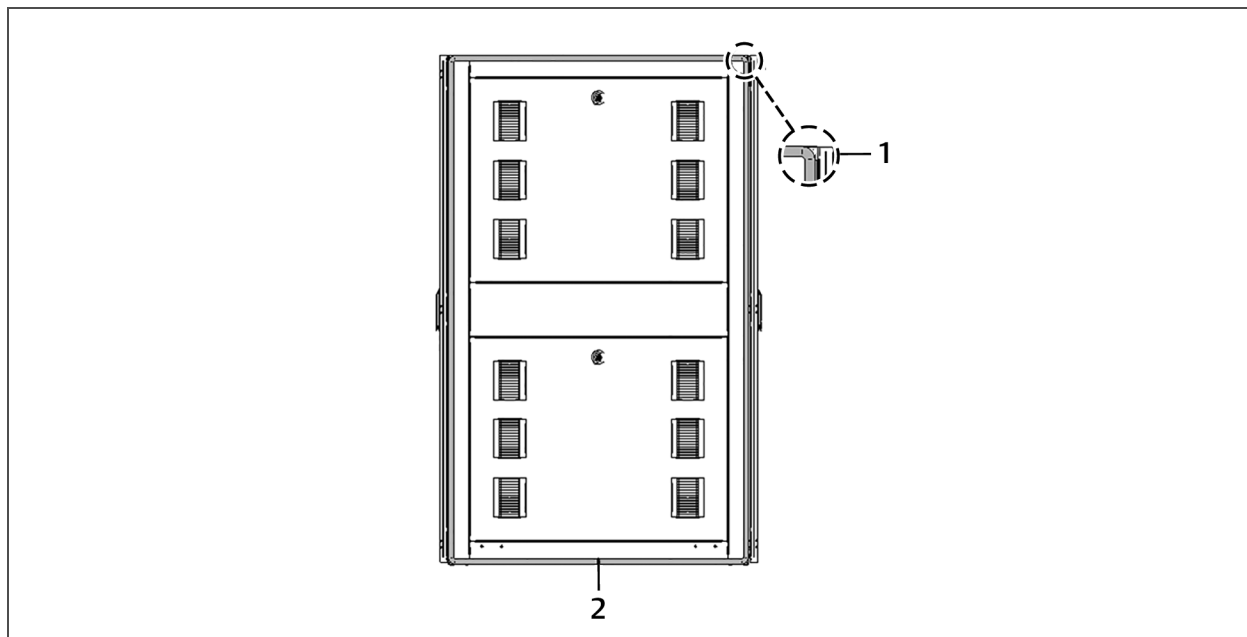
No.	Description	No.	Description
1	Solid split-side panel	5	PDX/PCW, Control Panel and Fire-suppression System
2	Cable-pass-through split-side panel	6	Gasket, factory-installed around each base plenum
3	Cable-pass-through split-side panels on both sides of rack	7	PDX/PCW and Control-panel shell
4	Gasket, field-installed		

To install the racks:

1. Find the DCR Rack that has the two solid split-side panels on one side and cable-pass-through panels on the other to place next to the PDX/PCW and Control Panel/Fire-suppression System (shown in **Figure 4.14** on the previous page or **Figure 4.15** above).
2. Apply the supplied gasketing to the rack's frame profile edge as shown **Figure 4.16** on the facing page:
 - Start the gasket strip at the base of the rack, directly in the middle of the rack.
 - Using pressure to make sure it adheres to the frame, apply the gasket continuously following the profile edge of the rack's frame.
 - At each corner, make a 1-in. to 1.5-in. radius.
 - Create a sealed joint by butting the start and finish edges together.

NOTE: Tags have been provided in each rack that illustrate these instructions as well. Do not remove these tags until the SmartRow assembly is completed.

Figure 4.16 Applying gasket to profile edge on side of the rack



No.	Description
1	Gasket 1-in. to 1.5-in. corner radius
2	Gasket start and finish

3. Use an adequate number of personnel to install that rack on the Base Plenum that is adjacent to the PDX/PCW and DCR Control Panel & Fire Suppression System.

NOTE: The side panels are interchangeable among the racks. Make sure that the rack that will be next to the PDX/PCW and Control Panel has the solid split-side panels on one side, as described in step 1.

NOTE: Removing the rack’s front and rear doors will lighten the unit, making it easier to maneuver.

- When setting DCR Racks on the base plenum, be sure to:
 - a. Align the front frame of the rack to the control-panel frame.
 - b. Space the DCR Racks evenly and square with the side of each DCR Base Plenum-Rack.

NOTE: Take care not to damage the gasket when applying it and when setting the DCR Racks on the base plenum. If the gasket is damaged, the rack must be removed and the gasket replaced. A damaged gasket will permit cooling air to escape, which will reduce cooling efficiency, increase energy use and adversely affect fire-suppression system operation.

4. Repeat steps 2 and 3 for each rack with cable-pass-through split-side panels on both sides of the rack (Figure 4.14 on page 27 or Figure 4.15 on the previous page).
5. Repeat steps 2 and 3 for the rack with left-side solid split-side panels (Figure 4.14 on page 27 or Figure 4.15 on the previous page).
6. Bay each adjacent rack with supplied baying plate and hardware, (2) plates front and back.

4.7 Install the Top Plenum-PDX/PCW

1. Remove the plenum side plate cover attached on the interior of the Primary DCR Top Plenum-PDX/PCW (DCR-A-400PDX). This side plate cover will be installed on side of the last top plenum in the row.

2. Set the DCR Top Plenum-PDX/PCW on the top of the PDX/PCW and DCR Control Panel and Fire Suppression System.

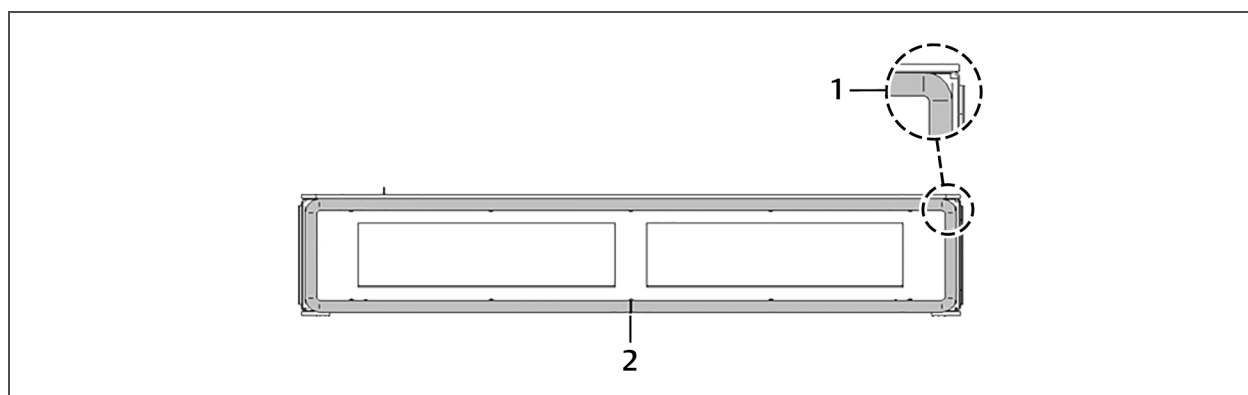
NOTE: Take care not to damage the gasket when setting the DCR Top Plenum-PDX/PCW on the top of the PDX/PCW and DCR Control Panel and Fire Suppression System. If the gasket is damaged, the plenum must be removed and the gasket replaced. A damaged gasket will permit cooling air to escape, which will reduce cooling efficiency, increase energy use and adversely affect fire-suppression system operation.

3. Secure the plenum to the Control Panel and Fire Suppression system using the factory-supplied (6) 1/4-in.-20 screws, nuts and washers through the top plenum and into the (6) factory-installed nut inserts in the Control Panel and Fire Suppression system.
4. Secure the rear of the plenum to the PDX/PCW using the factory-supplied carriage bolts.

4.8 Mounting the Top Plenums-Rack

1. Referring to **Figure 4.17** below, start at the center, bottom and apply D-shaped gasket material to the side of the DCR Top Plenum-Rack that faces the DCR Top Plenum-PDX/PCW (shown in **Figure 4.19** on page 32):
 - The gaskets are cut to the correct length at the factory.
 - Apply the gasket continuously along the profile edge of the plenum frame.
 - Apply pressure to the gasket to make sure it adheres to the frame.
2. At each corner, make a 1-in. to 1.5-in. radius, **Figure 4.17** below.
3. When you reach the starting point, form a sealed joint by butting the start and finish edges together as shown in **Figure 4.17** below.

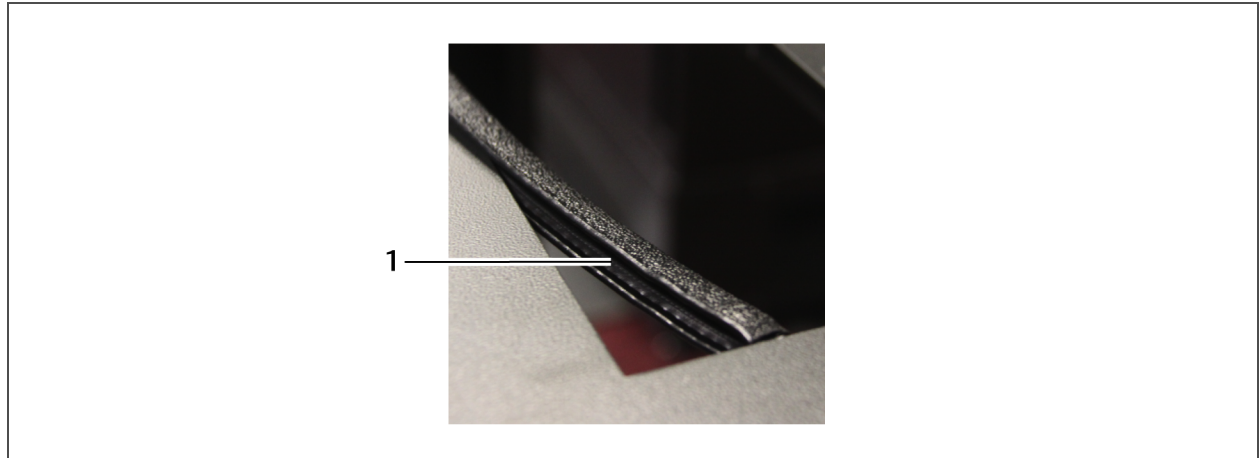
Figure 4.17 Gasket applied to face of top plenums



No.	Description
1	Gasket 1-in. to 1.5-in. corner radius
2	Gasket start and finish

4. Install edge guard on the bottom edge of the two openings in the top plenum by pressing the guard onto the edge as shown in **Figure 4.18** below.

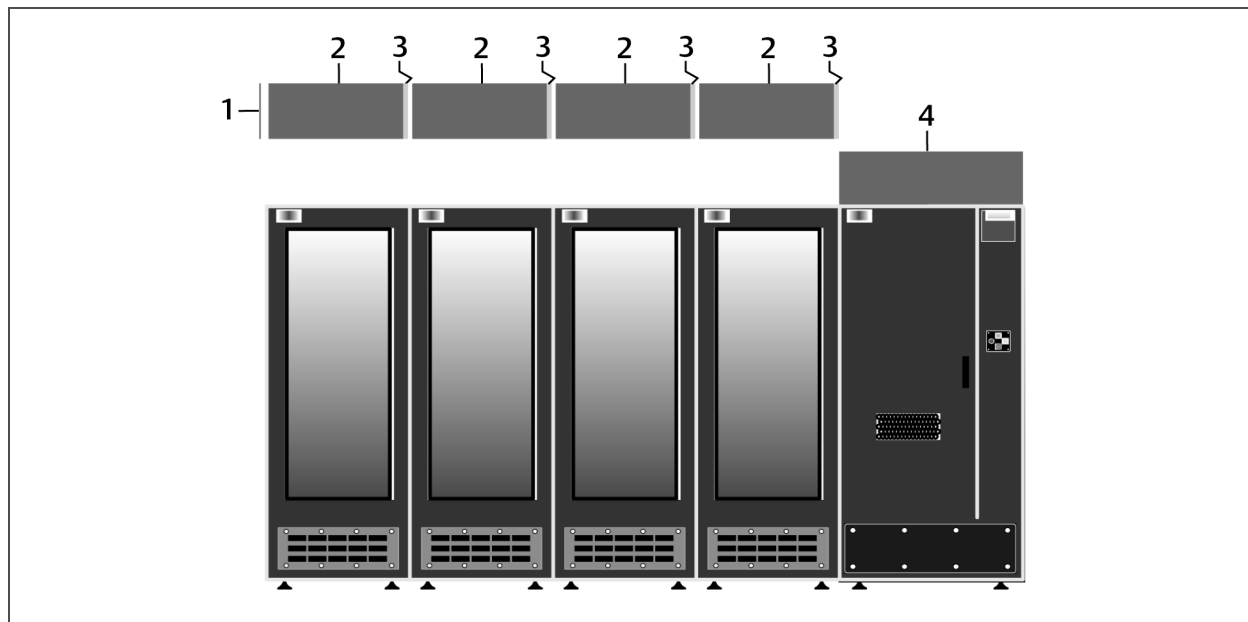
Figure 4.18 Edge guard installation



No.	Description
1	Edge guard

- Place the first DCR Top Plenum-Rack beside the DCR Top Plenum-PDX/PCW, and ensure that gasket side of the Top Plenum-Rack faces the Top Plenum-PDX/PCW, **Figure 4.19** below.

