

# NEC s1400 Disk Array Unit User Guide

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The warning label is attached to components with possible danger or their vicinity in your disk array unit 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.)

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**NEC Storage S1400  
NF1400-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.

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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, atomic installation or equipment, aerial and space equipment, transportation installation and equipment and to be installed into and to control the installation or equipment requiring high reliability. If you use this unit for these installation, equipment, or control system, 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.

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**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 his own expense.

**Momentary voltage drop prevention:**



This network storage unit may be affected by a momentary voltage drop caused by lightning. To prevent a momentary voltage drop, an AC uninterruptible power supply (UPS) unit should be used.










## Safety Precautions

Before using this unit, read this manual carefully and keep cautions in order to use this unit safely and correctly and to avoid to be a cause of damage to the body or properties. Keep this manual to see whenever it is necessary.

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




 <b>WARNING</b>	Indicate there is a risk of death or serious wound.
 <b>CAUTION</b>	Indicate there is a risk of burn or injury.

Risks and 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 object.
	Indicates the danger of an injury due to harmful material.

## Notes on Use

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

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>■ Do not use the disk array unit in an area with much moisture or water usage. If so, a fault, electrical shock, or fire may occur.</li></ul>
	<ul style="list-style-type: none"><li>■ Do not use the disk array unit in an area where inflammable gas and/or combustible substance are placed. If so, fire or explosion may occur.</li><li>■ Do not concentrate power cords only to some AC outlets. If so, fire may occur.</li><li>■ Do not put a heavy substance 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.</li><li>■ Do not install the disk array unit in an area of much moisture or dust. Remove dust adhering to AC outlets and the plugs of power cords, if any. If dust remains adhering to an AC outlet and/or plug, fire may occur.</li><li>■ Do not connect the plug of a power cord to an AC outlet with a wet hand. If so, you may be electrically shocked.</li><li>■ While the disk array unit can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the disk array unit can only accept 100 – 120 VAC. Use 100 – 120 VAC (50/60 Hz) when the attached power cord is used. Using power of different voltage may cause electric shock, smoke, and/or fire to occur.</li><li>■ The controller of the disk array unit contains 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 ordinance. Contact your local government for details.</li><li>■ 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.</li></ul>

## CAUTION



- Do not install the disk array unit and the host systems on unstable places. If so, some substances may be dropped to cause you to be injured.



- Do not install the disk array unit and the power cords in an area with direct sunshine or near an apparatus generating heat such as a heater. If so, a fault may occur. Further, the coating of the power cord may be melted to cause fire or electric shock to occur.
- Insert the plug of a power cord to an AC outlet securely. Any power cord shall be routed with sufficient margin to avoid excess force from being given 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 a power cord to an AC outlet with earth terminal. Connection of the earth line to a gas tube is extremely dangerous. Never do it.



- Connect or remove a peripheral device from the disk array unit after turning off all the powers of the disk array unit and peripherals and pulling out the power cords from the AC outlets. If not, some units may be broken 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 broken, you may be electrically shocked, and/or a fire may occur.



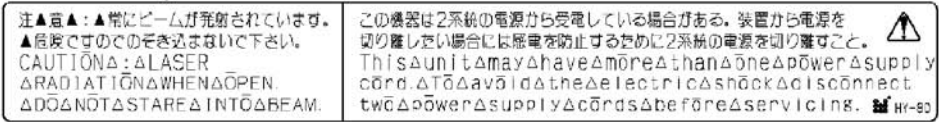
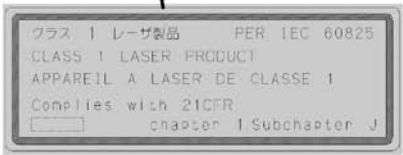
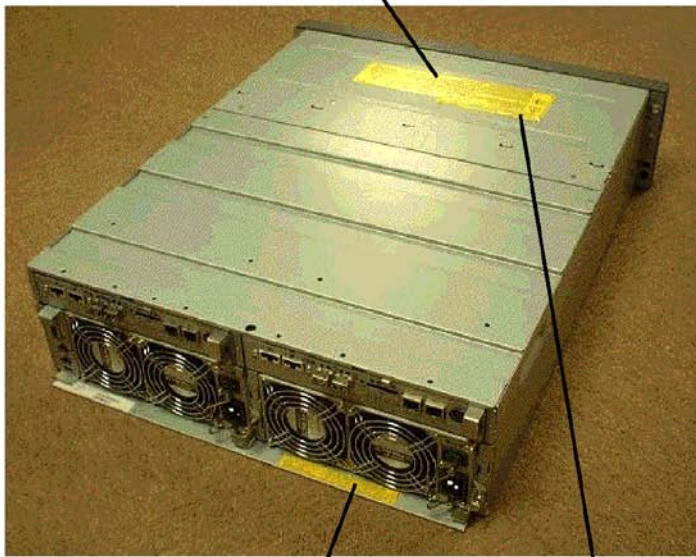
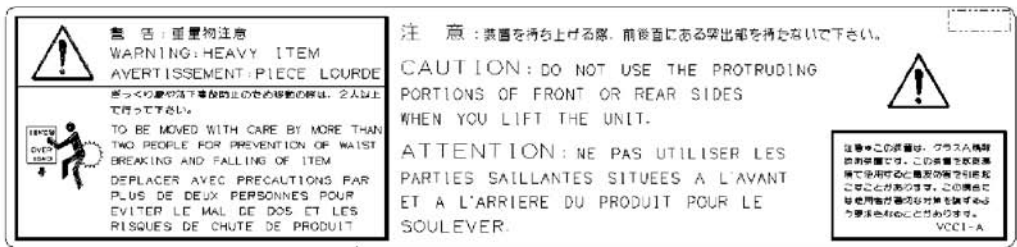
### **To install the unit in a rack, observe the following guidelines.**

1. TMRA – If installed in a rack, consideration should be given to installing the equipment in an environment compatible with the 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 Earthing – Reliable earthing 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).

## Indication on Safety

The warning label is attached to components with possible danger or their vicinity in your 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.

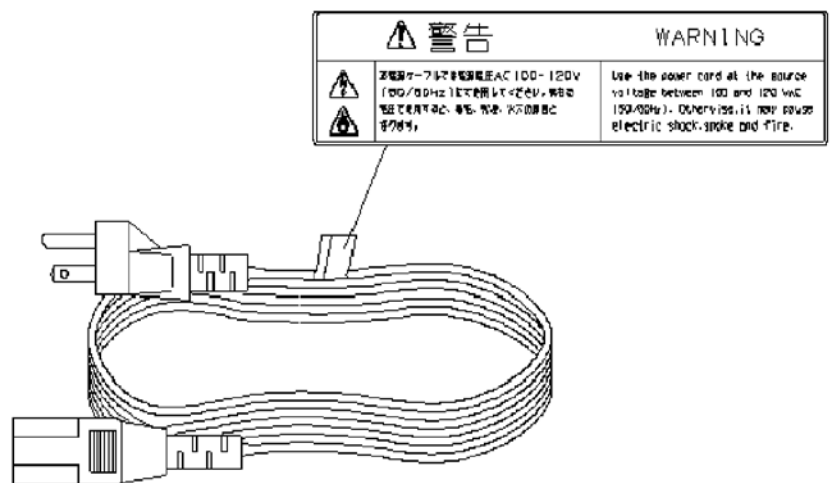
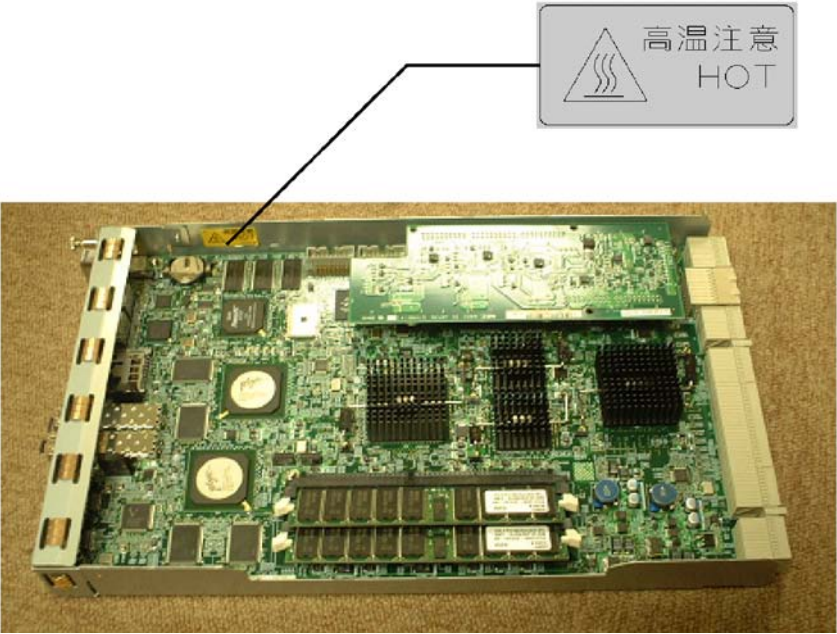


電源を交換する際は、取り外される電源のBBU(バッテリー) ASSYを、交換用の電源に乗せ換えてください。



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

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





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: (at 27°C)

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

## Preface

Thank you very much for your purchase of the disk array unit. This manual is intended to enable you to correctly use the disk array unit NF1400-SR40E.

Before using the disk array unit, also read the manuals of several devices including NEC Express5800 series, FibreChannel controller, NX7000/NX7700i series, FC-AL SCSI connection mechanism, or CX5000 series to be connected with the disk array unit and the manual of the used OS.

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

The following options are provided for the disk array unit:

Options for NF1400-SR40E:

- |  |               |
|--|---------------|
| ■ Additional FC disk enclosure             | NF1400-SE42E  |
| ■ Additional FC disk drive (73-GB/10Krpm)  | NF1400-SM413E |
| ■ Additional FC disk drive (147-GB/10Krpm) | NF1400-SM414E |
| ■ Additional FC disk drive (300-GB/10Krpm) | NF1400-SM415E |
| ■ Additional FC disk drive (36-GB/15Krpm)  | NF1400-SM422E |
| ■ Additional FC disk drive (73-GB/15Krpm)  | NF1400-SM423E |
| ■ Additional FC disk drive (147-GB/15Krpm) | NF1400-SM424E |
| ■ Power supply control unit                | NF1400-SP03   |
| ■ Option battery                           | NF1400-SZ01E  |

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

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

After reading the manual, store it in an area where you can access it easily.

First edition, December 2004



# Check of Components in Package

## (1) Unpacking

Open the package and take out the disk array unit and accessories from the package without large shock. The disk array unit is greatly heavy. Accordingly, if two people or less lift the unit, their backs may be damaged. To take out 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.

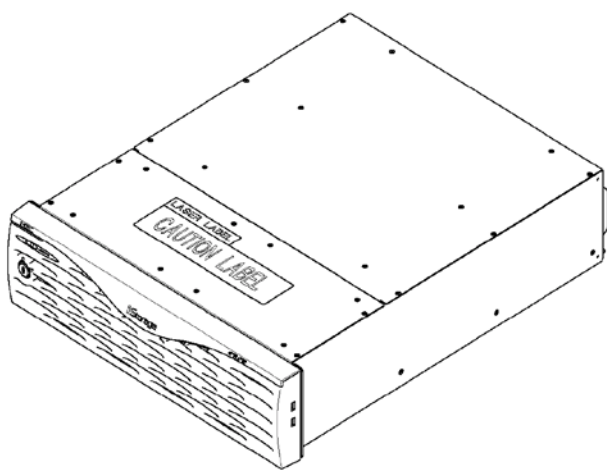
The package is specially designed for carriage of a precision device. Do not dispose of the package because it is required to return the disk array unit to the factory for its repair.

## (2) Inspection

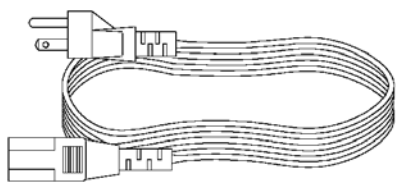
After unpacking, check that all the components listed in the table below are provided. If any of the components is missed, contact your sales representative. Next, inspect the disk array unit and accessories. If any of the components is damaged, contact your sales representative.

No.	Product name	Remarks	Qty
1	NEC Storage S1400	S1400: NF1400-SR40E	1
2	Power cord	Length 5 m (for 200 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	Program	SystemGlobe NEC Storage BaseProduct Ver3.3 - NEC Storage S1400	1
7	Packing list		1

NF1400-SR40E



(1) NEC Storage S1400 (The figure above shows the unit with the front mask installed.)



(2) Power cord (x2)

(3) Front mask

(4) User's Guide

(5) Rack-mount kit



(6) Programs

(7) Packing list


# 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 be defected or frozen.

Symbol	Description
	If the description is ignored to handle the disk array unit, the unit may be defected, some software used in the unit may be broken, and/or the data created by the user may be broken.
	If the description is ignored to handle the disk array unit, the unit may be defected and/or some software used in the unit may not operate normally.

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 NF1400-SR40E.
Disk enclosure	Indicates the additional FC disk enclosure NF1400-SE42E (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 series, NX 7000/NX7700i series, or CX5000 series.
Host bus adapter	Indicates the FibreChannel controller for NEC Express5800 series, FC-AL SCSI connection mechanism for NX7000/NX7700i series, or FibreChannel controller for CX5000 series.

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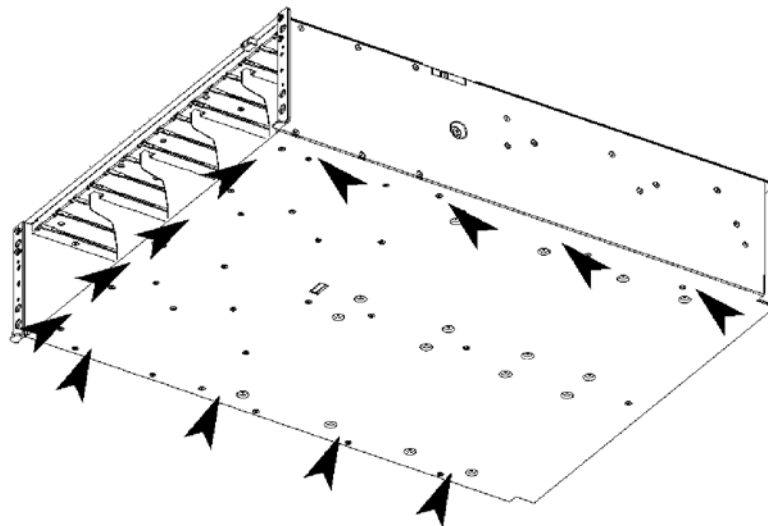
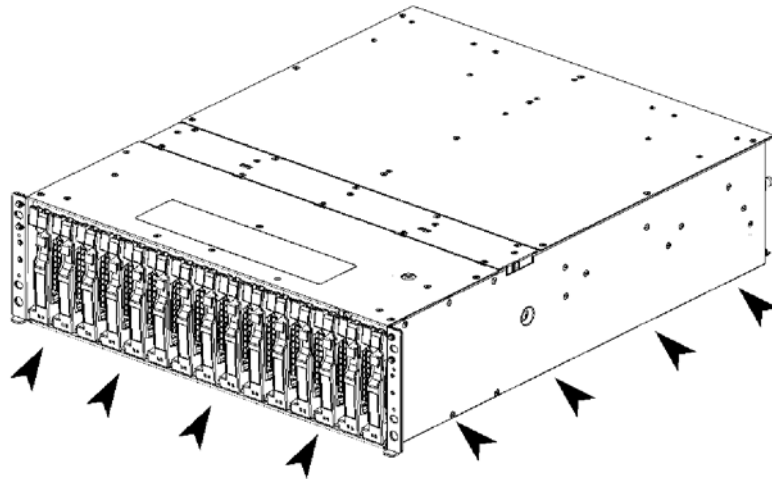
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# 1. Notes on Installation and Handling of Disk Array Unit

## 1.1 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.






## 1.2 Environment in Use of Disk Array Unit





In installation of the disk array unit, take into account the following items 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 to the unit if necessary.
-  ■ Install the disk array unit on a level floor with sufficient strength. In addition, do not give shocks and/or vibrations to the disk array unit. If so, some components may be dropped to cause the disk array unit to be defected and/or people to be injured.
-  ■ Install the disk array unit in an area under the following conditions; temperature range between 5°C - 40°C and humidity range between 10% - 80% (without condensation).
-  ■ Do not install the disk array unit in an area with water or oil poured, area suffering liquid such as water and oil, suffering steam, area with steam, and area with much moisture. If so, a fault or electrical shock may occur.
-  ■ Do not install the disk array unit in an area with emission of chemical steam or an area where the disk array unit may be contact with inflammable substance. If so, a fault, fire, or explosion may occur.
-  ■ Do not install the disk array unit in an area with much dust. 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, and codeless telephone. Some noise may appear in the TV, radio, and codeless 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 a device generating strong magnetism. If so, a fault may occur.
-  ■ Install the disk array unit so that the ventilating holes opened on the front and rear faces are not blocked. If not, heat generation and/or fault may occur.







1.3     Installation and Connection of Disk Array Unit







 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>■ Do not use the disk array unit in an area with much moisture or water usage. 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 substance are placed. If so, fire or explosion may occur.</li><li>■ Do not install the disk array unit in an area of much moisture or dust. Remove dust adhering to AC outlets and the plugs of power cords, if any. If dust remains adhering to an AC outlet and/or plug, fire may occur.</li><li>■ Do not concentrate power cords only to some AC outlets. If so, fire may occur.</li></ul>
	<ul style="list-style-type: none"><li>■ Do not put a heavy substance 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.</li><li>■ Do not connect the plug of a power cord to an AC outlet with a wet hand. If so, you may be electrically shocked.</li></ul>

 <b>CAUTION</b>	
	<ul style="list-style-type: none"><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>
	<ul style="list-style-type: none"><li>■ While the disk array unit can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the disk array unit can only accept 100 – 120 VAC. Use 100 – 120 VAC (50/60 Hz) when the attached power cord is used. Using power of different voltage may cause electric shock, smoke, and/or fire to occur.</li></ul>
	<ul style="list-style-type: none"><li>■ Do not install the disk array unit and the power cords in an area with direct sunshine or near an apparatus generating heat such as a heater. If so, a fault may occur. Further, the coating of the power cord may be melted to cause fire or electric shock to occur.</li></ul>

-  ■ The disk array unit weighs 34 kg or more. Hold the disk array unit and disk enclosure firmly with at least three people to carry it. Carrying the devices only by two or less people may strain their back.
-  ■ Select the place where the disk array unit can be connected to the AC outlet by using the attached power cord.
-  ■ 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.
-  ■ Provide sufficient margins for the cables connected to the disk array unit so that legs may not be trapped by the cables. Avoid power plugs and FC connectors from suffering excess forces.
-  ■ Do not use cables connected to the disk array unit with them leaving bent. If so, a fault or fire may occur.


- 
  - Use the cables approved by NEC as those connected to the disk array unit and check the destinations to which the cables are connected. In addition, always lock power cords and FC cables when they are connected.
- 
  - Use the power source independent from TV or radio. Otherwise, a noise 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 hold the cable itself to disconnect it.


## 1.4 Notes on Use of Disk Array Unit


- 
  - Do not let any animal (pet) or children touch the cable connected to the disk array unit. Pulling the cable may cause the unit to fall down, resulting in failure of the unit.
- 
  - Do not enter any liquid such as water into the disk array unit. If so, you may be electrically shocked or the unit may be defected. If some liquid is entered into the disk array unit, turn off the power and contact your sales representative or maintenance engineer. If the disk array unit seems dry, only a small amount of liquid may remain to cause the unit to be defected.
- 
  - Do not enter foreign substances such as clip and screw 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. If so, a fault or electrical shock may occur. Repair of the unit will be charged regardless of warranty.
- 
  - If the disk array unit will not be used for a long period, disconnect the plugs of the power cords from the AC outlets for safety.
- 
  - Disconnect the power plug from the outlet 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.

# 1.5     Routine Inspection of Disk Array Unit

<div> <b>CAUTION</b></div>	
<div></div>	<ul style="list-style-type: none"><li>■ To clean the disk array unit, always turn off the power and also disconnect the plugs of power cord from AC outlets. If not, you may be electrically shocked.</li></ul>

- 

  - If a surface of the disk array unit becomes dirt, wipe the surface lightly with soft cloth. Wiping the surface by using chemicals such as benzene and thinner, or volatile chemicals, may cause the surface to be deformed or discolored. In addition, note that splaying 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. It is because dust may be accumulated after the disk array unit is used for a long time.  
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 because it is dangerous.
- 

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

## 1.6 Notes on Storage or Carriage of Disk Array Unit



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



- Note that foreign substances such as water and metals may not be entered into the disk array unit during storage. Using the disk array unit with some foreign substance left inside may cause a fault, electrical shock, or fire to occur.



- During the storage, do not put any substance on the disk array unit or do not place the disk array unit on an area where the unit may be dropped.



- To use the disk array unit after storage for longer than six months, it is recommended to 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 with at least three people to carry it. Carrying the devices only by two or less people may strain their back.



- Make sure to package the disk array unit when transporting it with the packing material that comes with the disk array unit. If any other packing materials are used, a vibration or shock generated during transportation may cause a malfunction of the unit.

## 2. Features of Disk Array Unit

The disk array unit has the following features.

NF1400-SR40E is a high-performance disk array unit designed for 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 the disk array unit can be easily expanded by installing an additional FC disk drive (option) in the expansion slot of the disk array unit.

An additional FC disk enclosure (option) to enable the expansion of the storage capacity of the disk array unit is provided for 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 can continue the operation without loss of data.


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

If a single disk drive is specified as the spare disk, the data in the defected 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 defected disk drive to be automatically recovered in the spare disk as soon as a disk drive is defected. This improves the system reliability.

The disk array unit has the cache memory data hold function by using the battery backup unit. The function allows comfortable high-speed data processing to be done under high reliability.

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

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



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

## 2.1 Hot Spare Feature

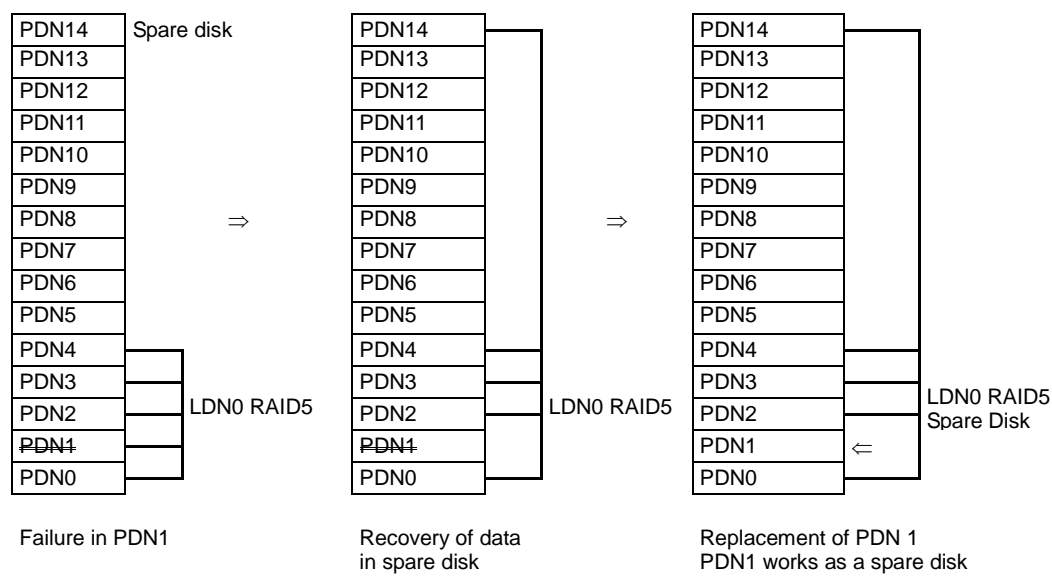
Spare disks can be installed in the disk array unit. If a disk drive is defected, the data in the defective disk drive is recovered in the spare disk. After the data recovery, the disk drive operates normally if another disk drive is defected.

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

With the shipping default, if the disk drive defected during the operation by using the spare disk is replaced with a normal disk drive, the replaced disk drive works as a spare disk.


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

Example of hot spare operation (LDN0 RAID5)




\* 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 are defined to manage the disk drives clearly.  
Up to 32 spare disks may be installed in the entire disk array unit.

## 2.2 Write Cache Feature

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

The 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 data to disk drive for 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 provides the battery backup by battery backup unit installed in the power supply to retain data in the cache memory.

The backup time using the battery backup unit is restricted as follows:

The backup time of 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	
Standard configuration (Optional batteries not provided)	24H	8-hour charging (power-on) and 16-hour discharging (power-off) in environment in which the ambient temperature is @25°C
Expansion configuration with optional batteries (Optional batteries provided)	72H	

\* If the discharging (power-off) time exceeds 16 hours in daily use, the battery back units need to be replaced at a cost before they reach the service life of 5 years. Ask your NEC sales representative for the relation between the operation mode and the life of a battery backup unit.

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

- The disk array unit is operating normally with the following components being installed:
  - 2 controllers (or 1 controller if you have made the setting to enable 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 for about eight hours.

## 2.3 Program Product

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

- For S1400:  
SystemGlobe NEC Storage BaseProduct Ver3.3 (or later) - NEC Storage S1400

To use the disk array unit, release the license lock using the license code that is provided with "SystemGlobe NEC Storage BaseProduct Ver3.3 - NEC Storage S1400".

A maintenance person is responsible for releasing the license lock of "SystemGlobe NEC Storage BaseProduct Ver3.3 - NEC Storage S1400" 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.

## 2.4 Management Software

SystemGlobe NEC Storage BaseProduct Ver3.3 (or later) - NEC Storage S1400 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
- Collection of error log

## 2.5 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.



## 2.6 RAID Configuration

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

RAID type	RAID1	RAID5	RAID6 *1	RAID10	RAID50
Number of logical drives in configuration	1+1	4+1	6 to 120	2x2, 4x2, 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 6.7TB	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.

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

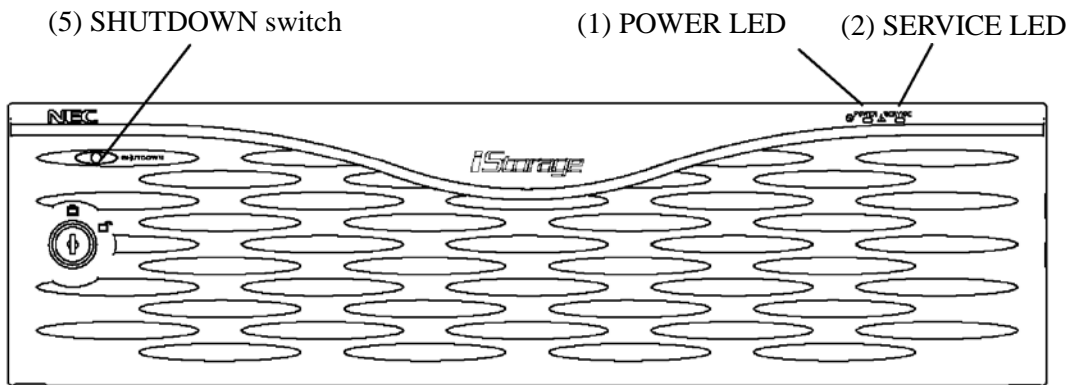
The RAID types have the following characteristics.

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 when doubly failed. 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

### 3. Names and Roles of Sections

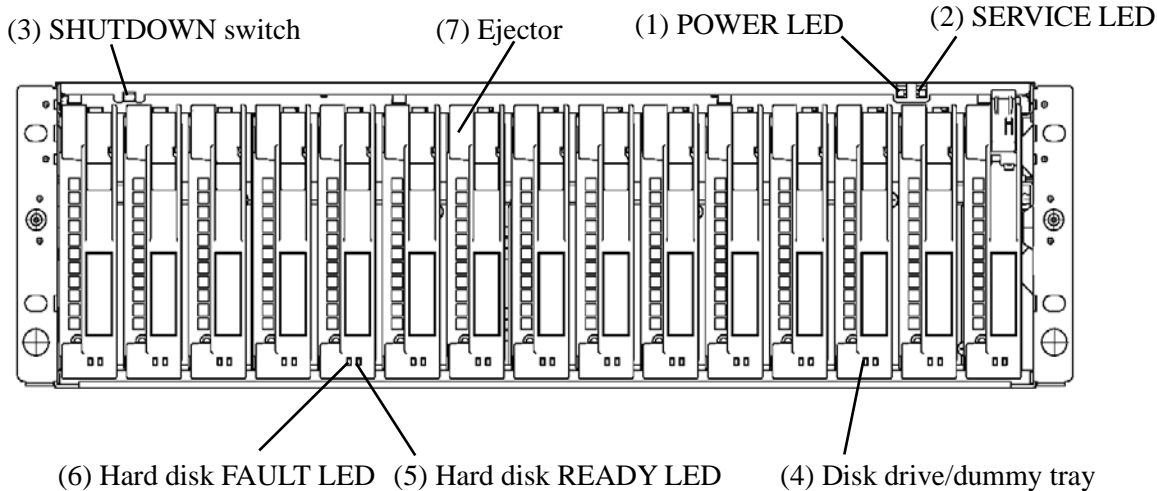
This chapter describes the names and functions of the sections in the disk array unit.

#### 3.1 Front View



A front mask is installed on the front face of the disk array unit as shown in the figure above. The front mask can be removed by releasing the lock with the accessory key and pulling out toward you with your hands hooked on the both sides of the mask.

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



### (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 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 being 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 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

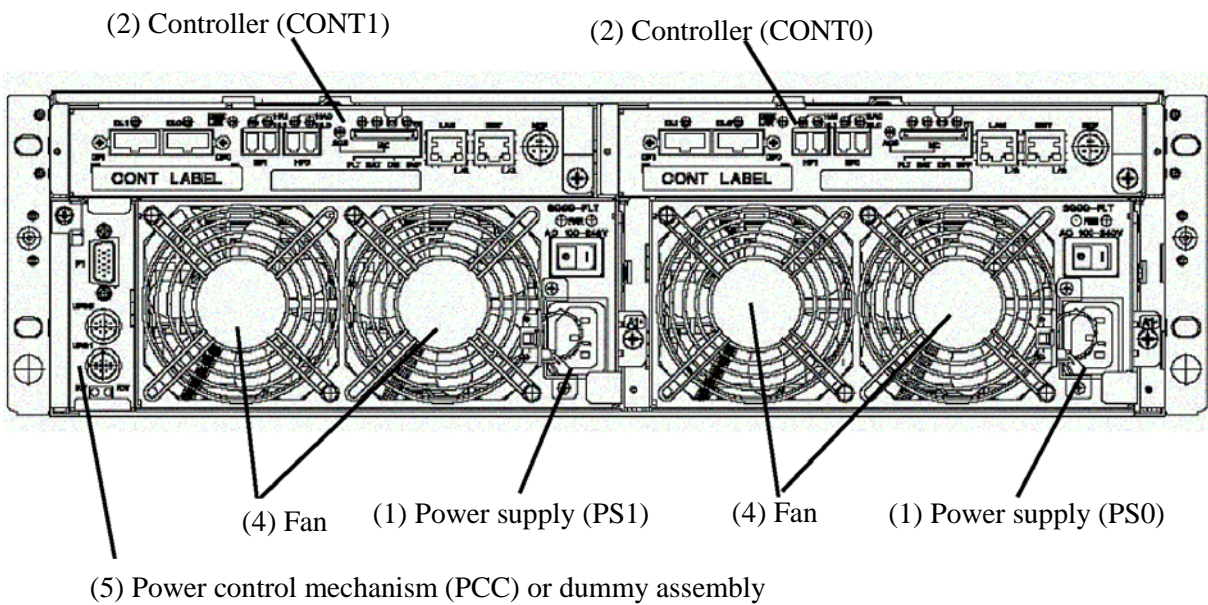
Use the ejector to install/remove the disk drive or dummy tray.

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 malfunction.

