DAS Subsystems

DC SPS (Direct Current Standby Power Supply)
Installation and Service

Bull DAS Subsystems

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Installation and Service

Hardware

July 2000

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Trademarks and Acknowledgements

Year 2000

The product documented in this manual is Year 2000 Ready.

NOTE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

WARNING

This product complies with EN55022 Class B.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Testing was done with shielded cables. Therefore, in order to comply with the FCC regulations, you must use shielded cables with your installation.

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe (B) prescrites dans la norme sur le matériel brouilleur : "Appareils Numériques", NMB-003 édictée par le ministre des Communications.

Manufacturer's Declaration of Conformity

This equipment has been tested and found to comply with the requirements of European Community Council Directives 89/336/EEC and 73/23/EEC relating to electromagnetic compatibility and product safety respectively.

<div style="border:1px solid">

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　取扱説明書に従って正しい取り扱いをして下さい。

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Preface

This manual describes how to install, service, and use the DC Standby Power Supply (DC SPS). There are two types, 400 and 800 watts.

Audience and objectives

This manual is for people who want to install and use the Standby Power Supply (SPS) with CLARiiON® disk-array storage systems.

IMPORTANT   Only service personnel should replace the SPS battery pack.

WICHTIG: Das Austauschen der SPS-Batterieeinheit darf nur von Fachpersonal ausgeführt werden.

Some rackmount systems ship fully assembled, with the SPS units and storage systems installed in a cabinet. Or you can plan to install an SPS yourself. If you will install the SPS in a rackmount cabinet, we assume that you have installed the SPS mounting tray (explained in the rails installation document shipped with the tray).

Some deskside units come with the SPS unit(s) already installed. You may want to add a second SPS to a deskside unit you already have.

Organization of the manual

Chapter 1   Introduces both models of the Standby Power Supply (SPS) and explains how to install it and connect cables to them.

Chapter 2   Explains how to replace the SPS in a rackmount system.

Chapter 3   Explains how to replace the SPS in a deskside system.

Appendix A Lists the SPS technical specifications and battery storage and self-discharge times.

Related manuals

This manual refers to the rails and tray installation document.

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Contents

Chapter 1 – About the DC SPS

Chapter 2 – Replacing the SPS in a rackmount system

Chapter 3 – Replacing the SPS in a deskside system

Appendix A – Technical specifications and operating limits

1 About the DC SPS

The DC SPS (Direct Current Standby Power Supply) provides backup power required to protect the integrity of the Fibre Channel array storage processor (SP) write cache. The array can use the write cache only while a fully charged SPS is present. If you are familiar with the SCSI storage-system Battery Backup Unit (BBU), the SPS performs a similar function.

> **IMPORTANT** The SPS is intended to provide backup power for Fibre Channel Disk-Array Processor Enclosures (DPEs) and intelligent Disk-Array Enclosures (iDAEs) only.

About the SPS

An SPS provides backup power for one Disk-Array Processor Enclosure (DPE) or intelligent Disk-Array Enclosure (iDAE). For higher availability, to allow write caching to continue when an SPS is faulted or not fully charged, you can acquire a second SPS.

The DC SPS has two phone-jack type connectors and status lights on the right side of its rear panel.
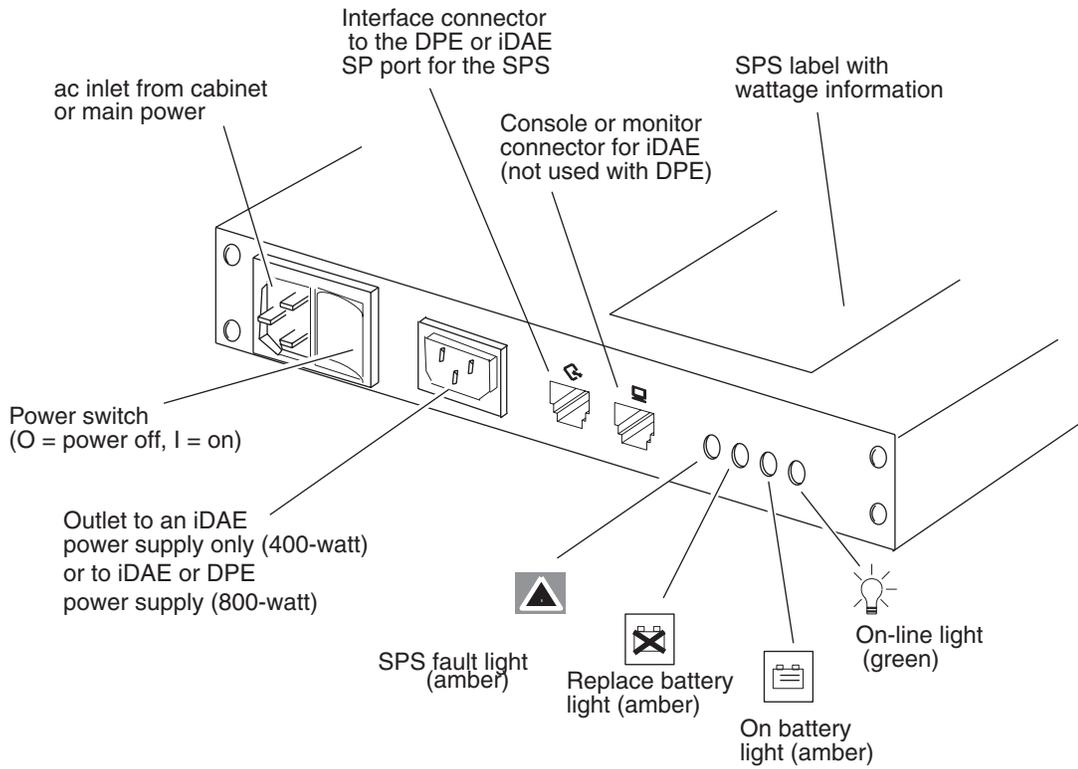
There are two types of DC SPS: 400 watt, to supply power for an iDAE, and 800 watt, to supply power for a DPE. The material in this manual applies to both types, unless noted otherwise.

> **IMPORTANT** With a DPE, use only an 800-watt SPS. The 400-watt SPS cannot provide enough power to support a DPE. Read the label (as shown in the following figure) to verify the wattage of an SPS unit.
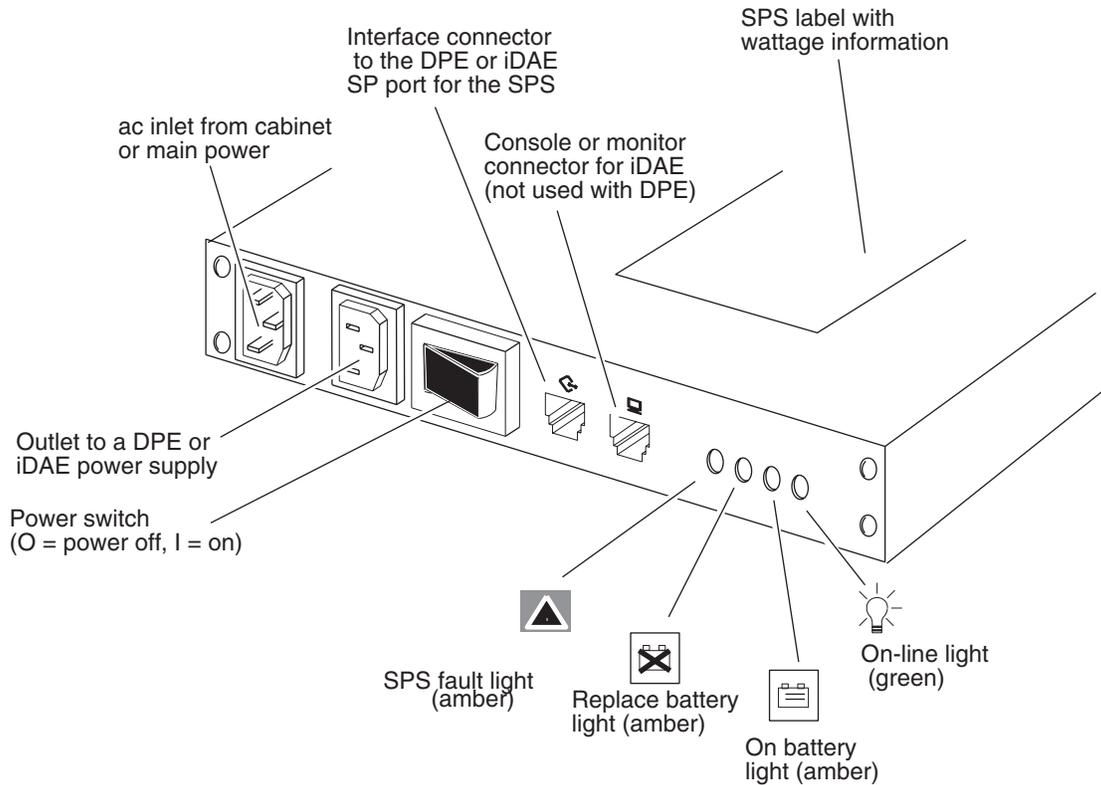>
> Improper storage and handling of an SPS will render the warranty null and void. Please see Appendix A for appropriate storage requirements.

The following figures show the two types of SPS unit.

