



# Vertiv™ VRC

## VRC100 Series Self-contained Rack Cooler

Installer/User Guide

0.9 to 3.5 kW, 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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## SAFETY PRECAUTIONS

**IMPORTANT!** This manual contains important safety instructions that must be followed during the installation and maintenance of Vertiv™ VRC. Read this manual thoroughly and the safety and regulatory information, available at <https://www.vertivco.com/ComplianceRegulatoryInfo>, before attempting to install, service, or operate this unit.

Retain this manual for the entire service life of the unit.

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

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

The VRC must be used exclusively for the purpose for which it is intended. The manufacturer takes no liability for incorrect use or a modification to the unit.

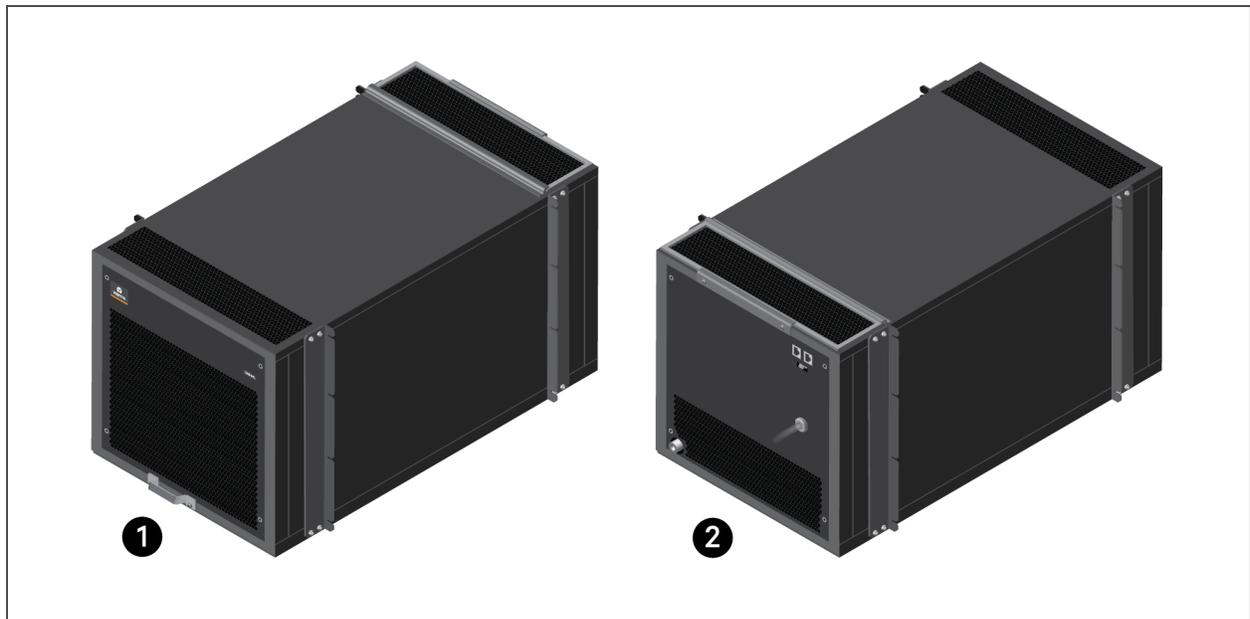
Before handling, installing, or operating the system, read carefully the warning and caution notices that accompany the procedures. Also, pay attention to the warning labels on the unit and its components.

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# 1 VERTIV™ VRC

The VRC is a compact, integrated, rack-mounted cooling unit for use in a 19-in. EIA server rack. Specifically designed for the cooling demand of the equipment mounted inside the rack, the VRC features high reliability, high sensible-heat ratio and high air flow.

**Figure 1.1 VRC Rack-mounted Cooling Unit**

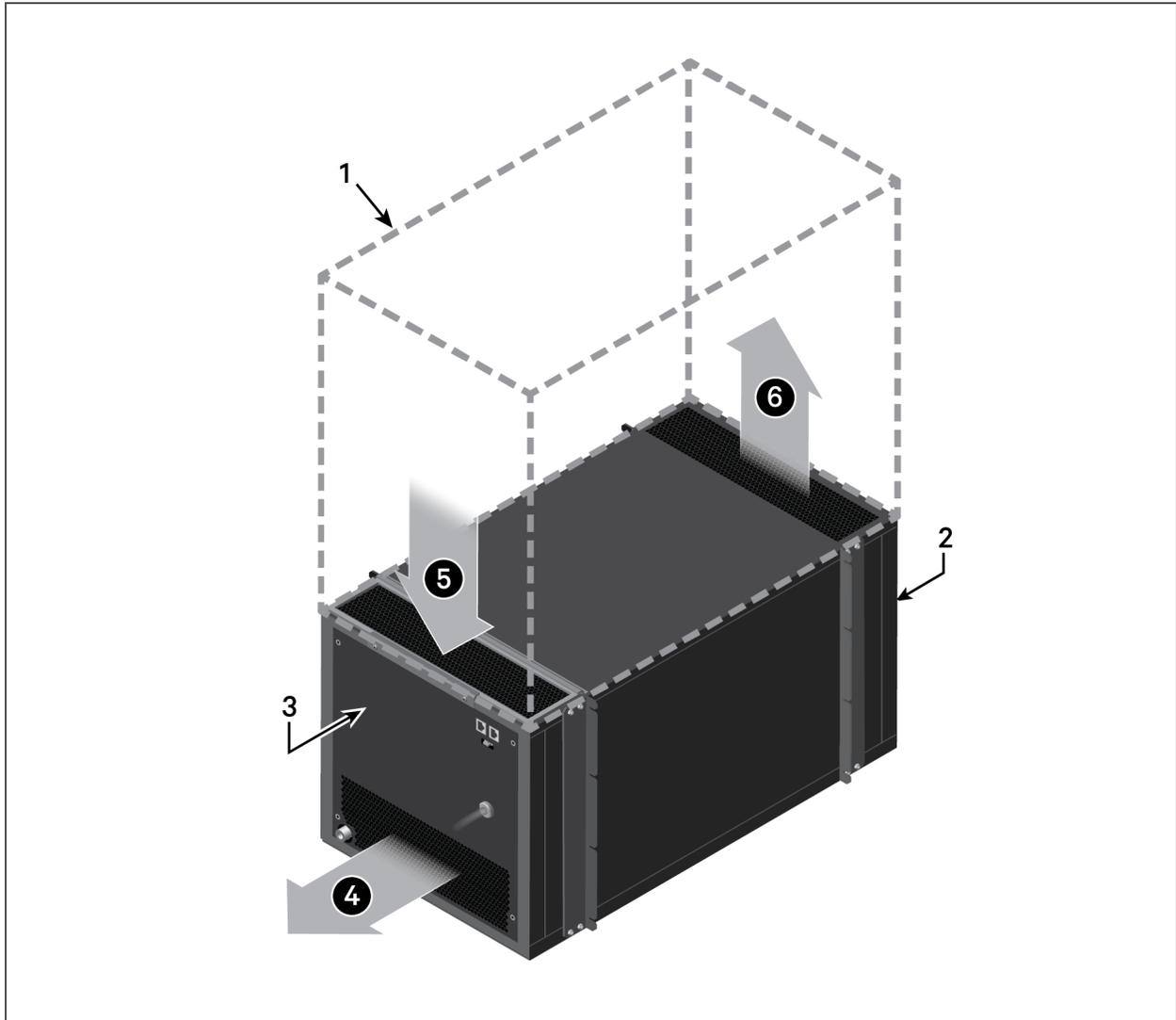


Item	Description
1	Front view of VRC
2	Rear view of VRC

Installed at the bottom of the cabinet, the VRC provides air flow as shown in [Figure 1.2](#) on the next page. Hot return air enters from the rear of the cabinet, and conditioned cold air is supplied at the front of the unit directly in front of the rack-mounted equipment.

Cooling capacity varies from 30% to 100%, approximately 0.9 kW to 3.5 kW to accommodate partial or variable cooling loads.

Figure 1.2 Air flow of the rack-mounted VRC indoor unit



Item	Description
1	Space inside cabinet
2	Front of VRC
3	Rear of VRC
4	Heat-rejection air out
5	Hot air from cabinet in
6	Cool air from VRC out

## 1.1 Model Nomenclature

Table 1.2 below, describes each digit of the model number.

**Table 1.1 VRC Model-number Example**

1	2	3	4	5	6
V	R	C	1	0	0

**Table 1.2 Model-number Digit Definitions**

Digit and Description
Digits 1, 2, 3 = Base unit <ul style="list-style-type: none"> <li>VRC = Vertiv™ Rack Cooler</li> </ul>
Digit 4 = System type <ul style="list-style-type: none"> <li>1 = Self-contained cooling module</li> <li>2 = Split-system indoor cooling module</li> <li>3 = Split-system heat-rejection module</li> </ul>
Digits 5, 6 = Power supply <ul style="list-style-type: none"> <li>00 = 120 V / 1 ph / 60 Hz</li> <li>01 = 208/230 V / 1 ph / 60 Hz</li> </ul>

## 1.2 Specifications

Table 1.3 below, lists the mechanical and electrical specifications of the VRC by model.

