



## Chassis Installation

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This chapter provides information on rack configurations and instructions for installing and removing the chassis and its sub-components – the upper and lower fan trays and the Power Filter Units (PFUs).



### Important

Prior to installation, personnel should review and be familiar with all recommendations for Central Office installations, as found in Telcordia GR-1275-CORE Central Office Environment Installation/Removal Generic Requirements, Issue 3, December 2001.

This chapter includes the following sections:

- [Equipment Rack Configuration, page 1](#)
- [Weight Considerations, page 3](#)
- [Unpacking the ASR 5000 Chassis, page 3](#)
- [Installing the Chassis, page 6](#)

## Equipment Rack Configuration

The chassis is designed for installation in a standard 19-inch (48.26 cm) equipment rack. Additional rack hardware, such as extension brackets, may be used to install the chassis in a standard 23-inch (58.42 cm) rack. Each chassis is 24.50 inches (62.23 cm) high. This equates to roughly 14 Rack Mount Units (RMUs: 1 RMU = 1.75 in (4.45 cm)).

You can mount a maximum of three chassis in a standard 48 RMU (7 ft.) equipment rack or telco cabinet provided that all system cooling and ventilation requirements are met. A fully-loaded rack with three chassis installed has approximately 5.5 inches (13.97 cm, 3.14 RMUs) of vertical space remaining.



### Caution

When planning chassis installation, take care to ensure that the equipment rack or cabinet hardware does not hinder air flow at any of the intake or exhaust vents. Additionally, ensure that the environmental control system (HVAC) allows the system to function within the required limits.

## Ventilation Considerations

Airflow within the system is designed per Telcordia recommendations to ensure the proper vertical convection cooling of the system.

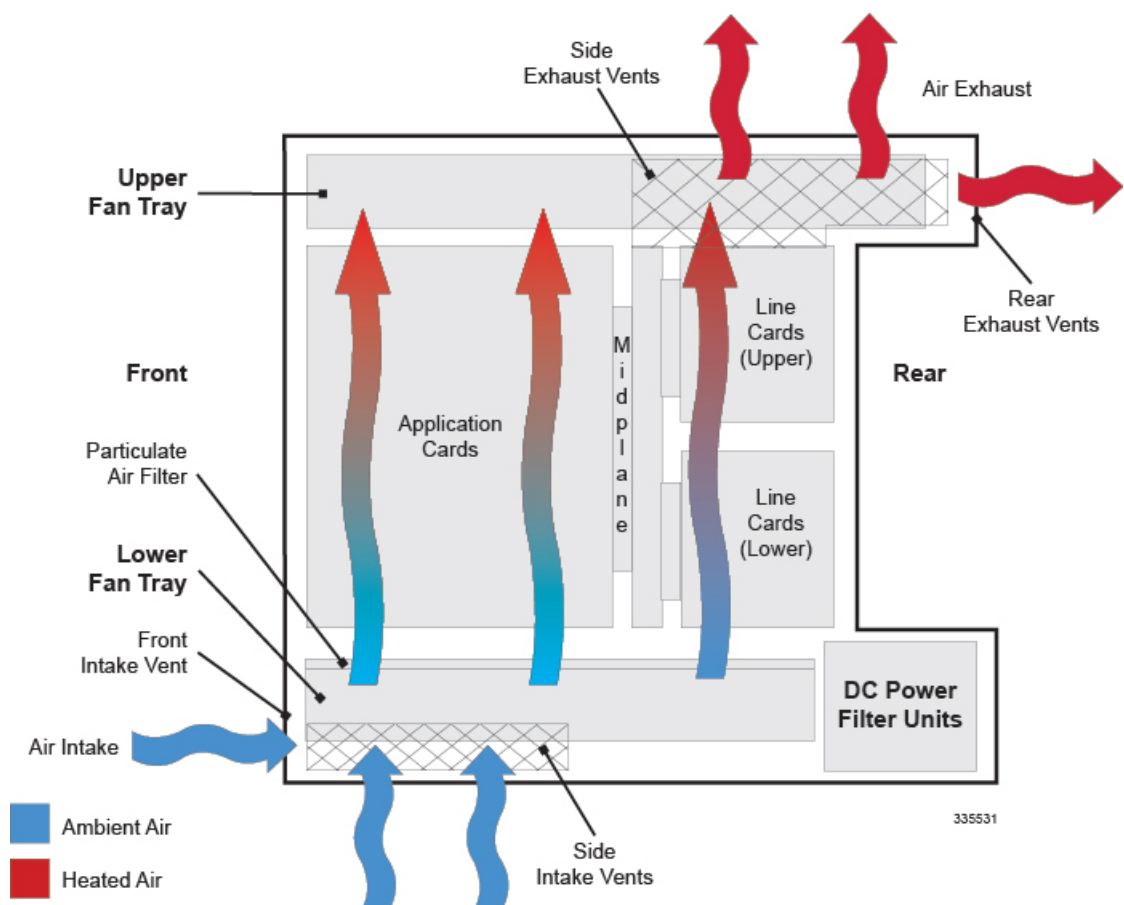
As shown in the figure below, the lower fan tray pulls ambient air inward from the front and side intake vents located at the bottom of the chassis. The air is pushed upwards through the system and absorbs heat as it passes over system components.

Total air flow exiting the chassis is approximately:

- 275CFM (7.8 cubic meters/minute) – Low fan speed
- 565CFM (16 cubic meters/minute) – High fan speed

The upper fan tray pulls the heated air up through the chassis. The heated air exits through the side and rear exhaust vents located at the top of the chassis.

**Figure 1: System Airflow and Ventilation**



Proper ventilation and cooling must allow the chassis to operate within the temperature and humidity levels described in the following table.

