Addition/Removal/Relocation

This “Addition/Removal/Relocation” volume describes the addition, Removal and relocation related to the setting of the subsystem.

Contents

This page is for editorial purpose only.

Chapter 1. Adding Optional Components

1.1 Before Starting Addition of Optional Components

If you make a mistake in operation during an addition of the optional component, it is feared that user data in the subsystem is lost. Therefore, perform the following before starting the addition of the optional component to provide against an unexpected accident.

(1) Backup user data.
Backup user data in the subsystem by the operation on the host computer side.

(2) The work to add an optional component varies depending on the component and a location where the component is to be installed. Besides, perform the addition after making sure whether the work must be done with the subsystem power on or off.
- An addition with the subsystem power on :
  A status in which the subsystem power is turned on irrespective of whether the system (host computer) is turned on or off.
- An addition with the subsystem power off :
  A status in which the subsystem power is turned on irrespective of whether the system (host computer) is turned on or off.

(3) When adding the optional component, it is required to change the settings of the subsystem using a service PC connected via a LAN. Make the following preparations before starting the addition of the optional component.
- Prepare a PC in which Hitachi Storage Navigator Modular 2 is installed. The PC must be used in the LAN environment.
- Ask the customer whether the subsystem is operable via a LAN. If not, obtain customer's permission to operate the subsystem via a LAN.

(4) Promote mutual understanding with the user about the possibility of a system down in order to minimize damage caused by failures.

(5) When adding the optional component with the subsystem power on, the operation replacing dummy Disk Drive with Disk Drive has to be finished within 10 minutes.

(6) Do not make the addition work when the READY LED (green) on the front of the Basic Chassis is blinking at high speed. When it is high-speed blinking, the ENC firmware is being downloaded. Perform the addition work after checking that the READY LED (green) on the front of the Basic Chassis lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of RKH).

(7) When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the addition work. While this WARNING LED (orange) is blinking at high speed, the update of the flash program or the automatic download of the ENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the addition work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up in the maximum of 30 to 85 minutes.

(8) If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.
- The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of E-mail Alert Function, SNMP Agent Support Function, and TRAP occur at the time of the path blockade.
  Perform the notice and the check to the Failure Monitoring Department in advance.
  The path blockade automatically recovers after restarting.
- When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.

If the Pair status of TrueCopy remote replication/TrueCopy Extended Distance is either PAIR or COPY, suspend the pairs before restarting the array subsystem.

(9) Do not add the optional parts while the array subsystem is being started.
When the array subsystem is being started, add the optional parts after the array subsystem becomes the Ready status.

(10) It is required to install the adaptable firmware depending on the parts to be added.
Check the adaptable firmware revision referring to Firmware "1.8 Adaptable Firmware Revision" (FIRM 01-0920).
If the Hitachi Storage Navigator Modular 2 compatible with the adaptable firmware is not installed, the setting for the option to be added cannot be made.
Verify that the version of the Hitachi Storage Navigator Modular 2 installed on the Maintenance PC is compatible with the adaptable firmware.

(11) Do not execute the addition work while rewriting the drive firmware ("IZ0000 HDU firmware download start" is displayed in the Information Message on WEB). Execute the addition work after checking that "IZ0100 HDU firmware download end" is displayed in the Information Message on WEB.

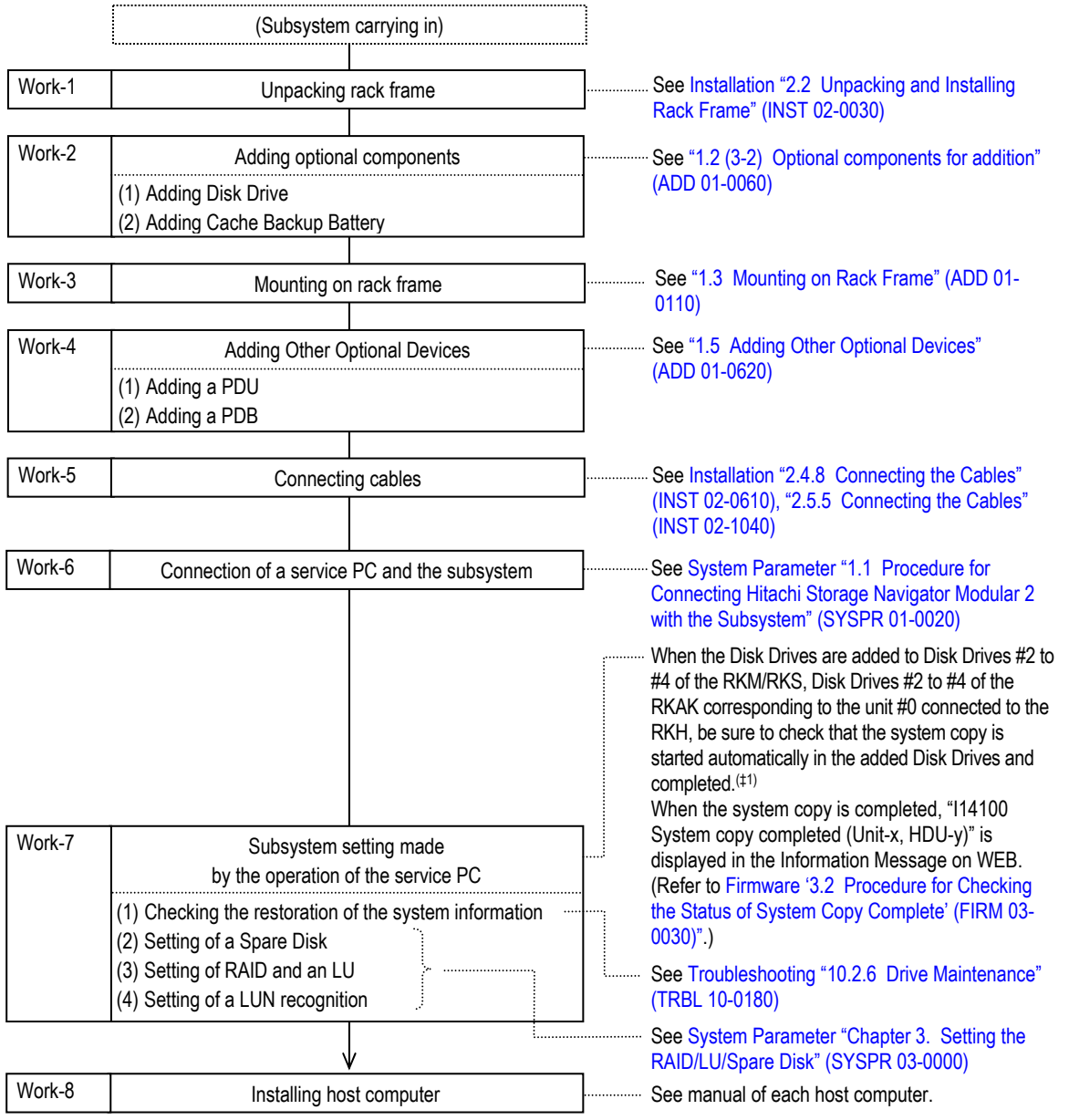
(12) The equipment with the NEBS specifications is designed for use in an Isolated Battery return configuration (DC-I). Connect the DC Return leads directly to the Central Office Power Return buss. Do not connect the return leads to the chassis or ground.

(13) When installing SAS drives in RKAKX, use RKAKX chassis with its serial number 88010208 or more. If the RKAKX with its serial number less than 88010208 is used, some slots cannot install SAS drives.
For the locations of subsystem serial number markings, refer to Installation "2.3 (2) Checking contents of package" (INST 02-0320).

1.2 Procedures for Adding Optional Components

(1) Procedure for adding an optional component while the subsystem power online

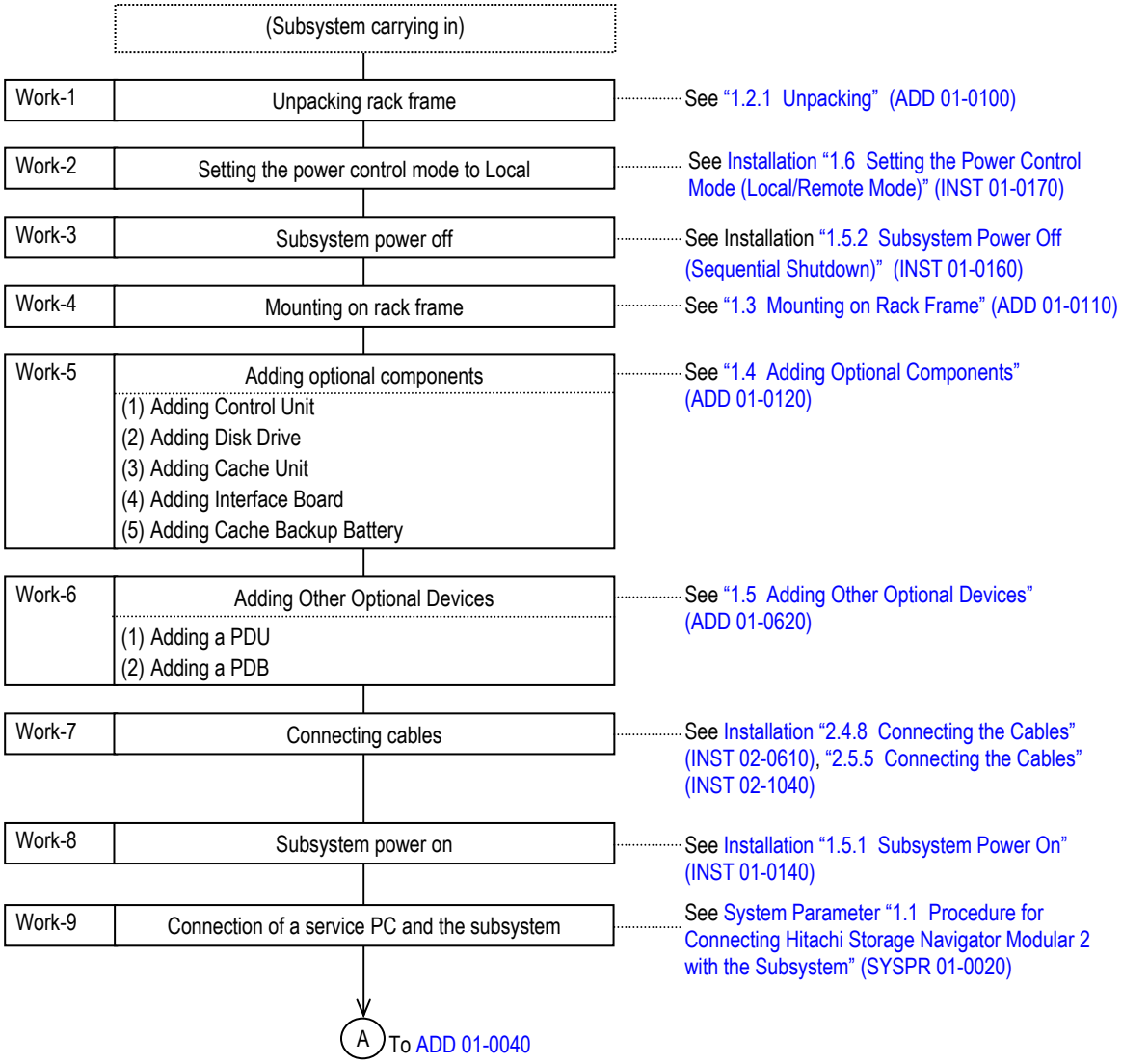
NOTE : • For safety use, always close the front bezel after the operation.
• Service personnel must check if a customer has backed up user data.
If the customer does not perform the backup, start the work after getting customer's permission.

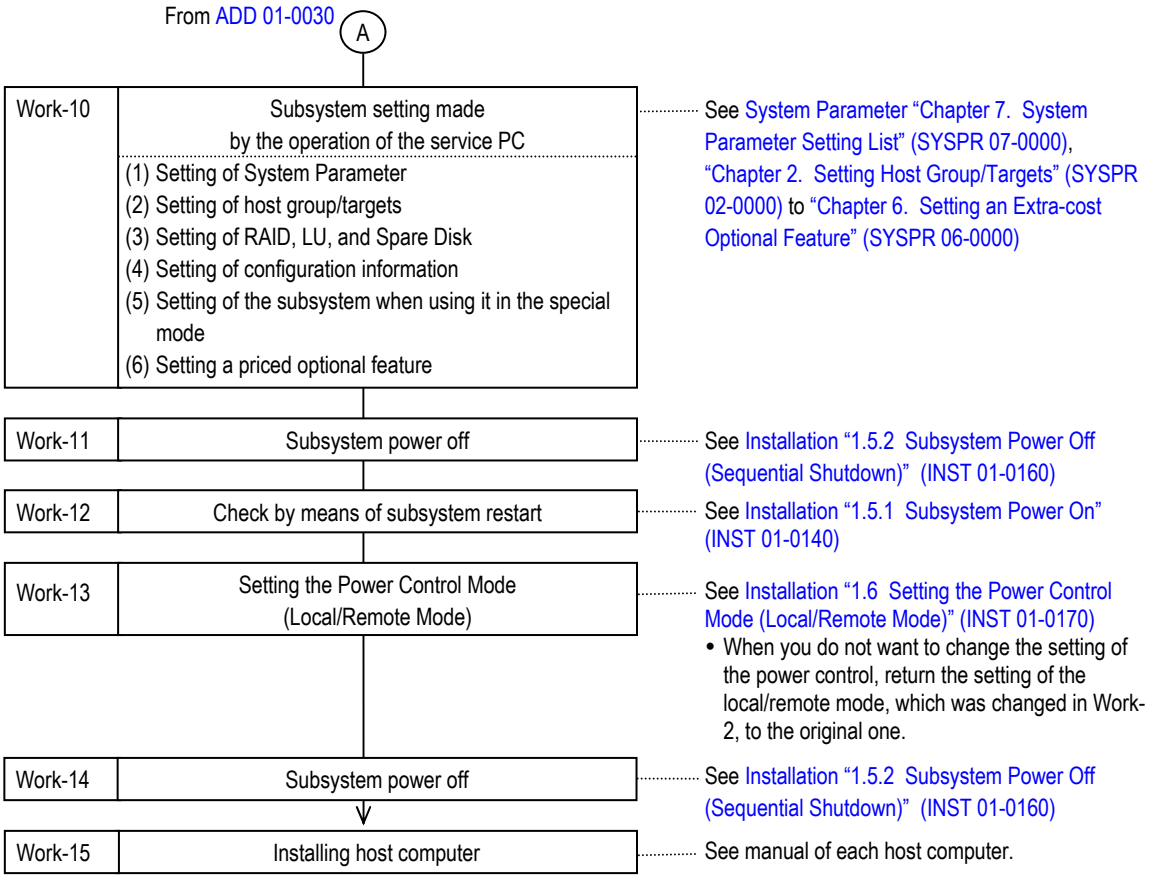


‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Settings] - [Advanced Settings] - [Open Advanced Settings] button - [Configuration Settings] -[Set] - [Restore Options] tab in the unit window of Hitachi Storage Navigator Modular 2, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually.
In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Hitachi Storage Navigator Modular 2. For the operating procedure, refer to the Addition/Removal/Relocation "1.4.3 (5) Restoring the system information" (ADD 01-0350).

(2) Procedure for adding the optional components offline (with the subsystem power turned off)

NOTE : • For safety use, always close the front bezel after the operation.
• For the see Installation "1.5.2 Subsystem Power Off (Sequential Shutdown)" (INST 01-0160).
• Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer's permission.





(3) Component to be added and condition of addition

(3-1) Rackmount disk array for extension

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
Rackmount disk array for extension	DF-F800-RKAK	A set of an disk array and basic accessories to be mounted on a rack frame	• Prepare the following components at least for the disk array to be added. Two Disk Drives • Up to 15 RKAKs can be connected to the one RKM. • Up to 7 RKAKs can be connected to the one RKS. • Up to 32 RKAKs can be added to the one RKH.	Possible "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0660)	Possible "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0660)

*1 : Data is exchanged between a host computer and the subsystem.

(3-2) Optional components for addition

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
Control Unit	HDF-F800-MFC4 (for RKM)	Control Unit (1), 4Gbps Fibre Channel Interface Board (including Host Connector (4)) (1), Cache Memory of 2,048 M bytes (2)	–	Impossible	Possible "1.4.2 Adding a Control Unit" (ADD 01-0130)
	HDF-F800-MFC8 (for RKM)	Control Unit (1), 4Gbps Fibre Channel Interface Board (including Host Connector (4)) (1), Cache Memory of 4,096 M bytes (2)			
	HDF-F800-MIS4 (for RKM)	Control Unit (1), iSCSI Interface Board (1), Cache Memory of 2,048 M bytes (2)			
	HDF-F800-MIS8 (for RKM)	Control Unit (1), iSCSI Interface Board (1), Cache Memory of 4,096 M bytes (2)			
	HDF-F800-M8FC4 (for RKM)	Control Unit (1), 8Gbps Fibre Channel Interface Board (including Host Connector (4)) (1), Cache Memory of 2,048 M bytes (2)			
	HDF-F800-M8FC8 (for RKM)	Control Unit (1), 8Gbps Fibre Channel Interface Board (including Host Connector (4)) (1), Cache Memory of 4,096 M bytes (2)			
	DF-F800-F1KEM	Control Unit (including Host Connector (4)) (1), Cache Memory of xxxx M bytes (2)			
	HDF-F800-SFC2 (for RKS)	Control Unit (1), 4Gbps Fibre Channel Interface Board (including Host Connector (2)) (1), Cache Memory of 2,048 M bytes (1)			
	HDF-F800-SFC4 (for RKS)	Control Unit (1), 4Gbps Fibre Channel Interface Board (including Host Connector (2)) (1), Cache Memory of 4,096 M bytes (1)			
	HDF-F800-SIS2 (for RKS)	Control Unit (1), iSCSI Interface Board (1), Cache Memory of 2,048 M bytes (1)			
	HDF-F800-SIS4 (for RKS)	Control Unit (1), iSCSI Interface Board (1), Cache Memory of 4,096 M bytes (1)			
	DF-F800-F1KES	Control Unit (including Host Connector (2)) (1), Cache Memory of xxxx M bytes (1)			
	DF-F800-F1KEXS	Control Unit (including Host Connector (2)) (1), Cache Memory of xxxx M bytes (1)			

*1 : Data is exchanged between a host computer and the subsystem..

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
Disk Drive(*2) (Including Spare Disk)	DF-F800-AKH146	3.5-inch Disk Drive (142.61 G bytes) (Disk rotational speed : 15,000 min^{-1})	• Select from the Disk Drives shown on the left according to the intended total capacity of the subsystem. • The Spare Disk Drives can be set up to 30 in the whole subsystem (up to 15 in case of the RKS).	Varies depending on the disk array to be added. "1.4.3 Adding a Disk Drive" (ADD 01-0190)	Varies depending on) the disk array to be added. "1.4.3 Adding a Disk Drive" (ADD 01-0190)
	DF-F800-AKH300	3.5-inch Disk Drive (287.62 G bytes) (Disk rotational speed : 15,000 min^{-1})			
	DF-F800-AKH450	3.5-inch Disk Drive (439.44 G bytes) (Disk rotational speed : 15,000 min^{-1})			
	DF-F800-AKH450X (RKAKX)	3.5-inch Disk Drive (439.44 G bytes) (Disk rotational speed : 15,000 min^{-1})			
	DF-F800-AKH600	3.5-inch Disk Drive (575.30 G bytes) (Disk rotational speed : 15,000 min^{-1})			
	DF-F800-AKH600X (RKAKX)	3.5-inch Disk Drive (575.30 G bytes) (Disk rotational speed : 15,000 min^{-1})			
	DF-F800-AKF400	3.5-inch Disk Drive (392.73 G bytes) (Disk rotational speed : 10,000 min^{-1})			
	DF-F800-AVE500	3.5-inch Disk Drive (491.25 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F800-AVE750	3.5-inch Disk Drive (737.49 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F800-AVE1K	3.5-inch Disk Drive (983.69 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F800-AVE1KX (RKAKX)	3.5-inch Disk Drive (983.69 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F800-AVE2K	3.5-inch Disk Drive (1,968.52 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F800-AVE2KX (RKAKX)	3.5-inch Disk Drive (1,968.52 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F800-AKS200	Flash Drive (195.82 G bytes)			
Cache Unit	DF-F800-C1GK	Cache memory (1,024 M bytes)	• For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.	Impossible	Possible "1.4.4 Adding a Cache Unit" (ADD 01-0390)
	DF-F800-C2GK	Cache memory (2,048 M bytes)			
	DF-F800-C4GK	Cache memory (4,096 M bytes)			
FC Interface Board	DF-F800-DKF44	4G bps FC Interface Board (including host connectors for 4G bps (4))	• Install the interface board after removing the dummy interface board from the Control Unit.	Impossible	Possible "1.4.5 Adding a FC Interface Board" (ADD 01-0450)
	DF-F800-DKF42	4G bps FC Interface Board (including host connectors for 4G bps (2))			
	DF-F800-DKF84	8G bps FC Interface Board (including host connectors for 8G bps (4))			
	DF-F800-DKF82	8G bps FC Interface Board (including host connectors for 8G bps (2))			

*1 : Data is exchanged between a host computer and the subsystem.

*2 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.
The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
iSCSI Interface Board	DF-F800-DKS12	iSCSI Interface Board	–	Impossible	Possible "1.4.6 Adding an iSCSI Interface Board" (ADD 01-0510)
Cache Backup Battery	DF-F800-N1K	Cache Backup Battery	• Install the Cache Backup Battery after removing the dummy from the Control Unit.	Possible "1.4.7 Adding a Cache Backup Battery" (ADD 01-0570)	Possible "1.4.7 Adding a Cache Backup Battery" (ADD 01-0570)
Additional Battery Box	DF-F800-N1RK	Additional Battery Box	–	Possible "1.4.8 Adding an Additional Battery Box" (ADD 01-0580)	Possible "1.4.8 Adding an Additional Battery Box" (ADD 01-0580)

*1 : Data is exchanged between a host computer and the subsystem.

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(3-3) Addition/Removal of Disk Drive/disk array

No.	Unit of addition/ removal	Component to be added/removed	Addition for storage capacity expansion		Replacement for storage capacity expansion	
			Addition of the disk array(s) or the Disk Drive(s) in order to expand a storage capacity		Replacement with the Disk Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1))	Power offline (with the subsystem power turned off)	Power online (A host is in operation(*1))	Power offline (with the subsystem power turned off)
1	Subsystem	RKAK/RKAKX	Possible(*2) (The final RKAK/RKAKX only)	Possible(*2) (The final RKAK/RKAKX only)	–(*3)	–(*3)
			Refer to "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0660)	Refer to "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0660)	–	–
2	Disk Drive	RKM/RKS Disk Drive #0 to 4 or RKAK/RKAKX corresponding to the unit #0 connected to the RKH Disk Drive #0 to 4	Possible(*4)	Impossible	Possible(*4)	Impossible
			Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0230)	–	Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0280)	–
3		RKAK/RKAKX corresponding to the unit #1 connected to the RKM/RKSRKH	Possible	Possible	Possible	Possible
			Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0230)	Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0250)	Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0280)	Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0300)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : The additional subsystem can be added at the end of the configuration. An addition in the middle of the configuration cannot be done.

*3 : In the replacement for storage capacity expansion, it is not necessary to replace the disk array. Replace only the Disk Drive(s) installed in the disk array.

*4 : In the additional Disk Drives of #0 to #4 in the RKM/RKS or the Disk Drives of #0 to #4 in the first RKAKX to be connected to the RKH, the SAS Disk Drives and the SATA Disk Drives are mixed and cannot be installed.
When adding or replacing the additional Disk Drives of #0 to #4 in the RKM/RKS or the Disk Drives of #0 to #4 in the first RKAK/RKAKX to be connected to the RKH, be sure to perform the addition work with the subsystem power turned on, and check that the system copy is started automatically in the added Disk Drives and completed. (‡1)
When the system copy is completed, "I14100 System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to Firmware "3.2 Procedure for Checking the Status of System Copy Complete" (FIRM 03-0030).)
The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Settings] - [Advanced Settings] – [Open Advanced Settings] button – [Configuration Settings] -[Set] – [Restore Options] tab in the unit window of Hitachi Storage Navigator Modular 2, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually.
In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Hitachi Storage Navigator Modular 2. For the operating procedure, refer to the "1.4.3 (5) Restoring the system information" (ADD 01-0350).

(3-4) Other optional additional device

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
PDB	A-6516-PDU6	For A-6516-RK40	Additional PDB for RK40 rack frame	Possible "1.5.2 Mounting a PDB (A-F6516-PDU6)" (ADD 01-0630)	Possible "1.5.2 Mounting a PDB (A-F6516-PDU6)" (ADD 01-0630)

*1 : Data is exchanged between a host computer and the subsystem.

(4) Tool for optional work

Table 1.1.1 Tool for Optional Work

Division	Tool name	Specification	Rackmount Model (RK40 rack frame)
Tool	Lifter	–	○
	Phillips screwdriver	No.1	○
	Phillips screwdriver	No.2	○
	Slotted screwdriver	No.1	○
	Allen wrench	No.3	–
	Allen wrench	No.4	○
	Allen wrench	No.5	○
	Allen wrench	No.6	○
	Spanner	No.8	–
	Spanner	No.13	–
	Spanner	No.22	○
Tool of other	Wrist strap	–	○
	LAN cross cable	Category 5	○
	PC for maintenance(*1)	Pentium	○

*1 : For maintenance. (Pentium 4 1 G Hz (2 G Hz or more is recommended.))
Memory 1 G bytes or more. (2 G bytes or more is recommended.)

For the usage of the tools for adding optional components, refer to the chapter for each type.

1.2.1 Unpacking

NOTE : • Unpack it indoor.
Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rainwater.
• Work on the unpacking in the place where a rapid difference of temperature does not occur.
It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

(1) Checking exterior of optional component
Check the exterior of each component visually for distortion or damage owing to transport.
(2) Checking contents of package
Check if the contents of the package (their model names, product serial numbers, and quantities) agree with those in the packing list shipped with the subsystem.

1.3 Mounting on Rack Frame

In the case of adding Disk Drives to a subsystem of the rackmount model, the additional subsystem must be added when vacant slots for the Disk Drives to be added are insufficient in the existing subsystem.

When the Additional Chassis are added, there are the offline (with the subsystem power turned off) addition and the online addition.
Perform the addition referring to "1.6.1 Procedure for Adding the Additional Subsystem to the Subsystem of Rackmount Model with RK40 Rack Frame" (ADD 01-0660).

1.4 Adding Optional Components

1.4.1 Subsystems Optional Components for Addition

(1) Optional components for addition
Refer to ”1.2 (3-2) Optional components for addition” (ADD 01-0060).

1.4.2 Adding a Control Unit

An addition of the Control Unit is done when duplicating the Control Unit.

⚠ CAUTION

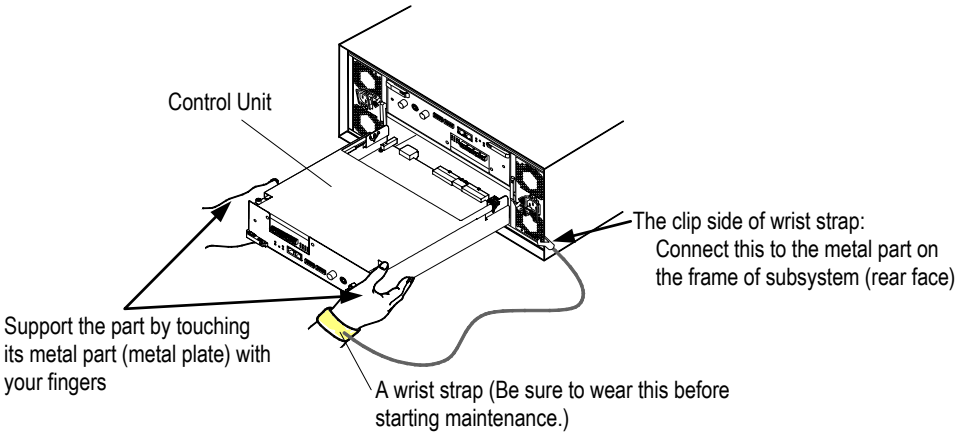
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Control Unit is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Control Unit from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



(1) Turn off the main switch.
(2) Make sure that the POWER LED (green) on the panel goes out.

NOTE : When the power has already been turned off, make sure that the cache is not in the cache backup mode. (Refer to Replacement "1.1.2 Checking Cache Memory in the Back-up State" (REP 01-0040).)
When the cache is in the cache backup state, cancel the status.

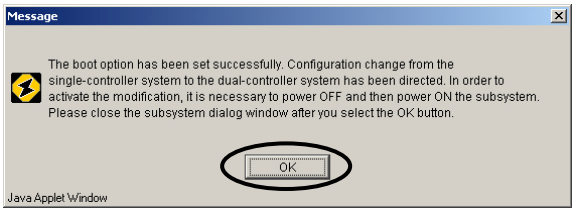
(3) Make sure that the C-PWR LED (green) on the Controller is off.
When the C-PWR LED (green) is on, user data which has not written on the disk exists in the cache memory.
(4) Remove the dummy (control Unit).
Open the right and left levers toward you at the same time while pressing the right and left buttons (blue) which fix the levers of the dummy (control Unit).
(5) Open the right and left levers of control Unit #1 forward.
(6) Insert the Control Unit #1 into the specified position.
Insert the Control Unit in the set position, and close the levers completely until you hear the buttons (blue), which fix the levers, click.

NOTE : • Do not catch an ENC cable, when the Control Unit for the inserted.
• In the case of the RKM/RKS, the installation direction is different in the Control Unit # 0 and # 1.
Install the Control Unit #0 with the cover up and #1 with the cover down.

(7) Connect the interface cable, the LAN cable, the ENC cable, and the power cable.

NOTE : • When connecting the Interface cable and the ENC cable, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.
• When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(8) Turn on the main switch.
(9) Make sure that the READY LED (green) on the front side of the subsystem comes on.
(10) Connect the PC to be connected with Hitachi Storage Navigator Modular 2 and the LAN port for the maintenance of the Control Unit #0 with a LAN cross cable. (Refer to System Parameter "1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Subsystem" (SYSPR 01-0020).)
(11) Set the system starting attribute of Boot Option to the dual active mode to operate it by the dual system. (Refer to System Parameter "4.2 (1) Setting Boot Options" (SYSPR 04-0050).) Besides, since the following message is displayed after the system parameters have been set, click the [OK] button.

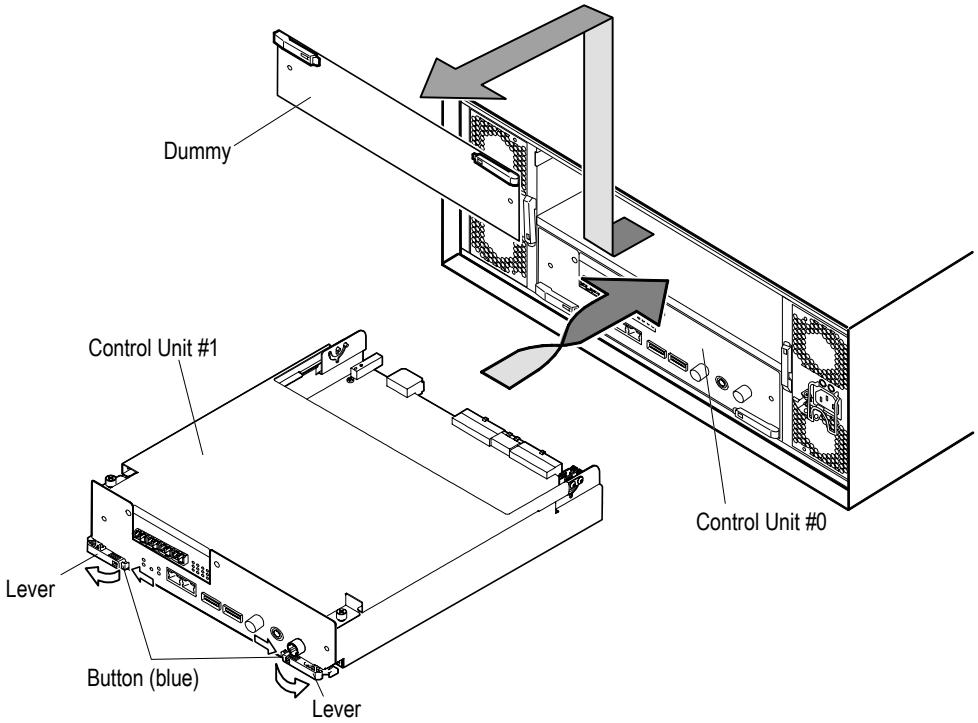


(12) Turn off the main switch.
(13) Make sure that the POWER LED (green) on the panel goes out.
(14) Turn on the main switch after waiting for one minute or longer.
(15) Make sure that the READY LED (green) on the front side of the subsystem comes on.
(16) Remove the LAN cross cable from the Control Unit #0, and connect the LAN cross cable to the LAN port for the maintenance of the Control Unit #1.
(17) Because the subsystem configuration was changed from the single Control Unit to the dual Control Unit, register the IP address of the Control Unit #1 in the array subsystem after deleting the target array subsystem in which the Hitachi Storage Navigator Modular 2 is registered. (Refer to System Parameter "1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Subsystem" (SYSPR 01-0020).)
(18) Reset the configurations for the Control Unit #1.

NOTE : A setup for the dual controller is necessary for the controller 1. (Refer to System Parameter "Chapter 4. Setting Configuration Information" (SYSPR 04-0000).)
When the cache is in the cache backup state, cancel the status.

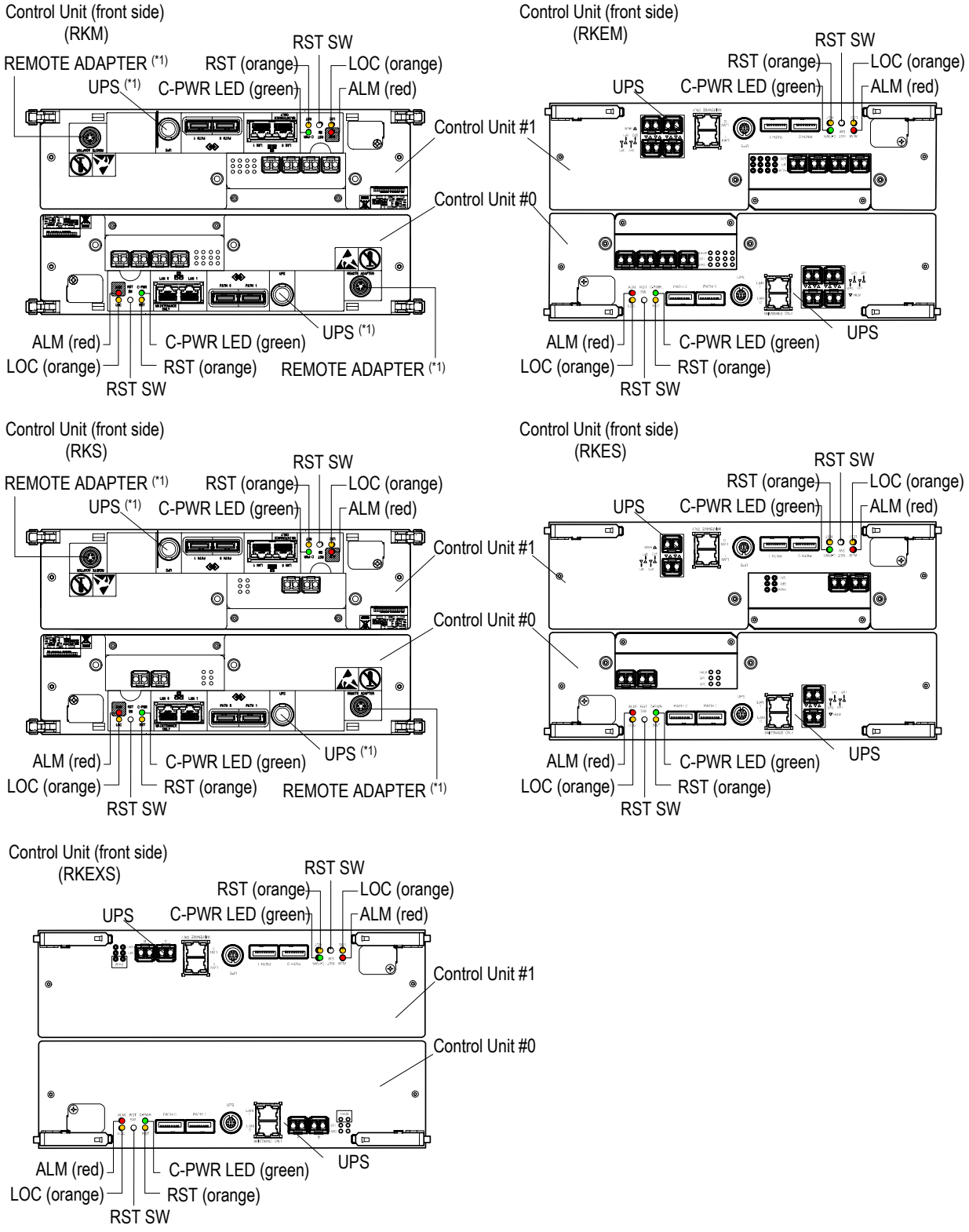
(19) Turn off the main switch.
(20) Make sure that the POWER LED (green) on the panel goes out.

(21) Remove the LAN cross cable connected to the Hitachi Storage Navigator Modular 2 from the Control Unit#1.
(22) Turn on the main switch.
(23) Make sure that the READY LED (green) on the front side of the subsystem comes on.
(24) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed.
When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code (refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)").



*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKM.

Figure 1.4.1 Adding the Control Unit (RKM/RKS)



*1 : The position of the connector is different depending on the Control Unit.
Confirm the connector.

Figure 1.4.2 Position of the LED on the Control Unit (RKM/RKEM/RKS/RKES/RKEXS)

1.4.3 Adding a Disk Drive

A procedure for adding/subtracting the Disk Drive varies depending on a location of the Disk Drive and a condition (whether the subsystem power is on or off).
Take care to use a procedure appropriate for the purpose because a use of an inappropriate procedure may cause an accident such as a loss of user data.

Table 1.4.1 Kinds of Disk Drive Addition and Removal

No.	Unit of addition/ removal	Component to be added/ removed	Addition for storage capacity expansion		Replacement for storage capacity expansion	
			Addition of the disk array(s) or the Disk Drive(s) in order to expand a storage capacity		Replacement with the Disk Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)	Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
1	Disk Drive	RKM/RKS Disk Drive #0 to 4 RKAK/RKAKX corresponding to the unit #0 connected to the RKH Disk Drive #0 to 4	Possible(*2) Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0230)	Impossible –	Possible(*2) Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0280)	Impossible –
2		RKM/RKS Disk Drive #5 or more RKAK/RKAKX corresponding to the unit #0 connected to the RKH Disk Drive #5 or more	Possible Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0230)	Possible Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0250)	Possible Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0280)	Possible Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0300)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : Disk Drives of #0 to #4 in the RKM/RKS or the Disk Drives of #0 to #4 in the first RKAK or RKAKX to be connected to the RKH, must be either SAS Disk Drives type or SATA Disk Drives, intermix of drive type is not supported for installation.
When the Disk Drives are added additionally or by replacement in #0 to #4 of the RKM/RKS or the Disk Drives of #0 to #4 of the first RKAK/RKAKX connected to the RKH, be sure to check that the addition work is performed with the subsystem power turned on and the system copy is automatically started in the added Disk Drives and completed.
The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Settings] - [Advanced Settings] - [Open Advanced Settings] button - [Configuration Settings] -[Set] - [Restore Options] tab in the unit window of Hitachi Storage Navigator Modular 2, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Hitachi Storage Navigator Modular 2. For the operating procedure, refer to the "1.4.3 (5) Restoring the system information" (ADD 01-0350).
When the system copy is completed, "I14100 System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to Firmware "3.2 Procedure for Checking the Status of System Copy Complete" (FIRM 03-0030).)

No.	Unit of addition/ removal	Component to be added/ removed	Addition for storage capacity expansion		Replacement for storage capacity expansion	
			Addition of the disk array(s) or the Disk Drive(s) in order to expand a storage capacity		Replacement with the Disk Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)	Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
3	Disk Drive	RKM/RKS Disk Drive #5 or more RKAK/RKAKX corresponding to the unit #0 connected to the RKH Disk Drive #5 or more	Possible Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0230)	Possible Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0250)	Possible Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0280)	Possible Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0300)

*1 : Data is exchanged between a host computer and the subsystem.

This page is for editorial purpose only.

(1) Before starting addition of Disk Drive

⚠ CAUTION

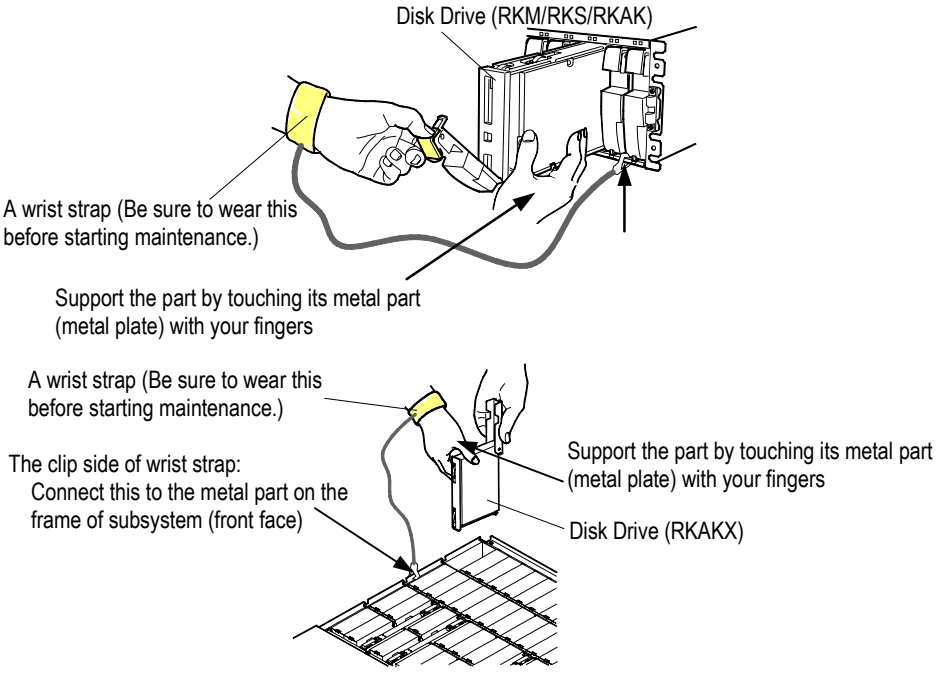
Do not pull out multiple RKAKXs at a time because the rack can fall over.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **Disk Drives are precision components.**
  Be careful not to expose drives to hard shock.
- **When you install a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Disk Drive is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Disk Drive from electrostatic discharge.

NOTE : • The Disk Drive is a precision machine. Never apply a shock or vibration to it.
• Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : When adding the Disk Drive to the RKAKX, check that the stabilizer is installed to the front side of the rack.
If the stabilizer is not installed, install the stabilizer to the rack. (Refer to Installation "2.2.1 (7) Installing the stabilizer" (INST 02-0090).)

(1-1) In the case of RKM/RKS/RKAK

(a) Locations and numbers of Disk Drives
The Disk Drive number is #0 to #14 from the left sequentially seen.
The Disk Drive is not installed in RKH.

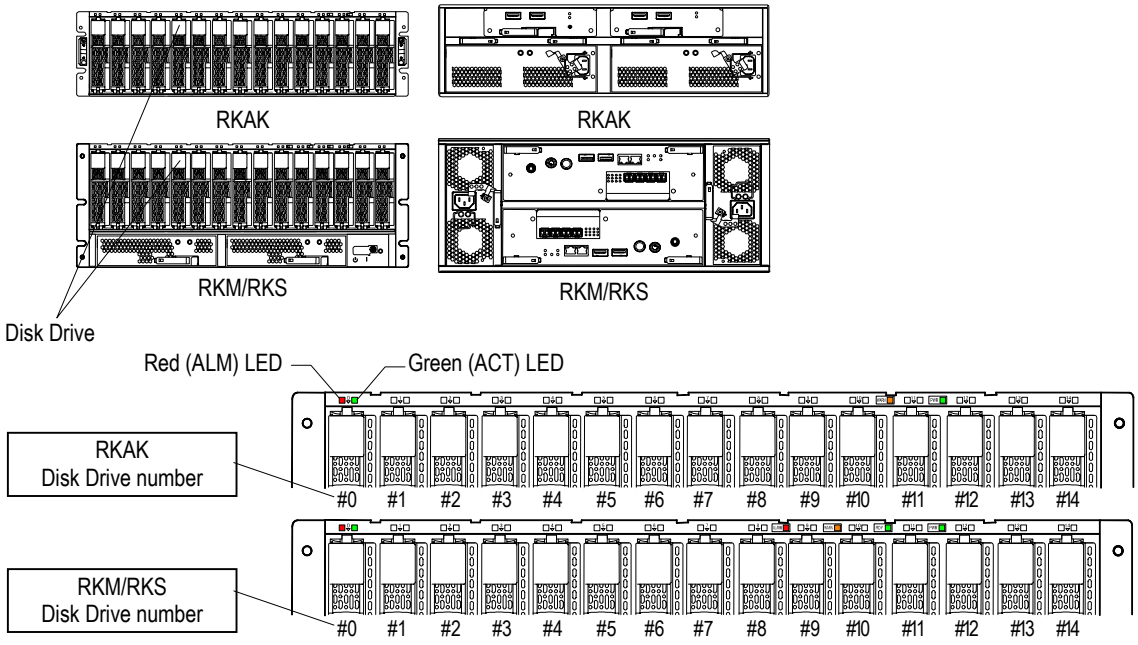


Figure 1.4.3 Disk Drive Mounting Location (RKM/RKS/RKAKX)

(b) If necessary number of vacant slots do not exist in the subsystem to which the Disk Drives are to be added. (Refer to "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0660))

(c) The Disk Drives for the Spare Disk Drives can be set up to 30 in one subsystem (up to 15 in case of the RKS) can be set in the optional positions.
Assign the Disk Drive, which has not been assigned to be a data disk, to be a Spare Disk.

(1-2) In the case of RKAKX

(a) Locations and numbers of Disk Drives

The Disk Drive numbering is #A0 to #A23, #B0 to #B23 sequentially viewed from the above of the subsystem. (Refer to Figure 1.4.3.1)

NOTE : • Add the Disk Drives in order from the front side of the subsystem (in ascending order of the Disk Drives number).

• For SAS drives, up to 38 Disk Drives can be installed in a RKAKX. Install them in the positions of #A0 to #A18 and #B0 to #B18. Do not install them in the positions of #A19 to #A23 and #B19 to #B23.
In a RKAKX, intermix of SAS Disk Drives and SATA Disk Drives is not supported for installation.

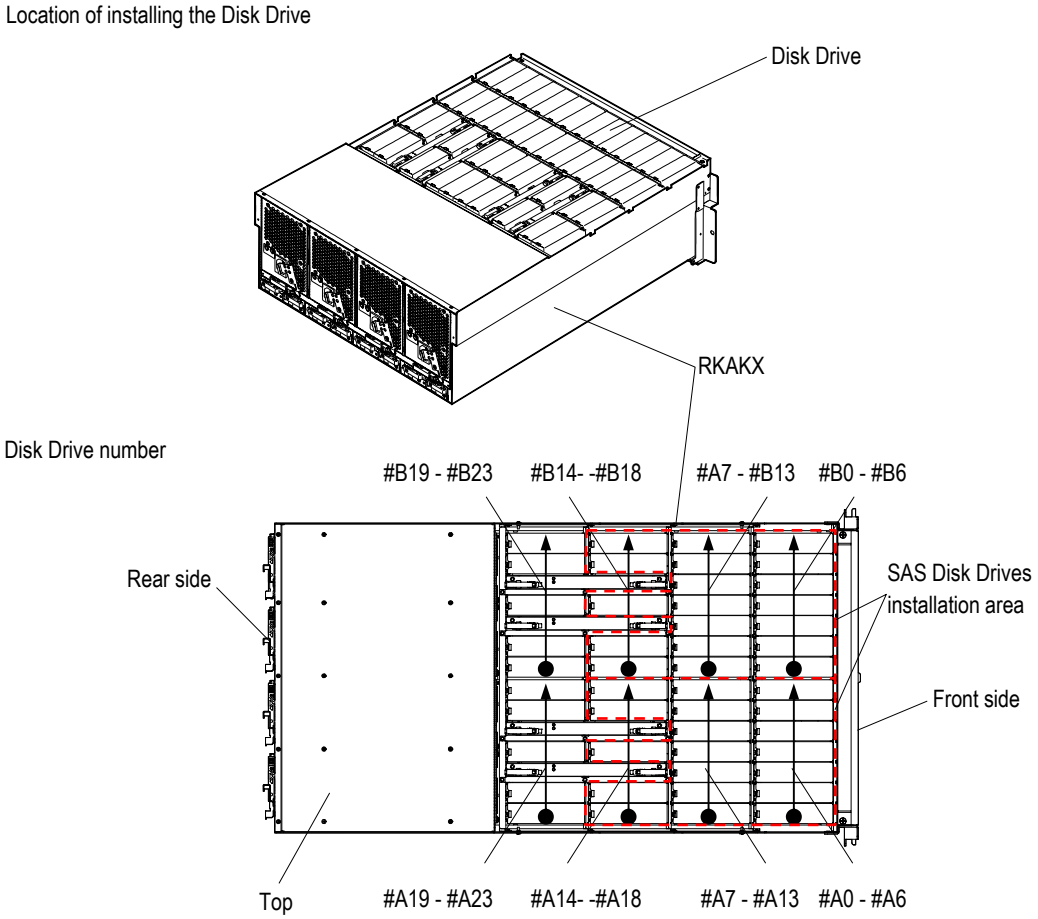


Figure 1.4.3.1 Disk Drive Mounting Location (RKAKX)

(b) If necessary number of vacant slots do not exist in the subsystem to which the Disk Drives are to be added. (Refer to "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0660))

(c) The Disk Drives for the Spare Disk Drives can be set up to 30 in one subsystem (up to 15 in case of the RKS) can be set in the optional positions.
Assign the Disk Drive, which has not been assigned to be a data disk, to be a Spare Disk.

This page is for editorial purpose only.

(2) Procedure for adding Disk Drive (in order to expand a storage capacity)

- In the additional Disk Drives of #0 to #4 in the RKM/RKS or the Disk Drives of #0 to #4 in the first RKAKX to be connected to the RKH, the SAS Disk Drives and the SATA Disk Drives are mixed and cannot be installed.
- A procedure for adding the Disk Drive to a vacant slot of the subsystem is shown below.
- When an addition of the Additional Chassis is necessary because of insufficient vacant slots, add the Additional Chassis. (Refer to "1.3 Mounting on Rack Frame" (ADD 01-0110).)
- When the Disk Drives are additionally added to the vacant slots of #2 to #4 of the RKM/RKS, #2 to #4 of the RKAK corresponding to the unit #0 connected to the RKH, it cannot be performed with the subsystem power turned off.
  Perform the addition of the Disk Drives online (in order to expand the storage capacity) according to (2-1), and be sure to check that the system copy starts automatically to the added Disk Drives and it is completed. (‡1)
  When the system copy is completed, "I14100 System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to Firmware "3.2 Procedure for Checking the Status of System Copy Complete" (FIRM 03-0030).)
- It is recommended to backup data of all LUs to provide against an emergency because user data may be lost if a wrong operation is done.

The work for addition varies depending on whether the work is done while the power is turned on or off (with the subsystem power turned off).

