



NF2300-SE41E Additional Disk Enclosure 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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**FEDERAL COMMUNICATIONS COMMISSION
RADIO FREQUENCY INTERFERENCE STATEMENT**

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

Warning

This is a Class A product. In domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.



警告使用者：

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








Safety Precautions

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

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

 WARNING	Indicate there is a risk of death or serious wound.
 CAUTION	Indicate there is a risk of burn or injury.

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

	Indicates the risk of smoke emission or fire outbreak.
	Indicates the risk of electric shock.
	Indicates the danger of an injury due to harmful material.
	Indicates instructions to keep a device away from inflammable object.
	Indicates notice of general prohibition.
	Indicates required general actions for operators.
	Indicates instructions to pull the plug of a power cord from outlet and to off main circuit breaker.

Notes on Use

The following includes information necessary for proper and safe operation of the additional disk enclosure.

WARNING



- Do not use the additional disk enclosure in an area with much moisture or water usage. If so, a fault, electrical shock, or fire may occur.



- Do not use the additional disk enclosure in an area where inflammable gas and/or combustible substance are placed. If so, fire or explosion may occur.
- Do not concentrate power cords only to some AC outlets. If so, fire may occur.
- Do not put a heavy substance on a power cord. If so, the coating of the power cord may be broken, fire may occur, and/or you may be electrically shocked.
- Do not install the additional disk enclosure in an area of much moisture or dust. Remove dust adhering to AC outlets and the plugs of power cords, if any. If dust remains adhering to an AC outlet and/or plug, fire may occur.
- Do not connect the plug of a power cord to an AC outlet with a wet hand. If so, you may be electrically shocked.
- While the additional disk enclosure can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the additional disk enclosure can only accept 100 - 120 VAC. Use 100 - 120 VAC (50/60 Hz) when the attached power cord is used. Using power of different voltage may cause electric shock, smoke, and/or fire to occur.

⚠ CAUTION



- Do not install the additional disk enclosure and disk array unit on an unstable place. If so, some substances may be dropped to cause you to be injured.
- Do not install the additional disk enclosure and the power cords in an area with direct sunshine or near an apparatus generating heat such as a heater. If so, a fault may occur. Further, the coating of the power cord may be melted to cause fire or electric shock to occur.
- Insert the plug of a power cord to an AC outlet securely. Any power cord shall be routed with sufficient margin to avoid excess force from being given to the plugs of the power cord or the power cord itself. If a power cord is removed from the AC outlet during operation, data may be lost and/or a fault may occur.
- To prevent electric shocks, connect a power cord to an AC outlet with earth terminal. Connection of the earth line to a gas tube is extremely dangerous. Never do it.



- Connect or remove a peripheral from the additional disk enclosure after turning off all the powers of the additional disk enclosure 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 additional disk enclosure, disconnect all cables and power cords connected to the additional disk enclosure beforehand. If not, a malfunction of the system, an electric shock and/or fire may occur.

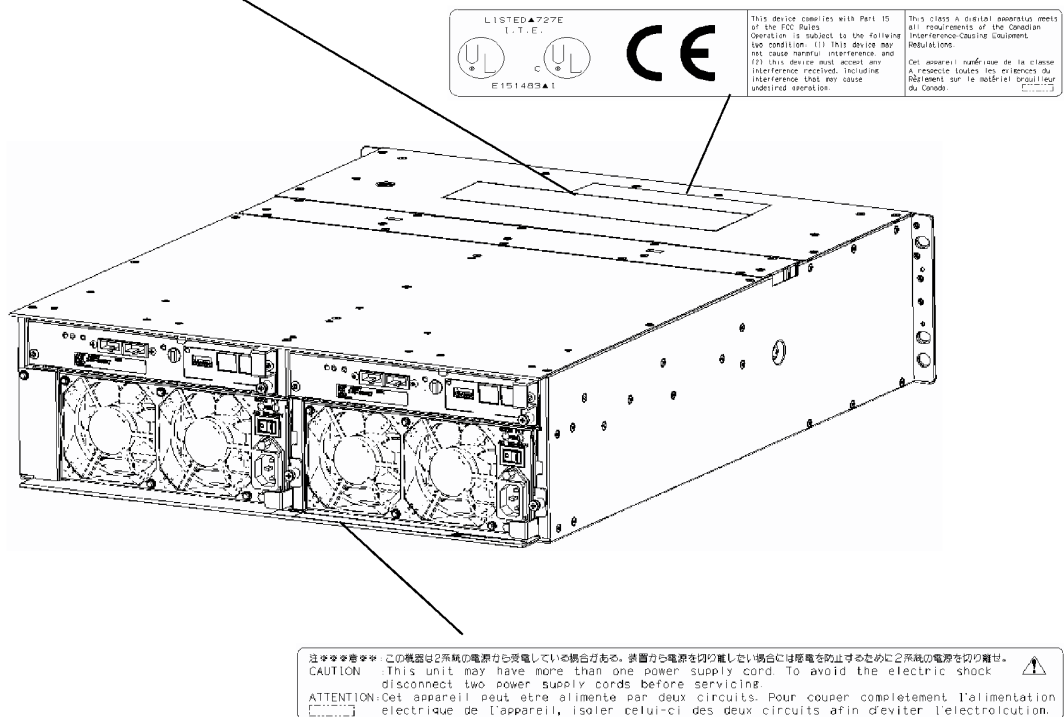
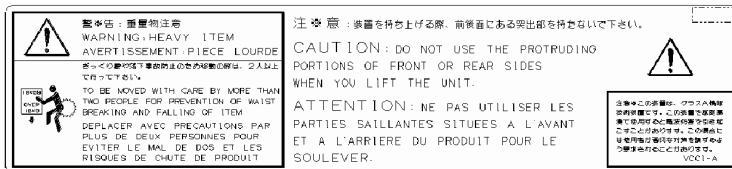


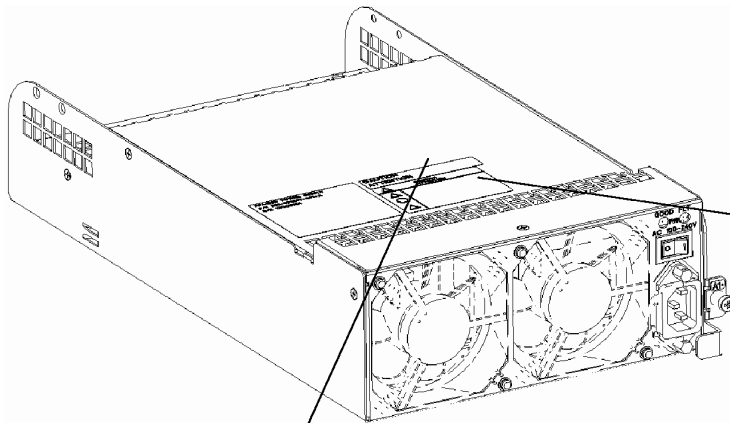
To install the unit in a rack, observe the following guidelines.

1. TMRA – If installed in a rack, consideration should be given to installing the equipment in an environment compatible with the TMRA.
2. Reduced Air Flow – Installation in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. Mechanical loading – Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. Circuit Overloading – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. Reliable Earthing – Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Indication on Safety

Warning labels are put on parts possibly be dangerous and/or surroundings in the additional disk enclosure. They are intended to always make you conscious of possible dangers when you handle the additional disk enclosure. (Do not peel off the labels or do not make them dirty.) If any of the labels is not put on the proper position, is peeled off a little, or is dirty to make it unreadable, contact your sales agent or maintenance engineer.

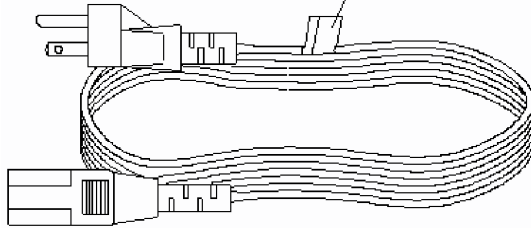




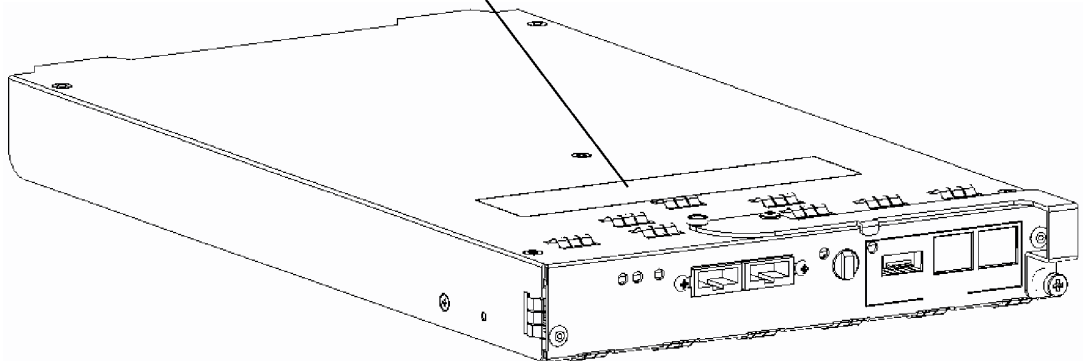
⚠	注意 CAUTION VORSICHT ATTENTION	MN
⚠	感電の危険あり、開くな。 Risk of electric shock. Do not open. Gefährliche spannung. Nicht öffnen. Risque de choc électrique. Ne pas ouvrir.	
⚠	高温注意 This unit may be hot and should not be touched without taking care.	

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

⚠	警告	WARNING
⚠	本電源ケーブルが電源電圧AC 100-120V (50/60Hz) 以下で使用してください。異なる 電圧で使用すると、発熱、発煙、火元の原因と なり得ます。	Use the power cord at the source voltage between 100 and 120 V _{AC} (50/60Hz). Otherwise, it may cause electric shock, smoke and fire.



⚠ 注意： 内部実装部品が高温になるため取扱注意のこと。
CAUTION: Be careful of handling
because internal package
parts become HOT.



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Momentary voltage drop prevention

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

Notes

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

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Preface

Thank you very much for your purchase of the additional disk enclosure.

The manual describes the operations and notes on use of Additional Disk Enclosure NF2300-SE41E available for the NF2300-SR4xxE disk array unit to be connected to NEC Express5800, NX7000, or CX5000 series system.

Before using NF2300-SE41E, also read the manuals of the connected Express5800 series, FibreChannel controller, NX7000 series, FC-AL SCSI connection mechanism, CX5000 series, and disk array unit and the manual of the used OS to enable the full ability of the additional disk enclosure to be brought.

The NF2300-SE41E additional disk enclosure is provided with the following options; additional 36GB disk drive NF2300-SM412E, additional 73GB disk drive NF2300-SM413E, additional 147GB disk drive NF2300-SM414E, additional 36GB/15Krpm disk drive NF2300-SM422E, and rack-mount kit NF9100-SK01E, NF9100-SK02E, and NF9100-SK03E.

After reading the document, keep it carefully in a place where you can take it if required.

First edition, February 2003

Check of Components in Package

(1) Unpacking

Open the package and take out the additional disk enclosure and accessories from the package without large shock. The additional disk enclosure is greatly heavy. Accordingly, if two people or less lift the unit, their back may be damaged. To take out the additional disk enclosure from the package, more than three people should always support the bottom of the unit without holding the power supply on the rear face and the projections of the adapter.

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

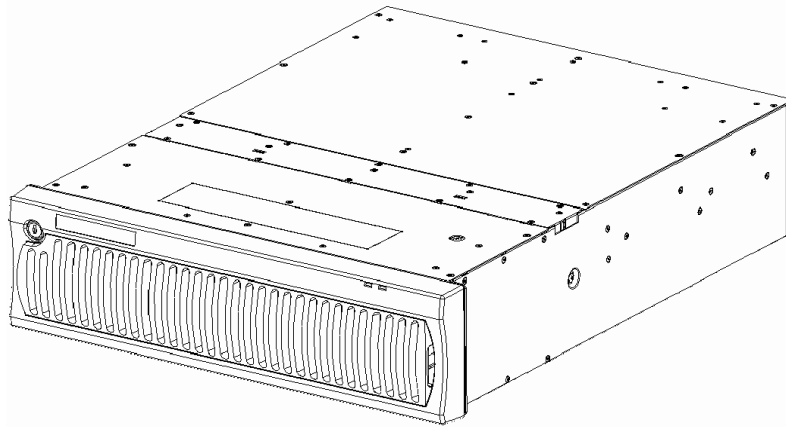
(2) Inspection

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

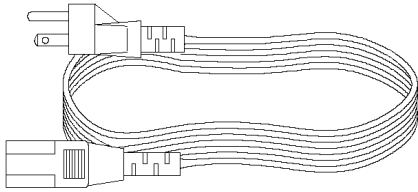
No.	Product name	Remarks	Qty
1	Additional Disk Enclosure		1
2	Power cord	Length 5 m (for 100 - 120 VAC)	2
3	HSSDC cable	Length 1m	2
4	DE diagnosis cable	Length 1m	2
5	Front mask		1
6	Key		1
7	User's Guide (this document)		1
8	Packing list		1
9	Location label		1
10	Rack mount kit	For NEC Storage rack (L and R)	1

* Use the HSSDC cable and DE diagnosis cable provided with the additional disk enclosure for connecting disk array unit NEC Storage S2300 with the additional disk enclosure. A DE cable set (NF9120-SJ04E), which is separately priced, may be used instead of the provided cables.

NF2300-SE41E



(1) Additional disk enclosure (The figure above shows the unit with the front mask installed.)



(2) Power cord



(3) HSSDC cable

(4) DE diagnosis cable

(5) Front mask

(6) Key

(7) User's guide (This document)

(8) List of accessories



(9) Location label

(10) Rack mount kit


Legend

Symbols in the Text

This User's Guide uses the following symbols to indicate improper handling which may cause the additional disk enclosure to be defected or frozen.

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

This User's Guide also uses the following symbol.

Symbol	Description
	Supplement of the text

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

Additional disk enclosure	Indicates the additional disk enclosure NF2300-SE41E.
Disk array unit	Indicates NF2300-SR4xxE NEC Storage S2300 1/2 and 2/2.
Array controller	Indicates NF2300-SR4xxE NEC Storage S2300 1/2.
Disk enclosure	Indicates the NF2300-SR4xxE NEC Storage S2300 2/2 and the additional disk enclosure.
Disk drive	Indicates the hard disk unit with dedicated tray.
Dummy tray	Indicates the dedicated tray only, with no hard disk installed.
Host system	Indicates the NEC Express5800 series, NX 7000 series, or CX5000 series.
Host bus adapter	Indicates the FibreChannel controller for NEC Express5800 series, FC-AL SCSI connection mechanism for NX7000 series, or FibreChannel controller for CX5000 series.

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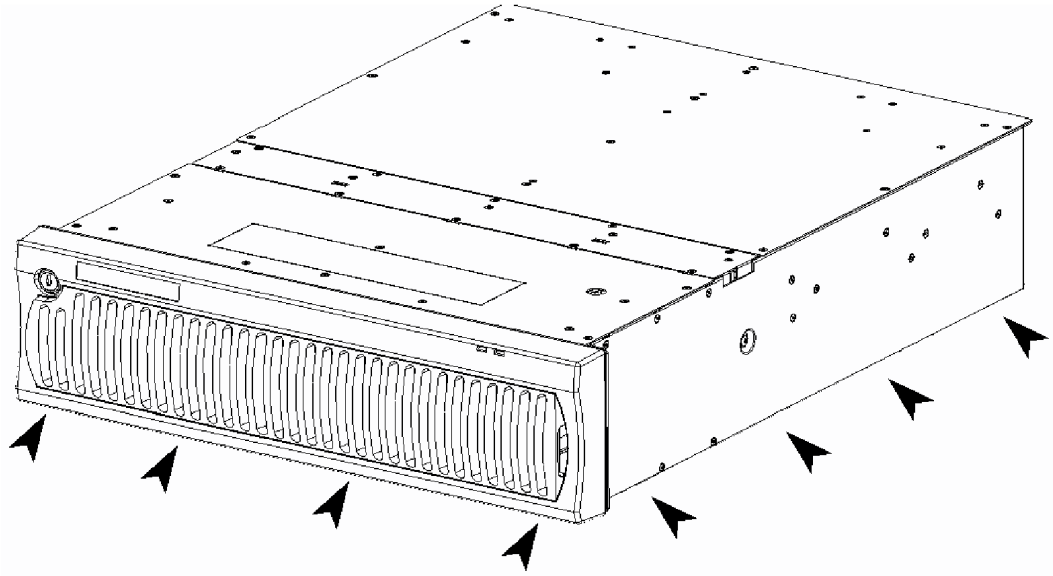
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1. NOTES ON INSTALLATION AND HANDLING OF ADDITIONAL DISK ENCLOSURE












1.1 Note on Carrying Additional Disk Enclosure

Be sure to hold the bottom the additional disk enclosure when carrying it.
Hold the front or side bottom of the additional disk enclosure if possible.



