



Cabling the Power Filter Units

This chapter provides information and instructions for applying the power supply and return cables to the Power Filter Units (PFUs) .

This chapter includes the following sections:

- [Power Considerations, page 1](#)
- [Connecting the PFU to the Power Source, page 5](#)

Power Considerations

Each chassis supports one or two 165-amp PFUs.

The following table describes the power requirements for the chassis.



Note

These requirements are guidelines to assure that the cabling for your system meets safety requirements.

Table 1: Chassis Power Requirements

Characteristic	Value
Input Voltage	Maximum range: -40VDC to -60VDC Nominal range: -48VDC to -60 VDC
TUV Rated Peak Current Load	165A @ -48 VDC
Maximum Peak Power Load	5760W
Empty Chassis Maximum Power Load (includes fan trays)	800W

Characteristic	Value
Line Card (rear-installed) Maximum Power Load	SPIO: 15W FLC2: 13.5W GLC2: 10.5W RCC: 20W QGLC: 15W XGLC: 25W OLC2: 23W CLC2: 23W
Application Card (front-installed) Maximum Power Load	SMC: 130W PSC: 250W PSC2: 325W PSC3: 330W PPC: 275W
Power Feed	PFU: 165 Amps

Estimating Power Requirements

Use the following formula to estimate the total power consumption for each deployed chassis:

(Total Application Card Maximum Power Load) + (Total Line Card Maximum Power Load) + (Chassis Maximum Power Load)

The calculation for estimating the power required for an ASR 5000 installation with 3 PSCs, 2 SMCs, 2 SPIOs, 2 RCCs, and 4 Ethernet 1000 line cards is as follows:

$$(250W \times 3) + (130W \times 2) + ((20W \times 2) + (13.5W \times 4)) + 800W = 1934W$$

Power Cable Requirements

You can install up to three chassis in an equipment rack or telecommunications cabinet. Typically power cabling is run from the office Power Distribution Frame (PDF) to a Power Distribution Panel (PDP) installed in the rack or cabinet and then to each of the chassis. Due to the required bending radius at each of the system's PFUs, distributing power through a PDP allows you to use a smaller, more flexible cable for each chassis.

The following table identifies the recommended gauges for power cables.

Table 2: Recommended Cable Gauge Information

Termination	Conductor Sizing Information
PDF to Fuse Panel	<p>Assuming an 80-foot (24 meter) loop length, each cable between the PDF and PDP must be the equivalent of 350,000 circular mils or greater.</p> <p>Calculations assume a 0.3 volt drop from the PDF to the PDP, and a 0.3 volt drop from the PDP to the chassis. This is a total voltage drop of 0.6 volts.</p>
Fuse Panel to ASR 5000	<p>Assuming an 18-foot (5.5 meter) loop length, each cable between the PDP and the chassis must be the equivalent of 83,690 circular mils (1 AWG) or greater. Use high-flex cable.</p> <p>Calculations assume a 0.3 volt drop from the PDF to the PDP, and 0.3 volt drop from the fuse panel to the chassis. This is a total voltage drop of 0.6 volts.</p> <p>The following figure and table provide details for wiring the PFUs.</p>