DC SPS 400-watt type (and special SPS 800-watt type)

Interface connector
to the DPE or iDAE
SP port for the SPS

ac inlet from cabinet
or main power

SPS label with
wattage information

Console or monitor
connector for iDAE
(not used with DPE)

Power switch
(O = power off, I = on)

Outlet to an iDAE
power supply only (400-watt)
or to iDAE or DPE
power supply (800-watt)

SPS fault light
(amber)

Replace battery
light (amber)

On battery
light (amber)

On-line light
(green)

DC SPS 800-watt standard type

Interface connector
to the DPE or iDAE
SP port for the SPS

SPS label with
wattage information

ac inlet from cabinet
or main power

Console or monitor
connector for iDAE
(not used with DPE)

Outlet to a DPE or
iDAE power supply

Power switch
(O = power off, I = on)

SPS fault light
(amber)

Replace battery
light (amber)

On battery
light (amber)

On-line light
(green)

1-2
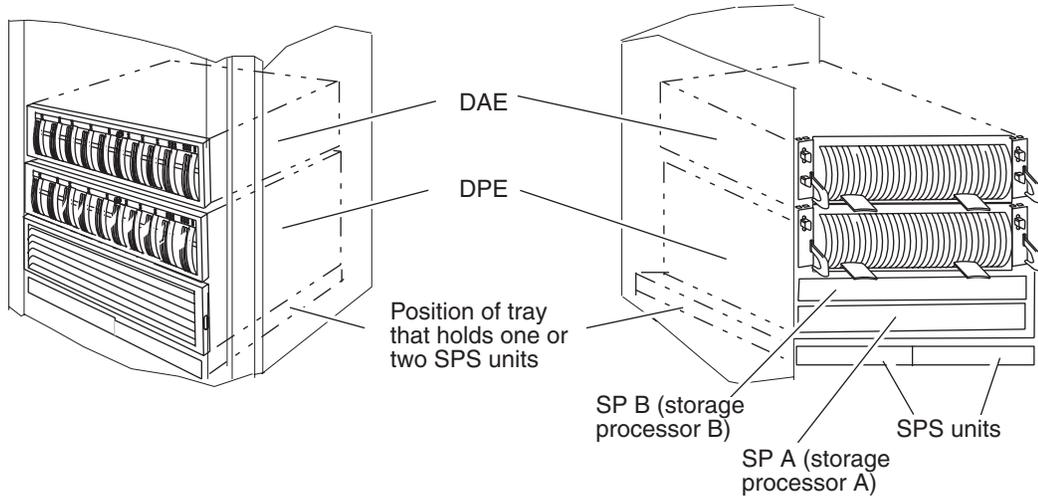
The status lights have the following meanings.
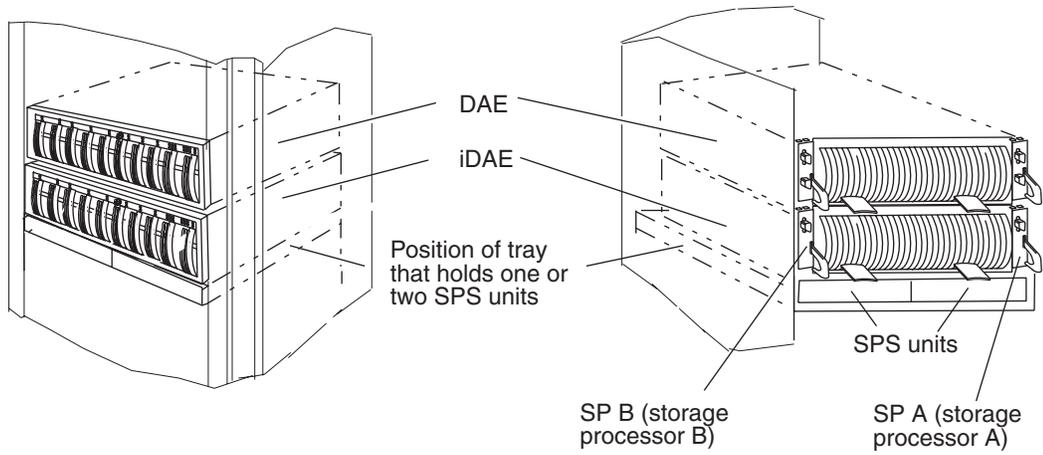
Light	Meaning when lit
SPS fault - Amber	There is an internal fault in the SPS. The SPS may still be able to run on line, but write caching cannot occur. Replace the SPS (Chapter 2 or 3) as soon as possible.
Replace battery - Amber	The SPS battery pack can no longer support loads. When the battery reaches this state, and no other on-line SPS is connected to the DPE or iDAE, then the DPE or iDAE flushes all cache data to disk and disables caching. This light stays active until the SPS completes a successful power test. Replace the SPS (Chapter 2 or 3) as soon as possible.
On battery - Amber	The ac line power is no longer available and the SPS is supplying dc output power from its battery. When battery power comes on, and no other on-line SPS is connected to the iDAE/DPE, then the iDAE/DPE writes all cached data to disk; and the event log records the event.
On-line - Green	When this is steady, the SPS is ready and operating normally. When this blinks, the SPS is being charged. In either case, the output from the SPS is supplied by ac line input.

For a rackmount installation, one or two SPS units fit in a tray beneath the DPE or iDAE to which they connect. For a deskside installation, one or two SPS units fit into slots at the bottom of the deskside cabinet. The following figures show the SPS in a cabinet with a DPE and iDAE, each in rackmount and deskside installations.
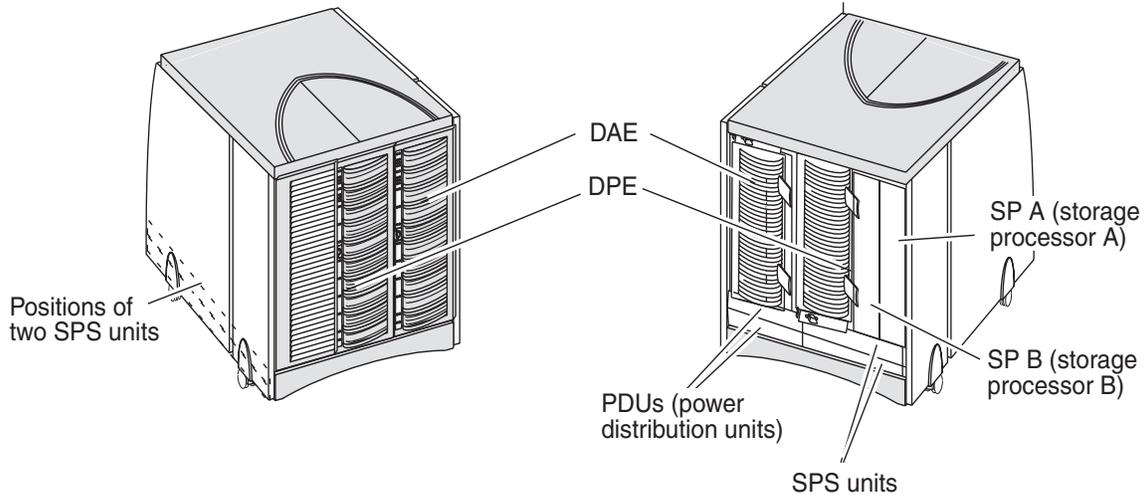
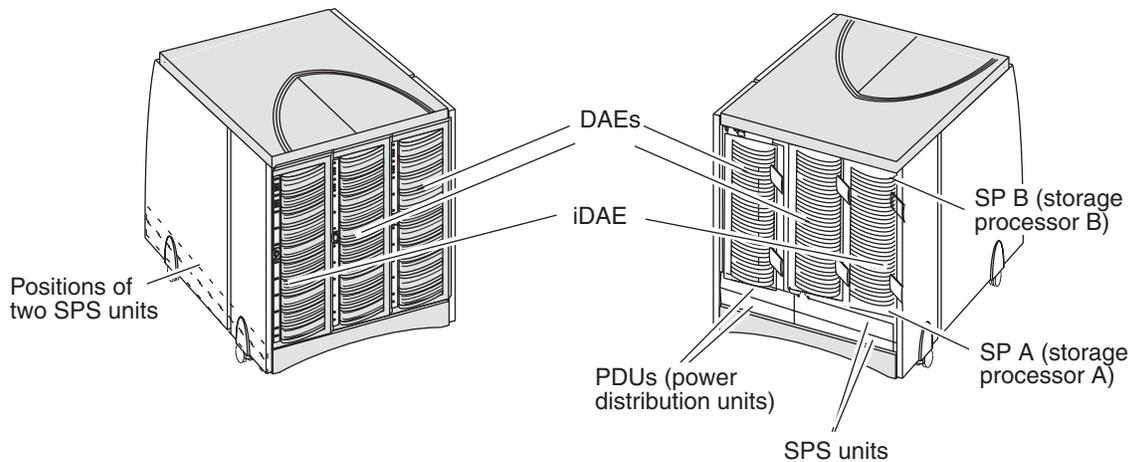**Rackmount installation, front and back views, with DPE**

DAE

DPE

Position of tray
that holds one or
two SPS units

SP B (storage
processor B)

SP A (storage
processor A)

SPS units

Rackmount installation, front and back views, with iDAE

DAE

iDAE

Position of tray
that holds one or
two SPS units

SPS units

SP B (storage
processor B)

SP A (storage
processor A)

Deskside installation, front and back views, DPE

DAE
DPE
SP A (storage processor A)
Positions of two SPS units
SP B (storage processor B)
PDUs (power distribution units)
SPS units

Deskside installation, front and back views, iDAE

DAEs
iDAE
SP B (storage processor B)
Positions of two SPS units
PDUs (power distribution units)
SP A (storage processor A)
SPS units

On a power failure, an SPS provides backup power until the SP has flushed its write cache data to the iDAE/DPE disks. Then the SP shuts the SPS power off. If the cache flush has not completed within 90 seconds — more than enough time to flush a full cache — or if the SP has failed, then the SPS shuts itself down to prevent deep discharge. If there is no ac inlet power and the SPS is shut down, all status lights will be off.

When power returns, the SPS starts recharging. It may reach a state of full charge relatively quickly. If power remains off for a long period — days or weeks — the battery may require more time to charge fully. The recharge times are explained in Appendix A. The SP will not use the write cache unless it detects at least one fully charged SPS.

Battery lifetime depends on the number of discharge cycles and depth of discharge. In a typical environment, with reasonably clean ac power, a battery pack can last 3 to 5 years. Battery pack lifetime will be shorter in a location that has frequent ac outages.

Installing an SPS in a rackmount tray

This section explains how to install an SPS in a rackmount tray. It assumes the SPS tray has already been installed in the cabinet — as explained in the rails installation document shipped with the tray.

If you have one SPS already connected to a DPE or iDAE, you can add a second SPS and connect it while the DPE or iDAE is powered up. We recommend that you disable write caching before adding a second SPS while the original DPE or iDAE remains on line.

The installation kit contains parts needed to install in any configuration. Therefore, unused parts may remain after you complete the installation correctly.

> **IMPORTANT** With a rackmount system, the SPS unit(s) must be placed directly beneath the enclosure to which it will connect. We assume that the person who installed the SPS tray mounted it directly beneath the DPE or iDAE.

From the back, you will connect the left SPS to power supply PS A and connect its interface cable to SP A. Thus the left SPS will be unit SPS A. You will connect the second SPS (if any) to power supply PS B and connect its interface cable to SP B. Thus the right SPS will be unit SPS B.

To install an SPS in a rackmount tray, follow these steps.

> **IMPORTANT** The SPS weighs 9.1 kg (20 pounds).

1. Remove the SPS from its packing and place it on a clean, static-free surface.

   To install just one SPS, skip to the step on page 1-8.

   To add an SPS to a system with an existing SPS, skip to the step on page 1-9.

2. To install two SPS units, fasten the mounting brackets to the SPS units and the tray as follows. Tighten all screws securely.