1.2 Environment in Use of Additional Disk Enclosure

In installation of the additional disk enclosure, take into account the following items on the location, room temperature, space required for handling, ventilation, and other conditions.

-  ■ Install the additional disk enclosure indoors.
Do not expose the additional disk enclosure to direct sunlight. Use a window shade or curtain to block sunlight to the unit if necessary.
-  ■ Install the additional disk enclosure on a level floor with sufficient strength. In addition, do not give shocks and/or vibrations to the additional disk enclosure. If so, some components may be dropped to cause the additional disk enclosure to be defected and/or people to be injured.
-  ■ Install the additional disk enclosure in an area under the following conditions; temperature range between 5°C - 40°C and humidity range between 10% - 80% (without condensation).
-  ■ Do not install the additional disk enclosure in an area with water or oil poured, area suffering liquid such as water and oil, suffering steam, area with steam, and area with much moisture. If not, a malfunction of the system, or an electric shock may occur.
-  ■ Do not install the additional disk enclosure in an area with emission of chemical steam or an area where the additional disk enclosure may be contact with inflammable substance. If so, a fault, fire, or explosion may occur.
-  ■ Do not install the additional disk enclosure in an area with much dust. If so, a fault may occur.
-  ■ Do not install the additional disk enclosure in an area with direct sunshine or near fire or an apparatus generating heat such as stove. If so, a fault or deformation may occur.
-  ■ Do not install the additional disk enclosure near TV, radio, and codeless telephone. Some noise may appear in the TV, radio, and codeless telephone.
-  ■ Do not use cellular phones near the additional disk enclosure. If so, a fault may occur.
-  ■ Do not install the additional disk enclosure near a device generating strong magnetism. If so, a fault may occur.
-  ■ Install the additional disk enclosure so that the ventilating holes opened on the front and rear faces are not blocked. If not, heat generation and/or fault may occur.

1.3 Installation and Connection of Additional Disk Enclosure

WARNING



- Do not use the additional disk enclosure in an area with much moisture or water usage. If so, a fault, electrical shock, or fire may occur.
- Do not use the additional disk enclosure in an area where inflammable gas and/or combustible substance are placed. If so, fire or explosion may occur.
- Do not install the additional disk enclosure in an area of much moisture or dust. Remove dust adhering to AC outlets and the plugs of power cords, if any. If dust remains adhering to an AC outlet and/or plug, fire may occur.
- Do not concentrate power cords only to some AC outlets. If so, fire may occur.



- Do not put a heavy substance on a power cord. If so, the coating of the power cord may be broken, fire may occur, and/or you may be electrically shocked.
- Do not connect the plug of a power cord to an AC outlet with a wet hand. If so, you may be electrically shocked.

CAUTION












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









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




- Do not install the additional disk enclosure and the power cords in an area with direct sunshine or near an apparatus generating heat such as a heater. If so, a fault may occur. Further, the coating of the power cord may be melted to cause fire or electric shock to occur.



-  ■ The additional disk enclosure weighs 34 kg or more. Hold the disk enclosure firmly with at least three people to carry it. Carrying the additional disk enclosure only by two or less people may strain their back.
-  ■ Select the place where the additional disk enclosure can be connected to the AC outlet by using the attached power cord or the power cord approved by NEC.
-  ■ 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 additional disk enclosure so that legs may not be trapped by the cables. Avoid power plugs and FC connectors from suffering excess forces.
-  ■ Do not use cables connected to the additional disk enclosure with them leaving bent. If so, a fault or fire may occur.
-  ■ Use the cables approved by NEC as those connected to the additional disk enclosure and check the destinations to which the cables are connected. In addition, always lock power cords and FC cables when they are connected.
-  ■ Use the power source independent from TV or radio. Otherwise, a noise may be generated.
-  ■ To connect a cable to the mating connector, make sure that the connector of the cable is not damaged and any pins are not bent. Using a cable not approved by NEC or a damaged cable may cause fire to occur.
-  ■ To disconnect a cable from the mating connector, always hold the connector of the cable. Do not hold the cable itself to disconnect it.

1.4 Notes on Use of Additional Disk Enclosure






-  ■ Do not let any animal (pet) or children touch the cable connected to the additional disk enclosure. Pulling the cable may cause the unit to fall down, resulting in failure of the unit.
-  ■ Do not enter any liquid such as water into the additional disk enclosure. If so, you may be electrically shocked or the unit may be defected. If some liquid is entered into the additional disk enclosure, turn off the power and contact your sales agent or maintenance engineer. If the additional disk enclosure seems dry, only a small amount of liquid may remain to cause the unit to be defected.
-  ■ Do not enter foreign substances such as clip and screw into the additional disk enclosure through the ventilating holes on the front or rear face. If so, a fault may occur.
-  ■ Do not disassemble or modify the additional disk enclosure. If so, a fault or electrical shock may occur.
-  ■ If the additional disk enclosure will not be used for a long period, disconnect the plugs of the power cords from the AC outlets for safety.
-  ■ Disconnect the power plug from the outlet when a thunderstorm is approaching. If it starts thundering before you disconnect the power plug, do not touch any part of the unit including the cables. If any failure is found later, contact your sales agent.

1.5 Routine Inspection of Additional Disk Enclosure

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

-  ■ If a surface of the additional disk enclosure becomes dirt, wipe the surface lightly with soft cloth. Wiping the surface by using chemicals such as benzene and thinner, or volatile chemicals, may cause the surface to be deformed or discolored. In addition, note that spraying insecticide on a surface may cause the surface to be deformed or discolored.
-  ■ It is recommended that the inside of the additional disk enclosure is cleaned periodically. It is because dust may be accumulated after the additional disk enclosure is used for a long time. Contact your sales agent or maintenance engineer for the cleaning of the inside of the additional disk enclosure. Users must not disassemble and/or repair the additional disk enclosure because it is dangerous.

1.6 Notes on Storage or Carriage of Additional Disk Enclosure

-  ■ Do not store the additional disk enclosure 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 additional disk enclosure in an area with much moisture or dust.
-  ■ Note that foreign substances such as water and metals may not be entered into the additional disk enclosure during storage. Using the additional disk enclosure with some foreign substance left inside may cause a fault, electrical shock, or fire to occur.
-  ■ During the storage, do not put any substance on the additional disk enclosure or do not place the additional disk enclosure on an area where the unit may be dropped. To use the additional disk enclosure after storage for longer than six months, it is recommended to contact your sales agent or maintenance engineer for inspection and/or repair.
-  ■ The additional disk enclosure weighs 34 kg or more. Hold the disk enclosure firmly with at least three people to carry it. Carrying the additional disk enclosure only by two or less people may strain their back. Do not hold the projected section of the power supply or adapter located on the rear of the disk enclosure. An access force applied to them may cause a damage to the power supply or the adapter, or cause the additional disk enclosure to fall down resulting in human injury.
-  ■ Make sure to package the additional disk enclosure when transporting it with the packing material that comes with the additional disk enclosure. A vibration or shock generated during transportation may cause a malfunction of the unit.

2. FEATURES OF ADDITIONAL DISK ENCLOSURE

The additional disk enclosure has the following features.

NF2300-SE41E is a high-performance additional disk enclosure developed for the NF2300-SR4xxE disk array unit connected to the NEC Express5800 basic processing unit, NX7000 basic processing unit, or CX5000 basic processing unit.

The additional disk enclosure NF2300-SE41E is not equipped with disk drives at the shipment. To use the additional disk enclosure, add disk drives sold separately. Up to 15 disk drives can be installed in NF2300-SE41E.

The disk drives for disk array unit NF2300-SR4xxE can be added by connecting the additional disk enclosure NF2300-SE41E (up to 13 disk enclosures, 210 disk drives).

The combination of the additional disk enclosure and disk array unit NF2300-SR4xxE enables a defected disk drive to be replaced with a new one without system shutdown. Further, the additional disk enclosure has the auto rebuild feature which automatically starts data recovery after the replacement of the defected disk drive.

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

Refer to "NF2300-SR4xxE Disk Array Unit User's Guide" for details of hot spare feature.

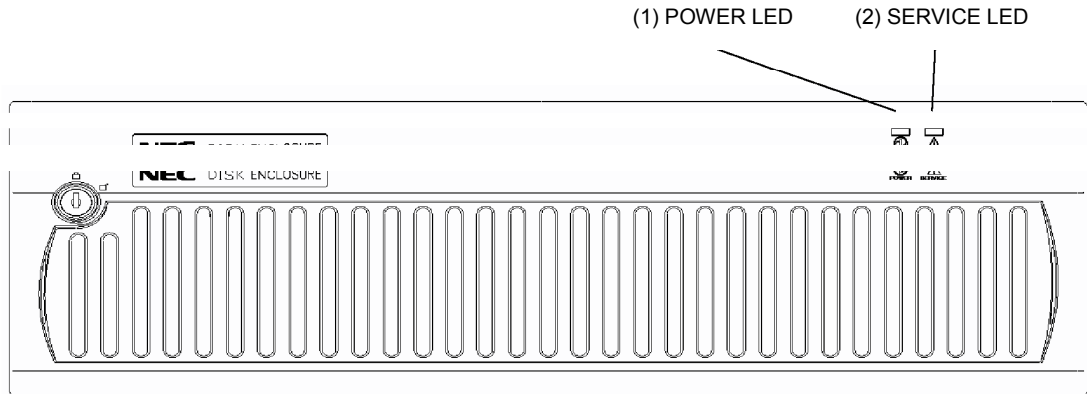
Further, owing to the redundant configuration of the adapter and power supply, the entire system is not shut down if any part of the system is defected during operation.

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

3. NAMES AND ROLES OF SECTIONS

This chapter describes the names and functions of the sections in the additional disk enclosure.

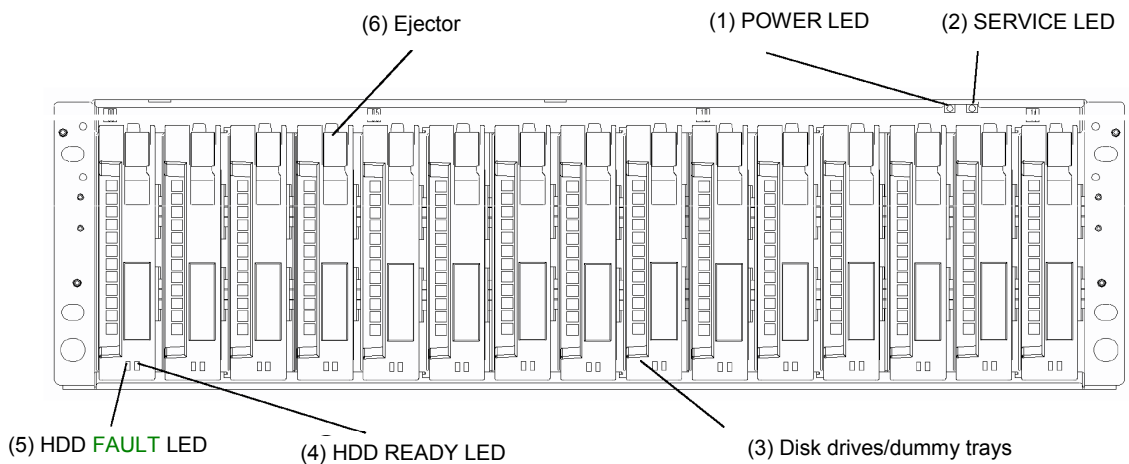
3.1 Disk Enclosure (Front)



A front mask is installed on the front face of the additional disk enclosure as shown in the figure above.

The front mask can be removed by releasing the lock with the accessory key and pulling out toward you with your hands hooked on the both sides of the mask.

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



(1) POWER LED (green)

The POWER LED is lit 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 goes on orange if an error occurs in the additional disk enclosure.

The LED is off while the disk enclosure operates normally.

(3) Disk drive/dummy tray

Disk drive: Contains a hard disk drive (HDD) with the dedicated tray.

Dummy tray: Contains only the dedicated tray with no hard disk drive.

* The additional disk enclosure NF2300-SE41E is not equipped with disk drives at the shipment. To use the additional disk enclosure, add disk drives sold separately.

* The disk drives installed in the disk enclosure are dedicated to the FC loop at 2Gbps.

A mixture of 1Gbps and 2Gbps disk drives is not permitted.

Do not install any 1Gbps disk drives in the disk enclosure.

The following measures are adopted to prevent insertion of a 1Gbps disk drive:

- A) A 1Gbps disk drive cannot go into the position where a 2Gbps disk drive is locked.
- B) The ejector color is different.

(4) HDD READY LED (green)

The HDD READY LED is lit green while the disk drive operates normally. The LED blinks when the disk drive transfers data.

The HDD READY LED blinks during the self-test or initialization just after power-on.

(5) HDD FAULT LED (orange)

The HDD FAULT LED goes on at the occurrence of an error in the disk drive. The LED is off while the disk drive operates normally.

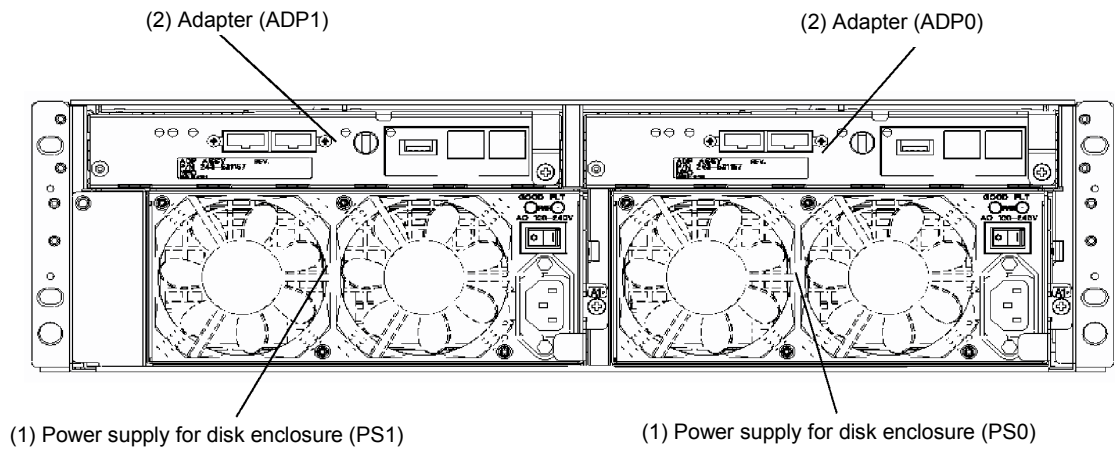
(6) Ejector

The ejector is used to install or remove the disk drive or dummy tray. In the normal operation status, the ejectors fix disk drives or dummy tray to the additional disk enclosure.



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

3.2 Disk Enclosure (Rear)



- (1) Power supply for disk enclosure (PS0/PS1)

The power supply is intended to supply power to the additional disk enclosure. See Section 3.3 "Power Supply for Disk Enclosure".

- (2) Adapter (ADP0/ADP1)

The adapter board is used to control the additional disk enclosure. See Section 3.4 "Adapter".