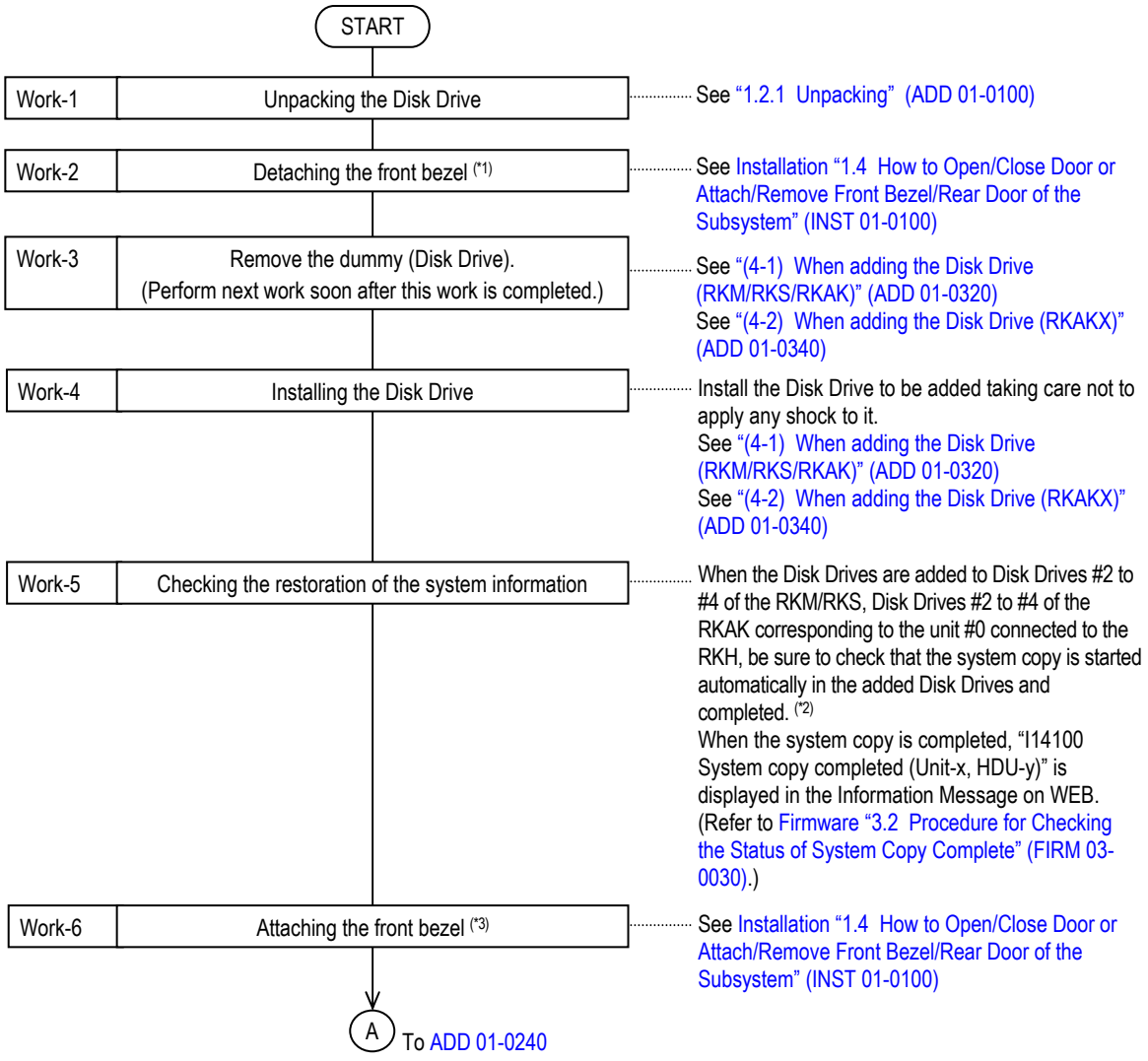
- Procedure for adding a Disk Drive while the power is turned online :
  See "(2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0230).
- Procedure for adding the Disk Drives offline (with the subsystem power turned off) :
  See "(2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0250).

‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Settings] - [Advanced Settings] – [Open Advanced Settings] button – [Configuration Settings] –[Set] – [Restore Options] tab in the unit window of Hitachi Storage Navigator Modular 2, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Hitachi Storage Navigator Modular 2.
For the operating procedure, refer to the "1.4.3 (5) Restoring the system information" (ADD 01-0350).

(2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online

A procedure for adding the Disk Drive (in order to expand a storage capacity) without shutting down the subsystem is shown below.

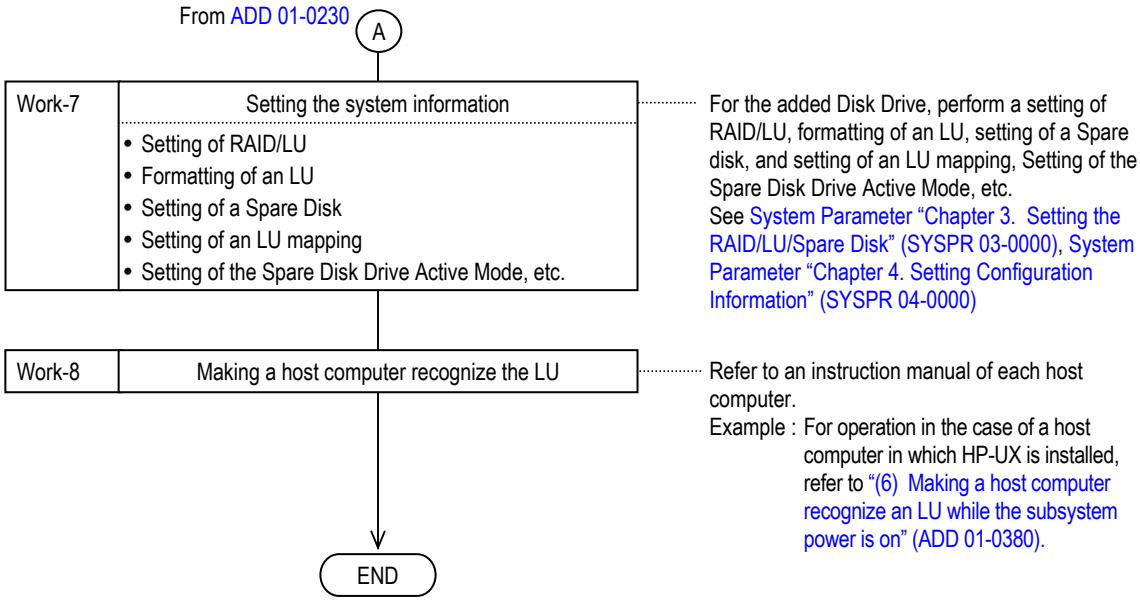
NOTE : When adding the two or more Disk Drives in the installation of the Disk Drives (Work-4), checking the restoration of the system information (Work-5) for the each Disk Drive one by one, and then install the Disk Drives one by one.



*1 : In the case of the RKAKX, remove the front bezel, pull the subsystem out of the rack, and then remove the top cover.

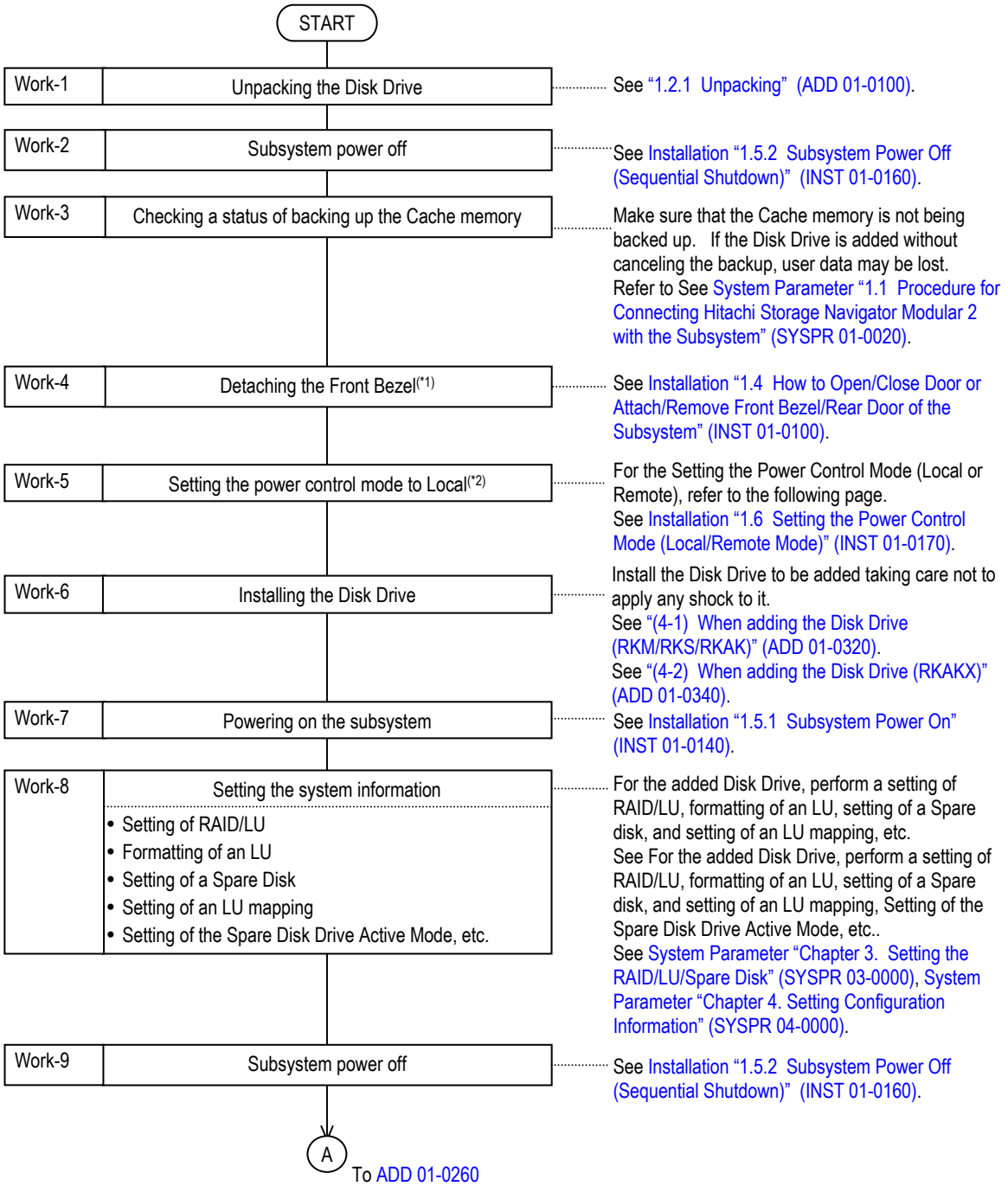
*2 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Settings] - [Advanced Settings] – [Open Advanced Settings] button – [Configuration Settings] -[Set] – [Restore Options] tab in the unit window of Hitachi Storage Navigator Modular 2, and if [Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Hitachi Storage Navigator Modular 2. For the operating procedure, refer to the "1.4.3 (5) Restoring the system information" (ADD 01-0350).

*3 : In the case of the RKAKX, attach the top cover, store the subsystem in the rack, and then attach the front bezel.



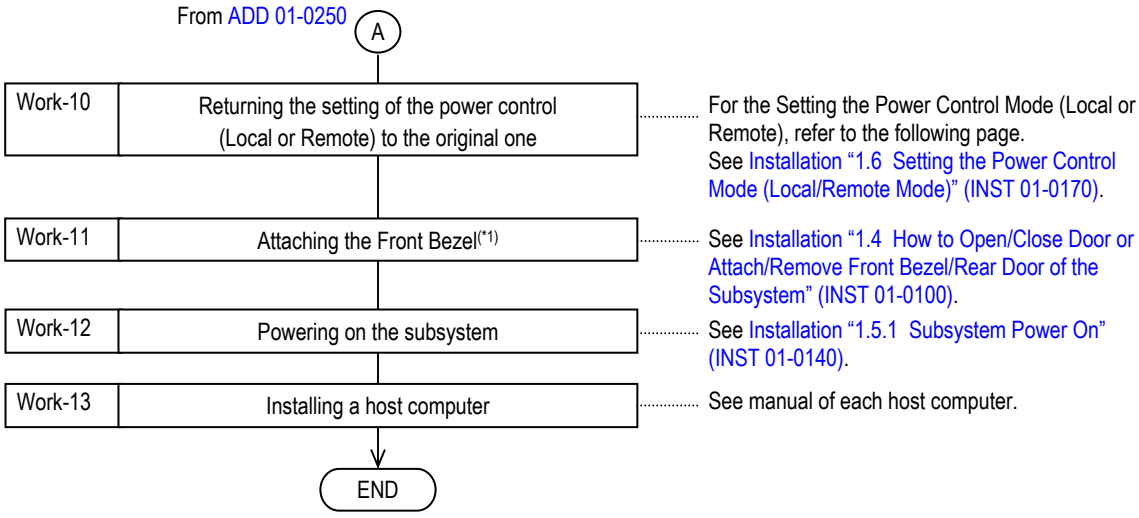
(2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)

A procedure for adding the Disk Drive (in order to expand a storage capacity) after turning off the subsystem power is shown below.



*1 : In the case of the RKAKX, remove the front bezel, pull the subsystem out of the rack, and then remove the top cover.

*2 : When the subsystem power control works interlocking with the UPS, etc., make an adjustment so that the power is supplied to it.



*1 : In the case of the RKAKX, attach the top cover, store the subsystem in the rack, and then attach the front bezel.

(3) Procedure for replacing Disk Drive (in order to expand a storage) capacity

- In the additional Disk Drives of #0 to #4 in the RKM/RKS or the Disk Drives of #0 to #4 in the first RKAKX to be connected to the RKH, the SAS Disk Drives and the SATA Disk Drives are mixed and cannot be installed.
- A procedure for replacing the Disk Drive installed in the subsystem with the Disk Drive having a larger capacity is shown below.
- When replacing two or more Disk Drives, be sure to replace them one by one in order of location.
- When the Disk Drives #0 to #4 of the RKM/RKS or the Disk Drives #0 to #4 of the RKAK corresponding to the unit #0 connected to the RKH are added by replacement, it cannot be performed with the subsystem power turned off. Perform the replacement of the Disk Drives online (in order to expand the storage capacity) according to (2-1), and be sure to check that the system copy starts automatically to the added Disk Drives and it is completed(‡1). When the system copy is completed, "I14100 System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to Firmware, "3.2 Procedure for Checking the Status of System Copy Complete" (FIRM 03-0030).)
- It is recommended to backup data of all LUs to provide against an emergency because user data may be lost if a wrong operation is done.

The procedure for the replacement varies depending on whether the replacement is performed while the power is turned online or offline (with the subsystem power turned off).

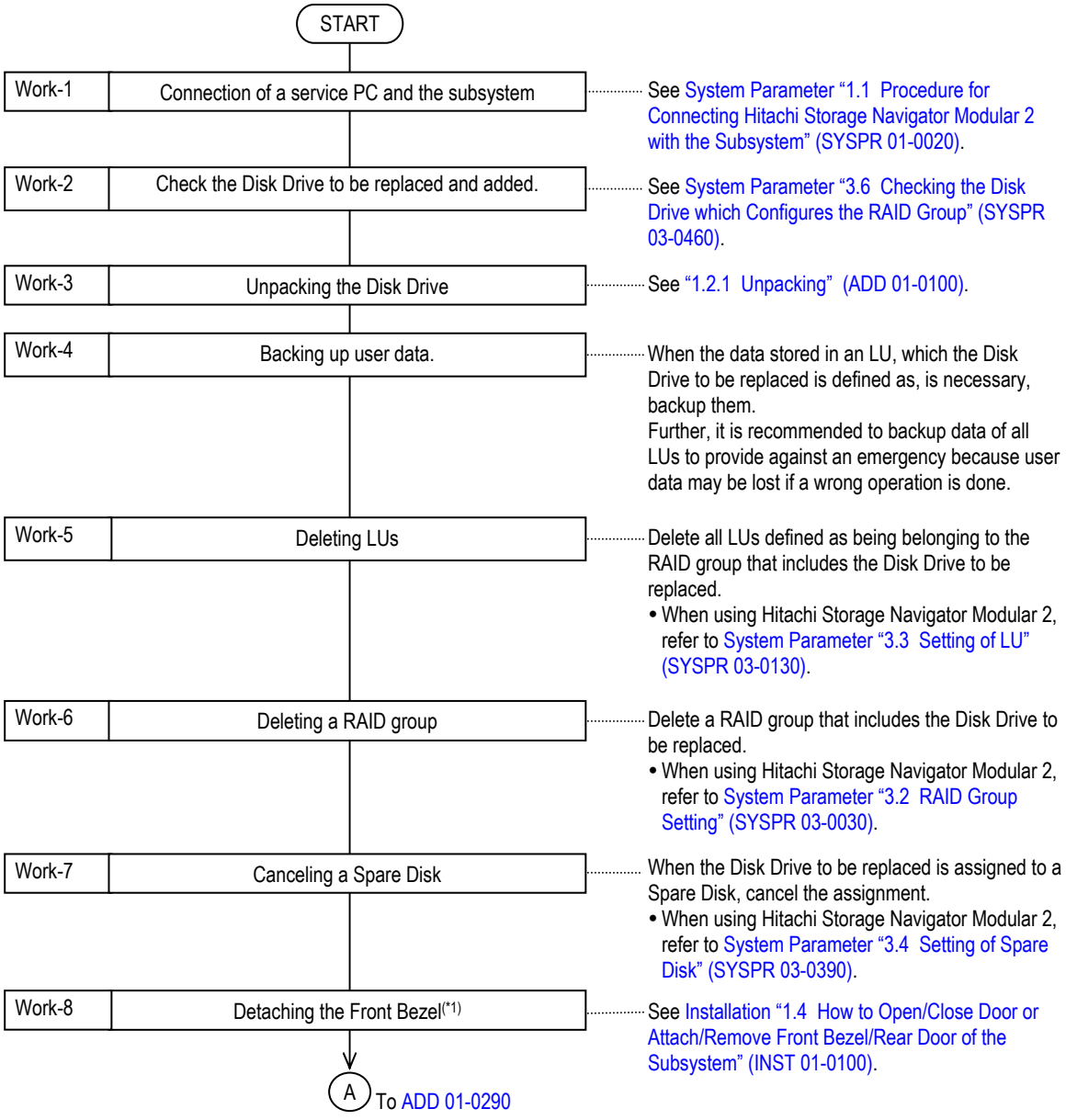
- Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online :
  "(3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0280)
- Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off) :
  "(3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0300)

‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Settings] - [Advanced Settings] – [Open Advanced Settings] button – [Configuration Settings] –[Set] – [Restore Options] tab in the unit window of Hitachi Storage Navigator Modular 2, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Hitachi Storage Navigator Modular 2.
For the operating procedure, refer to the "1.4.3 (5) Restoring the system information" (ADD 01-0350).

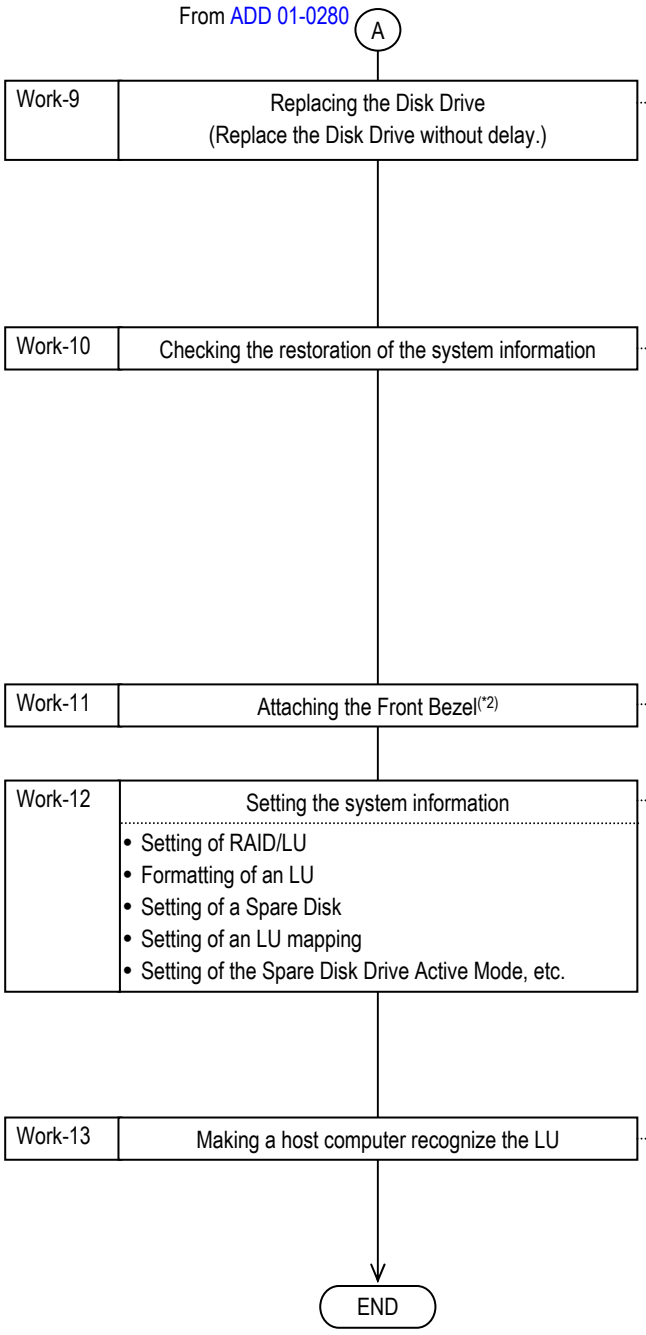
(3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online

A procedure for replacing the Disk Drive (in order to expand a storage capacity) without shutting down the subsystem is shown below.

NOTE : When two or more Disk Drives are added by the replacement work of the Disk Drives on Work-9, it is necessary to check the restoration of the system information on Work-10 for each unit and install the Disk Drives one by one.



*1 : In the case of the RKAKX, remove the front bezel, pull the subsystem out of the rack, and then remove the top cover.



When replacing two or more Disk Drives, be sure to replace them one by one.
Remove the Disk Drive to be replaced and install the new one taking care not to apply any shock to it.
See "(4-3) When replacing the Disk Drive (RKM/RKS/RKAK)" (ADD 01-0341).
See "(4-4) When replacing the Disk Drive (RKAKX)" (ADD 01-0342).

When the Disk Drives are replacement in Disk Drives #0 to #4 of the RKM/RKS or Disk Drives #0 to #4 of the first RKAK connected to the RKH, be sure to check that the addition work is performed with the subsystem power turned on and the system copy is automatically started in the added Disk Drives and completed. (*1)
When the system copy is completed, "I14100 System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB.
(Refer to Firmware "3.2 Procedure for Checking the Status of System Copy Complete" (FIRM 03-0030).)

See Installation "1.4 How to Open/Close Door or Attach/Remove Front Bezel/Rear Door of the Subsystem" (INST 01-0100).

For the added Disk Drive, perform a setting of RAID/LU, formatting of an LU, setting of a Spare disk, and setting of an LU mapping, etc.
See For the added Disk Drive, perform a setting of RAID/LU, formatting of an LU, setting of a Spare disk, and setting of an LU mapping, Setting of the Spare Disk Drive Active Mode, etc.
See System Parameter "Chapter 3. Setting the RAID/LU/Spare Disk" (SYSPR 03-0000), System Parameter "Chapter 4. Setting Configuration Information" (SYSPR 04-0000).

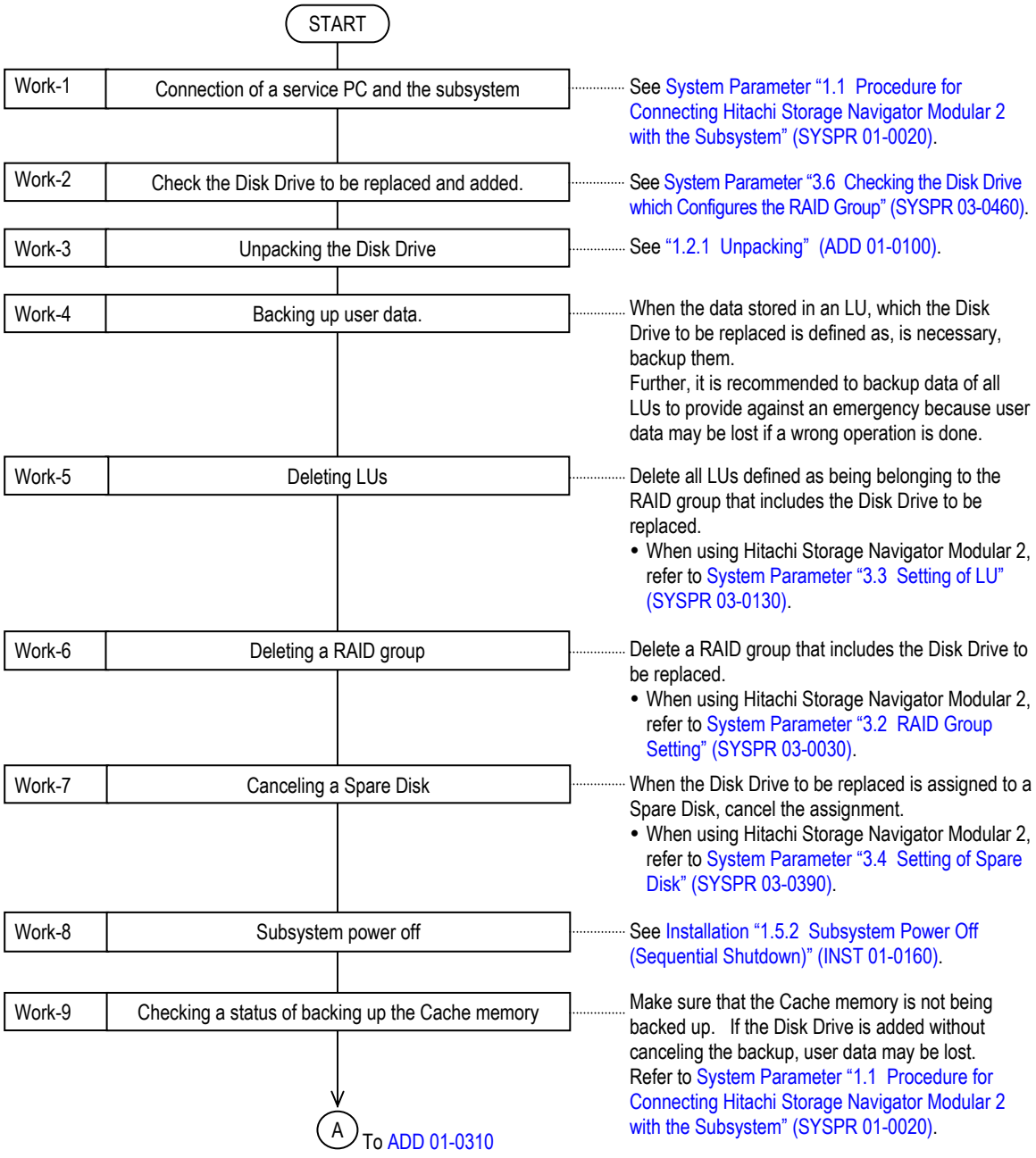
See manual of each host computer.
Example : For operation in the case of a host computer in which HP-UX is installed, refer to "(6) Making a host computer recognize an LU while the subsystem power is on" (ADD 01-0380).

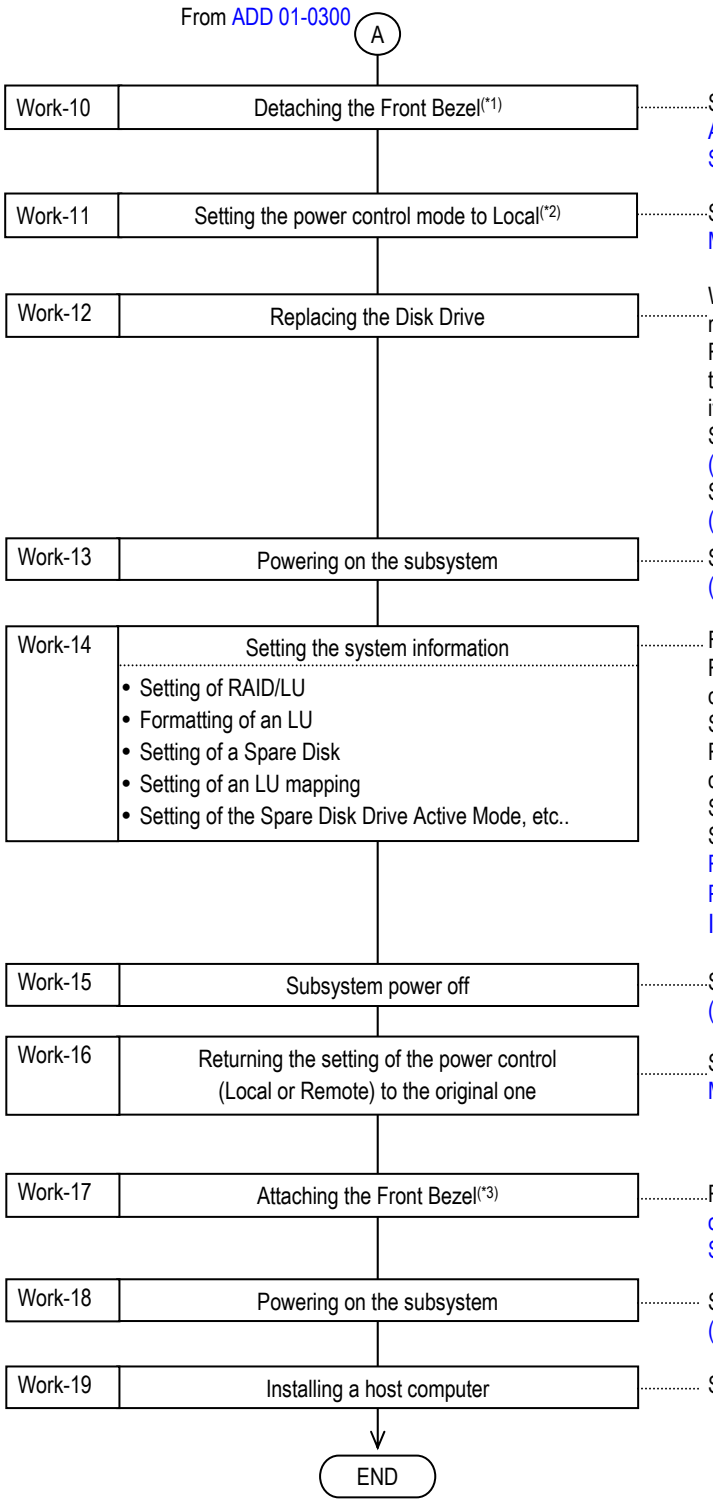
*1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Settings] - [Advanced Settings] - [Open Advanced Settings] button - [Configuration Settings] -[Set] - [Restore Options] tab in the unit window of Hitachi Storage Navigator Modular 2, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Hitachi Storage Navigator Modular 2. For the operating procedure, refer to the "1.4.3 (5) Restoring the system information" (ADD 01-0350).

*2 : In the case of the RKAKX, attach the top cover, store the subsystem in the rack, and then attach the front bezel.

(3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)

A procedure for replacing the Disk Drive (in order to expand a storage capacity) after powering off the subsystem is shown below.





*1 : In the case of the RKAKX, remove the front bezel, pull the subsystem out of the rack, and then remove the top cover.

*2 : When the subsystem power control works interlocking with the UPS, etc., make an adjustment so that the power is supplied to it.

*3 : In the case of the RKAKX, attach the top cover, store the subsystem in the rack, and then attach the front bezel.

(4) Installing/removing Disk Drive

When installing/removing the Disk Drive in the addition or removal of it, follow the procedure shown below.

- Procedure for adding a Disk Drive :
  See Item "(4-1) When adding the Disk Drive (RKM/RKS/RKAK)" (ADD 01-0320).
- Procedure for adding a Disk Drive :
  See Item "(4-2) When adding the Disk Drive (RKAKX)" (ADD 01-0340).
- Procedure for replacing a Disk Drive :
  See Item "(4-3) When replacing the Disk Drive (RKM/RKS/RKAK)" (ADD 01-0341).
- Procedure for replacing a Disk Drive :
  See Item "(4-4) When replacing the Disk Drive (RKAKX)" (ADD 01-0342).

(4-1) When adding the Disk Drive (RKM/RKS/RKAK)

Perform the following operations (a) to (d) for each of the Disk Drives to be added (in order to expand a storage capacity) one by one.

(a) Pull the dummy (Disk Drive), and remove it.

Pressing the latch (round dent) at the lower part of the dummy (Disk Drive), hold the upper part and pull it out, and then remove it.

Because the dummy (Disk Drive) that has been removed will be used when the added Disk Drive is subtracted, keep it in custody.

(b) Install the Disk Drive to be added taking care not to apply any shock to it.

(i) Fit the Disk Drive in the guide rail of the chassis and slide it in the direction shown by the arrow.

(ii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the disk array unit.

(iii) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

NOTE : If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(c) When the Disk Drive has been added while the subsystem power is on, the ALARM LED on the Disk Drive will go out a little while after the Disk Drive has been inserted. Make sure that the LED goes out.

(d) When the Disk Drive has been added while the subsystem power is on, Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed. When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code (refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)").

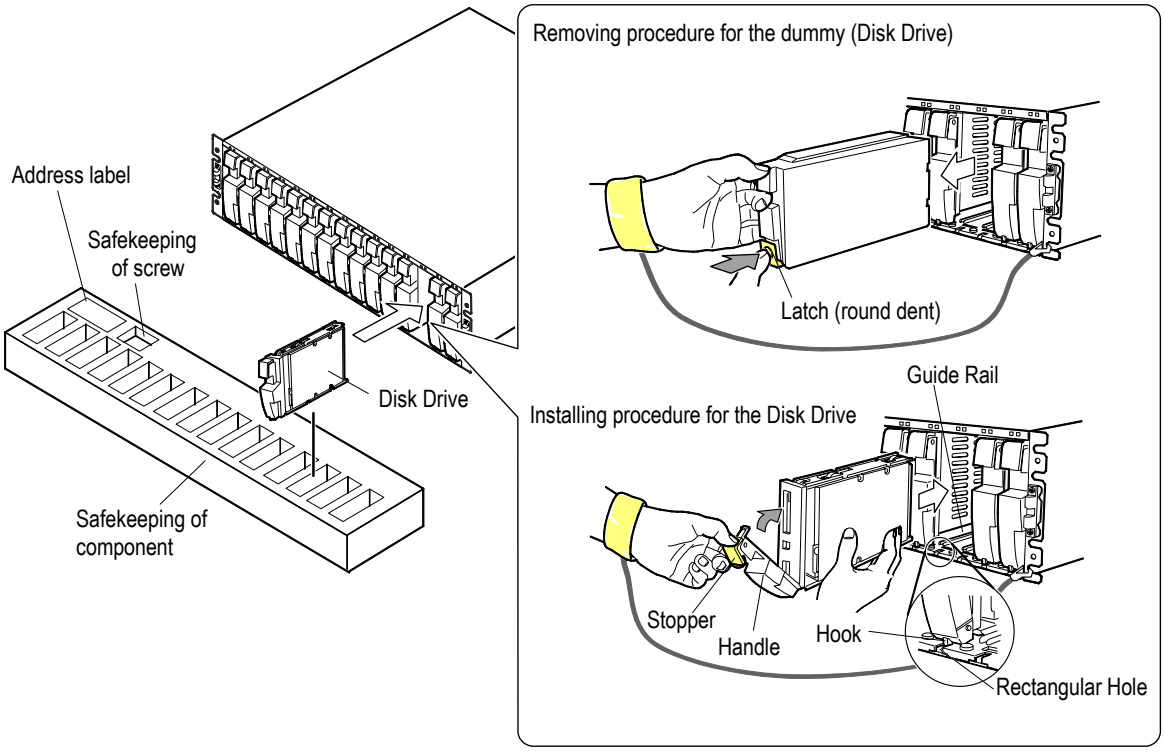


Figure 1.4.4 Removing the Dummy (Disk Drive) and Installing the Disk Drive (RKM/RKS/RKAK)

(4-2) When adding the Disk Drive (RKAKX)

Perform the following operations (a) to (c) for each of the Disk Drives to be added one by one.

(a) Remove the Disk Drive by pulling it out.
The dummy (Disk Drive) that has been removed will be used when the added Disk Drive is subtracted, keep it in custody.

(b) Install the Disk Drive to be added taking care not to apply any shock to it.

NOTE : Check that there is no foreign substance near the connector and in the subsystem before inserting the Disk Drive.

(i) Open the handle, and insert the Disk Drive holding it with both hands.
(ii) Close the handle, and lock it.

(c) When the Disk Drive has been added while the array power is on, the Alarm LED on the Disk Drive will go out a few minutes after the Disk Drive has been inserted. Make sure that the LED goes out.

(d) When the Disk Drive has been added while the subsystem power is on, Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed. When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code (refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)").

Procedure of the installing the Disk Drive

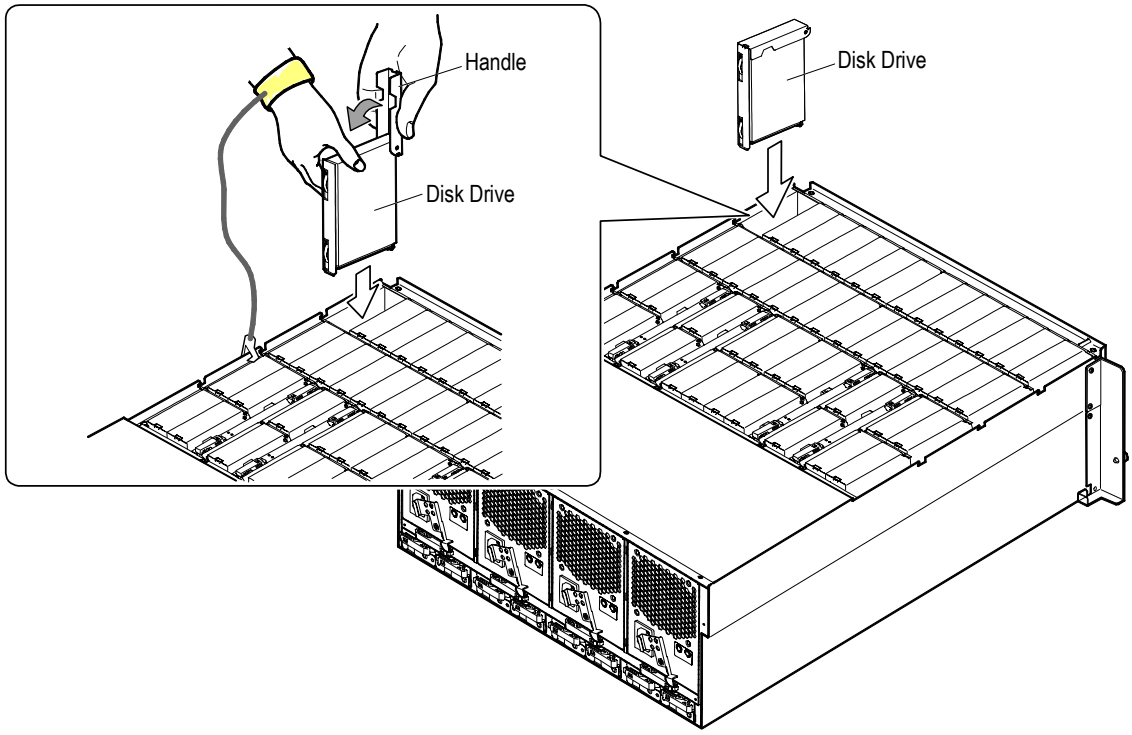


Figure 1.4.4.1 Operation of Mount/Remove the Disk Drive (RKAKX)

(4-3) When replacing the Disk Drive (RKM/RKS/RKAK)

Perform the following operations (a) and (d) for each of the slots, where the Disk Drive is to be replaced, one by one.

(a) Pull the stopper at the upper part of the Disk Drive handle toward you to have the lock off, tilt the handle toward you, and then remove the Disk Drive by pulling it out taking care not to apply a shock to it.

When using the removed Disk Drive for the purpose of addition to another disk array unit, keep it in custody with its handle returned to its original state (locked by the stopper) taking care not to apply a shock to it.

(b) Install the Disk Drive to be added taking care not to apply any shock to it.

(i) Fit the Disk Drive in the guide rail of the chassis and slide it in the direction shown by the arrow.

(ii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the disk array unit.

(iii) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

NOTE : If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(c) When the Disk Drive has been added while the subsystem power is on, the ALARM LED on the Disk Drive will go out a little while after the Disk Drive has been inserted.

Make sure that the LED goes out.

(d) When the Disk Drive has been added while the subsystem power is on, Check that the start message and the end message of the drive firmware automatic download are displayed.

When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed. When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code (refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)").

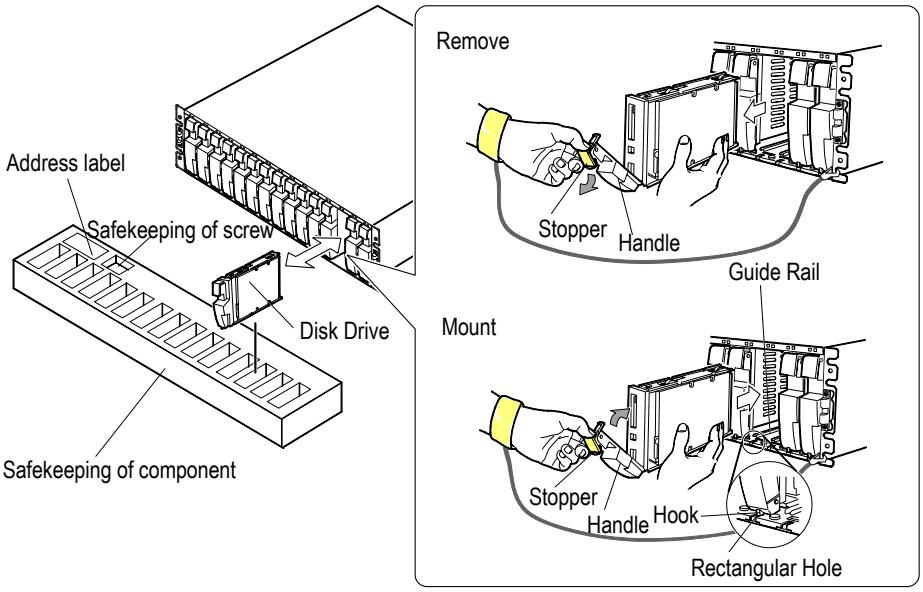


Figure 1.4.5 Operation of Mount/Remove the Disk Drive (RKM/RKS/RKAK)

(4-4) When replacing the Disk Drive (RKAKX)
Perform the following operations (a) and (c) for each of the slots, where the Disk Drive is to be replaced, one by one.

(a) Open the handle toward you, and then remove the Disk Drive by pulling it out taking care not to apply a shock to it.
When using the removed Disk Drive for the purpose of addition to another disk array unit, keep it in custody with its handle returned to its original state (locked by the stopper) taking care not to apply a shock to it.

(b) Install the Disk Drive to be added taking care not to apply any shock to it.
NOTE : Check that there is no foreign substance near the connector and in the subsystem before inserting the Disk Drive.
(i) Open the handle, and insert the Disk Drive holding it with both hands.
(ii) Close the handle, and lock it.

(c) When the Disk Drive has been added while the array power is on, the Alarm LED on the Disk Drive will go out a few minutes after the disk drive has been inserted. Make sure that the LED goes out.

(d) When the Disk Drive has been added while the subsystem power is on, Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed. When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code (refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)").

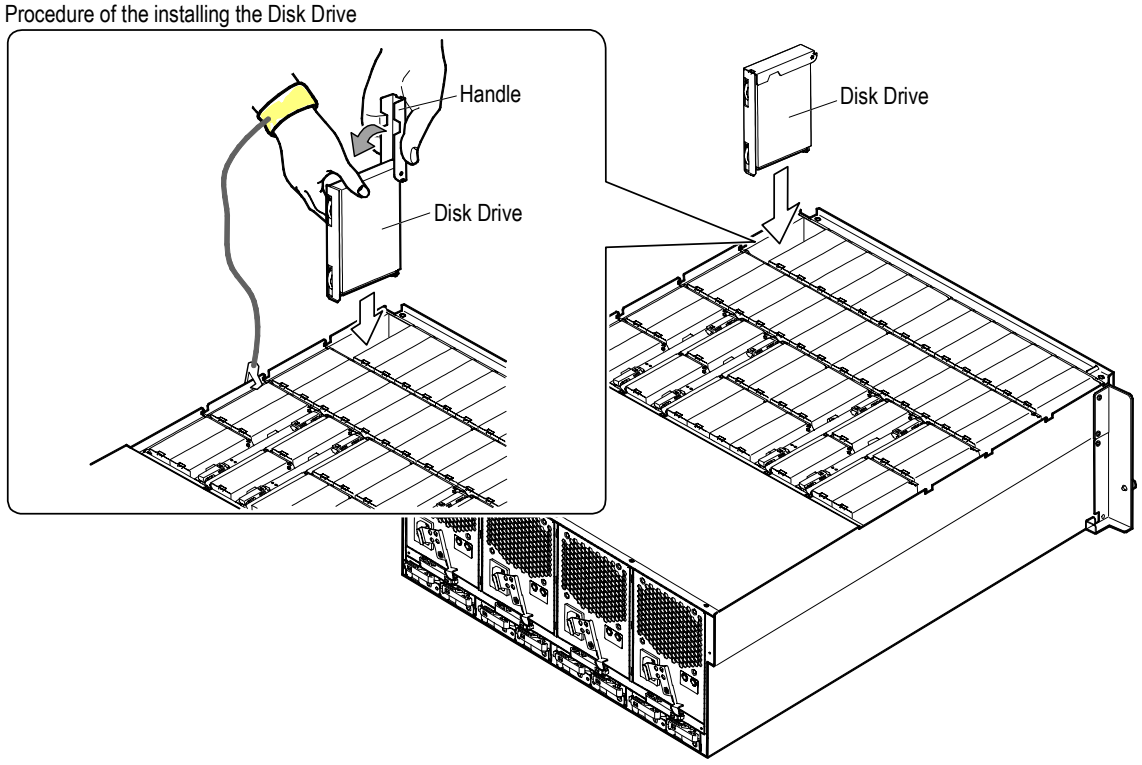


Figure 1.4.5.1 Operation of Mount/Remove the Disk Drive (RKAKX)

(5) Restoring the system information

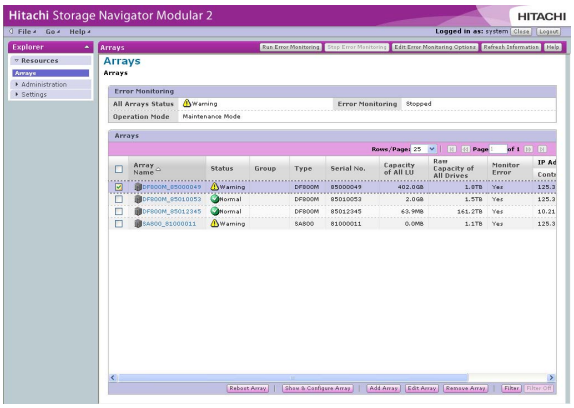
A restoration of the system information can be done by using either of the Hitachi Storage Navigator Modular 2.

(5-1) Restoring the system information using Hitachi Storage Navigator Modular 2

(a) Start the Hitachi Storage Navigator Modular 2.

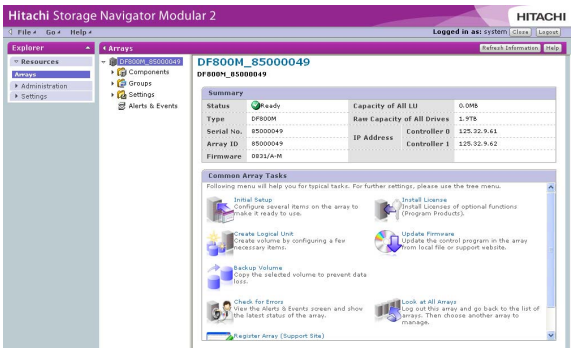
(b) Check the array subsystem to be set in the main window and press the [Ctrl] key and [E] key at the same time, and change the operation mode to "Maintenance Mode".(‡1)

It is displayed as "maintenance mode" in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



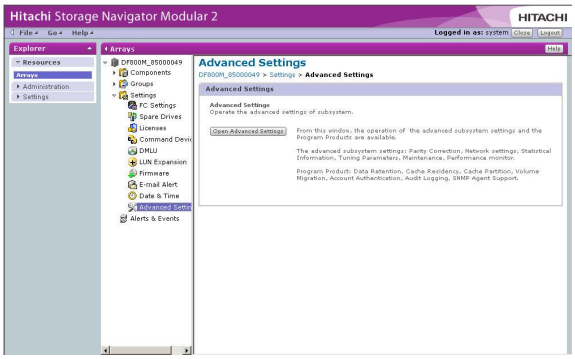
(c) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2" (SYSPR 01-0120).)

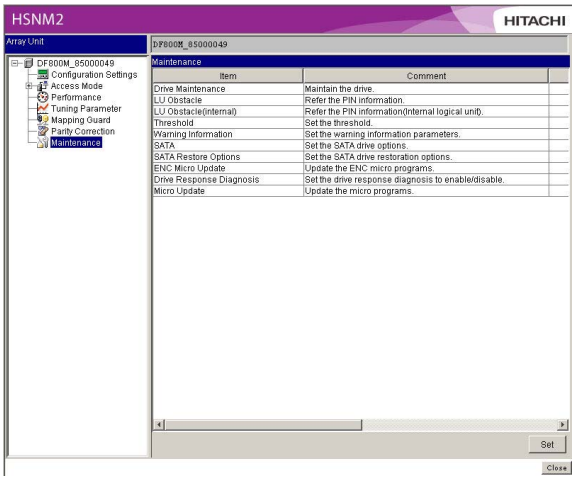


‡1 : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the "Arrays" window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

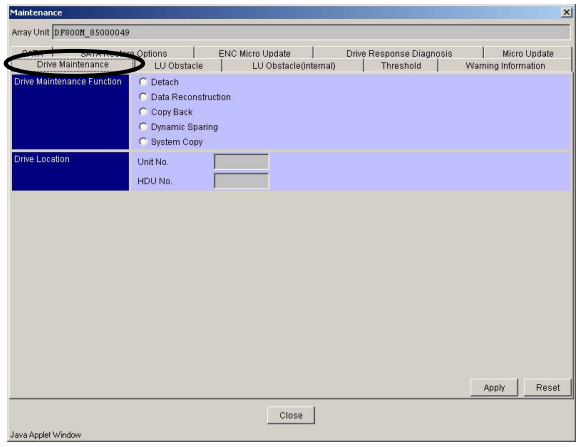
(d) Select [Settings] – [Advanced Settings] on the unit window, and click the [Open Advanced Settings] button.



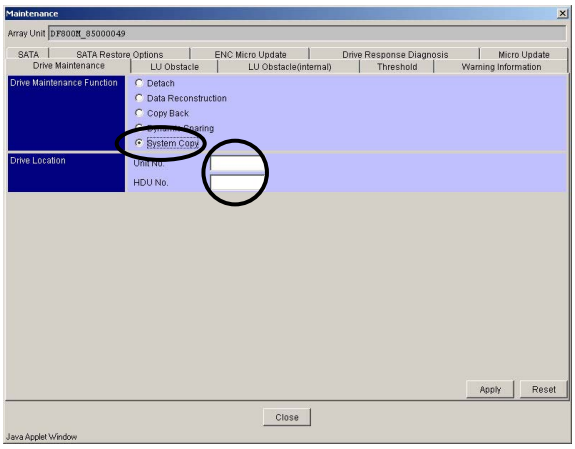
(e) Select the [Maintenance] on the applet window, and click the [Set] button. Maintenance dialog box is displayed.



(f) Click the [Drive Maintenance] tab.

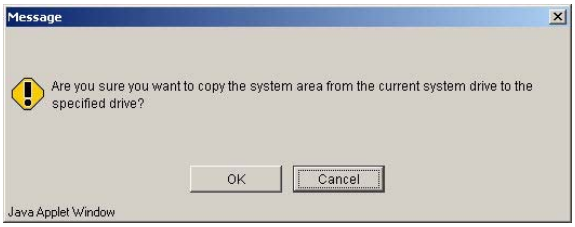


(g) Select the [System Copy] and set the number of the Disk Drive that has been added.



(h) Click the [Apply] button.

(i) The confirmation window is display. Click the [OK] button.



(j) A window showing that the setting has been completed is displayed.
Press the [OK] button.

(k) When “System copy started (Unit-x, HDU-y)” and “System copy completed (Unit-x, HDU-y)” are displayed at the “Information Message” in the WEB window, the system copy has been completed.