**Table 1: Operating Temperature and Humidity Recommendations**

<b>Operating Temperature</b>	0 degrees C to +55 degrees C 32 degrees F to +131 degrees F
<b>Operating Humidity</b>	20 percent to 80 percent, non-condensing

## Mounting Options

There are two options for mounting the chassis in a standard equipment rack or telecommunications cabinet:

- **Flush Mount:** In this configuration, the flanges of the mounting brackets are flush with the front of the chassis. This is the default configuration as shipped as is commonly used with 4-post racks and equipment cabinets. Refer to [Flush Mount Installation of the Chassis, on page 9](#).
- **Mid-mount:** In this configuration, the flanges of the mounting brackets are recessed from the front of the chassis. This configuration is required when mounting the chassis in a 2-post rack. To do this, install the mounting brackets toward the middle of the chassis on either side. Refer to [Mid-Mount Installation of the Chassis, on page 10](#).

## Weight Considerations

The shipping weight of the chassis is approximately 160 pounds (72.57 kg). Please consider the following recommendations before proceeding:

- If available, use an equipment lift to lift and move the chassis during the installation process.
- If no lift is available, reduce the weight according to the instructions in the [Reducing the Weight of the Chassis Prior to Installation, on page 6](#). These procedures reduces the weight of the chassis to approximately 125 lbs. (56.7 kg).
- At least two people are required to perform the installation. These individuals should be physically able to lift and control the weight of the chassis.
- When lifting any heavy object, it is important to remember to bend at the knees and lift with your legs. Bending at the waist and lifting with your back could cause personal injury.

## Unpacking the ASR 5000 Chassis

**Important**

Before unpacking the chassis, use a pallet jack to move the container as close to the final installation site as possible.

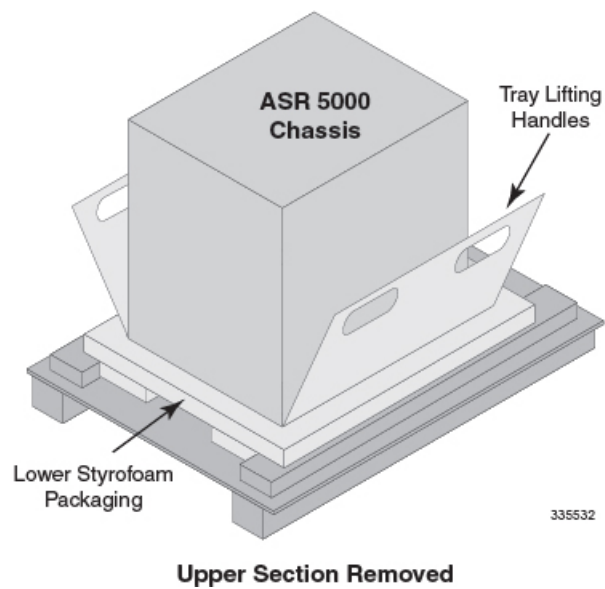
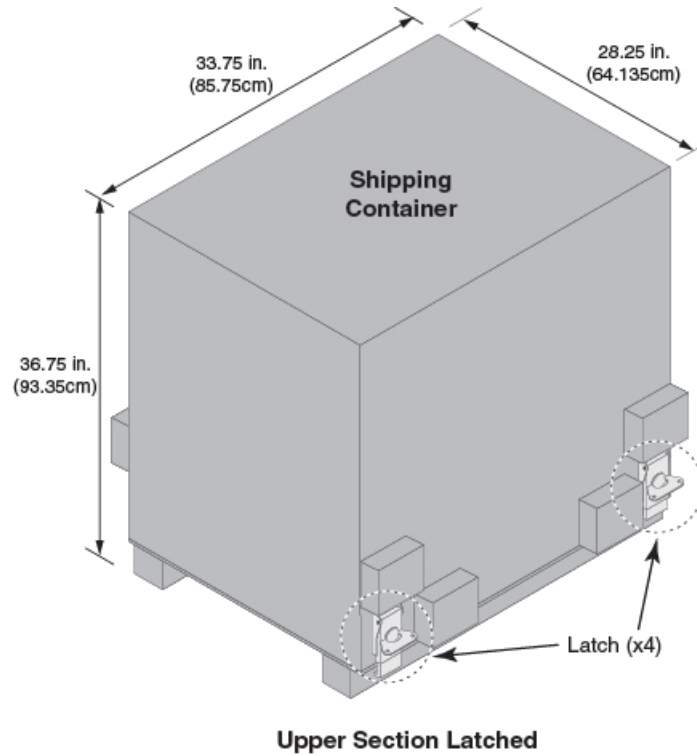
The chassis ships in a wooden container that is 28.25 in. (64.135cm) wide by 36.75 in. (93.35cm) high by 33.75 in. (85.75cm) deep. The container consists of an upper and lower section. The upper section forms the sides and top of the container. The lower section serves as the bottom of the container. The upper and lower

sections are secured together for shipping via four locking mechanisms located near the bottom corners of the container.

**Important**

Refer to the printed instructions that come with the shipment for detailed unpacking procedures.

**Figure 2: ASR 5000 Shipping Container**



# Installing the Chassis

**Important**

If you are installing more than one chassis in an equipment rack, to ensure an easier installation, begin by installing the first chassis near the bottom of the rack.

**Caution**

When handling or moving the chassis, lift the chassis from the bottom only. Lifting it by any other part could result in damage to the chassis.

**Caution**

During installation, maintenance, and/or removal, wear grounding wrist and/or heel straps to avoid ESD damage to the components. Failure to do so could result in damage to sensitive electronic components and potentially void your warranty.