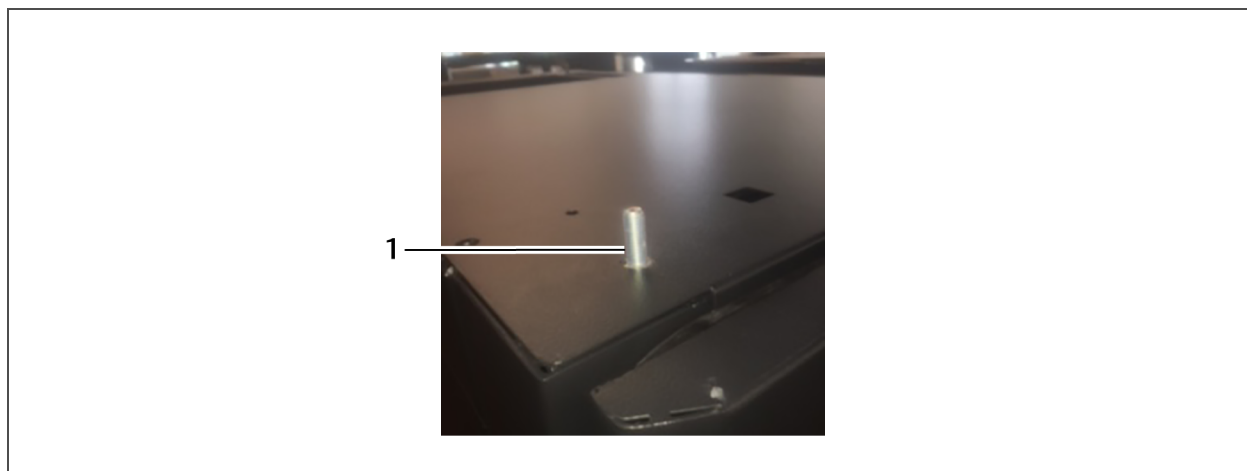
Figure 4.19 Correct orientation of top plenum sections and required side gaskets



No.	Description
1	Side plate cover (shipped loose)
2	Rack top plenums
3	Gasket
4	PDX/PCW top plenum

6. Attach the Top Plenum-Rack to the DCR Rack:
 - Position the top plenum over the 4 attachment points on the top of the rack, see **Figure 4.20** below.
 - Secure the plenum with the factory-supplied washers and hex nuts.

Figure 4.20 Plenum attachment point example on top of rack



No.	Description
1	Attachment point

7. Attach the plenums together:
 - Use the (4) 9-mm long spacers that are factory-installed on the left-hand side of each plenum
 - Use factory-supplied locknut and washer to secure the plenum faces together.
8. Repeat steps 6 to 7 for each of the remaining top plenums. There is one DCR Top Plenum-Rack for each DCR Rack.
9. Attach the shipped-loose, side plate cover to the outside of the final top plenum in the row (see **Figure 4.19** on the previous page).

4.9 Installing a Second PDX/PCW (20-kW (N + 1)/36-kW (N) Configuration)

To install a second PDX/PCW:

1. On the secondary DCR Base Plenum-PDX/PCW (DCR-A-301PDX), apply D-shaped gasket to the side that faces the adjacent DCR Rack.
 - The gaskets are cut to the correct length at the factory.
 - Apply the gasket continuously along the profile edge of the plenum frame.
 - Apply pressure to the gasket to make sure it adheres to the frame.
 - At each corner, form a 1-in. to 1.5-in. radius.
 - When you reach the starting point, form a sealed joint by butting the start and finish edges together.
2. Attach the secondary Base Plenum-PDX/PCW to the adjacent Base Plenum-Rack with the 4 factory-supplied Nylock nuts.

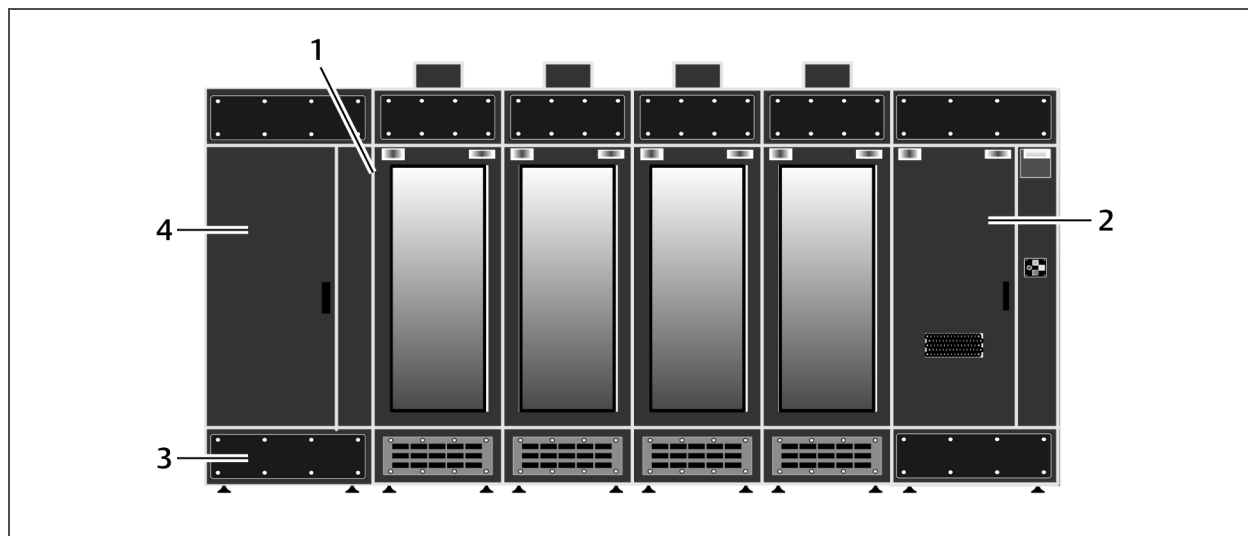
NOTE: Take care not to damage the gasket when setting the PDX/PCW on the DCR Base Plenum-PDX/PCW. If the gasket is damaged, the cooling unit must be removed and the gasket replaced. A damaged gasket will permit cooling air to escape, which will reduce cooling efficiency, increase energy use and adversely affect fire-suppression system operation.

3. Attach the shipped-loose side plate cover to the outside of the secondary Base Plenum-PDX/PCW.

4. Level the secondary Base Plenum-PDX/PCW with other base plenums.
5. Apply D-shaped gasketing to the side of the DCR Rack that is adjacent to the second PDX/PCW, if you have not already done so.
6. Use pallet jacks or similar lifting devices to place the second PDX/PCW on the secondary Base Plenum-PDX/PCW.

The PDX/PCW must be aligned with the back and outer edges of the base plenum that supports it.

Figure 4.21 20-kW (N + 1)/36-kW (N) PDX/PCW option arrangement



No.	Description	No.	Description
1	Gasket	3	Base plenum-PDX/PCW
2	Control panel and Fire-suppression system. PDX/PCW is installed behind panel.	4	Control-panel shell. Second PDX/PCW installed behind shell.

7. Secure the PDX/PCW using the four factory-supplied carriage bolts, see **Figure 4.11** on page 23.
8. Apply supplied gasket material to the side of the PDX/PCW that the DCR Control Panel will rest against, see **Figure 4.13** on page 26.
9. Use a pallet jack or an adequate number of qualified personnel to lift the DCR Control Panel Shell onto the secondary Base Plenum-PDX/PCW.

The DCR Control Panel Shell must be aligned with the front of the base plenum and will be flush with the end of the base plenum.

10. Bolt the DCR Control Panel Shell to the base plenum with the 6 factory-supplied 1/4-20x3/4 bolts.
11. Apply D-shaped gasket to the side of the secondary Top Plenum-PDX/PCW facing adjacent DCR Rack.

12. Install edge guard on the bottom half of the two openings on the secondary Top Plenum-PDX/PCW.
13. Set the secondary DCR Top Plenum-PDX/PCW on the top of the PDX/PCW and DCR Control Panel Shell, and secure it with 6 1/4-20x3/4 bolts.

NOTE: Take care not to damage the gasket when applying it and when setting the DCR Top Plenum-PDX/PCW on the top of the PDX/PCW and Redundant Control Shell. If the gasket is damaged, the cooling unit must be removed and the gasket replaced. A damaged gasket will permit cooling air to escape, which will reduce cooling efficiency, increase energy use and adversely affect fire-suppression system operation.

4.10 Installing and Wiring Sensors

- DCR Return Temperature Thermostat—Activates emergency fans
- Supply Air Temperature Sensor—For supply air temperature control
- 2T Sensor—Sense temperature of each rack; for load balancing
- Smoke Detector—Senses combustion products in the return air to activate fire suppression
- HVAC Fault/Emergency Fan Control, Thermal unit Shutdown

See **Table 11.4** on page 73 for SmartRow DCR field-wiring guidelines

4.10.1 Connect Return-temperature Thermostat, the L5-20 Receptacle and the Smoke Detector

The DCR Return Temperature Thermostat and smoke detector are factory-installed in the DCR Top Plenum PDX/PCW. The L5-20 receptacle, which supplies power for the emergency fans, is factory-installed on the exterior of the DCR Top Plenum-PDX/PCW.

Wiring for the DCR Return-temperature thermostat, smoke detector, and supply power for the Emergency Fan's receptacle must be connected for these items to function properly. To facilitate this connection, a factory-supplied harness is located in the Control Panel and Fire Suppression cabinet. The wiring harness consists of three connector cables:

- 4-pin Smoke Detector connector cable
- 3-pin Emergency Fan supply-power connector (P1)
- 3-pin DCR Return Temperature thermostat connector (P3)

NOTE: The DCR Return Temperature Thermostat is used to activate the emergency fans in the event of a high return air temperature (98°F [37°C]).

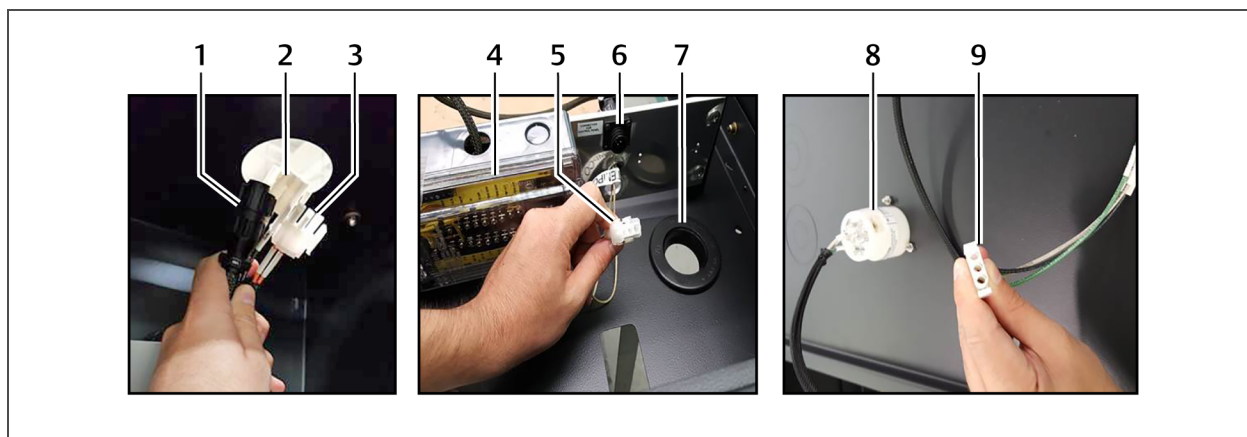
The wiring harness is located in the control panel.

To install and connect the wiring:

1. Locate the wiring harness in the DCR Control Panel and Fire Suppression System, and feed it through the rubber grommet into the DCR Top Plenum-PDX/PCW as shown in **Figure 4.22** on the next page.

2. Connect the wires to the appropriate connection points on the smoke-detector assembly as shown in **Figure 4.22** below.
 - When connecting the Emergency Fan supply-power connector (P1) to its receptacle, it is easier to remove the top plate of the DCR Top Plenum-PDX/PCW, turn it upside down exposing the receptacle points, and making the connections.
 - Once the connections are made, return the top plate to its original position.

Figure 4.22 Wire connection points in the Top Plenum-PDX/PCW



No.	Description	No.	Description
1	4-pin smoke-detector connector cable	6	4-pin smoke-detector connector receptacle
2	3-pin emergency-fan supply-power connector cable (P1)	7	Rubber grommet
3	3-pin return-temperature thermostat connector cable (P3)	8	L5-20 receptacle
4	Smoke detector	9	3-pin emergency-fan supply-power connector receptacle (from top plate of DCR Top Plenum-PDX/PCW)
5	3-pin return-temperature thermostat connector receptacle		

4.10.2 Connecting the Secondary Return-temperature Thermostat (P3R) for 20-kW (N+1)/36-kW (N) Configurations

1. Locate the wire harness with the secondary, 3-Pin return-temperature thermostat connector (P3R) in the Control Panel and Fire Suppression cabinet, and route the wire harness through the rubber grommet as shown in **Figure 4.22** above.
2. In the Secondary Top Plenum-PDX/PCW, locate the 30-ft extension cable with the 3-pin connector for the return temperature thermostat.
3. Connect one side of the extension cable to the 3-pin connector cable in the secondary Top Plenum-PDX/PCW.
4. Route the extension, through the Top Plenum-Rack(s) to the Primary Top Plenum-PDX/PCW, and connect this end of the extension to the 3-pin connector for the return-temperature thermostat.

4.10.3 Connecting the Secondary PDX/PCW Smoke Detector to the Primary PDX/PCW Smoke Detector

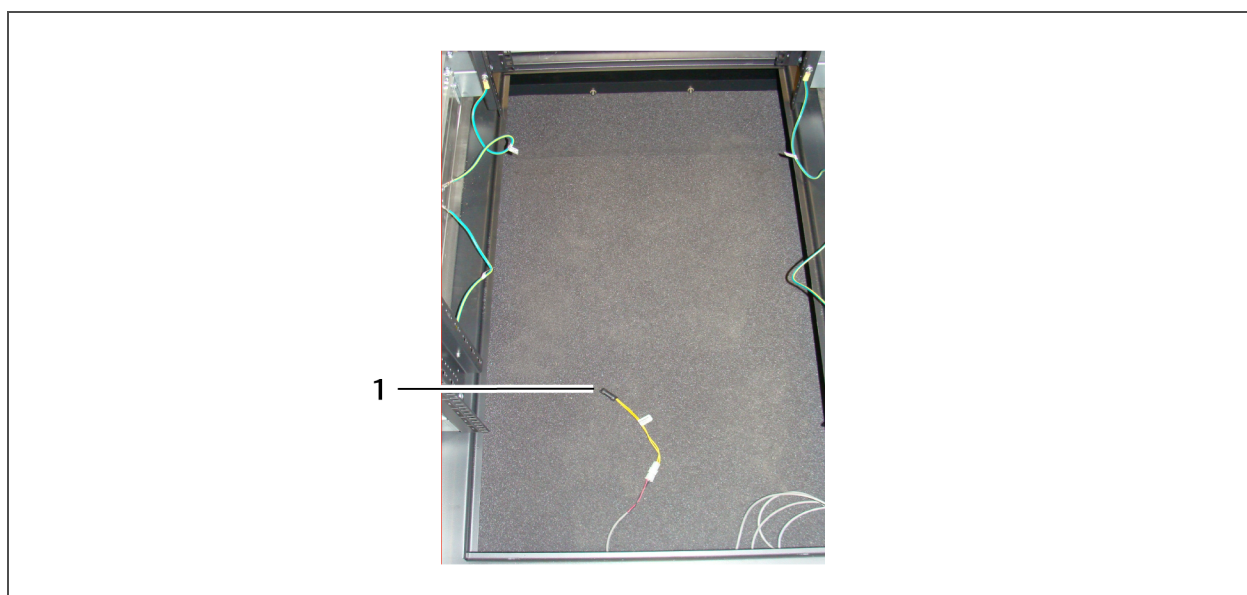
1. In the secondary Top Plenum-PDX/PCW, locate the 30-ft extension cable with the black, 4-pin connector for the secondary PDX/PCW Smoke Detector.