**Table 1.3 Specifications by Model Number**

Model:	VRC100	VRC101
Cooling capacity, kW	0.9 to 3.3	0.9 to 3.3
Air volume, CFM (CMH)	450 (770)	465 (790)
Unit dimensions W x D x h, in. (mm)	17.4 x 38.5 x 17.28 (442 x 978 x 439)	
Voltage, VAC	L+N+G, 120	L1+L2+G, 208/230
Frequency, Hz	60	
Color	EG7021 (black)	
System-protection grade	IP20	
Unit weight, lb (kg)	143.4 (65)	
Shipping weight, lb (kg)	218.3 (99)	
Noise level	<66 dB(A)	

## 1.2.1 Cooling Capacity

Table 1.4 below, lists the net-sensible cooling capacity for various evaporator and condenser-air inlet temperatures.

Table 1.4 Net Sensible (IT) Cooling Capacity, kW

		Condenser Air temperature, °F		
		85	95	104
Evaporator Air Temperature into unit, °F	85	3.2	2.8	2.4
	95	3.7	3.4	3.0
	104	4.0	3.9	3.2

NOTE: The addition of heat-rejection duct work may reduce cooling capacity.

## 2 EQUIPMENT INSPECTION AND HANDLING

### Safety Precautions

 **WARNING!** Risk of handling heavy unit and component parts. Can cause injury and equipment damage. Use OSHA-recommended safe lifting techniques and/or lifting equipment rated for the weight of the unit. Unit weights are specified in [Table 1.3](#) on page 5.

 **WARNING!** Risk of improper moving. Can cause equipment damage, injury or death. Use only lifting equipment that is rated for the unit weight by an OSHA-certified rating organization. The center of gravity varies depending on the unit size.

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

### NOTICE

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

### NOTICE

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

Upon arrival of the unit and before unpacking:

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

### Equipment Recommended for Handling the Packaged Unit:

- Pallet jack or forklift
- Utility knife

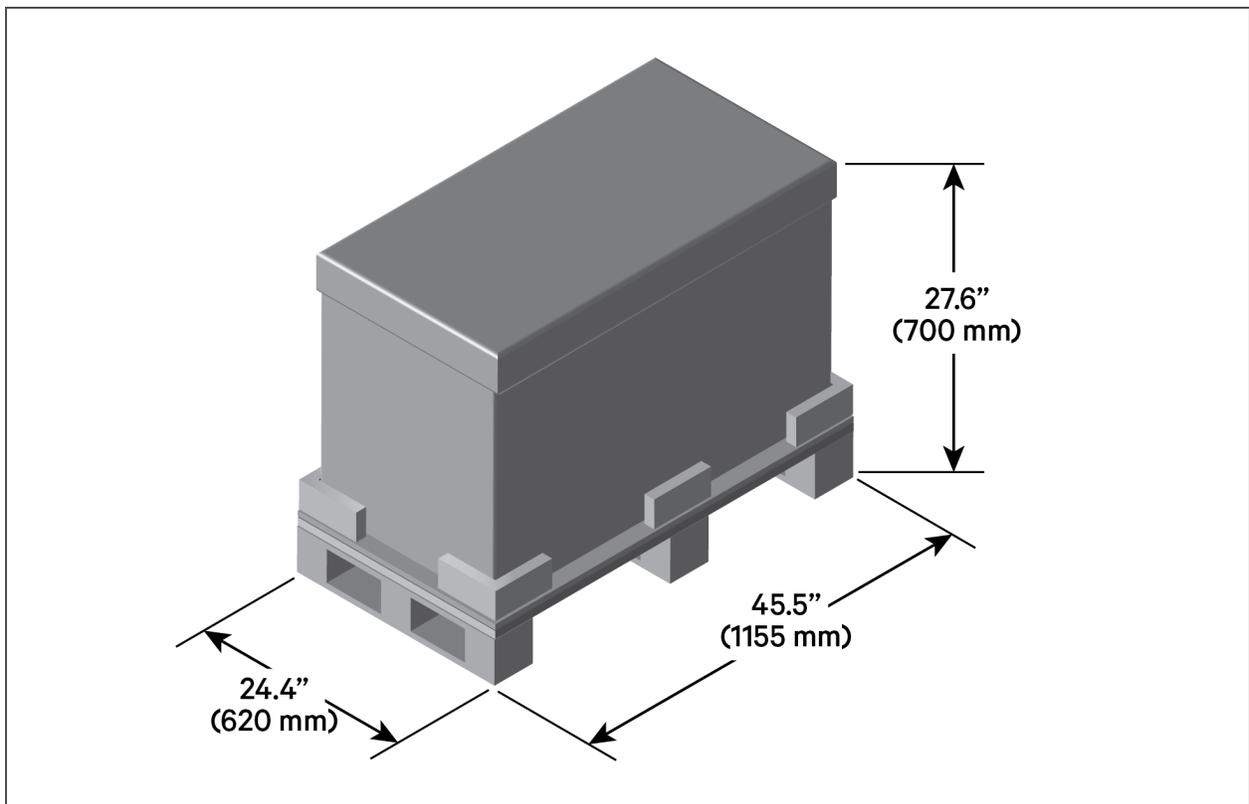
## 2.1 Handling the Packaged Unit

Transport the packaged unit with a fork lift or pallet jack. See [Table 1.3](#) on page 5, for the packaged/shipping weight for your model. [Figure 2.1](#) below, shows the dimensions of the packaged unit.

When using the fork lift or pallet jack, observe the following:

- Make sure that the lift/jack has adjustable fork arms, and the arms are spread to the widest allowable distance to still fit under this pallet.
- Make sure that the fork arm length is suitable for the length of the pallet.
- When moving the packaged unit, align the fork arms with the unit center of gravity and do not tilt the unit more than 20 degrees in any direction to prevent the unit from falling over.
- Place the unit as close as possible to the final installation location on a firm, level surface

**Figure 2.1** Packaged-unit Dimensions



## 2.1.1 Storing the Packaged Unit

Store the unit in the original packaging in an area protected from excessive dirt, debris, and contact damage until final installation. Observe the following requirements and the conditions listed in [Table 2.1](#) below.

- Do not store the unit outdoors.
- Make sure that the unit stands upright.

**NOTE: If the total shipment and storage time exceeds 6 months, the unit requires re-calibration for proper performance.**

**Table 2.1 Storage Conditions**

Condition	Requirement
Ambient temperature:	-40 to 158°F (-40 to 70°C)
Ambient humidity:	less than 95% relative humidity (103°F)

## 2.2 Unpacking the Unit

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

1. Use a utility knife to cut the packing strip from the box.
2. Remove the cardboard box cover, sides, and supports, then remove the paper corners and corner cushions.

**NOTE: You will lift the unit from the wooden pallet when installing in the rack. Leave the pallet in place until then.**

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### 3 PRE-INSTALLATION PREPARATION

**NOTE:** Before installing unit, determine whether any building alterations are required to run piping, wiring and duct work. Follow the figures, specifications, and listed requirements for proper clearances.

Proper preparation of the installation location and consideration of the installation environment optimizes the performance of your VRC.

#### 3.1 Cabinet and Room Requirements

To ensure the proper operation of the VRC, you must install the unit in a sealed cabinet in a room that meets the following requirements:

- The cabinet must be moisture proof and free from air leaks that could destabilize the temperature gradient.
- The cabinet must have appropriate thermal insulation and a sealed, moisture-proof layer.
- Minimize the amount of outdoor air entering the equipment room to prevent an unnecessary load increase. We recommend keeping the leak rate of outdoor air below 5% of the total indoor airflow.
- All room doors and windows should be closed properly to avoid infiltration of outside into the room.
- Consider the weight-bearing capacity of the room floor because the weight of the system will increase as equipment is added to the cabinet.
- Do not install the unit outdoors.

#### 3.2 Environmental Requirements

Observe the following requirements and the operating conditions listed in [Table 3.1](#) below, when planning installation.

- Keep the unit away from flames or any heat source.
- Do not install in a location where the unit is exposed to direct sunlight.
- Do not install where the unit is exposed to corrosive gas or organic solvents.

**Table 3.1 Operating Conditions**

Condition	Requirement
Ambient temperature:	
Indoor	64.4 to 104°F (18°C to 40°C)
Heat-rejection	32 to 104°F (0° to 40°C)
Ambient humidity:	less than 90% relative humidity
Altitude:	less than 3,280 ft (100 m). Derating is required when the altitude exceeds 3,280 ft (1000 m)

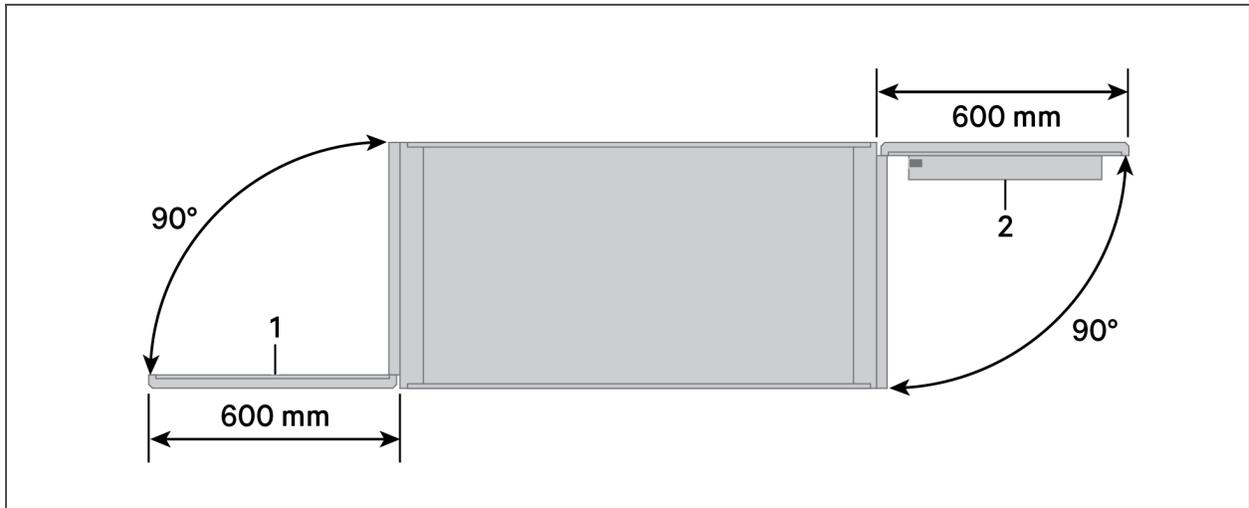
**NOTE:** Requirements for storage conditions are detailed in [Storing the Packaged Unit](#) on page 9.