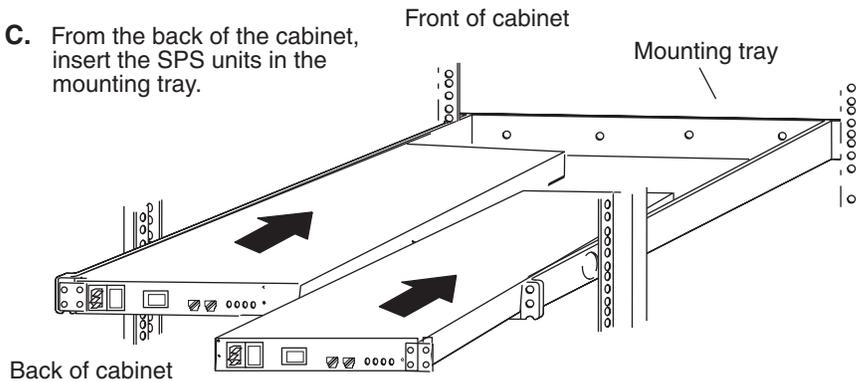**Fastening two SPS units into the cabinet**

A. On the left side of one SPS, use two screws to fasten an attachment bracket to the SPS.
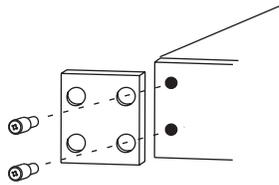
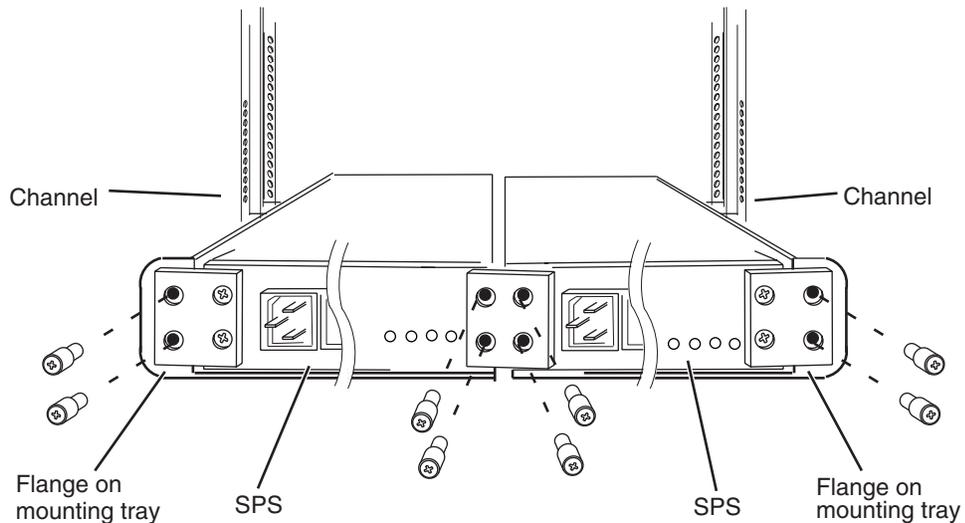**B.** On the right side of the other SPS, use two screws to fasten an attachment bracket to it.
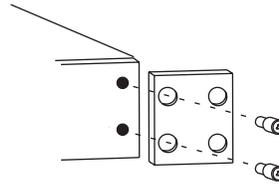
C. From the back of the cabinet, insert the SPS units in the mounting tray.

Front of cabinet

Mounting tray

Back of cabinet

D. On the left side of the left SPS, use two screws to fasten an attachment bracket to the mounting flange on the tray.

E. Using four screws, fasten an attachment bracket between the two SPS units.

F. On the right side of the right SPS, use two screws to fasten an attachment bracket to the mounting flange on the tray.

Channel

Channel

Flange on mounting tray

SPS

SPS

Flange on mounting tray

Skip to Step 5.

3. With just one SPS unit to install, fasten the attachment brackets and filler panel to the SPS unit and the tray as follows. You can install the SPS on the left side or the right side, but we suggest the left side.

**1-7**

Fastening one SPS unit to the rackmount cabinet

A. On the left side of the SPS, use two screws to fasten the attachment bracket to the SPS.
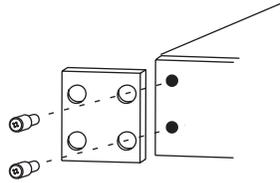
B. Facing the back of the cabinet, insert the SPS unit in the mounting tray.
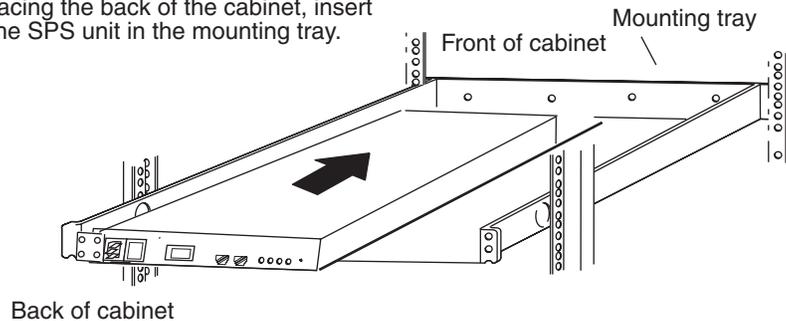
Mounting tray

Front of cabinet

Back of cabinet

C. On the left side of the SPS, use two screws to fasten an attachment bracket to the mounting flange on the tray.

Channel

Flange on mounting tray

SPS
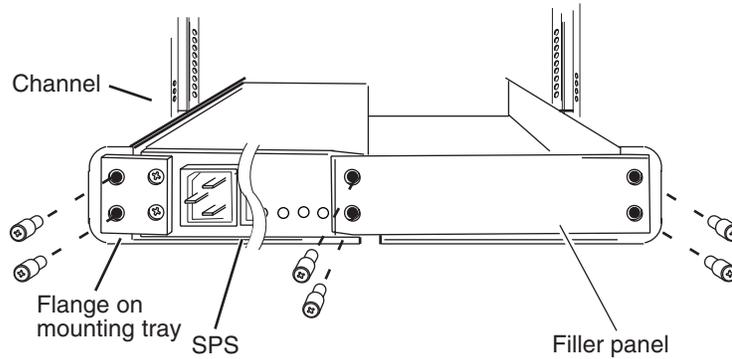
Filler panel

D. Fasten the filler panel over the vacant slot using four screws -- two in the tray flange and two in the SPS.

Skip to Step 5.

4. To add a second SPS to a complete system that already has one SPS, fasten the attachment brackets to the SPS unit and the tray as follows.

Fastening an add-on SPS into the cabinet

**A.** Fasten attachment brackets to the SPS, one on each side.

B. From the back of the cabinet, remove the four screws that hold the filler panel over the empty SPS slot; then remove the filler panel. This panel may be on the left or right.

Filler panel

Back of cabinet

C. Slide the add-on SPS into the empty slot.

Mounting tray
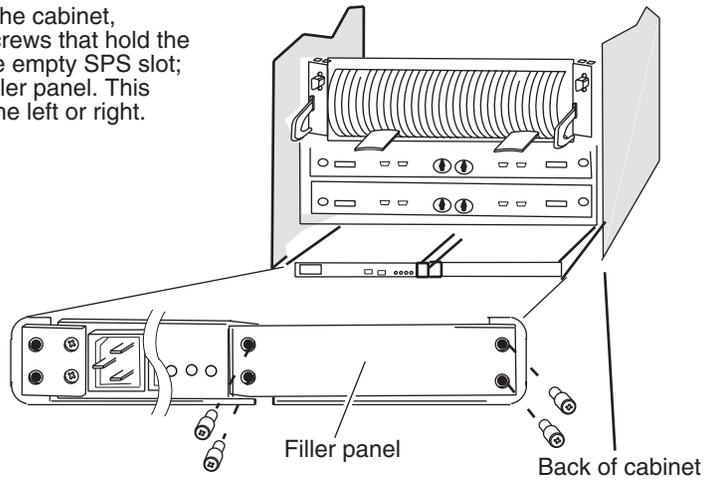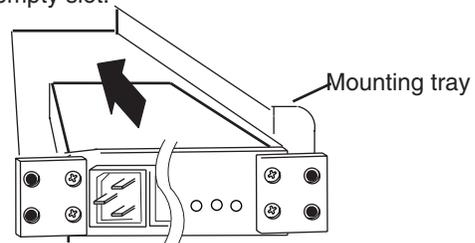
D. Using two screws, fasten an attachment bracket to the existing SPS unit.

Attachment bracket

Flange on mounting tray
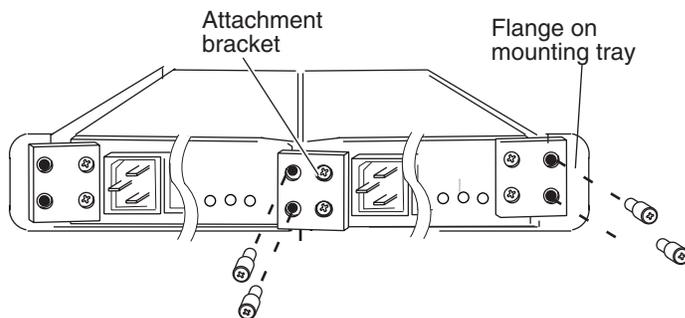
5. Working from the front of the tray, fasten two screws through the front panel into each SPS as shown below.

**Fastening the SPS unit(s) to the front of the tray**
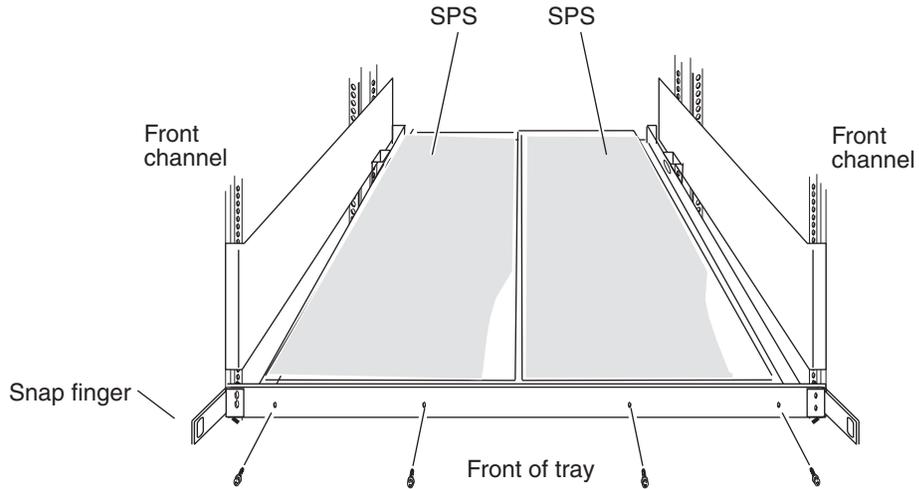
6. Press the filler panel snap fingers together and slide the filler panel over them until it clicks into place.