2. Connect one end of the extension cable to the Smoke Detector connection point in the secondary Top Plenum-PDX/PCW.
3. Route the other end through the Top Plenum-Rack(s) to the primary Top Plenum-PDX/PCW, and connect this end of the cable to the smoke-detector connection point on TB2.

4.10.4 Install Supply Air Temperature Sensor

1. Locate the supply air-temperature sensor in the bottom, right-hand corner of the front of the PDX/PCW unit, and cut the wire ties securing it there.
(The Supply Air Temperature Sensor is wired to the iCOM™ at the factory.)
2. Route the wiring into the middle of the second rack base plenum from the PDX/PCW, **Figure 4.23** below.
3. Repeat steps 1 and 2 for a secondary PDX/PCW unit, if applicable.

Figure 4.23 Supply Air Temperature Sensor wiring routed through base plenum



No.	Description
1	Supply-air sensor

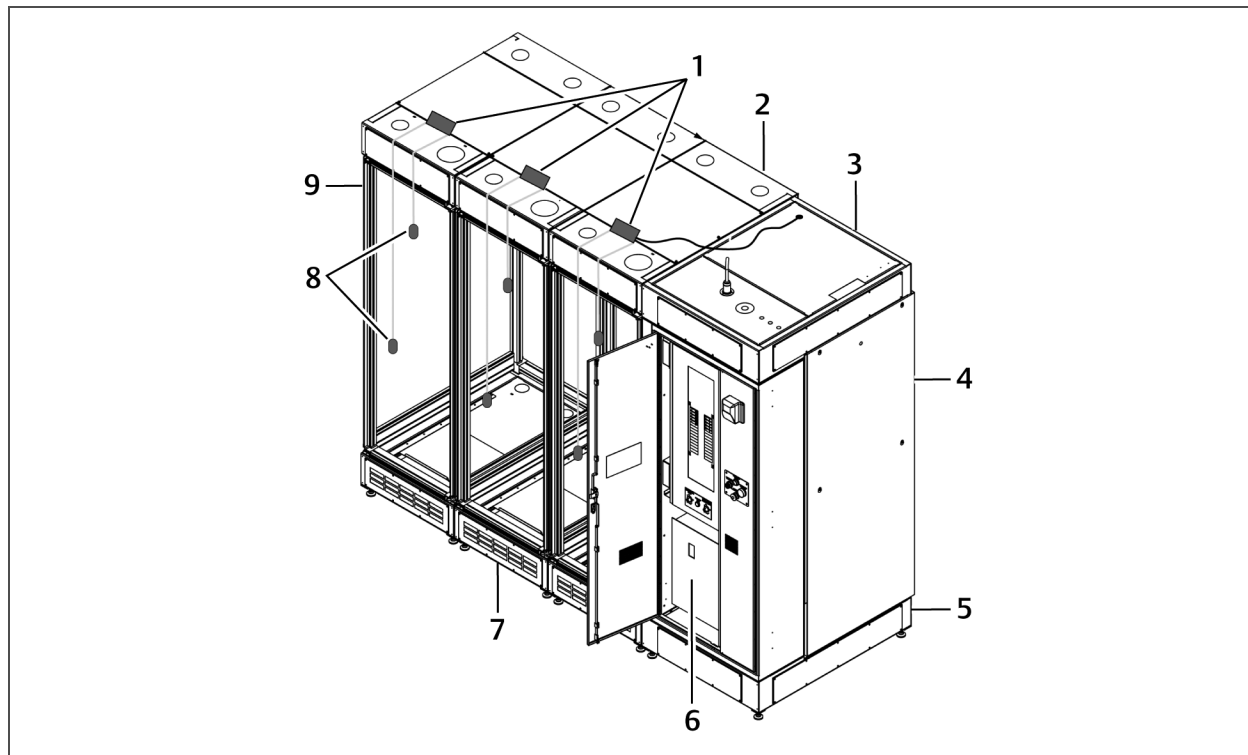
4.10.5 Install and Wire 2T Sensors

2T sensors are factory-installed in the top, front of each rack.

1. Route the wire for both sensors in the front of the racks as shown in **Figure 4.24** on the next page:
 - Install one sensor probe in the middle of the rack.
 - Install one sensor probe near the top of the rack.
2. Locate the coiled CAN cable on top of the PDX/PCW.

3. Uncoil the cable, route it to 2T sensor on the adjacent rack and connect it to the 2T sensor.
4. Connect all adjacent 2T sensors with supplied CAN cable.

Figure 4.24 2T sensor and probe placement



No.	Description	No.	Description
1	2T sensors	6	Control panel and Fire-suppression system
2	Top plenum-rack	7	Base plenum-rack
3	Top plenum-PDX/PCW	8	2T-sensor probes
4	PDX/PCW cooling unit	9	DCR Rack (standard doors; panels and partitions removed for clarity)
5	Base plenum-PDX/PCW		

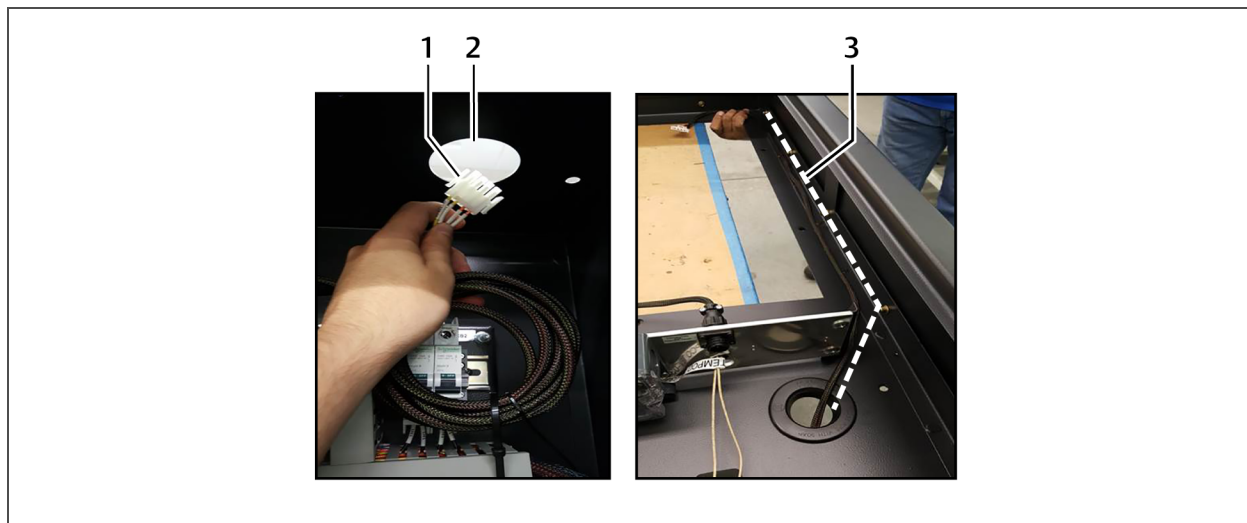
4.10.6 Locate and Install 4-pin HVAC Fault/Emergency Fan Control, Thermal-unit Shutdown Connector Cable (P2)

The wires may be identified by their color:

- Orange wires are HVAC fault/Run Emergency Fans
 - Yellow wires are thermal-unit shutdown.
1. Locate this cable (with the 4-pin connector) in the bottom of the DCR control panel.
 2. Referring to **Figure 4.25** on the facing page, route the cable out of the grommet in the top, right-hand corner of the Control Panel and Fire Suppression module.

3. Again referring to **Figure 4.25** below, route the cable along the right-hand side of the top plenum and connect to the mated low-voltage connector of the PDX/PCW.

Figure 4.25 HVAC fault/Emergency Fan control/Thermal-unit Shutdown cable routing path



No.	Description
1	4-pin connector
2	Rubber grommet
3	Cable path

4.10.7 Connecting Secondary, 4-pin HVAC Fault/ Emergency Fan Control, Thermal-Unit Shutdown Connector Cable (P2R) for 20-kW (N+1)/36-kW (N) Configurations

1. Locate the wire harness with the secondary, 4-pin connector (P2R) in the Control Panel and Fire Suppression cabinet, and route the wire harness through the rubber grommet as shown in **Figure 4.25** above.
2. In the secondary DCR Top Plenum-PDX/PCW (DCR-A-401PDX) locate the 30-ft extension cable with the 4-pin connector.
3. Connect one end of the extension cable to the low-voltage connector attached to the secondary PDX/PCW unit, referring to **Figure 4.25** above for routing the cable.
4. Route the opposite end of the extension cable through the Top Plenum-Rack(s) to the primary Top Plenum-PDX/PCW, and connect this end to the 4-pin connector of the DCR Control Panel and Fire Suppression module.

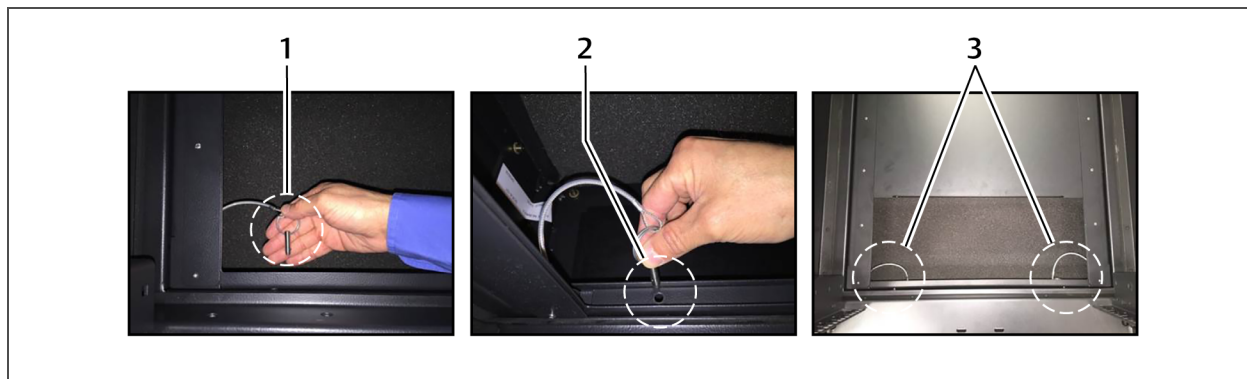
4.11 Adjusting Air-flow Adjustment Dampers

To make sure that the air-flow adjustment dampers stay in place during cooling-unit operation, (2) damper-security push pins are factory-installed in each of the damper assemblies.

1. Refer to **Figure 4.26** on the next page, and locate the pins in the front of the air-supply opening on the damper.

2. Insert the pins in each of the pin openings located directly below the front of the dampers as shown in **Figure 4.26** below.

Figure 4.26 Securing the air-flow adjustment damper



No.	Description
1	Damper-security push pin
2	Pin opening
3	Damper-security pins installed

3. Repeat steps **1** and **2** for the remaining dampers.
4. The damper slides must be opened varying amounts to provide adequate cooling for each DCR Rack:

NOTE: The cooling air flow required by the equipment in a DCR Rack will vary according to several factors, especially the distance from the PDX/PCW and each rack's heat load. Do not obstruct back draft dampers in the bottom plenum. We recommend running all rack PDU cables through the top plenum.

- a. After the SmartRow DCR is operational and the heat loads have time to equalize, check the temperature in each DCR Rack with the racks' doors closed via the 2T sensors connected to the CANbus port on the iCOM.
 - If the 2T sensor reading of a rack is lower than the average leaving air temperature of the other racks, close the inlet damper slightly to reduce cooling air flow.
 - If the 2T sensor reading of a rack is higher than the average leaving air temperature of the other racks, open the inlet damper slightly to increase cooling air flow.
- b. Reposition the air-flow adjustment dampers to equalize the cooling in each rack as needed, referring to **Figure 4.27** on the facing page:
 - Loosen the wing nuts.
 - Move the damper to the position you want.
 - Tighten the wing nuts to make sure the damper doesn't move during operation.
- c. Repeat steps **a** and **b** until the system is equalized.

Figure 4.27 Adjusting the air-flow dampers



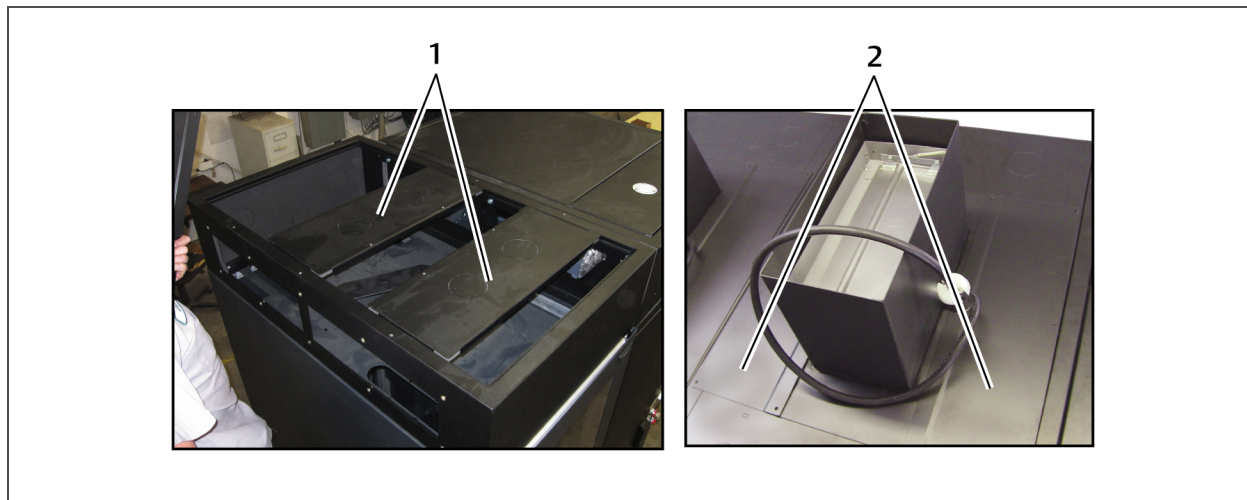
No.	Description
1	Wing nuts

4.12 Install Emergency-fan Assemblies

Fans can be positioned front-to-back or side-to-side depending on the application. Orientation must be consistent with plenum opening.

