# NEC S2500 Storage Disk User Guide

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**NEC**

**NEC Storage S2500
NF2500-SR40E
NEC Storage S1500
NF1500-SR40E**

**Disk Array Unit
User's Guide**

**NOTE:**
Read this manual carefully before using the unit. Keep this manual nearby as a handy reference and refer to the "CAUTION" and "WARNING" statements whenever necessary.

856-850725-101-A

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Remarks

(1)  No part of this manual may be photocopied in any form without prior written consent from NEC.
(2)  The information in this manual is subject to change without notice.
(3)  All possible efforts are being made to create this manual, but in the event that any technical or editorial errors or omissions are found, contact your dealer.
(4)  Save this manual in a convenient area even after you finished reading it.
(5)  When transferring this unit to other person, be sure to transfer this manual also.
(6)  NEC shall not be liable for any loss or lost profits from the use of this disk array unit regardless of the item in (3).
(7)  This unit is not intended to be installed into the installation or equipment associated with human life, such as medical equipment; nuclear installations or equipment, aerial and/or space equipment, transportation installations and equipment and is to be installed into and to control the installation or equipment requiring high reliability. If you use this unit for these installations, equipment, or control systems, NEC shall not be liable for an accident leading to an injury or death, fire, or social loss resulting from a breakdown of our product.

**FEDERAL COMMUNICATIONS COMMISSION**
**RADIO FREQUENCY INTERFERENCE STATEMENT**

**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

# Safety Precautions

Before using this unit, read this manual carefully and take proper precautions in order to use this unit safely and correctly, avoiding the potential for any personal or property damage. Keep this manual nearby for easy reference.

The following symbols are used in this manual so that you can easily understand how to operate the unit safely and correctly.

| ⚠ **WARNING** | Indicates that there is a risk of death or serious injury. |
| --- | --- |
| ⚠ **CAUTION** | Indicates that there is a risk of burn or injury. |

Risks and the necessary actions to reduce risks are indicated individually by the following symbols.

| | |
| --- | --- |
| | Indicates the risk of smoke emission or fire outbreak. |
| | Indicates the risk of electric shock. |
| | Indicates required general actions for operators. |
| | Indicates instructions to pull out the plug of a power cord from outlet. |
| | Indicates notice of general prohibition. |
| | Indicates instructions to keep a device away from inflammable objects. |
| | Indicates the danger of an injury due to harmful material. |

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# Notes on Use

The following includes information necessary for proper and safe operation of the disk array unit.

> ### ⚠ WARNING
>
> - Do not use the disk array unit in an area of high humidity or water usage. If so, a fault, electrical shock, or fire may occur.
>
> - Do not use the disk array unit in an area where inflammable gas and/or combustible substances are placed. If so, fire or explosion may occur.
>
> - Do not overload AC outlets with power cords. If so, fire may occur.
>
> - Do not put any heavy materials on a power cord. If so, the coating of the power cord may be broken, fire may occur, and/or you may be electrically shocked.
>
> - Do not install the disk array unit in a dirty or dusty environment. Remove any dust adhering to AC outlets and the plugs of power cords. Should any dust remain adhering to an AC outlet and/or plug, fire may occur.
>
> - Do not connect the plug of a power cord to an AC outlet with a wet hand. If so, you may be electrically shocked.
>
> - While the disk array unit NFx500-SR40E can accept the power in the range of 100 - 240 VAC (50/60 Hz), the power cord shipped with the disk array unit can only accept 100 – 120 VAC. Use 100 – 120 VAC (50/60 Hz) when the included power cord is used. Using power of a different voltage may cause electric shock, smoke, and/or fire to occur.
>
> - The controller of the disk array unit contains a lithium battery. Do not remove the lithium battery. The lithium battery may explode when it is brought close to fire or immersed in water. Dispose of the controller according to local ordinances. Contact your local government for details.
>
> - If the disk array unit does not operate normally due to the life of the lithium batteries, contact your service representative. Do not disassemble the controller, or replace or charge battery by yourself.

| | **⚠ CAUTION** |
|---|---|
| ⚠ | • Do not install the disk array unit and the host systems in an unsafe or unstable manner. If so, damage may occur to the unit and/or you may be personally injured. |
| ⚠ | • Do not install the disk array unit and the power cords in an area with direct sunshine or near any apparatus generating heat such as a heater. If so, a fault may occur. Further, the insulating coating of the power cord may be melted causing fire or electric shock to occur. |
| | • Insert the plug of a power cord to an AC outlet securely. Tightly secure the DC power cable with the screw. Any power cord shall be routed with sufficient margin to avoid excess strain from being applied to the plugs of the power cord or the power cord itself. If a power cord is removed from the AC outlet during operation, data may be lost and/or a fault may occur. |
| | • To prevent electric shocks, connect all power cords to an AC outlet with earth grounding. Connection of the earth line to a gas pipe is extremely dangerous. Never do it. |
| ⚠ | • Before connecting or removing a peripheral device from the disk array unit, turn off all the power switches of the disk array unit and peripherals and pull out the power cords from the AC outlets or distribution board. If not, some units may be damaged and/or you may be electrically shocked. |
| | • To carry or reinstall the disk array unit, disconnect all cables and power cords beforehand. If not, some units may be damaged, you may be electrically shocked, and/or a fire may occur. |
| ❶ | • Handle optical fibers carefully and gently. |
| | • The minimum bending radius of optical fiber shall be 30 mm. |
| | • Dust and/or dirt may attenuate the optical power of optical fiber to cause data errors to occur. Clean any optical fiber cable whenever it is inserted into the mating connector with the following procedure. Never clean a connector in which light is present in the fiber. |
| |     1. Use a lint-free "wipe" that has been dipped into alcohol (use of 99% reagent-grade alcohol is recommended). |
| |     2. Followed immediately by a dry lint-free wipe. |
| |     3. And finally to blow-dry using a can of clean, compressed air |

**To install the unit in a rack, observe the following guidelines.**

1. Temperature – If installed in a rack, consideration should be given to installing the equipment in an environment compatible with the manufacturer's recommended ambient temperature (TMRA).

2. Reduced Air Flow – Installation in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

3. Mechanical loading – Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

4. Circuit Overloading – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

5. Reliable Grounding – Reliable grounding of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

# Notes on Disposal

### Disposing of your used NEC product

**In the European Union**

EU-wide legislation as implemented in each Member State requires that used electrical and electronic products carrying the mark (Left) must be disposed of separately from normal household waste. The equipment with this mark may include electrical accessories (e.g. memory cards). When disposing of used NEC products, you should comply with applicable legislation or such terms which may have been agreed between NEC and your company regarding used products. This mark on electrical and electronic products only applies to the current European Union Member States.

**Outside the European Union**

If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority and ask for the correct method of disposal.

# Indication on Safety

The warning label is attached to components (or a location in their vicinity) that pose a possible danger or to inform the user that a hazardous situation may arise when operating the disk array unit. (Do not intentionally remove or damage any of the labels.)

If you find any labels totally/partially removed or illegible due to damage, contact your sales representative.
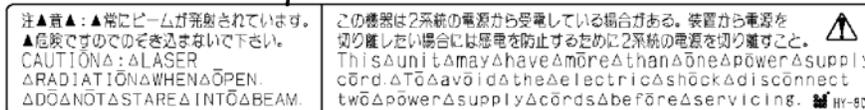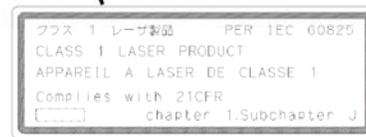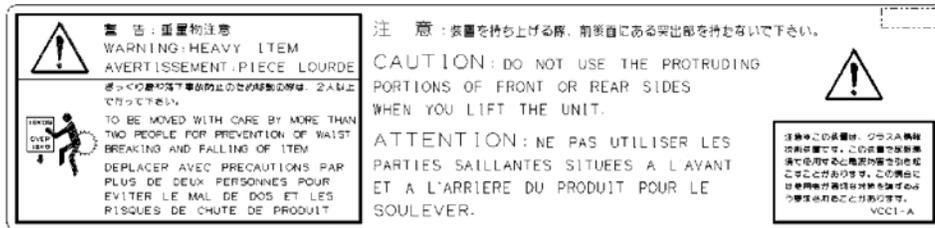
**Power supply for NFx500-SR40E**

電源を交換する際は、取り外される電源のBBU（バッテリ）
ASSYを、交換用の電源に乗せ換えてください。

| ⚠ | 注意　CAUTION |
|---|---|
| ⚠ 🚫 | 感電の危険有り、開くな。<br>Risk of electric shock.<br>Do not open. |
| ⚠ | 高温注意<br>This unit may be hot and should not<br>be touched without taking care. |

CAUTION:
DOUBLE POLE/NEUTRAL FUSING.
ATTENTION:
DOUBLE POLE/FUSIBLE SUR LE NEUTRE.

⚠ 高温注意
HOT

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バッテリー交換有効期限：Validity for replacement of battery：
Échéance de remplacement de la batterie
有効年月：Validity date：Date limite d'utilisation：(at27℃)    Y    M
製造年月：Manufacturing date：Date de fabrication：    Y    M



⚠ 危険
・この機器以外に使用しない。
・＋－端子をショートさせない。
・火中への投入や加熱をしない。
・分解、改造をしない。
　液漏れ、発熱、破裂の恐れがあります。

♻
Ni-MH

x

**AC Power Cord**



| ⚠ 警告 | WARNING |
|--------|---------|
| この電源ケーブルで電源電圧AC100-120V (50/60Hz)にて使用してください。本電圧以外で使用すると、感電、発煙、火災の原因になります。 | Use the power cord at the source voltage between 100 and 120 VAC (50/60Hz). Otherwise, it may cause electric shock, smoke and fire. |

# Preface

Thank you very much for your purchase of this NFx500-SR40E.disk array unit. This manual is intended to enable you to correctly use the disk array unit

Before using the disk array unit, you might also read the manuals of several other devices including any of the NEC Express5800 series, the NX7000/NX7700i series or CX5000 series computers, any FC-AL SCSI connection mechanism or FibreChannel controller that is to be connected with the disk array unit and the manual of the operating system in use.

The NEC Storage BaseProduct software needs to be purchased separately for using the disk array unit.

The following options are available for the disk array unit:

Options for NF2500-SR40E

- Cache memory                                NF2500-SC01E

Options for NF2500-SR40E/NF1500-SR40E

- FC disk enclosure                          NF2500-SE42E
- SATA disk enclosure                        NF2500-SE82E
- FC disk drive ( 73GB/10Krpm)               NF2500-SM413E
- FC disk drive (147GB/10Krpm)               NF2500-SM414E
- FC disk drive (300GB/10Krpm)               NF2500-SM415E
- FC disk drive ( 73GB/15Krpm)               NF2500-SM423E
- FC disk drive (147GB/15Krpm)               NF2500-SM424E
- SATA disk drive (400GB/7200rpm)            NF2500-SM802E

Options for NF1500-SR40E

- Cache memory                                NF1500-SC04E
- Option battery                              NF1500-SZ01E

To install the disk array unit in a non-standard rack:

- Rack mount kit NF9100-SK01E, NF9100-SK02E, and NF9100-SK03E

After reading this manual, keep it nearby for use as a handy reference.

First edition, December 2005

# Pre-Installation Checklist

## (1) Unpacking

Open the package and remove the disk array unit and accessories from the package carefully. The disk array unit is very heavy. Accordingly, if two people or less lift the unit, personal injury may occur. To remove the disk array unit from the package, more than three people should always support the bottom of the unit without holding the power supply and the projections of the controller.

The package is specially designed for conveyance of a precision device. Do not dispose of the package because it is required to return the disk array unit to the factory for any repair.

## (2) Inspection

After unpacking, check that all the components listed in the table below are provided. If any of the components are missing, contact your sales representative. Next, inspect the disk array unit and accessories. If any of the components are damaged, contact your sales representative.

| No. | Product name | Remarks | Qty |
|-----|--------------|---------|-----|
| 1 | NEC Storage S2500/S1500 | S2500: NF2500-SR40E<br>S1500: NF1500-SR40E<br>Note: An SD card is mounted only on CONT0. | 1 |
| 2 | Power cord | Length 3 m (for 100 VAC) | 2 |
| 3 | Front mask | With security key | 1 |
| 4 | User's Guide | This document | 1 |
| 5 | Rack mount kit | For NEC Storage rack (L and R) | 1 |
| 6 | Software | NEC Storage S2500/S1500 Disk Array control program CD | 1 |
| 7 | Packing list | | 1 |
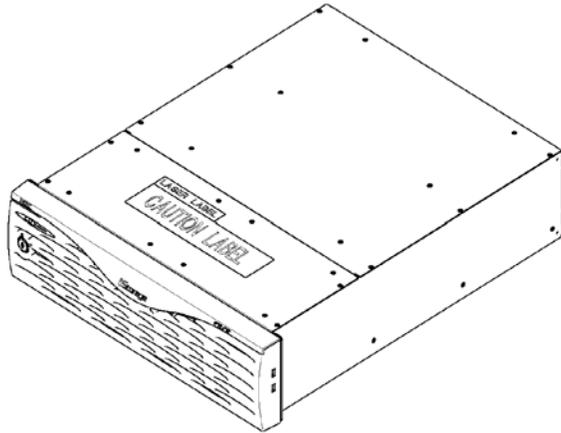
(1) NEC Storage S2500/S1500 disk array unit
(The figure above shows the unit with the front mask installed.)
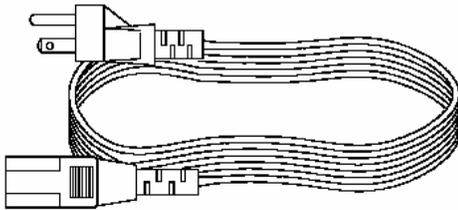


(2) Power cord (x2), or

(3) Front mask            (4) User's Guide

(5) Rack-mount kit         (6) Software

(7) Packing list

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# Legend

## Symbols in the Text

This User's Guide uses the following symbols to indicate improper handling which may cause the disk array unit to become defective.

| Symbol | Description |
|---|---|
|  | If the description is ignored when handling the disk array unit, the unit may become defective, some software used in the unit may be damaged, and/or the data created by the user may become corrupted. |
|  | If the description is ignored when handling the disk array unit, the unit may become defective and/or some software used in the unit may not operate properly. |

This User's Guide also uses the following symbol.

| Symbol | Description |
|---|---|
|  | Supplement of the text |

This User's Guide uses the following terms to indicate specific devices.

| | |
|---|---|
| Disk array unit | Indicates the NF2500-SR40E and/or the NF1500-SR40E . |
| FC disk enclosure | Indicates the additional FC disk enclosure NF2500-SE42E (sold separately). |
| SATA disk enclosure | Indicates the additional SATA disk enclosure NF2500-SE82E (sold separately). |
| Disk drive | Indicates the hard disk drive with dedicated tray. |
| Dummy tray | Indicates the dedicated tray only, with no hard disk drive installed. |
| Host system | Indicates the NEC Express5800, NX 7000/NX7700i , or CX5000 series. |
| Host bus adapter | Indicates the FibreChannel controller for the NEC Express5800 or CX5000 series, or the FC-AL SCSI connection mechanism for the NX7000/NX7700i series. |

# Contents

# Notes on the Installation and Handling of the Disk Array Unit

## *Note on Carrying Disk Array Unit*

Be sure to hold the bottom the disk array unit when carrying it.

Hold the front or side bottom of the disk array unit if possible.

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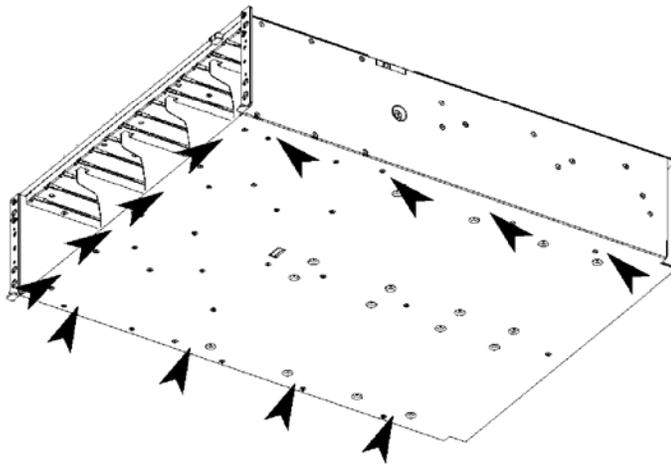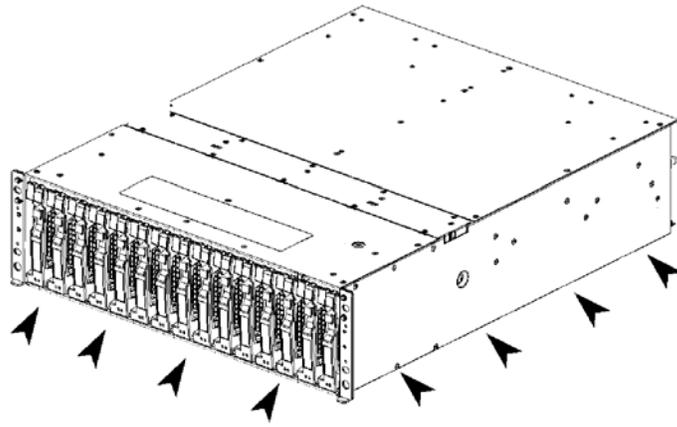
## *Environmental Considerations for the Use of Disk Array Unit*

During installation of the disk array unit, take into account the following considerations on the location, room temperature, space required for handling, ventilation, and other conditions.

- Install the disk array unit indoors.
  Do not expose the disk array unit to direct sunlight. Use a window shade or curtain to block sunlight on the unit if necessary.

- Install the disk array unit on a level surface of sufficient strength. In addition, do not apply shocks and/or vibrations to the disk array unit. If so, some components may be damaged causing the disk array unit to become defective and/or personal injury.

- Install the disk array unit in an area under the following conditions; temperature range between 5°C - 40°C and a humidity range between 10% - 80% (without condensation).

- Do not install the disk array in an area with running water or oils, areas contaminated by liquids such as water and oil, steam, areas with steam or other high moisture content. If so, a fault or electrical shock may occur

- Do not install the disk array in an area near the emission of chemical steam or an area where the disk array may come in contact with an inflammable substance. If so, a fault, fire, or explosion may occur.

- Do not install the disk array unit in dirty or dusty environments. If so, a fault may occur.

- Do not install the disk array unit in an area with direct sunshine or near fire or an apparatus generating heat such as stove. If so, a fault or deformation may occur.

- Do not install the disk array unit near TV, radio, or cordless telephones as some interference may appear in the TV, radio, or cordless telephone.

- Do not use cellular phones near the disk array unit. If so, a fault may occur.

- Do not install the disk array unit near any device generating a strong magnetic field, such as audio speakers. If so, a fault may occur.

- Do not install the disk array unit so that the ventilating holes on the front and rear faces are blocked. If so, heat generation and/or fault may occur.

## *Installation and Connection of Disk Array Unit*

<table>
<tr><td colspan="2" align="center">⚠ <strong>WARNING</strong></td></tr>
<tr>
<td>⚠🔥</td>
<td>
<ul>
<li>Do not use the disk array unit in an area of high humidity or where water usage occurs. If so, a fault, electrical shock, or fire may occur.</li>
<li>Do not use the disk array unit in an area where inflammable gas and/or combustible materials are placed. If so, fire or explosion may occur.</li>
<li>Do not install the disk array unit in a dirty or dusty environment. Remove any dust adhering to AC outlets and the plugs of power cords. If dust remains adhering to an AC outlet and/or plug, fire may occur.</li>
<li>Do not overload AC outlets with power cords. If so, fire may occur.</li>
</ul>
</td>
</tr>
<tr>
<td>⚠⚡</td>
<td>
<ul>
<li>Do not put heavy materials on a power cord. If so, the insulating coating of the power cord may be broken, fire may occur, and/or you may be electrically shocked.</li>
<li>Do not connect the plug of a power cord to an AC outlet or distribution board with a wet hand. If so, you may be electrically shocked.</li>
</ul>
</td>
</tr>
</table>

<table>
<tr><td colspan="2" align="center">⚠ <strong>CAUTION</strong></td></tr>
<tr>
<td>🔌</td>
<td>
<ul>
<li>Make sure to disconnect all power cords and cables before relocating the disk array unit. If not, a malfunction of the system, an electric shock and/or fire may occur.</li>
</ul>
</td>
</tr>
<tr>
<td>⚠🔥</td>
<td>
<ul>
<li>While the disk array unit can accept power in the range of 100 - 240 VAC (50/60 Hz), the power cord shipped with the disk array unit can only accept 100 – 120 VAC. Use 100 – 120 VAC (50/60 Hz) when the enclosed power cord is used. Using power of different voltage may cause electric shock, smoke, and/or fire to occur.</li>
</ul>
</td>
</tr>
<tr>
<td>⚠⚡</td>
<td>
<ul>
<li>Do not install the disk array unit and the power cords in an area with direct sunshine or near any apparatus generating heat such as a heater. If so, a fault may occur. Further, the insulating coating of the power cord may be damaged causing fire or electric shock to occur.</li>
</ul>
</td>
</tr>
</table>

<table>
<tr>
<td>🚫</td>
<td>
<ul>
<li>The disk array unit weighs 34 kg or more. Hold the disk array unit or disk enclosure firmly using at least three people to carry it. Carrying the devices by two or less people may cause personal injury.</li>
</ul>
</td>
</tr>
<tr>
<td>❗</td>
<td>
<ul>
<li>Select a location where the disk array unit can be connected to the AC outlet or distribution board by using the attached power cord, without using an extension cord,</li>
</ul>
</td>
</tr>
<tr>
<td>⚠🔥</td>
<td>
<ul>
<li>Insert the plug of a power cord into an AC outlet securely. If some clearance remains between the plug of the power cord and the AC outlet, dust may enter into the clearance. This then may cause fire to occur.</li>
</ul>
</td>
</tr>
<tr>
<td>🚫</td>
<td>
<ul>
<li>Provide sufficient margins for the cables connected to the disk array unit so that entanglement is not an issue. Avoid placing unnecessary strain on power plugs and FC connectors.</li>
</ul>
</td>
</tr>
<tr>
<td>⚠🔥</td>
<td>
<ul>
<li>Do not crimp cables connected to the disk array unit. If so, a fault or fire may occur.</li>
</ul>
</td>
</tr>
</table>

- Use the cables provided by NEC as those connected to the disk array unit and check the destinations to which the cables are connected. In addition, always secure power cords and FC cables when they are connected.

- Use a power source independent from any TV or radio. Otherwise, interference may be generated.

- To connect a cable to the mating connector, make sure that the connector of the cable is not damaged and any pins are not bent. Using a cable not approved by NEC or a damaged cable may cause a fault or fire to occur.

- To disconnect a cable from the mating connector, always hold the connector of the cable. Do not pull the cable itself to disconnect it.

## *Notes on Use of the Disk Array Unit*

- Do not let any animals (pets) or children touch the cables connected to the disk array unit. Pulling the cable may cause the unit to fall down, resulting in failure of the unit or personal injury.

- Do not let any liquid such as water into the disk array unit. If so, you may be electrically shocked or the unit may become defective. If some liquid does enter into the disk array unit, immediately turn off the power, unplug the power cord from AC outlet or distribution board, and contact your sales representative or maintenance engineer. If the disk array unit seems dry, remember, only a small amount of liquid may cause the unit to become defective.

- Do not let any foreign substances such as paperclips or screws into the disk array unit through the ventilating holes on the front or rear face. If so, a fault may occur.

- Do not disassemble or modify the disk array unit in any way. If so, a fault or electrical shock may occur. And, your warranty will be voided.

- If the disk array unit will not be used for a long period of time, disconnect the plugs of the power cords from the AC outlet or distribution board for safety.

- It is advised that you disconnect the power plug from the outlet or distribution board when a thunderstorm is approaching. If it starts thundering before you disconnect the power plug, do not touch any part of the unit including the cables. If any failure is found later, contact your sales representative.

