NEC S2900 Disk Array Unit User Guide

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NEC

NEC Storage S2900
NF2900-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 ensure the accuracy of 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 after you finished reading it.
(5) When transferring this unit to another 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).

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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 their 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.

“ Perchlorate Material **-** special handling may apply.

See www.dtsc.ca.gov/hazardouswaste/perchlorate.”

Safety Precautions

Before using this unit, read this manual carefully and use precaution in order to use this unit safely and correctly and to avoid any risk of accident or injury to your person or properties. Keep this manual nearby for easy reference.

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

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

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

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

Notes on Use

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

⚠ WARNING

- Do not use the disk array unit in an area with high humidity or water usage. If so, a fault, electrical shock, or fire may occur.
- Do not use the disk array unit in an area where inflammable gas and/or combustible substance are placed. If so, fire or an explosion may occur.
- Do not concentrate power cords to just a few AC outlets. If so, fire may occur.
- Do not set heavy materials on any power cord. If so, the coating of the power cord may be broken, fire may occur, and/or you may be electrically shocked.
- Do not install the disk array unit in an area of high humidity or dust. Remove any dust adhering to AC outlets and the plugs of power cords. If dust accumulates on an AC outlet and/or plug, fire may occur.
- Do not connect the plug of a power cord to an AC outlet with wet hands. If so, you may be electrically shocked.
- The disk array unit can accept the power in the range of 100 - 240 VAC (50/60 Hz). Using power of a different voltage may cause electric shock, smoke, and/or fire to occur.
- The controller of the disk array unit contains a lithium battery. Do not remove the lithium battery. The lithium battery may explode when it is brought close to fire or when immersed in water. Dispose of the controller according to local ordinances. Contact your local government for details.
- If the disk array unit does not operate normally due to the life of the lithium batteries, contact your service representative. Do not disassemble the controller, or replace or charge the battery by yourself.

⚠ CAUTION

- Do not install the disk array unit and the host systems in an unstable environment. If so, the equipment may fall causing injury to you and/or the array.
- Do not install the disk array unit and the power cords in any area with direct sunshine or near any apparatus generating heat such as a heater. If so, a fault may occur. Further, the protective coating of the power cords may be damaged causing 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 the array power cord to an earth grounded AC outlet. Connection of the grounding line to a gas pipe is extremely dangerous. Never do it.

- Connect or remove a peripheral device from the disk array unit after turning off all the power supplies 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.

- 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 causing data errors to occur. Clean any optical fiber cable whenever it is inserted into the mating connector with the following procedure.

1. Blow parts cleaning gas (e.g. compressed air) to the connector of the optical fiber cable for several seconds.
2. Wipe the connector with a non-woven cloth soaked with alcohol for several passes.
3. Apply the compressed air to the connector again.

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 created due to uneven mechanical loading.
4. Circuit Overloading – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. Reliable grounding – Reliable grounding of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Notes on Disposal

Disposing of your used NEC product

In the European Union

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

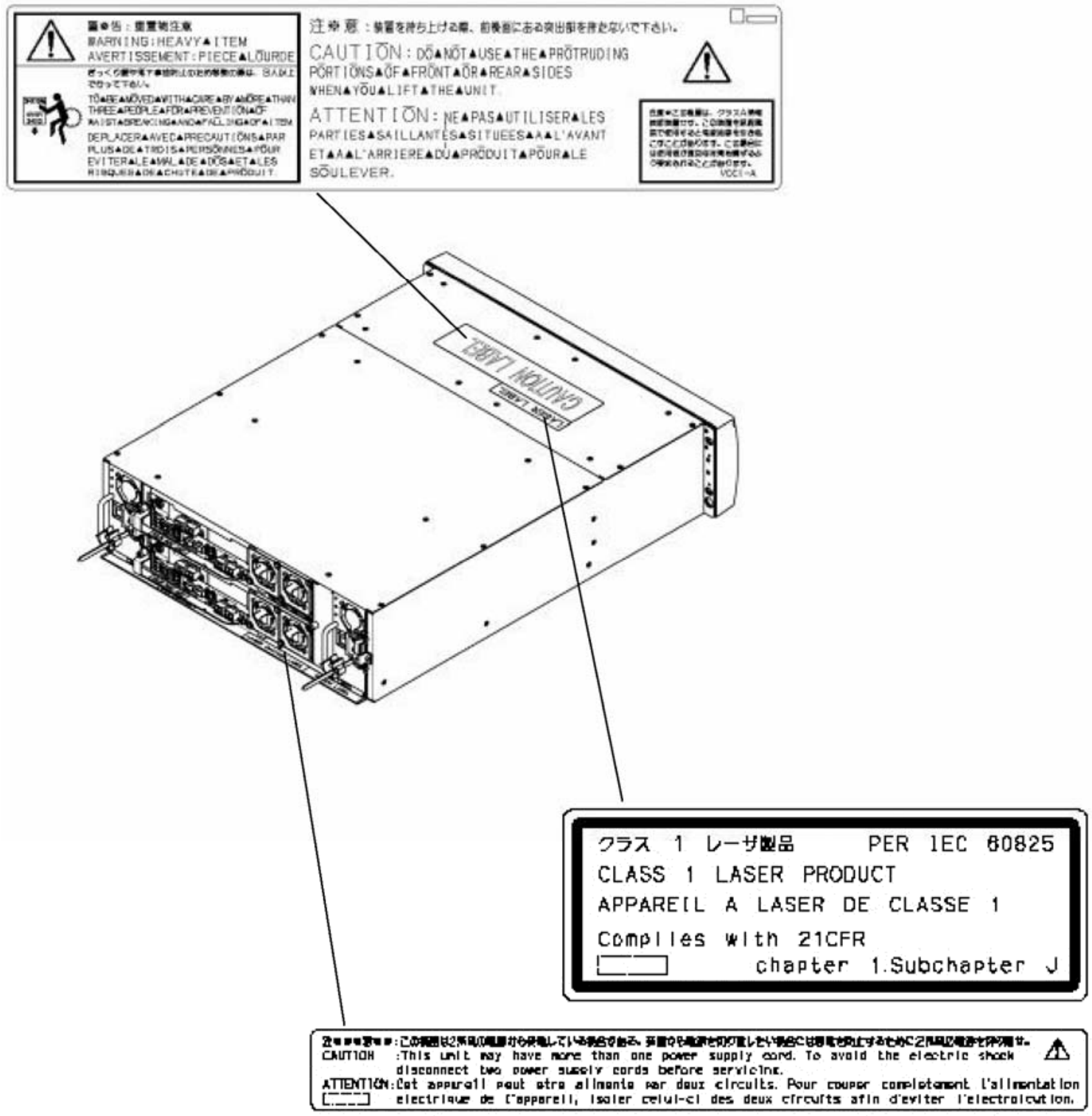
Outside the European Union

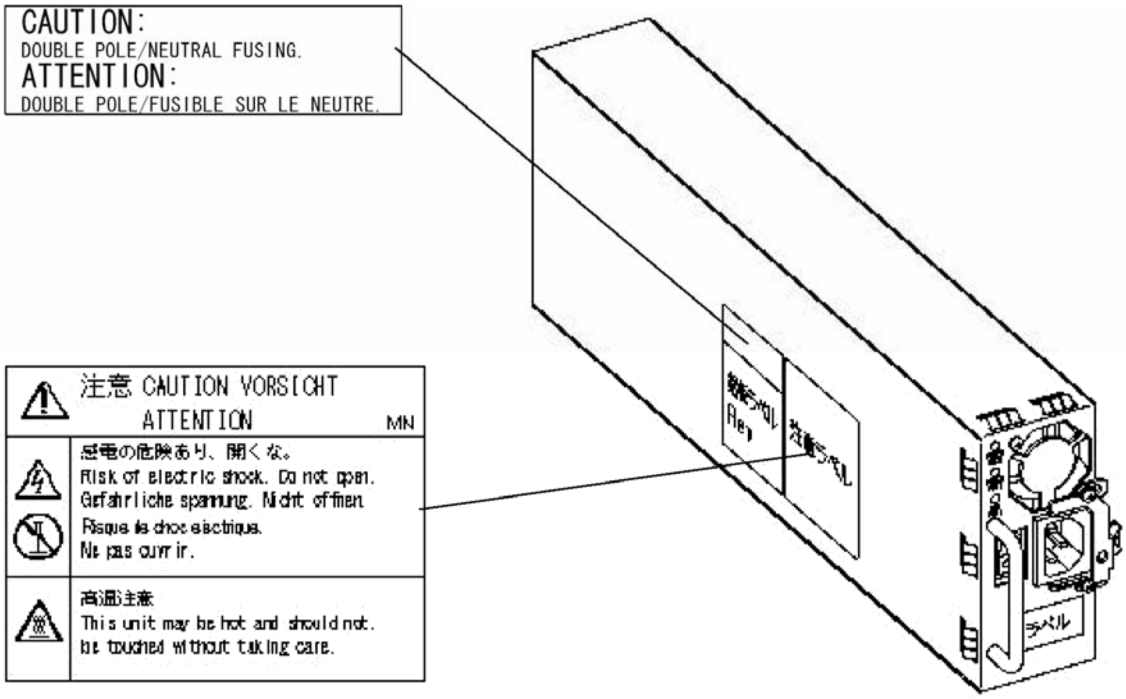
If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority and ask for the correct method of disposal.

Notes on Safety

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

If you find any labels totally/partially removed or illegible due to damage, contact your sales representative.


警 告：重量物注意
WARNING:HEAVY▲ITEM
AVERTISSEMENT:PIECE▲LOURDE
TO▲BE▲MOVED▲WITH▲CARE▲BY▲MORE▲THAN THREE▲PEOPLE▲FOR▲PREVENTION▲OF WAIST▲BREAKING▲AND▲FALLING▲OF▲ITEM
DEPLACER▲AVEC▲PRECAUTIONS▲PAR PLUS▲DE▲TROIS▲PERSONNES▲POUR EVITER▲LE▲MAL▲DE▲DOS▲ET▲LES RISQUES▲DE▲CHUTE▲DE▲PRODUIT.
注 意：装置を持ち上げる際、前後面にある突出部を持たないで下さい。
CAUTION: DO▲NOT▲USE▲THE▲PROTRUDING PORTIONS▲OF▲FRONT▲OR▲REAR▲SIDES WHEN▲YOU▲LIFT▲THE▲UNIT.
ATTENTION: NE▲PAS▲UTILISER▲LES PARTIES▲SAILLANTES▲SITUEES▲A▲L'AVANT ET▲A▲L'ARRIERE▲DU▲PRODUIT▲POUR▲LE SOULEVER.
VCCI-A
CAUTION LABEL
LASER LABEL
クラス 1 レーザ製品 PER IEC 60825
CLASS 1 LASER PRODUCT
APPAREIL A LASER DE CLASSE 1
Complies with 21CFR
chapter 1.Subchapter J
CAUTION :This unit may have more than one power supply cord. To avoid the electric shock disconnect two power supply cords before servicing.
ATTENTION:Cet appareil peut etre alimente par deux circuits. Pour couper completement l'alimentation electrique de l'appareil, isoler celui-ci des deux circuits afin d'eviter l'electrocution.

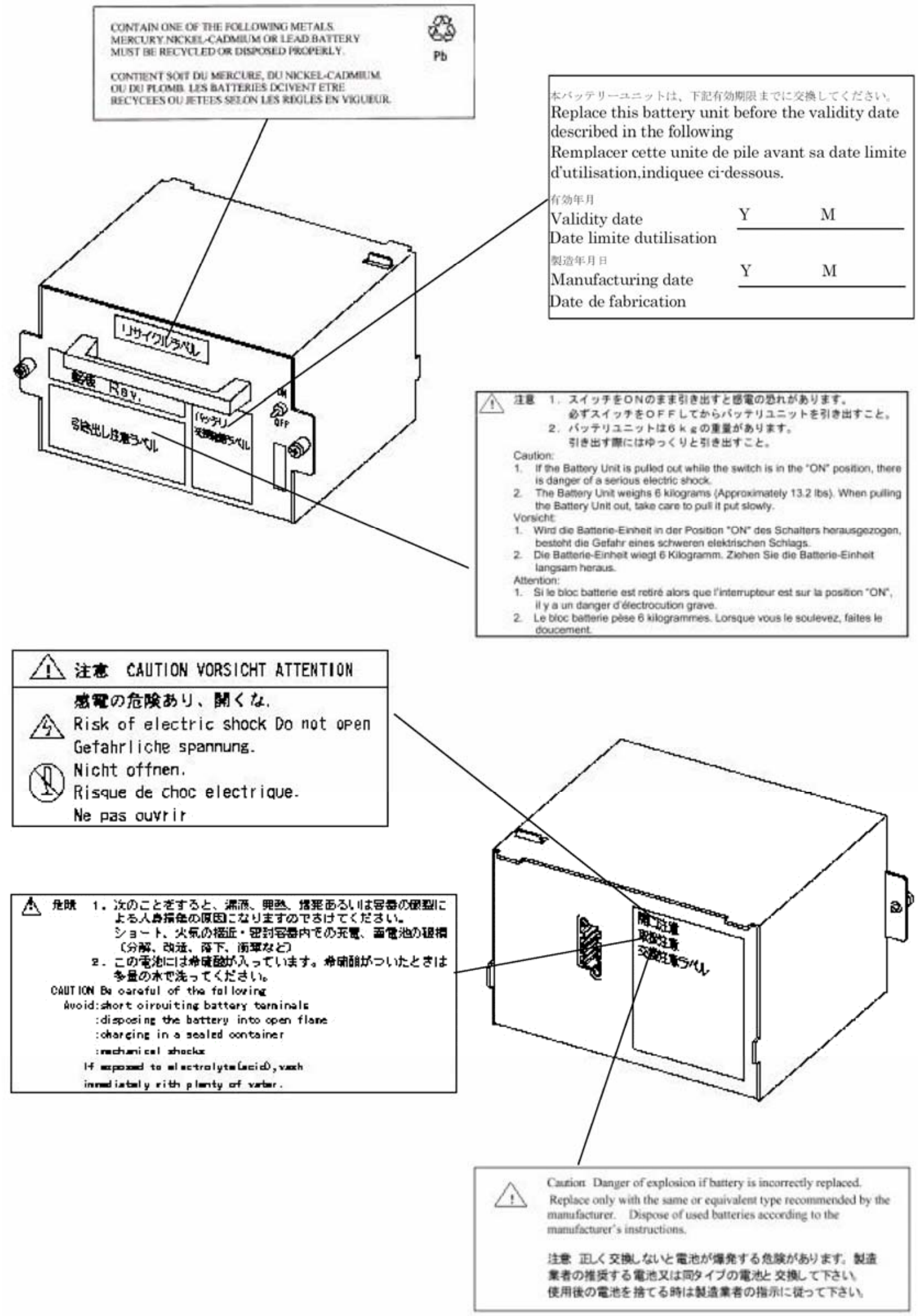


CAUTION:
DOUBLE POLE/NEUTRAL FUSING.
ATTENTION:
DOUBLE POLE/FUSIBLE SUR LE NEUTRE.

注意 CAUTION VORSICHT
ATTENTION MN

感電の危険あり、開くな。
Risk of electric shock. Do not open.
Gefahrliche spannung. Nicht offnen
Risque de choc electrique.
Ne pas ouvrir.

高温注意
This unit may be hot and should not.
be touched without taking care.



CONTAIN ONE OF THE FOLLOWING METALS.
MERCURY.NICKEL-CADMIUM OR LEAD BATTERY
MUST BE RECYCLED OR DISPOSED PROPERLY.

CONTIENT SOIT DU MERCURE, DU NICKEL-CADMIUM.
OU DU PLOMB. LES BATTERIES DCIVENT ETRE
RECYCEES OU JETEES SELON LES REGLES EN VIGUEUR.

本バッテリーユニットは、下記有効期限までに交換してください。
Replace this battery unit before the validity date described in the following
Remplacer cette unite de pile avant sa date limite d'utilisation,indiquee ci-dessous.

有効年月
Validity date
Date limite dutilisation
Y　　M ____

製造年月日
Manufacturing date
Date de fabrication
Y　　M ____

注意　1．スイッチをONのまま引き出すと感電の恐れがあります。
必ずスイッチをOFFしてからバッテリユニットを引き出すこと。
2．バッテリユニットは6kgの重量があります。
引き出す際にはゆっくりと引き出すこと。

Caution:
1. If the Battery Unit is pulled out while the switch is in the "ON" position, there is danger of a serious electric shock.
2. The Battery Unit weighs 6 kilograms (Approximately 13.2 lbs). When pulling the Battery Unit out, take care to pull it put slowly.

Vorsicht:
1. Wird die Batterie-Einheit in der Position "ON" des Schalters herausgezogen, bestoht die Gefahr eines schweren elektrischen Schlags.
2. Die Batterie-Einheit wiegt 6 Kilogramm. Ziehen Sie die Batterie-Einheit langsam heraus.

Attention:
1. Si le bloc batterie est retiré alors que l'interrupteur est sur la position "ON", il y a un danger d'électrocution grave.
2. Le bloc batterie pèse 6 kilogrammes. Lorsque vous le soulevez, faites le doucement.

注意　CAUTION VORSICHT ATTENTION

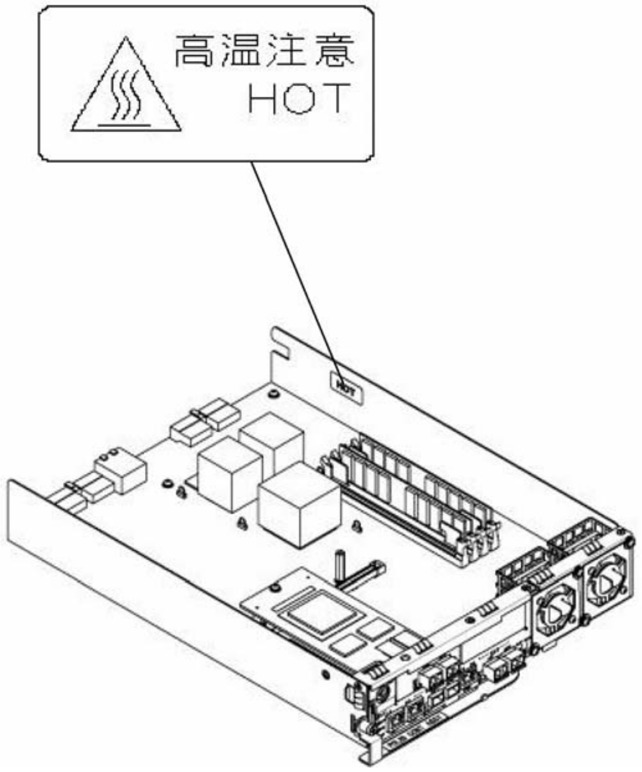
感電の危険あり、開くな。
Risk of electric shock Do not open
Gefahrliche spannung.
Nicht offnen.
Risque de choc electrique.
Ne pas ouvrir

危険　1．次のことをすると、漏液、発熱、破損あるいは容器の破裂による人身損傷の原因になりますのでさけてください。
ショート、火気の接近・密封容器内での充電、蓄電池の破損（分解、改造、落下、衝撃など）
2．この電池には希硫酸が入っています。希硫酸がついたときは多量の水で洗ってください。

CAUTION Be careful of the following
Avoid:short circuiting battery terminals
:disposing the battery into open flame
:charging in a sealed container
:mechanical shocks
If exposed to electrolyte(acid),wash immediately with plenty of water.

Caution Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

注意　正しく交換しないと電池が爆発する危険があります。製造業者の推奨する電池又は同タイプの電池と交換して下さい。
使用後の電池を捨てる時は製造業者の指示に従って下さい。


高温注意
HOT
HOT

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 NF2900-SR40E connected with the NEC Express5800 series, NX7000/NX7700 series, or CX5000 series system.

Before using the disk array unit, also read the manuals of several devices including the NEC Express5800 , NX7000/NX7700 or CX5000 series, your FibreChannel controller, and any FC-AL SCSI connection mechanism, to be connected with the disk array unit as well as the manual of the operating system in use.

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

Various options, such as the FC disk drive option which enables extension of equipment capacity, the cache extension memory option which enables extension of the cache memory capacity, the Disk Expansion port option which enables extension of the DE ports, and a rack-mounted kit option for installing in racks other than standard, are available for yourNF2900-SR40 disk-array equipment. Please read Chapter 9.2 "Optional Parts" for details.

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

1st edition, September 2006

Check of Components in the Package

(1) Unpacking

Open the package and carefully remove the disk array unit and accessories from the package.. The disk array unit is very heavy. Accordingly, if two people or less lift the unit, personal injury may occur. At least three people should remove the disk array unit from the package. Always support the bottom of the unit and never carry the unit by grasping the power supply on the rear face or 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 any repairs.

(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 S2900		1
2	Front bezel	For NEC Storage S2900, with security key	1
3	User's Guide (this document)		1
4	Rack mount kit	For NEC Storage rack (L and R)	1
5	Modem	Cable (Length 1 m, for connection between modem and DAC)	1
6	Express Builder software		1
7	NF2800 Event Logging Tool	SD card	1
8	Packing list		1
9	Notes on Use		1

* Use the FC cable (HSSDC-HSSDC) provided with the disk array unit or the available optionally DE cable (NF9120-SJ34E) for connecting disk array unit with the FC disk enclosure/SATA. disk enclosure.

Legend

Symbols in the Text

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

Symbol	Description
❗	If the description is ignored while handling the disk array unit, the unit may become defective, software used in the unit may become corrupted, and/or the data created by the user may be lost.
❕	If the description is ignored while handling the disk array unit, the unit may become defective and/or software used in the unit may not function properly.

This User's Guide also uses the following symbol.

Symbol	Description
📖	Supplement of the text

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

Disk array unit	NF2900-SR40E.
Array controller	The NEC Storage S2900.
FC Disk enclosure	The NEC Storage S2900 FC disk enclosure (sold separately).
SATA Disk enclosure	The NEC Storage S2900 SATA disk enclosure (sold separately).
Disk drive	The hard disk drive with dedicated tray.
Dummy tray	The dedicated tray only, with no hard disk drive installed.
Host system	The NEC Express5800 series, NX 7000/NX7700 series, or CX5000 series.
Host bus adapter	The FibreChannel controller for NEC Express5800 or CX5000 series or the FC-AL SCSI connection mechanism for the NEC NX7000/NX7700 series,

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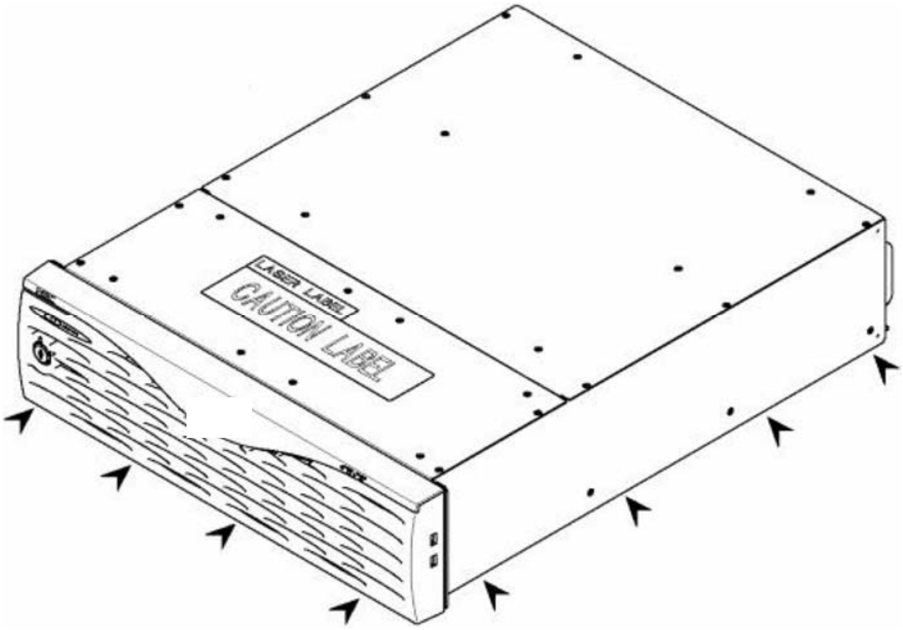
1. Notes on the Installation and Handling of the Disk Array Unit

1.1 Note on Carrying Disk Array Unit

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

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


LASER LABEL
CAUTION LABEL

1.2 Disk Array Unit Installation Environment

Before installation of the disk array unit, take into account the following items regarding the location, room temperature, space required for handling, ventilation, and other environmental 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 from the unit if necessary.

🚫 ■ Install the disk array unit on a level floor of sufficient strength. In addition, do not apply 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 per 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 of high humidity. If so, a fault or electrical shock may occur.

⚠ ■ Do not install the disk array unit in an environment of chemical steam emission or an area where the disk array unit may come in contact with inflammable substances. If so, a fault, fire, or an explosion may occur.

🚫 ■ Do not install the disk array unit in a dirty or dusty environment. If so, a fault may occur.

🚫 ■ Do not install the disk array unit and the power cords in any area with direct sunshine or near any apparatus generating heat such as a heater. If so, a fault may occur. Further, the protective coating of the power cords may be damaged causing fire or electric shock to occur.

🚫 ■ Do not install the disk array unit near televisions, radios, and cordless telephones, as interference may occur.

🚫 ■ 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 a strong magnetic field. If so, a fault may occur.

🚫 ■ Install the disk array unit so that the ventilating holes on the front and rear faces are not blocked. If not, a fault may occur.

1.3 Installation and Connection of the Disk Array Unit

WARNING

- Do not use the disk array unit in an area of high humidity. If so, a fault, electrical shock, or fire may occur.
- Do not use the disk array unit in an area where inflammable gas and/or combustible substances are used. If so, fire or anexplosion may occur.
- Do not install the disk array unit in a dirty or dusty environment. Remove any dust adhering to AC outlets and the plugs of power cords. Any dust adhering to an AC outlet and/or plug, may be a potential cause of fire.
- Avoid overloading AC outlets with too many devices. If so, fire may occur.

- Do not put any heavy materials on a power cord. If so, the coating of the power cord may be damaged, fire may occur, and/or you may be electrically shocked.
- Always dry your hands prior to connecting the plug of a power cord to an AC outlet. If not, you may be electrically shocked.

CAUTION

- Make sure to disconnect all power cords and FC cables before relocating the disk array unit. If not, a malfunction of the system, an electric shock and/or fire may occur.

- The disk array unit can accept power between 100 - 240 VAC (50/60 Hz). Using power of different voltage may cause electric shock, smoke, and/or fire to occur.

- Do not install the disk array unit and the power cords in an area of direct sunshine or near any apparatus generating heat such as a heater. If so, a fault may occur. Further, the insulating coating of the power cord may be damaged causing fire or electric shock to occur.

- The array controller and the disk enclosure weigh 34 kg or more. Hold the array controller and disk enclosure firmly using at least three people to carry it. Carrying the devices only by two or less people may cause personal injury or damage to the unit.

- 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 the cables do not present an entanglement problem. Prevent power plugs and FC connectors from suffering excessive force.

- Do not allow cables connected to the disk array unit to become crimped. If so, a fault or fire may occur.

- Use only NEC approved cables for 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 a power source independent from televisions or radios. Otherwise, interference may be generated.

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

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

1.4 Notes on Use of the Disk Array Unit

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

- Do not let any liquids such as water into the disk array unit. If so, you may be electrically shocked or the unit may become defective. If liquids do enter into the disk array unit, turn off the power and contact your sales representative or maintenance engineer. If the disk array unit seems dry, remember that only a small amount of liquid remaining may cause the unit to become defective.

- Do not let any foreign substances such as clips and screws enter 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. Also, repair of the unit will be charged regardless of warranty.

- If the disk array unit will not be used for a long period of time, disconnect the plugs of the power cords from the AC 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 the Disk Array Unit

⚠ CAUTION

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

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

- It is recommended to clean the inside of the disk array unit periodically. This is because dust may accumulate after the disk array unit has been used for a long time.
  Contact your 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 that is dangerous.

- Do not use any Battery Backup Unit exceeding its life. If so, a fault or fire may occur. (Assumed life of a battery backup unit (BBU): 5 years operating environment at temperature of 27°C)

1.6 Notes on Storage or Carriage of the 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 high humidity or dust.

⚠

- Store the array in the original shipping carton. Note that foreign substances such as water and metals must not get into the disk array unit during storage. Using the disk array unit with any foreign substance inside may cause a fault, electrical shock, or fire to occur.

❗

- During the storage, do not put any materials on the disk array unit. Do not place the disk array unit anywhere that the unit may fall. To use the disk array unit after a storage period of longer than six months, it is recommended to contact your maintenance engineer for inspection and/or repair.

🛇

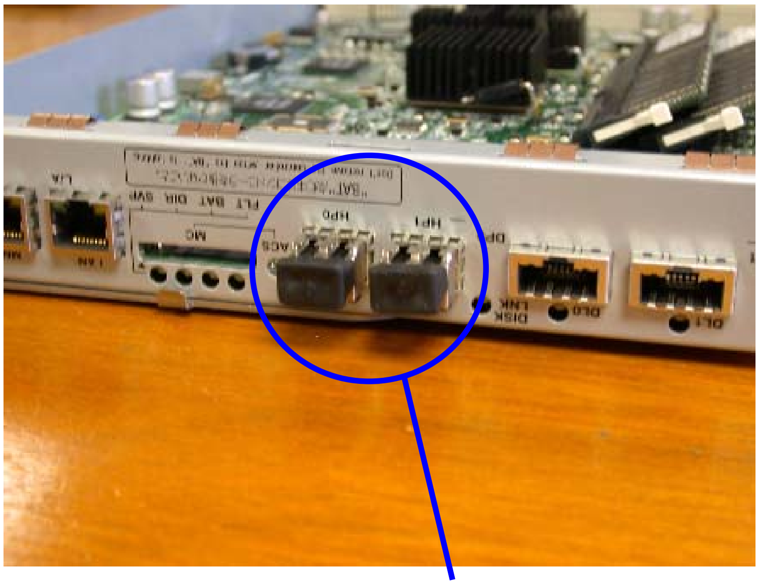
- The array controller and the disk enclosure weigh 34 kg or more. Hold the array controller and disk enclosure firmly using at least three people to carry it. Carrying the devices by two or less people may Cause personal injury.Do not hold the protrusions from the power supply or controller. Doing so applies excessive force to the power supply and controller. As a result, the power supply or controller may be damaged, and/or the array controller or disk enclosure may fall and cause personal injury.

❗

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

🛇

- During storage and transporting the disk array unit, attach the dust proof cover to the FC connectors to prevent dust accumulation. (See the figure below)



Dust proof cover

2. Features of the Disk Array Unit

The disk array unit has the following features.

The NF2900-SR40E is a high-performance disk array unit designed for the NEC Express5800, NX7000/NX7700, and CX5000 systems.

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

Fibre Channel (FC) and SATA disk enclosures (optional) to enable the expansion of the storage capacity of the disk array unit are available.

The NF2900-SR40E supports RAID levels 1, 5, 6, 10 and 50. If a fault occurs in a single disk drive, theNF2900-SR40E can continue the operation without a loss of data.

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

If a single disk drive is specified as the spare disk, the data in the 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 becomes defective. This improves the system reliability.

The disk array unit has a cache memory data hold function made available by the cache memory, power supply, and 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, the entire system is not shut down if any part of the system becomes defective during operation.

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

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

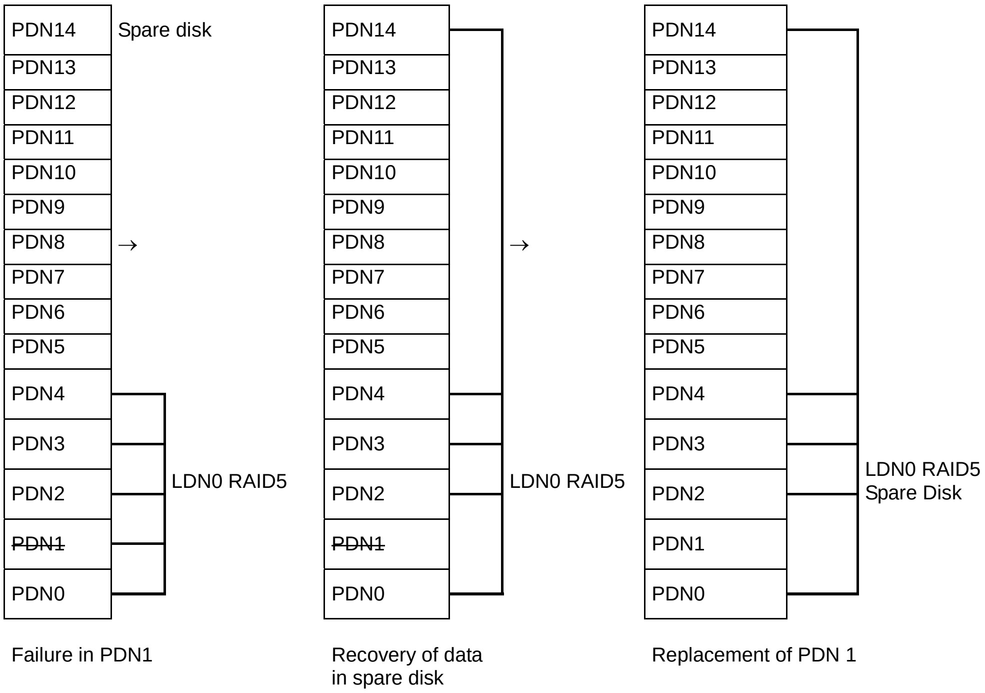
2.1 Hot Spare Feature

Hot Spare disks can be installed in the disk array unit. If a disk drive becomes defective, the data in the defective disk drive is recovered in the spare disk. After the data recovery, the disk drive operates normally while the defective disk is replaced. A defective disk drive can be replaced without turning off the power of the disk array unit.

With the factory defaults, the replaced disk drive works as a spare disk.

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

The diagram below presents an example of the hot spare operation


PDN14
Spare disk
PDN13
PDN12
PDN11
PDN10
PDN9
PDN8
→
PDN7
PDN6
PDN5
PDN4
PDN3
PDN2
LDN0 RAID5
~~PDN1~~
PDN0
Failure in PDN1
PDN14
PDN13
PDN12
PDN11
PDN10
PDN9
PDN8
→
PDN7
PDN6
PDN5
PDN4
PDN3
PDN2
LDN0 RAID5
~~PDN1~~
PDN0
Recovery of data in spare disk
PDN14
PDN13
PDN12
PDN11
PDN10
PDN9
PDN8
PDN7
PDN6
PDN5
PDN4
PDN3
PDN2
LDN0 RAID5 Spare Disk
PDN1
PDN0
Replacement of PDN 1

* PDN (Physical Disk Number): Disk drive
LDN (Logical Disk Number): Logical Disk Number

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

The spare disk can operate properly only when it has a capacity and a rotational speed equal to the defective disk drive.

If disk drives having different capacities and/or revolutions coexist, spare disks of the different capacities and/or revolutions must be defined to manage the disk drives clearly.

Up to 32 spare disks may be installed in the entire disk array unit.

2.2 Write Cache Feature

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

So, 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 the disk drive, improving the performance.

In general, if the power is shut down before the data saved in the cache memory is written to the disk drive, the data in the cache memory will be lost. To prevent this, the disk array unit provides a battery backup to 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 the battery backup unit depends on the capacity of the installed cache memory and the service period of the battery. The following table shows the backup time when two battery backup units are installed and they are both fully charged.

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

- Two controllers, one or more battery backup units, and power supplies for the battery backup unit (PS0 for BBU0, PS1 for BBU1) are installed and operating normally.
- The battery backup units are fully charged.

If any of the conditions are not satisfied, the write cache preservation feature will not work properly.

The batteries installed in the battery backup unit are fully charged for about eight hours.

If the battery switch on battery backup unit is not turned on, the battery backup unit does not operate.

Cache memory capacity	Battery Back Up unit Service period	
	2 .5 years or under	2.5 to 5 years
4GB	96H	48H
8GB	72H	36H
16GB	48H	24H

* The battery backup time can be maintained by replacing the battery at intervals of 2.5 years (with charge).

* The life expectancy of a battery is 5 years. However, if the power on/off sequence is required everyday, the batteries are exhausted faster. If so, the batteries should be replaced with charge at intervals of 2.5 years.

2.3 Management Software

The S2900 Disk Array management software " NEC Storage Manager Base Product" (available optionally included) can be used to allow the host system to display the resources in the disk array unit in a real time mode.

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

- Setting of the RAID configuration (RAID 1, 5, 6, 10, 50, and hot spare disk)
- Resetting of the RAID configuration
- Maintenance of an error log

> Before the disk array unit can be used to store data, the license lock must be released by using the license code provided with the NEC Storage BaseProduct.

2.4 RAID Configuration

The RAID configuration in the disk array unit can be used in the combinations shown in the table below.

RAID level	RAID1	RAID5	RAID6 [*1]	RAID10	RAID50
Number of logical drives in configuration	1+1	4+1	6 to 240	2x2 6x2 3x2 7x2 4x2 8x2 5x2	5x2, 5x4
Number of logical drives per subsystem	1,024 maximum				
Storage capacity per logical drive (When a 73-GB disk drive is used)	71.6GB	286.4GB	286.4GB to 13TB	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.

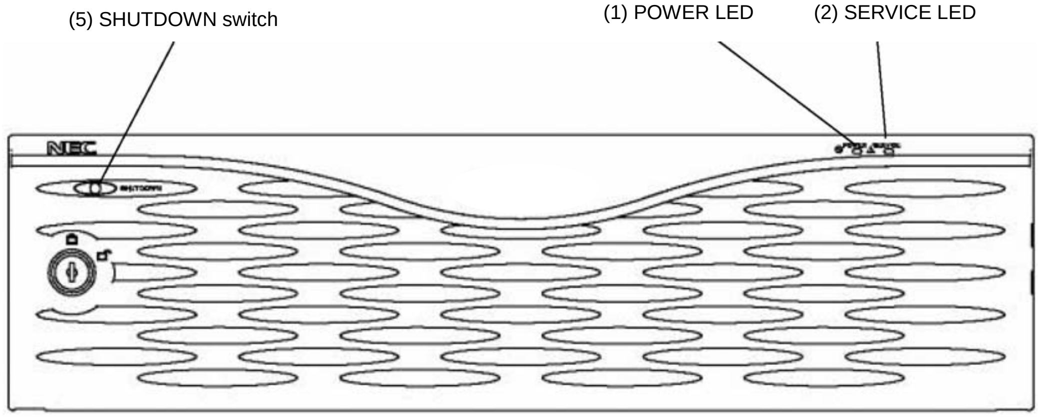
The RAID levels have the following characteristics.

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 with multiple HDD failures. 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 implementation cost

3. Names and Roles of Components

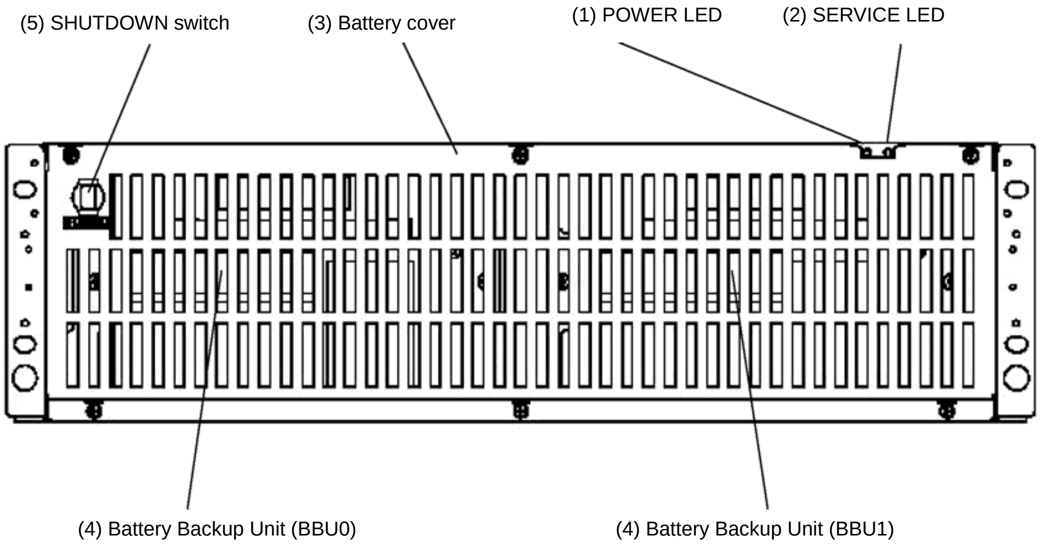
This chapter describes the names and functions of the components in the disk array unit.