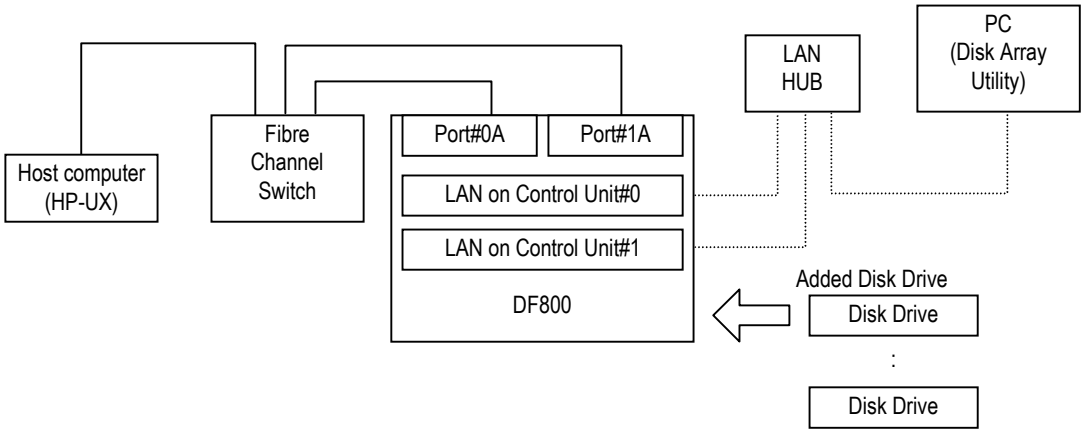
(6) Making a host computer recognize an LU while the subsystem power is on

< An example of the case of a host in which HP-UX is installed >

An example of the procedure to make the Disk Drive added while the subsystem power is on recognized by the host computer in which the HP-UX is installed is shown below.

(a) System configuration

LAN connect the PC, in which the Hitachi Storage Navigator Modular 2 is installed.



(b) Operation procedure

(i) Make sure that the host computer and the DF800 are in the Ready status. (I/Os host computer can be continued)

(ii) Install the Disk Drives to be added in the DF800.

(iii) Set a new RAID group for the installed Disk Drives.

(iv) Set (an) LU(s) newly for the RAID group which has been set in step (iii).

(v) Format the LU(s) which has been set in step (iv).

(vi) Issue the "ioscan -nfC disk" command from the host computer to verify that the DF800 has been recognized by the host computer. (However, the status of the newly added LU is displayed as NO-NW.)

(vii) Execute the "insf -e" command from the host to create a device file of the LU which has been newly added.

(viii) Issue the "ioscan -nfC disk" command from the host computer to verify that the DF800 has been recognized by the host computer. (The status of the newly added LU is displayed as CLAIMED.)

(ix) Execute a creation of a file system by creating the volume group and logical volume for the newly added LU from the host computer.

By operating as explained above, the LU(s) which has been newly created becomes able to be used by the host computer.

1.4.4 Adding a Cache Unit

Adding a Cache Unit is not work of the service personnel.

⚠ CAUTION

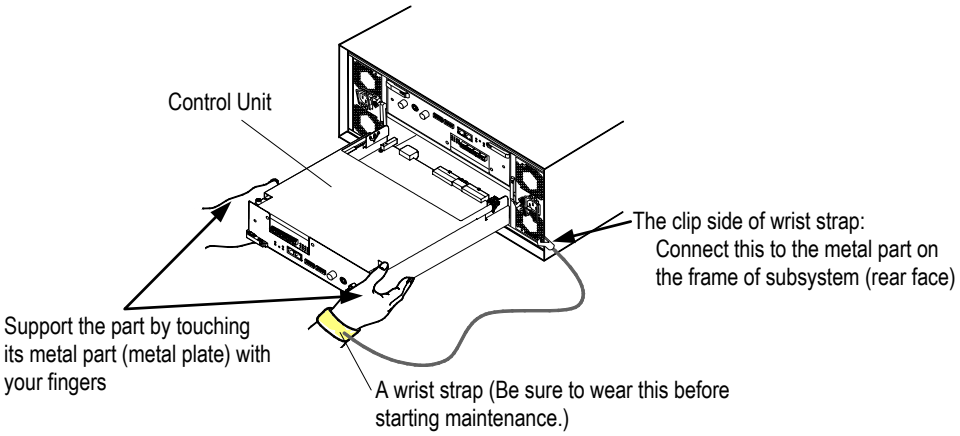
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Control Unit is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Control Unit from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.

<Working Procedure>

(1) Turn off the main switch.
Make sure that the POWER LED (green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking Cache Memory in the Back-up State" (REP 01-0040).)
When the Cache is in the backup status, cancel the status.

In this case, check that the C-PWR LED (green) on Control Unit is extinguished.

NOTE : If the C-PWR LED (green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(2) Remove the power cables from two Power Units.
(3) Open the right and left levers toward you at the same time while pressing the right and left buttons (blue) which fix the levers of the Control Unit.
When the levers are completely opened, the Control Unit comes out forward.
(4) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(5) Remove the Control Unit by pulling it out toward you.
(6) Loosen two cover fixing screws (blue) on the top of the cover, and open the cover to the arrow (⟶) direction.
You can fix the cover at a perpendicular position and, furthermore, you can lift the cover a little from this position and fall it to the opposite side.
(7) Remove the Cache Unit.
Place the removed Cache Unit in the place where anti-static measures are taken.

(8) Install the Cache Unit in the Control Unit.

NOTE : • Remove the dust cover when installing the Cache Unit.
- For the RKM, insert the Cache Units in the cache slots in regular order starting from the slot #0.
- when installing two Cache Units in RKM, install the Cache Unit of the same capacity as each slot.
- For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.
- In the case of the RKH, if the Cache memories are not installed in the slot #0 and the slot #1, the blockade of the Control Unit occurs.
  Be sure to install the Cache memories in the slot #0 and the slot #1.
- Install the Cache Units by the set of two in the slot #0 and #1 and the slot #2 and #3.
- For the RKH, install the Cache Unit of the same capacity in the slot #0, slot #1 and slot #2, slot #3, respectively, and make the capacity and the installation position of the Control Unit #0 and the Control Unit #1 the same.

(9) Close the cover and fix it by fastening two cover fixing screws (blue) on the top of the cover.
(10) Insert it in the set position in the status where the right and left levers on the Control Unit are opened, and close the levers completely until you hear the buttons (blue), which fix the levers, click. If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
- The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(11) In the case of the dual control Unit composition, perform the procedure from (3) to (10) to the other Control Unit.
(12) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
  If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
- In the case of the RKM/RKS, the installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(13) Connect the power cables (two).
(14) Turn on the main switch.
(15) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(16) Check that the READY LED (green) on the front of the Basic Chassis lights up. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the Warning status, the WARNING LED (orange) goes out.

(17) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed.
When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code (refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)").

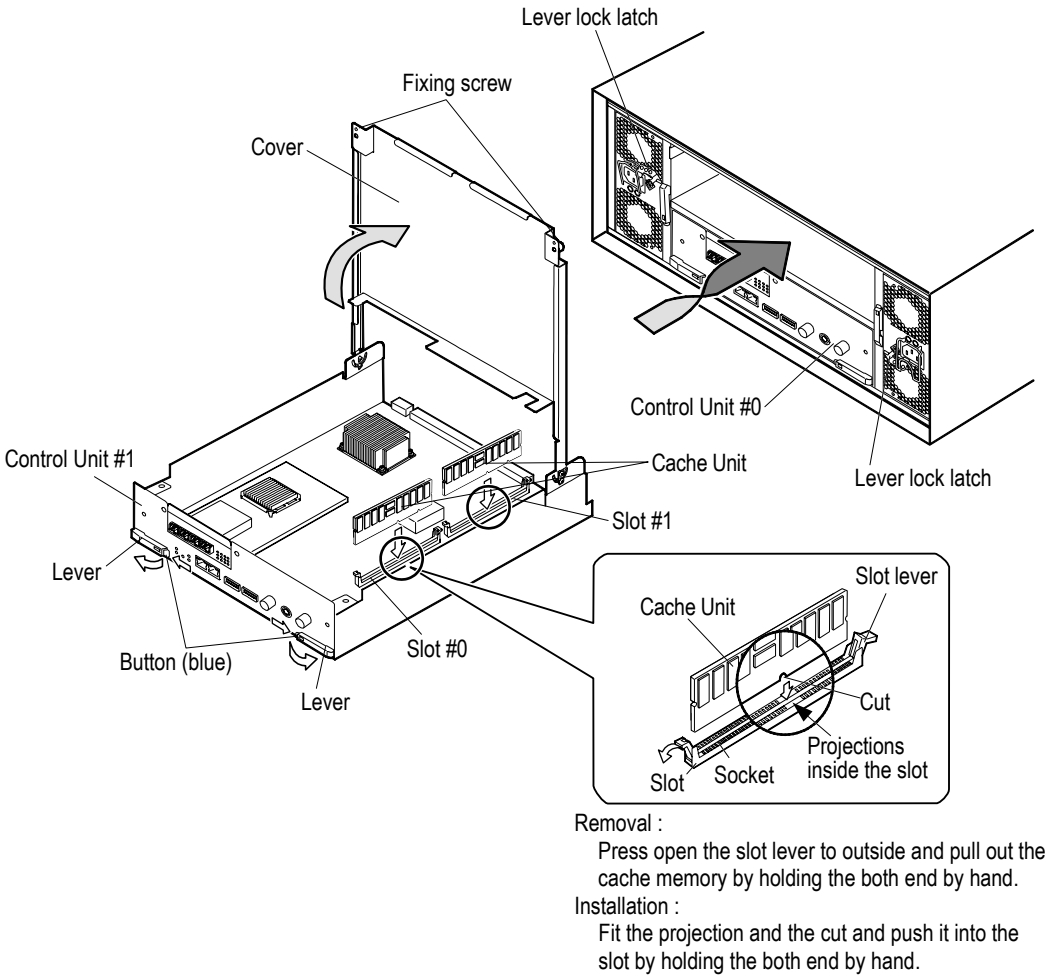
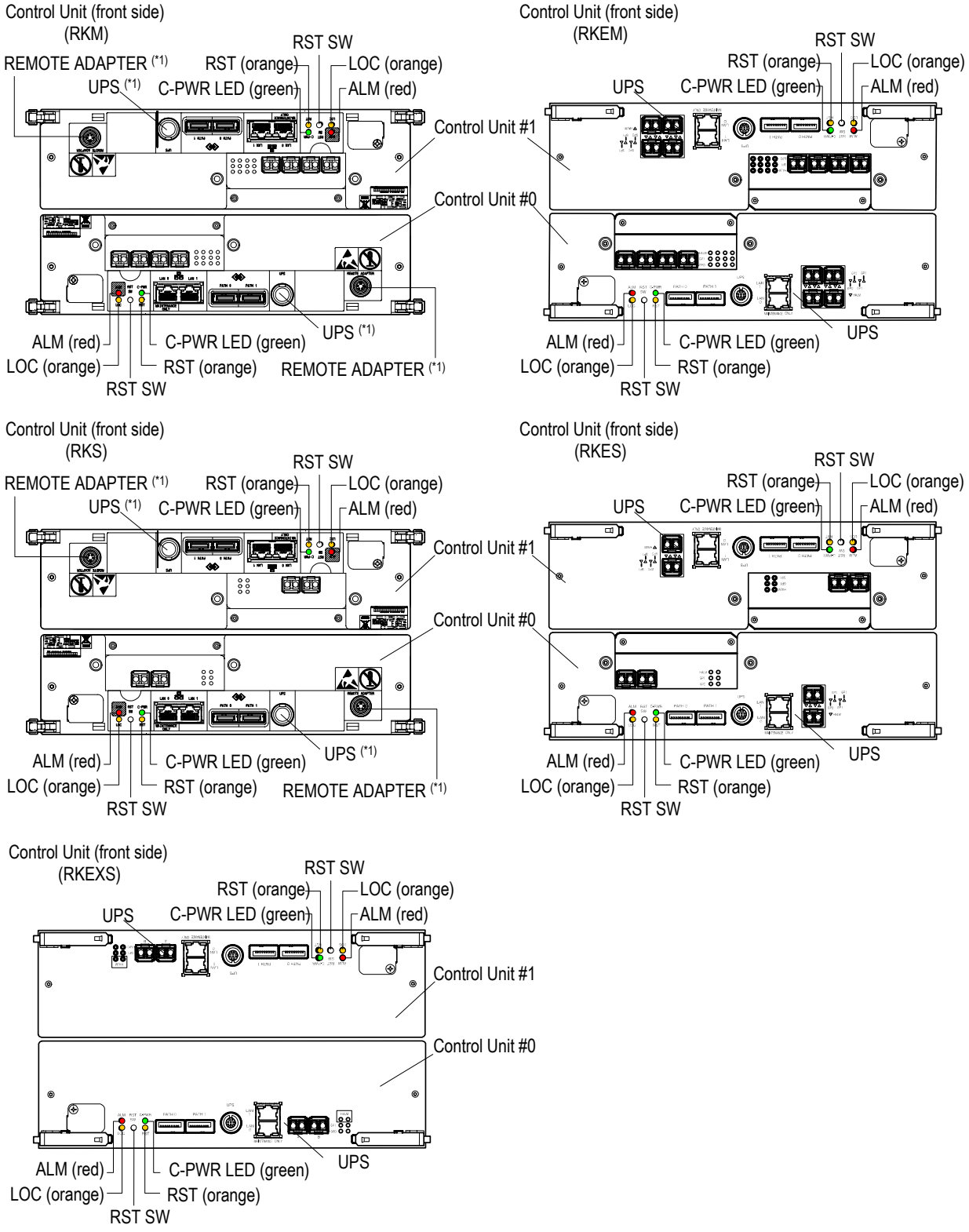


Figure 1.4.6 Adding the Cache Unit (RKM/RKS)



*1 : The position of the connector is different depending on the Control Unit.
Confirm the connector.

Figure 1.4.7 Position of the LED on the Control Unit (RKM/RKEM/RKS/RKES/RKEXS)

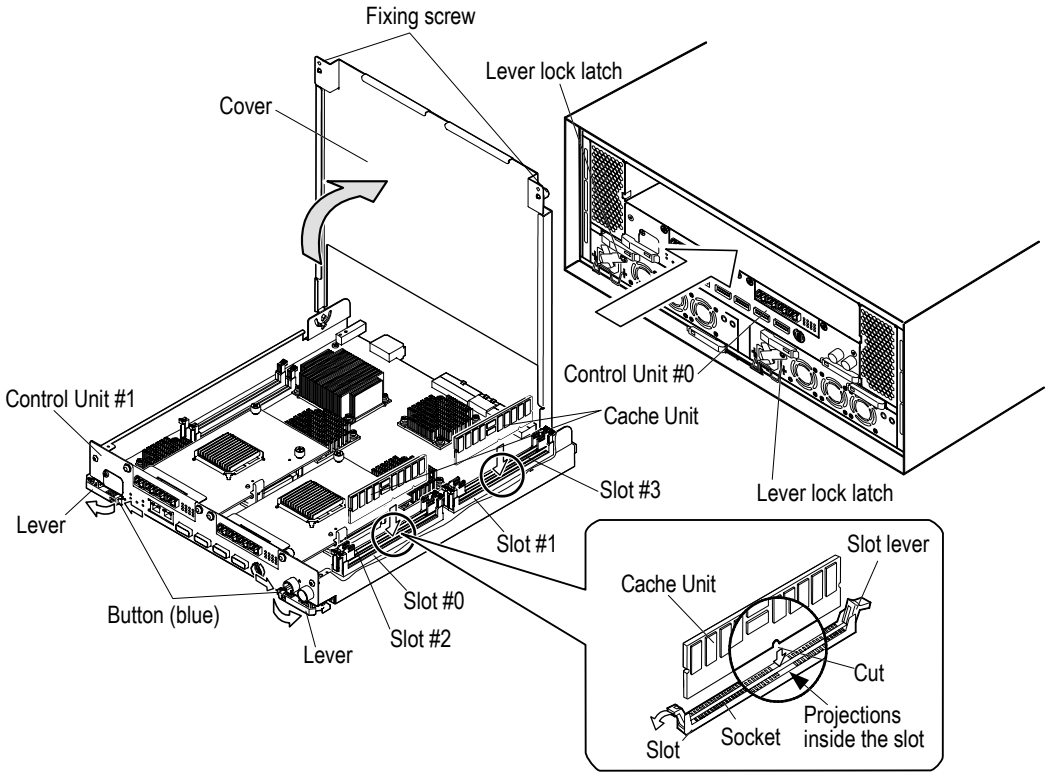


Figure 1.4.8 Adding the Cache Unit (RKH)

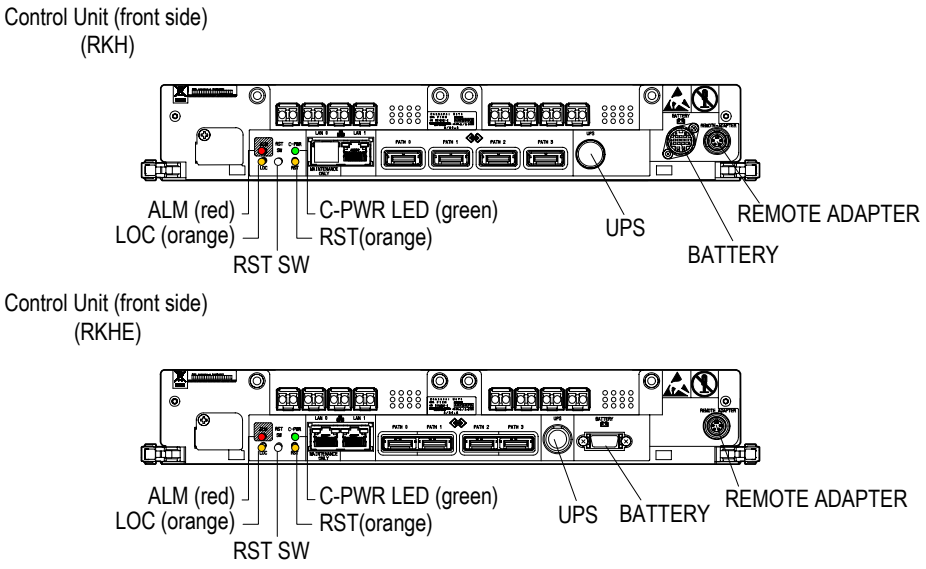


Figure 1.4.9 Position of the LED on the Control Unit (RKH/RKHE)

1.4.5 Adding a FC Interface Board

Adding a FC Interface Board is not work of the service personnel.

⚠ CAUTION

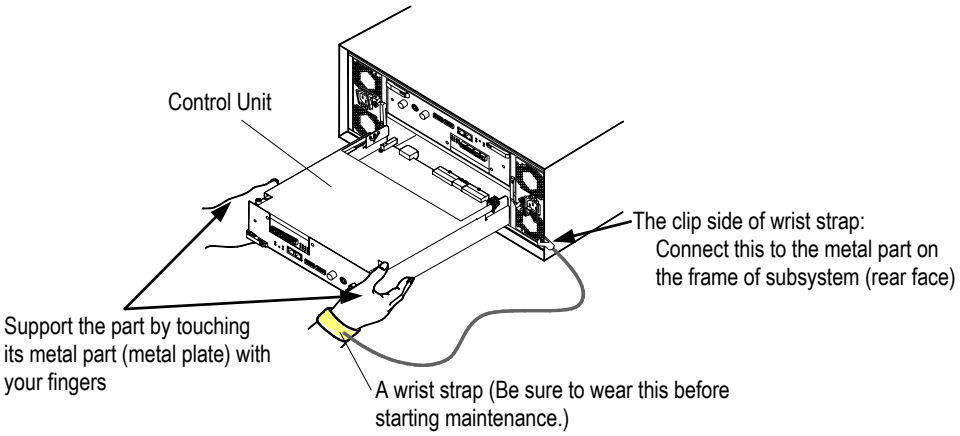
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Control Unit is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Control Unit from electrostatic discharge.

NOTE : Before unpacking and adding maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.

<Working Procedure>

(1) Collect Simple Trace and Constitution Information. (Refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

NOTE : When the installation position of the Interface Board is changed(‡1) or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.

- Host Group Information/Target Information
- Host Group Option/Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/iSCSI port setting information
- CHAP security information (iSCSI)

(2) Turn off the main switch.
Make sure that the POWER LED (green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking Cache Memory in the Back-up State" (REP 01-0040).)
When the Cache is in the backup status, cancel the status.

In this case, check that the C-PWR LED (green) on Control Unit is extinguished.

NOTE : If the C-PWR LED (green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(3) Remove the power cables from two Power Units.

(4) Open the right and left levers toward you at the same time while pressing the right and left buttons (blue) which fix the levers of the Control Unit.
When the levers are completely opened, the Control Unit comes out forward.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

(5) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force. Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(6) Remove the Control Unit by pulling it out toward you.
(7) Loosen two cover fixing screws (blue) on the top of the cover, and open the cover to the arrow (⟶) direction.
You can fix the cover at a perpendicular position and, furthermore, you can lift the cover a little from this position and fall it to the opposite side.
(8) Remove the Interface Board or the dummy.
In the case of the Interface board, loosen the fixing screws ① to ④ of the Interface Board installed in the Control Unit, operate the latch lever slowly to the arrow direction (⟶), remove the connector while lifting up the Interface Board, and remove it from the Control Unit.
In the case of the dummy, loosen the fixing screws ②and ③ of the dummy, remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(9) Place the adding Interface Board according to the positioning pin of the Control Unit, temporarily fix the fixing screw ①. Press the label (PUSH HERE) part, and insert it in the connector.
At this time, check that the connector is inserted surely. Insert the Interface Board making its sheet metal part face inside of the Control Unit.

NOTE : • In the case of the RKH, install the Interface Boards of the same type in the same position of the Control Unit #0 and #1.
• When installing the Interface Board, insert the connector after checking the locations of the positioning pin and the fixing screws for Interface Board because the incorrect location decision may cause the connector to be damaged.

(10) Fix the Interface Board by tightening the fixing screws ① to ④.
(11) Close the cover and fix it by fastening two cover fixing screws (blue) on the top of the cover.

(12) Insert it in the set position in the status where the right and left levers on the Control Unit are opened, and close the levers completely until you hear the buttons (blue), which fix the levers, click.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

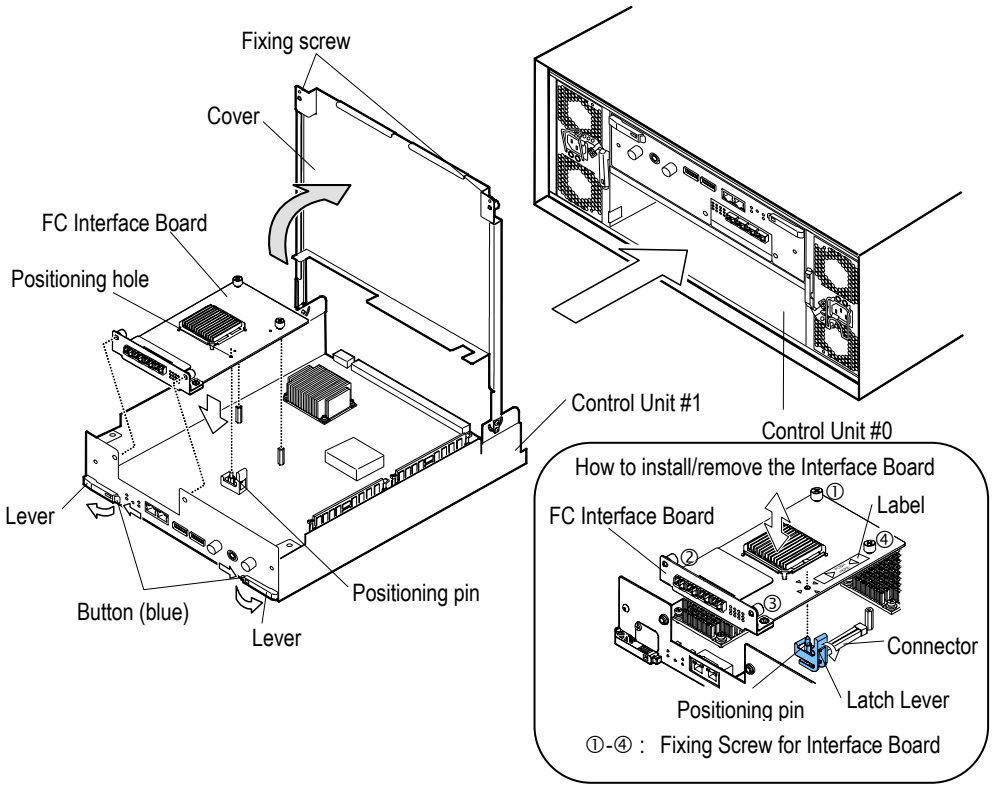
NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• In the case of the RKM/RKS, the installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(13) In the case of the dual control Unit composition, perform the procedure from (6) to (12) to the other Control Unit.
(14) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

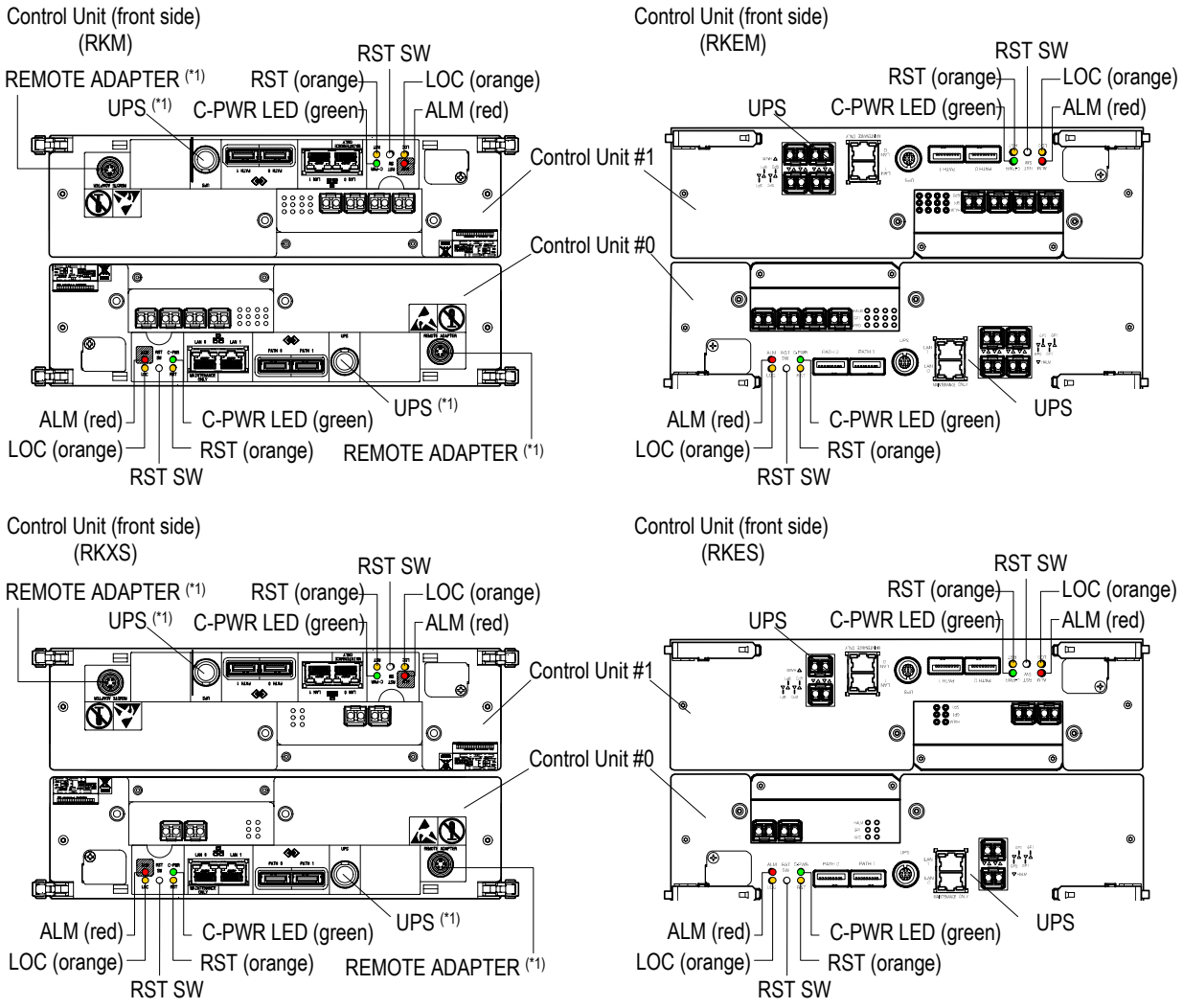
(15) Slide the Lever lock latch, and connect the power cables (two) with the Power Unit.
(16) Turn on the main switch.
(17) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(18) Check that the READY LED (green) on the front of the Basic Chassis lights up. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
(19) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed.
When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code. (Refer to Firmware “1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)”.)
(20) For the added FC Interface Board Port, configure the host group and Fibre Channel port setting. (Refer to System Parameter “Chapter 2. Setting Host Group/Targets” (SYSPR 02-0000), and Hitachi Storage Navigator Modular 2 Help “FC Settings”.)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the Warning status, the WARNING LED (orange) goes out.



*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKS.

Figure 1.4.10 Adding a FC Interface Board (RKS/RKM)



*1 : The position of the connector is different depending on the Control Unit.
Confirm the connector.

Figure 1.4.11 Position of the LED on the Control Unit (RKS/RKES/RKM/RKEM)

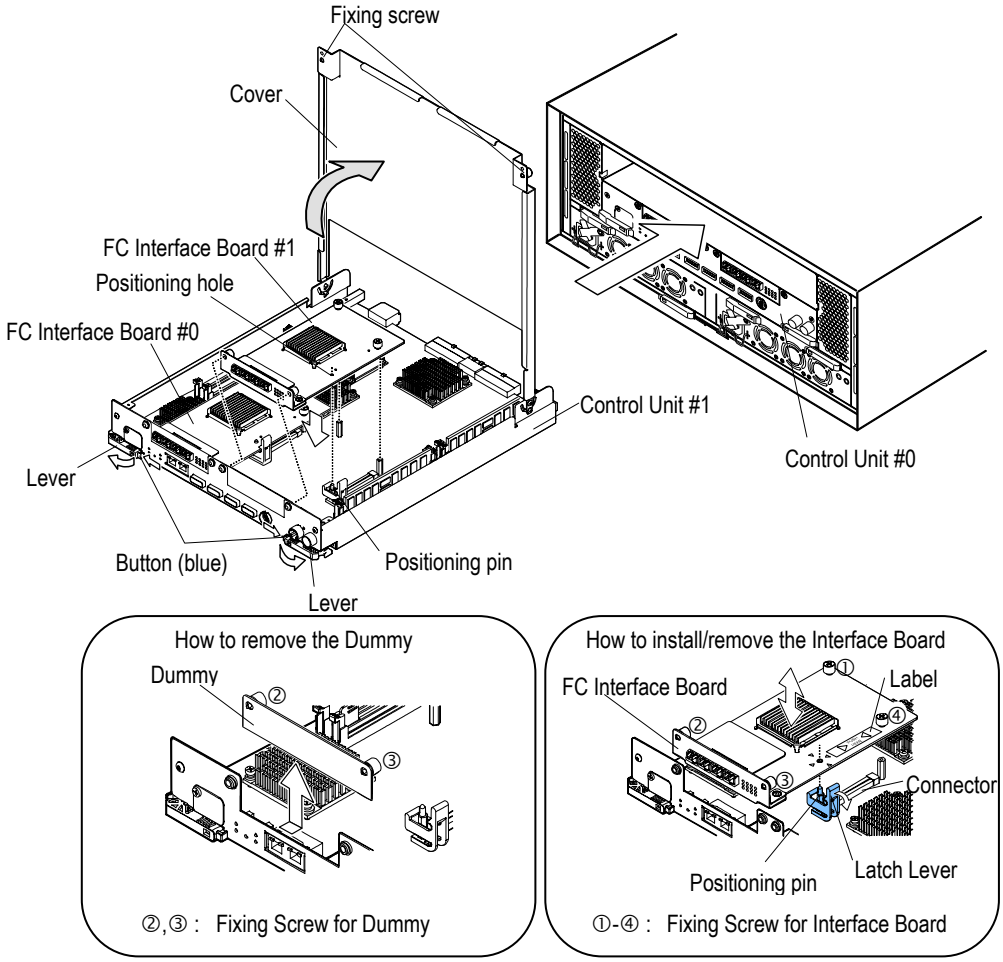


Figure 1.4.12 Adding a FC Interface Board (RKH)

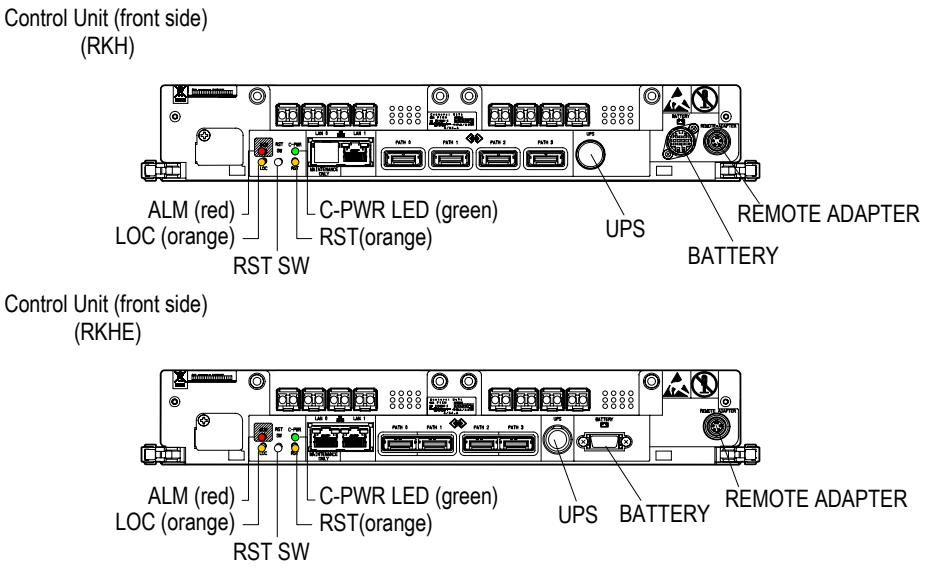


Figure 1.4.13 Position of the LED on the Control Unit (RKH/RKHE)

This page is for editorial purpose only.

1.4.6 Adding an iSCSI Interface Board

Adding an iSCSI Interface Board is not work of the service personnel.

⚠ CAUTION

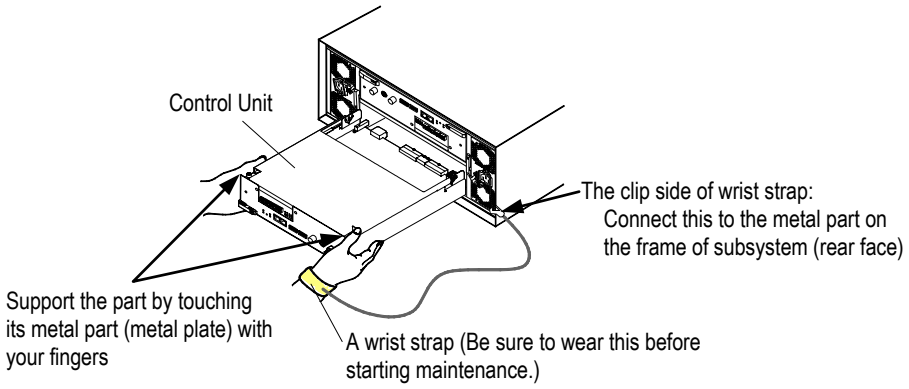
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Control Unit is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Control Unit from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.

<Working Procedure>

(1) Collect Simple Trace and Constitution Information. (Refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

NOTE : When the installation position of the Interface Board is changed(‡1) or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.

- Host Group Information/Target Information
- Host Group Option/Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/iSCSI port setting information
- CHAP security information (iSCSI)

(2) Turn off the main switch.
Make sure that the POWER LED (green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking Cache Memory in the Back-up State" (REP 01-0040).)
When the Cache is in the backup status, cancel the status.

In this case, check that the C-PWR LED (green) on Control Unit is extinguished.

NOTE : If the C-PWR LED (green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(3) Remove the power cables from two Power Units.

(4) Open the right and left levers toward you at the same time while pressing the right and left buttons (blue) which fix the levers of the Control Unit.
When the levers are completely opened, the Control Unit comes out forward.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

(5) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force. Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(6) Remove the Control Unit by pulling it out toward you.
(7) Loosen two cover fixing screws (blue) on the top of the cover, and open the cover to the arrow (⟶) direction.
You can fix the cover at a perpendicular position and, furthermore, you can lift the cover a little from this position and fall it to the opposite side.
(8) Remove the Interface Board or the dummy.
In the case of the Interface board, loosen the fixing screws ① to ④ of the Interface Board installed in the Control Unit, operate the latch lever slowly to the arrow direction (⟶), remove the connector while lifting up the Interface Board, and remove it from the Control Unit.
In the case of the dummy, loosen the fixing screws②and ③ of the dummy, remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(9) Place the adding Interface Board according to the positioning pin of the Control Unit, temporarily fix the fixing screw ①. Press the label (PUSH HERE) part, and insert it in the connector.
At this time, check that the connector is inserted surely. Insert the Interface Board making its sheet metal part face inside of the Control Unit.

NOTE : • In the case of the RKH, Install the Interface Boards of the same type in the same position of the Control Unit #0 and #1.
• When installing the Interface Board, insert the connector after checking the locations of the positioning pin and the fixing screws for Interface Board because the incorrect location decision may cause the connector to be damaged.

(10) Fix the Interface Board by tightening the fixing screws ① to ④.
(11) Close the cover and fix it by fastening two cover fixing screws (blue) on the top of the cover.

(12) Insert it in the set position in the status where the right and left levers on the Control Unit are opened, and close the levers completely until you hear the buttons (blue), which fix the levers, click.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

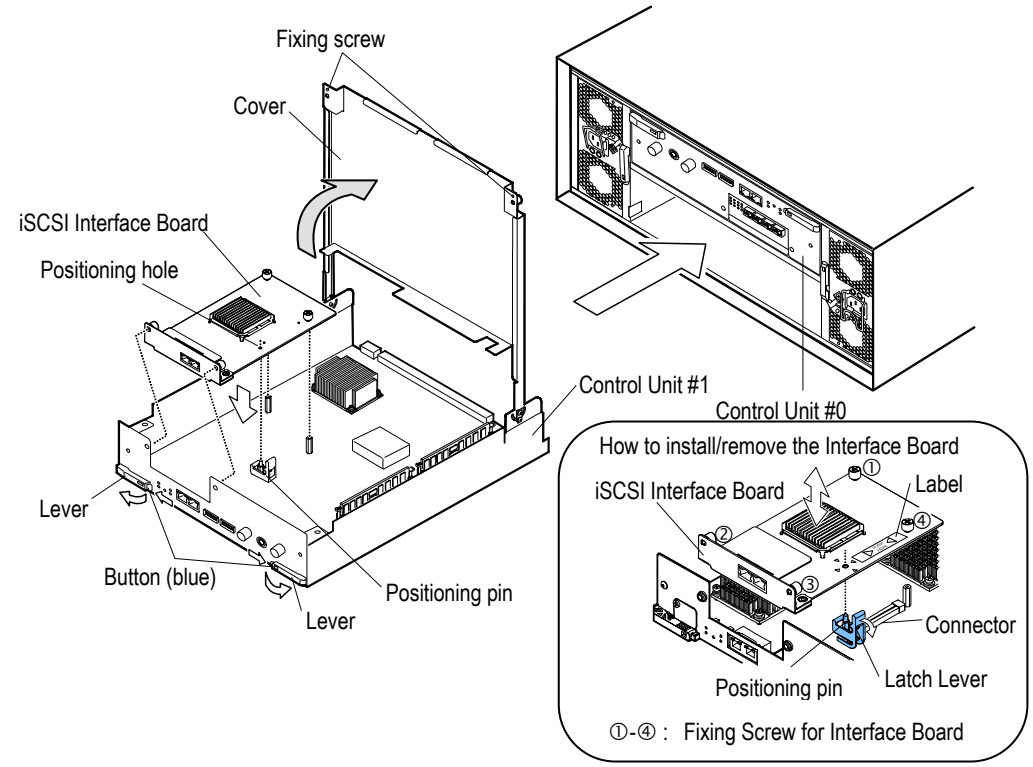
NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• In the case of the RKM/RKS, the installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(13) Connect the iSCSI Interface cables to the adding Interface Board.
(14) In the case of the dual control Unit composition, perform the procedure from (4) to (13) to the other Control Unit.
(15) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

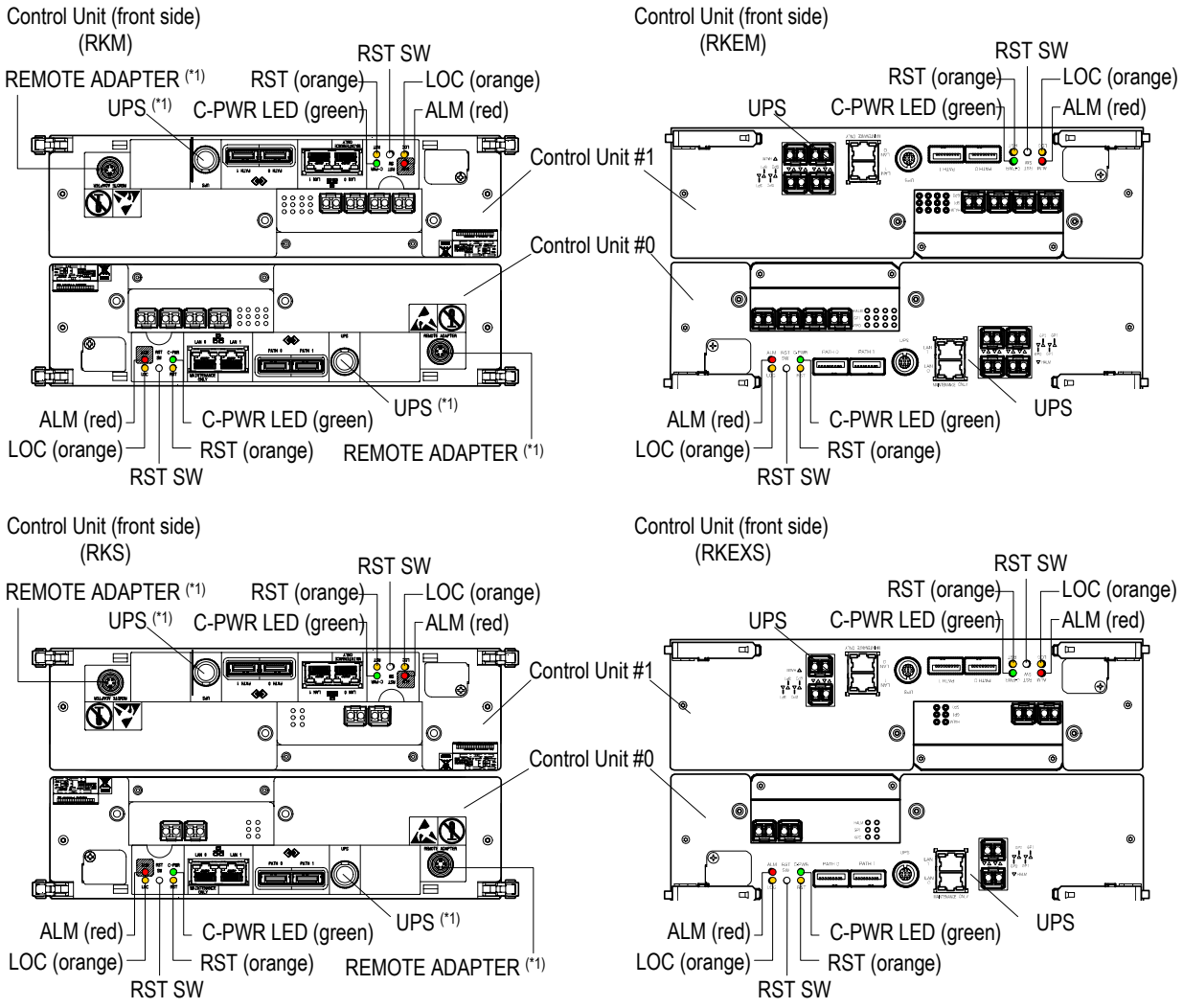
(16) Slide the Lever lock latch, and connect the power cables (two) with the Power Unit.
(17) Turn on the main switch.
(18) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(19) Check that the READY LED (green) on the front of the Basic Chassis lights up. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
(20) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed.
When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code. (Refer to Firmware “1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)”.)
(21) For the added iSCSI Interface Board Port, Configure the host group and iSCSI port setting. (Refer to System Parameter “Chapter 2. Setting Host Group/Targets” (SYSPR 02-0000), and Hitachi Storage Navigator Modular 2 Help “iSCSI Settings”.)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the Warning status, the WARNING LED (orange) goes out.



*1 : The figure shows the case where the iSCSI Interface Board is installed in the Control Unit of the RKM.

Figure 1.4.14 Adding an iSCSI Interface Board (RKM/RKS)



*1 : The position of the connector is different depending on the Control Unit.
Confirm the connector.

Figure 1.4.15 Position of the LED on the Control Unit (RKM/RKEM/RKS/RKES/RKEXS)

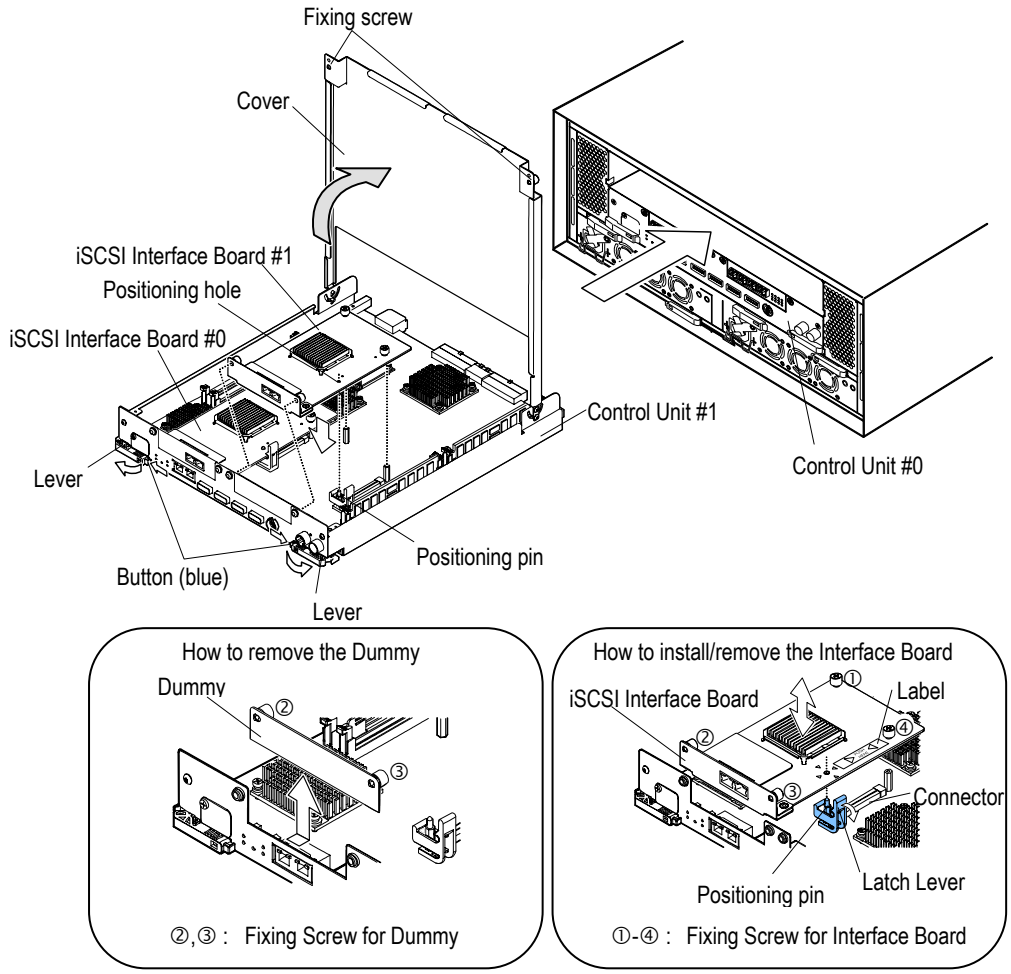


Figure 1.4.16 Adding an iSCSI Interface Board (RKH)

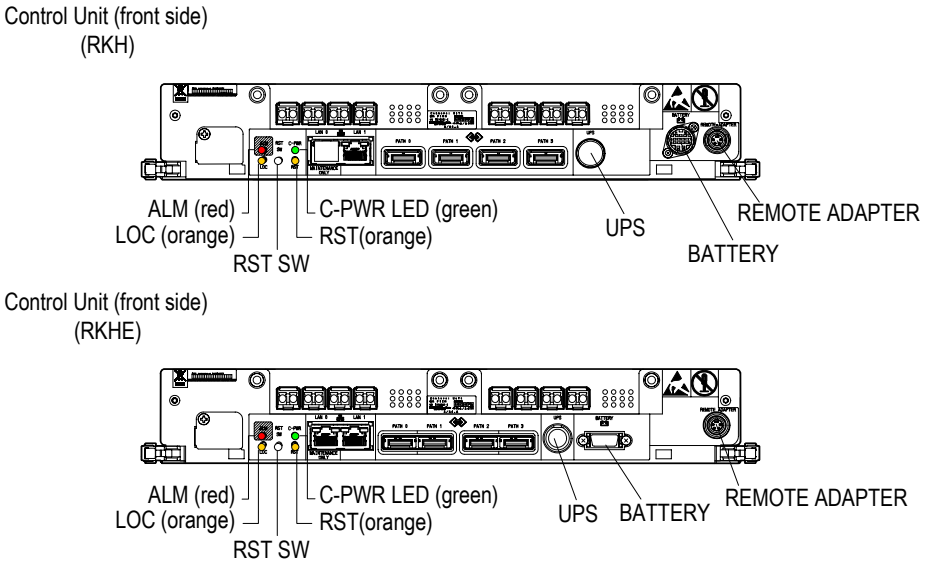


Figure 1.4.17 Position of the LED on the Control Unit (RKH/RKHE)

This page is for editorial purpose only.

1.4.7 Adding a Cache Backup Battery

Table 1.4.1.1 Installed battery configuration of the RKHE/RKHE2

Total of installing battery	2	3	4	5	6
Number of Cache Backup Batteries	2	3	4	4	4
Additional Battery Boxes	0	0	0	1	2

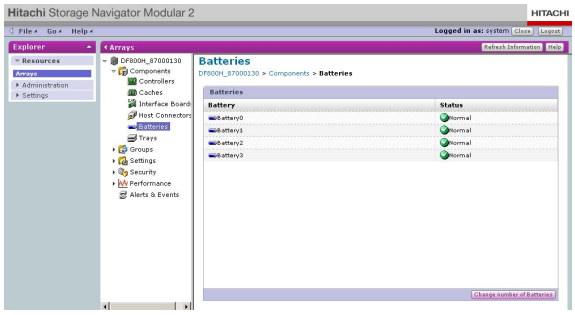
(1) Remove the Front Bezel. (Refer to Installation "1.4 How to Open/Close Door or Attach/Remove Front Bezel/Rear Door of the Subsystem" (INST 01-0100).)

(2) Remove the dummy.
Open the levers toward you while pressing the buttons (blue) which fix the levers of the dummy.

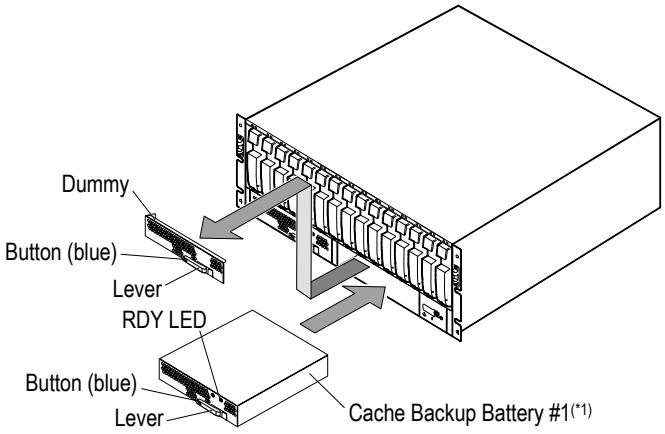
(3) Open the lever of the Cache Backup Battery to be added toward you.