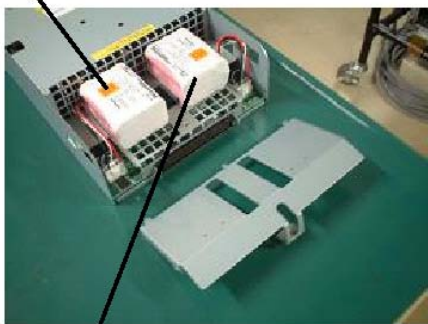
3.2 Rear View



(3) Battery backup unit (standard configuration)



(1) Power supply



(3) Battery backup unit (option)

#### (1) Power supplies (PS0/PS1)

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

#### (2) Controllers (CONT0/CONT1)

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

In the standard configuration, one battery backup unit is installed in each power supply.

The battery backup units are also provided as optional batteries (NF1400-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 ventilating holes are not blocked.



- Install the disk array unit so that the ventilating holes may not be blocked. If either or both of the ventilating holes are blocked, the internal temperature of the disk array unit may increase to cause a fault to occur.
- 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 safety operation of the disk array unit, replace the power supply immediately if a fan failure occurs.

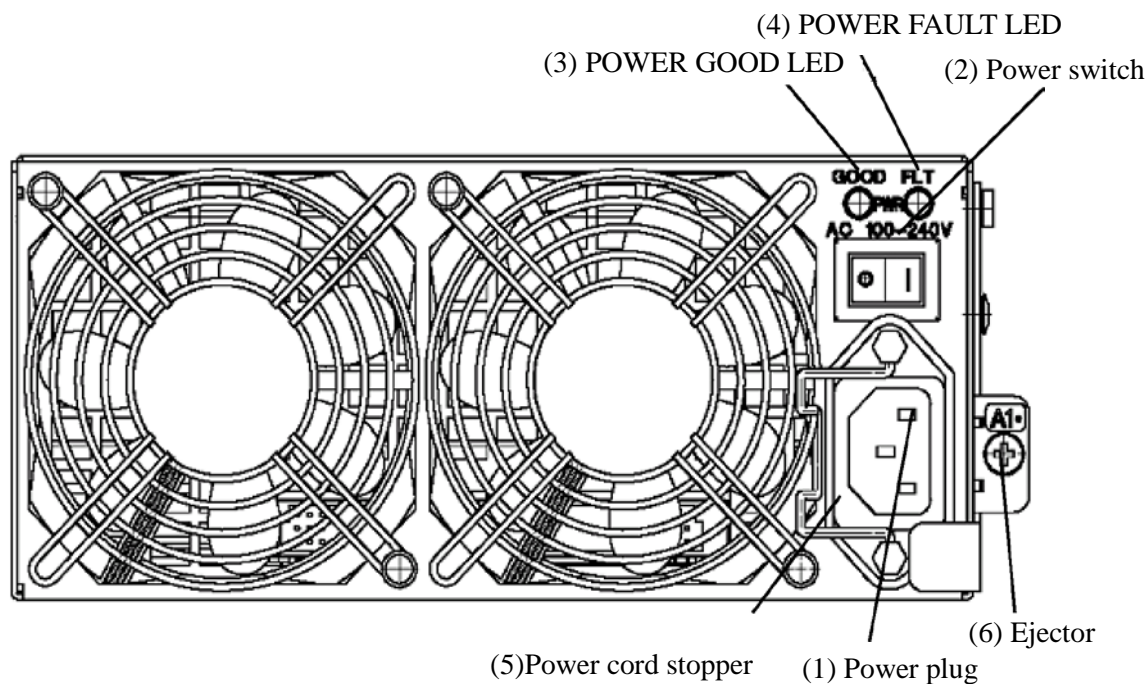
#### (5) Power control card (PCC)

A power control card can be additionally installed as an option for the NF1400-SR40E only. In the standard configuration, a dummy assembly is installed as a cover in place of the power control card.

When the disk array unit is turned OFF, the power control card is used for writing the remaining cache data from the disk array unit into the disk drive according to the instructions from the external power controller.

See "3.6 Power Control Card" for details.


### 3.3 Power Supply



#### (1) Power plug

The power plug is intended to supply power to the disk array unit. Connect the attached 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 the redundant power configuration to prevent the entire unit from being shut down by a single failure. In this configuration, connect two power cords in use of the disk array unit.



While the disk array unit can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the disk array unit can only accept 100 VAC. Use 100 VAC (50/60 Hz) when the attached power cord is used. Using power of 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 the redundant power configuration to prevent the entire disk array unit from shutting down due to a single failure. Therefore, turn on/off the two power switches when operating the disk array unit.

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

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

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

---

**NOTE:** The shape of the power cord stopper may be different from the figure here. See "5.5 Connection of Power Cords".

---

### (6) Ejector

Use the ejector to install/remove the power supply.

To use the ejector, loosen the screw that secures the ejector.

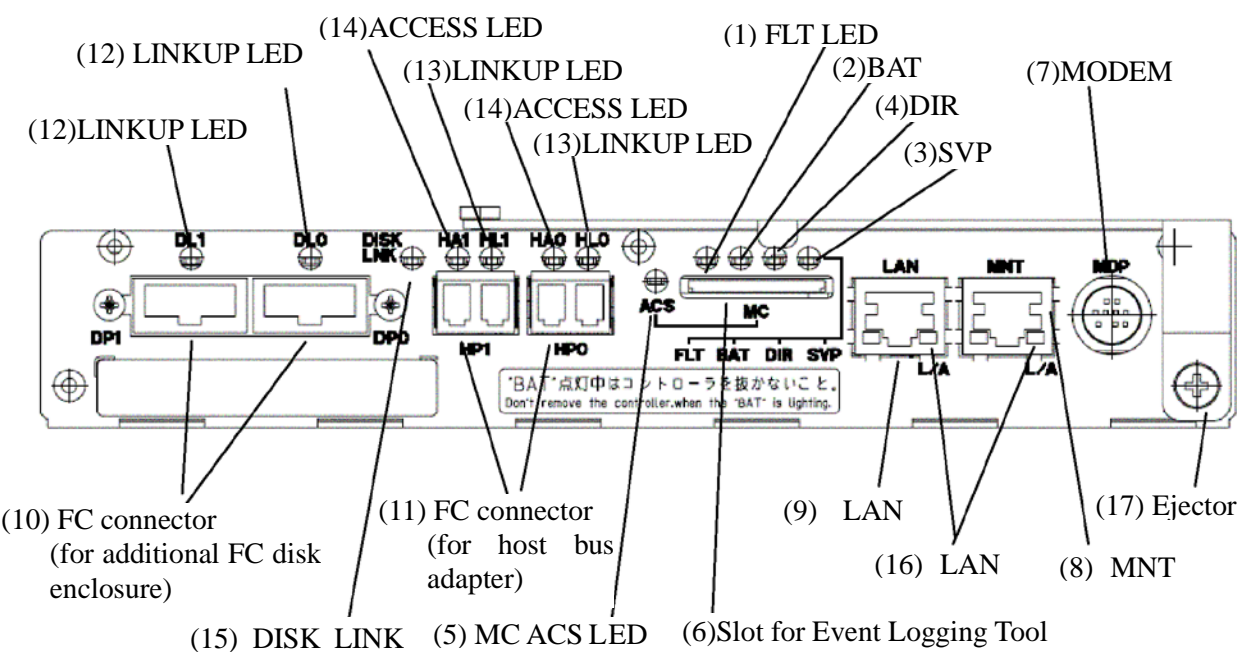


When inserting the power supply into the disk array unit, push it as far as it will go and then secure it with the screws.  
Incorrect insertion may cause a power supply failure again.



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

### 3.4 Controller




#### (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 controller supplying power normally in such a case as 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 operates normally.

#### (4) DIR LED (green)

The SVP LED flashes green when the Director Control processor (DIR) in the controller operates normally.

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

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



## **(6) Slot for Event Logging Tool**

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

## **(7) Modem connector**

Don't use for the un-support.

## **(8) MNT connector**

Use this connector to connect with maintenance PC.

## **(9) LAN connector**

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

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

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

See Chapter 4 "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 4 "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 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 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 just after power-on.

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

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

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

## **(17) Ejector**

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

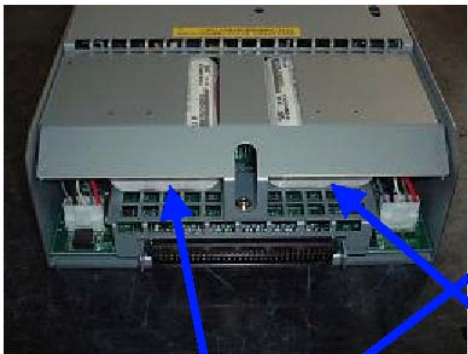


When inserting the controller into the disk array unit, push it as far as it will go and then secure it with the screws.  
Incorrect insertion may cause malfunction.

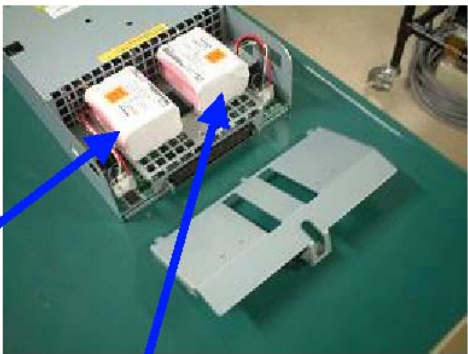
### 3.5 Battery Backup Unit



(1) Connector




BBU (Standard)



BBU (Option)

#### (1) Connector

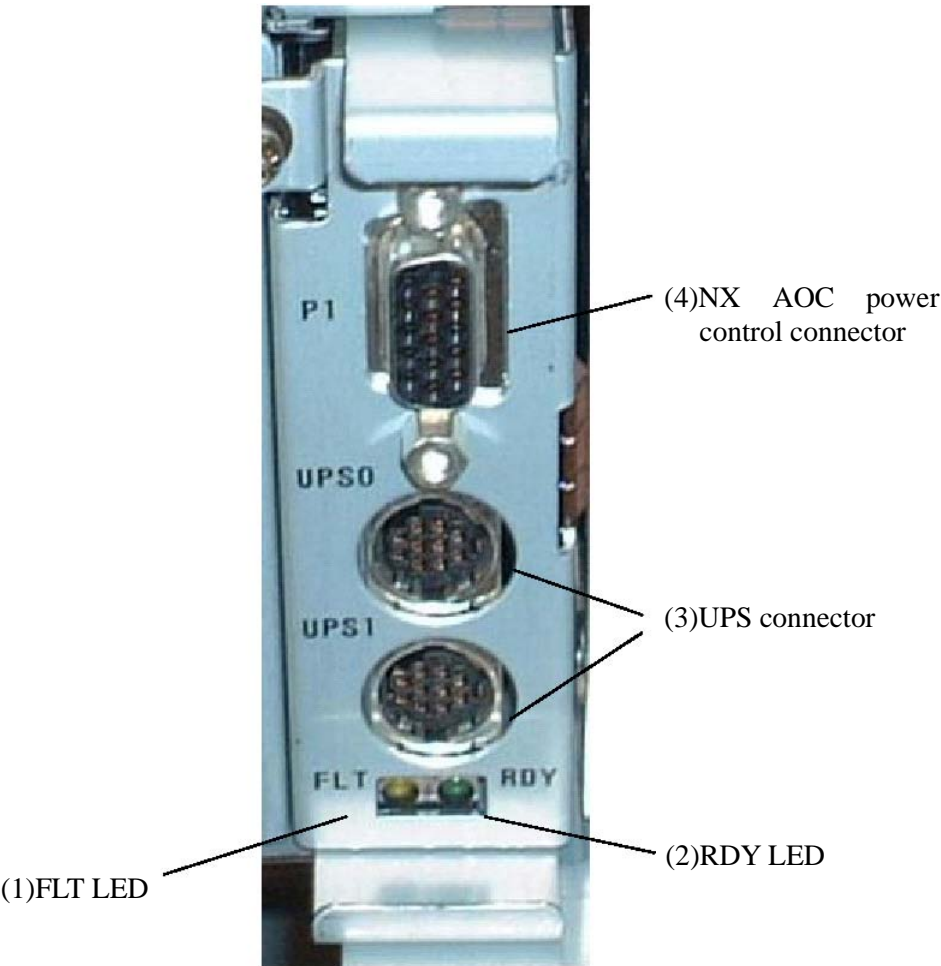
The connector is used to connect the battery backup unit with the power supply.



- Note the following points on replacing or additionally installing a battery backup unit:
  - A replacement or additional battery backup unit must be of the type used in the standard configuration.
  - The standard battery backup unit must be installed on the left side. (See the figure above.)
  - The optional battery backup unit must be installed on the right side. (See the figure above.)
- 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.
- When installing the battery backup unit in the power supply, push in the connector until it is locked.  
If the connector is not fully inserted, the battery backup unit may not be enabled.

### 3.6 Power Control Card (NF1400-SP03E)

**NOTE:** The power control card is an option for the NF1400-SR40E only.



**(1) FAULT LED (FLT LED) (orange)**

The FAULT LED lights orange when the power control card fails.


**(2) READY LED (RDY LED) (green)**

The READY LED lights green while the power control card is operating normally.

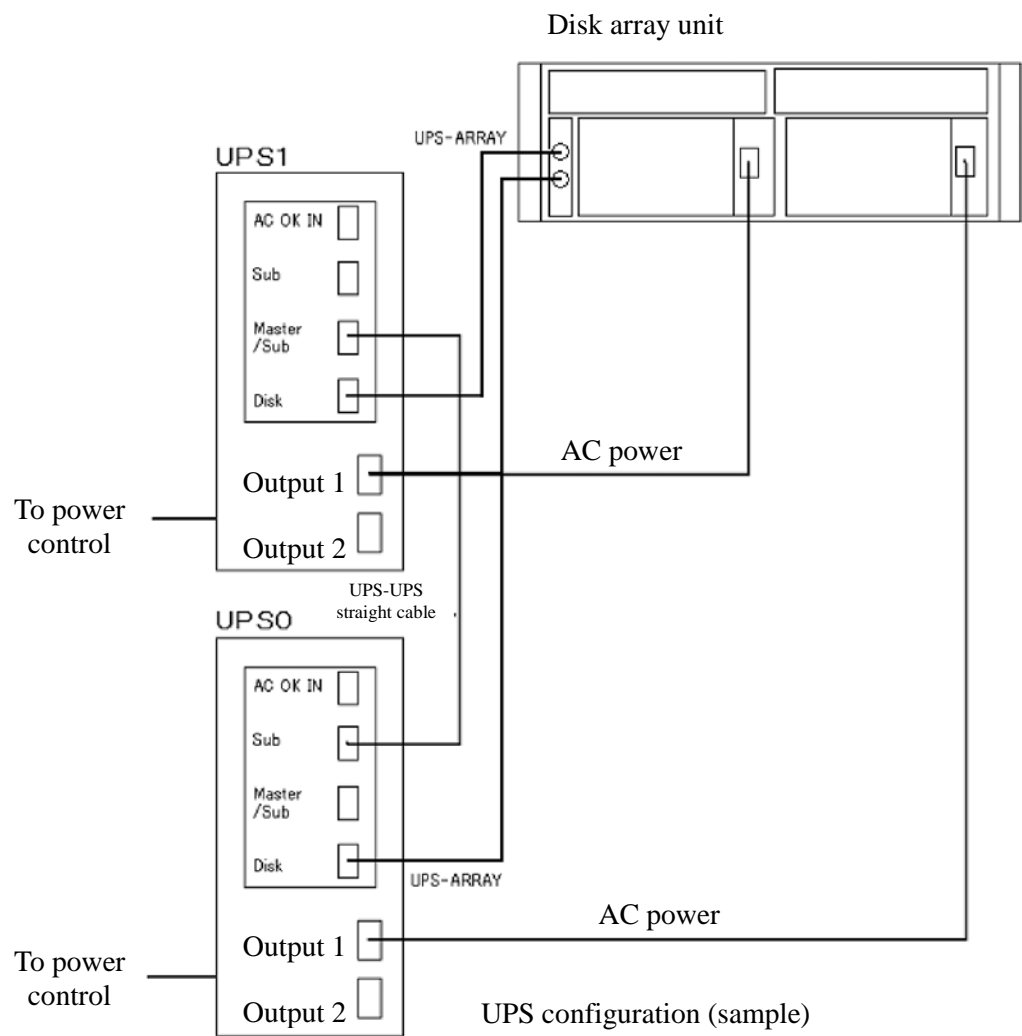
(3) UPS connectors (UPS0/UPS1 connector)

If the system is configured for receiving AC power from an uninterruptible power supply (UPS), the UPS connector is used as a signal connection connector in order to link up with the UPS.

If you configure a system using UPS, stable system operation is ensured even if an unexpected power failure or a momentary AC power failure occurs.



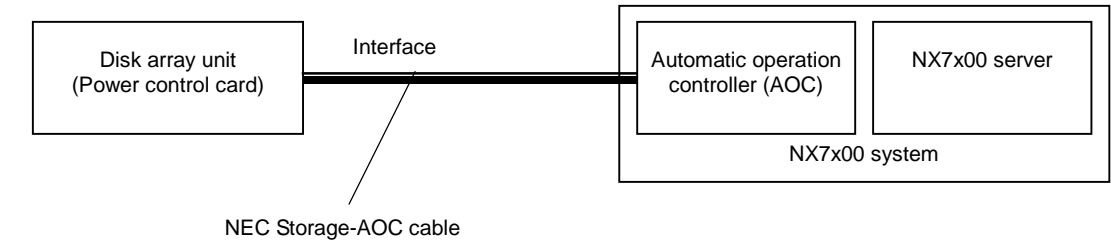
- Ask your NEC sales representative for the system configuration using UPS.
- For the reconnection of the system after configuration, ask your NEC maintenance service representative who has technical knowledge. If you reconnect the system by yourself, the UPS may not function normally when it is started due to a power failure, thereby stopping system operation or losing data.




**(4) NX AOC connector (P1 connector)**

This connector is used to connect the automatic operation controller (AOC) of the NX7000/NX7700i system in order to provide power control.

<Example of connection>








When inserting the power control card into the disk array unit, push it as far as it will go and then secure it with the screws.  
Incorrect insertion may cause malfunction.

# 4. 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.

Take care of the matters described in Chapter 1 "Notes on Installation and Handling of Disk Array Unit" in doing the jobs.

 <b>CAUTION</b>	
 	<ul style="list-style-type: none"><li>■ Do not give shock and vibration to the disk array unit. Excess shock or vibration may cause the disk array unit to be defected.</li><li>■ While the disk array unit can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the disk array unit can only accept 100 VAC. Use 100 VAC (50/60 Hz) when the attached power cord is used. Using power of different voltage may cause electric shock, smoke, and/or fire to occur.</li></ul>

## 4.1 Installation and Connection Procedures

- Check of components in package

Check the components in the package following "Check of Components in Package". If any component is missed, contact your sales representative.
- Installation onto the rack

Install the disk array unit on the rack according to Appendix D "Installing Unit on Rack".
- Connection of 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 FC cable

Use the cable compatible with the disk array unit.

Insert the connector until the latch emits a click.

Do not bend the cable forcibly.

When disconnecting the cable, be careful not to apply excessive force to it. Hold and remove the connector pushing the latch.
- Connection of the Ethernet (LAN) cable

To prevent malfunction, use the Ethernet (LAN) cable of the shielded type.

Insert the connector until the latch emits a click.

Do not bend the cable forcibly.

When disconnecting the cable, be careful not to apply excessive force to it. Hold and remove the connector pushing the latch.

- Connection of power cord

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

- Set of parameters


For setting 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 resource status for 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.





# 5. Connection of 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 the responsibility for any damage of the disk array unit and components and any influence resulting from the operation of the disk array unit. NEC recommends that you ask your maintenance engineer of the maintenance 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. In the 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.
- Treat any connector carefully so that it may not be dropped on the floor to be damaged. Do not drag any connector on the floor to have dust adhere to the connector.
- Do not give excess force to the connector and cable connected with each other. Do not step or put a substance on a cable to deform the cable.



- 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 in the following procedure.
  - Blow parts cleaning gas (e.g. air splay) to the connector of the optical fiber cable for several seconds.
  - Wipe the connector with non-woven cloth soaked with alcohol for several times.
  - Blow the parts cleaning gas to the connector again.
- Since DE cable has a possibility that a deterioration of an electrical quality and/or mechanical destruction (disconnection) may arise if it is handled inappropriately, be careful of the following points.
  - Cabling should have a margin in order to prevent excessive stress to connectors and/or cables.
  - Never give cables a jerk or stress.
  - The cables should be kept 50mm of curvature radius or more.

## 5.1 Notes on Connection of Disk Array Unit

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

### (1) 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).

### (2) Cable length limit

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

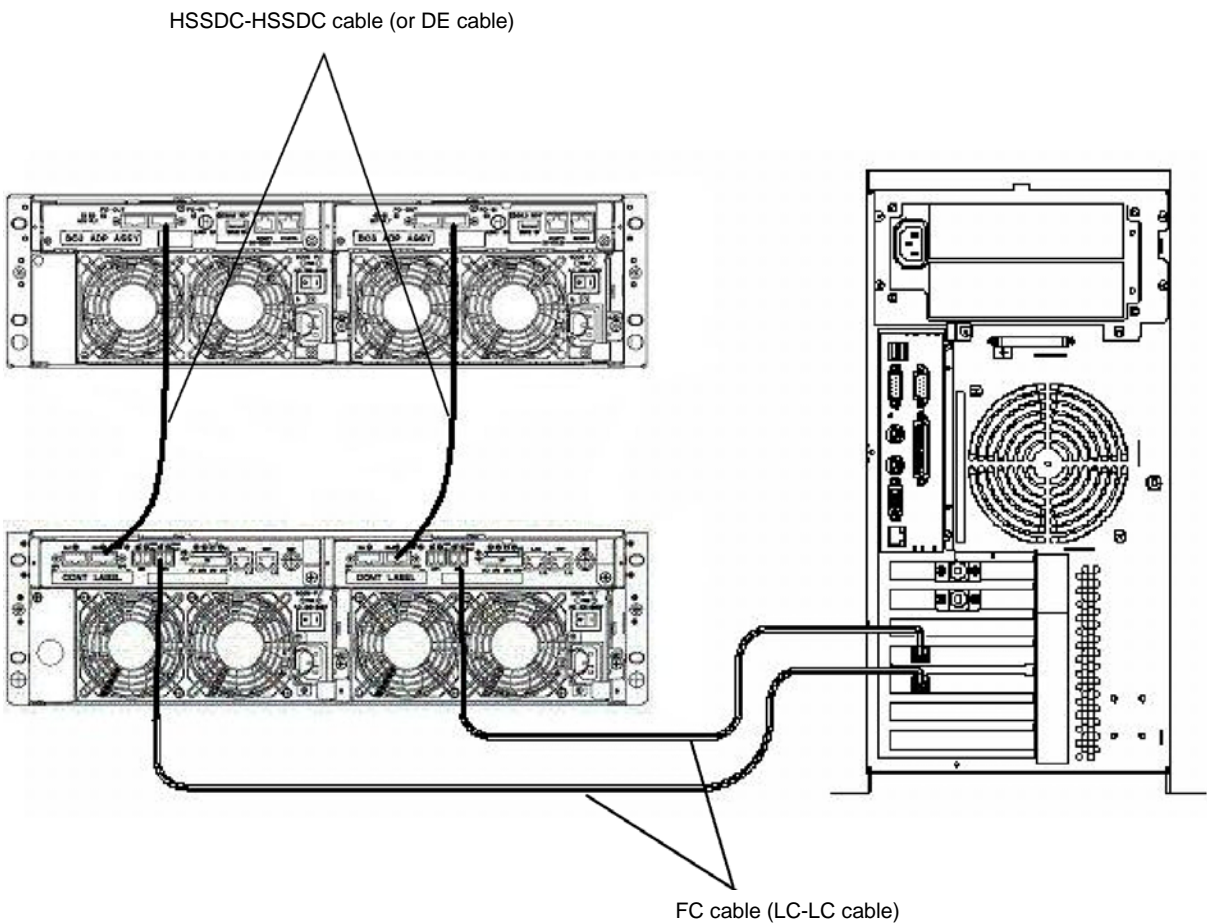
FC optical cable for operating the host interface at 2Gbps: Up to [300 m]

## 5.2 Connection of Disk Array Unit

This section shows recommended connection samples.

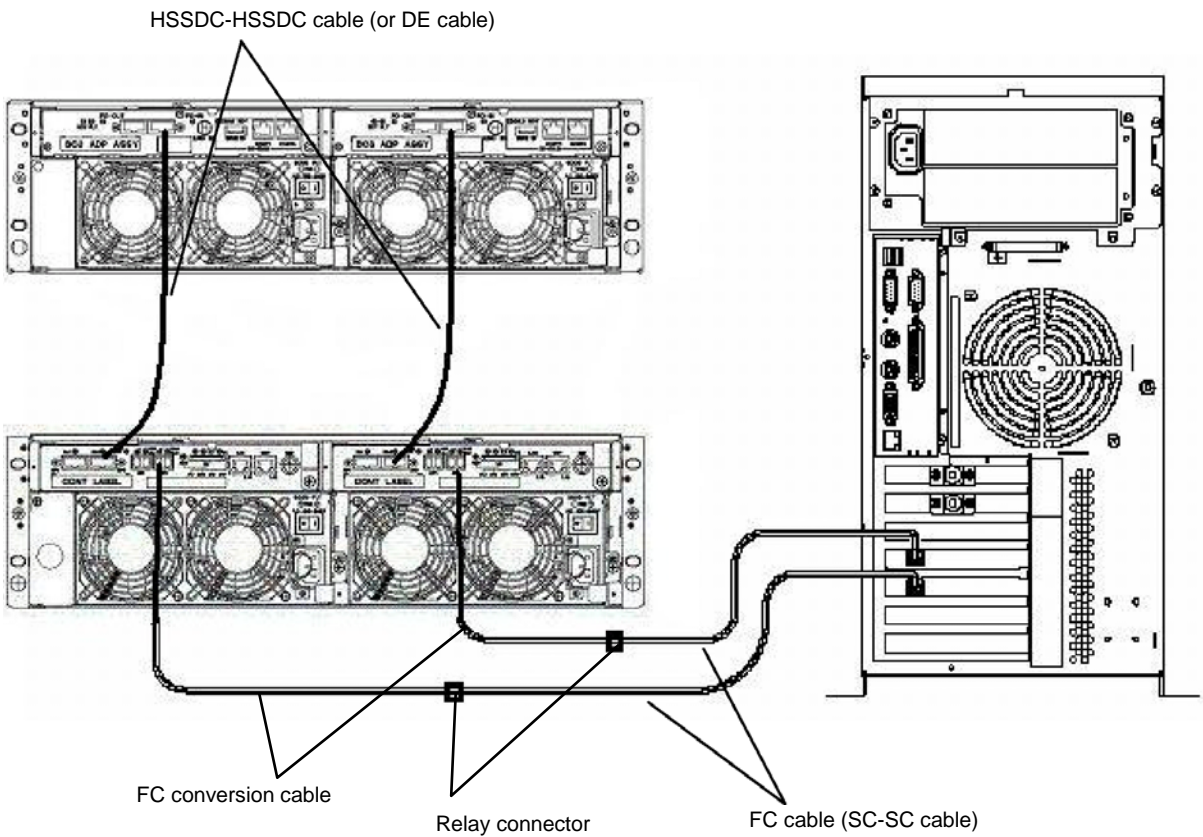
To make any of the recommended connections, you need to connect two host bus adapters installed in the host system. Two LC-LC cables (or two SC-SC cables and two FC conversion cables) are necessary for connecting the disk array system with the host bus adapters.

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



\* The additional FC disk enclosure is optional.  
See Section 6.2 "Addition of Disk Enclosure".

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

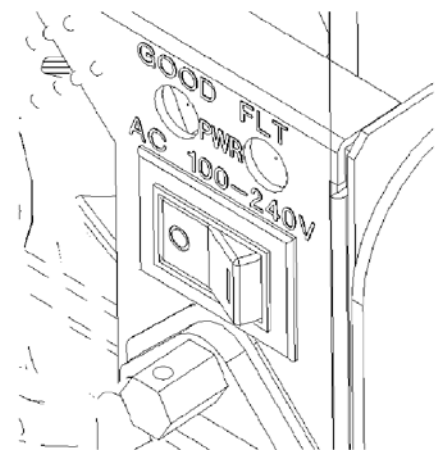


\* The FC disk enclosure is optional.  
See Section 6.2 "Addition of Disk Enclosure".

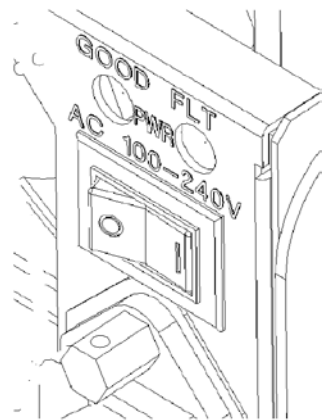
Connect the disk array unit with the host system by using an FC cable in the following procedure.

**(1) Check of Power Supply**

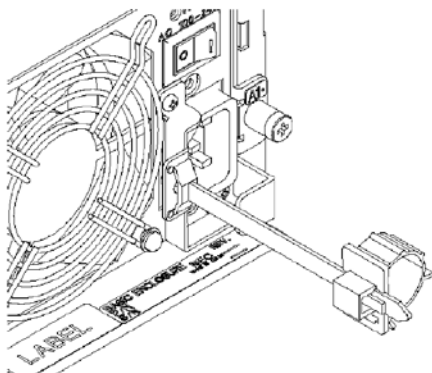
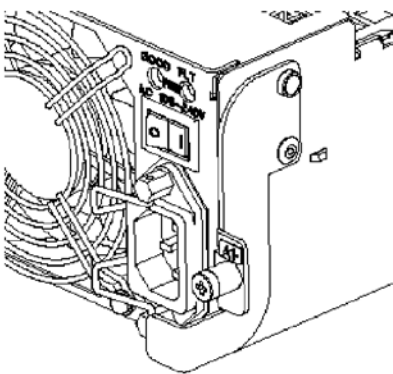
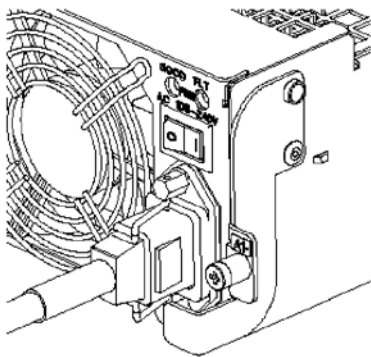
Check that the power switch on the disk array unit and those on the host system including the host bus adapters or FC\_AL switch are set to OFF and the plugs of the power cords are removed from AC outlets.



OFF




ON



(2) Connection of disk array unit with host system

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

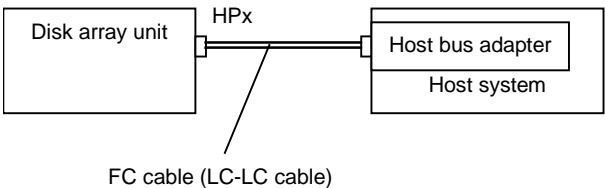
Use the separately priced FC cable (NF9320-SJ0xE). Push the connector at either end of the cable into the FC connector (HPx) for the host bus adapter of either controller (CONT0 or CONT1) until a click is heard. The FC cable has the same connectors at both ends. Either connector may be connected to the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



Pushing any connector excessively may injure the tip to decrease the optical intensity, which will then cause 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>



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

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

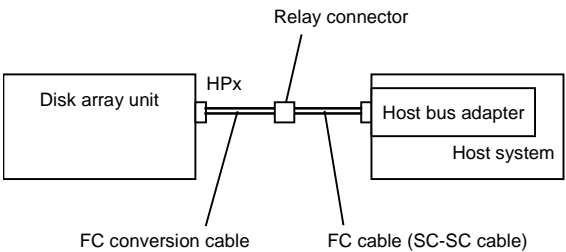
Use the separately priced FC conversion cable (NF9310-SJ10E). The cable has different-size connectors at the ends. Push the smaller connector into the FC connector (HPx) for the host bus adapter of either controller (CONT0 or CONT1) until a click is heard.



Pushing any connector excessively may injure the tip to decrease the optical intensity, which will then cause malfunction to occur.

Connect the other end of the FC conversion cable to the separately priced 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>




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.