## Reducing the Weight of the Chassis Prior to Installation

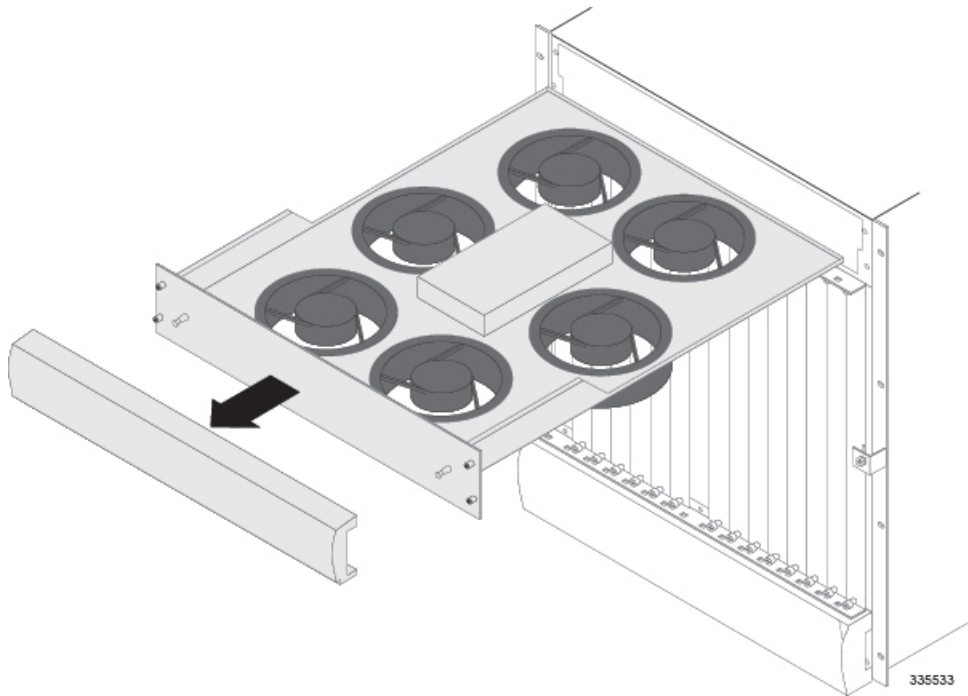
To make the installation process easier, you can reduce the weight of the chassis prior to installation by removing the upper and lower fan trays and the PFUs. Follow the instructions below to safely remove these components prior to installation.

**Caution**

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**Step 1** Remove the upper fan tray.

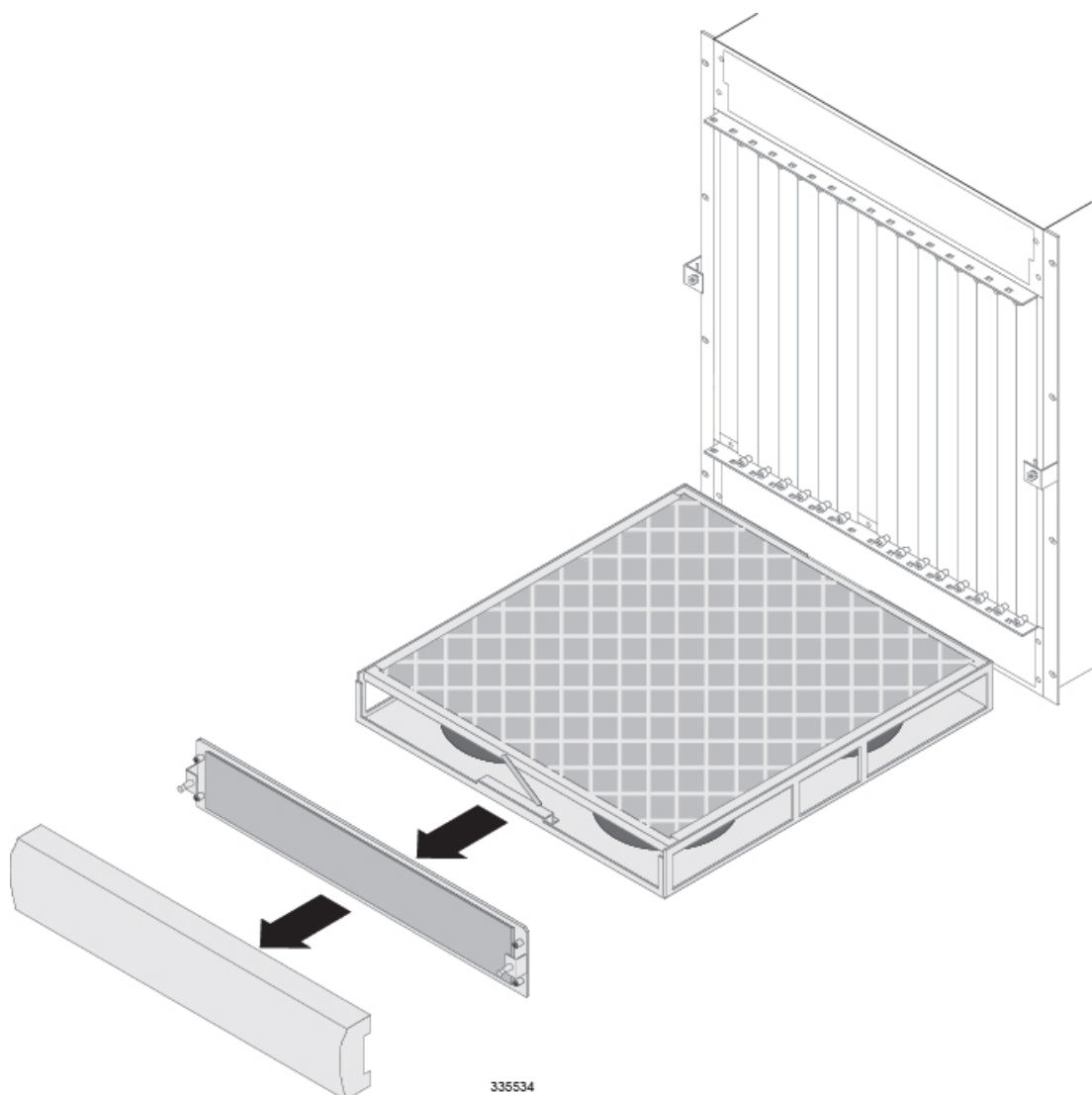


- a) Remove the plastic bezel from the upper-front of the chassis by placing your fingers in the notches on the sides of the bezel and pulling it toward you. Place it to the side for re-installation later.
- b) Loosen the four screws that secure the fan tray in place using a Phillips #1 screwdriver.
- c) Grasp the two bezel mounts on the front of the fan tray and pull. The fan tray should easily slide out of the chassis. Place it to the side for re-installation later.