1. Install the emergency-fan assembly on the rack top plenums:
 - a. Determine the orientation, and position the cover plates on the top of plenum as shown in **Figure 4.28** on the next page.
 - b. Refer to **Figure 4.28** on the next page, and set the emergency-fan assemblies onto the cover plates and bolt each into place with 5/16-in., self-tapping, sheet-metal screws.
2. Repeat step 1 for each remaining DCR Rack.

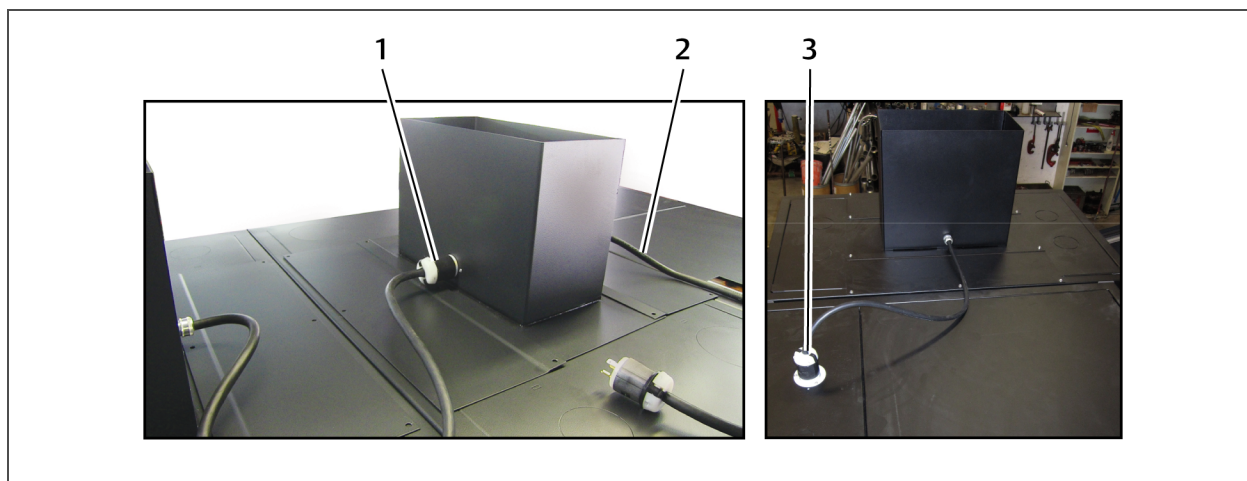
Figure 4.28 Adjust cover plates, place and attach emergency-fan assembly



No.	Description
1	Cover plates
2	Cover plates with holes for screws

3. Plug the emergency fans into outlets on the adjacent Emergency-fan housing as shown in **Figure 4.29** below. Ensure that all fans are daisy-chained to each other.
4. Plug the emergency fan on the rack next to the PDX/PCW into the receptacle on top of the Top Plenum-PDX/PCW, **Figure 4.29**.

Figure 4.29 Connect Emergency Fans



No.	Description
1	Power connection for adjacent emergency fan
2	Power cord
3	Power connection on top plenum of PDX/PCW

4.13 Air/Ventilation Management

Free rack space in the DCR Racks must be blocked with blanking panels. Blocking the open space helps optimize system cooling performance by minimizing short cycling of conditioned air.

Heat loads should be balanced as well as possible among the cabinets. This can be done by distributing equipment evenly among the cabinets to avoid excessive heat concentration. Refer to **Table 3.2** on page 12 for details.

4.13.1 Ventilation Requirements

- The maximum room temperature for a SmartRow DCR is 85°F (29°C).
- The air-supply inlet temperature to the room should match the output capacity of the emergency fans.
- If the room is sealed, the air inlet opening size from the building should be 1.5 ft² (0.14 m²) per rack.
- If the ceiling space is not open to the rest of the building, a damper or grille of 1.5 ft² (0.14 m²) per rack will be required.

4.13.2 Emergency-fan Notes

The emergency-fan assembly for each rack will move nominally 1160 cfm (548 l/s) of air and are powered from the Control Panel and Fire Suppression System through a factory-installed L5-20 receptacle on top of the Top Plenum-PDX/PCW.

If the SmartRow DCR is installed in a dedicated room and airflow inlet and outlet openings to the room are not provided, the emergency fans will remove cabinet heat for only a short time.

4.14 Cable Management

The SmartRow DCR includes factory-supplied cable-management accessories throughout the system, taking advantage of industry best practices. Follow these cable-management guidelines to help ensure optimal performance of your system.

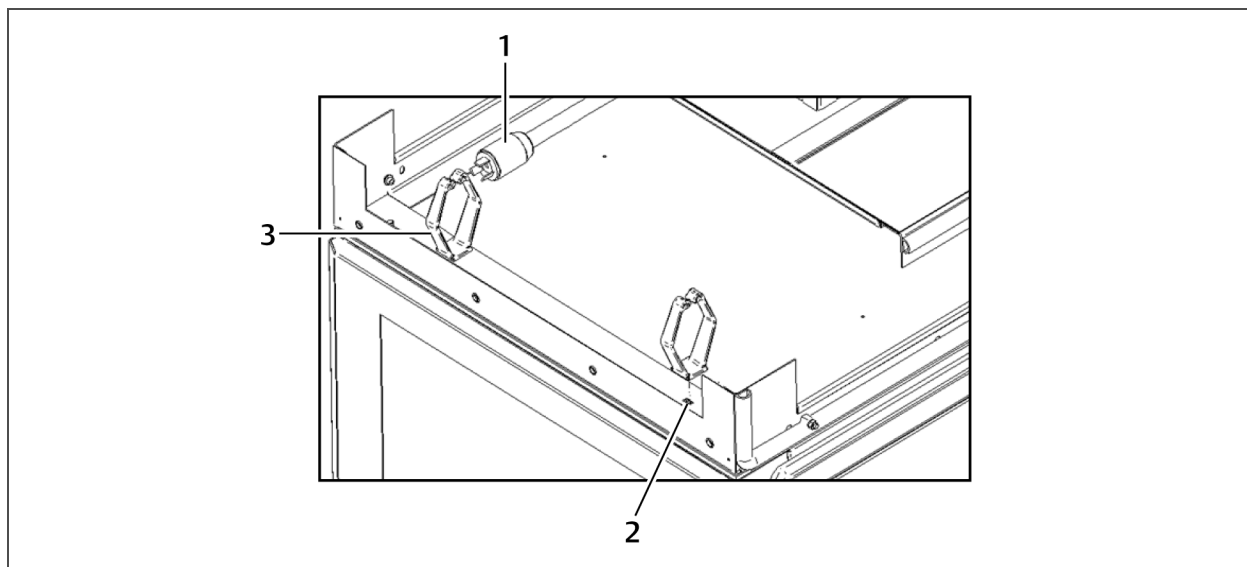
4.14.1 Prepare for Cable Management

1. On Top Plenum(s)-Rack, remove the access panel from the front and rear of the plenum and locate the two rectangular cutouts on each side, shown in **Figure 4.30** on the next page.

2. Install the factory-supplied lobster claws in the rectangular cutouts, 1 on each side of the plenum (2 in the front and 2 in the rear of the plenum).
3. Repeat steps 1 and 2 for each Top Plenum-Rack in your system.

NOTE: Run High-voltage power whips in the front of the row. Run Ethernet and other network cabling in the rear of the row.

Figure 4.30 Lobster-claw installation (power whips not shown)



No.	Description
1	PDU plug
2	Rectangular cutouts (2 in front and 2 in rear of plenum, 4 total)
3	Lobster claw installed

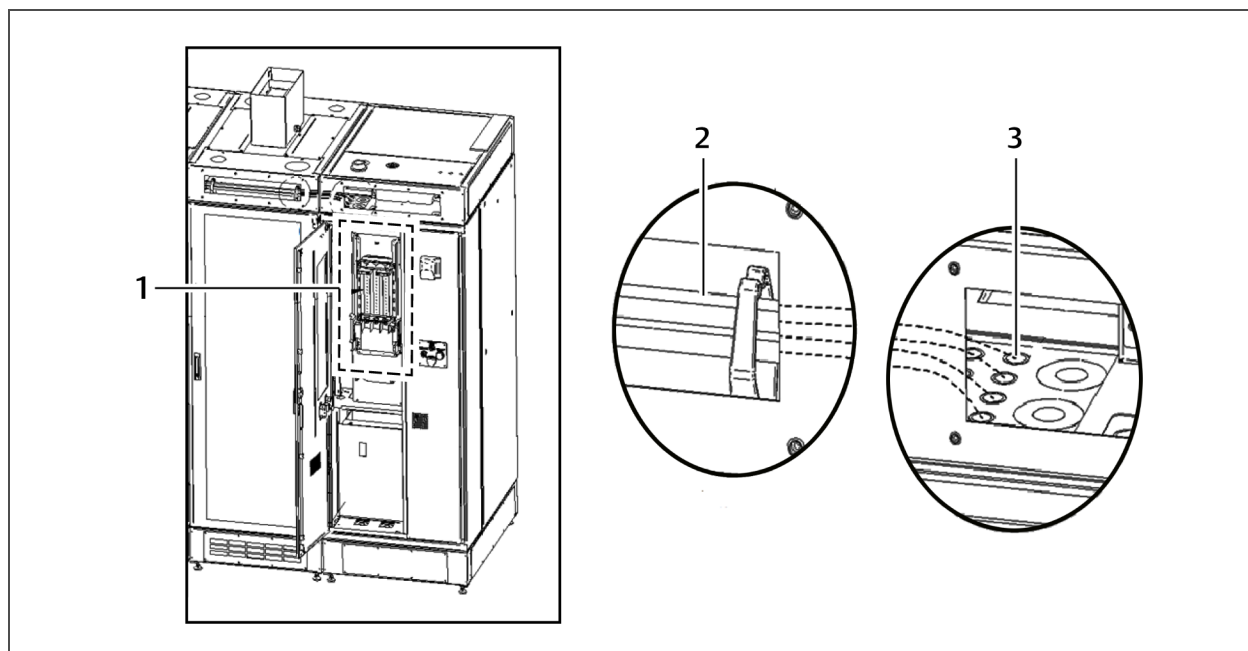
4.14.2 Routing Power Whips

Route power whips on the front of the row.

1. Locate the Rack/PDU Circuit breaker in the Load distribution center, **Figure 4.31** on the facing page.
2. Identify the field-supplied power-cable whip and refer to **Figure 4.31** on the facing page:
 - a. At the start or end of the DCR row, connect the whip to the PDU plug (shown in **Figure 4.30** above).
 - b. Route the whip through the (2) front-side lobster claws of each of the Top Plenums-Rack.
 - c. Punch-out the knockouts in the top of the Control Panel & Fire Suppression system.
 - d. Attach whip to the Rack/PDU Circuit breaker in the Load distribution center in the Control Panel & Fire Suppression system.

3. Repeat steps 1 and 2 for each power whip until complete.

Figure 4.31 Power whip routing, knockouts, and circuit-breaker connection



No.	Description
1	Circuit breakers in load-distribution center
2	Whips routed in front of plenum
3	Knockouts in top of Control panel/Fire-suppression system

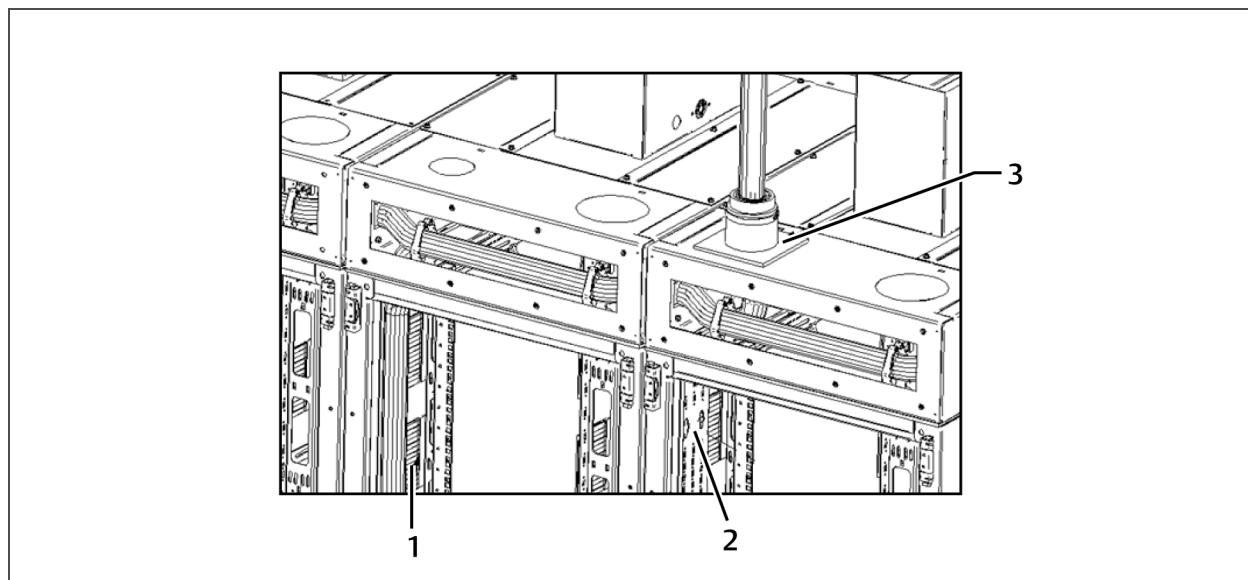
4.14.3 Routing Network Cables—Ethernet and Fiber-optic

NOTE: Follow best practices for cable routing and management. Refer to SL-11364 for further details.

Route the network cables on the rear of the row.

1. Route the cables into the DCR using the sealed cable-entrance kit, **Figure 4.32** on the next page.
 - You can use the kit in each rack or you can group all cables into a “main trunk” that enters through the Network rack.