### 5.3 Connection of Disk Array Unit as Additional Unit

This section describes the procedure of installing the disk array unit itself additionally.

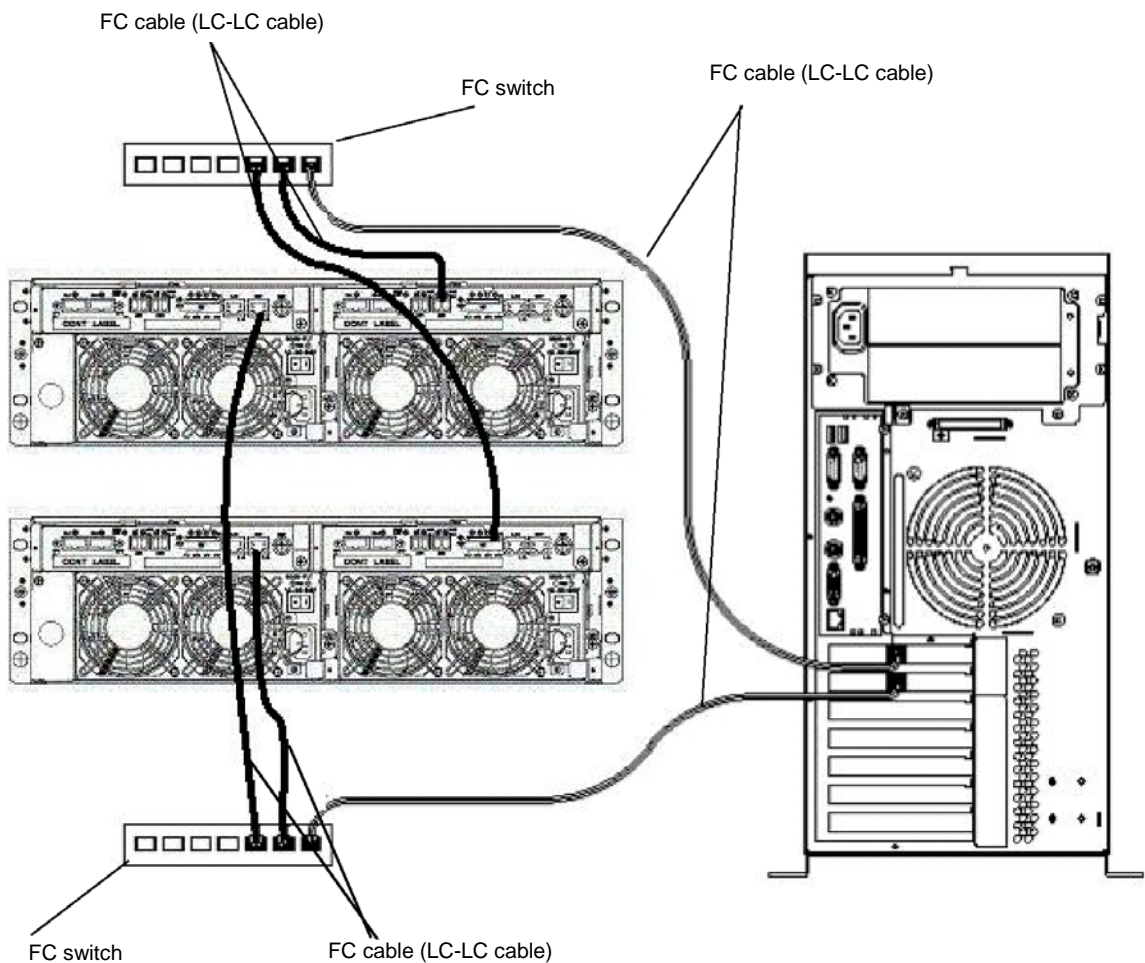


- The following describes a sample connection when a single disk array unit is installed additionally in a system containing another disk array unit.
- For the actual expansion job and system configuration, contact your service engineer of the maintenance service representative with expert knowledge on the disk array unit.

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

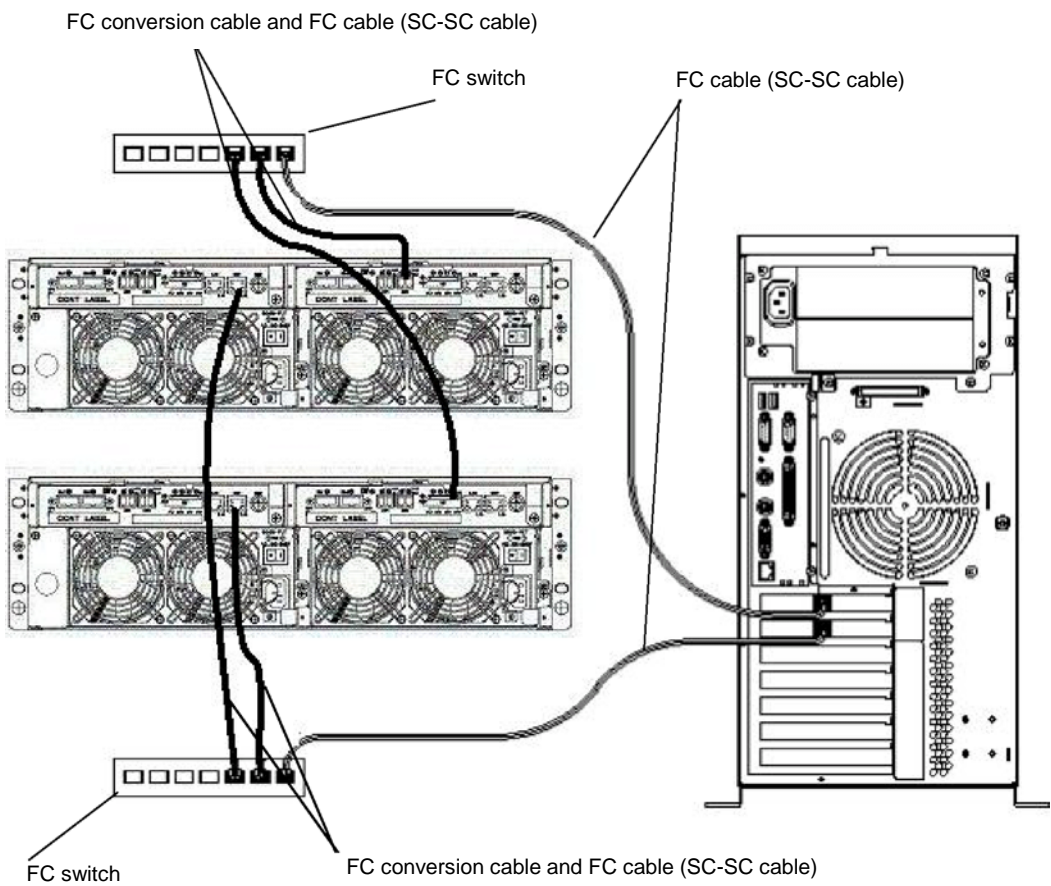
Six LC-LC cables (or six SC-SC cables and four FC conversion cables) are necessary for connecting the FC switch and host bus adapters.

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





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



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



## (1) Check of 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.

## (2) Connection of disk array unit with host system

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

Use the separately priced 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 injure the tip to decrease the optical intensity, which will then cause 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 "SC" type

Use the separately priced 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 injure the tip to decrease the optical intensity, which will then cause 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 separately priced 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.

## 5.4 Connection of Ethernet Cable

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

### (1) Installation of Ethernet cable

Connect the separately priced 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 Ethernet.

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




- Use straight STP cable, in case that controller and PC are connected through a hub and so on.
- Use cross STP cable, in case that controller and PC connected directly.

STP : Shielded twisted pair



Only connecting the Ethernet cable to the controller cannot make it possible to use the WebSAM NEC Storage Manager through Ethernet. Refer to the manual that comes with the software for details of WebSAM NEC Storage Manager.

## 5.5 Connection of Power Cords

 <b>WARNING</b>	
 	<ul style="list-style-type: none"><li>■ Do not concentrate power cords only to some AC outlets. If so, fire may occur.</li><li>■ Do not connect the plug of a power cord to an AC outlet with a wet hand. If so, you may be electrically shocked.</li><li>■ Do not put a heavy substance 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.</li></ul>

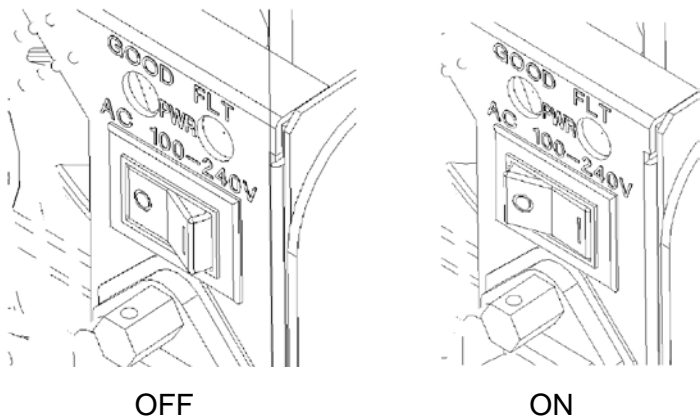
Be sure to use the power cords provided with the disk array unit.

Connect the power cords in the following procedure.

The disk array unit has the 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.

### (1) Check of power supply

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



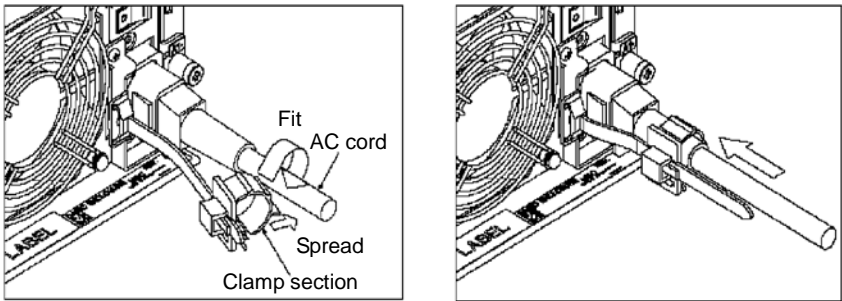
(2) Connection of power cords

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

**NOTE:** If the lock of the power cord is different from the figure above, connect the power cords according to the procedure below.

As shown in the left figure below, open the AC cable clamp, fit the power cord into it, and lightly lock the clamp.

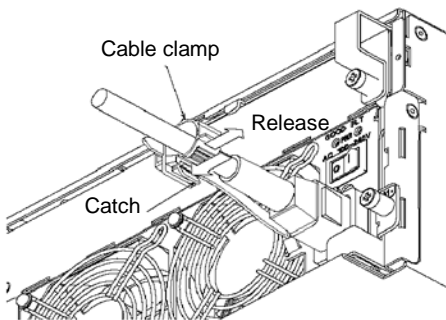
As shown in the right figure below, move the clamp in the direction indicated by the arrow, and firmly secure the clamp near the root of the plug.



**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.

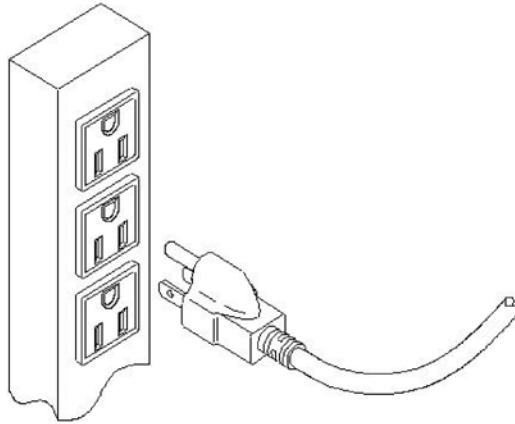
(Power cord disconnection procedure)

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.



### (3) Connection of power plug


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





- While the disk array unit can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the disk array unit can only accept 100 – 120 VAC. Use 100 – 120 VAC (50/60 Hz) when the attached power cord is used. Using power of different voltage may cause electric shock, smoke, and/or fire to occur.

# 6. Addition of Optional Devices

## 6.1 Addition of Disk Drive

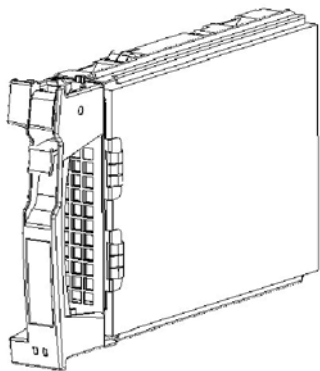
**CAUTION**



- Store the product in an area where high temperature do not occur and the difference between the high and low temperatures is not large. Do not store the product in a place with high humidity and/or much dust.
- Note that foreign substances such as water and metal may not be entered into the product during storage. Failure to follow it may cause device failure, electric shock, and/or fire to occur.
- Store the product in the package during storage.

Up to 15 additional disk drives can be installed in the disk array unit. In the standard configuration, no disk drive is installed in the disk array unit. Therefore, you have to install at least three disk drives in slots 0 through 2.

- For NF1400-SR40E
  - NF1400-SM413E Additional FC disk drive (73GB/10,000 rpm)
  - NF1400-SM414E Additional FC disk drive (147GB/10,000 rpm)
  - NF1400-SM415E Additional FC disk drive (300GB/10,000 rpm)
  - NF1400-SM422E Additional FC disk drive (36GB/15,000 rpm)
  - NF1400-SM423E Additional FC disk drive (73GB/15,000 rpm)
  - NF1400-SM424E Additional FC disk drive (147GB/15,000 rpm)





- In the standard configuration, no disk drive is installed in the disk array unit. Therefore, you have to install at least three disk drives in slots 0 through 2 before you use the disk array unit.
- To install the additional disk drives, install them sequentially from left to right of the disk enclosure.
- An additional disk drive can also be used as a disk drive for a spare disk. In this case, be sure to install the additional disk drive in slot 14. If slot 14 already contains a disk drive for a spare disk, install the additional disk drive in slot 13.



When you change a failing disk to a spare disk, confirm the following to get the spare disk to function normally:

- The capacity of the spare disk is equal to or greater than that of the failing disk.
  - The rotational speed of the spare disk is equal to or faster than that of the failing disk.
- If your disk array unit contains disks of different capacities or different rotational speeds, you should define a spare disk matching the capacity and rotational speed of each disk in order to clarify disk management.

Up to 32 spare disks can be installed for the entire disk array unit.

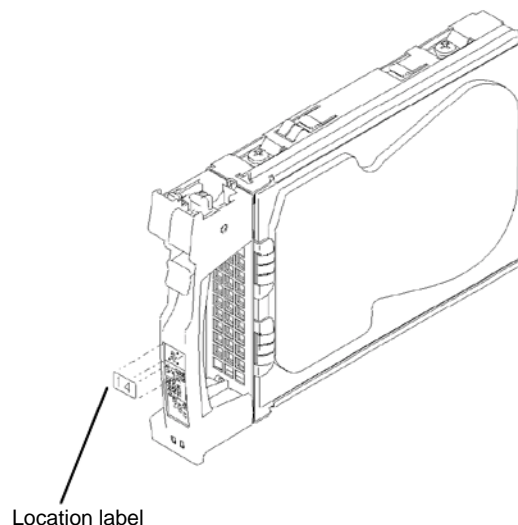
#### <Addition procedure>

Disk drives may be installed in the disk enclosure with the powers of the disk array unit and host unit being ON.

For the replacement of two or more dummy trays and disk drives, replace them one by one. Do not remove two or more dummy trays at a time.

#### (1) Putting of location label

Before installing the disk drive, select the location label appropriate to the location where the disk drive is to be installed, and put it on the additional disk drive.

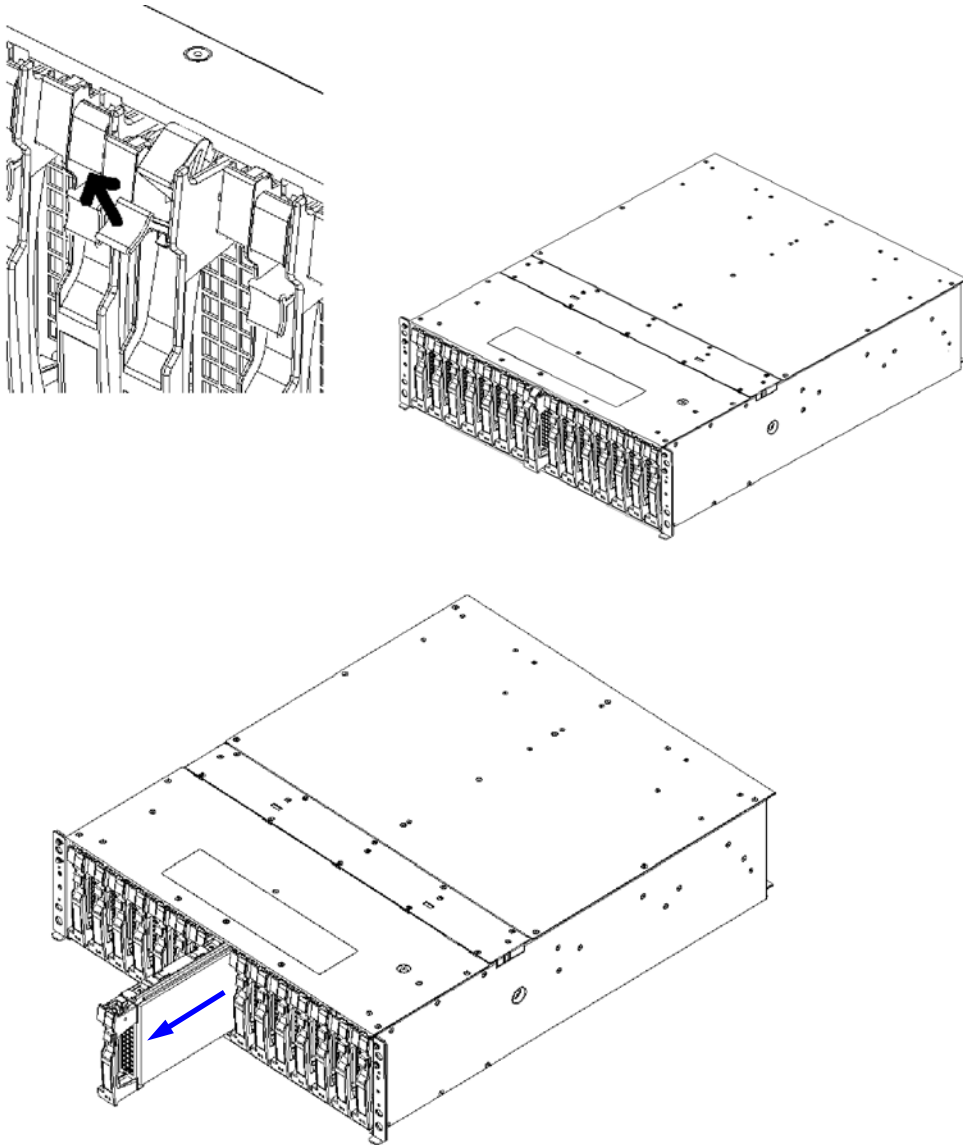




## (2) Removal of dummy tray

Lift the ejector on the dummy tray toward you to release the lock. A click occurs when the lock is released.

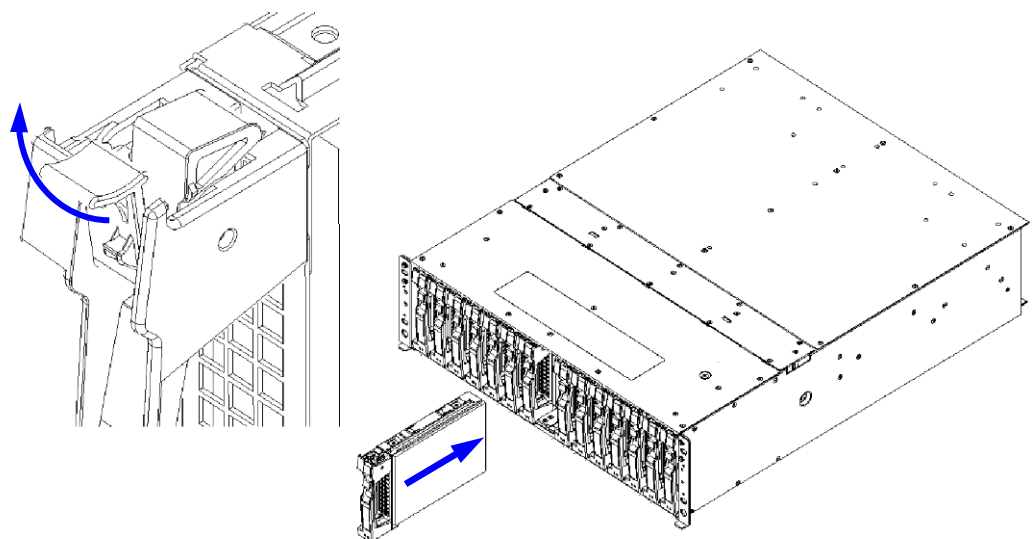
If the lock is released, hold the handle and pull out the dummy tray.



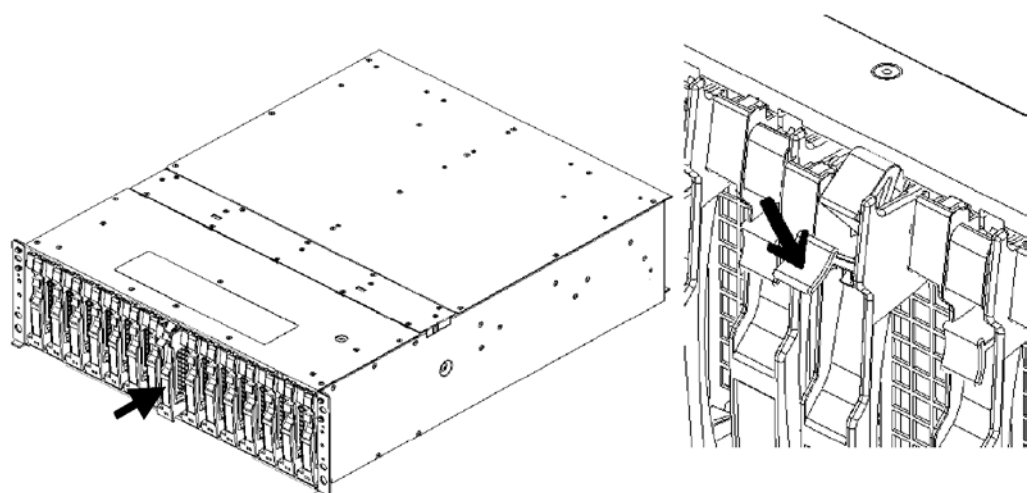
- Be sure to keep removed dummy trays in the safe place.
- After removing an additional disk drive from the unit, be sure to install a dummy tray into the slot. If using the unit without a dummy tray being installed, cooling effect on the disk drives lowers and causes heat generation. Heat generation increases the failure rate, and at its worst it may cause data loss.

**(3) Installation of disk drive**

With the ejector of the disk drive opened, engage the guides on the top and bottom faces of the disk drive with the guide grooves on the disk array unit or additional FC disk enclosure and insert the disk drive to the end.



After the disk drive is inserted to the end securely, push down the ejector opened upward to click for locking.



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



The disk array unit cannot use the disk drive only if the disk drive is installed additionally.  
Provide the proper setting for the disk drive by using the "NEC Storage Manager" or contact the service engineer of the maintenance service agent with the expert knowledge.

(4) Writing information on option label

To allow the options installed in the disk array unit to be found by external view, the label indicating the options available for the installation is put on the disk array unit.

If a disk drive is added, write down the last three digits of model number and a check mark at the corresponding field on the label to indicate the addition as shown in the figure below.




EXTENSION UNIT			DISK MODULE/PCC/BBU/MODEM														NF1400-S	
NF1400-SM 414	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14		NF1400-S	
NF1400-SM 423	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14		NF1400-S	
NF1400-SM	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14		NF1400-S	

Enter the last three digits of model number

Write down a check mark as shown in the figure.

Note: The figure above indicates that a single NF1400-SM423E is installed at location '03' in NF1400-SR40E.  
If NF1400-SM414E is additionally installed in NF1400-SR40E, write down check marks at the locations in which the disk drives are installed, which appears in the area to the right of the model number field.  
If the model number of disk drive additionally installed does not appear in the model number field, enter the last three digits of model number in "NF1400-SM (E)" field as follows.  
When installed NF1400-SM413E, enter '413'  
When installed NF1400-SM414E, enter '414'  
When installed NF1400-SM415E, enter '415'  
When installed NF1400-SM422E, enter '422'  
When installed NF1400-SM423E, enter '423'  
When installed NF1400-SM424E, enter '424'  
Then, write down a check mark at the location in which the disk drive is installed, which appears in the area to the right of the model number field.  
If disk drives are installed at locations '03' and '04,' write down check marks at the '03' and '04' fields.

6.2     Addition of Disk Enclosure

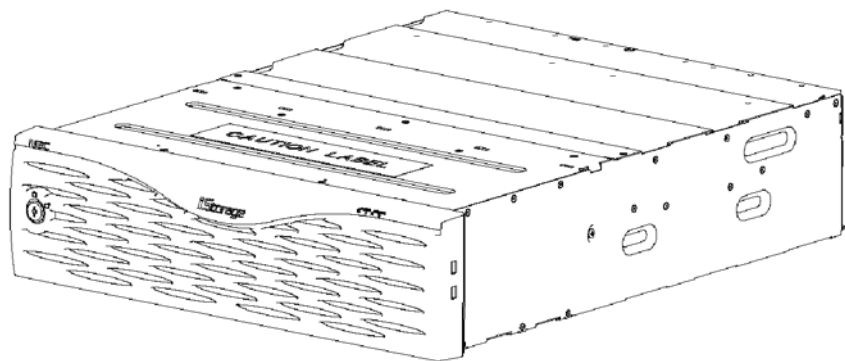
<b>⚠ CAUTION</b>	
	<ul style="list-style-type: none"><li>■ Store the product in an area where high temperature do not occur and the difference between the high and low temperatures is not large. Do not store the product in a place with high humidity and/or much dust.</li><li>■ Note that foreign substances such as water and metal may not be entered into the product during storage. Failure to follow it may cause device failure, electric shock, and/or fire to occur.</li><li>■ Store the product in the package during storage.</li></ul>


The disk array unit can contain up to 15 disk drives in standard mode.

To increase the capacity of the disk array unit, install an additional FC disk enclosure for adding disk drives.

- The NF1400-SR40E can contain up to three additional FC disk enclosures (NF1400-SE42E) with which up to 60 FC disk drives can be installed.

Product name: Additional FC disk enclosure    Model number: NF1400-SE42E



	Make backup copies of necessary data before you start installing an additional disk enclosure. If a disk drive in the additional disk enclosure and a disk drive originally installed in the disk array unit are assigned to the same logical disk, the previously written data will be initialized.
---	--

## <Addition Procedure>

### **(1) Power check**

Make sure that the power switch of the disk enclosure to be added is set to OFF and the plug of the power cords is removed from AC outlet.

The powers of the disk array and host units may be set to ON. However, it is recommended to advance the procedure with the powers set to OFF.

### **(2) Connection of additional FC disk enclosure (NF1400-SE42E)**

Push the connector of the FC cable (HSSDC-HSSDC) provided with the additional FC disk enclosure, or the separately priced DE cable (NF9120-SJ33E/SJ34E) into the FC connector (DP0) for the additional FC disk enclosure of the controller 0 (CONT0) installed in the disk array unit until a click is heard. The cable has the same connectors at both ends. Either connector may be connected to the controller.

Push the connector at the other end of the cable into the FC-IN connector on adapter 0 (ADP0) of the additional FC disk enclosure until a click is heard.

Similarly, connect the FC connector (DP0) for the additional FC disk enclosure of the other controller 1 (CONT1) installed in the disk array unit to the FC-IN connector on adapter 1 (ADP1) of the additional FC disk enclosure.

### **(3) Connection between additional FC disk enclosures**

Use the FC cable (HSSDC-HSSDC) provided with the additional FC disk enclosure or the separately priced DE cable (NF9120-SJ33E/SJ34E). Push the connector at either end of the cable into the FC-OUT connector on adapter 0 (ADP0) of the existing additional FC disk enclosure until a click is heard. The cable has the same connectors at both ends. Either connector may be connected to the adapter of the existing additional FC disk enclosure.

Push the connector at the other end of the cable into the FC-IN connector on adapter 0 (ADP0) of the additional FC disk enclosure to be added until a click is heard.

Similarly, connect the FC-OUT connector on adapter 1 (ADP1) of the existing disk enclosure to the FC-IN connector on adapter 1 (ADP1) of the additional disk enclosure to be added.

#### **(4) Settings of switches**

Before an additional FC disk enclosure can be installed on the disk array unit, the ENC ID switch on the adapter of the additional FC disk enclosure must be set.

##### **Setting of ENC ID switch on additional FC disk enclosure**

Set an ENC ID by using the ENC ID switch on each adapter of the additional FC disk enclosure.

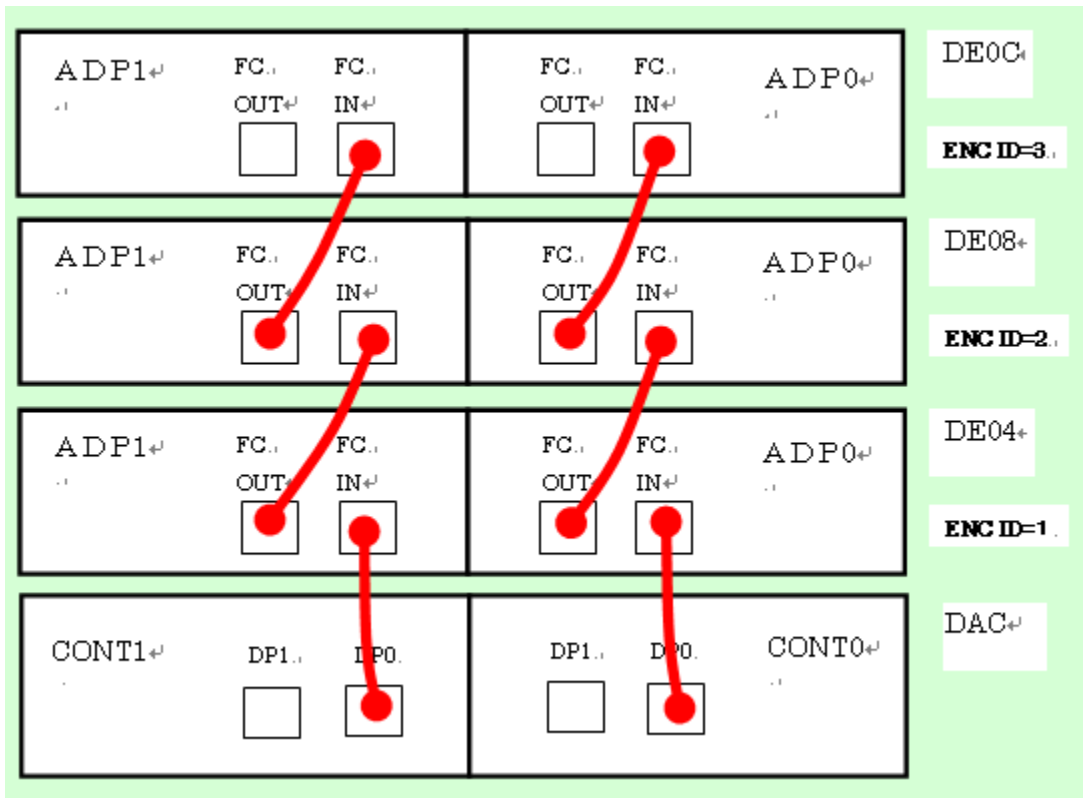
The ENC ID switches on both adapters are factory-set to "0". Set an ENC ID so that it will be different from the ENC IDs of other disk enclosures in the same FC loop.

Set "1" for the ENC ID switches on both adapters in the first additional FC disk enclosure that is connected to the controller via the FC cable (HSSDC-HSSDC). If you have installed additional FC disk enclosures, set the ENC ID switches on both adapters of each additional enclosure to "1", "2", and then "3" in the connection order.