### 3.3 Clearance Requirements

For installation and for maintenance access, the distance from the front door of the cabinet to a wall or other obstacles must be greater than the length of the unit. You must be able to pull the unit completely out for proper maintenance access. See [Table 1.3](#) on page 5, for the length of your VRC model.

The minimum clearance required for opening the front and rear doors to access the installed VRC is shown in [Figure 3.1](#) below.

**Figure 3.1 Minimum Clearance for Installed Unit**



### 3.4 Mounting, Ducting, Drain and Electrical-connection Considerations

This section provides an overview of the installation requirements for consideration before installing the system. Detailed equipment and safety requirements are also included in the specific installation sections.

- The VRC is designed to provide cooling air to equipment above it in the cabinet. We recommend installing the unit in the lowest section of the cabinet.
- The condensate-drain connection for drain piping is 1/2-in. Male NPT.
- If connecting heat-rejection duct work, fabricate and install duct work in accordance with local codes.
- Electrical service must conform to national and local electrical codes. See [Table 1.3](#) on page 5, for the electrical requirements for your VRC model.

## 4 INSTALLATION



**WARNING!** Arc flash and electric shock hazard. Open all local and remote electric power-supply disconnect switches, verify with a voltmeter that power is Off and wear appropriate, OSHA-approved personal protective equipment (PPE) per NFPA 70E before working with the unit. Failure to comply can cause serious injury or death. Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power. The unit controller does not isolate power from the unit, even in the “Unit Off” mode. Some internal components require and receive power even during the “Unit Off” mode of the controller.



**WARNING!** Risk of handling heavy unit and component parts. Can cause injury and equipment damage. Use OSHA-recommended safe lifting techniques and/or lifting equipment rated for the weight of the unit. Unit weights are specified in [Table 1.3](#) on page 5.



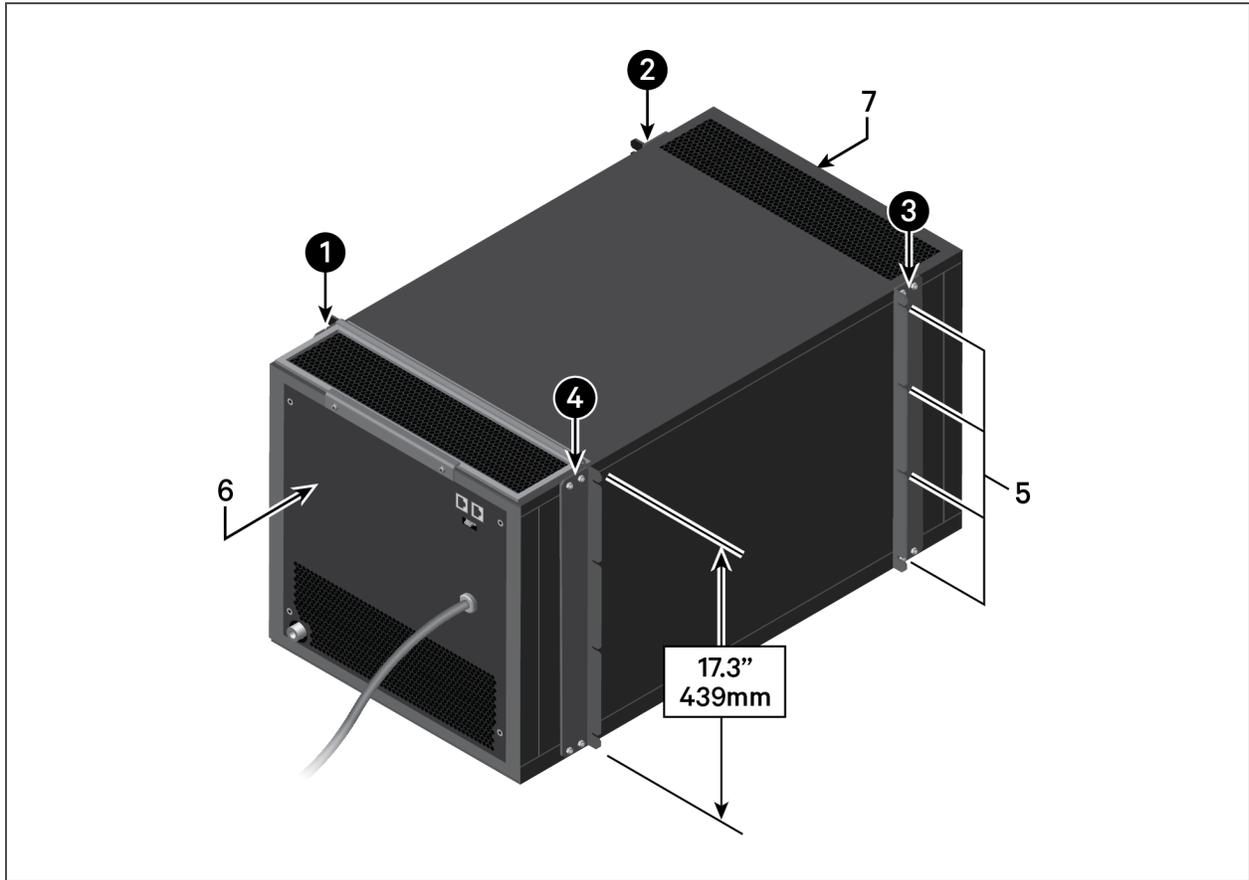
**CAUTION:** Risk of contact with sharp edges, splinters, and exposed fasteners. Can cause injury. Only properly trained and qualified personnel wearing appropriate, OSHA-approved PPE should attempt to move, lift, remove packaging from or prepare the unit for installation.

### 4.1 Mounting the Unit in the Cabinet

The unit is secured to the cabinet rails with mounting brackets shown in [Figure 4.1](#) on the next page. Each bracket has four 0.27-in. (7-mm) slots spaced 5.5 in. (133.3 mm) apart for attachment to the EIA rail.

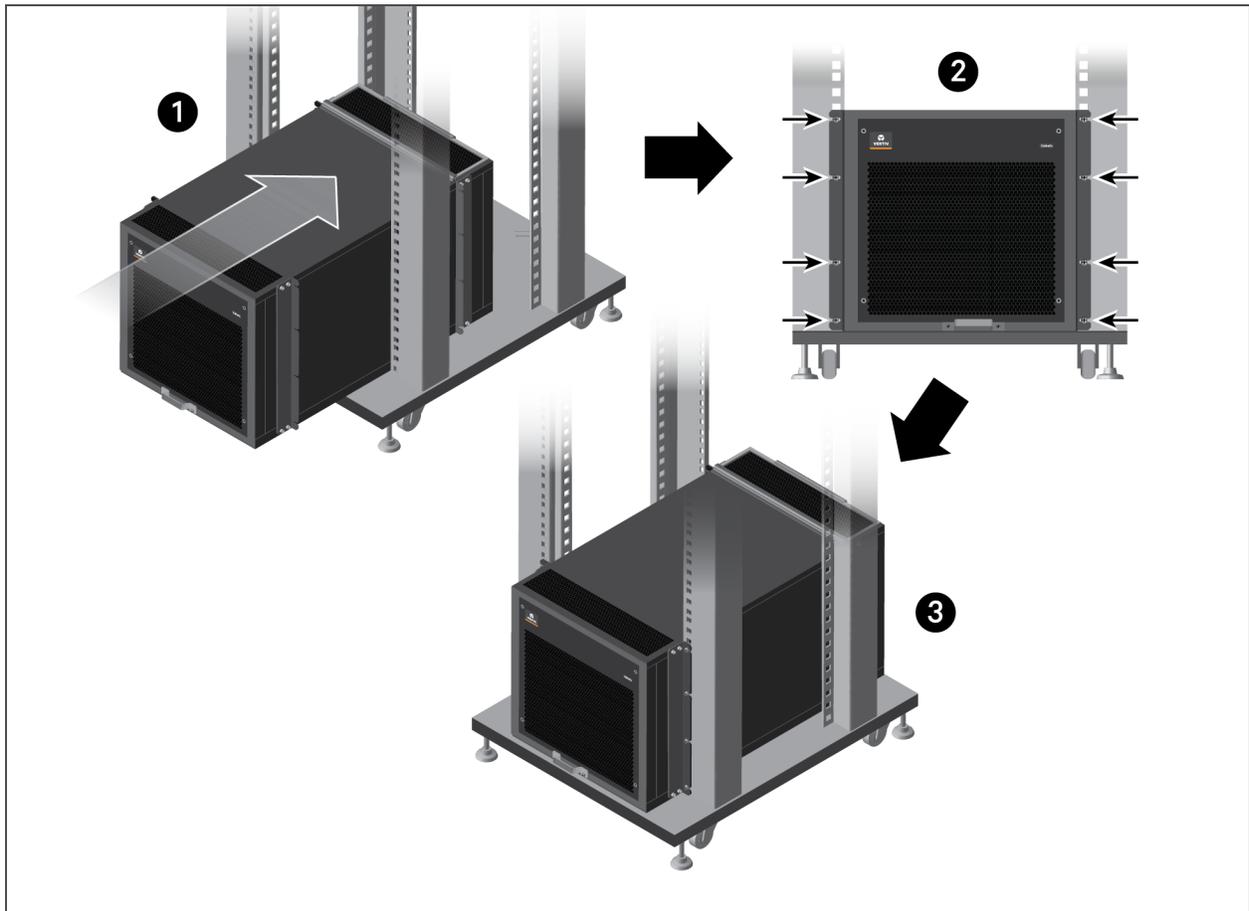
1. Remove brackets 1 and 4 from the unit, set aside the fasteners for re-attachment.
2. At the front of the cabinet, slide the back of the unit into the cabinet until brackets 1 and 3 are flush against the rack rails, see [Figure 4.2](#) on page 15.
3. Re-attach brackets 1 and 4 to the rear of the unit using the removed fasteners, then secure all four brackets to the rack rails using the provided M6 panel screws and floating nuts.