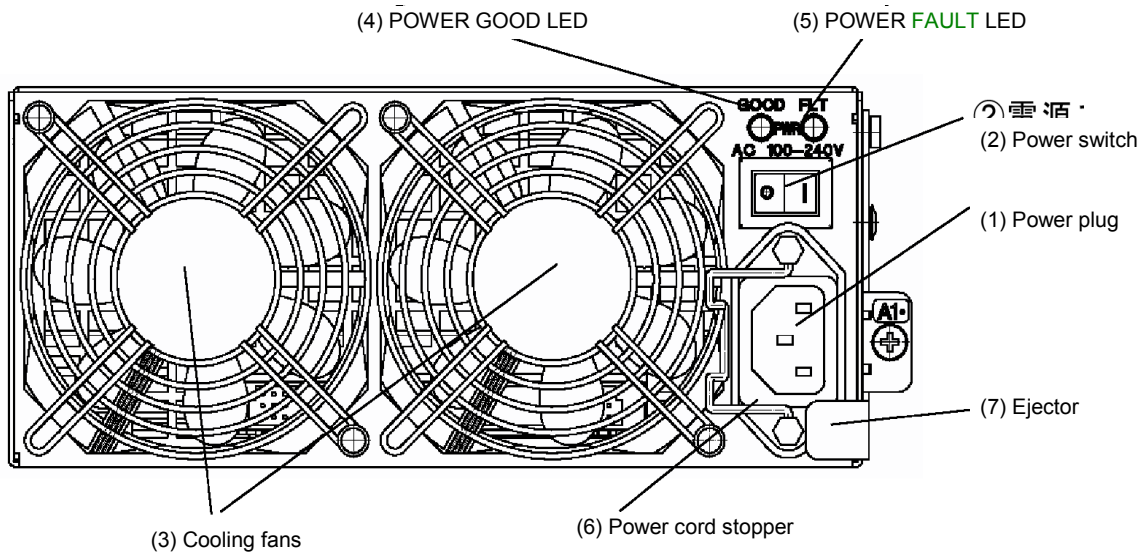


When inserting or replacing the power supply for the disk enclosure or an adapter into the disk enclosure, push it as far as it will go and then secure it with the screws. Incorrect insertion may cause a power supply failure or adapter failure again.



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 are heating units of the disk enclosure:
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 the reliability.

3.3 Power Supply for Disk Enclosure



(1) Power plug

The power plug is intended to supply power to the additional disk enclosure. Insert the receptacle of the accessory power cord to the power plug and the plug of the power cord to an outlet of 100 - 120 VAC power at 50 or 60 Hz.

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



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

(2) Power switch

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

(3) Cooling fans

When the power switch is set to ON, two cooling fans are rotating. Note that the ventilating holes are not blocked.



- Install the disk enclosure so that the ventilating holes may not be blocked. If either or both of the ventilating holes are blocked, the internal temperature of the disk enclosure may increase to cause a fault to occur.
- The disk enclosure is equipped with 4 fans in total. Even if a fan fails, the air-cooling conditions for the entire disk enclosure are satisfied. However, to guarantee the safety operation of the disk array unit, replace the power supply for disk enclosure as soon as possible. Replacing the defected fan means that two fans are stopped, therefore, perform the replacing work within three minutes.

(4) POWER GOOD LED (green)

The POWER GOOD LED is lit green when the AC power is supplied to the additional disk enclosure and the power switch is set to ON. The LED is off if the power switch is set to OFF or a fault occurs in the power supply.

(5) POWER FAULT LED (orange)

The POWER FAULT LED goes on if a fault occurs in the power supply (including fan fault). The LED is off while the power supply operates normally.

(6) Power cord stopper

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

(7) Ejector

The ejector is used to install or remove the power supply from the additional disk enclosure. Loosen the screw before using the ejector.

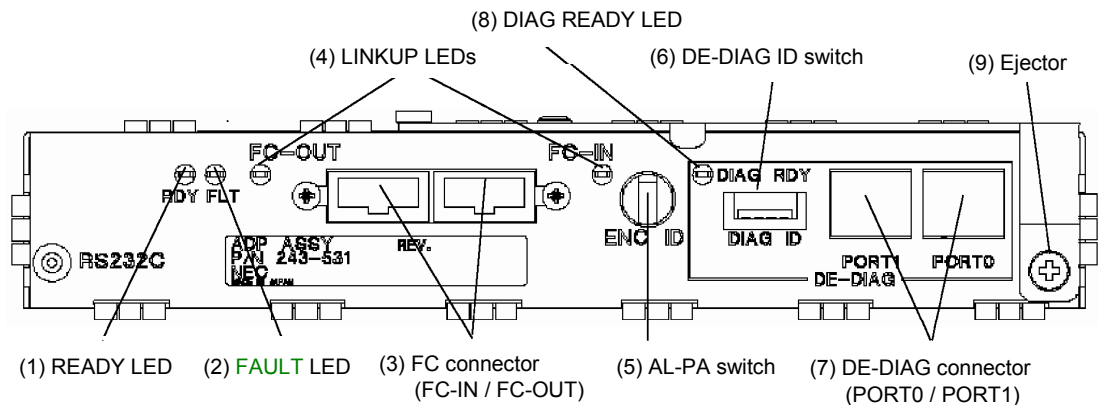


When inserting or replacing the power supply for the disk enclosure into the disk enclosure, push it as far as it will go and then secure it with the screws.
Incorrect insertion may cause a power supply failure again.



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 are heating units of the disk enclosure:
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 the reliability.

3.4 Adapter



(1) READY LED (green)

The READY LED lights green when the adapter is powered on and the initial diagnostics in the adapter is completed normally. The LED is on while the power is on.

(2) FAULT LED (orange)

The FAULT LED goes on orange if a fault occurs in the adapter.

The LED goes on at the power-on and then goes off at the completion of the self-test for the adapter.

(3) FC connectors (FC-IN/FC-OUT)

The FC connectors are used to connect an array controller with a disk enclosure or connect a disk enclosure with another disk enclosure.

See Chapter 5 "CONNECTION OF ADDITIONAL DISK ENCLOSURE" for cable connections.

(4) LINKUP LED (FC-IN/FC-OUT) (green)

The LINKUP LED goes on green when the corresponding FC connector (FC port) becomes operable (to link up).

The LED is off or flashing during the self-test or initialization just after the power-on.

(5) AL-PA switch

The AL-PA switch sets the AL-PA of the additional disk enclosure.

Set the AL-PA switches on both of the adapters installed in the first additional disk enclosure connected to the array controller via FC cable (HSSDC) to "0". Further, set the AL-PA switches of the adapters installed in each additional disk enclosure to "1", "2", ..., "5", or "6" in the connection order.

When the AL-PA switches of the left and right adapters are set differently, the FAULT LEDs on the adapters blink and the additional disk enclosure is not started. If different values are set for the AL-PA switches, turn off the power of the system including the additional disk enclosure, re-set the AL-PA values properly, and turn on the power again.

When replacing the adapter due to failure and others, make sure that the AL-PA switches of the left and right adapters are set to the same values before installation. If different values are set, a link failure may occur in the worst case.

(6) DE-DIAG ID switch

The DE-DIAG ID switch sets the DE-DIAG address of the disk enclosure.

Set "0" for all the DE-DIAG IDs of the adapters installed in the disk enclosure that is connected with the standard controller in the array controller via the FC cable (HSSDC).

If an additional control card (NF2300-SP02E) is installed in the array controller, set "1" for all the DE-DIAG IDs of the adapters installed in the disk enclosure that is connected with the additional control card via the FC cable (HSSDC).

The DE-DIAG ID switch is factory-set to "0".

(7) DE-DIAG connectors

To connect the additional disk enclosure (NF2300-SE41E) to the disk array unit, make the following connections:

- From the PORT1 connector of adapter "0" (ADP0) installed in the disk enclosure of the disk array unit to the PORT0 connector of adapter "0" (ADP0) installed in the additional disk enclosure
- From the PORT1 connector of adapter "1" (ADP1) installed in the disk enclosure of the disk array unit to the PORT0 connector of adapter "1" (ADP1) installed in the additional disk enclosure

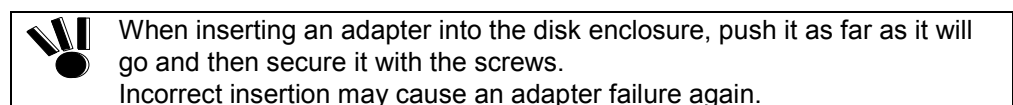
For each of the above connections, use the DE diagnosis cable provided with the additional disk enclosure or the DE diagnosis cable of separately priced DE cable (NF9120-SJ04E).

(8) DIAG READY LED (DRDY LED) (green)

The DIAG READY LED lights green when the disk enclosure becomes ready for diagnosis.

(9) Ejector

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






4. INSTALLATION AND CONNECTION PROCEDURES

This chapter describes the procedure for the installation and connection of the additional disk enclosure.

In general, follow the procedure shown in Section 4.1 for the installation and connection of the additional disk enclosure.

Take care of the matters described in Chapter 1 "NOTES ON INSTALLATION AND HANDLING OF ADDITIONAL DISK ENCLOSURE" in doing the jobs.

 CAUTION	
	<ul style="list-style-type: none">■ Do not give shock and vibration to the additional disk enclosure. Excess shock or vibration may cause the additional disk enclosure to be defected.
	<ul style="list-style-type: none">■ While the additional disk enclosure can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the additional disk enclosure can only accept 100 - 120 VAC. Use 100 VAC (50/60 Hz) when the attached power cord is used. Using power of different voltage may cause electric shock, smoke, and/or fire to occur.

4.1 Installation and Connection Procedures

- Check of components in package
Check the components in the package following "Check of Components in Package".
If any component is missed, contact your sales agent.
- Connection of FC cable
Use the cable compatible with the additional disk enclosure. Insert the connector until the latch emits a click.
Do not bend the cable forcibly.
When disconnecting the cable, be careful not to apply excessive force to it. Hold and remove the connector pushing the latch.
- Connection of power cord
Always use the proper power cord available for the additional disk enclosure. Do not use the power cord with it bent and under complicated cable connections.
- Set of parameters
For setting parameters including RAID level and disk assignment, use the NEC Storage Manager or contact your maintenance service agent.
- Check of states of resources for additional disk enclosure
Before using the additional disk enclosure, check the states of resources including power supply, adapters, and disk drives by using the NEC Storage Manager.

5. CONNECTION OF ADDITIONAL DISK ENCLOSURE



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

This chapter describes the basic procedure for connecting the additional disk enclosure to the disk array unit (NEC Storage S2300, 1/2 and 2/2). In the connection, also read the User's Guide of the disk array unit to which the additional disk enclosure is connected.

CAUTION



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



- Any FC cable and DE diagnosis cable used for the connection of the additional disk enclosure shall be approved by NEC. Also, the length of the cable shall be within the rating range. If an FC cable not approved by NEC is used or the length of the cable is out of the rating range, read data may be incorrect or invalid data may be written.
- To avoid incorrect wiring, make sure that connectors are connected to the proper destinations based on the cable specification.
- Do not push any cable connector excessively. Each connector can be connected properly only when it is inserted to the mating connector in the correct direction and at the correct angle. Proper insertion allows the connector to be inserted to the mating connector smoothly without excess force. If the connector cannot be inserted smoothly, do not insert it by force but check the direction of the connector again.
- Make sure that damages such as buckling, dust adhesion, and dirt are not found on the connector and contact before connection.
- Treat any connector carefully so that it may not be dropped on the floor to be damaged. Do not drag any connector on the floor to have dust adhere to the connector.
- Do not give excess force to the connector and cable connected with each other. Do not step or put a substance on a cable to deform the cable.



- Be sure to install disk drives into PD00 and PD01 of an additional disk enclosure.
- If the disk drives in both PD00 and PD13 are faulty or they have not been installed, the SERVICE LED on the additional disk enclosure and the FAULT LED on the ADP0 side light.
- If the disk drives in both PD01 and PD14 are faulty or they have not been installed, the SERVICE LED on the additional disk enclosure and the FAULT LED on the ADP1 side light.

5.1 Notes on Connection of Additional Disk Enclosure

For the connection of the additional disk enclosure, check the following items.

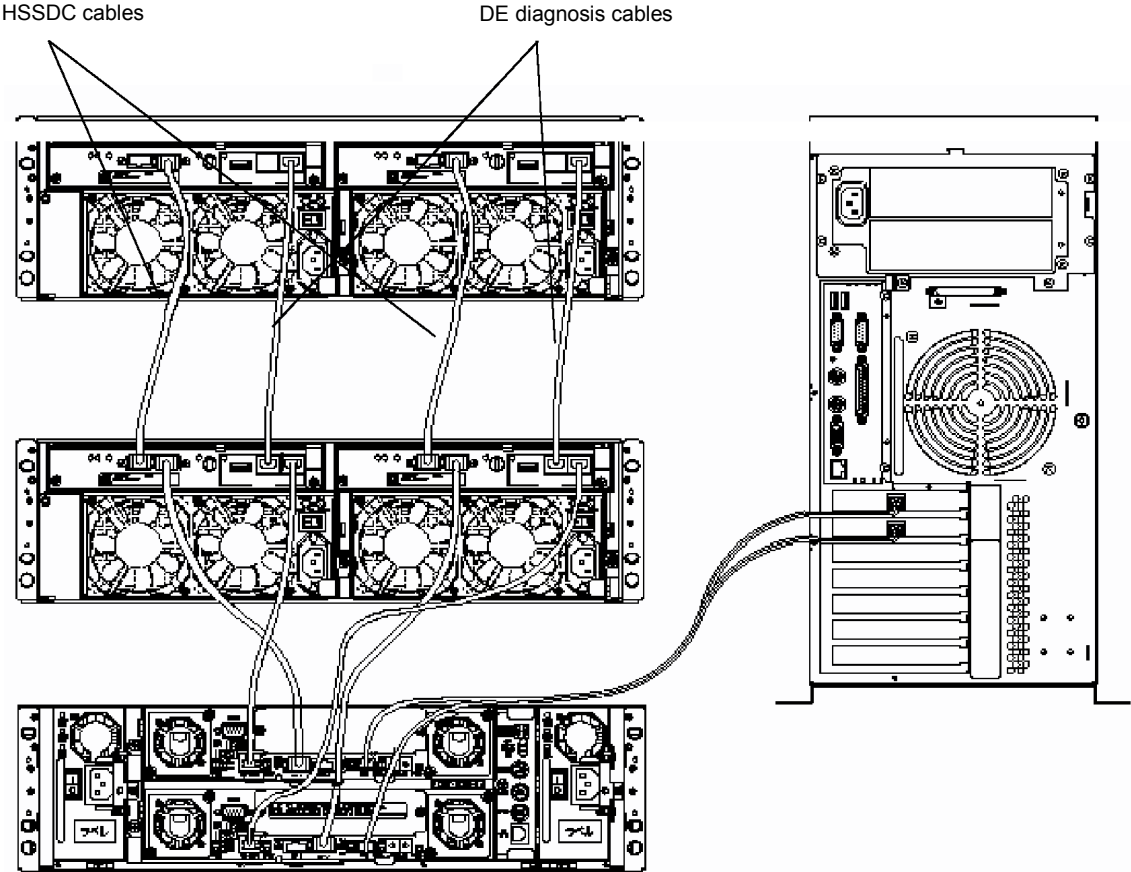
(1) Cables used for connection

Use the provided power cord or the NEC-specified power cord to connect the additional disk enclosure with the power supply.

To connect the array controller with the additional disk enclosure, be sure to use the HSSDC cable and DE diagnosis cable provided with the additional disk enclosure, or the NEC-specified DE cable (NF9120-SJ04E).