Figure 1: PFU Wiring Diagram

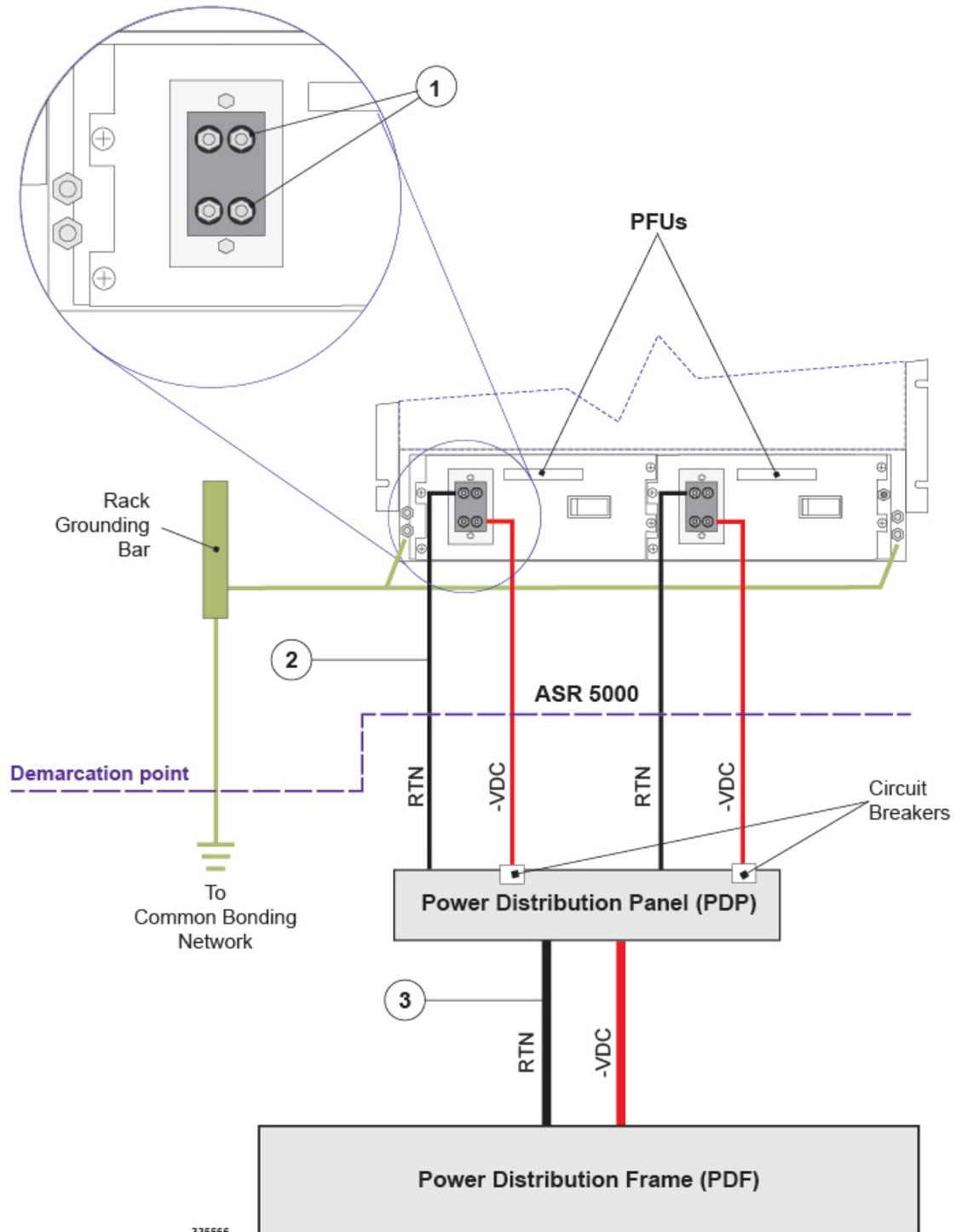
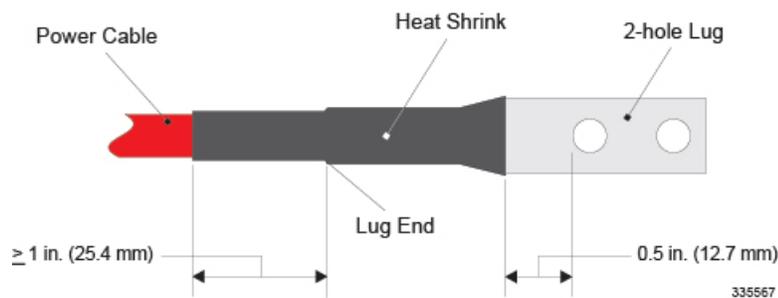


Table 3: ASR 5000 PFU Wiring Diagram Descriptions

Item	Description
1	<p>Two 2-hole lugs are required: one for return (RTN) and one for power (-VDC). The PFU 0.3125-inch posts spaced 0.88-inch on center.</p> <p>Method of connection: PFU - Flat Washer - Lug - Lock-Washer - Nut (9/16-inch). The nut(s) must be torqued to 50 in-lb. (5.65 N-m).</p> <p>The lug must be covered with heat shrink tubing. The heat shrink tubing should begin approximately 1 inch (25.4 mm) before the lug and extend to within 0.5 inch (12.7 mm) of the lugs first hole. Slide the tubing over the cable end before crimping the lug to the cable.</p> <p>Use the Panduit® lugs supplied with the chassis (LCD1-56C-E). Crimp them to the cable ends with a Panduit crimp tool part number CT-920 (die color: green P37 (CD-920-1)).</p> <p>The plastic terminal cover must be installed over power and return lugs at all times.</p> <p>Die angeschlossenen Kabelschuhe muessen mit der Plastikabdeckung gesichert sein.</p>
2	<p>Power Cables (PDP-to-Chassis):</p> <p>Cable length: Not more than 9 feet (2.7 meters) one way</p> <p>Voltage drop: 0.3v</p> <p>Cable size: 1 AWG or greater</p>
3	<p>Power Cables (PDF-to-PDP):</p> <p>Cable length: not more than 40 feet (12.2 meters) one way</p> <p>Voltage drop: 0.3v</p> <p>Cable size: 350,000 Circular Mills</p>

Figure 2: Power Lug

Connecting the PFU to the Power Source

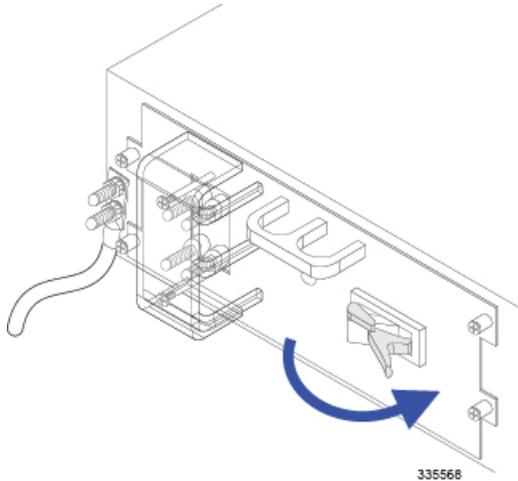
Follow the instructions in this section to connect the PFU(s) to the power source.