7. Install all the other rails, trays, and SPS, DPE, iDAE, and DAE devices you want in the cabinet.

8. Attach ac cables between the cabinet power strips and SPS inlets and between SPS outlets and power supply inlets, and attach interface cables between the SP and SPS ports, as follows. The cable lengths shown are not to scale. Fan packs are omitted for clarity. All four models of SP — SP Model 4400 (for the Model 4500 DPE), 5600, 5400, and 4200 for an iDAE — are shown.

Cabling diagram for rackmount installation, showing Model 4400 or 5600 SPs (with the SPS port on the right) from back
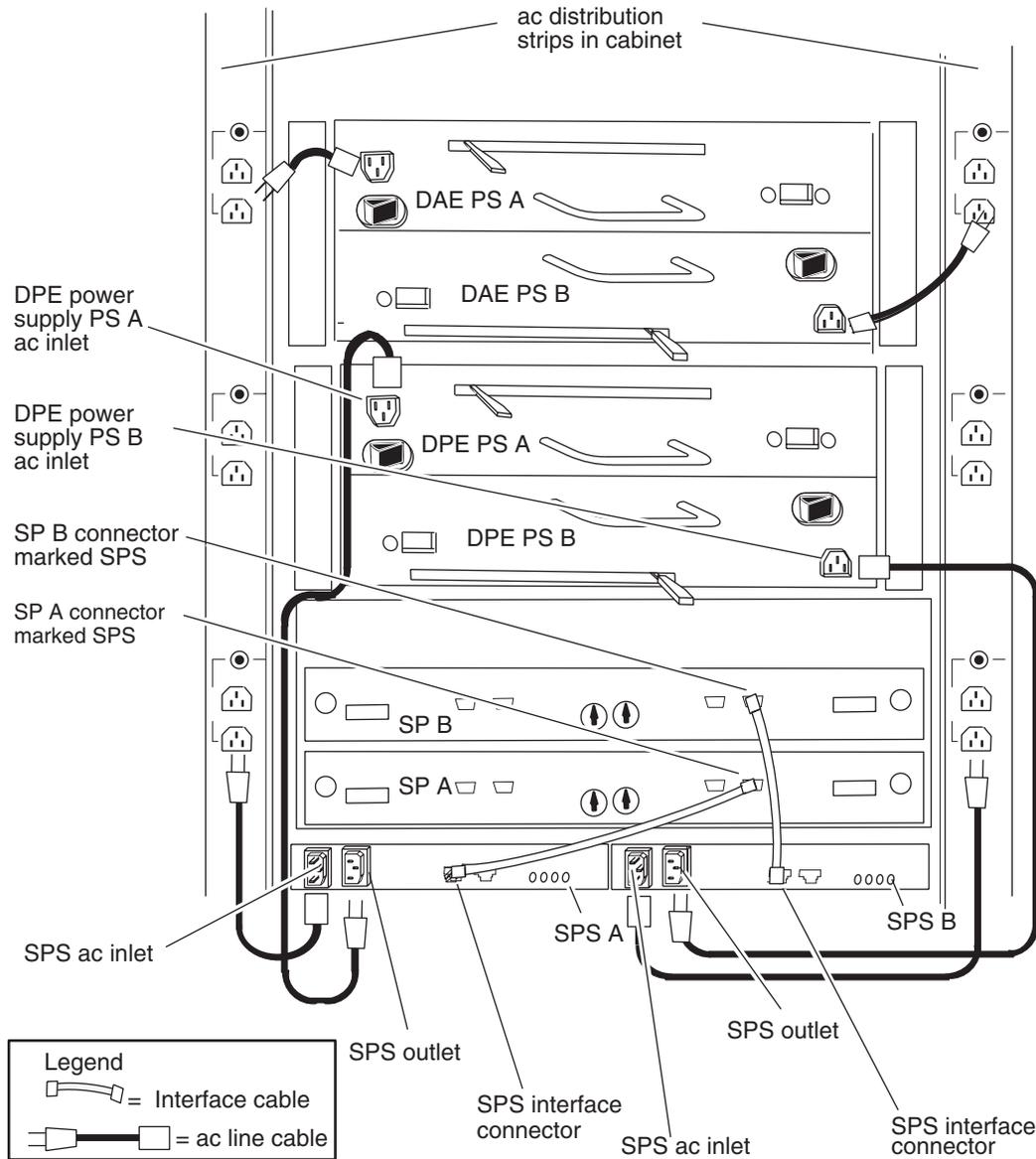
ac distribution strips in cabinet

DAE PS A

DAE PS B

DPE power supply PS A ac inlet

DPE power supply PS B ac inlet

DPE PS A

SP B connector marked SPS

DPE PS B

SP A connector marked SPS

SP B

SP A

SPS ac inlet

SPS A

SPS B

SPS outlet

Legend

= Interface cable

= ac line cable

SPS outlet

SPS interface connector

SPS ac inlet

SPS interface connector

IMPORTANT With only one SPS, connect the second power-supply line cord directly to the nearest ac distribution strip.

Cabling diagram for rackmount installation, showing Model 5400 SPs (with the SPS port on the left) from back
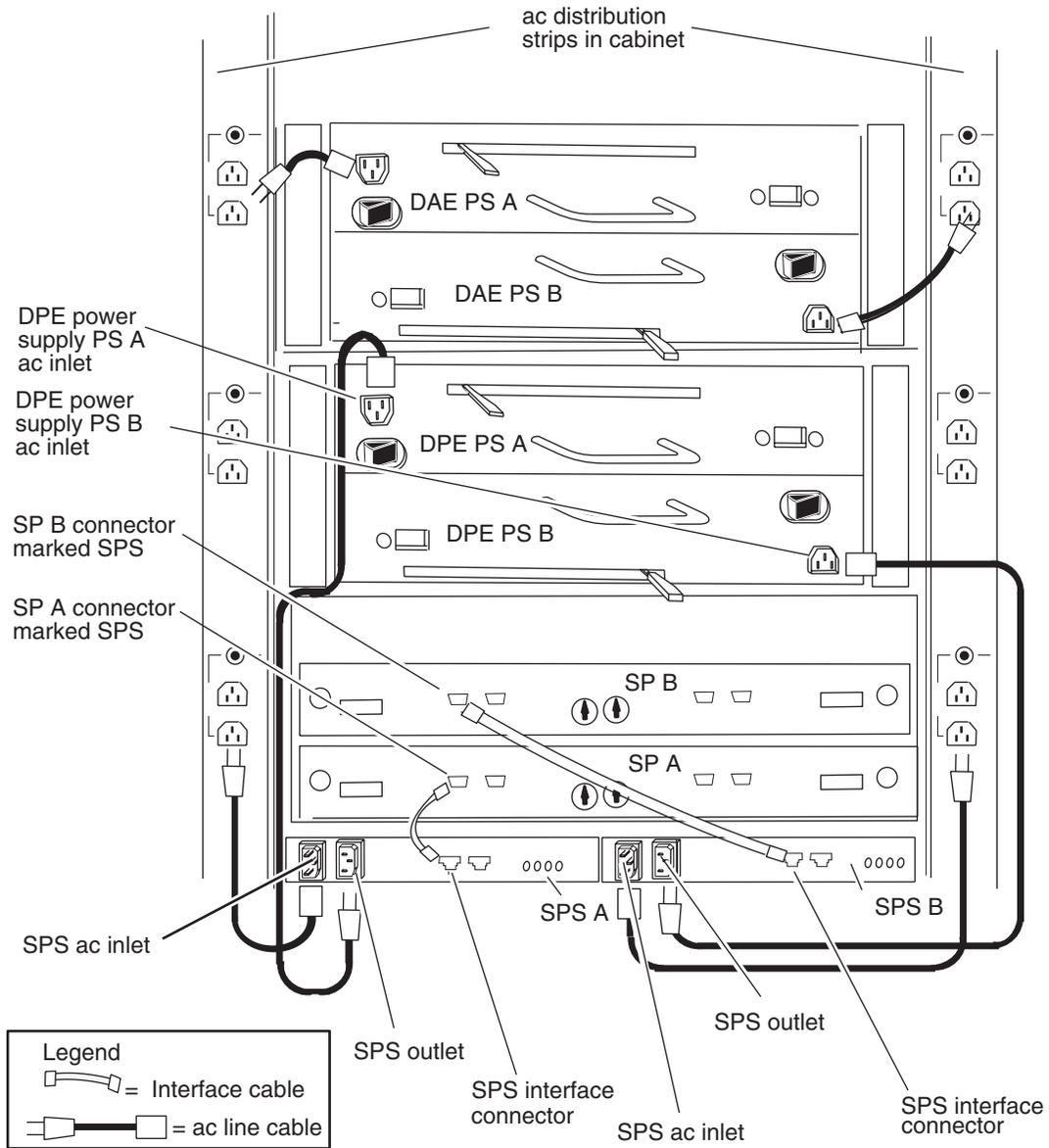
IMPORTANT With only one SPS, connect the second power-supply line cord directly to the nearest ac distribution strip.