## *Routine Inspection of the Disk Array Unit*

| ⚠ **CAUTION** |
|---|
| ⚠    • To clean the disk array unit, always turn off the power and also disconnect the plugs of the power cord from AC outlets. If not, you may be electrically shocked. |

❗    • If a surface of the disk array unit becomes dirty, wipe the surface lightly with a soft cloth. Wiping the surface by using chemicals such as benzene and thinner, or other volatile chemicals, may cause the surface to become deformed or discolored. In addition, note that spraying insecticide on a surface may cause the surface to be deformed or discolored.

   •

🚫    • It is recommended to clean the inside of the disk array unit periodically. This is because dust may accumulate.
Contact your sales representative or maintenance engineer for the cleaning of the inside of the disk array unit.
Users must not disassemble and/or repair the disk array unit as this is dangerous.

⚠    • Do not use any battery backup unit exceeding its service life. If so, a fault or fire may occur.

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### *Notes on the Storage or Moving of the Disk Array Unit*

⊘ • Do not store the disk array unit in an area where the temperature may increase extremely or the temperature difference between the warm and cold states is considerably large. In addition, do not store the disk array unit in an area with high humidity or dust.

⚠ • Note that foreign substances such as water and metal should be prevented from entering into the disk array unit during storage. Using the disk array unit with any foreign substance inside may cause a fault, electrical shock, or fire to occur.

⊘ • During storage, do not put any materials on the disk array unit and do not place the disk array unit in an environment where the unit may fall or be dropped.

⊘ • To use the disk array unit after storage for longer than six months, it is recommended that you contact your sales representative or maintenance engineer for inspection and/or repair.

⊘ • The disk array unit weighs 34 kg or more. Hold the disk array unit firmly using at least three people to carry it. Carrying the device by two or less people may cause personal injury.

⊘ • When transporting the unit, make sure to package the disk array unit with the packing material that shipped with the disk array unit. If any other packing materials are used, vibration or shock generated during transportation may cause a malfunction of the unit.

⊘ • During storage and transporting, attach the dust proof cover to the FC connectors to prevent dust sticking. (See the figure below)



Dust proof cover

# Features of the Disk Array Unit

This disk array unit has the following features.

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The NFx500-SR40E is a high-performance disk array unit designed for use with the NEC Express5800 (Windows 2000 /Windows Server 2003 / Turbolinux 7 Server / RedHat Linux 7.2 / Miracle Linux Standard Edition 2.1 / RedHat Enterprise Linux AS 2.1 / RedHat Enterprise Linux ES 2.1), NX7000/NX7700i (HP-UX), and CX5000 (Solaris) systems.

\*   Ask your sales representative for non-NEC servers (hosts) which are supported and compatible operating systems.

The storage capacity of this disk array unit can be easily expanded by installing an additional FC disk drive (optional) into the expansion slot of the disk array unit.

Expansion of the storage capacity of the disk array unit of is also possible by adding an additional FC or SATA disk enclosure (optional) to the disk array unit.

The disk array unit supports RAID types 1, 5, 6, 10 and 50. If a fault occurs in a single disk drive (2 disk drives for RAID type 6), the disk array unit will continue the operation without loss of data.

Any defective disk drive can be replaced with a new one without system shutdown. Further, the disk array unit has an auto repair feature which automatically starts data recovery after the replacement of the defective disk drive.

If a single disk drive is specified as the spare disk, the data in the defective disk drive can be immediately recovered in the spare disk. The use of this hot spare feature as well as the auto repair feature allows the data in the defective disk drive to be automatically recovered in the spare disk as soon as a disk drive becomes defective. This improves the system reliability.

The disk array unit has a cache memory data hold function when using the battery backup unit (BBU). This function allows comfortable high-speed data processing to be done with high reliability.

Further, owing to the redundant configuration of the controller, fan, power supply, and battery backup unit as well as the spare disk drive, high availability is achieved.

See Section 9.2 "Optional Components" for the product names and part numbers of options.

> The above features of the disk array unit are effective only for hardware failures (e.g., the hard disk is physically damaged or inoperative). Any software failure (e.g., the data is lost or rewritten due to program excursion) is not covered by these features. Should a software failure occur, the system could seriously be damaged. To minimize the damage, be sure to back up the data periodically.

## *Hot Spare Feature*

Spare disks can be installed in the disk array unit. If a disk drive becomes defective, the data in the defective disk drive is recovered in the spare disk. After the data recovery, the disk drive operates normally if another disk drive becomes defective.

A defective disk drive can be replaced without turning off the power of the disk array unit.

With the shipping default, if the spare disk replaces a disk drive that has become defective and the spare is replaced with a new drive, the replacement disk drive works as a spare disk drive.

The data can also be recovered in another other disk enclosure.

Example of hot spare operation (LDN0 RAID5)



Failure in PDN1            Recovery of data            Replacement of PDN 1
                          in spare disk               PDN1 works as a spare disk
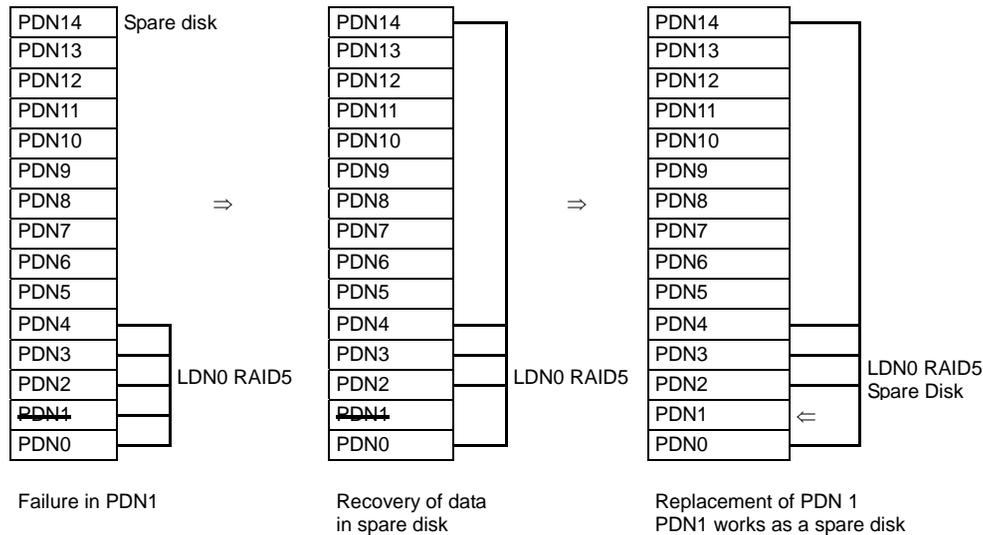
\*   PDN: Physical Disk Number

    LDN: Logical Disk Number

| | |
|---|---|
| ✍ | Do not move any of the factory-installed disk drives into another slot. |

| | |
|---|---|
| 📖 | The spare disk can operate only when it has a capacity and a revolution equal to the defected disk drive. If disk drives having different capacities and/or revolutions coexist, spare disks of the different capacities and/or revolutions must be defined to manage the disk drives clearly. Up to 32 spare disks may be installed in the entire disk array unit. |

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## *Write Cache Feature*

For RAID type 5, 6, or 50, the performance of the disk array unit may be decreased during the writing of a small amount of data. This is because the previous data and parity data must be read to recalculate the parity.

This disk array unit is equipped with cache memory. When write data is stored in the cache memory, the disk array unit terminates the command processing and then writes the cached data to the disk drive, improving the performance.

> The cache memory is backed up with the battery backup unit. To increase data security, an uninterruptible power supply (UPS) should also be used.

In general, if the power is shut down before the data saved in the cache memory is written to disk drive, the data in the cache memory will be lost. To prevent this, the disk array unit features a battery backup unit installed in the power supply to retain data in the cache memory.

The backup time of the battery backup unit depends on the number of battery backup units installed. The following table shows the backup time when the battery backup units are installed and they are fully charged.

| Number of Battery Backup Units Installed | Period of Service | | | Operating Conditions |
| --- | --- | --- | --- | --- |
| | Up to 5 years | | | |
| | 2GB | 4GB | 8GB | |
| Standard configuration (S1500) | 24H | 24H | – | Ambient temperature: @25ºC Backup frequency: Once a week 16-hour discharging (power-off) |
| Expanded configuration with optional batteries (S1500) | 72H | 48H | – | |
| Standard configuration (S2500) | – | 72H | 36H | |

\*    If the ambient temperature or backup frequency exceeds the conditions described above, the battery back units need to be replaced (not a warranty replacement) before they reach their service life of 5 years. Ask your NEC sales representative for the relationship between the operation mode and the life of a battery backup unit.

The following conditions are necessary to make the write cache feature effective:

- The disk array unit will operate normally with the following components installed:
  - 2 controllers (or 1 controller if you have enabled Write Cache from the maintenance PC)
  - 1 or more power supplies
  - 1 or more battery backup units installed in the power supply or power supplies above (BBU0 for PS0 and BBU1 for PS1)
- The battery backup units are fully charged.

If any of the conditions is not satisfied, the write cache feature does not work sufficiently.
The batteries installed in the battery backup unit are fully charged after about 6 hours.

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## *Software Products*

To use the disk array unit, the following software product is required:

- For S2500:

  NEC Storage BaseProduct Ver4.2 (or later) - NEC Storage S2500

- For S1500:

  NEC Storage BaseProduct Ver4.2 (or later) - NEC Storage S1500

To use the disk array unit, release the license lock using the license code that is provided with "NEC Storage BaseProduct Ver4.2 - NEC Storage S2500 (S1500)".

A trained technician is responsible for releasing the license lock of "NEC Storage BaseProduct Ver4.2 -NEC Storage S2500 (S1500)" during the installation of the disk array unit. Please give the person the license code provided with the product.

> Before the disk array unit can be used, the license lock must be released by using the license code provided with NEC Storage BaseProduct.
> Be sure to release the license lock. A disk array unit with the license lock remaining locked cannot receive any maintenance services because the operation cannot be guaranteed.

For other software products available for the disk array unit, ask your sales representative.

## *Management Software*

NEC Storage BaseProduct Ver4.2 (or later) - NEC Storage S2500 (S1500) or the management software WebSAM NEC Storage Manager can be used to allow the host system to display the resources in the disk array unit in the real time mode.

NEC Storage Manager also enables you to set the following parameters through the host computer:

- Setting of RAID configuration (RAID 1, 5, 6, 10, 50, and hot spare disk)
- Resetting of RAID configuration
- Downloading firmware
- Error Reporting Log

## Updating of the Control Software

At times, NEC may develop and release new functions or features for the disk array unit.  These changes may be made available by upgrading the version of storage control software.

You can update the storage control software by yourself. However, if you fail to update it properly, the disk array unit may not function properly.

NEC maintenance service representatives can provide the service for updating the storage control software (at an additional charge).  It is strongly recommended that you should ask your NEC trained maintenance service representative to update storage control software..

## RAID Configuration

The RAID configuration in the disk array unit can be used in the combinations shown in the table below. (G = 1000^3)

| RAID type | RAID1 | RAID5 | RAID6 *1 | | RAID10 | RAID50 |
|---|---|---|---|---|---|---|
| | | | S2500 | S1500 | | |
| Number of logical drives in configuration | 1+1 | 4+1 | 6 to 120 | 6 to 60 | 2x2, 3x2, 4x2, 5x2, 6x2, 7x2, 8x2 | 5x2, 5x4 |
| Number of logical drives per subsystem | 1,024 max. | | | | | |
| Storage capacity per logical drive (When 73-GB disk drive is used) | 71.6GB | 286.4GB | 286.4GB to 6TB | 286.4GB to 3TB | 143.2GB to 572.8GB | 572.8GB to 1145.6GB |

\*   A combination of disk drives of the same capacity and same rotational speed is required for configuring logical drives.
The NFx500-SE82E only supports RAID6 and does not support any other RAID configuration.

\*1  Two modes (66%-mode and 80%-mode) can be selected according to capacity efficiency.

The RAID types have the following characteristics.

| Level | Function | Advantage | Disadvantage |
|---|---|---|---|
| RAID1 | Mirroring | High reliability | High cost |
| RAID5 | Striping of data and redundant data | High capacity efficiency | Low-speed data writing |
| RAID6 | Striping of data and redundant data | High reliability that allows continuous operation even if two disk drives fail. Capacity can be expanded for every drive. | Low-speed data writing |
| RAID10 | Striping of RAID-1 | High-speed data read/write | High cost |
| RAID50 | Striping of RAID-5 | High-speed data read High capacity efficiency | High induction cost |

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# Names and Roles of Sections

This chapter describes the names and functions of the sections in the disk array unit.

## *Front View*

(3) SHUTDOWN switch          (1) POWER LED      (2) SERVICE LED
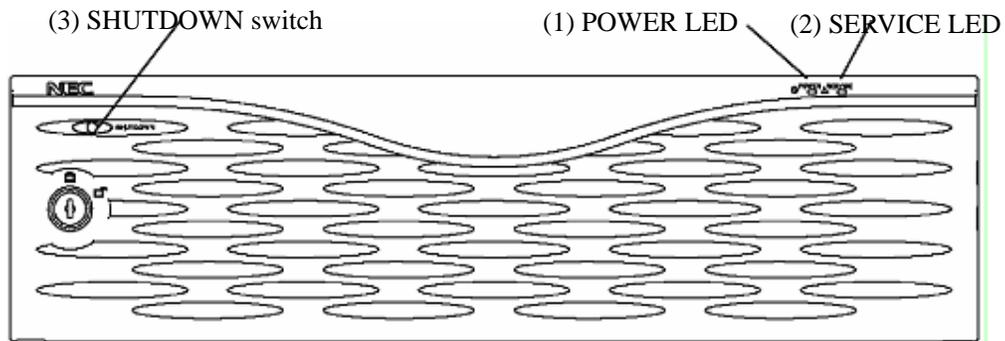
A front bezel is installed on the front face of the disk array unit as shown in the figure above.
The front bezel can be removed by releasing the lock with the accessory key, grasping both sides of
the bezel and pulling out toward you with your hands.

Removing the front bezel, you can view the disk drives shown in the figure below.

(3) SHUTDOWN switch          (7) Ejector          (1) POWER LED      (2) SERVICE LED

(6) Hard disk FAULT LED   (5) Hard disk READY LED      (4) Disk drive/dummy tray

**xxx**
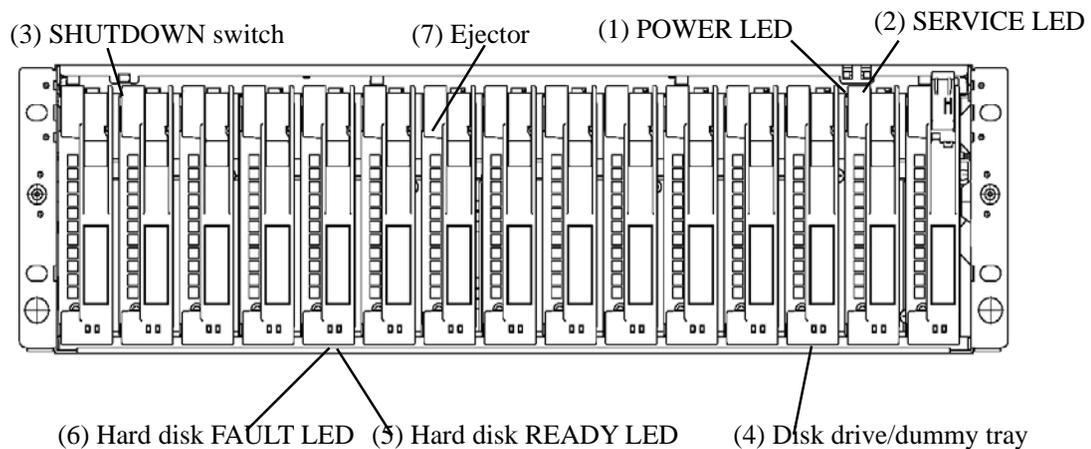
(1)     POWER LED (green)

The POWER LED lights green if the AC power is supplied and the power switch is set to ON. The LED is off if the power switch is set to OFF.

(2)     SERVICE LED (orange)

The SERVICE LED lights orange when the disk array unit or a disk array unit component including an additional FC disk enclosure (if installed) fails. The LED flashes during the self-test and initialization sequence immediately after the power is turned on.

The LED goes off when the disk array unit has started, and it is off while the disk array unit is operating normally.

(3)     SHUTDOWN switch

Use this switch to turn off the disk array unit. Turning on this switch starts writing the cache data remaining in the array controller into disk drive.

To power off the disk array unit, see "7.2 Power On/Off of Disk Array Unit" for details.

> Data backed up will be lost if a controller, power supply, or battery is replaced in the following conditions:
> - The scheduled stop procedure using the SHUTDOWN switch is not performed.
> - There are not any power supplies that are supplying power to the array controller normally.

(4)     Disk drive / dummy tray

Disk drive: A hard disk drive (HDD) with a dedicated tray is installed.
Dummy tray: Only a dedicated tray with no HDD is installed

(5)     Hard disk drive READY LED (green)

The READY LED lights green while the disk drive is operating normally, and flashes while the disk drive is transferring data.

This LED also flashes during the self-test and initialization sequence immediately after the power is turned on.

(6)     Hard disk drive FAULT LED (orange)

The FAULT LED lights when the disk drive fails.

The LED is off while the disk drive is operating normally.

(7)     Ejector

Use the ejector to install/remove disk drives or dummy trays.

In general, secure the disk drive and dummy tray to the frame.

> When inserting the disk drive into the disk enclosure, push it as far as it will go and then lock the ejector.
> Incorrect insertion may cause a malfunction.

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## *Rear View*

NF2500/1500-SR40E

(2) Controller (CONT1)      (2) Controller (CONT0)



(4) Fan   (1) Power supply (PS1)   (4) Fan   (1) Power supply (PS0)
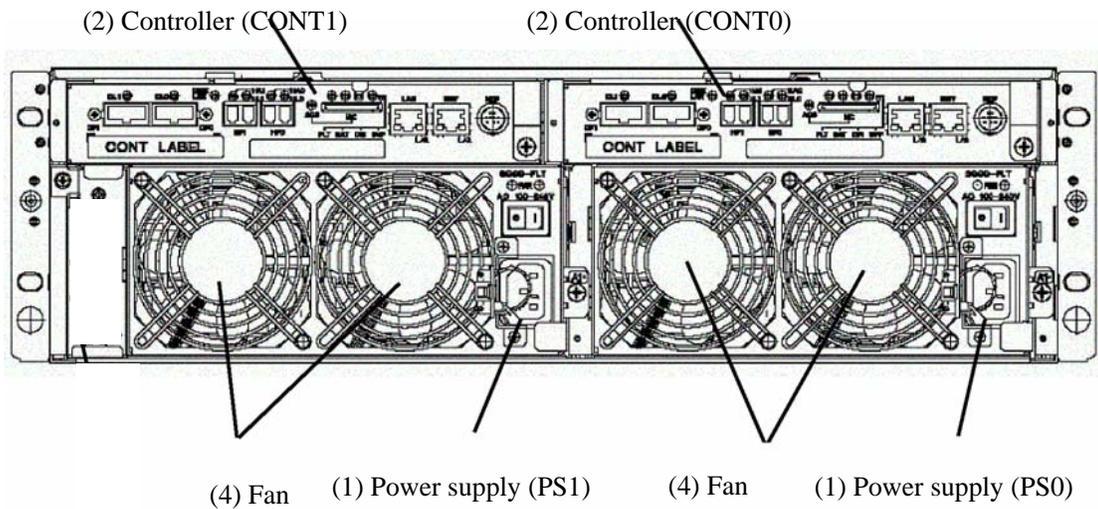
(3) Battery backup unit (standard configuration)
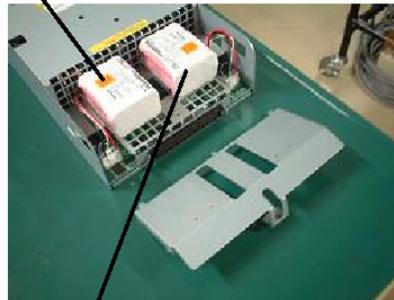


(1) Power supply      (3)  Battery backup unit
                                     S2500: Standard
                                     S1500: Option

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(1)      Power supplies (PS1/PS0)

The power supplies are provided to supply power to the disk array unit. See Section 3.3 "Power Supply" for details.

(2)      Controllers (CONT1/CONT0)

The controller boards are provided to control the disk array unit. See Section 3.4 "Controller" for details.

(3)      Battery Backup Unit (BBU1/BBU0)

The battery backup units are provided to protect data in the cache memory when a power failure occurs.

In the standard configuration of the S2500, two battery backup units are installed in each power supply. In the standard configuration of S1500, one battery backup unit is installed in each power supply. The battery backup units are also provided as optional batteries (NF1500-SZ01E) for the expansion configuration.

See "3.5 Battery Backup Unit" for details.

(4)      Fans (FAN1-[0]/FAN1-[1]/FAN0-[0]/FAN0-[1])

The fans are provided to prevent the heat-up of the overall system.

When the power switch is set to ON, four cooling fans are rotating. Note that the ventilation holes are not to be blocked.

| | • Install the disk array unit so that the ventilation holes are not blocked. If either or both of the ventilation holes are blocked, the internal temperature of the disk array unit may increase, causing a fault to occur.<br>• The disk array unit is equipped with four fans. Even if a fan fails, the air-cooling conditions for the entire disk array unit are satisfied. However, to guarantee the safe and proper operation of the disk array unit, replace the power supply immediately if a fan failure occurs. |
|---|---|

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## *Power Supply*

Power supply for NFx500-SR40E



(4) POWER FAULT LED

(3) POWER GOOD LED

(2) Power switch

(5)Power cord stopper

(6) Ejector
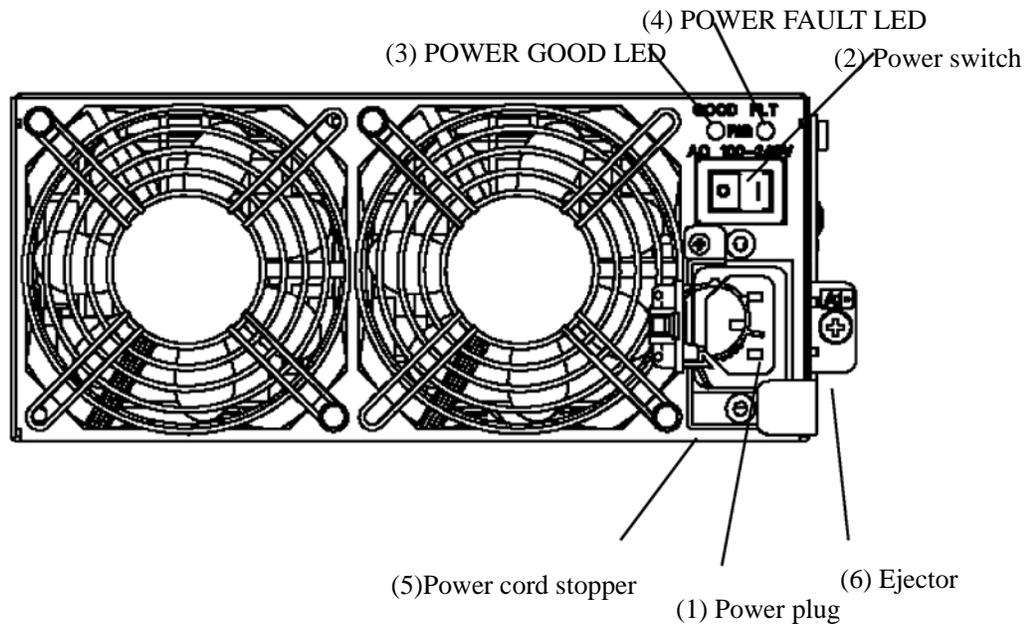
(1) Power plug

### (1)  Power plug

The power plug is intended to supply power to the disk array unit. Connect the supplied power cord to the power plug and the plug of the power cord to an outlet of 100 VAC power at 50 or 60 Hz.

The disk array unit has a redundant power configuration to prevent the entire unit from being shut down by a single failure. In this configuration, connect two power cords for use of the disk array unit.