3.1 Array Controller (Front)


(5) SHUTDOWN switch
(1) POWER LED
(2) SERVICE LED
NEC
SHUTDOWN

A front bezel is installed on the front face of the array controller as shown in the figure above. The front bezel 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 bezel. In this state, the accessory key cannot be pulled out. To pull the key out from the front bezel, you must set the key at the lock position.

Removing the front bezel, you can view the battery cover shown in the figure below.


(5) SHUTDOWN switch
(3) Battery cover
(1) POWER LED
(2) SERVICE LED
(4) Battery Backup Unit (BBU0)
(4) Battery Backup Unit (BBU1)

(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.

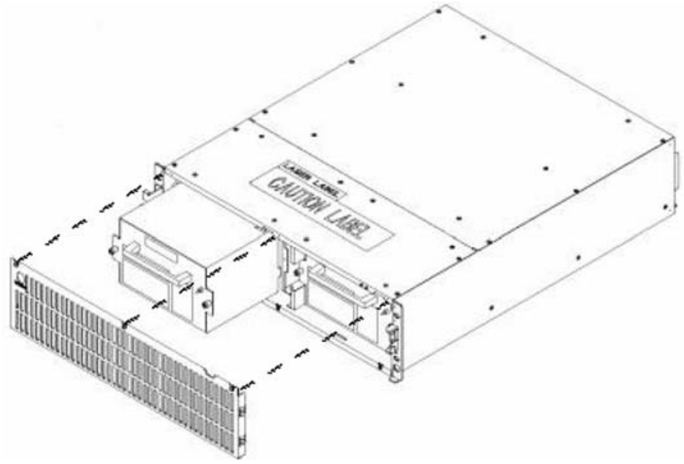
(2) SERVICE LED (orange)

The SERVICE LED lights orange when the disk array unit encounters an error. The LED flashes during the self-test and initialization process that occurs 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) Battery cover

Opening the battery cover, you can see two battery backup units installed in the disk array unit.



(4) Battery Backup Units (BBU0/BBU1)

The battery backup units are installed to protect the data remaining in the cache memory at the occurrence of a power interruption.

See Section 3.3 "Battery Backup Unit" for details.

(5) SHUTDOWN switch

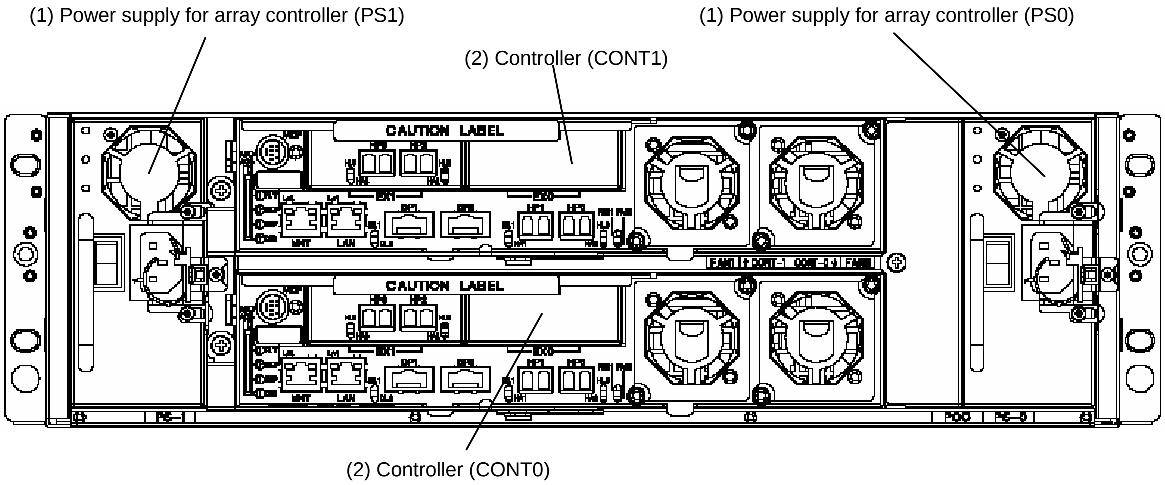
Use this switch to turn off the disk array unit. Using this switch starts writing any cache ddata remaining in the array controller into disk drive.

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

Cached data will be lost if a controller, power supply, or battery is replaced in the following conditions:

- Turning off the Disk Array unit without using the SHUTDOWN switch.
- There are not any functioning power supplies supplying power to the array.

3.2 Array Controller (Rear)


(1) Power supply for array controller (PS1)
(1) Power supply for array controller (PS0)
(2) Controller (CONT1)
CAUTION LABEL
CAUTION LABEL
MNT
LAN
PS-1
PS-0
(2) Controller (CONT0)

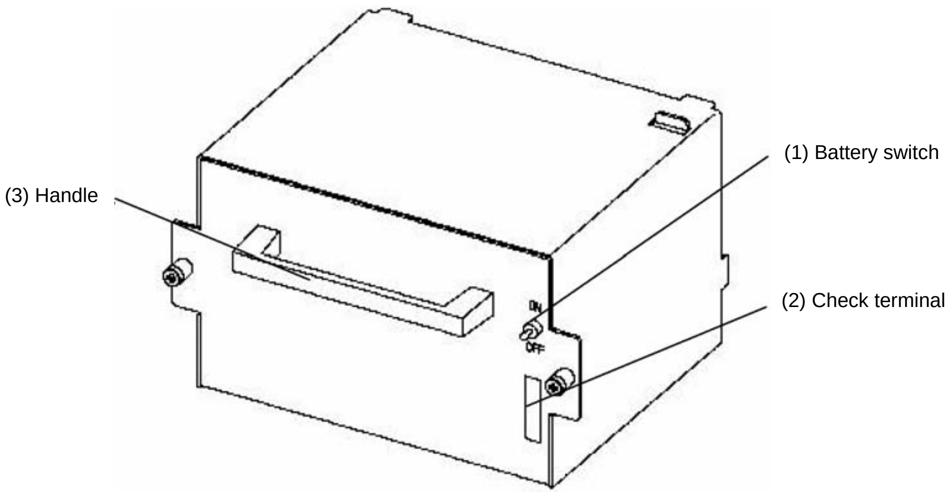
(1) Power supplies for the array controller (PS0/PS1)

The power supplies are provided to supply power to the array controller. See Section 3.4"Power Supply for the Array Controller" for details.

(2) Controllers (CONT0/CONT1)

The array controller boards are provided to control the disk array unit. See Section 3.5 "Controller" for details.

3.3 Battery Backup Unit



(1) Battery switch

If the battery switch is set to ON, the battery backup power is supplied to the cache memory at the occurrence of a power interruption. Turn on this switch before the disk array unit is used.

The battery switch may not be turned off if the power of the disk array unit is turned off.

●	If the battery switch is set to OFF, the battery backup power for the cache memory is not provided at the occurrence of a power interruption.

○	Turning off the battery backup unit disables write cache feature.

(2) Check terminal

The check terminal is provided for maintenance inspection of the battery backup unit.

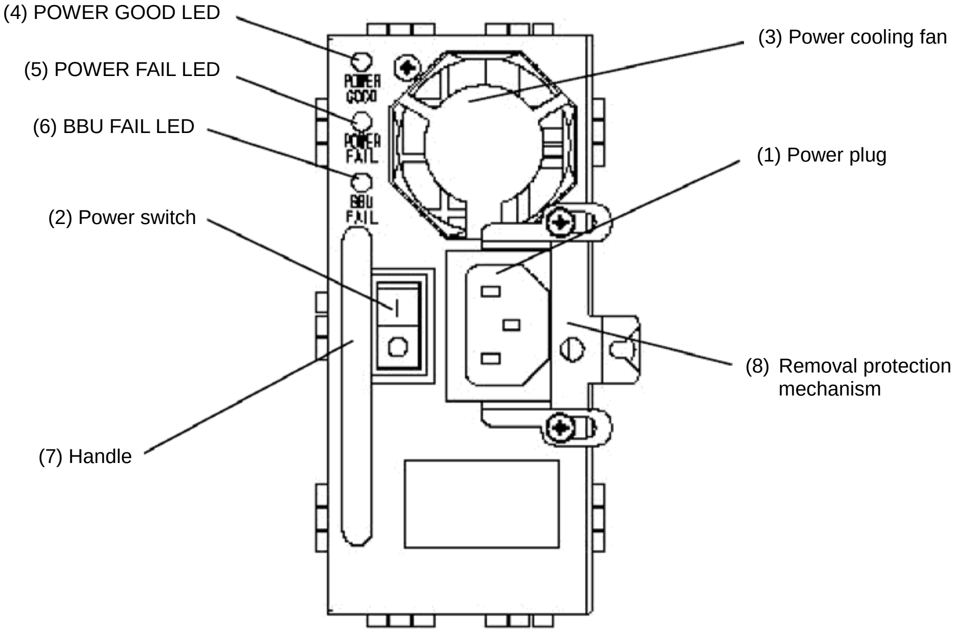
Note - This terminal is exclusively used for maintenance.

(3) Handle

Hold the handle to pull out the battery backup unit when it is replaced due to failure or the end of the battery's service life.

●	When inserting the battery backup unit into the array controller, push it as far as it will go and then secure it with the screws. Incorrect insertion may cause a battery backup unit failure. .

3.4 Power Supply for the Array Controller


(4) POWER GOOD LED
(5) POWER FAIL LED
(6) BBU FAIL LED
(2) Power switch
(7) Handle
(3) Power cooling fan
(1) Power plug
(8) Removal protection mechanism
POWER GOOD
POWER FAIL
BBU FAIL

(1) Power plug

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

The array controller has a redundant power configuration to prevent the entire unit from being shut down by a single failure. To ensure this functionality, connect two power cords at the rear of the array controller.

(2) Power switch

The power switch is used to turn On/Off the power of the array controller.

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

(3) Power cooling fan

When the power switch is set to ON, a cooling fan is rotating. Ensure that the system chassis ventilating holes are not blocked

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

(4) POWER GOOD LED (green)

The POWER GOOD LED lights green when the AC power is supplied to the array controller and the power switch is set to ON. The LED is off if the power switch is set to OFF or should a fault occur in the power supply.

(5) POWER FAIL LED (orange)

The POWER FAIL LED lights if a fault occurs in the power supply.

(6) BBU FAIL LED (orange)

The BBU FAIL LED lights when the respective battery backup unit is installed and a fault occurs in the battery backup unit.

(7) Handle

If the power supply becomes defective, pull the power supply out by holding the handle.

(8) Removal protection mechanism

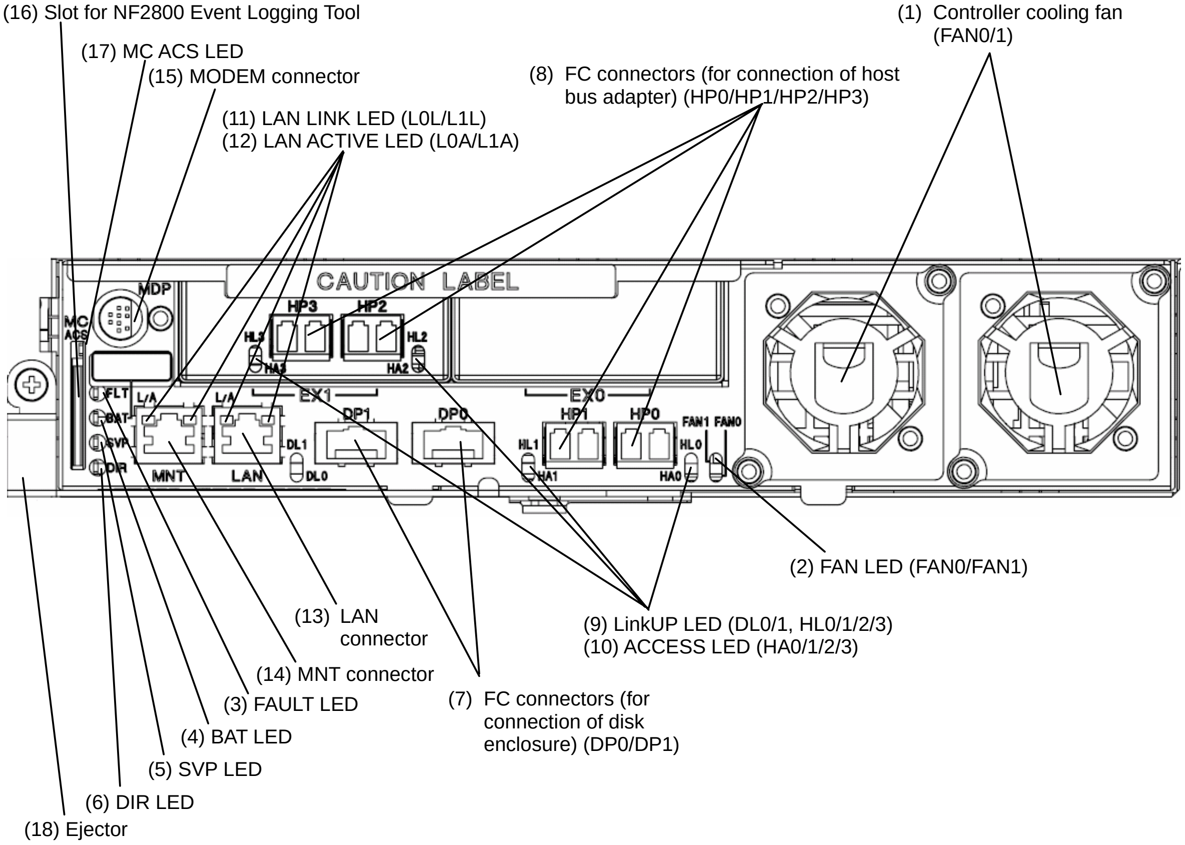
The removal protection mechanism prevents the power supply from being removed accidentally.

To remove the power supply, remove the power cord and slide the removal protection mechanism aside.

When inserting the power supply for the array controller into the array controller, push it as far as it will go and then secure it with the screws.

Incorrect insertion may cause a power supply failure.

3.5 Controller


(16) Slot for NF2800 Event Logging Tool
(17) MC ACS LED
(15) MODEM connector
(11) LAN LINK LED (L0L/L1L)
(12) LAN ACTIVE LED (L0A/L1A)
(8) FC connectors (for connection of host bus adapter) (HP0/HP1/HP2/HP3)
(1) Controller cooling fan (FAN0/1)
CAUTION LABEL
MC
ACS
MDP
HP3
HP2
HL3
HA3
HL2
HA2
FLT
BAT
SVP
DIR
L/A
L/A
EX1
DP1
DP0
EX0
HP1
HP0
FAN1
FAN0
HL1
HA1
HL0
HA0
DL1
DL0
MNT
LAN
(2) FAN LED (FAN0/FAN1)
(13) LAN connector
(9) LinkUP LED (DL0/1, HL0/1/2/3)
(10) ACCESS LED (HA0/1/2/3)
(14) MNT connector
(3) FAULT LED
(7) FC connectors (for connection of disk enclosure) (DP0/DP1)
(4) BAT LED
(5) SVP LED
(6) DIR LED
(18) Ejector

(1) Controller cooling fans (FAN0/FAN1)

With the power switch being ON, the two cooling fans are rotating. Ensure that the system chassis ventilating holes are not blocked.

- Install the array controller so that the ventilating holes are not blocked. If either or both of the ventilating holes are blocked, the internal temperature of the array controller may increase, potentially causing a fault to occur.
- The controller is equipped with 4 fans in total. Even if a fan fails, the air-cooling conditions for the entire array controller are satisfied. However, to guarantee the proper operation of the disk array unit, replace the controller cooling fan immediately if a fan failure occurs.

(2) FAN LED (FAN0/FAN1) (orange)

The FAN LED lights orange if the cooling fan for the respective controller is not installed or a fault occurs in the fan. The LED is off while the respective fan operates normally.

(3) FAULT LED (orange)

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

(4) BATTERY BACKUP LED (orange)

With no power supplies for the array controller supplying power (as in the case of a power interruption), the BATTERY BACKUP LED lights orange if the cache memory is being maintained by battery backup power.

> If any of the controllers, power supplies, or batteries are replaced while the BATTERY BACKUP LED is ON (with no power supplies for the array controller supplying power), the write cache data is lost.
>
> However, if you have performed the scheduled stop procedure using the SHUTDOWN switch, you can replace the controller , power supplies, and batteries even while the BATTERY BACKUP LED (BAT) is on.

(5) SVP LED (green)

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

(6) DIR LED (green)

The Director Control Processor (DIR) LED flashes green in normal operation.. The LED will not blink if there is a problem or during the power on initialization sequence.

(7) FC connector (for connection of a disk enclosure) (DP0/DP1)

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

See Chapter5 "Connection of the Disk Array Unit" for the cable connections.

(8) FC connector (for connection of host bus adapter) (HP0/HP1/HP2/HP3)

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

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

(9) LINKUP LED (DL0/DL1/HL0/HL1/HL2/HL3)

A LINKUP LED lights green if the respective FC connector (FC port) becomes operable (links up). DL0 and DL1 LEDs correspond to DP0 and DP1 connectors, respectively. HL0, HL1, HL2, and HL3 LEDs correspond to HP0, HP1, HP2, and HP3 connectors, respectively.

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

(10) HPx ACCESS LED (HA0/HA1/HA2/HA3)

The HPx ACCESS LED lights when an I/O access to HPx occurs.

(11) LAN LINK LED (L0L/L1L)

The LAN LINK LED lights while the LAN port operates normally.

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

(12) LAN ACTIVE LED (L0A/L1A)

The LAN ACTIVE LED lights when the LAN port receives a link pulse from Ethernet.

(13) LAN connector

The LAN connector is used to connect the controller with the Ethernet port.

(14) MNT connector

The MNT connector is used for maintenance purposes only.

(15) MODEM connector

The MODEM connector is used to connect a modem for fault notification.

(16) Slot for NF2900 Event Logging Tool

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

(17) MC ACS LED

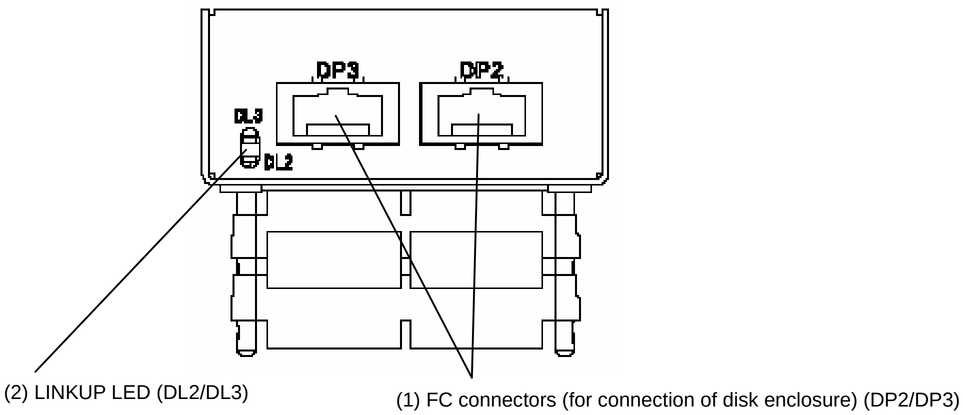
The MC ACS LED lights when the NF2900 Event Logging Tool (SD card) is accessed.

(18) Ejector

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

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

3.6 DE Port (Option) (NF2900-SP02E)


DP3
DP2
DL3
DL2
(2) LINKUP LED (DL2/DL3)
(1) FC connectors (for connection of disk enclosure) (DP2/DP3)

(1) FC connector (for connection of a disk enclosure) (DP2/DP3)

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

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

(2) LINKUP LED (DL2/DL3)

A LINKUP LED lights green if the respective FC connector (FC port) becomes operable (links up).

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

> When inserting the DE port into the controller, push it as far as it will go and then secure it with the screws.
>
> Incorrect insertion may cause a 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.

Be sure to read Chapter 1 "Notes on Installation and Handling of Disk Array Unit" before installing and connecting the disk array unit.

⚠ CAUTION

- Do not apply shock and/or vibration to the disk array unit. Excess shock or vibration may cause the disk array unit to become defective.
- The disk array unit can accept power of 100 - 240 VAC (50/60 Hz). Using power of a different voltage may cause electric shock, smoke, and/or fire to occur.

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 missing, contact your sales representative.

- Connection of Host Bus Adapter

  Connect the host bus adapter (HBA) 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 a shielded Ethernet (LAN) cable.

  Insert the connector until the latch emits a click. Do not forcibly bend the cable.

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

  the connector by pushing the latch.

- Connection of the power cord

  Always use the NEC approved power cord for the disk array unit. Do not use a power cord that is crimped or under complicated cable connections.

- Setting of the disk array parameters

  For setting parameters including RAID level and disk assignment, use the NEC Storage Manager or contact your maintenance service representative.

- Check the resource status for disk array unit

  Before using the disk array unit, check the Resource Status including the controller, power supply, battery backup unit, controller cooling fans, and disk drives by using the NEC Storage Manager software..

5. Connection of the Disk Array Unit

A 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 to the disk array unit and components and any influence resulting from the operation of the disk array unit. NEC recommends that you ask your Technical Engineer or service representative trained with expert knowledge on the 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 to the host system. Before proceeding, also read the User's Guide of the FC-AL switch, host system and host bus adapter to which the disk array unit is connected.

⚠ CAUTION

Before connecting 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, DE cable, and CONT-DE cable used for the connection of the disk array unit must be approved by NEC. Also, the length of the cable shall be within the specified range. If a cable not approved by NEC is used or the length of the cable is out of the specified range, data corruption could occur.
- To avoid mistakes, familiarize yourself with the cabling specifications before making connections.
- Do not force any cable connection. Each connector can be connected only when it is inserted properly 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 excessive force. If the connector cannot be inserted smoothly, do not insert it by force but check the alignment of the connector again.
- Make sure that cable damages such as buckling, dust adhesion, and dirt are not found on the connector and contact before connection.
- Treat all connectors carefully so that they may not be dropped to the floor to be damaged. Do not drag any connector on the floor as dust may adhere to the connector.
- Do not apply excessive force to any cabling connection. Do not step on or put any material on a cable that might deform the cable.

- Handle optical fibers carefully and gently.
- The minimum bending radius of an optical fiber shall be 30 mm.
- Dust and/or dirt may attenuate the optical power of an optical fiber and cause data errors to occur. Clean any optical fiber cable before it is inserted into the mating connector using the following procedure.
  1. Blow a parts cleaning gas (e.g. compressed air) to the connector of the optical fiber cable for several seconds.
  2. Wipe the connector with a non-woven cloth soaked with alcohol for several passes
  3. Apply a parts cleaning gas to the connector again.
- Since the DE cable has the possibility that a deterioration of its electrical quality and/or its mechanical destruction (disconnection) may arise if it is handled inappropriately, be careful of the following points:
  1. Cabling lengths should have a safety margin in order to prevent excessive stress to connectors and/or cables.
  2. Never give cables a jerk or stress.
  3. The cables should be kept with a curvature radius of 50mm or more.

5.1 Notes on Connection of the Disk Array Unit

Confirm the following items before connecting the disk array unit:

(1) Cable Connection

Use the supplied 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 to the array controller, be sure to use the NEC-specified FC cable.

To connect the array controller with a disk enclosure, be sure to use the CONT-DE cable provided with the disk enclosure or the NEC-specified CONT-DE cable (NF9120-SJ34E).

(2) Cable length limit

It is important to note that exceeding the recommended maximum cable length can significantly impact data integrity. NEC recommends the following cable length limits:

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

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

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

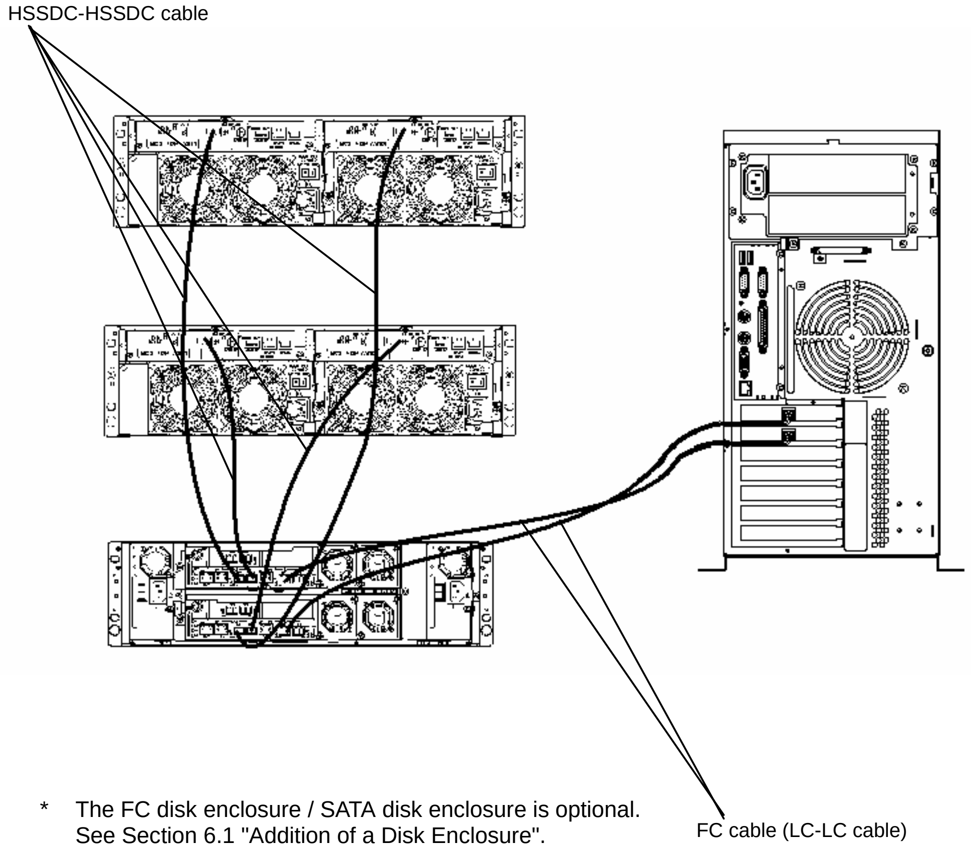
5.2 Connection of the Disk Array Unit

This section shows recommended connection examples.

To make any of the recommended connections, you need to connect two host bus adapters with the host system.

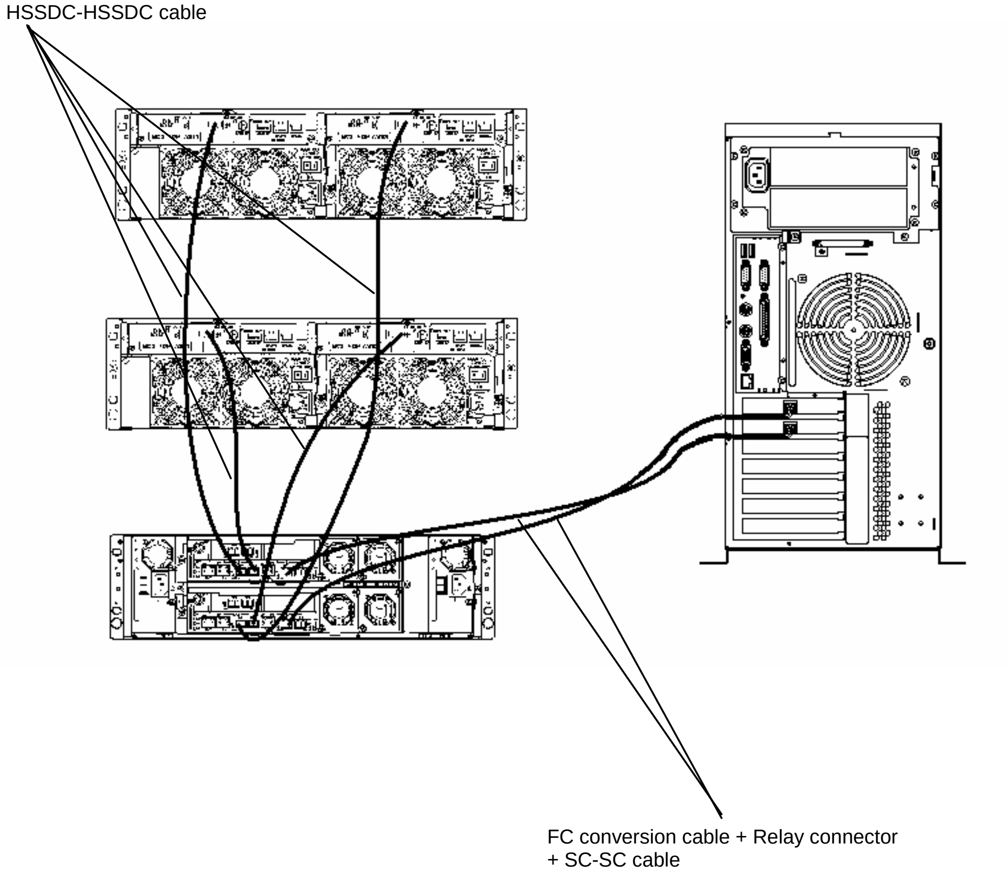
Two LC-LC cables (or two SC-SC cables and two FC conversion cables) are necessary for connecting the host bus adapters.

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



* The FC disk enclosure / SATA disk enclosure is optional. See Section 6.1 "Addition of a Disk Enclosure".

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


HSSDC-HSSDC cable
FC conversion cable + Relay connector
+ SC-SC cable

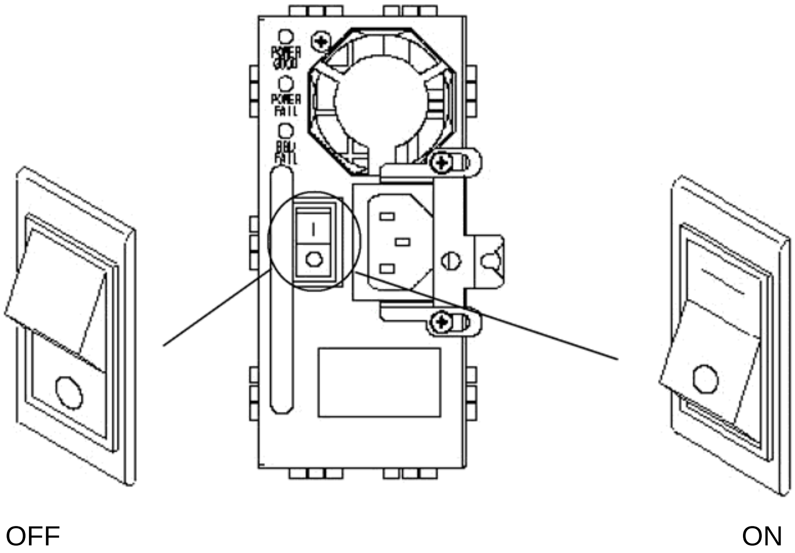
* The FC disk enclosure / SATA disk enclosure is optional.
See Section 6.1 "Addition of a Disk Enclosure".

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

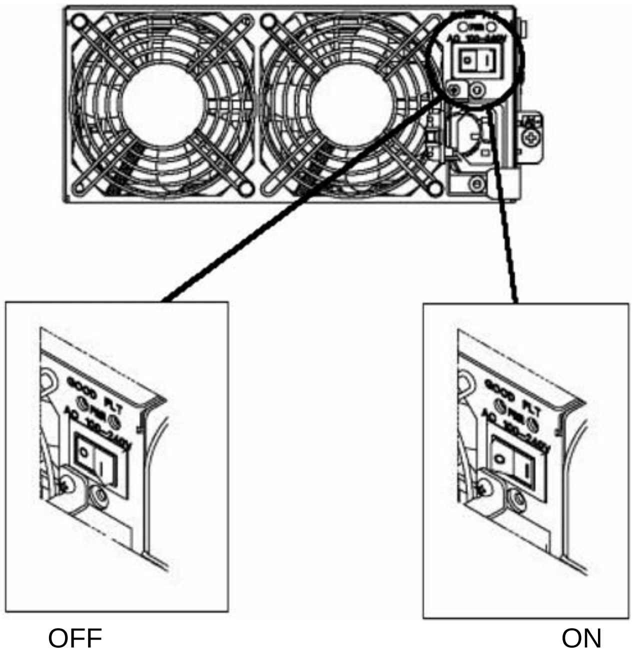
(1) Check of the Power Supply

Check that the power switch on the disk array unit and those on the host system are set to OFF and the plugs of the power cords are removed from AC outlets.

a) Power supply for array controller


POWER GOOD
POWER FAIL
BBU FAIL
OFF
ON

b) Power supply for the disk enclosure


GOOD PLT
AC 100-240V
OFF
ON

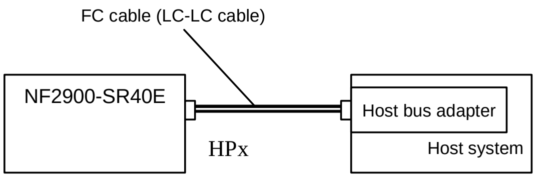
(2) Connection of the disk array unit with a host system

a) With the host bus adapter or the FC-AL switch connectors of the "LC" type.

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

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

Connect the connector at the other end of the FC cable to the host bus adapter or the FC-AL switch, installed at the host system.



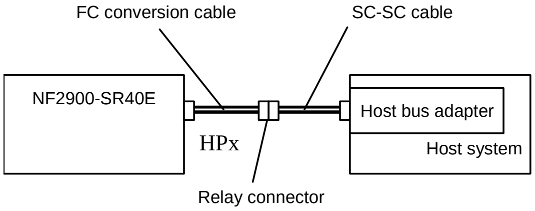
<Connection example>

Similarly, connect the other controller with the other host bus adapter or the FC-AL switch installed at the host system.

b) With the host bus adapter or the FC-AL switch connectors of the "SC" type

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

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



<Connection example>

Connect the other end of the FC conversion cable to the SC-SC cable via the relay connector provided with the FC conversion cable. Push the connector so that it clicks into place securely. The connector at an end of the SC-SC cable is the same as that at the other end. Either of the connectors may be connected to the relay connector.

Connect the connector at the other end of the SC-SC cable to the host bus adapter or the FC-AL switch installed at the host system.

Similarly, connect the other controller with another host bus adapter or the FC-AL switch installed at the host system.

(3) Connection between array controllers and FC disk enclosures

Push the connector of the FC cable (HSSDC-HSSDC) provided with the disk enclosure, or the available optionally FC cable (HSSDC-HSSDC) into the FC connector (DP0) for the disk enclosure of the controller 0 (CONT0) until a click is heard.

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

Similarly, connect the FC connector (DP0) for the disk enclosure of the other controller 1 (CONT1) to the FC-IN connector on Adapter 1 (ADP1) of the disk enclosure.

Connect the DP1 connector on Controller 0 (CONT0) and DP0 connector on Controller 1 (CONT1) to the other FC disk enclosure/SATA disk enclosure.

If you have attached the DE port NF2900-SP02E to the NF2900-SR40E, use the FC cable (HSSDC-HSSDC) provided with the DE port or available optionally CONT-DE cable (NF9120-SJ43E). Push the connector at one end of the cable into the FC connector (DP2) of the disk enclosure on the DE port of Controller 0 (CONT0) until a click is heard.

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

Similarly, connect the FC connector (DP2) of the disk enclosure on DE port installed in the other controller 1 (CONT1) to the FC-IN connector on Adapter 1 (ADP1) of the FC disk enclosure.

Connect the DP3 connector of the DE port installed on Controller 0 (CONT0) and DP3 connector of the DE port installed on Controller 1 (CONT1) to the other FC disk enclosure/SATA disk enclosure.

(4) Setting of switches

a) Setting of the ENC ID switch on disk enclosure

Set the ENC ID by using the ENC ID switch on each adapter.

Set the ENC ID so that it is not the same as that of another disk enclosure on the same FC loop.

Set the ENC ID switches of both the adapters installed in the first FC disk enclosure connected to the array controller via the FC cable (HSSDC-HSSDC) to "0". If additional FC disk enclosures are added, set the ENC ID switches of the adapters installed in each additional FC disk enclosure/SATA disk enclosure to "1", "2", or "3" in the connection order.

When the ENC ID switches of the left and right adapters are set differently, the FAULT LEDs on the adapters flash and the disk enclosure is not started. If different values are set for the ENC ID switches, turn off the power of the system including the disk enclosure, reset the ENC ID values properly, and turn on the power again.

The outline of cable connections and the settings of ENC ID switches are shown on pages 31 and 32.

b) Setting of the AL-PA switch on the array controller

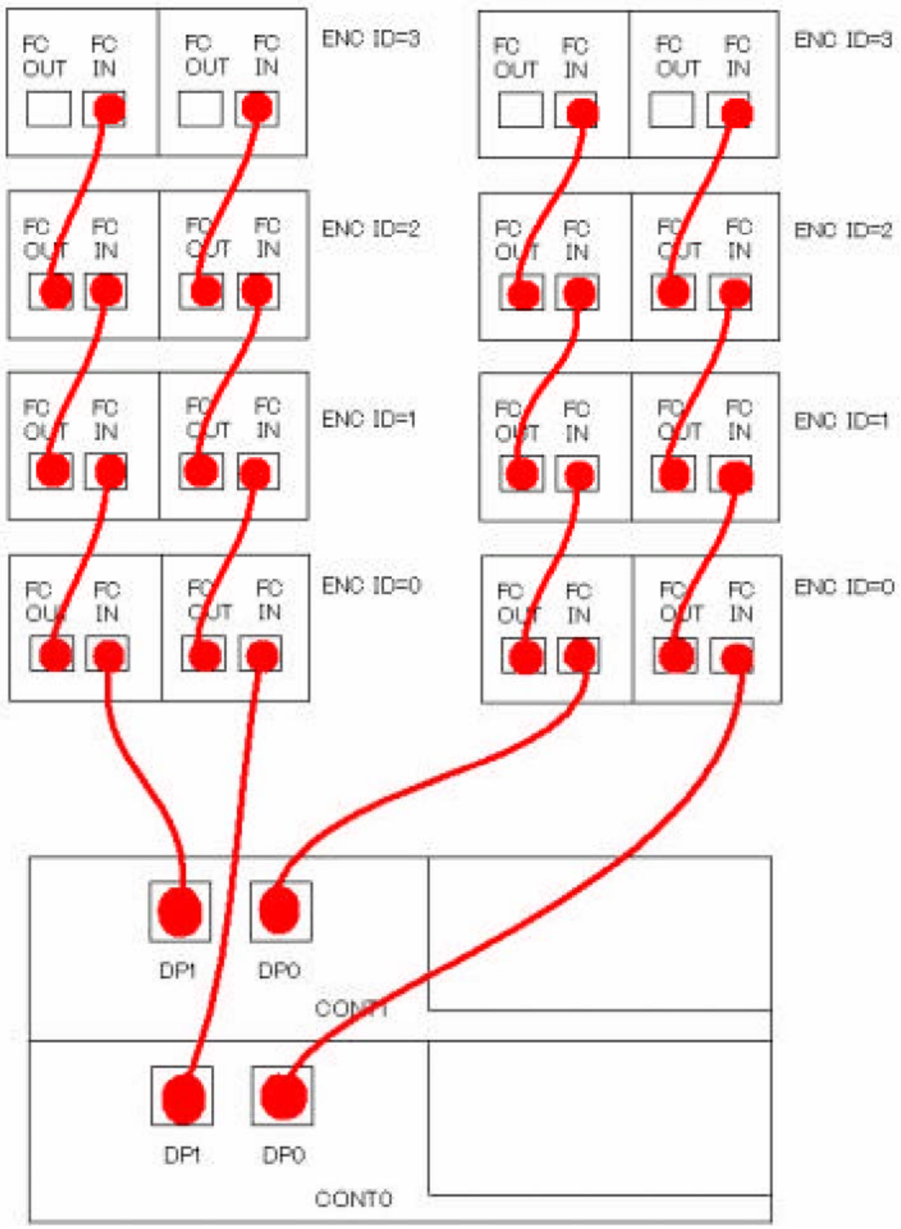
Setting the AL-PA switch is accomplished by using the maintenance PC.

Set the AL-PA switch so that it may not be the same as that of another FibreChannel device in the same host FC loop.