To avoid personal injury and/or damage to the fan tray, be sure to support the weight of the fan tray from its front and back as you slide it completely out of the chassis.

Vorsicht beim Herausziehen der Luefter-Schublade: um eine Beschädigung des Moduls und eventuelle Verletzungen zu vermeiden, sollte diese hinten und vorne unterstuetzt werden.

**Step 2** Remove the lower fan tray assembly.



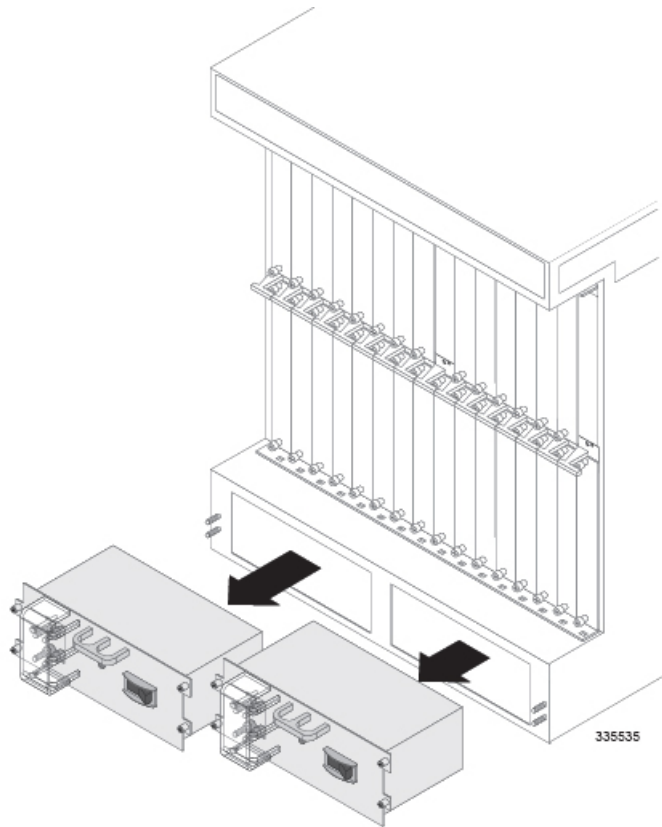
- Unsnap the plastic bezel from the lower-front of the chassis by placing your fingers in the notches on the sides of the bezel and pulling it toward you. Place it to the side for re-installation later.
- Use a Phillips #1 screwdriver to loosen the four captive screws that hold the fan tray cover/EMI shield in place. Pull the cover away from the chassis. **Do NOT use an electric or pneumatic torque driver to loosen these screws.**
- Pull the fan tray toward you using the handle. The fan tray should easily slide out of the chassis. Place it to the side for re-installation later.

To avoid personal injury and/or damage to the fan tray, be sure to support the fan tray's weight from its front and back as you slide it completely out of the chassis.

Vorsicht beim Herausziehen der Luefter-Schublade: um eine Beschaedigung des Moduls und eventuelle Verletzungen zu vermeiden, sollte diese hinten und vorne unterstuetzt werden.

**Step 3** Remove the PFUs located in the lower-rear of the chassis.





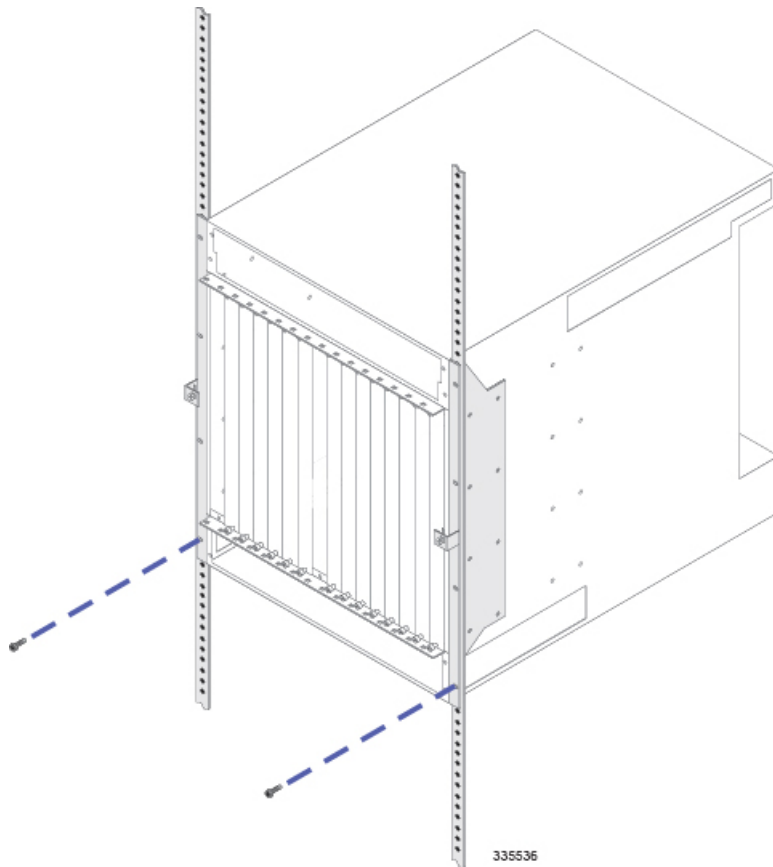
- Locate the PFU bay labeled Power Filter Unit 1 on the lower-left rear of the chassis.
- Use a Phillips #2 screwdriver to loosen the four screws that secure the PFU in to the chassis.
- Grasp the handle on the PFU and gently pull the PFU toward you. The PFU should slide easily out of the chassis. Place it to the side for re-installation later.
- Repeat step b and step c for the PFU located in the bay labeled Power Filter Unit 2 located on the lower-right side of the chassis.

**Step 4** Proceed to either the [Flush Mount Installation of the Chassis, on page 9](#) or [Mid-Mount Installation of the Chassis, on page 10](#), based on the mounting option you are using.

