Addition/Removal/Relocation

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

Contents

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 array 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 array 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 array power on or off.
- An addition with the array power on :
  A status in which the array power is turned on irrespective of whether the system (host computer) is turned on or off.
- An addition with the array power off :
  A status in which the array power is turned off 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 array 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 array is operable via a LAN. If not, obtain customer's permission to operate the array 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 array power on, the operation replacing dummy (Drive) with 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 Controller Box is blinking at high speed. When it is high-speed blinking, the ENC firmware and the backup controller firmware is being downloaded. Perform the addition work after checking that the READY LED (green) on the front of the Controller Box lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of CBL (80 to 180 minutes when the DBW is connected to the CBL)).

(7) When the WARNING LED (orange) on the front of the Controller Box 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 and the backup controller 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 Controller Box goes out and the READY LED (green) lights up in the maximum of 30 to 85 minutes.

(8) If the array 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.

(9) Do not add the optional parts while the array is being started.
When the array is being started, add the optional parts after the array 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 01-1670).
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) Before the adding work, be sure to collect the simple trace (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040).) because the configuration information before the addition is required if the array is returned to the original state during the adding work.

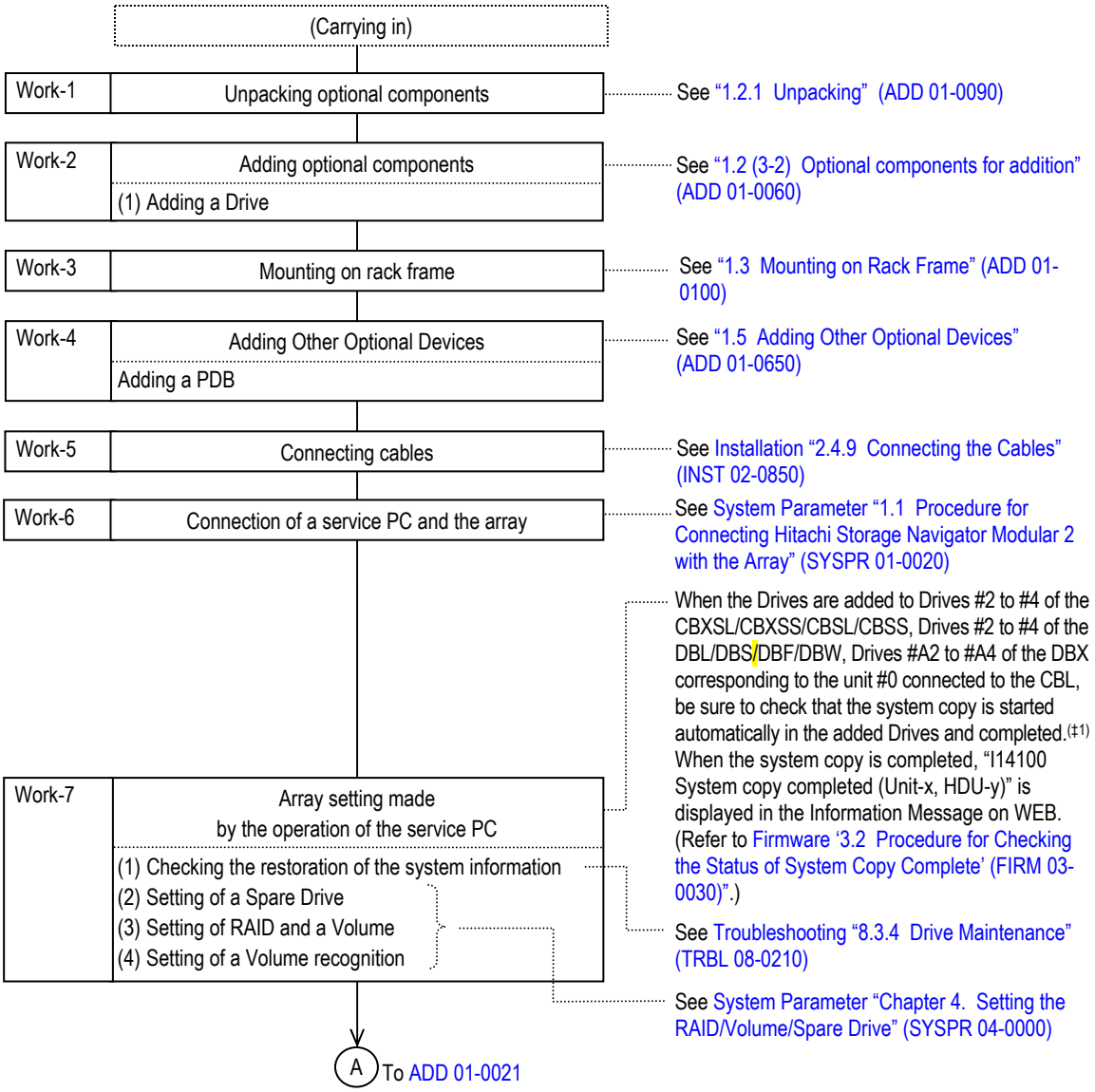
(13) Connect only the regular parts defined in the maintenance manual for the maintenance parts.

(14) In case of one DBW, 80 dB at the temperature of 32°C, the maximum level is 85 dB.
Do not work behind DBW for a long time.

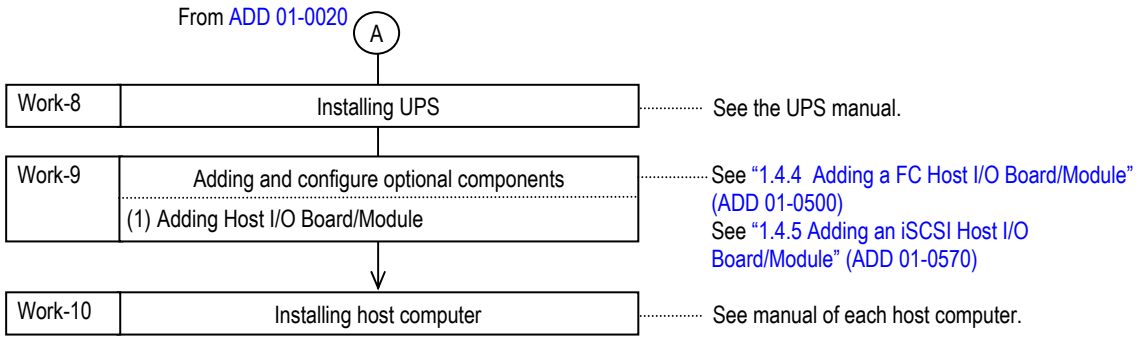
1.2 Procedures for Adding Optional Components

(1) Procedure for adding an optional component while the array 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.

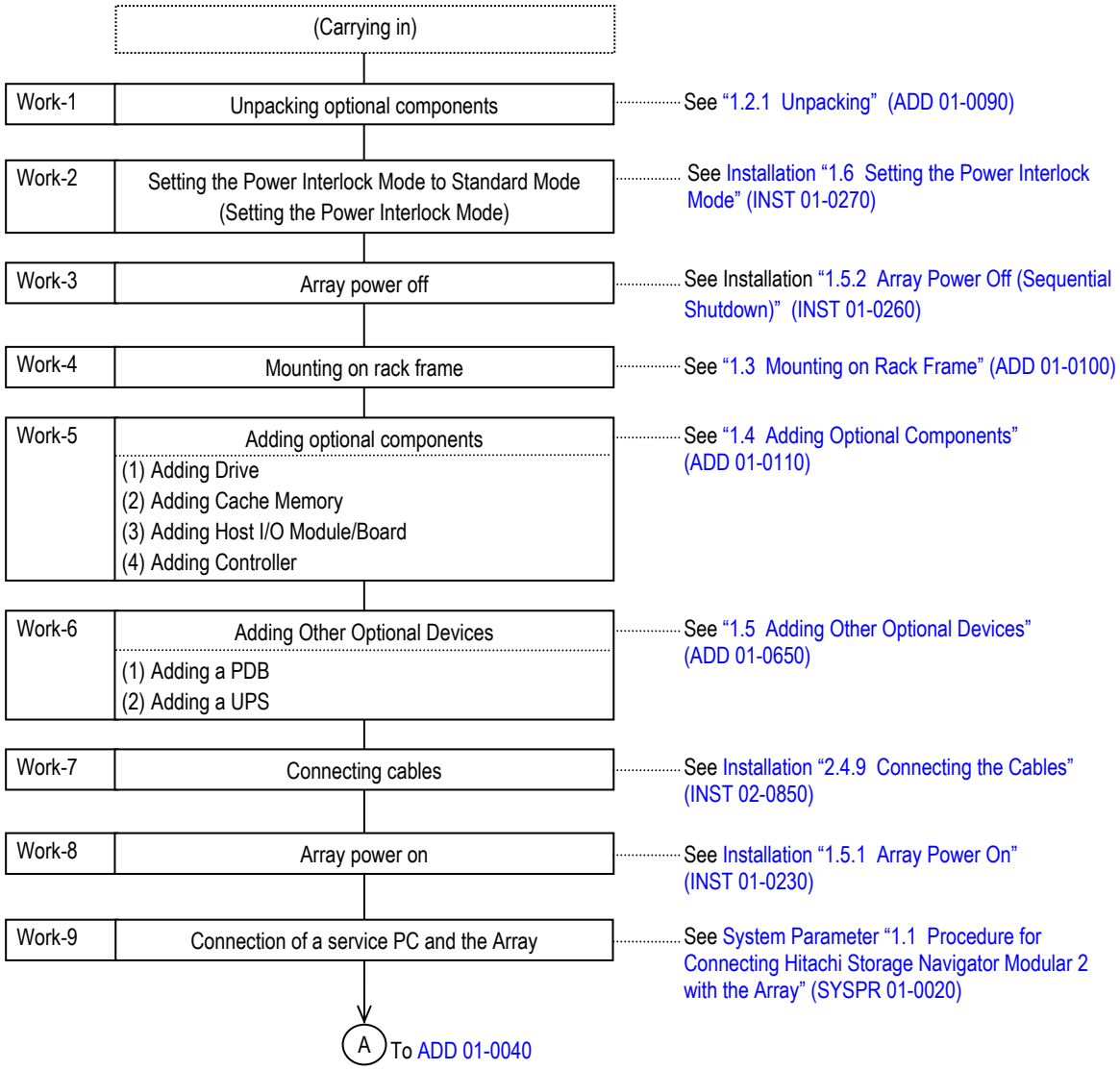


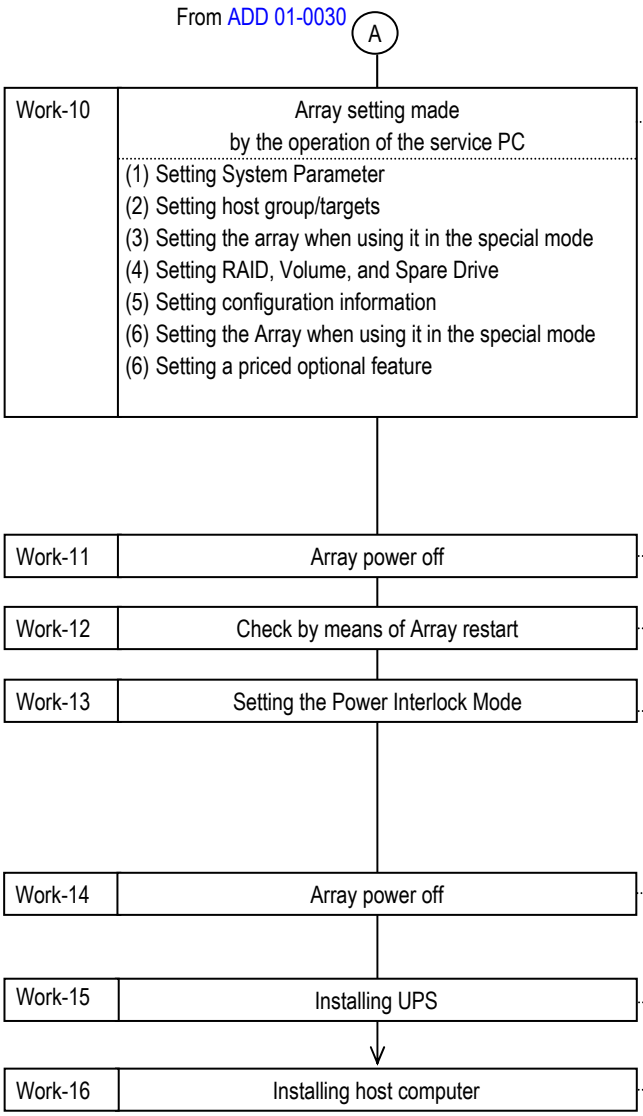
‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Drive.
Select the [Settings] – [Drive Recovery] – [Drive Recovery] on the unit window of Hitachi Storage Navigator Modular 2, and click the [Edit Recovery Options] button at the upper right of the window. If [Drive Restoration] 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 "1.4.2 (5) Restoring the system information" (ADD 01-0420).



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

NOTE : • For safety use, always close the front bezel after the operation.
• For the powering off procedure, refer to Installation "1.5.2 Array Power Off (Sequential Shutdown)" (INST 01-0260).
• 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) : See System Parameter "Chapter 8. Setting of the Basic Parameters of the System" (SYSPR 08-0000)

(2), (3) : See System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000)

(4) : See System Parameter "Chapter 4. Setting the RAID/Volume/Spare Drive" (SYSPR 04-0000)

(5) : See System Parameter "Chapter 12. Setting Verification" (SYSPR 12-0000) from System Parameter "Chapter 6. Setting Date and Time" (SYSPR 06-0000)"

(6) : System Parameter "Chapter 14. Setting Licenses (SYSPR 14-0000)

See Installation "1.5.2 Array Power Off (Sequential Shutdown)" (INST 01-0260)

See Installation "1.5.1 Array Power On" (INST 01-0230)

See Installation "1.6 Setting the Power Interlock Mode" (INST 01-0270)

- When you do not want to change the setting of the Power Interlock, return the setting of the Power Interlock Mode, which was changed in Work-2, to the original one.

See Installation "1.5.2 Array Power Off (Sequential Shutdown)" (INST 01-0260)

See the UPS manual.

See manual of each host computer.

(3) Component to be added and condition of addition

(3-1) Drive Box

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 array power turned off)
Drive Box	DF-F850-DBL	A set of an array and basic accessories to be mounted on a rack frame	• Prepare the following components at least for the array to be added. Two Drives • Up to 9 DBLs can be connected to the one CBXSL. • Up to 8 DBLs can be connected to the one CBXSS. • Up to 19 DBLs can be added to the one CBSL. • Up to 19(17)(*2) DBLs can be added to the one CBSS. • Up to 40 DBLs can be connected to the one CBL.	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)
	DF-F850-DBF	A set of an array and basic accessories to be mounted on a rack frame	• Prepare the following components at least for the array to be added. Two Drives • Up to 40 DBFs can be connected to the one CBL.	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)
	DF-F850-DBS	A set of an array and basic accessories to be mounted on a rack frame	• Prepare the following components at least for the array to be added. Two Drives • Up to 4 DBSs can be connected to the one CBXSL. • Up to 4 DBSs can be connected to the one CBXSS. • Up to 14(9)(*2) DBSs can be added to the one CBSL. • Up to 14(9)(*2) DBSs can be added to the one CBSS. • Up to 40 DBSs can be connected to the one CBL.	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)
	DF-F850-DBX	A set of an array and basic accessories to be mounted on a rack frame	• Prepare the following components at least for the array to be added. Two Drives • Up to 7(5)(*2) DBXs can be added to the one CBSL. • Up to 7(5)(*2) DBXs can be added to the one CBSS. • Up to 20 DBXs can be connected to the one CBL.	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)

*1 : Data is exchanged between a host computer and the array.
*2 : Firmware versions are the 0937/A or more number of the maximum connection. The firmware version of ( ) is the maximum connection number of less than 0937/A.