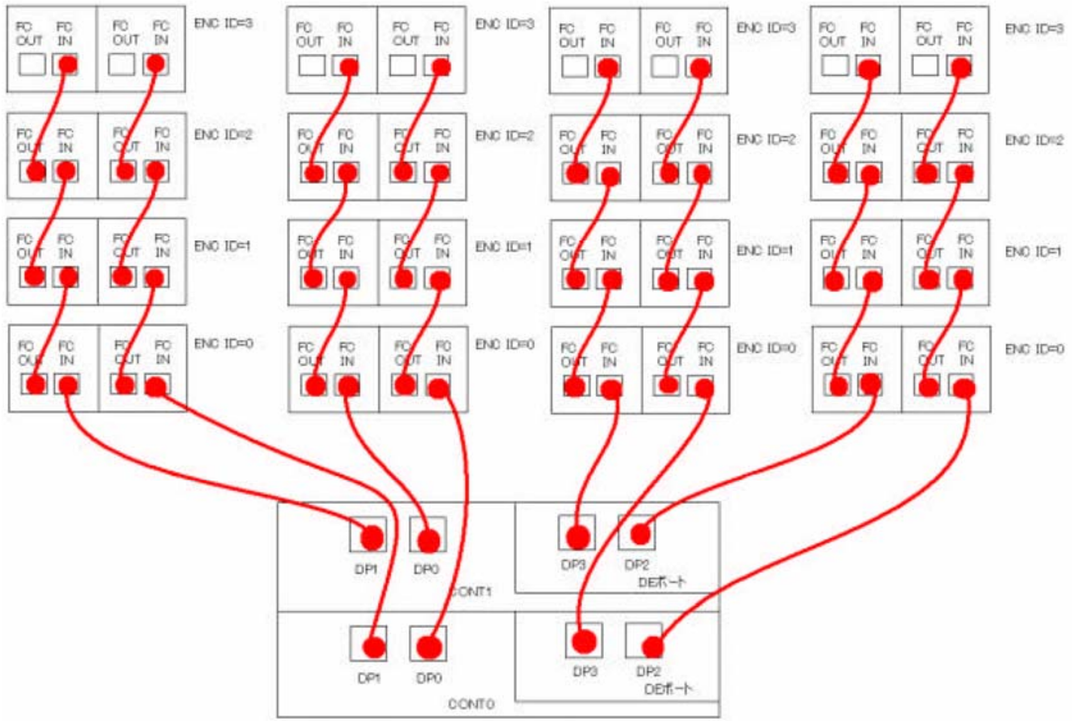
See Appendix C for information regarding the usage and settings of the maintenance PC.

Outline of cable connections and settings of the ENC ID switches

Sample configuration 1: NF2900-SR40E:1
NF2500-SE42E: 8


FC OUT
FC IN
ENC ID=3
ENC ID=2
ENC ID=1
ENC ID=0
DP1
DP0
CONT1
CONT0

Sample configuration 1:   NF2900-SR40E + NF2900-SP02E
NF2500-SE42E: 16


FC OUT
FC IN
ENC ID=3
ENC ID=2
ENC ID=1
ENC ID=0
DP1
DP0
CONT1
DP3
DP2
DEポート
CONT0

5.3 Connection of the Disk Array Unit as an Additional Unit

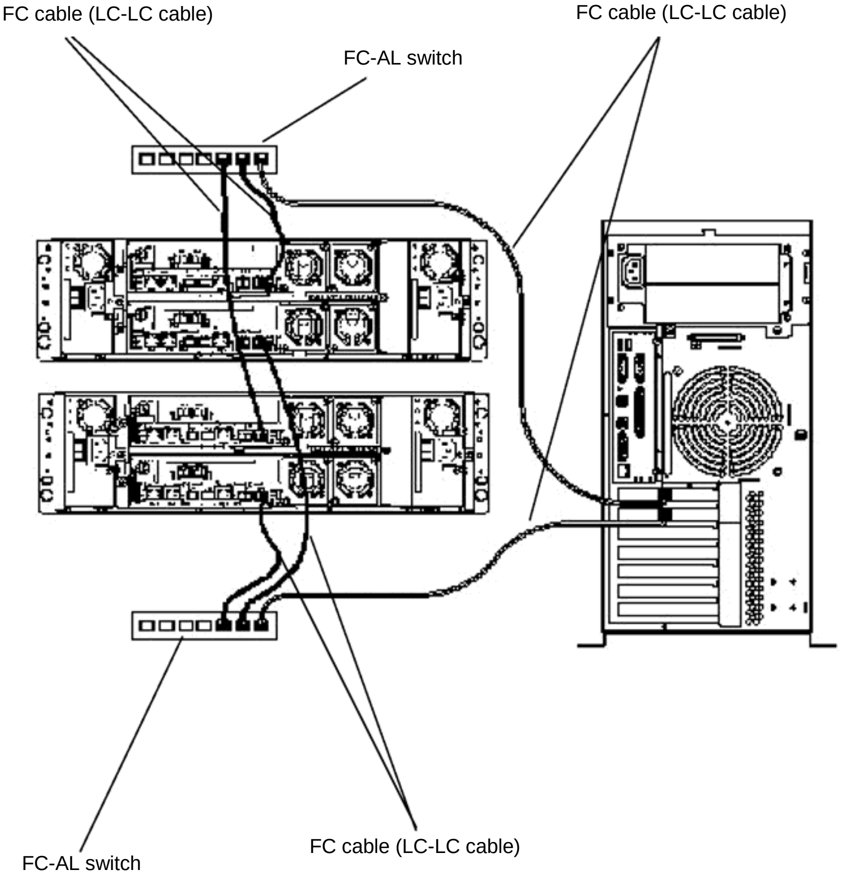
This section describes the procedure of installing additional disk arrays.

- The following describes a sample connection when a single additional disk array unit is installed into a system containing another disk array unit.
- For the actual expansion job and system configuration, contact your Service Engineer or NEC trained maintenance service representative who has expert knowledge of the disk array unit.

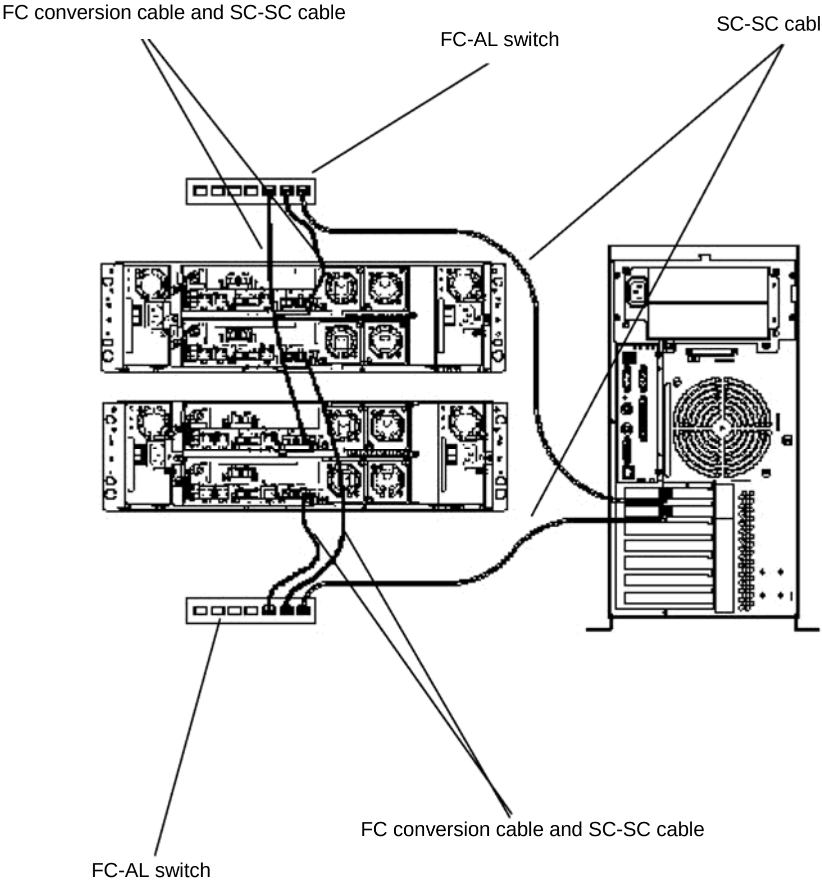
To make any of the sample connections, you need to connect two host bus adapters installed in the host system and two FC-AL switches.

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

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



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


FC conversion cable and SC-SC cable
FC-AL switch
SC-SC cable
FC conversion cable and SC-SC cable
FC-AL switch

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

(1) Check of the power supply

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

(2) Connection of the disk array unit with the host unit

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

Use the available optionally FC cable (NF9320-SJ0xE). Push the connector at an end of the cable into the FC connector (HPx) of the host bus adapter of either controller (CONT0 or CONT1) until a click is heard.

Connect the connector at the other end of the FC cable to either FC-AL switch connector. Be sure to push the connector until a click is heard. The FC cable has the same connectors at both ends. Either connector may be connected to the FC-AL switch.

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

Similarly, connect the controller on the other array controller to the FC-AL switch.

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

Be sure to seat 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-AL switch.

Subsequently, connect the FC connector (HPx) for the other host bus adapter, which is at the controller of each array controller, to the other FC-AL switch via the FC cable.

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

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

Use the available optionally 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.

Connect the connector at the other end of the FC conversion cable to either FC-AL switch via the relay connector provided with the FC conversion cable and the SC-SC cable. Be sure to push the connector until a click is heard. The SC-SC cable has the same connectors at both ends. Either connector may be connected to the relay connector.

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

Similarly, connect the controller on the other array controller to the FC-AL 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-AL 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 at the controller on each array controller, to the other FC-AL switch via the FC conversion cable and SC-SC cable.

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

(3) Connection of the disk array unit with a disk enclosure

Connect a disk enclosure to each of the array controllers. See "(3) Connections between array controllers and disk enclosures" in Section 5.2 for the procedure.

(4) Settings of switches

Connect the maintenance PC and set an AL-PA for each controller. Also set an enclosure ID by using the ENC ID switch on each disk enclosure.

For the setting procedure, see "(4) Setting of switches" in Section 5.2, "Use of Maintenance PC" in Appendix C, and the "NF2500-SE42E FC Disk Enclosure User's Guide".

5.4 Connection of an Ethernet Cable

To enable configuration changes and fault monitoring for the disk array unit using the NEC Storage Manager management software and the Ethernet, the Ethernet cable must be connected.

(1) Installation of the Ethernet cable

Connect the available optionally Ethernet cable to the Ethernet connector (modular jack).

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

Notes regarding LAN cables for use with NEC Storage Manager and the maintenance PC

- Use a straight-through Shielded Twisted Pair (STP) cable, if the controller and PC are connected through a hub.
- Use a crossover STP cable, if the controller and PC are connected directly.

> Connecting the Ethernet cable to the controller is just the first step in using NEC Storage Manager software across an Ethernet. Contact your service engineer or an NEC trained service representative If you need assistance in configuring your storage array.

5.5 Connection of Power Cords

⚠ WARNING

- Do not concentrate power cords to just a few AC outlets. If so, fire may occur.
- Do not connect the plug of a power cord to an AC outlet with wet hands. If so, you may be electrically shocked.
- Do not place any heavy materials on a power cord. If so, the coating of the power cord may be damaged, fire may occur, and/or you may be electrically shocked.

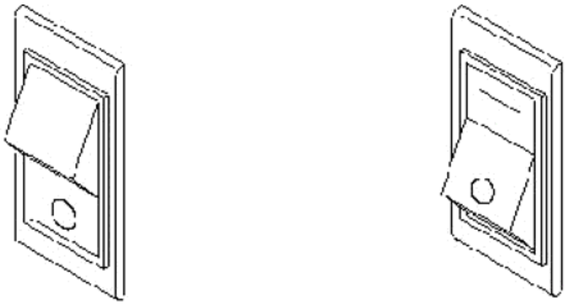
The disk array unit has a redundant power configuration to prevent the entire unit from shutting down due to a single failure. Therefore, connect two power cords to both the array controller and the disk enclosure when operating the disk array unit.

Connect the power cords in the following procedure.

(1) Check of power supply

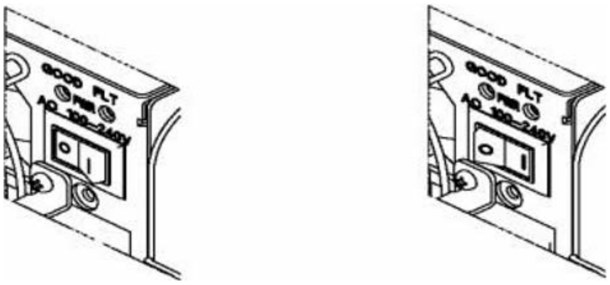
Check that the power switch on the disk array unit and those on the host system and FC-AL switch are all set to OFF.

a) Power supply for array controller



OFF ON

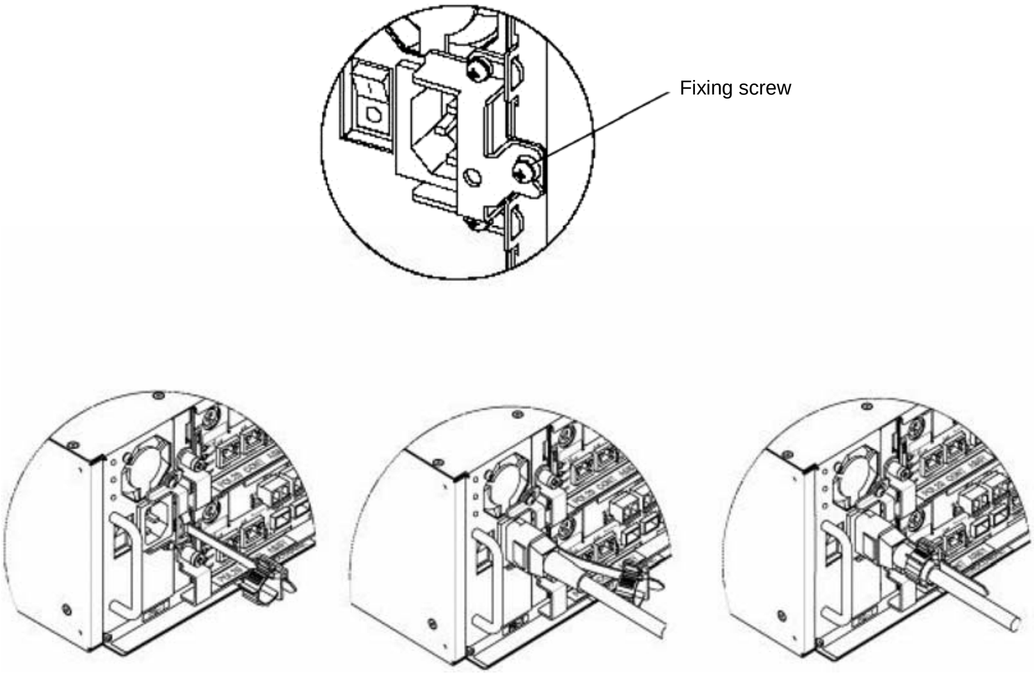
b) Power supply for disk enclosure



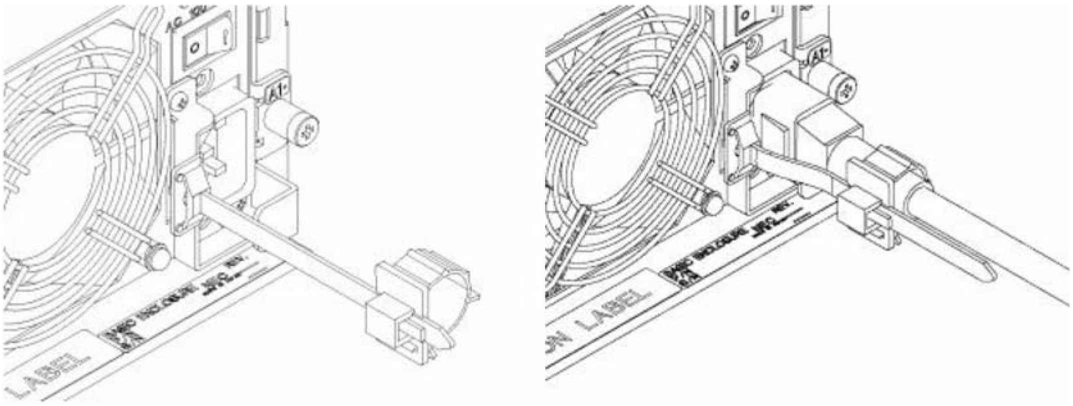
OFF ON

(2) Connection of power cords

Make sure that the removal protection mechanism for the power supply of the array controller is placed outward and secured with a fixing screw, as shown in the figure below. Insert the power cord, and then secure the power cord by firmly fitting the power cord stopper into the receptacle of the power cord.

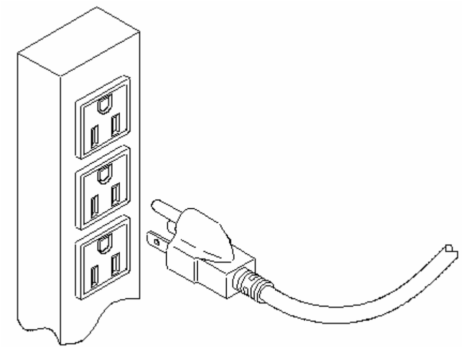


When connecting the power supply of the disk enclosure, insert the power cord, and then secure the power cord by firmly fitting the power cord stopper into the receptacle of the power cord.



(3) Connection of power plug

Insert the plug of the power cord to an AC outlet. Because the plug has a grounding pin, use an AC outlet with grounding terminals for the connection as shown in the figure below.



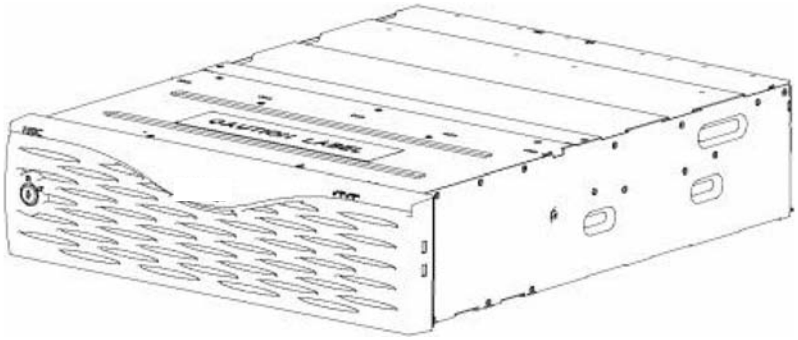
6. Addition of Optional Devices

6.1 Addition of a Disk Enclosure

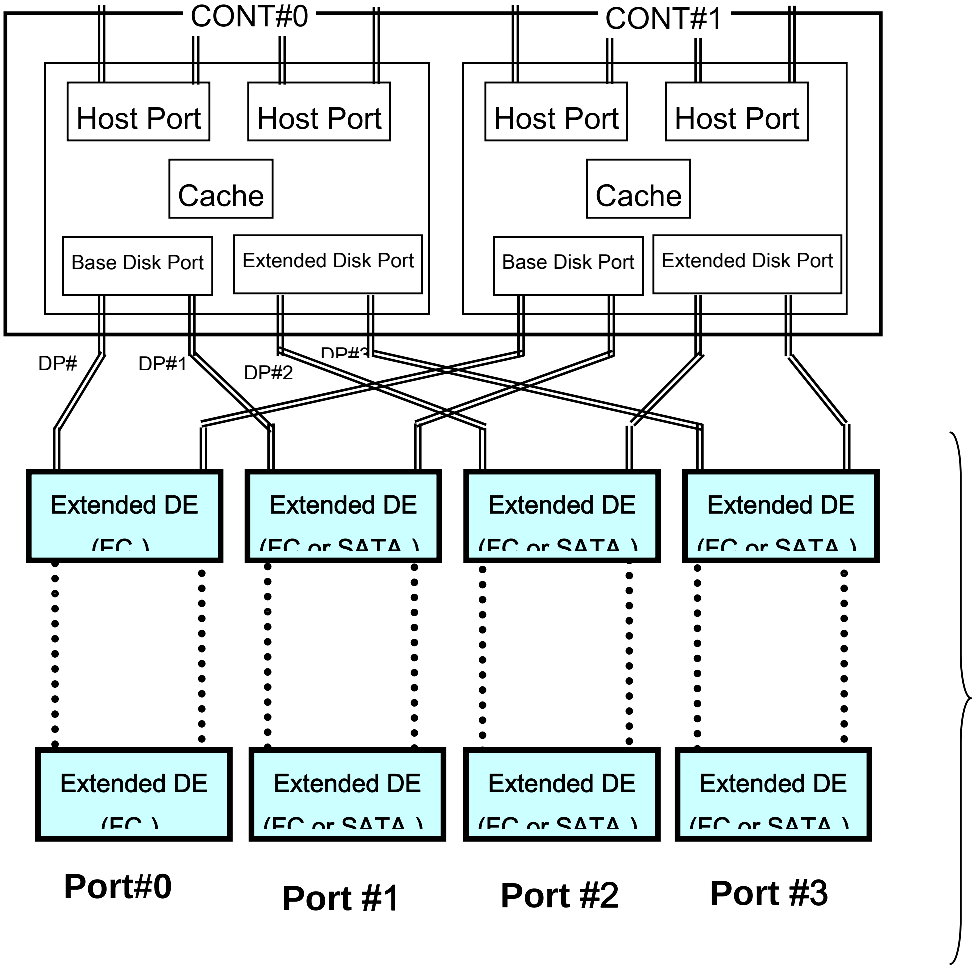
For more capacity, the addition of one or more Disk Enclosures (DE) allows disk drives to be added. (Up to 120 disk drives may be installed with up to eight additional disk enclosures.)

With the installation of a DE port NF2900-SP02E, up to 16 disk enclosures and up to 240 disk drives may be installed.

Product name:	FC disk enclosure	NEC Part number: NF2500-SE42E
:	SATA disk enclosure	NEC Part number: NF2500-SE82E



- ■Be sure to install disk drives into slots PD00, PD01, PD02, and PD03 of the first FC disk enclosure.
- ■ DP0 can contain up to four FC Disk Enclosures,
- ■DP1, DP2 and DP3 can contain up to four FC and SATA Disk Enclosures.
- ■FC and SATA Disk Enclosures can not be mixed on one port.


CONT#0
CONT#1
Host Port
Host Port
Host Port
Host Port
Cache
Cache
Base Disk Port
Extended Disk Port
Base Disk Port
Extended Disk Port
DP#
DP#1
DP#2
DP#3
Extended DE (FC)
Extended DE (FC or SATA)
Extended DE (FC or SATA)
Extended DE (FC or SATA)
Extended DE (FC)
Extended DE (FC or SATA)
Extended DE (FC or SATA)
Extended DE (FC or SATA)
Port#0
Port #1
Port #2
Port #3

Up to 4DES
four each PORT

DE:Disk Enclosure

(1) Power check

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

The power to the disk array and host system may be set to ON; however, it is recommended to do this procedure with the power switches set to OFF.

(2) Connection of a FC disk enclosure (NF2500-SE42E)

Push the connector of the FC cable (HSSDC-HSSDC) provided with the FC disk enclosure, or the optional DE (HSSDC) cable (NF9120-SJ34E) into the FC connector (DP1/2/3) of the 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 FC disk enclosure until a click is heard.

Similarly, connect the FC connector (DP1/2/3) for the 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 FC disk enclosure.

NOTES: Extension of the disk port is required for the connections with DP 2/3 by extension of the option.

Connection of a SATA disk enclosure (NF2500-SE82E)

Push the connector of the FC cable (HSSDC-HSSDC) provided with the FC disk enclosure, or the optional DE (HSSDC) cable (NF9120-SJ34E) into the SATA connector (DP1/2/3) for the SATA 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 SATA disk enclosure until a click is heard.

Similarly, connect the SATA connector (DP1/2/3) for the SATA 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 SATA disk enclosure.

NOTES: Extension of the disk port is required for the connection with DP 2/3 by extension of the option.

For more information regarding the cable connection and setting of the ENC ID switch, please refer Section 5.2 (4)
“Setting of switches”.

(3) Connection between FC/SATA disk enclosures

Use the FC cable (HSSDC-HSSDC) provided with the FC/SATA disk enclosure or the available optionally DE cable (NF9120-SJ34E). Push the connector at either end of the cable into the FC-OUT connector on Adapter 0 (ADP0) of the existing 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 disk enclosure.

Push the connector at the other end of the cable into the FC-IN connector on Adapter 0 (ADP0) of the additional disk enclosure 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 disk enclosure to be added.

NOTE: The DP0 connector of the disk array unit can be used for connection with a FC disk enclosure (NF2500-SE42E).
The DP 1/2/3 connector of the disk array unit can be used for connection with the FC disk enclosure (NF2500-SE42E) or the SATA disk enclosure (NF2500-SE82E).
Note, however, the FC disk enclosure cannot be installed together with the SATA disk enclosure on the other port.

(4) Settings of switches

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

a) Setting of the ENC ID switch on FC/SATA disk enclosure

Set an ENC ID by using the ENC ID switch on each adapter of the FC/SATA 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 FC/SATA disk enclosures in the same FC loop.
Set "0" for the ENC ID switches on both adapters in the first FC/SATA disk enclosure that is connected to the controller via the FC cable (HSSDC-HSSDC). If you have installed additional FC/SATA disk enclosures, set the ENC ID switches on both adapters of each additional FC/SATA enclosure to "1" and then "2" in the connection order.

If you set different values for the ENC ID switches on the right and left adapters of the 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 disk enclosure, set the same value for the ENC ID switches, and then turn on the power.

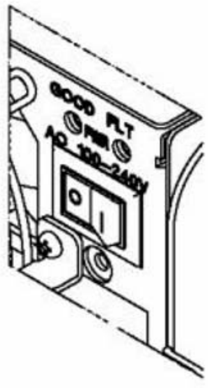
> The ENC ID of an FC/SATA disk enclosure is factory-set to "0". The setting must be changed for any additional disk enclosures to be connected to the disk array unit. Set a new ENC ID according to the ENC ID switch setting process above. If you start up the system without setting a new ENC ID, data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

(5) Installation of additional disk drives

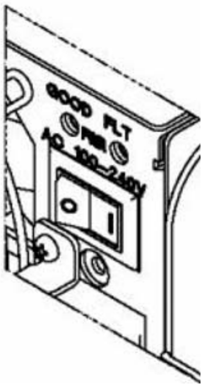
Disk drives can be added to an enclosure at any time. It is recommended that disk drives of the same capacity and rotational speed be used together.

(6) Check of power supply

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


GOOD
FLT
PWR
AC 100~240V
O
I

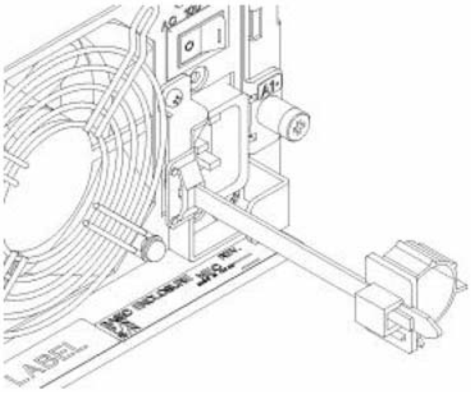
OFF

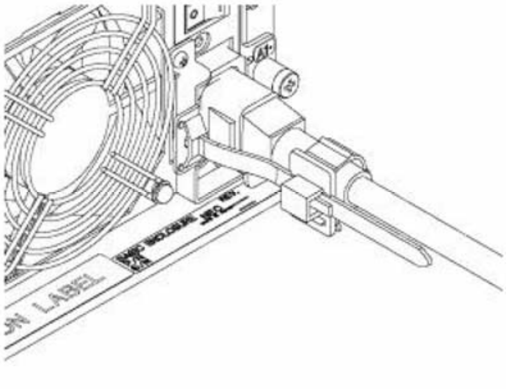

GOOD
FLT
PWR
AC 100~240V
O
I

ON

(7) Connection of power cords

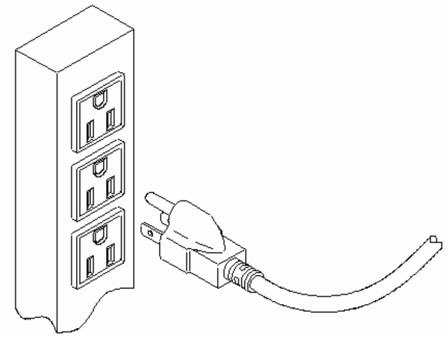
Insert the receptacle of the power cord received with the disk enclosure into the power plug of the power supply of the disk enclosure. Extend the clamp section of the AC cable clamp, fit it to the AC cord, and lock the clamp section lightly. Then, move the clamp section toward the receptacle of the power cord to make a clamp at a point near the end of the plug. Securely lock the clamp section to avoid disconnection.





(8) Connection of power plug

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



The disk array unit will not recognize the disk enclosure just because cabling has been connected between the units. Provide the proper settings for the disk enclosure through the maintenance PC. Or, contact your service engineer or an NEC trained service engineer for assistance in configuring your disk enclosure. See Appendix C for instructions on the use of the maintenance PC.

(9) Power on of a disk enclosure

Turn the power switch of the disk enclosure to ON.

6.2 Addition of a DE Port

⚠ CAUTION

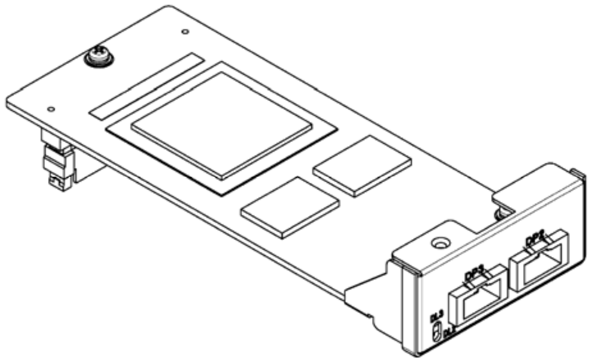
- Note that foreign substances such as water and metal must not get into the product during the following process. Failure to assure this may cause device failure, electric shock, and/or fire to occur.
- Do not allow the connector terminals to become short-circuited. Do not pour water or liquid on terminals. Failure to follow these guidelines may cause device fault or electric shock to occur.
- Note that the inside of the Disk Array unit has sharp edges, electrical connections and other potential dangers to your hands and fingers.

- Do not disassemble or modify the additional DE port. Doing so may cause the device to become defective.

The standard disk array unit can be configured with up to eight disk enclosures.

For larger capacity, installing an additional DE port allows disk enclosures to be added; up to 16 disk enclosures and up to 240 disk drives may be installed per disk array unit.

Product name: DE Port Part number: NF2900-SP02E



NF2900-SP02E is composed of two DE ports. Install a single DE port on each of the two controllers.

(1) Power check (when the disk array unit is off-powered)

Note - when adding a DE port, the disk array unit must be powered off.

While the disk array unit is powered off and the [BAT LED] is on, the cache memory may still contain data that needs to be written into the disk drive. If there is data remaining in the cache memory, press the SHUTDOWN switch to write the data from the cache memory, and then turn the disk array power off.

> If you turn off the power switch of the disk array unit before pressing the SHUTDOWN switch, the cache memory in the array controller still contains data that is to be written into the disk drive. If you add a new DE port in this state, the data remaining in the cache memory will be lost.
>
> Perform the procedure explained in Section 7.2 "(2) Notes on turning off the AC power" so as not to leave any unwritten data in the cache memory of the array controller. After that, add the new DE port.

(2) Disconnection of host unit (for offline addition)

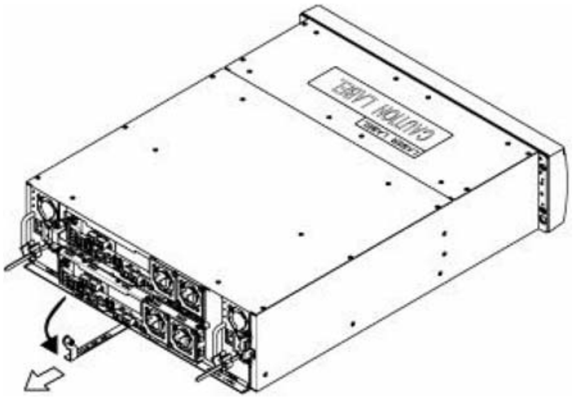
Disconnect the host unit that is connected to the controller to be added.

(3) Removal of cables

Remove all the cables connected to the controller. Write down the connections between the cables to be removed and the mating connectors.

(4) Removal of controller

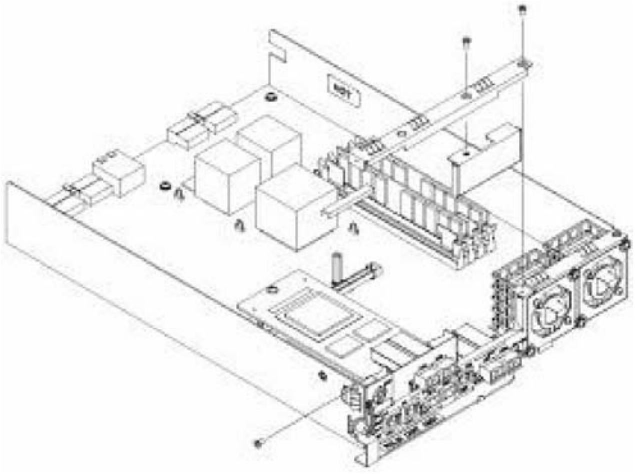
Loosen a screw securing the ejector of the target controller, open the ejector pulling it by 90º, and then pull out the controller. (When the controller is pulled out, the protection shutter in the unit closes and it is locked.)



⚠ ***Be careful as this may be hot.***

(5) Removal of blank panel and seal for the DPE connector cover

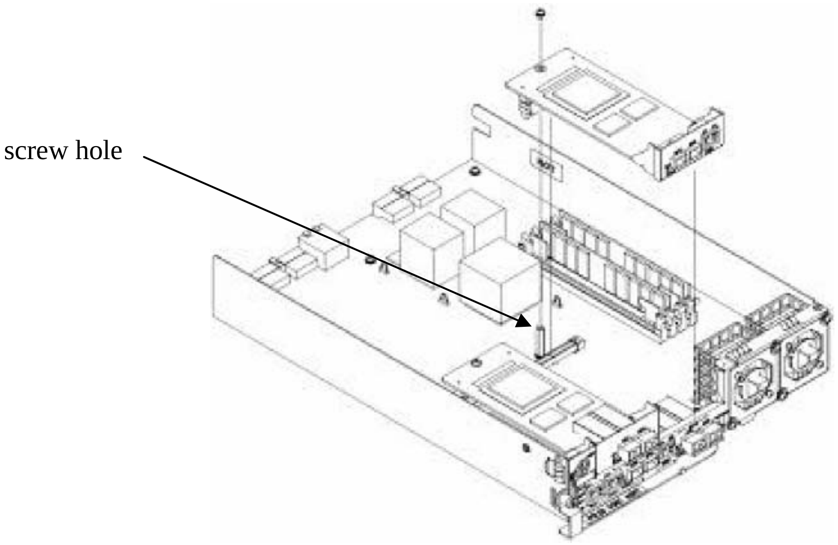
Remove the three screws securing the blank panel of the controller, and then remove the blank panel. In addition, remove the U-shaped seal attached to the upper part of the DPE stack connector.



- Be sure to keep removed blank panel in a safe place.
- After removing a DE port from the unit, be sure to install a blank panel into the slot. If using the unit without a blank panel being installed, the cooling effect on the array controller lowers and causes heat generation. Heat generation increases the failure rate, and at its worst it may cause data loss.

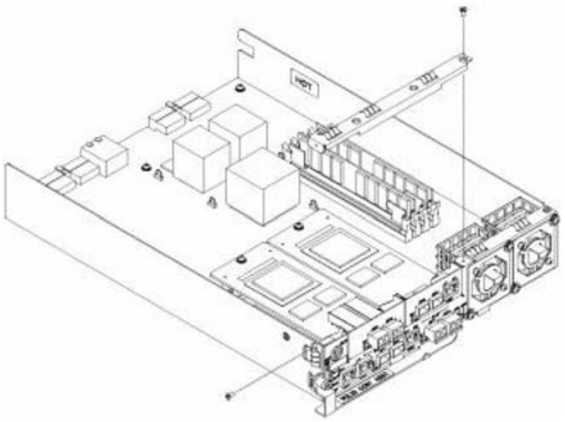
(6) Installation of DE port

Install a DE port in the controller. With the screw holes and a space from where the blank panel was removed as reference, place the DE port in the controller.



When you have placed the DE port correctly, push both sides of the connector on the port with your thumbs until fitting in the connector firmly.

After confirming that the connector is fit in, firmly secure the DE port with three screws - two screws you removed in "(5) Removal of blank panel" and one screw provided with the DE port. Fasten the screws of the front panel while pushing them from the top so that the hatched faces will be aligned.



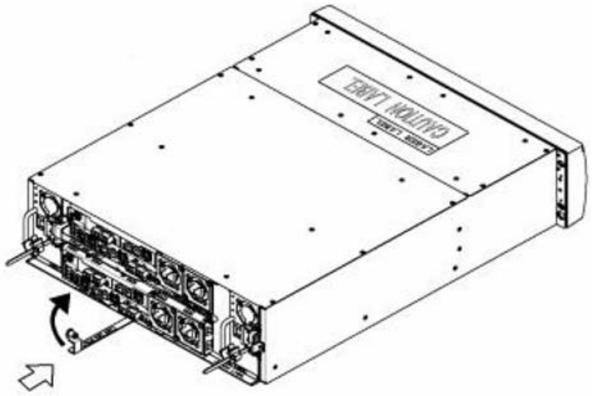
When installing the DE port to the controller, push it as far as it will go and then secure it with the screws.

Incorrect installation may cause a malfunction.

(7) Installation of the controller

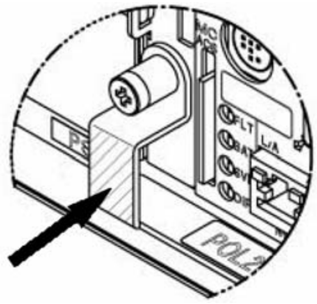
Open the ejectors of the controller insert the controller into the slot securely. (The lock of the protection shutter that closed when the controller was pulled out is automatically released by inserting the controller.)

Connect the cables removed from the controller in ‘Step (3) Removal of cables’ to the mating connectors as before.



Close the ejector after connecting the cables.

Firmly push the ejector (the part indicated by the arrow in the figure) until the controller is seated firmly, and then secure the ejector with the screw.



When inserting the controller into the array controller, push it as far as it will go and then secure it with the screws.

Incorrect insertion may cause a malfunction.

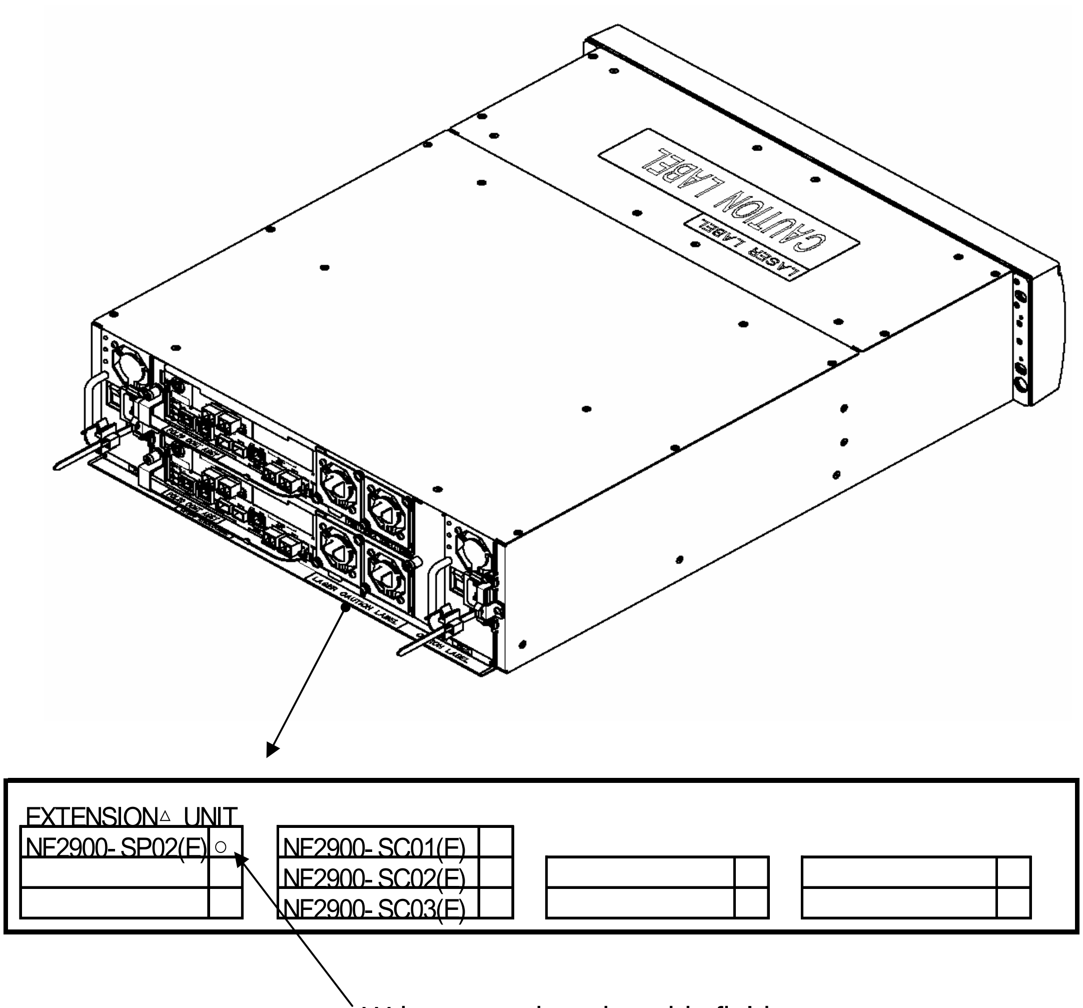
(8) Installing the DE Port into the other controller

Install the DE port into the other controller using the procedure described in Steps (2) through (7) above.