## Flush Mount Installation of the Chassis

Follow the instructions below to perform the flush mount installation of the chassis.

- Step 1** Position the chassis in the equipment rack so that the flanges of the mounting brackets at the front of the chassis are flush with the mounting rails of the equipment rack.
- Step 2** Mount the chassis to the rails of the equipment rack. Use the hardware that was supplied with the equipment rack. Begin with the two bottom holes and work your way up until all four holes on each flange are secured.

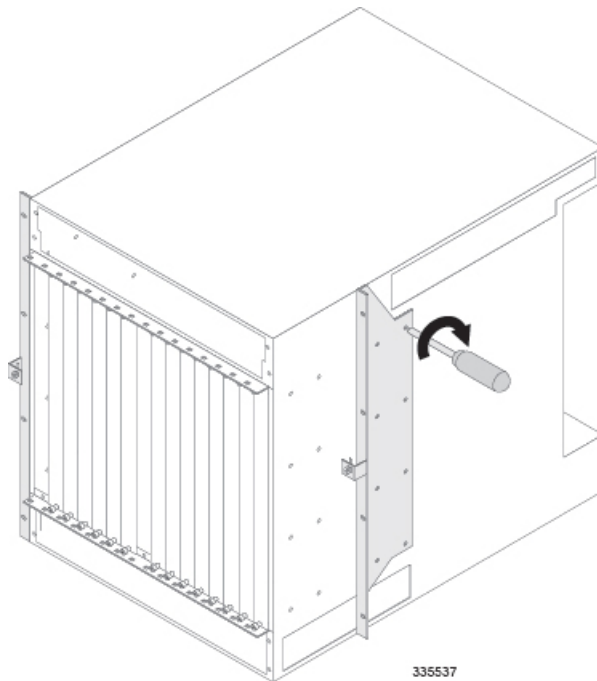


- Step 3** Repeat step 1 and step 2 for any additional chassis you are installing in the equipment rack.
- Step 4** Proceed to the [Grounding the Chassis, on page 12](#) section and ground the chassis.
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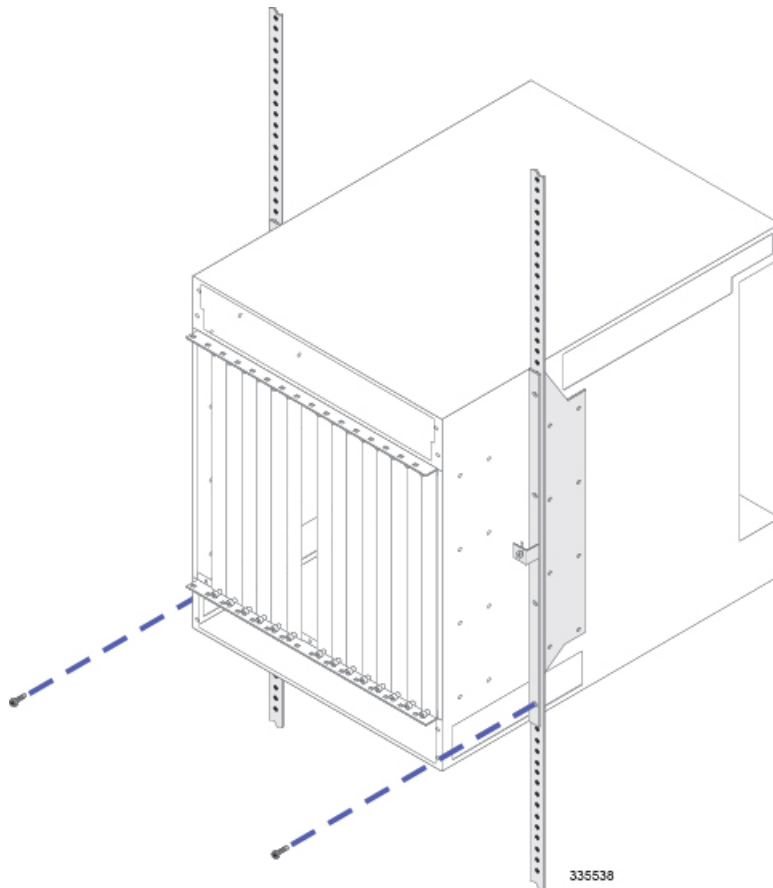
## Mid-Mount Installation of the Chassis

Follow the instructions below to perform the mid-mount installation of the system.

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- Step 1** On the side of the chassis, unfasten the eight Phillips #2 screws that secure the mounting bracket to the chassis.
- Step 2** Place the mounting bracket over the middle set of mounting holes on the side of the chassis and secure it to the chassis with the screws you removed in step 1.



- Step 3** Repeat step 1 and step 2 for the bracket on the opposite side of the chassis.
- Step 4** Position the chassis in the equipment rack so that the flanges of the mounting brackets are flush with the mounting rails of the equipment rack.
- Step 5** Mount the chassis to the rails of the equipment rack with the hardware that was supplied with the equipment rack. Begin with the two bottom holes and work your way up until all holes on each flange are secured.



**Step 6** Repeat step 1 through step 5 for any additional chassis you are installing in the equipment rack.

**Step 7** Proceed to the [Grounding the Chassis, on page 12](#) and ground the chassis.

## Grounding the Chassis

Make sure that the chassis is properly grounded prior to installing any chassis sub-components or cards. The chassis and the equipment rack or telecommunications cabinet that it is installed in must be connected to the same ground.