(4) Install the Cache Backup Battery in the set position.
Insert the Cache Backup Battery until its lever is slightly closed, and then close it completely until you hear the button (blue), which fixes the lever, click.

(5) Check the status of the added Cache Backup Battery.
Start Hitachi Storage Navigator Modular 2, and click the name of the array subsystem concerned to open the unit window. Select [Components] – [Batteries] in the unit window.
The batteries window is displayed.
Check that the status of the added Cache Backup Battery is Normal.

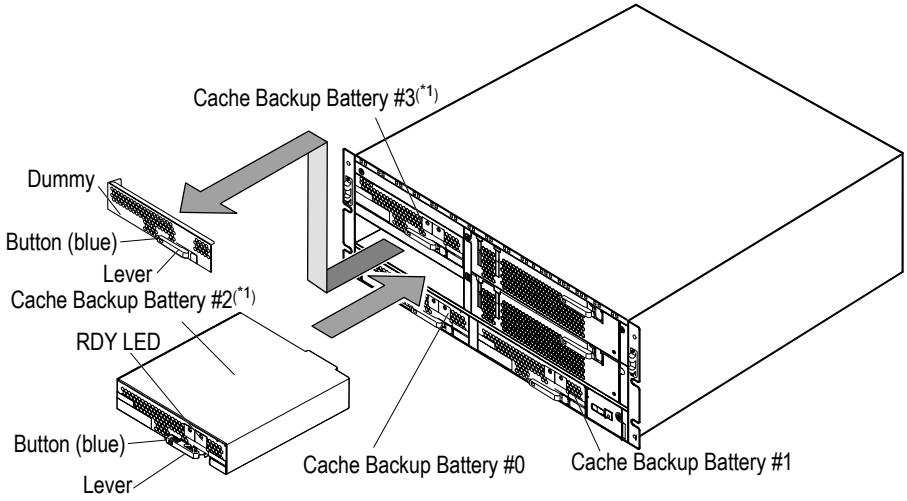


(6) Attach the Front Bezel. (Refer to Installation "1.4 How to Open/Close Door or Attach/Remove Front Bezel/Rear Door of the Subsystem" (INST 01-0100).)



*1 : Install the Cache Backup Battery of the RKM/RKS on the right side of the subsystem.
In the case of the DF800-RK2, two batteries are installed as a standard.

Figure 1.4.18 Adding a Cache Backup Battery (RKM/RKS)



*1 : Install the Cache Backup Battery of the RKH on the #2, #3 of the subsystem.
In the case of the DF800-RKH2 and the DF800-RKHE2, four batteries are installed as a standard.

Figure 1.4.19 Adding a Cache Backup Battery (RKH)

This page is for editorial purpose only.

1.4.8 Adding an Additional Battery Box

Be sure to add the Additional Battery Boxes to the RKHE/RKHE2/RKHED/RKHE2D.
RKM/RKS/RKH/RKH2 cannot be added Additional Battery Box.

Table 1.4.2 Installed battery configuration of the RKHE/RKHE2/RKHED/RKHE2D

Total of installing battery	2	3	4	5	6
Number of Cache Backup Batteries	2	3	4	4	4
Additional Battery Boxes	0	0	0	1	2

(1) When adding Additional Battery Boxes with no Additional Battery Box (0 unit) connected

(a) Installing the rail and the Additional Battery Box

The way of installing the rack rail and the Additional Battery Box Unit varies on the rack frame in which the Additional Battery Box is installed.

(a-1) RK40 Rack Frame

(i) Installing the optional parts.

Table 1.4.3 show optional parts required to install one Additional Battery Box to the RK40 rack frame (Model name : DF-F800-N1RK/DF-F800-N1RKD).

Table 1.4.3 Components of rack rail (DF-F800-URHTN7) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail	3274779-A	1	For right hand side	—
2	Rail	3274740-B	1	For left hand side	—
3	Stopper	5531106-1	2	For securing the subsystems	—
4	Rack nut	5510146-1	12	For securing the subsystems and the rails (2 spares are included.)	—
5	Bind screw with washer (M3×10)	3261960-310	6	For securing the Stopper (2 spares are included.)	—
6	Bind screw (M5×10)	SB510N	4	For securing the subsystems (2 spares are included.)	—
7	Bind screw (M5×16)	SB516N	10	For securing the rails (2 spares are included.)	—
8	Power cable	3272181-E	1	Power cable (900mm)	—

(ii) Installing the rail

① On the left side of the installation location in the rack frame, align the round holes of the Rail (L) with those of the rack frame and insert the Rack nut (at five places in total in front and rear.).

② Fasten the Rail (L) to the rack frame using the binding screw (M5×16) (at two places each on the front and rear sides.).

③ Install the Rail (R) to the rack frame in the same way

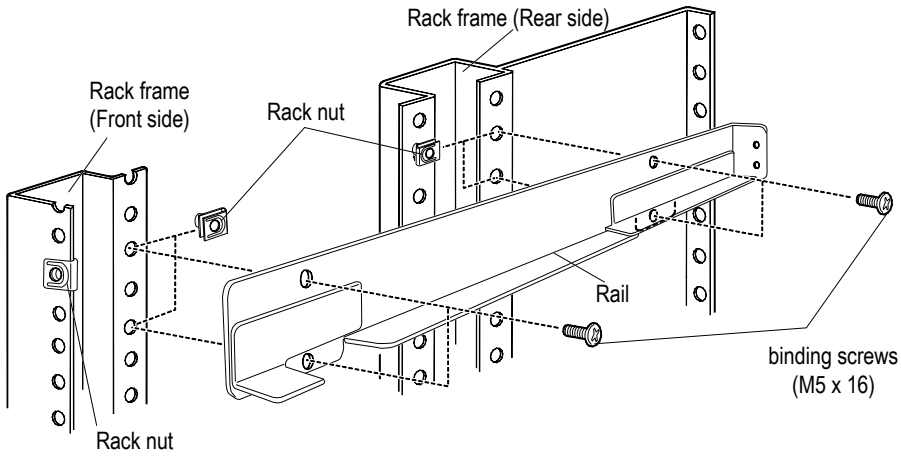


Figure 1.4.20 Installing the Rail (RK40 rack frame)

(iii) Installing the Additional Battery Box

① Install the Additional Battery Box from the front side so that the outlet opening aims at the rear side of the subsystem.

② Fix the front part of the Additional Battery Box with two Binding screws (M5 x 10) (one place each at left and right).

③ Fix the rear part of the Additional Battery Box with two Stoppers (one place each at left and right) and four the binding screws with washer (M3 x 10) (two places each at left and right).

NOTE : Shift each of the two Stoppers in the direction shown by the arrow and make it contact the frame.

④ Attach the Front Bezel to the front frame.

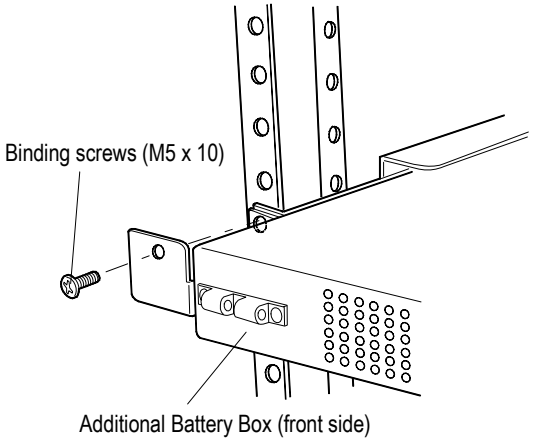


Figure 1.4.21 Fixing the Front Side of the Additional Battery Box (RK40 rack frame)

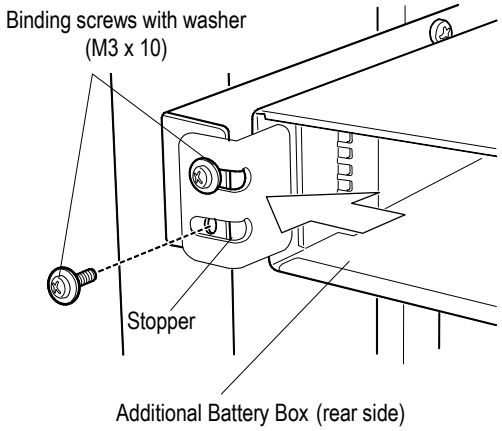


Figure 1.4.22 Fixing the Rear Side of the Additional Battery Box (RK40 rack frame)

(a-2) HP Rack Frame

(i) Installing the optional parts.

Table 1.4.4 show optional parts required to install one Additional Battery Box to the HP rack frame (Model name : DF-F800-N1RK/DF-F800-N1RKD).

Table 1.4.4 Components of rack rail (DF-F800-URN7) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Front Rail	2850146-A	1	For right hand side	—
2	Front Rail	2850146-B	1	For left hand side	—
3	Rear Rail	3274832-1	1	For right hand side	—
4	Rear Rail	3274835-A	1	For left hand side	—
5	Stopper	5531200-1	2	For securing the subsystems	—
6	Spacer	5531202-1	2	For securing the subsystems	—
7	Bind screw (M5×10)	SB510N	10	For securing the rails (2 spares are included.)	—
8	Bind screw (M4×8)	SB408N	10	For securing the rails (2 spares are included.)	—
9	Bind screw (M3×6)	SB306N	6	For securing the stopper (2 spares are included.)	—
10	Screw	SC306N	6	For securing the Spacer (2 spares are included.)	—
11	Rack nut	5510146-1	10	For securing the rails (2 spares are included.)	For circular holes
12	Bind screw (M5×8)	3274845-508	4	For securing the subsystems (2 spares are included.)	—
13	Cage nut (M5)	5528564-1	10	For securing the rails (2 spares are included.)	For rectangular holes
14	Bind screw (UNI)	5531209-1	10	For securing the rails (2 spares are included.)	For the SUN rack
15	SIDE_SUP2	3274837-1	1	For right hand side	Not used
16	SIDE_SUP2	3274837-2	1	For left hand side	Not Used

(ii) Installing the rail

① Install the Rack nuts in the installation position of the front rail (two places).
② Fix the front side of the front rail with the Binding screws (M5x10) (two places).
③ Install the Spacer in the front of the front rail, and fix it with the Screws (M3x6) (two places).
④ Install the Rack nuts in the installation position of the rear rail (two places).
⑤ Fix the rear side of the rear rail with the Binding screws (M5x10) (two places).
⑥ Fix the front rail and the rear rail with the Binding screws (M4x8) (four places).
⑦ Perform the above-mentioned installation to the right and left of the rack frame.

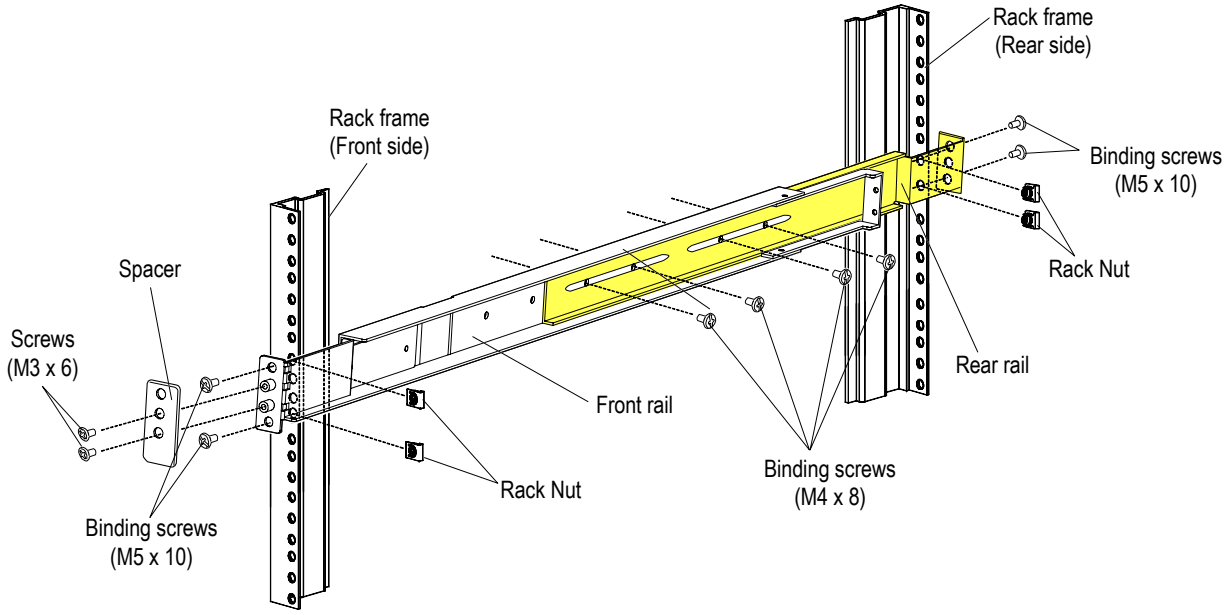


Figure 1.4.23 Installing the Rail (HP rack frame)

(iii) Installing the Additional Battery Box

① Install the Additional Battery Box from the front side so that the outlet opening aims at the rear side of the subsystem.

② Fix the front part of the Additional Battery Box with two Binding screws (M5 x 8) (one place each at left and right).

③ Fix the rear part of the Additional Battery Box with two Stoppers (one place each at left and right) and four Binding screws (M3 x 6) (two places each at left and right).

NOTE : Shift each of the two Stoppers in the direction shown by the arrow and make it contact the frame.

④ Attach the Front Bezel to the front frame.

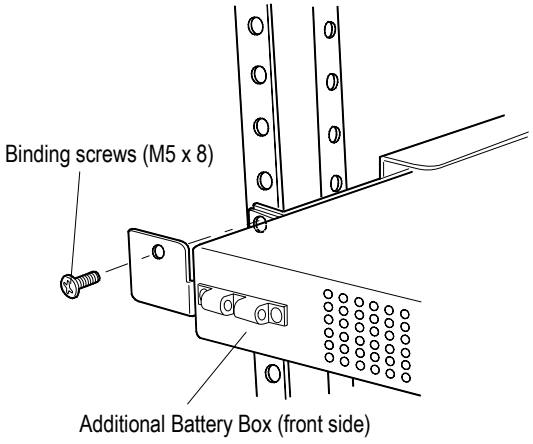


Figure 1.4.24 Fixing the Front Side of the Additional Battery Box (HP rack frame)

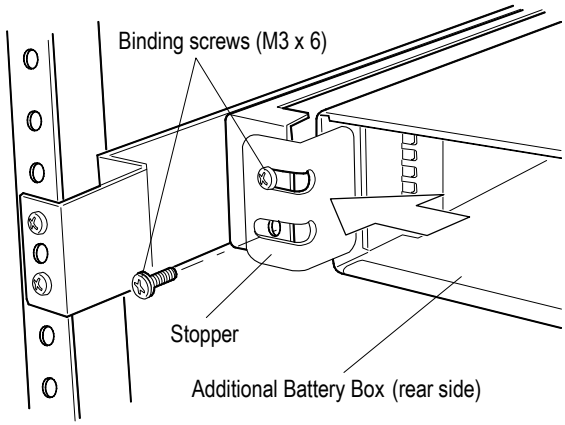


Figure 1.4.25 Fixing the Rear Side of the Additional Battery Box (HP rack frame)

(a-3) Sun StorEdge Rack Frame

(i) Installing the optional parts.

Table 1.4.5 show optional parts required to install one Additional Battery Box to the Sun StorEdge rack frame (Model name : DF-F800-N1RK/DF-F800-N1RKD).

Table 1.4.5 Components of rack rail (DF-F800-URN7) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Front Rail	2850146-A	1	For right hand side	—
2	Front Rail	2850146-B	1	For left hand side	—
3	Rear Rail	3274832-1	1	For right hand side	—
4	Rear Rail	3274835-A	1	For left hand side	—
5	Stopper	5531200-1	2	For securing the subsystems	—
6	Spacer	5531202-1	2	For securing the subsystems	—
7	Bind screw (M5×10)	SB510N	10	For securing the rails (2 spares are included.)	—
8	Bind screw (M4×8)	SB408N	10	For securing the rails (2 spares are included.)	—
9	Bind screw (M3×6)	SB306N	6	For securing the stopper (2 spares are included.)	—
10	Screw	SC306N	6	For securing the Spacer (2 spares are included.)	—
11	Rack nut	5510146-1	10	For securing the rails (2 spares are included.)	For circular holes
12	Bind screw (M5×8)	3274845-508	4	For securing the subsystems (2 spares are included.)	—
13	Cage nut (M5)	5528564-1	10	For securing the rails (2 spares are included.)	For rectangular holes
14	Bind screw (UNI)	5531209-1	10	For securing the rails (2 spares are included.)	For the SUN rack
15	SIDE_SUP2	3274837-1	1	For right hand side	Not used
16	SIDE_SUP2	3274837-2	1	For left hand side	Not Used

(ii) Installing the rail

① Fix the front side of the front rail with binding screws (UNI) (two places).

② Install the Spacer in the front of the front rail, and fix it with the Screws (M3x6) (two places).

③ Fix the rear side of the rear rail with the Binding screws (UNI) (two places).

④ Fix the front rail and the rear rail with the Binding screws (M4x8) (four places).

⑤ Perform the above-mentioned installation to the right and left of the rack frame.

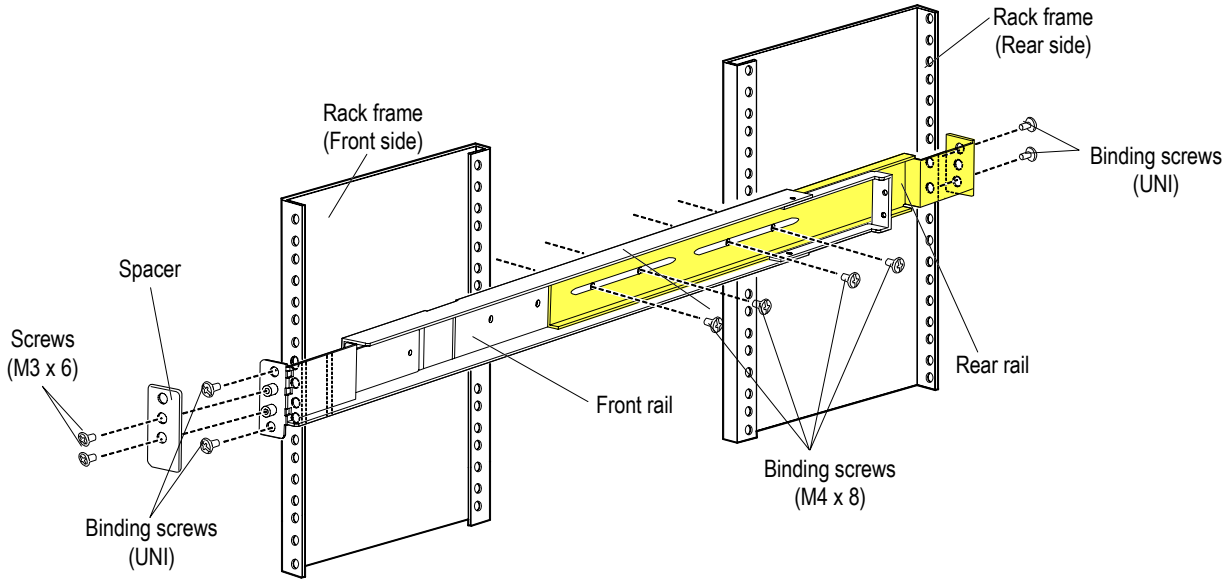


Figure 1.4.26 Installing the Rail (Sun StorEdge rack frame)

(iii) Installing the Additional Battery Box

① Install the Additional Battery Box from the front side so that the outlet opening aims at the rear side of the subsystem.

② Fix the front part of the Additional Battery Box with two Binding screws (M5 x 8) (one place each at left and right).

③ Fix the rear part of the Additional Battery Box with two Stoppers (one place each at left and right) and four Binding screws (M3 x 6) (two places each at left and right).

NOTE : Shift each of the two Stoppers in the direction shown by the arrow and make it contact the frame.

④ Attach the Front Bezel to the front frame.

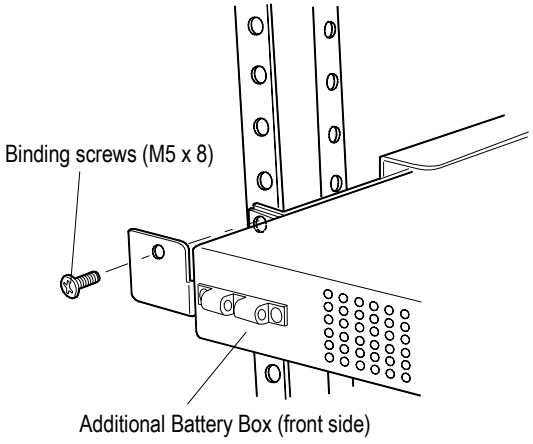


Figure 1.4.27 Fixing the Front Side of the Additional Battery Box (Sun StorEdge rack frame)

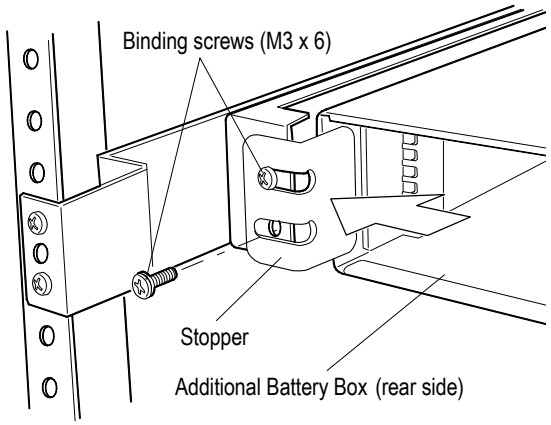


Figure 1.4.28 Fixing the Rear Side of the Additional Battery Box (Sun StorEdge rack frame)

(a-4) RS6000 Rack Frame

(i) Installing the optional parts.

Table 1.4.6 show optional parts required to install one Additional Battery Box to the RS6000 rack frame (Model name : DF-F800-N1RK/DF-F800-N1RKD).

Table 1.4.6 Components of rack rail (DF-F800-URN7) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Front Rail	2850146-A	1	For right hand side	—
2	Front Rail	2850146-B	1	For left hand side	—
3	Rear Rail	3274832-1	1	For right hand side	—
4	Rear Rail	3274835-A	1	For left hand side	—
5	Stopper	5531200-1	2	For securing the subsystems	—
6	Spacer	5531202-1	2	For securing the subsystems	—
7	Bind screw (M5×10)	SB510N	10	For securing the rails (2 spares are included.)	—
8	Bind screw (M4×8)	SB408N	10	For securing the rails (2 spares are included.)	—
9	Bind screw (M3×6)	SB306N	6	For securing the stopper (2 spares are included.)	—
10	Screw	SC306N	6	For securing the Spacer (2 spares are included.)	—
11	Rack nut	5510146-1	10	For securing the rails (2 spares are included.)	For circular holes
12	Bind screw (M5×8)	3274845-508	4	For securing the subsystems (2 spares are included.)	—
13	Cage nut (M5)	5528564-1	10	For securing the rails (2 spares are included.)	For rectangular holes
14	Bind screw (UNI)	5531209-1	10	For securing the rails (2 spares are included.)	For the SUN rack
15	SIDE_SUP2	3274837-1	1	For right hand side	Not used
16	SIDE_SUP2	3274837-2	1	For left hand side	Not Used

(ii) Installing the rail

① Install the Rack nuts in the installation position of the front rail (two places).
② Fix the front side of the front rail with the Binding screws (M5x10) (two places).
③ Install the Spacer in the front of the front rail, and fix it with the Screws (M3x6) (two places).
④ Install the Rack nuts in the installation position of the rear rail (two places).
⑤ Fix the rear side of the rear rail with the Binding screws (M5x10) (two places).
⑥ Fix the front rail and the rear rail with the Binding screws (M4x8) (four places).
⑦ Perform the above-mentioned installation to the right and left of the rack frame.

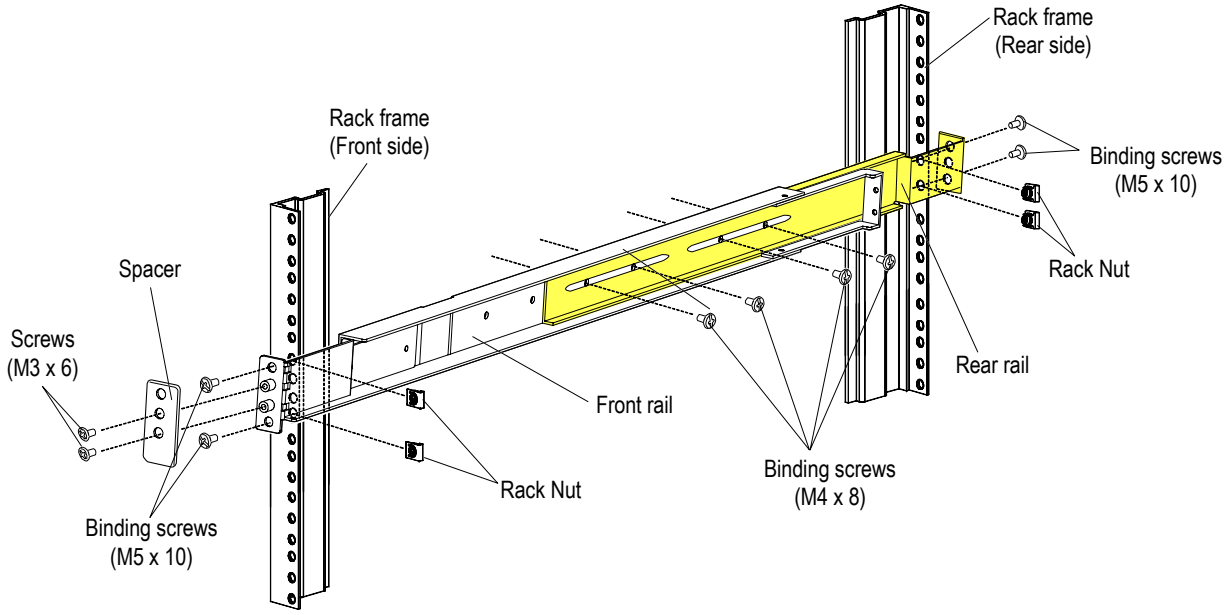


Figure 1.4.29 Installing the Rail (RS6000 rack frame)

(iii) Installing the Additional Battery Box

① Install the Additional Battery Box from the front side so that the outlet opening aims at the rear side of the subsystem.

② Fix the front part of the Additional Battery Box with two Binding screws (M5 x 8) (one place each at left and right).

③ Fix the rear part of the Additional Battery Box with two Stoppers (one place each at left and right) and four Binding screws (M3 x 6) (two places each at left and right).

NOTE : Shift each of the two Stoppers in the direction shown by the arrow and make it contact the frame.

④ Attach the Front Bezel to the front frame.

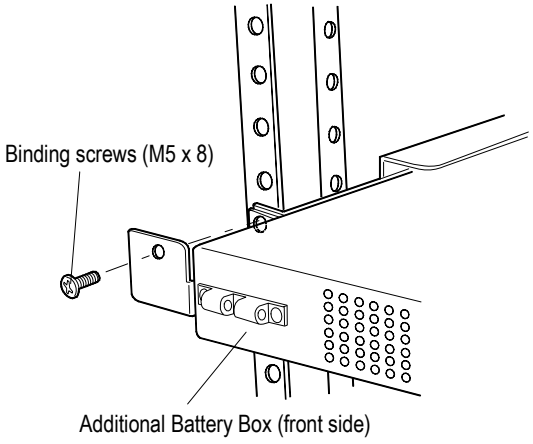


Figure 1.4.30 Fixing the Front Side of the Additional Battery Box (RS6000 rack frame)

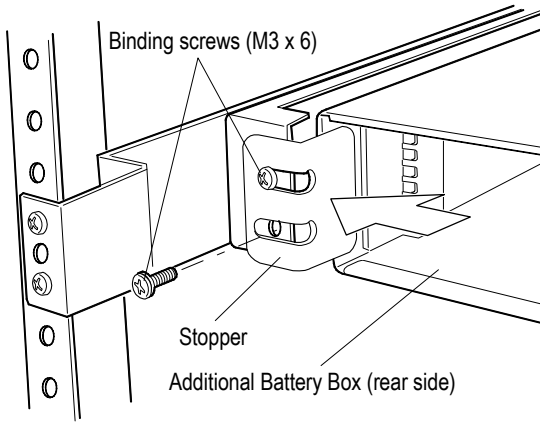


Figure 1.4.31 Fixing the Rear Side of the Additional Battery Box (RS6000 rack frame)

(d) Connect the Control Unit between the Additional Battery Box with a special cable.

(d-1) One Additional Battery Box is installed

Connect the BATTERY connector of the Control Unit # 0 between PORT 0 connector of the Additional Battery Box with a special cable.

Connect the BATTERY connector of the Control Unit of # 1 and between PORT 1 connector of the Additional Battery Box with a special cable.

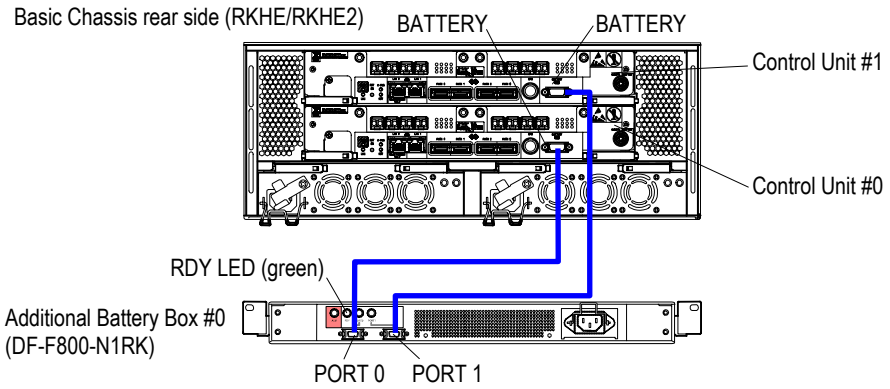


Figure 1.4.32 Connecting the Battery cables with one Additional Battery Box (AC power supply model)

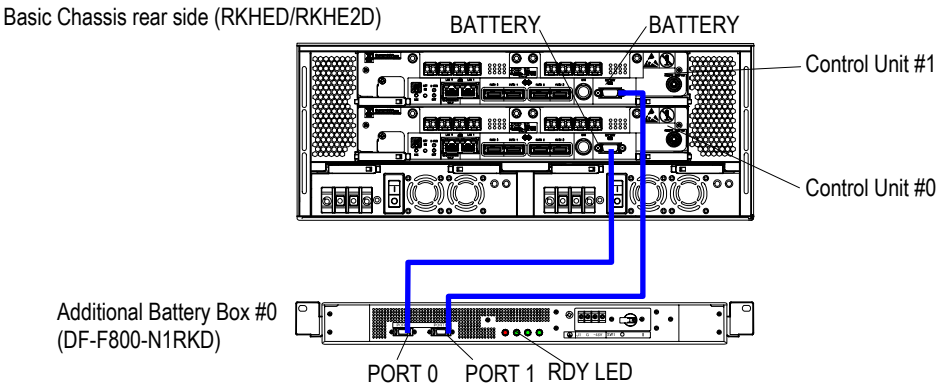


Figure 1.4.33 Connecting the Battery cables with one Additional Battery Box (DC power supply model)

(d-2) Two Additional Battery Box are installed

Connect the BATTERY connector of the Control Unit # 0 between PORT 0 connector of the Additional Battery Box # 0 with a special cable.

Connect the BATTERY connector of the Control Unit # 1 between PORT 0 connector of the Additional Battery Box # 1 with a special cable.

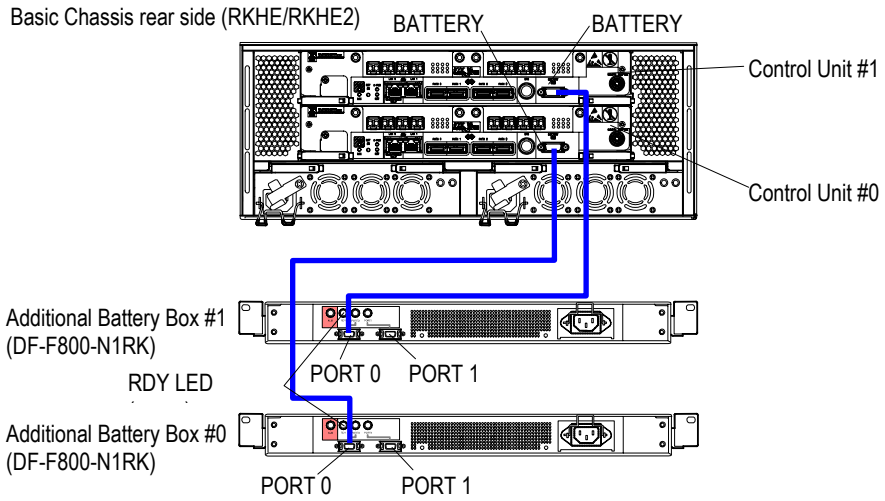


Figure 1.4.34 Connecting the Battery cables with two Additional Battery Box (AC power supply model)

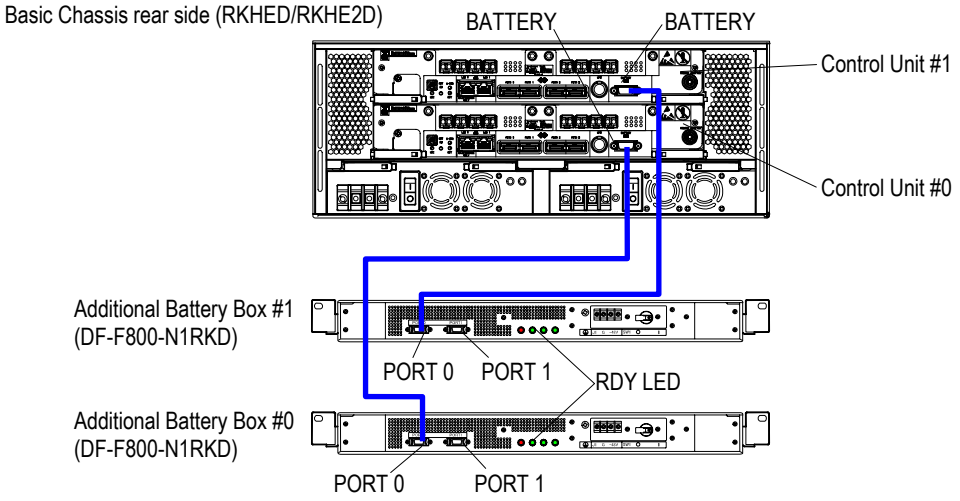


Figure 1.4.35 Connecting the Battery cables with two Additional Battery Box (DC power supply model)

(e) Supply the Additional Battery Box with the power supply.

(e-1) DF-F800-N1RK

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

(i) Insert the power cable plug into the receptacle on the Additional Battery Box.

(ii) Insert the power cable plug into the corresponding receptacle of the PDB.

(iii) Hang the each cable clamp on the plug of the power cable.

(iv) Push in the plug of the power cable which has been inserted into the Additional Battery Box and the PDB again.

(v) When the PDB breaker is off, turn it on.

(vi) Make sure that the RDY LED (green) of the Additional Battery Box is blinking or lighting up.

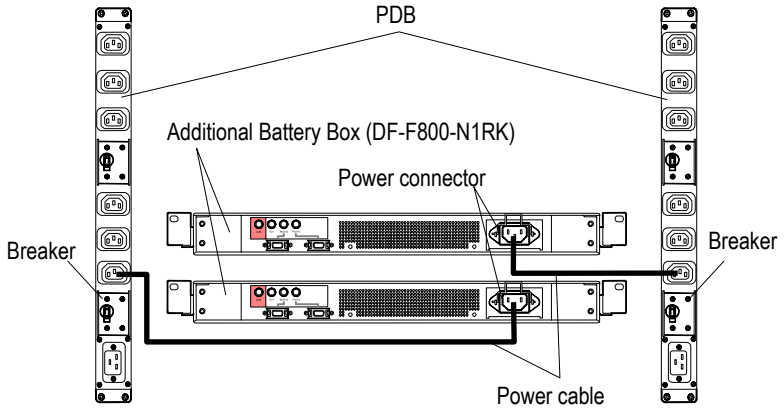


Figure 1.4.35.1 Connection between Additional Battery Box and PDB (AC Power Model)

(e-2) DF-F800-N1RKD

The specification of the Power Unit (DC) cable and the terminal form for the subsystem side are shown in Table 1.4.7 and Figure 1.4.36.

NOTE : • When replacing the Power Unit for the reasons such as a failure, it needs to shut off the power supply to the concerned Power Unit. For the power supply system, shut off the power supply by the switch such as breaker.

• For the power cable (including FG) and breaker in the equipment, use the ones other than and equal to the breaker capacity of the subsystem.

Table 1.4.7 Specification of the Power Cable (DC)

Items	Subsystem Name	DF-F800-N1RKD Fuse 4A
3-core/Single core	Wire description	1015/1431 (For Wire rating temperature 105°C)
	Size AWG	AWG24
	Standing	11/0.16mm

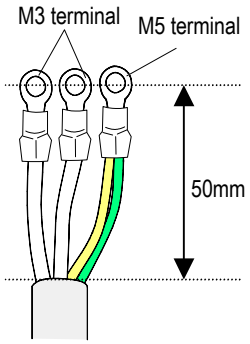


Figure 1.4.36 Terminal Form for Subsystem Side

CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

CAUTION

Here exists a hazard that can cause an electric shock. Start the work after making sure that the breaker in the power distribution box has been turned off.
Connect the power cable by tightening screws of the terminals firmly.

(i) Make sure that Power Unit Switches (breakers) on the Additional Battery Box have been all turned off.

(ii) Remove the terminal block cover.

⚠ CAUTION

- **This subsystem shall be connected directly to the d.c. supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the d.c. supply system earthing electrode conductor is connected.**
- **This subsystem shall be located in the same immediate area (such as, adjacent cabinets) as any other subsystem that has a connection between the earthed conductor of the same d.c. supply circuit and the earthing conductor, and also the point of earthing of the d.c. system. The d.c. system shall not be earthed elsewhere.**
- **The d.c. supply source is to be located within the same premises as this subsystem.**
- **Switching or disconnecting devices shall not be in the earthed circuit conductor between the d.c. source and the point of the connection of the earthing electrode conductor.**

(iii) Connect the FG cable to the frame ground (FG).

(iv) Connect the cable to the (+) and (−) power input terminals on the terminal block. When doing this, take care not to confuse the plus and minus terminals.

(v) Install the terminal block cover.

(vi) Fix the power cable to the rack with a strain relief so as not to give the load to the terminal.
Route the power cables so that the Power Unit, Control Unit, and ENC Unit can be replaced.

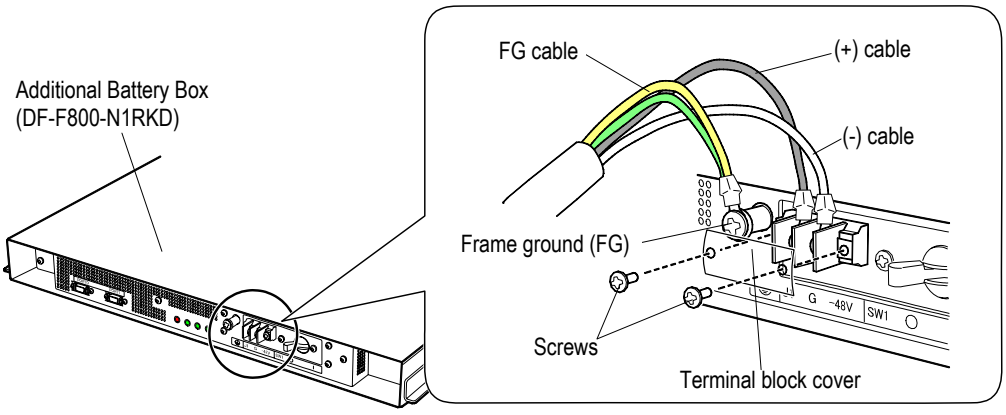
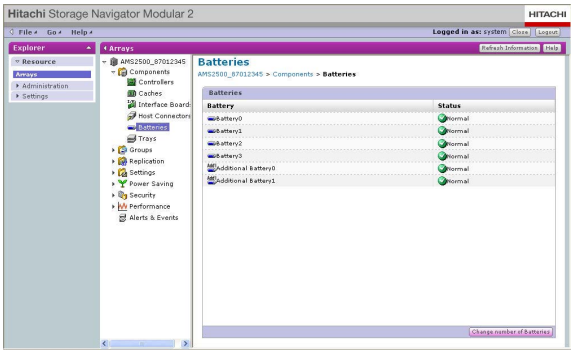


Figure 1.4.37 Power Cable Connection

(f) Check the status of the added Additional Battery Box.
Start Hitachi Storage Navigator Modular 2, and click the name of the array subsystem concerned to open the unit window. Select [Components] – [Batteries] in the unit window. The batteries window is displayed.
Check that the status of the added Additional Battery Box is Normal.



(2) When adding Additional Battery Boxes with one Additional Battery Box already connected
(a) Remove the installed Additional Battery Box. (Refer to "2.4.8 Removing an Additional Battery Box" (ADD 02-0484).)
(b) Add two Additional Battery Boxes. (Refer to "1.4.8 (1) When adding Additional Battery Boxes with no Additional Battery Box (0 unit) connected" (ADD 01-0580).)

1.5 Adding Other Optional Devices

1.5.1 Other Optional Additional Devices

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation(*1),)	Power offline (with the subsystem power turned off)
PDB (A-F6516-PDU6)	A- F 6516-PDU6	For A-6516-RK40	Additional PDB for RK40 rack frame	Possible "1.5.2 Mounting a PDB (A-F6516-PDU6)" (ADD 01-0630)	Possible "1.5.2 Mounting a PDB (A-F6516-PDU6)" (ADD 01-0630)

*1 : Data is exchanged between a host computer and the subsystem.

1.5.2 Mounting a PDB (A-F6516-PDU6)

(1) Height of Required Space in Rack Frame
The height of the space required for mounting the PDB on the rack frame is one unit of the EIA standard.

(2) Optional Parts for Mounting (Model Name : A-F6516-PDU6)

NOTE : The current capacity for a PDB is limited to up to 16 amperes. When mounting the subsystem, connect them avoiding applying the current of more than 16 amperes to a PDB. (RKH one unit : 2.2 A, RKM one unit : 3.8 A, RKS one unit : 3.8 A, RKAK one unit : 2.4 A, RKAKX one unit : 3.7 A)
Connect the power cables so that the load on a PDB breaker does not exceed 8 A after checking the load through a calculation.

The optional parts and their quantities required to mount the one PDB are shown below.

Table 1.5.1 Composition of A-F6516-PDU6 (Per Set)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	PDU	3276098-A	2	PDB	—
2	RAC NUT (Fastener)	5510146-1	10	For securing the PDB (2 spare is included)	—
3	Bind screw (M5 × 10)	SB510	10	For securing the PDB (2 spare is included)	—

(3) Tool Required
- Phillips screwdriver (No.2)

(4) Installing PDB (A-F6516-PDU6) in RK40 Rack Frame
Install the PDB making it face the rear of the rack frame.

NOTE : When adding PDB, mount PDB in two-part set (right and left) due to the duplicated power supply.

(a) Fasten the subsystem to the rack frame with the M5×10 binding screws (four places).
(b) Add another two-part set of PDB in the same way.
(c) Route and connect cables, observing the rules provided in Installation "1.1 (3) Note on cable routing" (INST 01-0010).

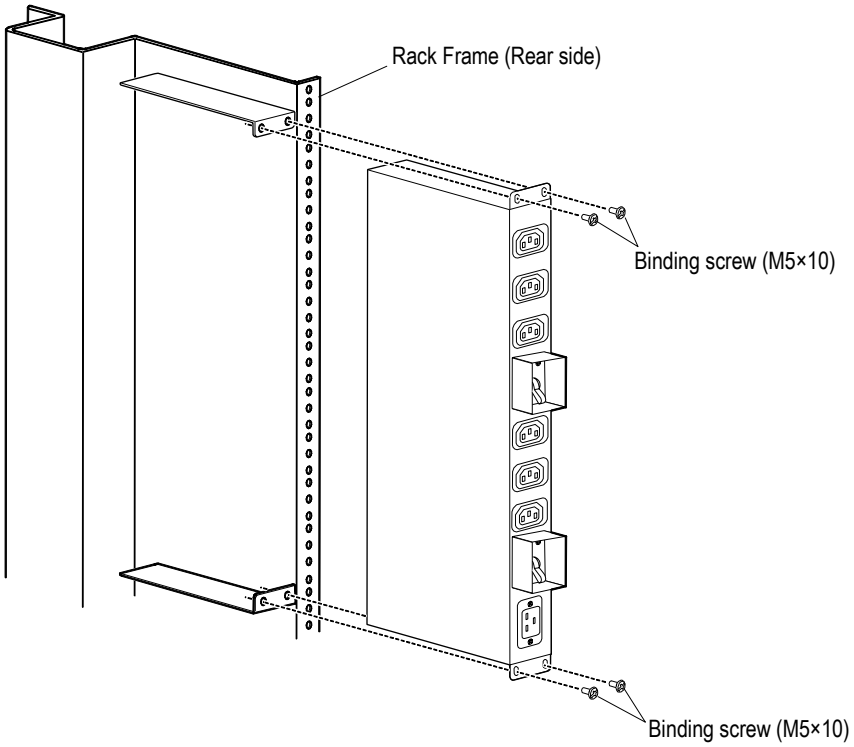


Figure 1.5.1 Installing the PDB (A-F6516-PDU6)

(5) Installing the power Cable (Added PDB append parts) and cable holder.

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : Make sure that conductors shall be provided with 30 A over current protection in accordance with Article 240 of the National Electrical Code, ANSI/NFPA 70, and the Canadian Electrical Code, Part 1, CSA C22.1, Section 14.

(a) Open the rear door. (Refer to Installation "1.4.2 How to Open/Close the Rear Door of RK40 Rack Frame" (INST 01-0120).)
(b) Make sure that the power supply switches of the PDBs are turned off.
(c) Remove the cable holder (adding PDB).
(d) Put out the power cables of PDBs through the Cable passing opening at the bottom of the Rack.
(e) Fasten the power cables to the rack frame by attaching the cable holders (adding PDB) with the hexagon socket head bolt M4×30.
(f) Make sure that the connecter is securely fixed after the assembly work.

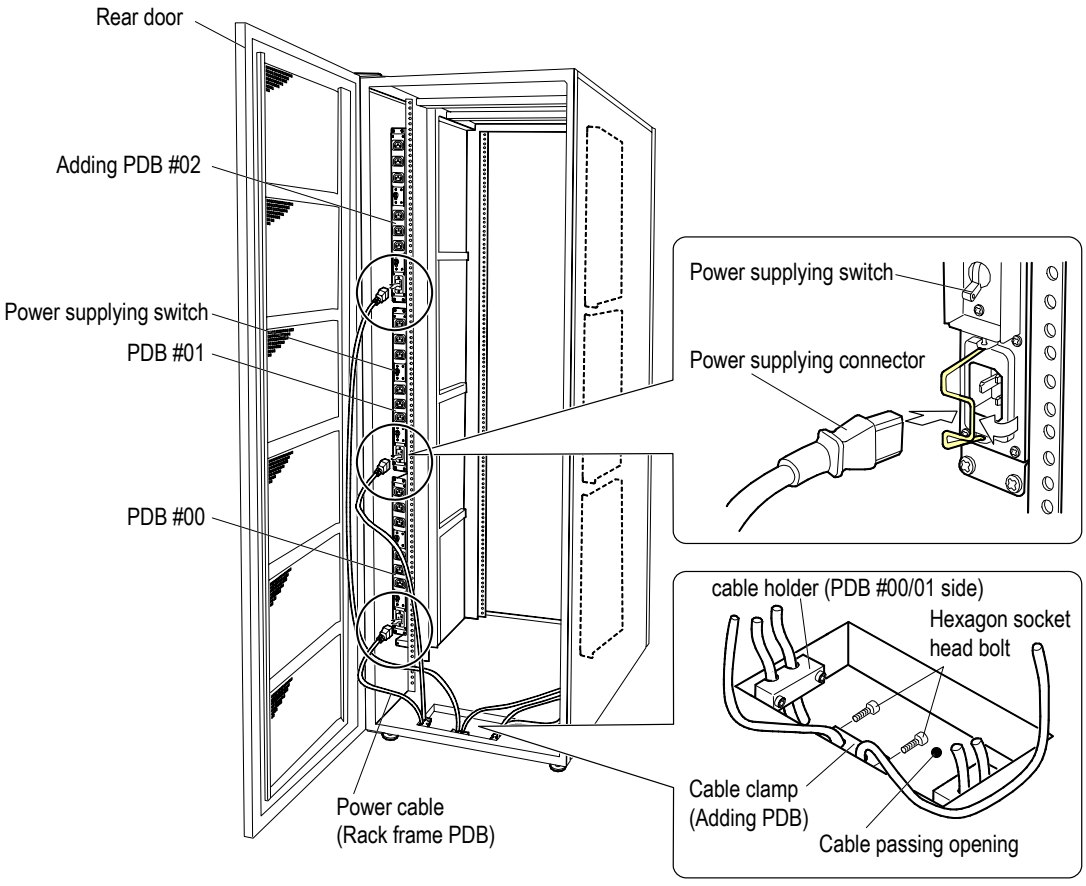


Figure 1.5.2 Installing the PDB (A-F6516-PDU6)

1.6 Adding the Additional Subsystem to the Rack Frame

In the case of adding Disk Drives to a subsystem of the rackmount model, the additional subsystem must be added when vacant slots for the Disk Drives to be added are insufficient in the existing subsystem (‡1).

The procedure for adding the Additional Chassis to the RK40 rack frame online or offline (with the subsystem power turned off)(‡2) is shown.

When mounting the additional subsystem on the rack frame, installation of as many rack rail kits (DF-F800-URHT8) as the additional subsystem to be added are required.

When the decoration panels/filler panels of the rack frame are attached, it is necessary to remove the panels at the installation positions.

1.6.1 Procedure for Adding the Additional Subsystem to the Subsystem of Rackmount Model with RK40 Rack Frame

(1) Prerequisites

Before starting the addition, make sure that the following requirements are satisfied. If not, an abnormal termination of the addition or a system down may be caused.

(a) You can add the chassis only when the WARNING LED (orange) and ALARM LED (red) on the subsystem go out and the POWER LED (green) and READY LED (green) light up. (Refer to Troubleshooting “Chapter 8. Trouble Analysis by LED Indication” (TRBL 08-0000).)

(b) Do not perform the recognition (‡2) operation of the Additional Chassis during the execution of the format command (it is not the LU format from the Hitachi Storage Navigator Modular 2) from the host computer. When the format was executed from the host computer, add the additional chassis after the format is completed.

(c) Do not make the addition work when the READY LED (green) on the front of the Basic Chassis is blinking at high speed. When it is high-speed blinking, the ENC firmware is being downloaded. Perform the addition work after checking that the READY LED (green) on the front of the Basic Chassis lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of RKH).

(d) When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the addition work. While this WARNING LED (orange) is blinking at high speed, the update of the flash program or the automatic download of the ENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the addition work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up in the maximum of 30 to 85 minutes.

(e) To add the RKAKX, the firmware version 0860/A or later and the Hitachi Storage Navigator Modular 2 version 6.00 or later are required.

‡1 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed becomes the existing subsystem.

‡2 : The expression “with the subsystem power on” described here means a state in which the power of the disk array subsystem is turned on. (System operation with a host is no concern of it.)

(2) Restrictions

Observe the following restrictions strictly. There is fear of the abnormal termination of the addition or the subsystem down.

(a) The part replacement cannot be performed during the recognition(‡1) of the additional chassis ((5) - Work 7).

The parts cannot be replaced during the connection and recognition(‡1) of the additional chassis ((5) - Work 7).