(9) Updating the Option label

On the disk array unit, a label indicating the options available for installation is placed to allow any installed options to be known by an external view.

If the DE port is added, write a round mark at the corresponding field on the label to indicate the addition as shown in the figure below.


CAUTION LABEL
LASER LABEL
LASER CAUTION LABEL
EXTENSION△ UNIT
NF2900- SP02(F) ○
NF2900- SC01(F)
NF2900- SC02(F)
NF2900- SC03(F)

Write a round mark at this field.

6.3 Addition of Cache Memory

⚠ CAUTION

■

■

■ Note that foreign substances such as water and metal must not get into the product during the following process. Failure to assure this may cause device failure, electric shock, and/or fire to occur.

■ Do not allow the connector terminals to become short-circuited. Do not pour water or liquid on terminals. Failure to follow these guidelines may cause device fault or electric shock to occur.

■ Note that the inside of the Disk Array unit has sharp edges, electrical connections and other potential dangers to your hands and fingers.

■ Do not disassemble or modify the cache memory. Failure to do this may cause the unit to become defective.

The disk array unit is normally equipped with two 1GB cache memory cards on each controller.

To use a larger quantity of cache memory for improving the performance features of the disk array unit, up to four cache memory cards can be added for each controller.

Product name: Additional 1GB cache memory   Part number: NF2900-SC01E
(2GB/PKG → 4GB/PKG)

Product name: Additional 2GB cache memory   Part number: NF2900-SC02E
(2GB/PKG → 8GB/PKG)

Product name: Additional 2GB cache memory   Part number: NF2900-SC03E
(4GB/PKG → 8GB/PKG)

■ Cache memories with different capacities may not coexist in a specific controller. CONT0 must have cache memories with the same capacities as those installed in CONT1.

NF2900-SC01E is composed of four 1GB cache memory cards. Install two cache memory cards in empty slots of each of the two controllers.

NF2900-SC02E/SC03E is composed of eight 2GB cache memory cards. Install four cache memory cards in empty slots of each of the two controllers.

(1) Power check (when the disk array unit is off-powered)

Note - when adding cache memory the disk array unit must be powered off.

-

While the disk array unit is powered off and the [BAT LED] is on, the cache memory may still contain data that needs to be written into the disk drive. If there is data remaining in the cache memory, press the SHUTDOWN switch to write the data from the cache memory, and then turn the disk array power off.

> If you turn off the power switch of the disk array unit before pressing the SHUTDOWN switch, the cache memory in the array controller still contains data that is to be written into the disk drive. If you add a new DE port in this state, the data remaining in the cache memory will be lost.
>
> Perform the procedure explained in Section 7.2 "(2) Notes on turning off the AC power" so as not to leave any unwritten data in the cache memory of the array controller. After that, add the new cache memory.

(2) Disconnection of host unit (for offline addition)

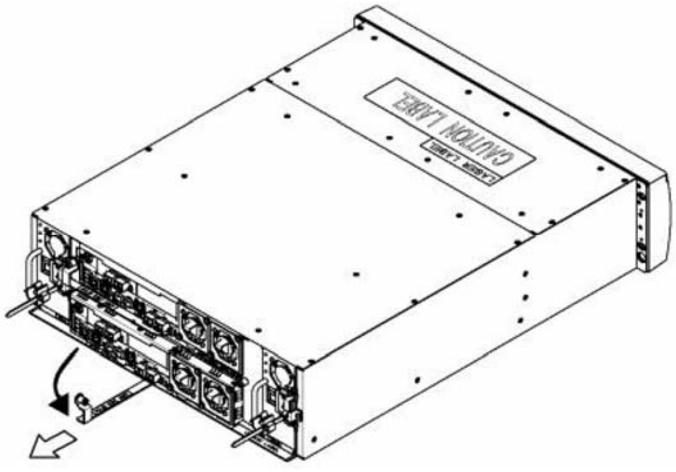
Disconnect the host unit that is connected to the controller to be added.

(3) Removal of cables

Remove all the cables connected to the controllers. Write down the connections between the cables to be removed and the mating connectors.

(4) Removal of controller

Loosen a screw securing the ejector of the target controller, open the ejector pulling it by 90º, and then pull out the controller. (When the controller is pulled out, the protection shutter in the unit closes and it is locked.)



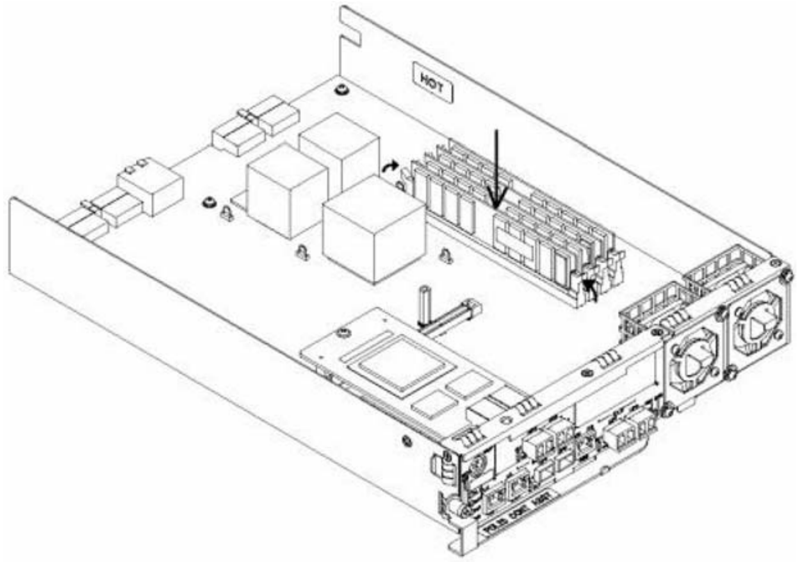
⚠ Be careful as this may be hot.

(5) Installation of cache memory

Install additional cache memory in the controller.

Perform the following procedure for installing cache memory in the controller:

- Open the socket levers, and install the cache memory, fitting the two recesses of the cache memory to the protrusions of the socket.
- Confirm that they are seated properly. Until the cache memory is secured by the levers, push the cache memory along the connector rail as far as it will go. Be careful not to apply excess force to the cache memory in doing so.
- When the levers fit into the notches of the cache memory, secure it.

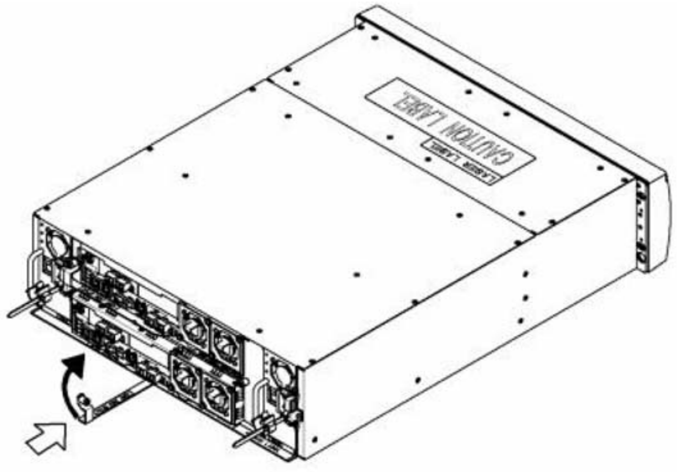


	When installing the additional cache memory into the controller, push it as far as it will go and then secure it with the levers. Incorrect insertion may cause a malfunction.

(6) Installation of the controller

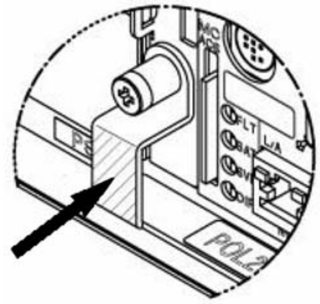
Open the ejectors of the controller insert the controller into the slot until it seats securely. (The lock of the protection shutter that closed when the controller was pulled out is automatically released by reinserting the controller.)

Connect the cables removed from the controller in ‘Step (3) Removal of Cables’ to the mating connectors as before.



Close the ejector after connecting the cables.

Firmly push the ejector (the part indicated by the arrow in the figure) until the controller is properly seated, and secure the ejector with the screw.



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

(7) Connection of host unit (for online addition)

Connect the host unit to the added controller.

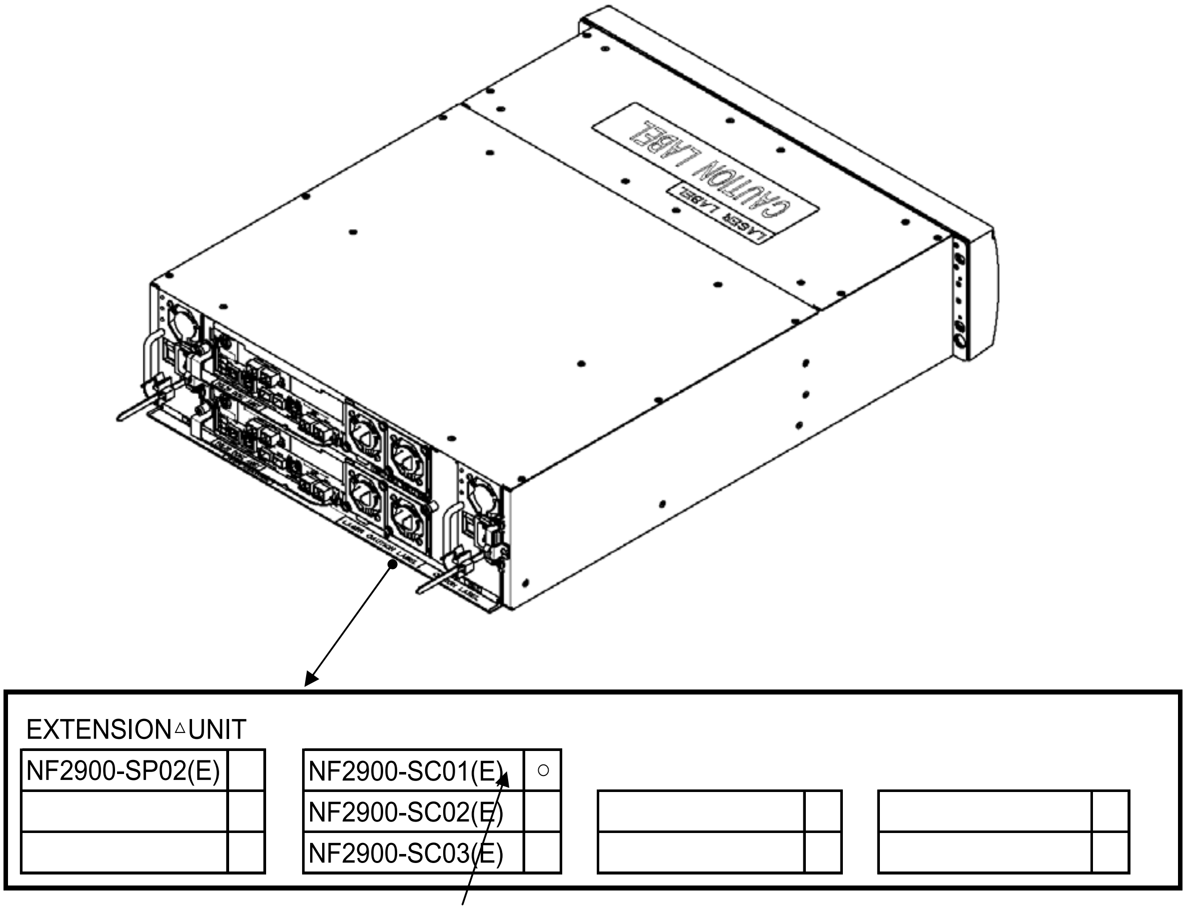
(8) Installing into the other controller

Install the cache memory into the other controller in the procedure described in 'Steps (2) through (7)' above.

(9) Updating the Option label

On the disk array unit, a label indicating the options available for installation is placed to allow any installed options to be known by an external view.

If additional cache memory is added, write a round mark at the corresponding field on the label to indicate the addition as shown in the figure below.


CAUTION LABEL
LASER LABEL
EXTENSION△UNIT
NF2900-SP02(E)
NF2900-SC01(E) ○
NF2900-SC02(E)
NF2900-SC03(E)

Write round mark as shown in the figure.

Note: The figure above indicates the addition of NF2900-SC01E.

7. Handling of the 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 regarding the following in use of the disk array unit. Incorrect handling of the disk array unit may cause the unit to become defective and/or data corruption.

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

The reliability features of the disk array unit are effective only in the case of a hardware failure (e.g., the hard disk becomes physically damaged or inoperative). Any software failure (e.g., the data is lost or rewritten due to program excursion) is not covered by these features. Should a software failure occur, the system/data could be seriously damaged. To minimize this damage, be sure to back up your data regularly.

It is recommended that important files are backed up regularly. This enables the damage to be minimized in the case of an emergency including sudden vibration/shock or a power shutdown caused by any 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 data to be corrupted, some software to operate incorrectly, and/or the unit to become defective.

(1) Turning on AC power

a) Ensure that all disk drives are properly seated..

b) Turn on both power switches at the rear of the disk array unit. The disk array unit and any additional FC or SATA disk enclosures have a redundant power configuration to prevent the entire unit from shutting down due to any single failure.
If an additional FC or SATA disk enclosure is connected, first turn on the two power switches at the rear of the additional FC or SATA disk enclosure, and then turn on the two power switches at the rear of the disk array unit. Alternatively, turn on the disk array unit and all the additional FC or SATA disk enclosures connected with the disk array unit at the same time.

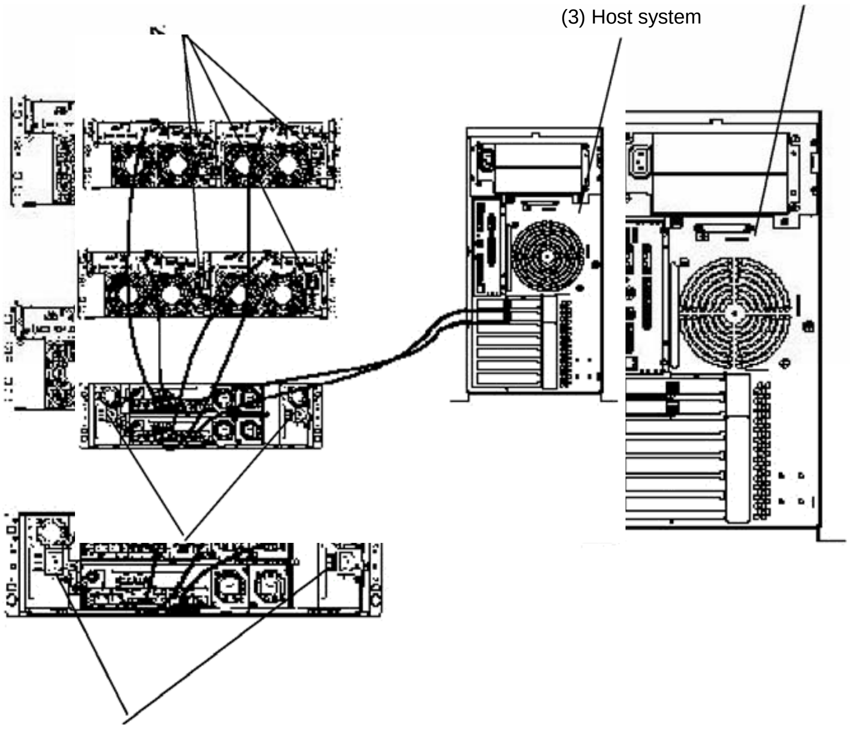
When turning on the power switches, confirm that the POWER GOOD LED (green) of the power supply and the POWER LED (green) on the front panel of the disk array unit and any additional FC or SATA disk enclosures go on. The disk array unit performs a self-test and initialization sequence immediately after 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 the DIR LED status, and then turn on the host system.

The disk array unit takes 15 minutes (at maximum) to start.

[Power-on procedure]

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

(1) Power switches of disk enclosures



(2) Power switches of array controller
(May be turned on at the same time the power switches of disk enclosures are turned on.)

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

(2) Notes on turning off the 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 a write to the disk drive, the remaining data in the cache memory is backed up by the battery backup units.

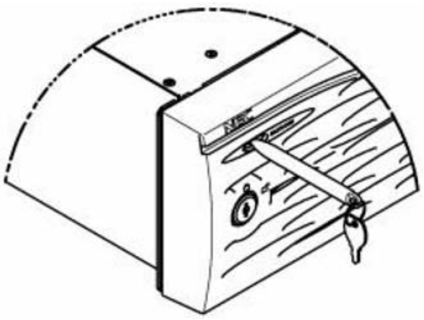
However, the backup time is limited. (The backup time depends on the installed cache memory capacity and the battery service period. See Section 2.2 "Write Cache Feature" for details.). To securely protect your data, write all the data remaining in cache memory in the disk array unit onto the disk drive according to the following procedure. Then turn off the AC power according to the procedure explained in "(3) Turning off the 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 array controller by using the stick attached to the key for at least 5 seconds.

   When the POWER LED starts flashing, release the stick from the switch.



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

- When the host system is shut down, it writes the remaining cache data into the disk array unit. Before turning OFF the power of the disk array unit, confirm that no cache data remains on the host system and no data remains in the cache memory of the disk array unit.
- To check if data remains in the cache memory of the disk array unit, watch 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 of 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 the 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 the AC power".

b) Push the SHUTDOWN switch for at least five seconds to write any data remaining in the cache memory onto the disk before turning off the AC power when:

- you turn off the AC power for any long period
- you replace any of the controllers, power supplies, or battery backup units in power-off state.

See Item (2) "Notes on turning off AC power".

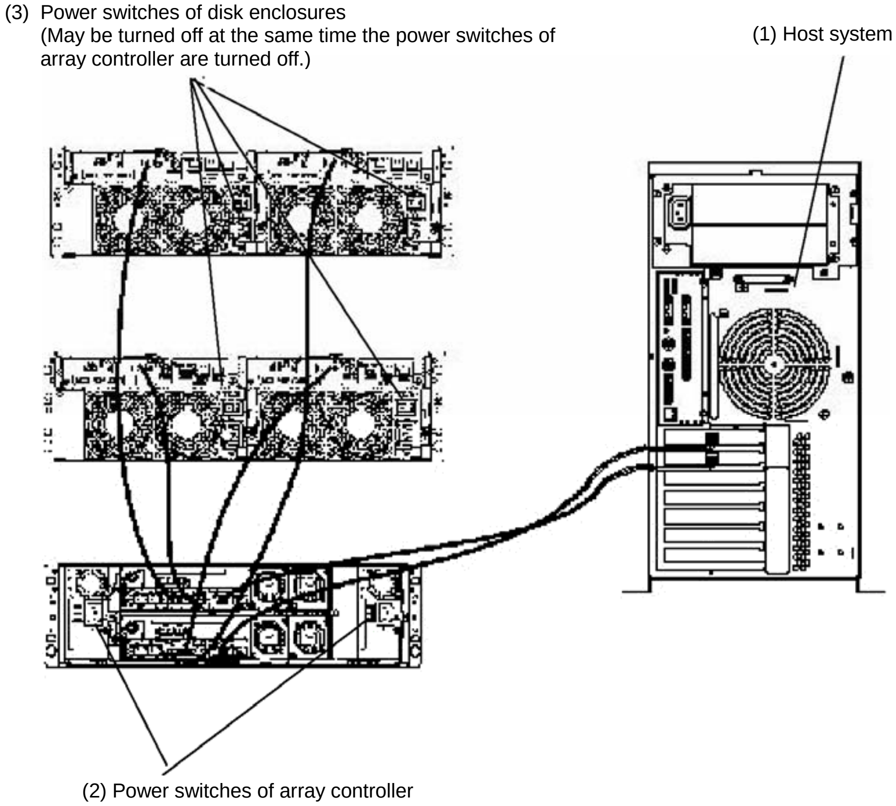
c) Turn off the array controller and then disk enclosures. Alternatively, turn off the array controller and all the FC disk enclosures connected with the array controller at the same time.

The disk array unit has a 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 array controller and disk enclosures) at the rear of the unit.

Be aware that data may be lost if you turn off the disk enclosures before the array controller.

[Power-off procedure]

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


(3) Power switches of disk enclosures
(May be turned off at the same time the power switches of array controller are turned off.)
(1) Host system
(2) Power switches of array controller

7.3 LD (Logical Disk) Setting Procedure

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

Set the RAID level and LD (logical disk) by using the " NEC Storage Manager Software", or contact your Service Engineer or NEC trained maintenance service representative who has expert knowledge of the disk array unit for the setting of the RAID level and LD.

7.4 Spare Disk Setting Procedure

Spare disks can only be set in RAID levels 1, 5, 6, 10, or 50.

Set the spare disk by using the " NEC Storage Manager", or contact your Service Engineer or NEC trained maintenance service representative who has expert knowledge of the disk array unit.

When you change a failing disk to a spare disk, confirm the capacity and rotational speed of the spare disk are 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. Troubleshooting

The user may remove a defective component and install a new component for the replacement according to the procedures 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 contact your Service Engineer or NEC trained maintenance service representative who has expert knowledge of the disk array unit to remove any defected component and install a new component.

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

WARNING

Should the disk array unit demonstrate any sign of smoke/fire a fault such as the 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 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 that is dangerous.

CAUTION

- Note that the inside of the Disk Array unit has sharp edges, electrical connections and other potential dangers to your hands and fingers.
- If a fault occurs in the disk array unit, the SERVICE LED on the array controller, the FAULT LED on the defected component, or the POWER FAIL LED lights contact your Service Engineer or NEC trained maintenance service representative who has expert knowledge of the disk array unit, or prepare the proper maintenance component and replace the defective component immediately.
- Perform the replacement job as quickly as possible. Do not operate the disk array unit for a long time in the state that one or more existing disk drives, power supply, controller or fan is removed. Failure to practice this may cause a fault to occur.

8.1 Troubleshooting Tips

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 turned on.	
Cause	Countermeasures
The power cord is not connected.	After setting the power switch to OFF, plug the cord in.
The AC power (100 VAC) is not supplied.	Check whether 100 VAC ±10% (50/60 Hz) is supplied.

The LINKUP LED (green) of the controller on the array controller connected with the FC cable, LINKUP LED (green) of the adapter in the 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, 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 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 5.2 (4) " Setting of switches ".

The host system cannot recognize the disk array unit.	
Cause	Countermeasures
The FC cable is not connected correctly.	Connect the FC cable correctly according to Chapter 5 "Connection of Disk Array Unit".
After turning on the power switch of the host system or FC-AL switch, 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 in the loopaccording to Chapter 5 "Connection of Disk Array Unit".
The setting of a host bus adapter or FC-AL switch is incorrect.	Set the switches correctly according to the User's Guide of the host bus adapter or FC-AL switch, the host system, and/or 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 " NEC Storage Manager software" or contact your service representative.

8.2 Computer Virus

A computer virus is a program that is intentionally designed to cause damage to a third party's programs or databases

The program can replicate itself or use another system function to infect other systems by copying itself into other programs. The appearance of symptoms of virus infection can be delayed by having the system wait for a specific point in time, a specific period of time, or a specific number of transaction executions. The virus may destroy programs, data, or other files or causes systems to operate in a way not intended by the designers.

To suppress the risk of damage to a minimum level, take proper measures such as a regularly scheduled backup of important data.

8.3 Indications of the Occurrence of a Fault

If the disk array unit becomes defective, the SERVICE LED on the array controller lights orange and also the LED specific for each unit lights to indicate defective unit.

The table below shows the relationship between the LED indicating the occurrence of a fault and the defective unit.

LED display	Defected unit
The FAULT LED on the controller lights orange.	The controller with the FAULT LED being on is defective.
A FAN LED on the controller lights orange.	The controller cooling fan corresponding to the FAN LED being on is defective.
The POWER FAIL LED on an array controller power supply lights orange.	The array controller power supply with the POWER FAIL LED being on is defective.
The BBU FAIL LED on an array controller power supply lights orange.	The battery backup unit corresponding to the BBU FAIL LED being on (BBU0 for PS0 or BBU1 for PS1) is defective.
The SERVICE LED on the 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 defective.
The SERVICE LED on the disk enclosure lights orange and also the FAULT LED on the adapter lights orange.	The adapter with the FAULT LED being on is defective.
The SERVICE LED of the disk enclosure lights orange and also the POWER FAULT LED of the power supply for the disk enclosure lights orange.	The power supply for the disk enclosure with the POWER FAULT LED being on is defective (including a cooling fan failure).

8.4 Replacement of Controller

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

If a cache memory or DE port installed in the controller becomes defective, the SERVICE LED on the relevant array controller and the FAULT LED on the controller are lit.

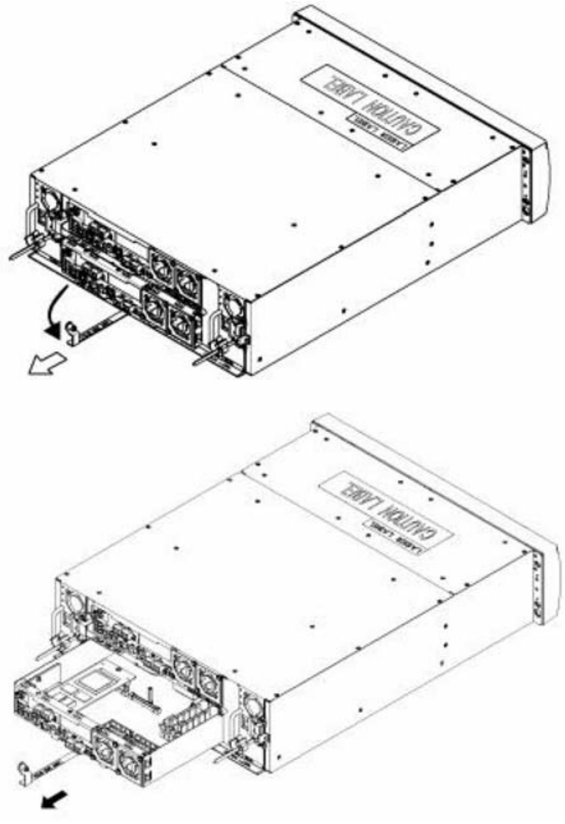
If so, replace all the cache memories and DE ports as well as the controller or contact your maintenance service representative to identify the defective unit for replacement.

<Replacement procedure>

1. Identify the defected controller with the FAULT LED on the controller being lit.

   Remove all the cables connected to the defective controller. Write down the connections between the cables to be removed and the mating connectors.

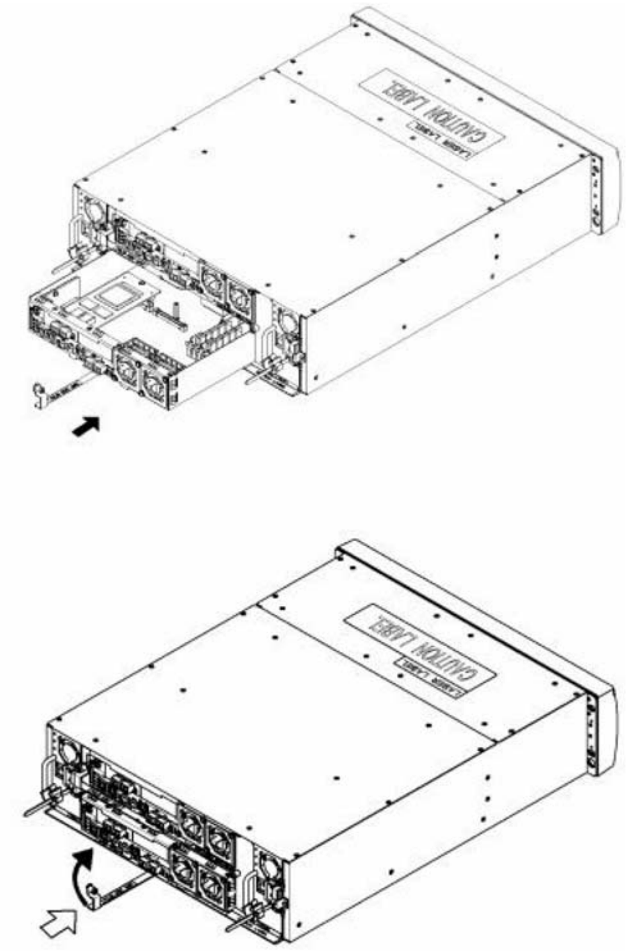
2. Loosen a screw securing the ejector of the target controller, open the ejector pulling it by 90º, and then pull out the controller. (When the controller is pulled out, the protection shutter in the unit closes and it is locked.)



Be careful this may be hot.

3. Set the DIP switch on the new controller for replacement to be the same as that of the defective controller.

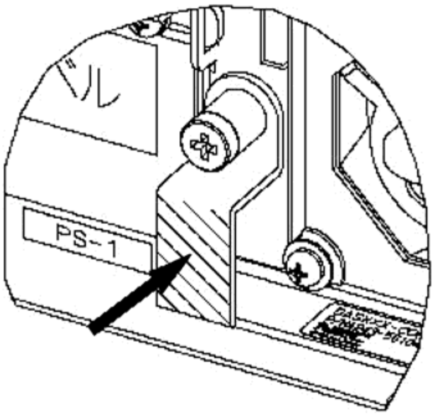
4. Open the ejectors of the controller for replacement, insert the controller into the slot until firmly seated. (The lock of the protection shutter that closed when the controller was pulled out is automatically released by inserting the controller.)


CAUTION LABEL
LASER LABEL
CAUTION LABEL
LASER LABEL

Connect the cables removed in step (1) to the mating connectors as before.

After connecting the cables, close the ejector.

Strongly push the ejector (the part indicated by the arrow in the figure) until the controller is inserted firmly, and secure the ejector with the screw.



When inserting the controller into the array controller, push it as far as it will go and then secure it with the screws.

Incorrect insertion may cause a malfunction.

At the startup immediately after replacement, write back the IP address of the old controller to the new controller. If the controller was replaced with a new one, the system starts using the IP address specified for the new controller. Therefore, a maintenance PC and NEC Storage Manager cannot connect with the old IP address. To connect with a maintenance PC and NEC Storage Manager, perform either of the following procedures:

(1) Connect by using the default IP address.

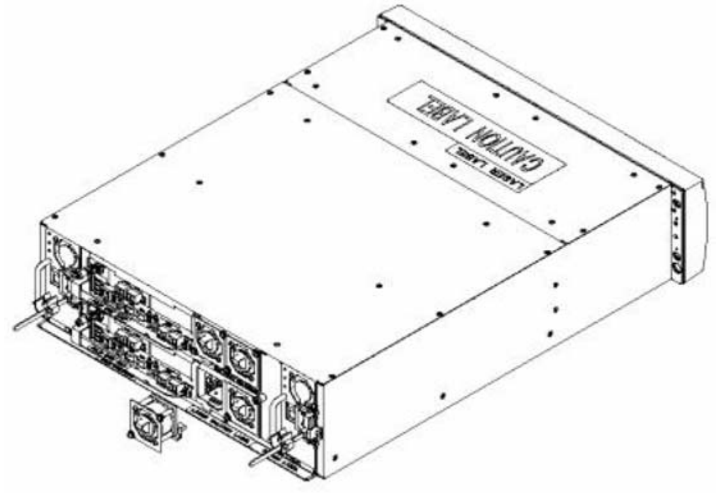
(2) Wait at least three minutes after the controller starts flashing, remove the replaced controller, insert it again, then connect by using the IP address of the old controller.

8.5 Replacement of a Controller Cooling Fan

If a controller cooling fan becomes defective, the SERVICE LED on the array controller lights orange. In addition, the FAN LED on the corresponding controller lights orange. The defective controller cooling fan may be replaced with the power of the disk array unit remaining ON.

<Replacement procedure>

1. Check whether the defected controller cooling fan is FAN0 or FAN1 depending on the FAN LED being on.
2. Loosen the two set screws at the upper right and lower left corners of the defective controller cooling fan to pull it out from the slot. (Note that the fan may be rotated by inertia.)



3. Insert the controller cooling fan for replacement into the slot.
4. Fasten the two set screws at the upper right and lower left corners of the controller cooling fan to secure it.

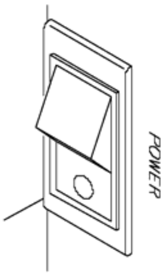
❗	When inserting the cooling fan into the controller, push it as far as it will go and then secure it with the screws. Incorrect insertion may cause a malfunction.

8.6 Replacement of a Power Supply for Array Controller

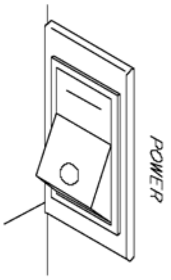
If a power supply becomes defective, the SERVICE LED on the array controller lights orange. In addition, the POWER FAIL LED on the power supply lights orange. The defective power supply may be replaced with the other power supply remaining ON.

<Replacement procedure>

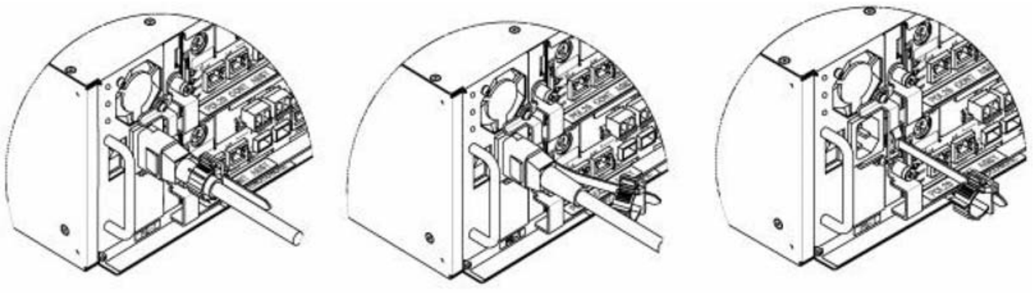
1. Identify the defective power supply by the POWER FAIL LED of the power supply.
2. Set the switch of the defected power supply to OFF and pull out the power cord from the power plug.



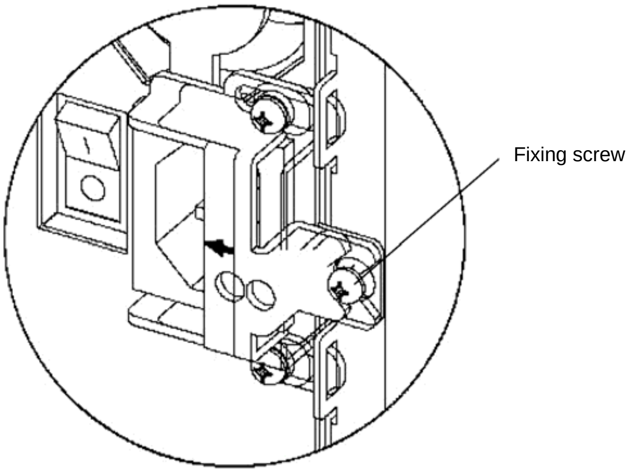
OFF



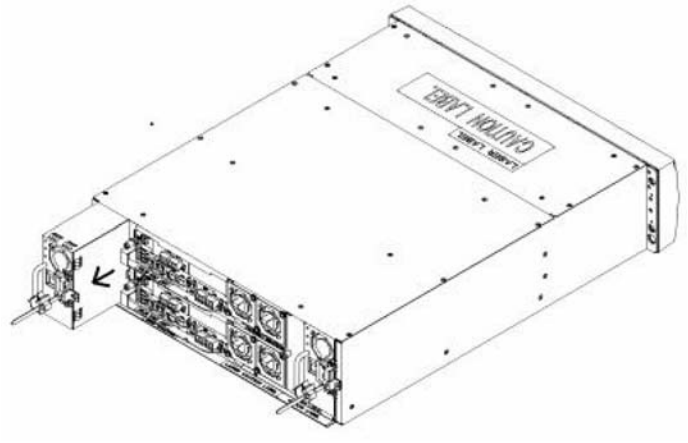
ON



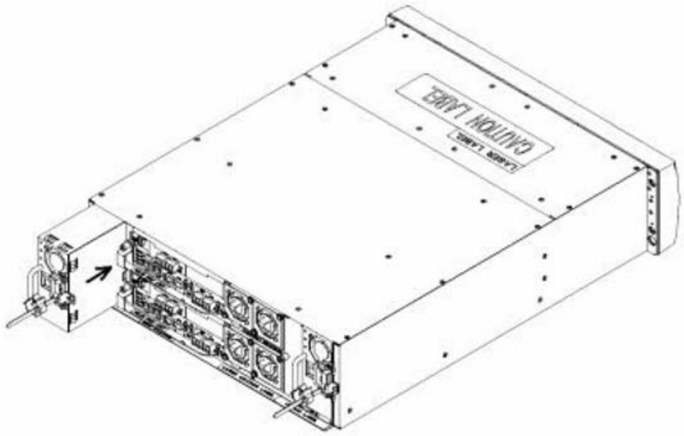
3. Loosen the screw fixing the power supply and slide the removal protection mechanism inward as shown in the figure below.



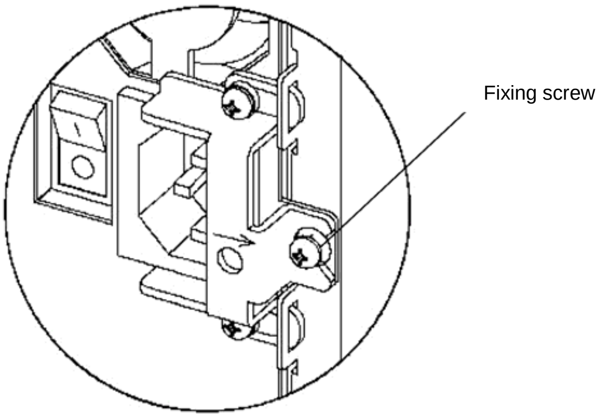
4. Hold the handle of the defective power supply and pull it out.


CAUTION LABEL
LASER LABEL

5. Make sure that the switch of the power supply for replacement is set to OFF and the power cord is removed from the power plug.
6. Slide the removal protection mechanism inward as shown in the figure below and insert the replacement power supply into the slot securely.


CAUTION LABEL
LASER LABEL

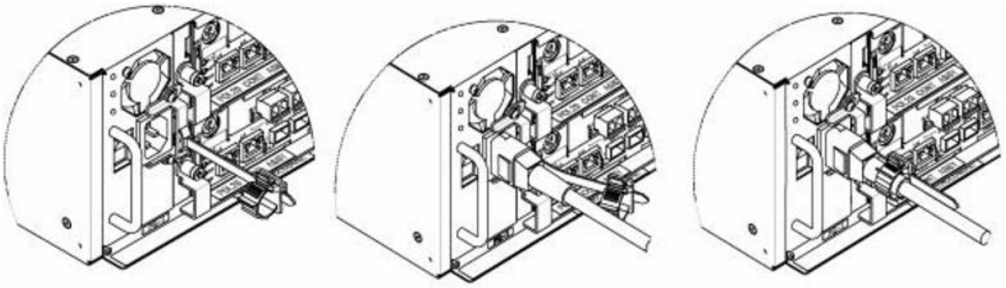
7. Slide the removal protection mechanism outward and fix it with a single screw.



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

8. Insert the power cord into the power plug of the replaced power supply, and insert the power cord stopper into the power cord to secure the power cord.