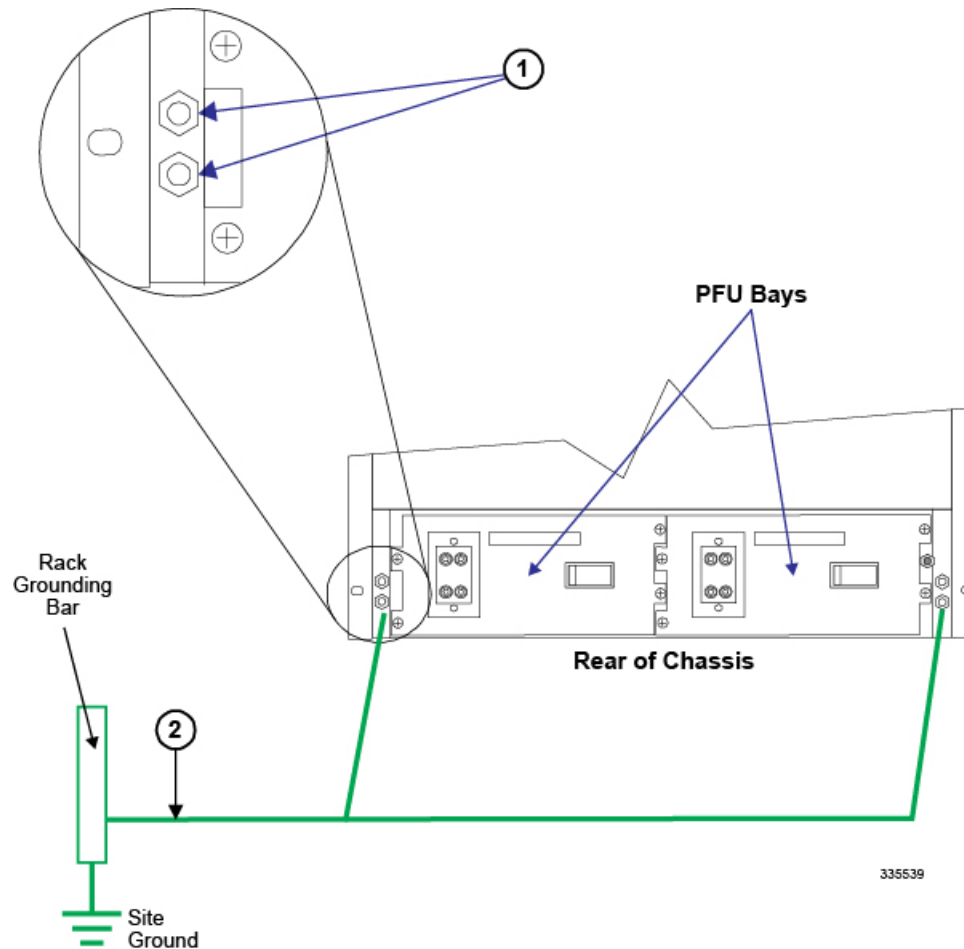


### Caution

Failure to properly ground the chassis could result in personal injury and/or damage to the chassis and its components.

There are two sets of grounding terminals located at the lower-rear of the chassis. The following figure and the table that follows show the location of these terminals and provide specifications for the appropriate lug and cable size.

**Figure 3: Chassis Ground Terminals**

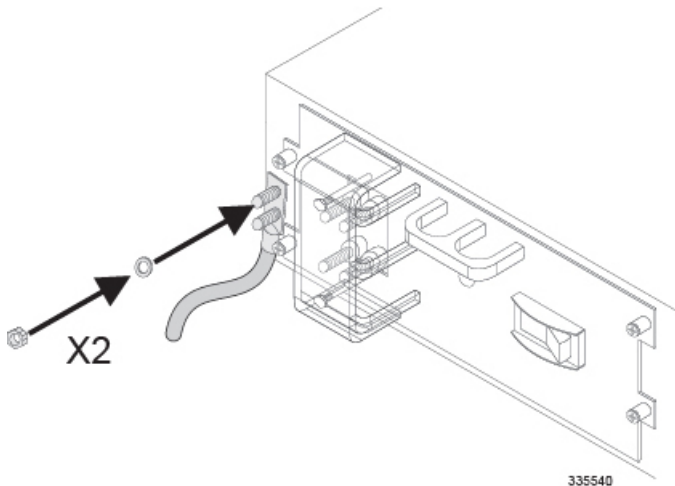


**Table 2: Terminal and Cable specifications**

Item	Description
1	Ground Terminal: 2-hole lug (0.186-inch posts, spaced 0.630-inch on center). The method of connection is: chassis - lug - flat washer - nut (3/8-inch). The nut(s) must be torqued to 50 in-lb (5.65 N-m).
2	Ground Cable: Cable length: Not more than 70 feet (21.336 meters) one way. Cable size: 6 AWG (minimum), stranded copper.

Follow the instructions below to connect the chassis to earth ground.

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- Step 1** Locate the chassis ground terminal on the lower-left corner of the rear of the chassis next to Power Filter Unit 1.
- Step 2** Route the stranded copper ground cable to the chassis ground terminal.
- Step 3** Crimp a 2-hole lug (Panduit type LCC6-10A-L) to the end of the ground cable using Panduit crimp tool part number CT-1700 (die color: blue 24).
- Step 4** Use a 3/8-inch nut driver or socket wrench to remove the nuts and washers from each of the two posts.
- Step 5** Insert the lug connected to the grounding cable over the two posts.
- Step 6** Secure the lug to the ground terminals with the nuts and washers you removed in step 4. The nuts should be torqued to 50 in-lb (5.65 N-m).



- Step 7** Repeat step 2 through step 6 to connect the second ground cable to the chassis ground terminal on the lower-right corner at the rear of the chassis next to Power Filter Unit 2.
- Step 8** If you took steps to reduce the weight of the chassis prior to installation, refer to the instructions in the [Re-Installing Chassis Sub-components, on page 14](#) to re-install the components. Otherwise, proceed to the *Application Card Installation* chapter.
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## Re-Installing Chassis Sub-components