Cabling diagram for rackmount installation, showing Model 4200 SPs (iDAE SPs), from back
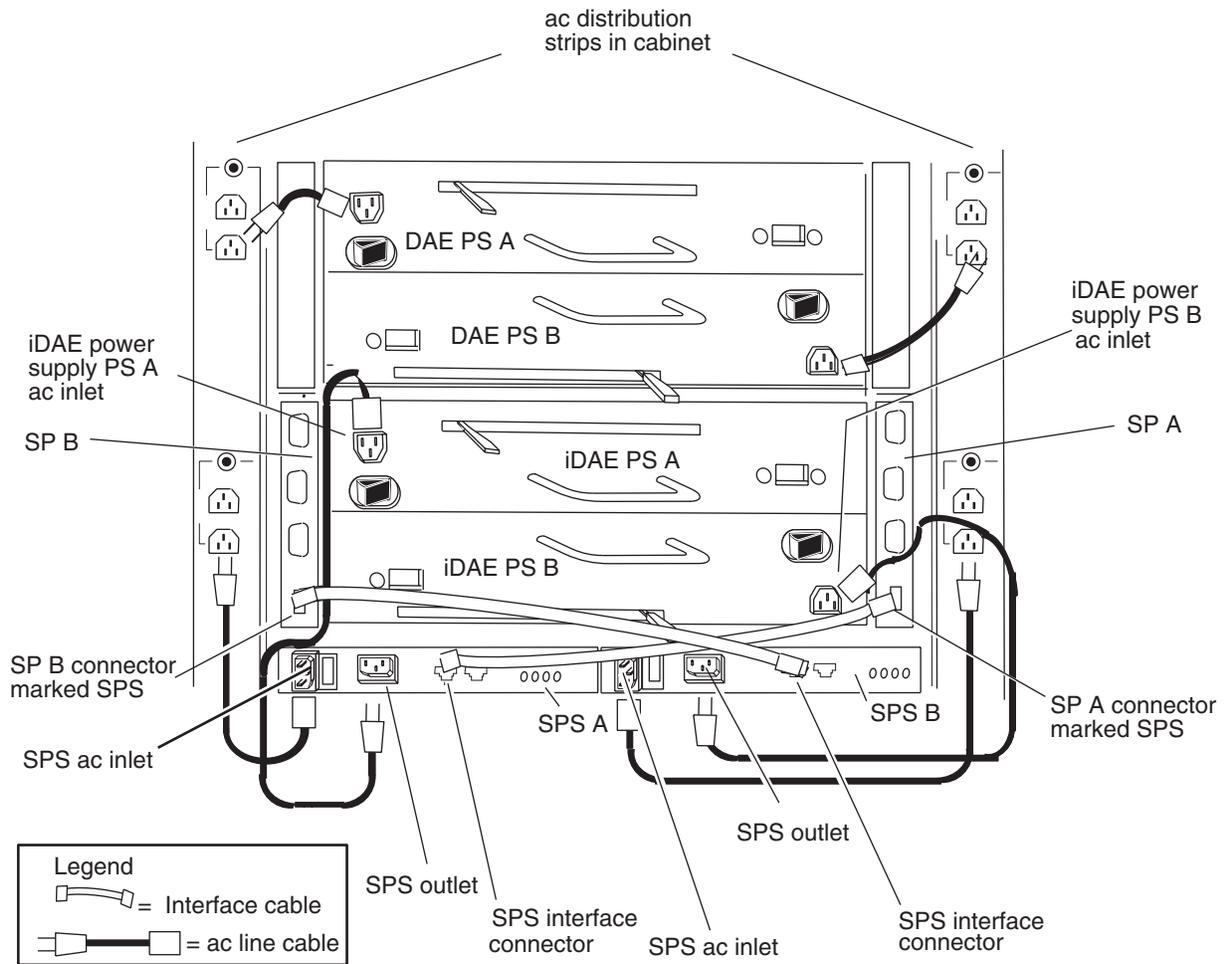
9. Make sure the power switch of each SPS (shown on page 1-2) is in the power-on (1) position.

The SPS begins charging the moment you connect it to ac power. The amount of time needed to charge it depends on the time spent in storage and previous depth of discharge, as explained in Appendix A. Write caching cannot occur with a DPE or iDAE unless at least one SPS connected to it is fully charged.

Installing an add-on SPS in a deskside system

This section explains how to install a second SPS in a deskside system.

If you have one SPS already connected to a DPE or iDAE, you can add a second SPS and connect it while the DPE or iDAE is powered up. We recommend that you disable write caching before adding a second SPS while the original DPE or iDAE remains on line.

The installation kit contains parts needed to install in any configuration. Therefore, unused parts may remain after you complete the installation correctly.

From the back, you will connect the top SPS between power distribution unit A (PDU A) and power supply PS A; and you will connect its interface cable to SP A. Thus the top SPS will be unit SPS A. You will connect the second SPS (if any) between PDU B and power supply PS B; and you will connect its interface cable to SP B. Thus the bottom SPS will be unit SPS B.

To install an add-on SPS to a deskside system, follow these steps.

IMPORTANT The SPS weighs 9.1 kg (20 pounds).

1. Remove the SPS from its packing and place it on a clean, static-free surface.

2. Remove the filler panel and fasten the mounting brackets to the SPS unit as follows.

Fastening an add-on SPS into a deskside system

A. Fasten attachment brackets to the left and right sides of the SPS.

Captive thumb screw

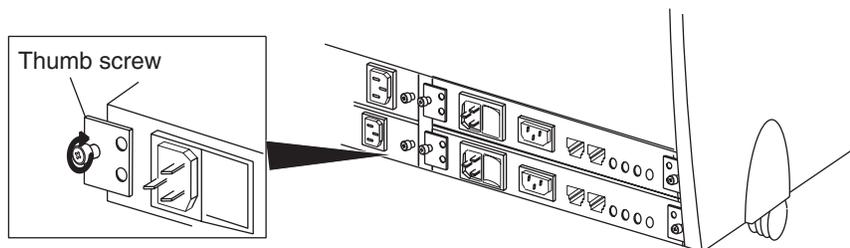**B.** From the back of the cabinet, loosen the two thumb screws that hold the filler panel over the empty SPS slot; then remove the filler panel. This panel may be on the top or bottom.

Thumb screw

Filler panel

Back of cabinet
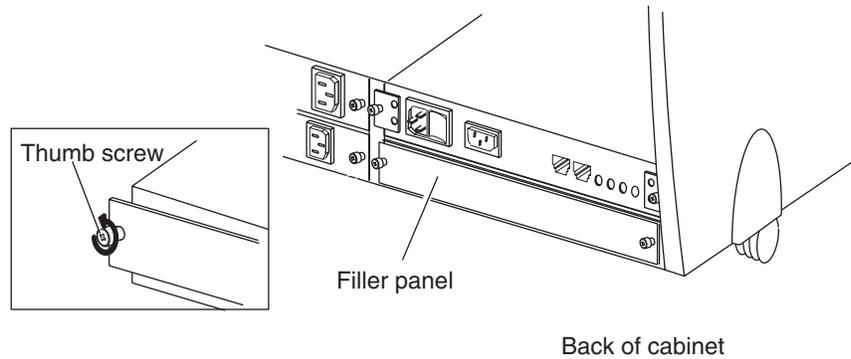
C. Slide the add-on SPS into the empty slot.
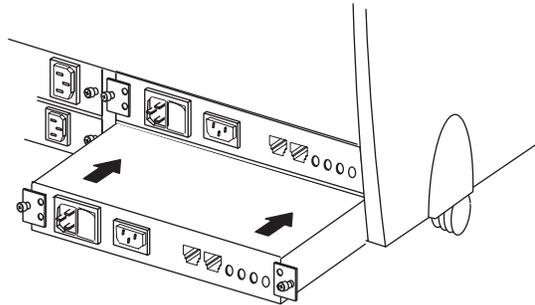
D. Using the two thumb screws, fasten the attachment brackets to the chassis.

Thumb screw

3. Make sure that the ac cables between the PDUs and SPS inlets, the ac cables between SPS outlets and power supply inlets, and the interface cables between the SP and SPS ports, are attached as follows. The cable lengths shown are not to scale. Fan packs are omitted for clarity. All models of SP — SP Model 4400 (for the Model 4500 DPE), 5600, 5400, and 4200 for an iDAE — are shown.

Cabling diagram for deskside storage system, showing Model 4400 or 5600 SPs (with the SPS port at the top) from back
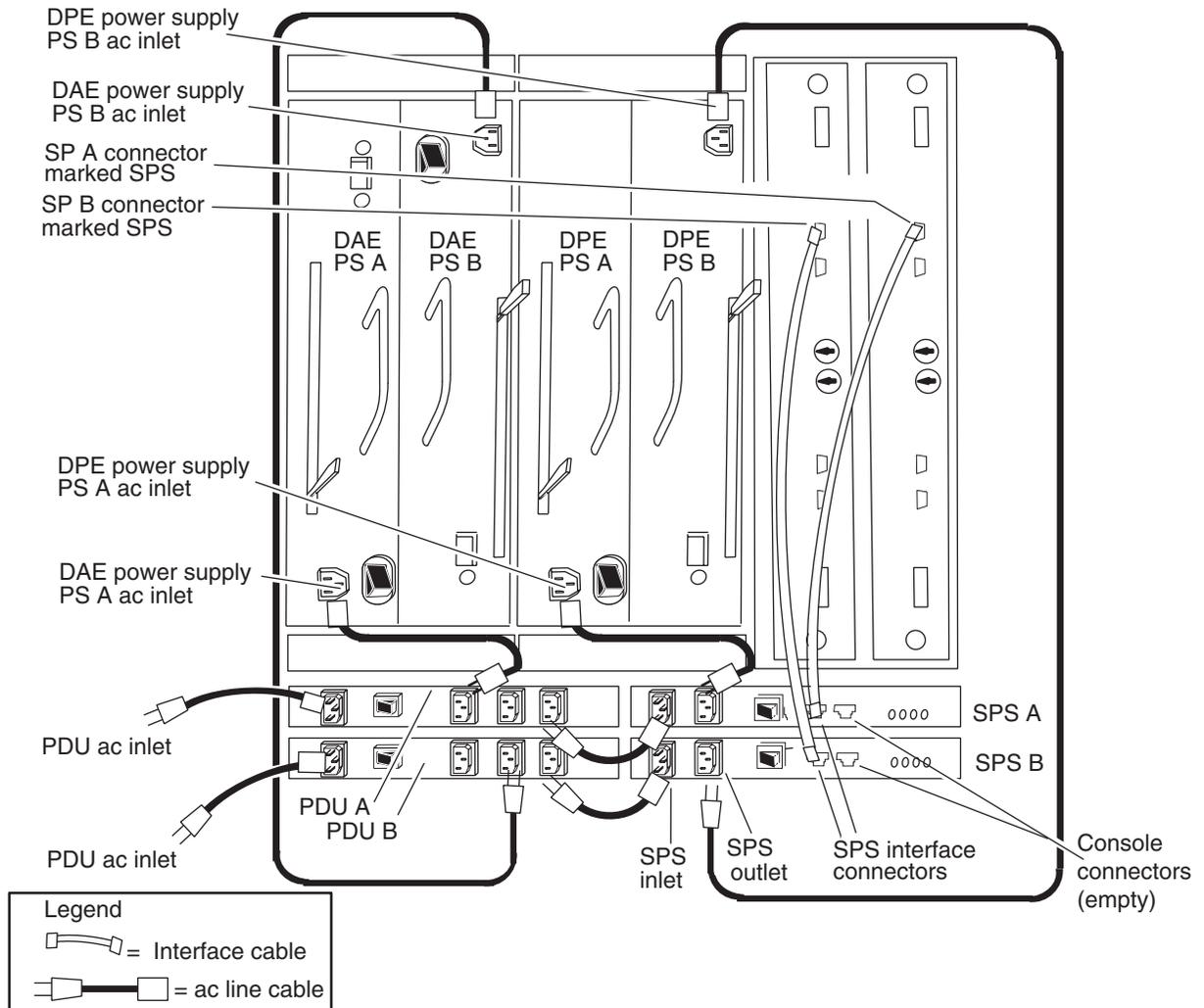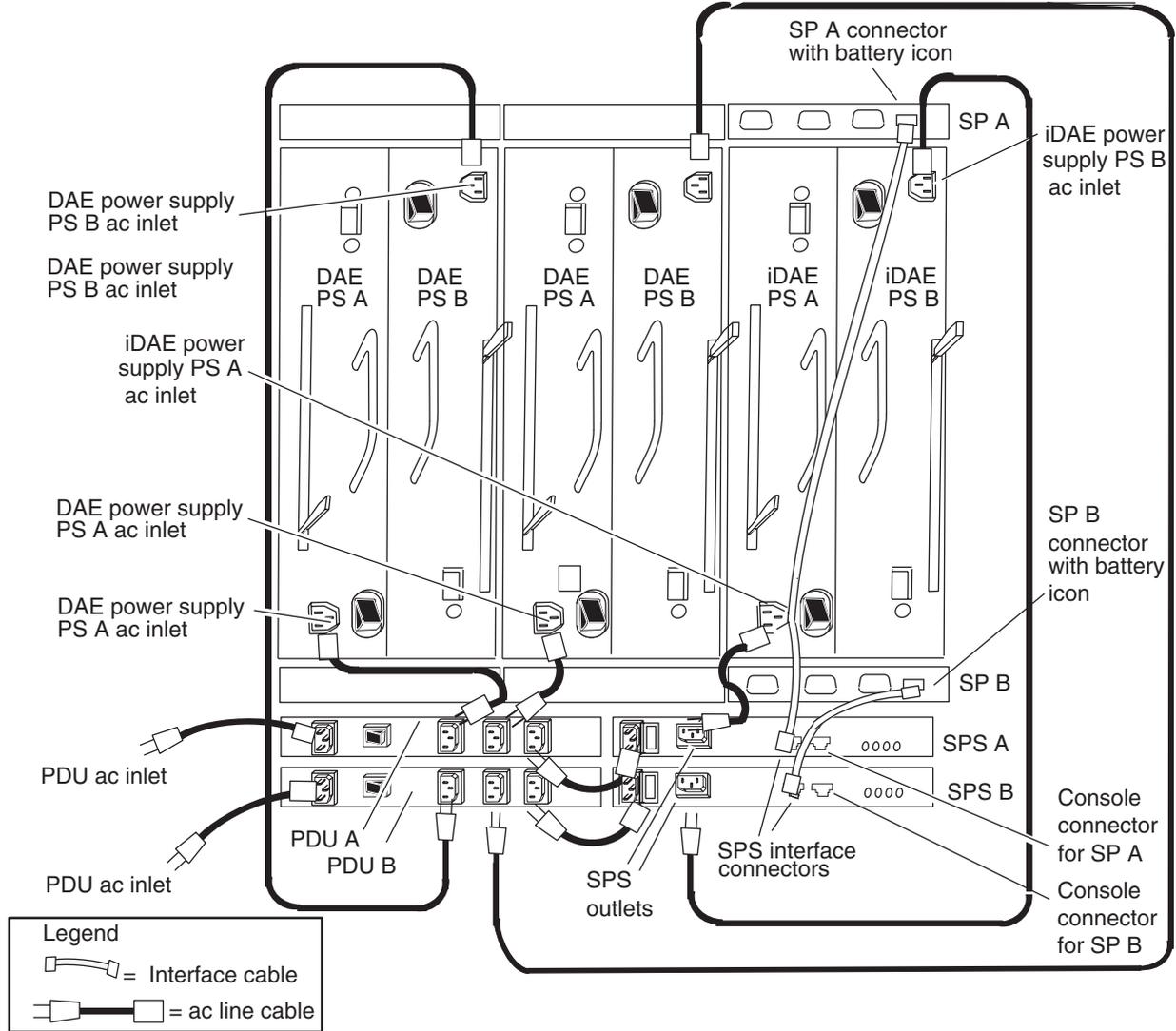
DPE power supply
PS B ac inlet