5.2 Connection of Additional Disk Enclosure

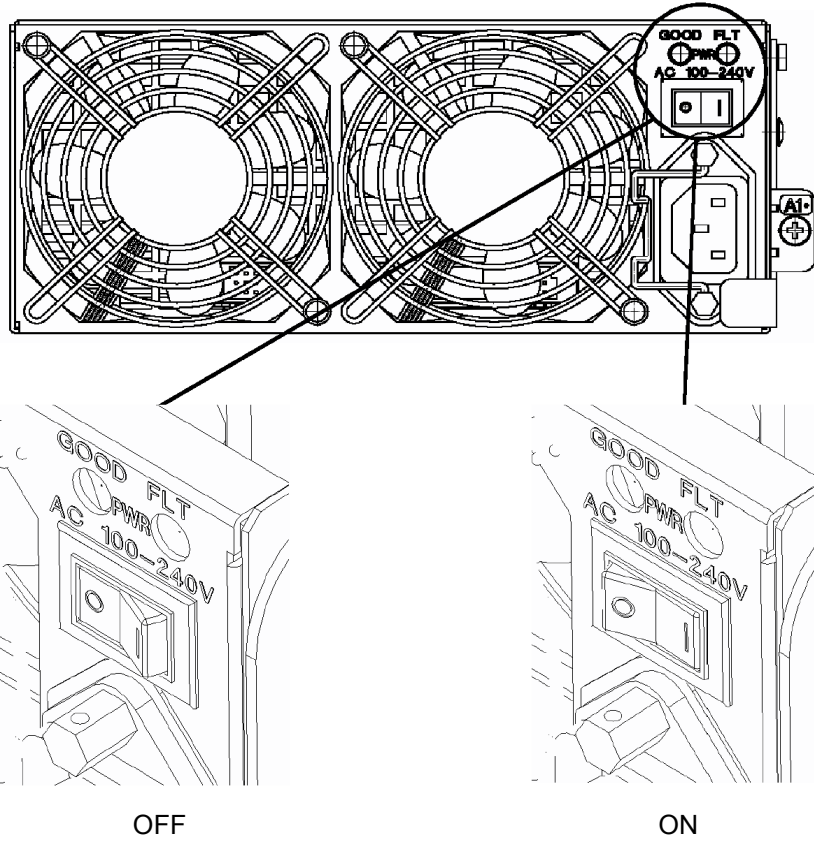
This section shows recommended connection samples.



Connect the additional disk enclosure with the existing disk enclosures by using FC cables (HSSDC cables) and DE diagnosis cables in the following procedure.

(1) Check of power supply

Check that the plug of the power cord is removed from the AC outlet in the state that the power switch of the additional disk enclosure is set to OFF.



(2) Connection between existing disk enclosures and additional disk enclosures

Use the FC cable (HSSDC) provided with the additional disk enclosure or the FC cable (HSSDC) of the separately priced DE cable (NF9120-SJ04E).

Push the connector at either end of the cable into the FC-OUT connector of the existing disk enclosure until a click is heard.

The FC 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 FC cable (HSSDC) 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 additional disk enclosure.

Subsequently, use the DE diagnosis cable provided with the additional disk enclosure or the DE diagnosis cable of the separately priced DE cable (NF9120-SJ04E). Push the connector at either end of the DE diagnosis cable into the DE-DIAG connector [PORT1] on adapter 0 (ADP0) of the existing disk enclosure until a click is heard. The DE diagnosis 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 DE diagnosis cable into the DE-DIAG connector [PORT0] on adapter 0 (ADP0) of the additional disk enclosure until a click is heard.

Similarly, connect the DE-DIAG connector [PORT1] on adapter 1 (ADP1) of the existing disk enclosure to the DE-DIAG connector [PORT0] on adapter 1 (ADP1) of the additional disk enclosure.

(3) Connection between array controllers and additional disk enclosures

You need to install the additional control card (NF2300-SP02E) before connecting the additional disk enclosure with the array controller.

Push the connector at either end of the FC cable (HSSDC) into the FC connector (DEF2) for the disk enclosure of the array controller 0 (CONT0) until a click is heard. You can use the FC cable (HSSDC) provided with the additional disk enclosure or the FC cable (HSSDC) of the separately priced DE cable (NF9120-SJ04E). The FC 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 FC cable (HSSDC) into the FC-IN connector on adapter 0 (ADP0) of the additional disk enclosure until a click is heard.

Similarly, connect the FC connector (DEF3) for the disk enclosure on the additional control card installed on the other controller (CONT1) of the disk array unit to the FC-IN connector on adapter 1 (ADP1) of the additional disk enclosure.

Do not connect any cable/connector to the DEF3 connector of additional control card installed on controller 0 (CONT0) or DEF2 connector of the additional control card installed on controller 1 (CONT1).

Subsequently, use the DE diagnosis cable provided with the additional disk enclosure or the DE diagnosis cable of the separately priced DE cable (NF9120-SJ04E). Push the connector at either end of the DE diagnosis cable into the DE-DIAG connector [PORT1] on adapter 0 (ADP0) of the existing disk enclosure until a click is heard. The DE diagnosis 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 DE diagnosis cable into the DE-DIAG connector [PORT0] on adapter 0 (ADP0) of the additional disk enclosure until a click is heard.

Similarly, connect the DE-DIAG connector [PORT1] on adapter 1 (ADP1) of the existing disk enclosure to the DE-DIAG connector [PORT0] on adapter 1 (ADP1) of the additional disk enclosure.

(4) Settings of switches

a) Setting of AL-PA switch on disk enclosure

Set an AL-PA by using the AL-PA switch on each adapter of the additional disk enclosure.

The AL-PA switches on both adapters are factory-set to "1". Set an AL-PA so that it will be different from the AL-PAs of other disk enclosures in the same FC loop.

Set "0" for the AL-PA switches on both adapters in the first disk enclosure that is connected to the array controller via the FC cable (HSSDC). If you have installed additional disk enclosures, set the AL-PA switches on both adapters of each additional disk enclosure to "1", "2", ... "5", and then "6" in the connection order.

If you set different values for the AL-PA switches on the right and left adapters of an additional 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 AL-PA switches, and then turn on the power.

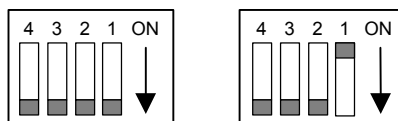
b) Setting of DE-DIAG ID switch on disk enclosure

Set a DE-DIAG ID by using the DE-DIAG ID switch on each adapter of the additional disk enclosure.

Set "0" for all the DE-DIAG IDs of the adapters installed in the disk enclosure that is connected with the standard controller in the array controller via the FC cable (HSSDC).


If an additional control card (NF2300-SP02E) is installed in the array controller, set "1" for all the DE-DIAG IDs of the adapters installed in the disk enclosure that is connected with the additional control card via the FC cable (HSSDC).

The DE-DIAG ID switch is factory-set to "0".



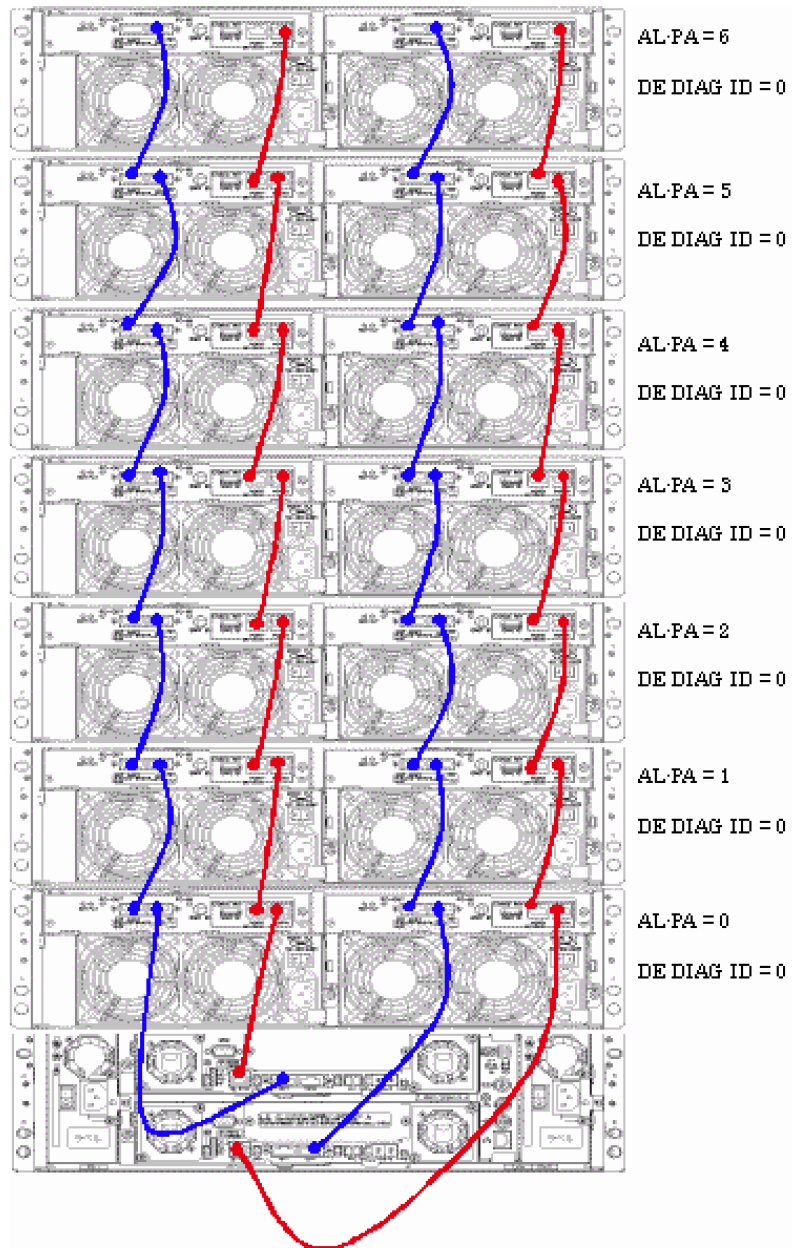
When DE-DIAG ID = "0" When DE-DIAG ID = "1"

The set value of each switch on a disk enclosure is shown in pages 23 and 24.

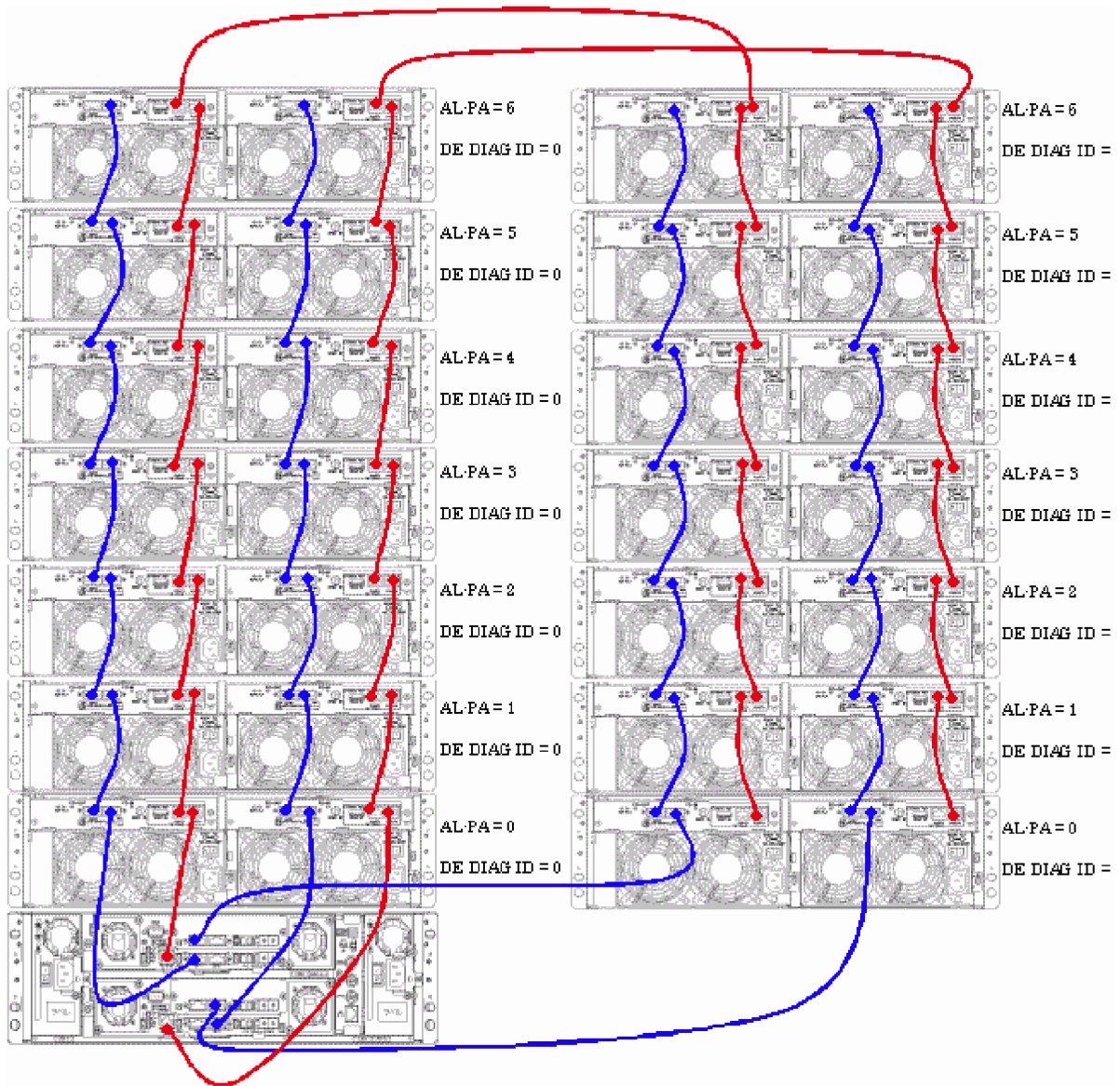
 The disk array unit cannot use the disk enclosure only if the disk enclosure is installed additionally. Provide the proper setting for the disk enclosure by using the "NEC Storage Manager" or contact the service engineer with the expert knowledge.

Outline of cable connections on disk enclosures and settings of AL-PA/DE-DIAG switches



Sample configuration 1: NF2300-SR4xxE



Sample configuration 2: NF2300-SR4xxE + NF2300-SP02E



5.3 Connection of Power Cords

⚠ WARNING	
	■ Do not concentrate power cords only to some AC outlets. If so, fire may occur.
	■ Do not connect the plug of a power cord to an AC outlet with a wet hand. If so, you may be electrically shocked.
	■ Do not put a heavy substance on a power cord. If so, the coating of the power cord may be broken, fire may occur, and/or you may be electrically shocked.

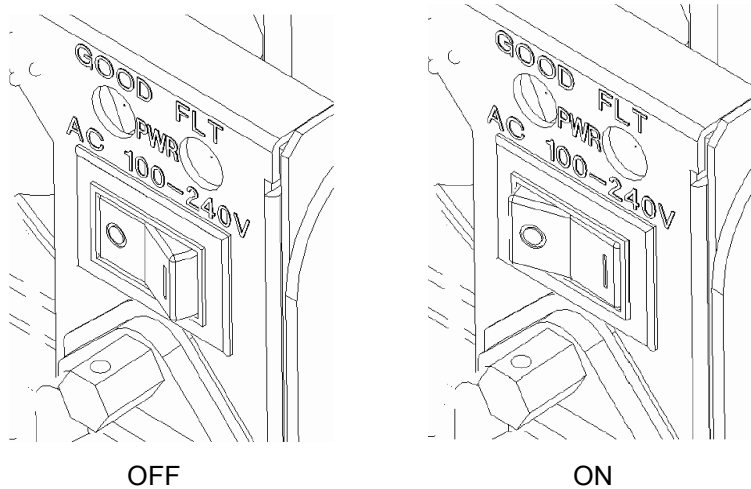
Be sure to use the power cords provided with the additional disk enclosure or NEC-specified power cord.

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

Connect the power cords in the following procedure.

(1) Check of power supply

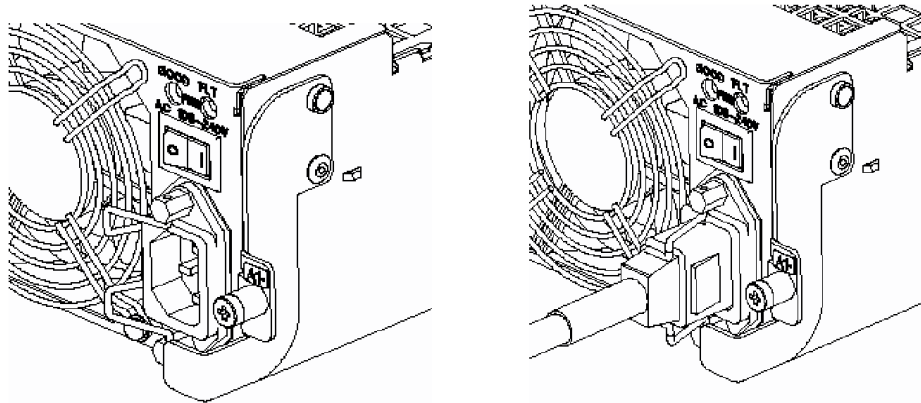
Check that the power switch of the additional disk enclosure is set to OFF.