> ⚠ While the disk array unit NFx500-SR40E can accept power in the range of 100 - 240 VAC (50/60 Hz), the power cord shipped with the disk array unit can only accept 100 – 120 VAC. Use 100 – 120 VAC (50/60 Hz) when the supplied power cord is used. Using power of a different voltage may cause electric shock, smoke, and/or fire to occur.

### (2)  Power switch

The power switch is used to turn on/off the power of the disk array unit.

The disk array unit has a redundant power configuration to prevent the entire disk array unit from shutting down due to a single failure. Therefore, turn on/off both of the two power switches when operating the disk array unit.

### (3)  POWER GOOD LED (green)

The POWER GOOD LED lights green when the power is supplied to the disk array unit and the power

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switch is set to ON. The LED is off if the power switch is set to OFF or a fault occurs in the power supply or the fan.

### (4) POWER FAULT LED (orange)

The POWER FAULT LED lights if a fault occurs in the power supply, the fan, or the installed battery backup unit. The LED is off while in normal operation.

### (5) Power cord lock

The power cord lock prevents the power cord from being removed unexpectedly.

> **NOTE:** The shape of the power cord lock may be different from the figure shown above. See "5.5 Connection of the Power Cords".

### (6) Ejector

Use the ejector to install/remove the power supply.
To use the ejector, loosen the screw that secures the ejector.

| | When inserting the power supply into the disk array unit, push it as far as it will go and then secure it with the screws.<br>Incorrect insertion may cause another power supply failure. |
|---|---|

| | A power supply or battery backup unit must be replaced within five minutes. To do so, prepare the replacement power supply or battery backup unit before you start the replacement procedure.<br>The disk array unit includes the following elements that generate heat:<br>    A) Disk drives<br>    B) Power supplies<br>    C) Controllers<br>The power supplies contain the cooling fans.<br>Therefore, if you leave the disk array unit with a power supply removed, the disk drives in the unit may heat up causing serious issues with reliability. |
|---|---|

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## *Controller*



(14) ACCESS LED (HA1)

(12) LINKUP LED (DL0)

(13) LINKUP LED (HL1)

(1) FLT LED

(2) BAT LED

(7) MODEM connector

(14) ACCESS LED (HA0)

(4) DIR LED

(12) LINKUP LED (DL1)

(13) LINKUP LED (HL0)

(3) SVP LED

(10) FC connector
(for additional disk
enclosure)

(11) FC connector
(for host bus
adapter)

(9) LAN connector

(17) Ejector

(16) LAN LINK/ACT LED

(8) MNT connector

(15) DISK LINK LED

(5) MC ACS LED

(6) Slot for Event Logging Tool
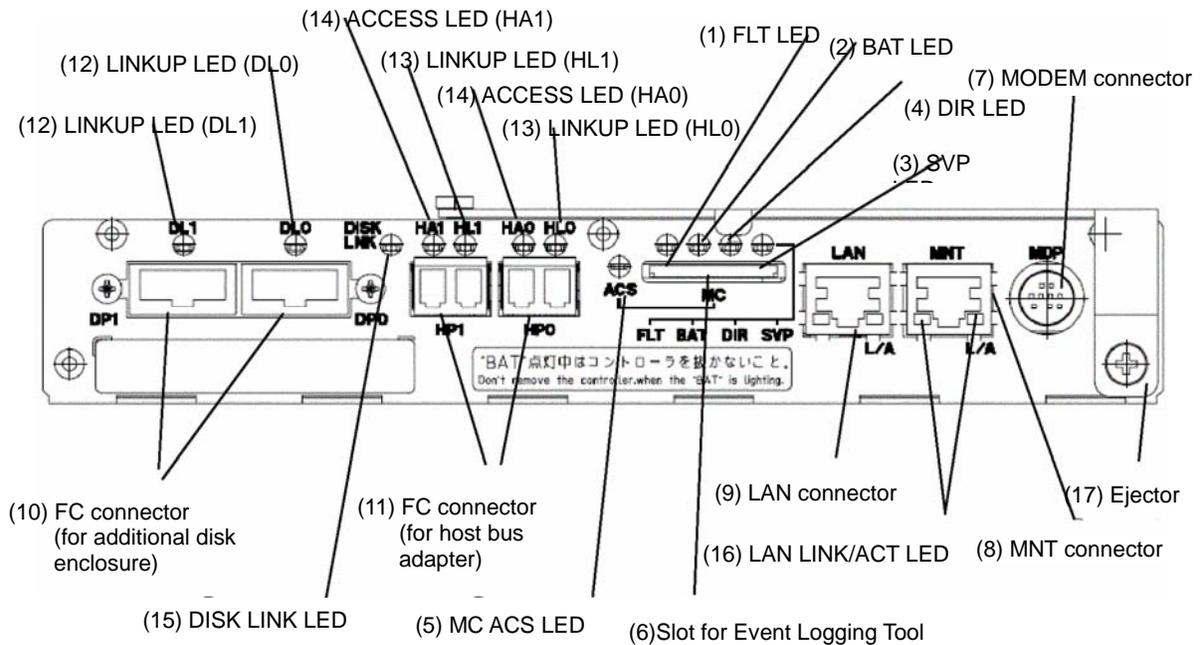
### (1)  FAULT LED (orange)

The FAULT LED lights orange if a fault occurs in the controller.

### (2)  BATTERY BACKUP LED (orange)

With no power supplies for the controller supplying power normally (such as the case of a power interruption), the BATTERY BACKUP LED lights orange if the cache memory is subject to battery backup.

> The warning "Do not remove the controller while the "BAT" LED is on." is printed on the CONT chassis. However, if you have performed the scheduled stop procedure using the SHUTDOWN switch, you can replace the controller even while the BATTERY BACKUP LED (BAT) is on.

### (3) SVP LED (green)

The SVP LED flashes green when the Status Monitoring Processor (SVP) in the controller is operating normally.

### (4) DIR LED (green)

The SVP LED flashes green when the Director Control Processor (DIR) in the controller is operating normally.

### (5) MC ACS LED (green)

The MC ACS LED lights when the Event Logging Tool (SD) card is being accessed.

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### (6) Slot for Event Logging Tool

Use this slot to insert the SD card, which stores the events logged in the controller.

### (7) Modem connector

Unsupported.

### (8) MNT connector

Use this connector to connect with the Maintenance PC.

### (9) LAN connector

Use this connector to connect with a LAN for WebSAM NEC Storage Manager and SNMP.

### (10) FC connector (for additional FC disk enclosure) (DP0/DP1)

The FC connectors are used to connect the array controller with the expansion FC disk enclosure.

See Chapter 5 "Connection of Disk Array Unit" for the cable connection.

### (11) FC connector (for host bus adapter) (HP0/HP1)

The FC connectors are used to connect the host system with the disk array unit.

See Chapter 5 "Connection of Disk Array Unit" for the cable connection.

### (12) LINKUP LED (DL0/DL1)

A LINKUP LED lights if the respective FC connector (FC port for additional FC disk enclosure) becomes operable (to link up). DL0 and DL1 LEDs correspond to DP0 and DP1 connectors, respectively.

These LEDs flash during the self-test or initialization sequence just after power-on.

### (13) LINKUP LED (HL0/HL1)

A LINKUP LED lights if the respective FC connector (FC port for host bus adapter) becomes operable (to link up). HL0 and HL1 LEDs correspond to HP0 and HP1 connectors, respectively.

These LEDs flash during the self-test or initialization sequence just after power-on.

### (14) ACCESS LED (HA0/HA1)

The ACCESS LED lights when an I/O access to the respective FC port for host bus adapter (HP0/HP1) occurs.

### (15) DISK LINK LED (DISK LINK)

A DISK LINK LED lights if the internal FC port for the built-in disk enclosure in the disk array unit becomes operable (to link up).

This LED flashes during the self-test or initialization sequence just after power-on.

**(16) LAN LINK LED (L/A)**

The LAN LINK LED lights when the LAN receives a link pulse from the Ethernet. This LED lights also while the LAN port operates normally.

These LEDs flash during the self-test or initialization sequence just after power-on.

**(17) Ejector**

The ejector is used to install or remove the controller. Loosen the screw before using the ejector.

| | When inserting the controller into the disk array unit, push it as far as it will go and then secure it with the screws. Incorrect insertion may cause a malfunction. |
|---|---|

## *Battery Backup Unit*

(1) Connector
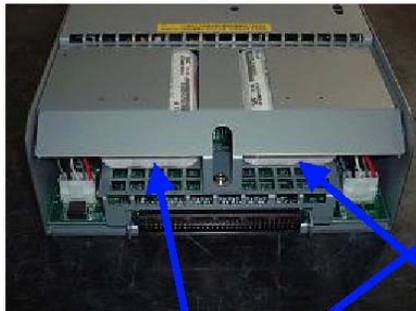
BBU (Standard)
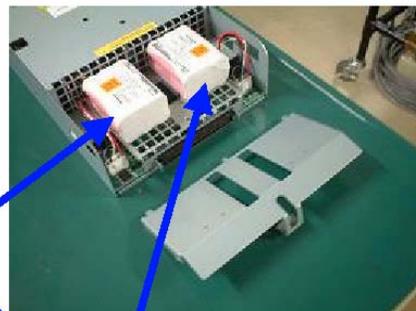
BBU
S2500: Standard
S1500: Option

### (1)  Connector

The connector is used to connect the battery backup unit with the power supply.

| | |
|---|---|
| ⚠ | • Note the following points on replacing or additionally installing a battery backup unit:<br>  – A replacement or additional battery backup unit must be of the type used in the standard configuration.<br>  – The standard battery backup unit must be installed on the left side. (See the figure above.)<br>  – The optional battery backup unit must be installed on the right side. (See the figure above.)<br>• The batteries are not enabled unless a battery backup unit is installed at the standard battery location. They are not enabled either if a battery backup unit is installed only at the optional battery location.<br>• When installing the battery backup unit in the power supply, push in the connector until it is locked.<br>  If the connector is not fully inserted, the battery backup unit may not be enabled. |

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# Installation and Connection Procedures

This chapter describes the procedure for the installation and connection of the disk array unit. In general, follow the procedure shown in Section 4.1 for the installation and connection of the disk array unit.

Refer to Chapter 1 "Notes on the Installation and Handling of the Disk Array Unit" before beginning.

---

### ⚠ CAUTION

- Do not deliver any shock or vibration to the disk array unit. Excess shock or vibration may cause the disk array unit to become defective.
- While the disk array unit NFx500-SR40E can accept power in the range of 100 to 240 VAC (50/60 Hz), the power cord coming included with the disk array unit can only accept 100 to 120 VAC. Use 100 to 120 VAC (50/60 Hz) when the included power cord is used. Using power of different voltage may cause electric shock, smoke, and/or fire to occur.

---

## *Installation and Connection Procedures*

■ Inventory the components in the package

Check the components in the package following the "Pre-Installation Checklist". If any component is missing, contact your sales representative.

■ Installation into the rack

Install the disk array unit in the rack according to Appendix D "Installing the Unit in a Rack".

■ Connection of a host bus adapter

Connect the host bus adapter according to the manual provided with the host system or host bus adapter. And, install the proper driver.

■ Connection of a FC cable

Use a cable compatible with the disk array unit.

Insert the connector until the latch emits a click. Do not forcibly bend the cable. When disconnecting the cable, be careful not to apply excessive force to it. Hold and remove the connector by pushing the latch.

Keep the dustproof cover attached to SFP mounted on controller and the FC cable to use during storage and transportion.

■ Connection of the Ethernet (LAN) cable

To prevent malfunction, use a shielded Ethernet (LAN) cable.

Insert the connector until the latch emits a click. Do not forcibly bend the cable.
When disconnecting the cable, be careful not to apply excessive force to it. Hold and remove the connector by pushing the latch.

■ Connection of the power cord

Always use the proper power cord available for the disk array unit. Do not use the power cord if it is bent or under complicated cable connections.

■ Setting of parameters

For setting of the parameters including RAID type and drive assignment, use the WebSAM NEC Storage Manager or contact your maintenance service representative. For the parameter settings, read the "WebSAM NEC Storage Manager Configuration Guide".

■ Check of the resource status for the disk array unit

Before using the disk array unit, check the resource status including controller, power supply, battery backup unit, and disk drives by using the WebSAM NEC Storage Manager.

## Connection of the Disk Array Unit

> The user may conduct the connection of the Disk Array Unit described in this chapter. However, if so, NEC does not assume any responsibility for any damage to the Disk Array Unit, its components or any influence resulting from the operation of the Disk Array Unit. NEC recommends that you ask your maintenance engineer or your service representative with expert knowledge on details of the Disk Array Unit, to install or remove the Disk Array Unit.

This chapter describes the basic procedure for connecting the disk array unit. Before connection, also read the User's Guide of the host system or host bus adapter to which the disk array unit is connected.

### ⚠ CAUTION

> To connect a peripheral device to the system, disconnect the power cord of the peripheral from the AC outlet. If not, you may be electrically shocked.

> - Any FC cable and DE cable used for the connection of the disk array unit shall be approved by NEC. Also, the length of the cable shall be within the rating range. If a cable not approved by NEC is used or the length of the cable is out of the rating range, read data may be incorrect or invalid data may be written.
> - To avoid incorrect wiring, make sure that connectors are connected to the proper destinations based on the cable specification.
> - Do not push any cable connector excessively. Each connector can be connected properly only when it is inserted to the mating connector in the correct direction and at the correct angle. Proper insertion allows the connector to be inserted to the mating connector smoothly without excess force. If the connector cannot be inserted smoothly, do not insert it by force but check the direction of the connector again.
> - Make sure that damages such as buckling, dust adhesion, and dirt are not found on the connector and contact before connection.

| | |
|---|---|
| | <ul><li>Treat all connectors carefully so that they may not be dropped on the floor and be damaged. Do not drag any connector on the floor as dust may adhere to the connector.</li><li>Do not apply excess force to the connector and cable connected with each other. Do not step on or place heavy materials on a cable which might deform the cable.</li></ul> |
| **!** | <ul><li>Handle optical fibers carefully and gently.</li><li>The minimum bending radius of optical fiber shall be 30 mm.</li><li>Dust and/or dirt may attenuate the optical power of optical fiber to cause data errors to occur. Clean any optical fiber cable whenever it is inserted into the mating connector with the following procedure. Never clean a connector in which light is present in the fiber.</li></ul><ol start="4"><li>Use a lint-free "wipe" that has been dipped into alcohol (use of 99% reagent-grade alcohol is recommended).</li><li>Followed immediately by a dry lint-free wipe.</li><li>And finally to blow-dry using a can of clean, compressed air</li></ol> |
| | <ul><li>Since the DE cable has the possibility that a deterioration of its electrical quality and/or its mechanical destruction (disconnection) may arise if it is handled inappropriately, be careful of the following points:</li></ul><ol><li>Cabling lengths should have a safety margin in order to prevent excessive stress to connectors and/or cables.</li><li>Never give cables a jerk or stress.</li><li>The cables should be kept with a curvature radius of 50mm or more.</li></ol> |

## *Notes on Connection of Disk Array Unit*

Confirm the following items before attempting to connect the disk array unit:

### Connection cable

Use the provided power cord to connect the disk array unit with the power supply.

To connect the host bus adapter of the host system or the FC-AL switch with the disk array unit, be sure to use the NEC-specified FC cable.

To connect the disk array unit with the additional disk enclosure, be sure to use the DE cable provided with the additional disk enclosure or the NEC-specified DE cable (NF9120-SJ33E/SJ34E).

### Cable length limit

FC optical cable for operating the host interface at 1Gbps: Up to [500 m]

FC optical cable for operating the host interface at 2Gbps: Up to [300 m]

FC optical cable for operating the host interface at 4Gbps: Up to [150 m]

## *Connection of Disk Array Unit*

This section shows recommended connection samples.

To make any of the recommended connections, you need to connect to two host bus adapters installed in the host system. Two LC-LC cables (or two SC-SC cables and two FC conversion cables) are necessary for connecting the disk array system with the host bus adapters.

a)      With the host bus adapter connectors of "LC" type
(disk array unit + additional FC disk enclosure)

HSSDC-HSSDC cable (or DE cable)



FC cable (LC-LC cable)
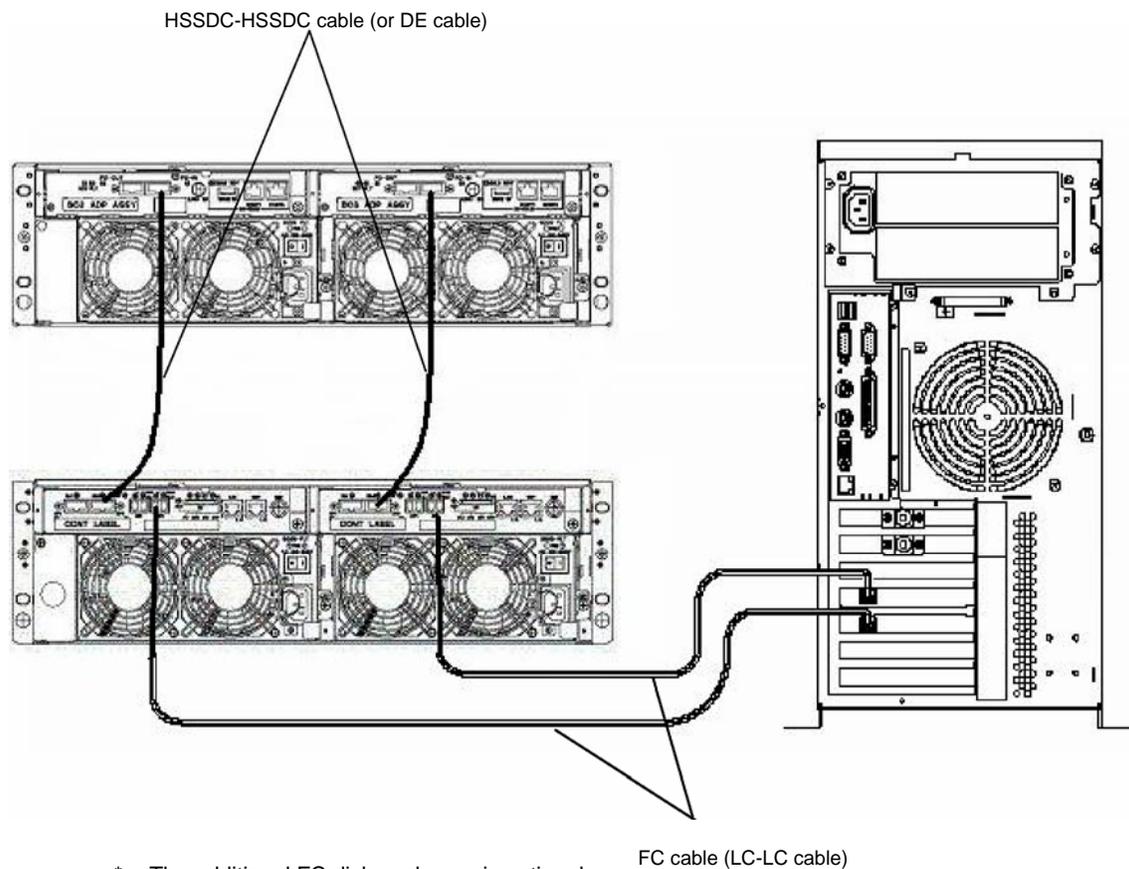
*      The additional FC disk enclosure is optional.
See Section 6.2 "Addition of Disk Enclosure".

b)    With the host bus adapter connectors of the "SC" type
(disk array unit + additional FC disk enclosure)

HSSDC-HSSDC cable (or DE cable)



FC conversion cable

Relay connector

FC cable (SC-SC cable)
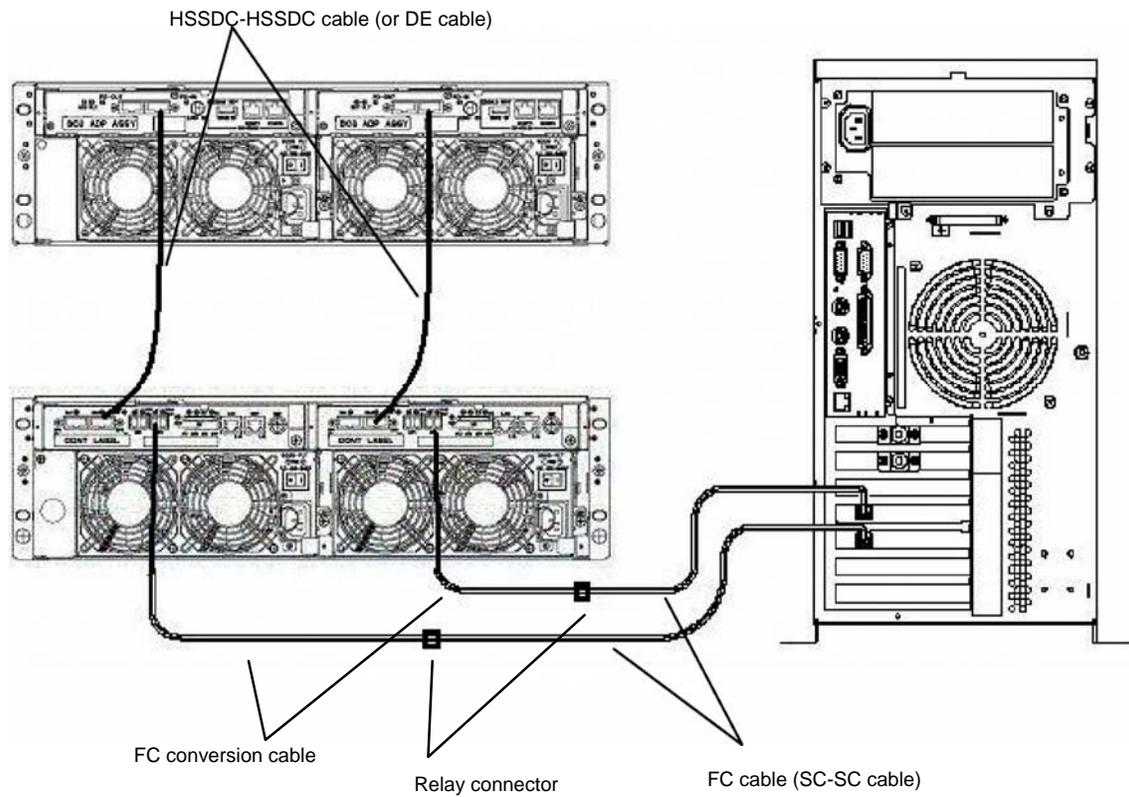
*    The FC disk enclosure is optional.
     See Section 6.2 "Addition of Disk Enclosure".

Connect the disk array unit with the host system by using an FC cable in the following procedure.

**Check of Power Supply**

Check that the power switch on the disk array unit and those on the host system including the host bus adapters or FC_AL switch are set to OFF and the plugs of the power cords are removed from AC outlets or distribution board.

Power supply for NFx500-SR40E
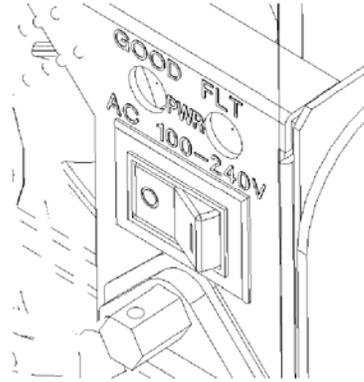


OFF                                        ON
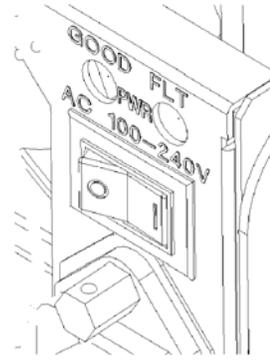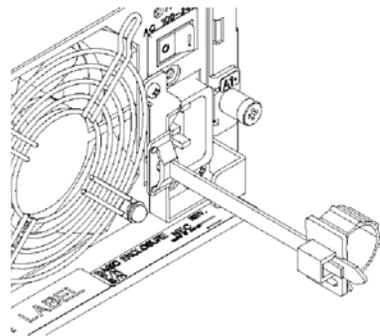
**Connection of disk array unit with host system**

a)      With the host bus adapter connectors of the "LC" type

Use the optional FC cable (LC-LC cable). Push the connector at either end of the cable into the FC connector (HPx) for the host bus adapter of either controller (CONT0 or CONT1) until a click is heard. The FC cable has the same connectors at both ends. Either connector may be connected to the controller.