Figure 4.1 Mounting Brackets



Item	Description
1	Bracket 1
2	Bracket 2
3	Bracket 3
4	Bracket 4
5	Slots for fasteners
6	Rear of VRC
7	Front of VRC

Figure 4.2 Installing and Securing the Unit in the Rack



Item	Description
1	Slide the unit into the rack.
2	Secure the brackets.
3	Unit installed.

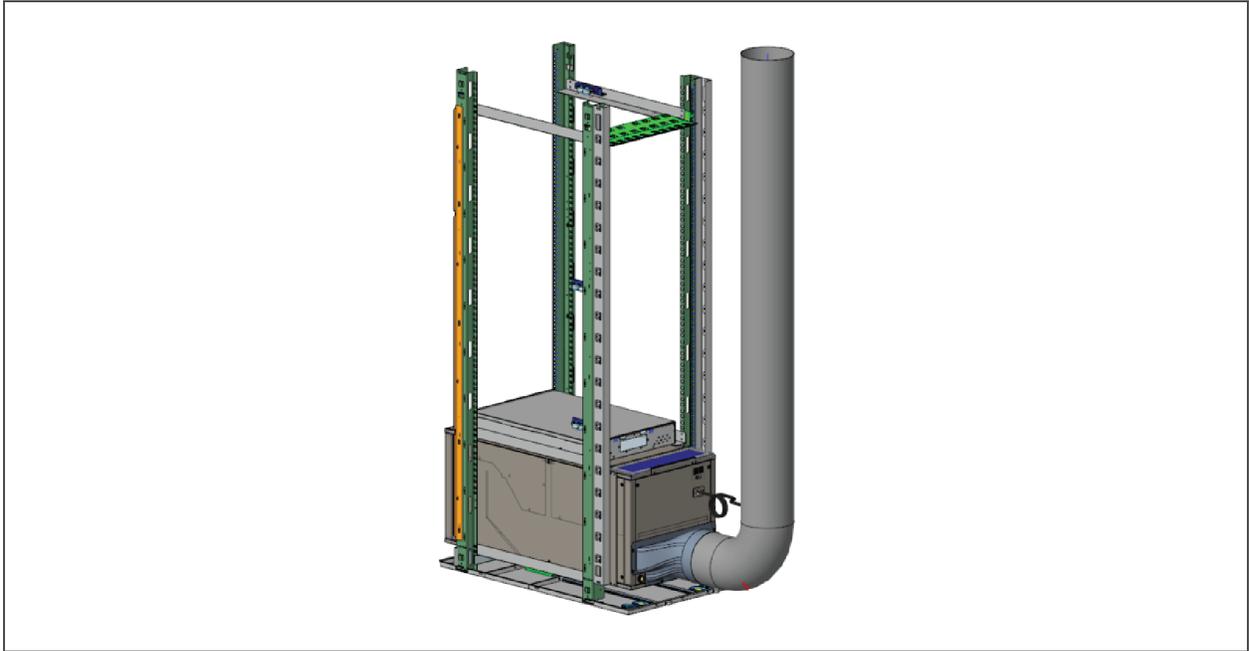
## 4.2 Connecting Duct Work

If the condenser hot air discharged by the VRC must be removed from the immediate area or room, you may connect ducting to the air outlet on the rear of the unit. If the duct work removes hot air from the room or into a dropped ceiling, make provisions to bring make-up air into the room. Install duct work in accordance with local codes.

If your system includes the optional duct-work kit, follow the instructions included with the kit to install and connect the duct work.

**NOTE:** Ducting is optional, and the duct work shown in [Figure 4.3](#) on the next page, is an example of the installed duct.

Figure 4.3 Duct Connection Example



### 4.3 Connecting the Condensate-drain Piping

#### NOTICE

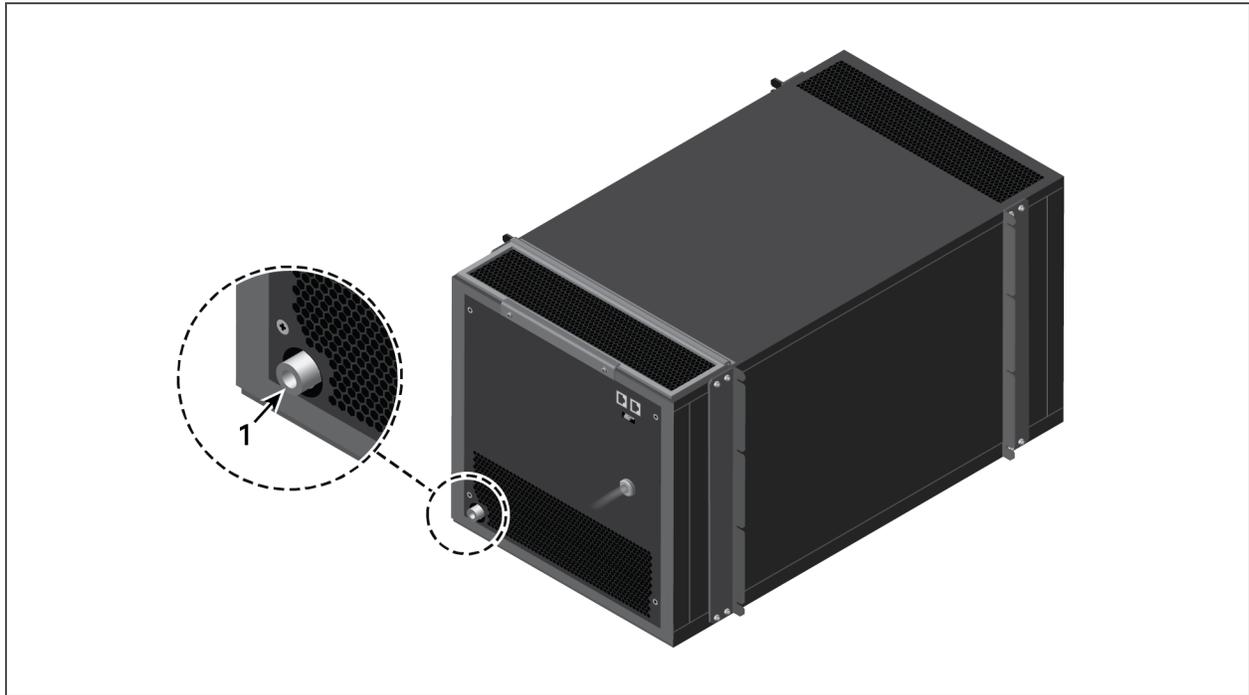
Risk of clogged or leaking drain lines. Can cause equipment and building damage. This unit requires a water drain connection. Drain lines must be inspected at start-up and periodically, and maintenance must be performed to ensure that drain water runs freely through the drain system and that lines are clear and free of obstructions and in good condition with no visible sign of damage or leaks. Improper installation, application and service practices can result in water leakage from the unit. Water leakage can result in catastrophic and expensive building and equipment damage and loss of critical equipment. Do not locate unit directly above any equipment that could sustain water damage. We recommend installing a monitored fluid-detection system to immediately discover and report condensate drain-line leaks.

The VRC includes a 1/2-in. Male NPT connector for the condensate drain. Observe the following requirements when installing and routing the drain line:

- The drain line must be sized for 1 gpm (3.8 l/m) flow.
- The drain line must comply with all applicable codes.
- The drain line must be located so it will not be exposed to freezing temperatures.
- Do not externally-trap the drain line. The unit already has an internal trap on the condensate drain line.
- The drain line must slope continuously downwards away from the unit.
- If the drain connection is below the gravity-fed drain line, an optional condensate-drain pump kit is required, and the pump inlet must be below the unit's condensate-drain outlet when installed. Contact your Vertiv™ representative for additional information.

Figure 4.4 on the facing page, shows the drain-line connection on the unit.