Figure 4.32 Rear of Top Plenums and sealed cable entrance example



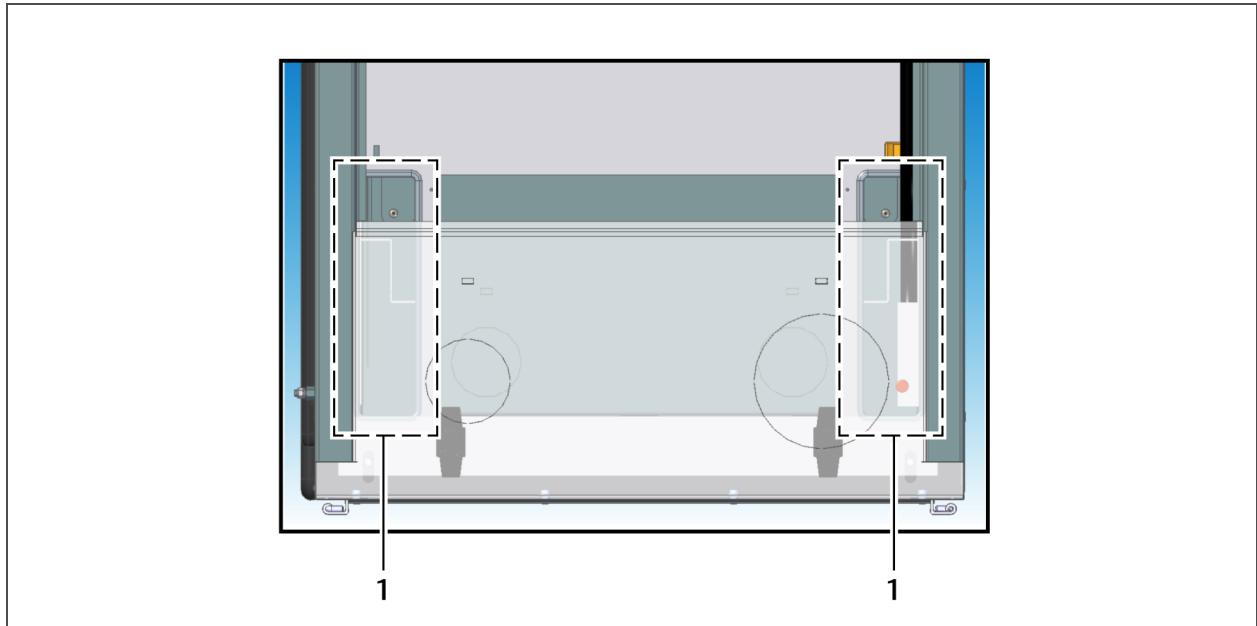
No.	Description
1	Cable-pass-through side panels
2	PDU/Cable-management brackets
3	Sealed cable entrance

2. Once inside the rack, route the cables through the top plenums or through the cable-pass-through side panels:
 - a. Route the cabling down through the cable-entrance openings in the rack Top Panel, **Figure 4.33** on the facing page.
 - b. Then, route the cables to the front of the racks where you can use the factory-supplied cable management fingers, **Figure 4.34** on page 48, and the field-supplied cable-management tools you choose.

NOTE: Inter-cabinet routing can be completed using a variety of DCE cable-management accessories.

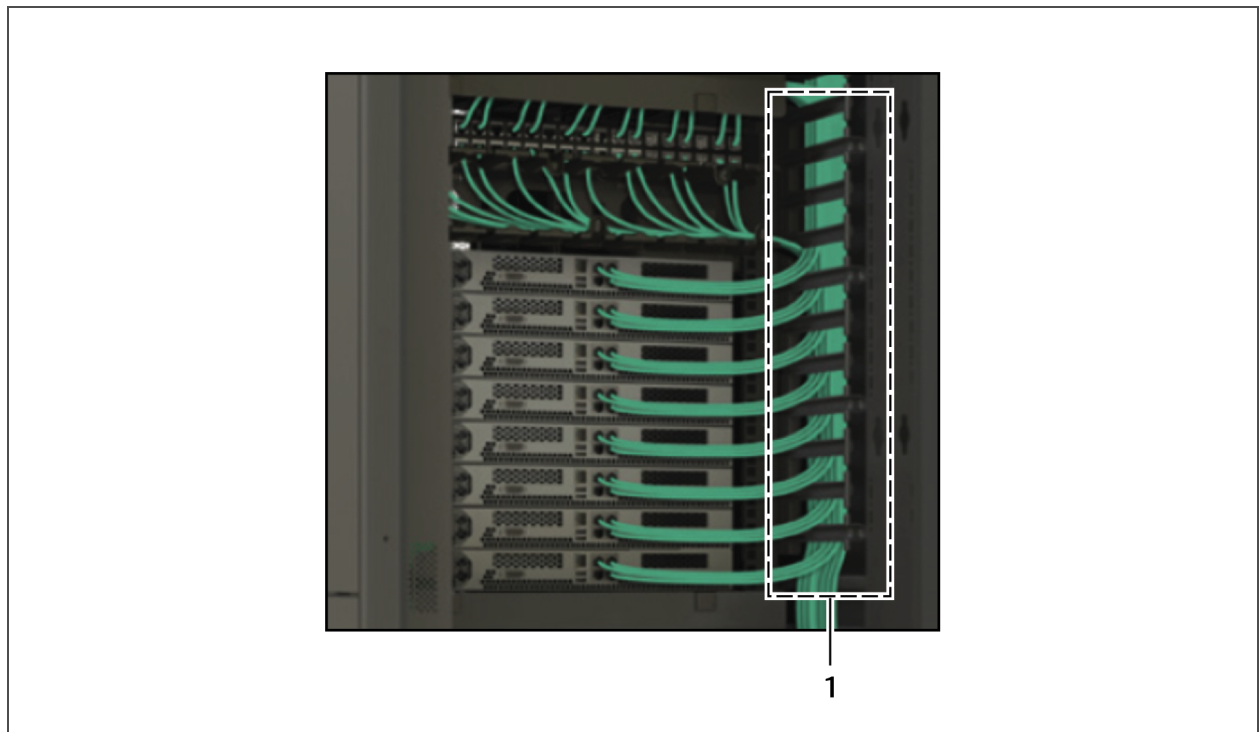
- Once all cable-routing is complete, attach the shipped-loose side plate cover (from the primary Top Plenum-PDX/PCW) to the outside of the top plenum at the end of the row.

Figure 4.33 Cable entrances in Top rack plenum, looking down through the top surface-rear door



No.	Description
1	Cable entrances

Figure 4.34 Factory-supplied cable-management fingers, shown in the front of network rack



No.	Description
1	Cable-management fingers

5 POWER CONNECTIONS

5.1 Power Connections to PDX/PCW

Provide input power to the PDX/PCW on its own dedicated circuit based on the specific PDX/PCW configuration requirements. Input power to the PDX/PCW must not be connected through the 225A 3PH or 125A 1PH load center in the DCR Control Panel and Fire Suppression System. Refer to the PDX/PCW user manual that shipped with the unit and is available at <http://www.VertivCo.com/en-us/support/>.

For electrical and piping connections, the PDX/PCW can be top-fed, bottom-fed or a combination of the two. Connections are made through the knockouts in the bottom of the PDX/PCW electrical panel/box. For top access, power wiring is routed through the PDX/PCW top piping chase.

NOTICE

Risk of improper power input. Can cause equipment damage or degraded cooling.

The PDX/PCW must be powered separately by a dedicated circuit. Power must not be supplied from the 225A 3PH or 125A 1PH panel, in part because of potential electrical noise problems.

5.2 Input Power Wiring Alternatives to DCR Control Panel and Fire Suppression System and Rack Equipment

The load-distribution center located inside the DCR Control Panel and Fire Suppression System requires connection to either a 120/208VAC, 3-phase, 5-wire connection, or a 120/208VAC, 1-Phase, 4-wire connection depending on the phase of the load-distribution center selected.

Two 120 VAC, 15 A branch breakers are supplied for:

- DCR Control Logic/Emergency Ventilation Fans
- Fire Suppression System

The user must supply branch breakers, whips and wiring for all rack equipment, including optional rack PDUs, rack UPSs and general connectivity.

The SmartRow DCR Fire Suppression system and the Control-logic/Emergency-fan circuits must be connected to an on-line, double-conversion UPS power source to ensure that the Fire-Suppression system, Control Logic and Emergency ventilation fans do not lose power in the event of any type of power interruption. The remote emergency-power-off (REPO) switch for the UPS may be a normally-open (N/O) or normally-closed (N/C).

NOTE: The connection requirements to the SmartRow DCR for each system is different. UPS systems with a N/O REPO switch must tie-in to terminals 25 & 26A, and the jumper between terminals 21 and 22 must be removed. UPS systems with a N/C REPO switch must tie in to terminals 25 & 26 (See the figure "SmartRow DCR control logic" in [Technical-installation Illustrations](#) on page 75). It is critical that this UPS is connected to the system correctly.

The remaining UPS systems that are connected to loads within the SmartRow DCR system must be N/C systems. Please refer to the figure "SmartRow DCR control logic" in [Technical-installation Illustrations](#) on page 75," for further details.

NOTE: To determine if an electrical disconnect is required to be installed in conjunction with the use of the SmartRow DCR, consult local codes and agency requirements.

5.2.1 Single Bus—SmartRow DCR Load Supplied by a Single UPS

1. Connect the UPS to the load-distribution center located in the SmartRow DCR Control Panel and Fire Suppression System.
2. Use customer-supplied whips to route power from the load-distribution center to the individual racks as required.
3. Once power is routed to the racks, optional Rack PDUs can be installed and plugged in to distribute power to the rack equipment.
4. Connect emergency fans.

5.2.2 Single Bus—SmartRow DCR Load Supplied by Rack-mounted UPS

1. Connect utility input power to the load-distribution center in the DCR Control Panel and Fire Suppression System.
2. Use customer-supplied whips to route input power from the load-distribution center to each rack UPS as required.
3. Once power is routed to the rack UPSs, Rack PDUs can be installed and plugged in to distribute power to the rack equipment.
4. Connect emergency fans to the UPS(s) in the rack or to Rack PDUs connected to the UPS in the rack.
5. Connect the DCR Control Logic and Fire Suppression system circuits to a rack-mount UPS (See the figure, "SmartRow DCR with rack-mounted UPS systems" in [Technical-installation Illustrations](#) on page 75).

NOTICE

Risk of improper electrical connections. Can cause equipment damage.

5.2.3 Dual Bus—SmartRow DCR Load Supplied by Two Central UPSs

1. Connect UPS A to the load-distribution center in the DCR Control Panel and Fire Suppression System.
2. Connect UPS B to the Redundant Load Distribution Center.
3. Connect equipment on Circuit A to output power from the load-distribution center.
4. Connect equipment on Circuit B to output power from the redundant load-distribution center.
5. Connect emergency fans in a daisy chain to the connection on top of the DCR Top Plenum-PDX/PCW (L5-20R).
6. Wire Circuit A and Circuit B (See the figure, "SmartRow DCR with rack-mounted UPS systems" in [Technical-installation Illustrations](#) on page 75).

6 LIEBERT iCOM™ CONTROLS SET-UP

The iCOM provides control of the PDX/PCW and monitoring of conditions in the DCR Racks. If more than one SmartRow DCR is installed, the iCOM's may be networked so that each can be monitored or controlled from a single location.

Field-wiring is required for the iCOM, even if it is part of a stand-alone unit, as in a single SmartRow DCR. Refer to the PDX/PCW installation manual, SL-19800, or to the iCOM user manual, SL-18841. The manuals are available at <http://www.VertivCo.com/en-us/support/>.

The PDX/PCW with iCOM has IntelliSlot™ slots for use with optional communication card:

- IntelliSlot UNITY-DP card

Each card employs the Velocity Protocol to monitor and manage a wide range of operating parameters, alarms, and notifications. The cards communicate with Vertiv software tools & services, including Trellis®, SiteScan Web™ and Nform™. Visit www.VertivCo.com for the latest supported protocols.

The iCOM must be configured as stated in this section for the SmartRow DCR to operate properly. These instructions are applicable to SmartRow DCR systems with one or two PDX/PCW units and all cooling-system types (air-cooled, water/glycol and chilled water). These configurations must be made on each cooling unit, even if the units are networked, because not all settings are shared. These Settings are factory set, but the this documentation illustrates how to set them if anything were changed or was malfunctioning for some reason.

6.1 iCOM Installation Prerequisites


- The SmartRow system is fully-assembled according to this Guide.
- The 2T rack temperature sensors are installed on the front (cold side) of each rack in the active air stream.
- The supply-air temperature sensors are properly located in the supply air stream.
- If the DCR has two cooling units, make sure that they are connected and communicating with each other via Ethernet switch (vNSA or equivalent).

6.2 Liebert iCOM Set-up for all SmartRow DCR Types

Log-in to the iCOM control, and perform these set-up procedures on all system types.



To log in:





At the iCOM display on the PDX/PCW unit, touch , and enter the service-level password: **5010**.

6.2.1 Set Temperature-control Setpoints

Adjust these settings for all PDX/PCW units in your system.




1. Touch  then the Menu icon () > *Setpoints* > *Temperature Control*, enter the following parameter settings then touch save:
 - Temperature Control Sensor: *Remote Sensor*
 - Temperature Setpoint: 65°F (or your preferred setpoint)
 - Temperature Control Type: *PI*
 - AutoSet Enabled: *No*
 - Temperature Proportional Band: 25°F
 - Temperature Integration Time: 5 min
 - Temperature Deadband: 2°F

NOTE: After the IT equipment is loaded and operational, if the SmartRow DCR system cooling capacity is responding too slowly to heat-load changes, decrease the Temperature Integration Time, which dampens iCOM's rate of change.

2. Touch  then  > *Setpoints* > *High/Low Limit Control*, then set Supply Limit Enabled to *No*, and touch *Save*.

6.2.2 Set a Fixed Fan Speed



Adjust these settings for all PDX/PCW units in your system.

1. Touch  then  > *Setpoints* > *Fan Control*.
2. In the Fan Control Sensor field, select: *MANUAL*, and touch *Save*.
3. Touch  > *Options Setup* > *Fan Settings*, enter the following settings, then touch *Save*:
 - Dehumidification Fanspeed: 100
 - No Power Fanspeed: 100

6.2.3 Prevent False High- and Low-temperature Alarms

Because of the high rate of air exchange inside the SmartRow DCR, you need to adjust the delay time of the alarm triggers from factory defaults to avoid false/nuisance alarms.

NOTE: The system must use V4 IS cards (Unity) to report temperature alarms remotely.

1. Touch  then  > *Alarm/Event Setup* > *Remote Sensor Alarms*, enter the following settings, then touch *Save*.
 - Remote Sensor Alarms Enable: *Com Set*



NOTE: The selection, “Com Set,” uses a “Common Setpoint” for the delay on all sensors.