Then set the power switch to ON.



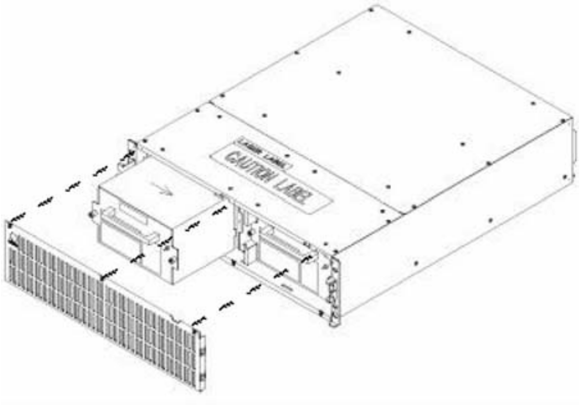
8.7 Replacement of a Battery Backup Unit

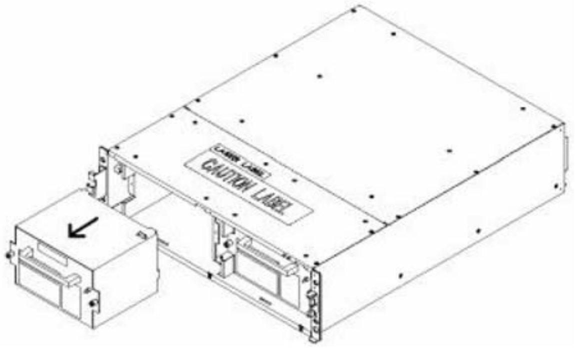
If the battery backup unit becomes defective, the SERVICE LED on the array controller lights orange. In addition, the BBU FAIL LED on the power supply corresponding to the defective battery backup unit, PS0 for BBU0 or PS1 for BBU1, lights orange. The defective battery backup unit may be replaced with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

<Replacement procedure>

1. Using the front bezel key and remove the front bezel from the array controller.
2. Loosen the three screws securing the battery cover of the array controller to remove the cover.
3. Set the battery switch of the defected battery backup unit to OFF.
4. Loosen the two set screws of the defective battery backup unit and pull out the battery backup unit from the slot.

   Because the battery backup unit has a drop protection mechanism, it cannot be pulled out simply by pulling it straight. As the claw is caught by the chassis, push the battery backup unit inward a little, slide the battery backup unit to the right, and pull it out.

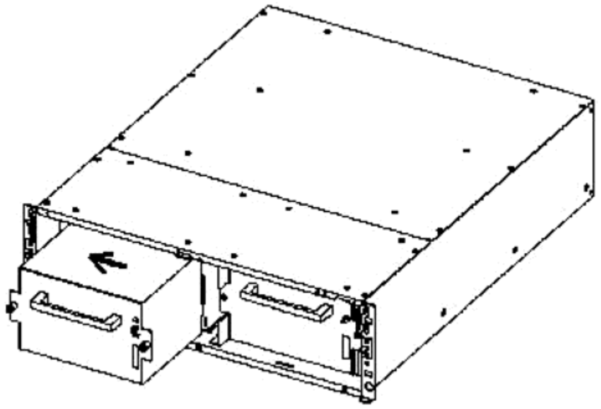


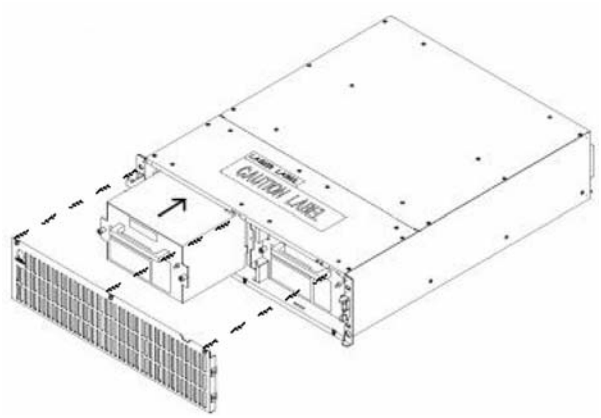


❗	The battery backup unit is as heavy as 4.5 kg. Pull out the battery backup unit slowly and carefully so that the unit may not get dropped.

5. Make sure that the battery switch of the battery backup unit for replacement is set to OFF.

6. Insert the replacement battery backup unit into the slot and secure it with two screws. For the insertion, fit the drop protection claw to the notch on the chassis, slide the unit to the left, and insert it slowly.





When inserting the battery backup unit into the array controller, push it as far as it will go and then secure it with the screws.

Incorrect insertion may cause amalfunction.

7. Set the battery switch of the replaced battery backup unit to ON.

8. Install the battery cover on the array controller.

9. Install the front bezel on the array controller and lock it with a key.

8.8 Replacement of a Disk Drive

If a disk drive becomes defective, the SERVICE LED on the array controller lights orange. In addition, the SERVICE LED on the FC/SATA disk enclosure in which the defective disk drive is installed and the FAULT LED on the defective disk drive are lit orange.

The defective disk drive may be replaced with the powers of the disk array unit and FC disk enclosure remaining ON.

If the FAULT LED on a disk drive lights, the fault of any other disk drive in the same logical disk will cause data to be lost due to interruption of redundancy. Except in a RAID6 environment where 3 disk drives wold need to fail. If the FAULT LED on a disk drive lights, replace the disk drive immediately. Perform the replacement job as quickly as possible. Operating the disk enclosure for a long time with a disk drive removed is very risky.

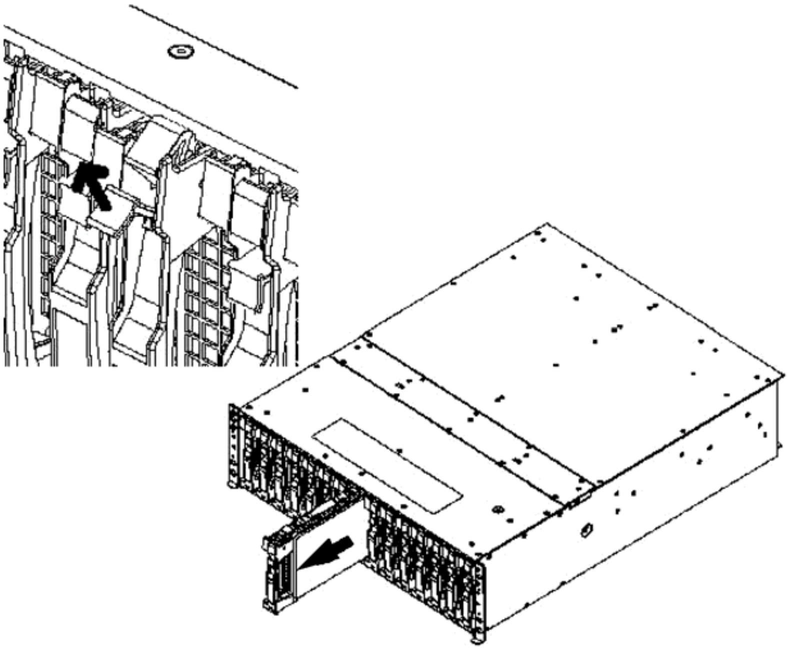
Always replace a defective disk drive with a disk drive having the same storage capacity and rotational speed.

<Replacement procedure>

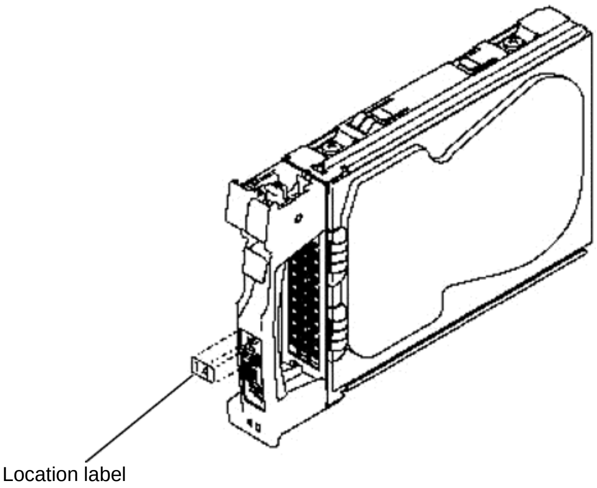
1. Identify the defective disk drive with the FAULT LED lit.
2. Lift the ejector of the defective disk drive towards you to release the lock.

   When the lock is released, a click occurs.

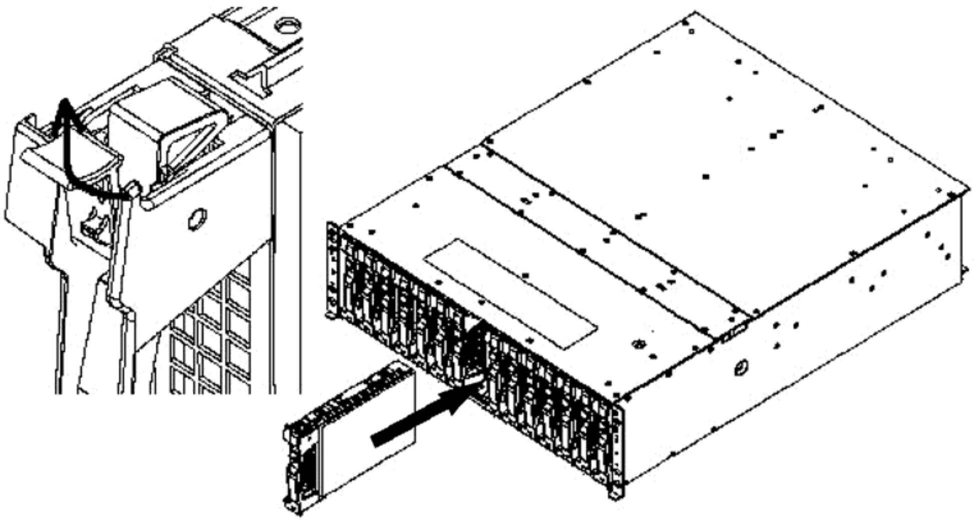
   After the lock is released, hold the handle and pull out the disk drive.



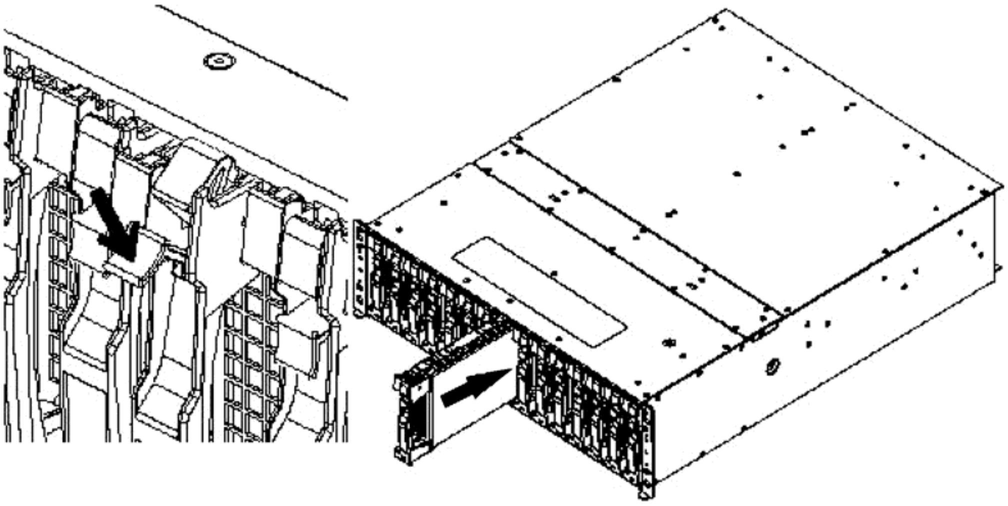
3. Select the location label having the same location as that of the defective disk drive from the location label sheet that is provided with the replacement disk drive, and then put the label on the replacement disk drive.



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 until it is properly seated.



After the disk drive is securely seated, push down the ejector that was opened upward until the lever clicks indicating the installation is complete.



When inserting the disk drive into the disk enclosure, push it as far as it will go and then lock the ejector.

Incorrect insertion may cause a malfunction.

5. 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 data recovery. Otherwise, the reduced state ("reduce" shown as the logical disk status) remains.
- Setting the Auto Repair feature to ON in while in the recovery wait state will not start the data recovery. The setting is enabled starting with the next recovery.

6. The FC/SATA disk enclosure and the disk array unit operate normally during the data recovery. At the termination of the data recovery, the SERVICE LEDs on the array controller and FC/SATA disk enclosure go off.

8.9 Replacement of Power Supply for Disk Enclosure

If a power supply for the disk enclosure becomes defective, the SERVICE LED on the array controller lights orange. In addition, the SERVICE LED on the FC/SATA disk enclosure in which the defective power supply is installed and the POWER FAULT LED on the defective power supply are lit orange.

The defective power supply for the disk enclosure may be replaced with the powers of the array controller and FC/SATA disk enclosure remaining ON.

When replacing a power supply for the disk enclosure, prepare the new power supply before removing the old one, and then replace it within about 3 minutes.

The following units of the FC disk enclosure generate heat while operating:

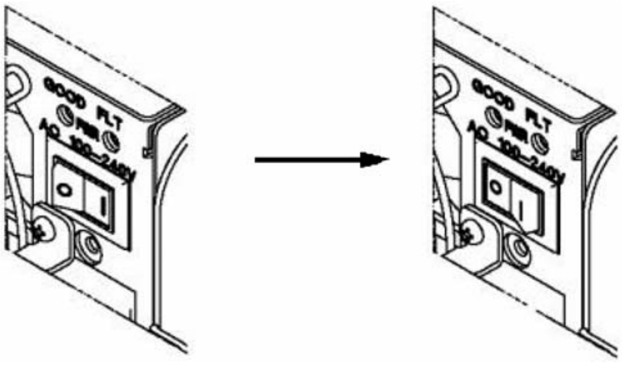
A) Disk drives

B) Power supplies for the disk enclosure

The fans in the power supplies for the disk enclosure serve as cooling fans for both of the above. Therefore, do not leave the disk enclosure with one of the power supplies removed. Doing so causes the disk drive temperature to rise, which may significantly decrease their reliability and increase the risk of data loss

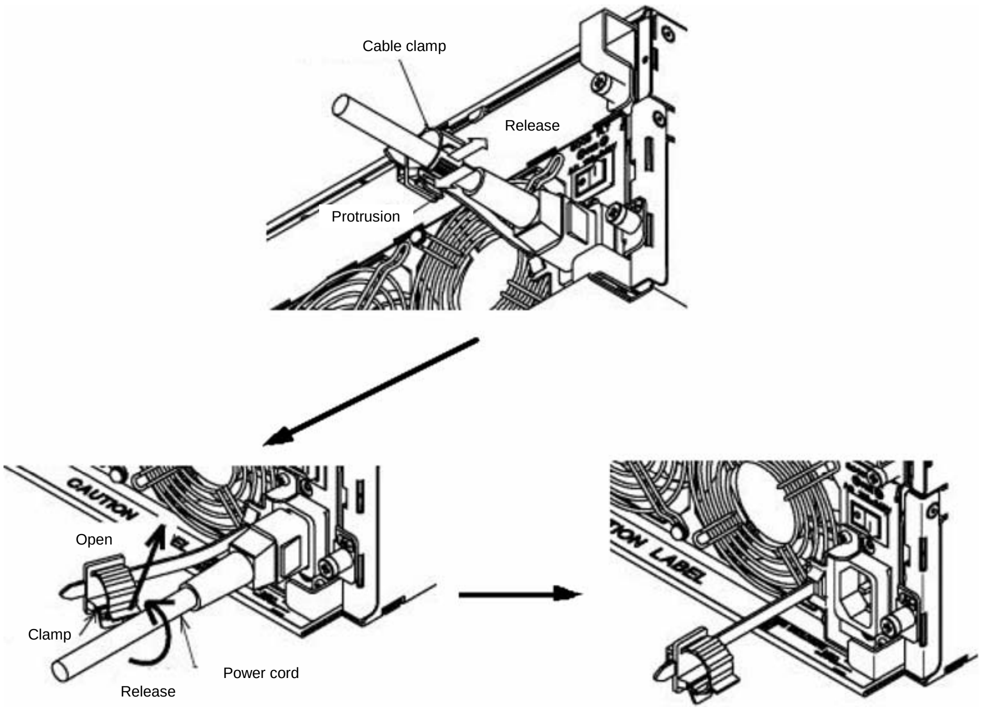
<Replacement procedure>

1. Turn off the power switch of the defective power supply for the disk enclosure.

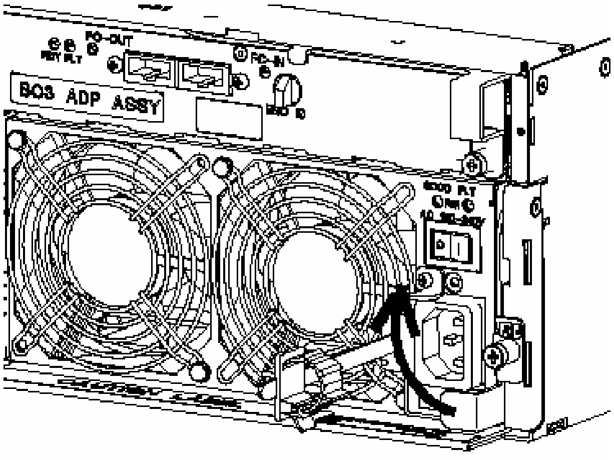


ON OFF

2. Pushing the protrusion on the AC clamp, as shown in the figure below, releases the lock. Remove the AC clamp from the power cord. Then, pull out the receptacle of the power cord from the power plug of the power supply for the disk enclosure.

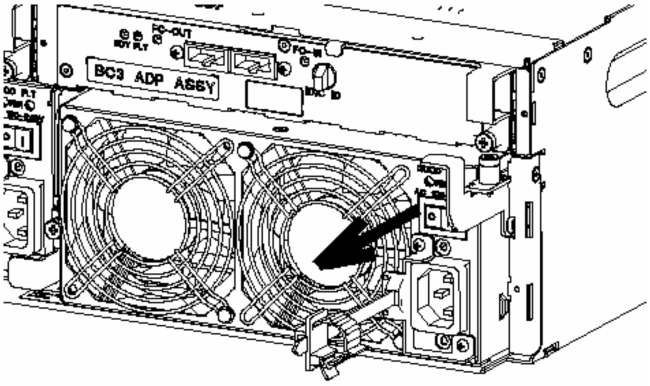

Cable clamp
Release
Protrusion
Open
Clamp
Power cord
Release
CAUTION
TION LABEL

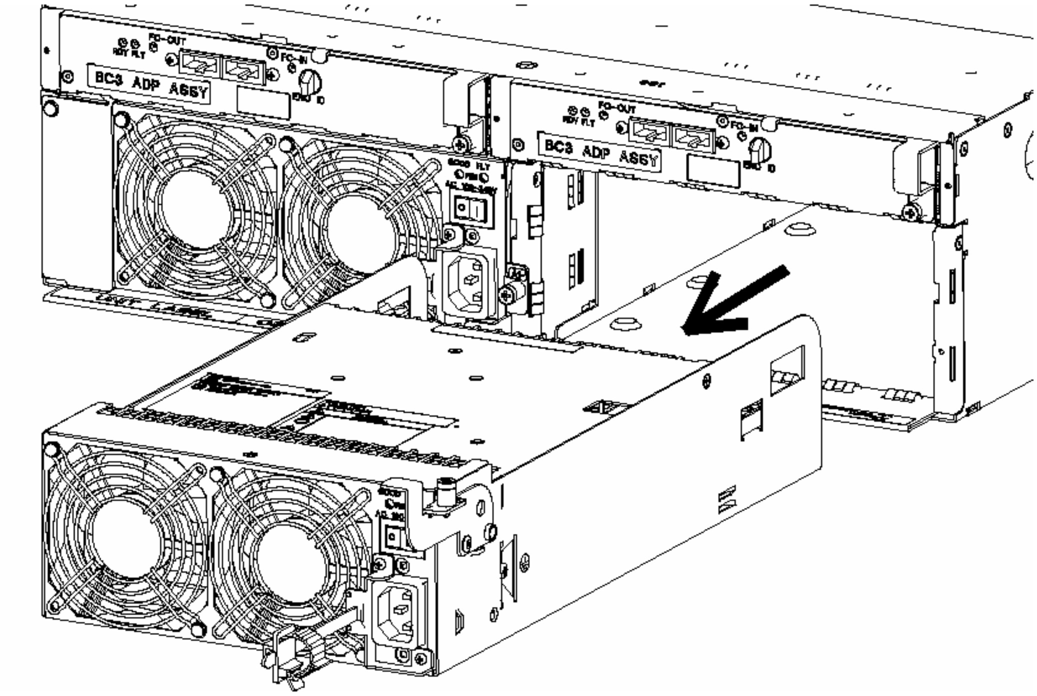
3. Loosen the screw securing the ejector, put your finger on the protrusion (shown in the figure below) of the ejector, and pull it toward you.


RDY FLT
FC-OUT
FC-IN
BO3 ADP ASSY
GOOD FLT

When the ejector turns by 90º, pull out the defective power supply.

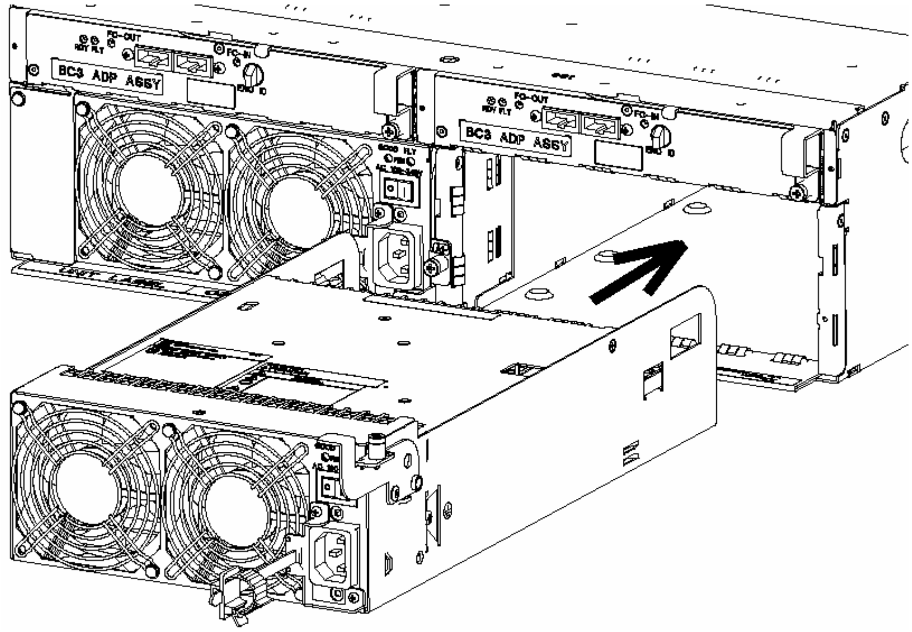
When the defective power supply comes out, guide it with both hands and slowly remove it.


FC-OUT
RDY FLT
FC-IN
BC3 ADP ASSY
ID

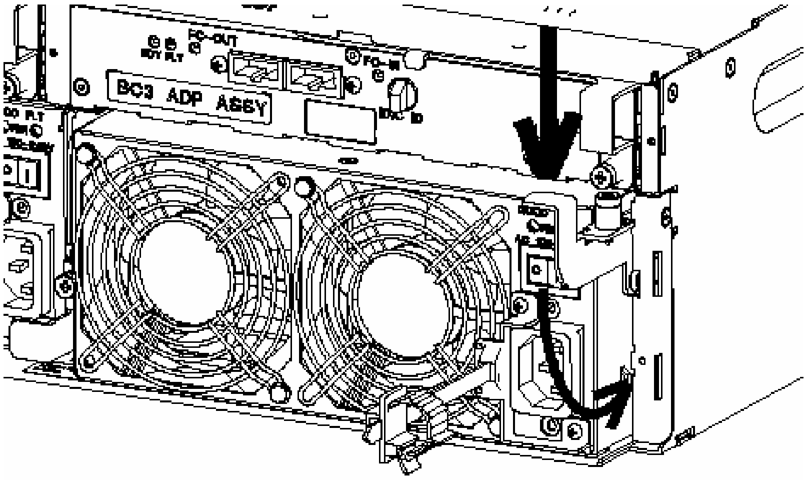

FC-OUT
RDY FLT
FC-IN
BC3 ADP ASSY
ID
FC-OUT
RDY FLT
FC-IN
BC3 ADP ASSY
ID

4. Confirm that the power switch of the new power supply for the disk enclosure is OFF and the power cord is disconnected from the power plug.

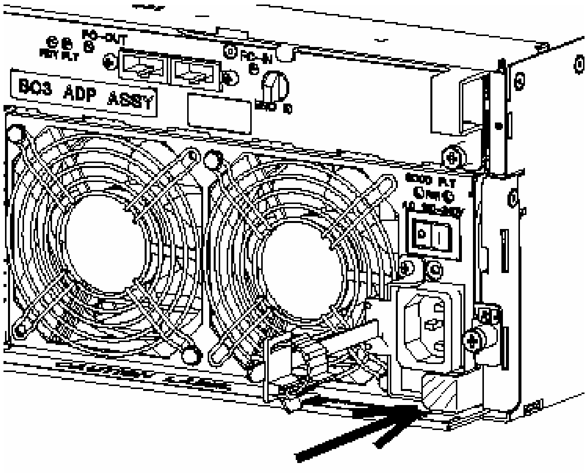
5. With the ejector pulled toward you, hold the new power supply for the disk enclosure with both hands and insert it into the slot.


BC3 ADP ASSY
FC-OUT
FC-IN
RDY FLT
ENC ID
GOOD FLT

6. Push the protrusion (shown in the figure) of the ejector to turn the ejector and push in the new power supply.


BC3 ADP ASSY
FC-OUT
FC-IN
RDY FLT
ENC ID

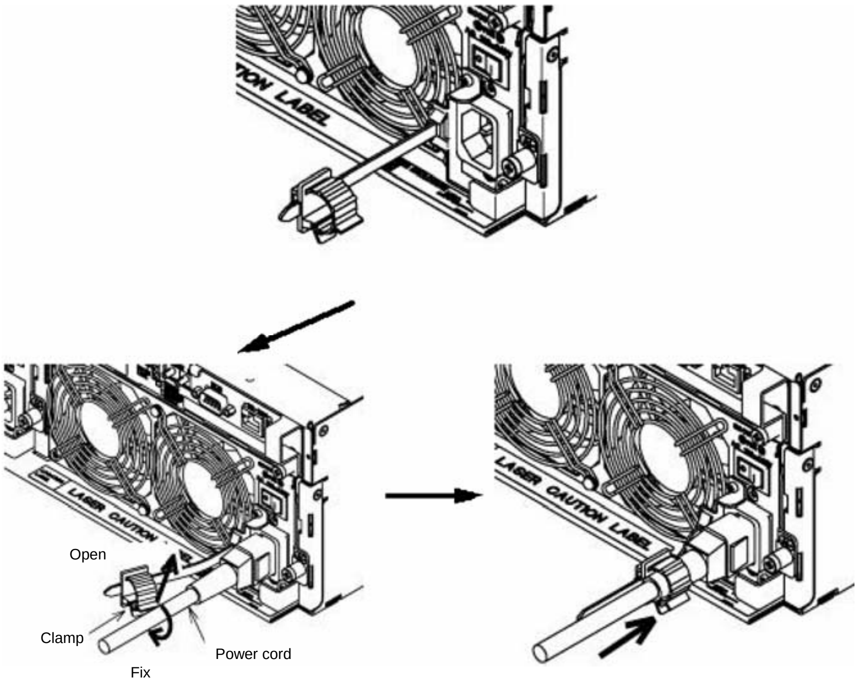
7. Strongly push the ejector (the part indicated by the arrow in the figure) until the new power supply for the disk enclosure is seated properly, and secure the ejector with the screw.



When inserting the power supply for the disk enclosure into the disk enclosure, push it as far as it will go and then secure it with the screws.

Incorrect insertion may cause a nother power supply failure.

8. Insert the receptacle of the power cord shipped with the FC/SATA disk enclosure into the power plug of the power supply for the disk enclosure. Extend the clamp section of the AC cable clamp, fit it to the AC cord, and lock the clamp section lightly. Then, move the clamp section toward the receptacle of the power cord to make a clamp at a point near the end of the plug. Securely lock the clamp section to avoid disconnection.



8.10 Replacement of an Adapter

If an adapter becomes defective, the SERVICE LED on the array controller lights orange. In addition, the SERVICE LED on the disk enclosure in which the defective adapter is installed and the FAULT LED on the defective adapter are lit orange.

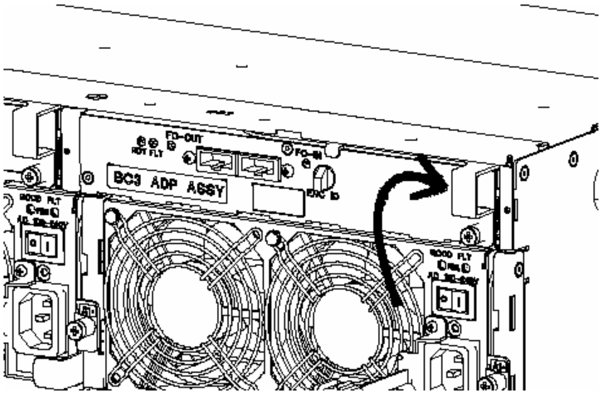
The defective adapter may be replaced while the powers of the array controller and disk enclosure remain ON.

<Replacement procedure>

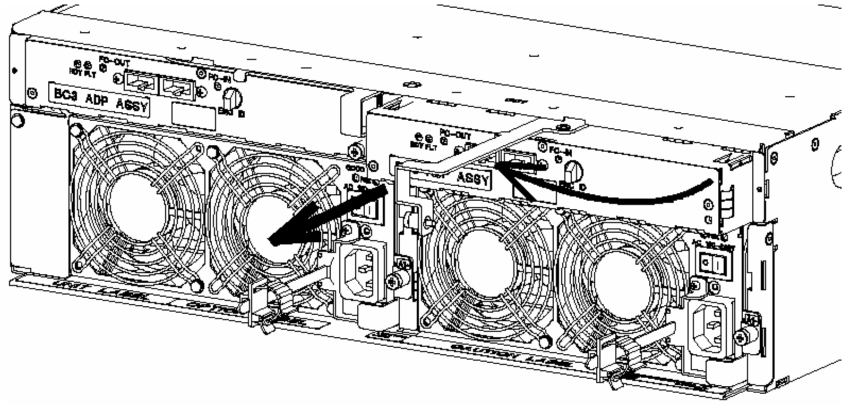
1. Identify the defective adapter with the FAULT LED on the adapter being lit.

   Remove all the cables connected to the defective adapter. Write down the connections between the cables to be removed and the mating connectors.

2. Loosen the screw securing the ejector, put your finger on the protrusion (shown in the figure) of the ejector, and pull it toward you.



3. Open the ejector pulling it by 90º, and then pull out the defected adapter.

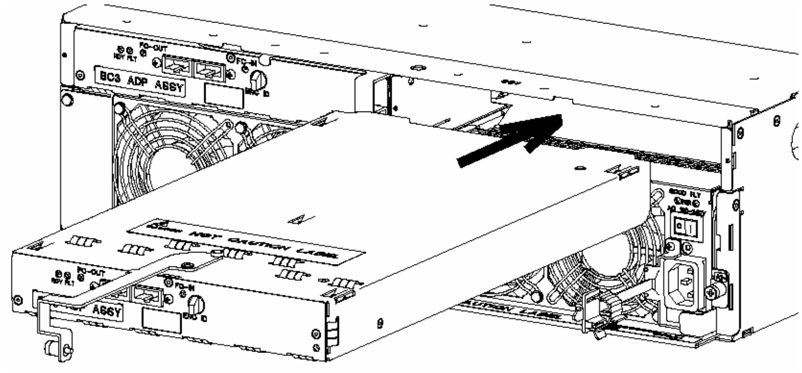


Be careful this may be hot.

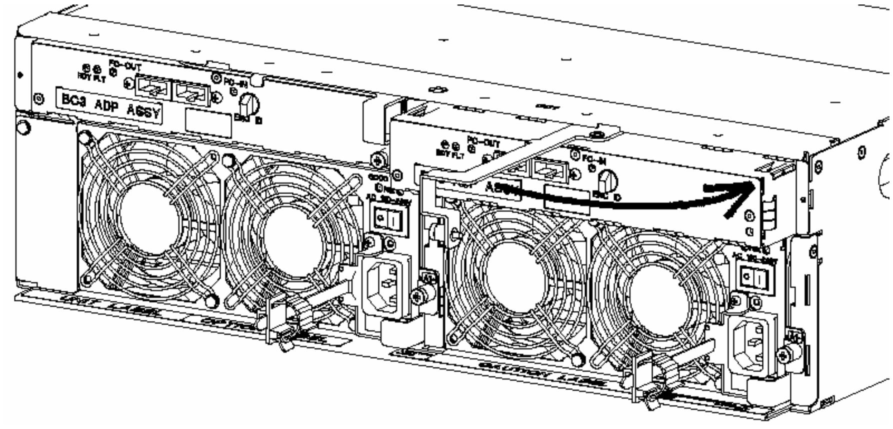
4. Set the ENC ID of the replacement adapter to be the same as that of the defective adapter.

Before replacing the adapter, make sure that the ENC ID switch of the adapter for replacement is set to the same value as that of the defective adapter. If the adapter is installed with a different ENC ID setting , a link failure may occur in the worst case.

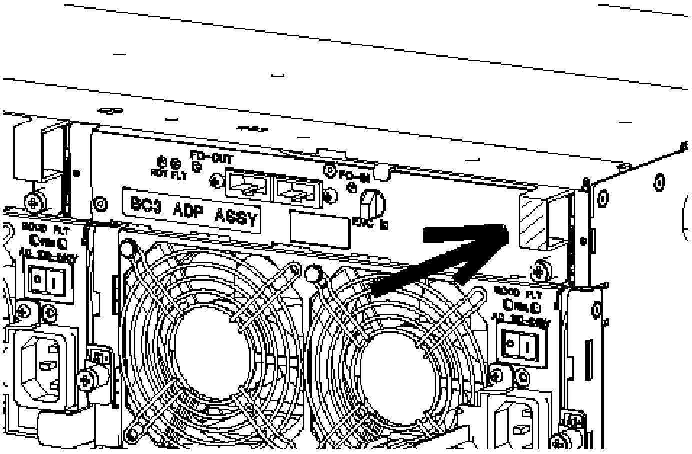
5. Insert the replacement adapter to the slot with the ejector remaining opened until the adapter is properly seated.


RDY FLT
FC-OUT
FC-IN
BC3 ADP ASSY
ENC ID
ASSY

6. Insert the adapter as far as it will go, and close the ejector.


RDY FLT
FC-OUT
FC-IN
BC3 ADP ASSY
ENC ID

7. Strongly push the ejector (the part indicated by the arrow in the figure) until the adapter is seated properly, and secure the ejector with the screw.

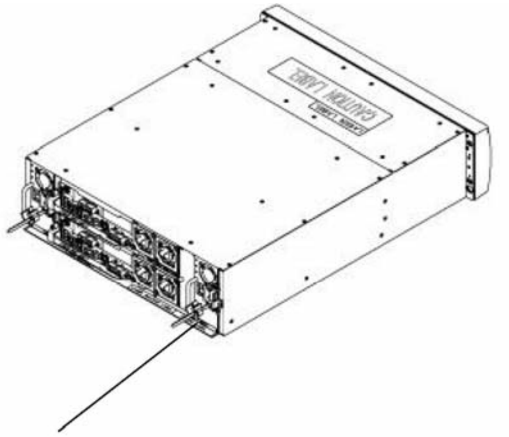


> When inserting the adapter into the disk enclosure, push it as far as it will go and then secure it with the screws.
>
> Incorrect insertion may cause a malfunction.

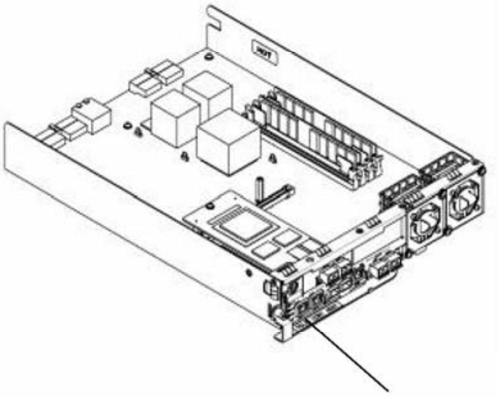
8. Connect the cables removed in step (1) to the mating connectors as before.

8.11 Model Name and Serial Numbers locations

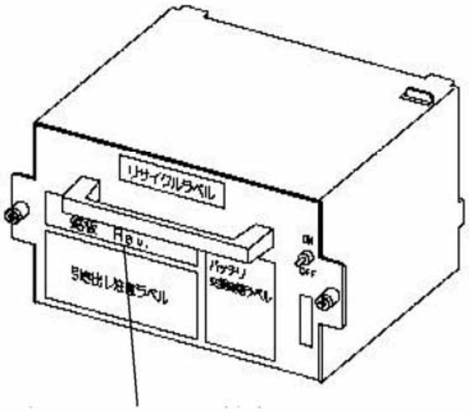
The model name and serial number of the disk array unit are shown at the locations in the figure below.


CAUTION LABEL

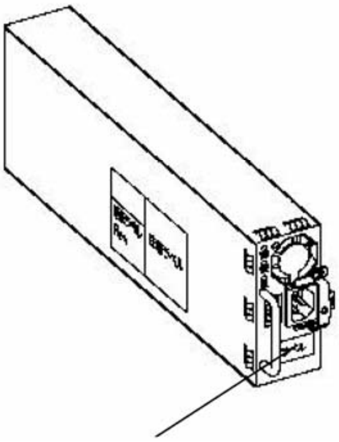
Manufacturing number label of array controller



Manufacturing number label of controller


リサイクルラベル
号機 Rev.
引出し注意ラベル
バッテリ交換時期ラベル
ON
OFF

Manufacturing number label of battery backup unit



Manufacturing number label of power supply for array controller

8.12 Preparations before Contacting technical Support

When you have any question or need to contact us regarding the occurrence of a fault or error on the unit, please make 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 nearby for easy reference.

8.13 Service and Support

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

8.14 Unit Life/Repair Service Period

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

Some components (e.g., cooling fans and battery backup units) of the disk array unit may have a shorter life than the unit as a whole. 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 , contact your maintenance service representative.

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

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

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

*1 Tocontinue using a disk array unit that has reached its service life, be sure to purchase a hardware maintenance contract, and have the disk array unit overhauled (at an additional cost). Overhauling of the unit is available only once.

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

9. Product Specifications

9.1 Basic Specifications of the Disk Array Unit

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

Hot spare feature	Provided
Host interface specification	FC-AL [Optical]
Data transfer rate of host interface	400 MB/S or 200 MB/S or 100 MB/S
Disk drive interface specification	FC-AL [Copper]

9.2 Optional Components

The table below shows the optional components available for the disk array unit.

P/N	Product name	Qty	Remarks
NF2900-SP02E	DE port	1	For 2 controllers
NF2900-SC01E	Cache memory	1	1GB ×4, 4GB → 8GB
NF2900-SC02E	Cache memory	1	2GB ×8, 4GB → 16GB
NF2900-SC03E	Cache memory	1	2GB ×8, 8GB → 16GB
NF2500-SE42E	FC disk enclosure for addition of disk array	1	Front panel: standard color
NF2500-SE82E	SATA disk enclosure for addition of disk array	1	Front panel: standard color
NF2500-SM413E	Additional FC disk drive	1	73GB/10,000rpm
NF2500-SM414E	Additional FC disk drive	1	147GB/10,000rpm
NF2500-SM415E	Additional FC disk drive		300GB/10,000rpm
NF2500-SM423E	Additional FC disk drive	1	73GB/15,000rpm
NF2500-SM424E	Additional FC disk drive	1	147GB/15,000rpm
NF2500-SM802E	Additional SATA disk drive	1	400GB/7200rpm
NF2500-SM803E	Additional SATA disk drive	1	500GB/7200rpm
NF9120-SJ34E	DE cable	1	HSSDC-HSSDCC cable (5m) × 2
NF9100-SK02E	Rack mount kit	1	For Sun StorEdge rack
NF9100-SK03E	Rack mount kit	1	For Express rack or old type
NF9100-SP21E	Power cord	1	For HP rack S1x00/S2x00
NF9100-SP31E	Power cord	1	Parallel bi-polar with ground line, for S1x00E/S2x00E
NF9310-SJ10E	FC conversion cable	1	LC-SC connector conversion cable (2m) × 2
NF9320-SJ01E	FC cable	1	LC-LC connector cable (5m) × 2
NF9320-SJ02E	FC cable	1	LC-LC connector cable (10m) × 2
NF9320-SJ03E	FC cable	1	LC-LC connector cable (20m) × 2
NF9320-SJ04E	FC cable	1	LC-LC connector cable (50m) × 2

9.3 Environmental Specifications

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

	Operating	Non-Operating [*2]
Ambient temperature	5°C to 40°C	–10°C to 60°C
Relative humidity [*1]	10% to 80%	5% to 80%
Allowable vibration level	0.25 G	0.5 G

*1 Without condensation
*2 The Non-Operating condition includes units packaged in original shipping cartons and stored units.