Figure 4.4 Drain-line Connector on Rear of Unit



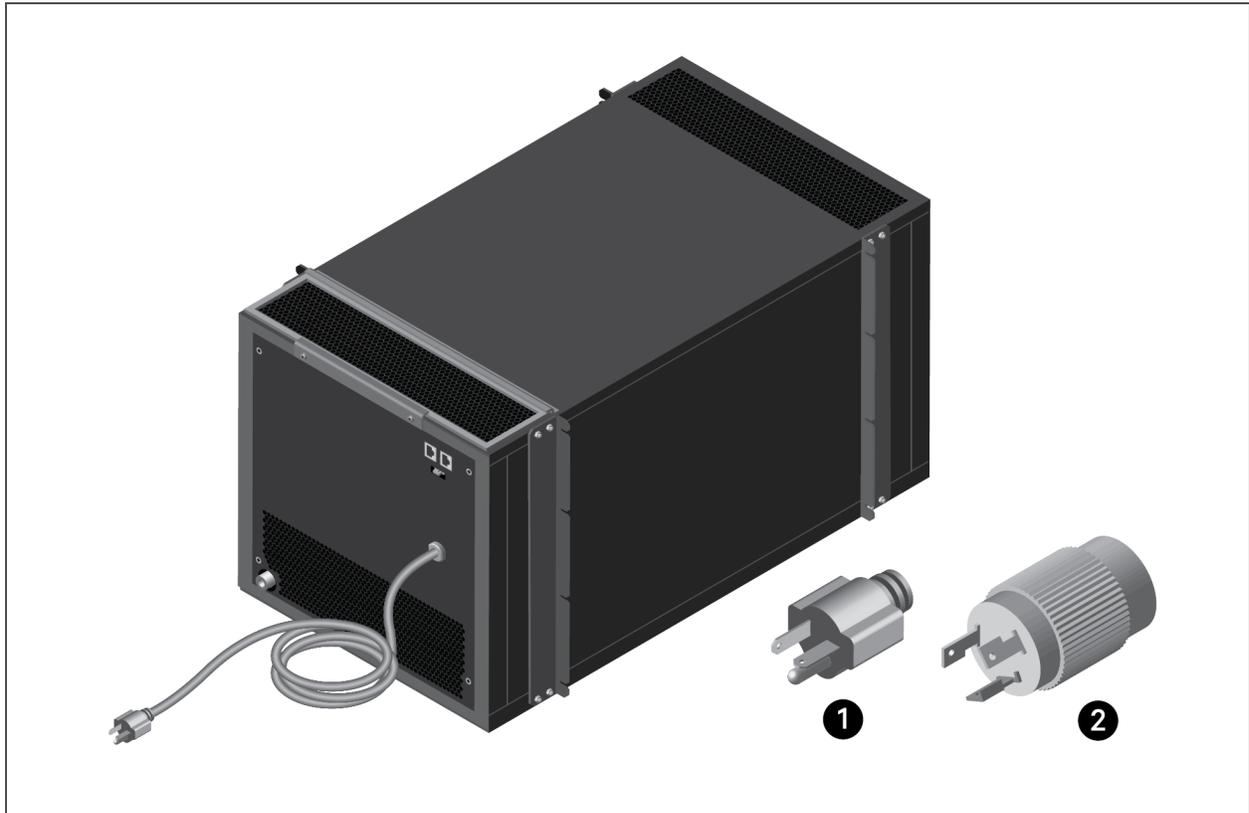
Item	Description
1	Pipe connector, 1/2-in. Male NPT

#### 4.4 Connecting Supply Power

The VRC includes a power cord (with plug) to plug the unit into an appropriate outlet, see [Figure 4.5](#) on the next page.

- Do not power the unit through a UPS.
- Route the power cord away from foot traffic to avoid accidental disconnection.

Figure 4.5 Power Cord and Plug



Item	Description
1	5-20P plug for VRC100
2	L6-20P plug for VRC101

## 4.5 Monitoring and Display Connections

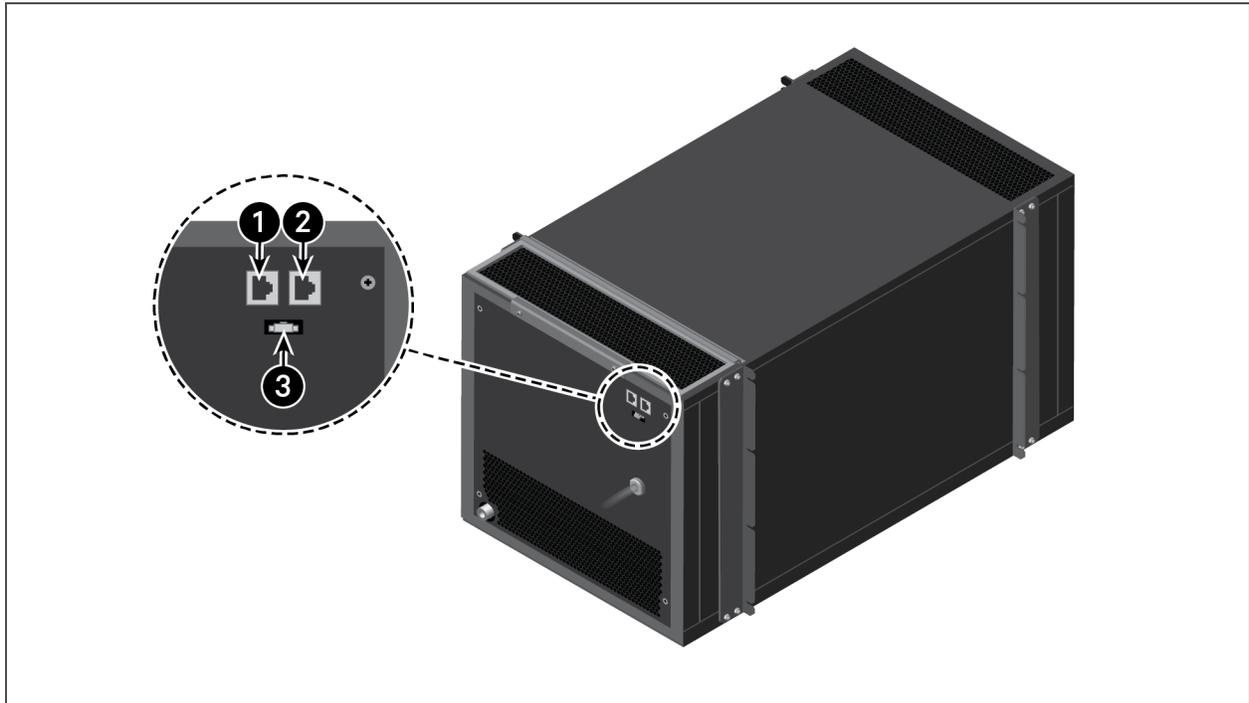
The rear panel of the unit includes connectors for third-party monitoring systems and for the display controller, see [Figure 4.6](#) on the facing page. [Table 4.1](#) on the facing page, describes the pin-out of each RJ-45 connector.

**NOTE:** An optional SIC-card monitoring kit is available from Vertiv™ for one of the remote-monitoring connections. Contact your Vertiv™ representative for additional information.

To connect the display controller:

Connect the cable from the display unit to the connector on the rear of the unit, see [Figure 4.6](#) on the facing page.

Figure 4.6 Monitoring and Display Connectors



Item	Description
1	RS485-1. RJ-45 port, see <a href="#">Table 4.1</a> below, for pin-out
2	RS485-2. RJ-45 port, see <a href="#">Table 4.1</a> below, for pin-out
3	Display connector

Table 4.1 Communication Port Pin-out

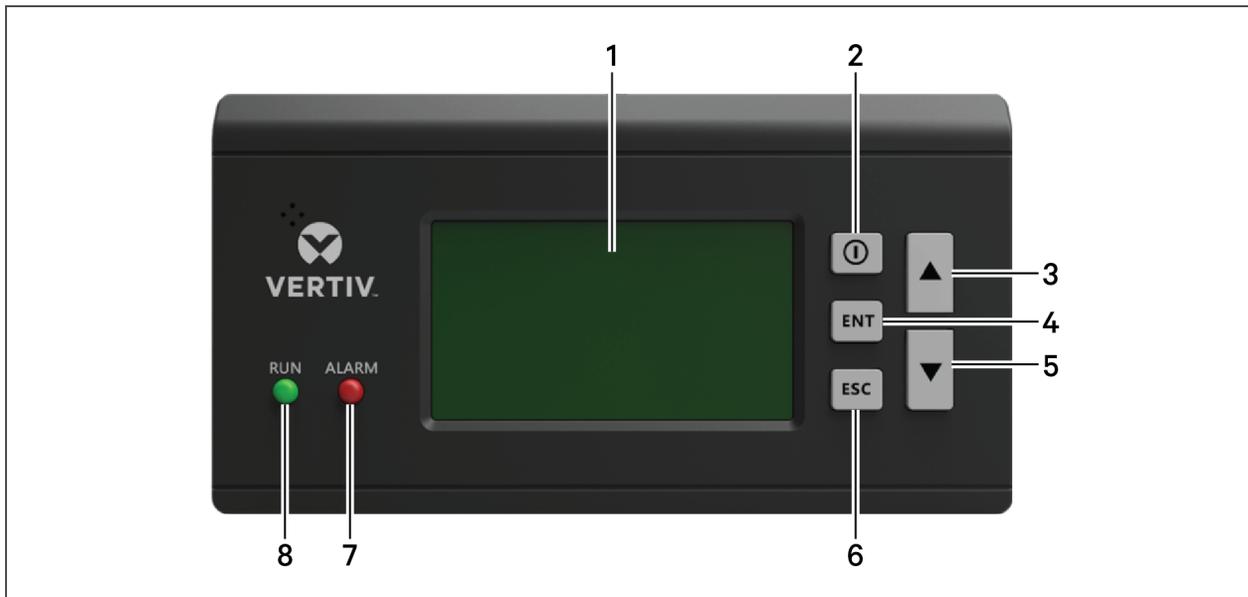
Pin	RS485-1	RS485-2
1	12 V	NC
2	12 V	NC
3	NC	NC
4	GND	GND
5	GND	GND
6	NC	NC
7	D+	D+
8	D-	D-

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## 5 USING THE CONTROLLER AND DISPLAY

The controller includes LED indicators, function buttons, and an LCD interface to configure and control VRC operation.