If you set different values for the ENC ID switches on the right and left adapters of an FC disk enclosure, the FAULT LED on each adapter flashes and the disk enclosure fails to start. If you have set different values, turn off the system including the additional FC disk enclosure, set the same value for the ENC ID switches, and then turn on the power.

The cable connection diagram and the setting of the ENC ID switch are shown below.

Cable connection diagram and ENC ID switch setting



NOTES:

- The NF1400-SR40E can contain up to three additional FC disk enclosures (NF1400-SE42E), which are DE04, DE08, and DE0C.



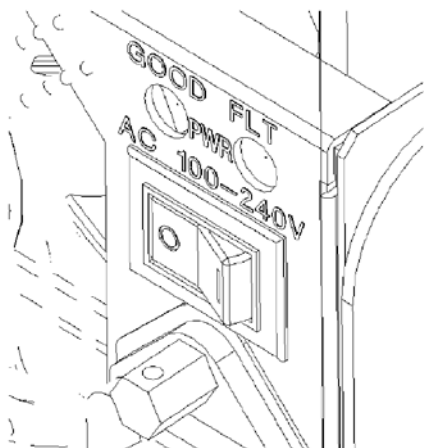
The ENC ID of an additional FC disk enclosure is factory-set to "0". The setting must be changed for the additional FC disk enclosure to be connected to the disk array unit. Set a new ENC ID according to the ENC ID switch setting above. If you start up the system without setting a new ENC ID, disk drive data in the disk array unit may be destroyed.

(5) Installation of additional disk drives

Install the additional FC disk drives you have purchased separately.

**(6) Check of power supply**

Confirm that the power switch of the additional FC disk enclosure is OFF.



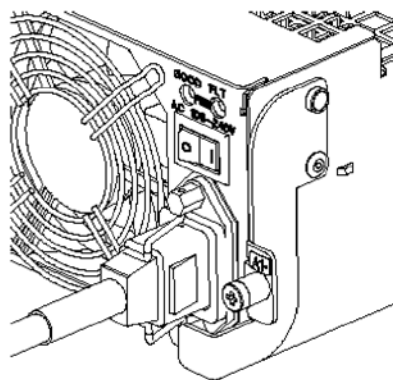
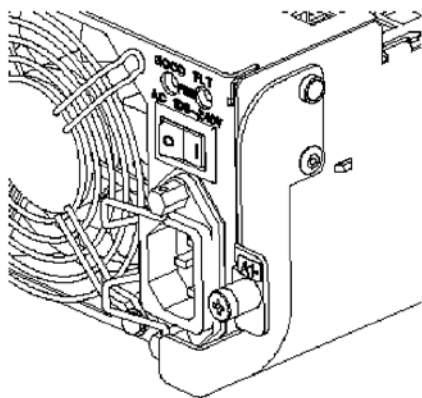
OFF



ON

**(7) Connection of power cords**

Insert the receptacle of the power cord coming with the additional FC disk enclosure into the power plug of power supply, and secure it with power cord stopper.

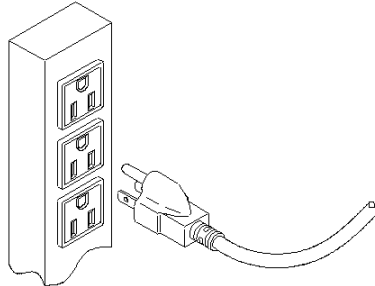


**NOTE:** If the shape of the power cord stopper of the power supply for additional FC disk enclosure is different from the figure above, connect the power cord according to the procedure described in Section 5.5.



## (8) Connection of power plug

Insert the plug of the power cord, provided with the additional FC disk enclosure, into an AC outlet. Since the plug has an earth pin, it must be connected to an AC outlet with an earth terminal as shown below.



While the additional FC disk enclosure can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the FC disk enclosure can only accept around 100 VAC. Use 100 VAC (50/60 Hz) when the attached power cord is used. Using power of different voltage may cause electric shock, smoke, and/or fire to occur.



The disk array unit cannot use the disk enclosure only if the disk enclosure is installed additionally. Provide the proper setting for the disk enclosure through the maintenance PC using WebSAM NEC Storage Manager. Or, contact the service engineer of the maintenance service representative with the expert knowledge. See Appendix C for how to use the maintenance PC.

## (9) Power on of additional FC disk enclosure


Turn the power switch of additional FC disk enclosure to ON.

## (10) Initial setup of controller

Configure the additional FC disk enclosure using the maintenance PC.

See Appendix C "Use of Maintenance PC, 1.2.3 Resource Configuration" for detailed procedure.


6.3 Addition of Optional Battery

⚠ CAUTION	
	<ul style="list-style-type: none"><li>■ Store the product in an area where high temperature do not occur and the difference between the high and low temperatures is not large. Do not store the product in a place with high humidity and/or much dust.</li><li>■ Note that foreign substances such as water and metal may not be entered into the product during storage. Failure to follow it may cause device failure, electric shock, and/or fire to occur.</li><li>■ Store the product into the shipping package during storage.</li></ul>

Addition of an optional battery can extend the battery backup time for the disk array unit. You can add an optional battery while the power switch on the disk array unit is ON.

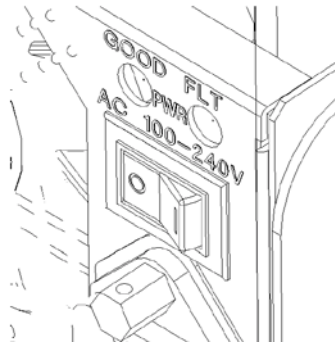
- For the NF1400-SR40E  
Product name: Optional battery                      Model number: NF1400-SZ01E



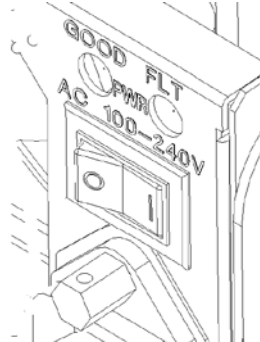
	<ul style="list-style-type: none"><li>■ Note the following point on adding two optional batteries (for two power supplies of the disk array unit) at the same time during operation: Confirm that the standard battery backup unit in each power supply of the disk array unit is fully charged in normal state (Ready state). (You can confirm it from the "WebSAM NEC Storage Manager".)</li><li>■ Prepare the optional batteries before you start the addition procedure.</li><li>■ The power supplies contain the fans for cooling the disk array unit, so cooling is stopped during addition of the optional batteries. In order to minimize the cooling stopped time, familiarize yourself with the power supply replacement procedure to quickly remove each power supply and install it back into the disk array unit.</li></ul>
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<Addition procedure>

1. Turn OFF the power switch on the power supply to which an optional battery is to be added.

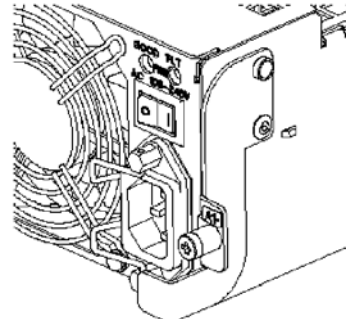
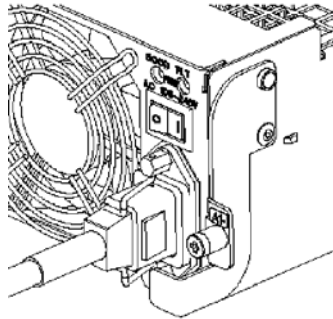


OFF



ON

2. As shown in the figure below, remove the power cord stopper to release the power cord, and disconnect the power cord from the power plug.

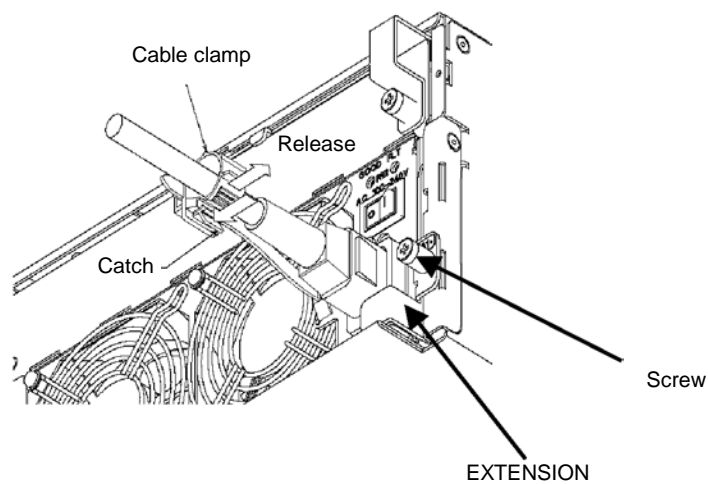


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**NOTE:** If the shape of the power cord stopper of the power supply is different from the figure above, disconnect the power cord according to the procedure below.

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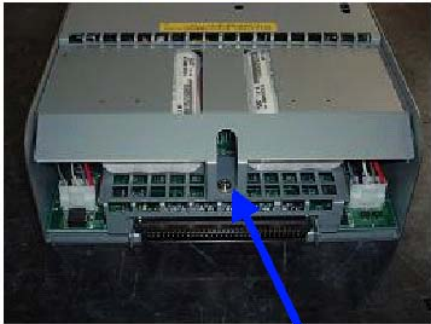
As shown in the figure below, push the catch on the AC cable clamp to release the lock. After releasing the lock, remove the AC cable clamp from the power cable.



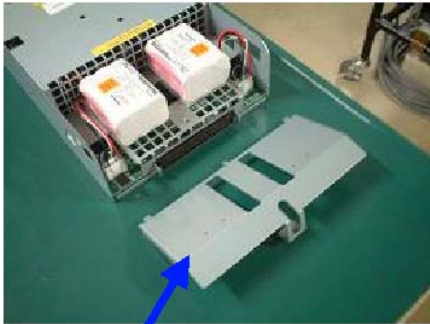
- 3. Loosen the screw that secures the power supply to which an optional battery is to be added.
- 4. Put your finger onto the ejector's protrusion, and pull it forward.
- 5. When the ejector turns 90 degrees, pull out the power supply.



6. Turn the screw that secures the BBU GUIDE to the power supply you removed, and remove the BBU GUIDE.

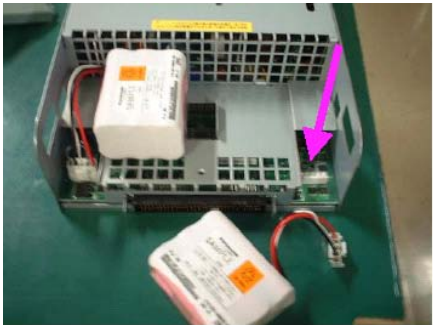


Screw securing BBU GUIDE



BBU GUIDE

7. With the battery backup unit label up, install the optional battery at the position shown in the figure below, and insert the optional battery connector into the power supply connector until it is locked.



(Standard battery) (Optional battery)  
Battery backup unit



When installing a battery backup unit in the power supply, insert the connector as far as it will go.  
Incorrect insertion may cause a power failure or battery backup unit failure.

8. Install the BBU GUIDE (removed in step 7) on the power supply.
- Insert the three points on the end of the BBU GUIDE into the net of the power supply, and place it on the battery backup unit.

9. Install the screw to secure the BBU GUIDE.
10. While the power switch on the power supply containing the added optional battery is OFF, confirm that the power cord is removed from the power plug.
11. While the ejector is open (at the up position), insert the power supply containing the optional battery into the slot as far as it will go.

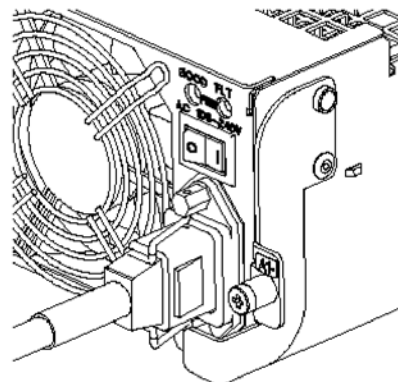
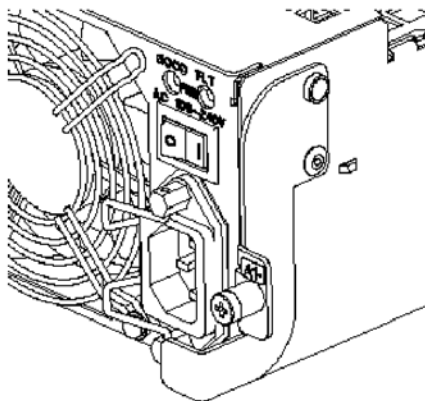


12. Push the ejector's protrusion to turn the ejector (to the down position), and insert the power supply.
13. Tighten the screw that secures the ejector.



When inserting the power supply into the disk array unit, push it as far as it will go and then secure it with the screw.  
Incorrect insertion may cause a power failure.

14. Push down the power cord stopper to the left, connect the power cord, and securely fit the power cord stopper into the power cord socket.





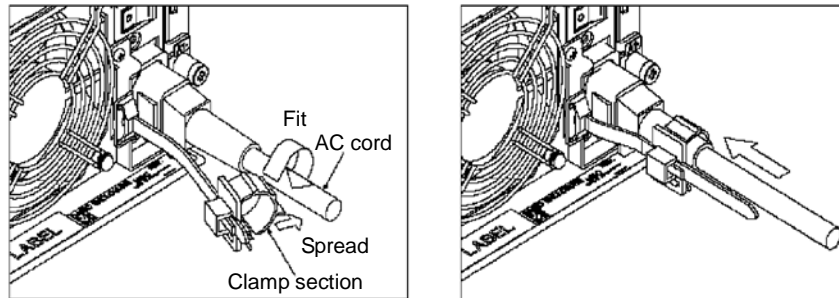
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**NOTE:** If the shape of the power cord stopper of the power supply is different from the figure above, connect the power cord according to the procedure below.

---

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.



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**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.

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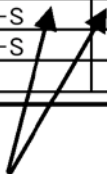
15. Turn ON the power switch on the new power supply.
16. Using the "WebSAM NEC Storage Manager", confirm the status of the battery backup unit containing the added optional battery. Make sure that the battery backup unit is fully charged and is in Ready state.
17. When you finish the confirmation, take steps 1 to 16 for adding an optional battery to the other power supply.
18. Using the "WebSAM NEC Storage Manager", confirm the status of the battery backup unit containing the added optional battery. Make sure that the battery backup unit is fully charged and is in Ready state.

19. Write to the option label.

A label to which you write the options additionally installed is attached on the disk array unit.  
(For the label location, see 6.1 (4) Writing information on option label.)

When you have additionally installed optional batteries, write the model number of the optional batteries and put a circle indicating the additional installation.

EXTENSION UNIT			DISK MODULE/PCC/BBU/MODEM														NF1400-SZ01		○
NF1400-SM	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	NF1400-S			
NF1400-SM	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	NF1400-S			
NF1400-SM	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14				




Write the last three digits of the model number as shown in the figure, and put a circle in the right field.

**NOTE:** The figure above shows an example of writing to the option label when the optional battery NF1400-SZ01E has been additionally installed in the NF1400-SR40E.



## 6.4 Addition of Power Control Card

⚠ CAUTION	
	<ul style="list-style-type: none"><li>■ Store the product in an area where high temperature do not occur and the difference between the high and low temperatures is not large. Do not store the product in a place with high humidity and/or much dust.</li><li>■ Note that foreign substances such as water and metal may not be entered into the product during storage. Failure to follow it may cause device failure, electric shock, and/or fire to occur.</li><li>■ Store the product into the shipping package during storage.</li></ul>

The disk array unit can contain an additional power control card. The scheduled stop procedure can be performed in remote mode by additionally installing the power control card for connection with the host power control unit and controlling the disk array unit through the host power control unit. The power control card can be additionally installed while the power switch on the disk array unit is ON. The power control card is an option exclusively used with the NF1400-SR40E.

- For the NF1400-SR40E only

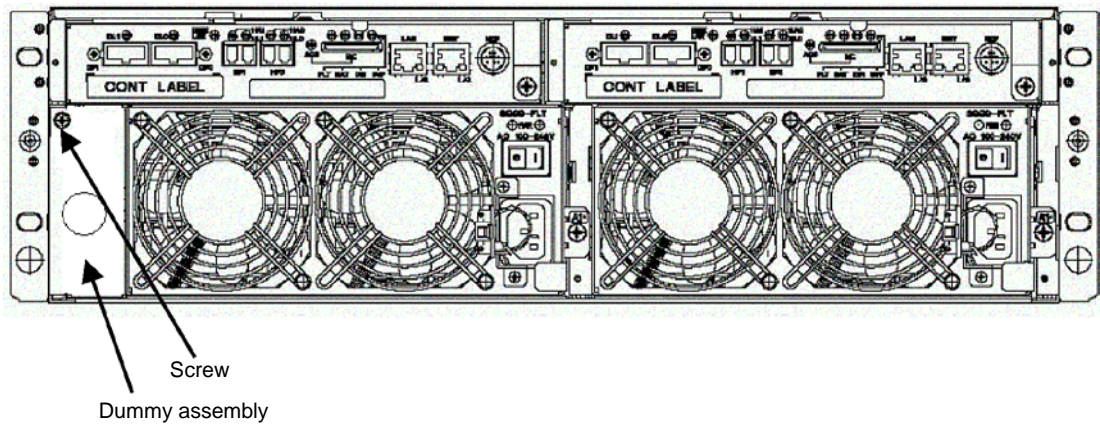
Product name: Power control card    Model number: NF1400-SP03E



<Addition procedure>

1. Remove the screw that secures the dummy assembly to the rear of the disk array unit.

Be careful not to lose the screw.




2. Install the power control card in the disk array unit. Push in the power control card along the rail, and firmly secure it with the screw you removed in step 1.



3. Connect the cable in accordance with the host power control unit that is to be connected with the power control card.
  - Connection to the UPS
 

Connect the cable provided with the power control card. The connectors on the power control card are UPS0 and UPS1.
  - Connection to the NX AOC
 

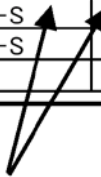
Connect the NEC Storage-AOC cable separately purchased. The connector on the power control card is P1.
4. Connect the maintenance PC, and install the power control card in the disk array unit.  
 (For the usage of the maintenance PC, see "Appendix C Use of Maintenance PC". For the installation method, see "1.2.3 Resource Configuration of Appendix C Use of Maintenance PC".)
5. Connect the disk array unit to the host power control unit.



The host power control unit (UPS or NX-AOC) to be supported depends on your system configuration. Ask your sales representative for the host power control unit. For the usage of the host power control unit, see the instruction manual provided with the host power control unit.

6. Write to the option label.  
 A label to which you write the options additionally installed is attached on the disk array unit.  
 (For the label location, see 6.1 (4) Writing information on option label.)  
 When you have additionally installed a power control card, write the model number of the power control card and put a circle indicating the additional installation.

EXTENSION UNIT			DISK MODULE/PCC/BBU/MODEM														NF1400-SP03		○
NF1400-SM	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	NF1400-S			
NF1400-SM	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	NF1400-S			
NF1400-SM	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14				



Write the last three digits of the model number as shown in the figure, and put a circle in the right field.

# 7. Handling of Disk Array Unit

This chapter describes how to handle the disk array unit.

## 7.1 Notes on Handling of Disk Array Unit

Note the following in use of the disk array unit. Incorrect handling of the disk array unit may cause the unit to be defected and/or some data to be broken.



- If the ACCESS LED (green) on the controller lights or flashes, the disk access operation is indicated on the host system, or the initialization is being executed, do not turn on/off the powers of the disk array unit or host system. Do not reset the host system.
- If the ACCESS LED (green) on the controller lights or flashes and the disk access operation is indicated on the host system, do not give vibrations and shocks to the disk array unit.
- Because the disk array unit is a precision device, it shall not be subject to hard vibration or shock.



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



It is recommended that important files are backed up to magnetic tapes. This enables the damage to be minimized in case of emergency including sudden vibration or shock and power shutdown caused by power interruption.

## 7.2 Power On/Off of Disk Array Unit

This section describes how to turn on or off the power of the disk array unit. Turning on or off the power carelessly may cause some data to be broken, some software to operate incorrectly, and/or the unit to be defected.

### (1) Turning on AC power

- a) Before turning on the power, check for loose disk drives by pushing each disk drive.
- b) Turn on both power switches on the rear of the disk array unit.  
If an additional FC disk enclosure is connected, first turn on two power switches on the rear of the additional FC disk enclosure, and then turn on two power switches on the rear of the disk array unit. Alternatively, turn on the disk array unit and all the additional FC disk enclosures connected with the disk array unit at the same time.

The disk array unit and additional FC disk enclosure have the redundant power configuration to prevent the entire unit from shutting down due to a single failure. Therefore, when turning on the disk array unit, turn on all the power switches (of the disk array unit and additional FC disk enclosures) at the rear of the unit.

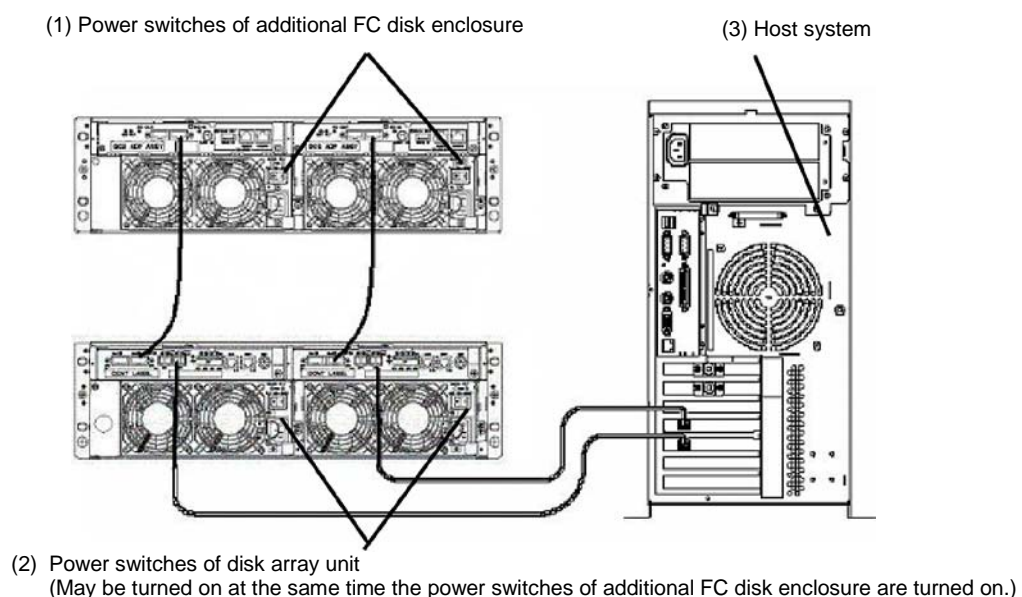
When turning on the power switches, confirm that the POWER GOOD LED (green) of the power supply and the POWER LED (green) on the front panel of the disk array unit and the additional FC disk enclosure go on. Power supply starts, and the POWER LED (green) is on while the power switches are on.

The disk array unit performs the self-test and initialization immediately after the power is turned on. When the self-test and initialization terminate and the disk array unit becomes ready, the DIR LED of the controller on the disk array unit stops lighting and starts flashing. Confirm DIR LED status, and then turn on the host system.

The disk array unit takes seven minutes (at maximum) to start.

#### [Power-on procedure]

Turn on the power switches in the following order (1) to (3):



- c) When you power on the disk array unit for the first time, you need to provide initial setup for the disk array unit by using the maintenance PC.  
For detailed setup procedure, see Appendix C "Use of Maintenance PC".

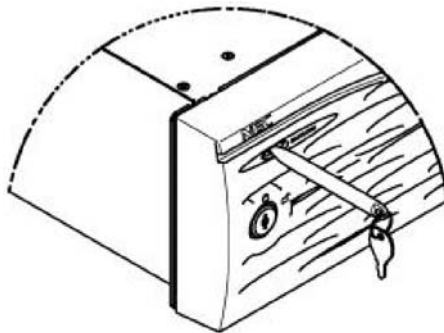
## (2) Notes on turning off AC power

The disk array unit periodically writes data in the cache memory onto a disk drive. If you turn off the AC power before completion of write to the disk drive, the remaining data in the cache memory is backed up by the battery backup units.

However, the backup time is limited. (The backup time depends on the number of installed battery backup units and the battery charged status. See Section 2.2 "Write Cache Feature" for details.). To securely protect data, write all the data remaining in cache memory in the disk array unit onto the disk drive according to the following procedure. Then turn off the AC power according to the procedure explained in "(3) Turning off AC power".

1. Turn off the power of the host system and the host bus adapter or the FC-AL switch.  
Alternatively, offline all the paths connected to the host system that is connected with the disk array unit.
2. Push the SHUTDOWN switch located on the front of the disk array unit by using the stick attached to the key for at least 5 seconds.

Make sure that the POWER LED starts flashing, release the stick from the switch.



3. Confirm that [POWER LED] on the front panel of the disk array unit goes off, and then turn off the AC power according to the procedure explained in "(3) Turning off AC power".

If [POWER LED] lights or flashes, the data in the cache memory is being written onto the disk drive. Do not turn off the AC power.

---

## NOTES:

- If you turn off the AC power of disk array unit during write operation (with POWER LED flashing) by mistake, the system enters the backup mode. Turn on the AC power of the entire disk array unit again. When the disk array unit has started, push down the SHUTDOWN switch to complete the write operation.
  - Writing cache data onto a disk drive takes about 20 minutes at maximum.
  - For details of Snap Shot, see "12.1 Note on Using Snap Shot" in Appendix A "Features of Disk Array Unit".
  - For details of Dynamic Data Replication, see "8. Notes on Use of DynamicDataReplication" in Appendix A "Features of Disk Array Unit".
- 



- When the host system is shut down, it writes the remaining cache data into the disk array unit. The cache data remaining in this host system is written into the disk array unit. Before turning OFF the power, confirm that no cache data remains on the host system and no data remains in the cache memory on the disk array unit.
- To check if data remains in the cache memory on the disk array unit, see the [hard disk drive READY LED] after shutting down the host system. If the [hard disk drive READY LED] is flashing, data remains in the cache memory on the disk array unit. It takes a maximum of about 20 minutes to write the remaining data from the cache memory to the disk drive.



### (3) Turning off AC power

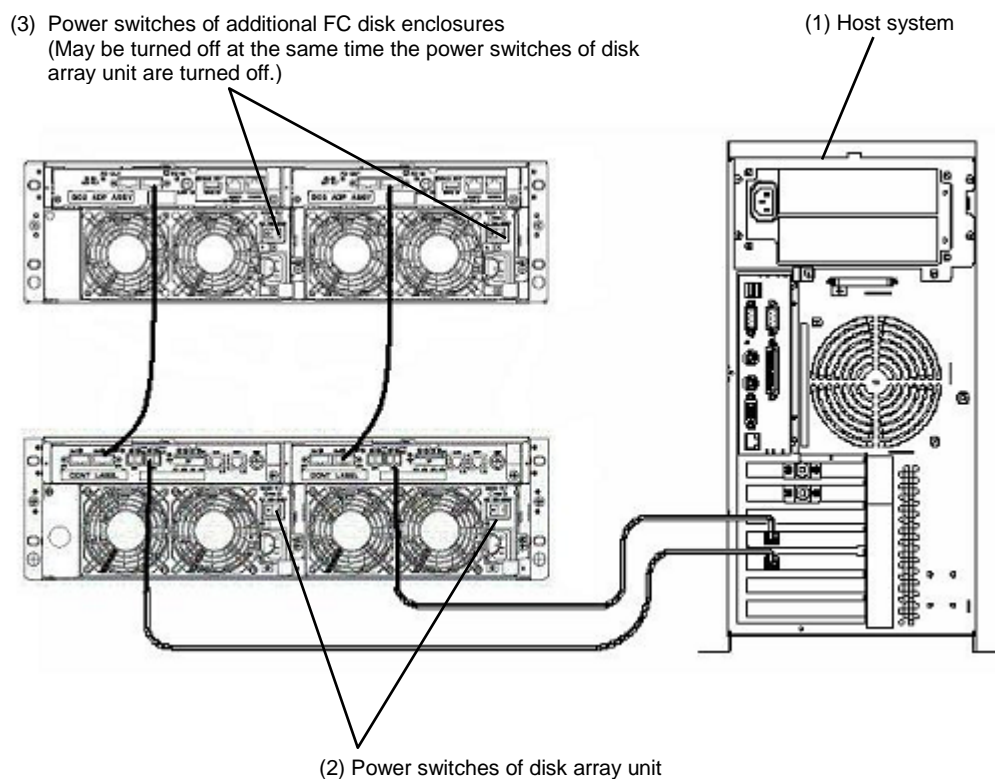
- a) To turn off the power, turn off the host system or the FC-AL switch, and then perform the procedure shown in "(2) Notes on turning off AC power".
- b) Turn OFF the two power switches on the rear of the disk array unit. If an additional FC disk enclosure is connected, turn OFF the two power switches on the rear of the disk array unit, and then turn OFF the two power switches on the rear of the additional FC disk enclosure. You can also turn OFF all the power switches on the disk array unit and the additional FC disk enclosure at the same time.

The disk array unit has the redundant power configuration to prevent the entire unit from shutting down due to a single failure. Therefore, when turning off the disk array unit, turn off all the power switches (of the disk array unit and additional FC disk enclosures) at the rear of the unit.

Be careful that data may be lost if you turn off the additional FC disk enclosures before the disk array unit.

#### [Power-off procedure]

Turn off the power switches in the following order (1) to (3):





## 7.3 LD (Logical Disk) Setting Procedure

When the additional FC disk drives are added to the disk array unit, the RAID type and LD (logical disk) must be set appropriately.

Set the RAID type and LD (logical disk) by using the "WebSAM NEC Storage Manager", or contact the service engineer with expert knowledge in your service representative for setting of the RAID type and LD.



If the disk array unit is connected with NF9520-SH01E (HBA) and used as a basic disk for Windows 2000, changing the LD (logical disk) configuration may cause the OS to fail to recognize the logical disks.  
Be sure to restart the host system after changing the LD configuration.

## 7.4 Spare Disk Setting Procedure


Spare disk can be set only in RAID type 1, 5, 6, 10, or 50.

Set the spare disk by using the "WebSAM NEC Storage Manager", or contact the service engineer with expert knowledge in your service representative for setting of the spare disk.




When you change a failing disk to a spare disk, confirm the following to get the spare disk to function normally: The capacity and rotational speed of the spare disk is equal to that of the failing disk.  
If your disk array unit contains disks of different capacities or different rotational speeds, you should define a spare disk matching the capacity and rotational speed of each disk in order to clarify disk management.  
Up to 32 spare disks can be installed for the entire disk array unit.


# 8. Action Taken at Occurrence of Fault or Error




The user may remove a defected component and install a new component for the replacement according to the description in this chapter. However, if so, NEC does not assume the responsibility for any damage of the disk array unit and components and any influence resulting from the operation of the disk array unit. NEC recommends that you ask your maintenance engineer of the maintenance service representative with expert knowledge on details of the disk array unit to remove any defected component and install a new component.




For adding disk drives or relocating their installation positions, perform the job for the disk drives one by one. The change of disk drive installation positions with LDNs assigned may cause some data to be lost.




WARNING



If a trouble including smoking and bad smell occurs or a fault such as halting of two or more cooling fans is found, turn off the power and disconnect the power plugs from the AC outlets. Then ask your sales representative or maintenance engineer to inspect and repair the disk array unit immediately. Using the disk array unit as it is may cause electric shock or fire to occur. The user must never repair the disk array unit because it is dangerous.



CAUTION



- Note that your fingers may not be caught or hit on some object when you work with inside of the disk array unit.
- If a fault occurs in the disk array unit, the SERVICE LED on the disk array unit and the FAULT LED on the defected component light. If a fault occurs, contact your maintenance engineer of the maintenance service representative with expert knowledge, or prepare the proper maintenance component and replace the defected component immediately.
- Perform the replacement job as quick as possible. Do not operate the unit for a long time in the state that one or more existing disk drive, power supply, fan, or controller is removed. Failure to follow it may cause a fault to occur.  
If you find the occurrence of an abnormal state such as smoking or bad smell, turn off the power and pull out the power plugs from AC outlets. Ask your maintenance service representative for inspection and repair immediately.