- Remote Sensor Alarms Init Delay: 180 seconds
- Rem Sens 1-10 HI TEMP: 90°F (for the remote 2T rack sensors)
- Rem Sens 1-10 LO TEMP: 55°F (for the remote 2T rack sensors)

6.2.4 Prevent Emergency Fan Activation by Warnings

Adjust these settings for all PDX/PCW units in your system.

This setting disables the activation of the relay to prevent a warning event, such as reaching a low-temperature threshold on a rack, from activating the emergency-ventilation fans.

1. Touch , then  > *Options Setup* > *Misc Settings*.
2. In *Warning Activates Alarm Relay*, select *No*, and touch *Save*.

NOTE: If a warning occurs, it is still recorded in the event log.

6.2.5 Set Cooling Control by Remote-rack, 2T Temperature-sensor Readings

Adjust these settings for all PDX/PCW units in your system.



These settings make sure that the cooling capacity or “call for cooling” (CFC) are driven by the readings from the remote 2T rack sensors.

IMPORTANT! The return air temperature sensor should never be used as a controlling sensor in the SmartRow DCR.

IMPORTANT! Make sure that the 2T temperature-sensor probes are located in an active air stream, not in front of blanking plates.



NOTE: Additional 2T temperature sensors may be installed in the SmartRow DCR for monitoring, such as determining the temperature in the rear of the racks. These sensors must be setup as “Reference,” not “Control.”

NOTE: If iCOM loses communication with the remote rack sensors, it automatically reverts to the supply-air temperature sensor in the base plenum for control.

1. Touch , then  > *Auxiliary Device Setup* > *Sensors* > *Wired Remote Sensors Setup*, enter the following settings, and touch *Save*.
 - Individual Remote Sensors Mode: *Maximum*
 - Unit Remote Sensors Mode: *Maximum*
2. Touch each sensor, Sensor 01 to 10, and make sure that those installed on the front (cold) side of the racks are set to *Control* (not *Reference*), then touch *Save*.

6.2.6 Confirm Alarm and Event Default Settings

Verify these settings for all PDX/PCW units in your system.

1. Touch , then  > *Alarm/Event Setup*.
2. For all PDX/PCW units in your system, refer to **Table 6.1** on the next page, and, if the “Change to” column lists a value, change the parameter setting and touch *Save*.
3. If you have a PDX air-cooled or water/glycol-cooled (compressorized) units, refer to **Table 6.2** on the next page, and, if the “Change to” column lists a value, change the parameter setting and touch *Save*.

NOTE: The settings listed in step 3, do not apply to PCW chilled-water-cooled units.

4. If you have a PDX water/glycol-cooled unit, refer to **Table 6.3** on the facing page, and, if the “Change to” column lists a value, change the parameter setting and touch Save.
5. Once you’ve confirmed these settings, proceed to the section specific to your system and follow the steps:
 - [Additional Set-up: 20-kW, Non-redundant Systems](#) on page 55
 - [Additional Set-up: 20-kW, N+1 Redundant Systems](#) on page 55
 - [Additional Set-up: 36-kW, Non-redundant Systems](#) on page 56

Table 6.1 Alarm & Event Setup for all PDX/PCW Units

Panel	Parameter	Default Value	Change to	Alarm type	Change to
Return Sensor Alarms	Return Sensor Alarms Enable	Enable	—	—	—
High Return Temp	Current Threshold	100°F	87°F	—	—
	Notifications	Enable	—	Warning	—
Remote Alarm Devices Input	Water Alarm Shuts Down Unit	No	—	—	—
	Water Under Floor > Notifications	Enable	—	Alarm	Warning
	Cond Pump - High water > Notifications	Enable	—	Alarm	Warning
	Loss of Flow	Enable	—	Alarm	Warning
	Standby Unit ON > Notifications	Enable	—	Alarm	Warning
	Customer Input 1 > Notifications	Enable	—	Warning	—
	Customer Input 2 > Notifications	Enable	—	Warning	—
	Customer Input 3 > Notifications	Enable	—	Warning	—
	Customer Input 4 > Notifications	Enable	—	Warning	—
	Call Service > Notifications	Enable	—	Alarm	Warning
Misc Events	High Temperature > Notifications	Enable	—	Alarm	Warning
	Loss of Airflow > Notifications	Enable	—	Alarm	—
	EC Fan Fault > Notifications	Enable	—	Alarm	—
	Clogged Filters > Notifications	Enable	—	Warning	Message
	Hrs. Exceeded	Enable	—	Warning	—

Table 6.2 Alarm & Event Setup for Air-cooled and Water/Glycol-cooled Units (Compressorized)-Not for Chilled-water Cooled

Panel	Parameter	Default Value	Change to	Alarm type	Change to
Compressor Alarms	Comp 1 Overload > Notifications	Enable	—	Alarm	Warning
	Circuit 1 High Press > Notifications	Enable	—	Alarm	Warning
	Circuit 1 Low Pressure > Notifications	Enable	—	Alarm	Warning
	Digital Scroll High Temperature > Notifications	Enable	—	Alarm	Warning

Table 6.3 Alarm & Event Setup for Water/Glycol-cooled Units Only

Panel	Parameter	Default Value	Change to	Alarm type	Change to
Remote Alarm Devices Input	Stby Glycol Pump On > Notifications	Enable	—	Alarm	Warning

6.3 Additional Set-up: 20-kW, Non-redundant Systems

NOTE: Before making these changes, complete the procedures detailed in [Liebert iCOM Set-up for all SmartRow DCR Types](#) on page 51.

These settings apply to SmartRow DCR systems with a single PDX/PCW unit, so make sure all of these multi-unit functions are disabled.



Touch **SERVICE**, then  > *BMS & Teamwork Setup* > *Teamwork / Standby* > *Teamwork Mode*, enter the following settings, and touch *Save*:

- Teamwork Mode: *0 No*
- Cascade Units: *No*

The iCOM set-up is complete.

6.4 Additional Set-up: 20-kW, N+1 Redundant Systems


NOTE: Before making these changes, complete the procedures detailed in [Liebert iCOM Set-up for all SmartRow DCR Types](#) on page 51.

These settings apply to systems with two PDX/PCW units with 1 unit operating and 1 unit in stand-by, and configure the following multi-unit functions:

- Teamwork, cascade, and rotation to share sensor readings between the cooling units and ensures efficient operation while meeting the required cooling capacity.
- Prevent high-temperature from starting both cooling units because the feature must be re-set manually, and the teamwork/stand-by settings provide the appropriate supplemental cooling automatically in a high-temperature scenario.
- Prevent false high-humidity alarms, by setting a longer delay for the alarm, which allows the humidity-sensor reading time to adjust because the stand-by unit is not in the active air stream when it rotates into operating mode.

To adjust set settings for redundant systems:




1. Touch **SERVICE**, then  > *BMS & Teamwork Setup* > *Teamwork / Standby*.
2. Touch *Teamwork Mode*, in the Teamwork Mode field, select *1 Parallel*, and touch *Save*. The *Based On* field displays.
3. In *Based On*, select *Maximum*, and touch *Save*.
4. Touch *Standby*, enter the following settings, and touch *Save*:
 - Number of Standby Units: *1*
 - Start All Standby Units by High Temperature: *No* (This is the setting that prevents starting both cooling units on a high-temperature alarm.)
5. Touch *Unit Rotation*, enter the following settings, and touch *Save*:

NOTE: Schedule rotation at a time when those responsible for SmartRow DCR operation are present.

- Rotation Frequency: *Every WED* (this selection is an example, schedule a convenient day)
- Rotate at: *9:00 AM* (this selection is an example, schedule a convenient time)
- Rotate by: *1*

6. Touch *Teamwork Mode*, select *Cooling* in the Cascade Units field and touch *Save*. The additional cascade parameters display.
7. Enter the following cascade settings, and touch *Save*:
 - Cascaded Units Delay: 3 min
 - Cascaded Units Quick Start: 15 sec
 - Cascaded Units Control Delay: 0 min
 - Cascaded Units Min Run: 5 min




8. Touch **SERVICE**, then  > *Alarm/Event Setup* > *Return Sensor Alarms* > *High Room Hum* > *Notifications*, set the Delay to 120, and touch *Save*.
(This is the setting that prevents false high-humidity alarms.)
9. Repeat steps 1 to 8 for the second PDX/PCW unit, then the iCOM set-up is complete.

6.5 Additional Set-up: 36-kW, Non-redundant Systems

NOTE: Before making these changes, complete the procedures detailed in [Liebert iCOM Set-up for all SmartRow DCR Types](#) on page 51.

These settings apply to systems with two PDX/PCW units with both units operating to provide even and adequate distribution of cool air in low-load conditions and prevent overcooling and undesired dehumidification. In this configuration, the fans on both units operation constantly and compressor operation is rotated to balance run hours.



1. Touch **SERVICE**, then  > *BMS & Teamwork Setup* > *Teamwork / Standby*.
2. Touch *Teamwork Mode*, enter the following settings, and touch *Save*:
 - Teamwork Mode: *1 Parallel*
 - Cascade Units: *No*
The Based On field displays.
3. Touch *Standby*, select 1 in Number of Standby Units, and touch *Save*.
4. Touch *Unit Rotation*, enter the following settings, and touch *Save*:

NOTE: Schedule rotation at a time when those responsible for SmartRow DCR operation are present.

- Rotation Frequency: *Every WED* (this selection is an example, schedule a convenient day)
 - Rotate at: *9:00 AM* (this selection is an example, schedule a convenient time)
 - Rotate by: *1*
5. Repeat steps 1 to 4 for the second PDX/PCW unit, then the iCOM set-up is complete.

7 DCR CONTROL PANEL AND FIRE SUPPRESSION SYSTEM

The SmartRow DCR must be installed in compliance with all applicable national, state and local fire codes. An emergency power off (EPO) switch is provided as one means of meeting regulations. Additional field-supplied connections to the system may be required, depending on the applicable regulations, the equipment configuration and the user's operational preference.

The DCR Control Panel and Fire Suppression System has been fully tested and certified at the factory.

The DCR Control Panel and Fire Suppression System is shipped with wiring that, if required by local fire code, must be field-connected to the shutdown circuits of the PDX/PCW and any connected UPS systems.

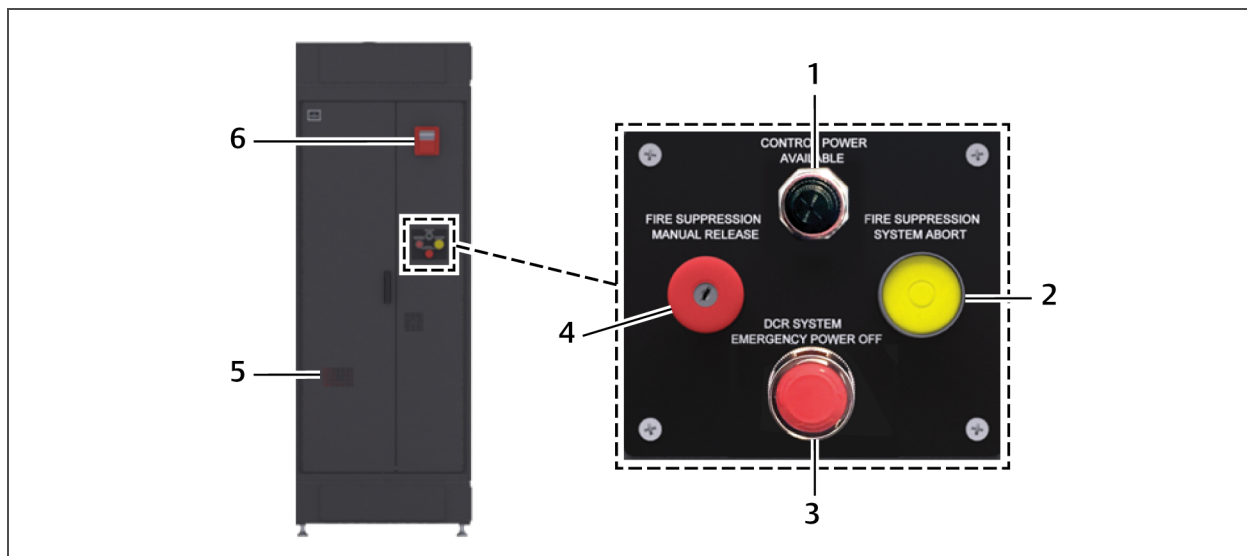
Under NFPA regulations, systems protected by a clean fire-suppression agent can be left with the UPS and HVAC systems operational at the discretion of the owner and local fire officials.

The DCR Control Panel and Fire Suppression System should be field-connected as a separate zone to the building fire detection and alarm system.

If the SmartRow DCR is installed in a dedicated room, an additional strobe and horn may be installed at the entrance to the room. Contact your local authorized service representative if required.