Each of the four power terminals is shipped with nuts and washers. The PFU has one lock-washer and one flat washer.

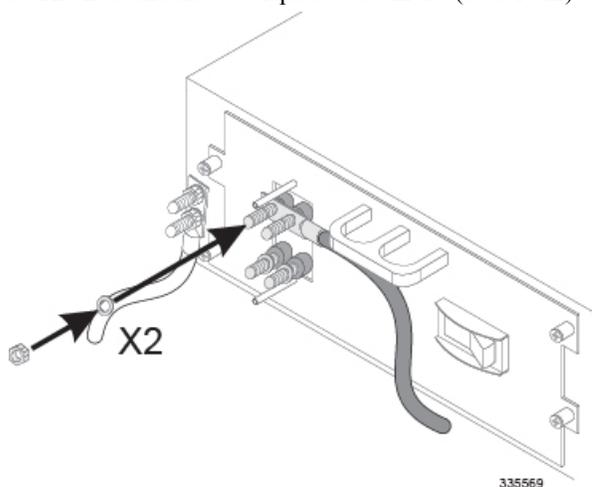
Verify that the power source from the fuse panel is OFF before attaching power cables to the PFU(s) installed in the chassis.

Spannungsversorgung abschalten vor Anschluss der Kabel an die Netzteile, um einen elektrischen Schlag zu vermeiden.

- Step 1** Flip the circuit breaker actuator on the PFU installed in the bay labeled Power Filter Unit 1 to the OFF position. If the circuit breaker on the PFU is equipped with a locking clip, lock the circuit breaker in place by moving the breaker's locking clip to the right until the clip's inside tang is recessed in the breaker's actuator opening.

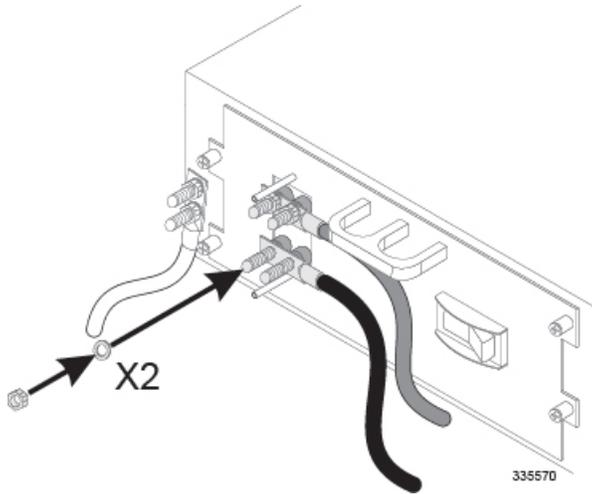


- Step 2** Remove the plastic cover from the power terminals with a #2 Phillips head screw driver.
- Step 3** Use a 9/16-inch nut driver or socket wrench to remove the nuts and the lock-washers from each of the four terminals.
- Step 4** Connect the lug attached to the power return cable to the PFU:
- Insert the lug over the two terminals labeled RTN. These are the two top terminals on the PFU.
 - Secure the lug to the RTN terminals with two of the four washers and two of the four nuts that you removed in step 3. The nuts should be torqued to 50 in-lb. (5.65 N-m).



- Step 5** Connect the lug attached to the power feed cable to the PFU:
- Insert the lug over the two terminals labeled -VDC. These are the two bottom terminals on the PFU.

- b) Secure the lug to the -VDC terminals with the remaining two washers and nuts that you removed in step 3. The nuts should be torqued to 50 in-lb. (5.65 N-m).



To avoid the risk of fire, take proper precautions to ensure that the power feed and return lugs are not touching. Um einen Kurzschluss zu vermeiden, dürfen sich die beiden Stromkabel nicht beruehren. Kabelschuhe dürfen sich nicht beruehren und muessen unbedingt auseinander gehalten werden.

Step 6 Reinstall the plastic terminal cover.

Caution To avoid the risk of potential damage to the system, never operate the chassis without the plastic terminal cover installed. Make sure that the power and return lugs do not protrude past the edge of the plastic terminal covers. Any portion of the lug that is exposed must be covered with heat shrink tubing.

Step 7 Repeat step 1 through step 6 for the PFU installed in the bay labeled Power Filter Unit 2.

Step 8 Proceed to the next chapter for information and instructions on applying power to the chassis and verifying that the installation was successful.