(b) Do not execute the format command (not the LU format from Hitachi Storage navigator Modular 2) from the host computer during the connection and recognition(‡1) of the additional chassis ((5) - Work 7).

‡1 : The recognition indicates that the Control Unit of the existing RKM/RKS/RKH recognizes the Additional Chassis.

(3) Specifications

(a) Be sure to connect to one ENC cable per ENC Unit between the RKM/RKS/RKH, and the Additional Chassis and the Additional Chassis.

(b) Restriction of number of the Additional Chassis allowed to be added is that the total number of the subsystems must not exceed the allowable maximum after the addition.
The RKM can be connected to the Additional Chassis, and installed up to 15 RKAKs and 4 RKAKXs.
The RKS can be connected to the Additional Chassis, and installed up to 7 RKAKs and 1 RKAKX.
The RKH can be connected to up to 32 RKAKs and up to 10 RKAKXs.
However, when subsystems are mounted mixing RKAKs and RKAKXs, the mountable number of additional unit is different.
For the mountable number of each additional chassis when subsystems are mounted mixing RKAKs and RKAKXs, refer to Introduction "Table 1.3.1 Mounted Number of Additional Chassis and the Maximum Mountable Number of Disk Drives" (INTR 01-0090).

(c) If a failure occurs in the additional chassis and the existing chassis (‡1) during the connection and recognition (‡2) of the additional chassis ((5)-Work-9), give priority to the existing chassis (‡1) and perform the maintenance. After that, perform the maintenance of the additional chassis and then restart the addition work.

(d) When adding the Additional Chassis with the subsystem power turned off, install all the Disk Drives to be added in the chassis, connect between all the chassis with the ENC cables, and turn on the subsystem power. (Refer to "(6) Procedure for adding the Additional Chassis in the status that the subsystem power is turned off" (ADD 01-0720).)

(e) Do not add the optional parts while the array subsystem is being started.
When the array subsystem is being started, add the optional parts after the array subsystem becomes the Ready status.

(f) Up to 38 SAS Disk Drives can be installed in a RKAKX.
In a RKAKX, intermix of SAS Disk Drives and SATA Disk Drives is not supported for installation.

‡1 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed becomes the existing subsystem.

‡2 : The recognition indicates that the Control Unit of the existing RKM/RKS/RKH recognizes the Additional Chassis.

(4) Procedure for adding the Additional Chassis

The procedure for adding the Addition Chassis has two types; one is the procedure to perform it with the subsystem power turned off, and the other is the procedure to perform it with the subsystem power turned on.

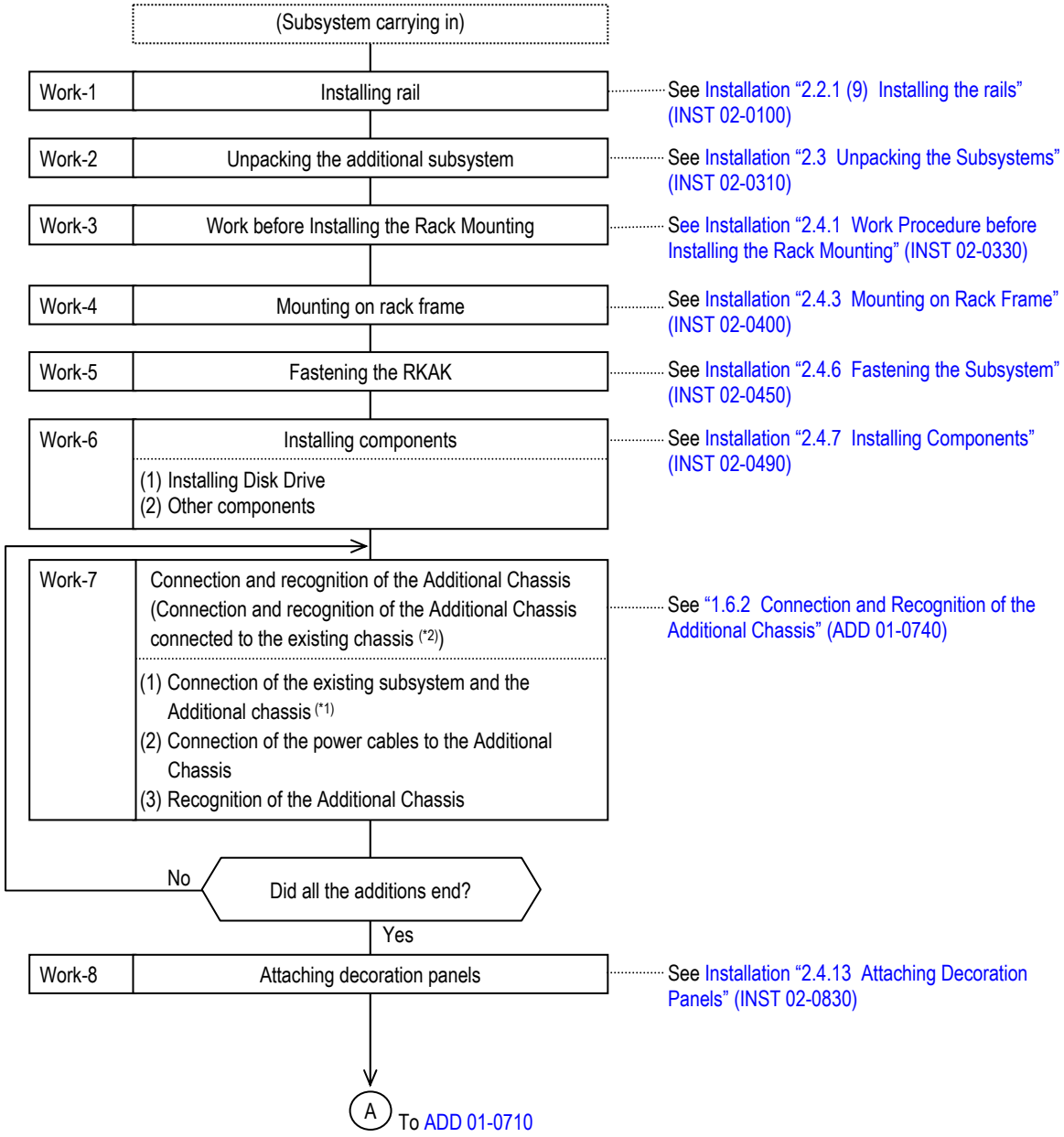
Perform the isolation of the work procedure referring to Table 1.6.1.

Table 1.6.1 Isolation of the Procedure for Adding the Additional Chassis

Power Status of the Subsystem in the Addition Work	Controller Configuration	Reference Place of the Procedure for the Addition Work
ON	Single	Cannot be operated
	Dual	"(5) Procedure for adding the Additional Chassis with the subsystem power turned on" (ADD 01-0700)
OFF	Single	"(6) Procedure for adding the Additional Chassis with the subsystem power turned off" (ADD 01-0720)
	Dual	

(5) Procedure for adding the Additional Chassis with the subsystem power turned on

The addition work can be performed only at the time of the dual controller configuration with the subsystem power turned on. Check the following work, and then work on it.



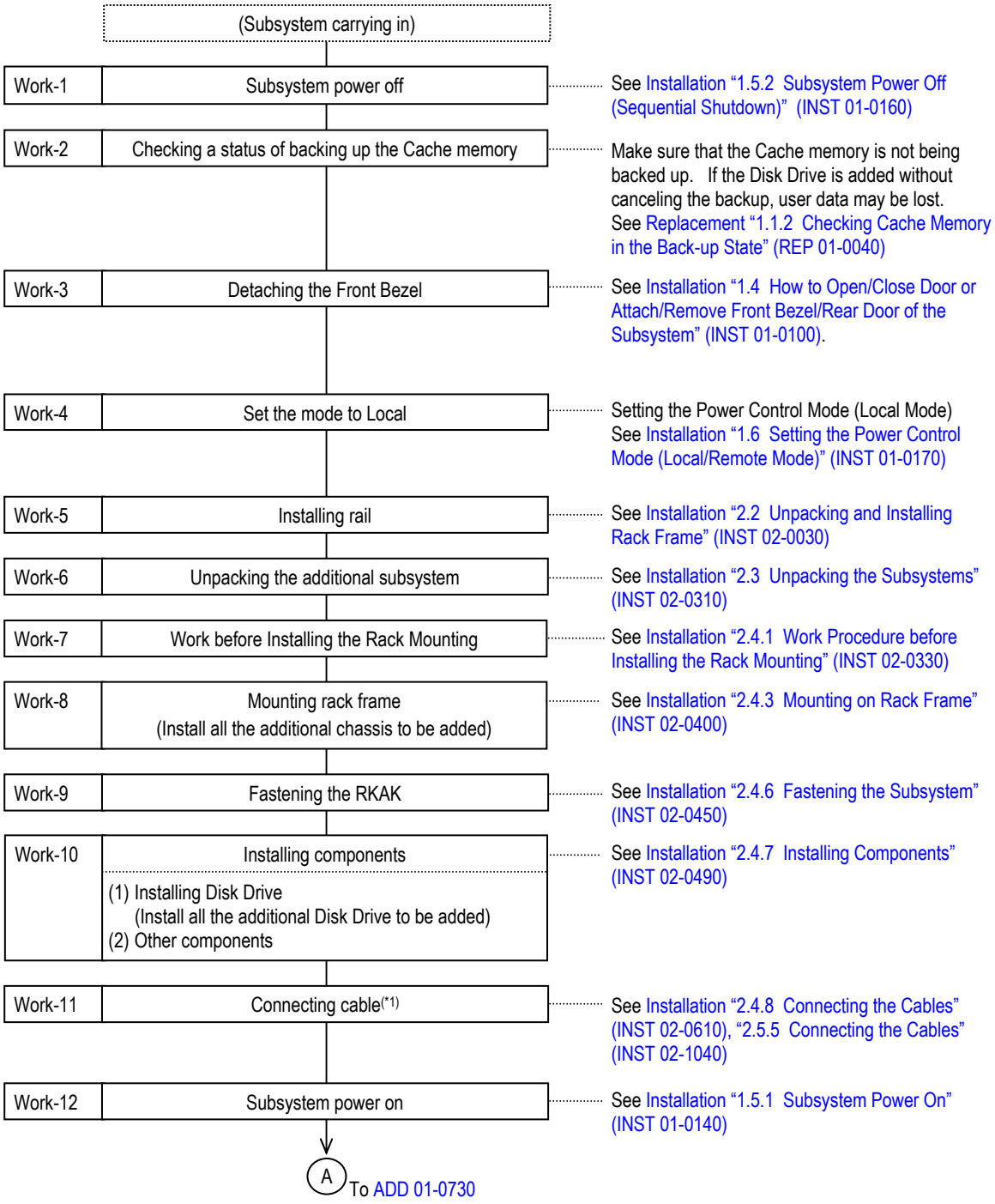
*1 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed becomes the existing subsystem.

*2 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

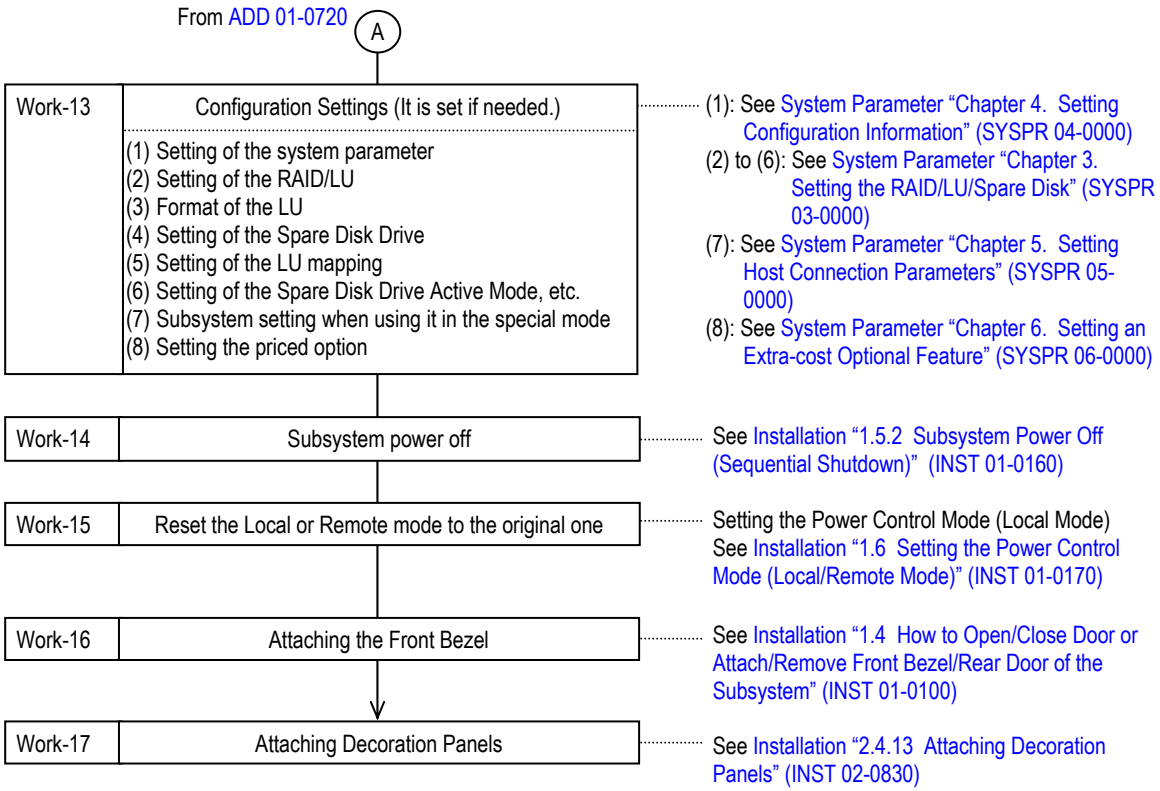
From ADD 01-0700 (A)

Work-9	Configuration Settings (It is set if needed.) (1) Setting of the system parameter (2) Setting of the RAID/LU (3) Format of the LU (4) Setting of the Spare Disk Drive (5) Setting of the LU mapping (6) Setting of the Spare Disk Drive Active Mode, etc. (7) Subsystem setting when using it in the special mode (8) Setting the priced option	(1): See System Parameter "Chapter 4. Setting Configuration Information" (SYSPR 04-0000) (2) to (6): See System Parameter "Chapter 3. Setting the RAID/LU/Spare Disk" (SYSPR 03-0000) (7): See System Parameter "Chapter 5. Setting Host Connection Parameters" (SYSPR 05-0000) (8): See System Parameter "Chapter 6. Setting an Extra-cost Optional Feature" (SYSPR 06-0000)

(6) Procedure for adding the Additional Chassis with the subsystem power turned off
Check the following work, and then work on it.



*1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.



1.6.2 Connection and Recognition of the Additional Chassis

Perform the connection and recognition of the additional chassis according to the window of Hitachi Storage Navigator Modular 2 in the following procedure. The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed becomes the existing subsystem.

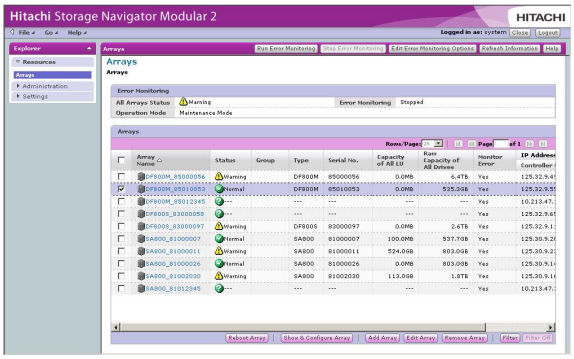
(1) Perform the prior check of the addition work.
Check the items in the following check sheet before connecting and recognizing the additional chassis.

Table 1.6.2 Check Sheet for the Prior Check

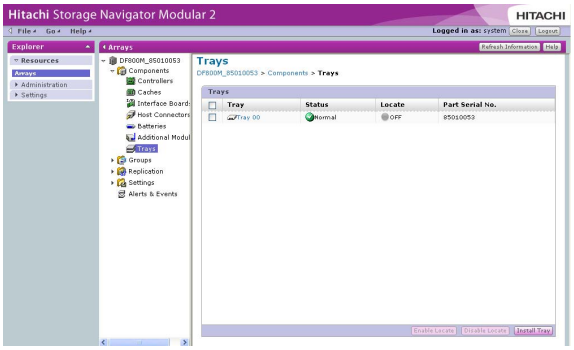
No.	Item to be checked	Matter to be checked	Actions to be taken when the conditions on the left were not satisfied	Check result
1	ENC Unit	The two units must be installed in the additional subsystem to be added.	Check that it is installed at the time of the shipment.	
2	Power Unit	The two units must be installed in the additional subsystem to be added.		
3	WARNING LED of the Basic Chassis	No WARNING LED (orange) on the front of the Basic Chassis must be lighting up or blinking.	Perform the maintenance referring to the Information Message on WEB and according to the message displayed. Check that the WARNING LED (orange) on the front of the Basic Chassis was turned off after completing the maintenance work.	
4	ALARM LED of the Basic Chassis	No ALARM LED (red) on the front of the Basic Chassis must be lighting up or blinking.	Perform the maintenance referring to the Information Message on WEB and according to the message displayed. Check that the ALARM LED (red) on the front of the Basic Chassis was turned off after completing the maintenance work.	
5	Information Message on WEB	The message, which says that the maintenance is necessary, should not be displayed.	Perform the maintenance according the message displayed. Check that the message, which says that the maintenance is not completed, is not displayed after completing the maintenance work.	
6	Mainframe of WEB	Subsystem Status is Ready, and there should be no abnormality in the status of the replacement part.	Perform the maintenance referring to the Information Message on WEB and according to the message displayed. Check that the Subsystem Status is Ready and there is no abnormality in the status of the replacement part.	
7	READY LED on the front of the Basic Chassis	The READY LED (green) on the front of the Basic Chassis should light up.	• When the READY LED (green) is blinking at high speed, the automatic download of the ENC firmware is operating. Check that the WANING LED (orange) on the front of the Basic Chassis goes out in the maximum of 30 to 50 minutes (the maximum of 40 to 60 minutes in case of the RKH), the READY LED (green) lights up, and "IZYR00 Automatic ENC microprogram download completed successfully" is displayed in the Information Message on WEB. • After the READY LED (green) on the front of the Basic Chassis lights up, recheck that the message, which says that the maintenance is necessary, is not displayed referring to the Information Message on WEB. • When the READY LED (green) on the front of the Basic Chassis continues blinking, collect the simple trace, and contact the Technical Support Center.	
8	Other maintenance works	No other maintenance work must be in progress.	Complete all the maintenance work in progress.	

(2) Start Hitachi Storage Navigator Modular 2 and change it to the maintenance mode. (Refer to the System Parameter "1.1 (4) (b) Changing the Maintenance " (SYSPR 01-0080).)

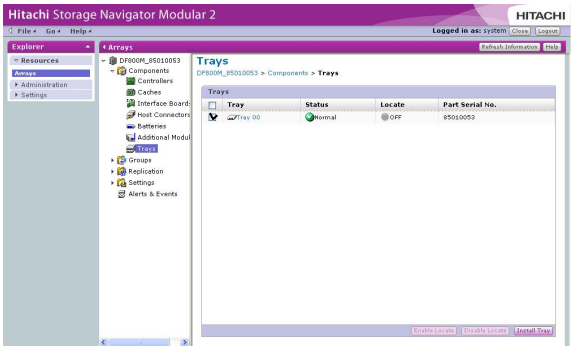
(3) Select the subsystem name to be added in the subsystem list window.



(4) Select [Component] – [Trays] in the main window.



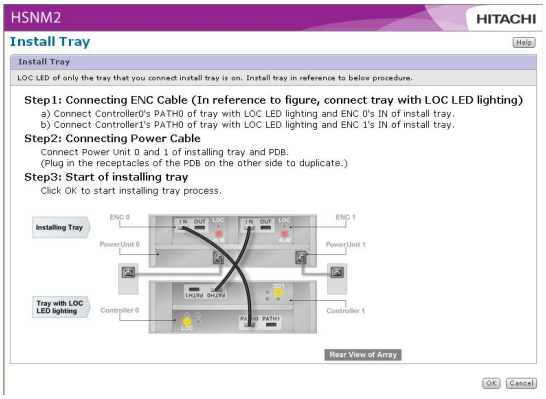
(5) When the Trays list window is displayed, and press the [Install Tray] button.



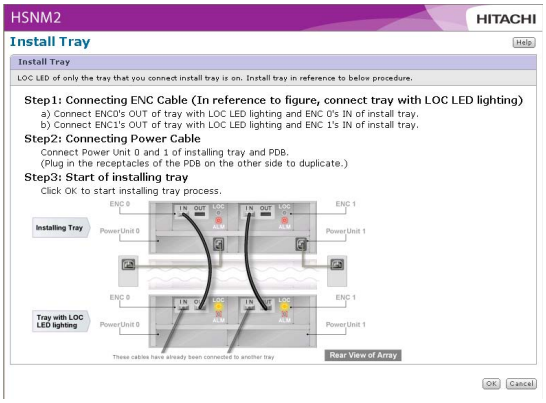
(6) Work on Step 1 to Step 3 in the chassis addition window.
The additional chassis may be connected to the basic chassis or the additional chassis may be connected each other.
Refer to Installation "2.4.8 Connecting the Cables" (INST 02-0610) and Installation "2.5.5 Connecting the Cables" (INST 02-1040) for connecting the ENC cable and power cables.
When connecting a power cable to PDB, if the PDB breaker is on, connect the power cable to the PDB without turning off the PDB breaker. If the PDB breaker is off, connect a power cable, and then turn on the PDB breaker.

NOTE :
- If you were unable to check the "Addition Completed" window because you closed the dialog while adding the chassis, wait for about three minutes and display the "Tray List" window again in Hitachi Storage Navigator Modular 2 following the procedure of (2) to (4).
  If the chassis under addition is displayed, the addition is completed.
  If it is not displayed, remove the cables connected at the time of the addition and add the chassis again.
- If you connect the power cables to the Power Unit of the chassis to be added, the ALARM LED (red) on the ENC Unit lights up.
  However, it is not an error.
  It will go out when the addition is completed.
- If you press the [Cancel] button in the chassis addition window, the window closes but the LOC LED keeps lighting.
  In this case, press the [Refresh Information] button in the Trays list window to update the window, select the tray on which the position column is displayed as ON, and press the [Disable Locate] button to turn off the LOC LED.
- For the RKAKX, the addition instruction is required for each chassis.
  Specify the [Dense] on the [Tray Type] ([Standard] by default) in the chassis addition window.

When connecting the additional chassis to the basic chassis

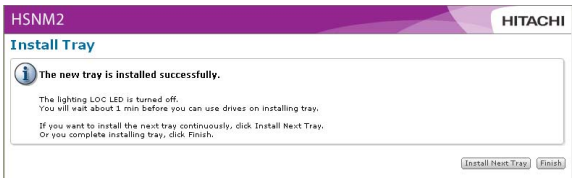


When connecting the additional chassis each other



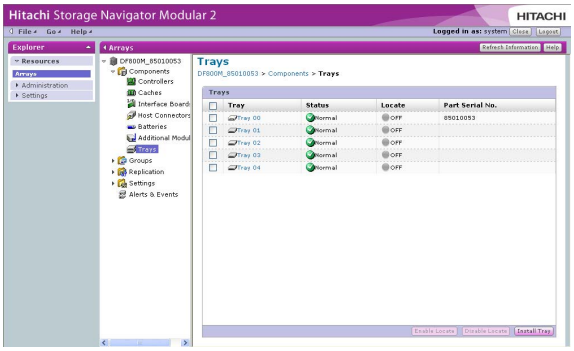
(7) The following window is displayed during the chassis addition processing.

(8) When the addition is completed, the following window is displayed.
If you continue the addition, press the [Install Next Tray] button and go to the procedure (6).
If you complete the addition, press the [Finish] button.



NOTE : • If the connection and recognition of the chassis fail, the following window is displayed.
When the connection and recognition of the chassis fail, press the [Close] button to close the window, remove the power cables of the additional chassis during the work and the ENC cables between the existing chassis and the additional chassis, and start from the procedure (6) again.
• If you stop the chassis addition work, the LOC LED keeps lighting.
In this case, press the [Refresh Information] button in the Trays list window to update the window, select the tray on which the position column is displayed as ON, and press the [Disable Locate] button to turn off the LOC LED.

(9) Check the added chassis in the Trays list window.
Refer to Installation “2.3 (2) Checking contents of package” (INST 02-0320).



(10) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the WARNING LED (orange) go out.
When the WARNING LED (orange) light up or blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB.
When “IY1800 Installed HDD numbers are over the limit for one backend path” is displayed in Information Message on WEB, chassis are added exceeding the maximum number of Disk Drives connectable to PATH.
Verify the configuration according to Introduction “1.3 Subsystem Structure” (INTR 01-0090).

(11) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed.
When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code (refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)").

This page is for editorial purpose only.

Chapter 2. Removing Optional Components

2.1 Before Starting Removal of Optional Components

If you make a mistake in operation during a removal of the optional component, it is feared that user data in the subsystem is lost. Therefore, perform the following before starting the removal of the optional component to provide against an unexpected accident.

(1) Backup user data.
Backup user data in the subsystem by the operation on the host computer side.

(2) The work to removal an optional component varies depending on the component and a location where the component is to be installed. Besides, perform the addition after making sure whether the work must be done with the subsystem power on or off.
- A removal with the subsystem power on :
  A status in which the subsystem power is turned on irrespective of whether the system (host computer) is turned on or off.
- A removal with the subsystem power off :
  A status in which the subsystem power is turned on irrespective of whether the system (host computer) is turned on or off.

(3) When removal the optional component, it is required to change the settings of the subsystem using a service PC connected via a LAN. Make the following preparations before starting the addition of the optional component.
- Prepare a PC in which Hitachi Storage Navigator Modular 2 is installed. The PC must be used in the LAN environment.
- Ask the customer whether the subsystem is operable via a LAN. If not, obtain customer's permission to operate the subsystem via a LAN.

(4) Promote mutual understanding with the user about the possibility of a system down in order to minimize damage caused by failures.

(5) Be sure to install a dummy Control Unit and a dummy Disk Drive in a vacant slot because dummy Control Unit and dummy Disk Drive are required for adjusting the cooling air flow. When removing the optional component with the subsystem power on, the operation replacing Disk Drive with dummy Disk Drive has to be finished within 10 minutes.

(6) When the Spare Disk Drive Active Mode(‡1) is set as variable or it was set as variable in the past, the RAID Group configuration and the Spare Disk Drive configuration may be different from the configuration at the time of the introduction depending on the occurrence conditions of the Disk Drive failures after the installation.
Check if the configuration examples conform to that described in "2.1.1 Preparatory Works for Removal" (ADD 02-0020) before starting the removal. When the conformity is confirmed, execute the procedure for the preparation.

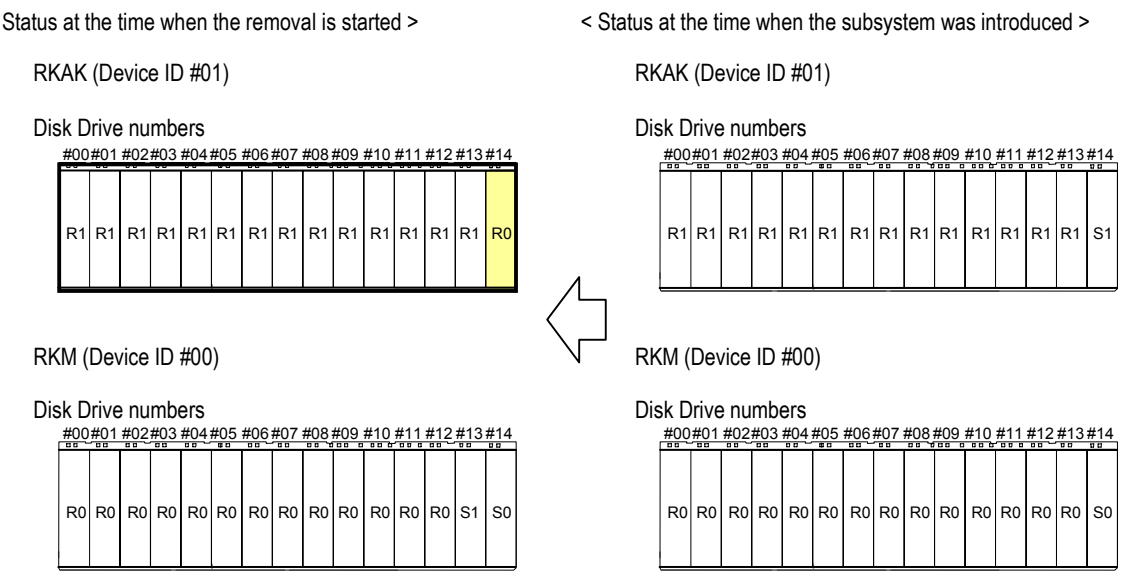
‡1 : For details of the spare Disk Drive operation mode, refer to System Parameter "4.2 (6) Setting of Restore Options" (SYSPR 04-0220) and "Introduction "3.6 (3) Operation after replacing failed Disk Drive" (INTR 03-0270).

(7) Do not remove the parts while the array subsystem is being started.
When the array subsystem is being started, remove the parts after the array subsystem becomes the Ready status.

2.1.1 Preparatory Works for Removal

When the Spare Disk Drive Active Mode is set as variable or it was set as variable in the past, the RAID Group configuration or the Spare Disk Drive configuration may be different from the configuration at the time of the introduction.
The Configuration examples concerned are shown in the following Items (1) to (4).
When they conform to these configuration examples, execute the following works before starting the removal.
Also, if the RAID group configuration of the Additional Chassis to be removed was changed from that at the time when the subsystem was introduced, restore the additional chassis to be removed to the configuration at the time when the subsystem was introduced, and then execute the removal work.

(1) When the additional subsystem to be de-installed has a Disk Drive that composes a RAID group unable to be eliminated



RKAK (Device ID #01) : Additional subsystem to be removed
- R1 : RAID group that can be eliminated
- S1 : Spare Disk Drive that can be relieved of its role
- R0 : RAID group that cannot be eliminated
- S0 : Spare Disk Drive that cannot be relieved of its role

* When the R0 has been detached in the past, there may be a case where its data is restored to a spare Disk Drive (Device ID #01, Drive #14). In the case above, the configuration may become the one shown on the left.

(a) Make sure that the model names of Disk Drive (Device ID #01, Drive #14) and the spare Disk Drive (Device ID #00, Drive #13) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Disk Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "3.5 Checking the Status of Disk Drive" (SYSPR 03-0430).)

(b) Output the text file of the "RAID group/Logical unit" in the configuration copy information. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

(c) Relieve spare Disk Drives other than the S1of their roles. (For the details, refer to System Parameter "[Procedure ④-C]Deleting Spare Disk" (SYSPR 03-0410).)

(d) Execute the dynamic sparing for the Disk Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "10.2.6 Drive Maintenance" (TRBL 10-0180).)

(e) Make sure that the Disk Drive (Device ID #00, Drive #13) becomes a data Disk Drive that is a component of the R0 and the Disk Drive (Device ID #01, Drive #14) becomes a detached Disk Drive(‡2) as a spare Disk Drive after the dynamic sparing is completed(‡3).
You can make sure of it by checking the "Type" and "Status" of the Disk Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "3.5 Checking the Status of Disk Drive" (SYSPR 03-0430).)

(f) Reset the spare Disk Drive that was relieved of its role in Step (c) referring to the text file that was output in Step (b). (For the details, refer to System Parameter "3.4 [Procedure ④-B]Setting Spare Disk" (SYSPR 03-0400).)
However, the Disk Drive (Device ID #00, Drive #13) cannot be set as a spare Disk Drive.

(g) Make sure that there is no other Disk Drive, which composes a RAID group that cannot be eliminated, than the additional unit to be de-installed. If such a Disk Drive exists, repeat the works again from Step (c).

(h) Output the text file of the "RAID group/Logical unit" in the configuration copy information again. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

(i) Make sure that the current settings of the RAID groups and spare disks are correct and neither more not less by comparing the text file that was output in Step (b) with that output in Step (h). At this time roles of the Disk Drives (Device ID #00, Drive #13 and Device ID #01, Drive #14) as a data Disk Drive and spare Disk Drive are reversed.

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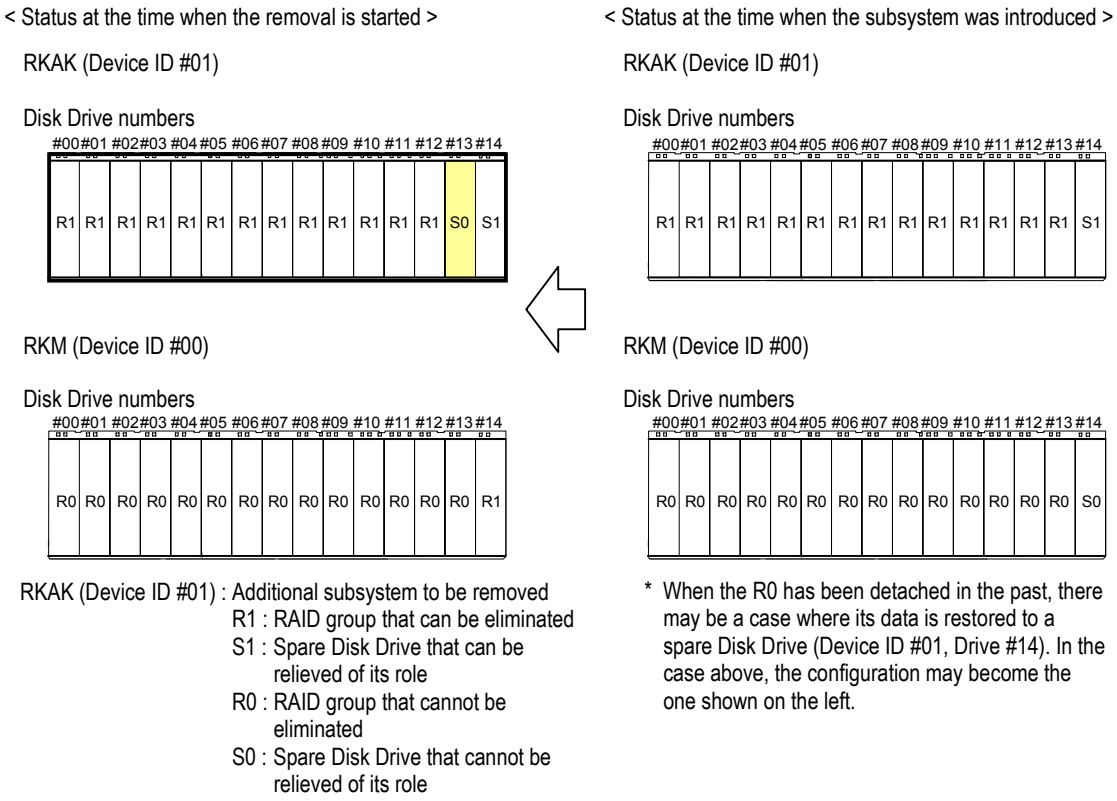
‡1 : When "Spare Drive" of [Configuration Settings] – [Restore Options] of the Hitachi Storage Navigator Modular 2 is variable (default value) and "Applying No Copy Back Mode on All the Units" is enabled, the Spare Disk Drive (S1) of the device ID #00 and the Disk Drive number #13 may not be the same model name as the Disk Drive of the device ID #01 and the Disk Drive number #14. The Spare Disk Drive (S1) of the device ID #00 and the Disk Drive number #13 may be the same model name as the Disk Drive of the device ID #01 and the Disk Drive number #14 or the Disk Drive whose the rotational speed differs and the capacity is the same as the Disk Drive of the device ID #01 and the Disk Diver number #14.

‡2 : The Disk Drive (Device ID #01, Drive #14) is detached. However, do not replace it because the detachment does not mean a trouble.

‡3 : It takes a while to complete the dynamic sparing. For the standard time required, refer to "Table 2.2.2 Standard Time Required for the Correction Copy or Copy Back" in Replacement "(4) Confirming completion of data recovery or copy back" (REP 02-0240).

(2) When the additional subsystem to be de-installed has a Spare Disk Drive that cannot be relieved of its role



RKAK (Device ID #01) : Additional subsystem to be removed
- R1 : RAID group that can be eliminated
- S1 : Spare Disk Drive that can be relieved of its role
- R0 : RAID group that cannot be eliminated
- S0 : Spare Disk Drive that cannot be relieved of its role

* When the R0 has been detached in the past, there may be a case where its data is restored to a spare Disk Drive (Device ID #01, Drive #14). In the case above, the configuration may become the one shown on the left.

(a) Make sure that the model names of Disk Drive (Device ID #01, Drive #14) and the Spare Disk Drive (Device ID #00, Drive #13) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Disk Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "3.5 Checking the Status of Disk Drive" (SYSPR 03-0430).)

(b) Output the text file of the "RAID group/Logical unit" in the configuration copy information. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

(c) Relieve Spare Disk Drives other than the S1of their roles. (For the details, refer to System Parameter "[Procedure ④-C]Deleting Spare Disk" (SYSPR 03-0410).)

(d) Execute the dynamic sparing for the Disk Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "10.2.6 Drive Maintenance" (TRBL 10-0180).)

‡1 : When "Spare Drive" of [Configuration Settings] – [Restore Options] of the Hitachi Storage Navigator Modular 2 is variable (default value) and "Applying No Copy Back Mode on All the Units" is enabled, the Spare Disk Drive (S0) of the device ID #01 and the Disk Drive number #13 may not be the same model name as the Disk Drive of the device ID #00 and the Disk Drive number #14. The Spare Disk Drive (S0) of the device ID #01 and the Disk Drive number #13 may be the same model name as the Disk Drive of the device ID #00 and the Disk Drive number #14 or the Disk Drive whose the rotational speed differs and the capacity is the same as the Disk Drive of the device ID #00 and the Disk Diver number #14.

(e) Make sure that the Disk Drive (Device ID #00, Drive #13) becomes a data Disk Drive that is a component of the R0 and the Disk Drive (Device ID #01, Drive #14) becomes a detached Disk Drive(‡1) as a Spare Disk Drive after the dynamic sparing is completed(‡2).
You can make sure of it by checking the "Type" and "Status" of the Disk Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "3.5 Checking the Status of Disk Drive" (SYSPR 03-0430).)

(f) Reset the Spare Disk Drive that was relieved of its role in Step (c) referring to the text file that was output in Step (b). (For the details, refer to System Parameter "3.4 [Procedure ④-B]Setting Spare Disk" (SYSPR 03-0400).)
However, the Disk Drive (Device ID #00, Drive #13) cannot be set as a Spare Disk Drive.

(g) Make sure that there is no other Disk Drive, which composes a RAID group that cannot be eliminated, than the additional unit to be de-installed. If such a Disk Drive exists, make a dummy replacement(‡3) of the Spare Disk Drive (Device ID #00, Drive #14) that was detached and repeat the works from Step (c) after making sure that the Disk Drive was recovered from the detachment(‡4).

(h) Output the text file of the "RAID group/Logical unit" in the configuration copy information again. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

(i) Make sure that the current settings of the RAID groups and Spare Disk Drives are correct and neither more not less by comparing the text file that was output in Step (b) with that output in Step (h). At this time roles of the Disk Drives (Device ID #00, Drive #13 and Device ID #01, Drive #14) as a data Disk Drive and Spare Disk Drive are reversed.

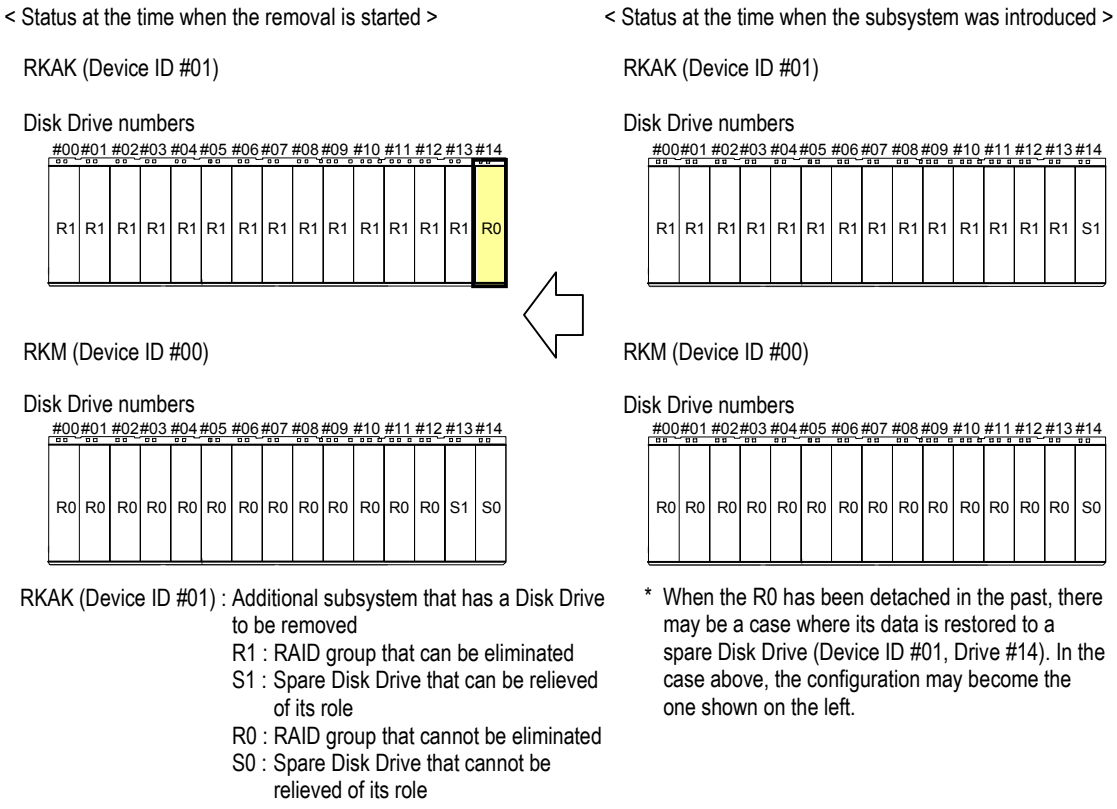
‡1 : The Disk Drive (Device ID #01, Drive #14) is detached. However, do not replace it because the detachment does not mean a trouble.

‡2 : It takes a while to complete the dynamic sparing. For the standard time required, refer to "Table 2.2.2 Standard Time Required for the Correction Copy or Copy Back" in Replacement "(4) Confirming completion of data recovery or copy back" (REP 02-0240).

‡3 : This means that the part concerned is removed, and it is reinstalled after 20 seconds or more passed.

‡4 : "I009ab Spare HDU recovered (x: Unit number, y: HDU number)" is displayed in the Information Message of the Web and the ALARM LED (red) on the Disk Drive concerned goes out.

(3) When the Disk Drives to be de-installed include a Disk Drive that composes a RAID group unable to be eliminated



RKAK (Device ID #01) : Additional subsystem that has a Disk Drive to be removed
R1 : RAID group that can be eliminated
S1 : Spare Disk Drive that can be relieved of its role
R0 : RAID group that cannot be eliminated
S0 : Spare Disk Drive that cannot be relieved of its role

* When the R0 has been detached in the past, there may be a case where its data is restored to a spare Disk Drive (Device ID #01, Drive #14). In the case above, the configuration may become the one shown on the left.

(a) Make sure that the model names of Disk Drive (Device ID #01, Drive #14) and the Spare Disk Drive (Device ID #00, Drive #13) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Disk Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "3.5 Checking the Status of Disk Drive" (SYSPR 03-0430).)

(b) Output the text file of the "RAID group/Logical unit" in the configuration copy information. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

(c) Relieve Spare Disk Drives other than the S1of their roles. (For the details, refer to System Parameter "[Procedure ④-C]Deleting Spare Disk" (SYSPR 03-0410).)

(d) Execute the dynamic sparing for the Disk Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "10.2.6 Drive Maintenance" (TRBL 10-0180).)

‡1 : When "Spare Drive" of [Configuration Settings] - [Restore Options] of the Hitachi Storage Navigator Modular 2 is variable (default value) and "Applying No Copy Back Mode on All the Units" is enabled, the Spare Disk Drive (S1) of the device ID #00 and the Disk Drive number #13 may not be the same model name as the Disk Drive of the device ID #01 and the Disk Drive number #14. The Spare Disk Drive (S1) of the device ID #00 and the Disk Drive number #13 may be the same model name as the Disk Drive of the device ID #01 and the Disk Drive number #14 or the Disk Drive whose the rotational speed differs and the capacity is the same as the Disk Drive of the device ID #01 and the Disk Diver number #14.

(e) Make sure that the Disk Drive (Device ID #00, Drive #13) becomes a data Disk Drive that is a component of the R0 and the Disk Drive (Device ID #01, Drive #14) becomes a detached Disk Drive(‡1) as a Spare Disk Drive after the dynamic sparing is completed(‡2).
You can make sure of it by checking the "Type" and "Status" of the Disk Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "3.5 Checking the Status of Disk Drive" (SYSPR 03-0430).)

(f) Reset the spare Disk Drive that was relieved of its role in Step (c) referring to the text file that was output in Step (b). (For the details, refer to System Parameter "3.4 [Procedure ④-B]Setting Spare Disk" (SYSPR 03-0400).)
However, the Disk Drive (Device ID #00, Drive #13) cannot be set as a Spare Disk Drive.

(g) Make sure that there is no other Disk Drive, which composes a RAID group that cannot be eliminated, than that to be removed. If such a Disk Drive exists, repeat the works again from Step (c).

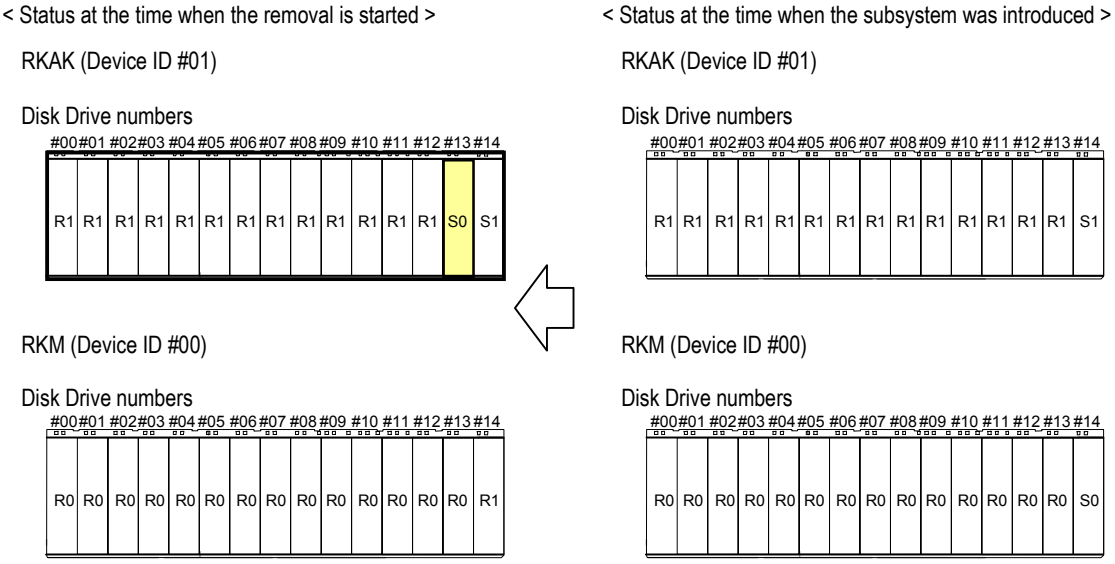
(h) Output the text file of the "RAID group/Logical unit" in the configuration copy information again. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

(i) Make sure that the current settings of the RAID groups and Spare Disk Drives are correct and neither more not less by comparing the text file that was output in Step (b) with that output in Step (h). At this time roles of the Disk Drives (Device ID #00, Drive #13 and Device ID #01, Drive #14) as a data Disk Drive and Spare Disk Drive are reversed.

‡1 : The Disk Drive (Device ID #01, Drive #14) is detached. However, do not replace it because the detachment does not mean a trouble.

‡2 : It takes a while to complete the dynamic sparing. For the standard time required, refer to "Table 2.2.2 Standard Time Required for the Correction Copy or Copy Back" in Replacement "(4) Confirming completion of data recovery or copy back" (REP 02-0240).

(4) When a Spare Disk Drive that cannot be eliminated is included in Disk Drives to be removed



RKAK (Device ID #01) : Additional subsystem that has a Disk Drive to be removed
R1 : RAID group that can be eliminated
S1 : Spare Disk Drive that can be relieved of its role
R0 : RAID group that cannot be eliminated
S0 : Spare Disk Drive that cannot be relieved of its role

* When the R0 has been detached in the past, there may be a case where its data is restored to a spare Disk Drive (Device ID #01, Drive #14). In the case above, the configuration may become the one shown on the left.

(a) Make sure that the model names of Disk Drive (Device ID #01, Drive #14) and the Spare Disk Drive (Device ID #00, Drive #13) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Disk Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "3.5 Checking the Status of Disk Drive" (SYSPR 03-0430).)

(b) Output the text file of the "RAID group/Logical unit" in the configuration copy information. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

(c) Relieve spare Disk Drives other than the S1of their roles. (For the details, refer to System Parameter "[Procedure ④-C]Deleting Spare Disk" (SYSPR 03-0410).)

(d) Execute the dynamic sparing for the Disk Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "10.2.6 Drive Maintenance" (TRBL 10-0180).)

‡1 : When "Spare Drive" of [Configuration Settings] – [Restore Options] of the Hitachi Storage Navigator Modular 2 is variable (default value) and "Applying No Copy Back Mode on All the Units" is enabled, the Spare Disk Drive (S0) of the device ID #01 and the Disk Drive number #13 may not be the same model name as the Disk Drive of the device ID #00 and the Disk Drive number #14. The Spare Disk Drive (S0) of the device ID #01 and the Disk Drive number #13 may be the same model name as the Disk Drive of the device ID #00 and the Disk Drive number #14 or the Disk Drive whose the rotational speed differs and the capacity is the same as the Disk Drive of the device ID #00 and the Disk Diver number #14.

(e) Make sure that the Disk Drive (Device ID #00, Drive #13) becomes a data Disk Drive that is a component of the R0 and the Disk Drive (Device ID #01, Drive #14) becomes a detached Disk Drive(‡2) as a Spare Disk Drive after the dynamic sparing is completed(‡3).
You can make sure of it by checking the "Type" and "Status" of the Disk Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "3.5 Checking the Status of Disk Drive" (SYSPR 03-0430).)

(f) Reset the Spare Disk Drive that was relieved of its role in Step (c) referring to the text file that was output in Step (b). (For the details, refer to System Parameter "3.4 [Procedure ④-B]Setting Spare Disk" (SYSPR 03-0400).)
However, the Disk Drive (Device ID #00, Drive #13) cannot be set as a spare Disk Drive.

(g) Make sure that there is no other Disk Drive, which composes a RAID group that cannot be eliminated, than the additional unit to be de-installed. If such a Disk Drive exists, make a dummy replacement(‡4) of the Spare Disk Drive (Device ID #00, Drive #14) that was detached and repeat the works from Step (c) after making sure that the Disk Drive was recovered from the detachment(‡5).

(h) Output the text file of the "RAID group/Logical unit" in the configuration copy information again. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

(i) Make sure that the current settings of the RAID groups and Spare Disk Drives are correct and neither more not less by comparing the text file that was output in Step (b) with that output in Step (h). At this time roles of the Disk Drives (Device ID #00, Drive #13 and Device ID #01, Drive #14) as a data Disk Drive and Spare Disk Drive are reversed.

‡1 : The Disk Drive (Device ID #01, Drive #14) is detached. However, do not replace it because the detachment does not mean a trouble.

‡2 : It takes a while to complete the dynamic sparing. For the standard time required, refer to "Table 2.2.2 Standard Time Required for the Correction Copy or Copy Back" in Replacement "(4) Confirming completion of data recovery or copy back" (REP 02-0240).