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 array power turned off)
Drive Box	DF-F850-DBW	A set of an array and basic accessories to be mounted on a rack frame	• Prepare the following components at least for the array to be added. 14 Drives • Up to 4 DBWs can be added to the one CBSL. • Up to 4 DBWs can be added to the one CBSS. • Up to 12(*1) (*2) DBWs can be added to the one CBL.	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)	Possible "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)

*1 : When the firmware version is 0920/A or more and less than 0930/A: 4 DBWs.

*2 : When using the Tray Power Saving function, the maximum number of trays to be mounted is four.

(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 array power turned off)
Controller	DF-F850-CTLXS/ DF-F850-CTLXSR(*3)	Array Controller for duplication (For CBXS/CBXSS)	• Make the configuration the same as the installed Controller (#0 side).	Impossible	Possible "1.4.6 Adding a Controller" (ADD 01-0640)
Drive(*2) (Including Spare Drive)	DF-F850-3HGSS	2.5-inch Drive (287.62 G bytes) (Drive rotational speed : 10,000 min^{-1})	• Select from the Drives shown on the left according to the intended total capacity of the array. • The Spare Drives can be set up. CBXSL/CBXSS : 15 CBSL/CBSS : 30 CBL : 80	Varies depending on the disk array to be added. "1.4.2 Adding a Drive" (ADD 01-0120)	Varies depending on) the disk array to be added. "1.4.2 Adding a Drive" (ADD 01-0120)
	DF-F850-3HGSSH	2.5-inch Drive (287.62 G bytes) (Drive rotational speed : 15,000 min^{-1})			
	DF-F850-6HGSS	2.5-inch Drive (575.30 G bytes) (Drive rotational speed : 10,000 min^{-1})			
	DF-F850-9HGSS	2.5-inch Drive (879.98 G bytes) (Drive rotational speed : 10,000 min^{-1})			
	DF-F850-12HGSS	2.5-inch Drive (1,173.71 G bytes) (Drive rotational speed : 10,000 min^{-1})			
	DF-F850-2TNL	3.5-inch Drive (1,956.94 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-2TNX (DBX)	3.5-inch Drive (1,956.94.00 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-3TNL	3.5-inch Drive (2,935.96 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-3TNX (DBX)	3.5-inch Drive (2,935.96 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-3TNW (DBW)	3.5-inch Drive (2,935.96 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-4TNL	3.5-inch Drive (3,915.01 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-4TNX (DBX)	3.5-inch Drive (3,915.01 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-4TNW (DBW)	3.5-inch Drive (3,915.01 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-3HGSLH	3.5-inch Drive (287.62 G bytes) (Drive rotational speed : 15,000 min^{-1})			
	DF-F850-9HGSL	3.5-inch Drive (879.98 G bytes) (Drive rotational speed : 10,000 min^{-1})			

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

*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.

*3 : RoHS2 compliant parts.

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 array power turned off)
Drive(*2) (Including Spare Drive)	DF-F850-2HGDM	2.5-inch Flash Drive (195.82 G bytes)	• Select from the Drives shown on the left according to the intended total capacity of the array. • The Spare Drives can be set up. CBXSL/CBXSS : 15 CBSL/CBSS : 30 CBL : 80	Varies depending on the disk array to be added. "1.4.2 Adding a Drive" (ADD 01-0120)	Varies depending on) the disk array to be added. "1.4.2 Adding a Drive" (ADD 01-0120)
	DF-F850-4HGDM	2.5-inch Flash Drive (392.73 G bytes)			
	DF-F850-8HGDM	2.5-inch Flash Drive (786.59 G bytes)			
	DF-F850-2HGDML	3.5-inch Flash Drive (195.82 G bytes)			
	DF-F850-4HGDML	3.5-inch Flash Drive (392.73 G bytes)			
	DF-F850-8HGDML	3.5-inch Flash Drive (786.59 G bytes)			
	DKC-F710I-1R6FM	Flash Drive (FMD) (1758.1 G bytes)			
Cache Memory	DF-F850-8GB	Cache memory (8,192 M bytes)	• For the dual Controller, install the Cache Memory of the same capacity in the Controller #0 and #1.	Impossible	Possible "1.4.3 Adding a Cache Memory" (ADD 01-0460)
	DF-F850-CMM8	Cache memory (8,192 M bytes)			
FC Host I/O Board/Module	DF-F850-HBF84/ DF-F850-HBF84R(*3)	8G bps FC Host I/O Board (including host connectors (4))	• Install the Host I/O Board/Module after removing the dummy (Module/Board) from the Controller. • The Host I/O Module/Board type must be corresponding to its slot type.	Possible "1.4.4 Adding a FC Host I/O Board/Module" (ADD 01-0500)	Possible "1.4.4 Adding a FC Host I/O Board/Module" (ADD 01-0500)
	DF-F850-HF8G/ DF-F850-HF8GR(*3) (CBL)	8G bps FC Host I/O Module (including host connectors (4))			
iSCSI Host I/O Board/ Module	DF-F850-HBS12	1G bps iSCSI Host I/O Board	• Install the Host I/O Board/Module after removing the dummy (Module/Board) from the Controller. • The Host I/O Module/Board type must be corresponding to its slot type.	Possible "1.4.5 Adding an iSCSI Host I/O Board/Module" (ADD 01-0570)	Possible "1.4.5 Adding an iSCSI Host I/O Board/Module" (ADD 01-0570)
	DF-F850-HBS102	10G bps iSCSI Host I/O Board (including host connectors (2))			
	DF-F850-HS10G (CBL)	10G bps iSCSI Host I/O Module (including host connectors (2))			

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

*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.

*3 : RoHS2 compliant parts.

(3-3) Addition/Removal of Drive/Array

No.	Unit of addition	Component to be added	Addition for storage capacity expansion Addition of the array(s) or the Drive(s) in order to expand a storage capacity		Replacement for storage capacity expansion Replacement with the Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1))	Power offline (with the array power turned off)	Power online (A host is in operation(*1))	Power offline (with the array power turned off)
1	Array	DBL/DBS/DBX/DBF	Possible(*2) (The final DBL/DBS/DBX/DBF only)	Possible(*2) (The final DBL/DBS/DBX/DBF only)	–(*3)	–(*3)
			Refer to "1.6 Adding the Drive Box" (ADD 01-0690)	Refer to "1.6 Adding the Drive Box" (ADD 01-0690)	–	–
		DBW	Impossible	Possible(*2) (The final DBW only)	–(*3)	–(*3)
			–	Refer to "1.6 Adding the Drive Box" (ADD 01-0690)	–	–
2	Drive	Drive #0 to 4 in the CBXSL/CBXSS/CBSL/CBSS	Possible(*4)	Impossible	Possible(*4)	Impossible
		Drive #0 to 4 (#A0 to #A4 for DBX) in the DBL/DBS/DBW/DBX /DBF corresponding to the unit #0 connected to the CBL	Refer to "1.4.2 (2-1) Procedure for adding Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0200)	–	Refer to "1.4.2 (3-1) Procedure for replacing Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0250)	–
3		Drive #5 or more in the CBXSL/CBXSS/CBSL/CBSS	Possible	Possible	Possible	Possible
		Drive #5 or more (#A5 or more for DBX) in the DBL/DBS/DBW/DBX /DBF corresponding to the unit #0 connected to the CBL	Refer to "1.4.2 (2-1) Procedure for adding Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0200)	Refer to "1.4.2 (2-2) Procedure for adding the Drives offline (with the array power turned off)" (ADD 01-0220)	Refer to "1.4.2 (3-1) Procedure for replacing Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0250)	Refer to "1.4.2 (3-2) Procedure for replacing the Drive (in order to expand a storage capacity) while the array power is offline (with the array power turned off)" (ADD 01-0280)

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

*2 : The Drive Box 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 Drive(s) installed in the disk array.

*4 : In the additional Drives of #0 to #4 in the CBXSS/CBSS or the first DBS to be connected to the CBL, a mix of the SAS Drives and Flash Drives cannot be installed.
When adding or replacing the additional Drives of #0 to #4 (#A0 to #A4 for DBX) in the CBXSL/CBXSS/CBSL/CBSS or the first DBL/DBS/DBW/DBF to be connected to the CBL, be sure to perform the addition work with the array power turned on, and check that the system copy is started automatically in the added Drives and completed.
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 Drive.
Select the [Settings] - [Drive Recovery] - [Drive Recovery] on the unit window of Hitachi Storage Navigator Modular 2, and click the [Edit Recovery Options] button at the upper right of the window. If [Drive Restoration] 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 "1.4.2 (5) Restoring the system information" (ADD 01-0420).

(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 array 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 01-0660)	Possible "1.5.2 Mounting a PDB (A-F6516-PDU6)" (ADD 01-0660)

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

(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.2	○
	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)	–	○

*1 : More than 15 G bytes of free space on the hard disk

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.
Further, if the part that remains at high or low temperature in transport is installed in the array, it may not operate normally.

(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 array.

1.3 Mounting on Rack Frame

In the case of adding Drives to the array, the Drive Box must be added when vacant slots for the Drives to be added are insufficient in the existing array.

When the Drive Boxes are added, there are the offline (with the array power turned off) addition and the online addition.
Perform the addition referring to "1.6.1 Procedure for Adding Drive Box to Rack Frame" (ADD 01-0700).

1.4 Adding Optional Components

1.4.1 Optional Components for Addition

(1) Optional components for addition
Refer to "1.1 (3-2) Optional components for addition" (ADD 01-0060).

1.4.2 Adding a Drive

A procedure for adding/subtracting the Drive varies depending on a location of the Drive and a condition (whether the array 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 Drive Addition and Removal

No.	Unit of addition/ removal	Component to be added/ removed	Addition for storage capacity expansion Addition of the disk array(s) or the Drive(s) in order to expand a storage capacity		Replacement for storage capacity expansion Replacement with the Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1).)	Power offline (with the array power turned off)	Power online (A host is in operation(*1).)	Power offline (with the array power turned off)
1	Drive	Drive #0 to 4 in the CBXSL/CBXSS/ CBSL/CBSS Drive #0 to 4 (#A0 to #A4 for DBX) in the DBL/DBS/DBW/ DBX/DBF corresponding to the unit #0 connected to the CBL	Possible(*2) Refer to "1.4.2 (2-1) Procedure for adding Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0200)	Impossible –	Possible(*2) Refer to "1.4.2 (3-1) Procedure for replacing Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0250)	Impossible –
2		Drive #5 or more in the CBXSL/ CBXSS/CBSL/ CBSS Drive #5 or more (#A5 or more for DBX) in the DBL/DBS/DBW/ DBX/DBF corresponding to the unit #0 connected to the CBL	Possible Refer to "1.4.2 (2-1) Procedure for adding Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0200)	Possible Refer to "1.4.2 (2-2) Procedure for adding the Drives offline (with the array power turned off)" (ADD 01-0220)	Possible Refer to "1.4.2 (3-1) Procedure for replacing Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0250)	Possible Refer to "1.4.2 (3-2) Procedure for replacing the Drive (in order to expand a storage capacity) while the array power is offline (with the array power turned off)" (ADD 01-0280)

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

*2 : In the additional Drives of #0 to #4 in the CBXSS/CBSS or the first DBS to be connected to the CBL, a mix of the SAS Drives and Flash Drives cannot be installed.
When adding or replacing the additional Drives of #0 to #4 (#A0 to #A4 for DBX) in the CBXSL/CBXSS/CBSL/CBSS or the first DBL/DBS/DBW/DBF to be connected to the CBL, be sure to perform the addition work with the array power turned on, and check that the system copy is started automatically in the added Drives and completed.
The system copy is completed in approximately 1 minute 30 seconds for each Drive.
Select the [Settings] - [Drive Recovery] - [Drive Recovery] on the unit window of Hitachi Storage Navigator Modular 2, and click the [Edit Recovery Options] button at the upper right of the window. If [Drive Restoration] 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 "1.4.2 (5) Restoring the system information" (ADD 01-0420).
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 Drive(s) in order to expand a storage capacity		Replacement with the Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1).)	Power offline (with the array power turned off)	Power online (A host is in operation(*1).)	Power offline (with the array power turned off)
3	Drive	DBL/DBS/DBW/ DBX/DBF corresponding to the unit #1 or more	Possible	Possible	Possible	Possible
			Refer to "1.4.2 (2-1) Procedure for adding Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0200)	Refer to "1.4.2 (2-2) Procedure for adding the Drives offline (with the array power turned off)" (ADD 01-0220)	Refer to "1.4.2 (3-1) Procedure for replacing Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0250)	Refer to "1.4.2 (3-2) Procedure for replacing the Drive (in order to expand a storage capacity) while the array power is offline (with the array power turned off)" (ADD 01-0280)

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

(1) Before starting addition of Drive

⚠ CAUTION

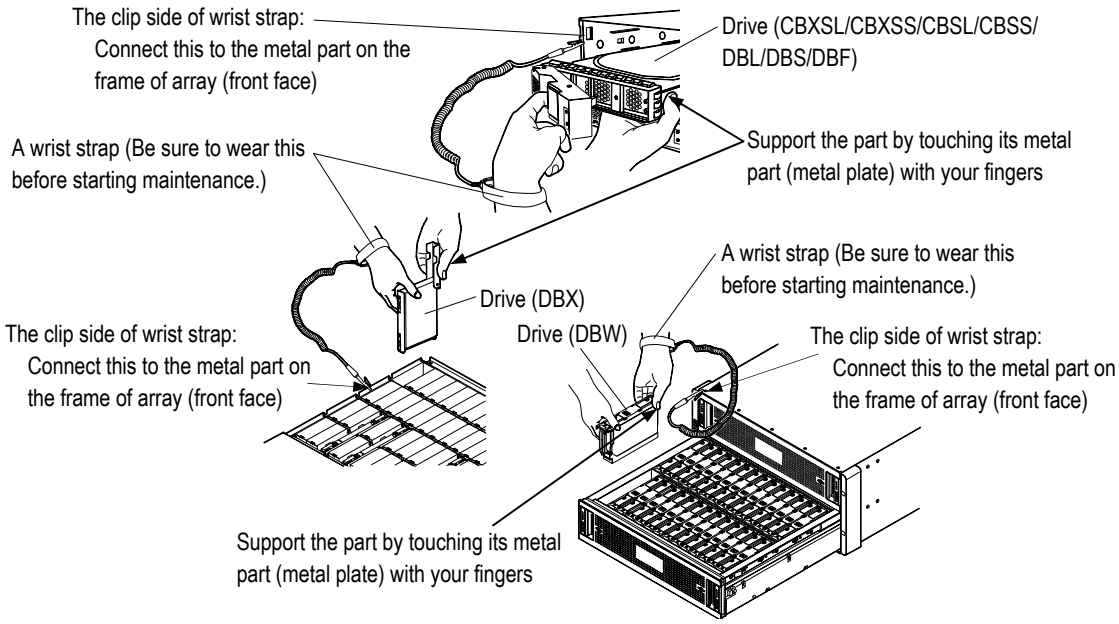
- **Do not pull out multiple DBXs/DBWs at a time because the rack can fall over.**
- **Do not put objects on the DBX which has been pulled out of the rack or use it as working space because the rack can fall over.**
- **Do not put objects in the open drawer of the DBW or use it as working space because the rack can fall over.**

NOTICE

- **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.**
- **Drives are precision components.**
  Be careful not to expose drives to hard shock.
- **When you install a 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 Drive is a precision instrument. Be sure to put on the wrist strap before starting work in order to protect Drive from electrostatic discharge.

