This document describes the few exceptions in which DC-powered VNXe1600™, VNXe3200™, and VNXe3300™ series systems differ from their AC counterparts. Topics include:

- Power considerations................................................................................................ 2
- Cabling DC power and powering the system up and down ......................................... 5

In general, you configure, operate, and maintain DC-powered systems as you would the more common AC systems. DC power supplies in the 15-slot and 25-slot disk processor enclosures (DPE) and 15-slot disk-array enclosures (DAE6S) include power on/off switches or buttons. The DC power supplies in the 25-slot disk-array enclosures (DAE5S) do not include power on/off switches or buttons.

For the most up-to-date and complete set of VNXe series documentation, visit the support site at emc.com/vnxesupport.

**IMPORTANT**

Systems with DC power are intended for use in environments with redundant and highly available power sources (for example, “Central Office” grade power within the telecommunications industry), and DC power provided by the site must meet this requirement. The sudden loss of all incoming DC power to a storage system may cause unexpected abnormal behavior of the storage system and loss of write-cache data.
## Power considerations

Power distribution must support the number of outlets required for the device (two per enclosure) and the device power rating.

*Table 1* lists the power specifications for EMC® VNXe1600 series disk processor and supported DC disk-array enclosures.

### Table 1  Disk processor/array enclosure (VNXe1600, DAE5S), DC ratings

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description (note all ratings assume fully configured systems)</th>
<th>VNXe1600 12-slot DPE</th>
<th>VNXe1600 25-slot DPE</th>
<th>DAE5S</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC line voltage</td>
<td>-39 to -72 V DC (nominal -48 V or -60 V power systems)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC line current (operating maximum)</td>
<td>10.1 A max at -39 V DC</td>
<td>12.3 A max at -39 V DC</td>
<td>7.56 A max at -36 V DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.4A max at -48 V DC</td>
<td>10.2 A max at -48 V DC</td>
<td>5.67 A max at -48 V DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.7A max at -72 V DC</td>
<td>6.9 A max at -72 V DC</td>
<td>3.78 A max at -72 V DC</td>
<td></td>
</tr>
<tr>
<td>Power consumption (operating maximum)</td>
<td>392 W max at 39 V DC</td>
<td>480 W max at 39 V DC</td>
<td>272 W max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>402 W max at 48 V DC</td>
<td>488 W max at 48 V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>413 W max at 72 V DC</td>
<td>498 W max at 72 V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat dissipation (operating maximum)</td>
<td>1.41 x 10^8 J/hr, (1,338 Btu/hr) max @ -39 V DC</td>
<td>1.73 x 10^6 J/hr, (1,638 Btu/hr) max @ -39 V DC</td>
<td>.979 x 10^6 J/hr (928.1 Btu/hr) max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.45 x 10^8 J/hr, (1,372 Btu/hr) max @ -48 V DC</td>
<td>1.76 x 10^6 J/hr, (1,665 Btu/hr) max @ -48 V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.49 x 10^8 J/hr, (1,409 Btu/hr) max @ -72 V DC</td>
<td>1.79 x 10^6 J/hr, (1,699 Btu/hr) max @ -72 V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-rush current</td>
<td>40 A peak, per requirements in EN300 132-2 Sect. 4.7 limit curve</td>
<td>40 A peak, per requirements in EN300 132-2 Sect. 4.7 limit curve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC protection</td>
<td>40 A fuse in each power supply</td>
<td>40 A fuse in each power supply</td>
<td>20 A fuse in each power supply</td>
<td></td>
</tr>
<tr>
<td>Mating DC connector</td>
<td>Positronics PLBH3W3F0000/AA</td>
<td>Positronics PLBH3W3F0000/AA</td>
<td>Positronics PLB3W3F7100A1</td>
<td></td>
</tr>
<tr>
<td>Ride-through time</td>
<td>1 ms min at -50V input</td>
<td>1 ms min at -50V input</td>
<td>5 ms min at -40 V input</td>
<td></td>
</tr>
<tr>
<td>Current sharing</td>
<td>± 5% of full load, between power supplies</td>
<td>± 10% of full load, between power supplies</td>
<td>±15% of full load, between power supplies</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 lists the power specifications for EMC® VNXe3200 series disk processor and supported DC disk-array enclosures.