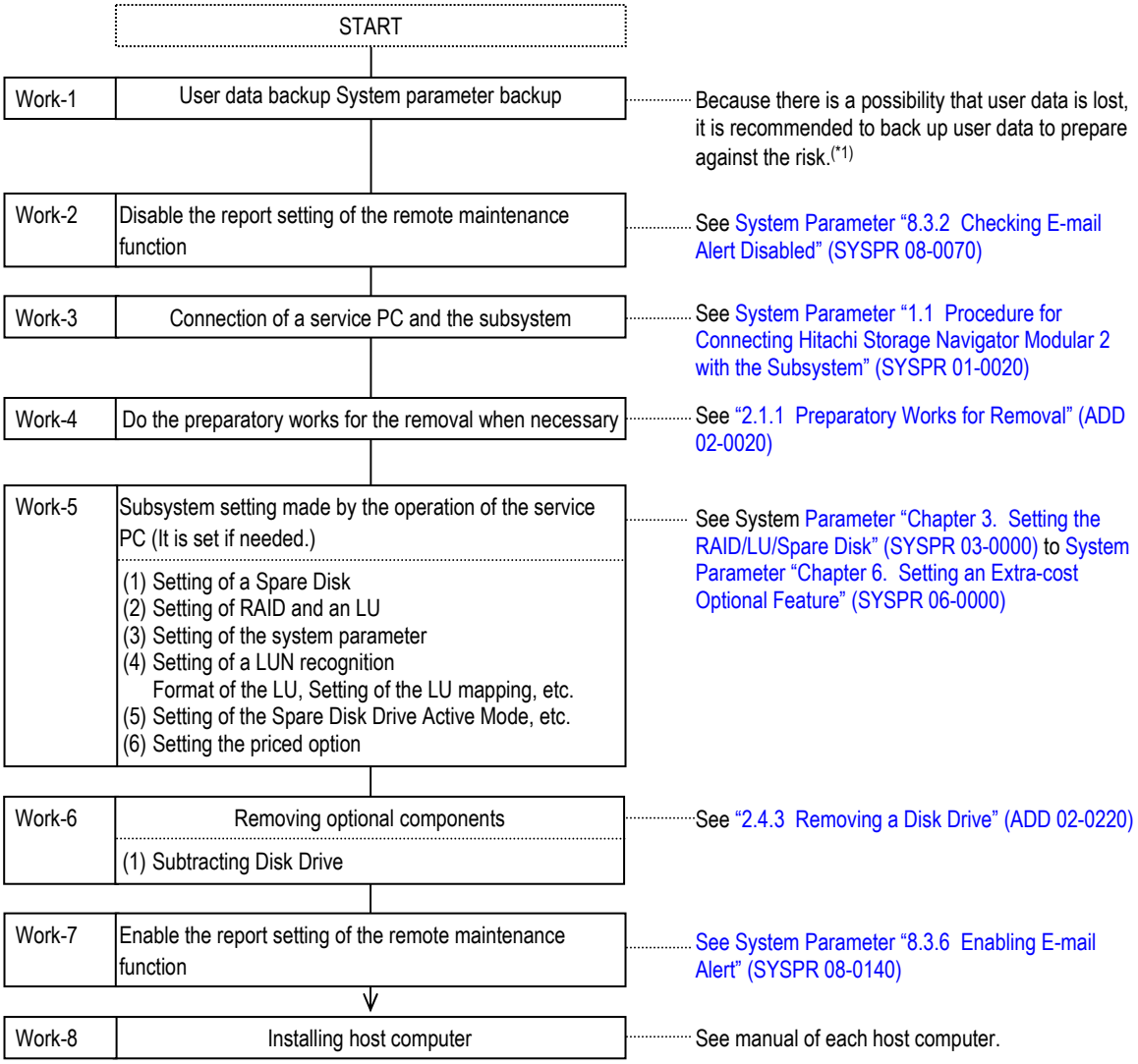
‡3 : This means that the part concerned is removed, and it is reinstalled after 20 seconds or more passed.

‡4 : "I009ab Spare HDU recovered (x: Unit number, y: HDU number)" is displayed in the Information Message of the Web and the ALARM LED (red) on the Disk Drive concerned goes out.

2.2 Procedures for Removing Optional Components

(1) Procedure for removing an optional component while the subsystem power online

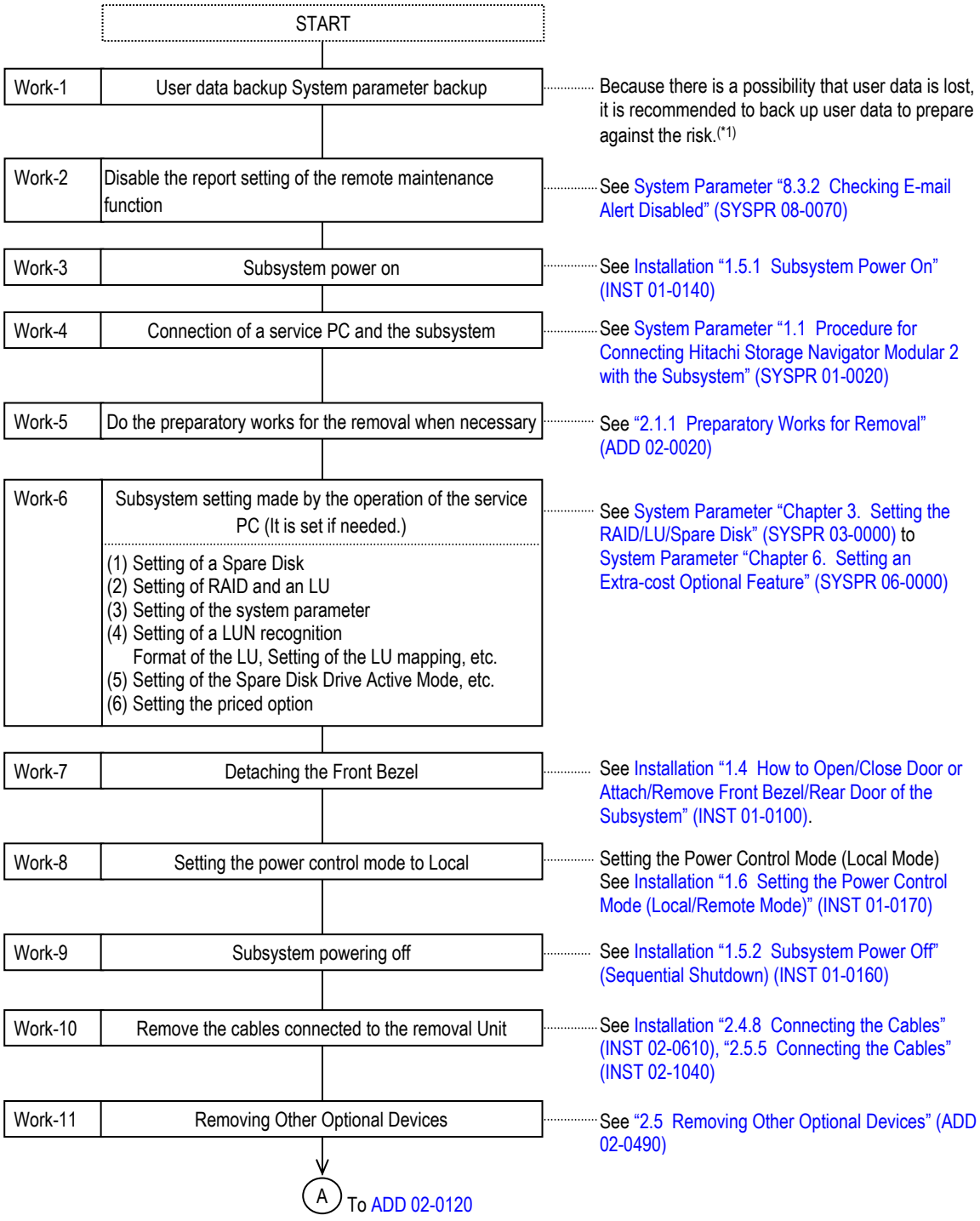
NOTE : For safety use, always close the front bezel after the operation.



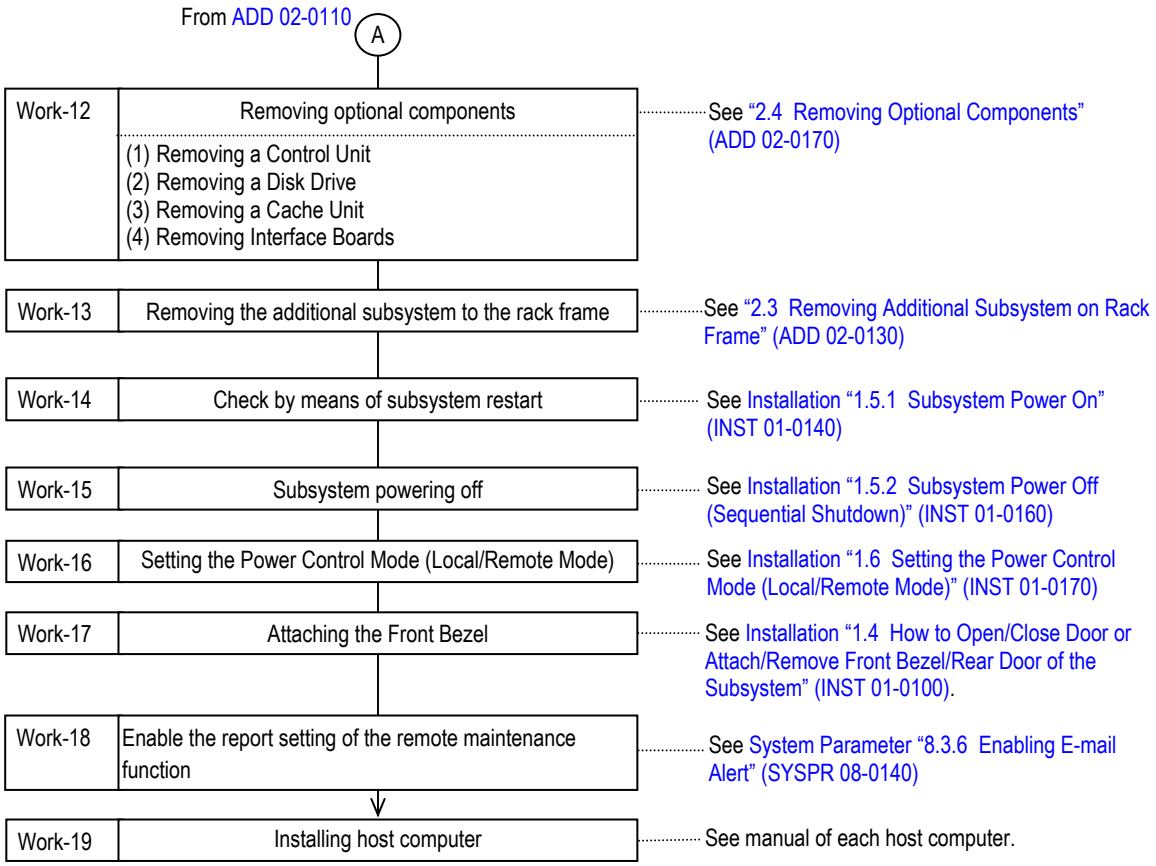
*1 : Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer's permission.

(2) Procedure for the offline removal (with the subsystem power turned off)

NOTE : • For safety use, always close the front bezel after the operation.
• For the see Installation "1.5 Power On/Off Procedure" (INST 01-0130).



‡1 : Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer's permission.



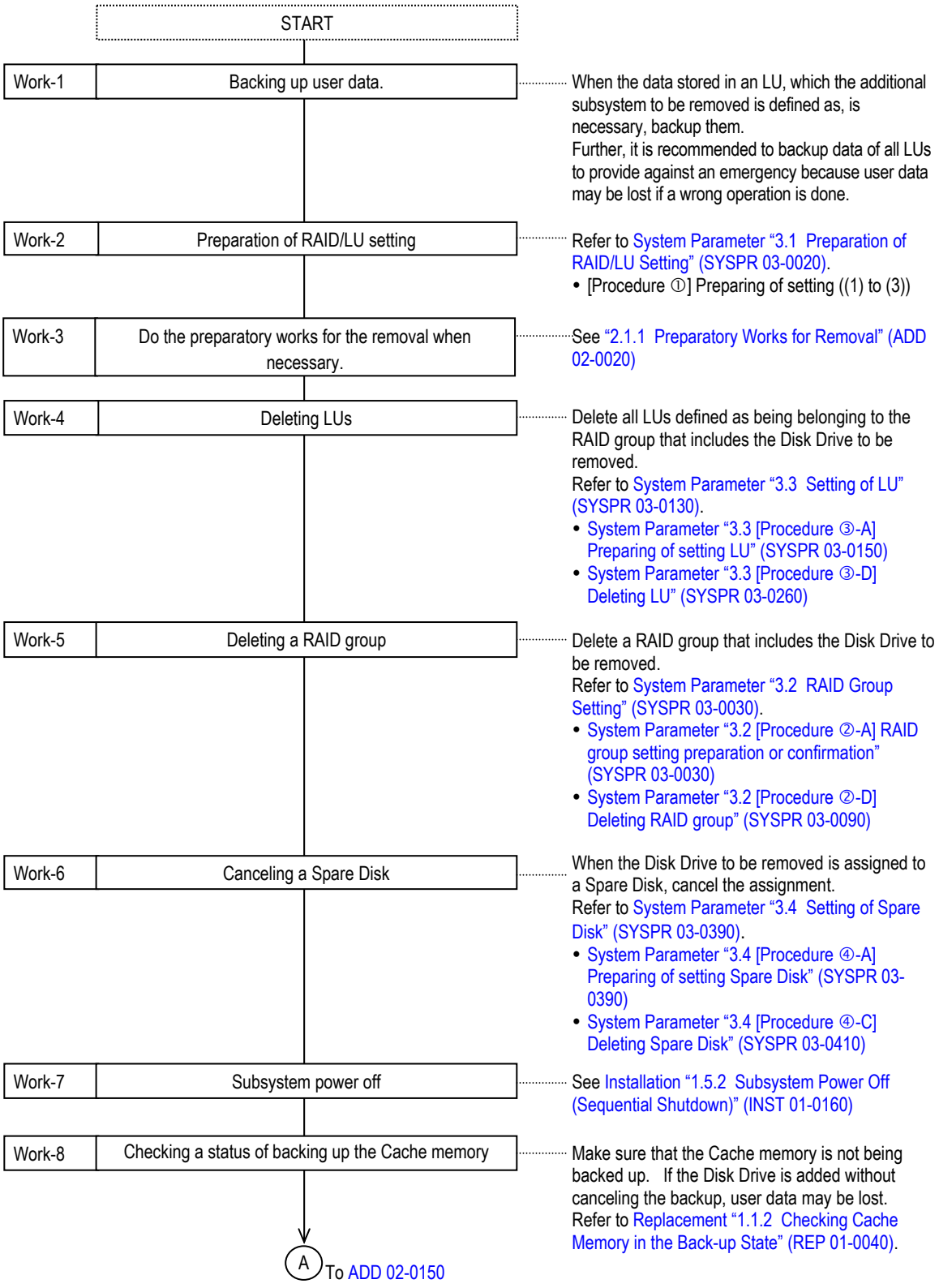
2.3 Removing Additional Subsystem on Rack Frame

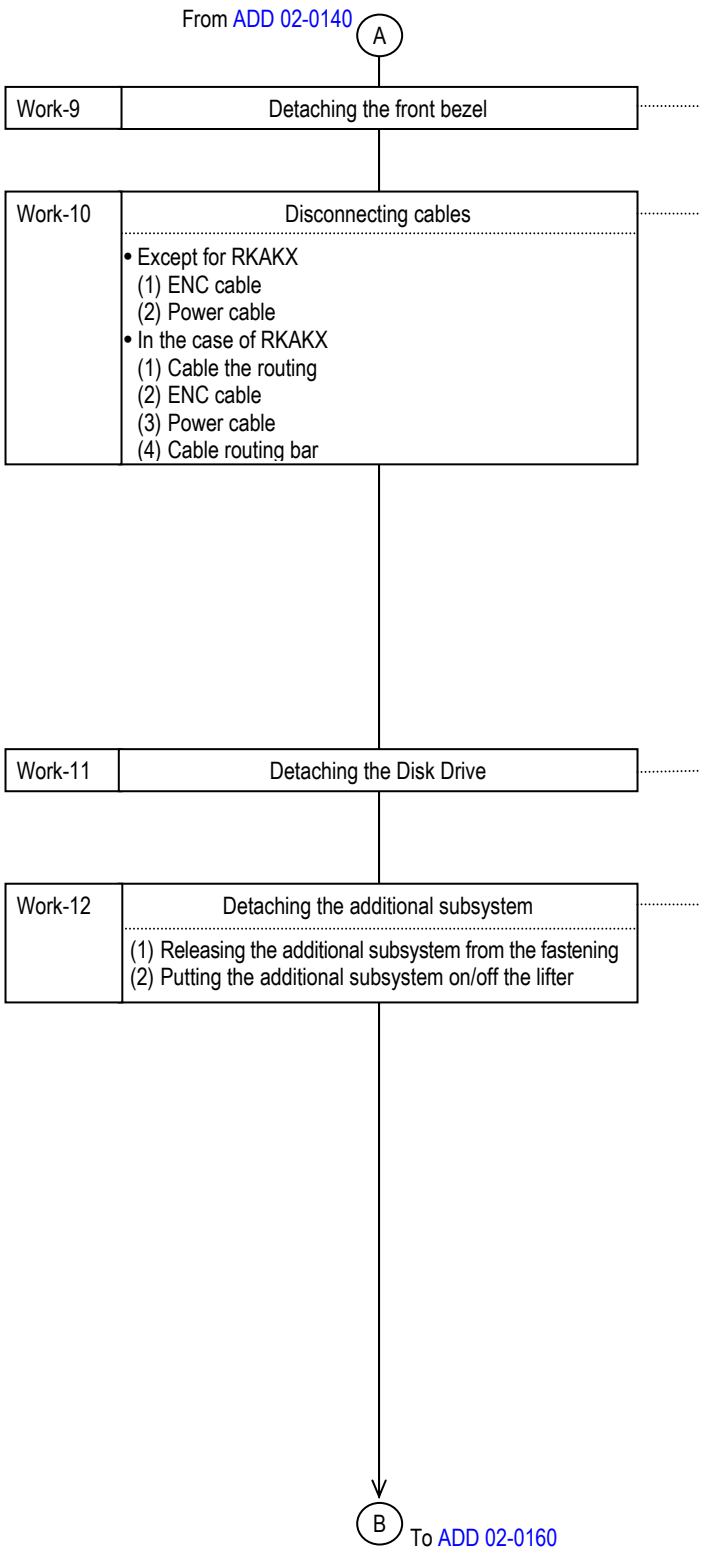
Select a procedure from the following and execute it.

No.	Model	Power status during the removal	Restriction	Removal Process section
1	Rackmount model	Removal with the power turned on	–	Impossible(*1)
2		Removal with the power turned off	1. Remove the Disk Drive. 2. When the Additional Subsystem are removed offline (with the subsystem power turned off), only the last Additional Subsystem of the configuration can be removed. While configuring Additional Subsystem, the Additional Subsystem cannot be removed. 3. Turn off the power of the subsystem. 4. Remove the Additional Subsystem in the opposite procedure of the operation of adding the Additional Subsystem to the rack frame.	Refer to "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0660)

*1 : Additional subsystem cannot be removed while the subsystem power is on. Be sure to perform it offline (with the subsystem power turned off).
When removing Additional Subsystem with subsystem power turned online, system may go down since the subsystem recognizes that a failure occurs in the removed Additional Subsystem.

(1) Procedure for removing the Additional Chassis offline (with the subsystem power turned off)
A procedure for removing the RKAK after powering off the subsystem is shown below.





See Installation "1.4 How to Open/Close Door or Attach/Remove Front Bezel/Rear Door of the Subsystem" (INST 01-0100)

Remove the cables in the reverse order of the installation referring to the following items.

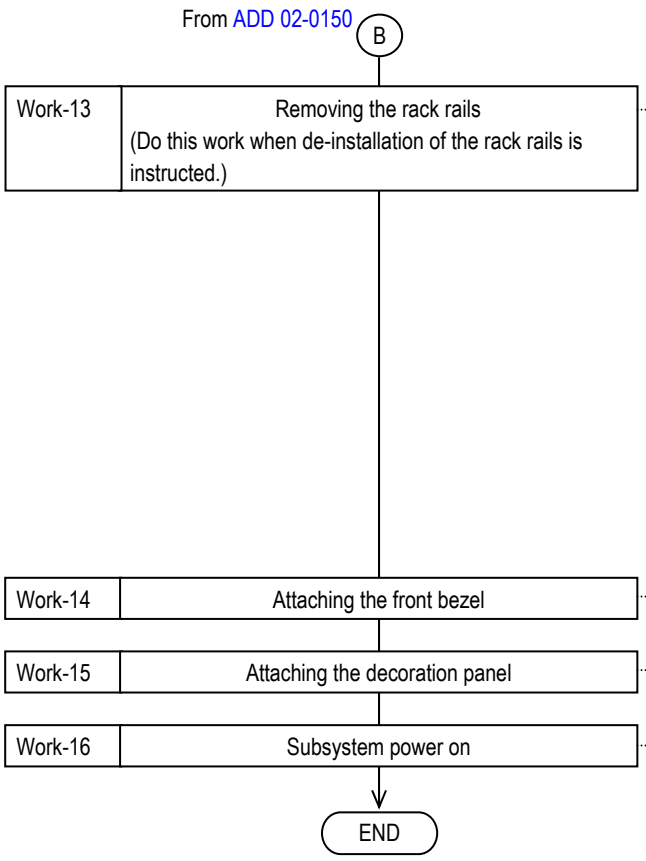
- Except for RKAKX
  (1) ENC cable (Refer to Installation "2.4.10 Connecting the ENC cables" (INST 02-0700).)
  (2) Power cable (Refer to Installation "2.4.11 Connecting the Power Cables" (INST 02-0800).)
- In the case of RKAKX
  (1) Routing Cables (Refer to Installation "2.5.8 Routing the Cables" (INST 02-1240).)
  (2) ENC cable (Refer to Installation "2.5.6 Connecting the ENC cables" (INST 02-1100).)
  (3) Power cable (Refer to Installation "2.5.7 Connecting the Power Cables" (INST 02-1220).)
  (4) Cable routing bar (Refer to Installation "2.5.4 Installing the Cables Routing Bars" (INST 02-1020).)

Install the Disk Drive to be added taking care not to apply any shock to it.

- Refer to "2.4.3 (3) Installing/removing Disk Drive" (ADD 02-0290).

Perform the removal in the reverse order of the installation referring to the following items.

(1) Releasing the additional subsystem from the fastening
  (a) Except for RKAKX
    - RK40 Rack frame (Refer to Installation "2.4.6 (1) RK40 Rack frame" (INST 02-0450).)
    - HP Rack frame (Refer to Installation "2.4.6 (2) HP Rack frame" (INST 02-0460).)
    - Sun StorEdge Rack frame (Refer to Installation "2.4.6 (3) Sun StorEdge Rack frame" (INST 02-0470).
    - IBM RS6000 Rack Frame (Refer to Installation "2.4.6 (4) IBM RS6000 Rack frame" (INST 02-0480).)
  (b) In the case of RKAKX (Refer to Installation "2.5.2 (2) Installing the RKAKX" (INST 02-0940).)
(2) Putting the additional subsystem on/off the lifter
  - Refer to Installation "2.4.5 Mounting Subsystem on Rack Frame" (INST 02-0430).



Perform the removal in the reverse order of the installation referring to the following items.

(1) Except for RKAKX
- RK40 Rack frame (URHT8) (Refer to Installation "2.2.1 (9) Installing the rails" (INST 02-0100).)
- HP Rack frame (UR7) (Refer to Installation "2.2.2 (2) Installing the rails" (INST 02-0160).)
- Sun StorEdge Rack frame (UR7) (Refer to Installation "2.2.3 (2) Installing rails" (INST 02-0230).)
- IBM RS6000 Rack Frame (UR7) (Refer to Installation "2.2.4 (1) When installing DF-F800-UR7" (INST 02-0260).)

(2) In the case of RKAKX (Refer to Installation "2.5.2 (1) Installing the rails" (INST 02-0880).)

See Installation "1.4.1 How to Attach/Remove Front Bezel of the Rackmount Model" (INST 01-0100)

See Installation "2.4.13 Attaching Decoration Panels" (INST 02-0830)

See Installation "1.5.1 Subsystem Power On" (INST 01-0140)

2.4 Removing Optional Components

2.4.1 Subsystems Optional Components for Removal

(1) Removing optional components

Component name	Model name	Specification	Requirements of removal	Condition of removal and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
Control Unit	HDF-F800-MFC4 (for RKM)	Control Unit (1), 4Gbps Fibre Channel Interface Board (including Host Connector (4)) (1), Cache Memory of 2,048 M bytes (2)	–	Impossible	Possible "2.4.2 Removing a Control Unit" (ADD 02-0180)
	HDF-F800-MFC8 (for RKM)	Control Unit (1), 4Gbps Fibre Channel Interface Board (including Host Connector (4)) (1), Cache Memory of 4,096 M bytes (2)			
	HDF-F800-MIS4 (for RKM)	Control Unit (1), iSCSI Interface Board (1), Cache Memory of 2,048 M bytes (2)			
	HDF-F800-MIS8 (for RKM)	Control Unit (1), iSCSI Interface Board (1), Cache Memory of 4,096 M bytes (2)			
	HDF-F800-M8FC4 (for RKM)	Control Unit (1), 8Gbps Fibre Channel Interface Board (including Host Connector (4)) (1), Cache Memory of 2,048 M bytes (2)			
	HDF-F800-M8FC8 (for RKM)	Control Unit (1), 8Gbps Fibre Channel Interface Board (including Host Connector (4)) (1), Cache Memory of 4,096 M bytes (2)			
	DF-F800-F1KEM	Control Unit (including Host Connector (4)) (1), Cache Memory of xxxx M bytes (2)			
	HDF-F800-SFC2 (for RKS)	Control Unit (1), 4Gbps Fibre Channel Interface Board (including Host Connector (2)) (1), Cache Memory of 2,048 M bytes (1)			
	HDF-F800-SFC4 (for RKS)	Control Unit (1), 4Gbps Fibre Channel Interface Board (including Host Connector (2)) (1), Cache Memory of 4,096 M bytes (1)			
	HDF-F800-SIS2 (for RKS)	Control Unit (1), iSCSI Interface Board (1), Cache Memory of 2,048 M bytes (1)			
	HDF-F800-SIS4 (for RKS)	Control Unit (1), iSCSI Interface Board (1), Cache Memory of 4,096 M bytes (1)			
	DF-F800-F1KES	Control Unit (including Host Connector (2)) (1), Cache Memory of xxxx M bytes (1)			
	DF-F800-F1KEXS	Control Unit (including Host Connector (2)) (1), Cache Memory of xxxx M bytes (1)			

*1 : Data is exchanged between a host computer and the subsystem..

Component name	Model name	Specification	Requirements of removal	Condition of removal and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
Disk Drive(*2) (including Spare Disk)	DF-F800-AKH146	3.5-inch Disk Drive (143.61 G bytes) (Disk rotational speed : 15,000 min-1)	–	Varies depending on the disk array to be removal. "2.4.3 (2) (2-1) Procedure for removing Disk Drive while the subsystem power is online" (ADD 02-0250)	Varies depending on) the disk array to be removal. "2.4.3 (2) (2-2) Procedure for removing the Disk Drive offline (with the subsystem power turned off)" (ADD 02-0270)
	DF-F800-AKH300	3.5-inch Disk Drive (287.62 G bytes) (Disk rotational speed : 15,000 min-1)			
	DF-F800-AKH450	3.5-inch Disk Drive (439.44 G bytes) (Disk rotational speed : 15,000 min-1)			
	DF-F800-AKH450X (RKAKX)	3.5-inch Disk Drive (439.44 G bytes) (Disk rotational speed : 15,000 min-1)			
	DF-F800-AKH600	3.5-inch Disk Drive (575.30 G bytes) (Disk rotational speed : 15,000 min-1)			
	DF-F800-AKH600X (RKAKX)	3.5-inch Disk Drive (575.30 G bytes) (Disk rotational speed : 15,000 min-1)			
	DF-F800-AKF400	3.5-inch Disk Drive (392.73 G bytes) (Disk rotational speed : 10,000 min-1)			
	DF-F800-AVE500	3.5-inch Disk Drive (491.25 G bytes) (Disk rotational speed : 7,200 min-1)			
	DF-F800-AVE750	3.5-inch Disk Drive (737.49 G bytes) (Disk rotational speed : 7,200 min-1)			
	DF-F800-AVE1K	3.5-inch Disk Drive (983.69 G bytes) (Disk rotational speed : 7,200 min-1)			
	DF-F800-AVE1KX (RKAKX)	3.5-inch Disk Drive (983.69 G bytes) (Disk rotational speed : 7,200 min-1)			
	DF-F800-AVE2K	3.5-inch Disk Drive (1,968.52 G bytes) (Disk rotational speed : 7,200 min-1)			
	DF-F800-AVE2KX (RKAKX)	3.5-inch Disk Drive (1,968.52 G bytes) (Disk rotational speed : 7,200 min-1)			
	DF-F800-AKS200	Flash Drive (195.82 G bytes)			
Cache Unit	DF-F800-C1GK	Cache memory (1,024 M bytes)	• For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.	Impossible	Possible "2.4.4 Removing a Cache Unit" (ADD 02-0310)
	DF-F800-C2GK	Cache memory (2,048 M bytes)			
	DF-F800-C4GK	Cache memory (4,096 M bytes)			
FC Interface Board	DF-F800-DKF44	4G bps FC Interface Board (including host connectors for 4G bps (4))	–	Impossible	Possible "2.4.5 Removing a FC Interface Board" (ADD 02-0380)
	DF-F800-DKF42	4G bps FC Interface Board (including host connectors for 4G bps (2))			
	DF-F800-DKF84	8G bps FC Interface Board (including host connectors for 8G bps (4))			
	DF-F800-DKF82	8G bps FC Interface Board (including host connectors for 8G bps (2))			
iSISI Interface Board	DF-F800-DKS12	iSCSI Interface Board	–	Impossible	Possible "2.4.6 Removing an iSCSI Interface Board" (ADD 02-0430)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.
The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

Component name	Model name	Specification	Requirements of removal	Condition of removal and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
Cache Backup Battery	DF-F800-N1K	Cache Backup Battery	–	Possible "2.4.7 Removing a Cache Backup Battery" (ADD 02-0481)	Possible "2.4.7 Removing a Cache Backup Battery" (ADD 02-0481)
Additional Battery Box	DF-F800-N1RK	Additional Battery Box	–	Possible "2.4.8 Removing a Additional Battery Box" (ADD 02-0484)	Possible "2.4.8 Removing a Additional Battery Box" (ADD 02-0484)

*1 : Data is exchanged between a host computer and the subsystem.

2.4.2 Removing a Control Unit

⚠ CAUTION

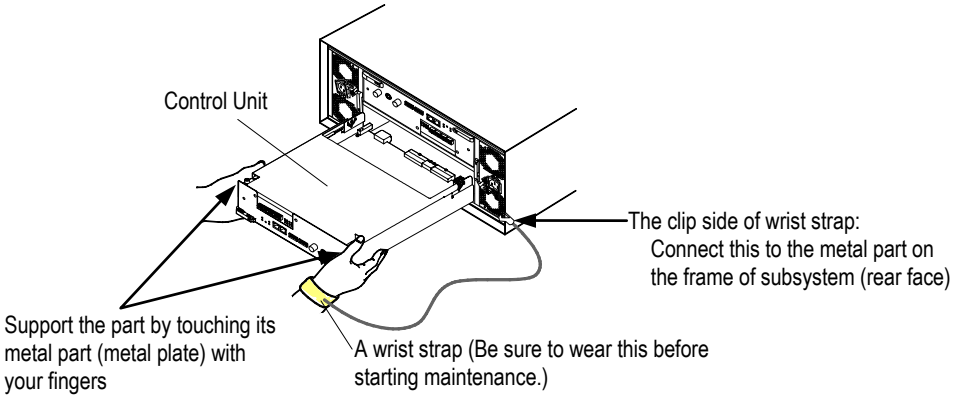
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Control Unit is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Control Unit from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : As the priced options, ShadowImage in-system replication, Copy-on-write SnapShot, TrueCopy remote replication, TrueCopy Modular distributed, TrueCopy Extended Distance, Modular Volume Migration, Dynamic Provisioning, and Cache Residency Manager are indispensable options for dual controller, their operation cannot be ensured when removing a Control Unit. Before removing a Control Unit, verify the locking/unlocking of the priced options described above with your customer or the sales engineer. If the priced options are unlocked, ask your customer or the sales engineer to lock the priced options, and after the locking is completed, remove a Control Unit.

(1) Removing Process for the Control Unit

Select a procedure from the following and execute it.

No.	Model	Power status during the removal	Restriction	Removal Process section
1	RKM/RKS	Removal with the power turned on	–	Impossible
2		Removal with the power turned off	The case of the dual Controller configuration only	Refer to "2.4.2 (2) Procedure for removal for the Control Unit" (ADD 02-0190)

(2) Procedure of removal for the Control Unit

(a) Connect the PC to be connected with Hitachi Storage Navigator Modular 2 and the Control Unit #0 with a LAN cable. (Refer to System Parameter "1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Subsystem" (SYSPR 01-0020).)

(b) Set the system starting attribute of Boot Option to the single mode to operate it by the single system. (Refer to System Parameter "4.2 (1) Setting Boot Options" (SYSPR 04-0050).)

(c) Turn off the main switch.

(d) Make sure that the POWER LED (green) on the panel goes out.

NOTE : When the power has already been turned off, make sure that the cache is not in the cache backup mode. (Refer to Replacement "1.1.2 Checking Cache Memory in the Back-up State" (REP 01-0040).)
When the cache is in the cache backup state, make the Removing after canceling the mode.

Make sure that the C-PWR LED (green) on the Control Unit is off.

NOTE : When the C-PWR LED (green) is on, user data which has not written on the disk exists in the cache memory.

(e) Remove the power cable connected with the Power Unit.

(f) Remove the Fibre Channel cable, LAN, ENC cable, and RS232C cables connected to the Control Unit #1.

NOTE : • Connect only the ENC Unit #0 side to make the single Control Unit configuration. The ENC Unit #1 side is not connected.
When two or more additional subsystem are connected, however, both cables in ENC Unit #0 and ENC Unit #1 should remain connected for the additional subsystem.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

(g) Remove the Control Unit #1.
Loosen the screws (right and left) which are fixing the levers of the Control Unit #1, push down the levers forward, and pull out the Control Unit.

(h) Install the dummy (control Unit).
Install the dummy (Control Unit) by fitting its right and left claws to the cutouts of the basic subsystem, slide the latches upward, and tighten the fixing screws (right and left).

NOTE : Do not catch a ENC cable, when the Control Unit for the inserted.

(i) Connect the power cables to the Power Units.

(j) Turn on the main switch.

(k) Make sure that the READY LED (green) on the front side of the subsystem comes on.

(l) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed.
When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code (refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)").

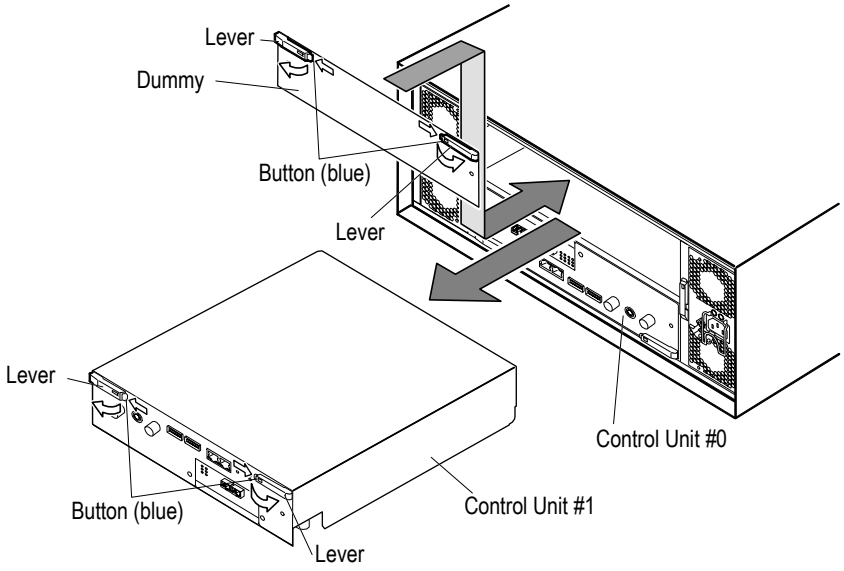
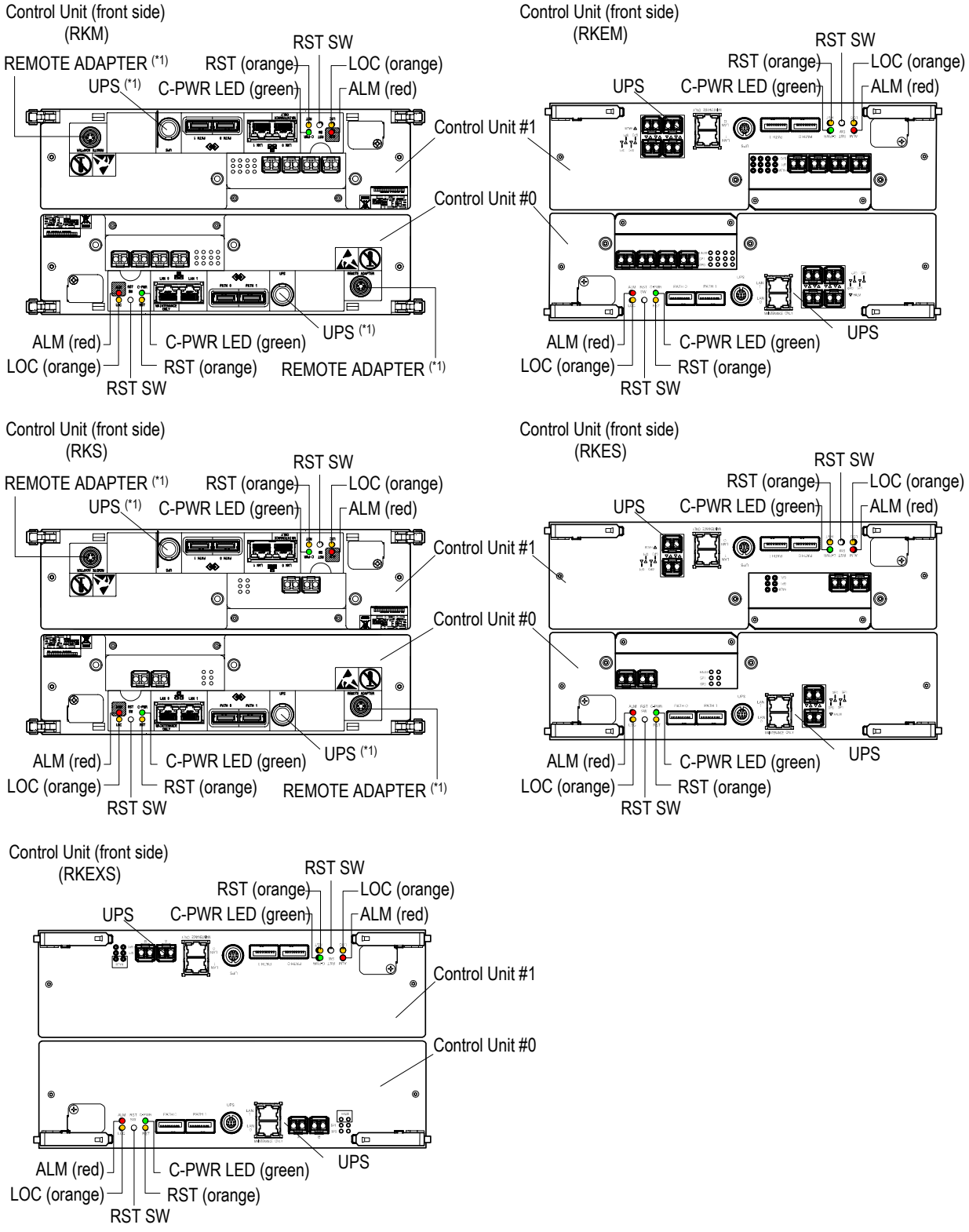


Figure 2.4.1 Removing Controller (RKM/RKS)



*1 : The position of the connector is different depending on the Control Unit.
Confirm the connector.

Figure 2.4.2 Position of the LED on the Control Unit (RKM/RKEM/RKS/RKES/RKEXS)

2.4.3 Removing a Disk Drive

A procedure for removing the Disk Drive varies depending on a location of the Disk Drive and a condition (whether the subsystem power is online or offline (with the subsystem power turned off)). Take care to use a procedure appropriate for the purpose because a use of an inappropriate procedure may cause an accident such as a loss of user data.

Table 2.4.1 Kinds of Disk Drive Removal

No.	Unit of addition/ removal	Component to be added/ removed	Removal	
			Removal of the Disk Drive(s) which is not used (from which a setting of a RAID group has been deleted)	
			Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
1	Disk Drive	RKM/RKS Disk Drive #0 to 4 RKAK/RKAKX corresponding to the unit #0 connected to the RKH #0 to 4	Impossible (*2)	Impossible(*2)
			–	–
2		RKM/RKS Disk Drive #5 or more RKAK/RKAKX corresponding to the unit #0 connected to the RKH Disk Drive #5 or more	Possible	Possible
			Refer to "2.4.3 (2-1) Procedure for removing Disk Drive while the subsystem power is online" (ADD 02-0250)	Refer to "2.4.3 (2-2) Procedure for removing the Disk Drives offline (with the subsystem power turned off)" (ADD 02-0270)
3		RKAK/RKAKX corresponding to the unit #1 or more connected to the RKM/RKS RKAK/RKAKX corresponding to the unit #1 or more connected to the RKH	Possible(*3)	Possible(*3)
			Refer to "2.4.3 (2-1) Procedure for removing Disk Drive while the subsystem power is online" (ADD 02-0250)	Refer to "2.4.3 (2-2) Procedure for removing the Disk Drives offline (with the subsystem power turned off)" (ADD 02-0270)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : The Disk Drives #0 to #4 of the RKM/RKS cannot be decreased because the firmware is stored in them. The Disk Drives #0 to #4 of the RKAK/RKAKX corresponding to the unit #0 connected to the RKH cannot be decreased because the firmware is stored in them.

*3 : All of the Disk Drives cannot be removed from the RKAK/RKAKX at the middle of a configuration. (Excluding the RKAK/RKAKX corresponding to the unit #0 connected to the RKH)
When you want to remove all the Disk Drives in the RKAK/RKAKX of the last configuration, remove the whole RKAK/RKAKX offline (with the subsystem power turned off). (Excluding the RKAK/RKAKX corresponding to the unit #0 connected to the RKH)

(1) Before starting removal of Disk Drive

⚠ CAUTION

Do not pull out multiple RKAKXs at a time because the rack can fall over.

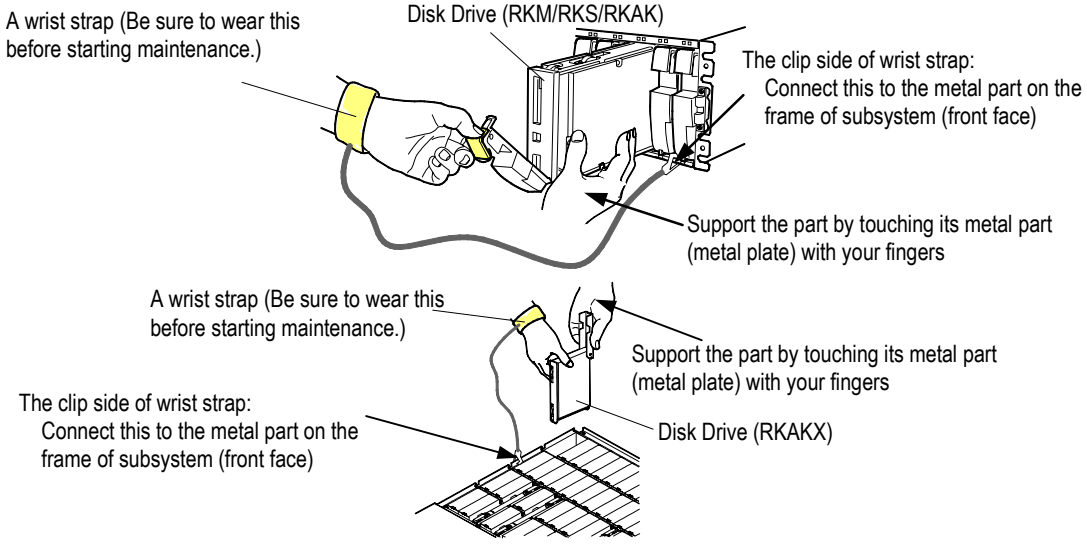
NOTE : • The Disk Drive is a precision machine. Never apply a shock or vibration to it.
• Prepare the dummy (disk drive) before removing the Disk Drive.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **Disk Drives are precision components.**
  Be careful not to expose drives to hard shock.
- **When you remove a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Disk Drive is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Disk Drive from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : When removing the Disk Drive to the RKAKX, check that the stabilizer is installed to the front side of the rack.
If the stabilizer is not installed, install the stabilizer to the rack. (Refer to Installation "2.2.1 (7) Installing the stabilizer" (INST 02-0090).)

(1-1) In the case of RKM/RKS/RKAK

(a) Locations and numbers of Disk Drives

The Disk Drive number is #0 to #14 from the left sequentially seen sideways.

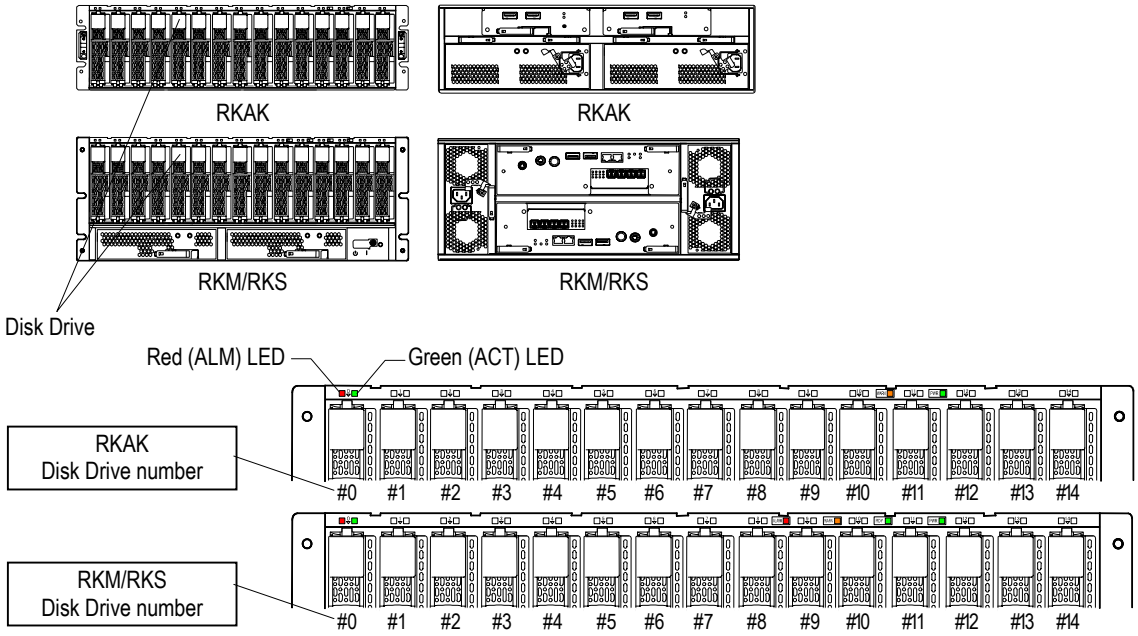


Figure 2.4.3 Disk Drive Mounting Location (RKM/RKS/RKAK)

(1-2) In the case of RKAKX

(a) Locations and numbers of Disk Drives

The Disk Drive numbering is #A0 to #A23, #B0 to #B23 sequentially viewed from the above of the subsystem. (Refer to Figure 2.4.3.1)

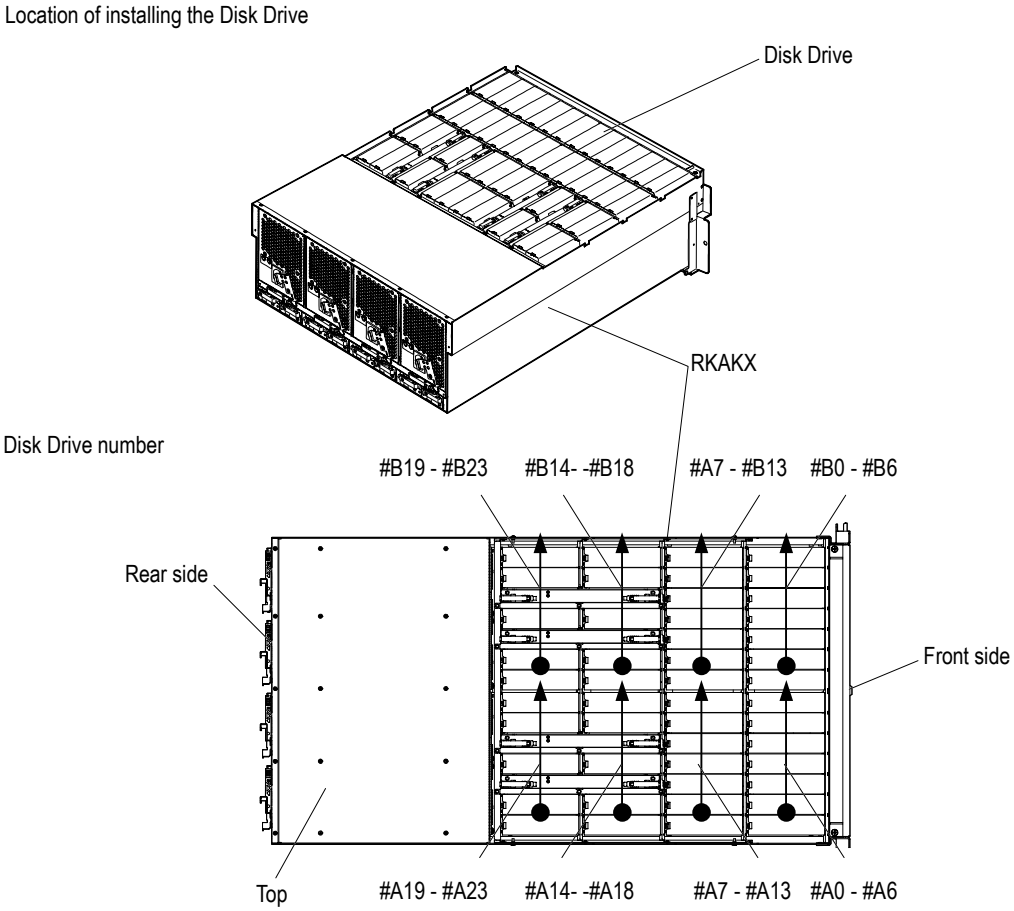


Figure 2.4.3.1 Disk Drive Mounting Location (RKM/RKS/RKAK)

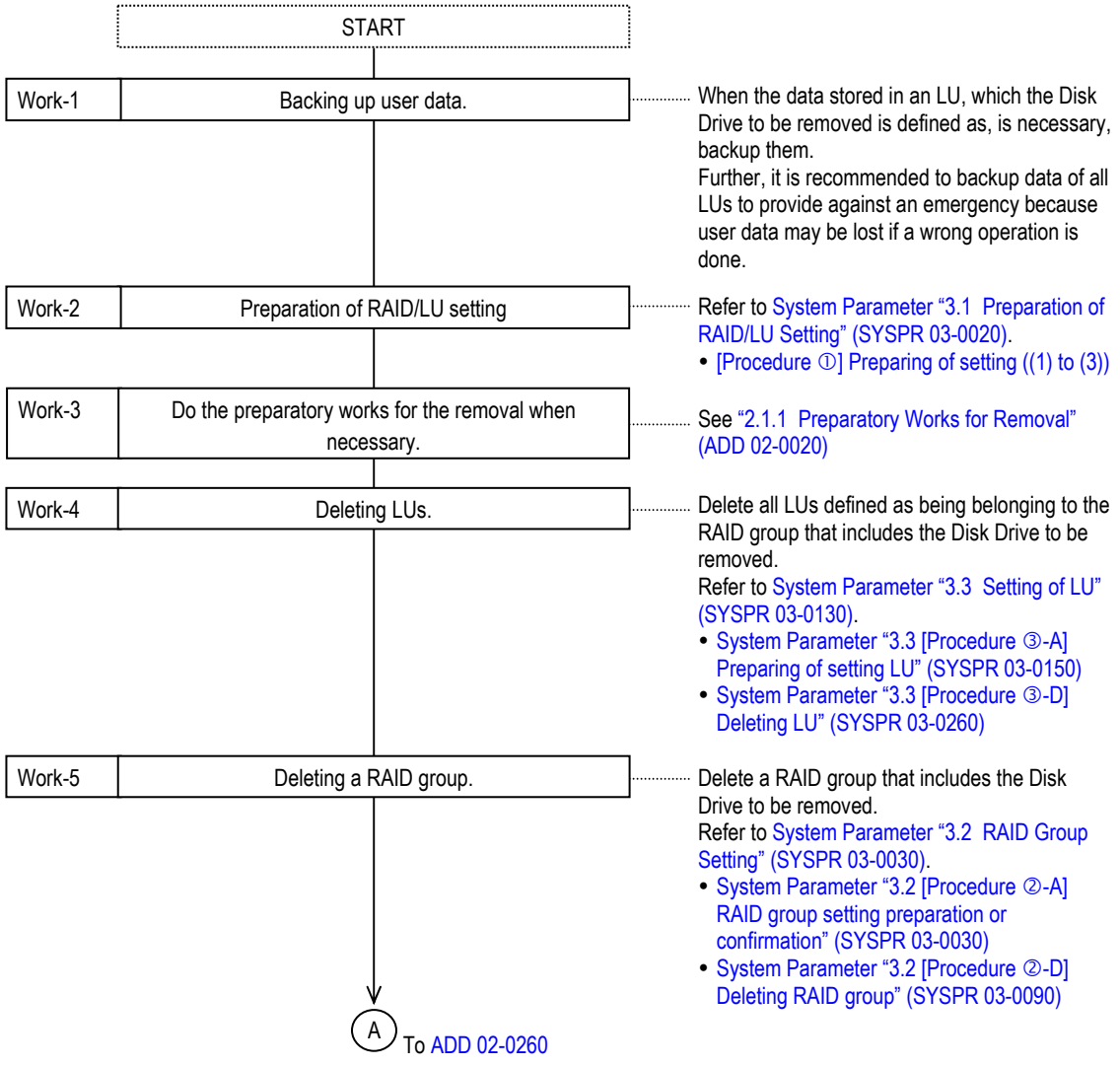
This page is for editorial purpose only.