NOTE : • The 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 Drive into the array, support the Drive as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When adding the Drive to the DBX/DBW, 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 (g) Installing the stabilizer" (INST 02-0150).)
• When pulling out or storing the DBX, perform it for only one DBX at a time slowly and surely. (Refer to Installation "1.4.1 (3) In the case of DBX. (a) How to pull the DBX out of the rack frame" (INST 01-0190) or "1.4.1 (3) In the case of DBX. (b) How to store the DBX in the rack frame." (INST 01-0200).)
• When pulling out or putting a drawer of DBW back, perform it for only one drawer at a time slowly and surely. (Refer to Installation "1.4.1 (4) In the case of DBW. (a) How to open a drawer of DBW out" (INST 01-0201) or "1.4.1 (4) In the case of DBW. (b) How to close a drawer of DBW." (INST 01-0202).)

(1-1) In the case of CBXSL/CBSL/DBL

(a) Installation locations and numbers of Drives

The Drive numbering is #0 to #11 from the bottom left to the top right viewed from the front side of the array.

The Drive is not installed in CBL.

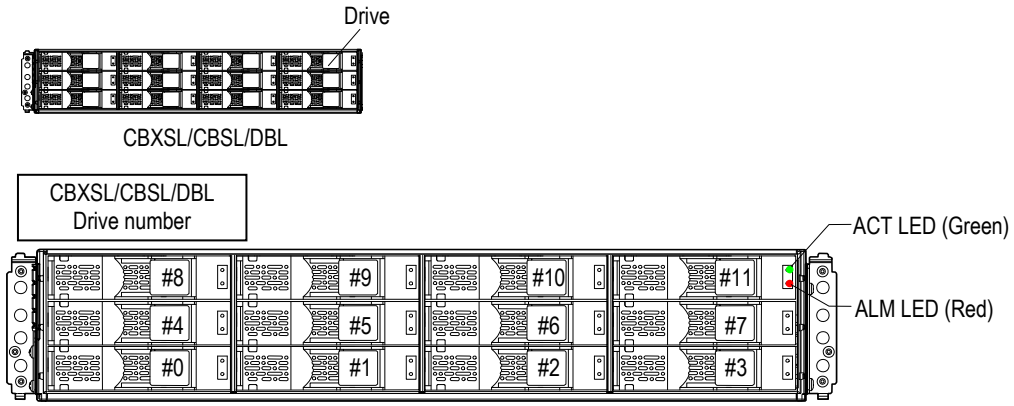


Figure 1.4.1 Drive Installation Location (CBXSL/CBSL/DBL)

(b) If there are less vacant slots in the system than Drives to be added, adding a DBL is required. (Refer to "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690).)

(c) Up to 15 Drives (CBXSL/CBXSS), 30 Drives (CBSL/CBSS), or 80 Drives (CBL) can be set as Spare Drives in any given location.

Assign the Disk Drive, which has not been assigned to be a data drive, to be a Spare Drive.

(1-2) In the case of DBF

(a) Installation locations and numbers of Drives

The Drive numbering is #0 to #11 from the bottom left to the top right viewed from the front side of the array.

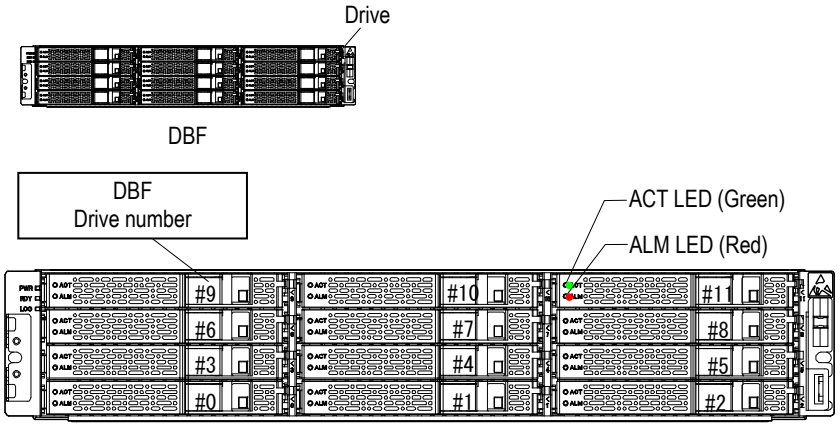


Figure 1.4.1.1 Drive Installation Location (DBF)

(b) If there are less vacant slots in the system than Drives to be added, adding a DBF is required.
(Refer to "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690).)

(c) Up to 80 Drives can be set as Spare Drives in any given location.
Assign the Disk Drive, which has not been assigned to be a data drive, to be a Spare Drive.

(1-3) In the case of CBXSS/CBSS/DBS

(a) Installation locations and numbers of Drives

The Drive numbering is #0 to #23 from the left viewed from the front side of the array.

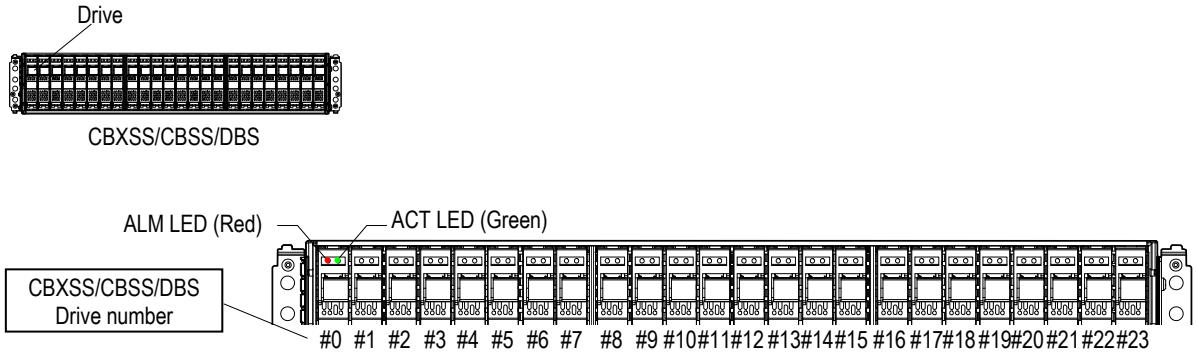


Figure 1.4.2 Drive Installation Location (CBXSS/CBSS/DBS)

(b) If there are less vacant slots in the system than Drives to be added, adding a DBS is required.
(Refer to "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690).)

(c) Up to 15 Drives (CBXSL/CBXSS), 30 Drives (CBSL/CBSS), or 80 Drives (CBL) can be set as Spare Drives in any given location.
Assign the Disk Drive, which has not been assigned to be a data drive, to be a Spare Drive.

(1-4) In the case of DBX

(a) Installation locations and numbers of Drives

The Drive numbering is #A0 to #A23, #B0 to #B23 viewed from the above of the array. (Refer to Figure 1.4.3)

NOTE : Add Drives in order from the front side of the array (in ascending order of the Drive number).

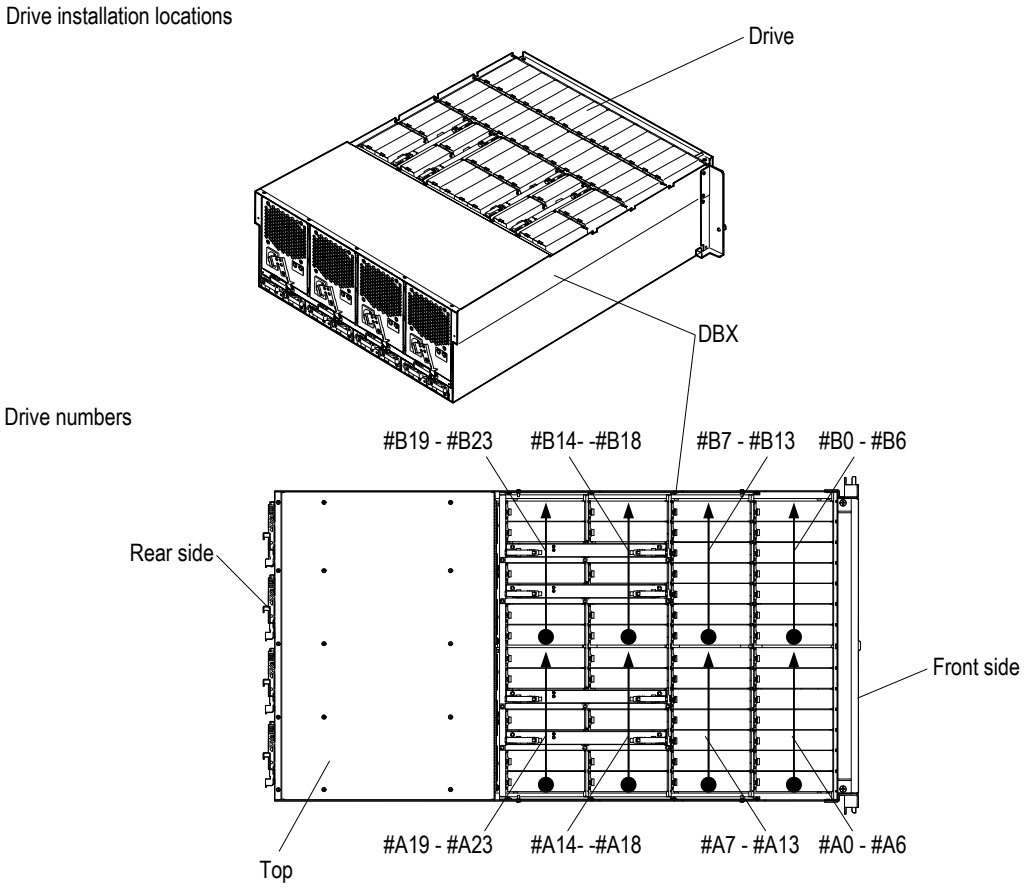


Figure 1.4.3 Drive Installation Locations (DBX)

(b) If there are less vacant slots in the system than Drives to be added, adding a DBX is required. (Refer to "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690).)

(c) Up to 30 Drives (CBSL/CBSS) or 80 Drives (CBL) can be set as Spare Drives in any given location.

Assign the Drive, which has not been assigned to a data drive, to a Drive.

(1-5) In the case of DBW

(a) Installation locations and numbers of Drives

The Drive numbering is #0 to #41 from the front side of the top drawer and #42 to #83 from the front side of the bottom drawer. (Refer to Figure 1.4.3.1)

NOTE : Follow the drive additional conditions described below. Otherwise, the array will not start up normally.

- Add Drives to the row B (#42 to #55) or subsequent rows in drive number ascending order not to leave empty slots between Drives.
- Add the Drives in the following order of rows: B (#42 to #55) → C (#14 to #27) → D (#56 to #69) → E (#28 to #41) → F (#70 to #83).
- In case of the firmware version 0930/A or more, for the DBW of unit #11, install the drives in the slots in the following order: A (#0 to #13) → B (#42 to #55) → C (#14 to #21).
  The drives cannot be installed in the slots of C (#22 to #27), D (#56 to #69), E (#28 to #41) and F (#70 to #83) in the DBW of unit #11.

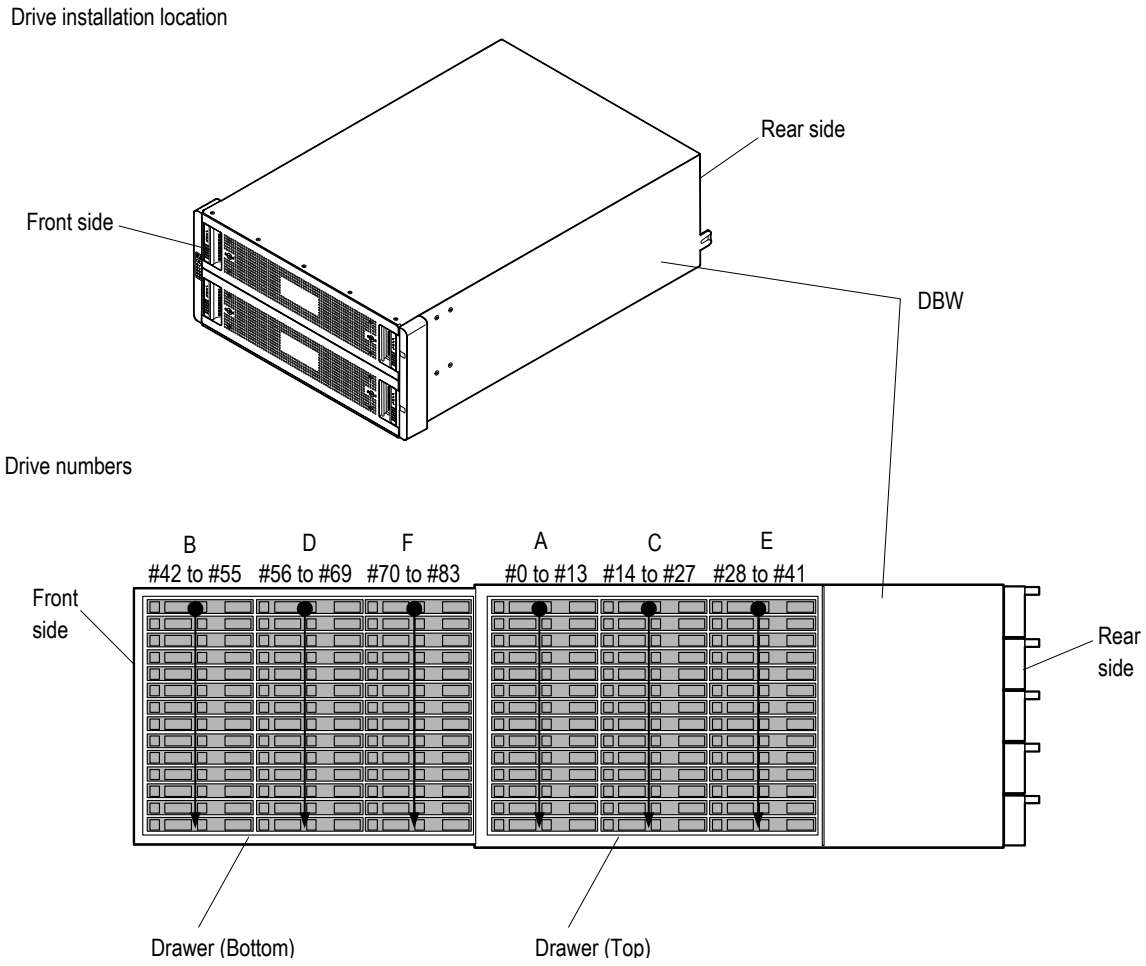
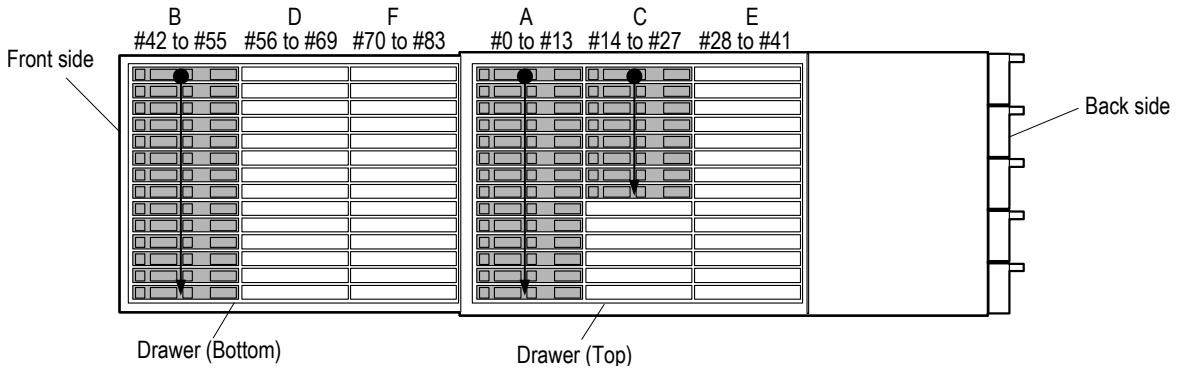


Figure 1.4.3.1 Drive Installation Locations (DBW)



*1: The drives can be installed in the slots of A (#0 to #13), B (#42 to #55) and C (#14 to #21).