> Pushing any connector excessively may damage the tip, decreasing the optical intensity, which will then cause a malfunction to occur.

Connect the connector at the other end of the FC cable to the host bus adapter installed in the host system.

<Connection sample>



Disk array unit | HPx | Host bus adapter / Host system

FC cable (LC-LC cable)
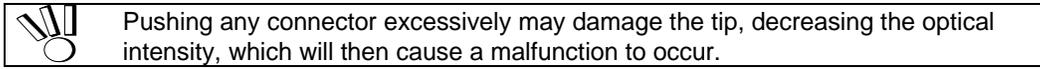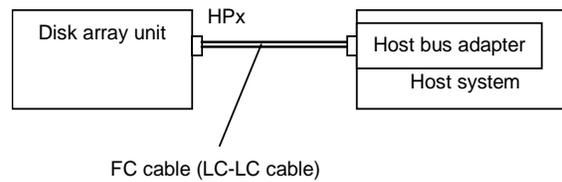
Similarly, connect the other controller with the other host bus adapter installed in the host system.

b)      With the host bus adapter connectors of the "SC" type

Use the optional FC conversion cable (NF9310-SJ10E). The cable has different-size connectors at the ends. Push the smaller connector into the FC connector (HPx) for the host bus adapter of either controller (CONT0 or CONT1) until a click is heard.

> Pushing any connector excessively may damage the tip, decreasing the optical intensity, which will then cause a malfunction to occur.
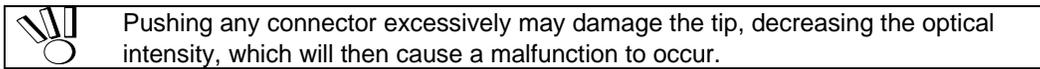
Connect the other end of the FC conversion cable to the optional FC cable (SC-SC cable: NF9310-SJ0xE) via the relay connector provided with the FC conversion cable. Push the connector so that it clicks securely. The connector at an end of the FC cable (SC-SC cable: NF9310-SJ0xE) is the same as that at the other end. Either of the connectors may be connected to the relay connector.

<Connection sample>



Relay connector

Disk array unit | HPx | Host bus adapter / Host system

FC conversion cable          FC cable (SC-SC cable)
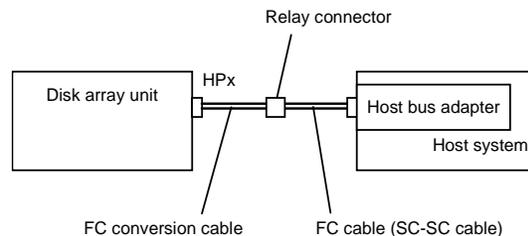
Connect the connector at the other end of the FC cable to the host bus adapter installed in the host system.

Similarly, connect the other controller with another host bus adapter installed in the host system.

## *Connection of the Disk Array Unit as an Additional Unit*

This section describes the procedure of installing the disk array unit as an additional expansion unit.

> - The following describes a sample connection when a single disk array unit is installed as an expansion unit into a system containing another disk array unit.
> - For the actual expansion job and system configuration, contact your trained service engineer.

To make any of the sample connections, you need to connect two host bus adapters connected with the host system and two FC switches.

Six LC-LC cables (or six SC-SC cables and four FC conversion cables) are necessary for connecting the FC switch and host bus adapters.

a)      If the host bus adapter connectors and FC switch connectors are of the "LC" type



FC cable (LC-LC cable)

FC switch

FC cable (LC-LC cable)

FC switch          FC cable (LC-LC cable)

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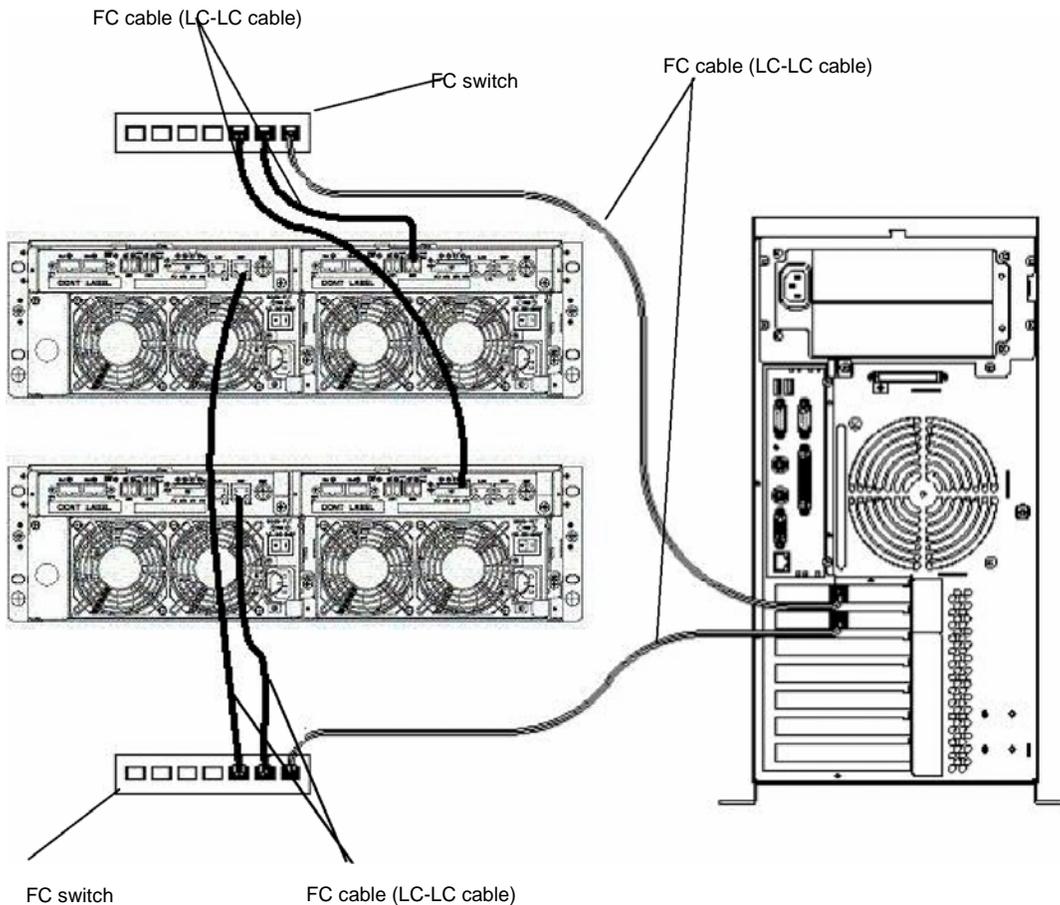
b)      If the host bus adapter connectors and FC switch connectors are of the "SC" type
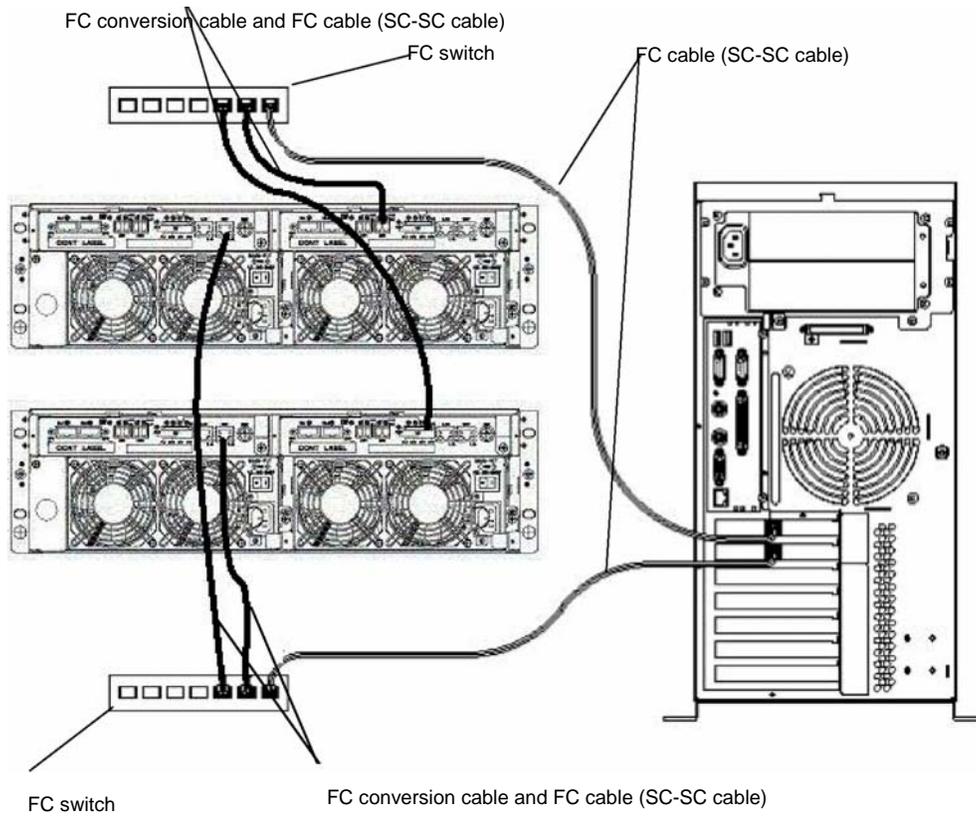
FC conversion cable and FC cable (SC-SC cable)

FC switch

FC cable (SC-SC cable)



FC switch

FC conversion cable and FC cable (SC-SC cable)

Connect the disk array unit with the host system by using an FC cable in the following procedure.

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**Check of the power supply**

Make sure that the power switch of the disk array unit and that of the host system are set to OFF and the plugs of the power cords are removed from AC outlets or distribution board.

**Connection of the disk array unit with host system**

a)      If the host bus adapter connector is of the "LC" type

Use the optional FC cable (NF9320-SJ0xE). Push the connector at an end of the cable into the FC connector (HPx) for the host bus adapter of either controller (CONT0 or CONT1) until a click is heard. The FC cable has the same connectors at both ends. Either connector may be connected to the controller.

| | Pushing any connector excessively may damage the tip decreasing the optical intensity, which will then cause a malfunction to occur. |
|---|---|

Connect the connector at the other end of the FC cable to the connector of the host bus adapter installed in the host system.

Similarly, connect the other controller with another host bus adapter installed in the host system.

Connect the connector at one end of the FC cable to the connector for connecting the host bus adapter installed in the host system, and the connector at the other end to the FC switch.
Be sure to push the connectors until a click is heard. The FC cable has the same connectors at both ends. Either connector may be connected to the FC switch.

Subsequently, connect the FC connector (HPx) for the other host bus adapter, which is on each controller, to the other FC switch via the FC cable.

Also connect the other host bus adapter in the host system to the FC switch via the FC cable.

b) If the host bus adapter connector is of the "SC" type

Use the optional FC conversion cable (NF9310-SJ10E). The cable has different-size connectors at the ends. Push the smaller connector into the FC connector (HPx) for the host bus adapter of either controller (CONT0 or CONT1) until a click is heard.

| | Pushing any connector excessively may damage the tip decreasing the optical intensity, which will then cause a malfunction to occur. |
|---|---|

Connect the other end of the FC conversion cable to either of the FC switch via the relay connector provided with the FC conversion cable and optional FC cable (SC-SC cable: NF9310-SJ0xE). Push the connector so that it clicks securely. The connector at an end of the FC cable (SC-SC cable: NF9310-SJ0xE) is the same as that at the other end. Either of the connectors may be connected to the relay connector.

Similarly, connect the other controller to the FC switch.

Connect the connector at one end of the SC-SC cable to the connector for connecting the host bus adapter installed in the host system, and the connector at the other end to the above FC switch.

Be sure to push the connectors until a click is heard.

Subsequently, connect the FC connector (HPx) for the host bus adapter, which is on each controller, to the other FC switch via the FC conversion cable and SC-SC cable.

Also connect the other host bus adapter in the host system to the FC switch via the SC-SC cable.

I

## *Connection of the Ethernet Cable*

To enable any configuration change and fault monitoring for the disk array unit by the WebSAM NEC Storage Manager through the Ethernet, the Ethernet cable must be connected.

### Installation of the Ethernet cable

Connect the optional shielded Ethernet cable to the Ethernet connector (modular jack) on the controller.

Connect the host system on which the management software WebSAM NEC Storage Manager is installed to the Ethernet.

### Regard as LAN cables for NEC Storage Manager or maintenance PC

- Use a straight-through Shielded Twisted Pair (STP) cable, in the case that the controller and PC are connected through a hub and so on.
- Use crossover STP cable, in case that the controller and PC are connected directly.

> Simply connecting the Ethernet cable to the controller will not make it possible to use the WebSAM NEC Storage Manager through the Ethernet. Refer to the manual that comes with the software for details on the usage of the WebSAM NEC Storage Manager.

## *Connection of Power Cords*

| ⚠ **WARNING** |
|---|
| ⚠ 🔥 ⚡ • Do not overload AC outlets with power cords. If so, fire may occur.<br><br>• Do not connect the plug of a power cord to an AC outlet or distribution board with a wet hand. If so, you may be electrically shocked.<br><br>• Do not put heavy materials on a power cord. If so, the insulating coating of the power cord may be broken, fire may occur, and/or you may be electrically shocked. |

Be sure to use the power cords provided with the disk array unit.

Connect the power cords in the following procedure.

The disk array unit has a redundant power configuration to prevent the entire unit from shutting down due to a single failure. Therefore, connect two power cords to the power supplies when operating the disk array unit.

### Check of the power supply

Check that the power switches on the disk array unit and those on the host system are all set to OFF.

Power supply for NFx500-SR40E
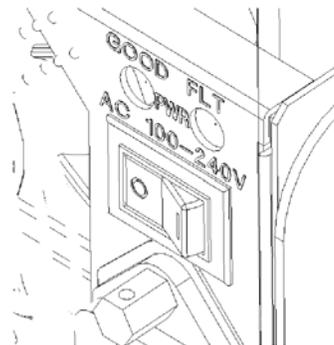


OFF                          ON
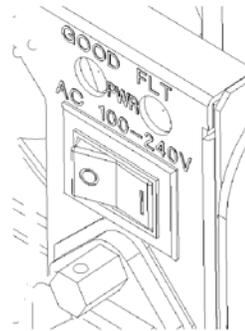
**Connection of the power cords**

Power supply for NFx500-SR40E

Insert the receptacle of the power cord provided with the disk array unit into the power plug on the power supply.

> As shown in the left figure below, open the AC cable clamp, fit the power cord into it, and lightly lock the clamp.
>
> As shown in the right figure below, move the clamp in the direction indicated by the arrow, and firmly secure the clamp near the root of the plug.
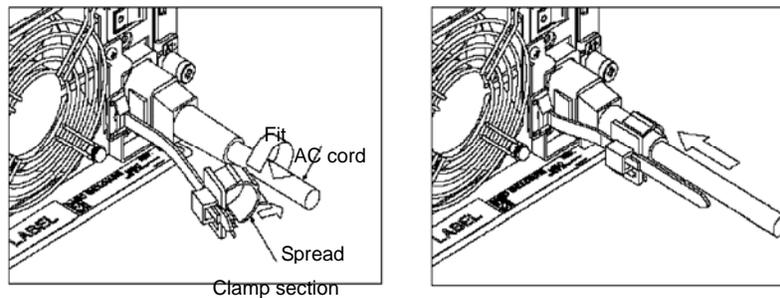


> **NOTE:** If the clamp is loosely locked, the power cord may come off. To prevent this problem, firmly secure the AC cable clamp near the root of the power cord.

(Power cord disconnection procedure)

> As shown in the figure below, push the catch on the AC cable clamp to release the lock. After releasing the lock, remove the AC cable clamp from the power cable.



**liii**
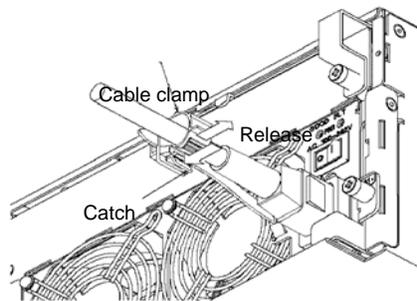
**Connection of the power plug**

Insert the plug of the power cord provided with the disk array unit into an AC outlet. Because the plug has an earth pin, use an AC outlet with earth groundingl for the connection as shown in the figure below.
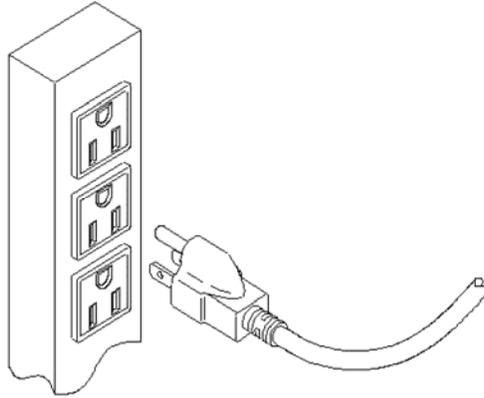


| ⚠ | • While the disk array unit NFx500-SR40E can accept any power in the range of 100 - 240 VAC (50/60 Hz), the power cord shipped with the disk array unit can only accept 100 – 120 VAC. Use 100 – 120 VAC (50/60 Hz) when the supplied power cord is used.  Using power of a different voltage may cause electric shock, smoke, and/or fire to occur. |
|---|---|

# Appendix A  - Features of the Disk Array Unit

## 1. Battery Backup

The Battery Backup Unit allows the disk array unit to preserve cached memory data by battery while the power is off.

Accordingly, to make the power off for a period longer than the battery hold period, it is necessary to write data remaining in cache memory to hard disk drive by pressing the SHUTDOWN switch before powering off the system. If the system is powered off without pressing the SHUTDOWN switch and the batteries exceed the battery hold period in the backup state, the following operation will be done. In this case, the cache data is lost. The data must be recovered from the backup data saved in magnetic tapes.

1) At the first start, the SERVICE LED repeats 5-sec flashing/7-sec OFF. The disk array unit is not started normally.

2) The controller shows the following FAULT code.

   02438413

3) The disk array unit is started normally by turning the array controller off once and then on again.

4) It takes six hours to charge battery at the longest.

## 2. Repair Time

The repair time is set to 12 hours by default. The repair time can be set in the range from 0 (fastest) to 24 hours. Depending on the disk capacity, the repair may not be terminated within the defined time. Without commands from the upper system, the repair operates in the fastest mode.

See "Individual Settings (Bind/Unbind of Logical Disk)" in "NEC Storage Series Configuration Guide" for the use of the management software (WebSAM NEC Storage Manager).

# 3. Logical Disk Capacity

## 3.1 Arbitrary Logical Disk Capacity

An arbitrary logical disk capacity can be bound by using the management software.

To bind logical disks, enter the capacity in GBs (G=1024^3).

See "Individual Settings (Bind/Unbind of Logical Disk)" in "NEC Storage Series Configuration Guide" for the use of the management software (WebSAM NEC Storage Manager).

## 3.2 Maximum Logical Disk Capacity

The maximum capacity per logical disk (including the system capacity of 2 MB) can be set by using the management software (WebSAM NEC Storage Manager)..

See "Individual Settings (Bind/Unbind of Logical Disk)" in "NEC Storage Series Configuration Guide" for the use of the management software (WebSAM NEC Storage Manager).

# 4. Access Control

Access Control sets an accessible logical disk for each host (HBA) or each port.

The use of the access control feature enables the division of logical disks into logical disk groups. The division extends the flexibility of the system configuration. The feature also ensures data protection and security protection by limiting access to each host (HBA) or each port.

The following specific software (separately priced) is necessary for using the access control feature.

SystemGlobe NEC Storage BaseProduct:

| | Number of connected servers |
|---|---|
| Lite | 4 |
| Standard | 16 |
| Enterprise | Unlimited |

For details on the usage, refer to the User's Guide provided with the software.

Before the access control feature can be used on this disk array unit, the license lock must be released by using the license key provided with the software.

You can release the license lock and make settings by yourself.

NEC maintenance service representative provides the installation service (for an additional charge) for releasing the license lock and making settings. Contact your maintenance service representative if necessary.

## 4.1  Port Mode

Accessible logical disks are set in ports in the port mode.

The access control in the port mode has the following features.

- Conversion between logical disk number for management in system and that on host interface

- Masking by setting logical disks accessible from port

- Addition/removal of logical disks accessible from port

- Registration of host permitting accesses


## 4.2  WWn Mode

Accessible logical disks in the system are set for each host (HBA) in the WWn mode.

The access control in the WWn mode has the following features.

- Conversion between logical disk number for management in system and that on host interface

- Masking by setting logical disks accessible from host (HBA)

- Addition/removal of logical disks accessible from host (HBA)


# 5.  Dynamic Data Replication

This feature creates the replication of a logical disk in a single unit. To create the replication, the source logical disk must have the same capacity as the destination disk. The Dynamic Data Replication and Snap Shot are a paired package.

- For S2500
  SystemGlobe DynamicDataReplication Set - NEC Storage S2500"

- For S1500
  SystemGlobe DynamicDataReplication Set - NEC Storage S1500"

Refer to the User's Guide provided with the software.

Before the Dynamic Data Replication can be used on this disk array unit, the license lock must be released by using the license key provided with the software.

You can release the license lock and make settings by yourself.

NEC maintenance service representative provides the installation service (for an additional charge) for releasing the license lock and making settings. Contact your maintenance service representative if necessary.

# 6. Miscellaneous Settings

Miscellaneous information shown below can be set by using the management software (WebSAM NEC Storage Manager):

- Time in disk array
- Setting of POOL
- Setting of logical disk
- Setting of spare disk
- Change of repair time

Refer to "NEC Storage Series Configuration Guide" for the above settings.

The time in disk array is set at system start by the time synchronization among controllers.

# 7. Various Default Values

Access Control                Off

Dynamic Data Replication    Off

# 8. Notes on Use of DynamicDataReplication

The following explains notes (state transition) if the event below occurs while Dynamic Data Replication is used:

- The holding of cache memory data by the battery backup unit in power-off state exceeds the specified time.

| Activity State | Sync State | Pairing state |
|---|---|---|
| Separate | Separated | Entire difference. No status change |
| | Sep-SYNCING | Change to fault state and abort of copy operation |
| Replicate | Rep-SYNCING | Entire difference. Replication retried automatically from the first step. No status change |
| | SYNCED | |
| Restore | Res-SYNCING | Change to fault state and abort of copy operation |
| | SYNCED | |

Any pair in which a fault has occurred is recovered by the following operation:

1. Issues Forced Separate in the RV target.

2. Executes the commands in the previous state again (Replicate $\rightarrow$ Separate or Restore).

The copy operation started again for the entire logic.

# 9. Setting of OS Type

The OS type must be set for each port connected to the host when the Port Mode is used or when the Access Control is not used.

If the host containing several kinds of operating systems is connected to one port, you may specify one of them. However, if the host using Solaris or AIX is contained, specify it in preference to other operating systems.

If the host using both Solaris and AIX is contained, specify either one operating system.

The OS type can be set with the "Configuration Setting" of the management software (WebSAM NEC Storage Manager).

In the WWn mode, use "LD Set Type" of the WebSAM NEC Storage Manager to specify the OS.

# 10. Program Product

To use the disk array unit, the following program product is required:

- For S2500:
  SystemGlobe NEC Storage BaseProduct Ver4.2 (or later) - NEC Storage S2500

- For S1500:
  SystemGlobe NEC Storage BaseProduct Ver4.2 (or later) - NEC Storage S1500

To use the disk array unit, release the license lock using the license code that is provided with "NEC Storage BaseProduct Ver4.2 - NEC Storage S2500 (S1500)".

A maintenance person is responsible for releasing the license lock of "SystemGlobe NEC Storage BaseProduct Ver4.2 - NEC Storage S2500 (S1500)" during the installation of the disk array unit. Please give the person the license code provided with the product.

> Before the disk array unit can be used, the license lock must be released by using the license code provided with NEC Storage BaseProduct.
>
> Be sure to release the license lock. A disk array unit with the license lock being locked cannot receive any maintenance services because the operation cannot be guaranteed.