9.4 Power Specifications

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

	Array controller	Disk enclosure
Input voltage	100 to 240 VAC ±10%, 50/60 Hz	
Maximum power consumption	330 VA	520 VA

9.5 External Dimensions and Weight

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

	Array controller	Disk enclosure
Width	482 mm	482 mm
Height	131 mm (3U)	131 mm (3U)
Depth (including front mask)	596 mm	596 mm
Weight (in the maximum configuration)	Approx. 36 kg	Approx. 45 kg

9.6 Life Expectancies of Components

Battery backup unit	5 years
Fan	50,000 hours

Appendix A Features of the Disk Array Unit

1. Battery Backup

The disk array unit retainsdata cached in memory with a battery while the power is OFF.

Accordingly, in anticipation of a power OFF state of longer than the battery hold period, it is necessary to write data remaining in the 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 battery hold period is exceeded, the following operation will be done. In this case, the cache data is lost. The data must be recovered from backup data

1) At the first start, the SERVICE LED repeats a 5-sec flashing/7-sec OFF sequence. 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.

2. Repair Time

The repair time is set to 12 hours by default. The repair time can be set in the range from 0 (fastest) to 24 hours. Depending on the disk capacity, the repairs may not terminate within the defined time.

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

3. Logical Disk Capacity

3.1 Arbitrary Logical Disk Capacity

An arbitrary logical disk capacity can be bound by using the NEC Storage Manager software.

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

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

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 NEC Storage Manager..

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

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.

Dedicated software (AccessControl - NEC Storage S2900), which is purchased separately, is necessary for using the access control feature. 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 setting changess by yourself.

An NEC maintenance service representative may provide the installation service (at an additionall charg) 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 World Wide Name (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.

To use this feature, the specific software "DynamicDataReplication - NEC Storage S2900" 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 setting changes by yourself.

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

6. Remote Data Replication

This feature creates the replication of a logical disk between units. To create the replication, the source logical disk must have the same capacity as the destination disk.

To use this feature, the specific software "Remote DataReplication - NEC Storage S2900" 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 setting changes by yourself.

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

7. Miscellaneous Settings

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

- Time in disk array
- Setting of POOLs
- Setting of logical disks
- Setting of spare disks
- 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.

8. Various Default Values

Access Control	Off

Dynamic Data Replication Off

Remote Data Replication Off

9. Notes on Use of DynamicDataReplication/ Remote DataReplication

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

- The holding of cache memory data by the battery backup unit in AC-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.

10.Setting of the OS Type

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

If a host containing several kinds of operating systems is connected to one port, use“ACCESS CONTROL WWN mode”.

The OS type can be set with the "Configuration Setting" utility of NEC Storage Manager.

In the WWN mode, use "LD Set Type" froom within NEC Storage Manager to specify the OS.

11.NEC Storage BaseProduct software

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

NEC Storage BaseProduct - NEC Storage S2900

To use the disk array unit, release the license lock using the license code that is provided with the" NEC Storage BaseProduct - NEC Storage S2900" During the installation of the disk array unit.

license code is provided the" -

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 will not function properly.

Other NEC software products are available for the disk array unit, ask your sales representative For more information.

12.Updating of Control Software

When you update the control software, such as adding Dynamic Data Replication/ Remote Data Replication , you must always update the software version of the application server where the software is stored as well.

You can update the storage control software by yourself. However, if you fail to update all versions, the disk array unit can no longer operate properly.

An NEC maintenance service representative may provide the service (at an additional 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.

13.Snap Shot

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

The following specific software (available optionally) is necessary for using the Snap Fhot feature. NEC Storage S2500/S1500 contains the Dynamic Data Replication and Snap Shot as paired package.

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

Before the 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 setting changes by yourself.

An NEC maintenance service representative may provide the installation service (at an additional charge) for releasing the license lock and changing settings. Contact your maintenance service representative if necessary.

13.1 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 in the cache memory. Thus, if the disk array unit is turned OFF and the time limit for holding data by batteries is exceeded, processing for creating the management information of the difference data is performed upon the next system start. As a result, the system startup is delayed depending on the difference data held by Snap Shot. (Delay time: About 10 minutes per 1TB of difference data)

So, to avoid the huge delay at next system startup with fully a discharged battery, please begin the shutdown process by pushing the Shutdown button before the power to the disk array unit is turned OFF. As the management information of the difference data will be stored on hard disk by proper execution of shutdown process, the delay of the next system startup with fully discharged battery will be reduced considerably.

Appendix B Installation Procedure

1. Creation of Logical Disks

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

The following procedure is required to create a logical disk.

- Bind the logical disk.

1.1 Binding Logical Disk

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

The POOL bind requires the specification of a RAID level. Select the RAID level carefully because it has certain influences on system performance and capacity. See Section 2.4"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 of the RAID. See "3. Logical Disk Capacity" in Appendix A for details.

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

Appendix C Use of a Maintenance PC

1. Initialization by Maintenance PC

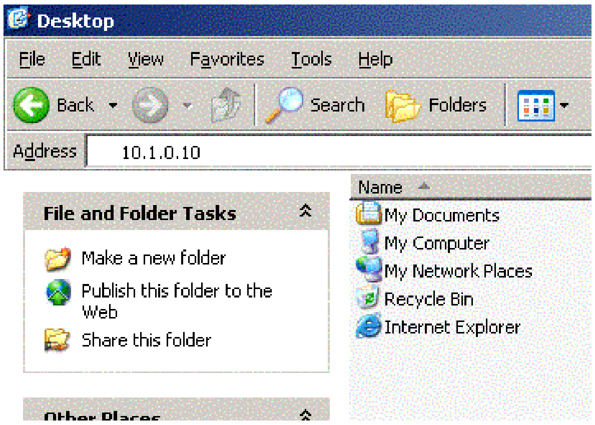
NOTES:

- 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 a Maintenance PC

1. To connect a PC to NF2900, the PC must include the 100/10Base interface and Internet Explorer Version5.0 or higher.
2. Connect the PC to NF2900 in the one-to-one mode. Connection via a hub may be possible. However, because the IP and MAC addresses are fixed, a connection to such an environment as LAN may cause a malfunction to occur.
3. Set the PC on network 10.1.0.xxx/255.255.255.0 (xxx should be set 1 –254 decimal value except for 10 or 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 port is used by the NEC Storage Manager.)


Desktop
File
Edit
View
Favorites
Tools
Help
Back
Search
Folders
Name
File and Folder Tasks
Make a new folder
Publish this folder to the Web
Share this folder
Other Places
My Documents
My Computer
My Network Places
Recycle Bin
Internet Explorer

Address 10.1.0.10

5. For connection to CONT0 (lower controller board), enter 10.1.0.10 in the address field after browser is started. Enter 10.1.0.10 for connection to CONT1.
6. At the next screen select Option at the lower left corner of the screen and enter "DE" using uppercase letters on the Password Input screen.
7. After the input, press the SET button. Then update the screen by using the Update or Refresh feature of the browser. All the features on the left side of the screen will become available.

Notes:

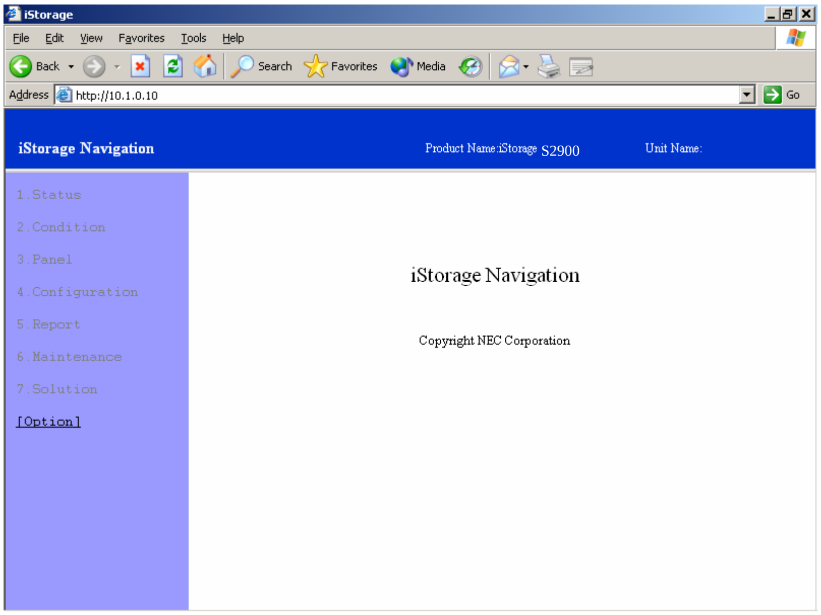
1. Because the IP and MAC addresses of the MNT's Ether port are set as described above, do not connect the port to any LAN and WAN.
2. The amber LED to the right of the Ether port is lit when the port is in the TCP connection state.

   If theMaintenance PC does not connect, please check the items below:.

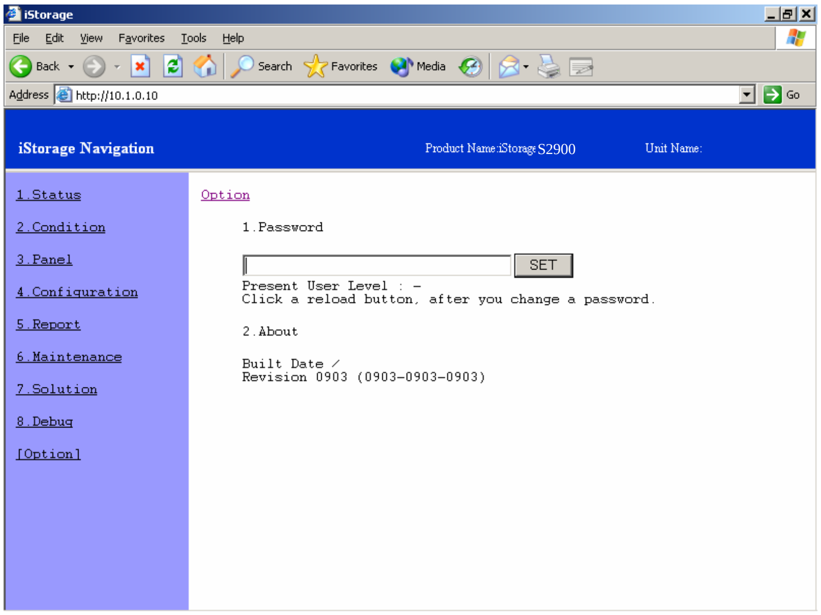
   ・The correct IP Address has been entered into the PC.

   ・The proper "proxy" is used by Internet Explorer

   After checking these items, attempt to connect, again. If the condition has not cleared, contact your service personnel.


iStorage
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://10.1.0.10
Go
iStorage Navigation
Product Name:iStorage S2900
Unit Name:
1.Status
2.Condition
3.Panel
4.Configuration
5.Report
6.Maintenance
7.Solution
[Option]
iStorage Navigation
Copyright NEC Corporation

Select [Option].


iStorage
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://10.1.0.10
Go
iStorage Navigation
Product Name:iStorage S2900
Unit Name:
1.Status
2.Condition
3.Panel
4.Configuration
5.Report
6.Maintenance
7.Solution
8.Debug
[Option]
SET

Option

1.Password

Present User Level : -
Click a reload button, after you change a password.

2.About

Built Date /
Revision 0903 (0903-0903-0903)

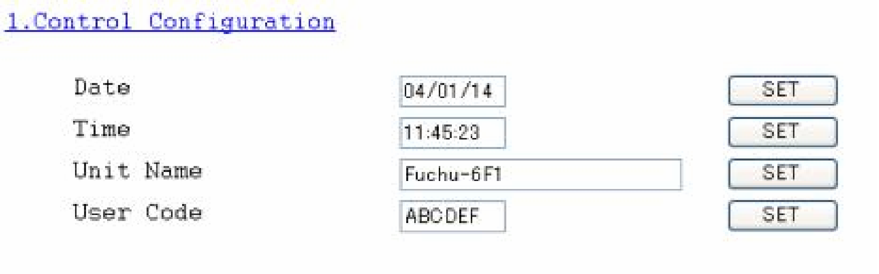
Enter "DE" in "1.Password." (Uppercase letters must be entered.) , then press Set .The browser is then updated.

1.2 Configuration

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

1.2.1 Control Configuration

Select "4.Configuration" → "1.Control Configuration." Then set the following items.


SET
SET
SET
SET

1.Control Configuration

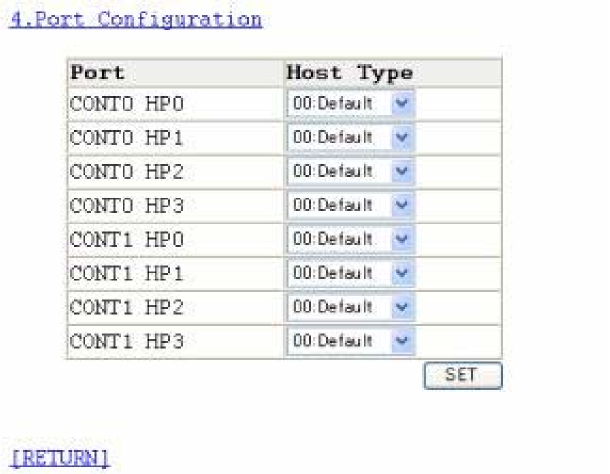
Date 04/01/14
Time 11:45:23
Unit Name Fuchu-6F1
User Code ABCDEF

Date	Current year, month, and date (Format: YY/MM/DD)
Time	Current time (Format: HH:MM:SS)
Unit Name	Unit name After changing the unit name, refresh the browser. The unit name on the screen and those of network properties SNMP Property#0 and SNMP Property#1 will be changed. To make SNMP Property#0 and SNMP Property#1 different from each other,

	set the Network Property first.
	This can be any value of up to 32 ASCII characters.
User Code	User code
	Set the user code used by the ALIVE feature of the NEC Storage Manager software.

1.2.2 Port Configuration

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



4.Port Configuration

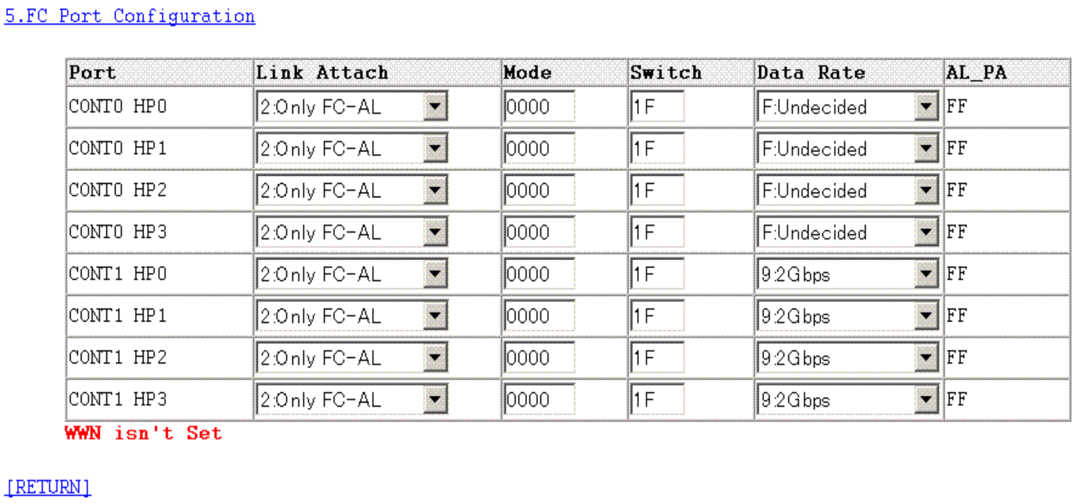
Port	Host Type
CONT0 HP0	00:Default
CONT0 HP1	00:Default
CONT0 HP2	00:Default
CONT0 HP3	00:Default
CONT1 HP0	00:Default
CONT1 HP1	00:Default
CONT1 HP2	00:Default
CONT1 HP3	00:Default

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(A4)
	02: ACOS2(A2)	80: Windows(WN)
	81: Windows(WN)	88: Solaris(CX)
	89: Linux(LX)	8A:AIX(AX)
	8B:HP-UX(NX)	8D:SUPER-UX(SX)

Select "80:Windows" for Windows. (Do not use "81:Windows.")

1.2.3 FC Port Configuration

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



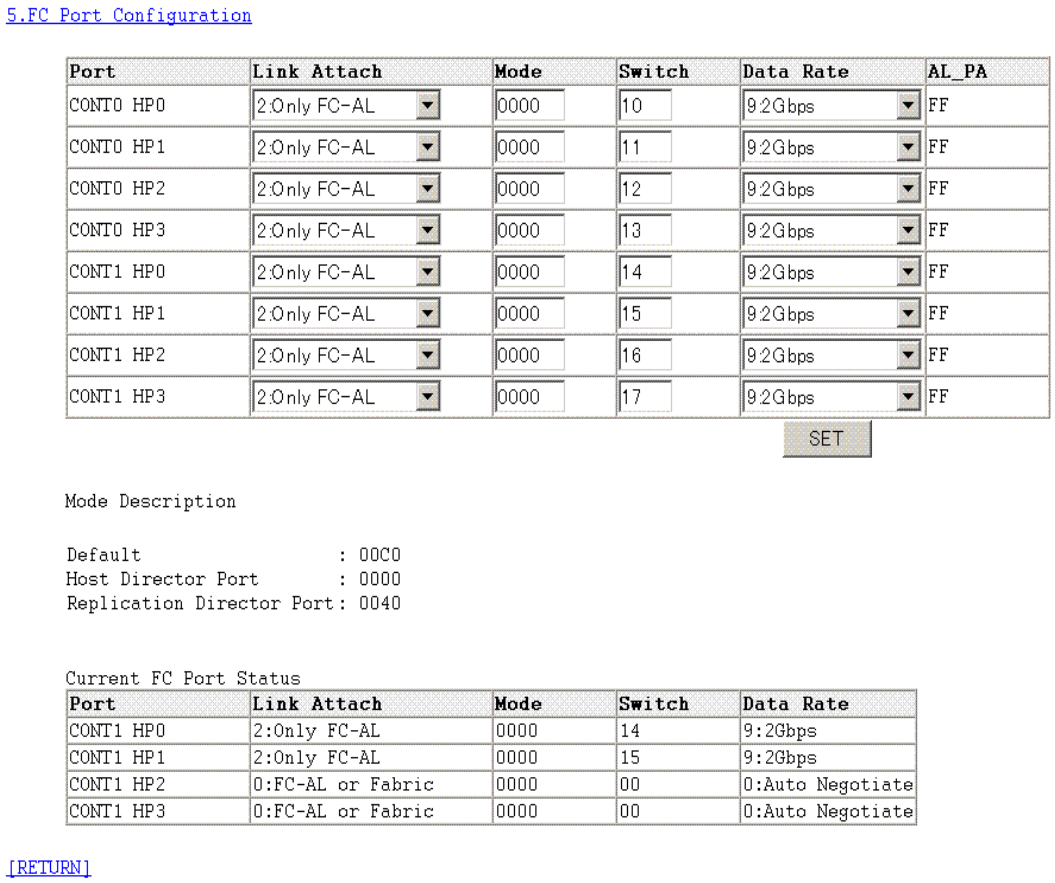
5.FC Port Configuration

Port	Link Attach	Mode	Switch	Data Rate	AL_PA
CONT0 HP0	2:Only FC-AL	0000	1F	F:Undecided	FF
CONT0 HP1	2:Only FC-AL	0000	1F	F:Undecided	FF
CONT0 HP2	2:Only FC-AL	0000	1F	F:Undecided	FF
CONT0 HP3	2:Only FC-AL	0000	1F	F:Undecided	FF
CONT1 HP0	2:Only FC-AL	0000	1F	9:2Gbps	FF
CONT1 HP1	2:Only FC-AL	0000	1F	9:2Gbps	FF
CONT1 HP2	2:Only FC-AL	0000	1F	9:2Gbps	FF
CONT1 HP3	2:Only FC-AL	0000	1F	9:2Gbps	FF

WWN isn't Set

[RETURN]

When WWN is not defined



5.FC Port Configuration

Port	Link Attach	Mode	Switch	Data Rate	AL_PA
CONT0 HP0	2:Only FC-AL	0000	10	9:2Gbps	FF
CONT0 HP1	2:Only FC-AL	0000	11	9:2Gbps	FF
CONT0 HP2	2:Only FC-AL	0000	12	9:2Gbps	FF
CONT0 HP3	2:Only FC-AL	0000	13	9:2Gbps	FF
CONT1 HP0	2:Only FC-AL	0000	14	9:2Gbps	FF
CONT1 HP1	2:Only FC-AL	0000	15	9:2Gbps	FF
CONT1 HP2	2:Only FC-AL	0000	16	9:2Gbps	FF
CONT1 HP3	2:Only FC-AL	0000	17	9:2Gbps	FF

Mode Description

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

Current FC Port Status

Port	Link Attach	Mode	Switch	Data Rate
CONT1 HP0	2:Only FC-AL	0000	14	9:2Gbps
CONT1 HP1	2:Only FC-AL	0000	15	9:2Gbps
CONT1 HP2	0:FC-AL or Fabric	0000	00	0:Auto Negotiate
CONT1 HP3	0:FC-AL or Fabric	0000	00	0:Auto Negotiate

[RETURN]

When WWN is defined

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 a setting for your Switch. See Table 1.2.2 for the additional rule on loop ID. See Table 1.2.1 for the relation between the Switch setting value and AL_PA.
Data Rate	Set the data rate of the FC link. (Select a proper value from the pull-down menu.) 0:Auto Negotiate 8:1Gbps 9:2Gbps A:4Gbps F:Undecided **Select "8" or "9."or”A”**
AL_PA	Indicates AL_PA.

Table 1.2.1 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 you 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 powering OFF/ON. See Section 2.3.

Table 1.2.2 Additional Rules on Switch Value (Loop ID)

Applicable HOST (OS)	Additional loop ID rule
ACOS connection port	Basic value: 1Fh. Set to –1 if loop duplication occurs.
NX connection port	Basic value: 0Fh. Set to –1 if loop duplication occurs.
Windows NT4.0/Windows2000 /Solaris/Linux/AIX	Basic value: 10h. Set to +1 if loop duplication occurs.
Miscellaneous	Conforms to the additional rule in the server if any. The basic value is "10h" if no additional rule is defined in the server. Set to +1 if loop duplication occurs.

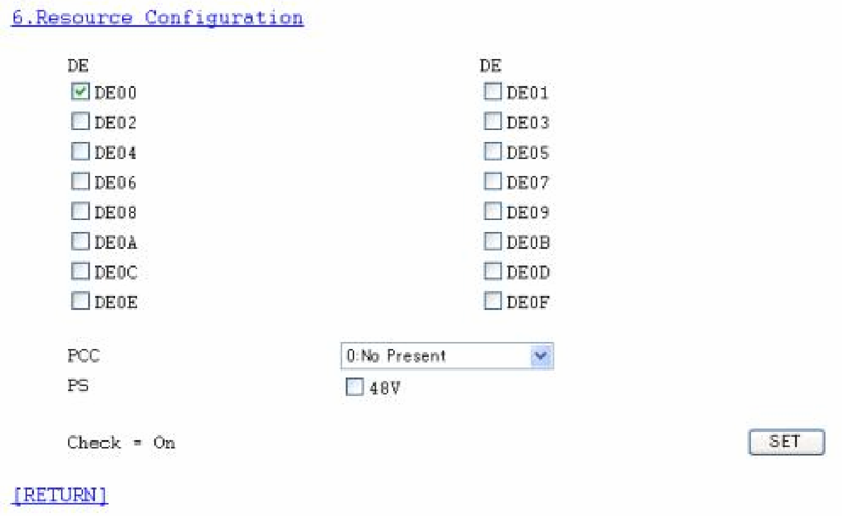
The rule above may be changed depending on the system configuration on the user side.

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

1.2.4 Resource Configuration

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

When there is no configuration information in the system disk.



6.Resource Configuration

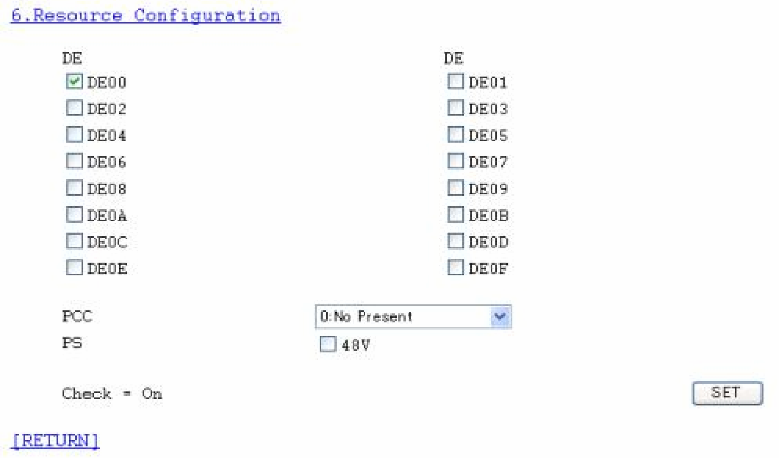
DE	DE
☑ DE00	☐ DE01
☐ DE02	☐ DE03
☐ DE04	☐ DE05
☐ DE06	☐ DE07
☐ DE08	☐ DE09
☐ DE0A	☐ DE0B
☐ DE0C	☐ DE0D
☐ DE0E	☐ DE0F

PCC 0:No Present

PS ☐ 48V

Check = On

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



6.Resource Configuration

DE	DE
☑ DE00	☐ DE01
☐ DE02	☐ DE03
☐ DE04	☐ DE05
☐ DE06	☐ DE07
☐ DE08	☐ DE09
☐ DE0A	☐ DE0B
☐ DE0C	☐ DE0D
☐ DE0E	☐ DE0F

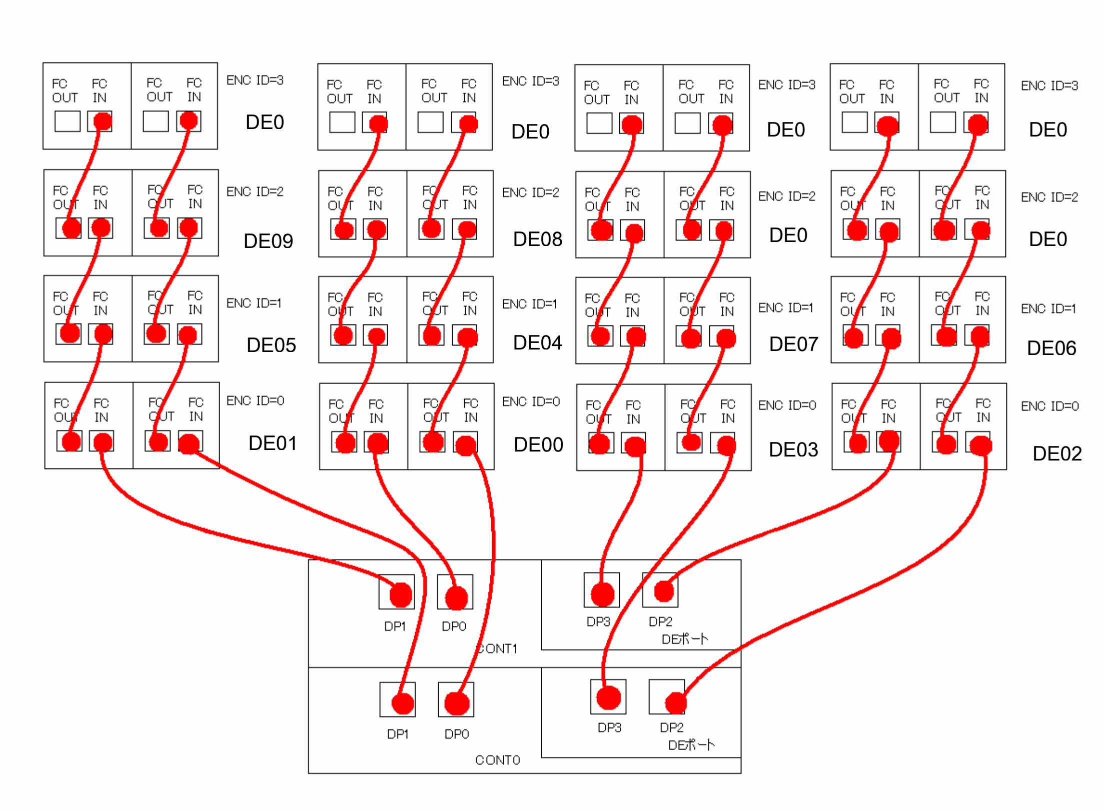
PCC 0:No Present

PS ☐ 48V

Check = On

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

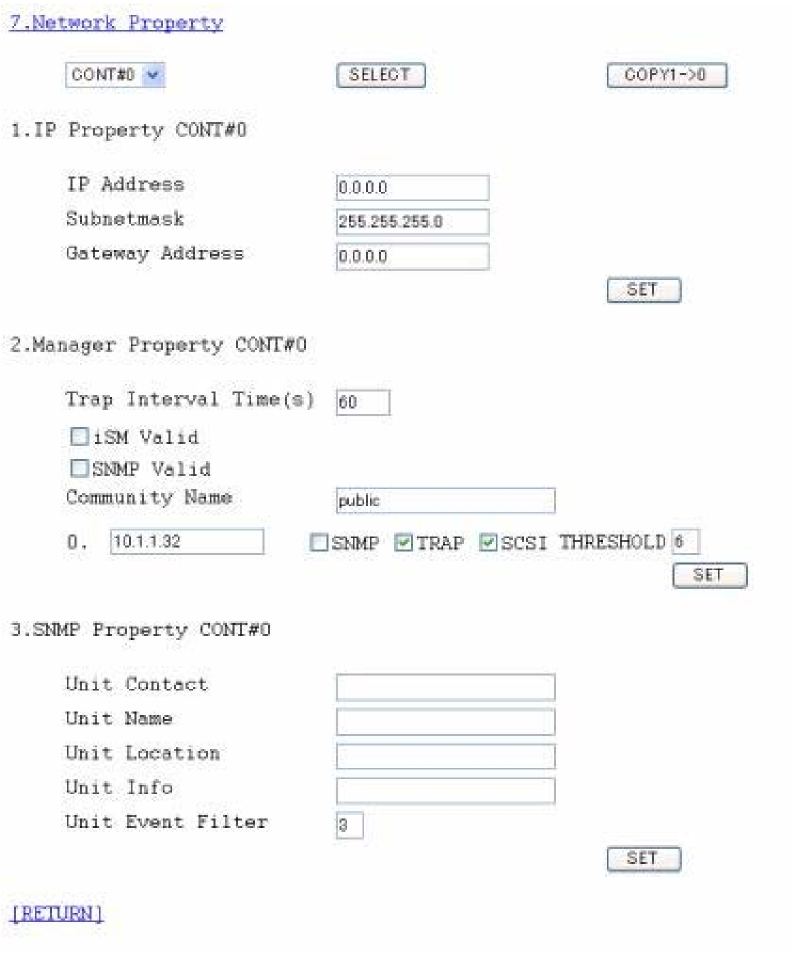
DE00 – DE0F	DE number
PCC	PCC mode 0: No present 3: UPS IF/AOC IF/SCBI (PCC-USN) **NF2900-SR40E: Always select "3."**


FC OUT
FC IN
ENC ID=3
DE0
ENC ID=2
DE09
ENC ID=1
DE05
ENC ID=0
DE01
ENC ID=3
DE0
ENC ID=2
DE08
ENC ID=1
DE04
ENC ID=0
DE00
ENC ID=3
DE0
ENC ID=2
DE0
ENC ID=1
DE07
ENC ID=0
DE03
ENC ID=3
DE0
ENC ID=2
DE0
ENC ID=1
DE06
ENC ID=0
DE02
DP1
DP0
CONT1
DP3
DP2
DEポート
DP1
DP0
DP3
DP2
DEポート
CONT0

DE Location View

1.2.5 Network Property

Select "4.Configuration" → "7.Network Property" to set the following items.



7.Network Property

1.IP Property CONT#0

IP Address: 0.0.0.0
Subnetmask: 255.255.255.0
Gateway Address: 0.0.0.0

2.Manager Property CONT#0

Trap Interval Time(s): 60
☐ iSM Valid
☐ SNMP Valid
Community Name: public
0. 10.1.1.32 ☐ SNMP ☑ TRAP ☑ SCSI THRESHOLD 6

3.SNMP Property CONT#0

Unit Contact:
Unit Name:
Unit Location:
Unit Info:
Unit Event Filter: 3

Set the network property. For the network control parts #0 and #1, the same values are set.

CONT#0/CONT#1	Select the CONT whose settings are to be viewed.
SELECT	After the selection, click SELECT to determine it.
COPY1->0/COPY0->1	Set the network properties having been set to 1 or 0 are set to either all 0s or all 1s and save the values. The IP property is also saved.

(1) IP Property

IP Address	LAN IP Address
Subnetmask	LAN Subnetmask
Gateway Address	LAN Gateway Address
SET	Determines the IP property.

(2) Manager Property

Trap Interval Time(s)	Set the interval for collecting information on SNMP trap in the range of 3 – 60 seconds. (Default: 20 sec)
iSM Valid	Makes iSM effective unconditionally (ON if checked). Make accessible from iSM without manager registration
SNMP Valid	Makes SNMP effective (ON if checked).
Community Name	Read permission for SNMP and community name of trap (default value: public)
0. 0.0.0.0	Registers accessible managers (up to 8).
SNMP	Check this to make accessible from SNMP manager.
TRAP	Check this to report SNMP trap.
SCSI	Check this to make accessible from iSM.
THRESHOLD	Set the threshold of SNMP trap to be reported to registered managers. (Set 6 if not specified especially.)
SET	Determine the Manager Property.

(3) SNMP Property

Unit Contact	Contact on management (Default: NULL)
Unit Name	Name of agent management destination (Default: NULL) Run browser update after modification
Unit Location	Unit installation location (Default: NULL)
Unit Info	Unit management information (Default: NULL)
Unit Event Filter	Threshold of event level to be registered to event table (Default=6)
SET	Determine the SNMP Property.

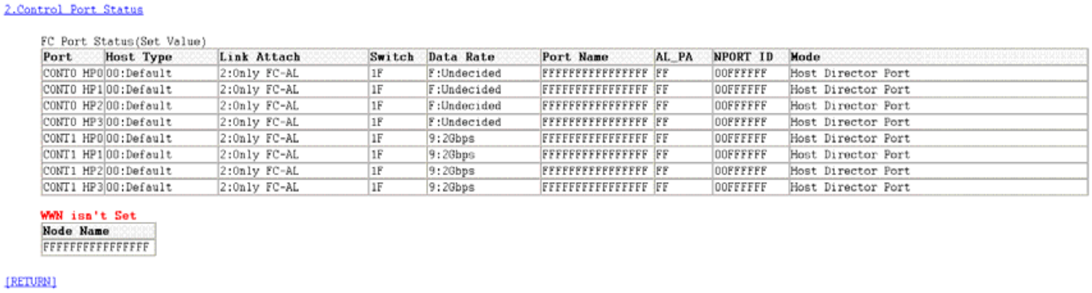
2. Confirmation of Unit Setup

Make sure that all the disk drives are started (READY LEDs lit) and the POWER LEDs on the front faces of both the Disk Array Unit and the Disk Enclosure are lit. Also make sure that the SVP/DIR LED on the rear face of the Disk Array Unit blinks.

Then start the Maintenance PC according to Section 1.2.

2.1 Confirmation of FC Port Configuration

Select [1.Status] → [2..Control Port Status] to confirm the settings of FC Port Configuration.



2.Control Port Status

FC Port Status(Set Value)

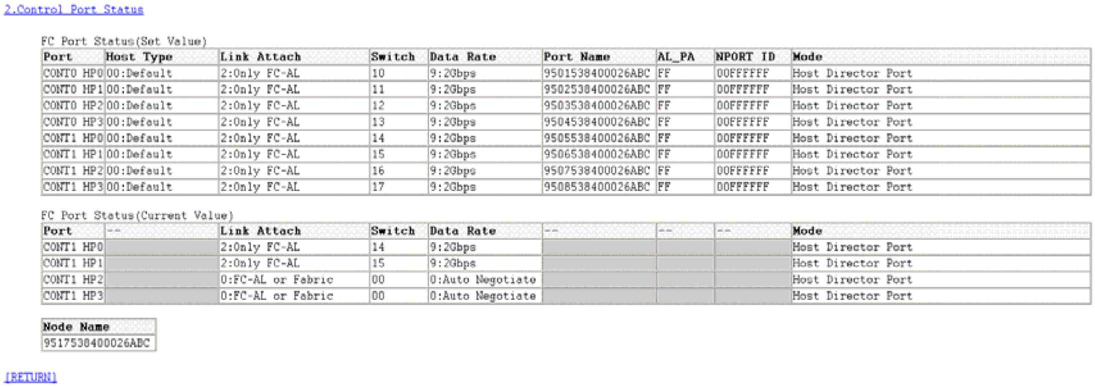
Port	Host Type	Link Attach	Switch	Data Rate	Port Name	AL_PA	NPORT ID	Mode
CONT0 HP0	00:Default	2:Only FC-AL	1F	F:Undecided	FFFFFFFFFFFFFFFF	FF	00FFFFFF	Host Director Port
CONT0 HP1	00:Default	2:Only FC-AL	1F	F:Undecided	FFFFFFFFFFFFFFFF	FF	00FFFFFF	Host Director Port
CONT0 HP2	00:Default	2:Only FC-AL	1F	F:Undecided	FFFFFFFFFFFFFFFF	FF	00FFFFFF	Host Director Port
CONT0 HP3	00:Default	2:Only FC-AL	1F	F:Undecided	FFFFFFFFFFFFFFFF	FF	00FFFFFF	Host Director Port
CONT1 HP0	00:Default	2:Only FC-AL	1F	9:2Gbps	FFFFFFFFFFFFFFFF	FF	00FFFFFF	Host Director Port
CONT1 HP1	00:Default	2:Only FC-AL	1F	9:2Gbps	FFFFFFFFFFFFFFFF	FF	00FFFFFF	Host Director Port
CONT1 HP2	00:Default	2:Only FC-AL	1F	9:2Gbps	FFFFFFFFFFFFFFFF	FF	00FFFFFF	Host Director Port
CONT1 HP3	00:Default	2:Only FC-AL	1F	9:2Gbps	FFFFFFFFFFFFFFFF	FF	00FFFFFF	Host Director Port

WWN isn't Set

Node Name
FFFFFFFFFFFFFFFF

[RETURN]

When WWN is not defined



2.Control Port Status

FC Port Status(Set Value)

Port	Host Type	Link Attach	Switch	Data Rate	Port Name	AL_PA	NPORT ID	Mode
CONT0 HP0	00:Default	2:Only FC-AL	10	9:2Gbps	9501538400026ABC	FF	00FFFFFF	Host Director Port
CONT0 HP1	00:Default	2:Only FC-AL	11	9:2Gbps	9502538400026ABC	FF	00FFFFFF	Host Director Port
CONT0 HP2	00:Default	2:Only FC-AL	12	9:2Gbps	9503538400026ABC	FF	00FFFFFF	Host Director Port
CONT0 HP3	00:Default	2:Only FC-AL	13	9:2Gbps	9504538400026ABC	FF	00FFFFFF	Host Director Port
CONT1 HP0	00:Default	2:Only FC-AL	14	9:2Gbps	9505538400026ABC	FF	00FFFFFF	Host Director Port
CONT1 HP1	00:Default	2:Only FC-AL	15	9:2Gbps	9506538400026ABC	FF	00FFFFFF	Host Director Port
CONT1 HP2	00:Default	2:Only FC-AL	16	9:2Gbps	9507538400026ABC	FF	00FFFFFF	Host Director Port
CONT1 HP3	00:Default	2:Only FC-AL	17	9:2Gbps	9508538400026ABC	FF	00FFFFFF	Host Director Port

FC Port Status(Current Value)

Port	--	Link Attach	Switch	Data Rate	--	--	--	Mode
CONT1 HP0		2:Only FC-AL	14	9:2Gbps				Host Director Port
CONT1 HP1		2:Only FC-AL	15	9:2Gbps				Host Director Port
CONT1 HP2		0:FC-AL or Fabric	00	0:Auto Negotiate				Host Director Port
CONT1 HP3		0:FC-AL or Fabric	00	0:Auto Negotiate				Host Director Port

Node Name
9517538400026ABC

[RETURN]

When WWN is defined

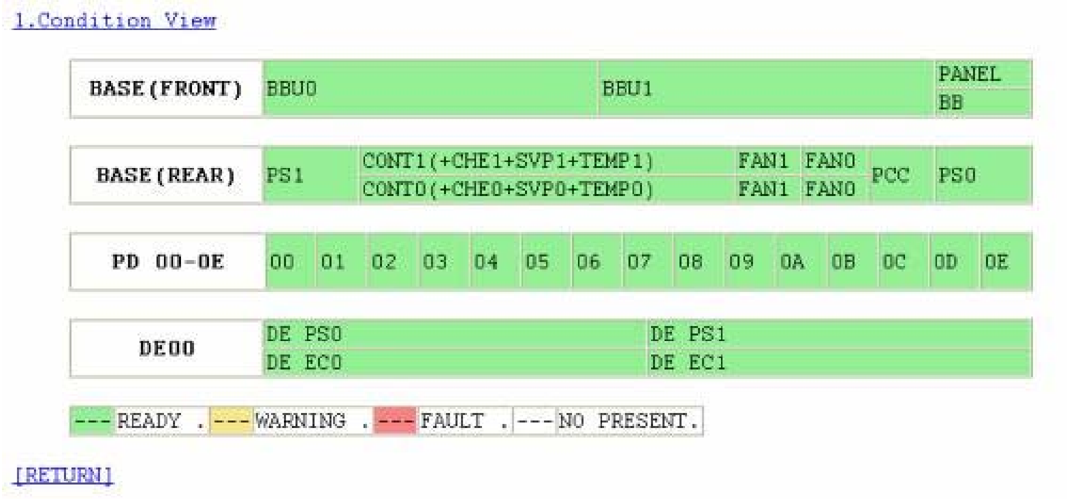
This function displays the FC Port status. The displayed items are as follows:

Port	Port name (setting value)
Host Type	Host type (setting value)
Link Attach	Setting value for Topology of Link
Switch	Setting value for Switch
Data Rate	Setting value for Data Rate on FC Link

Port Name	Port name (setting value)
AL_PA	AL_PA status value
NPORT ID	NPORT ID status value
Mode	The set information is displayed with characters.
Node Name	xxxxb yyyyb zzh vvvvvvh (factory setting) Format defined in the specifications: IEEE Extended format (xxxxb=0010b、yyyyb=0000b、zzh=00h)

2.2 Confirmation of Base Product Setting

Select [2.Condition] → [1.Condition View] to confirm the resources being set.