Figure 1.4.3.2 Slots that Drives in DBW of Units #11 Can Be Installed

(b) If there are less vacant slots in the system than Drives to be added, adding a DBW is required. (Refer to "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690).)

(c) Up to 80 Drives (CBL) can be set as Spare Drives in any given location.
Assign the Drive, which has not been assigned to a data drive, to a Drive.

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

- A procedure for adding a Drive to a vacant slot in an array is shown below.
- In the additional Drives of #0 to #4 in the CBXSS/CBSS or the first DBS to be connected to the CBL, a mix of the SAS Drives and Flash Drives cannot be installed.
- When adding a Drive Box is necessary due to the lack of vacant slots, add a Drive Box. (Refer to "1.3 Mounting on Rack Frame" (ADD 01-0100).)
- When Drives are added to the vacant slots of #0 to #4 in the CBXSL/CBXSS/CBSL/CBSS, #0 to #4 (#A0 to #A4 for DBX) the DBL/DBS/DBW/DBX/DBF corresponding to the unit #0 connected to the CBL, the additional operation cannot be performed with the array power turned off. Add Drives online (in order to expand the storage capacity) according to (2-1), and be sure to check that the system copy starts and terminates automatically to the added Drives. (‡1) When the system copy is completed, "I14100 System copy completed (Unit-x, HDU-y)" is displayed on the Information Message on WEB. (Refer to Firmware "3.2 Procedure for Checking the Status of System Copy Complete" (FIRM 03-0030).)
- When using the Tray Power Saving function, if you add drives in the status where the [Tray Power OFF] setting is "Enabled", the tray power status does not change to "Tray Power OFF". Therefore, change the [Tray Power OFF] setting to "Disabled", and then add the drives.
- It is recommended to back up the data of all Volumes 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 array power turned off).

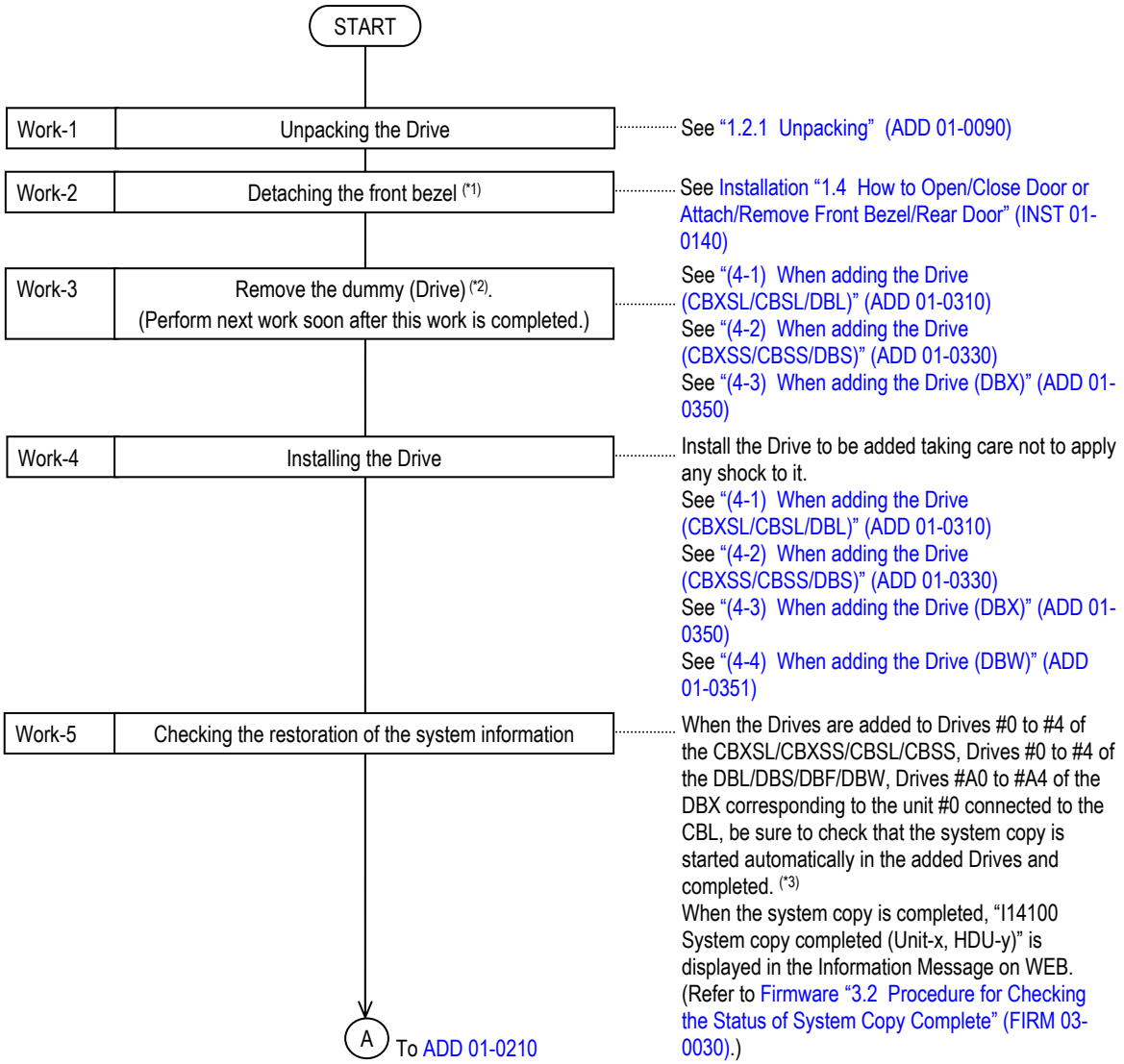
- Procedure for adding Drives while the power is turned on:
  See "(2-1) Procedure for adding Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0200).
- Procedure for adding Drives offline (with the array power turned off):
  See "(2-2) Procedure for adding Drives offline (with the array power turned off)" (ADD 01-0210).

‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Drive.
Select the [Settings] – [Drive Recovery] – [Drive Recovery] on the unit window of Hitachi Storage Navigator Modular 2, and click the [Edit Recovery Options] button at the upper right of the window. If [Drive Restoration] 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 "1.4.2 (5) Restoring the system information" (ADD 01-0420).

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

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

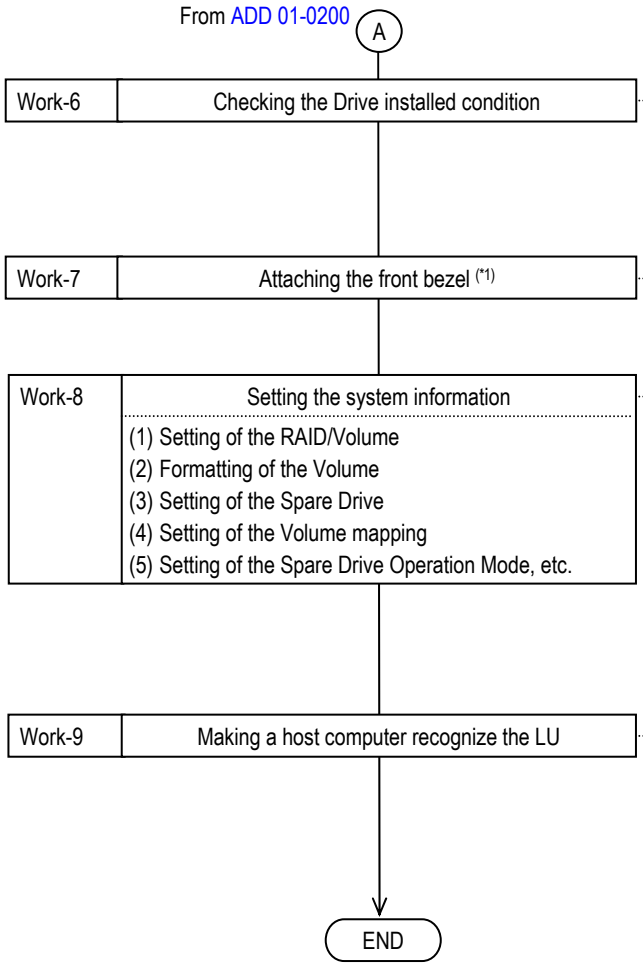
NOTE : When adding the two or more Drives in the installation of the Drives (Work-4), checking the restoration of the system information (Work-5) for the each Drive one by one, and then install the Drives one by one.



*1 : In the case of the DBX, remove the front bezel, pull the array out of the rack, and then remove the top cover. In the case of the DBW, the front bezel does not need to be removed. Pull the drawer out of the array.

*2 : Dummies (Drives) are not available in DBW.

*3 : The system copy is completed in approximately 1 minute 30 seconds for each Drive. Select the [Settings] – [Drive Recovery] – [Drive Recovery] on the unit window of Hitachi Storage Navigator Modular 2, and click the [Edit Recovery Options] button at the upper right of the window. 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 "1.4.2 (5) Restoring the system information" (ADD 01-0420).



Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen.
(Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

See Installation "1.4 How to Open/Close Door or Attach/Remove Front Bezel/Rear Door" (INST 01-0140)

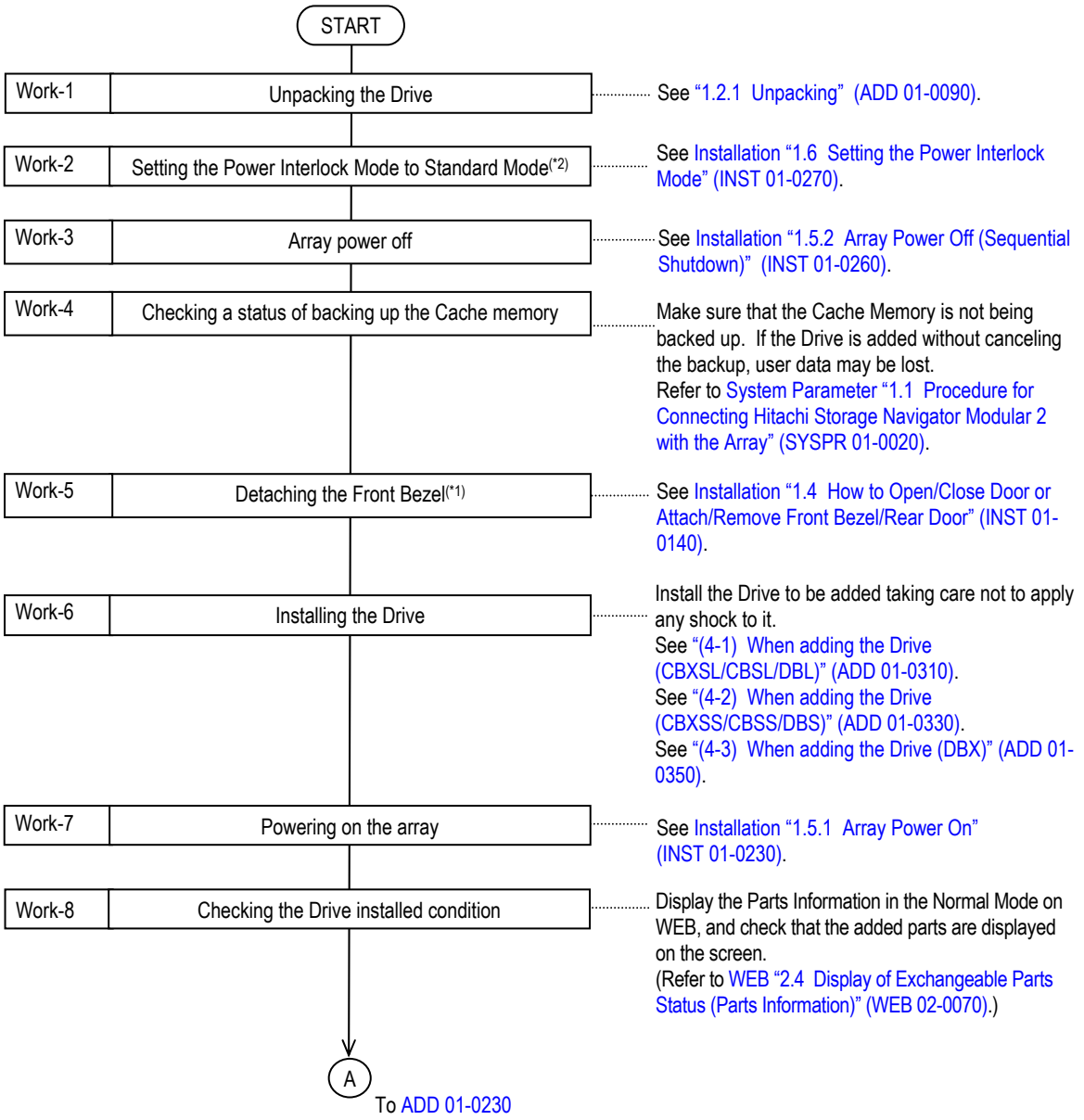
For the added Drives, perform a setting of RAID/Volume, formatting of a Volume, setting of a Spare Drive, and setting of a LU mapping, Setting of the Spare Drive Operation Mode, etc.
(1) – (3) : See System Parameter "Chapter 4. Setting the RAID/Volume/Spare Drive" (SYSPR 04-0000)
(4) : See System Parameter "5.2 Setting Volume Mapping" (SYSPR 05-0100)
(5) : See System Parameter "11.1 Setting Drive Recovery" (SYSPR 11-0000)

Refer to an instruction 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 a Volume while the array power is on" (ADD 01-0450).

*1 : In the case of the DBX, attach the top cover, store the array in the rack, and then attach the front bezel.
In the case of the DBW, put the drawer back in the array. The front bezel does not need to be attached.