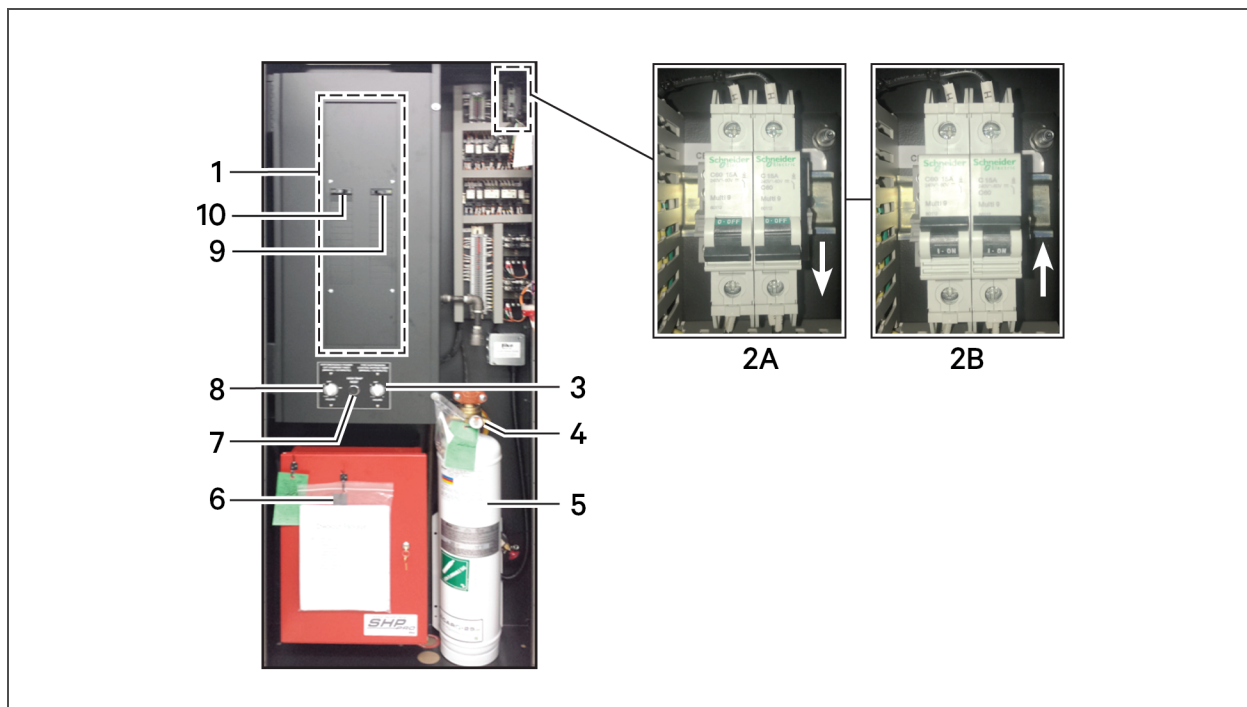
7.1 DCR Control Panel and Fire Suppression System Component Locations

Figure 7.1 DCR Control Panel and Fire Suppression System, exterior features



No.	Description	No.	Description
1	Control-power available light	4	Manual fire-suppression release button (key-opened)
2	Fire-suppression-system abort button	5	Viewing window (for fire-system status LEDs)
3	Emergency power-off button	6	Horn and strobe

Figure 7.2 DCR Control Panel and Fire Suppression System internal features



No.	Description
1	Load-distribution center
2A	Control-logic circuit breakers in "Off" position
2B	Control-logic circuit breakers in "On" position
3	Fire-suppression-control bypass timer
4	Fire-suppression tank gauge
5	Fire-suppression tank
6	Fire-system status LEDs
7	High-temp reset button
8	Emergency power-off override timer
9	15-A branch circuit breaker for fire-suppression control panel
10	15-A branch circuit breaker for control-logic and emergency-fan circuit

7.1.1 Control Panel and Fire Suppression System Components Operation

Table 7.1 on the facing page, shows each component, describes what each one does, and how to use it.

Table 7.1 Component operation for the DCR Control Panel and Fire Suppression System










Component	Action	Operation
	<p>Emergency power-off (Non-latching button)</p> <p>Press the EPO button on the front door of the Control Panel and Fire Suppression System.</p> <p>Press the Remote EPO (REPO) button(s) if they are connected to the system.</p> <p>Note: Systems manufactured and shipped before August 26, 2016 have the non-latching EPO button.</p>	<p>The EPO button is a spring loaded, non-latching button.</p> <p>To engage the EPO: Press the button once and the system shuts down.</p> <p>To disengage the EPO: Press the EPO button once more.</p> <p>When engaged, all cooling units, UPS(s) (if wired into EPO circuit), Fire suppression and emergency ventilation fans (if running) power down. There are multiple ways to configure the EPO circuit per the electrical schematic to comply with local codes, so your operation may vary. However, all equipment can be wired to shutdown.</p> <p>If equipped, the Shunt trip breaker in the load panel can be wired to open as well.</p>
	<p>Emergency power-off (Latching button)</p> <p>Press the EPO button on the front door of the Control Panel and Fire Suppression System.</p> <p>Press the Remote EPO (REPO) button(s) if they are connected to the system</p> <p>Note: Systems manufactured and shipped after August 26, 2016 have the latching EPO button.</p>	<p>The EPO button is a latching button.</p> <p>To engage the EPO: Press the button until it latches and the system shuts down.</p> <p>To disengage the EPO: Pull-out the EPO button.</p> <p>When engaged, all cooling units, UPS(s) (if wired into EPO circuit), Fire suppression and emergency ventilation fans (if running) power down. There are multiple ways to configure the EPO circuit per the electrical schematic to comply with local codes, so your operation may vary. However, all equipment can be wired to shutdown.</p> <p>If equipped, the Shunt trip breaker in the load panel can be wired to open as well.</p>
	<p>Resetting emergency ventilation fans</p> <p>Push the High Temp Reset button after an event in which the fans have activated and lowered the return air temperature to 89°F ±3°F or lower.</p>	<p>Deactivates the emergency ventilation fans after the safe temperature is reached.</p> <p>Allows cooling unit to reactivate when possible (Utility power restored, alarm cleared, etc.).</p> <p>Resets the control logic for the Emergency Ventilation Fans for future activation.</p> <p>Note: Do not reset emergency ventilation fans for at least 2 minutes after they activate to ensure that the thermal unit's 2-minute restart delay has expired.</p>
	<p>Turning the fire-suppression-control bypass timer</p> <p>Turn the timer past the 1-hour position.</p>	<p>Suspend the fire-detection so that maintenance can be performed on the system.</p> <p>The timer provides a normally-closed circuit bypassing the internal, normally-closed relays in the fire-suppression panel.</p> <p>Once the timer expires, the circuit is returned to its normal setting (Off).</p> <p>Note: You can turn the timer up to a maximum of two hours if necessary to perform maintenance.</p> <p>To continue the bypass operation, just turn the timer again when time gets low</p>
	<p>Turning the DCR emergency power-off override timer</p> <p>Turn the timer past the 1-hour position.</p>	<p>Temporarily bypass the EPO circuit. This allows manual restart of the UPS after an EPO event.</p> <p>Note: You can turn the timer up to a maximum of two hours if necessary to perform maintenance.</p> <p>To continue the bypass operation, just turn the timer again when time gets low.</p>
	<p>Turning the key to activate the manual fire-suppression release</p>	<p>If you see smoke and/or fire in the DCR system, but the smoke detector is malfunctioning, you can manually discharge the fire suppression material into the DCR system.</p>

Table 7.1 Component operation for the DCR Control Panel and Fire Suppression System (continued)

Component	Action	Operation
		
	Fire-suppression system abort	Prevents the fire-suppression system from dumping due to a false alarm.
	Control Power Available light illuminated (green)	Control system is powered via TB1 positions (1 & 2) or (3 & 4).
	Control Power Available light is NOT illuminated	No power going to the control panel
	<p>Main Circuit Breaker with Shunt Trip Assembly (If applicable)</p> <ul style="list-style-type: none"> To enable power flow to the control panel, flip the breaker switch to the UP position (On/Closed) To disable power flow to the control panel, flip the breaker switch to the DOWN position (Off/Open) 	<p>Eliminates power to all loads connected to and downstream of the load distribution center both locally and remotely.</p> <p>IMPORTANT! The shunt trip assembly requires a dedicated, field-supplied source of 120-V power to TB1 pins 9 & 10.</p> <p>If the breaker is tripped (EPO activation), you must reset the breaker before beginning the restart protocols. See Recovering from EPO Circuit Activation on page 60, for details.</p>

7.2 Recovering from EPO Circuit Activation

In the event that the EPO circuit is activated by the local EPO button on the SmartRow DCR or by a field-supplied REPO button and the system is shut down, the following steps must be taken to recover:

1. If a Shunt-Trip Main Circuit Breaker is being used, reset the Shunt-Trip Main Circuit Breaker.
2. Disengage the EPO circuit:

NOTE: You must reset the EPO or REPO button that activated the circuit to reset the circuit. Pressing a button that did not originally trigger the circuit will not reset the circuit.

- a. If the local EPO button on the DCR activated the circuit:
 - For a **Non-latching EPO button** on the DCR: Push the EPO button to disengage the circuit.
 - For a **Latching EPO button** on the DCR: Pull the button back to disengage the circuit.
- b. If a remote EPO (REPO) button activated the circuit, reset the REPO button that activated the circuit using the reset function of the field-supplied button.

Once cleared, the thermal-management units in the SmartRow DCR automatically start via their dedicated power supply.

3. Turn the Local Emergency Power Off Override Timer past the 1/2-hour position.

NOTE: If needed, you may turn the timer to a maximum of 2 hours. If time is running low, turn the timer past the 1/2-hour mark again to continue the bypass.

4. Reset the UPS that powers the SmartRow DCR control circuit and fire-suppression control circuit.
 - a. If the SmartRow DCR is powered by a stand-alone UPS, refer to the corresponding procedure in the manual for the UPS to start-up the UPS. If it will not restart, put the UPS in bypass and restart the remaining equipment. For assistance putting a 3-phase UPS in bypass and for service support, call 800-543-2378. For a single-phase UPS, call 800-222-5877, option #1.
 - b. If the SmartRow DCR controls, and emergency fans are connected to rack-mounted UPSs, you must manually restart the UPS(s). Refer to the corresponding procedure in the manual for the UPS to start-up the UPS.

The Fire-suppression System is protected from commercial power failures by an integrated battery and battery charger. In the event of a commercial power failure, the fire-suppression system continues to operate in idle mode from this battery for up to 48 hours. Upon restoration of commercial power, the battery charger automatically recharges the battery to float state.

7.3 Recovering from a Fire Suppression System Activation

In the event of a fire suppression system activation, contact your local fire-suppression representative for proper guidance on bringing your system back on-line.

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8 INSTALLATION CHECKLIST

8.1 Cooling and Power Component Installation Checklist

1. All cabinets and plenums have been installed.
2. All gaskets and edge guards are installed.
3. All electrical and piping connections have been made.
4. All cabinet doors seal and close securely.
5. All Emergency Power Off interlocks to the UPSs and to the PDX/PCW (P2 4-pin Connector) are connected.
6. All external Emergency Power Off and fire detection connections have been made, if applicable.
7. All Rack PDUs are installed and connected to the load-distribution center for external UPS configurations and to UPS outputs for internal UPS configurations, if applicable.
8. Fire-suppression control panel (CB-4) and the SmartRow DCR control logic circuit (CB-2) connected to a centralized or rack-mounted, online, double-conversion UPS.
9. PDX/PCW has been started-up and factory-commissioned.
10. UPSs have been installed and are operational.
11. If applicable:
 - a. Are all power-supply systems that are required to be shut-down by the EPO button properly tied-in to the shutdown terminals?
 - b. Are the PDX/PCW units connected to the SmartRow DCR Thermal Unit Shutdown circuit? (P2 and, if applicable, P2R)
 - c. Is there 120-V power supplied to your shunt-trip assembly (if applicable)?
 - d. When the local EPO button is pushed:
 1. Does the power supply for the DCR (Load Distribution Center or UPS systems) Shutdown?
 2. Does the PDX/PCW unit(s) shutdown?
12. Bypass timer for emergency power override works. To test the timer:
 - a. Turn the EPO bypass timer of an operational SmartRow DCR system past the 1-hour position.
 - b. Push the EPO button and check to see if your components that are tied-in to the circuit are still operational
 - c. Once confirmed, disengage the EPO button.
13. All external cable and piping entrances are properly sealed.
14. All rack supply air dampers have been adjusted to distribute the air based on the heat load in each cabinet.
15. 2T temperature sensor nodes are installed in the DCR Racks, and are routed correctly in each rack
16. Supply Air Temperature Sensor is installed in the DCR Base Plenum-Rack.
17. The iCOM displays the system supply-air temperature.
18. All monitoring points are communicating to the Network Management System.
19. Power and temperature monitoring are fully operational.
20. Perform all installation checks as stated in manuals for SmartRow DCR components:

PDX/PCW, iCOM, UPSs and Rack PDUs. Each UPS and PDX/PCW must be started before the fire-suppression system can be activated.

8.2 Fire Suppression System Installation Checklist

1. Is permanent 120VAC power available and on?
2. Is the Building Fire Alarm tied in?
Place a check mark next to each, depending on your application.
 - a. Alarm _____
 - b. Trouble _____
 - c. Supervisory _____
3. Is the separately-shipped box (see **Figure 8.1** below) that contains the following items on site?
 - a. One (1) Fire-suppression tank
 - b. One (1) Black Pipe Assembly
 - c. One (1) Aluminum Fike Nozzle
 - d. Two (2) Power Sonic Batteries (12V 12AH)

*Note: The local Fire Rep will install these items.
4. Is the PDX/PCW EPO tied-in?
5. Is the EPO override timer working correctly?
6. Perform EPO test to verify function (application-specific).
7. Is the SmartRow DCR installation complete and the SmartRow DCR operational?

Figure 8.1 Separately-shipped Fire-suppression kit



8.2.1 DCR Fire Suppression Commissioning Procedure

Do not call to have the Fire Suppression system commissioned until all of the items in [Cooling and Power Component Installation Checklist](#) on page 63, and [Fire Suppression System Installation Checklist](#) on page 64, have been completed.

The local company arming the fire-suppression system cannot turn the system On until all the items above have been completed, and the "Fire Suppression System Installation Checklist" has been signed by the representative and the customer. Scheduling the local distributor prior to these items being completed may result in additional charges.

After the tasks have been completed, a local qualified service representative will conduct final fire-suppression system commissioning and arming.

1. Reach out to Flagship Fire inc. at 941-723-7320 and request help to arrange a day and time for a local fire rep. to come out to charge, start up and commission the fire-suppression system. The representative will also walk through any special jurisdictional requirements for the project that may require additional paperwork and possibly fees.
2. When the local agent arrives on site, the dry agent tank will be charged and the system will be started and commissioned.
3. If you want the system to be put through any specific testing, a Vertiv technician is required to be on-site to oversee the cooling unit, UPS and other Vertiv equipment. This is explained during the initial phone call referenced in step 1.

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9 START-UP

9.1 System Start-up and Commissioning

The Thermal Management components will be started-up by Vertiv personnel. Authorized Fire Suppression Personnel will contact the user to schedule start-up and commissioning. Optional UPSs will be started-up and commissioned by authorized service personnel if the UPS start-up option is purchased by the user.

The initial start-up should be scheduled after all installation steps have been completed.

NOTE: The DCR Control Panel and Fire Suppression System is shipped from the factory with the solenoid activator disconnected and without the nozzle placed in the supply air stream. The fire-suppression system should be commissioned after the UPSs, Rack PDUs and PDX/PCW have been commissioned and are fully operational.

9.2 System Start-up and Activation

The SmartRow DCR is configured to start-up when power is connected. The user must connect the emergency fans and the SmartRow DCR Control Logic to an on-line double-conversion UPS power source.

We recommend that the DCR Fire-suppression Controls and the DCR Control Circuit are supported by an on-line double-conversion UPS. When power is fed to the SmartRow DCR, the Control Power available light should be illuminated (green) on the front door (See **Table 7.1** on page 59).