## 8.1 Countermeasures Taken when Occurrence of a Fault is Suspected

If you suspect the occurrence of a fault during the use of the disk array unit, check the status based on the tables below. If a symptom which is not described in the tables at all or the specified countermeasures cannot recover the proper operation, contact your maintenance service representative.

The POWER LED (green) does not light if the power switch is pressed.	
Cause	Countermeasures
The power cord is not connected.	Check the connection of the power cord after setting the power switch to OFF.
The AC power (100 VAC) is not supplied.	Check whether 100 VAC $\pm$ 10% (50/60 Hz) is supplied.

The LINKUP LED (green) of the controller on the disk array unit connected with the FC cable, LINKUP LED (green) of the adapter in the additional FC disk enclosure, or the LOOP STATUS LED (green) of the host bus adapter connected with the FC cable does not light.	
Cause	Countermeasures
The FC cable is not connected correctly.	Insert the connector of the FC cable until a click is heard. See Chapter 5 "Connection of Disk Array Unit".
The length of the FC cable exceeds the rating value.	See Chapter 5 "Connection of Disk Array Unit".
The setting of the host bus adapter or that of the FC-AL switch is not correct.	Provide the proper setting referring to the User's Guides of the host bus adapter, FC-AL switch, host unit, and those of added peripherals.
The used host bus adapter is unavailable for the disk array unit.	Use the host bus adapter available for the disk array unit. Contact your sales representative if unknown.

The FAULT LEDs (orange) on both adapters of the additional FC disk enclosure blink.	
Cause	Countermeasures
The ENC ID switch on the adapter is set incorrectly.	After setting the power switch to OFF, set the ENC ID switches on the left and right adapters to be the same. See Section 1.2.3 "Resource Configuration" in Appendix C.

The host system cannot recognize the disk array unit.	
Cause	Countermeasures
The FC cable is not connected correctly.	Insert the connector of the FC cable until a click is heard. See Chapter 5 "Connection of Disk Array Unit".
After turning on the power switch of the host system, the power of the disk array unit is turned on.	See Section 7.2 "Power On/Off of Disk Array Unit".
Each AL-PA must be unique. The same AL-PA is specified in duplicate.	Set an AL-PA different from the AL-PAs of other FC devices according to Section 1.2.2 "FC Port Configuration" in Appendix C.
The setting of host bus adapter or FC-AL switch is incorrect.	Set it correctly according to the User's Guide of the host bus adapter or FC-AL switch, the host system, and additionally installed peripherals.
The used host bus adapter is unavailable for the disk array unit.	Use the host bus adapter available for the disk array unit. Contact your sales representative if unknown.
The disk array unit is installed in an area in which it easily suffers vibration and/or shocks.	Install the disk array unit referring to Chapter 1 "Notes on Installation and Handling of Disk Array Unit".
The power is turned off or the reset button on the host system is pressed with the ACCESS LED (green) being on.	Contact your service representative.
The logical disk of the disk array unit is not assigned.	Assign the logical disk number appropriately using the "WebSAM NEC Storage Manager" or contact your service representative.

## 8.2 Indication at Occurrence of Fault

If the disk array unit is defected, the SERVICE LED on the disk array unit lights orange and also the LED specific for each unit lights to indicate defected unit.

The table below shows the relation between the LED indicating the occurrence of a fault and the defected unit.

LED display	Defected unit
The Hard Disk FAULT LED on the disk drive lights.	The disk drive with the FAULT LED being on is defected.
The FAULT LED on the controller lights orange.	The controller with the FAULT LED being on is defected.
The POWER FAULT LED on the power supply lights orange.	The power supply with the POWER FAIL LED being on or corresponding battery backup unit is defected.  Identify the defected unit with WebSAM NEC StorageManager.
The FAULT LED on the power control card lights orange.	The power control card with the FAULT LED being on is defected.
The SERVICE LED on the additional FC disk enclosure lights orange and also the FAULT LED on the disk drive lights orange.	The disk drive with the FAULT LED being on is defected.
The SERVICE LED on the additional FC disk enclosure lights orange and also the FAULT LED on the adapter lights orange.	The adapter with the FAULT LED being on is defected.
The SERVICE LED of the additional FC disk enclosure lights orange and also the POWER FAULT LED of the power supply for the additional FC disk enclosure lights orange.	The power supply for the additional FC disk enclosure with the POWER FAULT LED being on is defected (including a cooling fan failure).

## 8.3 Failure of Controller

If a controller is defected, the SERVICE LED on the disk array unit lights orange. In addition, the FAULT LED on the controller lights orange. The defected controller may be replaced with new one with the power of the disk array unit remaining ON.

### <Replacement procedure>

1. Identify the defected controller with the FAULT LED on the controller being lit.  
Remove all the cables connected to the defected controller. Write down the connections between the cables to be removed and the mating connectors.
2. Loosen a screw securing the ejector of the target controller.
3. Put your finger on the protrusion of the ejector and pull the ejector toward you. Open the ejector pulling it by 90°, and then pull out the controller.



***Be careful that it is hot.***

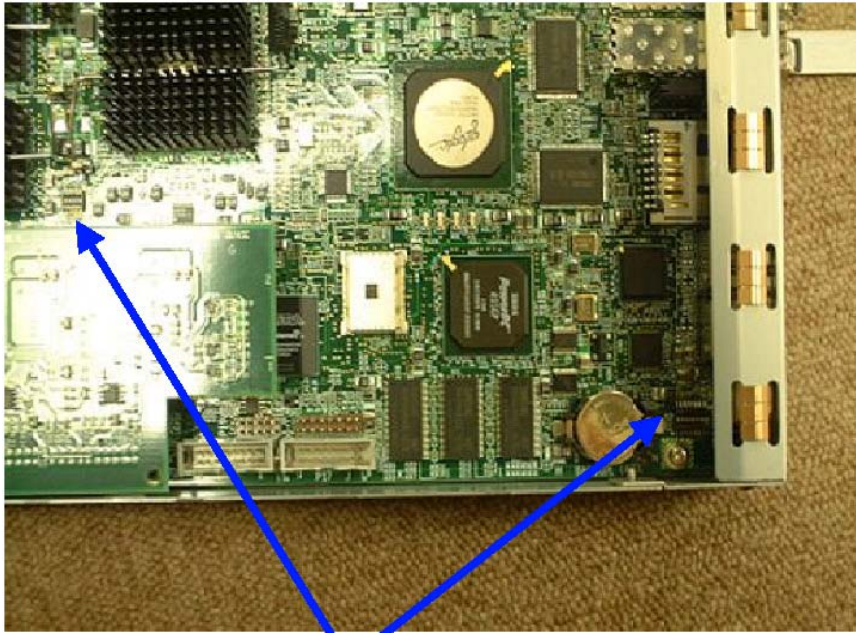
4. Widen the levers at the both ends of the connectors which are holding memory cards on the defected controller and remove memory cards.

Put the memory cards along the rail on the memory connectors of the spare controller and push it firmly so that the levers at the both ends go into the notches of the memory cards.



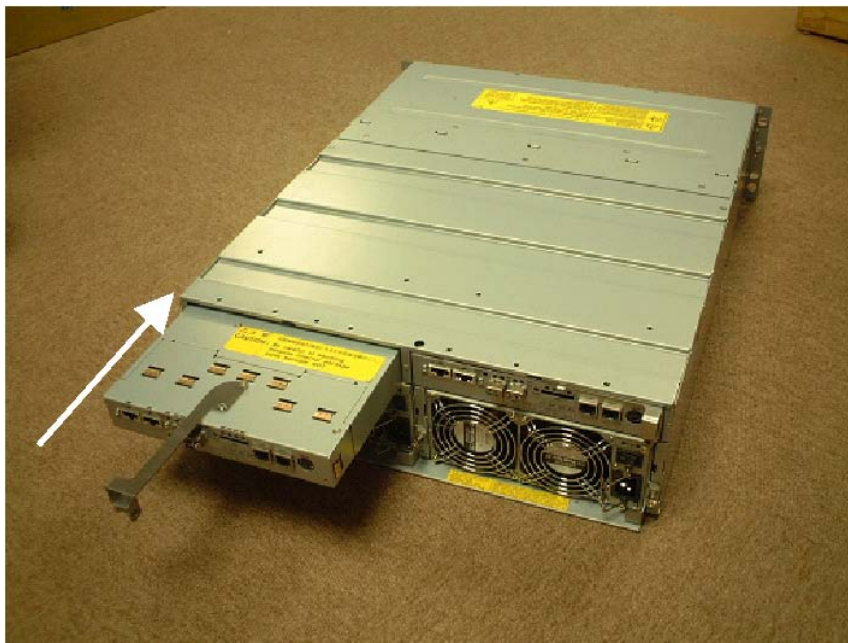


5. Set the DIP switch on the new controller for replacement to be the same as that of the defected controller. In case that there is no DIP switch located at A4F2, only one DIP switch, which is located at A1N2, should be set.



DIP switches (Location: A1N2 and A4F2)

6. Open the ejectors of the controller for replacement, insert the controller into the slot to the end securely.





7. Connect the cables removed in step (1) to the mating connectors as before.
8. Close the ejector. Strongly push the protrusion of ejector until the controller is inserted firmly.



9. Tighten a screw to secure 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 malfunction.



If the controller is replaced with new one, the system starts using the IP address specified for new controller. To connect with maintenance PC and NEC Storage Manager via Ethernet, perform the following procedure:

- For maintenance PC, connect by using the default IP address.
- For NEC Storage Manager via Ethernet, shutdown the NEC Storage Manager server. Wait at least three minutes after the controller starts flashing, and then connect it again.

## 8.4 Failure of Power Control Card

If a power control card is defected, the SERVICE LED on the disk array unit lights orange. In addition, the FAULT LED on the power control card lights orange. The defected power control card may be replaced with the power of the disk array unit remaining ON.

### <Replacement procedure>

1. If the disk array unit containing a defective power control card is logically connected to the host power control unit (online state), logically disconnect the disk array unit (offline state).  
(For the method to change to the offline state, see the instruction manual provided with the host power control unit.)
2. Disconnect all the cables from the power control card. At this time, take notes of the correspondence between the cables and connectors.
3. Remove the screw that secures the power control card. Be careful not to lose the screw.
4. Pull out the defective power control card forward, holding the upper and lower protrusions.



5. Insert the replacement power control card into the disk array unit.



6. Push the upper and lower protrusions on the power control card until it is fully inserted.
7. Tighten the screw to secure the power control card.
8. Connect the cables (removed in step 2) to the connectors on the power control card as they were originally connected.
9. If you have logically disconnected the disk array unit containing the power control card from the host power control unit in step 1 (offline state), logically connect the disk array unit again (online state).

(For the method to change to the online state, see the instruction manual provided with host power control unit.)



When inserting the power control card into the disk array unit, push it as far as it will go and then secure it with the screws.  
Incorrect insertion may cause malfunction.



If you replace the power control card with the UPS cable being connected while the disk array unit is online, the UPS may detect an alarm. In this case, you need to reset the UPS.  
For the UPS reset method, see the instruction manual provided with the UPS.

## 8.5 Failure of Power Supply



- Prepare the new power supply before you start the replacement procedure.
- The power supplies contain the fans for cooling the disk array unit, so cooling is stopped during replacement of the power supply. In order to minimize the cooling stopped time, familiarize yourself with the power supply replacement procedure to quickly remove each power supply and install it back into the disk array unit.

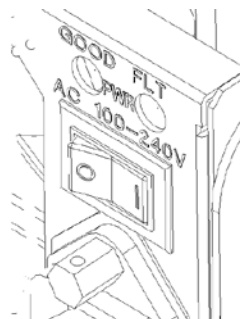
If a power supply is defected, the SERVICE LED on the disk array unit lights orange. In addition, the POWER FAULT LED on the power supply lights orange. The defected power supply may be replaced with the other power supply remaining ON.

### <Replacement procedure>

1. Check the defected power supply by the POWER FAULT LED of the power supply.
2. Set the switch of the defected power supply to OFF.

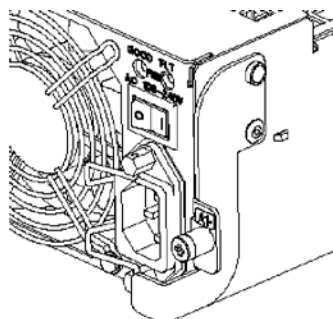
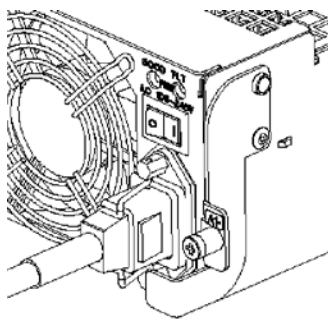


OFF



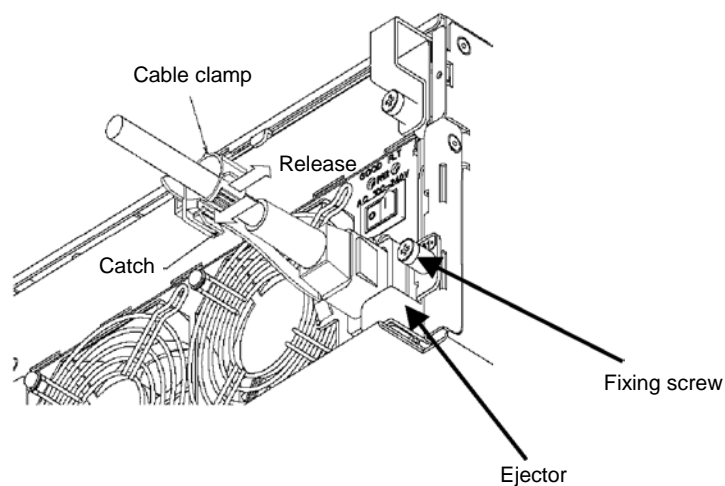
ON

3. As shown in the figure below, remove the power cord stopper to release the power cord, and disconnect the power cord from the power plug.



**NOTE:** If the shape of the power cord stopper of the power supply is different from the figure above, disconnect the power cord according to the procedure below.

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.



- 4. Loosen the screw that secures the ejector of the defective power supply.
- 5. Put your finger onto the ejector's protrusion, and pull it forward.
- 6. When the ejector turns 90 degrees, pull out the defective power supply.

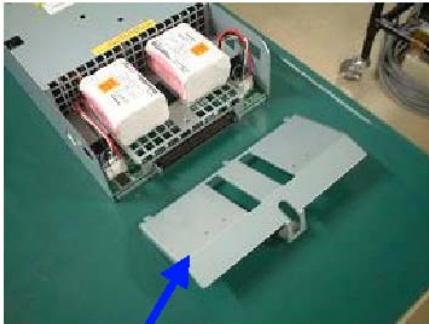




7. Turn the screw that secures the BBU GUIDE to the defective power supply, and remove the BBU GUIDE.



Screw securing BBU GUIDE

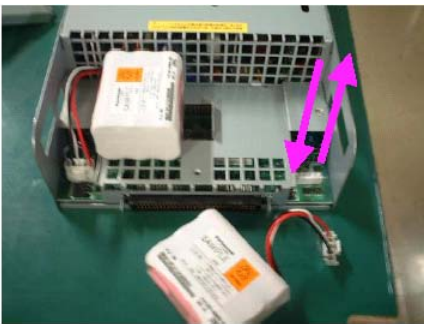


BBU GUIDE

8. Disconnect the cable, and remove the battery backup unit, which is in normal state, from the defective power supply.



(Standard battery) (Optional battery)  
Battery backup unit

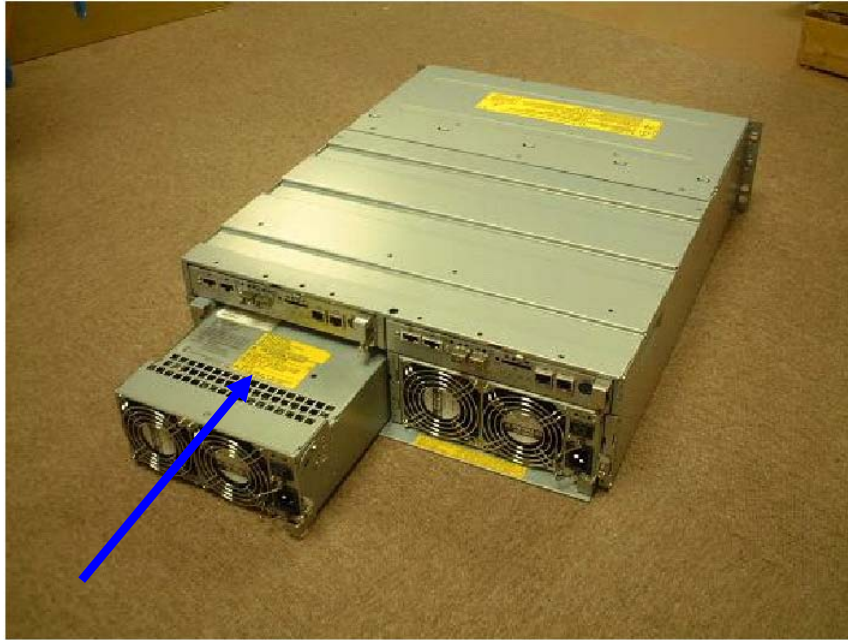


9. Insert the battery backup unit connector (removed in step 8) into the connector on the replacement power supply, and place the battery backup unit with the label up.



- Note the following points on replacing or additionally installing a battery backup unit:
  - A replacement or additional battery backup unit must be of the type used in the standard configuration.
  - The standard battery backup unit must be installed on the left side. (See the figure above.)
  - The optional battery backup unit must be installed on the right side. (See the figure above.)
- 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.
- When installing the battery backup unit in the power supply, push in the connector until it is locked.  
Incorrect insertion may cause a power failure or battery backup unit failure.

10. Install the BBU GUIDE (removed in step 7) on the power supply.  
Insert the three points on the end of the BBU GUIDE into the net of the power supply, and place it on the battery backup unit.
11. Install the screw to secure the BBU GUIDE.
12. While the power switch on the replacement power supply is OFF, confirm that the power cord is removed from the power plug.
13. While the ejector is open (at the up position), insert the replacement power supply into the slot as far as it will go.

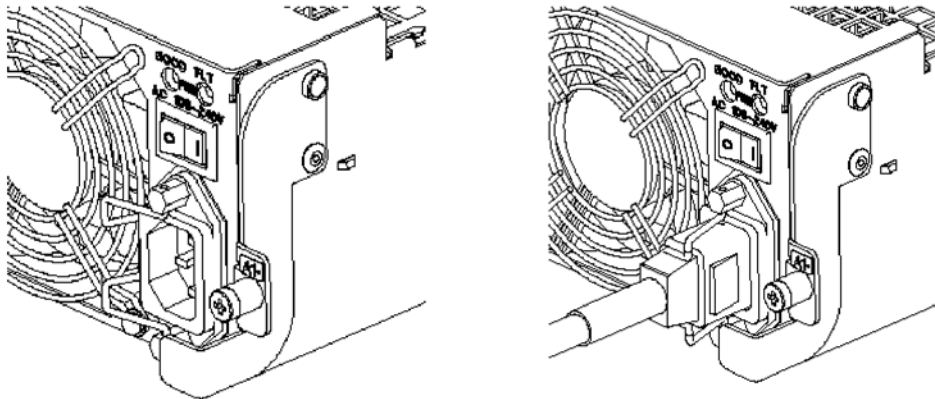


14. Push the ejector's protrusion to turn the ejector (to the down position), and insert the power supply.
15. Tighten the screw that secures the ejector.



When inserting the power supply into the disk array unit, push it as far as it will go and then secure it with the screw. Incorrect insertion may cause malfunction. Incorrect insertion may cause a power failure.

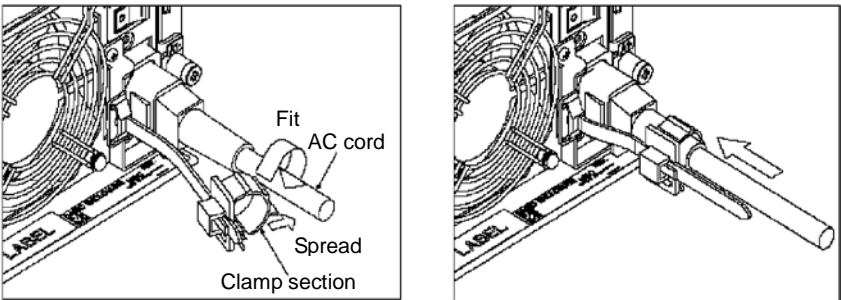
16. Push down the power cord stopper to the left, connect the power cord, and securely fit the power cord stopper into the power cord socket.



**NOTE:** If the shape of the power cord stopper of the power supply is different from the figure above, connect the power cord according to the procedure below.

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.

17. Turn ON the power switch on the new power supply.



## 8.6 Failure of Battery Backup Unit

If the battery backup unit is defected, the SERVICE LED on the disk array unit lights orange. In addition, the FAULT LED on the power supply corresponding to the defected battery backup unit, PS0 for BBU0 or PS1 for BBU1, lights orange. The defected battery backup unit may be replaced with the power supply of the disk array unit remaining ON.



- Prepare the replacement battery backup unit before you start the replacement procedure.
- The power supplies contain the fans for cooling the disk array unit, so cooling is stopped during replacement of the battery backup unit. In order to minimize the cooling stopped time, familiarize yourself with the power supply replacement procedure to quickly remove each power supply and install it back into the disk array unit.

### <Replacement procedure>

1. Remove the power supply containing the defective battery backup unit, and remove the battery backup unit. (See 8.5 Failure of Power Supply.)
2. Install the replacement battery backup unit in the power supply, and install the power supply in the disk array unit. (See 8.5 Failure of Power Supply.)



If a failure occurs while optional batteries are installed, it cannot be determined whether the standard battery backup unit or optional battery backup unit has failed. When a battery backup unit failure is detected, replace the standard battery backup unit, and install the power supply containing the new battery backup unit in the disk array unit. If a battery backup unit failure is detected again after the power is turned on, perform the <Replacement procedure> above to replace the other optional battery, and reinstall the battery backup unit to the original position. (Reinstall the standard battery backup unit to the original position, and replace the defective optional battery.)

## 8.7 Failure of Disk Drive

If a disk drive is defected, the SERVICE LED on the disk array unit lights orange. In addition, the Hard Disk FAULT LED on the defected disk drive lights orange.

The defected disk drive may be replaced with the power of the disk array unit remaining ON.

If the Hard Disk FAULT LED on a disk drive lights, the fault of the other disk drive in the same logical disk causes the data to be lost due to interruption of redundancy. If the Hard Disk FAULT LED on a disk drive lights, replace the disk drive immediately. Perform the replacement job as quick as possible. Do not operate the disk array unit for a long time in the state that the disk drive is pulled out.

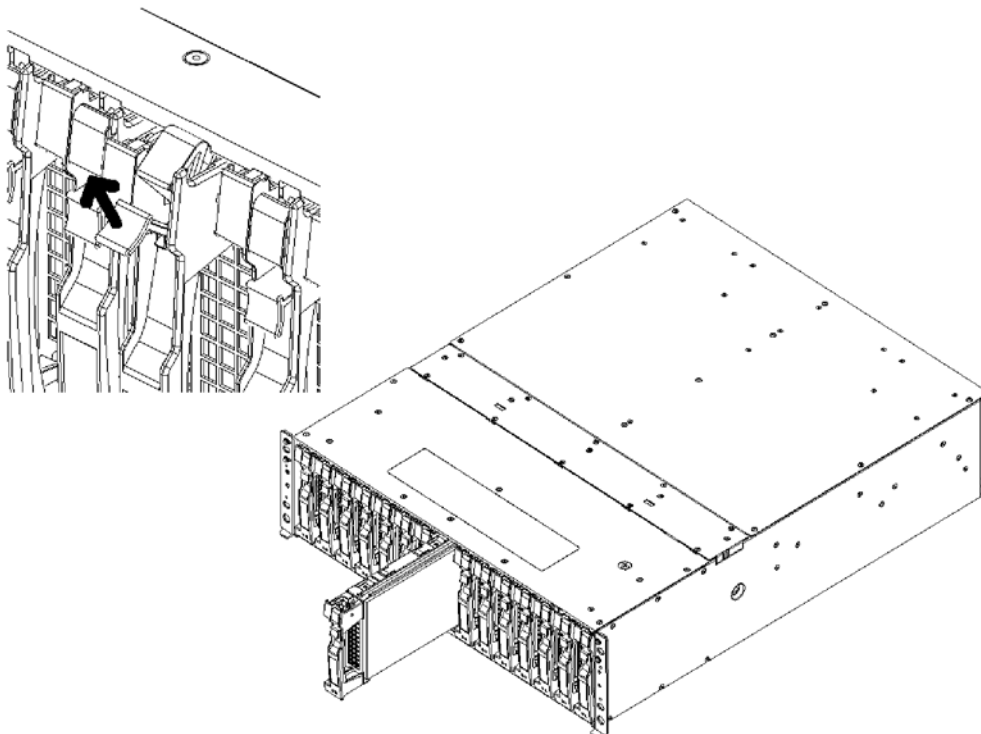
Replace the defected disk drive with a disk drive having the same storage capacity and rotational speed.

### <Replacement procedure>

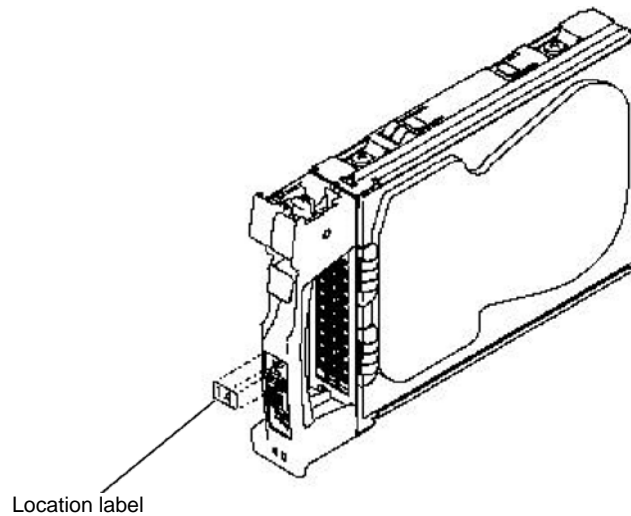
1. Check the defected disk drive with the Hard Disk FAULT LED on the disk drive being on.
2. Lift the ejector of the defected disk drive toward you to release the lock.

When the lock is released, a click occurs. After the lock is released, hold the handle to pull out the disk drive.

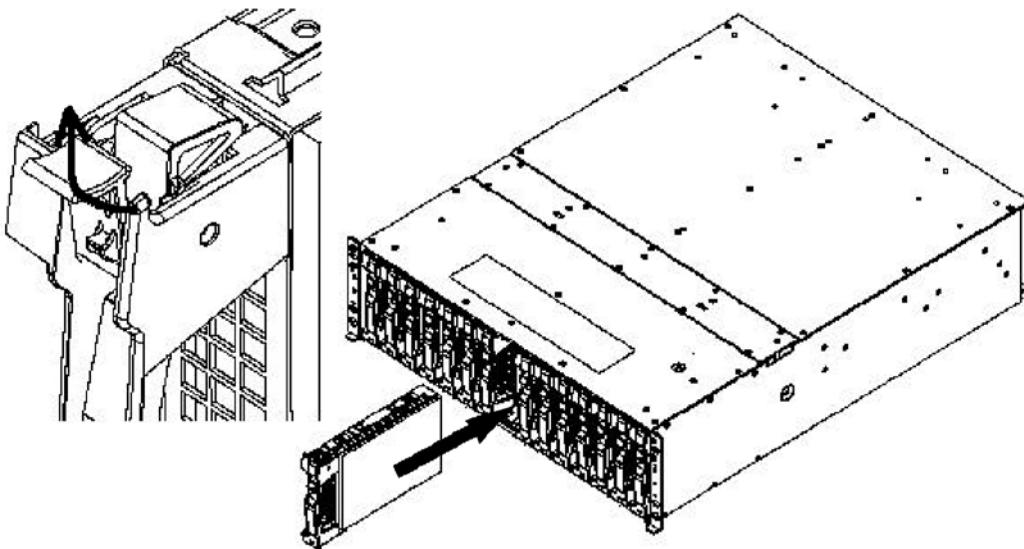
To pull out the disk drive, while lifting the ejector toward you to release the lock, wait until the revolution of the installed disk drive is stopped (for about 30 seconds) in the middle of the slot, then pull the disk drive out.



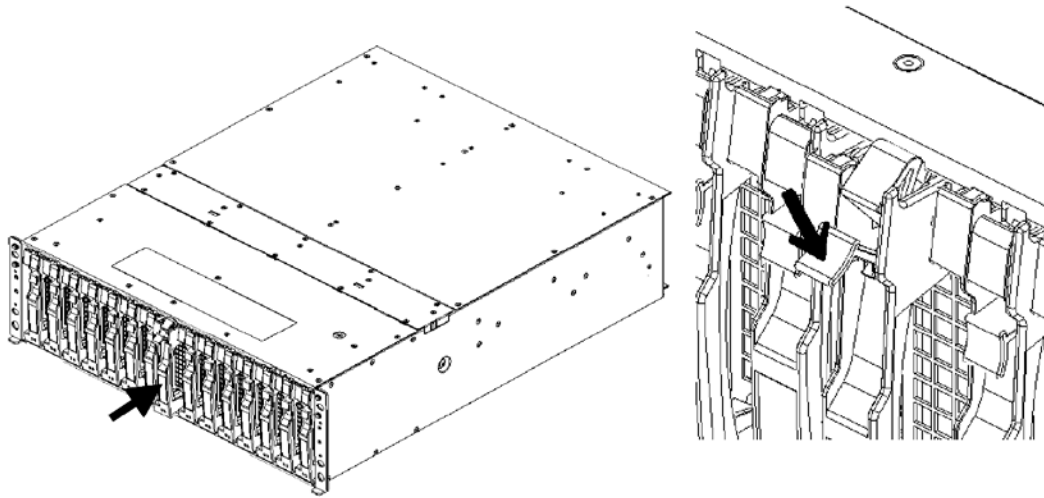
3. Select the location label having the same location as that of the defected disk drive from the location label provided with the replacing disk drive, and then put the label on the replacing disk drive.



4. With the ejector of the new disk drive opened, engage the guides on the top and bottom faces of the disk drive with the guide grooves on the disk enclosure and insert the disk drive to the end slowly.