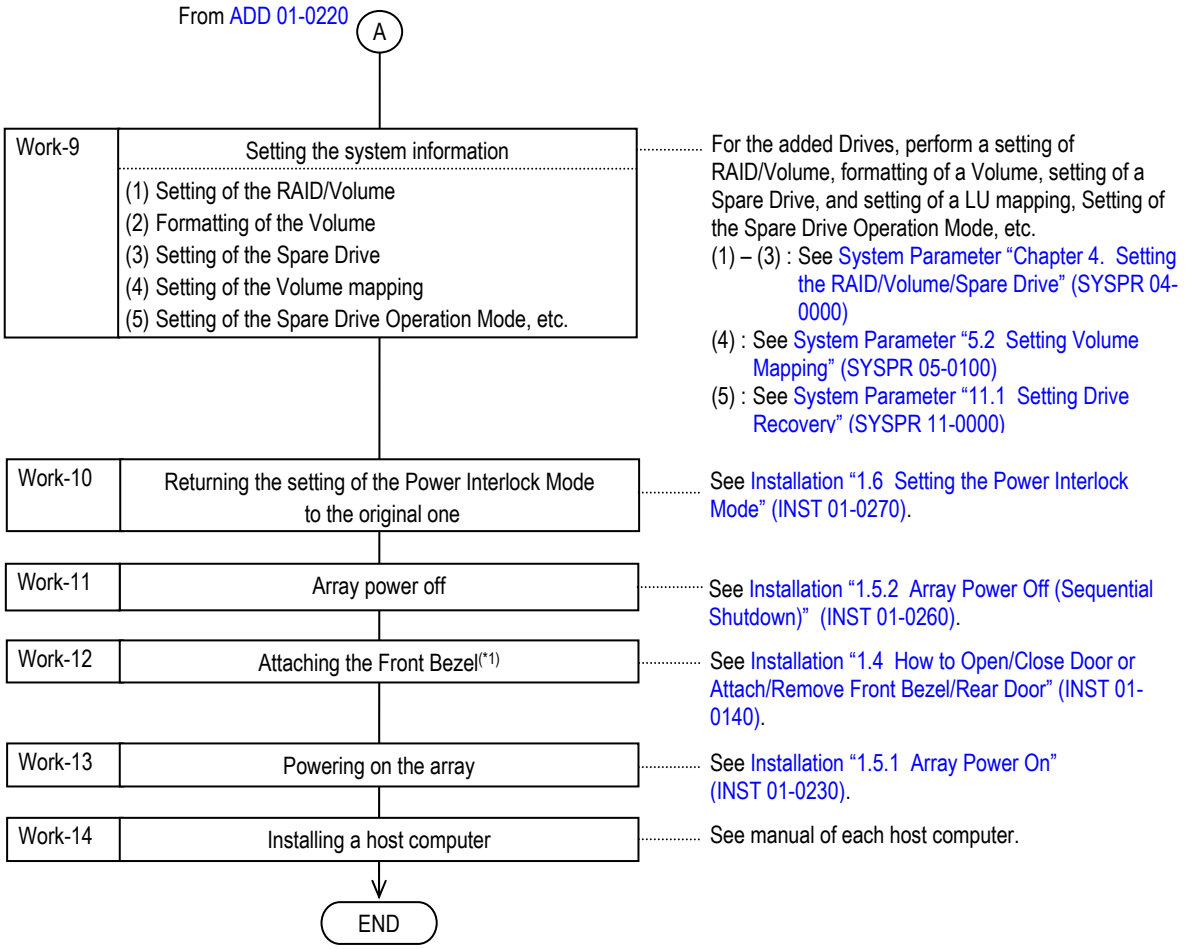
(2-2) Procedure for adding Drives offline (with the array power turned off)

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



*1 : In the case of the DBX, remove the front bezel, pull the array out of the rack, and then remove the top cover.
In the case of the DBW, the front bezel does not need to be removed. Pull the drawer out of the array.

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



*1 : In the case of the DBX, attach the top cover, store the array in the rack, and then attach the front bezel.
In the case of the DBW, put the drawer back in the array. The front bezel does not need to be attached.

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

- A procedure for replacing the Drive installed in the array with the Drive having a larger capacity is shown below.
- In the additional Drives of #0 to #4 in the CBXSS/CBSS or the first DBS to be connected to the CBL, a mix of the SAS Drives and Flash Drives cannot be installed.
- When replacing two or more Drives, be sure to replace them one by one sequentially.
- When the Drives #0 to #4 of the CBXSL/CBXSS/CBSL/CBSS or the Drives #0 to #4 (#A0 to #A4 for DBX) of the DBL/DBS/DBW/DBX/DBF corresponding to the unit #0 connected to the CBL are replaced with the same type of Drives, it cannot be performed with the array power turned off. Perform the replacement of the Drives online (in order to expand the storage capacity) according to (3-1), and be sure to check that the system copy starts and terminates automatically to the added Drives(‡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).)
  When replacing the Drives with a different type of Drives, the system reconfiguration (initial setup of the firmware) is needed. Contact the Technical Support Center beforehand.
- It is recommended to backup data of all Volumes 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 array power turned off).

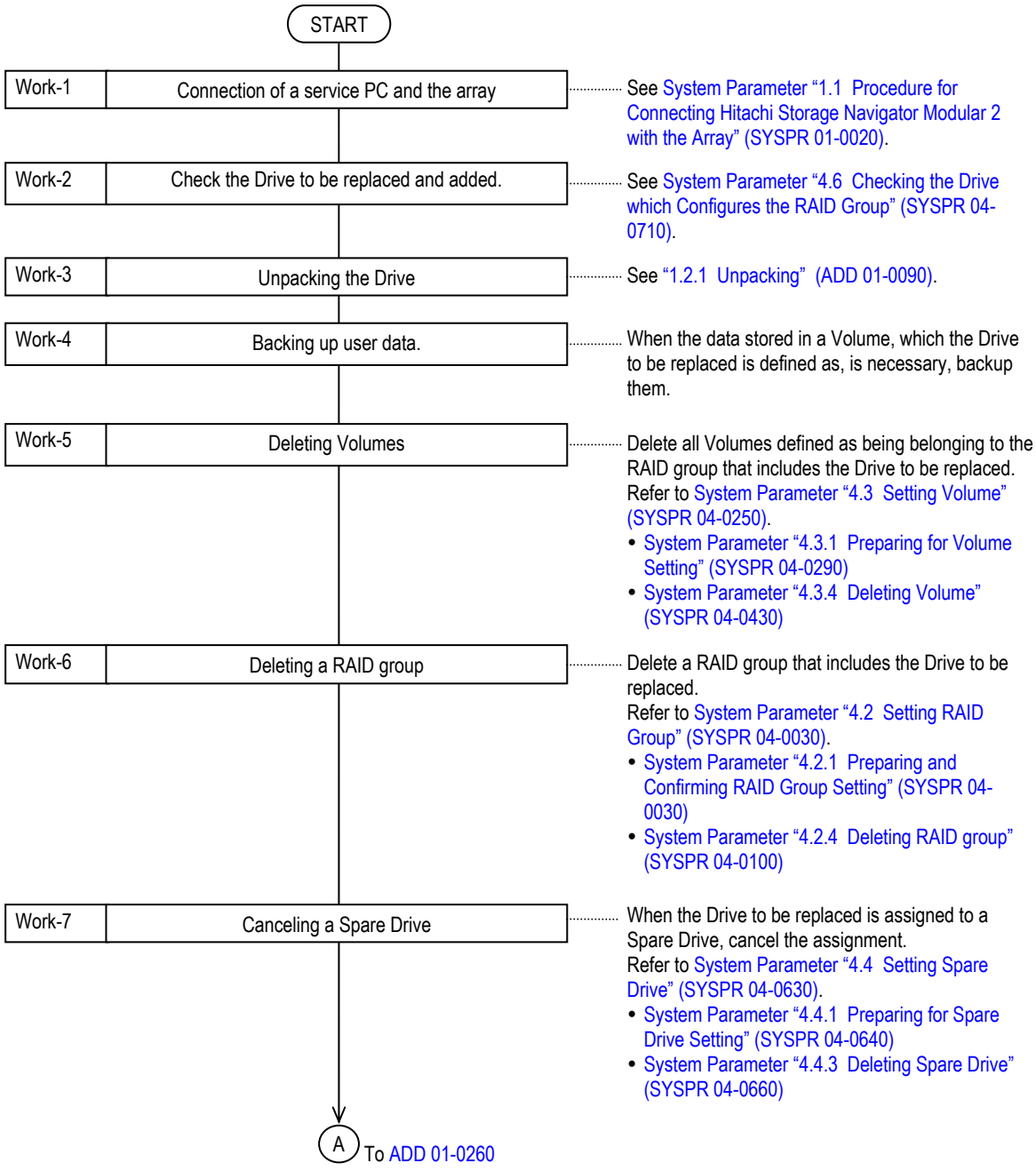
- Procedure for replacing Drive (in order to expand a storage capacity) while the array power is online :
  "(3-1) Procedure for replacing Drive (in order to expand a storage capacity) while the array power is online" (ADD 01-0250)
- Procedure for replacing the Drive (in order to expand a storage capacity) while the array power is offline (with the array power turned off) :
  "(3-2) Procedure for replacing the Drive (in order to expand a storage capacity) while the array power is offline (with the array power turned off)" (ADD 01-0280)

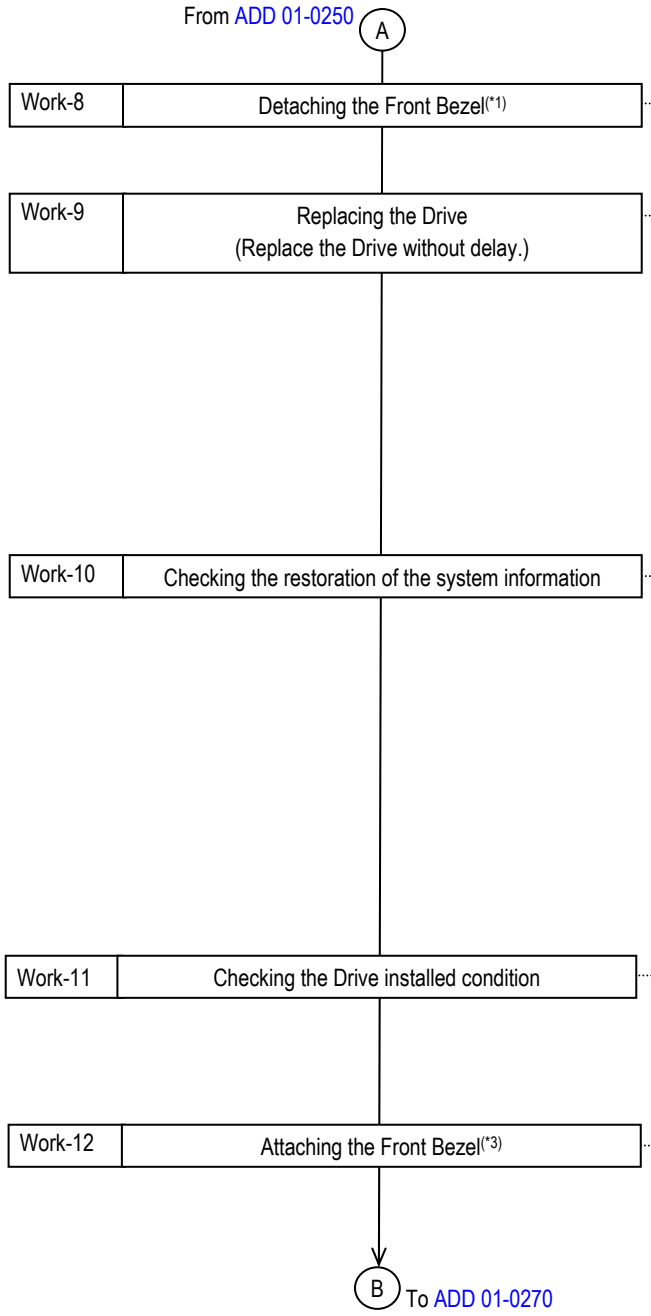
‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Drive.
Select the [Settings] – [Drive Recovery] – [Drive Recovery] on the unit window of Hitachi Storage Navigator Modular 2, and click the [Edit Recovery Options] button at the upper right of the window. If [Drive Restoration] 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 "1.4.2 (5) Restoring the system information" (ADD 01-0420).

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

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

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





See Installation "1.4 How to Open/Close Door or Attach/Remove Front Bezel/Rear Door" (INST 01-0140).

When replacing two or more Drives, be sure to replace them one by one.
Remove the Drive to be replaced and install the new one taking care not to apply any shock to it.
See "(4-5) When replacing the Drive (CBXSL/CBSL/DBL)" (ADD 01-0360).
See "(4-6) When replacing the Drive (CBXSS/CBSS/DBS)" (ADD 01-0380).
See "(4-7) When replacing the Drive (DBX)" (ADD 01-0400).
See "(4-8) When replacing the Drive (DBW)" (ADD 01-0411).

When the Drives are replacement in Drives #0 to #4 of the CBXSL/CBXSS/CBSL/CBSS or the Drives #0 to #4 of the DBL/DBS/DBF/DBW corresponding to the unit ID #0 connected to the CBL, the Drive #A0 to #A4 of the DBX, be sure to check that the addition work is performed with the array power turned on and the system copy is automatically started in the added Drives and completed. (*2)
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).)

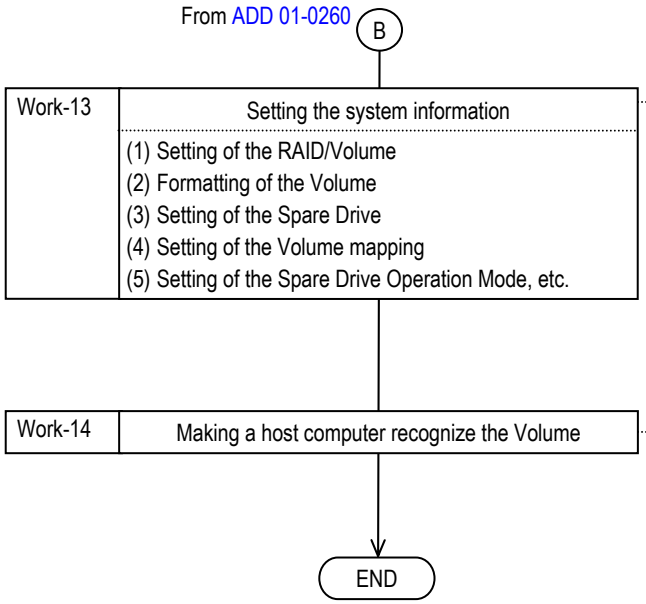
Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen.
(Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

See Installation "1.4 How to Open/Close Door or Attach/Remove Front Bezel/Rear Door" (INST 01-0140).

*1 : In the case of the DBX, remove the front bezel, pull the array out of the rack, and then remove the top cover.
In the case of the DBW, the front bezel does not need to be removed. Pull the drawer out of the array.

*2 : The system copy is completed in approximately 1 minute 30 seconds for each Drive.
Select the [Settings] – [Drive Recovery] – [Drive Recovery] on the unit window of Hitachi Storage Navigator Modular 2, and click the [Edit Recovery Options] button at the upper right of the window. If [Drive Restoration] 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 "1.4.2 (5) Restoring the system information" (ADD 01-0420).

*3 : In the case of the DBX, attach the top cover, store the array in the rack, and then attach the front bezel.
In the case of the DBW, put the drawer back in the array. The front bezel does not need to be attached.



For the added Drives, perform a setting of RAID/Volume, formatting of a Volume, setting of a Spare Drive, and setting of a LU mapping, Setting of the Spare Drive Operation Mode, etc.