For any other program product available for the disk array unit, ask your sales representative.

# 11. Updating of Control Software

The disk array unit may upgrade the version of storage control software when a function or the like is additionally installed.

You can use the added function by updating the storage control software of which version has been upgraded.

You can update the storage control software by yourself. However, if you fail to update it, the disk array unit can no longer operate at the worst.

NEC maintenance service representative provides the installation service (additionally charged) for updating the storage control software. It is strongly recommended that you should ask your maintenance service representative who has technical knowledge to update it.

# 12. Snap Shot

The snap shot function can instantaneously make the virtual copy of a logical disk in the same disk array unit. Only the difference data between the logical disk as the copy source and the virtual copy is managed, so copies can be made with a small capacity.

The following specific software (separately priced) is necessary for using the snap shot feature. NEC storage S2500/S1500 contains the Dynamic Data Replication and Snap Shot as paired package.

For details on the usage, refer to the User's Guide provided with the software.

Before the access control feature can be used on this disk array unit, the license lock must be released by using the license key provided with the software.

You can release the license lock and make settings by yourself.

NEC maintenance service representative provides the installation service (additionally charged) for releasing the license lock and making settings. Contact your maintenance service representative if necessary.

## 12.1  Note on Using Snap Shot

SnapShot manages the difference data between the logical disk as the copy source and the virtual copy, as a map on the cache memory. Thus, if the disk array unit is turned OFF and the time limit for holding data with batteries is exceeded while the battery backup state is placed, processing for creating the management information of the difference data is performed upon the next start. As a result, the system startup is delayed depending on the difference data held by Snap Shot. (Delay time: About 10 minutes per difference data of 1TB)

To avoid the huge delay of next system startup with fully discharged battery, please run shutdown process by pushing shutdown button before the power of disk array unit is turned OFF.

As the management information of the difference data will be stored into hard disk by execution of shutdown process, the delay of next system startup with fully discharged battery will be reduced drastically.

So it is recommended to run shutdown process when you turn off the power of this disk array unit. (The delay time will be approx. ten seconds per 1TB of difference.)

# Appendix B   Installation Procedure

# 1.  Creation of Logical Disks

The logical disk must be created according to your environment before using the disk array unit.

The following procedure is required to create a logical disk.

- Bind the logical disk.

## 1.1  Binding Logical Disk

To create a logical disk, a 2-step procedure consisting of a POOL bind and LD bind is required.

The POOL bind requires the specification of a RAID type. Select the RAID type carefully because it has certain influences on system performance and capacity. See Section 2.6 "RAID Configuration" for details.

The LD bind requires the specification of capacity. The specified capacity defines the number of logical disks in a single POOL. Select the capacity carefully because the unused area remaining may affect the performance and the capacity. See "3. Logical Disk Capacity" in Appendix A for details.

See "Individual Settings (Bind/Unbind of Logical Disk)" in "NEC Storage Series Configuration Guide" for the use of the management software (WebSAM NEC Storage Manager).

# Appendix C   Use of the Maintenance PC

## 1.  Initialization by the Maintenance PC

---
**NOTES:**

- The Maintenance PC is also described as NEC Storage Navigation.

- If you operate the maintenance PC for an operation which is not described in this manual, the disk array unit may malfunction. Be careful when you operate the maintenance PC.

---

### 1.1    Connection of Maintenance PC

1. To connect a PC to the disk array unit, the PC must include the 100/10Base interface and Internet Explorer Version 5.0 or higher.

2. Connect the PC to the disk array unit in the one-to-one mode. Connection via a hub may be possible. However, because the IP address and subnet mask are fixed, the connection to such an environment as a LAN may cause a malfunction to occur. Use shielded cables for the connection.

3. Set the PC on network 10.1.0.xxx/255.255.255.0. (xxx: Decimal number 1-254 except for 10/11)

   For the setting, use the Internet protocol (TCP/IP). Remove proxy setting if set.

4. Use the MNT port for the connection (the left Ether port at the lower left corner on the rear of the Disk Array Unit). (The right Ether port is used by the WebSAM NEC Storage Manager.)
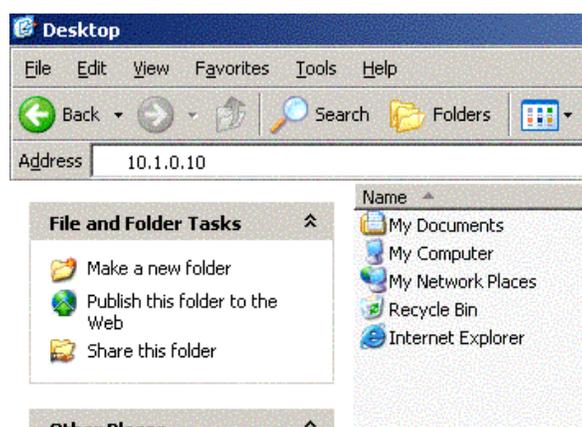
5. For connection of CONT0 (right controller board), enter 10.1.0.10 in the address field after browser is started. Enter 10.1.0.11 for connection of CONT1.

6. After the start, select Option at the lower left corner of the screen and enter "C" with uppercase letters on the Password Input screen.

7. After the input, press the SET button. Then update the screen by using the Update feature of the browser. All the features on the left side of the screen become available.

Notes:

1. Because the IP address and subnet mask of the MNT's Ether port are fixed as described above, do not connect the port to any LAN and WAN.

2. The amber LED to the right of the Ether port is lit. However, this does not indicate the occurrence of an error. It is lit in the TCP connection state.

3. Actions to take if the Maintenance PC is not recognized:

   Check if:

   – The IP address of the PC connected is correctly set.

   – "proxy" is disabled in the setting of Internet Explorer.

   If you still fail in connection while the above check results are correct, contact your NEC maintenance service representative.

Startup menu of Maintenance PC
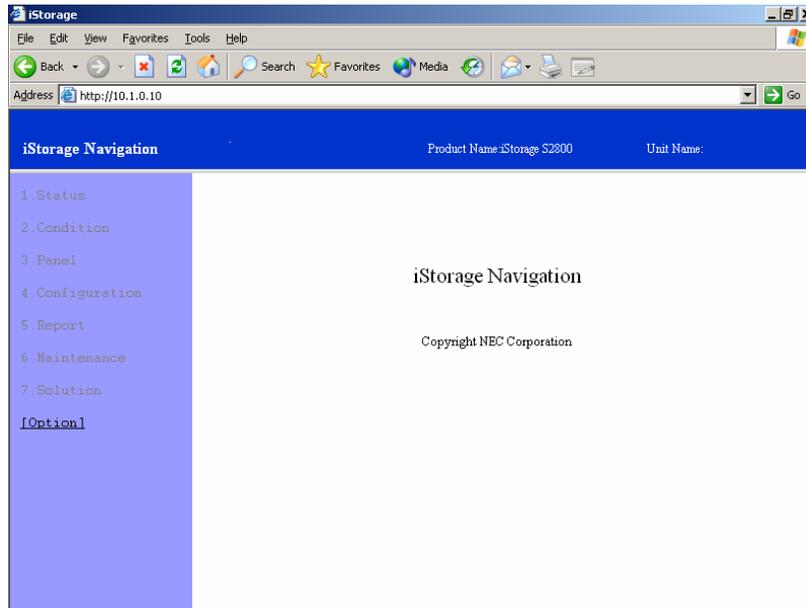


Select [Option].
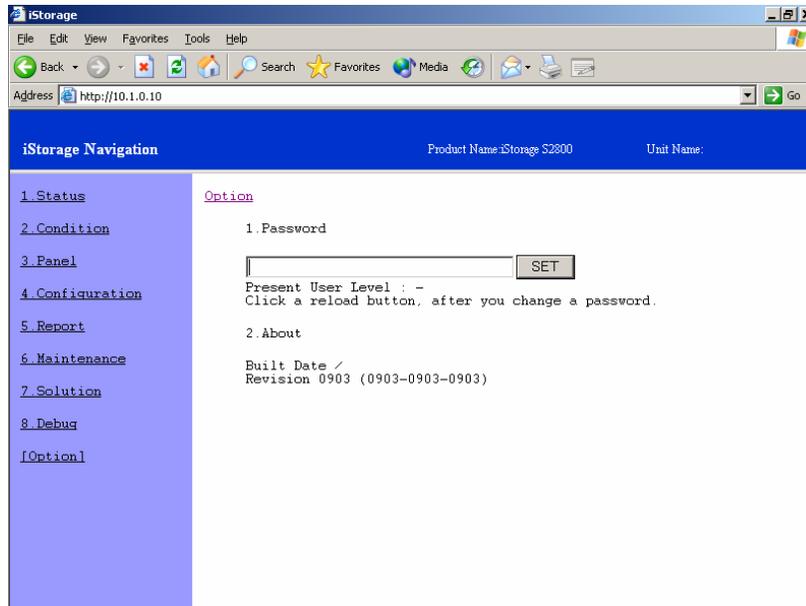


Enter "C" in "1. Password". The browser is updated. (Uppercase letters must be entered.)

## 1.2 Configuration

This section describes the items to be set on the "4. Configuration" screen.

### 1.2.1 Port Configuration

Select "4. Configuration" → "4. Port Configuration". Then set the following items.

<u>4.Port Configuration</u>

| Port | Host Type |
|------|-----------|
| CONT0 HP0 | 00:Default ▾ |
| CONT0 HP1 | 00:Default ▾ |
| CONT1 HP0 | 00:Default ▾ |
| CONT1 HP1 | 00:Default ▾ |
| | SET |

[RETURN]

Port            Port position
Host type       Host type (to be selected from the pull-down list. Click the SET button to
                determine the selection.)
                00: Default        01: ACOS4
                80: Windows
                88: Solaris        89: Linux
                8A:AIX             8B:NX
                8D:SX

**C-4**

## 1.2.2 FC Port Configuration

Select "4. Configuration" → "5. FC Port Configuration" to set the following items.



Set the Target ID Configuration of individual specification.

| | |
|---|---|
| Port | Indicates port positions. |
| Link Attach | Specify link topology. (Select a proper value from the pull-down menu.) |
| |     0: FC-AL or Fabric      2: Only FC-AL |
| |     3: Only Fabric |
| | Select "2" or "3". |
| Mode | Indicates the bit meaning on the screen (with a hexadecimal number). The following two modes can be set currently. Set either one. |
| |     Host Director Port      : 0000 |
| |     Replication Director Port   : 0040 |
| Switch | Provide setting for Switch. |
| | See Table 1.2.2 for the rule on loop ID assignment. |
| | See Table 1.2.1 for the relation between the switch setting value and AL_PA. |
| Data Rate | Set the data rate of the FC link. (Select a proper value from the pull-down menu.) |
| |     0: Auto Negotiate     8: 1Gbps |
| |     9: 2Gbps           A: 4Gbps              F: Undecided |
| | Select "8", "9" or "A". |
| AL_PA | Indicates AL_PA. |

*Table1.2.1 Relation between SWITCH Setting value and AL_PA*

| AL_PA | SWITCH value | AL_PA | SWITCH value | AL_PA | SWITCH value | AL_PA | SWITCH value |
|---|---|---|---|---|---|---|---|
| EF | 00 | B1 | 21 | 6E | 42 | 35 | 63 |
| E8 | 01 | AE | 22 | 6D | 43 | 34 | 64 |
| E4 | 02 | AD | 23 | 6C | 44 | 33 | 65 |
| E2 | 03 | AC | 24 | 6B | 45 | 32 | 66 |
| E1 | 04 | AB | 25 | 6A | 46 | 31 | 67 |
| E0 | 05 | AA | 26 | 69 | 47 | 2E | 68 |
| DC | 06 | A9 | 27 | 67 | 48 | 2D | 69 |
| DA | 07 | A7 | 28 | 66 | 49 | 2C | 6A |
| D9 | 08 | A6 | 29 | 65 | 4A | 2B | 6B |
| D6 | 09 | A5 | 2A | 63 | 4B | 2A | 6C |
| D5 | 0A | A3 | 2B | 5C | 4C | 29 | 6D |
| D4 | 0B | 9F | 2C | 5A | 4D | 27 | 6E |
| D3 | 0C | 9E | 2D | 59 | 4E | 26 | 6F |
| D2 | 0D | 9D | 2E | 56 | 4F | 25 | 70 |
| D1 | 0E | 9B | 2F | 55 | 50 | 23 | 71 |
| CE | 0F | 98 | 30 | 54 | 51 | 1F | 72 |
| CD | 10 | 97 | 31 | 53 | 52 | 1E | 73 |
| CC | 11 | 90 | 32 | 52 | 53 | 1D | 74 |
| CB | 12 | 8F | 33 | 51 | 54 | 1B | 75 |
| CA | 13 | 88 | 34 | 4E | 55 | 18 | 76 |
| C9 | 14 | 84 | 35 | 4D | 56 | 17 | 77 |
| C7 | 15 | 82 | 36 | 4C | 57 | 10 | 78 |
| C6 | 16 | 81 | 37 | 4B | 58 | 0F | 79 |
| C5 | 17 | 80 | 38 | 4A | 59 | 08 | 7A |
| C3 | 18 | 7C | 39 | 49 | 5A | 04 | 7B |
| BC | 19 | 7A | 3A | 47 | 5B | 02 | 7C |
| BA | 1A | 79 | 3B | 46 | 5C | 01 | 7D |
| B9 | 1B | 76 | 3C | 45 | 5D | | |
| B6 | 1C | 75 | 3D | 43 | 5E | 00 | 7E |
| B5 | 1D | 74 | 3E | 3C | 5F | -- | 7F |
| B4 | 1E | 73 | 3F | 3A | 60 | | |
| B3 | 1F | 72 | 40 | 39 | 61 | | |
| B2 | 20 | 71 | 41 | 36 | 62 | | |

\*   If an AL_PA value having been set cannot be acquired due to incorrect setting, set the SWITCH value again. And, press [3.Panel], change the status of the relevant port on [1.Port On/Off Switch] from "Port Offline" to "Port Online" (remove the check of the port to be removed, click "SET," add the check of the port to be selected, and click "SET".) (See the LED of the relevant port to confirm the port offline.) And then, confirm the acquired value again. The AL_PA value can be acquired again by power OFF/ON. See Section 2.3.

*Table 1.2.2   Rule on Switch Value (Loop ID) Assignment*

| Applicable HOST (OS) | Rule on Loop ID assignment |
|---|---|
| ACOS connection port | Basic value: 1Fh.<br>Decrement by one if loop duplication occurs. |
| NX connection port | Basic value: 0Fh.<br>Decrement by one if loop duplication occurs. |
| Windows/Solaris/Linux/AIX | Basic value: 10h.<br>Increment by one if loop duplication occurs. |
| Miscellaneous | Conforms to the rules in the server if any.<br>The basic value is "10h" if no rule is defined in the server.<br>Increment by one if loop duplication occurs. |

The rule above may be changed depending on the system configuration in the user side.

> Set the controller's AL-PA so that it is different from the AL-PA of any other FibreChannel equipment in the same host FC group.

### 1.2.3 Resource Configuration

Select "4. Configuration" → "6. Resource Configuration" to set the following items.

・ When there is no configuration information in the system disk of S2500 (initial state, only CONT#0
   is connected)

<u>6.Resource Configuration</u>

```
(SVP ROM Data)
DE                                    DE
                                         ☐ DE01
   ☐ DE04                                ☐ DE05
   ☐ DE08                                ☐ DE09
   ☐ DE0C                                ☐ DE0D

PCC                                   0:No Present          ▼
PS                                    ☐ 48V
Product Name                          S2500 Disk Array
Serial Number                         0000000000000001
Port WWN                              200000004C012345

Check = On                                                       SET
```

[RETURN]

When there is configuration information in the system disk of S2500 (after operation)

<u>6.Resource Configuration</u>

```
DE                                    DE
                                         ☐ DE01
   ☑ DE04                                ☐ DE05
   ☐ DE08                                ☐ DE09
   ☐ DE0C                                ☐ DE0D

PCC                                   2:UPS IF/AOC IF       ▼
PS                                    ☐ 48V

Check = On                                                       SET
```

[RETURN]

**C-8**

The screen can be used to set the resource type. On the Disk Enclosure (DE) columns, set the locations of installed DEs. The information on the DEs with their check buttons checked is only set. On the PCC columns, set the PCC mode (None present, UPS only, UPS+AOC, or UPS+AOC*SCBI). (See the DE location view on the next page for the DE locations.)

| | |
|---|---|
| DE01 - DE0D | DE number |
| PCC | PCC mode |
| | 0: None present |
| | 1: UPS Only |
| | 2: UPS + AOC |
| | 3: UPS + AOC + SCBI |
| | Select "0" . |
| PS 48V | Check this item when 48 VDC power is used. |
| Product Name | Displays system information stored in ROM. |
| Serial Number | When it is judged that there is no configuration information in the system |
| Port WWN | disks, this information is displayed and transferred to the system disks by clicking of the "SET" button. |
| | After clicking the SET button, the indication disappears. |

**C-9**
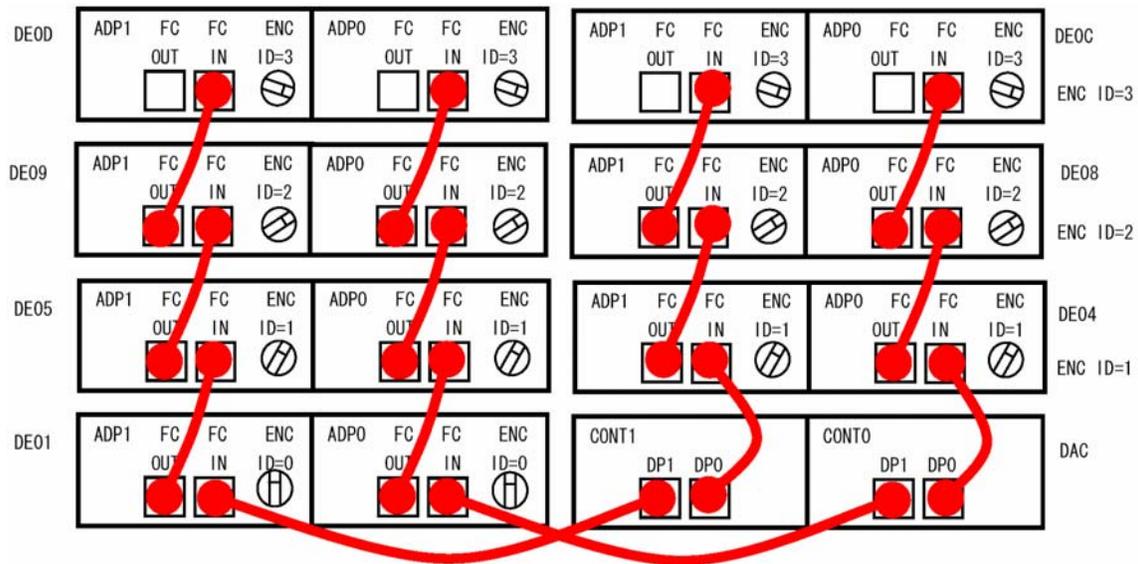
*DE Location View*

- The NF2500-SR40E allows the connection of up to seven additional FC disk enclosures NF2500-SE42E (DE01, DE04, DE05, DE08, DE09, DE0C, and DE0D).

  The NF2500-SR40E also allows the connection of up to three additional FC disk enclosures NF2500-SE42E (DE04, DE08, and DE0C) and up to four additional SATA disk enclosures NF2500-SE82E (DE01, DE05, DE09, and DE0D).

- The NF1500-SR40E allows the connection of up to three FC disk enclosures NF2500-SE42E (DE04, DE08, DE0C/DE01, DE05, and DE09/DE01, DE04, DE05/DE01, DE04, and DE08).

  The NF1500-SR40E also allows the connection of up to three additional SATA disk enclosures NF2500-SE82E (DE1, DE5, and DE09). The additional FC disk enclosure (NF2500-SE42E) and the additional SATA disk enclosure (NF2500-SE82E) cannot coexist in the same loop. However, if connected to different loops, they can coexist in the disk array unit. Up to three FC disk enclosures and X SATA disk enclosure can be connected in total.

C-10

# 2. Confirmation of Unit Setup

## 2.1 Activation on Modification of FC Port Configuration

If any of the items described in "1.2.2 FC Port Configuration" are modified, then activation is required.

After selecting [3. PANEL] → [1. Port On/Off Switch], remove the check(s) of the selected port(s) to set them to offline. Next, check the port(s) to be selected to set them online.

```
3.Panel

    1.Port On/Off Switch

    ☑ CONT0 HP0
    ☑ CONT0 HP1
    ☑ CONT1 HP0
    ☑ CONT1 HP1
    Check = On    SET

    2.Maintenance Seize

    Seize On

    State : It isn't Seized
```

Set the on/off status of the host ports on the CONT card.

| Port On/Off Switch | Feature of Port On/Off with host (Only mounting ports appear.) | |
|---|---|---|
| | CONT0 HP0 | CONT0 HP1 |
| | CONT1 HP0 | CONT1 HP1 |

Remove the check of port to be deselected and click "SET" → Offline

Add a check for the port to be selected and click "SET" → Online

The unit OFF/ON can provide the same effect.

## 2.2 Confirmation of FC Port Configuration

Select 1. Status → 2. Control Port Status to confirm the settings made by FC Port Configuration.

Control Port Status

FC Port Status

| Port | Host Type | Link Attach | Switch | Data Rate | Port Name | AL_PA | NPORT ID | Mode |
|------|-----------|-------------|--------|-----------|-----------|-------|----------|------|
| CONT0 HP0 | 00:Default | 2:Only FC-AL | 00 | 8:1Gbps | 200100004C012345 | EF | 000000EF | Host Director Port |
| CONT0 HP1 | 00:Default | 2:Only FC-AL | 01 | 8:1Gbps | 200200004C012345 | FF | 00FFFFFF | Host Director Port |
| CONT1 HP0 | 00:Default | 2:Only FC-AL | 02 | 8:1Gbps | 200500004C012345 | FF | 00FFFFFF | Host Director Port |
| CONT1 HP1 | 00:Default | 2:Only FC-AL | 03 | 8:1Gbps | 200600004C012345 | FF | 00FFFFFF | Host Director Port |

| Node Name |
|-----------|
| 200000004C012345 |

[RETURN]

This function displays the FC Port status. The display items are as follows:

| | |
|---|---|
| Port | Port name (setting value) |
| Host Type | Host type (setting value) |
| Link Attach | Setting value for Topology of Link |
| Switch | Setting value for Switch |
| Data Rate | Setting value for Data Rate on FC Link |
| Port Name | Port name (setting value) |
| AL_PA | AL_PA status value |
| NPORT ID | NPORT ID status value |
| Mode | The set information is displayed with characters. |
| Node Name | xxxxb yyyyb zzh vvvvvvh (factory setting) |
| | Format defined in the specifications: IEEE Extended format |
| | (xxxxb=0010b、yyyyb=0000b、zzh=00h) |

## 2.3     Confirmation of Resource Configuration

Select 2. Condition → 1. Condition View to check if the configuration has been recognized correctly by Resource Configuration.

1.Condition View

| BASE | PCC | CONT1(+CHE1+SVP1+TEMP1) | | CONT0(+CHE0+SVP0+TEMP0) | | PNL |
|---|---|---|---|---|---|---|
| | | FAN3 | PS1 | FAN2 | BBU1 | FAN1 | PS0 | FAN0 | BBU0 | BB |

| PD 00-0E | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD 40-4E | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 4A | 4B | 4C | 4D | 4E |

| DE04 | DE EC1 | DE EC0 |
|---|---|---|
| | DE PS1 | DE PS0 |

| --- READY . | --- WARNING . | --- FAULT . | --- NO PRESENT. |

[RETURN]

This function displays the Resource status with differently colored graphics.

|  |  |
|---|---|
| Need for maintenance: | Red |
| During state transition: | Yellow |
| During normal operation: | Green |
| Not installed: | White |

Notes

1. If the resource is not Ready, check Control Condition, DE Condition, and PD Condition for details.

2. If the resource is not installed, you need to make the setting with Resource Configuration.

3. Before the Base Product License key is unlocked, CONT is in the FAULT state.

# Appendix D   Installing Unit in a Rack

# 1.  Installing the Rack-mount Kit (Accessory) in an NEC Storage Rack

---

**NOTE:** NEC Storage rack indicates one of the following:
- NF9100-SY01E/SY02E/SY01BE/SY02BE (24U-rack)
- NF9100-SY04E/SY05E/SY04BE/SY05BE (36-U rack)
- NF9100-SY06E/SY07E/SY06BE/SY07BE (44U-rack)

---

## 1.1  Installing Unit on New Universal Rack Mount Kit

---

**NOTE:** The following procedures presume that a rail is installed on the left part of a rack when the rack is viewed from its front.
Install a rail on the right part of the rack in the same manner. The left and right rails are different from each other. Use the correct rail when installing it on the rack. (See the figure below.)
For each rail, consider the face labeled 'Inner' as the rear (see the figure below).