(2) Connection of power cord

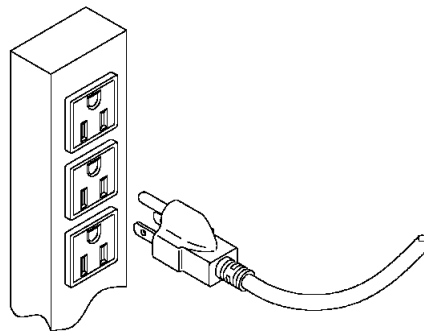
Insert the provided power cord or the NEC-specified power cord to the plug on the power supply of the disk enclosure.

When connecting the power supply of the disk enclosure, push down the power cord stopper toward the left, 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 provided power cord or the NEC-specified power cord to an AC outlet. Because the plug has an earth pin, use an AC outlet with earth terminal for the connection as shown in the figure below.



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

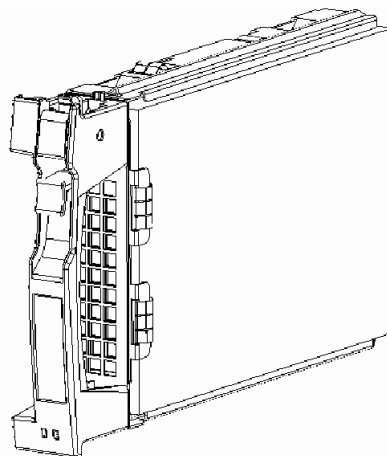
6. ADDITION OF OPTIONAL DEVICES


6.1 Addition of Disk Drive

⚠ CAUTION	
 	<ul style="list-style-type: none">■ Do not store the product 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 product in an area with much moisture or dust.■ Note that foreign substances such as water and metal may not be entered into the product during storage. Failure to follow it may cause device failure, electric shock, and/or fire to occur.■ Keep the product into the package during storage or shipment.

The additional disk enclosure is not normally equipped with disk drives. Before using the additional disk enclosure, install disk drives sold separately in the additional disk enclosure. (The additional disk enclosure can be equipped with up to 15 disk drives.

Product name	Part number	Capacity
Additional disk drive	NF2300-SM412E	36GB / 10,000 rpm
Additional disk drive	NF2300-SM413E	73GB / 10,000 rpm
Additional disk drive	NF2300-SM414E	147GB / 10,000 rpm
Additional disk drive	NF2300-SM422E	36GB / 15,000 rpm



	<ul style="list-style-type: none">■ If an additional disk drive and standard disk drive are reassigned to the same logical disk, all the current data is initialized. Be sure to make backup copies of necessary data before performing the addition procedure. To use additional disk drives for expansion, install them sequentially from left to right of the disk enclosure.■ An additional disk drive can also be used as a disk drive for a spare disk. In this case, be sure to install the additional disk drive in slot 14 of the disk enclosure. If slot 14 already contains a disk drive for a spare disk, install the additional disk drive in slot 13.
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When you change a failing disk to a spare disk, confirm the following to get the spare disk to function normally:

- The capacity of the spare disk is equal to or greater than that of the failing disk.
- The rotational speed of the spare disk is equal to or faster than that of the failing disk.

Therefore, if a large-capacity disk is defined as a spare disk, it can cover all the disks of a high-speed drive. However, 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 2 spare disks can be installed for each disk enclosure. Up to 16 spare disks can be installed for the entire disk array unit.

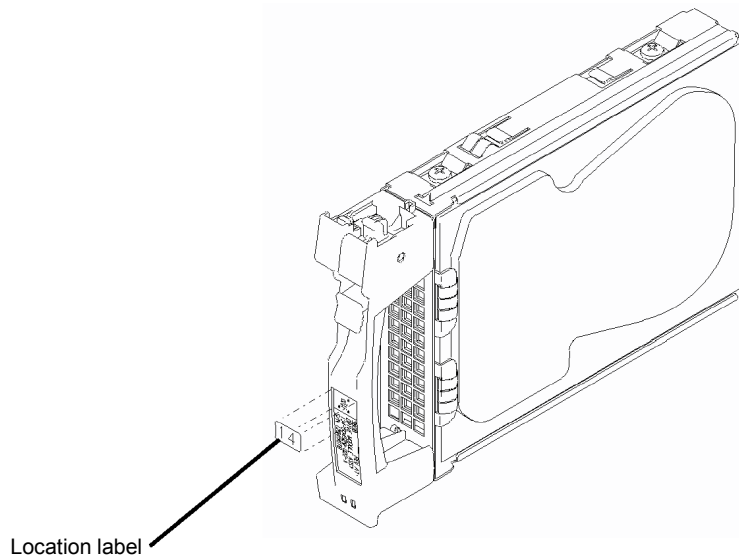
<Installation procedure>

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

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

(1) Putting of location label

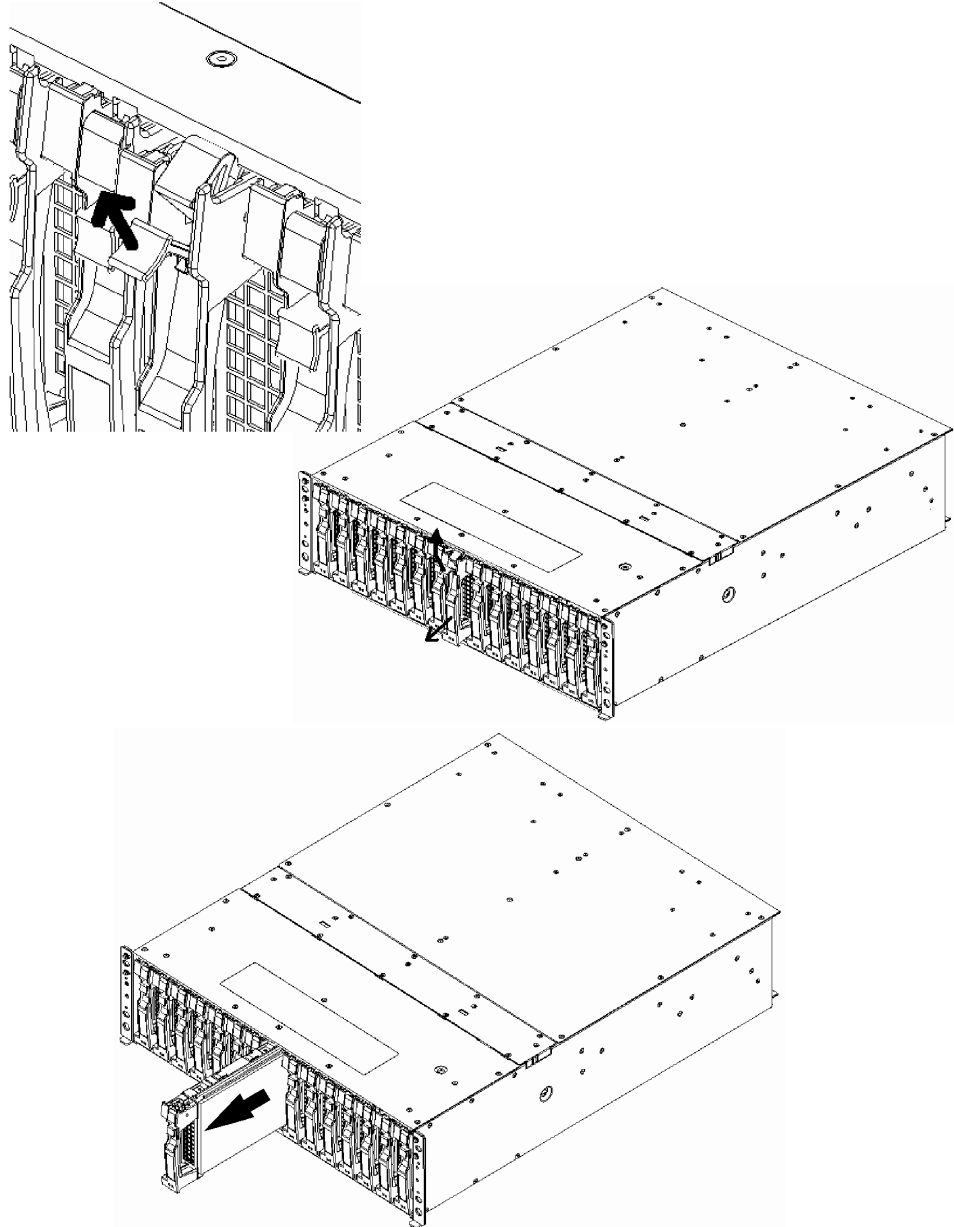
Before installing the disk drive, select the location label appropriate to the location where the disk enclosure is to be installed, and put it on the additional disk drive.



(2) Removal of dummy tray

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

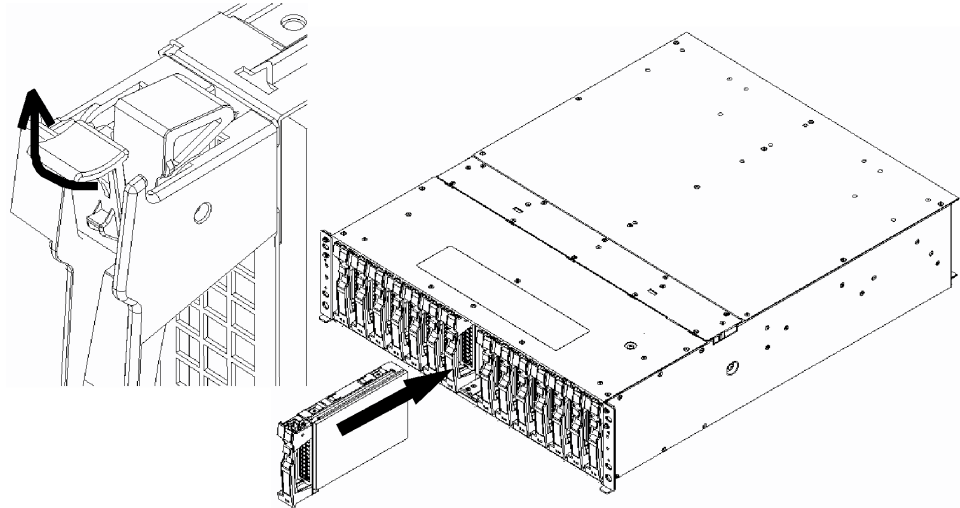
If the lock is released, hold the handle and pull out the dummy tray.



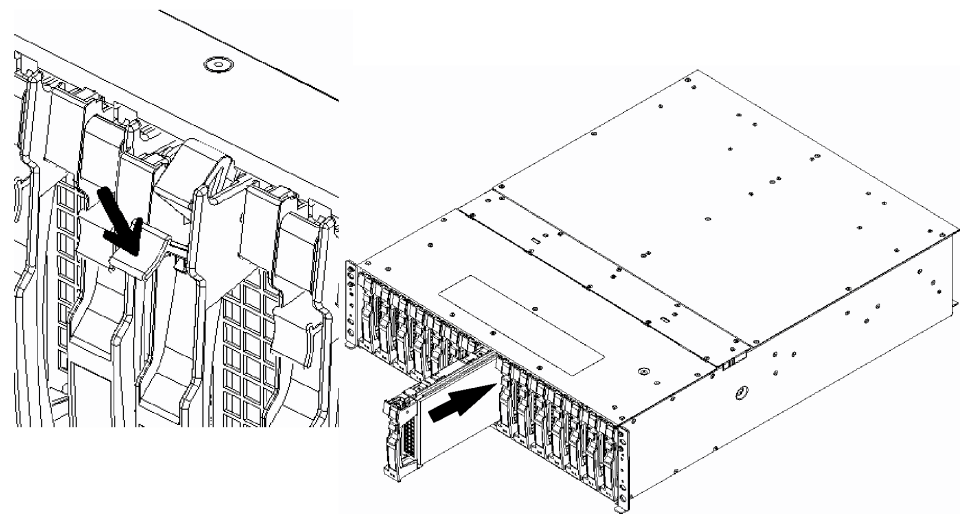
- Be sure to keep removed dummy trays in the designated place.
- After removing an additional disk drive from the unit, be sure to install a dummy tray into the slot. If using the unit without a dummy tray being installed, cooling effect on the disk drives lowers and causes heat generation. Heat generation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

(3) Installation of disk drive

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



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



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

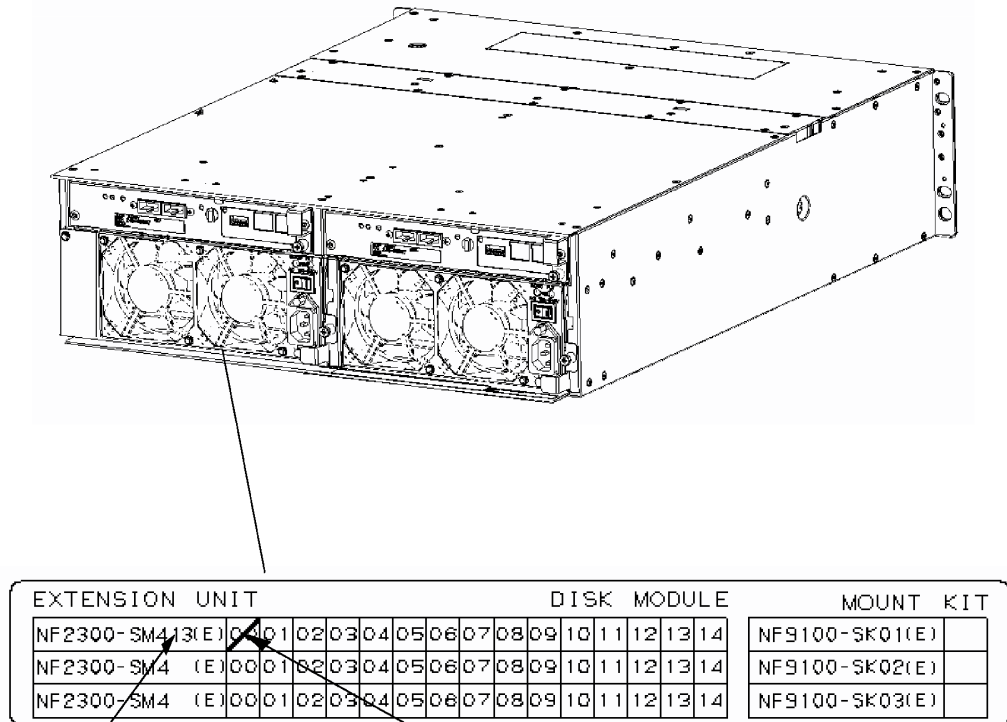


The disk array unit cannot use the disk drive only if the disk drive is installed additionally. Provide the proper setting for the disk drive by using the "NEC Storage Manager" feature of the disk array unit or contact the service engineer of the maintenance service agent with the expert knowledge.

(4) Writing information on option label

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

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



Enter the last two digits of model number ("13" in the example).

Write down a check mark as shown in the figure.

Note: The figure above indicates that a single NF2300-SM413E is installed at location '00' in NF2300-SE41E.

If NF2300-SM412E is added, enter the last two digits of model number ("12") in "NF2300-SM4 (E)" field. Write down a check mark at the location in which the disk drive is installed, which appears in the area to the right of the model number field.

Similarly, if NF2300-SM413E or NF2300-SM422E is added, enter the last two digits of model number ("13" or "22") in "NF2300-SM4 (E)" field. Write down a check mark at the location in which the disk drive is installed, which appears in the area to the right of the model number field.

If disk drives are installed at locations '00' and '01,' write down check marks at the '00' and '01' fields.

7. HANDLING OF ADDITIONAL DISK ENCLOSURE

This chapter describes how to handle the additional disk enclosure.

7.1 Notes on Handling of Additional Disk Enclosure

Note the following in use of the additional disk enclosure. Invalid handling of the additional disk enclosure may cause it to be defected and/or some data to be broken.



- If the HDD READY LED (green) blinks, the disk access operation is indicated on the host system, or the initialization is being operated, do not turn on/off the powers of the additional disk enclosure. Do not reset the host system.
- If the HDD READY LED (green) is lit or blinks and the disk access operation is indicated on the host system, do not give vibrations and shocks to the additional disk enclosure.
- Because the additional disk enclosure is a precision device, it shall not be subject to hard vibration or shock.