### Table 2 Disk processor/array enclosure (VNXe3200, DAE5S), DC ratings

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description (note all ratings assume fully configured systems)</th>
<th>VNXe3200 15-slot DPE</th>
<th>VNXe3200 25-slot DPE</th>
<th>DAE5S</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC line voltage</td>
<td>-36 to -72 V DC (nominal -48 V or -60 V power systems)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC line current (operating maximum)</td>
<td>12.56 A max at -36 V DC</td>
<td>11.78 A max at -36 V DC</td>
<td>7.56 A max at -36 V DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.42 A max at -48 V DC</td>
<td>8.83 A max at -48 V DC</td>
<td>5.67 A max at -48 V DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.28 A max at -72 V DC</td>
<td>5.89 A max at -72 V DC</td>
<td>3.78 A max at -72 V DC</td>
<td></td>
</tr>
<tr>
<td>Power consumption (operating maximum)</td>
<td>452 W max</td>
<td>424 W max</td>
<td>272 W max</td>
<td></td>
</tr>
<tr>
<td>Heat dissipation (operating maximum)</td>
<td>1.63 x 10^6 J/hr, (1,542 Btu/hr) max</td>
<td>1.53 x 10^6 J/hr, (1,447 Btu/hr) max</td>
<td>.979 x 10^6 J/hr (928.1 Btu/hr) max</td>
<td></td>
</tr>
<tr>
<td>In-rush current</td>
<td>40 A peak, per requirements in EN300 132-2 Sect. 4.7 limit curve</td>
<td>40 A peak, per requirements in EN300 132-2 Sect. 4.7 limit curve</td>
<td>20 A peak</td>
<td></td>
</tr>
<tr>
<td>DC protection</td>
<td>50 A fuse in each power supply</td>
<td>50 A fuse in each power supply</td>
<td>20 A fuse in each power supply</td>
<td></td>
</tr>
<tr>
<td>Mating DC connector</td>
<td>Positronics PLBH3W3F0000/AA</td>
<td>Positronics PLBH3W3F0000/AA</td>
<td>Positronics PLB3W3F7100A1</td>
<td></td>
</tr>
<tr>
<td>Ride-through time</td>
<td>1 ms min at -50V input</td>
<td>1 ms min at -50V input</td>
<td>5 ms min at -40 V input</td>
<td></td>
</tr>
<tr>
<td>Current sharing</td>
<td>± 10% of full load, between power supplies</td>
<td>± 10% of full load, between power supplies</td>
<td>±15% of full load, between power supplies</td>
<td></td>
</tr>
</tbody>
</table>
Table 3 lists the power specifications for EMC® VNXe3300 series disk processor and supported DC disk-array enclosures.