---



Upper: Rail(R)          Lower: Rail(L)



Front

Inner

Rear
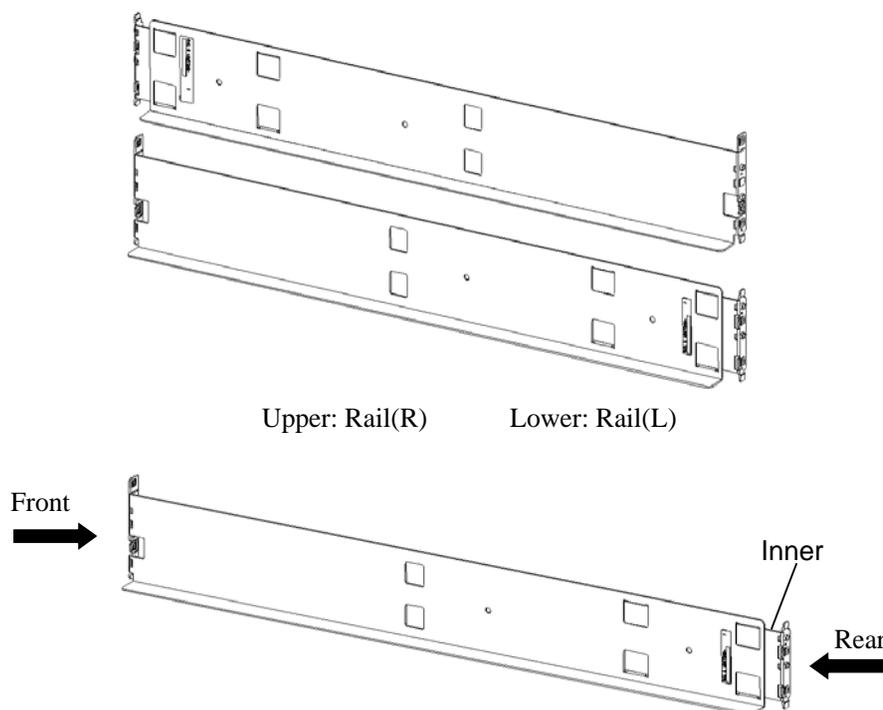
**1.** Align the bottom of the rail with the 1U mark and insert the top and bottom projections into the holes on the front of the rack.

Insert the provided screw into the hole at the bottom to secure the rail.

If the two small-head screws are provided, use them (as shown in the right figure below).
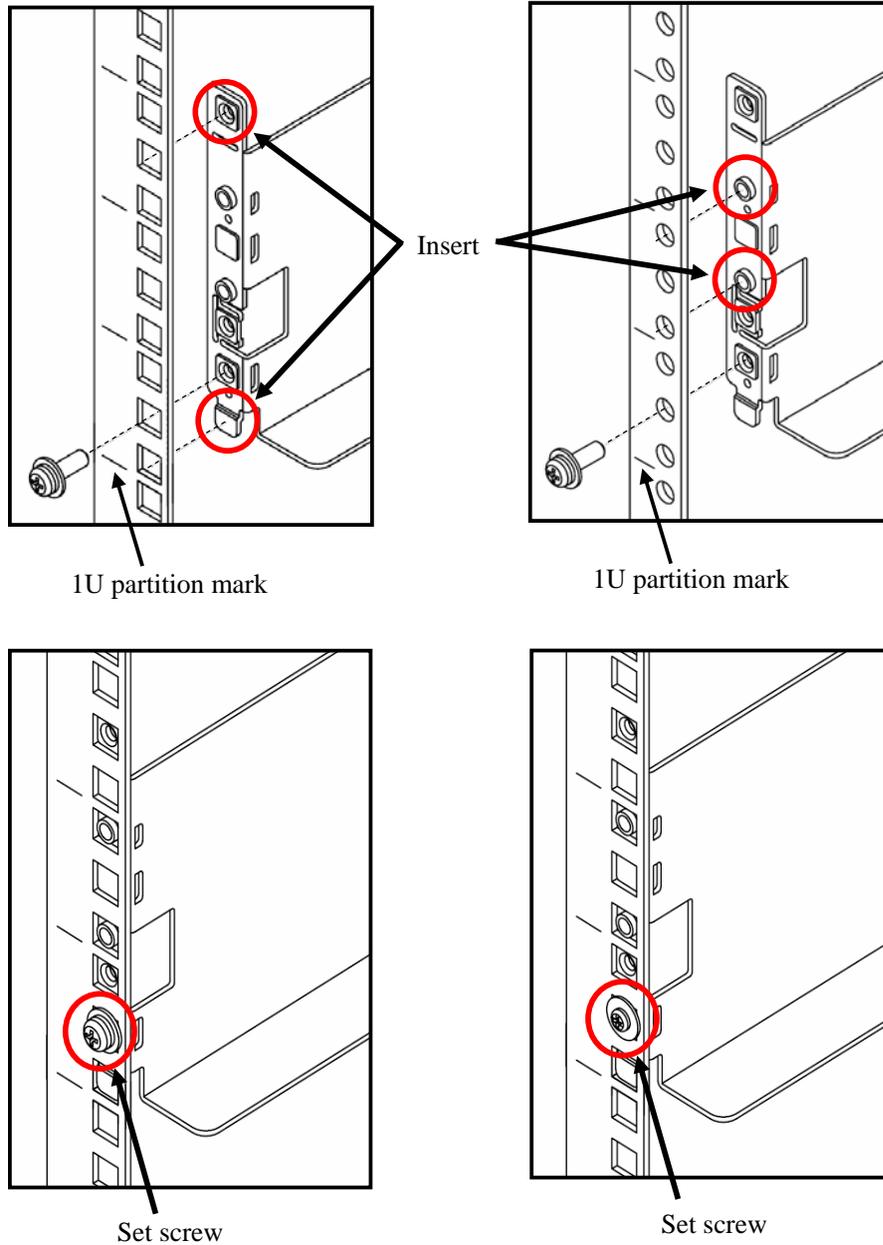


1U partition mark

1U partition mark

Insert



Set screw

Set screw

**2.** Pull the inner toward you and push the top and bottom projections into the angle holes.

Inner

Insert
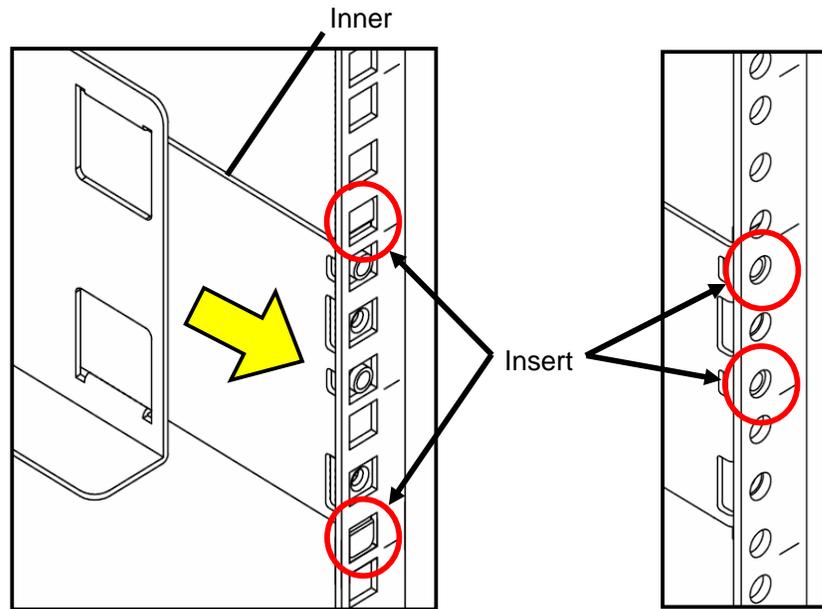
**3.** With the inner held, push the two set screws with a part for cable clamp into the female screws of the rail support and drive the screws equally. Take note on the direction of the part for cable clamp.

Drive
equally

D-3
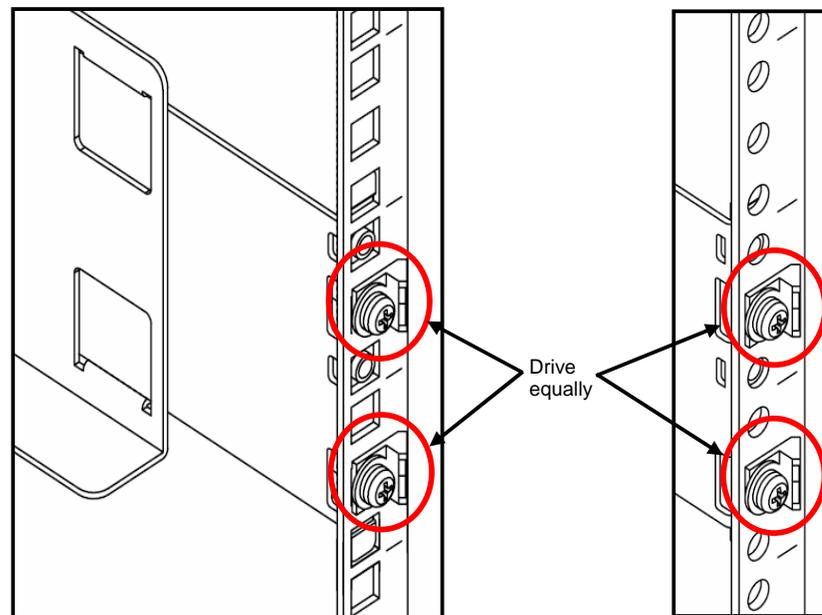
**4.** On the right side of the rack, install the other rail in the same manner.
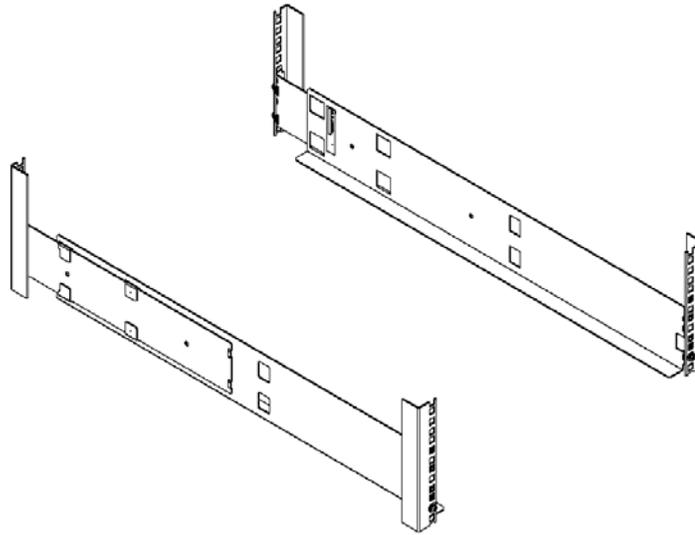


**5.** Lift the unit, put the rear section on the rails, and push it into the rack.

> **NOTE:** The unit is very heavy. It is recommended that 3 people assist in lifting and installing the unit. If less than three persons are involved, personal injury may occur.    Be careful not to drop the unit while lifting.

Fasten the four set screws at the two left and two right points on the front of the unit. The figure below only shows the right part of the unit. Fix the left part of the unit similarly.



Set screws

Set screws
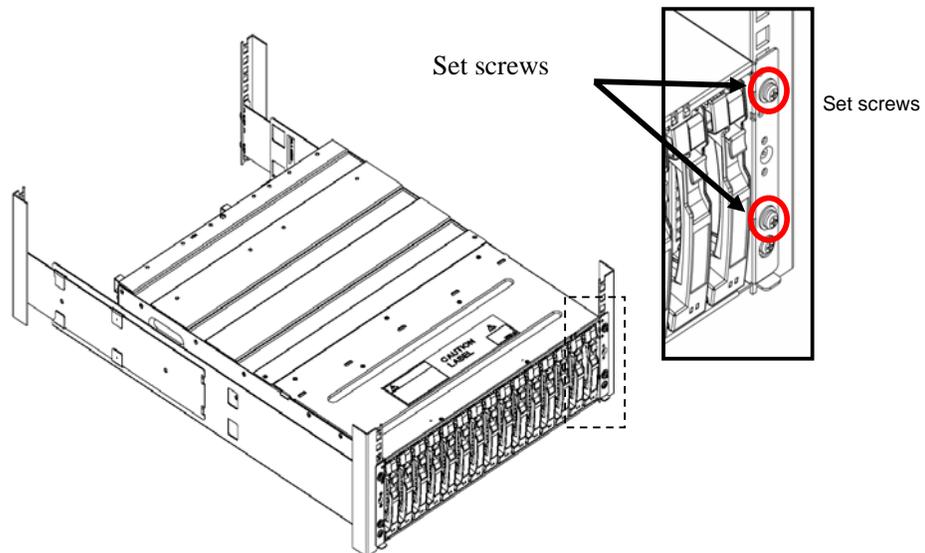
## 1.2   Installing Unit on Universal Rack Mount Kit

**Installation of Rails**

> **NOTE:** There are two types of rails, one for angle holes on a rack and the other for round holes. See the proper procedure depending on the type of the rail you use.
>
> Each of the following procedures supposes that a rail is installed on the left part of a rack when the rack is viewed from its front.
>
> Install a rail on the right part of the rack in a similar manner.
>
> The left and right rails are different from each other. Use the correct rail when installing it on the rack. (See the figure below.)
>
> For each rail, align the face with the label to the rear (see the figure below).

Upper: Rail (R)        Lower: Rail (L)

Front →                                    ← Rear

Rail (L)

D-5
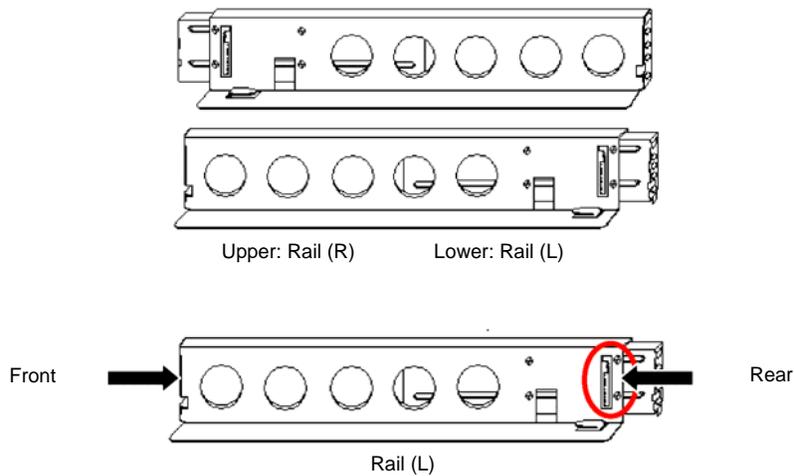
## 1.2.1 Angle Hole Fitting Rail

> **NOTE:** Each rail has a rail support attached. When a rail is installed on a rack with angle holes, use the rail as the rail support remains attached.

**1.** Loosen the four flush screws at the rear end of the rail

After loosening the screws, make sure that the moving part of the rail can slide smoothly.

> **NOTE:** Do not remove the flush screws.
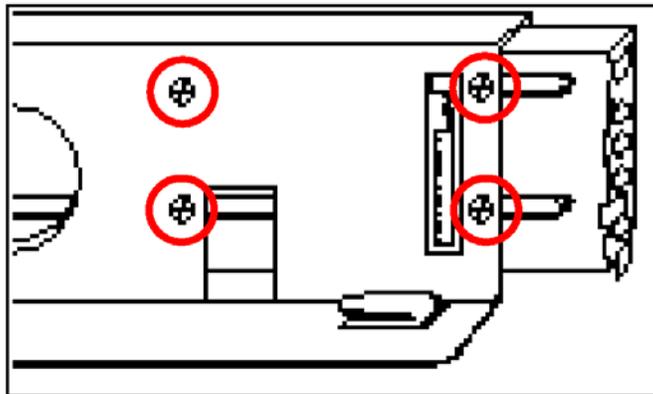


**2.** Remove the flush screw (1) enclosed by a circle in the figure below.
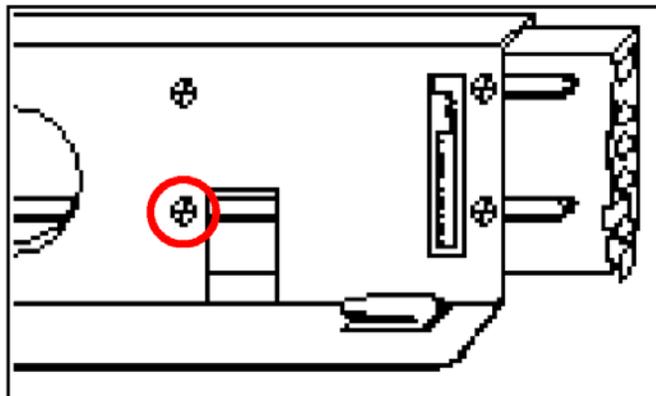
**3.** Install the attached bracket (see the figure below) with the flush screw removed in step 2 loosely. (Make sure that the moving part of the rail can slide smoothly.)

Bracket
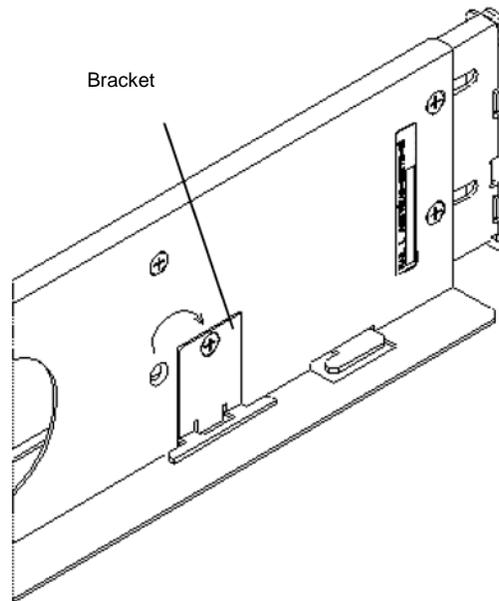
**4.** Insert the top and bottom projections into the angle holes on the front of the rack.

Insert

Enlarged view of
encircled part
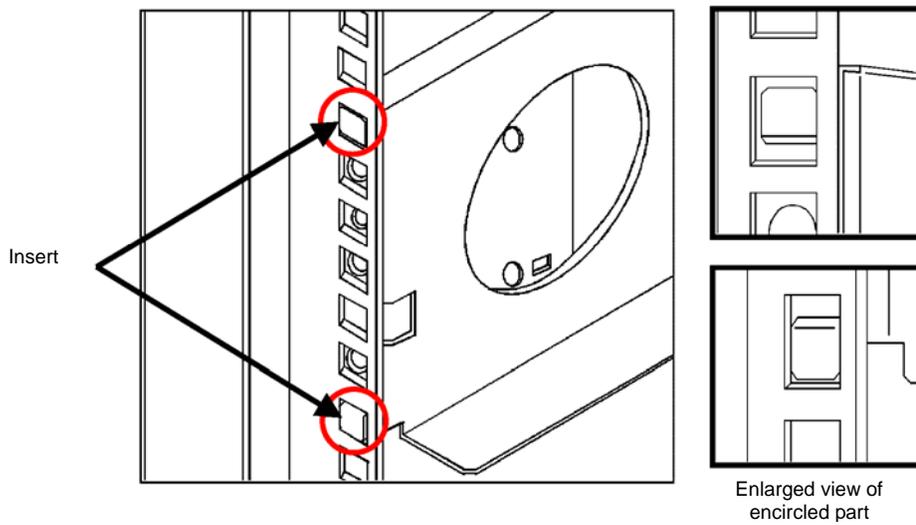
**5.** Mate the angle holes of the inner face of the rack with the screw holes of the rail and fix the rail with the attached set screws.

Use the set screw (see the figure below).
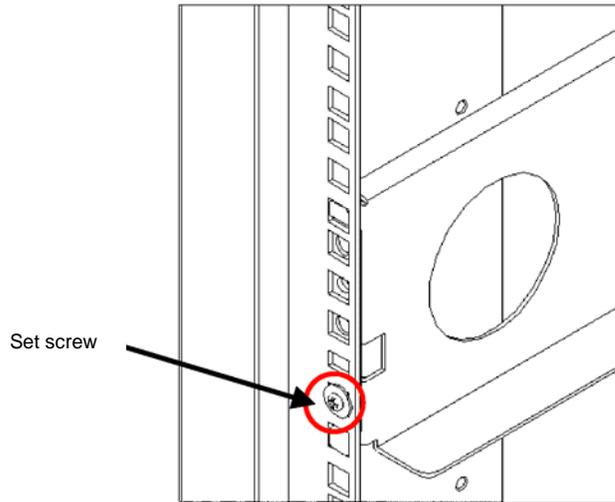


Set screw

**6.** Pull the inner toward you and push the top and bottom projections into the angle holes.



Inner

Insert

Insert
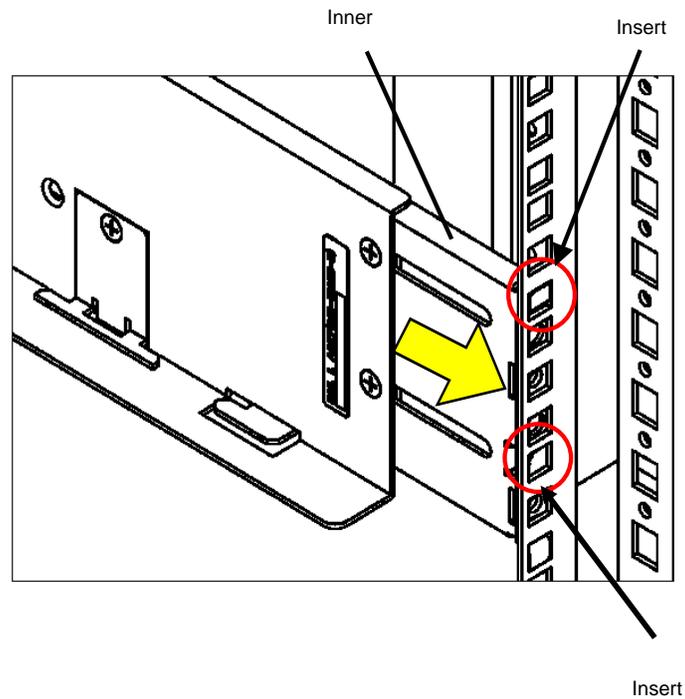
**7.** With the inner held, push the two set screws with a part for cable clamp into the female screws of the rail support and drive the screws equally. Take note on the direction of the part for cable clamp.