DAE power supply
PS B ac inlet

SP A connector
marked SPS

SP B connector
marked SPS

DAE
PS A

DAE
PS B

DPE
PS A

DPE
PS B

DPE power supply
PS A ac inlet

DAE power supply
PS A ac inlet

PDU ac inlet

PDU ac inlet

PDU A
PDU B

SPS A

SPS B

SPS
inlet

SPS
outlet

SPS interface
connectors

Console
connectors
(empty)

Legend

= Interface cable

= ac line cable

IMPORTANT With only one SPS, connect the DPE power supply that is not connected to the SPS directly to a free outlet on the associated PDU. For example, in the diagram, if only SPS A exists, run an ac cord between the DPE PS B inlet and a PDU B outlet.

Cabling diagram for deskside storage system, showing Model 5400 SPs (with the SPS port at the bottom) from back
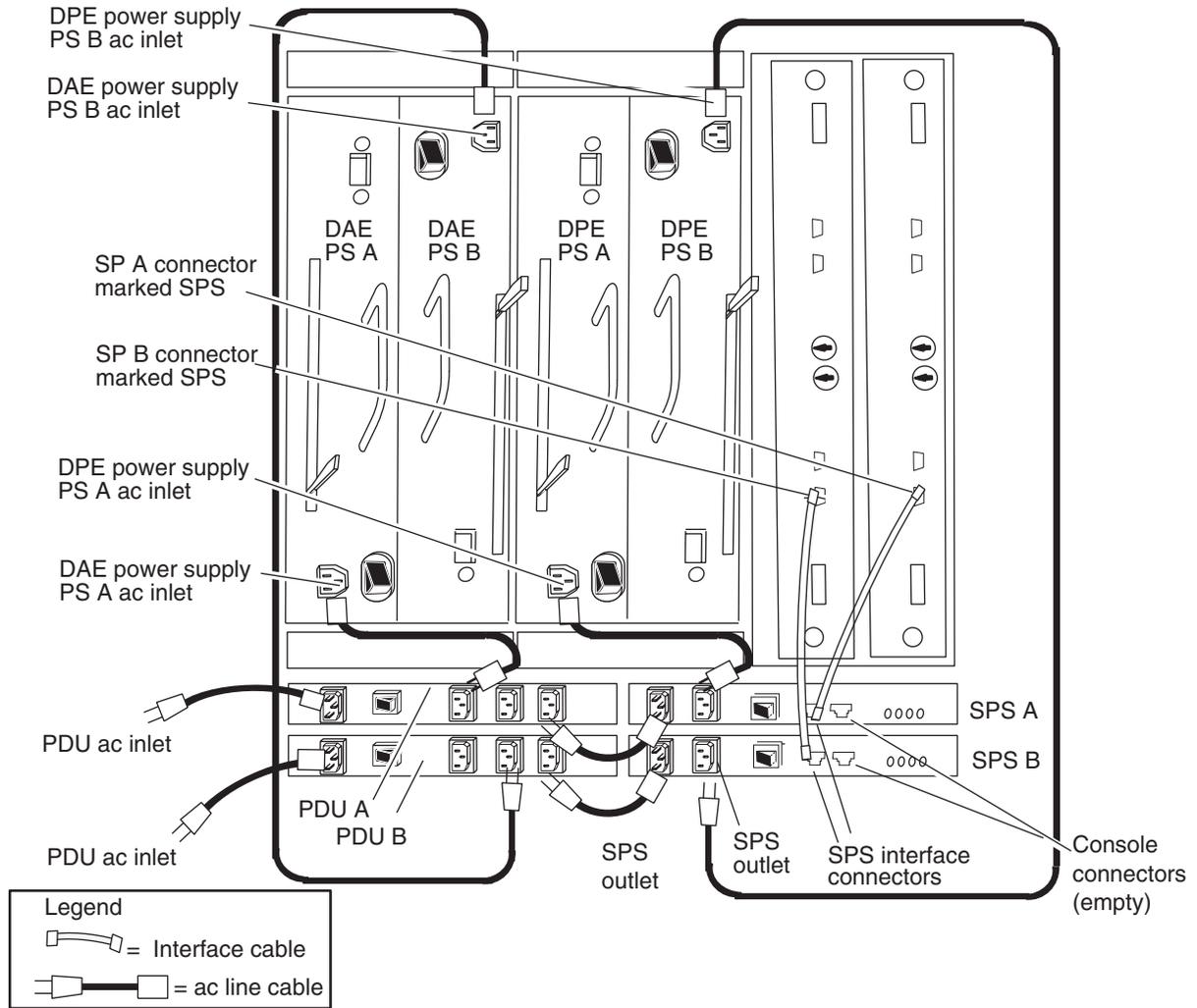
DPE power supply
PS B ac inlet

DAE power supply
PS B ac inlet

DAE
PS A

DAE
PS B

DPE
PS A

DPE
PS B

SP A connector
marked SPS

SP B connector
marked SPS

DPE power supply
PS A ac inlet

DAE power supply
PS A ac inlet

PDU ac inlet

PDU ac inlet

PDU A
PDU B

SPS
outlet

SPS
outlet

SPS interface
connectors

SPS A

SPS B

Console
connectors
(empty)

Legend

⌐▭ = Interface cable

▭ = ac line cable

IMPORTANT With only one SPS, connect the DPE power supply that is not connected to the SPS directly to a free outlet on the associated PDU. For example, in the diagram, if only SPS A exists, run an ac cord between the DPE PS B inlet and a PDU B outlet.

iDAE cabling diagram for deskside storage system, showing Model 4200 SPs (iDAE SPs) in a 30-slot storage system, from back

IMPORTANT With only one SPS, connect the iDAE power supply that is not connected to the SPS directly to a free outlet on the associated PDU. For example, in the diagram, if only SPS A exists, run an ac cord between the iDAE PS B inlet and a PDU B outlet.

4. Make sure the power switch of each SPS (shown on page 1-2) is in the power-on (1) position.

The SPS begins charging the moment you connect it to ac power. The amount of time needed to charge it depends on the time spent in storage and previous depth of discharge, as explained in Appendix A. Write caching cannot occur with a DPE or iDAE unless at least one SPS connected to it is fully charged.

□ □ □
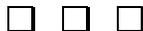
2 Replacing the SPS in a rackmount system

This chapter explains replacing the SPS in a rackmount installation.

Replace the SPS when the SPS fault light or the SPS Replace Battery light glows. Battery replacement must occur at the factory; you cannot do it yourself.

> **IMPORTANT** If just one SPS is connected to a DPE or iDAE and either the batteries or the SPS needs replacement, the Licensed Internal Code running in the SPs automatically disables write caching. It will not re-enable write caching until you replace the SPS and the new batteries are fully charged.

If you have two SPS units connected to a DPE or iDAE, you can service one SPS while the storage system is powered up. We recommend that you disable write caching before servicing the SPS.

To replace an SPS, you need the following items:

- Replacement SPS. The charge state of an SPS depends on the time and temperature of storage, as explained in Appendix A.

  > **IMPORTANT**   If an SPS has failed, do not remove it until you have a replacement ready.

- Medium and small Phillips screwdrivers

Follow these steps.

1. On the SPS to be replaced, turn power off using the SPS power switch (shown on page 1-2). The On-battery light may come on for a maximum of 90 seconds. Wait for the light to go off.

2. Unplug the ac inlet cable, ac outlet cable, and interface cable connector from the SPS (figures shown starting on page 1-11).