(1) – (3) : See System Parameter "Chapter 4. Setting the RAID/Volume/Spare Drive" (SYSPR 04-0000)

(4) : See System Parameter "5.2 Setting Volume Mapping" (SYSPR 05-0100)

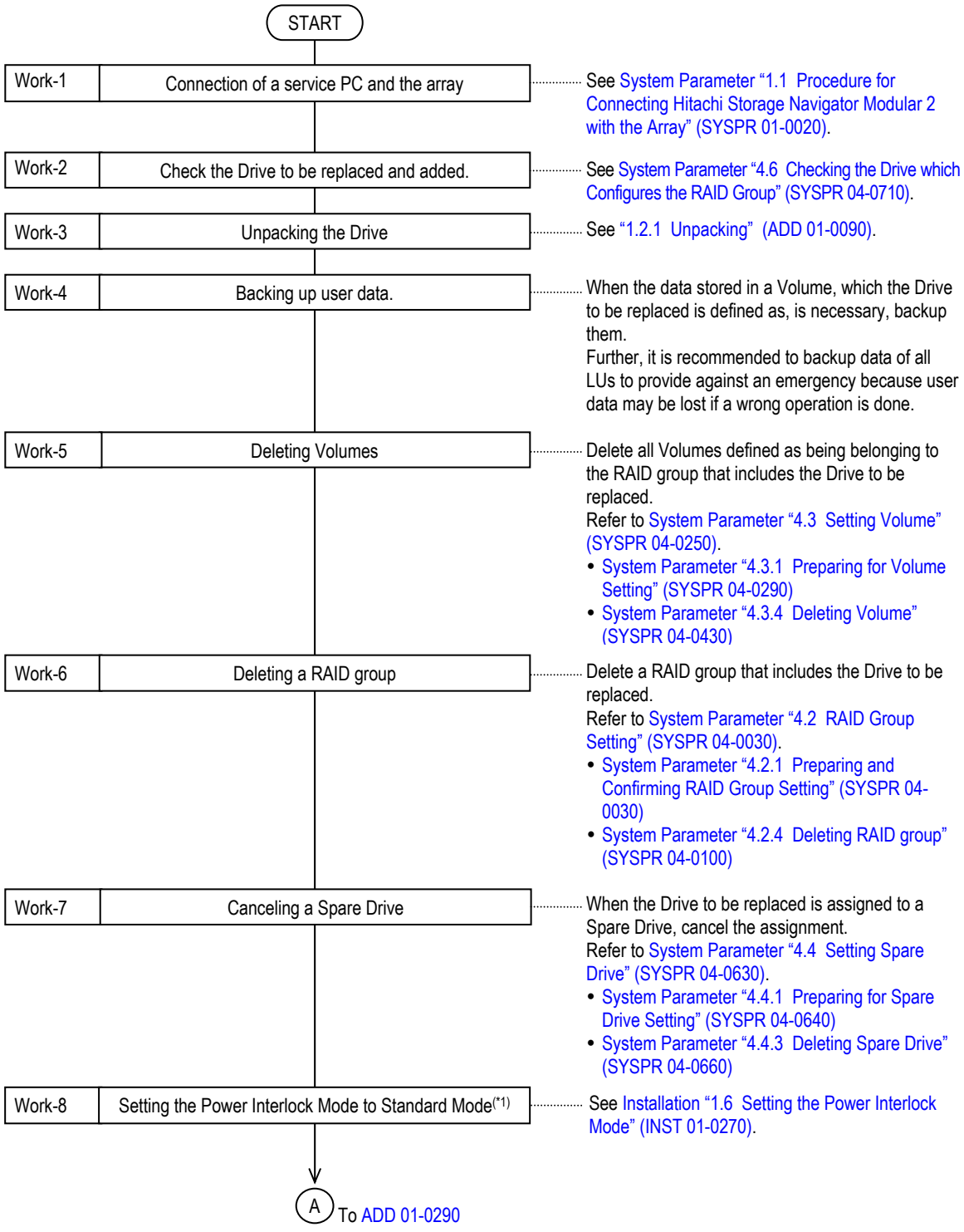
(5) :See System Parameter "11.1 Setting Drive Recovery" (SYSPR 11-0000)

See manual of each host computer.

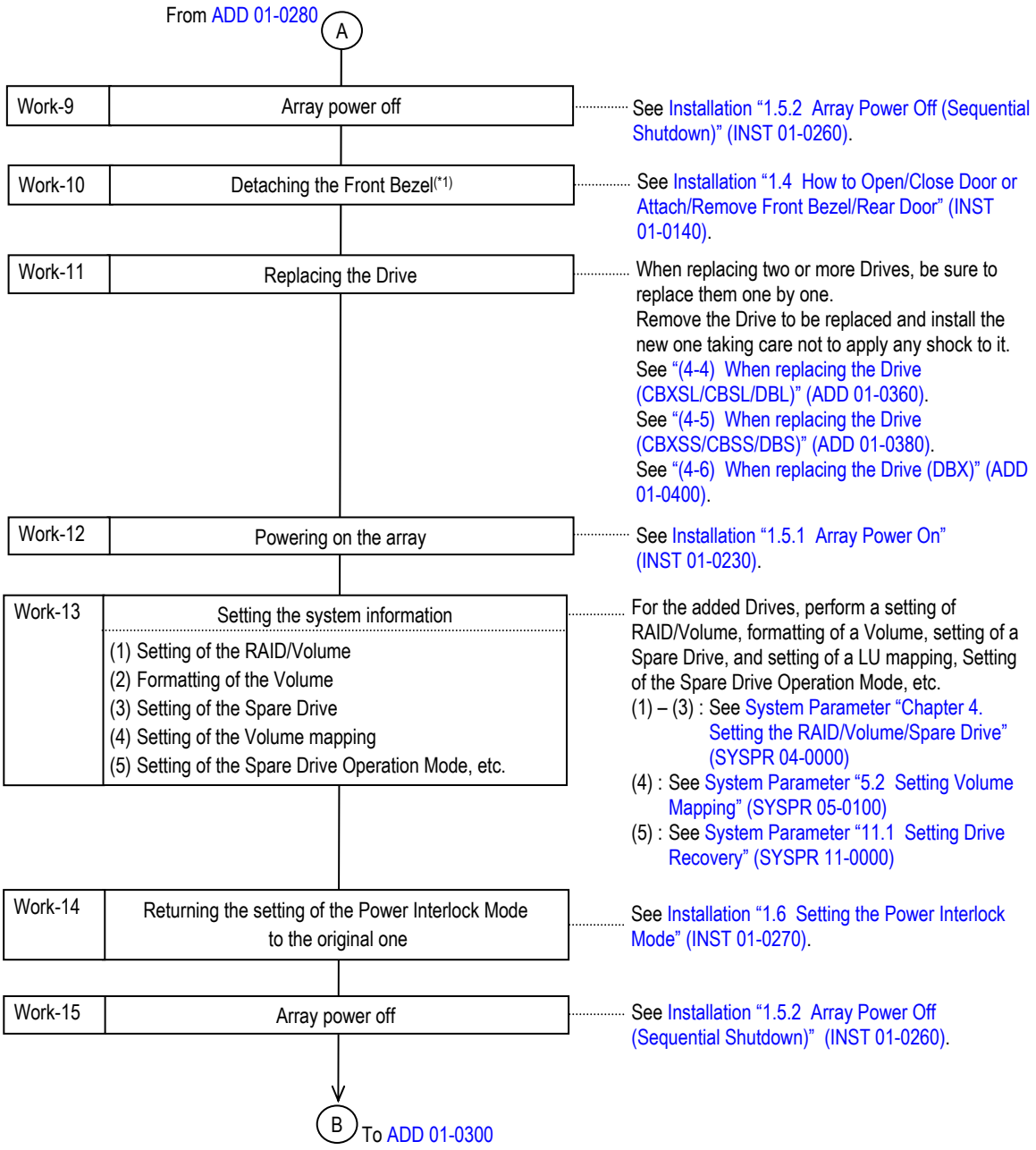
Example : For operation in the case of a host computer in which HP-UX is installed, refer to "(6) Making a host computer recognize a Volume while the array power is on" (ADD 01-0450).

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

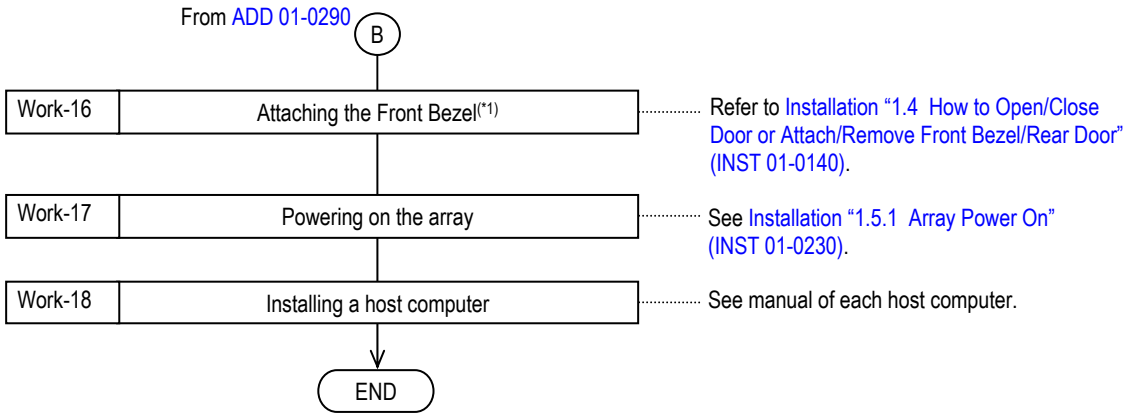
A procedure for replacing the Drive (in order to expand a storage capacity) after powering off the array is shown below.



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



*1 : In the case of the DBX, remove the front bezel, pull the array out of the rack, and then remove the top cover.
In the case of the DBW, the front bezel does not need to be removed. Pull the drawer out of the array.



*1 : In the case of the DBX, attach the top cover, store the array in the rack, and then attach the front bezel.
In the case of the DBW, put the drawer back in the array. The front bezel does not need to be attached.

(4) Installing/removing Drive

When installing/removing the Drive for adding and removing a drive, follow the procedure shown below.

- Procedure for adding a Drive :
  See Item "(4-1) When adding the Drive (CBXSL/CBSL/DBL/DBF)" (ADD 01-0310).
- Procedure for adding a Drive :
  See Item "(4-2) When adding the Drive (CBXSS/CBSS/DBS)" (ADD 01-0330).
- Procedure for adding a Drive :
  See Item "(4-3) When adding the Drive (DBX)" (ADD 01-0350).
- Procedure for adding a Drive :
  See Item "(4-4) When adding the Drive (DBW)" (ADD 01-0351).
- Procedure for replacing a Drive :
  See Item "(4-5) When replacing the Drive (CBXSL/CBSL/DBL/DBF)" (ADD 01-0360).
- Procedure for replacing a Drive :
  See Item "(4-6) When replacing the Drive (CBXSS/CBSS/DBS)" (ADD 01-0380).
- Procedure for replacing a Drive :
  See Item "(4-7) When replacing the Drive (DBX)" (ADD 01-0400).
- Procedure for replacing a Drive :
  See Item "(4-8) When replacing the Drive (DBW)" (ADD 01-0411).

(4-1) When adding the Drive (CBXSL/CBSL/DBL/DBF)

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

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

Pressing the latch on the left side of the dummy (Drive) to the direction of the arrow, hold the right side of the dummy (Drive) and pull it out, and then remove it.

Keep it in custody because the dummy (Drive) that has been removed will be used when the added Drive is removed.

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

NOTE : When handling the Drive, hold the RAIL side because the SHIELD SPRING is subject to breakage.

(i) Open the handle fully and fit the 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 square hole on a frame.

(iii) Pull the stopper lightly and close the handle, 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 square hole, the Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(iv) Pull the handle lightly to make sure that the Drive cannot be pulled out.

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

(d) When the Drive has been added while the array power is on, check that the start message and the end message of the dive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620)).

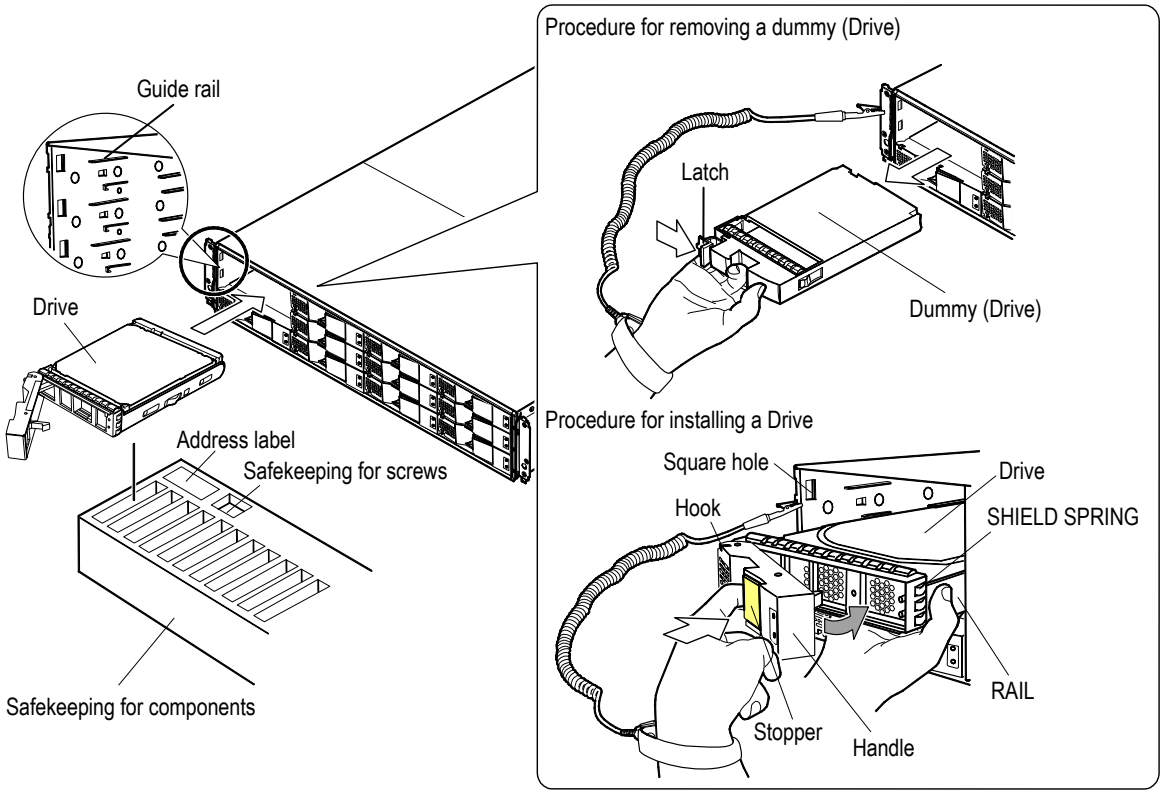


Figure 1.4.4 Removing the Dummy (Drive) and Installing the Drive (CBXSL/CBSL/DBL/DBF)

(4-2) When adding the Drive (CBXSS/CBSS/DBS)
Perform the following operations (a) to (d) for each of the Drives to be added (in order to expand a storage capacity) one by one.

(a) Pull the dummy (Drive), and remove it.
Pressing the latch at the lower part of the dummy (Drive) to the direction of the arrow, hold the upper part and pull it out, and then remove it.
Because the dummy (Drive) that has been removed will be used when the added Drive is removed, keep it in custody.

(b) Install the Drive to be added taking care not to apply any shock to it.
(i) Fit the Drive in the guide rail of the chassis and slide it in the direction shown by the arrow (①).
(ii) Push it in until it reaches the position where a hook of the handle can be entered into the square hole (②) at the lower part of a frame on the front side of the disk array unit.
(iii) Raise the stopper, which has been tilted toward you, and then have the lock on by pressing the stopper (③).

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

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

(d) When the Drive has been added while the array 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 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 01-1620)).