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



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

7.2 Power On/Off of Additional Disk Enclosure

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

(1) AC power-on

- a) Before turning on the AC power, check for loose disk drives by pushing each disk drive.

- b) Turn on all the disk enclosures connected with the array controller, and then turn on the array controller. Alternatively, turn on the array controller and all the disk enclosures connected with the array controller at the same time.

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

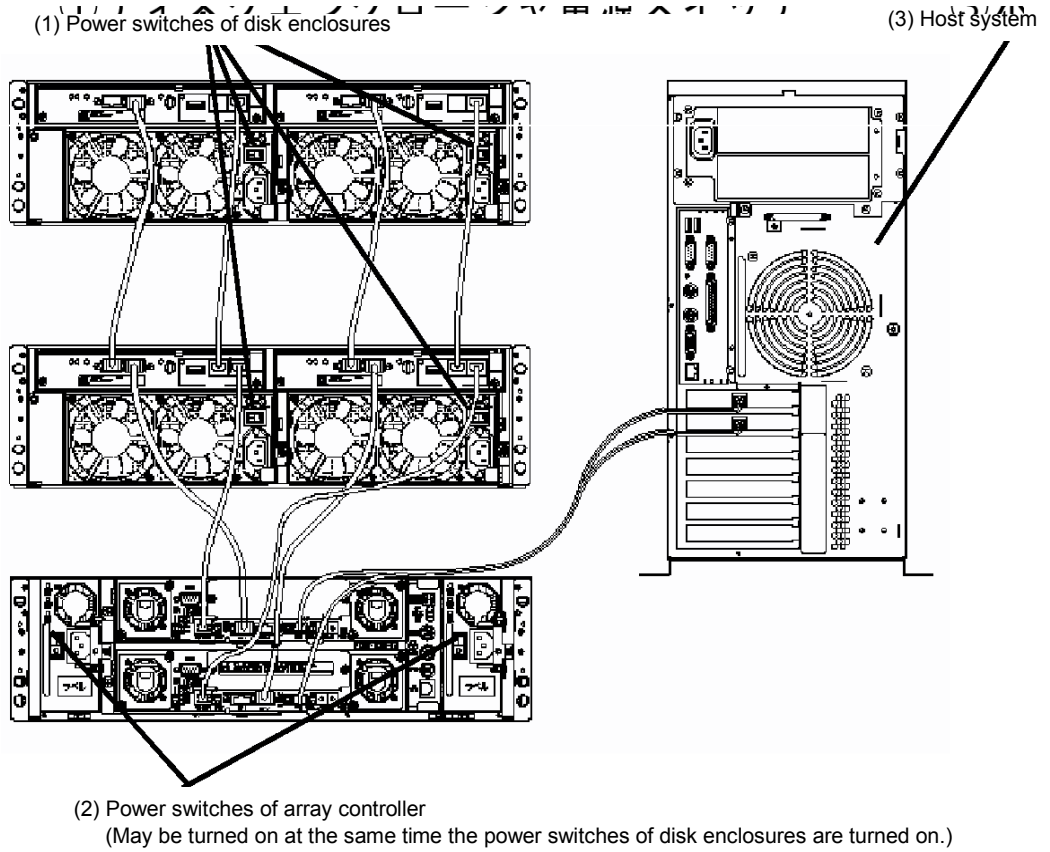
When turning on the power switches, confirm that the POWER GOOD LED (green) of the power supply and the POWER LED (green) on the front panel of the unit go on. Power supply starts, and the POWER LED (green) is on while the power switches are on.

The additional disk enclosure performs the self-test and initialization immediately after the power is turned on. When the self-test and initialization terminate and the disk enclosure becomes ready, the READY LED of the adapter stops flashing and enters the on state. The READY LED of the controller installed on the disk array unit also stops flashing and enters the on state.

The additional disk enclosure (including the connected disk array unit) takes four minutes (at maximum) to start.

[Power-on procedure]

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



(2) Notes on turning off AC power

The disk array unit to be connected with the additional disk enclosure periodically writes data from the cache memory onto a disk. If you turn off the AC power before completion of write to the disk, the remaining data on the disk is backed up by the battery backup units.

However, the backup time is limited (4 days if the cache memory has the allowable maximum capacity and the two battery backup units are fully charged). To securely protect data, turn off the AC power after all the data has been written from the cache memory in the disk array unit onto the disk. Turn off the AC power according to the procedure explained in "(3) Turning off AC power".

1. Turn off the host system and the host bus adapter or the FC-AL switch. Alternatively, offline all the buses connected to the host system that is connected with the disk array unit.
2. If NEC Storage DynamicDataReplication is used, execute the Unpair command.
3. Turn on the shut down switch (toggle switch with SHUT DOWN indicated) of the LAN card in the array controller. (*1)
4. Confirm that [SDN LED] of the LAN card in the array controller is on, and then turn off the AC power according to the procedure explained in "(3) Turning off AC power".
[SDN LED] flashes while data remaining in cache memory is being written onto the disk drive. Do not turn off the AC power while it is flashing. (*2)

Relationship between [SDN LED] states and operations of the disk array unit:

Normal state:	Off
During cache data write onto disk:	Flashing
Completion of cache data write onto disk:	On

Writing cache data onto a disk drive usually takes about 10 minutes and 20 minutes at maximum.

If cache data is not written onto a disk drive normally, the LEDs of the LAN card enters the following states. In this case, contact your maintenance service agent.

RDY LED:	On
FLT LED:	Flashing
SDN LED:	Off

5. Turn off the shut down switch (toggle switch with SHUT DOWN indicated) of the LAN card in the array controller. (*3)

- *1 – The shut down switch has a locking mechanism. To turn on/off the switch, hold and raise the lever.
 - While the shut down switch is on, the disk array unit does not accept any I/O operation by the host system.
(The Link UP LEDs of the controller's HL0 and HL1 go off.)

- *2 – If you turn off the AC power of the disk array unit during write operation (with SDN LED flashing) by mistake, the backup mode is enabled. (In this case, the controller's [BAT LED] goes on.)
 - If you turn off the AC power of the disk array unit during write operation (with SDN LED flashing) by mistake, turn on the AC power of the entire disk array unit (including the power of the additional disk enclosure) again. When the disk array unit has started (when the READY LED of the controller on the array controller stops flashing and enters the on state), turn off the shut down switch and then turn it on to complete the write operation.
 - Even if you turn off the AC power after [SDN LED] goes on, [BAT LED] goes on in the following case:
NEC Storage DynamicDataReplication is used, but you attempt to write the remaining cache data before executing the Unpair command.
In the above case, turn on the AC power of the entire disk array unit again. When the disk array unit has started (when the READY LED of the controller on the array controller board stops flashing and enters the on state), turn off the shut down switch. Then, execute the Unpair command for paired disks under NEC Storage DynamicDataReplication, and turn on the shut down switch to complete the write operation.

- *3 – Even if you forget to turn off the shut down switch, the disk array unit starts normally when being turned on next time, and accepts I/O operation by the host system. (Normal operation)
 - Turning off the shut down switch does not influence general operation of the disk array unit.
 - When turning off the disk array unit again, turn off the shut down switch and then turn it on. The system starts writing data remaining in cache memory onto the disk drive.

(3) Turning off AC power

Turn off the powers of the additional disk enclosure and disk array unit in the following procedure.

- a) Turn off the host system or FC-AL switch, and then perform the procedure explained in "(2) Notes on AC power-off".
- b) After finishing the operation in a, turn off the array controller and then all the disk enclosures including additional disk enclosures. Alternatively, turn off the array controller and all the disk enclosures including additional disk enclosures connected with the array controller at the same time.

The additional disk enclosure has the redundant power configuration to prevent the entire unit from shutting down due to a single failure. Therefore, when turning off the disk array unit, turn off the two power switches at the rear of the disk enclosure.

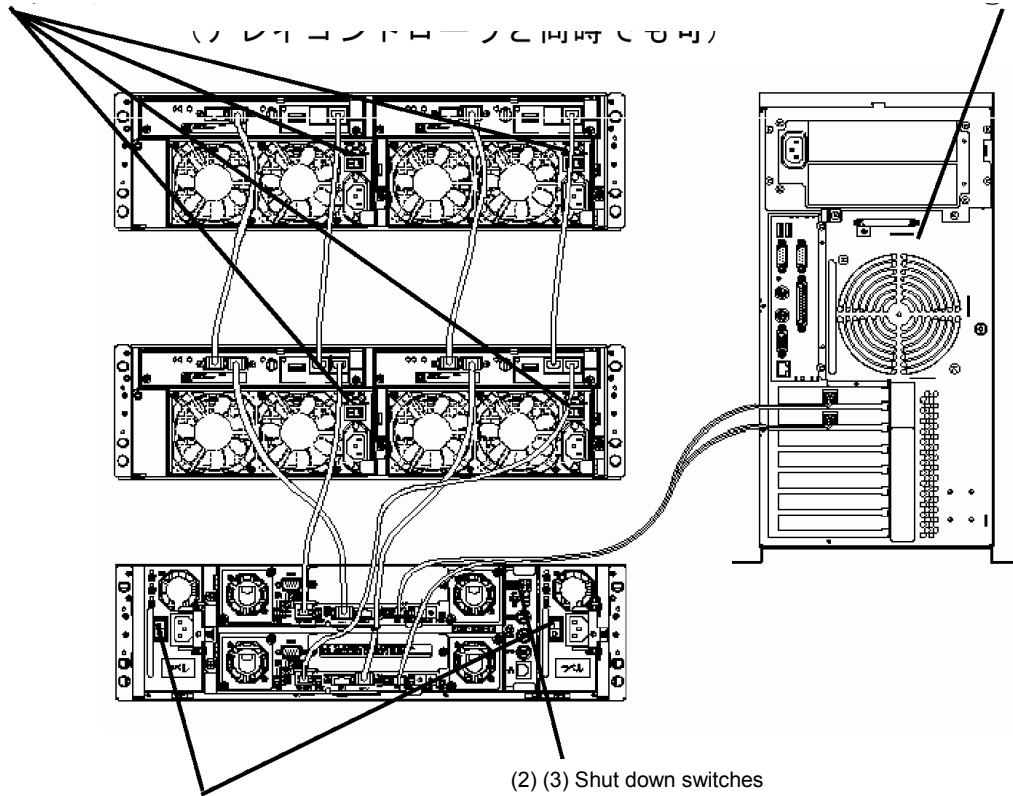
Be careful that data may be lost if you turn off the disk enclosures before the array controller.

[Power-off procedure]

Turn off the power switches in the following order (1) to (5):

- (5) 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



(4) Power switches of array controller

7.3 LD (Logical Disk) Setting Procedure

To use the additional disk enclosure, first install the disk drive and then set the RAID level of the installed disk drive, and assign the logical disk (LD) configuration. When the disk drives are added, the RAID level and logical disk (LD) must be set appropriately. Set the RAID level by using the "NEC Storage Manager", or contact the service engineer with expert knowledge in your service representative for setting of the RAID level.



If the disk array unit is connected with NF9520-SH01E, changing the LD (logical disk) configuration may cause the OS to fail to recognize the logical disks.
Be sure to restart the host system after changing the LD configuration.

7.4 Spare Disk Setting Procedure

Spare disk can be set only in RAID level 1, 5, or 10.

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



For spare disk, make sure to assign the disk drive in slot 14.
If slot 14 already contains a disk drive for a spare disk, install the additional disk drive in slot 13.



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

- The capacity of the spare disk is equal to or greater than that of the failing disk.
- The rotational speed of the spare disk is equal to or faster than that of the failing disk.

Therefore, if a large-capacity disk is defined as a spare disk, it can cover all the disks of a high-speed drive. However, 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 2 spare disks can be installed for each disk enclosure. Up to 16 spare disks can be installed for the entire disk array unit.

8. ACTION TAKEN AT OCCURRENCE OF FAULT OR ERROR



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



For the installation of two or more disk drives or the change of disk drive installation positions, perform the job for the disk drives one by one. The change of disk drive installation positions with any logical disks assigned may cause some data to be lost.

WARNING



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

CAUTION



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

8.1 Countermeasures Taken when Occurrence of a Fault is Suspected

If you suspect the occurrence of a fault during the use of the additional disk enclosure, 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 the maintenance service agent.

The POWER LED (green) does not go on if the power switch is turned on.	
Cause	Countermeasures
The power cord is not connected.	Check the connection of the power cord after setting the power switch to OFF.
The AC power (100 - 240 VAC) is not supplied.	Check whether 100 - 240 VAC \pm 10% (50/60 Hz) is supplied.

The LINKUP LED (green) of the controller on the array controller connected with the FC cable or the LINKUP LED (green) of the adapter in the disk enclosure does not go on.	
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 ADDITIONAL DISK ENCLOSURE".
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 manuals of the host bus adapter, host unit, and those of added peripherals.
The used host bus adapter is unavailable for the disk array unit to which the additional disk enclosure is connected.	Use the host bus adapter available for the disk array unit. Contact your sales agent if unknown.

The FAULT LEDs (orange) on both adapters blink.	
Cause	Countermeasures
The AL-PA switch on the adapter is set incorrectly.	After setting the power switch to OFF, set the AL-PA switches on the left and right adapters to be the same. See Section 3.4 "Adapter".

The host system cannot recognize the additional disk enclosure.	
Cause	Countermeasures
The FC cable is not connected correctly.	Connect the FC cable correctly according to 5 "CONNECTION OF ADDITIONAL DISK ENCLOSURE".
After turning on the power switch of the host system, host bus adapter, or FC-AL switch, the power of the disk array unit to which the additional disk enclosure is connected is turned on.	See Section 7.2 "Power On/Off of Additional Disk Enclosure".
The AL-PA is set to match that of another disk enclosure.	Set an AL-PA different from the AL-PAs of other FC devices according to Chapter 5 "CONNECTION OF ADDITIONAL DISK ENCLOSURE".
The additional disk enclosure is installed in an area in which it easily suffers vibration and/or shocks.	Install the additional disk enclosure referring to Chapter 1 "NOTES ON INSTALLATION AND HANDLING OF ADDITIONAL DISK ENCLOSURE".
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 additional disk enclosure is not assigned.	Assign the logical disk number appropriately using the "NEC Storage Manager" or contact your service representative.

8.2 Indication at Occurrence of Fault

If the additional disk enclosure is defected, the SERVICE LED goes on orange and also the LED specific for each unit to indicate that the unit is defected goes on.

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

LED display	Defected unit
The SERVICE LED on the disk enclosure is lit orange and also the FAULT LED on the disk drive is lit orange.	The disk drive with the FAULT LED being on is defected.
The SERVICE LED on the disk enclosure is lit orange and also the FAULT LED on the adapter is lit orange.	The adapter with the FAULT LED being on is defected.
The SERVICE LED on the disk enclosure is lit orange and also the POWER FAULT LED on the power supply for the disk enclosure is lit orange.	The power supply for the disk enclosure with POWER FAULT LED being on is defected (including cooling fan for power supply failure).

8.3 Fault of Disk Drive

If a disk drive is defected, the SERVICE LED on the array controller is lit orange. In addition, the SERVICE LED on the additional disk enclosure in which the defected disk drive is installed and the FAULT LED on the defected disk drive are lit orange.