Drive equally
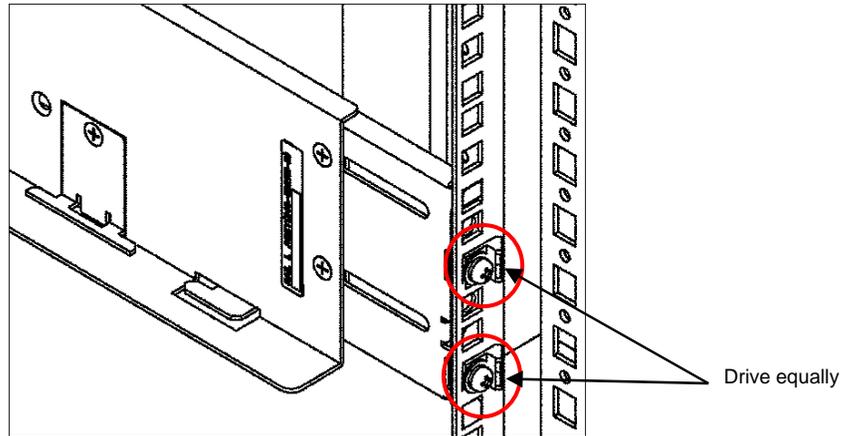
Drive the four flush screws loosened in step 1 and removed in step 3 securely.
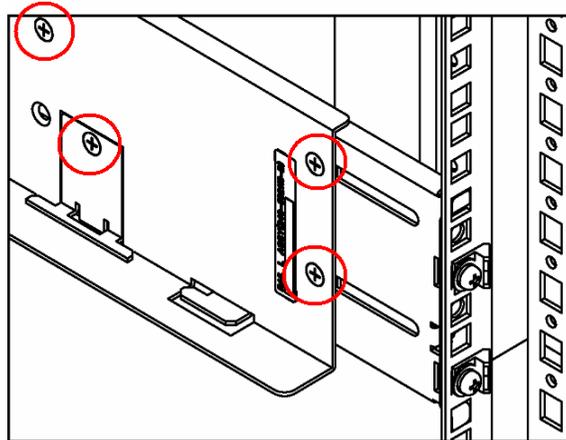
**8.** On the right side of the rack, install the other rail in the same manner.
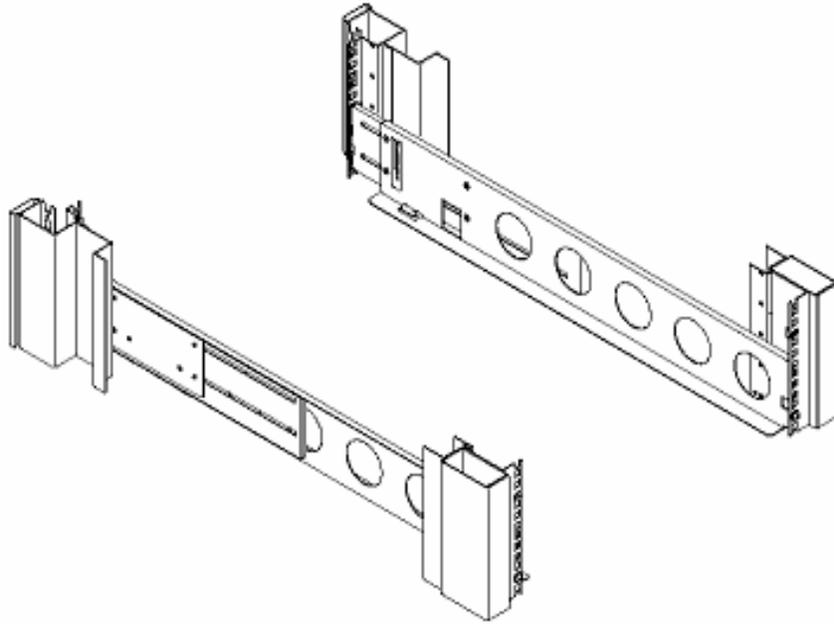


**9.** Install the rack nut at the position shown in the figure below (or the first hole on the projection at the top of the rail).



Rack nut
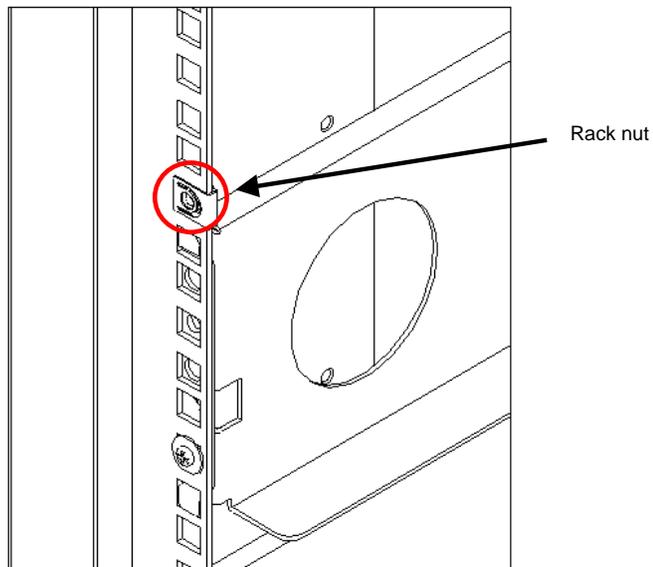
**10.** Lift the unit, put the rear section on the rails, and push it into the rack.

> **NOTE:** The unit is very heavy. It is recommended that 3 people
> assist in lifting and installing the unit. If less than three persons
> are involved, personal injury may occur.    Be careful not to
> drop the unit while lifting.



Insert
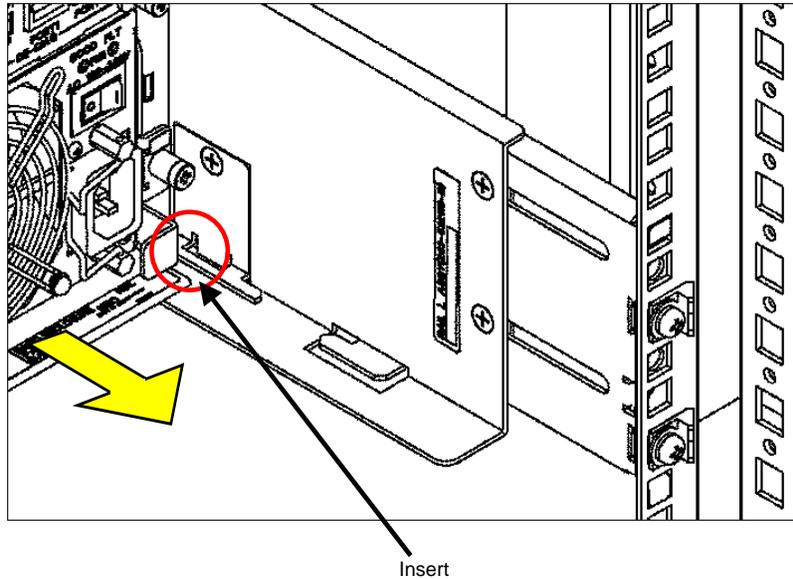
**11.** Fasten the four set screws at the two left and two right points on the front of the unit. The
figure below only shows the right part of the unit. Fix the left part of the unit similarly.



Set screws
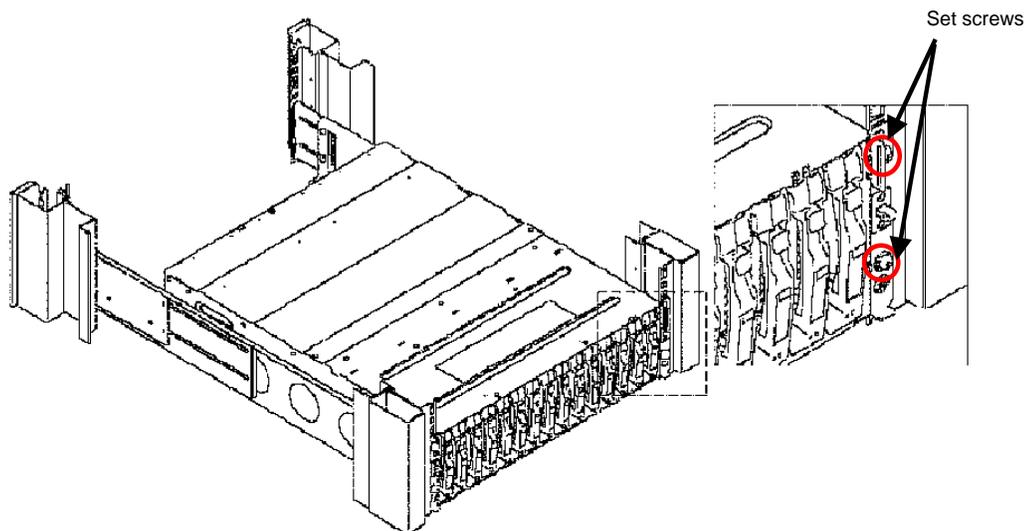
## 1.2.2  Round Hole Fitting Rail

> **NOTE:** Each rail has a rail support attached. When a rail is installed on a rack with round holes, remove the rail support from the rail.

**1.** Remove the rail support installed previously from each rail by removing four screws (two on the front and the other two on the rear).
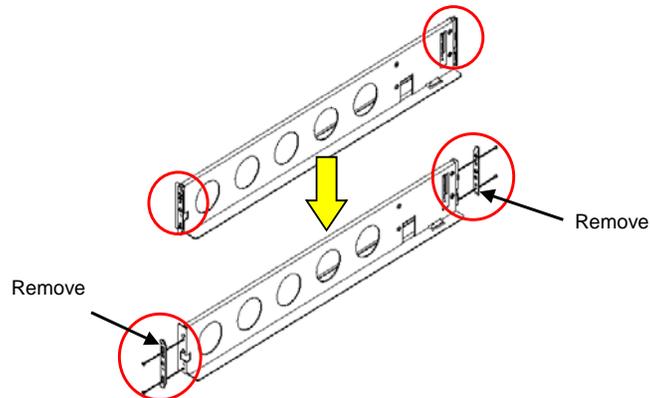


**2.** Loosen the four flush screws at the rear side of the rail.

After loosening the screws, make sure that the moving part of the rail can slide smoothly.

> **NOTE:** Do not remove the flush screws.
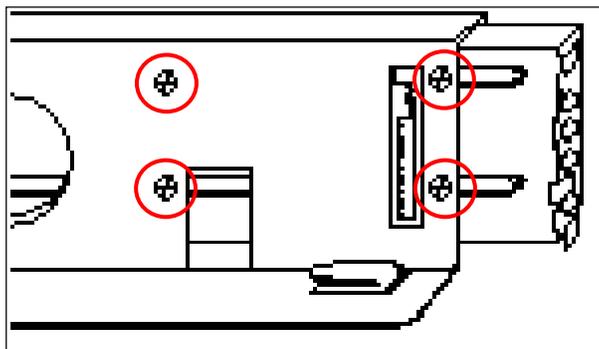
**3.** Remove the flush screw (1) enclosed by a circle in the figure below.
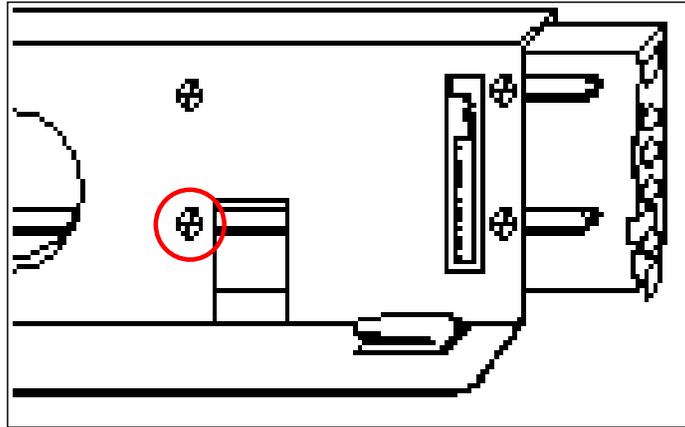


**4.** Install the attached bracket (see the figure below) with the flush screw removed in step 3 loosely. (Make sure that the moving part of the rail can slide smoothly.)



D-13
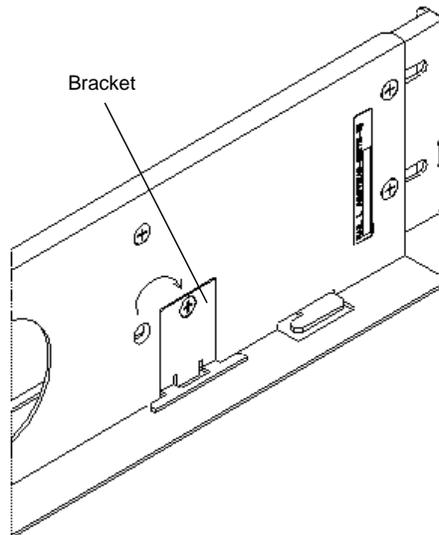
**5.** Adjust the round holes on the front of the rack to the screw holes on the rail (L) so that the inner face of the rack may be fit to the rail face with the label and fix the rail to the rack with the attached set screws.

Use screws (see the figure below).
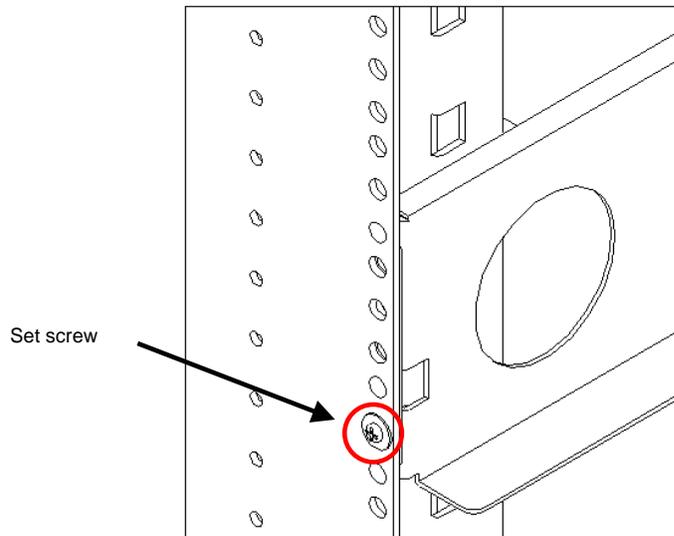


Set screw

**6.** Pull the inner toward you and, with it held, insert the two set screws with a part for cable clamp into the female screws of the inner and drive the screws equally. Take note on the direction of the part for cable clamp.



Drive equally

D-14
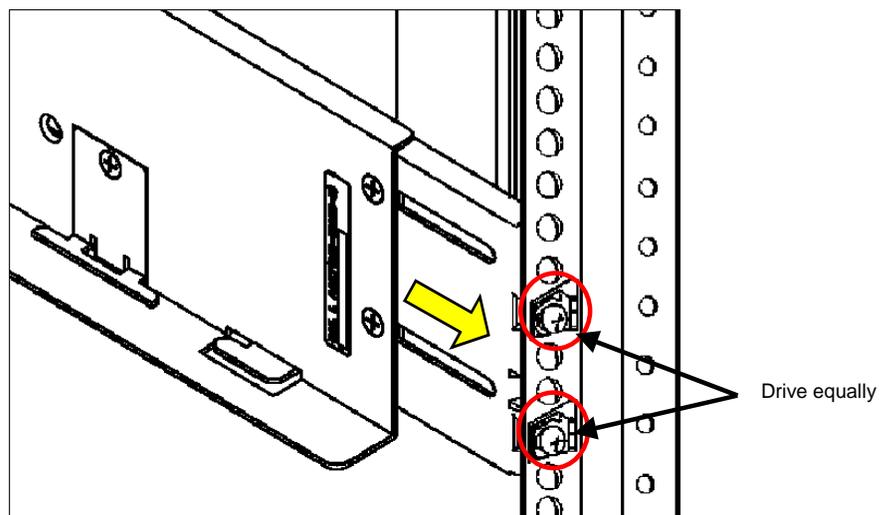
Drive the four flush screws loosened in step 1 and removed in step 3 securely.
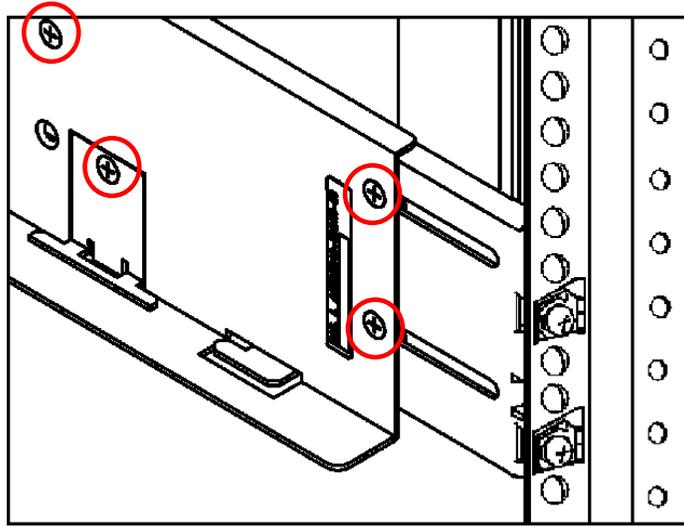


**7.** On the right side of the rack, install the other rail in the same procedure.
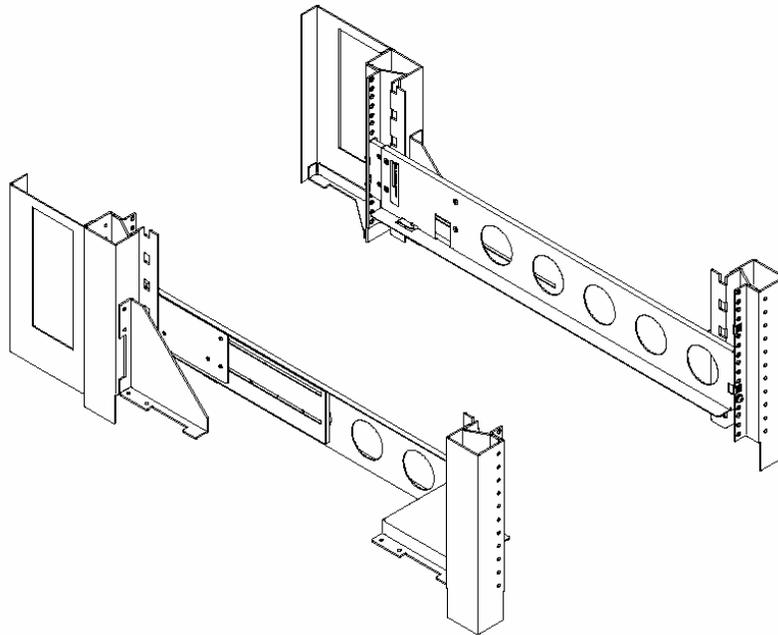
**8.** Install the rack nut at the position shown in the figure below (or the hole just above the set screw the first hole of the top of the rail).



Rack nut
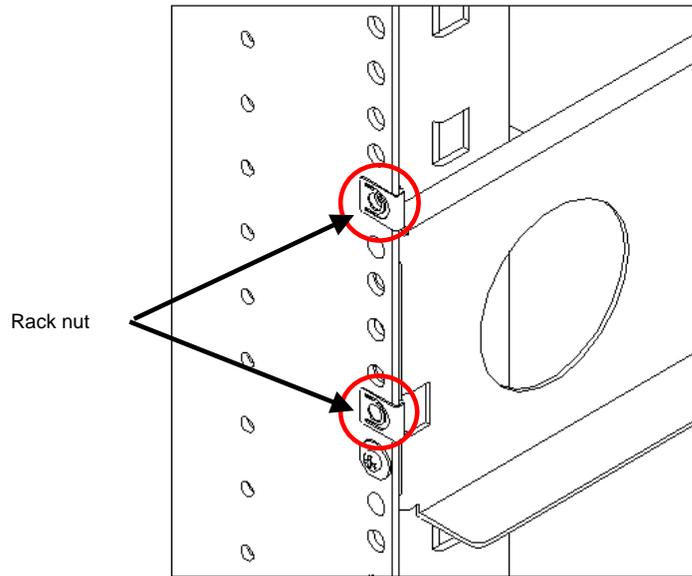
**9.** Lift the unit, put the rear section on the rails, and push it into the rack.

> **NOTE:** The unit is very heavy. It is recommended that 3 people assist in lifting and installing the unit. If less than three persons are involved, personal injury may occur.   Be careful not to drop the unit while lifting.



Insert
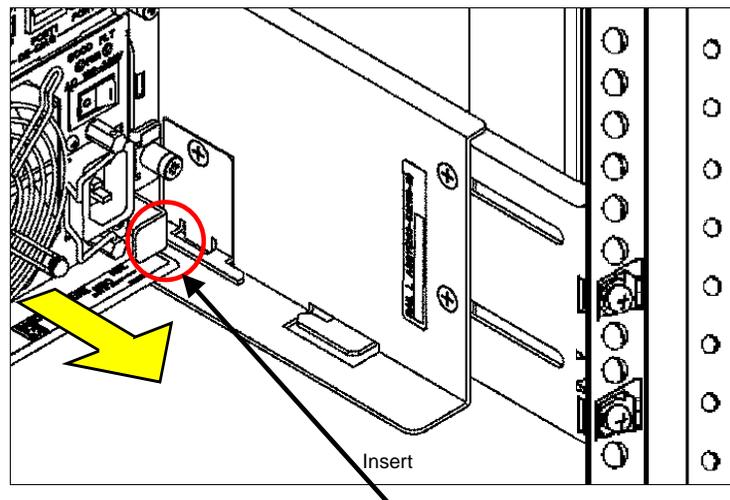
**10.** Fasten the four set screws at the two left and two right points on the front of the unit to fix the unit. The figure below only shows the right part of the unit. Fix the left part of the unit similarly.

Screws
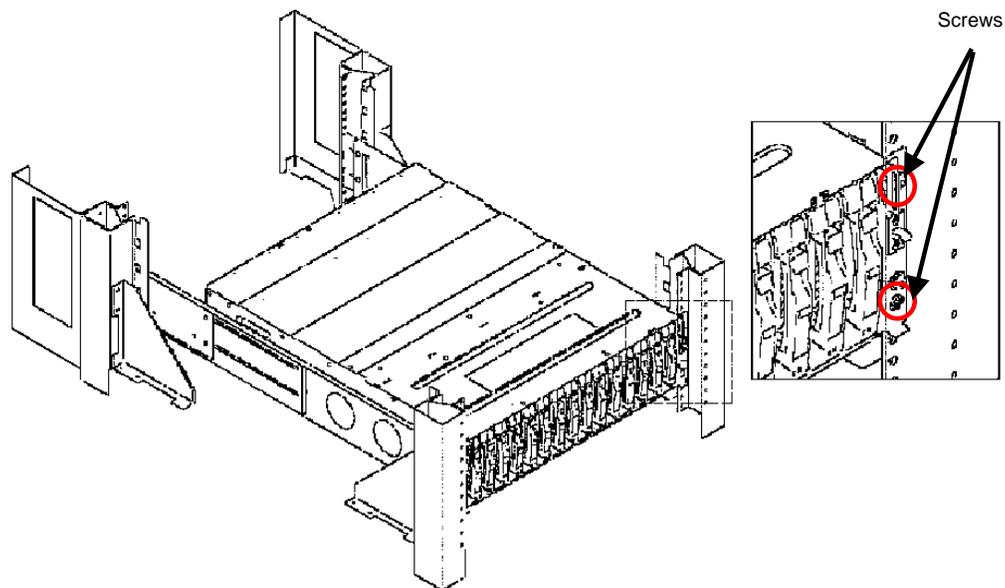
# 2. Installing Unit on HP Rack

> **NOTE:** There are old and new types of HP racks. To install the unit on the HP rack of the new type, the NF9100-SK01E rack-mount kit is to be purchased separately. Ask your sales representative for details.

## 2.1 Installation of Rails

The procedure explained in this section covers the rail installed to the left side of the rack, when viewed from the front of it. The same procedure is applied to the right rail.

1. Slightly loosen the four flush screws at the rear of the rail.



Flat head screw
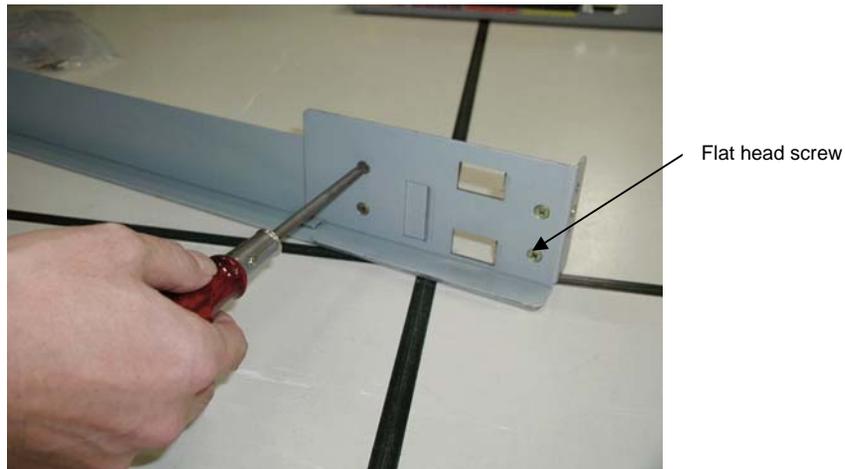
**2.** With the rail hook positioned at the rear of the rack, insert the rail into the rack, insert the hook into the angle hole at the intended install position of the unit, and engage the hook with the cutout.