**Table 3** Disk processor/array enclosure (VNXe3300, DAE6S, DAE5S), DC ratings

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description (note all ratings assume fully configured systems)</th>
<th>VNXe3300 15-slot DPE</th>
<th>VNXe3300 25-slot DPE</th>
<th>DAE6S</th>
<th>DAE5S</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC line voltage</td>
<td>-36 to -72 V DC (nominal -48 V or -60 V power systems)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC line current (operating</td>
<td></td>
<td>12.6 A max at -36 V DC</td>
<td>12.5 A max at -36 V DC</td>
<td>7.86 A max at -36 V DC</td>
<td>7.56 A max at -36 V DC</td>
</tr>
<tr>
<td>maximum)</td>
<td></td>
<td>9.5 A max at -48 V DC</td>
<td>9.4 A max at -48 V DC</td>
<td>5.90 A max at -48 V DC</td>
<td>5.67 A max at -48 V DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.93 A max at -72 V DC</td>
<td>3.78 A max at -72 V DC</td>
</tr>
<tr>
<td>Power consumption (operating</td>
<td></td>
<td></td>
<td>455 W max</td>
<td>450 W max</td>
<td>283 W max</td>
</tr>
<tr>
<td>maximum)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat dissipation (operating</td>
<td></td>
<td>1.64 x 10^6 J/hr (1,560 Btu/hr) max</td>
<td>1.64 x 10^6 J/hr (1,540 Btu/hr) max</td>
<td>1.02 x 10^6 J/hr (965.6 Btu/hr) max</td>
<td>.979 x 10^6 J/hr (928.1 Btu/hr) max</td>
</tr>
<tr>
<td>maximum)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-rush current</td>
<td></td>
<td>35 A peak</td>
<td>35 A peak</td>
<td>20 A peak</td>
<td>20 A peak</td>
</tr>
<tr>
<td></td>
<td>(per requirements in EN300 132-2 Sect. 4.7 limit curve)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC protection</td>
<td></td>
<td>30 A fuse in each power supply</td>
<td>30 A fuse in each power supply</td>
<td>20 A fuse in each power supply</td>
<td>20 A fuse in each power supply</td>
</tr>
<tr>
<td>Ride-through time</td>
<td></td>
<td>10 ms min at -50 V input</td>
<td>10 ms min at -50 V input</td>
<td>5 ms min at -40 V input</td>
<td>5 ms min at -40 V input</td>
</tr>
<tr>
<td>Current sharing</td>
<td></td>
<td>±10% of full load, between power supplies</td>
<td>±10% of full load, between power supplies</td>
<td>±15% of full load, between power supplies</td>
<td>±15% of full load, between power supplies</td>
</tr>
</tbody>
</table>
Cabling DC power and powering the system up and down

After installing the storage-system hardware, cable DC power and power up the system components.

**Note:** VNXe DPEs and DAEs start immediately when connected to active DC input; you do not need to press or toggle the power switches.

Connect each power supply to a DC power source. See Figure 2 on page 6.

For high availability, be sure to connect the A and B power cords in each enclosure to different power source feed circuits.

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**Power cords**

Figure 1 shows a typical power cord provided by EMC. Table 4 describes the pinouts.

![VNXe DC power cable cord](image)

**Figure 1** VNXe DC power cable cord

**Table 4** Cabling pinout

<table>
<thead>
<tr>
<th>P1 designation</th>
<th>Description</th>
<th>Wire color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DC positive (+)</td>
<td>Black</td>
</tr>
<tr>
<td>2</td>
<td>DC negative (-)</td>
<td>Brown</td>
</tr>
<tr>
<td>3</td>
<td>Chassis ground</td>
<td>Green/Yellow</td>
</tr>
</tbody>
</table>

---

*VNXe™ Series Hardware in NEBS-Compliant Environments Installation Guidelines*
Cabling DC power and powering the system up and down

Figure 2  DC power cord connection

**Note:** Grounding screws on the power supplies provide additional grounding sources, if necessary.

### Powering down a DC-powered VNXe series system

Follow these instructions to power down VNXe series storage systems with DC power:

1. Stop all I/O activity to the storage system.

   **Note:** Stopping the I/O allows the SP to destage cache data, and may take some time. The length of time will be based on criteria such as the amount of cache, the amount of data in the cache, the type of data in the cache, and the target location on the disks, but it is typically less than one minute.

2. If the server connected to the storage system is running the UNIX operating system, unmount the file systems.

3. On the disk processor enclosure, push the power button on each power supply and hold the button in for two seconds. Refer to Figure 3 on page 7.
Cabling DC power and powering the system up and down

Figure 3  DC power switches

**Note:** Allow the power supply to complete its shutdown sequence before removing the power source. An orderly shutdown that flushes all cache can take up to several seconds before the host sends a STOP to the power supply. We recommend that you wait two minutes before removing a power supply from the DPE chassis.

4. Power down power strips A and B.

**Note:** If you need to retain power to other systems in a rack/cabinet, leave the power strips powered up. If necessary, toggle the DAE6S power switches to the off position; remove power cords from the DAE6S enclosures.

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