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

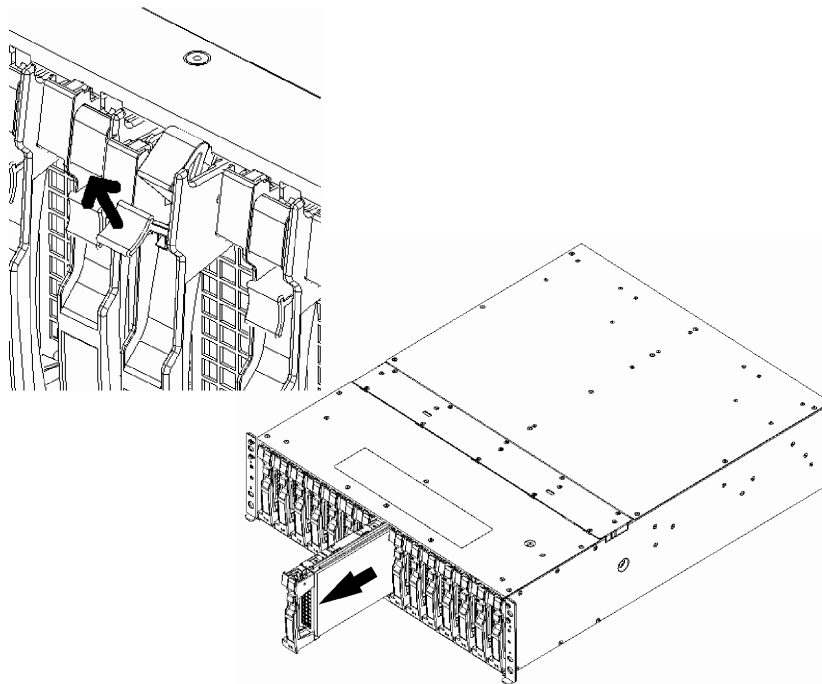
If the FAULT LED on a disk drive is lit, the fault of the other disk with the same LDN causes the data to be lost due to interruption of redundancy. If the FAULT LED on a disk drive is lit, replace the disk drive immediately. Perform the replacement job as quick as possible. Do not operate the additional disk enclosure for a long time in the state that the disk drive is pulled out.

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

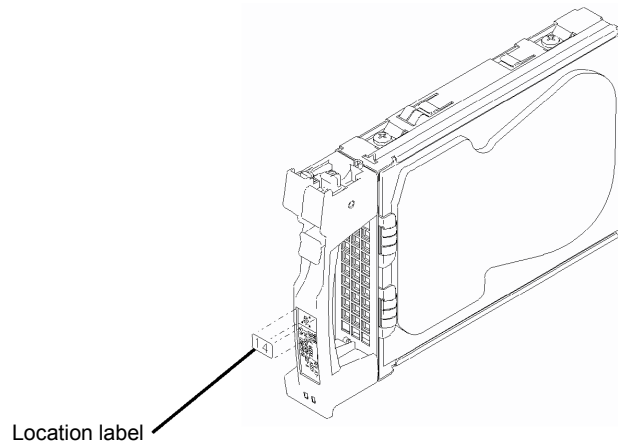
<Replacement procedure>

- (1) Confirm the defected disk drive with the FAULT LED on the disk drive being on.
- (2) Pull the ejector of the defected disk drive toward you to release the lock. When the lock is released, a click occurs. After the lock is released, hold the handle to pull out the disk drive.

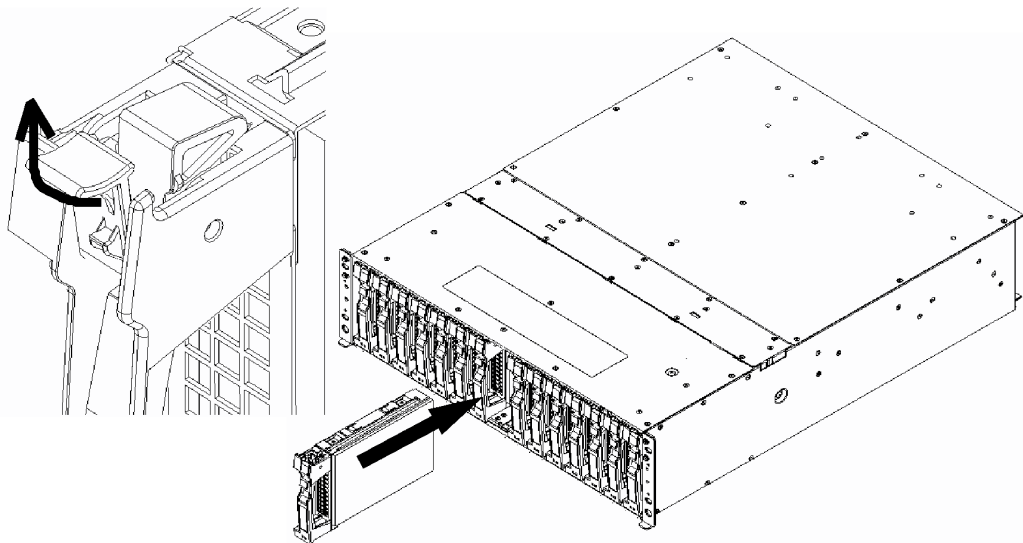
While the disk drive is pulled out, wait until the revolution of the installed hard disk is stopped (for about 30 seconds) in the middle of the slot.



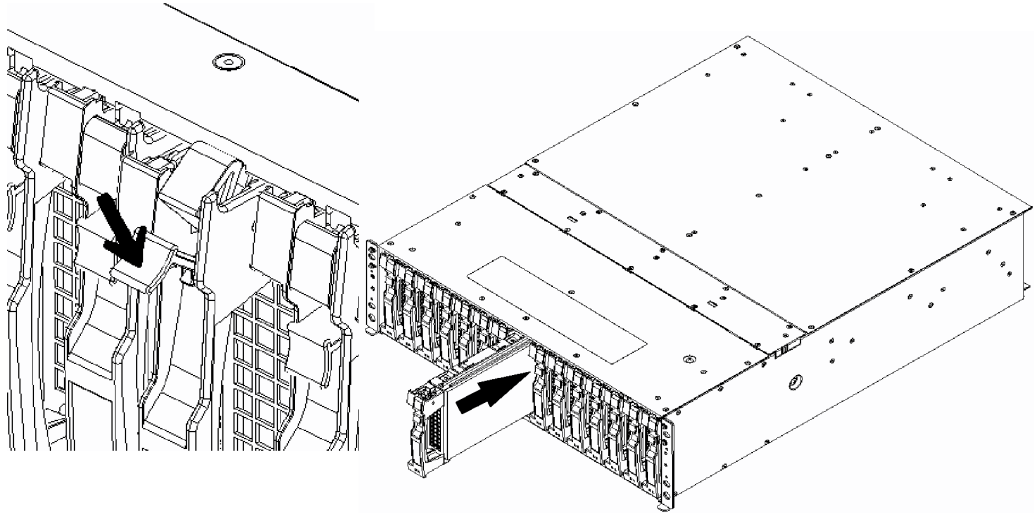
- (3) Select the location label having the same location as that of the defected disk drive from the location label provided with the replacing disk drive, and then put the label on the replacing disk drive.



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



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



When inserting the disk drive into the disk enclosure, push it as far as it will go and then lock the ejector. Incorrect insertion may cause 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 recovery. Otherwise, the reduced state ("reduce" shown as the logical disk status) remains.
- Setting the auto repair feature to ON in recovery wait state does not start recovery. The setting is enabled starting with the next recovery.

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

8.4 Fault of Power Supply for Disk Enclosure

If the power supply for the additional disk enclosure is defected, the SERVICE LED on the array controller is lit orange. In addition, the SERVICE LED on the additional disk enclosure in which the defected power supply is installed and the POWER FAULT LED on the defected power supply are lit orange.

The defected power supply for the disk enclosure may be replaced with the powers of the array controller and additional 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 are heating units of the disk enclosure:

A) Disk drives

B) Power supplies for the disk enclosure

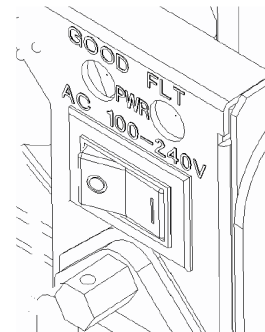
The fans in the power supplies for the disk enclosure serve as cooling fans for both of the above. Therefore, do not leave the disk enclosure with one of the power supplies removed. Doing so causes the disk drive temperature to rise, which may significantly decrease the reliability.

<Replacement procedure>

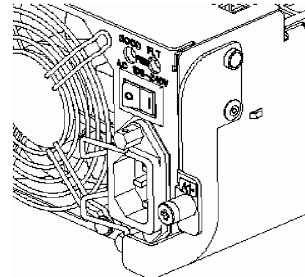
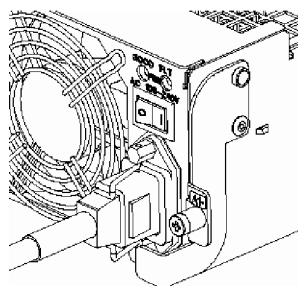
- (1) Turn off the power switch of the defected power supply for the disk enclosure. Push down the power cord stopper (for the power cord) toward the left, release the power cord stopper from the receptacle of the power cord, and then remove the power cord.



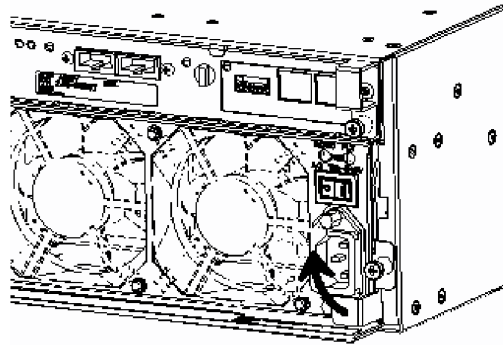
ON



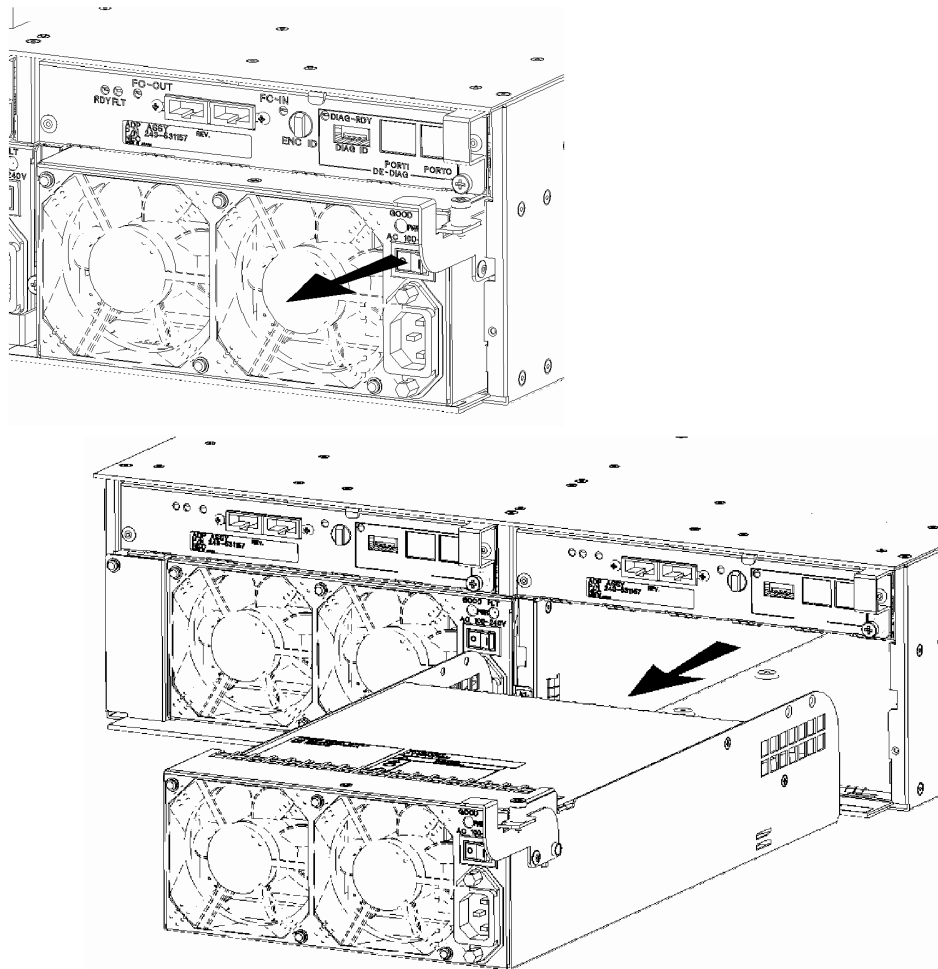
OFF



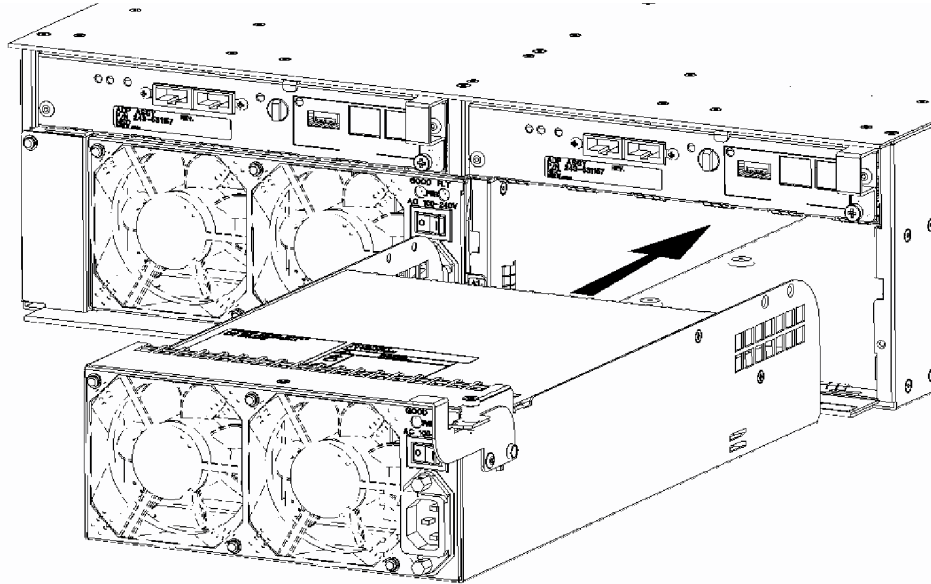
- (2) Loosen a screw securing the ejector, put your finger on the protrusion (shown in the figure) of the ejector, and pull it toward you.



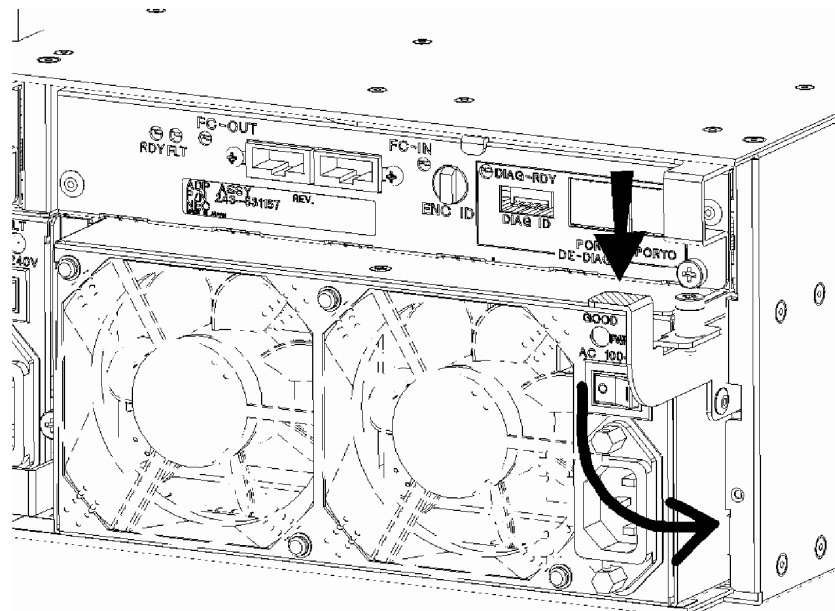
When the ejector turns by 90°, pull out the defected power supply.
When the defected power supply comes out, hold it with both hands and slowly remove it.