5. After the disk drive is inserted to the end securely, push down the ejector opened upward to click for locking.



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

6. Inserting a new disk drive allows the data recovery to be started automatically.

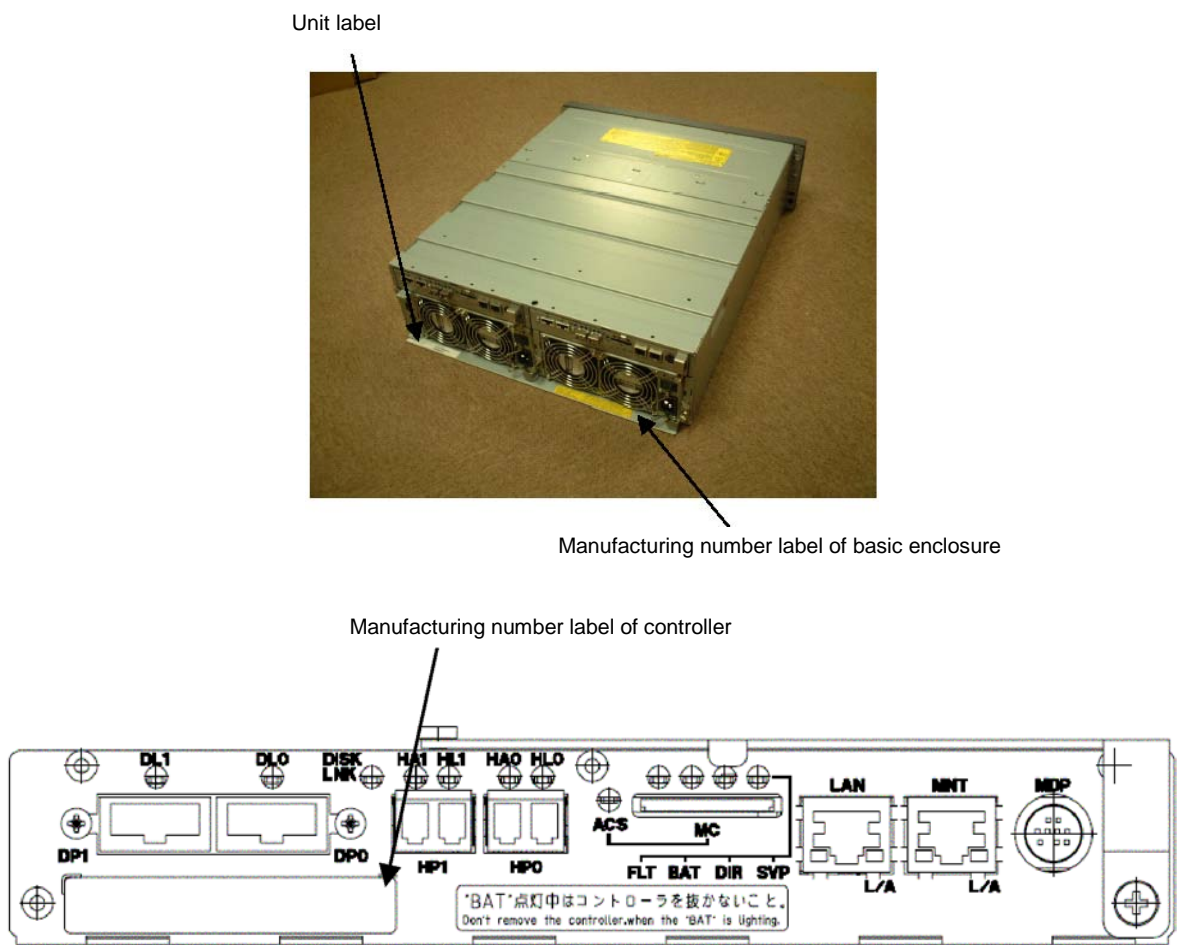


- If the auto repair feature is set to OFF, issue a recovery instruction from the management software in manual mode to start recovery. Otherwise, the reduced state ("reduce" shown as the logical disk status) remains.
- Setting the auto repair feature to ON in recovery wait state does not start recovery. The setting is enabled starting with the next recovery.

7. The disk array unit operates normally during the data recovery. At the termination of the data recovery, the SERVICE LED on the disk array unit goes off.

## 8.8 Check of Type Name and Manufacturing Numbers

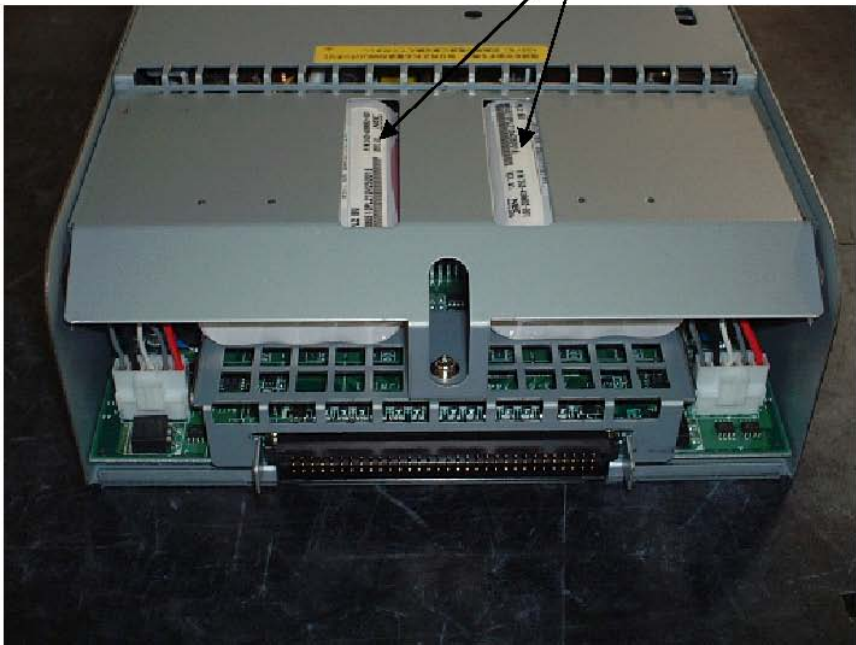
The type name and manufacturing number of the disk array unit are shown at the locations in the figure below.



Manufacturing number label of power supply



Manufacturing number label of battery backup unit



## 8.9 Computer Virus

Computer virus is one of major computer troubles.

If a computer is infected with a computer virus, the computer may suddenly play music or display abnormal messages. The computer may suffer damages including data destruction and initialization of network storage unit in the worst case.

To suppress the damage at the minimum level, take proper measures such as backup of important data. Anti-virus software "Server Protect" is provided as an option of this product. The software should be installed to protect the product from computer viruses. For details, see the User's Guide.

## 8.10 Preparation before Phone Call

When you have any question or desire to contact us on the occurrence of a fault or error on the unit, do the following preparations before calling us:

- Write down the failure or fault status and questions.
- Write down the configuration of the peripherals connected to the host unit and the software products used in the disk array unit.
- Keep this manual, the manuals on the peripherals connected to the host unit, and the manuals of used software products.

## 8.11 Service and Support

If you have any question on this product, contact your service representative.

## 8.12 Unit Life/Repair Service Period

The service life of the disk array unit and the repair service period after stopping of the production are as shown below.

Some components (e.g., cooling fans and battery backup units) of the disk array unit need replacement when they reach their lives. The service life of the disk array unit may become shorter than 5 years depending on the operating environment. Therefore, the components should be replaced periodically. For their replacement and lives, contact your maintenance service representative.

- Service life of the disk array unit: 5 years (\*1)
- Repair service period: 5 years after stopping of the production

Note that the following disk array units may not be repaired:

- Unit stained, damaged due to dropping, incorrect handling, etc.
- Unit modified by the customer
- Unit which has reached the end of its useful life
- Unit damaged by a natural disaster (e.g., earthquake, lightning, or fire) or by an external factor (e.g., incident)

\*1 To use the disk array unit that has reached its service life, be sure to make a hardware maintenance contract, and get the disk array unit to be overhauled (at a cost).

## 8.13 Disposal of Disk Array Unit

The disk array unit uses lead batteries. You should dispose of the batteries in accordance with the regulations and rules of your local government. Contact your local government for details.

The disk array unit uses nickel-hydrate batteries as battery backup units. The battery backup units are classified into small secondary batteries (rechargeable batteries) that are to be collected according to the rules defined by the Law for Promotion of Effective Utilization of Resources.

Ask your NEC sales representative or maintenance service representative for details. The controllers contain lithium batteries. You are to dispose of the lithium batteries as required by local regulations.



# 9. Product Specification

## 9.1 Basic Specification of Disk Array Unit

The table below shows the basic specification of the disk array unit.

Maximum disk drives per unit	15
Hot spare feature	Provided
Host interface specification	FC-AL/Fabric (Point to Point) [Optical]
Data transfer rate of host interface	200 MB/S or 100 MB/S
Disk drive interface specification	FC-AL [Copper]

## 9.2 Optional Components

### 9.2.1 Options for NEC Storage S1400

P/N	Product name	Qty	Remarks
NF1400-SE42E	Additional FC disk enclosure	1	FC disk enclosure for addition of disk array
NF1400-SM413E	Additional FC disk drive	1	73GB/10,000rpm
NF1400-SM414E	Additional FC disk drive	1	147GB/10,000rpm
NF1400-SM415E	Additional FC disk drive	1	300GB/10,000rpm
NF1400-SM422E	Additional FC disk drive	1	36GB/15,000rpm
NF1400-SM423E	Additional FC disk drive	1	73GB/15,000rpm
NF1400-SM424E	Additional FC disk drive	1	147GB/15,000rpm
NF1400-SP03E	Power control mechanism	1	UPS port x2, AOC port x 1
NF1400-SZ01E	Option battery	1	Backup time is extended from 24 to 72 hours.

### 9.2.2 Accessories common to S1400

P/N	Product name	Qty	Remarks
NF9100-SK01E	Rack-mount kit	1	For HP new-type rack
NF9100-SK02E	Rack-mount kit	1	For Sun StorEdge rack
NF9100-SK03E	Rack-mount kit	1	For NEC Express old-type rack
NF9120-SJ33E	DE cable	1	HSSDC-HSSDC cable (3m) x2
NF9120-SJ34E	DE cable	1	HSSDC-HSSDC cable (5m) x2
NF9310-SJ01E	FC cable	1	SC: 5m x 2
NF9310-SJ02E	FC cable	1	SC: 10m x 2
NF9310-SJ03E	FC cable	1	SC: 20m x 2
NF9310-SJ04E	FC cable	1	SC: 50m x 2
NF9310-SJ10E	FC cable	1	LC-SC conversion cable: 2m x 2
NF9320-SJ01E	FC cable	1	LC: 5m x 2
NF9320-SJ02E	FC cable	1	LC: 10m x 2
NF9320-SJ03E	FC cable	1	LC: 20m x 2
NF9320-SJ04E	FC cable	1	LC: 50m x 2
NF9320-SJ11E	FC cable	1	LC: 5m x 2 (Reinforced coating)
NF9320-SJ12E	FC cable	1	LC: 10m x 2 (Reinforced coating)
NF9320-SJ13E	FC cable	1	LC: 20m x 2 (Reinforced coating)
NF9320-SJ14E	FC cable	1	LC: 50m x 2 (Reinforced coating)

\* It is recommended to use NF9320-SJ01E/02E/03E/04E installed in the rack.  
It is recommended to use NF9320-SJ11E/12E/13E/14E outside the rack.

### 9.3 Environmental Conditions

The table below shows the environmental conditions of the disk array unit.

	Operating	Halting *2
Ambient temperature	5°C to 40°C	−10°C to 60°C
Relative humidity *1	10% to 80%	5% to 80%
Wet bulb temperature	0°C to 27°C	−8°C to 29°C
Allowable vibration level	0.25 G	0.5 G

- \*1 Without condensation
- \*2 The halting status includes the packaged status in shipping carton and the storage status.

### 9.4 Power Specification

The table below shows the power specification of the disk array unit.

	Disk array unit
Input voltage	100 to 240 VAC ±10% (x2), 50/60 Hz
Maximum power consumption	680 VA (Additional disk enclosure: 520 VA)

- \* While the disk array unit can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the unit can only accept around 100 VAC. Use 100 VAC (50/60 Hz) when the attached power cord is used.

### 9.5 External Dimension and Weight

The table below shows the external dimension and weight of the disk array unit.

	Disk array unit
Width	482 mm
Height	131 mm (3U)
Depth (including front mask)	594 mm
Weight (in the maximum configuration)	Approx. 45 kg

### 9.6 Life Expectancies of Components

Battery backup unit *1	5 years
Fan (power supply)	50,000 hours

- \*1 8-hour charging (power-on) and 16-hour discharging (power-off) in environment in which the ambient temperature is at 25°C

# Appendix A Features of Disk Array Unit

## 1. Battery Backup

The disk array unit keeps memory data with 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 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 eight hours to charge battery at the longest.

## 2. Repair Time

The repair time is set to 12 hours in 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 ( $M=1024^3$ ).

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.

- For NEC Storage S1400  
SystemGlobe AccessControl - NEC Storage S1400

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.

## 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.

This feature is available only on NEC Storage S1400. To use this feature, the specific software "SystemGlobe DynamicDataReplication - NEC Storage S1400" sold separately is required.

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 (additionally charged) 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:

- A controller is replaced
- 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 → 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 S1400:  
SystemGlobe NEC Storage BaseProduct Ver3.3 (or later) - NEC Storage S1400

To use the disk array unit, release the license lock using the license code that is provided with "SystemGlobe NEC Storage BaseProduct Ver3.3 - NEC Storage S1400 ".

A maintenance person is responsible for releasing the license lock of "SystemGlobe NEC Storage BaseProduct Ver3.3 -NEC StorageS1400 " 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.

- For S1400  
SystemGlobe DynamicSnapVolume - NEC Storage S1400

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 SnapShot. (Delay time: About 10 minutes 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.

(The delay time will be approx. ten seconds per 1TB of difference.)

So it is recommended to run shutdown process when you turn off the power of this disk array unit.

# 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, 2-step procedure consisting of 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 on 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 Maintenance PC

## 1. Initialization by Maintenance PC

---

### NOTES:

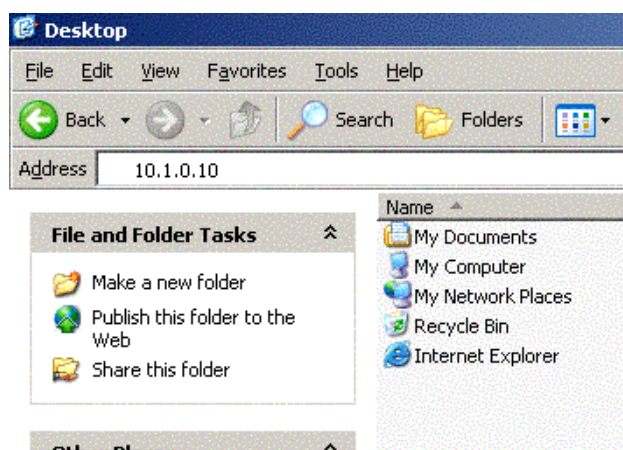
- The Maintenance PC is also described as NEC Storage Navigation.
  - If you operate the maintenance PC for operation which is not described in this manual, the disk array unit may malfunction. Be careful when you operate the maintenance PC.
- 

### 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 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 10.1.0.10 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:

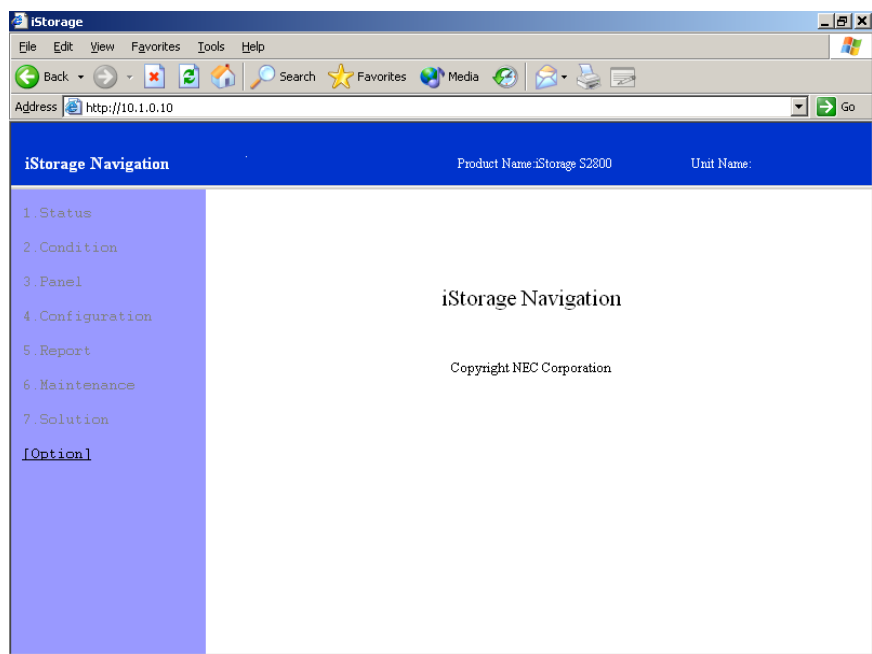
1. Because the IP address and subnet mask of the MNT's Ether port are fixed as described above, do not connect the port to any LAN and WAN.
2. The amber LED to the right of the Ether port is lit. However, this does not indicate the occurrence of an error. It is lit in the TCP connection state.
3. Action taken when the Maintenance PC is not connectable:

Check if:

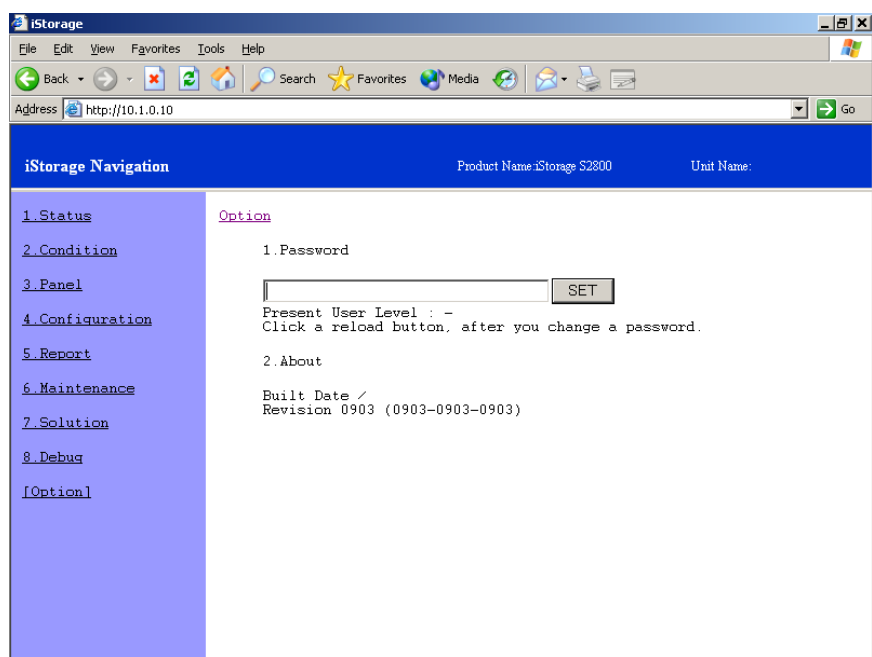
- The IP address of the PC connected is correctly set.
- "proxy" is disabled in the setting of Internet Explorer.

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.

[4.Port Configuration](#)

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	

## 1.2.2 FC Port Configuration

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

### 5.FC Port Configuration

Port	Link Attach	Mode	Switch	Data Rate	AL_PA
CONT0 HP0	2:Only FC-AL	0000	00	92Gbps	EF
CONT0 HP1	2:Only FC-AL	0000	01	92Gbps	E8
CONT1 HP0	2:Only FC-AL	0000	02	92Gbps	FF
CONT1 HP1	2:Only FC-AL	0000	03	92Gbps	FF

SET

#### Mode Description

Default : 00C0  
Host Director Port : 0000  
Replication Director Port : 0040

### [RETURN]

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      F: Undecided Select "8" or "9".
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. Decrement by one if loop duplication occurs.
NX connection port	Basic value: 0Fh. Decrement by one if loop duplication occurs.
Windows/Solaris/Linux/AIX	Basic value: 10h. Increment by one if loop duplication occurs.
Miscellaneous	Conforms to the rule in the server if any. The basic value is "10h" if no rule is defined in the server. 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 that must be 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 disks.(initial state,in case LAN cable is connected with CONT#0)

6.Resource Configuration

(SVP ROM Data)

DE

☐ DE04

☐ DE08

☐ DE0C

DE

☐ DE01

☐ DE05

☐ DE09

☐ DE0D

PCC

PS

Product Name

Serial Number

Port WWN

0:No Present

☐ 48V

iStorage S1400

000000000000000001

2000000004C012345

Check = On

SET

[RETURN]

When there is configuration information in the system disks.(After operation)

6.Resource Configuration

DE

☒ DE04

☐ DE08

☐ DE0C

DE

☐ DE01

☐ DE05

☐ DE09

☐ DE0D

PCC

PS

2:UPS IF/AOC IF

☐ 48V

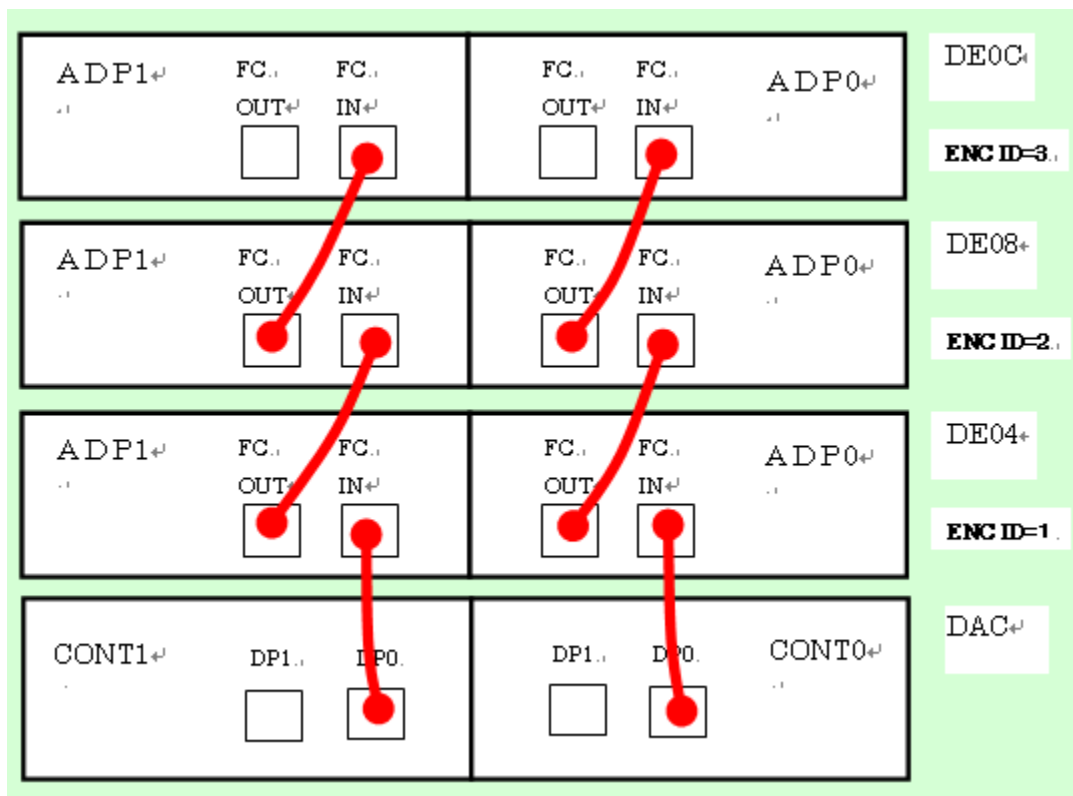
Check = On

SET

[RETURN]

The screen can be used to set the resource type. On the DE columns, set the locations of installed DEs. The information on the DEs with their check buttons checked is only set. Select the PCC mode (No Present, UPS Only, UPS+AOC, or UPS+AOC+SCBI) in the PCC field. (See the DE location view on the next page for the DE locations.)

DE01 - DE0D	DE number
PCC	PCC mode
	0: No present
	1: UPS only
	2: UPS+AOC
	3: UPS+AOC+SCBI
	NF1400-SR40E: Select "0" if optional NF1400-SP03E is not installed. Select "2" if optional NF1400-SP03E is installed.
	NF1400-NR40E: Select "0" if optional NF1400-NP03E is not installed. Select "2" if optional NF1400-NP03E is installed.
PS 48V	Checked at the time of 48V power supply use.
Product Name	When it is judged that there is no configuration information in the system disks, this information (default value) is displayed and stored to the system disks by clicking of the "SET" button.
Serial Number	
Port WWN	



#### DE Location View

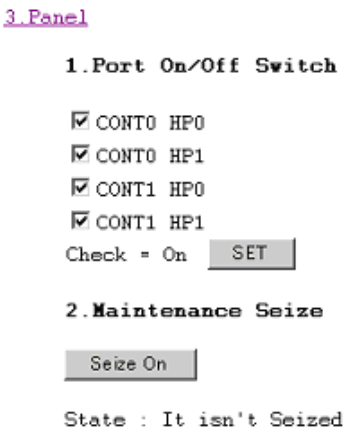
- Up to three additional FC enclosures (NF1400-SE42E) can be connected to NF1400-SR40E (in DE04, DE08, and DE0C).
- Up to three additional FC enclosures (NF1400-NE42E) can be connected to NF1400-NR40E (in DE04, DE08, and DE0C).

## 2. Confirmation of Unit Setup

### 2.1 Activation on Modification of FC Port Configuration

If any of the items described in "1.2.1 Port Configuration" is modified, the activation is required.

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



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 the check of 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

[2 Control Port Status](#)

FC Port Status								
Port	Host Type	Link Attach	Switch	Data Rate	Port Name	AL_PA	NPORT ID	Mode
CONT3 HP0	00:Default	2:Only FC-AL	00	8.1Gbps	200100004C012345	EF	000000EF	Host Director Port
CONT3 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	(factory setting) Format defined in the specifications: (xxxxb=0010b、yyyby=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 Config.
3. Before the Base Product License key is unlocked, CONT is in the FAULT state.



# Appendix D Installing Unit on Rack

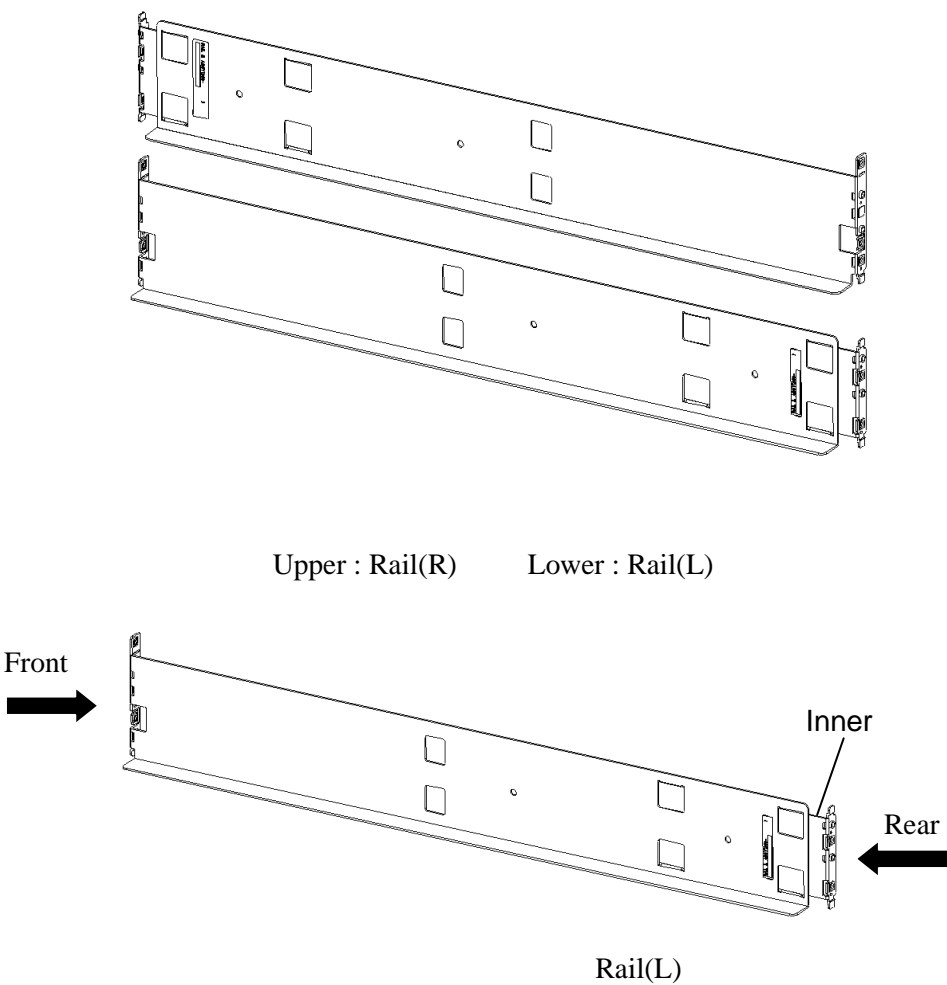
## 1. Installing New Rack-mount Kit (Accessory) on NEC Storage Rack

**NOTE:** 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 the similar procedure.

The left and right rails are different from each other. Use the correct rail when installing it on the rack. (See the figure below.)

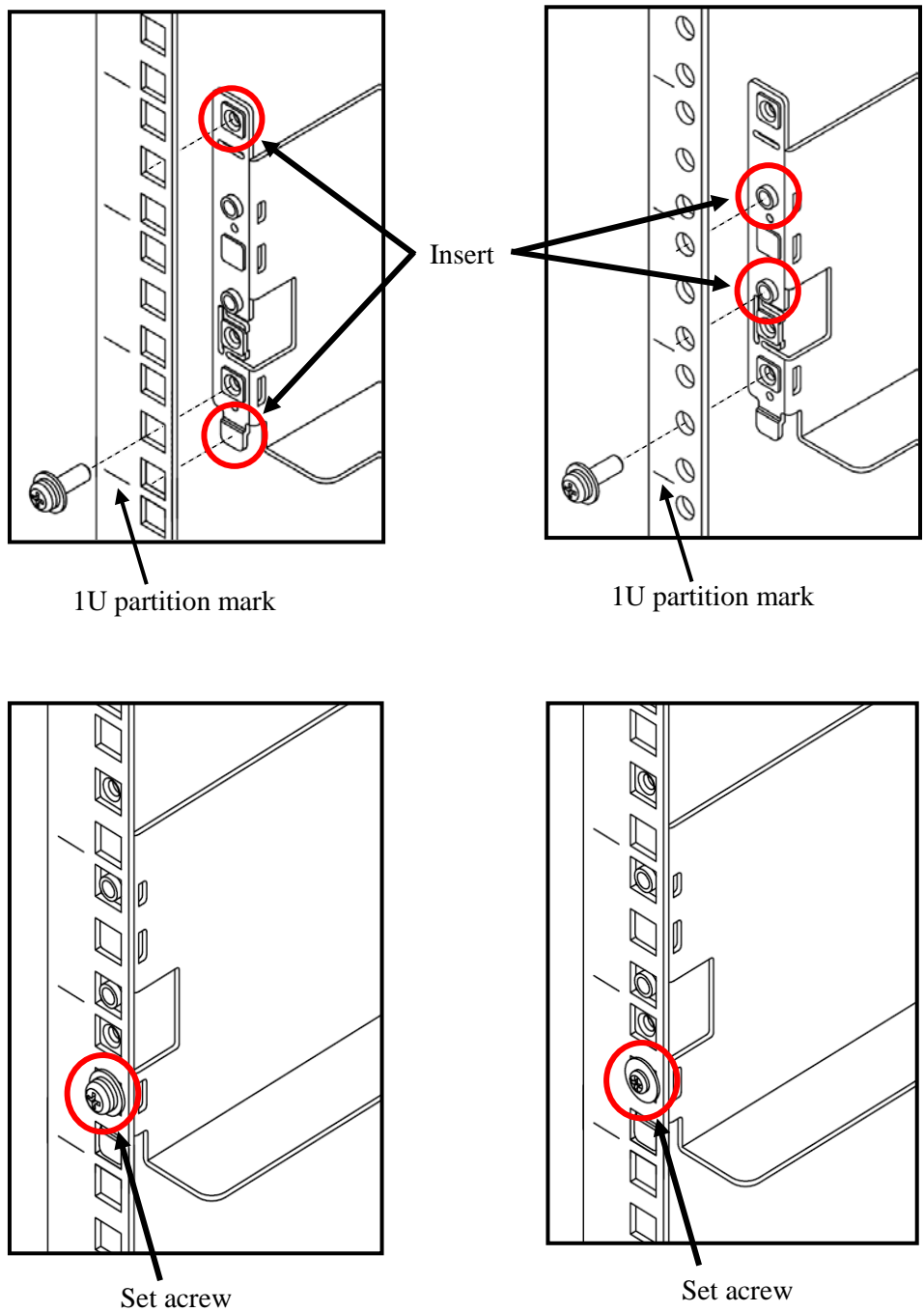
For each rail, assume the face with the inner as the rear (see the figure below).