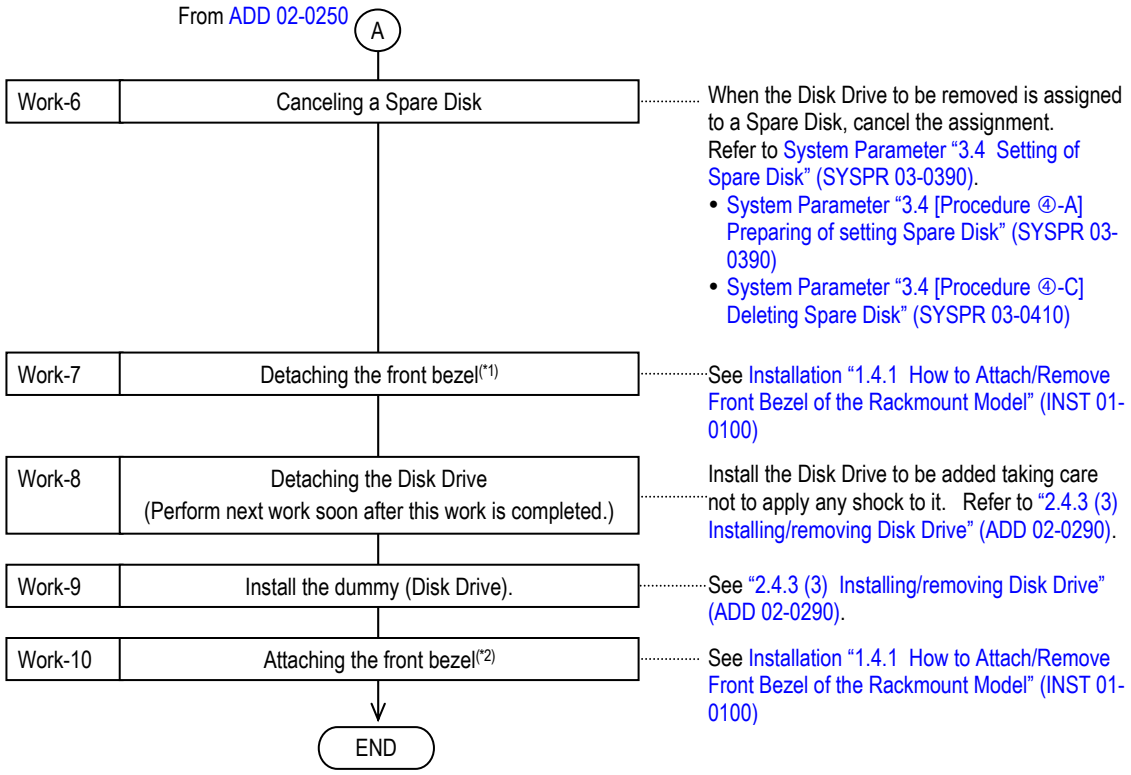
(2) Procedure for removing Disk Drive

- A procedure for removing the Disk Drive installed in the subsystem is shown below.
- Any of the Disk Drives #0 to #4 of the RKM/RKS cannot be removed.
- To remove all of the Disk Drives (RKAK : #0 and #1, RKAKX : #A0 to #A23/#B0 to #B23), it is required to remove them together with the RKAK/RKAKX in which they are installed.
- It is recommended to backup data of all LUs to provide against an emergency because user data may be lost if a wrong operation is done.

(2-1) Procedure for removing Disk Drive while the subsystem power is online

A procedure for removing the Disk Drive without shutting down the subsystem is shown below.

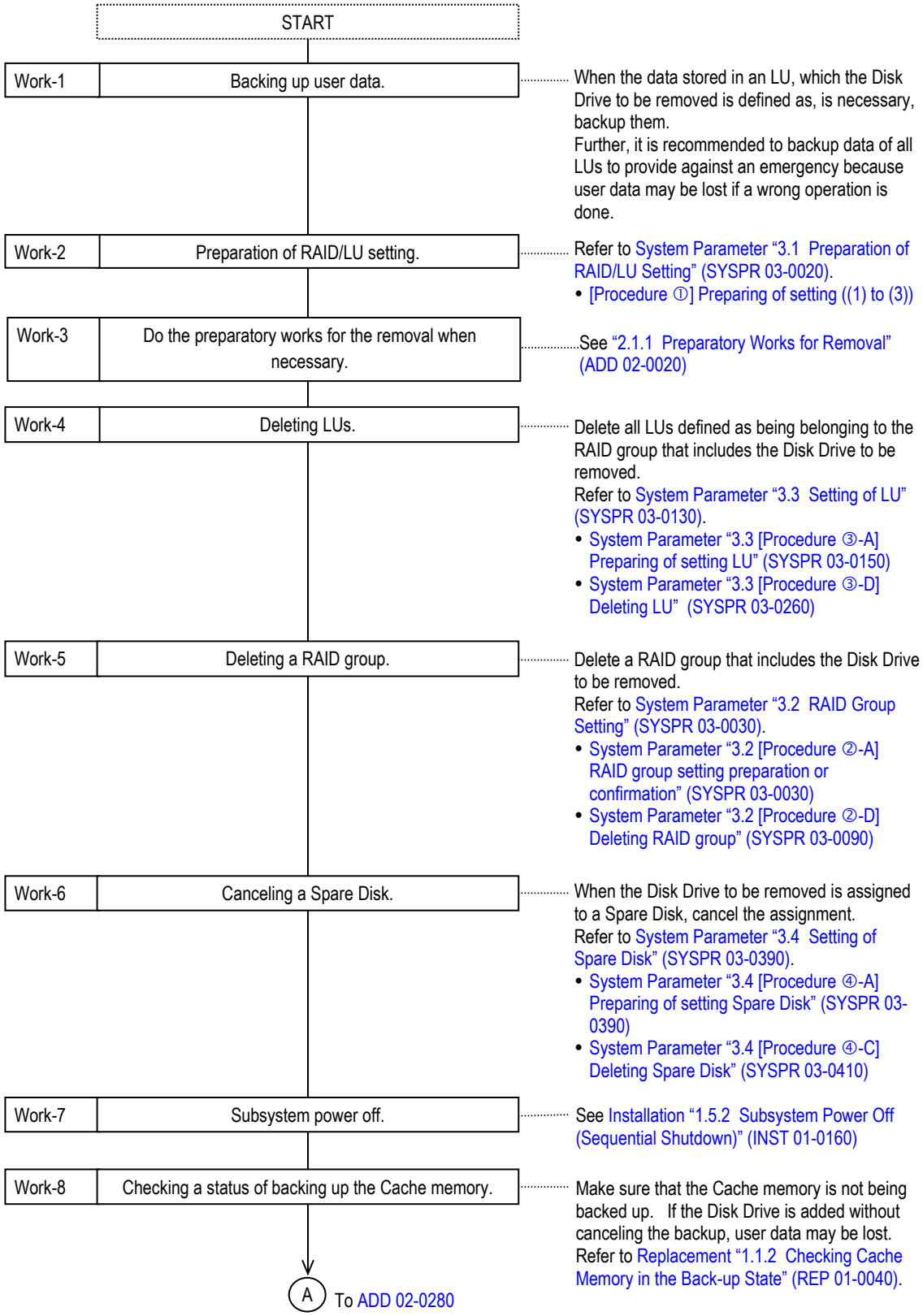


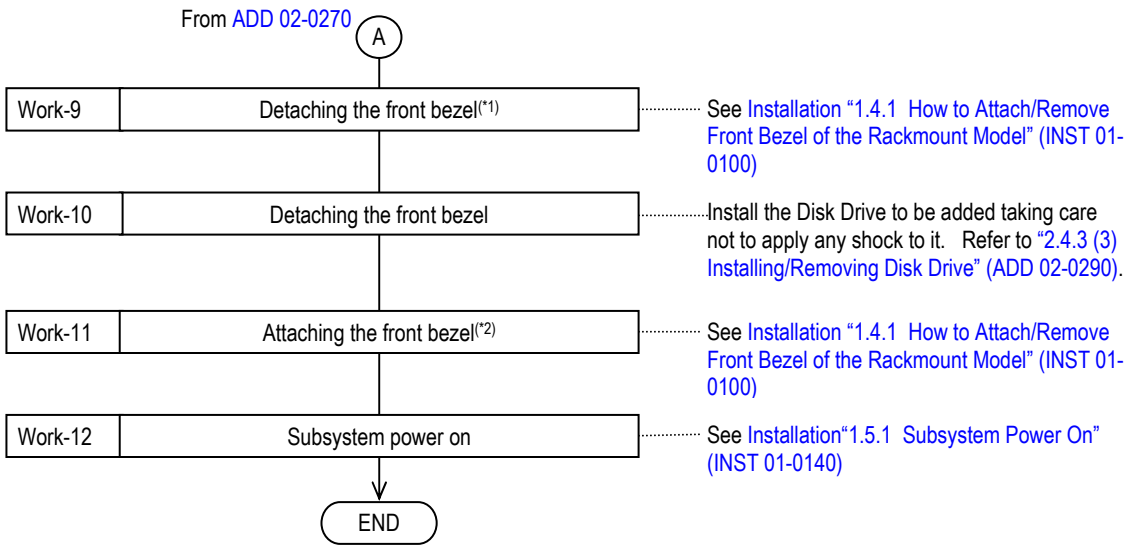


*1 : In the case of the RKAKX, remove the front bezel, pull the subsystem out of the rack, and then remove the top cover.
*2 : In the case of the RKAKX, attach the top cover, store the subsystem in the rack, and then attach the front bezel.

(2-2) Procedure for removing the Disk Drives offline (with the subsystem power turned off)

A procedure for removing the Disk Drive after powering off the subsystem is shown below.





*1 : In the case of the RKAKX, remove the front bezel, pull the subsystem out of the rack, and then remove the top cover.

*2 : In the case of the RKAKX, attach the top cover, store the subsystem in the rack, and then attach the front bezel.

(3) Installing/removing Disk Drive

(3-1) In the case of RKM/RKS/RKAK

When installing or removing a Disk Drive in the work for decreasing the number of Disk Drives, follow the procedure explained below.

Perform the following operations (a) and (b) for each of the slots, where the Disk Drive is to be replaced, one by one.

(a) Pull the stopper at the upper part of the Disk Drive handle toward you to have the lock off, tilt the handle toward you, and then remove the Disk Drive by pulling it out taking care not to apply a shock to it.

When using the removed Disk Drive for the purpose of addition to another disk array unit, keep it in custody with its handle returned to its original state (locked by the stopper) taking care not to apply a shock to it.

(b) Install the dummy (Disk Drive) in the slot from which the Disk Drive has been removed.

Be sure to insert the dummy (Disk Drive) in the vacant slot because it is necessary to regulate a cooling air flow inside the disk array.

Insert it into the slot slowly so that the latch (round dent) part of the dummy (Disk Drive) comes to the lower side.

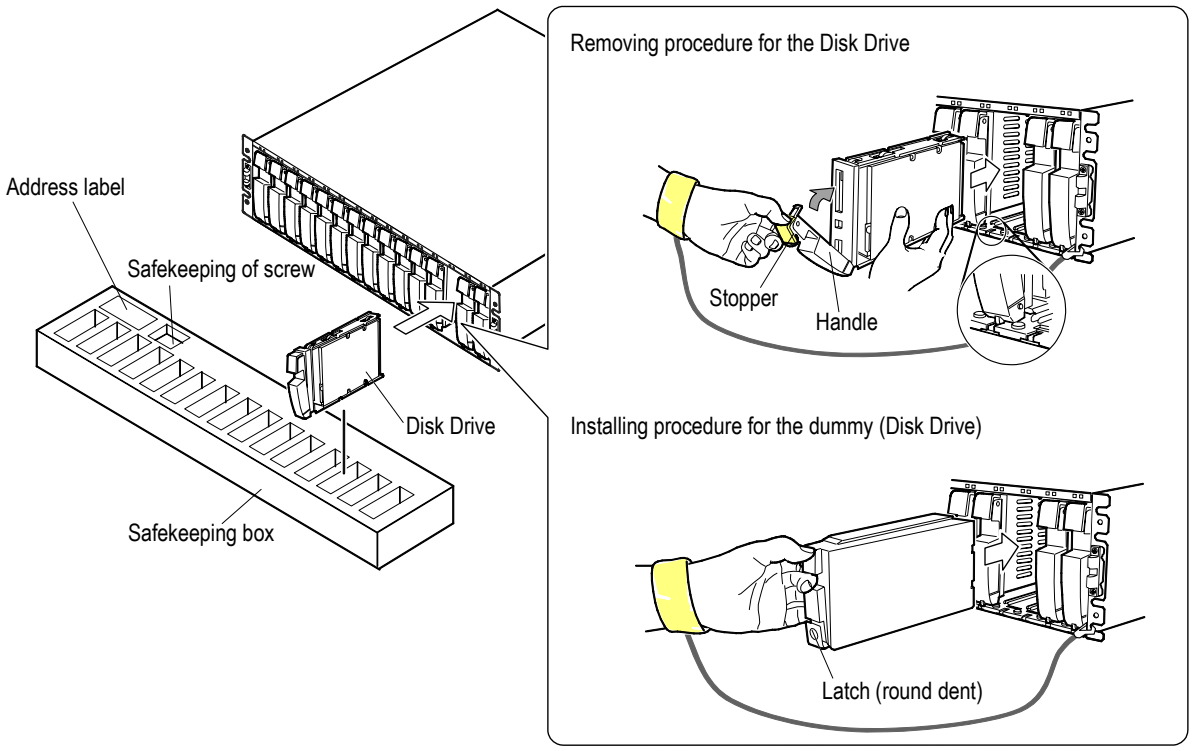


Figure 2.4.4 Removing the Disk Drive and Installing the Dummy (Disk Drive) (RKM/RKS/RKAK)

(3-2) In the case of RKAKX

When installing or removing a Disk Drive in the work for decreasing the number of Disk Drives, follow the procedure explained below.

Perform the following operations (a) and (b) for each of the slots, where the Disk Drive is to be replaced, one by one.

(a) Open the handle toward you, and then remove the Disk Drive by pulling it out taking care not to apply a shock to it.

When using the removed Disk Drive for the purpose of addition to another disk array unit, keep it in custody with its handle returned to its original state (locked by the stopper) taking care not to apply a shock to it.

(b) Install the dummy (Disk Drive) in the slot from which the Disk Drive has been removed.

Be sure to insert the dummy (Disk Drive) in the vacant slot because it is necessary to regulate a cooling air flow inside the disk array.

Insert it into the slot slowly so that the latch (round dent) part of the dummy (Disk Drive) comes to the lower side.

Procedure of the installing the Disk Drive

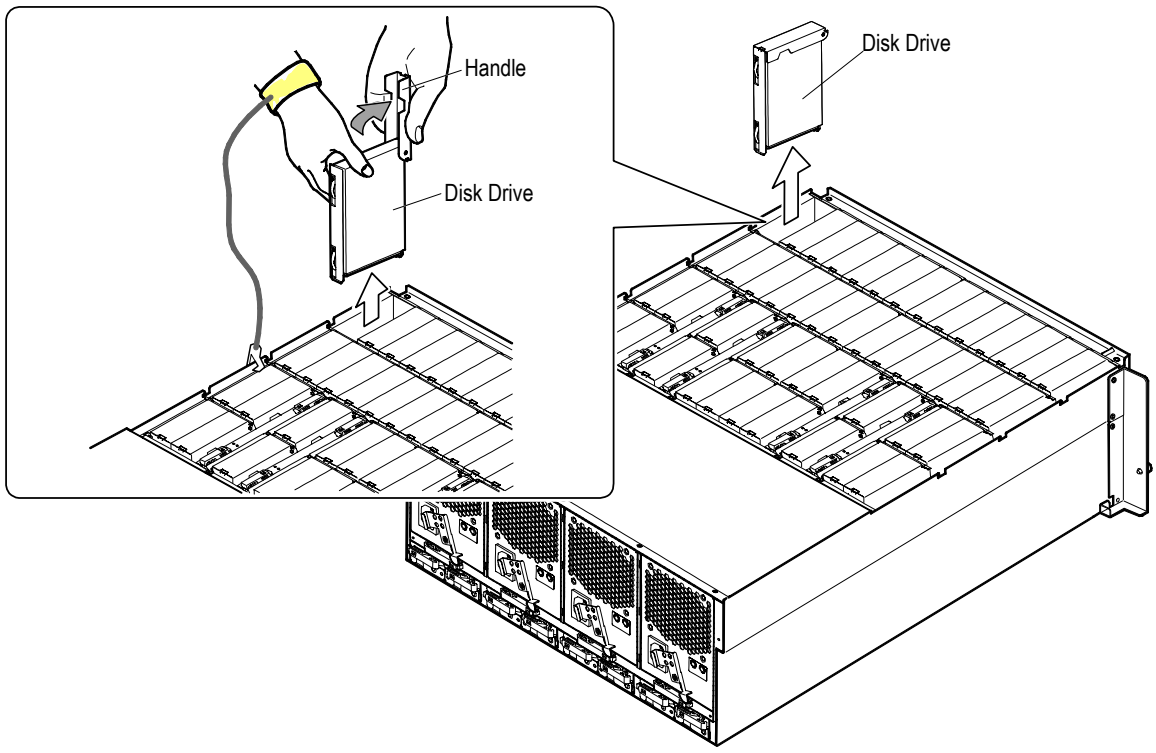


Figure 2.4.4.1 Removing the Disk Drive and Installing the Dummy (Disk Drive) (RKAKX)

This page is for editorial purpose only.

2.4.4 Removing a Cache Unit

Removing a Cache Unit is not work of the service personnel.

⚠ CAUTION

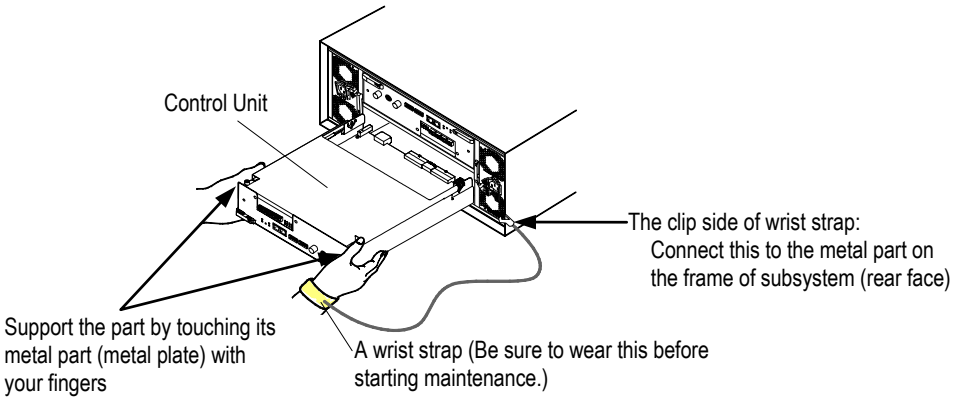
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Control Unit is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Control Unit from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • If you remove the Cache Unit in the status where the priced options of ShadowImage in-system replication, Copy-on-write SnapShot, TrueCopy remote replication, TrueCopy Extended Distance and Modular Volume Migration are enabled, the message of "HH2900 Cache capacity reduced although copy function enable" is displayed, and the array subsystem does not become Ready status.
If you remove the Cache Unit in the status where the priced options of Cache Partition Manager is enabled, the message of "HZ0Pxx Cache capacity reduced although Cache Partition Manager enable " is displayed, and the array subsystem does not become Ready status.
If you remove the Cache Unit in the status where the priced options of Dynamic Provisioning is enabled, the message of "HJ4C00 Cache memory is removed although DP function is enabled " is displayed, and the array subsystem does not become Ready status.
When performing the removal, check the Enable/Disable of the above-mentioned priced options with the customer/SE in advance.
If it is enabled, change it to disable once, and remove the Cache Unit.
Return it to enable after completing the removal.
Request the customer/SE for invalidation/validation of the priced option.

• If the Basic Chassis is RKES, RKEM, RKEH, RKEHD, or RKEXS, when removing the cache memory during LU format, the message "HH9T00 The cache memory capacity has been reduced before background LU format is completed" is displayed, and the array subsystem does not become Ready status.
After verifying that the LU format is completed" (Refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU (d)" (SYSPR 03-0370)), remove the cache memory.

<Working Procedure>

(1) Turn off the main switch.
Make sure that the POWER LED (green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : When the subsystem power has already been turned off, make sure that the cache memory is not being backed up. (Refer to Replacement "1.1.2 Checking Cache Memory in the Back-up State" (REP 01-0040).)
If the cache memory is being backed up, execute Step (2) and the following steps after canceling the backing up.

In this case, check that the C-PWR LED (green) on Control Unit is extinguished.

NOTE : If the C-PWR LED (green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(2) Remove the power cables from two Power Units.

NOTE : If the replacement is executed without removing the power cables, it may not recover.

(3) Open the right and left levers toward you at the same time while pressing the right and left buttons (blue) which fix the levers of the Control Unit.
When the levers are completely opened, the Control Unit comes out forward.

(4) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(5) Remove the Control Unit by pulling it out toward you.

(6) Loosen two cover fixing screws (blue) on the top of the cover, and open the cover to the arrow (⟶) direction.
You can fix the cover at a perpendicular position and, furthermore, you can lift the cover a little from this position and fall it to the opposite side.

(7) Remove the Cache Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(8) Install the removed Cache Unit in the Control Unit.

NOTE : • For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.
• If the Cache memory is not installed in slot #0 for RKM, the Control Unit blockade is caused. Be sure to install the Cache memory in slot #0.
• For the RKM, insert the Cache Units in the cache slots in regular order starting from the slot #0.
• when installing two Cache Units in RKM, install the Cache Unit of the same capacity as each slot.
• In the case of the RKH, if the Cache memories are not installed in the slot #0 and the slot #1, the blockade of the Control Unit occurs.
Be sure to install the Cache memories in the slot #0 and the slot #1.
• Install the Cache Units by the set of two in the slot #0 and #1 and the slot #2 and #3.
• For the RKH, install the Cache Unit of the same capacity in the slot #0, slot #1 and slot #2, slot #3, respectively, and make the capacity and the installation position of the Control Unit #0 and the Control Unit #1 the same.

(9) Close the cover and fix it by fastening two cover fixing screws (blue) on the top of the cover.
(10) Insert it in the set position in the status where the right and left levers on the Control Unit are opened, and close the levers completely until you hear the buttons (blue), which fix the levers, click.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

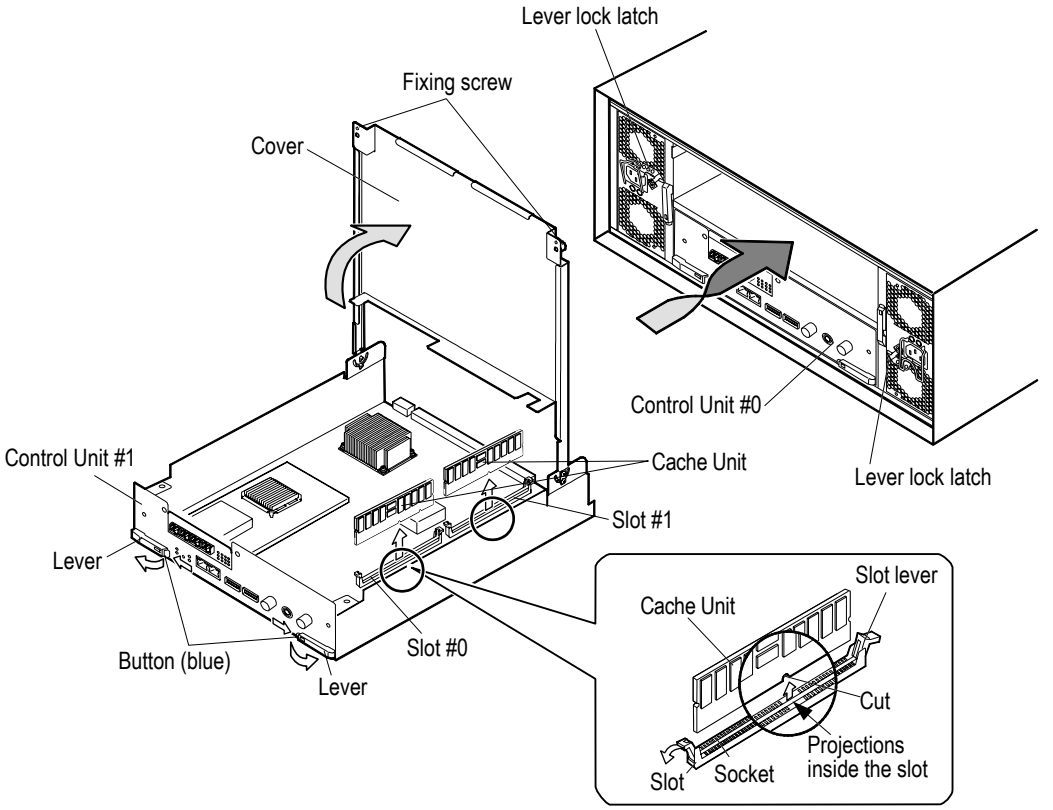
NOTE : • Do not catch an ENC cable, when the Control Unit for the inserted.
• In the case of the RKM/RKS, the installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(11) In the case of the dual control Unit composition, perform the procedure from (3) to (10) to the other Control Unit.
(12) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

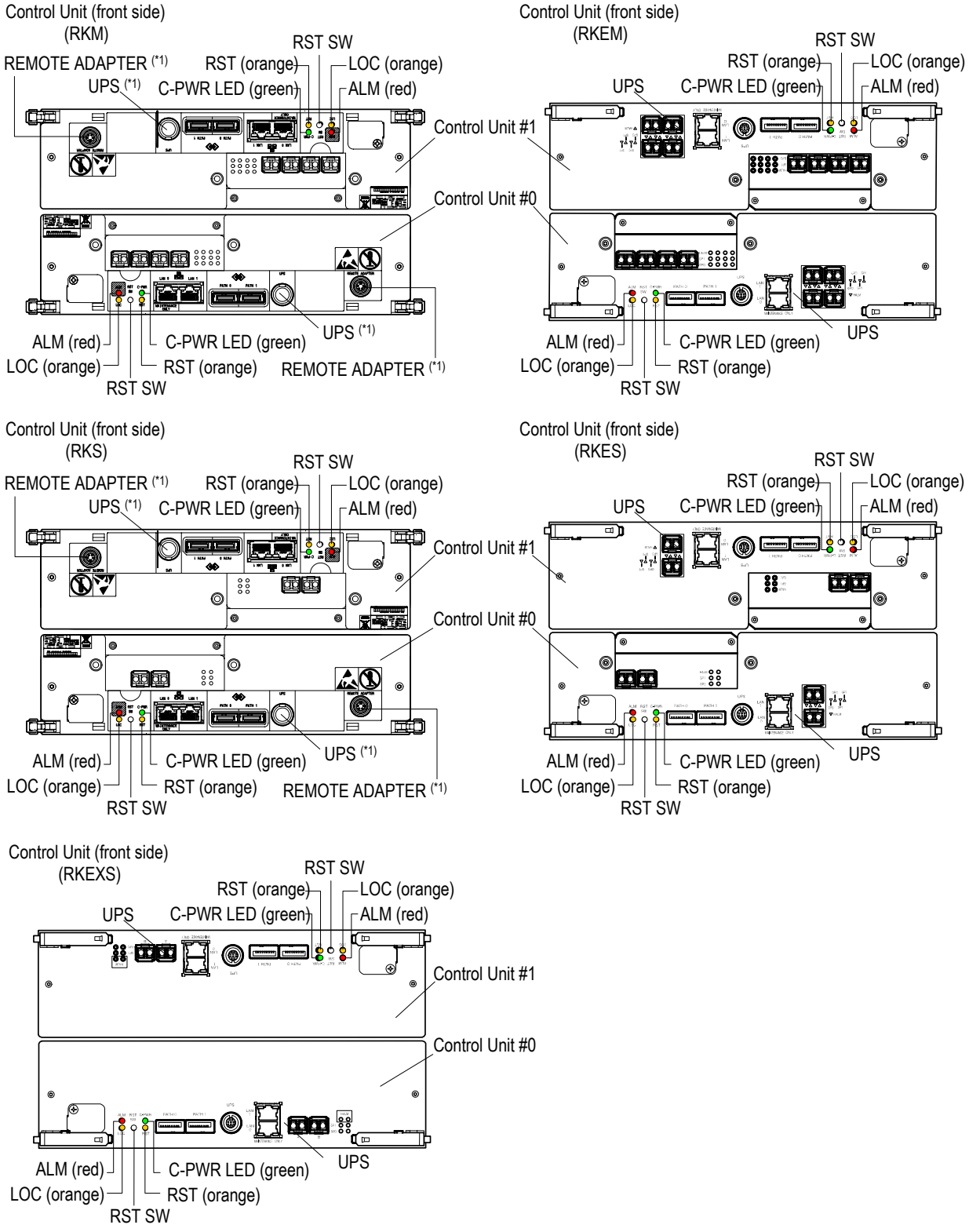
(13) Connect the power cables to two Power Units.
(14) Turn on the main switch.
(15) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(16) Check that the READY LED (green) or the WARNING LED (orange) on the front of the Basic Chassis lights up. The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
(17) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the disk drive is new, the start message and completion message of the drive firmware automatic download are not displayed.
When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code (refer to Firmware “1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)”).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the Warning status, the WARNING LED (orange) goes out.



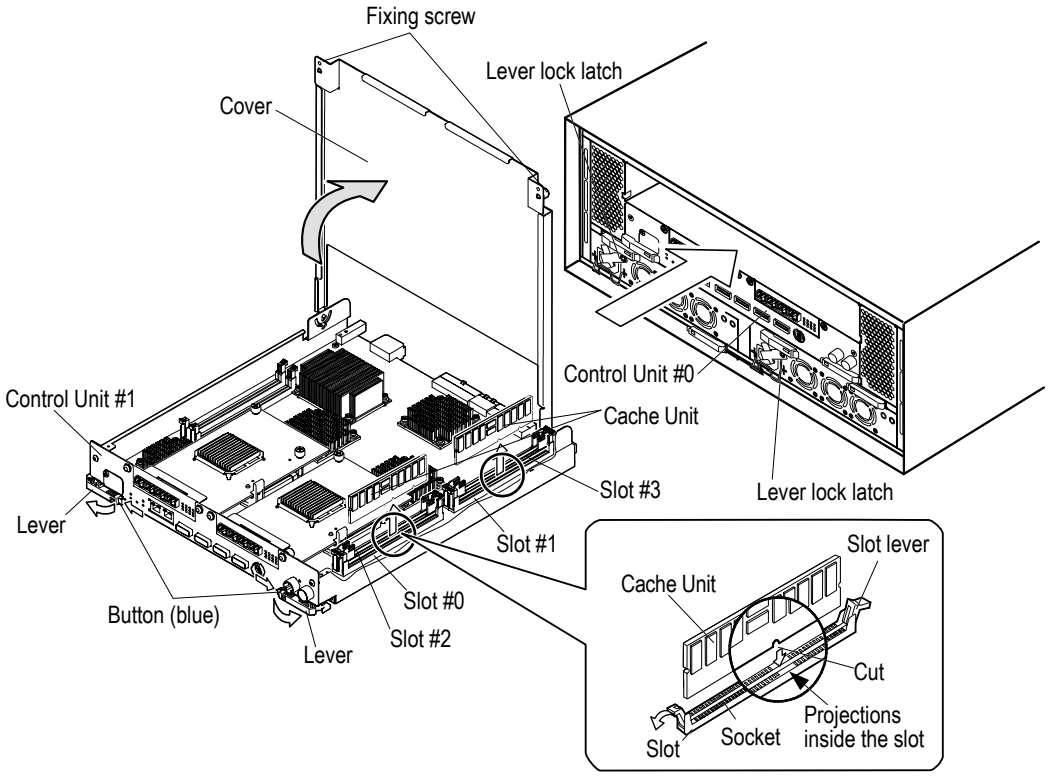
Removal :
Press open the slot lever to outside and pull out the cache memory by holding the both end by hand.
Installation :
Fit the projection and the cut and push it into the slot by holding the both end by hand.

Figure 2.4.5 Removing Cache Unit (RKM/RKS)



*1 : The position of the connector is different depending on the Control Unit.
Confirm the connector.

Figure 2.4.6 Position of the LED on the Control Unit (RKM/RKEM/RKS/RKES/RKEXS)



Removal :
Press open the slot lever to outside and pull out the cache memory by holding the both end by hand.
Installation :
Fit the projection and the cut and push it into the slot by holding the both end by hand.

Figure 2.4.7 Removing Cache Unit (RKH)

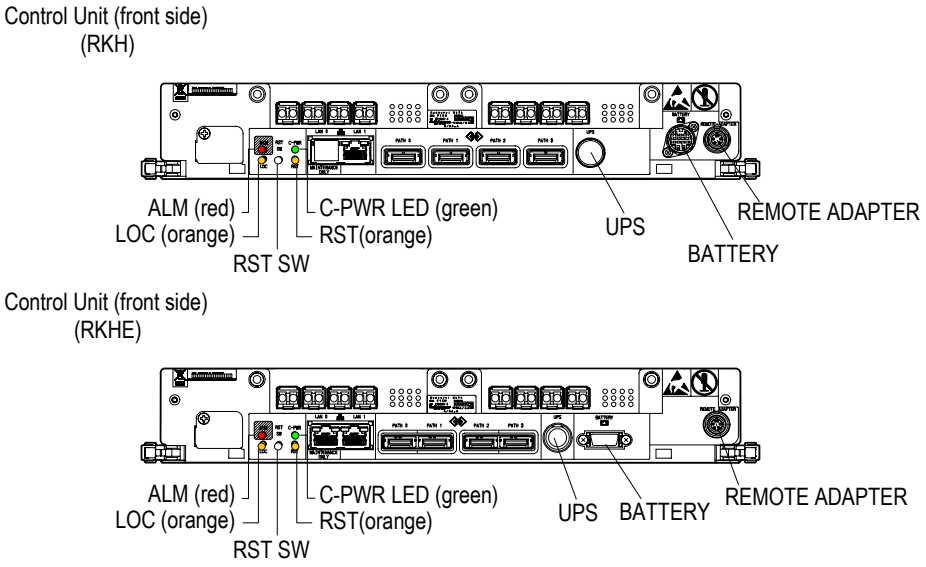


Figure 2.4.8 Position of the LED on the Control Unit (RKH/RKHE)

2.4.5 Removing a FC Interface Board

Removing a FC Interface Board is not work of the service personnel.

This work is for the RKEM/RKES/RKH.

⚠ CAUTION

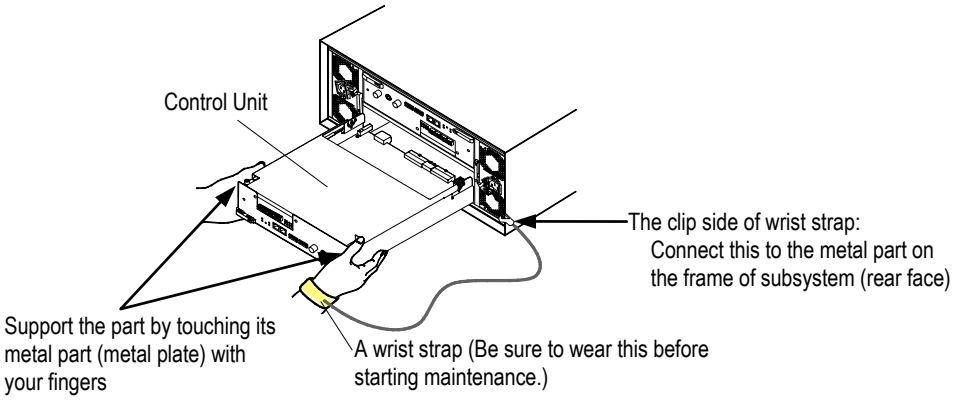
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Control Unit is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Control Unit from electrostatic discharge.

NOTE : Before unpacking and adding maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • Do the works for the Control Unit #0 and #1.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations.

<Working Procedure>

(1) Collect Simple Trace and Constitution Information. (Refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

NOTE : When the installation position of the Interface Board is changed [‡1] or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.

- Host Group Information/Target Information
- Host Group Option/Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/iSCSI port setting information
- CHAP security information (iSCSI)

(2) Turn off the main switch.
Make sure that the POWER LED (green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking Cache Memory in the Back-up State" (REP 01-0040).)
When the Cache is in the backup status, cancel the status.

In this case, check that the C-PWR LED (green) on Control Unit is extinguished.

NOTE : If the C-PWR LED (green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(3) Remove the power cables from two Power Units.

NOTE : If the replacement is executed without removing the power cables, it may not recover.

(4) Open the right and left levers toward you at the same time while pressing the right and left buttons (blue) which fix the levers of the Control Unit.
When the levers are completely opened, the Control Unit comes out forward.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

(5) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force. Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(6) Remove the Control Unit by pulling it out toward you.
(7) Loosen two cover fixing screws (blue) on the top of the cover, and open the cover to the arrow (⟶) direction.
You can fix the cover at a perpendicular position and, furthermore, you can lift the cover a little from this position and fall it to the opposite side.
(8) Loosen the fixing screws ① to ④ of the Interface Board installed in the Control Unit, operate the latch lever slowly to the arrow direction (⟶), remove the connector while lifting up the Interface Board, and remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(9) Install the dummy and fix it by tightening the fixing screws ②and ③.
At this time, install it so that the sheet metal part of the dummy Interface may become the inside of the Control Unit.
(10) Close the cover and fix it by fastening two cover fixing screws (blue) on the top of the cover.
(11) Insert it in the set position in the status where the right and left levers on the Control Unit are opened, and close the levers completely until you hear the buttons (blue), which fix the levers, click.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• For the RKEM/RKES, the installation direction of Control Unit #0 and Control Unit #1 is different. For the #0, install it with its cover side up, and for the #1, with its cover side down.

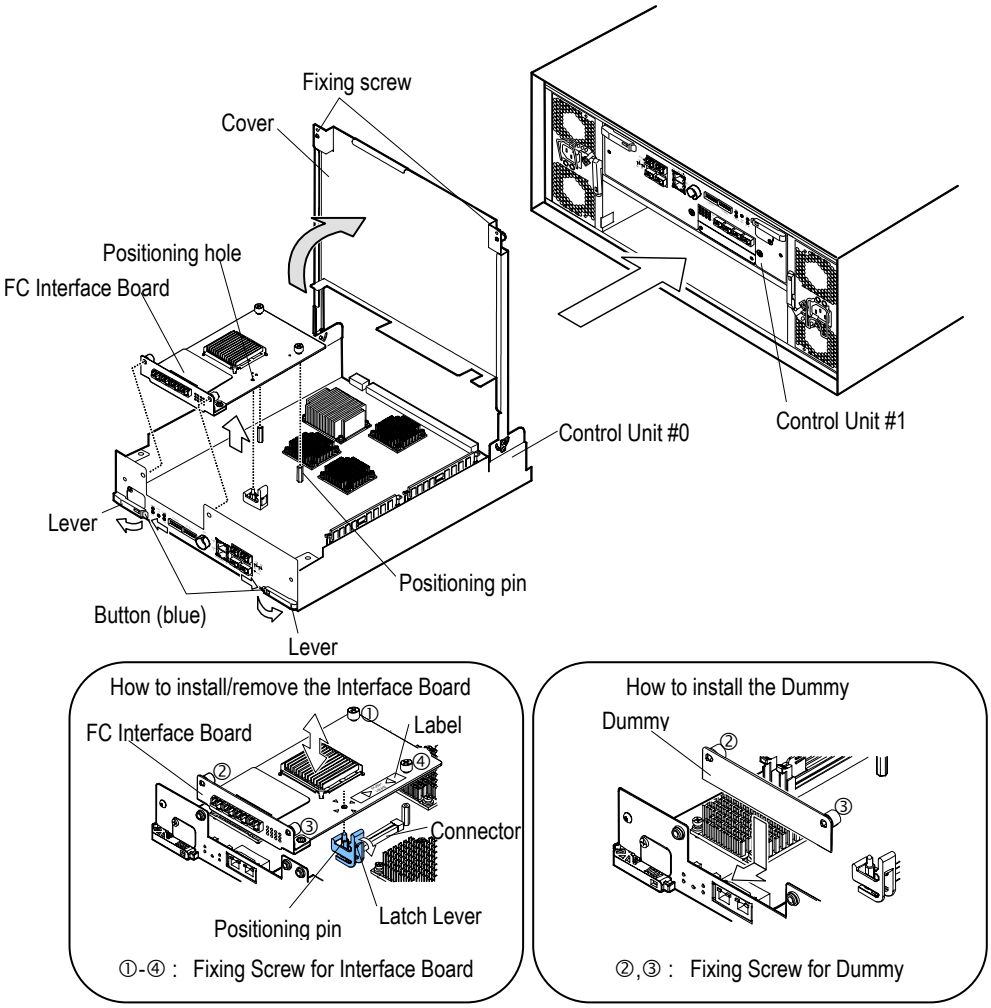
(12) Perform the procedure from (4) to (11) to the other Control Unit.

(13) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

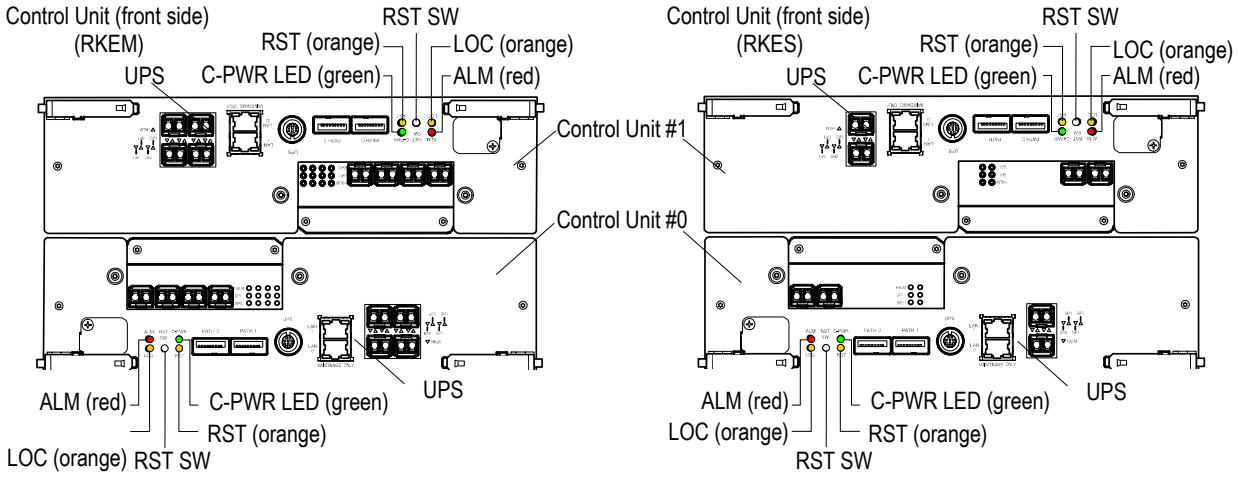
(14) Slide the Lever lock latch, and connect the power cables (two) with the Power Unit.
(15) Turn on the main switch.
(16) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(17) Check that the READY LED (green) on the front of the Basic Chassis lights up. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
(18) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the Disk Drive is new, the start message and completion message of the drive firmware automatic download are not displayed.
When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code. (Refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)".)
(19) For the removed FC Interface Board Port, configure the host group and Fibre Channel port setting. (Refer to System Parameter "Chapter 2. Setting Host Group/Targets" (SYSPR 02-0000), and Hitachi Storage Navigator Modular 2 Help "FC Settings".)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the Warning status, the WARNING LED (orange) goes out.



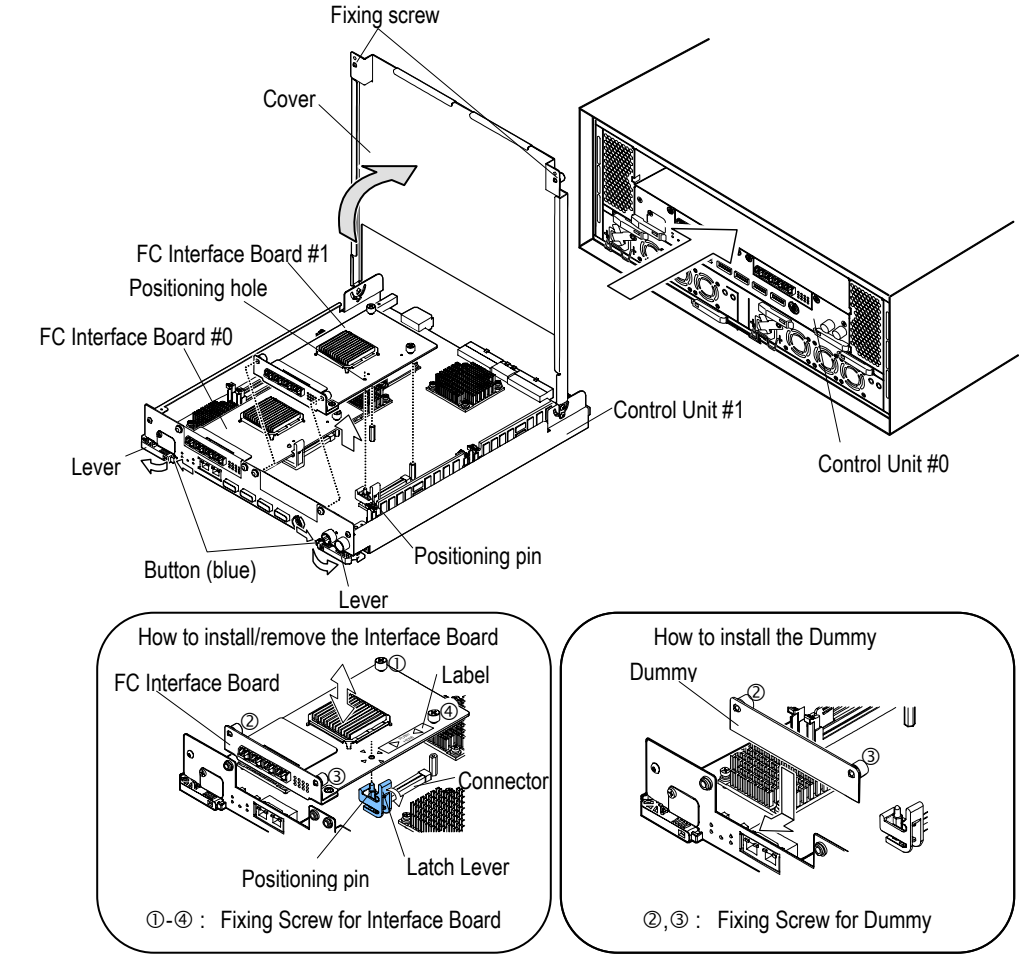
*1 : The figure shows the case where the FC Interface Board is removed from the Control Unit of the RKEM.

Figure 2.4.8.1 Removing a FC Interface Board (RKEM/RKES)



*1 : The position of the connector is different depending on the Control Unit.
Confirm the connector.

Figure 2.4.8.2 Position of the LED on the Control Unit (RKES/RKEM)



*1 : The figure shows the case where the FC Interface Board is removed in the Control Unit of the RKH.

Figure 2.4.9 Removing a FC Interface Board (RKH)

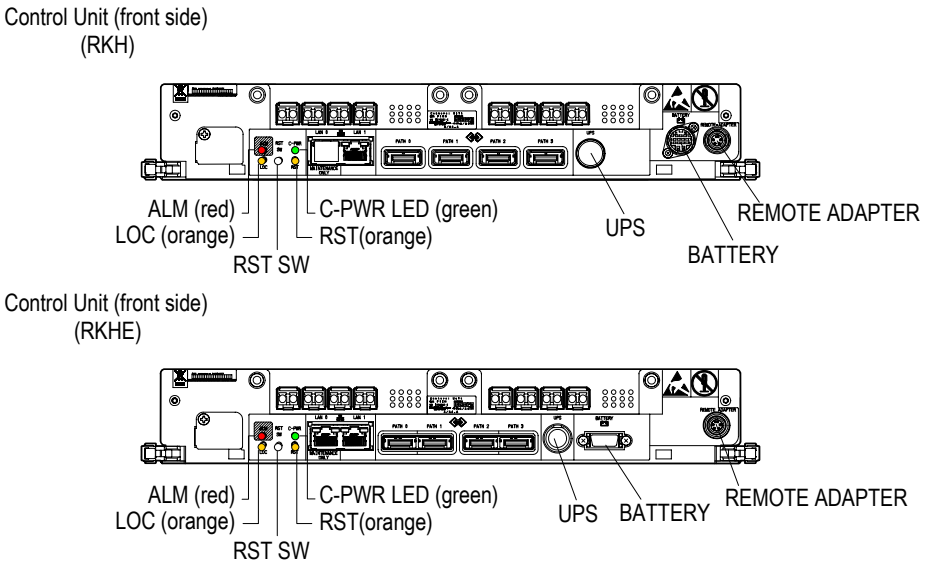


Figure 2.4.10 Position of the LED on the Control Unit (RKH/RKHE)

This page is for editorial purpose only.

2.4.6 Removing an iSCSI Interface Board

Removing an iSCSI Interface Board is not work of the service personnel.