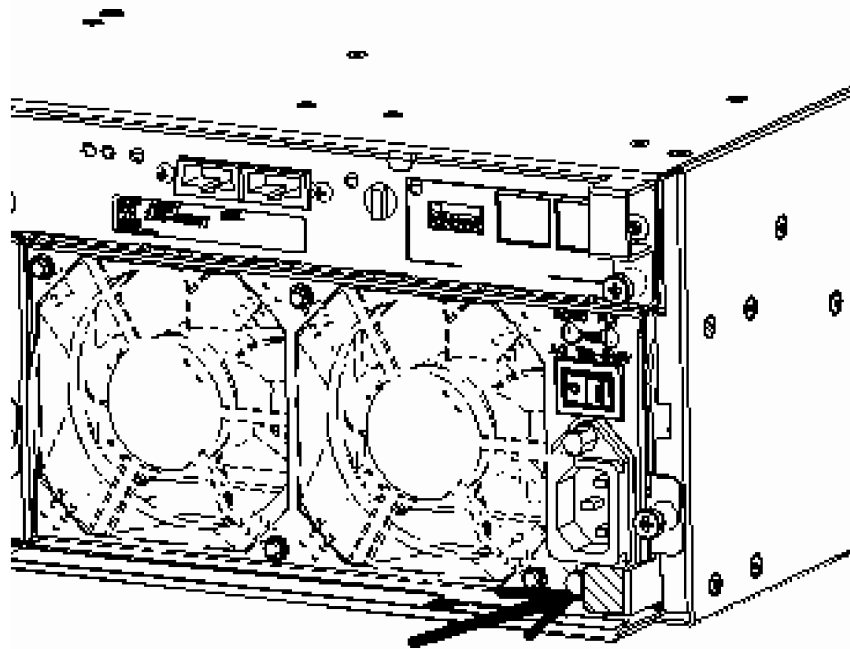
- (3) Confirm that the power switch of the new power supply for the disk enclosure is off and the power cord is disconnected from the power plug.
- (4) With the ejector pulled toward you, hold the new power supply for the disk enclosure with both hands and insert it into the slot.



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

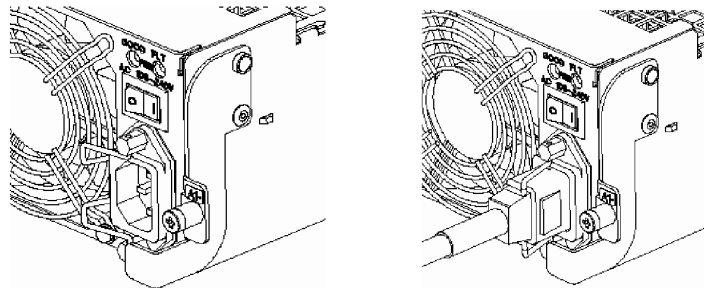


- (6) Strongly push the ejector (the part indicated by the arrow in the figure) until the new power supply for the disk enclosure is inserted firmly, and secure the ejector with the screw.



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 power supply failure again.

- (7) When connecting the power cord to the power supply of the disk enclosure, push down the power cord stopper toward the left, insert the power cord, and secure the power cord by firmly fitting the power cord stopper into the receptacle of the power cord. After that, turn on the power switch.



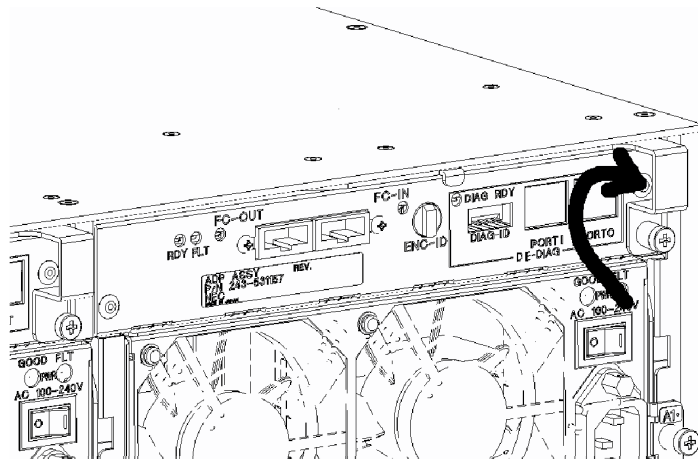
8.5 Fault of Adapter

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

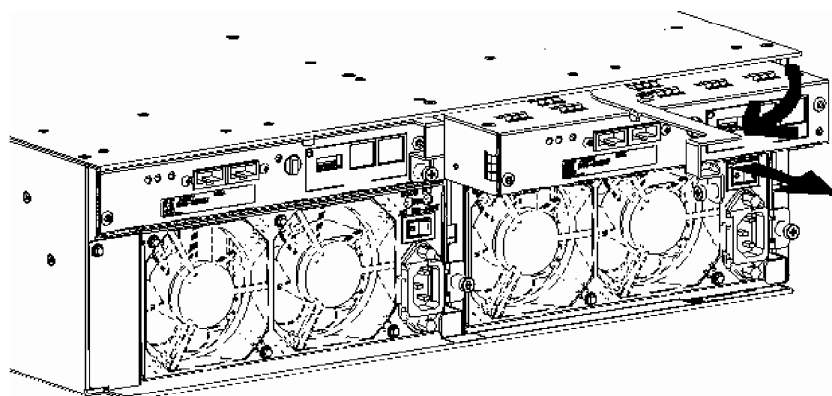
The defected adapter may be replaced with the powers of the array controller and additional disk enclosure remaining ON.

<Replacement procedure>

- (1) Confirm the defected adapter with the FAULT LED on the adapter being on. Remove all the cables connected to the defected adapter. Write down the connections between the cables to be removed and the mating connectors.
- (2) Loosen a screw securing the ejector, put your finger on the protrusion (shown in the figure) of the ejector, and pull it toward you.



- (3) When the ejector turns by 90°, pull out the defected adapter.



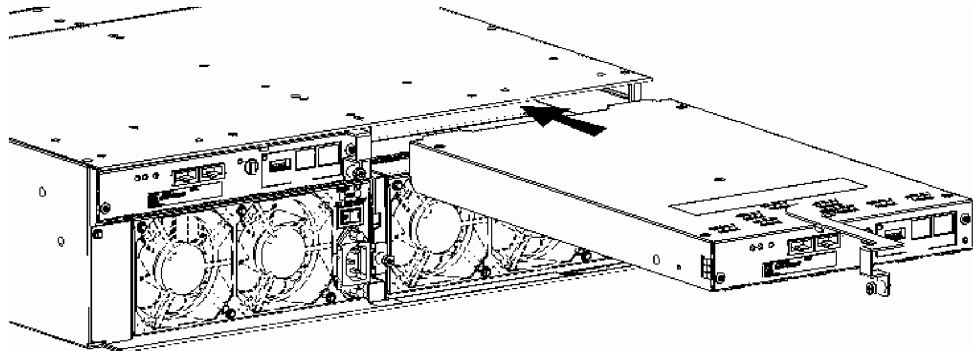
Be careful that it is hot.

- (4) Set the AL-PA and DE-DIAG ID of the adapter for replacement to be the same as those of the defected adapter.

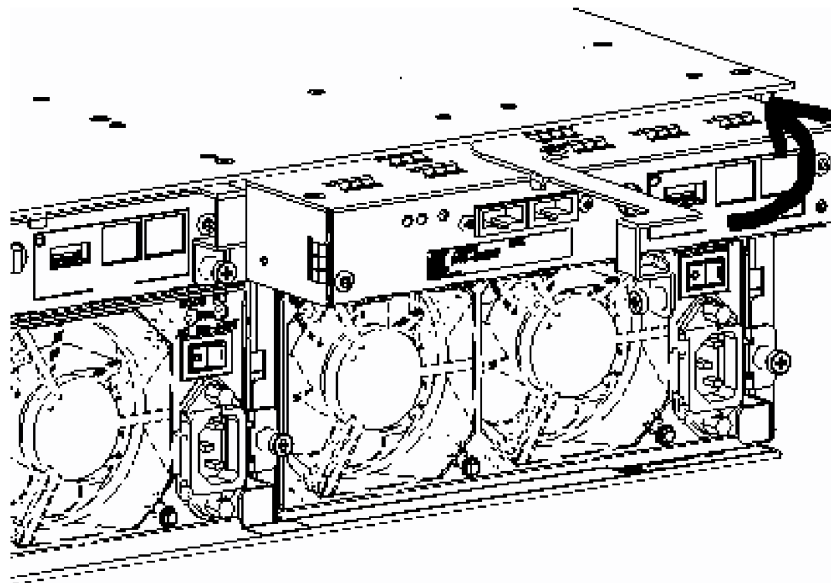


Before replacing the adapter, make sure that the AL-PA switch of the adapter for replacement is set to the same value as that of the defected adapter, as well as the sound adapter. If the adapter is installed with different setting of AL-PA switch, a link failure may occur in the worst case.

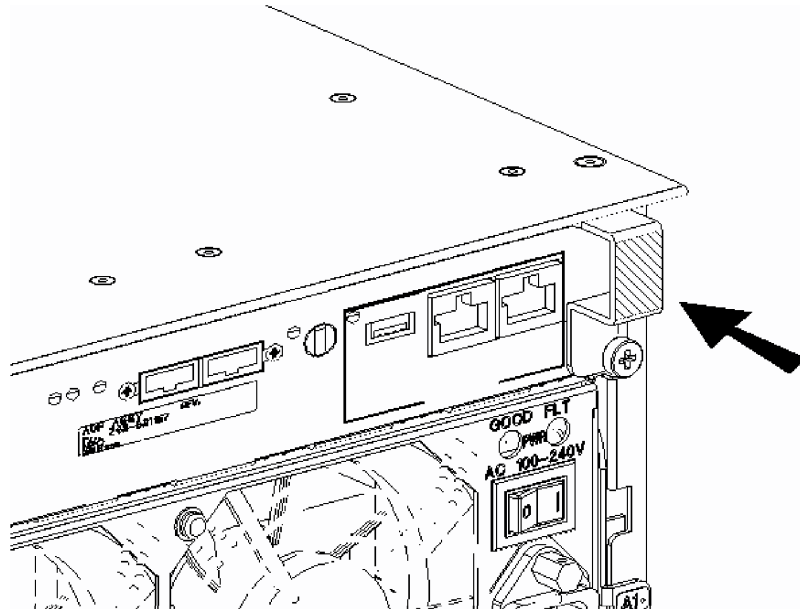
- (5) Insert the adapter for replacement to the slot with the ejector remaining opened until the adapter is carried to the end securely.



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



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

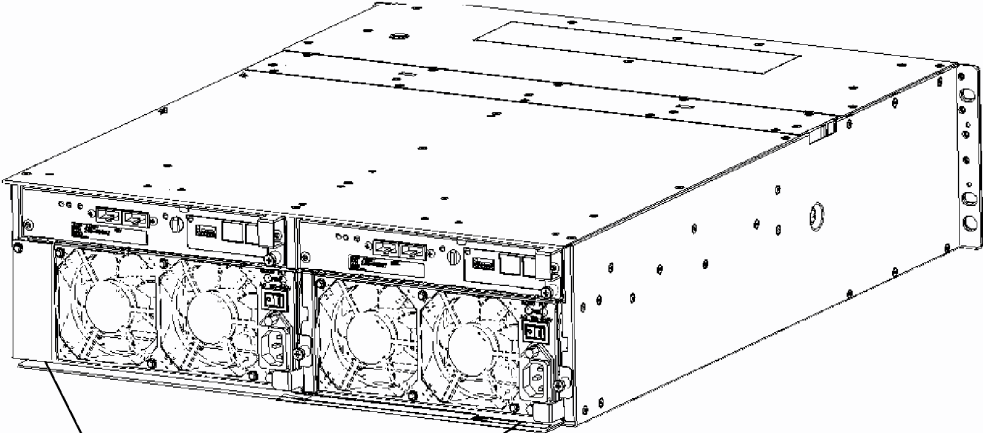


When inserting the adapter into the disk enclosure, push it as far as it will go and then secure it with the screws.
Incorrect insertion may cause malfunction.

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

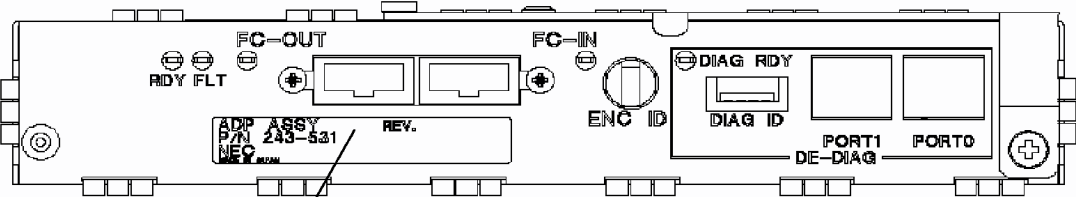
8.6 Check of Type Name and Manufacturing Numbers

The types name and manufacturing number of the additional disk enclosure are shown at the locations in the figure below

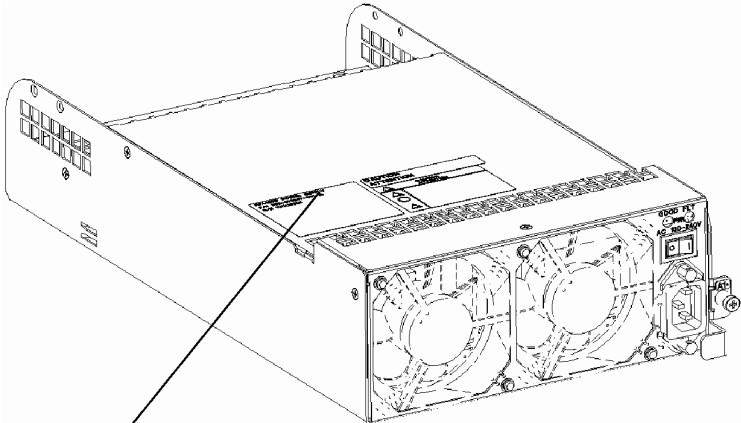


Manufacturing number label of disk enclosure

Manufacturing number label of basic enclosure



Manufacturing number label of adapter



Manufacturing number label of power supply for disk enclosure

8.7 Preparation before Phone Call

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

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

8.8 Service and Support

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

8.9 Unit Life/Repair Service Period

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

- Service life of the additional disk enclosure: 5 years (*1)
- Extended life after overhaul: 2 years (*2)
- Repair service period: 5 years after stopping of the production

Note that the following additional disk enclosure may not be repaired:

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

*1 The repair service is not available for the additional disk enclosure that has reached its service life.

Be sure to make a hardware maintenance contract, and get the additional disk enclosure to be overhauled (at a cost).

*2 Even if the additional disk enclosure is overhauled when it is 5 years old, the repair service is no longer available when it becomes 7 years old.

8.10 Disposal of Additional Disk Enclosure

Dispose of the additional disk enclosure according to local ordinance. Contact your local government for details.

9. PRODUCT SPECIFICATION

9.1 Basic Specification of Additional Disk Enclosure

The table below shows the basic specification of the additional disk enclosure.

Physical sector length (bytes/sector)	512 bytes
Maximum number of disk drives per unit	15 max. No disk drive is installed in the normal specification.
Disk drive interface	FC-AL (Copper)

9.2 Optional Components

The table below lists the optional components of the additional disk enclosure.

P/N	Product name	Qty	Remarks
NF2300-SM412E	Additional disk drive	1	36GB / 10,000 rpm
NF2300-SM413E	Additional disk drive	1	73GB / 10,000 rpm
NF2300-SM414E	Additional disk drive	1	147GB / 10,000 rpm
NF2300-SM422E	Additional disk drive	1	36GB / 15,000 rpm
NF9100-SK01E	Rack mount kit	1	For HP rack
NF9100-SK02E	Rack mount kit	1	For Sun StorEdge expansion rack
NF9100-SK03E	Rack mount kit	1	For old Express-series rack
NF9120-SJ04E	DE cable	1	2 HSSDC cables (5 m) 2 DE diagnosis cables (5 m)

9.3 Environmental Conditions of Additional Disk Enclosure

The table below shows the environmental conditions of the additional disk enclosure.

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

*1 Without condensation

*2 The halting status includes the packaged status in shipping carton and the storage status.

9.4 Power Specification

The table below shows the power specification of the additional disk enclosure.

	Additional disk enclosure
Input voltage	100 to 240 VAC \pm 10%, 50/60 Hz
Maximum power consumption	520 VA

* *While the additional disk enclosure can accept the power of 100 - 240 VAC (50/60 Hz), the power cord coming with the additional disk enclosure can only accept 100 - 120 VAC. Use 100 - 120 VAC (50/60 Hz) when the attached power cord is used.*

9.5 External Dimension and Weight of Additional Disk Enclosure

The table below shows the external dimension and weight of the additional disk enclosure.

	Additional disk enclosure
Width	482 mm
Height	131 mm (3U)
Depth (including front mask)	594 mm
Weight (in the maximum configuration)	Approx. 41 kg

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