1.Condition View

BASE(FRONT) BBU0 BBU1 PANEL BB

BASE(REAR) PS1 CONT1(+CHE1+SVP1+TEMP1) CONT0(+CHE0+SVP0+TEMP0) FAN1 FAN1 FAN0 FAN0 PCC PS0

PD 00-0E 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E

DE00 DE PS0 DE EC0 DE PS1 DE EC1

🟩---READY . 🟨---WARNING . 🟥---FAULT . ---NO PRESENT.

[RETURN]

The resource states are distinguished by using different colors to be displayed graphically:

Maintenance required	Red
State transition	Yellow
Normal operation	Green
No installation	White

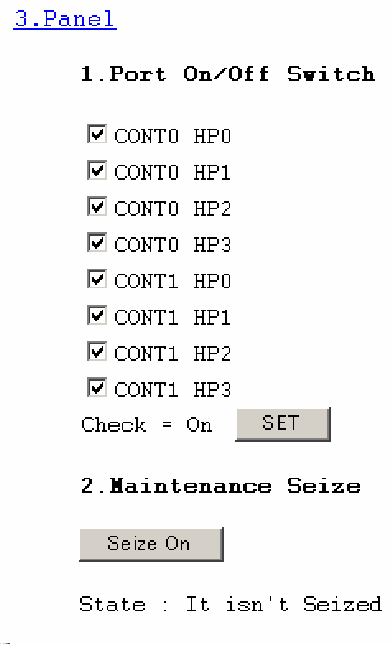
CONT0/CONT1 should be ready (green).

During lock, CONT0/CONT1 are entered into the fault state (red).

2.3 Activation on Modification of FC Port Configuration

If any of the items described in "1.3.4.3 FC Port Configuration" is modified, 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.



3.Panel

1.Port On/Off Switch

☑ CONT0 HP0
☑ CONT0 HP1
☑ CONT0 HP2
☑ CONT0 HP3
☑ CONT1 HP0
☑ CONT1 HP1
☑ CONT1 HP2
☑ CONT1 HP3

Check = On

2.Maintenance Seize

State : It isn't Seized

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

Port On/Off Switch	Feature of Port On/Off with host (Only mounting ports appear.)			
	CONT0 HP0	CONT0 HP1	CONT0 HP2	CONT0 HP3
	CONT1 HP0	CONT1 HP1	CONT1 HP2	CONT1 HP3

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.

Appendix D Installing theUnit into a Rack

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

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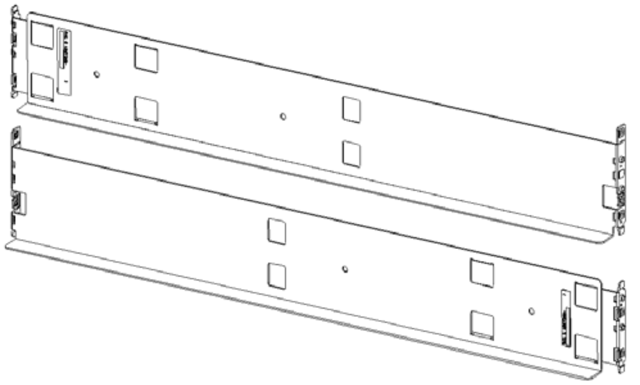
NOTE: NEC Storage rack indicates one of the followings:

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

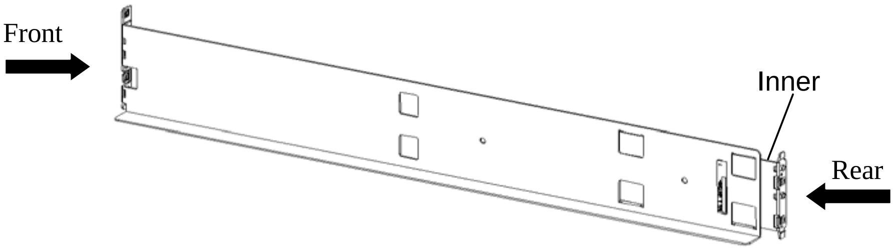
1.1 Installing Unit with a New Universal Rack Mount Kit

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



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

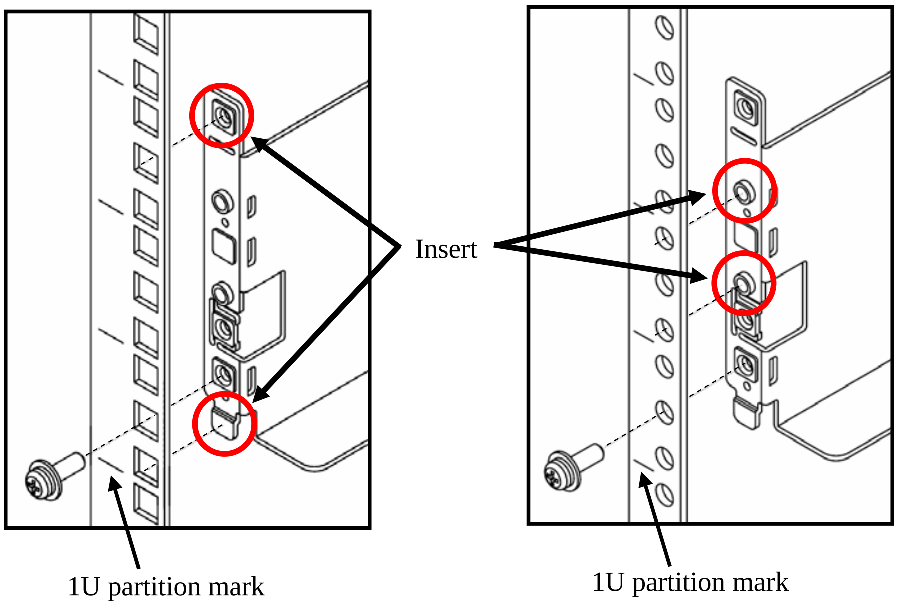


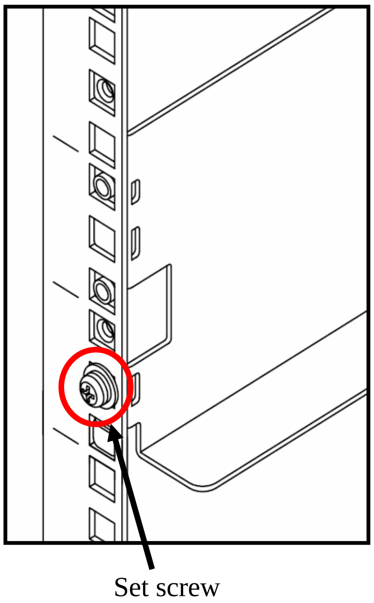
3. Align the bottom of the rail with the 1U mark and insert the top and bottom projections into

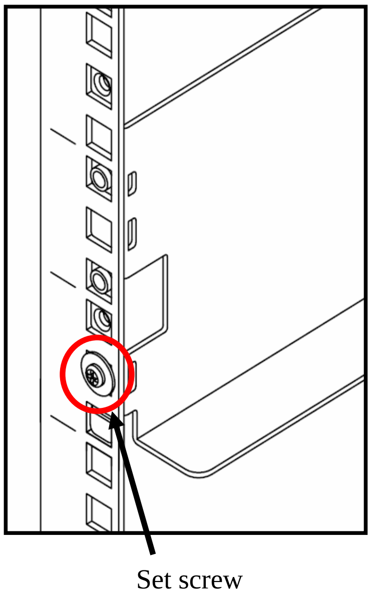
the holes on the front of the rack.

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

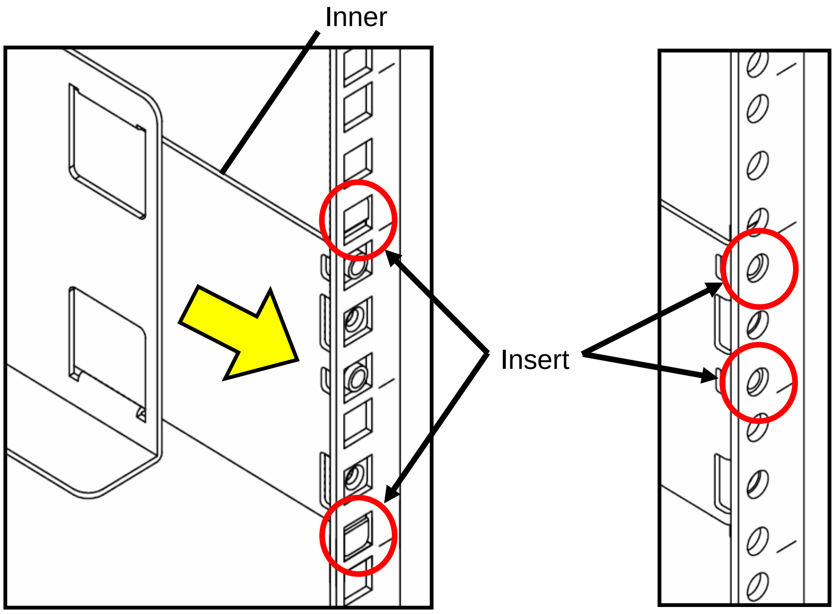
If the two small-head screws are provided, use them (as shown in the right figure below).


Insert
1U partition mark
1U partition mark

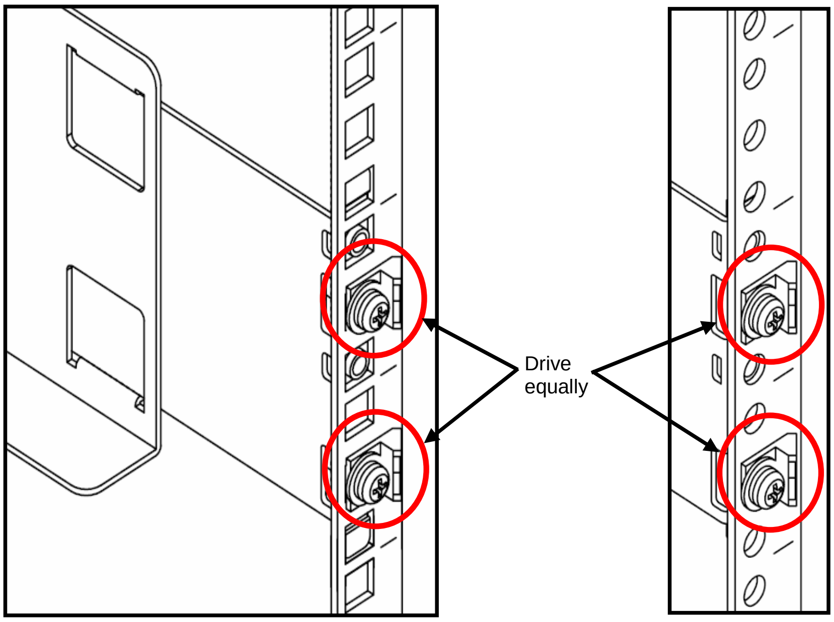




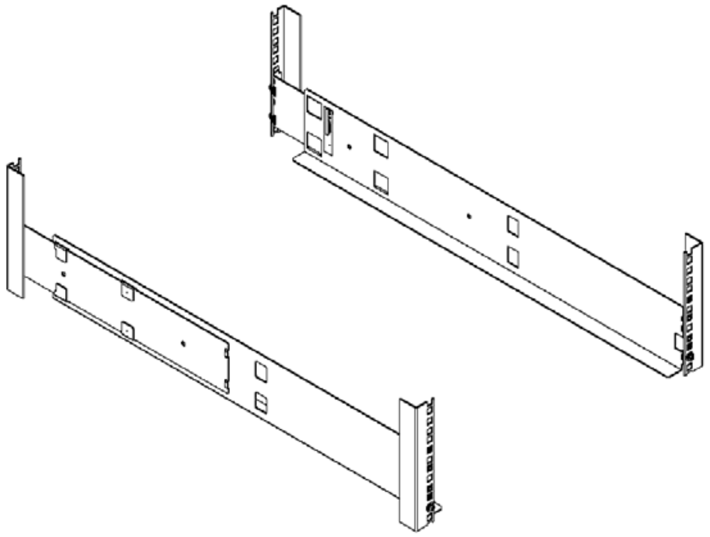
4. Pull the inner toward you and push the top and bottom projections into the angle holes.



5. 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.



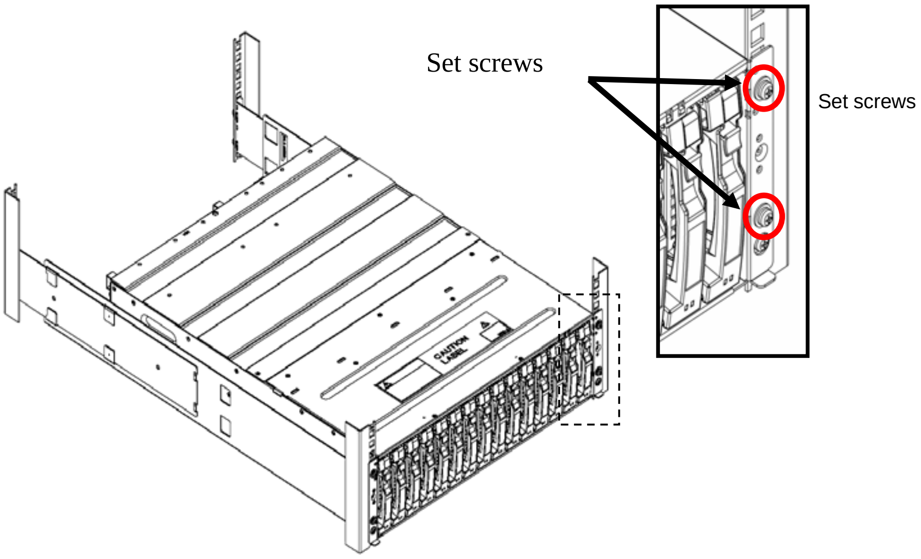
6. On the right side of the rack, install the other rail in the same procedure.



7. 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.



1.2 Installing Unit with a Universal Rack Mount Kit

Installation of Rails

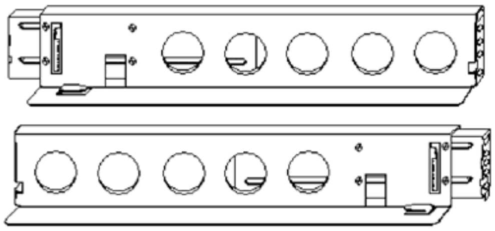
NOTE: There are two types of rails, one for angle holes on a rack and the other for round holes. See the proper procedure depending on the type of the rail you use.

Each of the following procedures supposes that a rail is installed on the left part of a rack when the rack is viewed from its front.

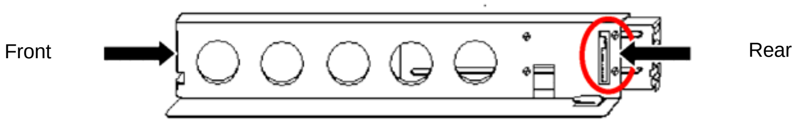
Install a rail on the right part of the rack in the similar procedure.

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).



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



Rail (L)

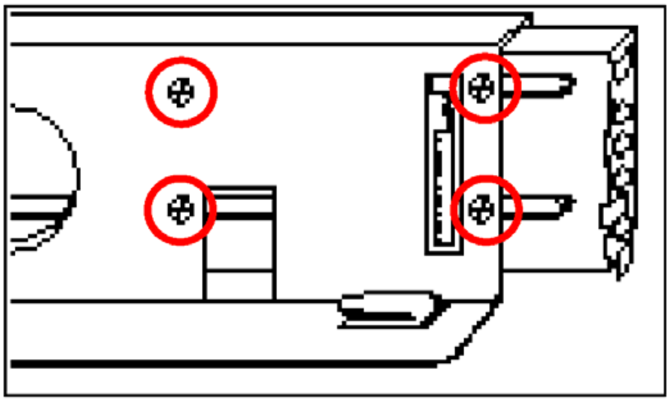
1.2.1 Angle Hole Fitting Rail

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

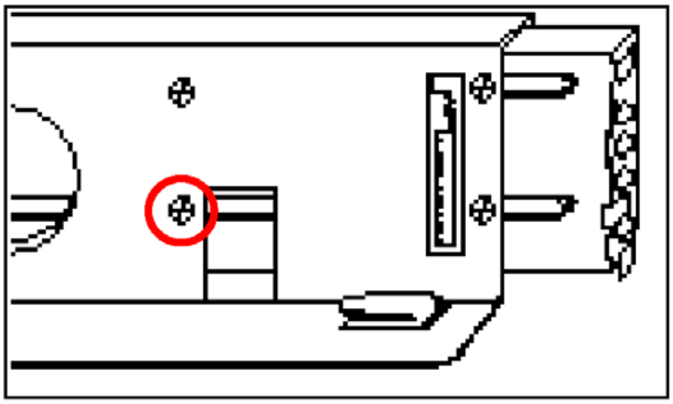
8. Loosen the four flush screws at the rear end of the rail

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

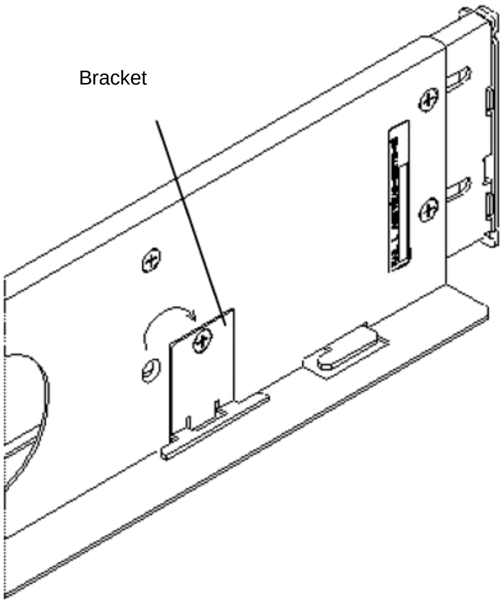
NOTE: Do not remove the flush screws.



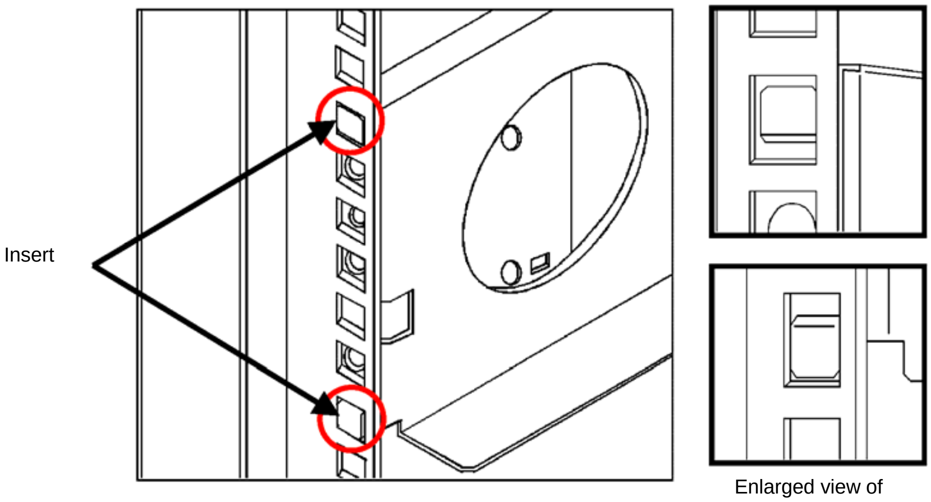
9. Remove the flush screw (1) enclosed by a circle in the figure below.



10. 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.)



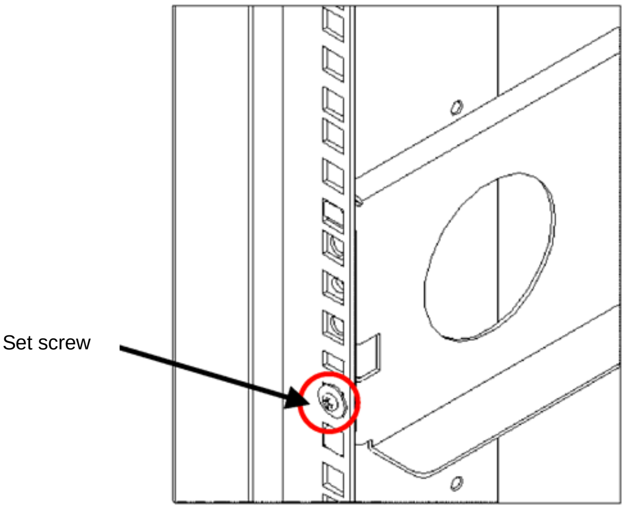
11. Insert the top and bottom projections into the angle holes on the front of the rack.



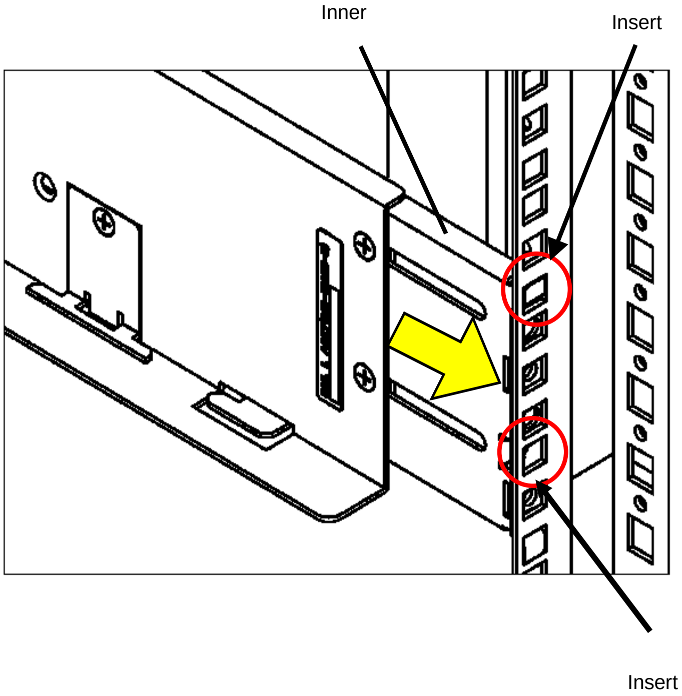
Enlarged view of encircled part

12. 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.

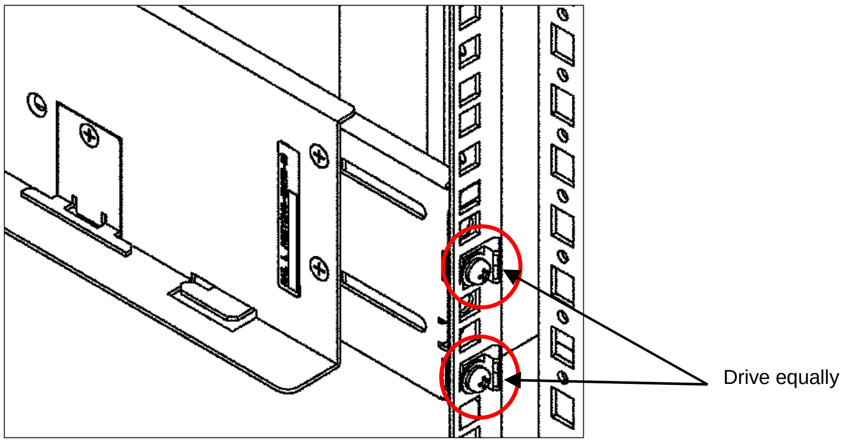
Use the set screw (see the figure below).



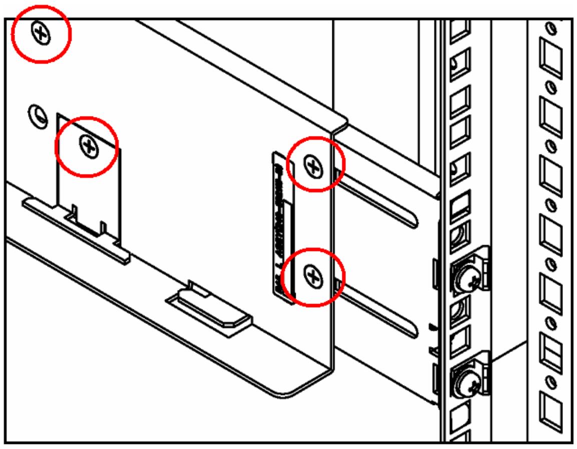
13. Pull the inner toward you and push the top and bottom projections into the angle holes.


Inner
Insert
Insert

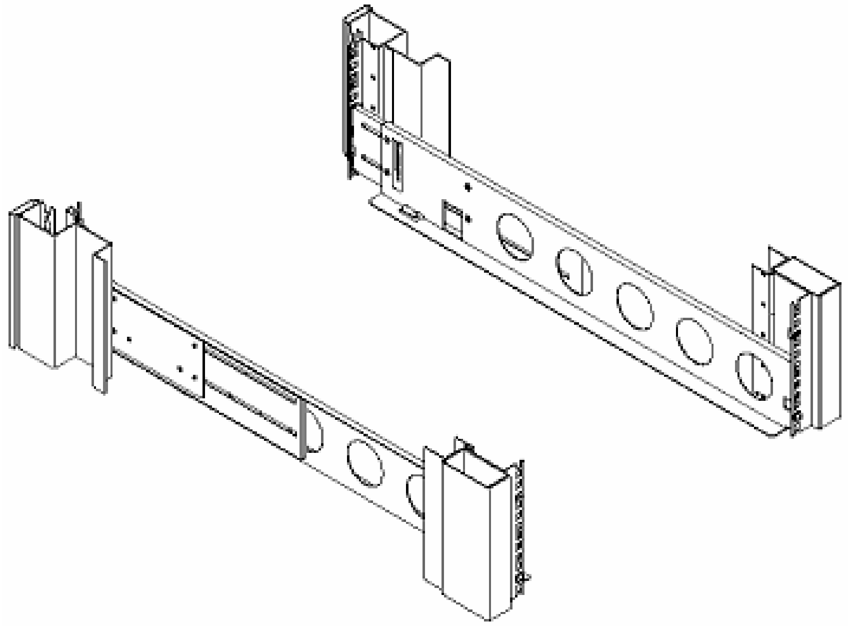
14. With the inner held, push the two set screws with a part for cable clamp into the female screws of the rail support and drive the screws equally. Take note on the direction of the part for cable clamp.



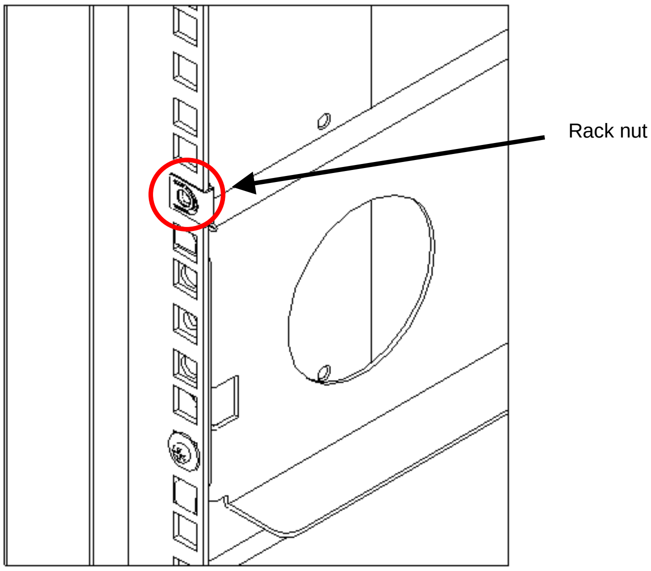
Drive the four flush screws loosened in step 1 and removed in step 3 securely.



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

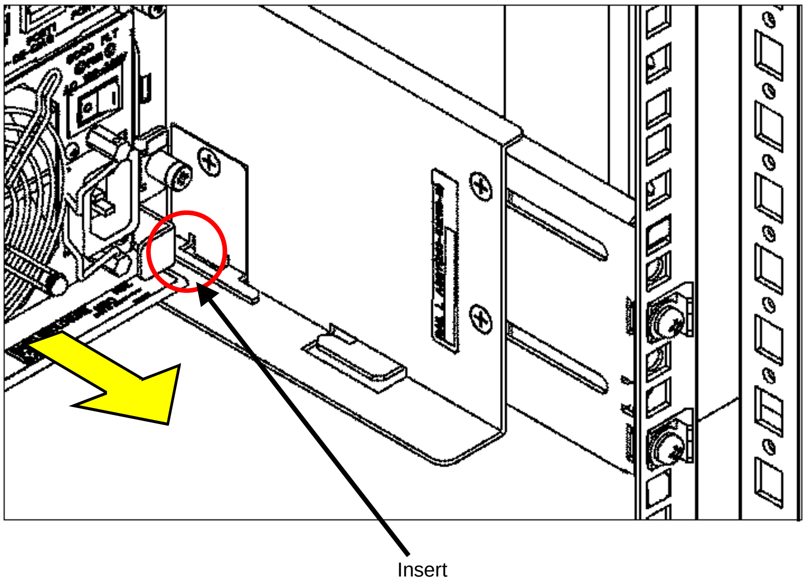


16. Install the rack nut at the position shown in the figure below (or the first hole on the projection at the top of the rail).

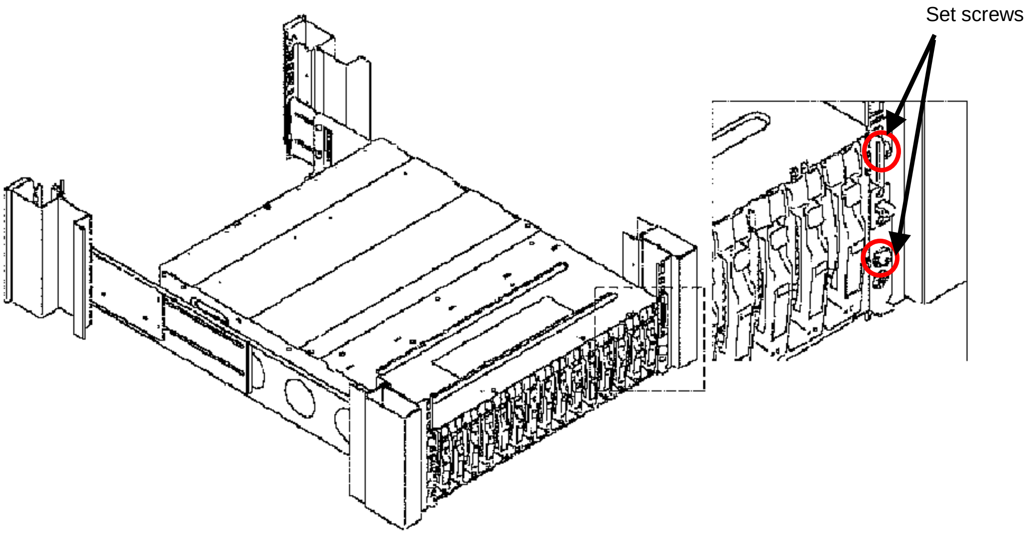


17. Lift the unit, put the rear section on the rails, and push it into the rack.

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



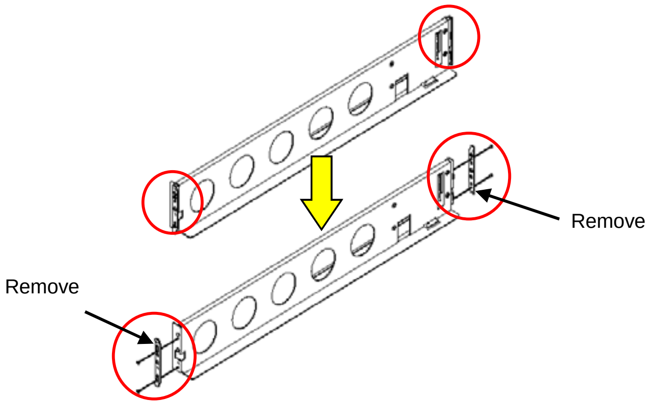
18. Fasten four set screws at two left and two right points on the front of the unit. The figure below only shows the right part of the unit. Fix the left part of the unit similarly.



1.2.2 Round Hole Fitting Rail

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

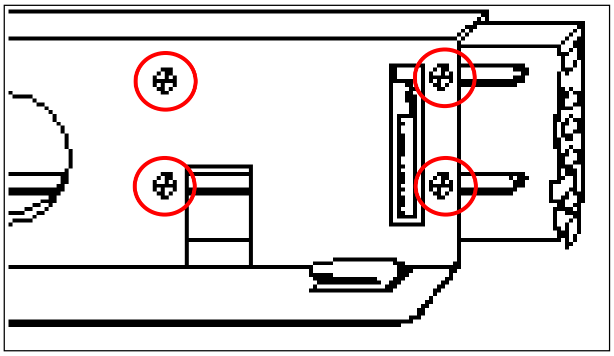
19. Remove the rail support installed previously from each rail by removing four screws (two on the front and the other two on the rear).



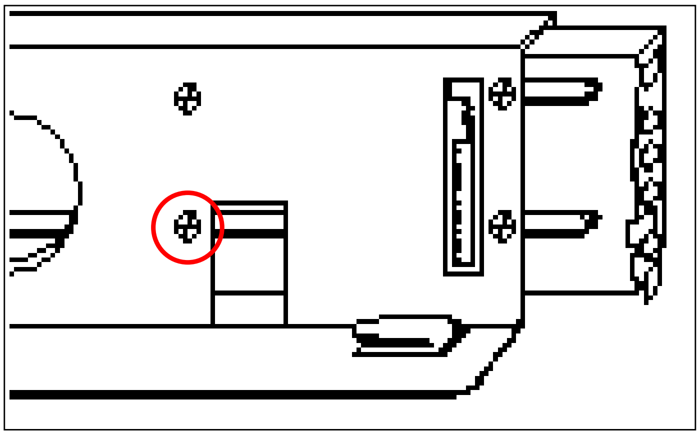
20. Loosen four flush screws at the rear side of the rail.

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

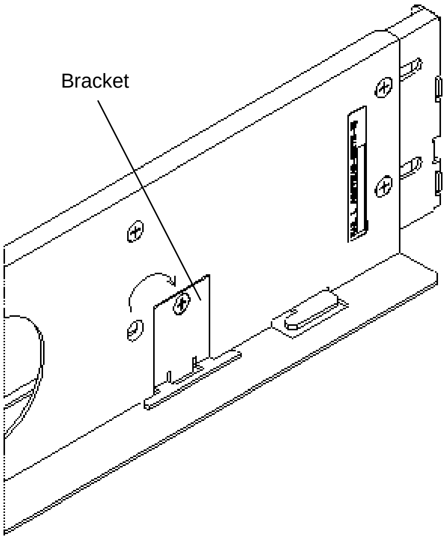
NOTE: Do not remove the flush screws.



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

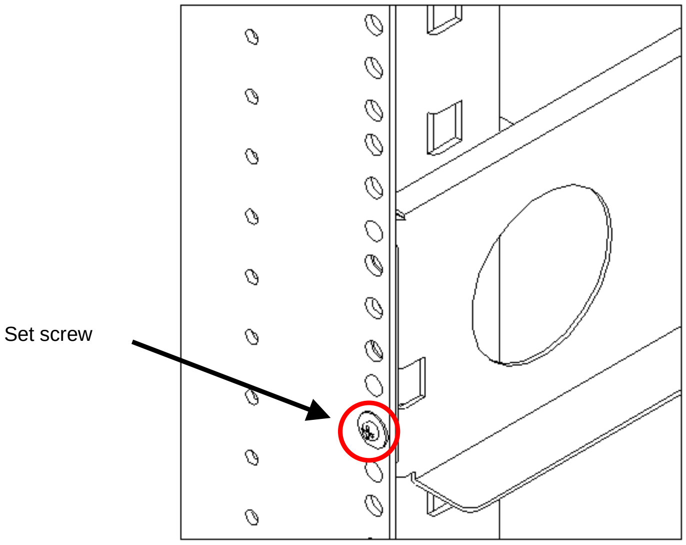


22. Install the attached bracket (see the figure below) with the flush screw removed in step 3 loosely. (Make sure that the moving part of the rail can slide smoothly.)

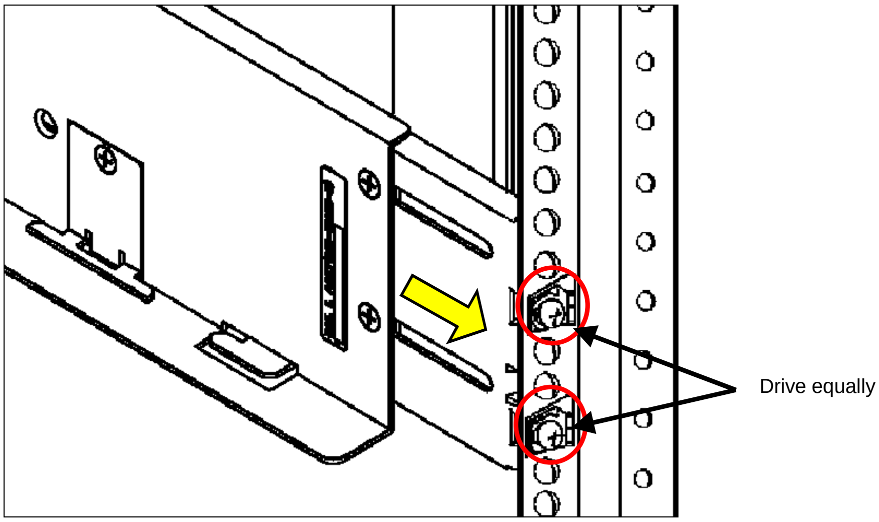


23. Adjust the round holes on the front of the rack to the screw holes on the rail (L) so that the inner face of the rack may be fit to the rail face with the label and fix the rail to the rack with the attached set screws.