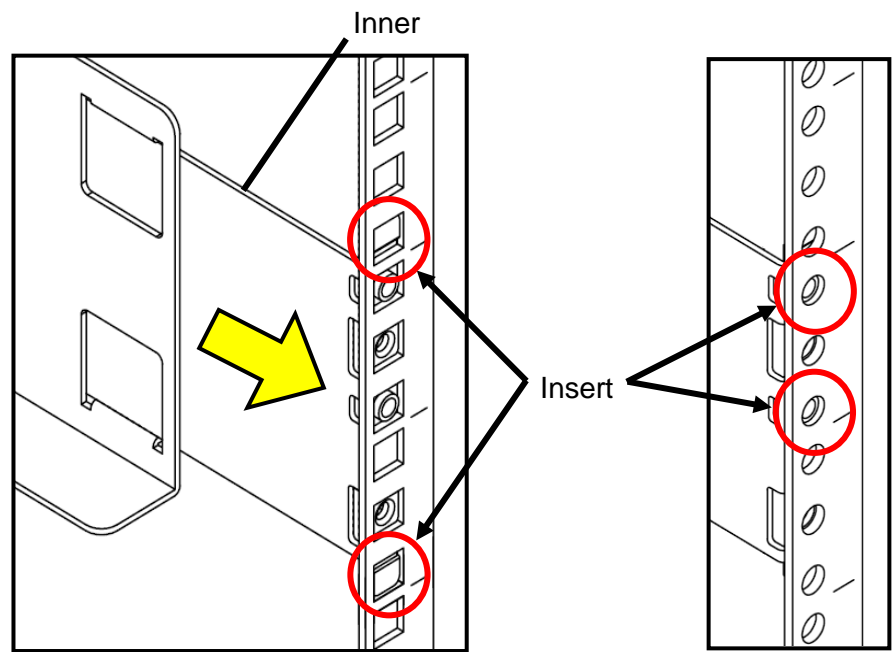
(1) The bottom of the rail is fitted to the partition mark of 1U, and two projections of the rail are set on the hole at the side in front of the rack.

An attached installation screw is tightened in the bottom screw hole, and a rail is fixed.

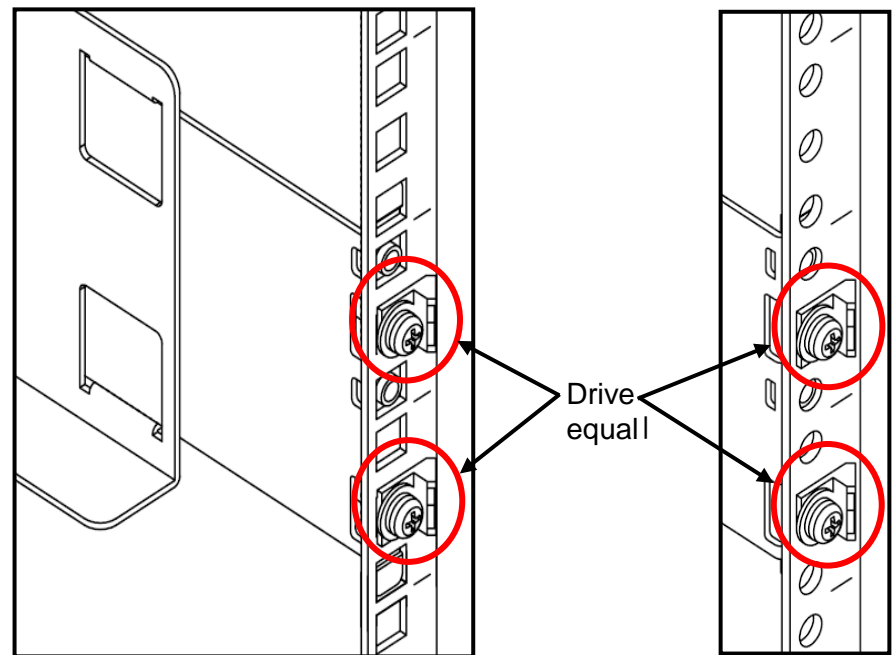
When 2 screws are attached, use the screw.  
(lower right figure)



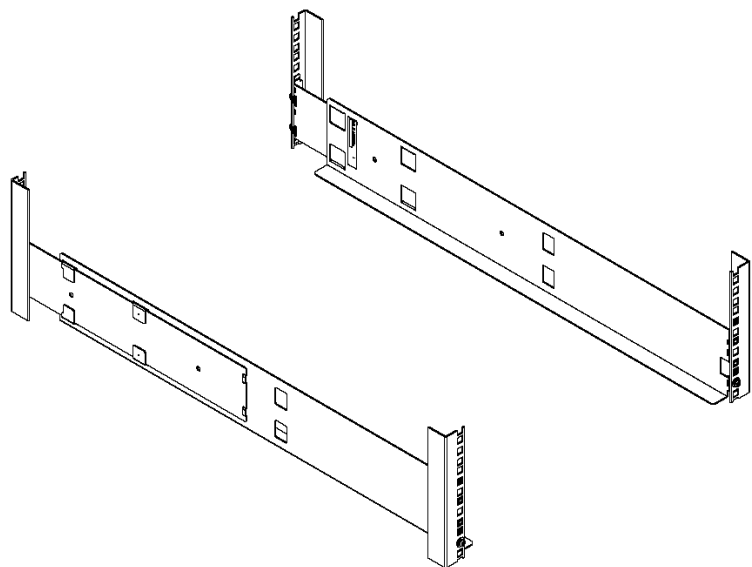
(2) Pull the inner toward you and push the top and bottom projections into the angle holes.



(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.

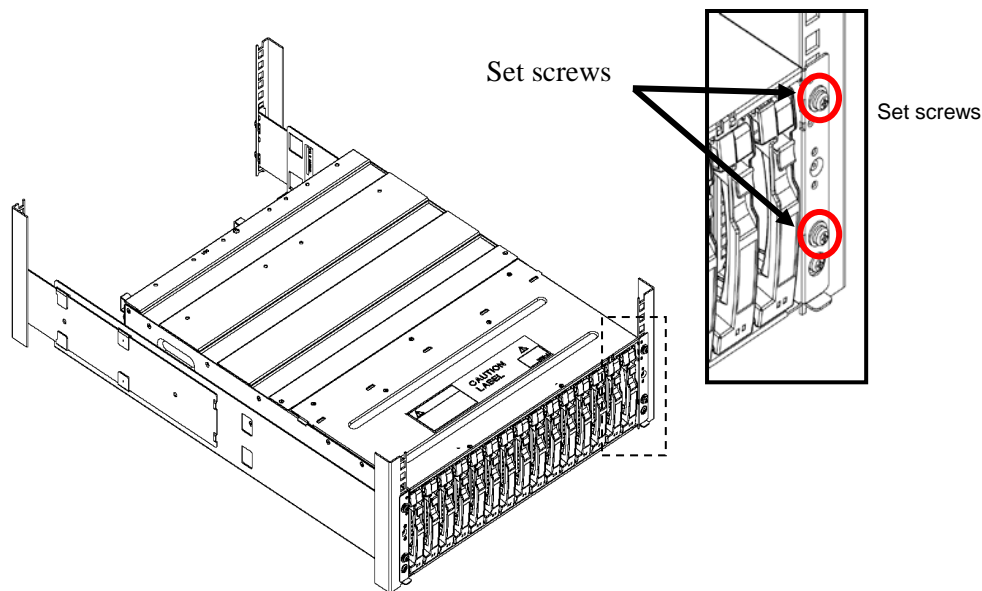


(4) On the right side of the rack, install the other rail in the same procedure.



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

**NOTE:** The unit is very heavy. Be careful not to drop it while lifting. Fasten four set screws at 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.



## 2. Installing Rack-mount Kit (Accessory) on NEC Storage Rack

**NOTE:** NEC Storage rack indicates one of the followings:

- NF9100-SY01E/SY02E/SY01BE/SY02BE (24U-rack)
- NF9100-SY04E/SY05E/SY04BE/SY05BE (36-U rack)
- NF9100-SY06E/SY07E/SY06BE/SY07BE (44U-rack).

### 2.1 Installation of Rails

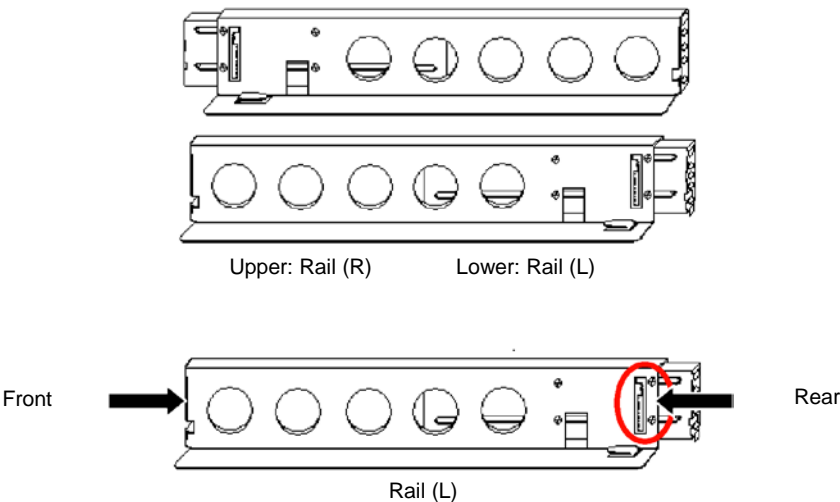
**NOTE:** There are two types of rails, one for angle holes on a rack and the other for round holes. See the proper procedure depending on the type of the rail you use.

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 the similar procedure.

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, assume the face with the label as the rear (see the figure below).



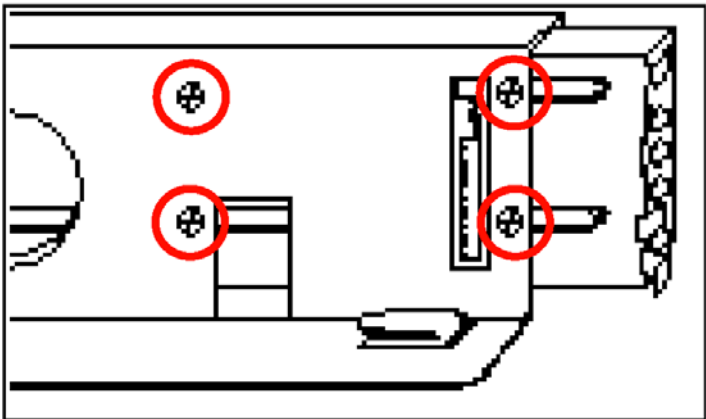
### 2.1.1 Angle Hole Fitting Rail

**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.

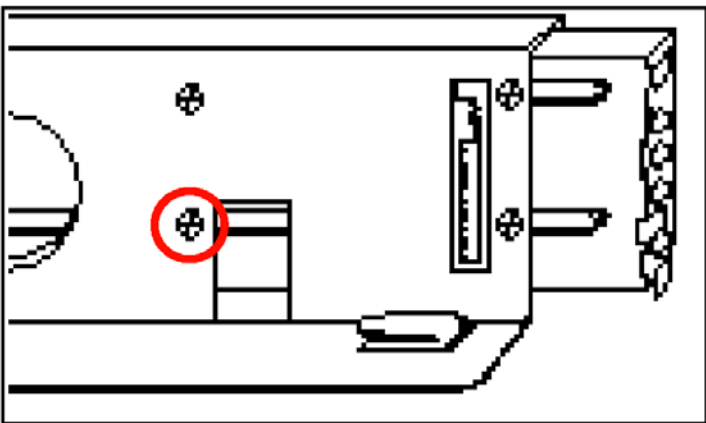
- 1. Loosen the four flush screws at the rear end of the rail

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

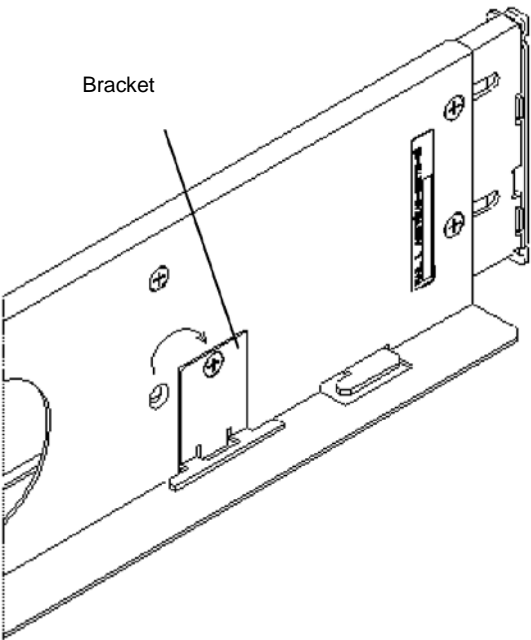
**NOTE:** Do not remove the flush screws.



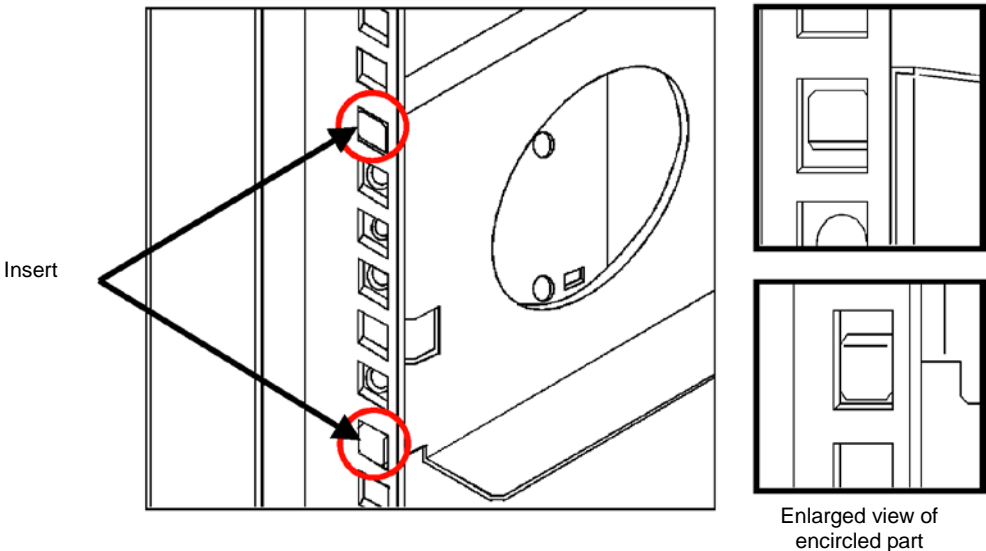
- 2. Remove the flush screw (1) enclosed by a circle in the figure below.



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.)

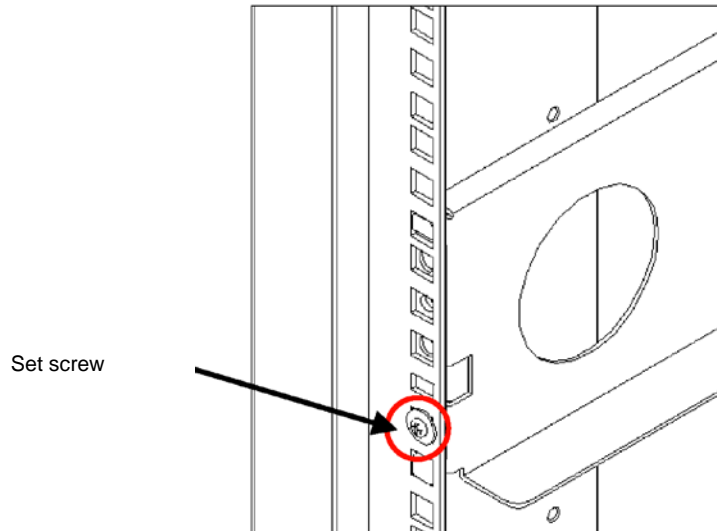


4. Insert the top and bottom projections into the angle holes on the front of the rack.

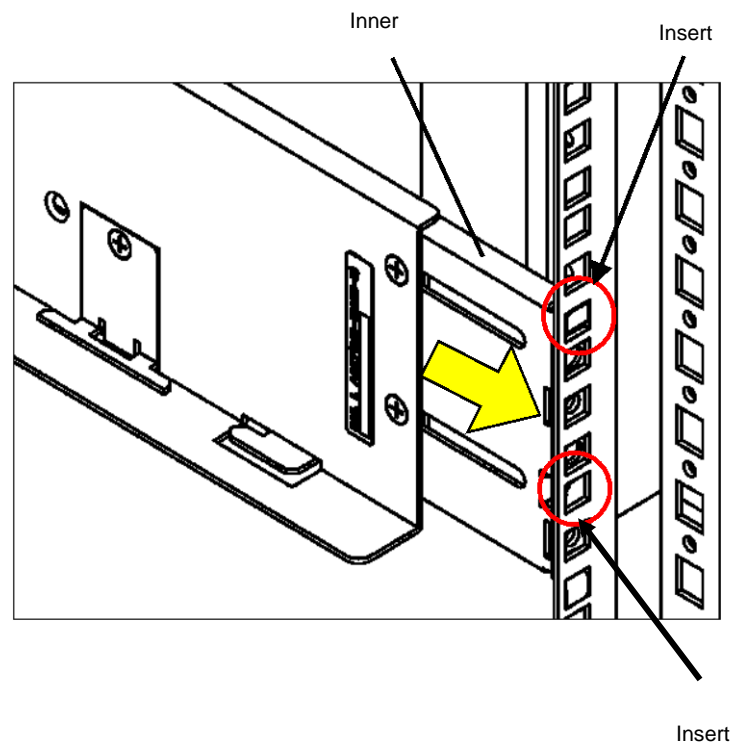


5. Mate the angle holes of the inner face of the rack with the screw holes of the rail and fix the rail with the attached set screws.

Use the set screw (see the figure below).

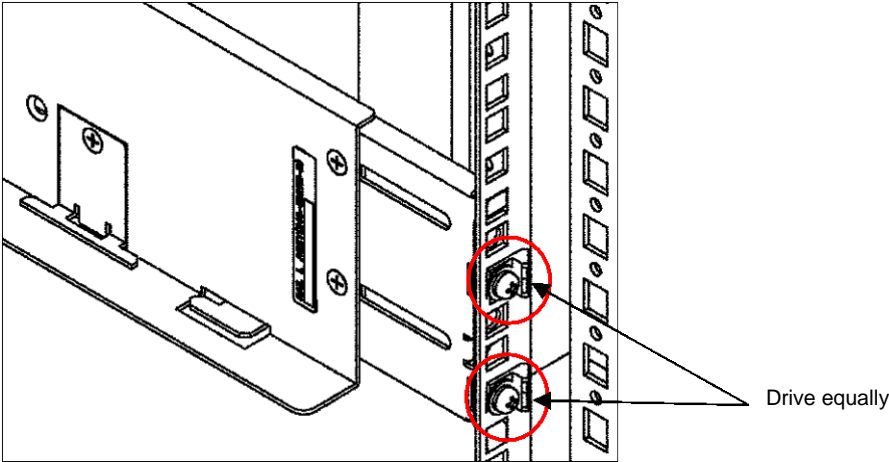


6. Pull the inner toward you and push the top and bottom projections into the angle holes.

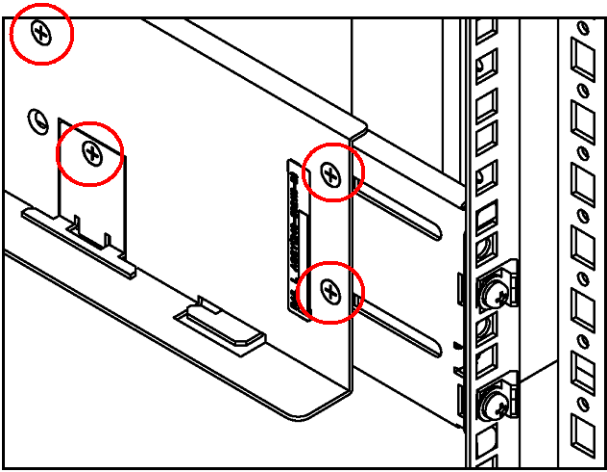




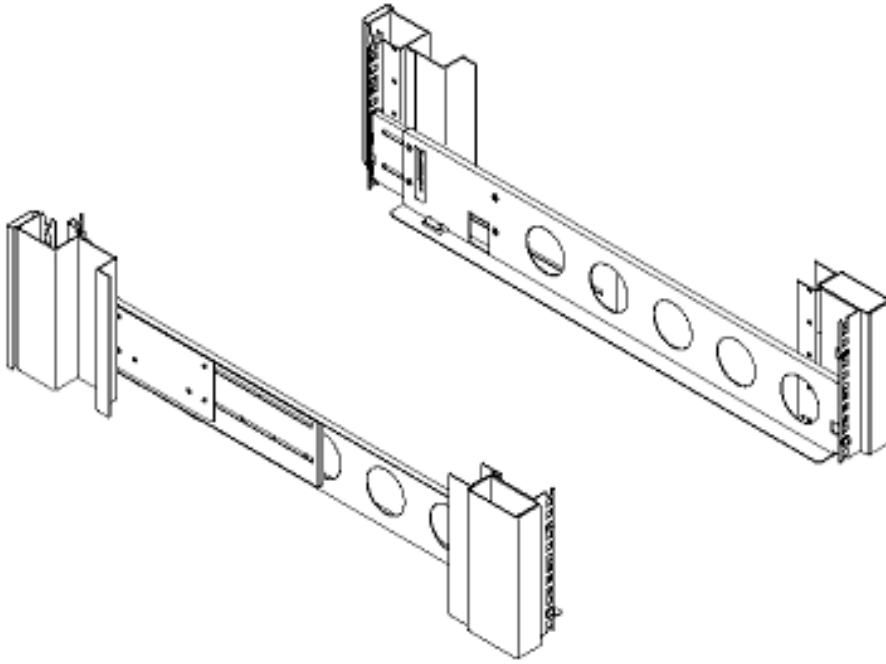
7. With the inner held, push the two set screws with a part for cable clamp into the female screws of the rail support and drive the screws equally. Take note on the direction of the part for cable clamp.



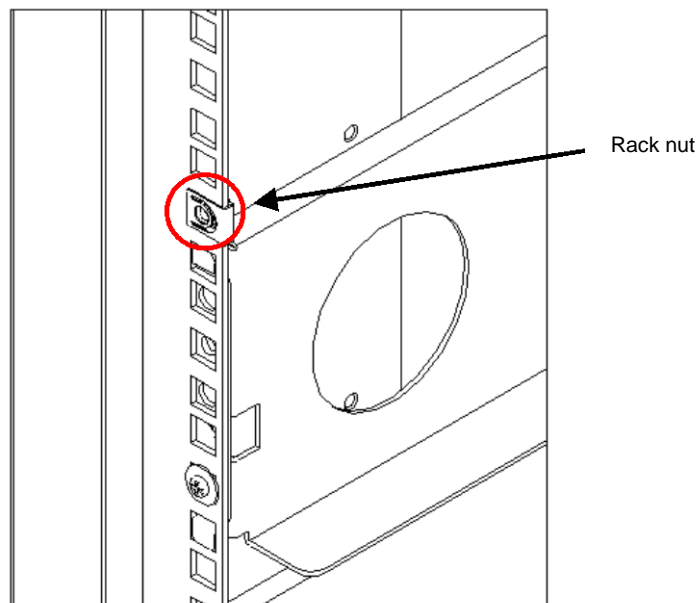
Drive the four flush screws loosened in step 1 and removed in step 3 securely.



8. On the right side of the rack, install the other rail in the same procedure.

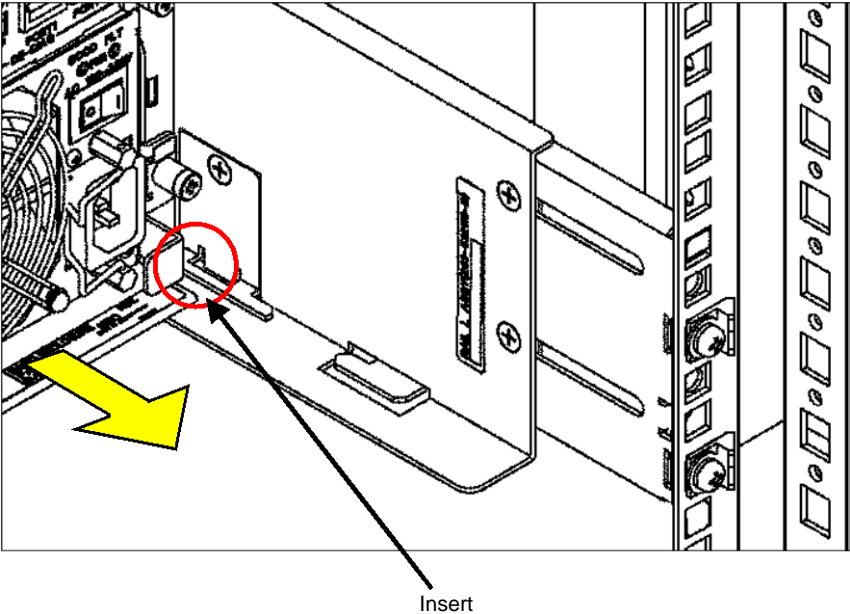


9. Install the rack nut at the position shown in the figure below (or the first hole on the projection at the top of the rail).

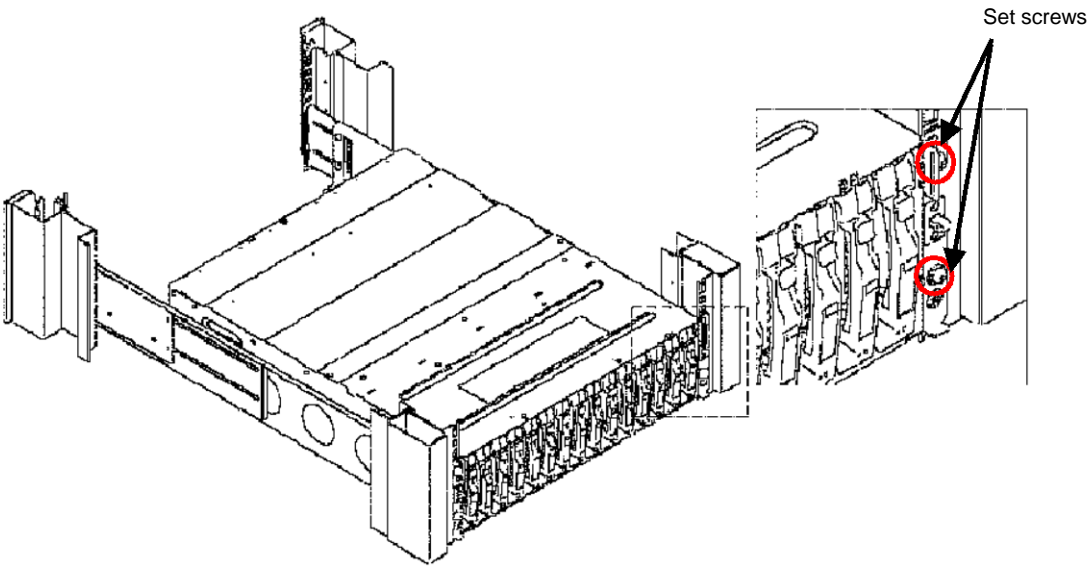


10. Lift the unit, put the rear section on the rails, and push it into the rack.

**NOTE:** The unit is very heavy. Be careful not to drop it while lifting.



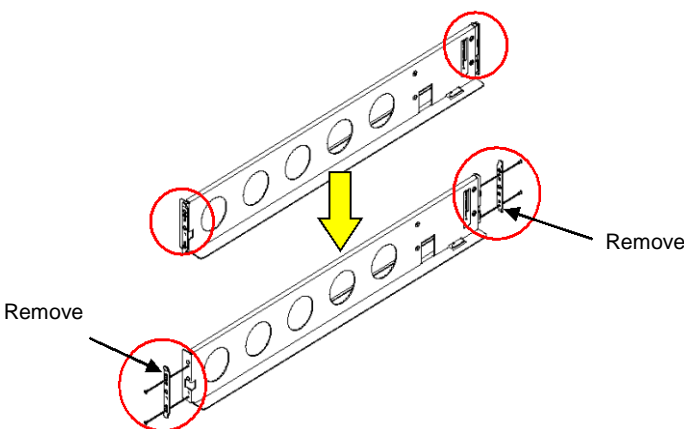
11. Fasten four set screws at two left and two right points on the front of the unit. The figure below only shows the right part of the unit. Fix the left part of the unit similarly.



## 2.1.2 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.

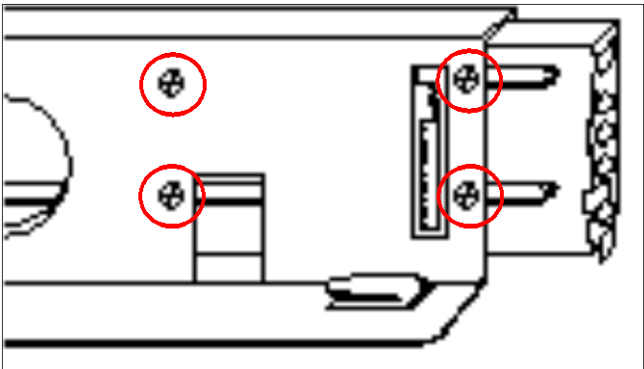
- 1. Remove the rail support installed previously from each rail by removing four screws (two on the front and the other two on the rear).



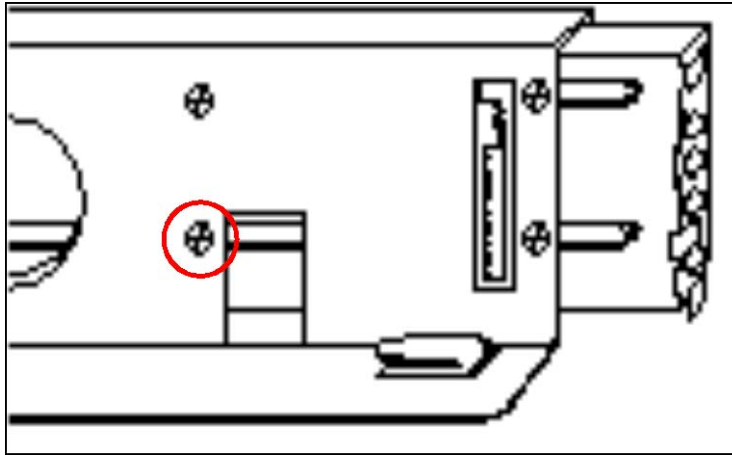
- 2. Loosen four flush screws at the rear side of the rail.

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

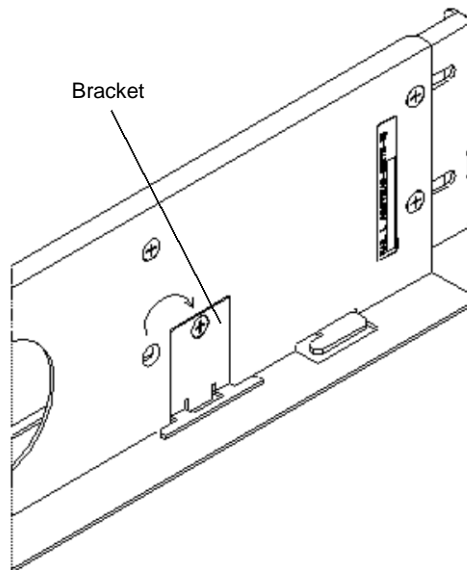
**NOTE:** Do not remove the flush screws.



3. Remove the flush screw (1) enclosed by a circle in the figure below.

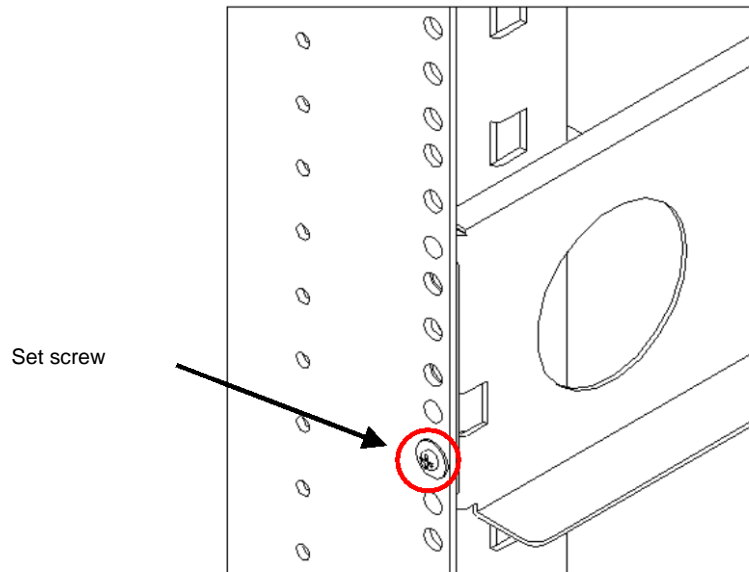


4. Install the attached bracket (see the figure below) with the flush screw removed in step 3 loosely. (Make sure that the moving part of the rail can slide smoothly.)