3. To maintain redundant power, plug the ac outlet cable into the ac inlet cable (figures shown starting on page 1-11).

4. At the front of the cabinet, remove the snap-on filler panel that covers the mounting tray. To do this, press the buttons on the side of the tray inward and pull the panel gently toward you.

Removing the front panel cover
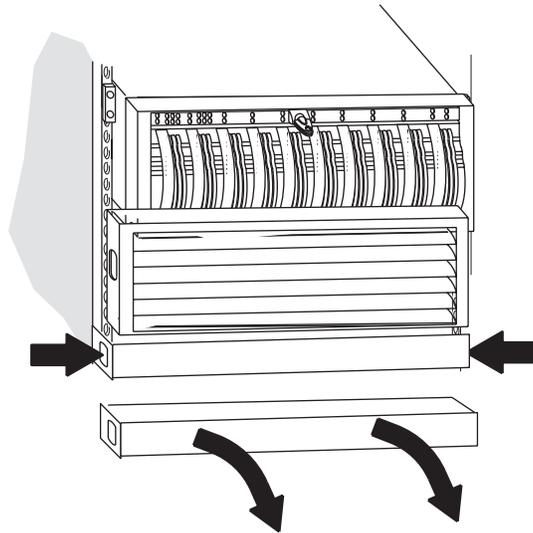
5.   Remove the two screws that fasten the front of the target SPS to the mounting tray as shown below.

Removing the front tray screws for the SPS

Front panel screws for one SPS

Front panel screws for the other SPS
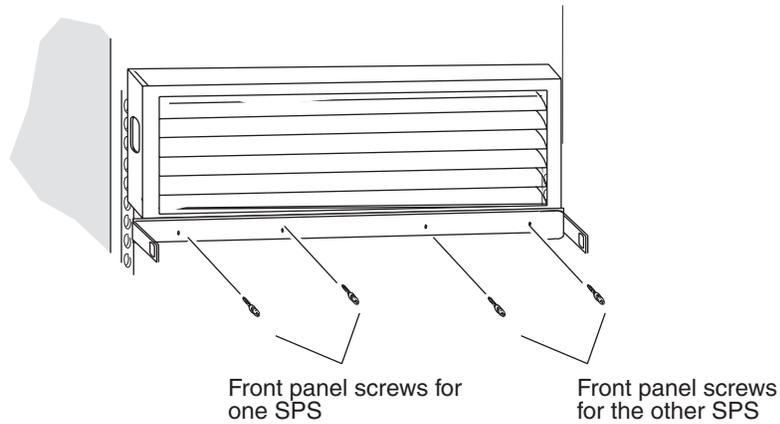
6.   If there are two SPS units in the tray, continue here. With one SPS unit, skip to Step 8.

Remove the attachment brackets from the back of the SPS you want to service or replace, as shown next. Removal of the left SPS bracket is shown.

Removing the attachment brackets with two SPS units

A. Remove the four screws that hold the attachment bracket between the two SPS units.

B. On the outside of the SPS you want to replace, remove the four screws that fasten the attachment bracket to the SPS and mounting tray flange.

Remaining SPS

Tray flange

Attachment brackets
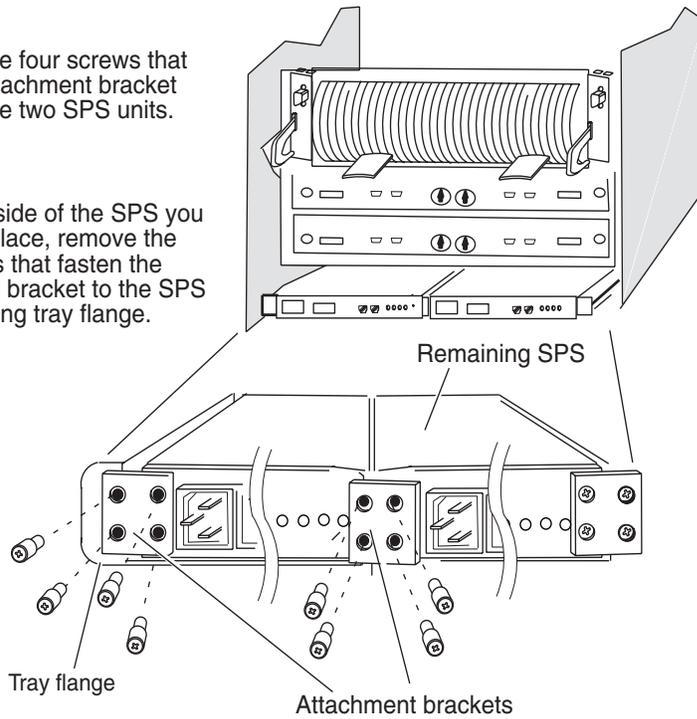
Skip to Step 8.

7. If just one SPS is in the tray, from the back of the cabinet, remove the screws that hold the filler panel and attachment bracket to the mounting tray, as shown next.

Removing the attachment brackets with one SPS unit

A. Remove the four screws that hold the attachment bracket to the SPS and mounting tray flange.

B. Remove the four screws that fasten the filler panel to the SPS and mounting tray flange.

Tray flange

Attachment bracket

Filler panel

2-3
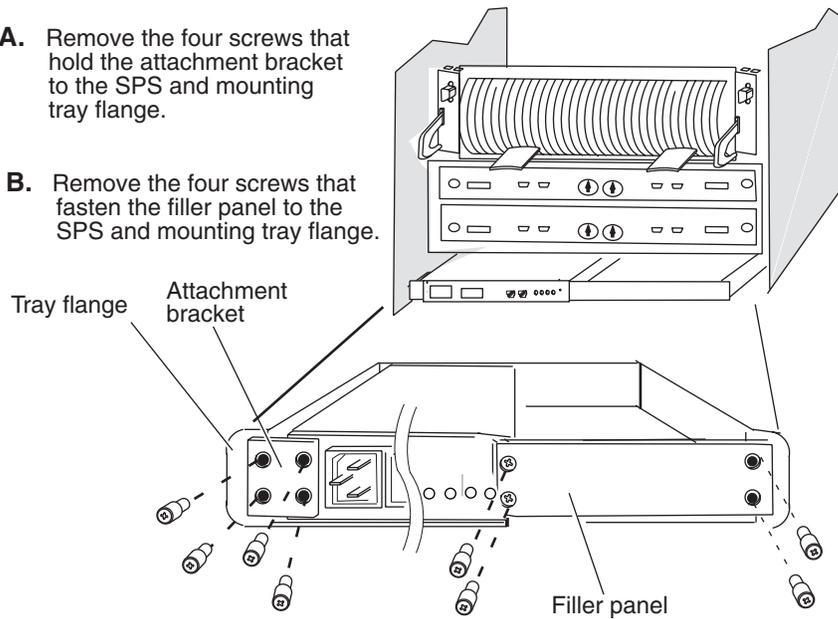
8. Remove the SPS you want to service or replace. Removal of the left SPS is shown below.

Removing an SPS -- view from back of cabinet
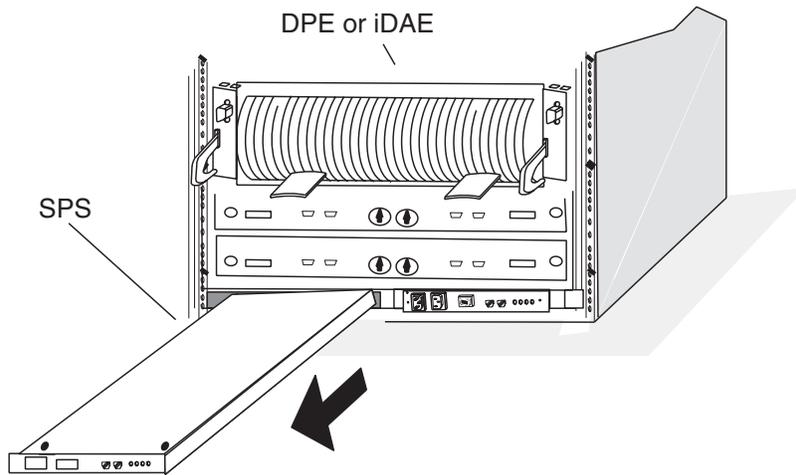
9. Pack the failed SPS in its original container for return to the factory.

> **IMPORTANT**   Replacing the batteries in an SPS is not a procedure customers may perform.

10. Insert the replacement SPS into its slot (reverse Step 8).

11. With two SPS units, fasten the screws that hold the SPS attachment bracket in its tray (reverse Step 6).

    With one SPS unit, fasten the screws that hold the attachment bracket and filler panel in place (reverse Step 7).

12. Reconnect the ac inlet, outlet, and interface cables as shown in the figures starting on page 1-11.

13. Turn power on at the SPS power switch (shown on page 1-2).

14. On the front of the tray, secure the front of the SPS (reverse Step 5).

15. Snap the filler panel cover over its snap fingers (reverse Step 4).

The SPS begins charging its batteries the moment you connect it to ac power. The amount of time needed to charge them depends on the time spent in storage and previous depth of discharge, as explained in Appendix A. Write caching cannot occur with a storage system unless at least one SPS connected to it is fully charged.

□ □ □

3 Replacing the SPS in a deskside system

This chapter explains replacing the SPS in a deskside system.

Replace the SPS when the SPS fault light or the SPS Replace Battery light glows. Battery replacement must occur at the factory; you cannot do it yourself.

> **IMPORTANT** If just one SPS is connected to a DPE or iDAE and either the batteries or SPS needs replacement, the Licensed Internal Code running in the SPs automatically disables write caching. It will not re-enable write caching until you replace the SPS and the new batteries are fully charged.

If you have two SPS units connected to a DPE or iDAE, you can service one SPS while the storage system is powered up. We recommend that you disable write caching before servicing the SPS.

To replace an SPS, you need the following items:

- Replacement SPS. The charge state of an SPS depends on the time and temperature of storage, as explained in Appendix A.

  > **IMPORTANT**   If an SPS has failed, do not remove it until you have a replacement ready.

- Medium and small Phillips screwdrivers

Follow these steps.

1. On the SPS to be replaced, turn power off using the SPS power switch (shown on page 1-2). The On-battery light may come on for a maximum of 90 seconds. Wait for the light to go off.

2. Unplug the ac inlet cable, ac outlet cable, and interface cable connector from the SPS (shown in the figures starting on page 1-11).

3. To maintain redundant power, plug the ac outlet cable into the ac inlet cable (shown in the figures starting on page 1-11).

4. Working from the back of the cabinet, loosen the two thumb screws that fasten the SPS brackets to the chassis; then remove the SPS. Removal of the screws of the bottom SPS (400-watt type) is shown below.