**Figure 5.1 Controller**



Item	Description
1	LCD display screen. See <a href="#">Display Screens</a> below.
2	ON/OFF button. Press-and-hold for 3 seconds to switch unit on/off.
3	Up-arrow button. Move cursor up, increase value, scroll to toggle selection, scroll up through multiple screens.
4	ENT (Enter) button. Confirm or enter selection.
5	Down-arrow button. Move cursor down, decrease value, scroll to toggle selection, scroll down through multiple screens.
6	ESC (Escape) button. Exit screen or menu by going back to previous, cancel selection, silence audible alarm.
7	Alarm indicator, red LED.
8	Run indicator, green LED.

### 5.1 Display Screens

At start-up, the "ON" screen displays for 10 seconds. You can select the display language from this screen.

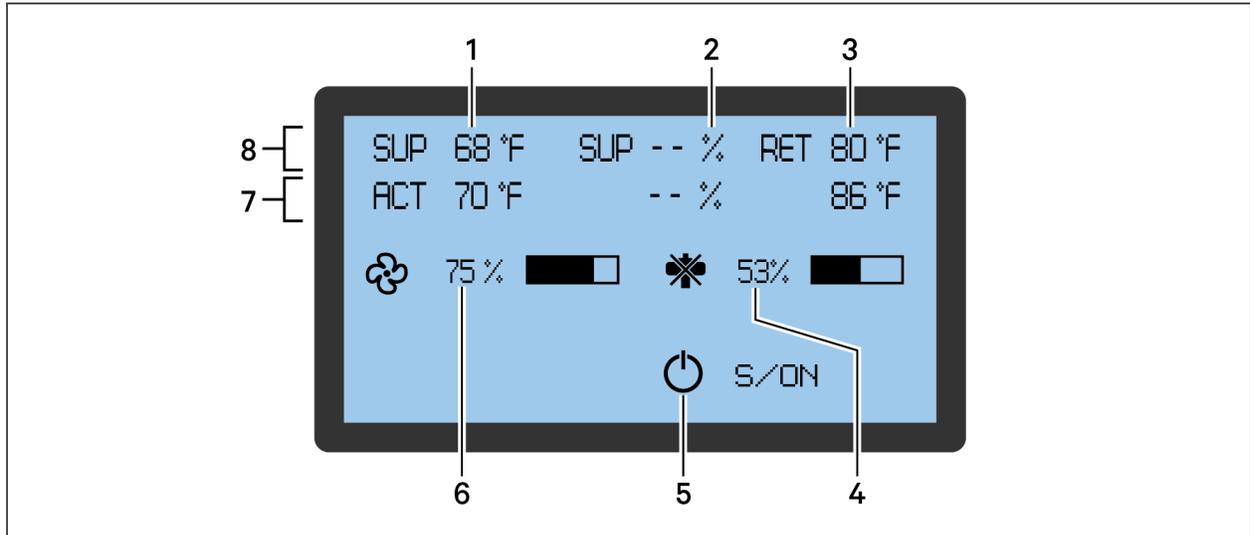
To select the display language:

1. At start-up when *Please choose language* displays, use the Up/Down buttons to highlight the language.
2. Press ENT to confirm the selection.

### 5.1.1 Normal Screen

During normal operation, the main screen displays parameter settings, actual reading, and operating statuses, see [Figure 5.2](#) below.

**Figure 5.2 Normal Screen Status and Icons**



Item	Description
1	Supply-air temperature
2	Supply-air humidity (Not available on VRC100 mode)
3	Return-air temperature
4	Compressor capacity. Percentage capacity of compressor operation.
5	Unit operating status. Values are: <ul style="list-style-type: none"> <li>• S = stand-alone</li> <li>• ON = operating</li> <li>• R-OFF = shut-down remotely.</li> <li>• L-OFF = shut-down locally</li> <li>• M-OFF = shut-down via monitoring</li> <li>• MANU = manual mode</li> <li>• BKUP = back-up</li> <li>• Lock = locked</li> </ul>
6	Fan-rotation speed. Actual percentage of rotation speed, range = 30% to 100%.
7	Row displays the actual readings for the supply- and return-air temperature
8	Row displays the setpoints for the supply and return air.

### 5.1.2 Entering Password and Menu

You access the parameter and alarm settings from the menu.

To display the menu:

1. At the Normal screen, press **ENT**.
2. At the Password scree, press **ENT** four times.

**NOTE: There is no preset password.**

3. Use the Up/Down buttons to highlight the menu item, and press **ENT** to open.

### 5.1.3 Alarm Screens

The Alarm menu offers options to review current alarms, adjust alarm setpoints, and enable/disable alarm functions, see [Figure 5.3](#) on the next page.

To access alarm options:

1. At the main menu, use Up/Down buttons to select the Alarm menu, and press **ENT**.
2. Select the alarm-menu item, and press **ENT**. [Table 5.1](#) on the next page, describes the alarm options.

Figure 5.3 Alarm Menu and Screens

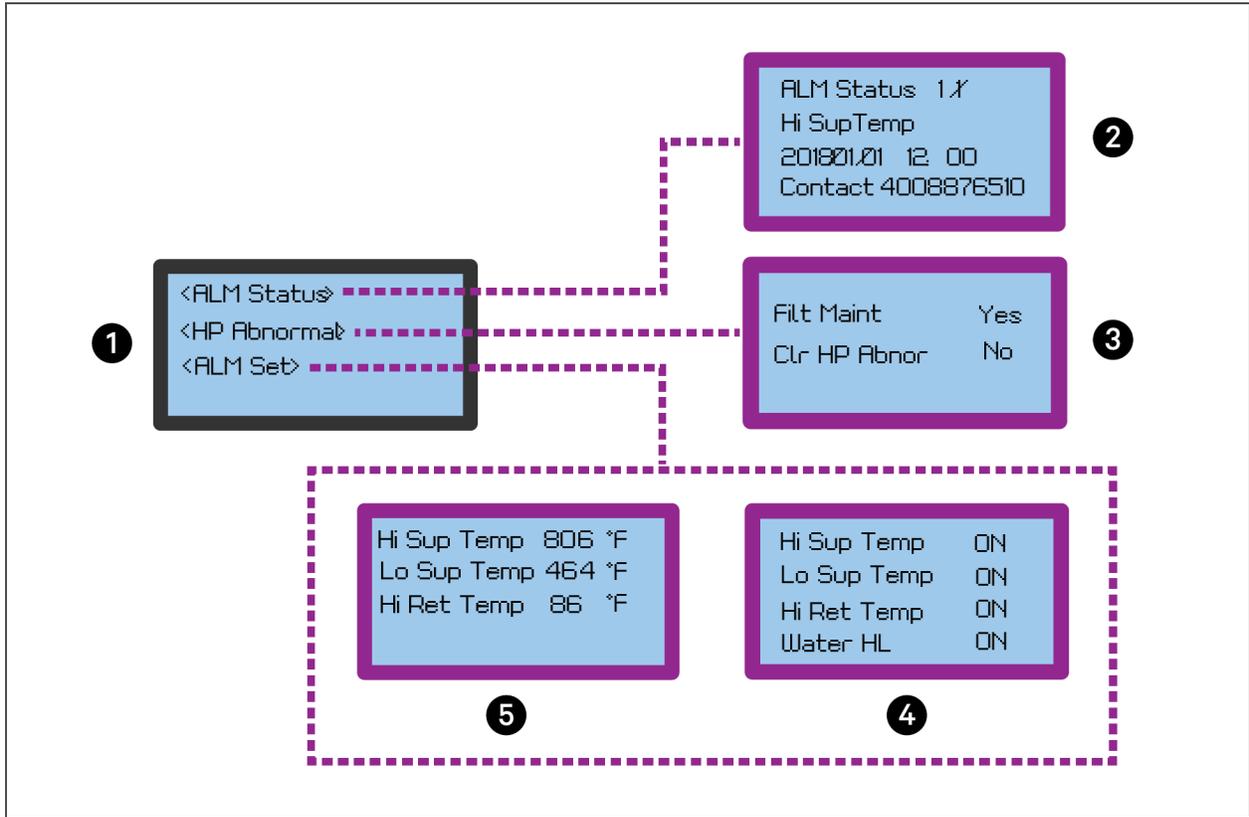


Table 5.1 Alarm Options and Settings

Item	Description
1	Alarm Menu
2	Alarm status screen. Displays XX/YY where XX is the alarm SN, and YY is the number of alarms reported. The type and date/time of occurrence is included. <ul style="list-style-type: none"> <li>Use the Up/Down buttons to scroll through multiple alarms.</li> </ul> <p><b>NOTE: Alarms are cleared if a system power failure occurs.</b></p>
3	Alarm handles screen. Enables/Disables alarm handles. See <a href="#">Adjusting Alarm Settings</a> below.
5	Alarm setpoints screen. Adjusts the current setpoints. See <a href="#">Adjusting Alarm Settings</a> below.
6	System alarms screen. Enables/Disables system alarms. See <a href="#">Adjusting Alarm Settings</a> below.