> **NOTE:** Two cutouts are provided: one for the new rack and the other is for the old rack. The outer cutout should be used for the new rack while the inner cutout should be used for the old rack.

Cutout for new rack        Cutout for old rack

Hook
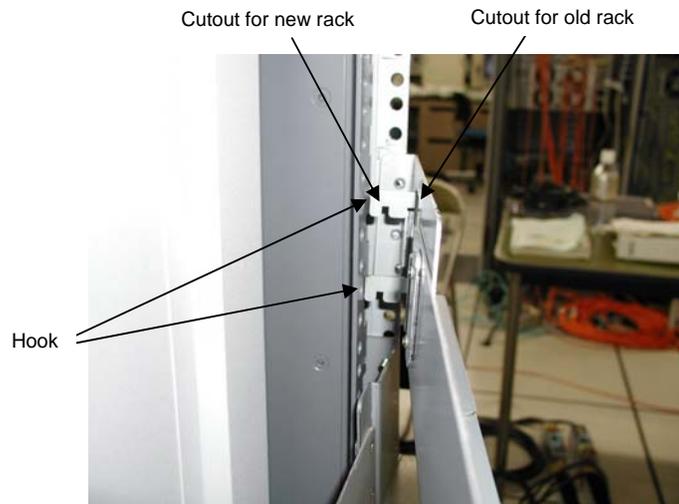
**3.** Pull the rail toward you and insert the rivets on the rail into the round holes on the rack.

Rivets
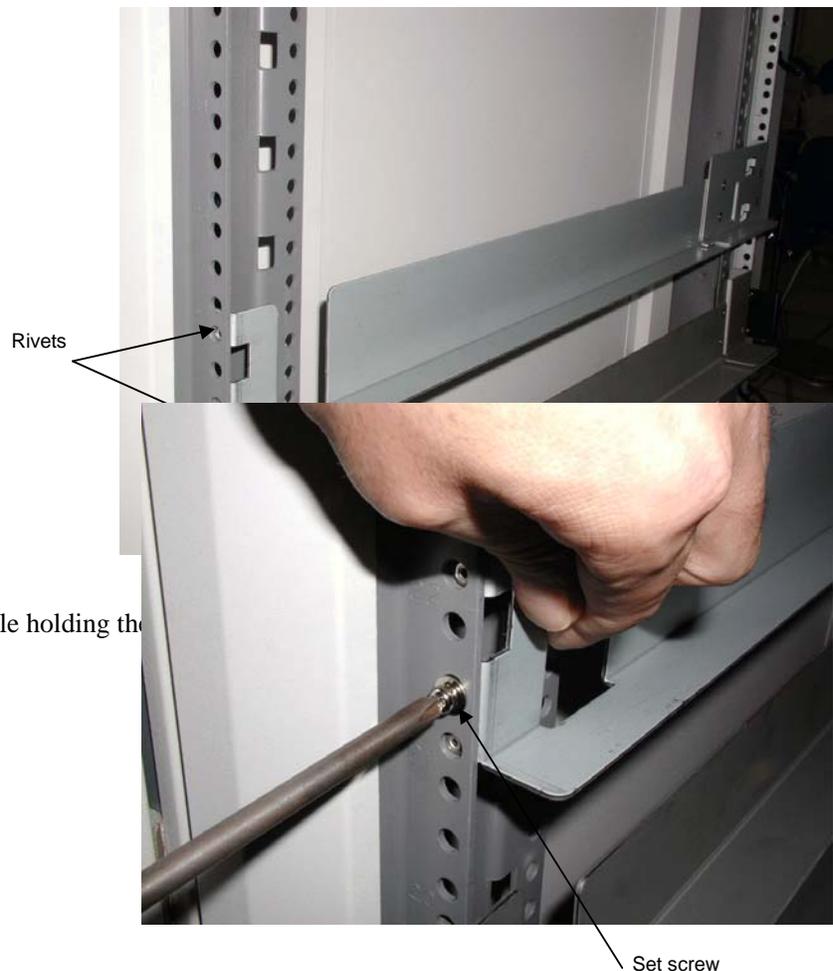
**4.** While holding the

Set screw

**5.** Move to the rear of the rack. First, while pulling the rail toward you, screw the set screw (M5 screw) into the lower female threaded hole.



Set screw

**6.** Next, secure the fixture, where the cable tie has been passed through, to the rack by screwing the set screw (M5 screw) into the upper female threaded hole.

Cable tie                Fixture



Set screw
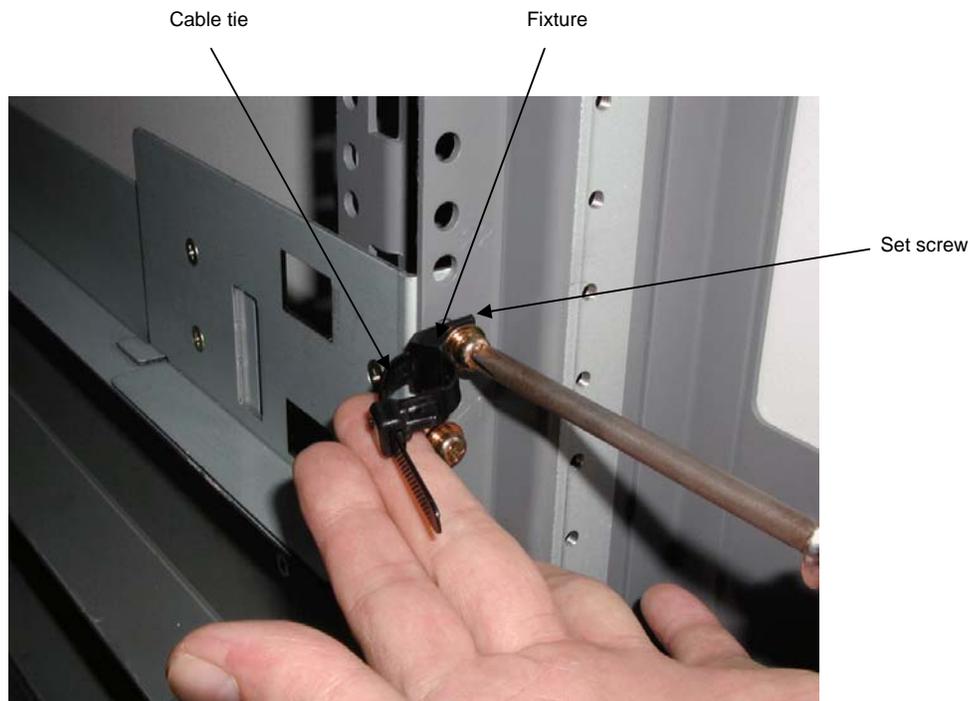
**7.** Firmly tighten the four flush screws.

Flat head screw

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## 2.2 Installation of Rack Nuts

Move to the front of the rack, and push one rack nut into the round hole, which corresponds to the cutout on the rail, from the side. Then, push another rack nut into the fifth round hole from the top, as well.

Rack nut



Cutout

Rack nut
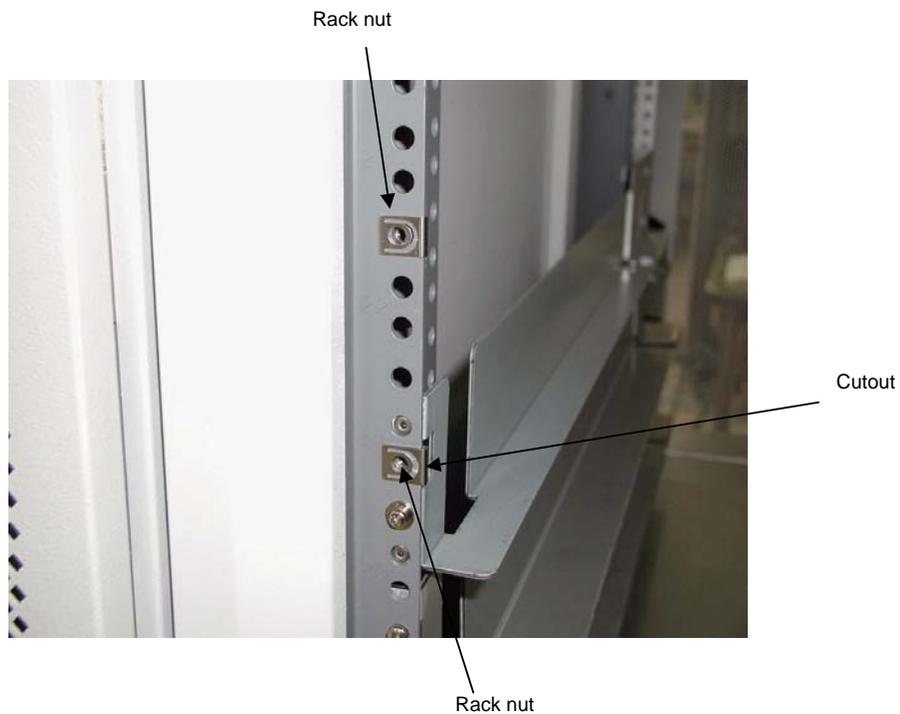
## 2.3　Installation of Unit

**1.** Using the same procedure explained above, install the right rail.

**2.** Lift the unit and place the rear section on the rails, and push the unit toward the innermost of the rack.

> **NOTE:** The unit is very heavy. It is recommended that 3 people assist in lifting and installing the unit. If less than three persons are involved, personal injury may occur.　Be careful not to drop the unit while lifting.

**3.** Screw four set screws (M5 screws) in the unit at both sides to fix the unit.

Set screw
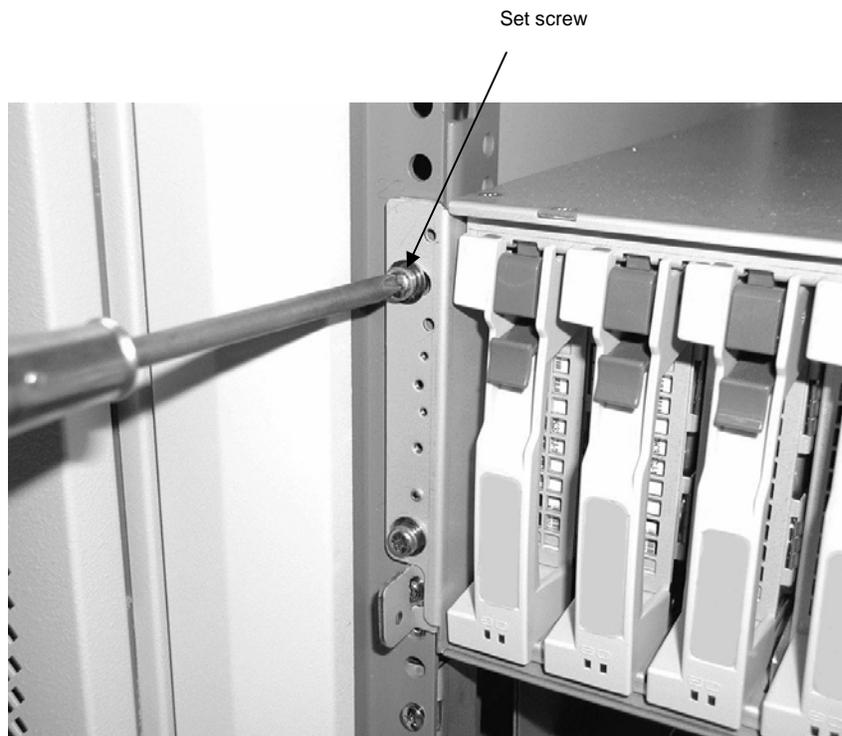


This completes the installation of the unit.

# 3. Installing Unit on Sun StorEdge Rack

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**NOTE:** To install the unit on the Sun StorEdge rack, the
NF9100-SK02E rack-mount kit must be purchased separately.
Ask your sales representative for details.

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## 3.1 Installation of Rails

1. Temporarily tighten the two set screws (#10-32UNF) at both ends of the front frame that
   corresponds to the unit installation location. (Do not tighten the screws firmly.)



Set screw

**2.** Hook each rail fitting the round hole in the rail onto the screws in step 1, and temporarily secure it.

Screw                                    Round hole
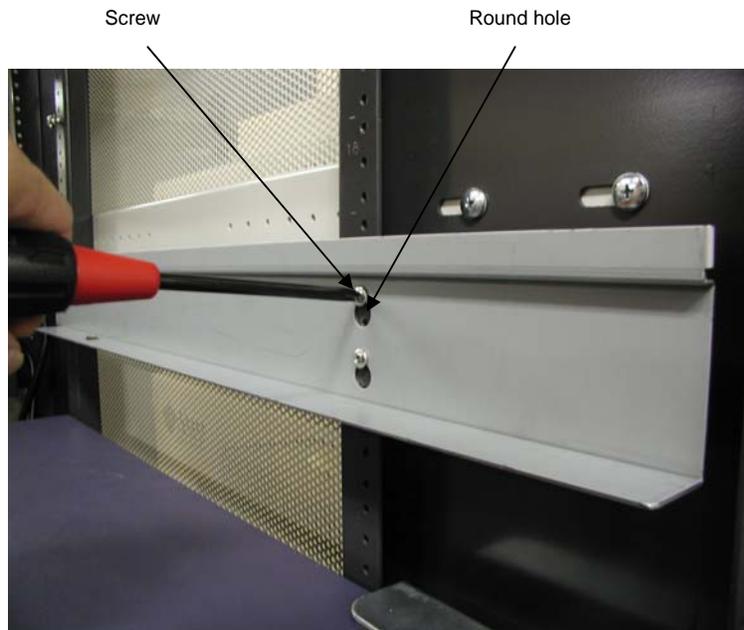


**3.** Move to the rear of the rack, and firmly secure each rail with two set screws (#10-32UNF).

Set screw

## 3.2  Installation of Unit

   **1.** Lift the unit, place the rear of the unit on the rails, and then push it in.

> **NOTE:** The unit is very heavy. It is recommended that 3 people assist in lifting and installing the unit. If less than three persons are involved, personal injury may occur.   Be careful not to drop the unit while lifting.

   **2.** At the front of the unit, firmly tighten the four set screws (2 at right and left each) (#10-32UNF) to secure the unit.



Set screw
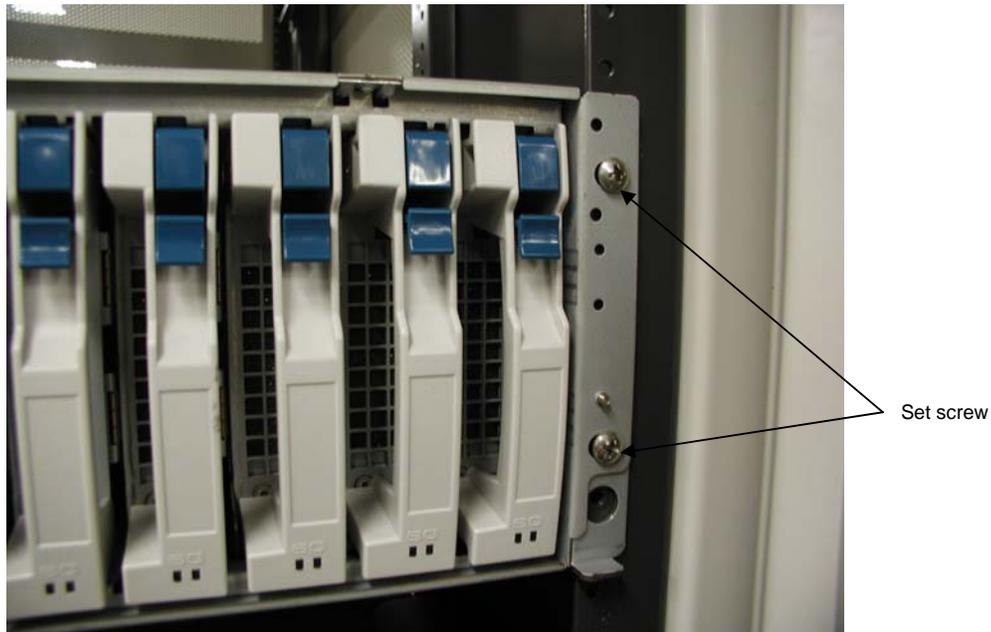
This completes the installation of the unit.

# 4. Installing Unit on Express Old-type Rack

**NOTE:** The Express old-type racks are:
N8540-28 (42U rack),
N8540-29 (36U rack),
N8540-38 (16U rack),
N8540-09 (44U rack),
N8540-09AC (44U rack),
N8540-10E (35U rack),
N8540-10AC (35U rack).
The Express old-type rack-mount kit is the NF9100-SK03E.

## 4.1 Installing the Rack Mount Kit

Install the rack mount kit into the rack as shown in the figure.



Detail A

PL-CP1MSx4x8x3GF

19inch RACK FRAME

RACK RAIL
(NF9100-SK03)

PL-CP1MSx5x16x15BF
(for fixing the installed unit)
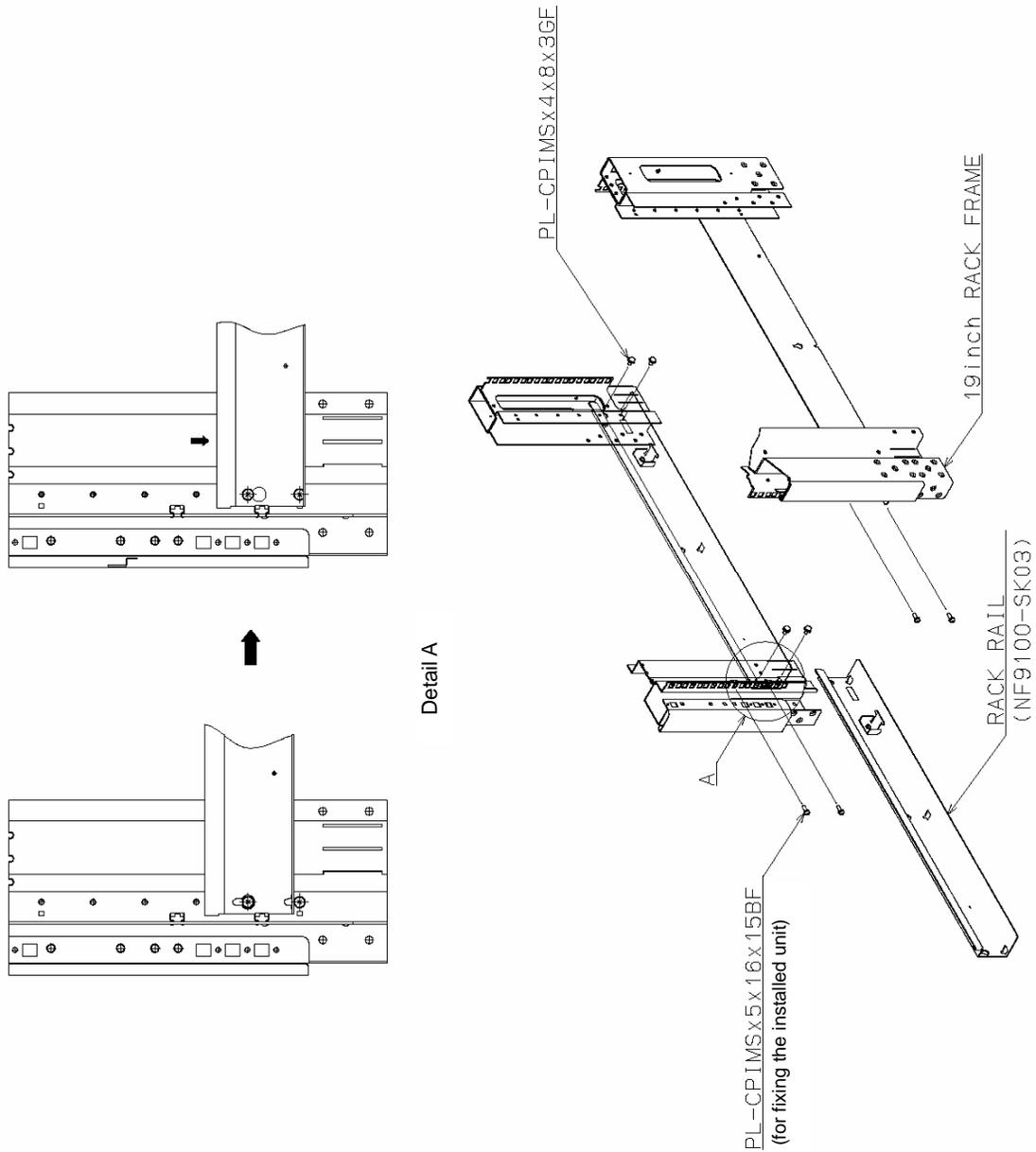
## 4.2  Installation of Unit

**1.** Lift the unit, place the rear of the unit on the rails, and then push it in.

> **NOTE:** The unit is very heavy. It is recommended that 3 people assist in lifting and installing the unit. If less than three persons are involved, personal injury may occur.   Be careful not to drop the unit while lifting.

**2.** At the front of the unit, firmly tighten the four set screws (2 at right and left each) (#10-32UNF) to secure the unit.



Set screws

This completes the installation of the unit.

# 5. Cable Wiring

After installing the required number of units on the rack, go to the rear of the rack and provide proper cable wiring.

Pass cable ties through the cable clamp for the cable handling if necessary.

However, always clamp the AC cord on the unit side (see the figure below).

For other cables, put several cables together and pass each set through repeat ties taking care of the notes below.

The following figure shows sample wiring of AC cord.
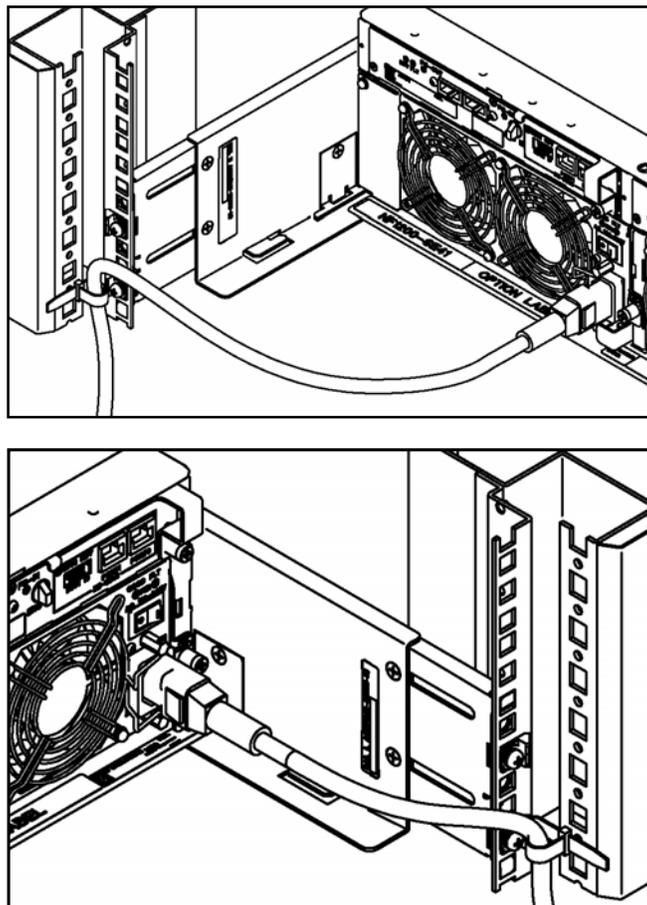


NOTE: To route FC cables, note that the maximum bending radius should be equal to or larger than 30 mm.