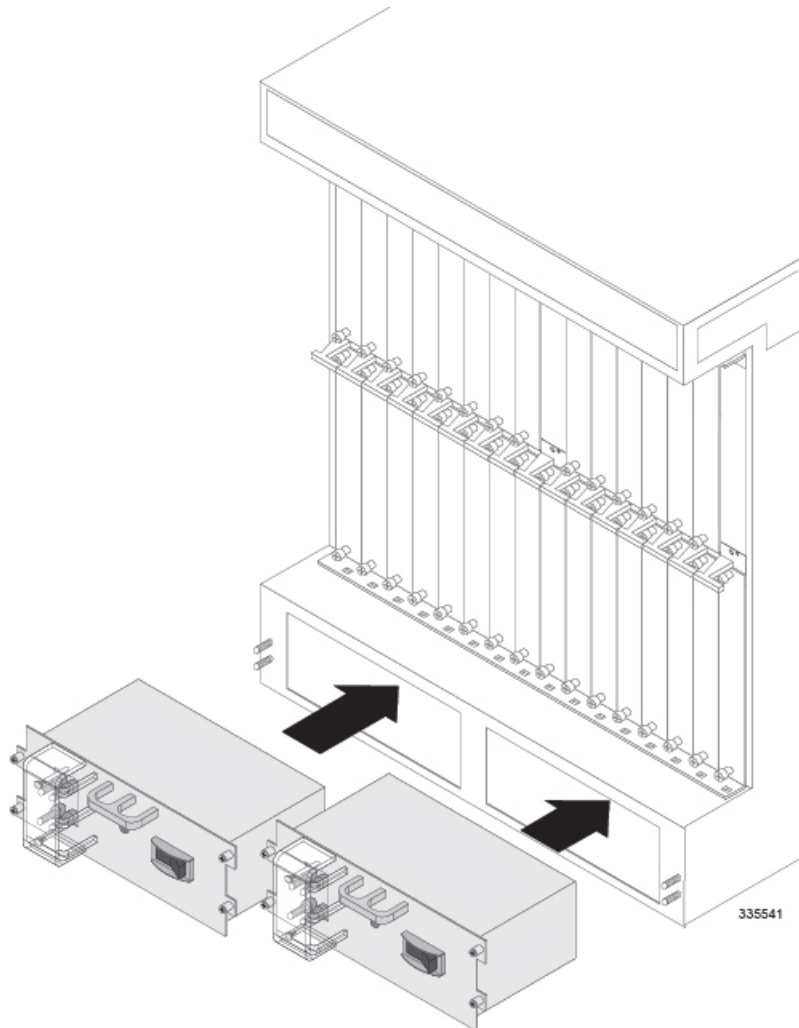
If you performed the procedure in the [Reducing the Weight of the Chassis Prior to Installation, on page 6](#) section, complete the procedures described below to re-install the sub-components of the chassis.

**Caution**

During installation, maintenance, and/or removal, wear grounding wrist straps to avoid ESD damage to the components. Failure to do so could result in damage to sensitive electronic components and potentially void your warranty.

**Step 1**

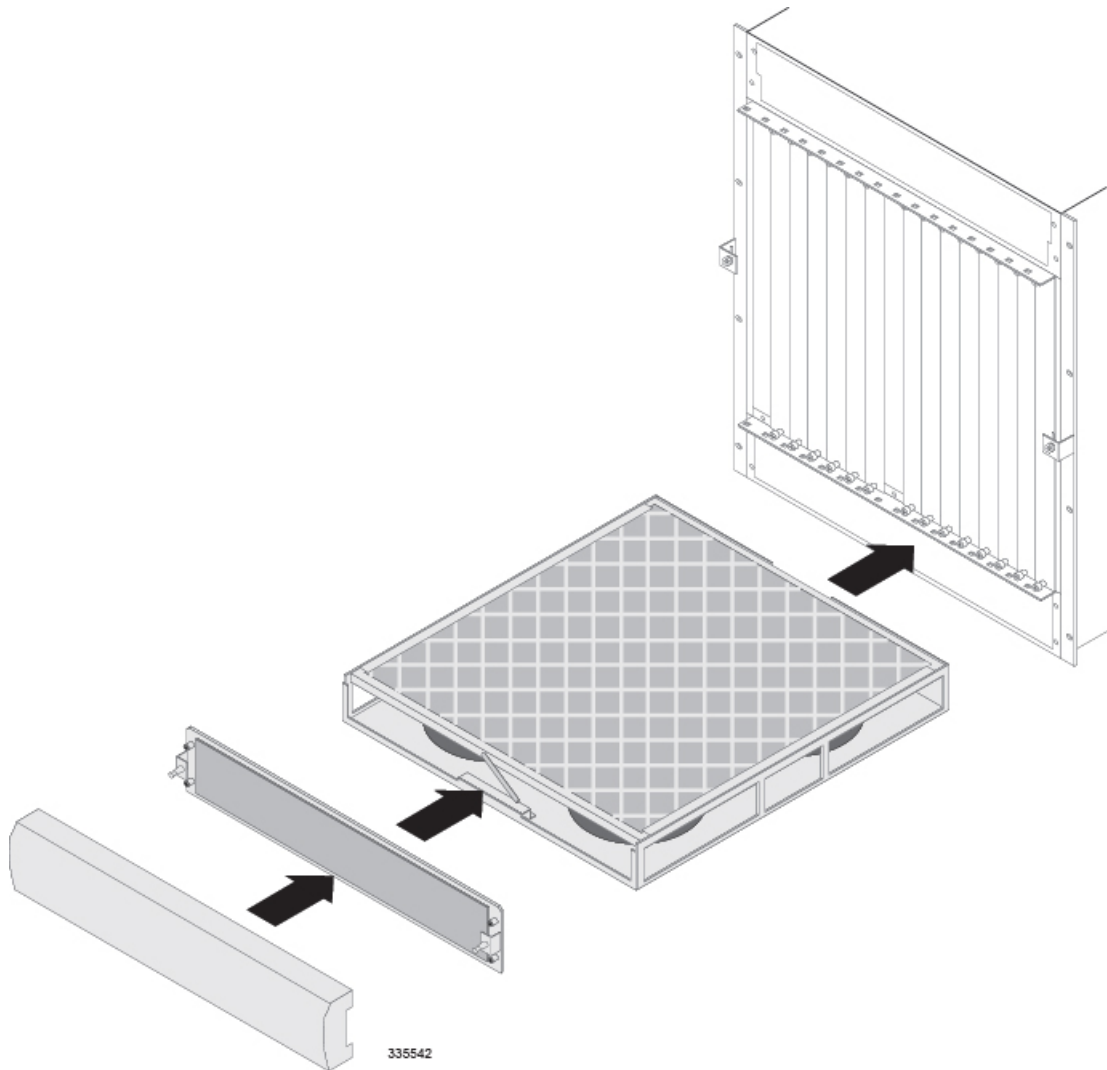
Re-install the PFUs into the chassis.