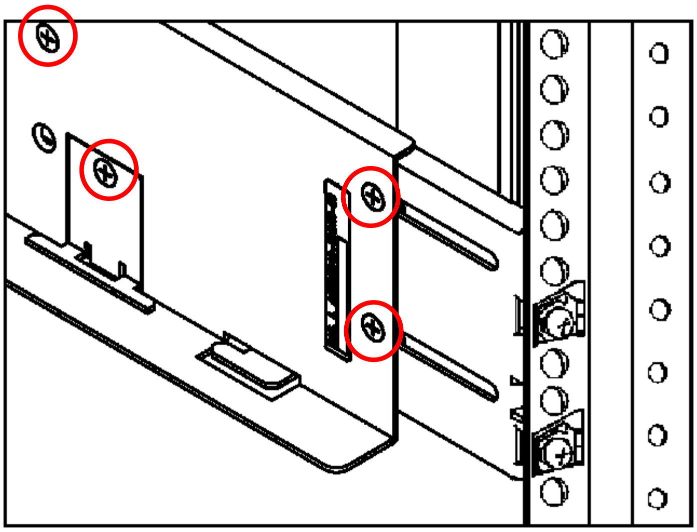
Use screws (see the figure below).



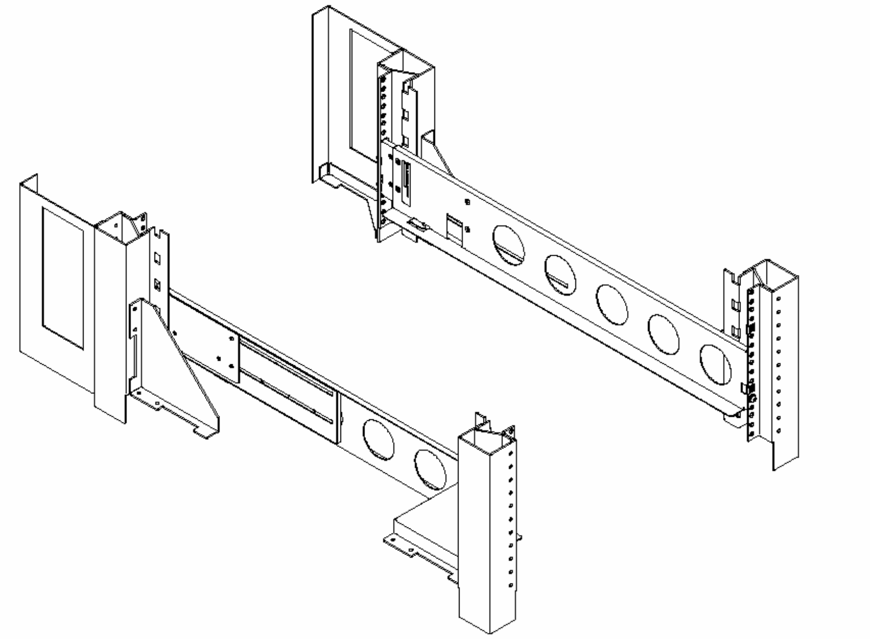
24. Pull the inner toward you and, with it held, insert the two set screws with a part for cable clamp into the female screws of the inner and drive the screws equally. Take note on the direction of the part for cable clamp.



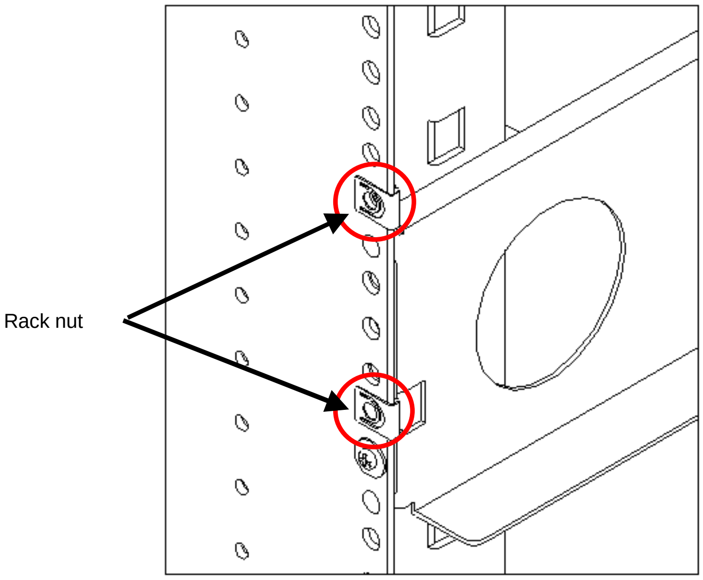
Drive the four flush screws loosened in step 1 and removed in step 3 securely.



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

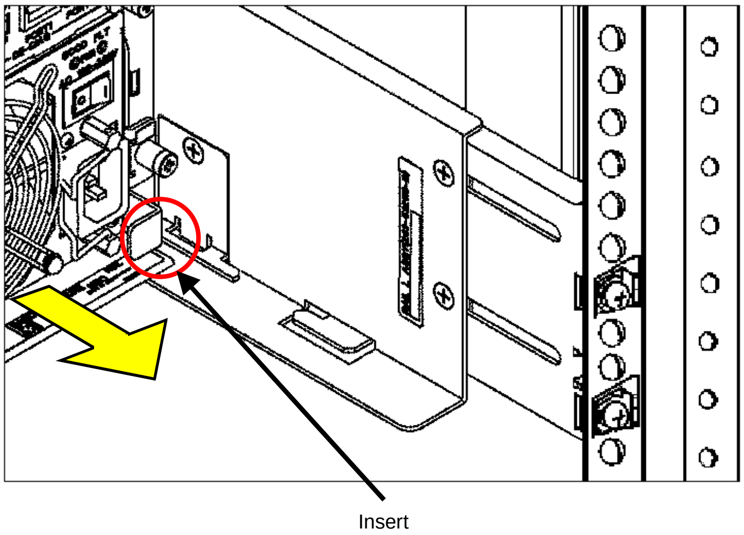


26. Install the rack nut at the position shown in the figure below (or the hole just above the set screw the first hole of the top of the rail).

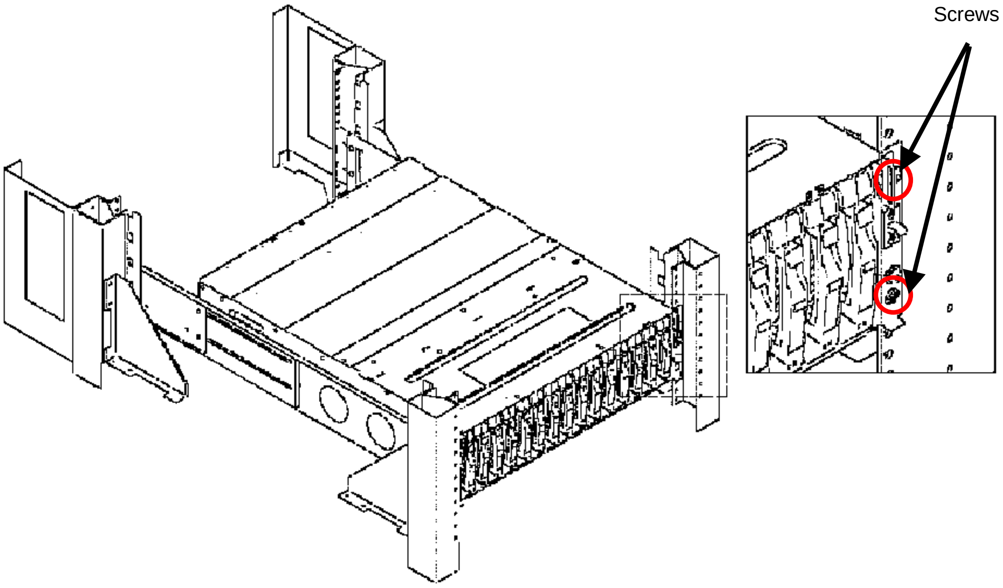


27. Lift the unit, put the rear section on the rails, and push it into the rack.

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



28. 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.



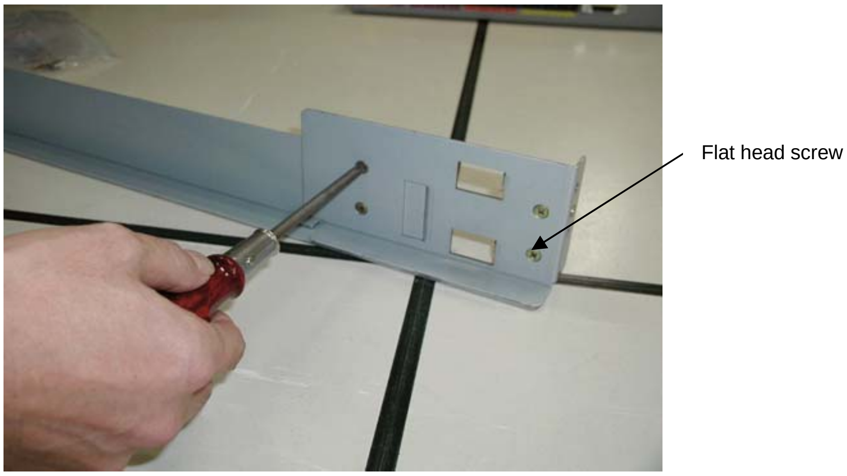
2. Installing Unit into an HP Rack

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

2.1 Installation of Rails

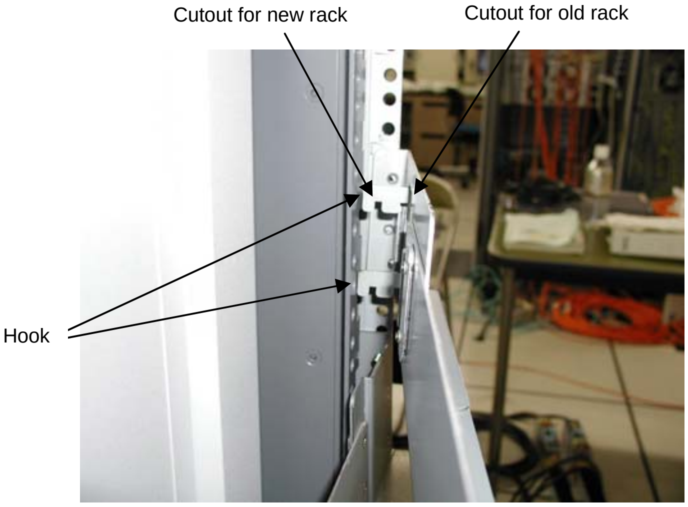
The procedure explained in this section covers the rail installed to the left side of the rack, when viewed from the front of it. The same procedure is applied to the right rail.

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

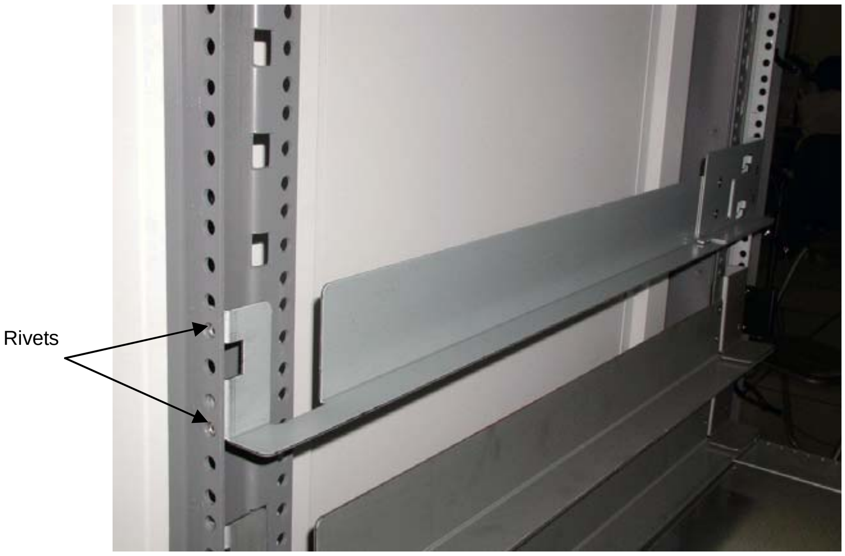


30. With the rail hook positioning at the rear of the rack, insert the rail into the rack, insert the hook into the angle hole at the intended install position of the unit, and engage the hook with the cutout.

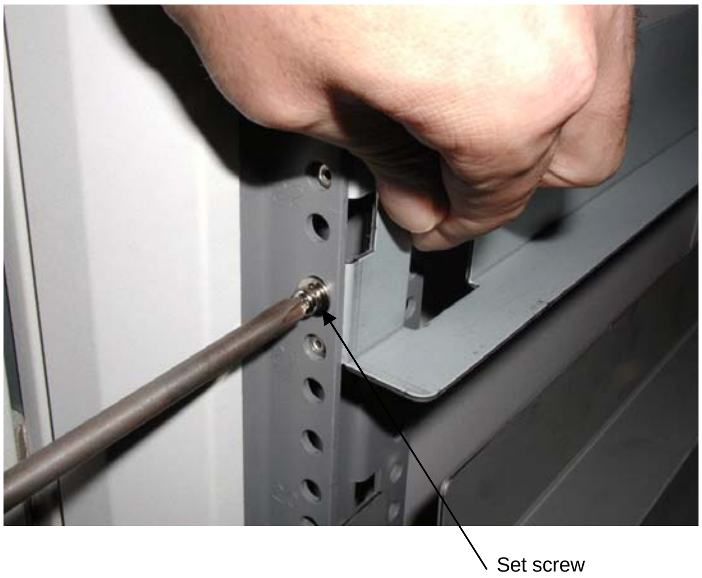
NOTE: Two cutouts are provided: one is for new rack and the other is for old rack. The outer cutout should be used for the new rack while the inner cutout is used for the old rack.



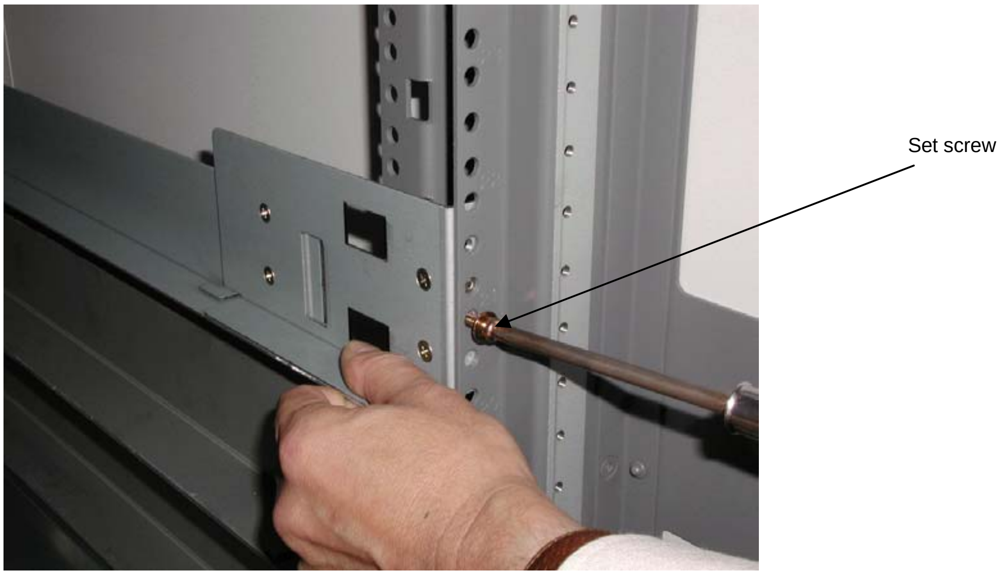
31. Pull the rail toward you and insert the rivets on the rail into the round holes on the rack.



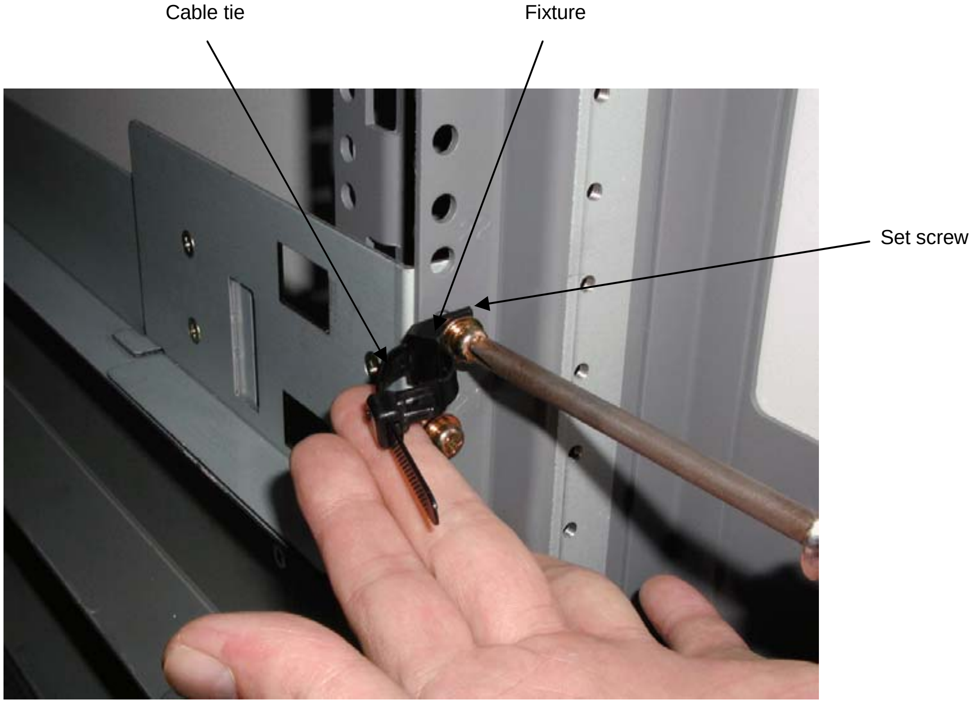
32. While holding the rail, tighten the set screw (M4 screw).



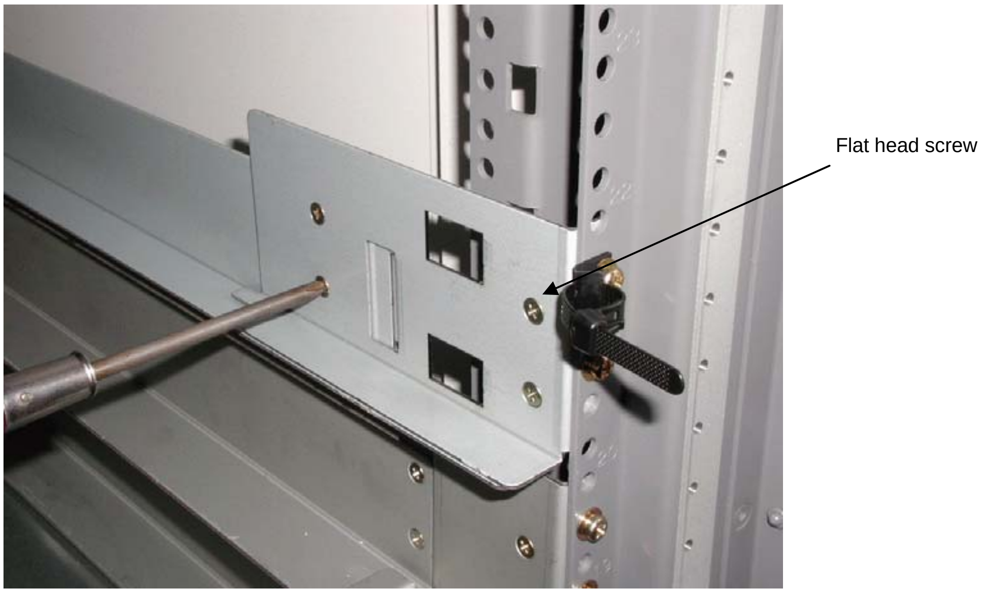
33. Move to the rear of the rack. First, while pulling the rail toward you, screw the set screw (M5 screw) into the lower female threaded hole.



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

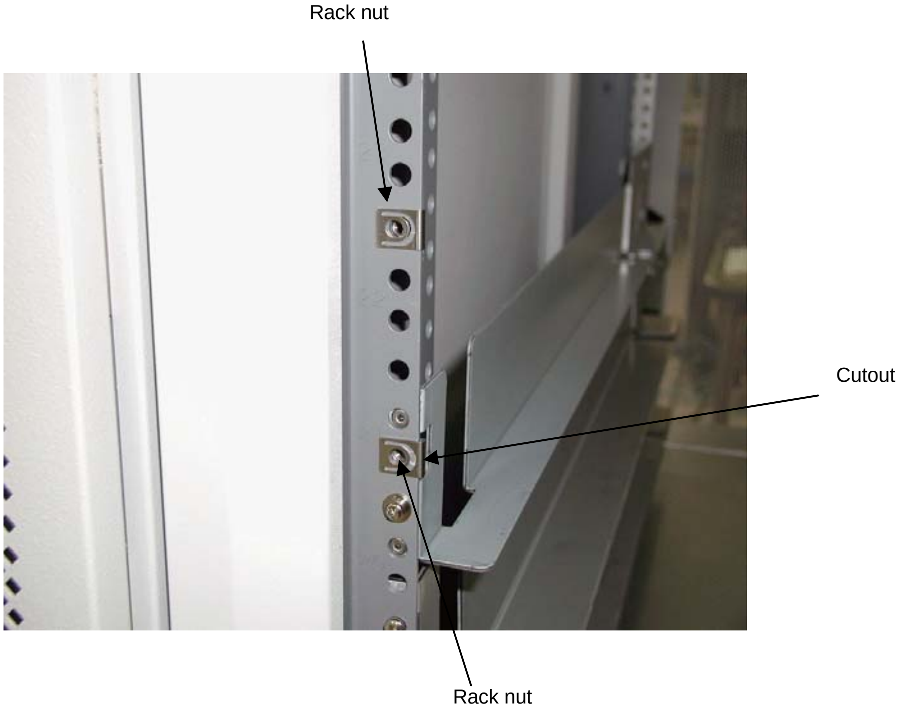

Cable tie
Fixture
Set screw

35. Firmly tighten the four flush screws.


Flat head screw

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.



2.2 Installation of Unit

36. Using the same procedure explained above, install the right rail.

37. 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.

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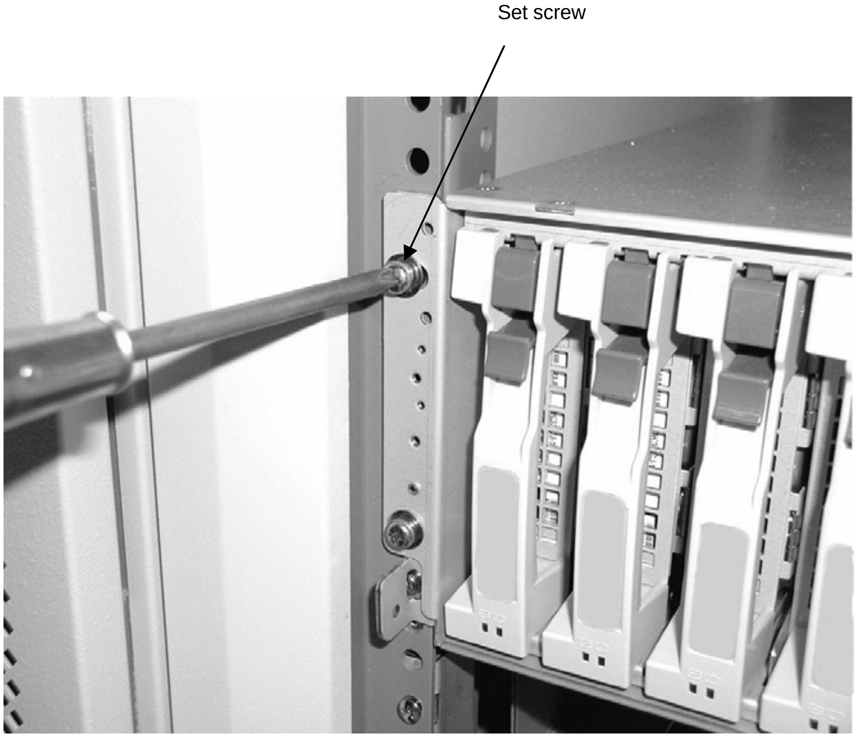
38. Screw four set screws (M5 screws) in the unit at both sides to fix the unit.



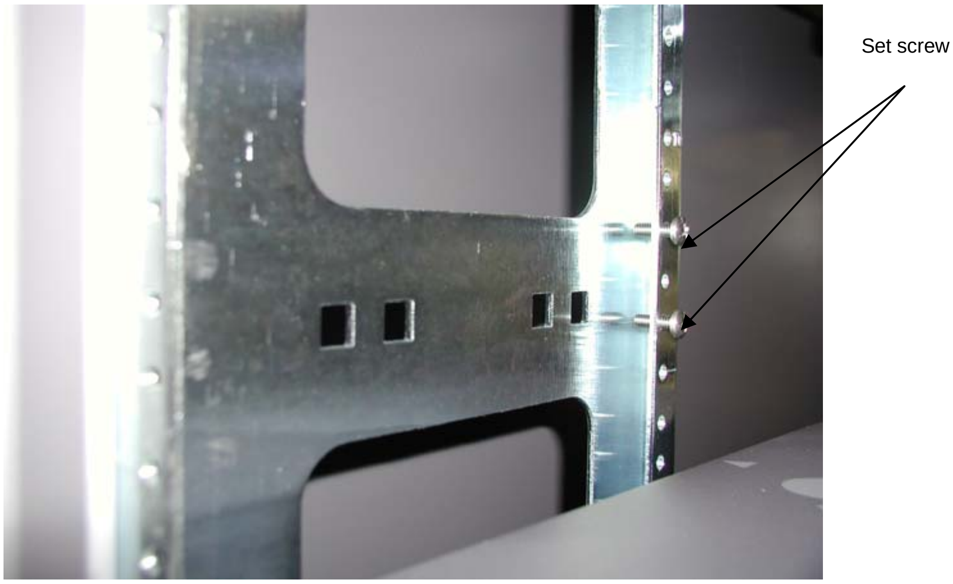
This completes the installation of unit.

3. Installing Unit into a Sun StorEdge Rack

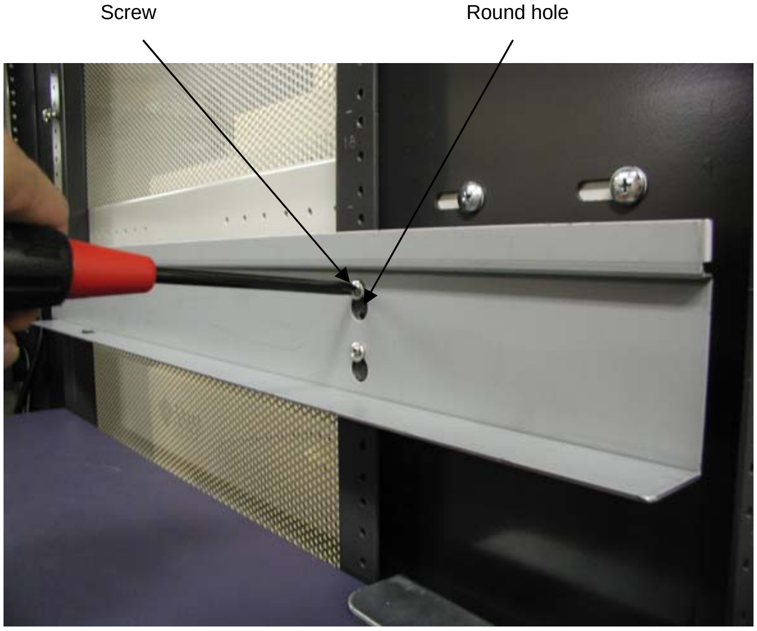
NOTE: To install the unit on the Sun StorEdge rack, the NF9100-SK02E rack-mount kit is to be separately purchased. Ask your sales representative for details.

3.1 Installation of Rails

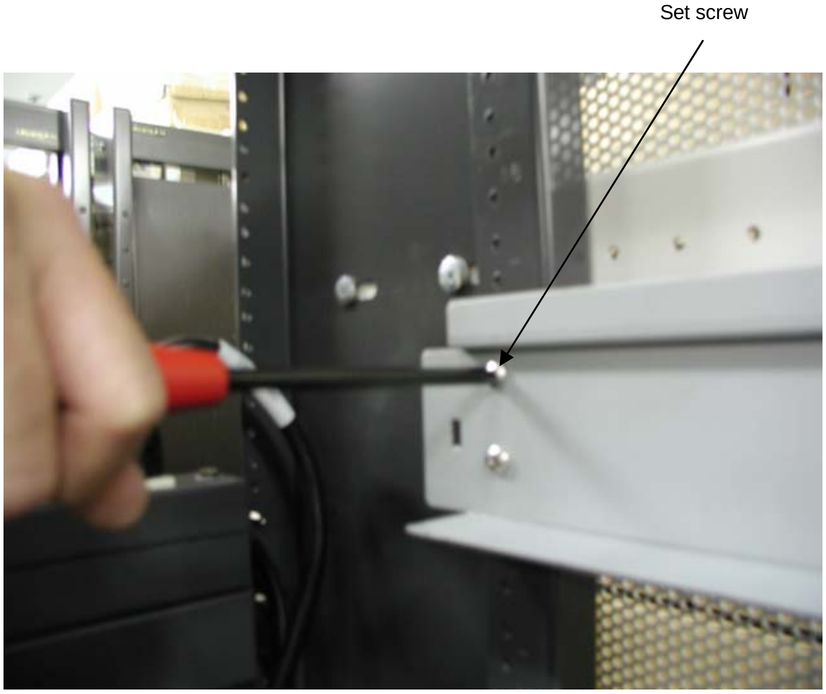
39. Temporarily tighten two set screws (#10-32UNF) at both ends of the front frame that corresponds to the unit installation location. (Do not tighten the screws firmly.)



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


Screw
Round hole

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

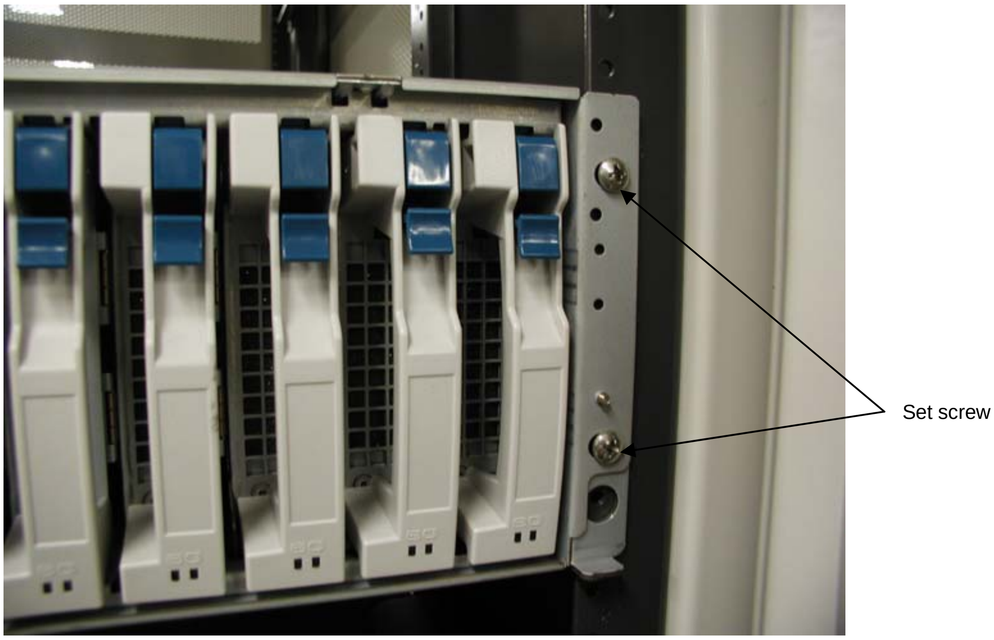


3.2 Installation of Unit

42. 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.

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



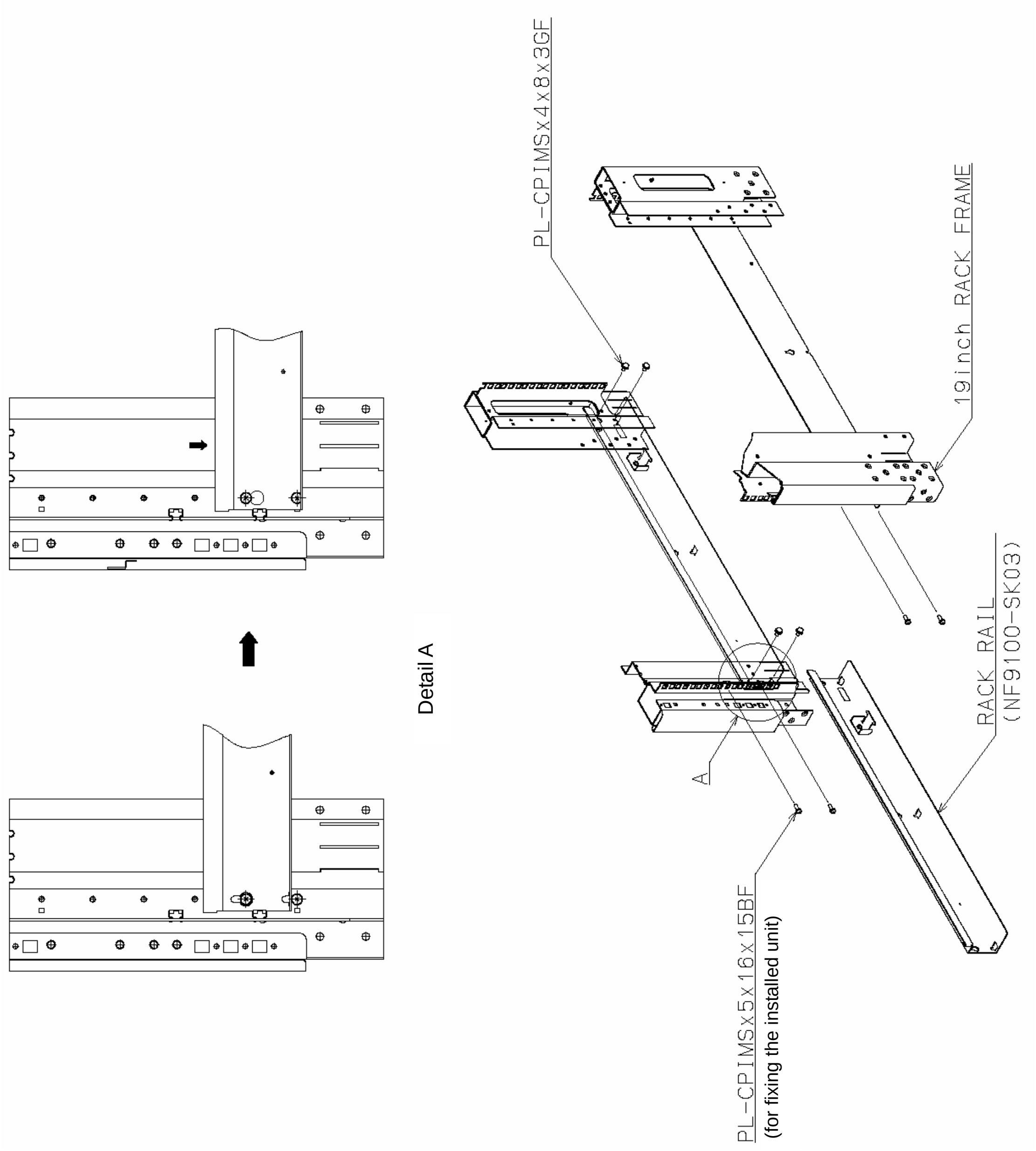
This completes the installation of the unit.

4. Installing Unit into an NEC Express Old-type Rack

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

4.1 Installing the Rack Mount Kit

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

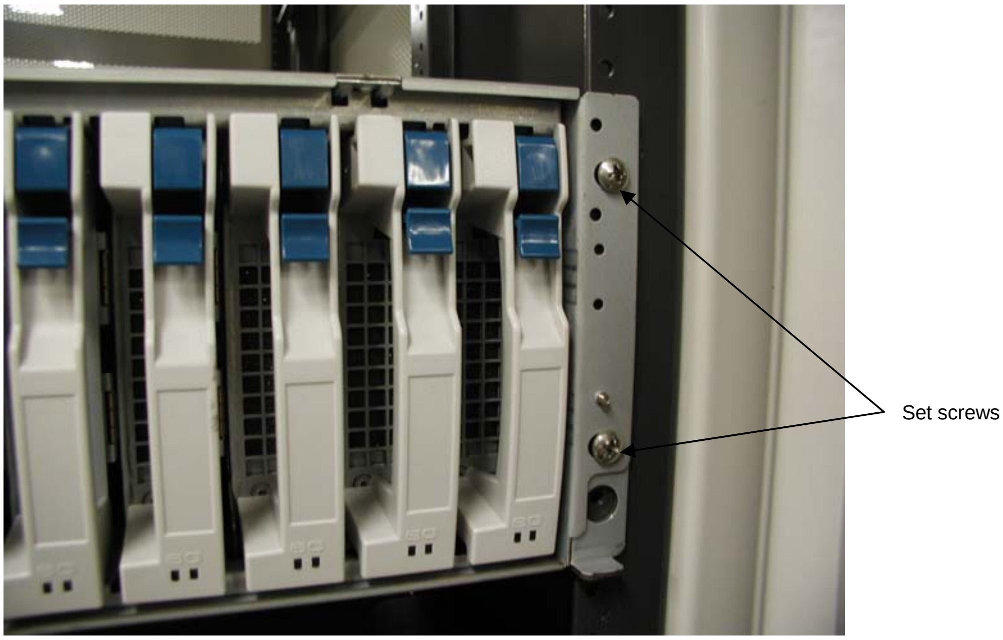

PL-CPIMSx4x8x3GF
19inch RACK FRAME
RACK RAIL
(NF9100-SK03)
A
Detail A
PL-CPIMSx5x16x15BF
(for fixing the installed unit)

4.2 Installation of Unit

44. 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.

45. 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. Cable Wiring

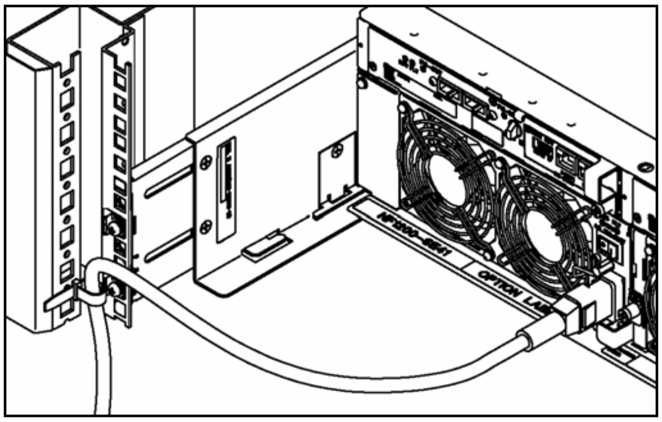
After installing the required number of units on the rack, go to the rear of the rack and provide the proper cable wiring.

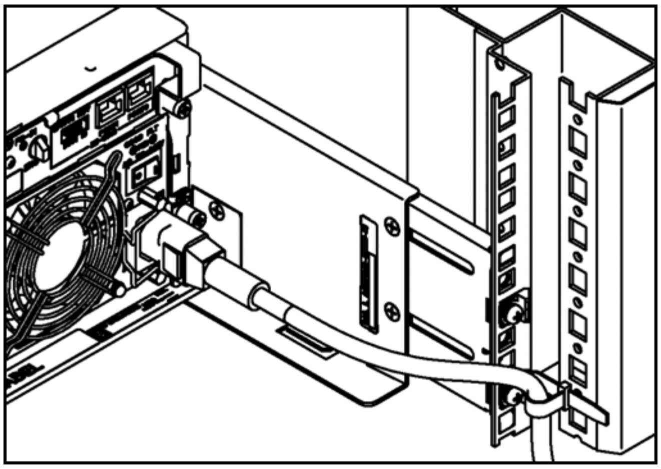
Pass cable ties through the cable clamp for cable handling if necessary.

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 as per the notes below.

The following figure shows sample wiring of an AC cord.





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