### Adjusting Alarm Settings

1. Use Up/Down buttons to select the setpoint, alarm, or handle, then press **ENT**.
2. Use Up/Down buttons to increase/decrease the value or toggle the setting, then press **ENT**. The selection is saved.
3. Press **ESC** to return to the menu.

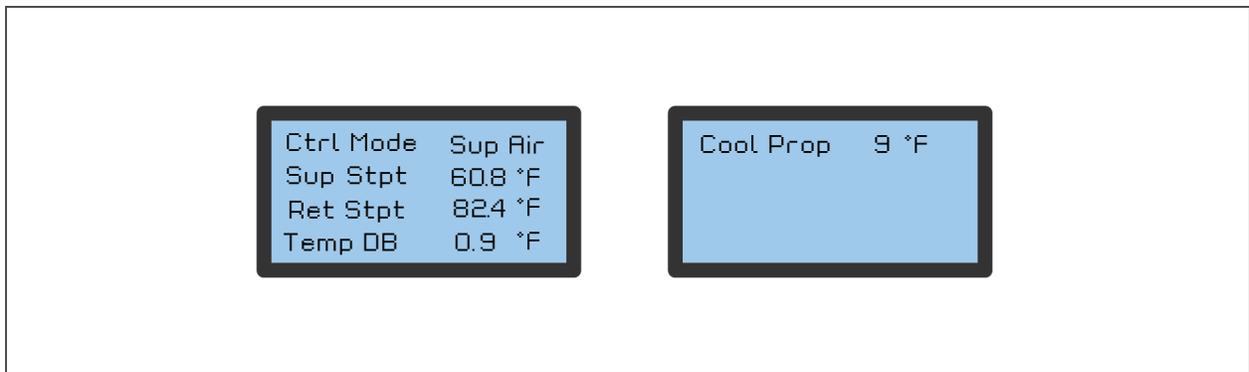
### 5.1.4 Temperature Settings Screen

The Temp Set screen offers options to select temperature-control options including supply- and return-air setpoints, see [Figure 5.4](#) below. [Table 5.2](#) below, describes the options.

To adjust temperature settings and setpoints:

1. At the main menu, use Up/Down buttons to select *Temp Set*, and press **ENT**.
2. Use Up/Down buttons to select the setpoint or option, then press **ENT**.
3. Use Up/Down buttons to increase/decrease the value or toggle the setting, then press **ENT**. The selection is saved.
4. Press **ESC** to return to the menu.

**Figure 5.4** Temp Set Screen



**Table 5.2** Temperature Options and Settings

Item	Description
Ctrl Mode	Control mode selects the setpoint value used to control unit operation. Options are: <ul style="list-style-type: none"> <li>• Sup Air = supply air (default)</li> <li>• Ret Air = return air</li> </ul> <p><b>NOTE: We recommend using return-air control mode when the unit is installed in an open rack.</b></p>
Sup Stpt	Supply setpoint is the temperature maintained for supply air when supply air is selected as the control mode.
Ret Stpt	Return setpoint is the temperature maintained for return air when return air is selected as the control mode.
Temp DB	Temperature deadband.
Cool Prop	Cooling proportional band.

### 5.1.5 System Status Screens

The System Status menu offers options to review the state of system components, see [Figure 5.5](#) on the next page.

To view component run times:

1. At the main menu, use Up/Down buttons to select the System Status menu, and press **ENT**.
2. Select the menu item, and press **ENT**. [Table 5.3](#) on the next page, describes the options.

Figure 5.5 System Status Screens

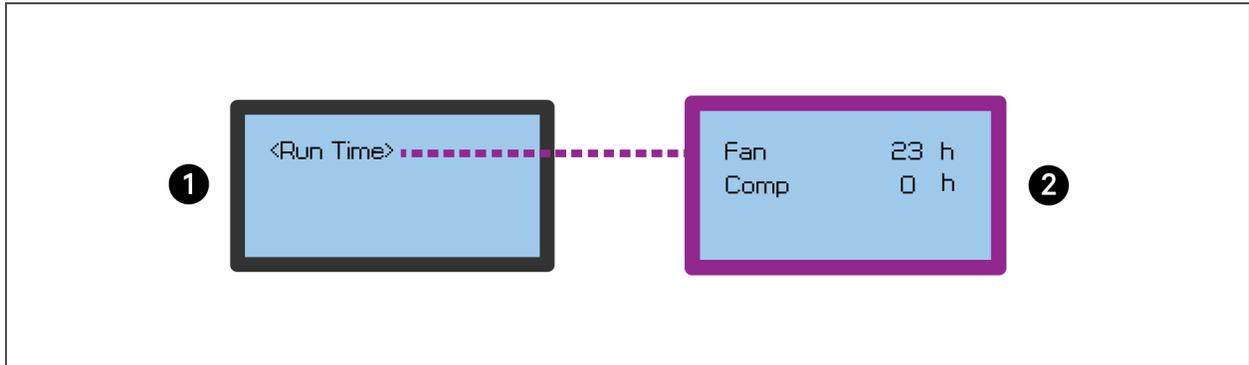


Table 5.3 System Status Options

Item	Description
1	Status menu
2	Run-time screen. Displays the current run hours of the fan and compressor.

### 5.1.6 Help Screens

The Help menu offers options to review the date and time options, see [Figure 5.6](#) on the facing page.

To view date and time settings:

1. At the main menu, use Up/Down buttons to select the Help menu, and press **ENT**.
2. Select the menu item, and press **ENT**. [Table 5.4](#) on the facing page, describes the options.

Figure 5.6 Help Screens

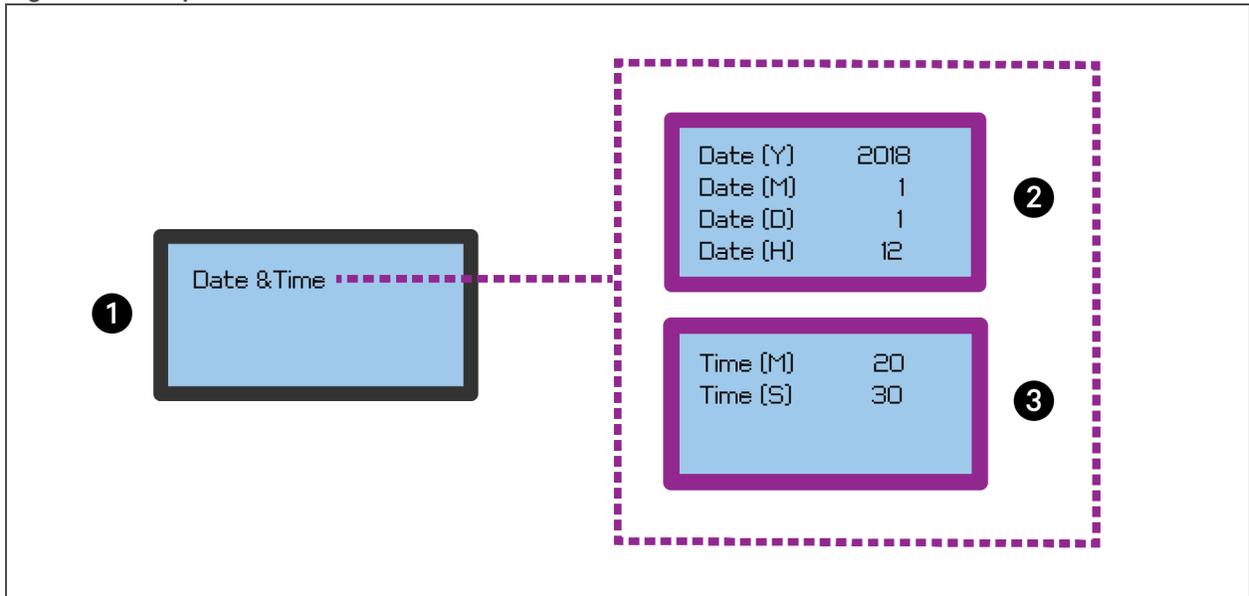


Table 5.4 Help Options

Item	Description
1	Help menu
2	Date screens. Displays the date settings.
3	Time screens. Displays the time settings.

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## 6 REGULAR AND PREVENTIVE MAINTENANCE



**WARNING!** Arc flash and electric shock hazard. Open all local and remote electric power-supply disconnect switches, verify with a voltmeter that power is Off and wear appropriate, OSHA-approved personal protective equipment (PPE) per NFPA 70E before working with the unit. Failure to comply can cause serious injury or death. Before proceeding maintenance or service, read all instructions. The unit controller does not isolate power from the unit, even in the “Unit Off” mode. Some internal components require and receive power even during the “Unit Off” mode of the controller. An electric-insulation switch on the unit allows safe installation and service in the unit.

Regular, periodic maintenance is critical to the life and reliability of the VRC. Refer to the following procedures for the steps to follow when completing the [Preventive Maintenance Checklist](#) on page 37.

Print the [Preventive Maintenance Checklist](#) on page 37, and mark each item as the maintenance is completed.