Removing the SPS

A. Loosen the two thumb screws from the chassis.

Thumb screw
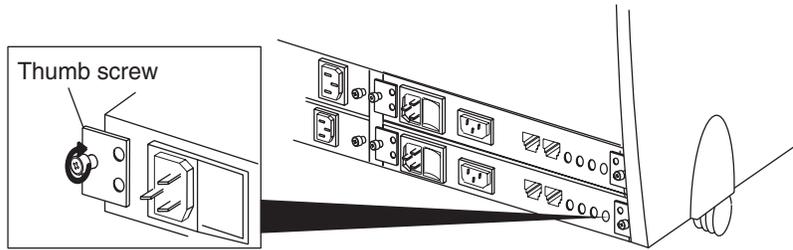
B. Remove the SPS from its slot.
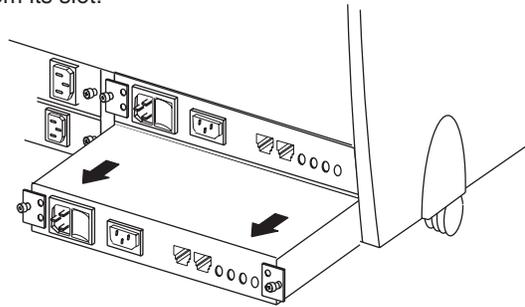
5. Remove the attachment brackets from the sides of the old SPS, and fasten them to the replacement SPS using a Phillips screwdriver, as shown below.
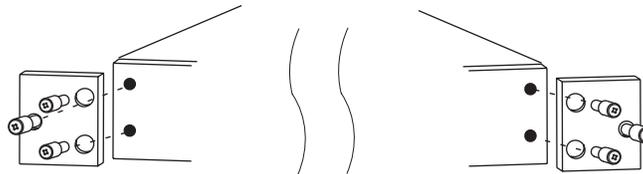
6. Pack the failed SPS in its original container for return to the factory.

> **IMPORTANT**   Replacing the batteries in an SPS is not a procedure customers may perform.

7. Insert the new SPS into its slot and secure the SPS attachment bracket (reverse Step 5).

8. Connect the SPS ac inlet, ac outlet, and interface cables as shown in the figures starting on page 1-11.

9. Turn power on at the SPS power switch (shown on page 1-2).

The SPS begins charging its batteries the moment you connect it to ac power. The amount of time needed to charge them depends on the time spent in storage and previous depth of discharge, as explained in Appendix A. Write caching cannot occur with a DPE or iDAE unless at least one SPS connected to it is fully charged.

□ □ □

A   Technical specifications and operating limits

This appendix lists the technical specifications and operating limits for both types of the DC Standby Power Supply (DC SPS).

SPS Interface

Type	Half-duplex RS-232
Baud rate	9600
Parity	None

Power specifications

Voltage	100 V ac to 240 V ac -10%/+10% single-phase, 47 Hz to 63 Hz; auto-ranging	
Current draw	400 watt:	4.5 A max. at 100 V ac input (when fully loaded)
	800 watt:	8.5 A max. at 100 V ac input (when fully loaded)
Power consumption		
Input power	400 watt:	450 watts maximum
	800 watt:	850 watts maximum
Output Power	400 watt:	400 watts
	800 watt:	800 watts maximum
Chassis power inlet	IEC 320-C14 Appliance Connector (panel mount)	
Chassis power outlet	IEC 320-C13 Appliance Connector (panel mount)	
Charge times		
After full power outage	45-60 minutes maximum	
After off-line storage	12 hours approximately	
Transfer time	20 ms. maximum	

Operating limits

Ambient temperature	10°C to 40°C (50°F to 104°F)
Relative humidity	20% to 80% noncondensing
Elevation	2439 m (8000 ft)

> **IMPORTANT** The operating limits listed above for temperature and humidity must not be exceeded inside the closed cabinet in which the SPS is mounted. For proper ventilation, airflow must not be restricted along the sides of the SPS.

Non-operating limits (shipping and storing)

Ambient temperature	-40°C to 65°C (-40°F to 149°F)
Gradient, maximum	24°C/hr (43.2°F/hr)
Relative humidity	10% to 90% noncondensing
Elevation	7625 m (25,000 ft)

Dimensions and battery information

Dimensions

Height	4.02 cm (1.58 in)
Width	20.1 cm (8.25 in)
Length	539 cm (21.2 in)
Weight	9.1 kg (20 lb)

Service clearance

Front	81.3 cm (32.0 in)
Rear	81.3 cm (32.0 in)

Battery tests

Internal Within 60 minutes after powerup and approximately every 2 weeks thereafter, the SPS itself performs a light test on the batteries. This test lasts a few seconds. It does not verify battery capacity but does check connectivity and functionality. This test is transparent to other components in the array. If an actual power failure occurs during the test, the test is terminated and the unit goes into On-Battery mode.

Full At each storage system startup, the Licensed Internal Code (LIC) initiates a full power test. The write cache is dumped and the SPS is allowed to stay on for its entire 90-second period. This test is also initiated at weekly intervals; you can set the test time using array management utilities but by default occurs at 1:00 a.m. Sunday morning.

The Full test is initiated when the SPS is On-Line and fully charged. If the batteries are charging at test time, the test is deferred until the next programmed time.

Battery self-discharge times

When you store an SPS, the battery charge level naturally decreases over time. This is characteristic of all rechargable batteries. The rate of self-discharge depends on temperature. Lower storage temperatures are desirable since the self-discharge rate is lower. The following graph shows how the remaining charge decreases over time at different temperatures.

Typical SPS self-discharge levels at different storage temperatures

Avoid allowing the battery to discharge below this level to allow full recharge within the SPS time limit.

Remaining capacity (%) / Storage time (months)

.... 20 degrees C (68 F)
- - - - 30 degrees C (86 F)
——— 40 degrees C (104 F)
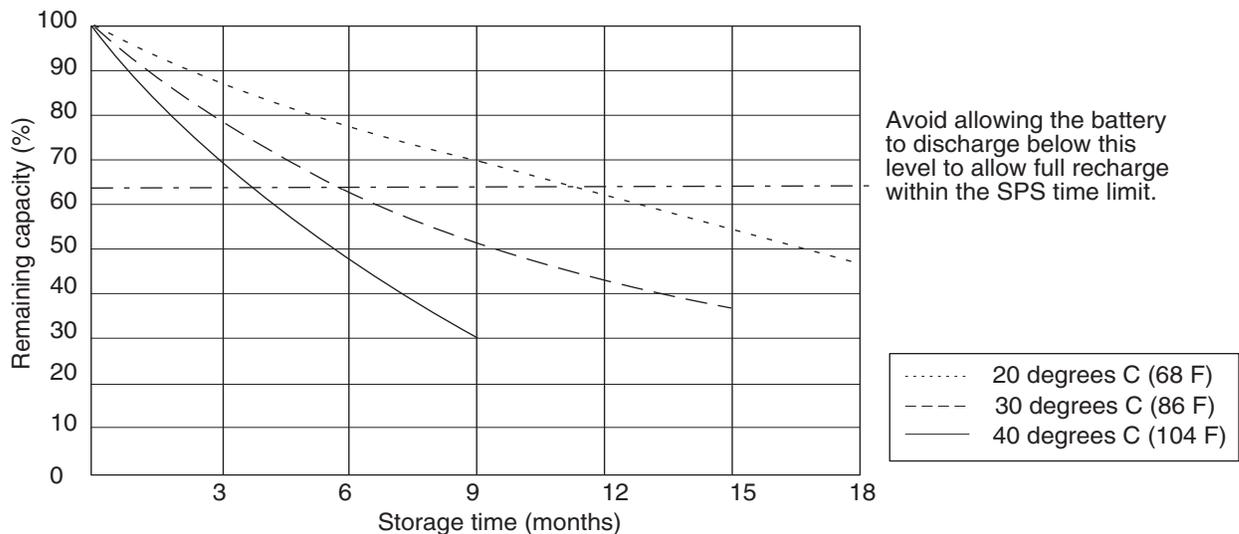
IMPORTANT If you are storing an SPS, do not store it longer than 6 months or at a temperature exceeding 30° C without recharging it. When you retrieve an SPS unit from storage, you should charge it by connecting it to ac power, with its power switch in the On position, for at least 12 hours before putting it into service or returning it to storage.

Standards certification/compliance

A stand-alone SPS will be tested and certified for compliance with the international environmental and safety specifications listed below. The SPS will be marked to indicate such compliance and certification as required.

Safety standards

EN 60950 - Safety of Information Technology Equipment including Electrical Business Equipment.

UL 1950 - Safety of Information Technology Equipment including Electrical Business Equipment.

CSA 22.2 No. 950 - Safety of Information Technology Equipment including Electrical Business Equipment.

EMI standards

EN55022 - Class B verified: Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.

FCC Interference Regulations - Part 15, Class B verified: Radiation and Radio Frequency Emission Limits.

CSA C108-8 - Electromagnetic Emission from Data Processing Equipment and Electronic Office Machines - Class B (FCC verification accepted).

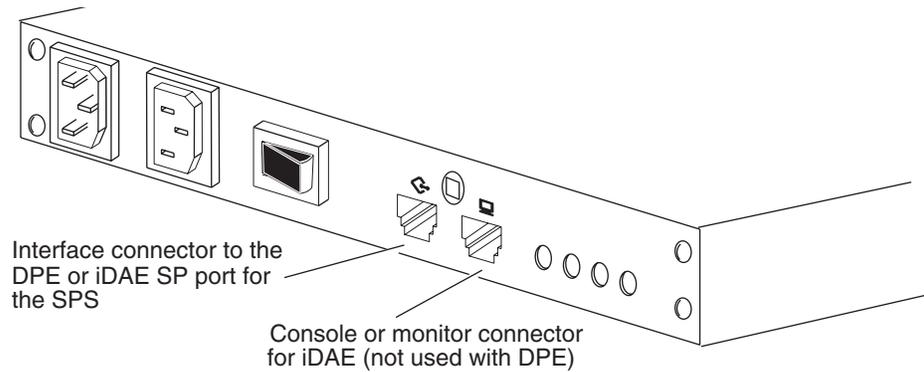VCCI - Voluntary Control Council for Interference by ITE, class 2.

CE Mark

Cable pinout information

The SPS interface and cable connector pin functions are as follows.

400-watt SPS

Interface connector to the iDAE SP port for the SPS

Console or monitor connector for iDAE

800-watt SPS

Interface connector to the DPE or iDAE SP port for the SPS

Console or monitor connector for iDAE (not used with DPE)

Interface connector		Console or monitor connector	
Pin	Function	Pin	Function
1	Ground	1	No connection
2	SP Receive from Console	2	No connection
3	SP Transmit to Console	3	Ground
4	Ground	4	SP Transmit to Console
5	SPS Transmit to SP	5	SP Receive from Console
6	SPS Receive from SP	6	Ground

Index

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LEFT CORNER

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Use the cut marks to get the labels.

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