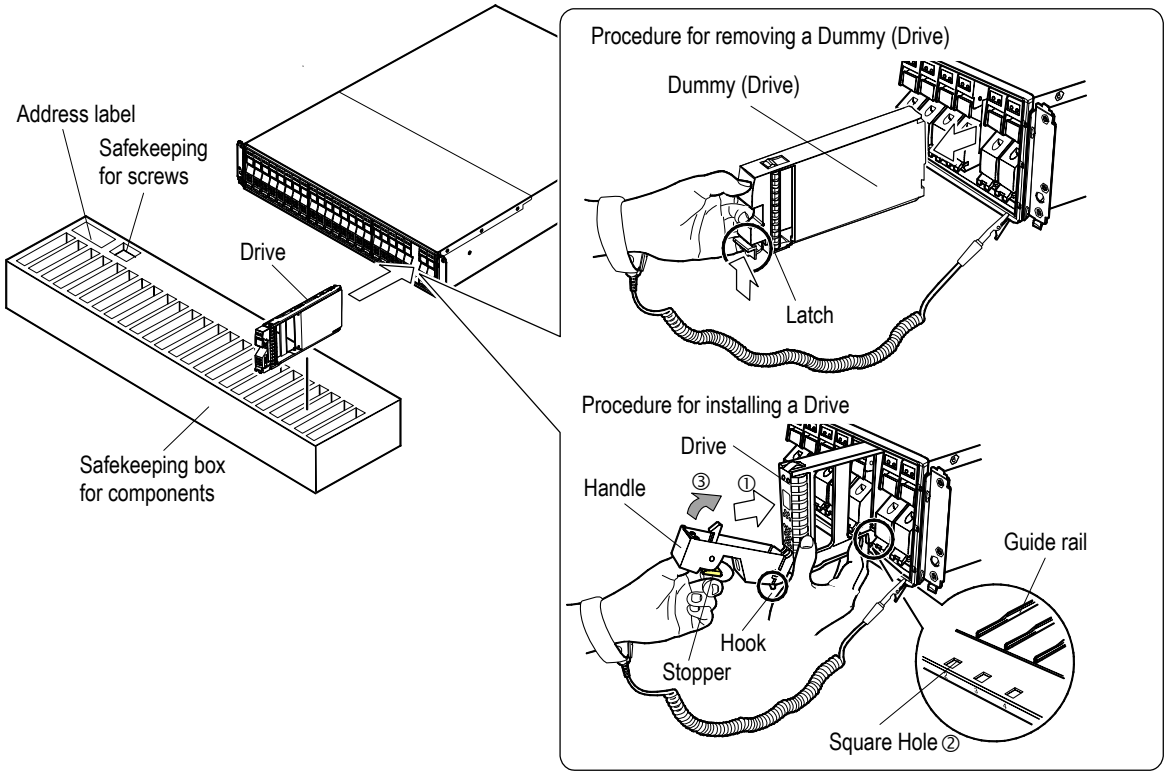


Figure 1.4.5 Removing the Dummy (Drive) and Installing the Drive (CBXSS/CBSS/DBS)

(4-3) When adding the Drive (DBX)

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

(a) Remove the Drive by pulling it out.

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

(b) Install the 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 array before inserting the Drive.

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

(ii) Close the handle.

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

(d) When the Drive has been added while the array 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 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 01-1620)).

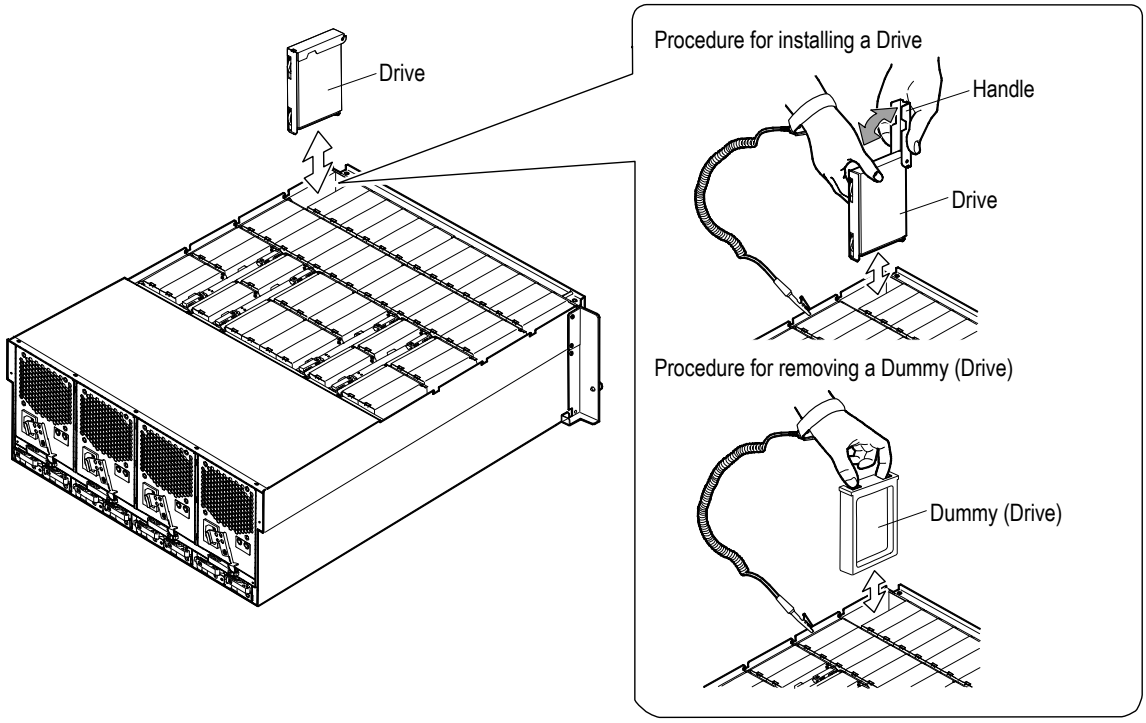


Figure 1.4.6 Removing the Dummy (Drive) and Installing the Drive (DBX)

(4-4) When adding the Drive (DBW)

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

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

NOTE : Install the Drive so that the ALM LED is on the near side of you.

(i) Insert the Drive into the slot, and then push it down until it stops (①).

(ii) Slide the top of the Drive in the direction of the arrow until the latch clicks into place (②).

NOTE : Make sure that the release button of the Drive is securely locked (yellow part is not visible).

(iii) After adding the Drive, push the upper part of the Drive again in the direction of the arrow to make sure that the release button of the Drive is securely locked (②).

NOTE : If the release button of the Drive is unlocked (yellow part is visible), the Drive may be pulled out inside the array. This prevents the drawer from being opened/closed.

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

(c) Wait for 10 minutes after adding all the Drives and closing the drawer.
Check that the WARNING LED (orange) on the front of the Controller Box does not light up.
If it lights up, perform the maintenance according to the Information Message on WEB.

(d) When the Drive has been added while the array 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 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 01-1620).)

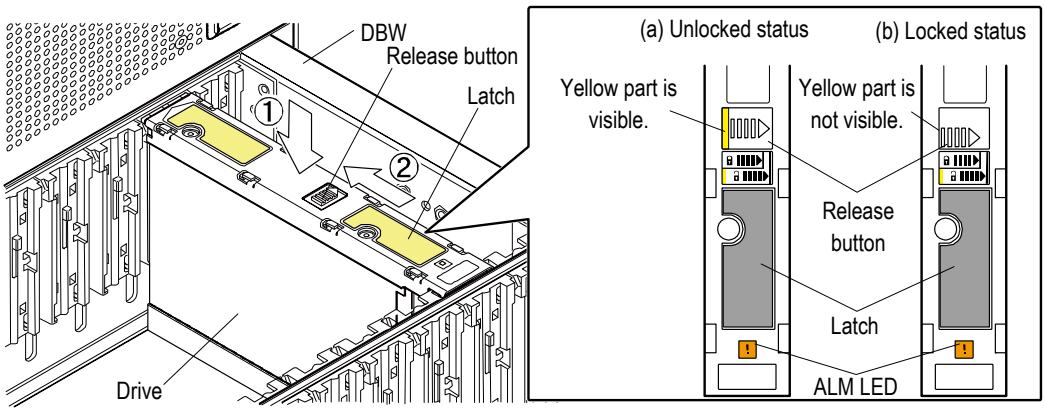


Figure 1.4.6.1 Installing the Drive (DBW)

(4-5) When replacing the Drive (CBXSL/CBSL/DBL/DBF)
Perform the following operations (a) and (d) for each of the slots, where the Drive is to be replaced, one by one.

NOTE : When handling the Drive, hold the RAIL side because the SHIELD SPRING is subject to breakage.

(a) Pull the stopper of the handle toward you to have the lock off, tilt the handle toward you, and then remove the Drive by pulling it out taking care not to apply a shock to it.
When using the removed 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 Drive to be added taking care not to apply any shock to it.

NOTE : When handling the Drive, hold the RAIL side because the SHIELD SPRING is subject to breakage.

(i) Open the handle fully and fit the 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 square hole on a frame.
(iii) Pull the stopper lightly and close the handle, 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 square hole, the Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(iv) Pull the handle lightly to make sure that the Drive cannot be pulled out.

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

(d) When the Drive has been added while the array 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 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 01-1620).)

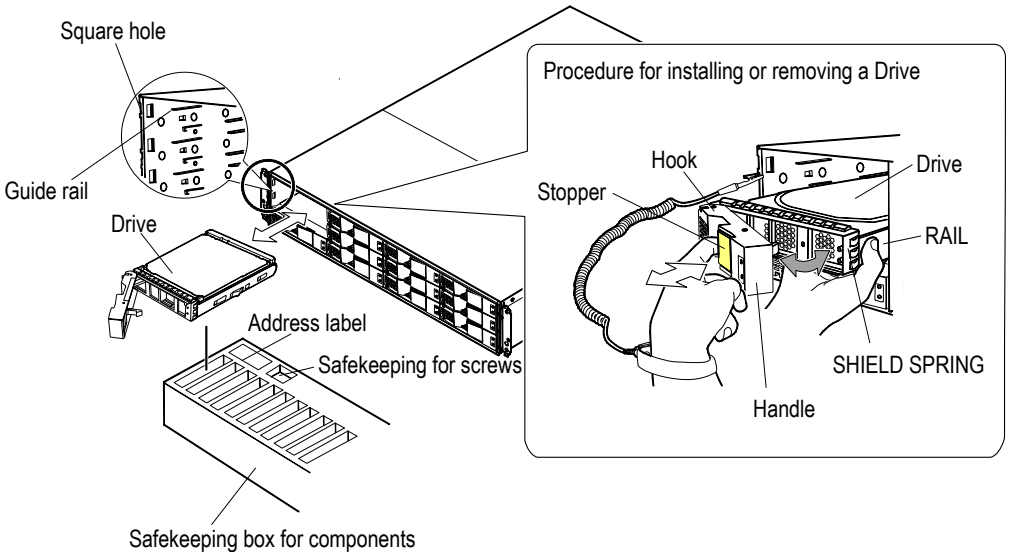


Figure 1.4.7 Replacing Drive (CBXSL/CBSL/DBL/DBF)

(4-6) When replacing the Drive (CBXSS/CBSS/DBS)

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

(a) Pull the stopper of the handle toward you to have the lock off, tilt the handle toward you, and then remove the Drive by pulling it out taking care not to apply a shock to it.
When using the removed 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 Drive to be added taking care not to apply any shock to it.

(i) Fit the Drive in the guide rail of the chassis and slide it in the direction shown by the arrow (①).

(ii) Push it in until it reaches the position where a hook of the handle can be entered into the square hole (②) at the lower part of a frame on the front side of the disk array unit.

(iii) Raise the stopper, which has been tilted toward you, and then have the lock on by pressing the stopper (③).

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

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

(d) When the Drive has been added while the array 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 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 01-1620).)

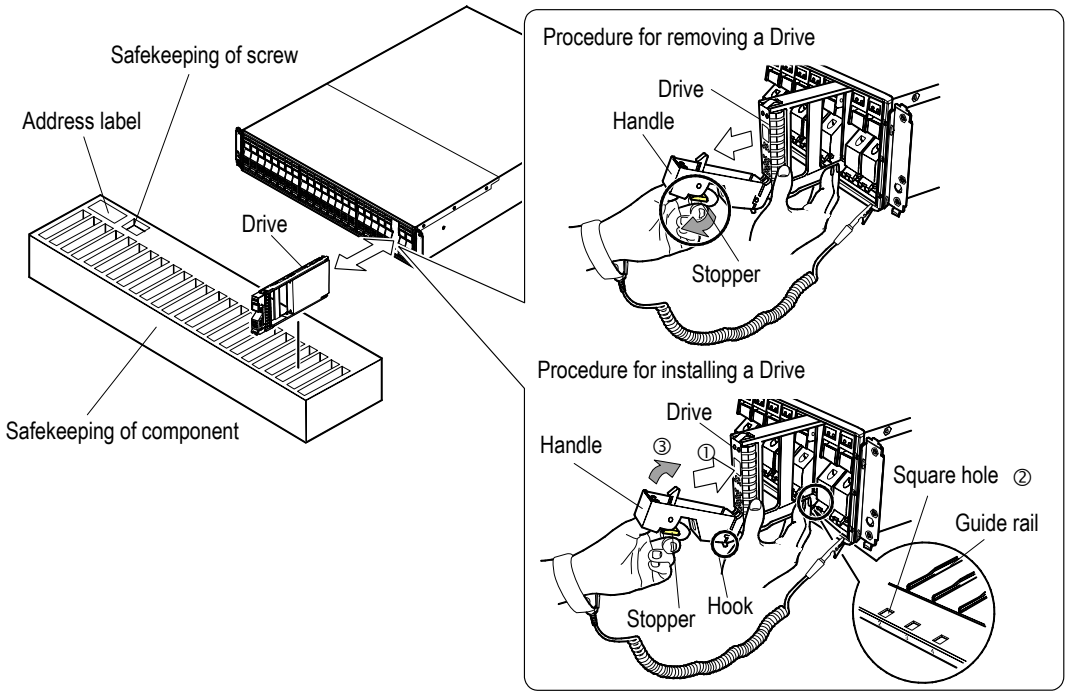


Figure 1.4.8 Operation of Mount/Remove the Drive (CBXSS/CBSS/DBS)

(4-7) When replacing the Drive (DBX)

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

(a) Slide the latch (blue) on the Drive and open the handle, and then pull out and remove the Drive taking care not to apply a shock to it.
When using the removed Drive for the purpose of addition to another array, keep it in custody with its handle returned to its original state taking care not to apply a shock to it.

(b) Install the 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 array before inserting the Drive.

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

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

(d) When the Drive has been added while the array 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 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 01-1620).)

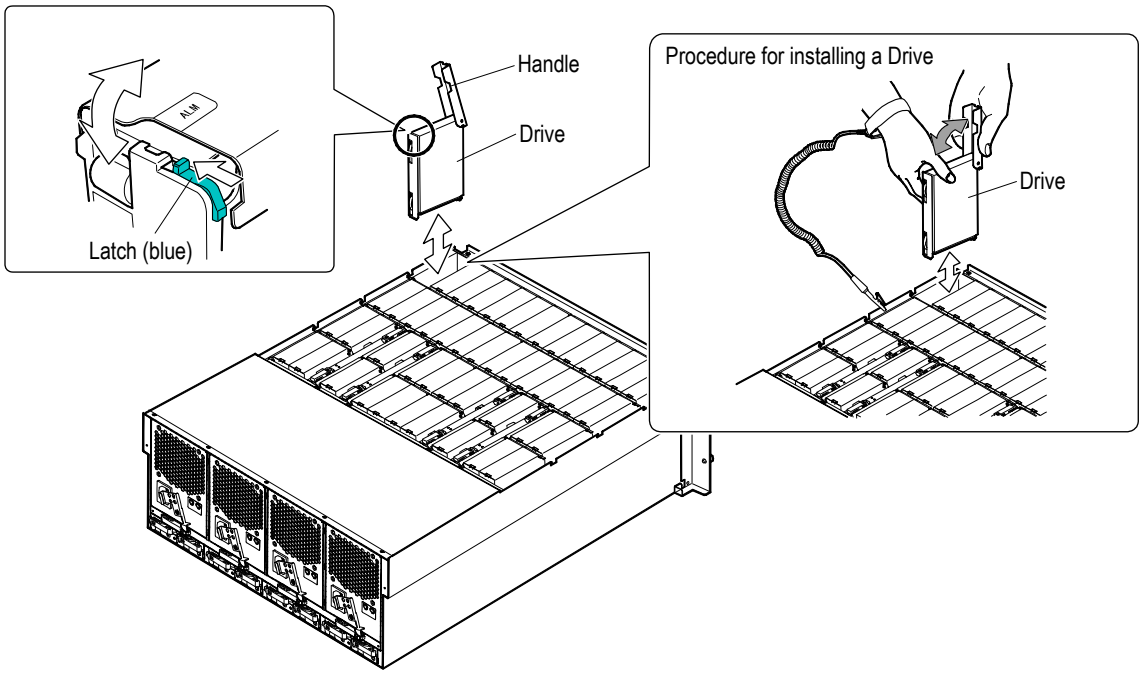


Figure 1.4.9 Installing/Removing the Drive (DBX)

(4-8) When replacing the Drive (DBW)

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

(a) Remove the Drive.