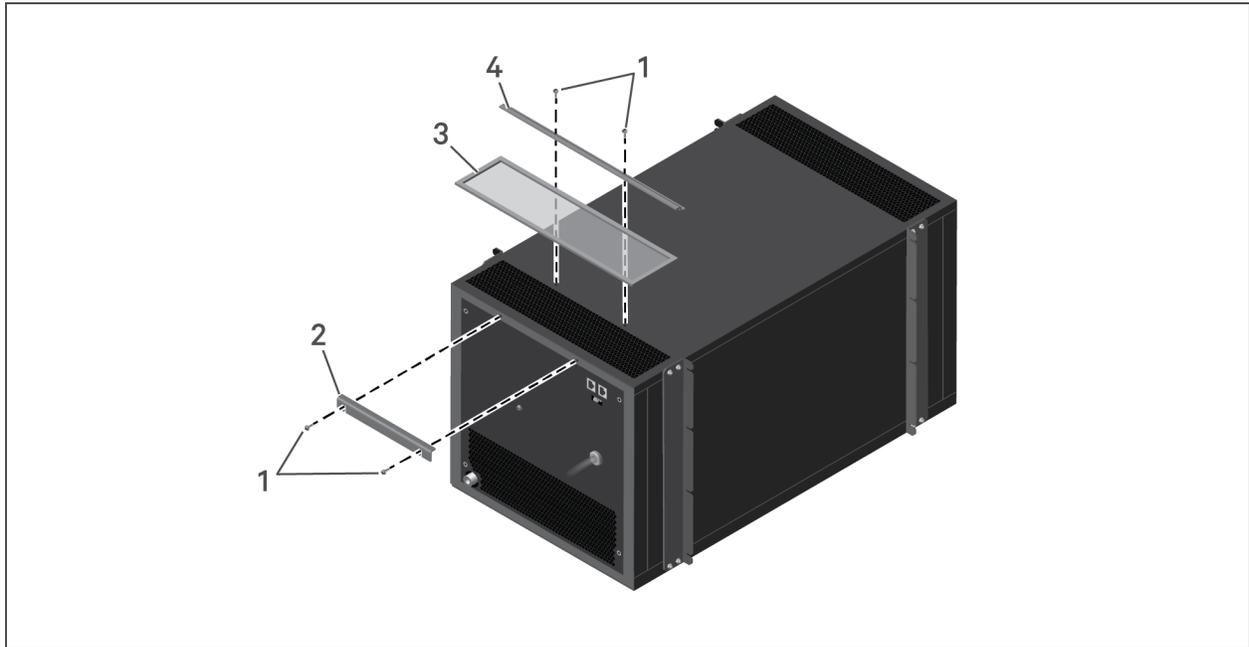
### 6.1 Cleaning and Replacing the Filters

Use this procedure when the regular maintenance inspection or the "replace filter" alarm indicate that it is time to service the filter.

To replace the evaporator filter:

1. Remove the brackets holding the filter by removing the 4 M4x10 screws, see [Figure 6.1](#) on the next page. Set the screws aside for re-installation.
2. Remove the filter and discard.
3. Install the replacement filter, then secure the brackets with the screws removed in Step 1.

Figure 6.1 Evaporator Filter

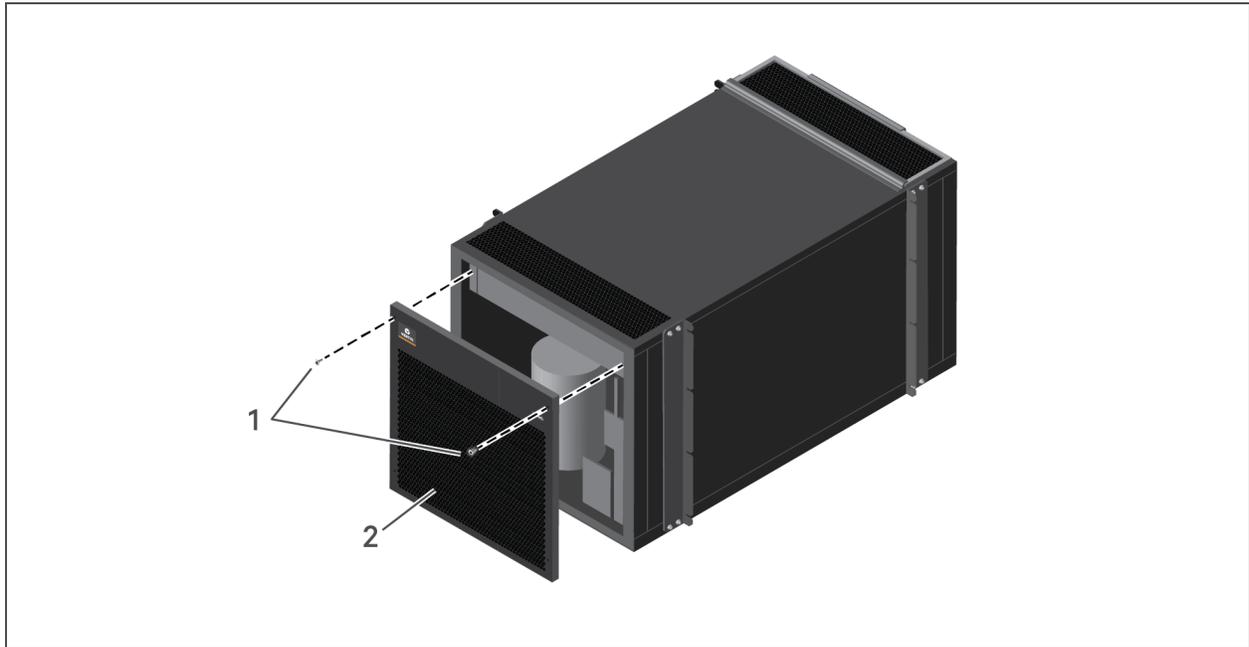


Item	Description
1	Cross-head screw, M4x10
2	Front bracket
3	Filter
4	Top bracket

To clean the condenser filter:

1. Turn off the unit.
2. Remove the filter bracket by removing the two screws at the top of the bracket, see [Figure 6.2](#) on the facing page.
3. Remove the filter from the bracket and clean the filter with water or compressed air.
4. Replace the filter in the bracket.
5. Re-install the bracket on the unit using the two screws.

Figure 6.2 Condenser Filter



Item	Description
1	Screws
2	Filter bracket

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## 7 TROUBLESHOOTING

Table 7.1 below, lists alarm messages that you may encounter on the controller, along with possible cause and remedy. If the remedy recommends contacting Vertiv™, visit <http://www.VertivCo.com/en-us/support/> for the appropriate technical-support contact.

**Table 7.1 Alarm Messages**

Message	Possible cause	Check or Remedy
High Temperature	Alarm temperature setpoint too low.	Adjust the setpoint temperature that triggers the alarm.
	Overload condition	Make sure that the actual head load is not above the maximum rated value.
	Fan malfunction.	Contact Vertiv™ Technical Support.
	Compressor malfunction.	Contact Vertiv™ Technical Support.
Low Temperature	Alarm temperature setpoint too high.	Adjust the setpoint temperature that triggers the alarm.
	Fan malfunction.	Contact Vertiv™ Technical Support.
	Compressor malfunction.	Contact Vertiv™ Technical Support.
High Pressure	Insufficient air flow.	Remove obstruction or debris from air inlets.
	Fan malfunction.	Contact Vertiv™ Technical Support.
	Pressure-sensor malfunction	Contact Vertiv™ Technical Support.
Low Pressure	Insufficient air flow.	Remove obstruction or debris from air inlets.
	Fan malfunction.	Contact Vertiv™ Technical Support.
	EEV malfunction	Contact Vertiv™ Technical Support.
	Condenser malfunction or refrigerant leak	Contact Vertiv™ Technical Support.

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# APPENDICES

## Appendix A: Checklist for Completed Installation

Before initial start-up of the VRC, print this checklist and mark each item as it is confirmed "completed."

### Mechanical Checks

Completed	Item
	There is sufficient clearance for unit access and maintenance.
	All fasteners and fittings are firmly secured.
	Unit is oriented correctly in the rack cabinet: cool, supply air is at the front and hot, return air is at the back.
	Foreign materials are removed from the area (shipping material, packaging, tools, etc.)
	Condensate-drain piping is properly connected.

### Electrical Checks

Completed	Item
	Power-supply voltage meets the rated voltage on the unit name plate.
	Unit is plugged-in to an appropriate supply outlet.
	Communication and control cables are firmly connected.

### Start-up Checks

Completed	Item
	Confirm no alarms or warnings displayed.
	Unit is operating without vibration or noise, and air is flowing.
	System is operating within range of the set parameters.

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## Appendix B: Preventive Maintenance Checklist

Inspection Date \_\_\_\_\_ Prepared by: \_\_\_\_\_

Model # \_\_\_\_\_ Serial Number # \_\_\_\_\_

During regular maintenance, print this checklist and mark each item as it is confirmed "completed." If necessary, refer to the procedure steps in [Regular and Preventive Maintenance](#) on page 29, to complete the item.

### Monthly Maintenance Checks

Completed	Item
	Verify that air flow is not restricted.
	Make sure that the air filter is clean. Clean the filter if needed.
	Unit is oriented correctly in the rack cabinet: cool, supply air is at the front and hot, return air is at the back.
	Foreign materials are removed from the area (shipping material, packaging, tools, etc.)
	Condensate-drain piping is properly connected.
	Check the condensate-drain connection and piping for leaks.
	Make sure there are no clogs in the condensate-drain line.
	If a condensate-drain pump is used with the drain line, make sure there are no clogs or leaks at the pump.

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