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10 TROUBLESHOOTING

Table 10.1 below, lists possible issues you could encounter when operating the SmartRow DCR, and steps for resolution of the issues

Table 10.1 Troubleshooting

Issue	Resolution
When there is a power outage, my entire SmartRow shuts down.	<ul style="list-style-type: none"> • Make sure the control panel logic is fed from a double-conversion UPS power source. If the control logic loses power, it will appear as if an EPO is pressed. • The UPS(s) connected to the system may give indications of an EPO being pressed, which also indicates a loss in control-logic power and improper connection to the system. • Call 800-222-5877, option #1.
The cooling unit(s), UPS(s), and the Control Panel & Fire Suppression system will not turn on.	<ul style="list-style-type: none"> • Make sure that the CB1 and CB2 in the top, right-hand corner of the Control Panel and Fire Suppression module are closed (ON). See Figure 7.2 on page 58, for the locations. These provide power to the control-logic circuitry. • Ensure that the two 15-A breakers supplied in the Load Distribution center are closed (ON) as they provide power to the fire suppression panel and the emergency ventilation fans • Turn EPO Override timer beyond the ½-hour position and restart the UPS. • If the SmartRow DCR is powered by a stand-alone, 3-phase UPS and will not restart, put the UPS in bypass and restart the remaining equipment. • Call 800-543-2738 for assistance in putting the UPS in bypass and for service support.
The fire suppression panel is alarming.	<ul style="list-style-type: none"> • Reference the Troubleshooting section 6.3 of the <i>Fike SHP Pro Product Manual</i> to identify the type of event triggering the alarm. • Call your local Fike fire-suppression representative with the details regarding the event for proper support of your system.
When the EPO is pressed the cooling units do not shutdown.	<ul style="list-style-type: none"> • Make sure that the 4-pin HVAC fault / Emergency Ventilation Fan Control, Thermal-unit Shutdown Connector Cable (P2) is connected to its low -voltage PDX/PCW receptacle. <ul style="list-style-type: none"> • See Locate and Install 4-pin HVAC Fault/Emergency Fan Control, Thermal-unit Shutdown Connector Cable (P2) on page 38 for additional details.
When a cooling unit shuts off and the Emergency Ventilation Fans do not activate.	<ul style="list-style-type: none"> • Make sure that the 4-pin HVAC fault / Emergency Ventilation Fan Control, Thermal-unit Shutdown Connector Cable (P2) is connected to its low -voltage PDX/PCW receptacle. <ul style="list-style-type: none"> • See Locate and Install 4-pin HVAC Fault/Emergency Fan Control, Thermal-unit Shutdown Connector Cable (P2) on page 38 for additional details. • Check to see if the load-distribution-center breaker that feeds the emergency-fan circuit is closed (ON). • Check to make sure that the return-air-temperature sensor is properly connected as documented in Connect Return-temperature Thermostat, the L5-20 Receptacle and the Smoke Detector on page 35. • Validate that the SmartRow DCR iCOM-control settings are entered as instructed for the SmartRow DCR. <ul style="list-style-type: none"> • See Liebert iCOM™ Controls Set-up on page 51 for additional details.
The Emergency Ventilation Fans activate for no apparent reason.	<ul style="list-style-type: none"> • Validate that the SmartRow DCR iCOM-control settings are entered as instructed for the SmartRow DCR. • See Liebert iCOM™ Controls Set-up on page 51 for additional details.

Table 10.1 Troubleshooting (continued)

Issue	Resolution
<p>The temperature in one of the racks is too warm/cold.</p>	<ul style="list-style-type: none"> • Adjust the damper in the bottom of the rack until the desired temperature is achieved. You may need to adjust the damper in neighboring racks slightly to help balance the airflow in the system. <ul style="list-style-type: none"> • See Adjusting Air-flow Adjustment Dampers on page 39 for additional details. • Do not exceed 6 kW of heat load in a given rack. • Ensure that the heat load is reasonably distributed across all of the racks. • Validate that the SmartRow DCR iCOM-control settings are entered as instructed in the SmartRow DCR. <ul style="list-style-type: none"> • See Liebert iCOM™ Controls Set-up on page 51 in for additional details.
<p>The cooling unit is short cycling (turning on and off frequently).</p>	<ul style="list-style-type: none"> • Close the air damper in racks that have no IT equipment. • Ensure blanking panels are installed in any empty U-space to prevent cold air supply bypassing directly into the return air stream. • Make sure that there is at least 4 kW of heat load in the 20-kW SmartRow, 8 kW in the 36-kW system. • Do not exceed 6 kW of heat in a single rack. • If using a 20-kW (N+1) or 36-kW (N) configuration, the iCOM controls of the thermal-management units must be set for Teamwork mode.

11 MAINTENANCE

11.1 PDX/PCW Maintenance

Proper application and maintenance of the entire DCR-integrated PDX/PCW is critical to the life and reliability of the system. See appropriate sections for maintenance in the PDX and PCW Thermal Management Systems User Manual for recommended procedures and timing of Preventative maintenance on your thermal-management units.

11.2 Fire Detection and Suppression System Maintenance

Periodic maintenance, replacement and testing shall be, as a minimum, performed per NFPA 72. Maintenance shall be performed by a trained or authorized Fike representative.

Make sure that you consistently check the cylinder to ensure it remains properly charged. The cylinder gauge must be in the green area. If it is not, be sure to contact your local trained or authorized Fike representative.

See section 6.0 in the SHP Pro Product Manual that comes with your system for further detail on proper Fire Suppression System Maintenance.

11.3 UPSs and Rack PDUs Maintenance

Refer to your system's UPS manual for recommended maintenance procedures and timing. Contact Vertiv at 800-543-2378 for information about availability of optional preventative-maintenance plans.

12 TECHNICAL DATA

12.1 Unit Dimensions, Weights, and Wiring Tables

Table 11.1 SmartRowDCR with a Single PDX/PCW

Component Reference	Dimensions, mm (in.)	Total System Weight, kg (lb)	
		Empty Racks	Max Rack Capacity
3 rack system width	3099 (122)	1454 (3232)	5504 (12231.5)
4 rack system width	3805 (149.8)	1727 (3838)	7127 (15838)
5 rack system width	4511 (177.6)	2000 (4444)	8750 (19444)
6 rack system width	5217 (205.4)	2273 (5050)	10373 (23050)

Leveling feet at minimum adjustable to 1 in. (25 mm).
Rack mounting rails must be positioned 9 in. (229 mm) from the front of the rack frame for cooling airflow.

Table 11.2 SmartRow DCR with a Second PDX/PCW

Component Reference	Dimensions, mm (in.)	Total System Weight, kg (lb)	
		Empty Racks	Max Rack Capacity
W3 (3 RACK)	3983 (156.8)	1980 (4400)	6030 (13400)
W4 (4 RACK)	4689 (184.6)	2253 (5006)	7653 (17006)
W5 (5 RACK)	5395 (212.4)	2525 (5612)	9275 (20612)
W6 (6 RACK)	6101 (240.2)	2798 (6218)	10898 (24218)
W7 (7 RACK)	6807 (268)	3071 (6825)	12521 (27825)
W8 (8 RACK)	7514 (295.8)	3444 (7431)	14144 (31431)
W9 (9 RACK)	8220 (323.6)	3617 (8037)	15767 (35037)
W10 (10 RACK)	8926 (351.4)	3890 (8644)	17390 (38644)

Leveling feet at minimum adjustable to 0.75 in. (19 mm).
Rack mounting rails must be positioned 9 in. (229 mm) from the front of the rack frame for cooling airflow.

Table 11.3 SmartRow DCR Part Dimensions

Part No.	Component Dimensions, (D x W x H) In. (mm.)	Shipping Material Dimensions, (D x W x H) In. (mm.)	Skid Dimensions, (D x W) In. (mm.)
DCR-A-101	46.62 (1184.3) x 27.56 (700.1) x 10.50 (266.7)	47.50 (1206.5) x 32.50 (825.5) x 10.75 (273.1)	43 (1092) x 51 (1295.4) (4) Unit Max
DCR-A-104	46.62 (1184.3) x 31.50 (800.1) x 10.5 (266.7)	47.50 (1206.5) x 32.50 (825.5) x 10.75 (273.1)	43 (1092) x 51 (1295.4) (4) Unit Max
DCR-A-200	46.62 (1184.3) x 27.56 (700.1) x 8.75 (222.3)	47.50 (1206.5) x 32.50 (825.5) x 10.75 (273.1)	43 (1092) x 51 (1295.4) (4) Unit Max
DCR-A-204	46.62 (1184.3) x 31.50 (800.1) x 8.75 (222.3)	47.50 (1206.5) x 32.50 (825.5) x 10.75 (273.1)	43 (1092) x 51 (1295.4) (4) Unit Max
DCR-A-300	46.62 (1184.3) x 34.93 (887.4) x 10.5 (266.7)	47.50 (1206.5) x 35.50 (901.7) x 10.75 (273.1)	43 (1092) x 51 (1295.4) (4) Unit Max
DCR-A-301	46.62 (1184.3) x 34.50 (876.3) x 10.5 (266.7)	47.50 (1206.5) x 35.50 (901.7) x 10.75 (273.1)	43 (1092) x 51 (1295.4) (4) Unit Max
DCR-A-400	46.62 (1184.3) x 34.93 (887.4) x 8.75 (222.3)	47.50 (1206.5) x 35.50 (901.7) x 10.75 (273.1)	43 (1092) x 51 (1295.4) (4) Unit Max
DCR-A-401	46.62 (1184.3) x 34.50 (876.3) x 8.75 (222.3)	47.50 (1206.5) x 35.50 (901.7) x 10.75 (273.1)	43 (1092) x 51 (1295.4) (4) Unit Max
DCR-A-500	13.50 (342.9) x 34.50 (876.3) x 77.56 (1970.1)	16.50 (273.1) x 34.75 (882.7) x 77.75 (1974.9)	36 (914.4) x 79 (2006.6) (2) Unit Max
DCR-A-600	13.50 (342.9) x 34.50 (876.3) x 77.56 (1970.1)	16.50 (273.1) x 34.75 (882.7) x 77.75 (1974.9)	36 (914.4) x 79 (2006.6) (2) Unit Max

Control enclosure is shipped laying down (the dimension scheme references it as standing).

Table 11.4 DCR field-wiring list

Bundle	From	To	Factory/Field-supplied wiring
PRIMARY PDX/PCW & CONTROL PANEL (All Configurations)			
1	Fire Control Panel	Smoke Detector	FACTORY
2	TB1(P1- 3pin connector, Positions 7, 8, and GND)	PDX Top Plenum (P1- 3pin connector)	FACTORY
3	TB2 (P2 - 4pin connector, Positions 3, 4, 23, and 24)	PDX / PCW (P2 - 4pin connector, Positions 75, 76, 37, and 38)	FACTORY
4	TB2 (P3 - 3pin connector, Positions 5 and 6)	PDX Top Plenum Thermostat (P3 - 3pin connector, Positions 5 and 6)	FACTORY
5	Supply Air Temp Sensor	PDX/PCW iCOM board	FACTORY
6	2T Sensor	Adjacent 2T Sensor	FACTORY
7	Rack Temp Sensor to PDX / PCW Sensor	PDX /PCW Return Air Sensor	FACTORY
8	Emergency Fan	Adjacent Emergency Fan	FACTORY
9	Load-center AC Power Input	Load center	FIELD
10	PDX AC Power Input	PDX	FIELD
11	MC Condenser AC Power Input	MC Condenser	FIELD

Table 11.4 DCR field-wiring list (continued)

Bundle	From	To	Factory/Field-supplied wiring
12	PDX / MC Piping	MC Condenser	FIELD
13	PDX Condensate Piping	Drain	FIELD
14	Fire Control Panel	Building Fire System	FIELD
15	PDU Power Input	Load center	FIELD
16	EPO	UPS or UTILITY FEED	FIELD
SECONDARY PDX/PCW (Redundant / Higher Capacity Configurations) & OPTIONAL LOAD CENTER			
1	Secondary PDX / PCW (P2R - 4pin connector)	TB2 (P2R - 4pin connector)	FACTORY
2	Secondary Top Plenum - Thermostat (P3R - 3pin connector)	TB2 (P3R - 3pin connector)	FACTORY
3	Supply Air Temp Sensor	PDX/PCW iCOM board	FACTORY
4	Secondary [[[[Undefined variable ctrl_panel_fire_suppress.PComponent4]]]] Smoke Detector to Primary Smoke Detector	Smoke Detector	FACTORY
5	Rack Temp Sensor to PDX / PCW Sensor	PDX /PCW Return Air Sensor	FACTORY
6	Optional Secondary Load-center AC Power Input	Load center	FIELD
7	Secondary PDX AC Power Input	PDX	FIELD
8	Secondary MC Condenser AC Power Input	MC Condenser	FIELD
9	Secondary PDX / MC Piping	MC Condenser	FIELD
10	Secondary PDX Condensate Piping	Drain	FIELD
11	vNSA AC Power	Load center	FIELD
12	vNSA Network	PDX	FIELD

12.2 Technical-installation Illustrations

The technical illustrations are included in the order listed. Reference the document number to find the title you need.

Table 11.5 Technical illustrations

Document Number	Title
DCR3RACK20 pg. 1	SmartRow DCR component arrangement
DCR3RACK20 pg. 2	SmartRow DCR dimensions and weights—20-kW(N) configuration
DCR6RACK20P136	SmartRow DCR dimensions and weights—20-kW(N + 1)/36-kW(N) configuration
DCR-CP-3	DCR Control Panel and Fire Suppression System components
DCR-RACK-700	DCR 700-mm wide cabinet
DCR-RACK-800	DCR 800-mm wide cabinet
DCR-PD-3	SmartRow DCR power distribution 3PH
DCR-PD-3MBS	SmartRow DCR power distribution 3PH with main circuit breaker and shunt-trip assembly
DCR-PD-1	SmartRow DCR power distribution 1PH
DCR-PD-1MBS	SmartRow DCR power distribution 1PH with main circuit breaker and shunt-trip assembly
1196888-E03	SmartRow DCR control logic
1196888-E04	SmartRow DCR control logic (continued)
1196888-E06	SmartRow DCR terminal block layout
DCRELECBD pg. 2	SmartRowDCR with rack-mounted UPS systems
DCRELECBD pg. 3	SmartRow DCR with Central UPS System
DCRELECBD pg. 4	SmartRow DCR with A-B UPS and load centers

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