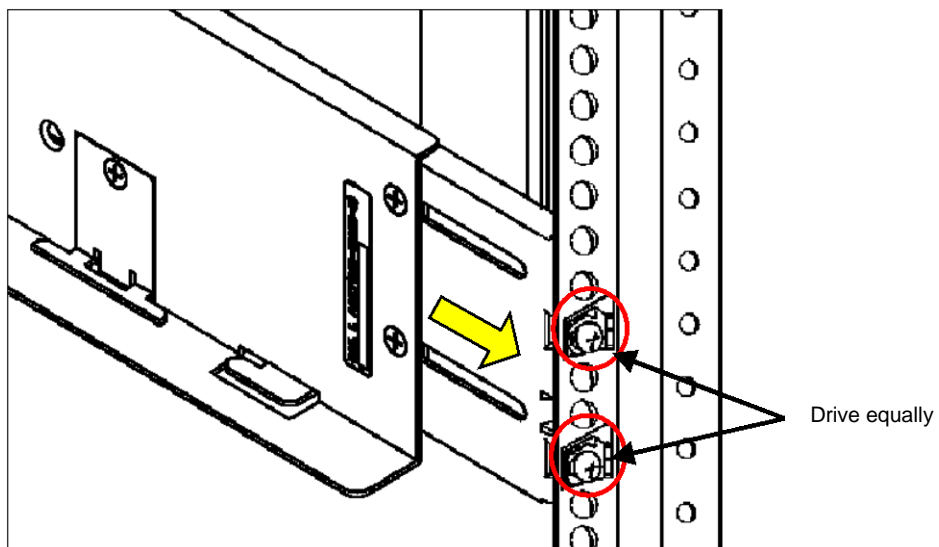


5. Adjust the round holes on the front of the rack to the screw holes on the rail (L) so that the inner face of the rack may be fit to the rail face with the label and fix the rail to the rack with the attached set screws.

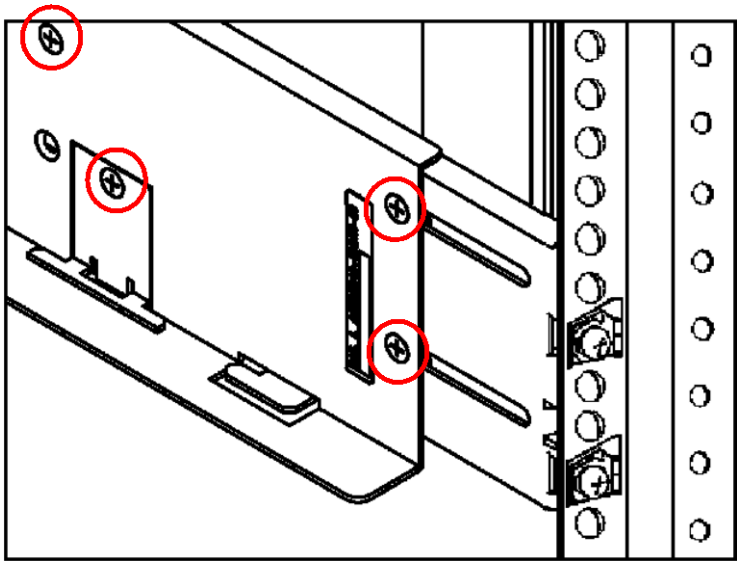
Use screws (see the figure below).



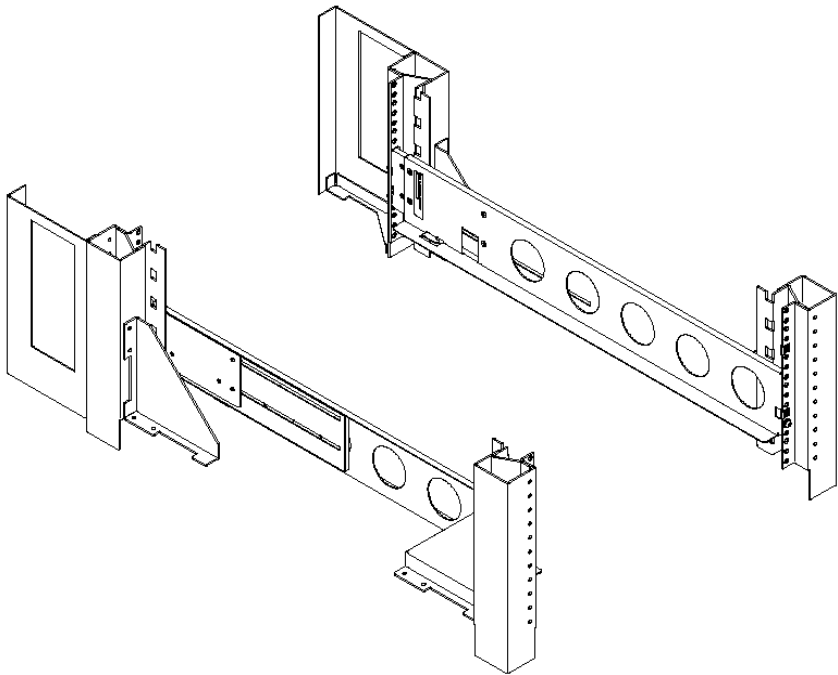
6. Pull the inner toward you and, with it held, insert the two set screws with a part for cable clamp into the female screws of the inner and drive the screws equally. Take note on the direction of the part for cable clamp.



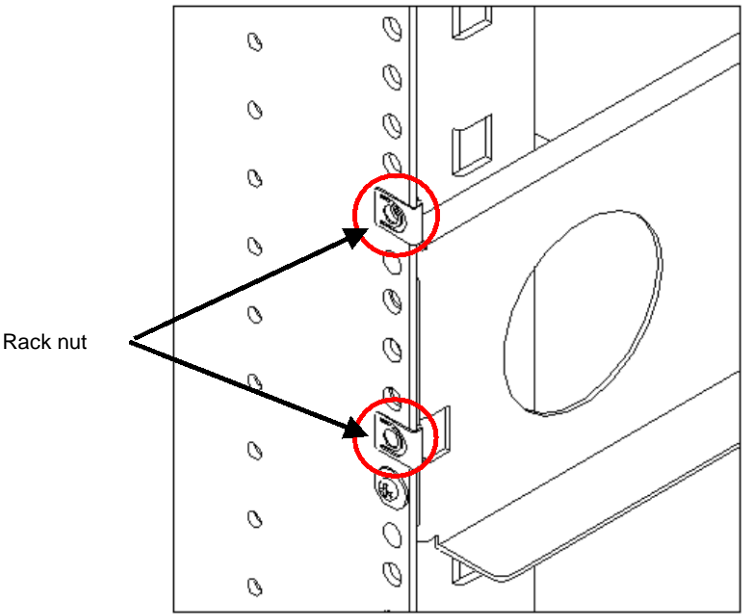
Drive the four flush screws loosened in step 1 and removed in step 3 securely.



7. On the right side of the rack, install the other rail in the same procedure.

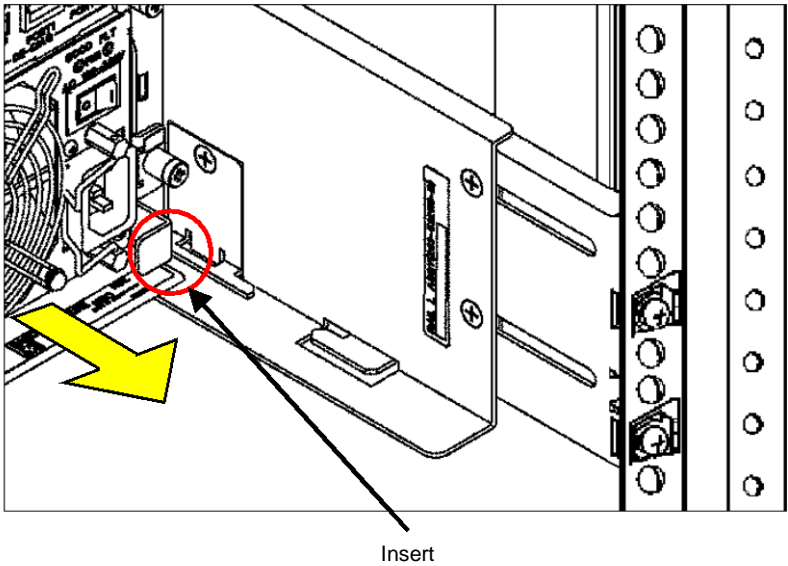


8. Install the rack nut at the position shown in the figure below (or the hole just above the set screw the first hole of the top of the rail).



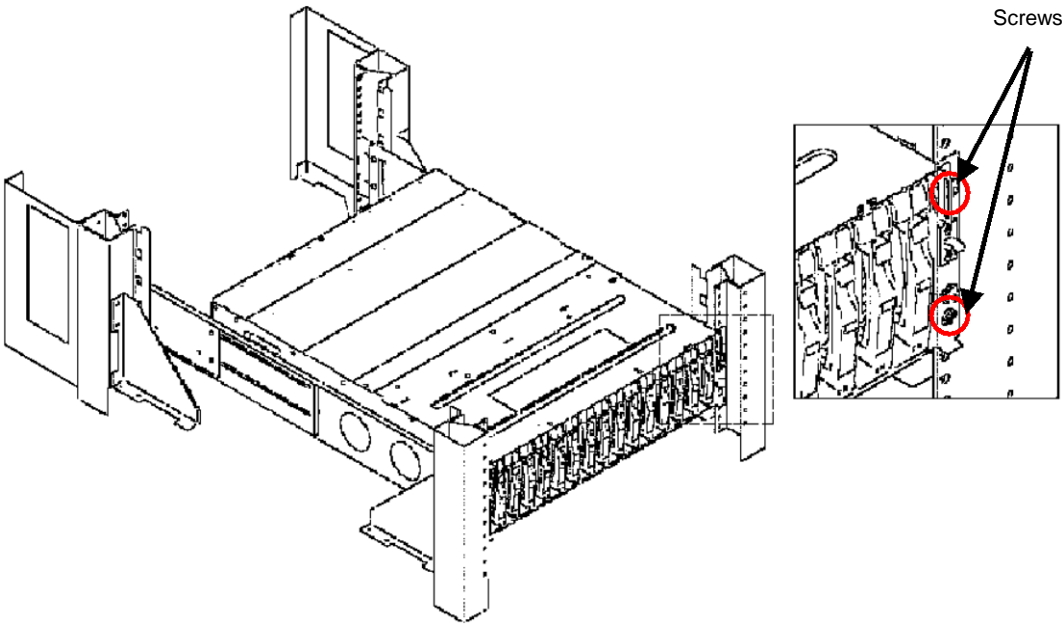
9. Lift the unit, put the rear section on the rails, and push it into the rack.

**NOTE:** The unit is very heavy. Be careful not to drop it while lifting.





- 10.** Fasten four set screws at 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.



## 3. Installing Unit on HP Rack

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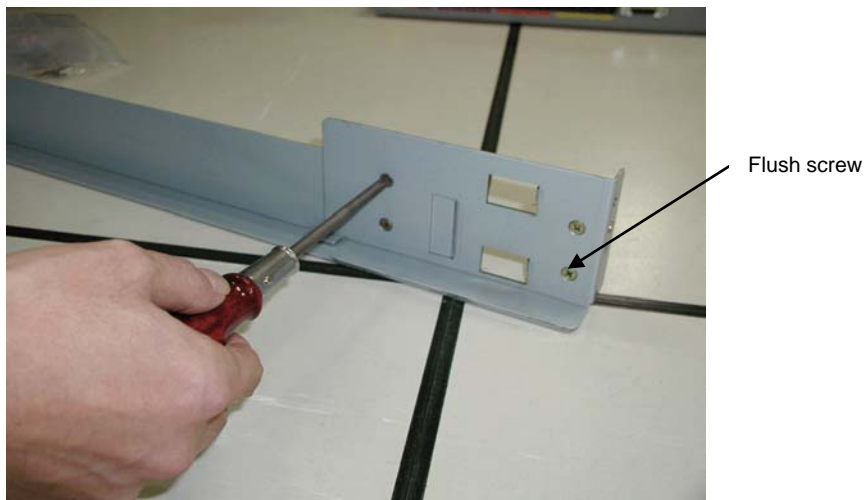
**NOTE:** There are old and new types of HP racks. To install the unit on the HP rack of the new type, the NF9100-SK01E rack-mount kit is to be separately purchased. Ask your sales representative for details.

---

### 3.1 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.

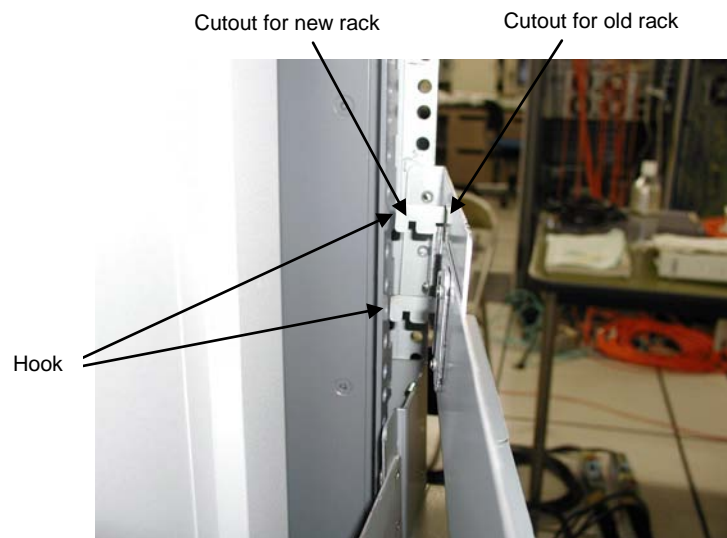


2. With the rail hook positioning at the rear of the rack, insert the rail into the rack, insert the hook into the angle hole at the intended install position of the unit, and engage the hook with the cutout.

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

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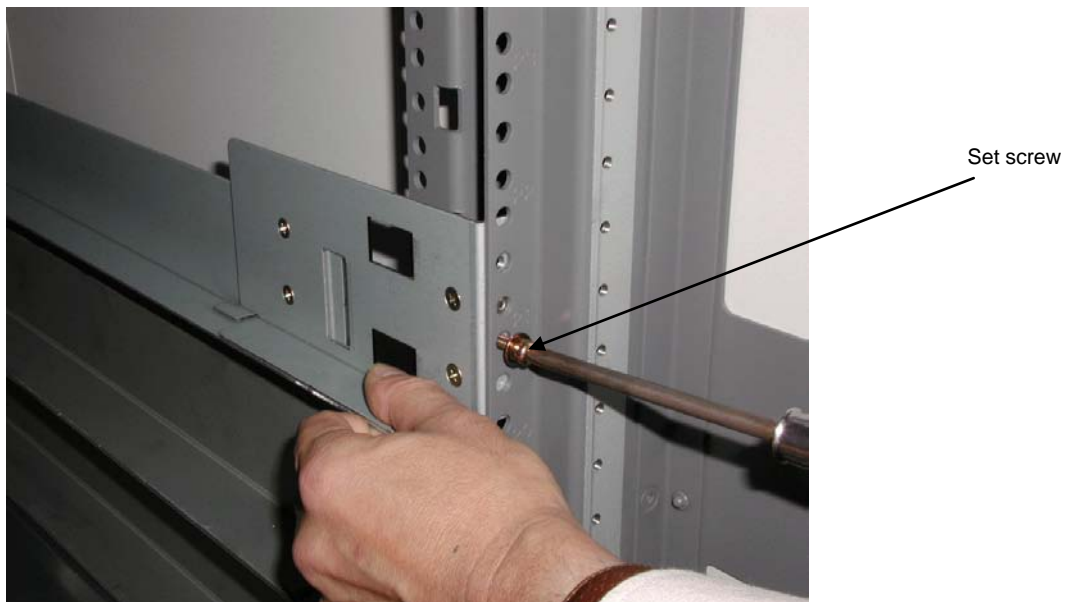
3. Pull the rail toward you and insert the rivets on the rail into the round holes on the rack.



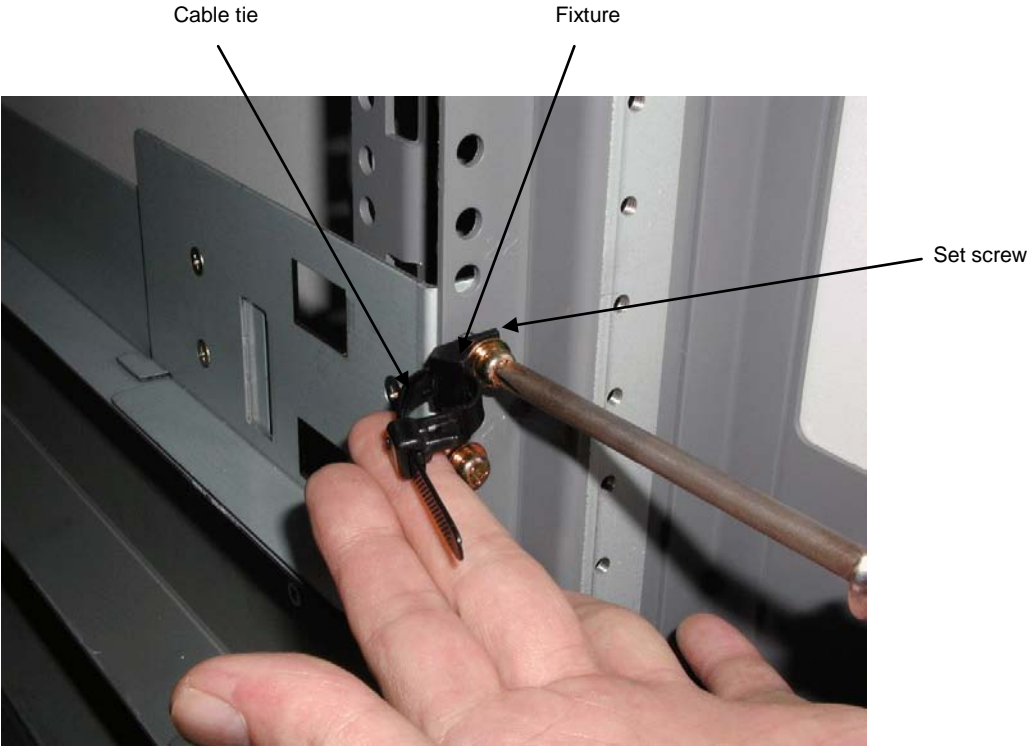
4. While holding the rail, tighten the set screw (M4 screw).



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.



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.

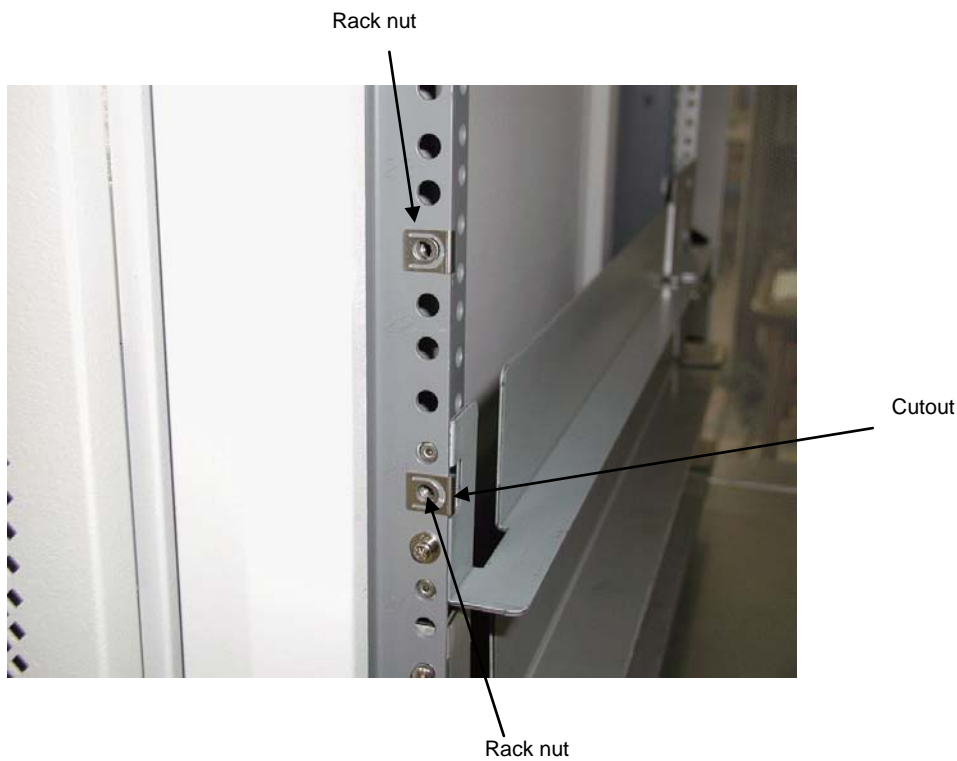


7. Firmly tighten the four flush screws.



### 3.2 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.



### 3.3 Installation of Unit

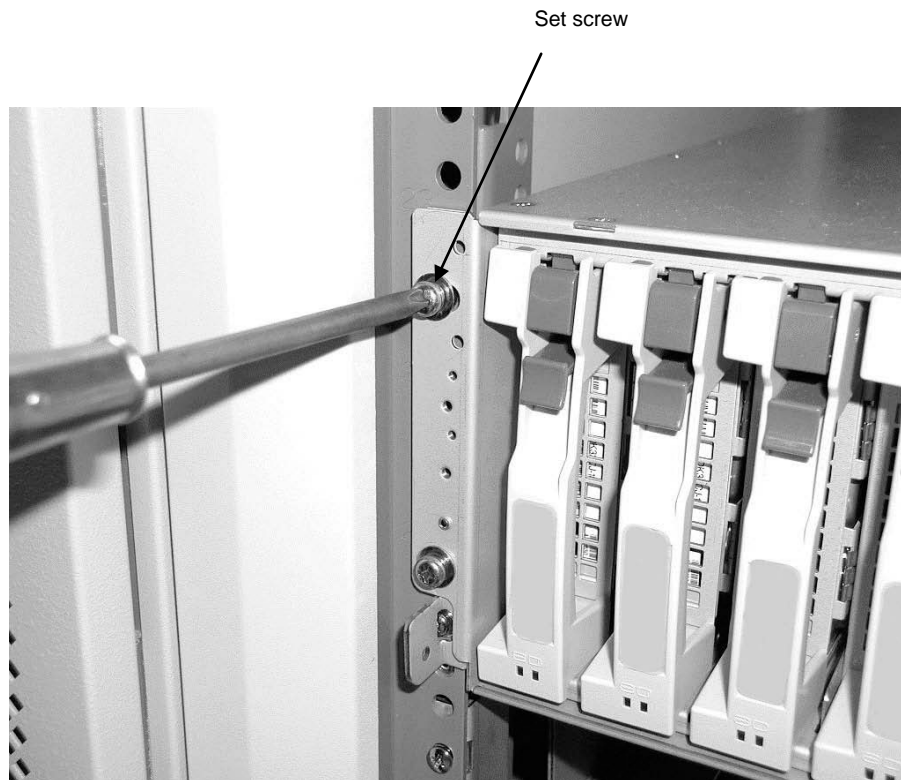
1. Using the same procedure explained above, install the right rail.
2. Lift the unit and place the rear section on the rails, and push the unit toward the innermost of the rack.

---

**NOTE:** The unit is very heavy. Be careful not to drop it while lifting.

---

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



This completes the installation of unit.

## 4. 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 is to be separately purchased. Ask your sales representative for details.

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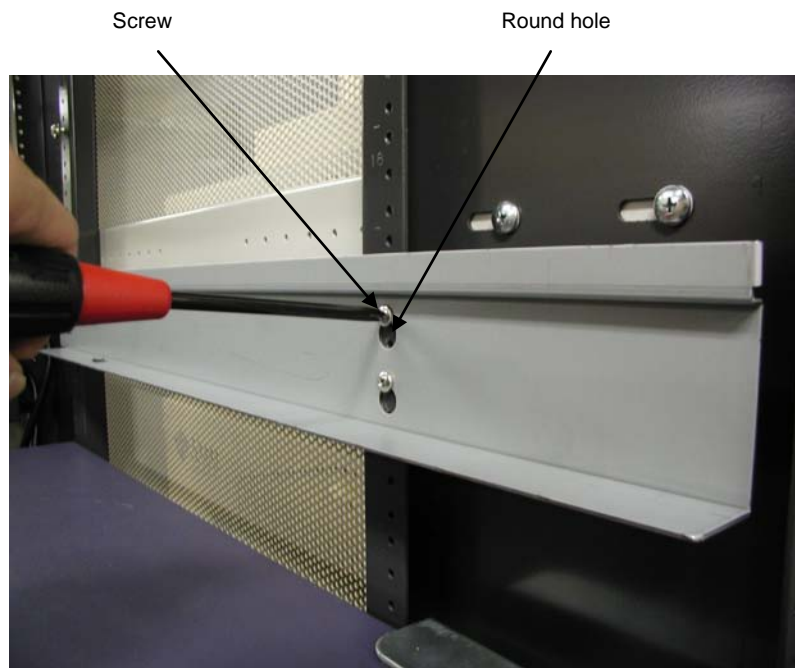
### 4.1 Installation of Rails

1. Temporarily tighten 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.)





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



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



## 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. Be careful not to drop it 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.



This completes the installation of the unit.

## 5. Installing Unit on Express Old-type Rack

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**NOTE:** The Express old-type racks are:

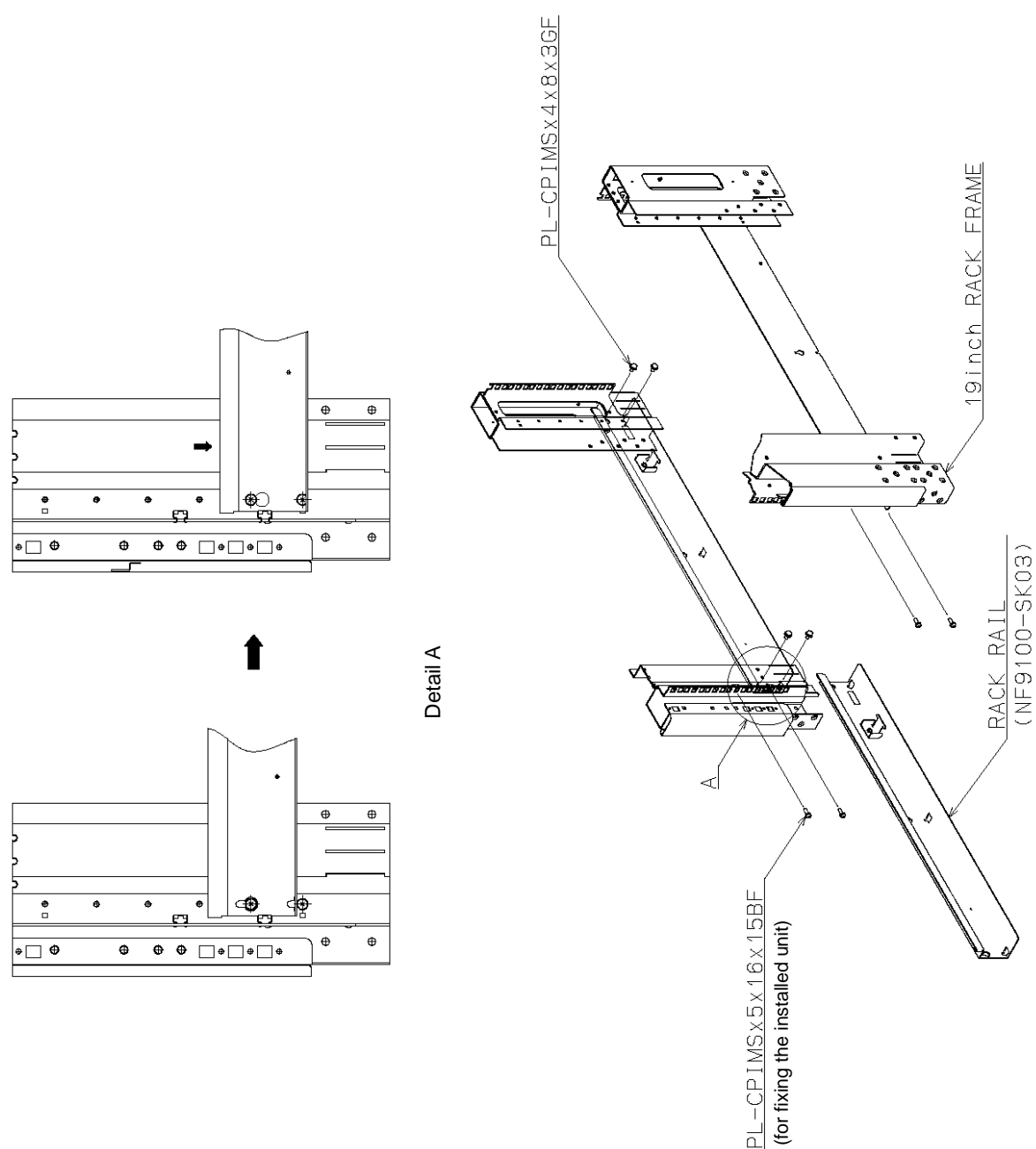
N8540-28 (42U rack),  
N8540-29 (36U rack),  
N8540-38 (16U rack),  
N8540-09 (44U rack),  
N8540-09AC (44U rack),  
N8540-10E (35U rack), and  
N8540-10AC (35U rack).

The Express old-type rack-mount kit is the NF9100-SK03E.

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# 5.1 Installing the Rack Mount Kit

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



## 5.2 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. Be careful not to drop it 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.



This completes the installation of the unit.

## 6. Cable Wiring

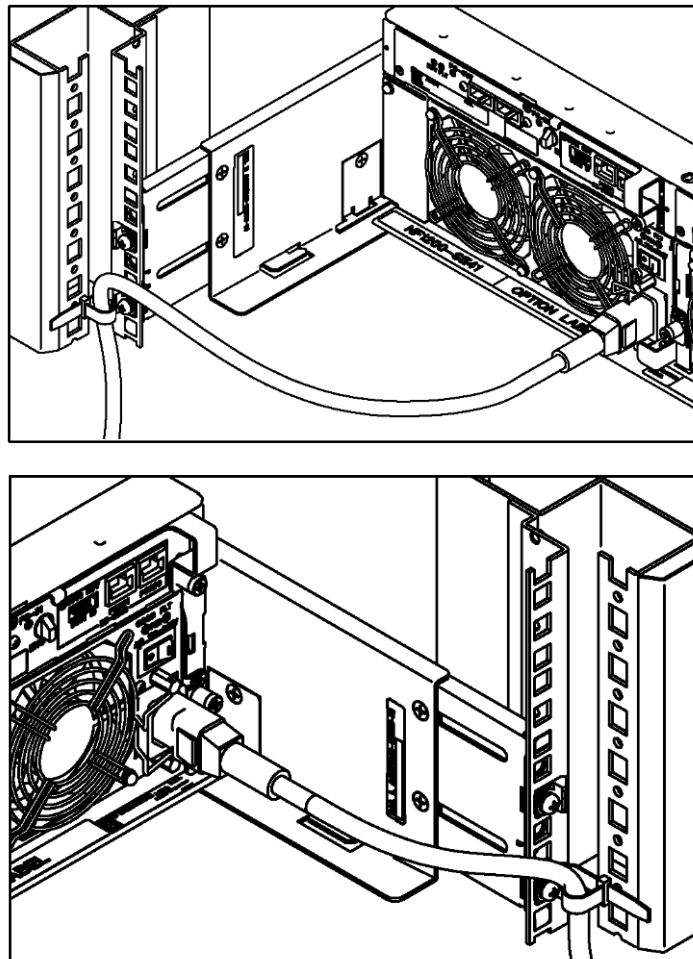
After installing the required number of units on the rack, go to the rear of the rack and provide proper cable wiring.

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.



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

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