⚠ CAUTION

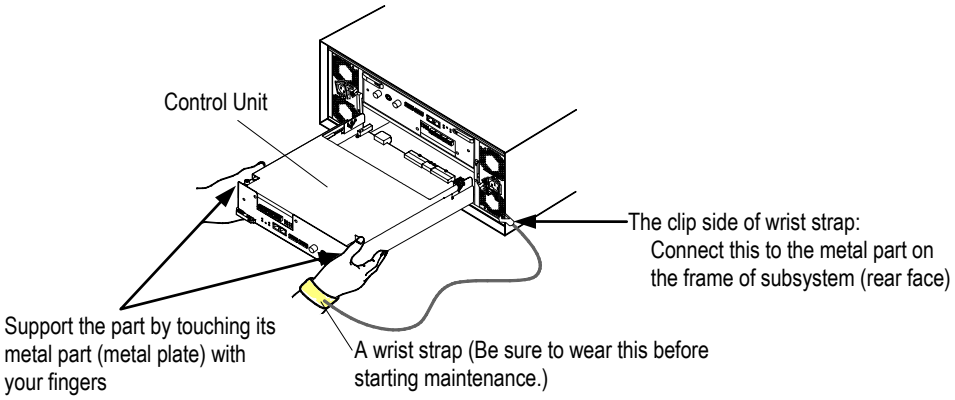
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Control Unit is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Control Unit from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.

<Working Procedure>

(1) Collect Simple Trace and Constitution Information. (Refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0280).)

NOTE : When the installation position of the Interface Board is changed (‡1) or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.

- Host Group Information/Target Information
- Host Group Option/Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/iSCSI port setting information
- CHAP security information (iSCSI)

(2) Turn off the main switch.
Make sure that the POWER LED (green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking Cache Memory in the Back-up State" (REP 01-0040).)
When the Cache is in the backup status, cancel the status.

In this case, check that the C-PWR LED (green) on Control Unit is extinguished.

NOTE : If the C-PWR LED (green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(3) Remove the power cables from two Power Units.

NOTE : If the replacement is executed without removing the power cables, it may not recover.

(4) Open the right and left levers toward you at the same time while pressing the right and left buttons (blue) which fix the levers of the Control Unit.
When the levers are completely opened, the Control Unit comes out forward.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

(5) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(6) Remove the Control Unit by pulling it out toward you.
(7) Loosen two cover fixing screws (blue) on the top of the cover, and open the cover to the arrow (⟶) direction.
You can fix the cover at a perpendicular position and, furthermore, you can lift the cover a little from this position and fall it to the opposite side.
(8) Loosen the fixing screws ① to ④ of the iSCSI Interface Board installed in the Control Unit, operate the latch lever slowly to the arrow direction (⟶), remove the connector while lifting up the iSCSI Interface Board, and remove it from the Control Unit.

NOTE : • Place the removed Interface Board in the place where anti-static measures are taken.
• Install the Interface Boards of the same type in the same position of the Control Unit #0 and #1.

(9) Install the FC Interface Board or the dummy.
In the case of the FC Interface Board, place the FC Interface Board (or the dummy Interface Board) according to the positioning pin of the Control Unit, temporarily fix the fixing screw ①.
Press the label (PUSH HERE) part, and insert it in the connector.
Fix the FC Interface Board by tightening the fixing screws ① to ④.
At this time, check whether the connector is inserted surely.
In the case of the dummy, fix the dummy by tightening fixing screws ②and ③.
Install it so that the metal part of the FC Interface Board or the dummy is inside the Control Unit.

NOTE : When installing the Interface Board, insert the connector after checking the locations of the positioning pin and the fixing screws for Interface Board because the incorrect location decision may cause the connector to be damaged.

(10) Close the cover and fix it by fastening two cover fixing screws (blue) on the top of the cover.

(11) Insert it in the set position in the status where the right and left levers on the Control Unit are opened, and close the levers completely until you hear the buttons (blue), which fix the levers, click.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

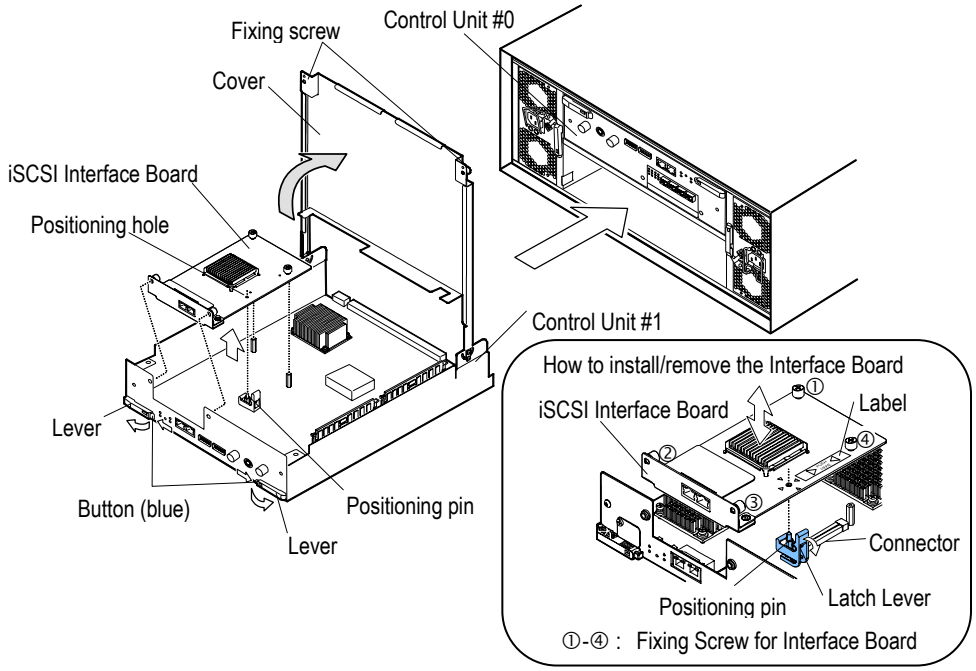
NOTE : • Do not catch an ENC cable, when the Control Unit for the inserted.
• In the case of the RKM/RKS, the installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(12) In the case of the dual control Unit composition, perform the procedure from (4) to (11) to the other Control Unit.
(13) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

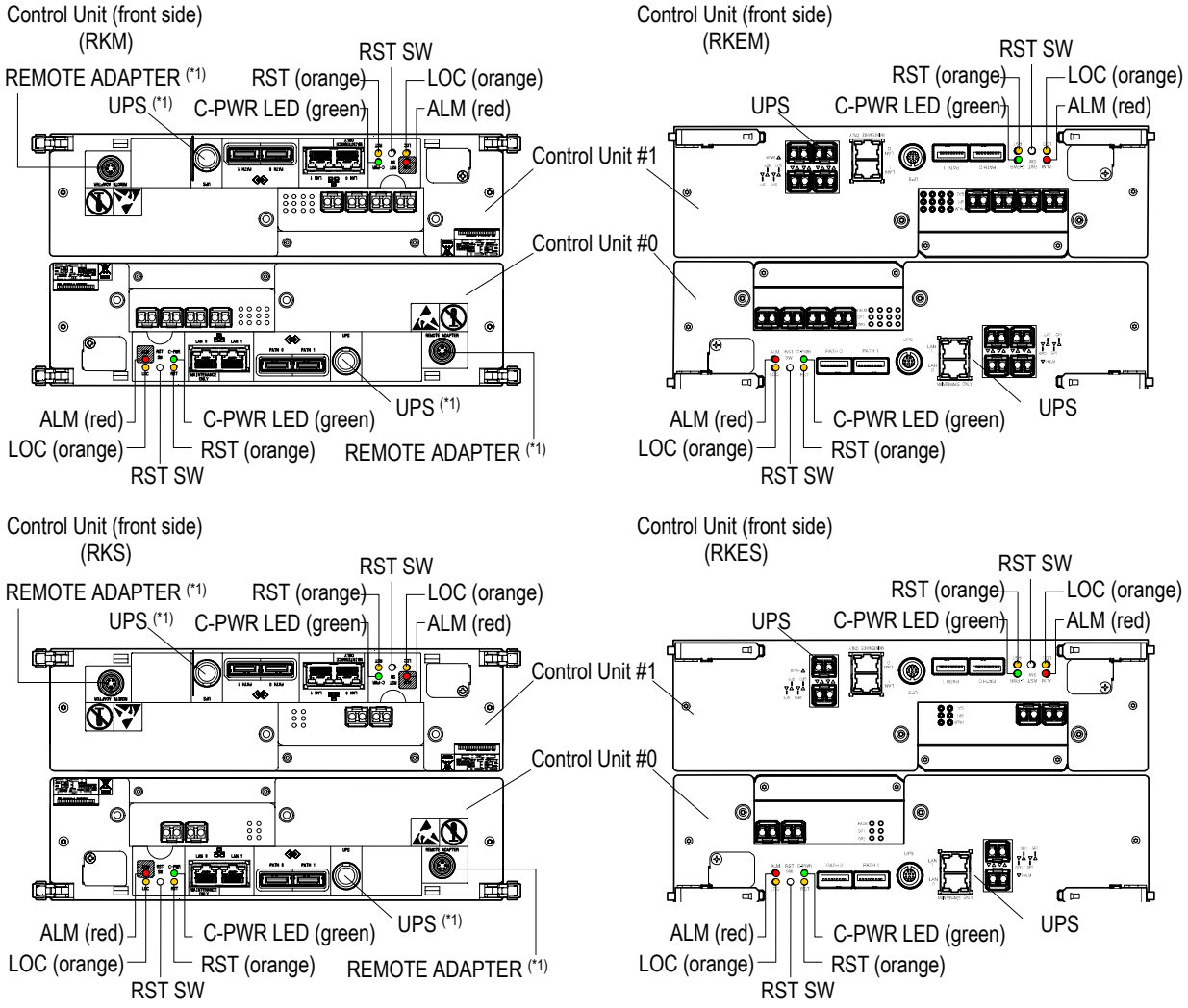
(14) Slide the Lever lock latch, and connect the power cables (two) with the Power Unit.
(15) Turn on the main switch.
(16) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(17) Check that the READY LED (green) or the WARNING LED (orange) on the front of the Basic Chassis lights up. The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
(18) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the Disk Drive is new, the start message and completion message of the drive firmware automatic download are not displayed.
When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code. (Refer to Firmware “1.6 (4) Checking the start message and end message of the automatic download (FIRM 01-0890)”.)
(19) When replacing the FC Interface Board after removing the iSCSI Interface Board, configure the host group and Fibre Channel port setting. (Refer to System Parameter “Chapter 2. Setting Host Group/Targets” (SYSPR 02-0000), and Hitachi Storage Navigator Modular 2 Help “FC Settings”.)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the Warning status, the WARNING LED (orange) goes out.



*1 : The figure shows the case where the iSCSI Interface Board is removed from the Control Unit of the RKM.

Figure 2.4.7 Removing iSCSI Interface Board (RKM/RKS)



*1 : The position of the connector is different depending on the Control Unit.
Confirm the connector.

Figure 2.4.7.1 Position of the LED on the Control Unit (RKM/RKEM/RKS/RKES)

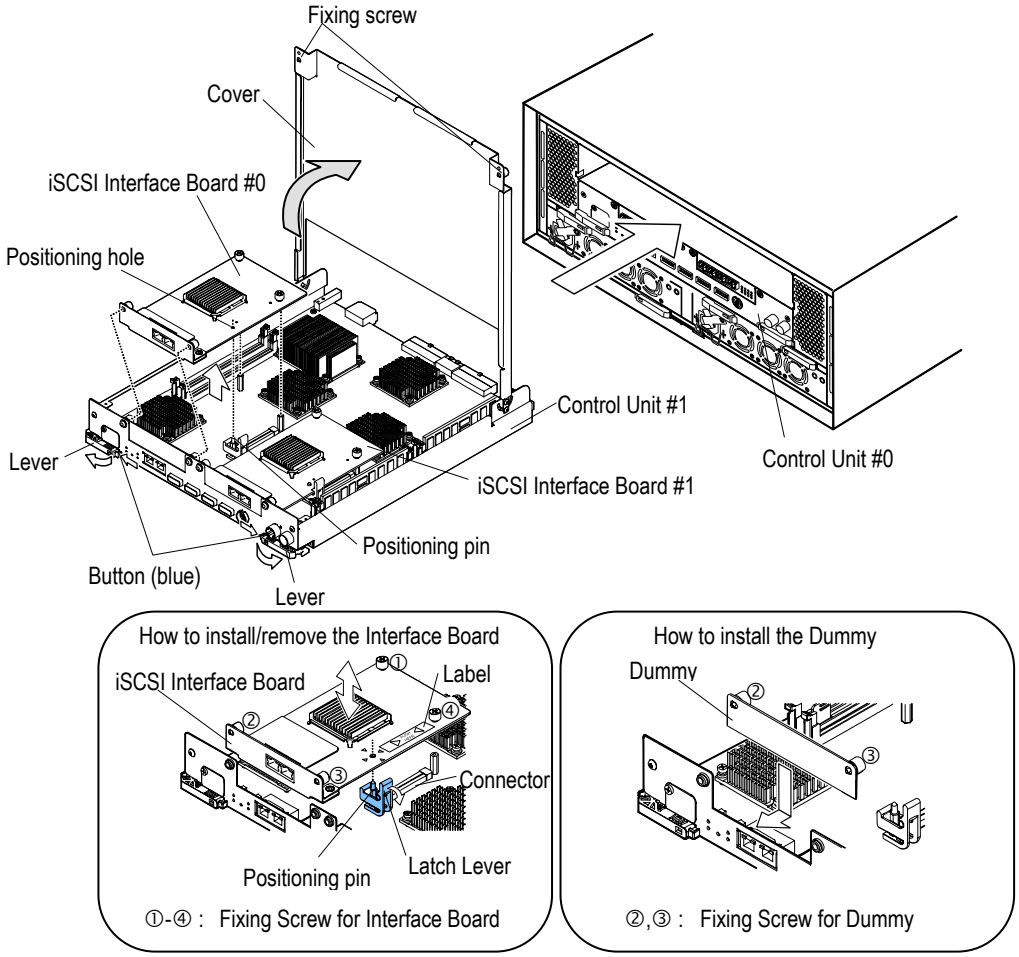


Figure 2.4.8 Removing iSCSI Interface Board (RKH)

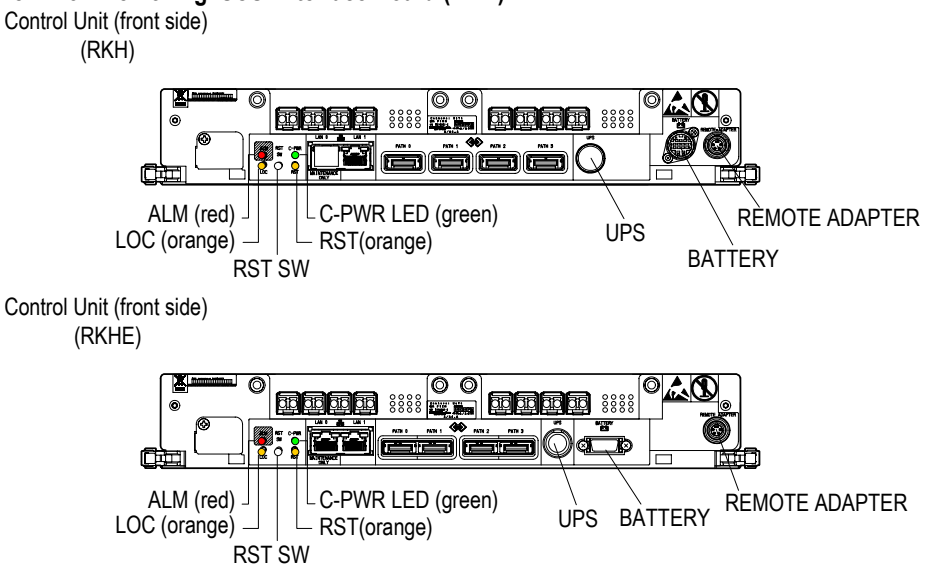


Figure 2.4.8.1 Position of the LED on the Control Unit (RKH/RKHE)

This page is for editorial purpose only.

2.4.7 Removing a Cache Backup Battery

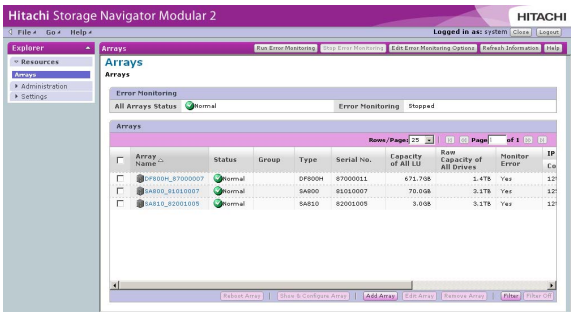
Table 2.4.1.1 Installed battery configuration of the RKHE/RKHE2

Total of installing battery	2	3	4	5	6
Number of Cache Backup Batteries	2	3	4	4	4
Additional Battery Boxes	0	0	0	1	2

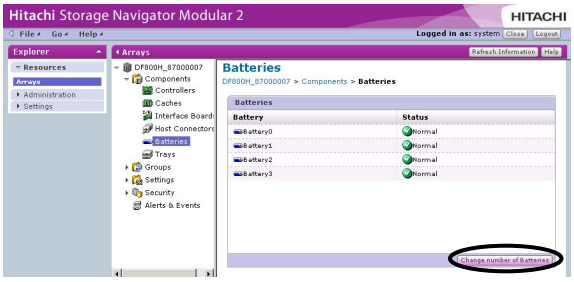
(1) When the main Power Unit is off, turn it on.

(2) Start Hitachi Storage Navigator Modular 2 and change it to the maintenance mode. (Refer to the System Parameter "1.1 (4) (b) Changing the Maintenance " (SYSPR 01-0080).)

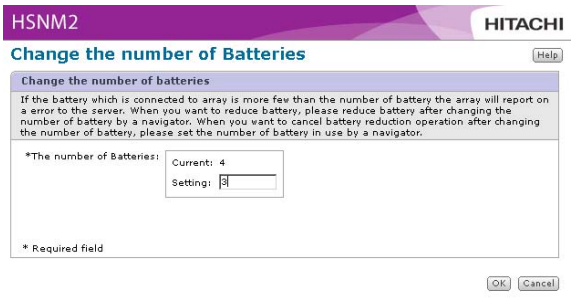
(3) Select the array subsystem that the Backup Battery Units are to be removed in the main window.



(4) Click [Components] – [Batteries] in the unit window, and click the [Change number of Batteries] button.

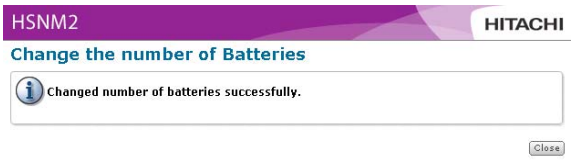


(5) Enter the number of batteries after the removal as the setting value of the number of batteries, and click the [OK] button.



NOTE : The number of batteries after the removal must be more than the number of batteries installed as default (RKH: Two units, RKM/RKS: One unit).

(6) Click the [Close] button to complete the setting.



(7) Remove the Front Bezel. (Refer to Installation "1.4.1 How to Attach/Remove Front Bezel of the Rackmount Model" (INST 01-0100).)

(8) Open the lever toward you while pressing the button (blue) which fixes the lever of the Cache Backup Battery.
When the lever is completely opened, the Cache Backup Battery comes out forward.

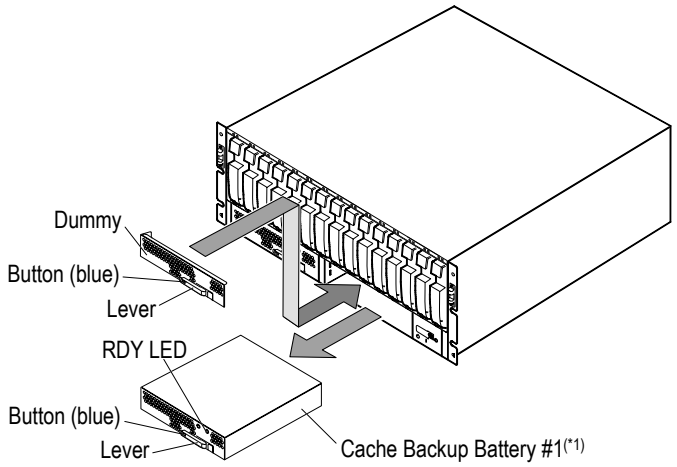
NOTE : Do not remove the Backup Battery Units installed as default (RKM/RKS: #0, RKH: #0/#1).

(9) Remove the Cache Backup Battery while holding the body of the Cache Backup Battery with both hands.

NOTE : Since the depth of a Cache Backup Battery is as short as about 200 mm and it is as heavy as about 2.0 kg, please pull out carefully.

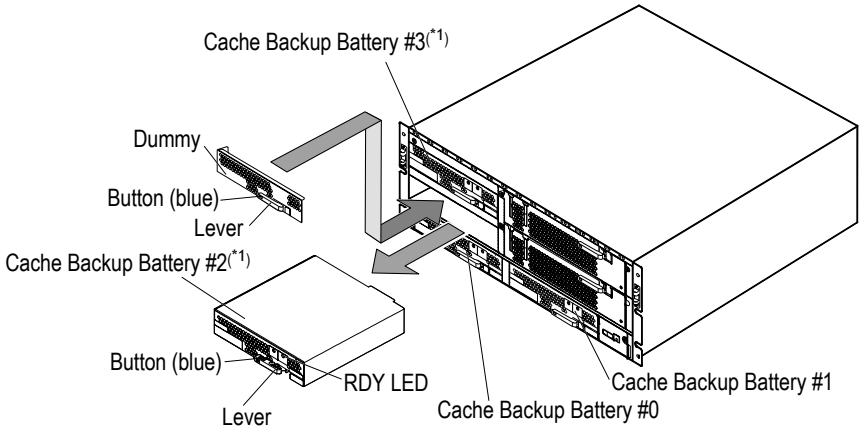
(10) Install a dummy.
Pull the lever of the dummy toward you and install it in the slot where the Backup Battery Unit is removed. Put the lever back completely until the button (blue) fixing the lever clicks.

(11) Attach the front bezel. (Refer to Installation "1.4.1 How to Attach/Remove Front Bezel of the Rackmount Model" (INST 01-0100).)



*1: You can remove the Backup Battery Unit on the right side (#1) of the subsystem for the RKM/RKS.

Figure 2.4.14.1 Removing a Cache Backup Battery (RKM/RKS)



*1: You can remove the Backup Battery Units #2 and #3 for the RKH.

Figure 2.4.14.2 Removing a Cache Backup Battery (RKH)

2.4.8 Removing an Additional Battery Box

Table 2.4.1.2 Installed battery configuration of the RKHE/RKHE2

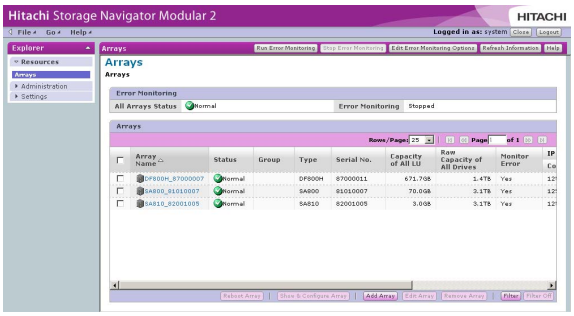
Total of installing battery	2	3	4	5	6
Number of Cache Backup Batteries	2	3	4	4	4
Additional Battery Boxes	0	0	0	1	2

(1) When removing all Additional Battery Boxes.

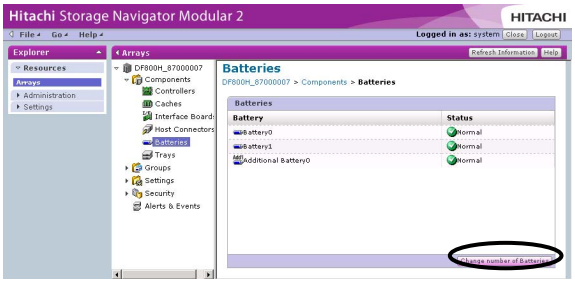
(a) When the main Power Unit is off, turn it on.

(b) Start Hitachi Storage Navigator Modular 2 and change it to the maintenance mode. (Refer to the System Parameter "1.1 (4) (b) Changing the Maintenance " (SYSPR 01-0080).)

(c) Select the array subsystem that the Backup Battery Units are to be removed in the main window.

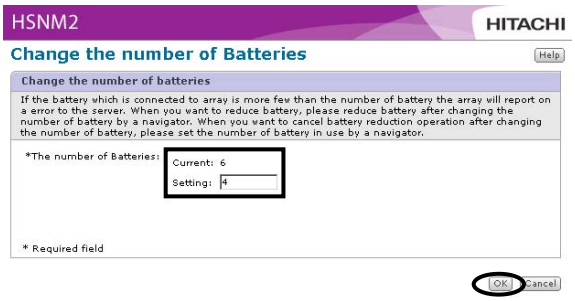


(d) Click [Components] – [Batteries] in the unit window, and click the [Change number of Batteries] button.



(e) Check the number of the removed Cache Backup Batteries installed in the RKHE/RKHE2. Enter the confirmed number of the Cache Backup Batteries in the setting value for the number of batteries in the "Change the Number of Batteries" window.

NOTE : The current value of the number of batteries is displayed including the Cache Backup Batteries installed in the RKHE/RKHE2.



(f) Click the [Close] button to complete the setting.

(g) Remove all cables connected to the Additional Battery Boxes, and then remove the Additional Battery Boxes from the rack.
Refer to "1.4.8 Adding an Additional Battery Box" (ADD 01-0580) for the cable connecting position and fixing position, and remove them in the opposite procedure.

(2) When removing one Additional Battery Box with two Additional Battery Boxes connected

(a) Remove all Additional Battery Boxes. (Refer to "2.4.8 (1) When removing all Additional Battery Boxes." (ADD 02-0484).)

(b) Add one Additional Battery Box. (Refer to "1.4.8 (1) When adding Additional Battery Boxes with no Additional Battery Box (0 unit) connected" (ADD 01-0580).)

This page is for editorial purpose only.

2.5 Removing Other Optional Devices

2.5.1 Other Optional Removal Devices

Component name	Model name	Specification	Requirements of removal	Condition of removal and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
PDB (A-F6516-PDU6)	A-F6516-PDU6	For A-6516-RK40	Additional PDB for RK40 rack frame	Possible Refer to "2.5.2 Removing a PDB (A-F6516-PDU6)" (ADD 02-0500)	Possible Refer to "2.5.2 Removing a PDB (A-F6516-PDU6)" (ADD 02-0500)

*1 : Data is exchanged between a host computer and the subsystem.

2.5.2 Removing a PDB (A-F6516-PDU6)

(1) Removing Process for the PDB (A-F6516-PDU6)

Select a procedure from the following and execute it.

No.	Model	Power status during the removal	Restriction	Removal Process section
1	Rackmount model	Removal with the power turned on	• This is the dedicated rack for the U4/RK40 rack frame. • Only the PDB whose all the outlets for output to which the power cable plugs are not connected can be removed.	Refer to "2.5.2 (2) Procedure for removal" (ADD 02-0500)
2		Removal with the power turned off		

(2) Procedure for removal

(a) Make sure that the power cable plugs are not connected to all the outlets for output on the PDB to be removed.

(b) Disconnect the power cable, which is connected to the PDB to be de-installed to supply power to it, by pulling its power feeder plug for safety.

(c) Remove the PDB to be removed from the rack frame.

Remove the PDB in the opposite procedure of the installing operation referring to "1.5.2 Mounting a PDB (A-F6516-PDU6)" (ADD 01-0630).

Keep the removed components as the occasion demands.

This page is for editorial purpose only.

Chapter 3. Relocation/Removal Work

3.1 Before Starting Relocation/Removal Work

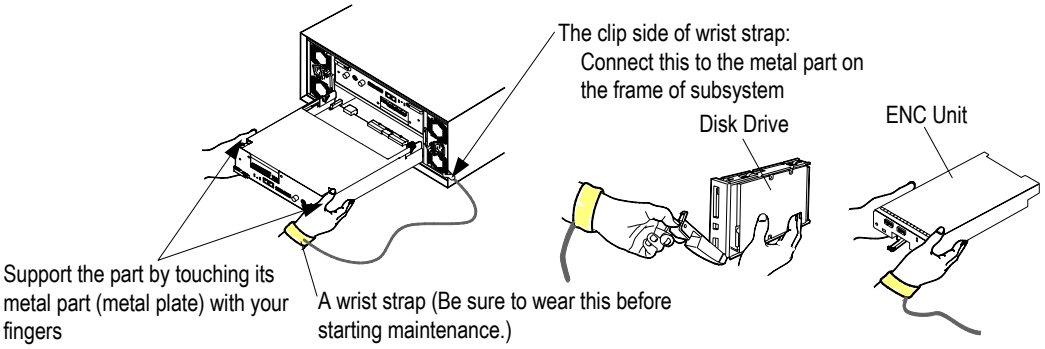
Take notice of the following when performing an installation work for the subsystem.
When moving or removing a subsystem, take care of the following matters.

(1) Note on installing and removing parts
Generally, each part is equipped with high-precision components. Remove and install the part gently so as not to give it any shock.

CAUTION

- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.**
- **When you install are Disk Drive, Control Unit and ENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

A failure may be caused by the electric shock since the Disk Drive, Control Unit or ENC Unit is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Disk Drive, Control Unit or ENC Unit from electrostatic discharge.



(2) Note on cable routing

(a) Handling of cables on the floor

- Protect cables which cannot be accommodated by the subsystem and thus laid on the floor or cables which cross a passage with cable protecting, etc.
- Do not make inter-device cables apart from the floor but lay them on the floor.

(b) Handling of under-floor cables when the subsystem is installed on the free access floor.

- Give excess lengths to cables routed under the floor so that they can easily be laid on the slab. Do not make them to be hung dangling.

(c) How to route cables

- Give adequate margin of length to cables to withstand earthquakes, etc.
- Route cables giving them excess lengths lest they should disturb replacement of part to be done for maintenance.
- Make power cable and power cable apart each other. When they have to be positioned close each other, do not make them run in parallel but make them cross each other.
- When using cable protecting duct, be careful not to damage or break cables by catching them.

(d) Be sure to insert or pull out a cable connector holding it with your hand. If you pull a cable, a trouble may be caused.

(e) When bending the FC I/F cable and RC (ENC) cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

(3) Note on restarting

When restarting the subsystem, turn on the main switch after waiting more than one minute after the main switch is turned off (after the POWER LED goes out).

(4) Note on completing a maintenance work

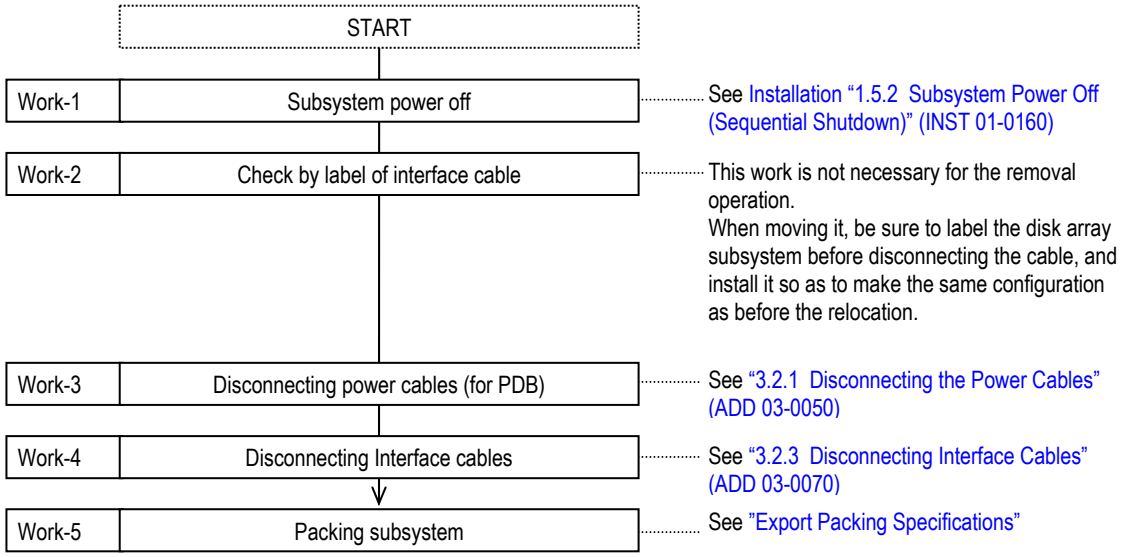
Close all the external covers when a maintenance work is completed.
It is required to make all the external covers closed to operate the subsystem properly.
(Be sure to close all the external covers during operation because it is indispensable to maintain the performance of the subsystem including prevention of adverse effects caused by radio frequency energy.)

3.2 Procedures for Relocating or Removing Rackmount Model

(1) When moving the subsystem together with a rack frame

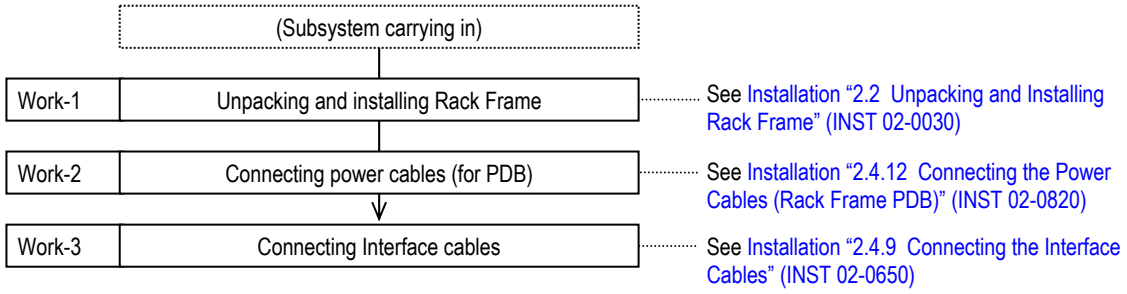
(a) Procedure for removal from where the subsystem is currently installed

Before performing the removal from where the subsystem is currently installed, make sure of work items to be done shown below.



(b) Procedure for installation at a place from where the subsystem is moved

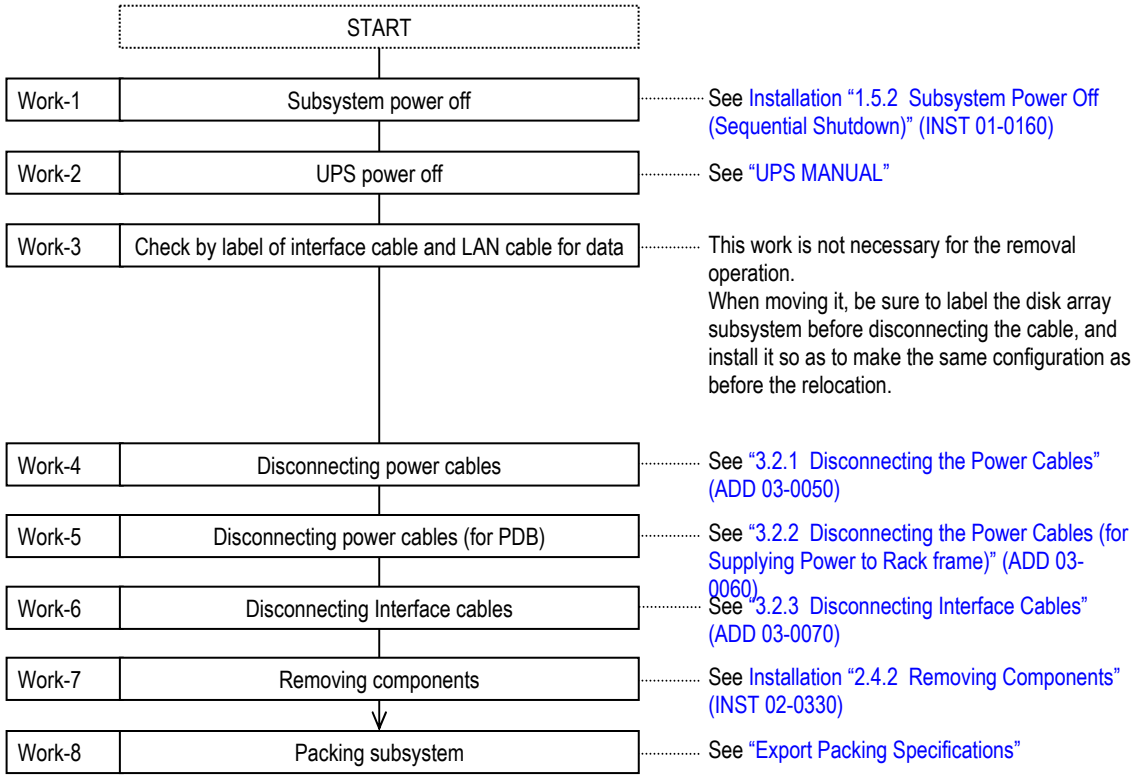
Before performing installation at a place where the subsystem is moved to, make sure of work items to be done shown below.



(2) When moving the subsystem together with removing of parts

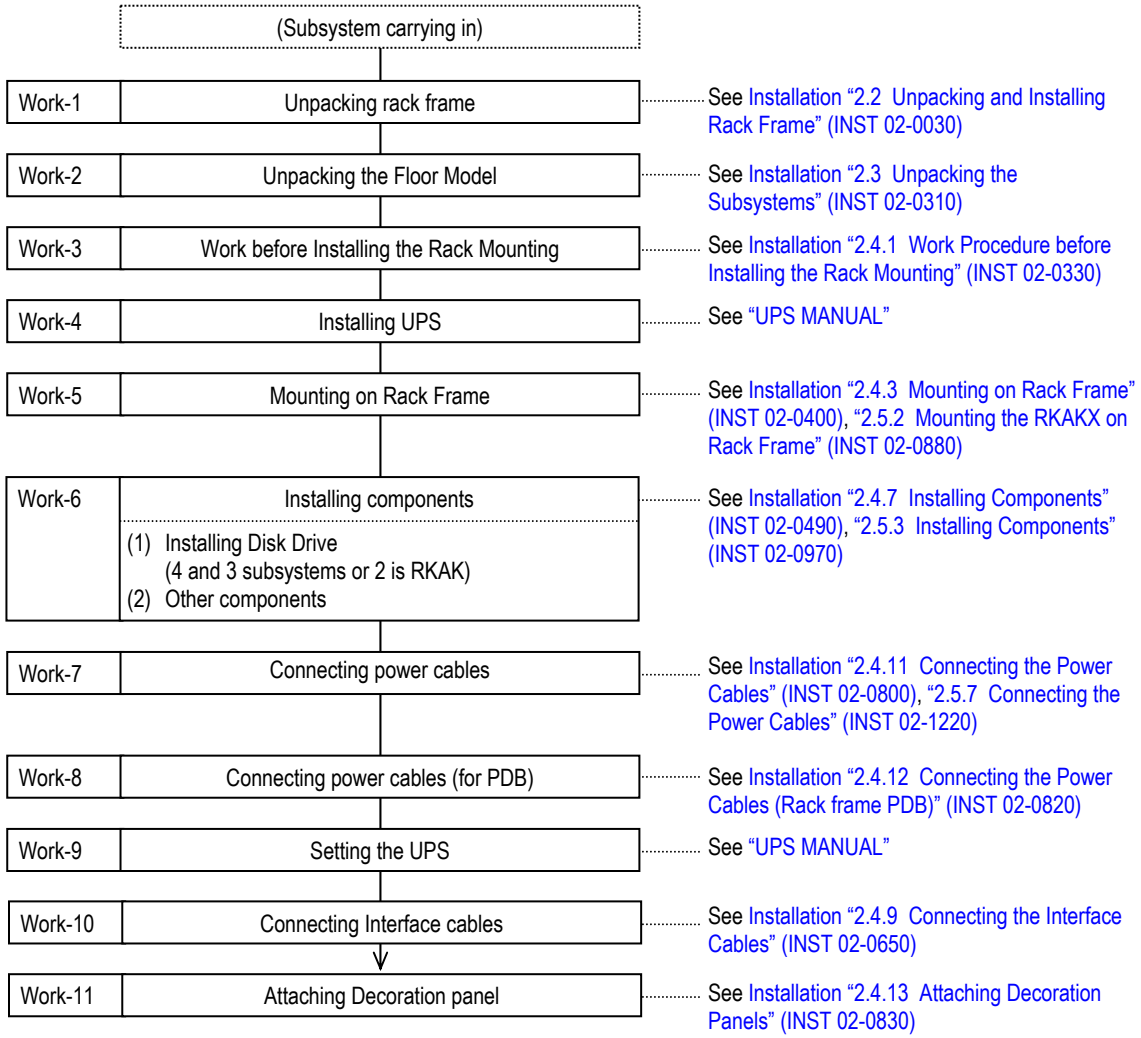
(a) Procedure for removal from where the subsystem is currently installed

Before performing the removal from where the subsystem is currently installed, make sure of work items to be done shown below.



(b) Procedure for installation at a place from where the subsystem is moved

Before performing installation at a place where the subsystem is moved to, make sure of work items to be done shown below.



3.2.1 Disconnecting the Power Cables

(1) Disconnecting the power cable of Power Unit

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Disconnect the power cable connected to the PDB.
(b) Remove the power cable fixed with the Repeat Binder.
(c) Disconnect the power cable connected to the Power Unit.

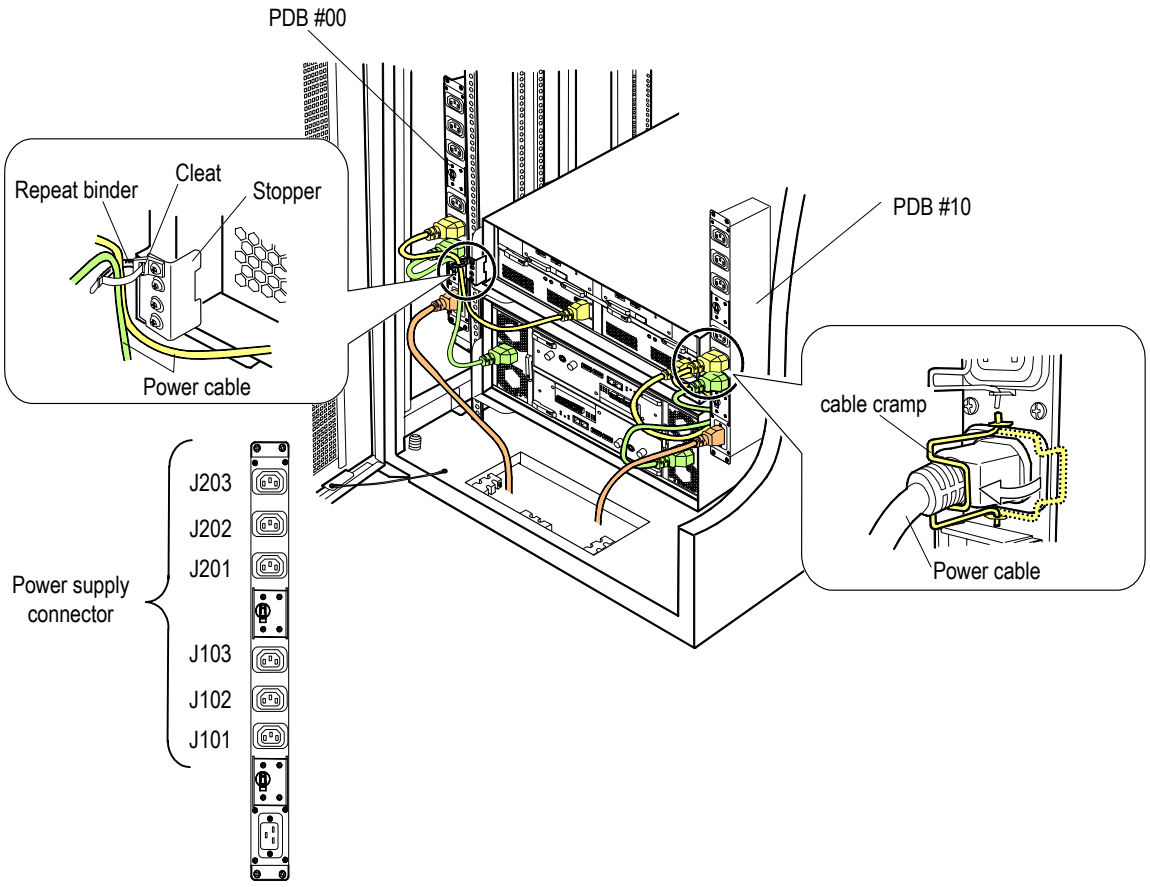


Figure 3.2.1 Disconnecting Power Cables

3.2.2 Disconnecting the Power Cables (for Supplying Power to Rack Frame)

(1) Open the rear door. (Refer to Installation "1.4.2 How to Open/Close the Rear Door of RK40 Rack Frame" (INST 01-0120).)
(2) Remove the cable holders from the rack frame by removing the hexagon socket head. (three places)
(3) Disconnecting the power cable to the consent.
(4) Disconnecting the power cable to the Power input connector.
(5) Return all the removed cable holders as they were before.
(6) Close the rear door.

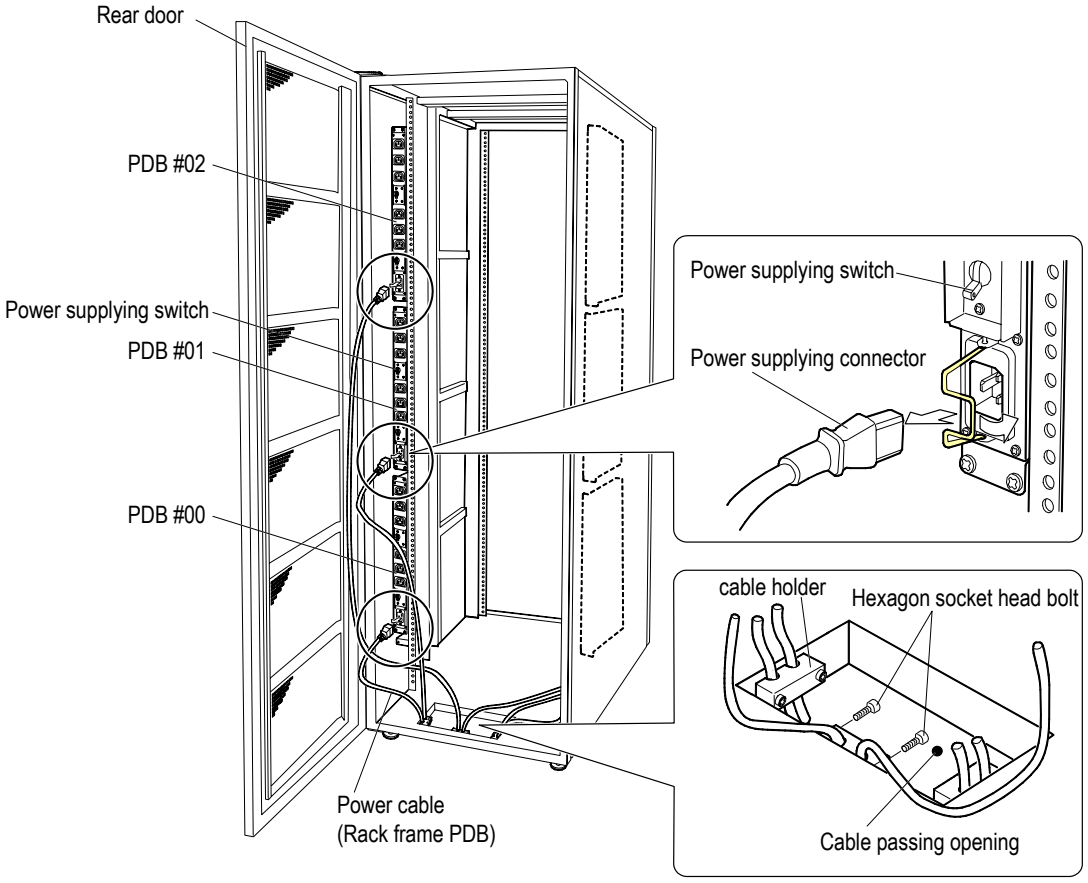


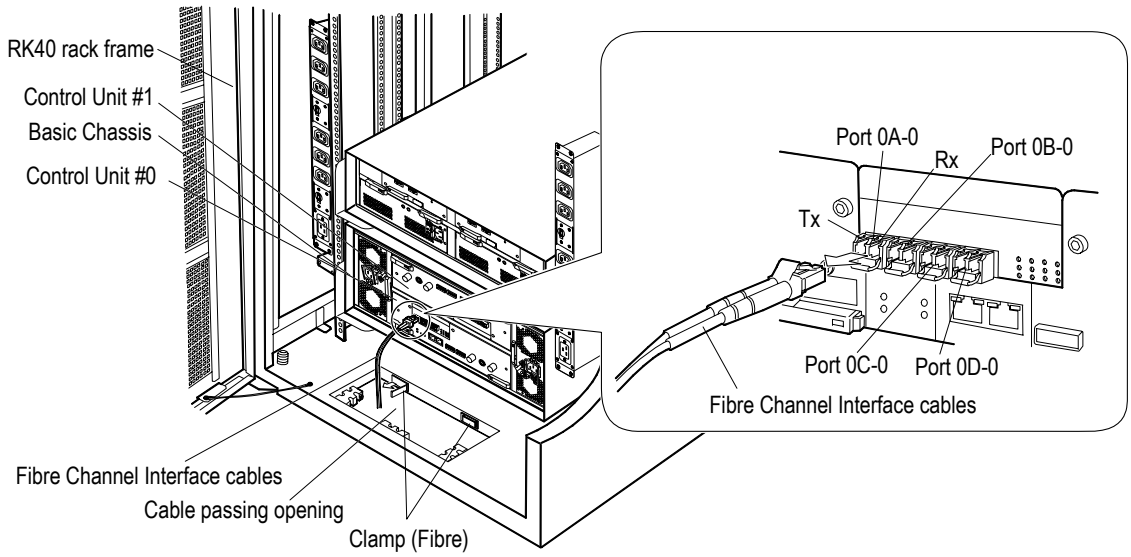
Figure 3.2.2 Disconnecting Power Cables

3.2.3 Disconnecting Interface Cables

(1) Disconnecting the Fibre Channel Interface cable

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Disconnecting the Fibre Channel Interface cable to the clamp
(b) Disconnect the Fibre Channel Interface cable connected to the Control Unit.



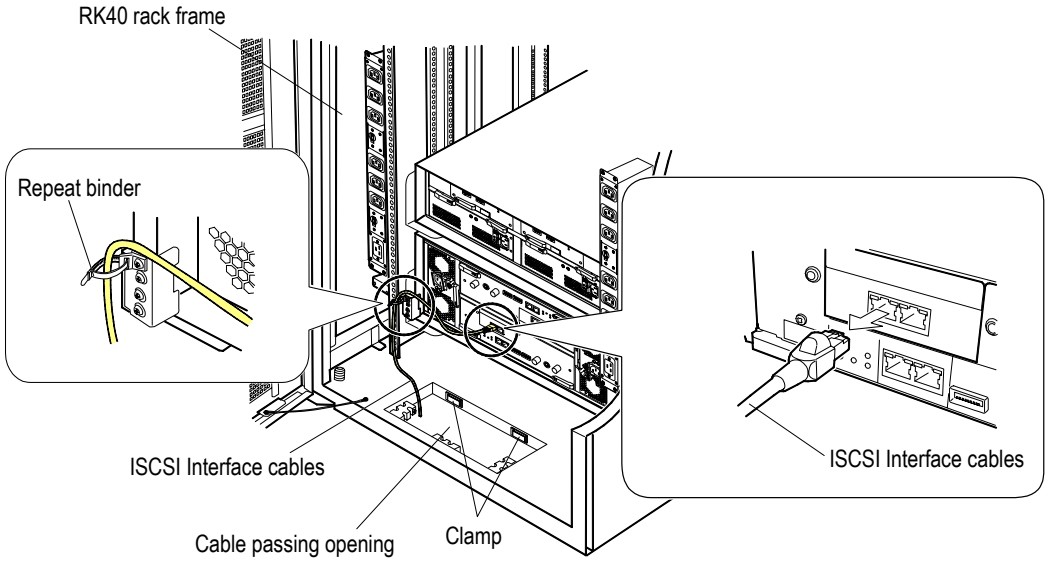
*1 : The figure shows the RKM.

Figure 3.2.3 Disconnecting Interface Cable (Basic Chassis)

(2) Disconnecting the iSCSI Interface cable

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Disconnecting the iSCSI Interface cable to the clamp
(b) Disconnect the iSCSI Interface cable connected to the Control Unit.



*1 : The figure shows the RKM.

Figure 3.2.4 Disconnecting Interface Cable (RKM/RKS/RKH)