- Locate the PFU bays at the lower-rear of the chassis. The bays are labeled from left to right Power Filter Unit 1 and Power Filter Unit 2.
- Slide the PFU assembly into the PFU bay labeled Power Filter Unit 1 until it is flush against the chassis.
- Use a Phillips #2 screwdriver to tighten each of the four screws on the PFU to secure it to the chassis.
- Re-install the second PFU in the PFU bay labeled Power Filter Unit 2 by repeating step b and step c.

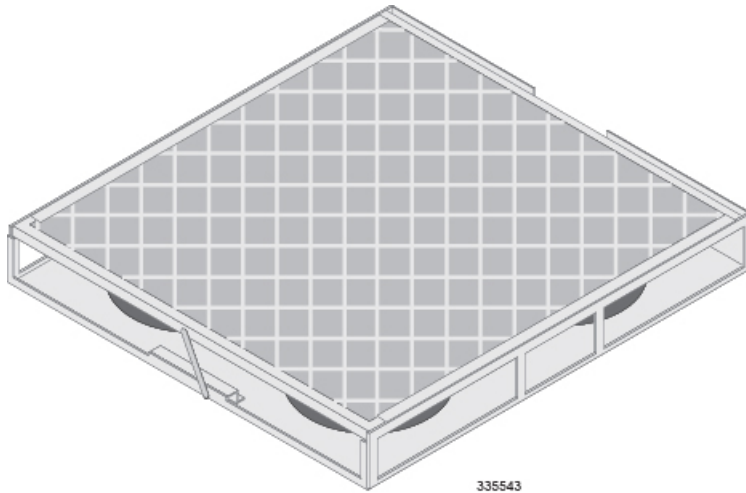
**Step 2**

Re-install the lower fan tray assembly into the chassis.



- Hold the front of the fan tray by its handle with one hand and use your other hand to align it with the lower fan tray bay of the chassis. The lower fan tray bay is located at the bottom front of the chassis.
- Slowly slide the fan tray into the chassis along the guides using its handle until it is seated firmly in the chassis and can go no further.
- Verify that the particulate filter is securely in place. Its front should be flush with the front of the fan tray assembly and its tab should be lowered to keep it in place.



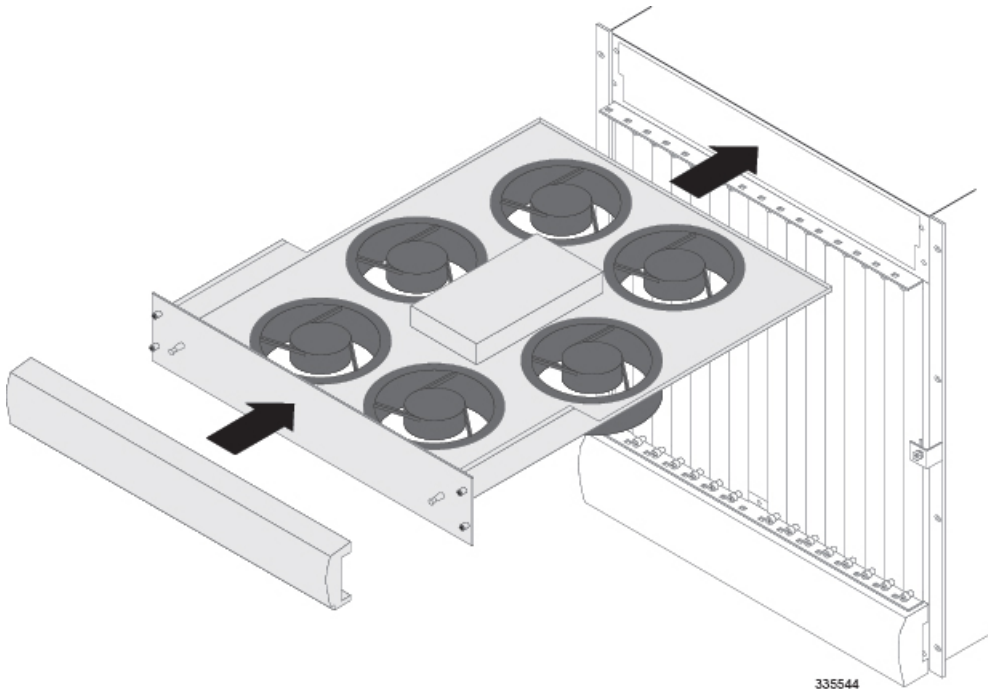


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- d) Replace the fan tray bay cover/EMI shield. The perpendicular tabs on the cover should face away from the chassis and be positioned at the bottom. Use a Phillips #1 screwdriver to hand tighten the four captive screws in an alternating pattern – upper left, lower right, lower left, upper right (5 inch-lb, 0.5 N-m). **Do NOT use an electric or pneumatic torque driver to tighten these screws.**
- e) Replace the lower plastic bezel: align it over the bezel mounts that protrude from the fan tray bay cover and snap it in place.

**Step 3**

Re-install the upper fan tray.



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- a) Hold the front of the fan tray by its sides and align it with the upper fan tray bay of the chassis. The upper fan tray bay is located at the upper-front of the chassis.
- b) Slowly slide the fan tray into the chassis along the guides until its face plate is firmly against the chassis.
- c) Use a Phillips #1 screwdriver to tighten the four screws on the face of the fan tray to secure it.

- d) Replace the upper plastic bezel: align it over the bezel mounts that protrude from the face of the fan tray and snap it in place.

**Step 4** Proceed to the *Application Card Installation* chapter.

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