(i) Slide the release button and the Drive will pop up slightly from the slot.
When the Drive is not lifted after sliding the release button, slide the latch on the Drive toward you (①) while sliding the release button, so that the Drive will be lifted up.

(ii) Lift the Drive out of the slot.
When using the removed Drive for the purpose of addition to another array, keep it in custody with its handle returned to its original state taking care not to apply a shock to it.

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

NOTE : Install the Drive so that the ALM LED is on the near side of you.

(i) Insert the Drive into the slot, and then push it down until it stops (①).

(ii) Slide the top of the Drive in the direction of the arrow until the latch clicks into place (②).

NOTE : Make sure that the release button of the Drive is securely locked (yellow part is not visible).

(iii) After adding the Drive, push the upper part of the Drive again in the direction of the arrow to make sure that the release button of the Drive is securely locked (②).

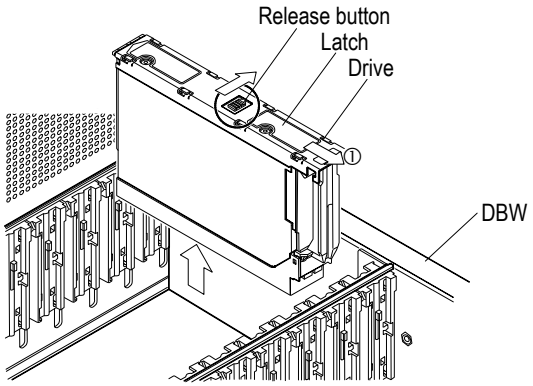
NOTE : If the release button of the Drive is unlocked (yellow part is visible), the Drive may be pulled out inside the array. This prevents the drawer from being opened/closed.

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

(d) Wait for 10 minutes after replacing all the Drives and closing the drawer.
Check that the WARNING LED (orange) on the front of the Controller Box does not light up.
If it lights up, perform the maintenance according to the Information Message on WEB.

(e) When the Drive has been added while the array 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 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 01-1620).)

Procedure for removing a Drive



Procedure for installing a Drive

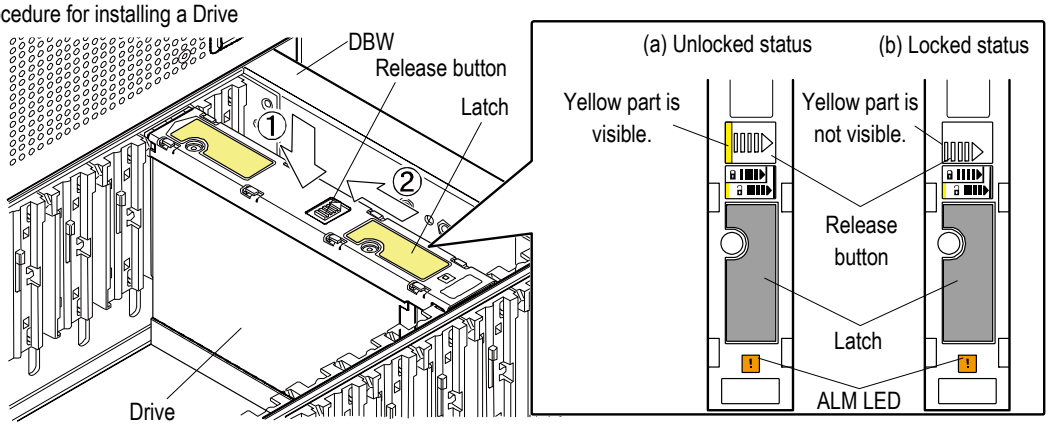


Figure 1.4.9.1 Installing/Removing the Drive (DBW)

(5) Restoring the system information

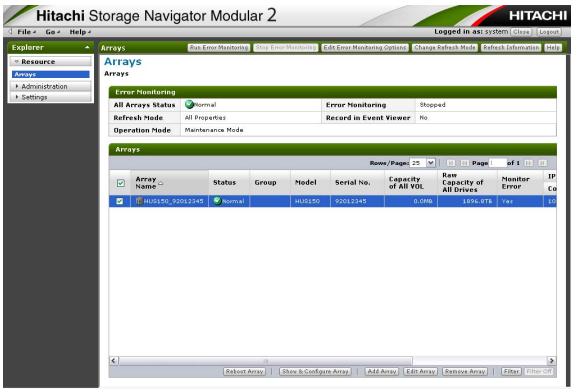
A restoration of the system information can be done by using either of the Hitachi Storage Navigator Modular 2.

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

(a) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more

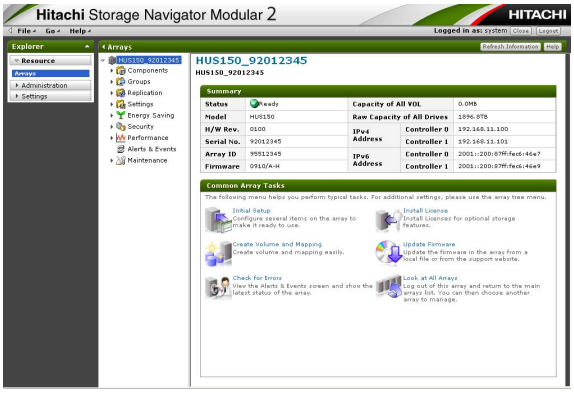
(i) Start the Hitachi Storage Navigator Modular 2.

(ii) Check the array to be set in the main window and press the [Ctrl] key, [Shift] 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.



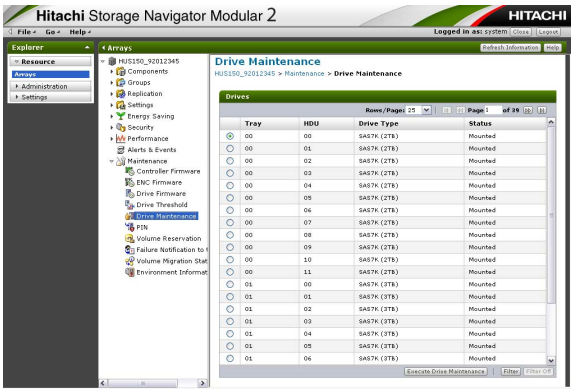
(iii) Click the array name, and open the unit window.

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 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).)



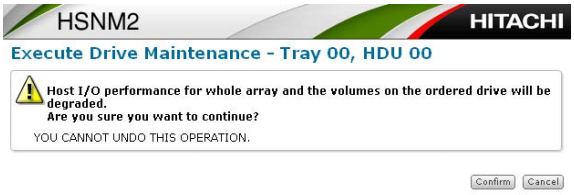
‡1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the "Arrays" window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

(iv) Select the [Maintenance] – [Drive Maintenance] in the unit window. Select a Drive to restore the system information, and then click the [Execute Drive Maintenance] button.



(v) The Execute Drive Maintenance window is displayed. Select the [System Copy], and then click the [OK] button.

(vi) The confirmation window is displayed. Click the [Confirm] button.



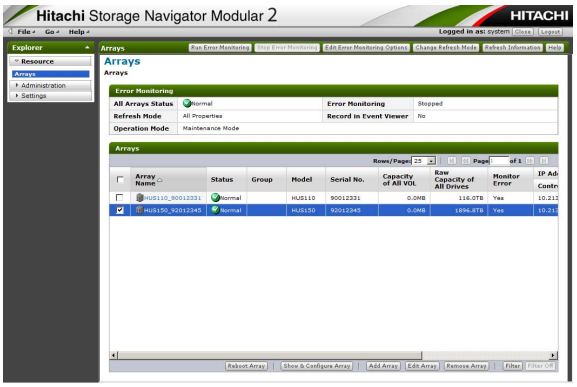
(vii) Click the [Close] button.

(viii) 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.

(b) When the Hitachi Storage Navigator Modular 2 version is less than 22.00

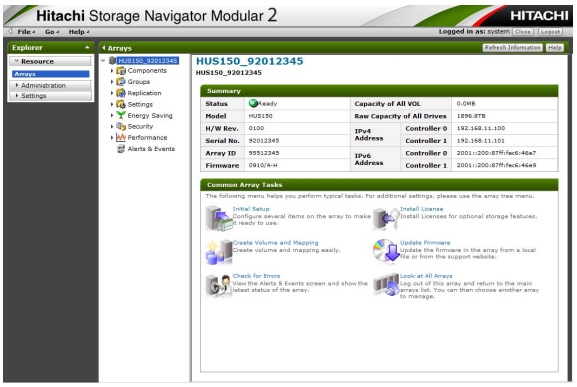
(i) Start the Hitachi Storage Navigator Modular 2.

(ii) Check the array 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.



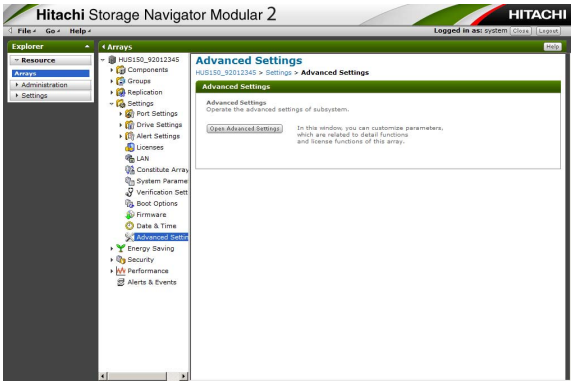
(iii) Click the array name, and open the unit window.

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 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).)

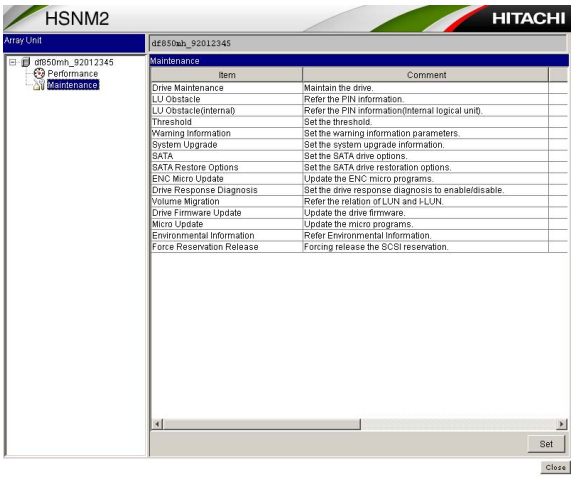


‡1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

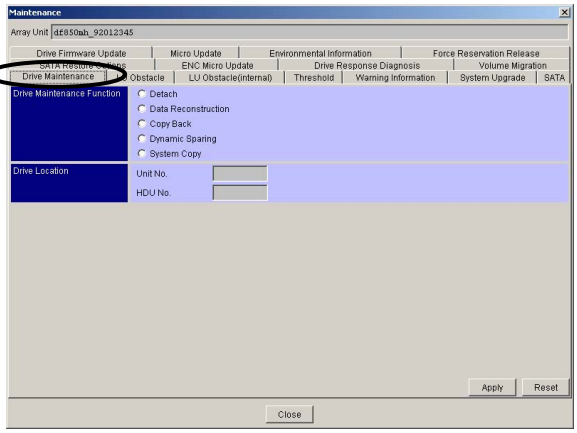
(iv) Select [Settings] – [Advanced Settings] on the unit window, and click the [Open Advanced Settings] button.



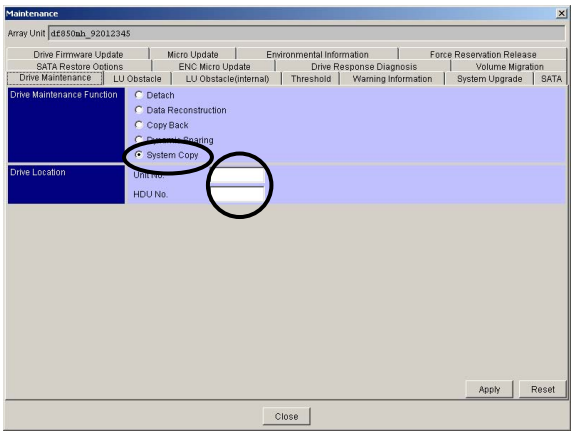
(v) Select the [Maintenance] on the applet window, and click the [Set] button. Maintenance dialog box is displayed.



(vi) Click the [Drive Maintenance] tab.

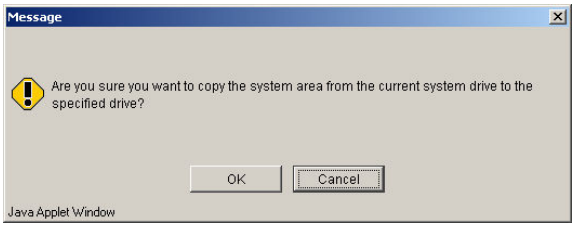


(vii) Select the [System Copy] and set the number of the Drive that has been added.



(viii) Click the [Apply] button.

(ix) The confirmation window is displayed. Click the [OK] button.



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

(xi) 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.

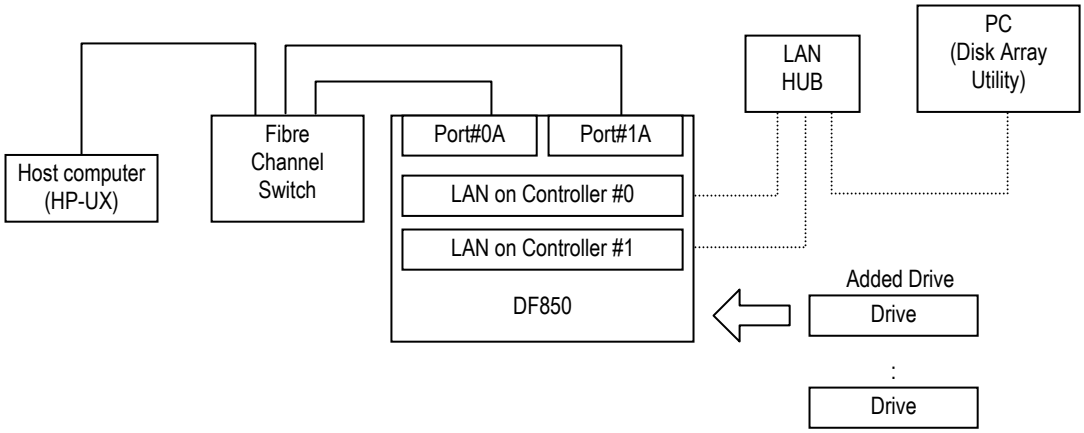
(6) Making a host computer recognize a Volume while the array power is on

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

An example of the procedure to make the Drive added while the array 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 DF850 are in the Ready status. (I/Os host computer can be continued)

(ii) Install the Drives to be added in the DF850.

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

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

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

(vi) Issue the "ioscan -nfC disk" command from the host computer to verify that the DF850 has been recognized by the host computer. (However, the status of the newly added Volume is displayed as NO-NW.)

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

(viii) Issue the "ioscan -nfC disk" command from the host computer to verify that the DF850 has been recognized by the host computer. (The status of the newly added Volume is displayed as CLAIMED.)

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

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

1.4.3 Adding a Cache Memory

This work is for CBSS/CBSL and for CBL.

NOTE : Cache Memory has the following types; for CBSS/CBSL and for CBL. Be careful not to use the wrong one at the time of replacement.

CAUTION

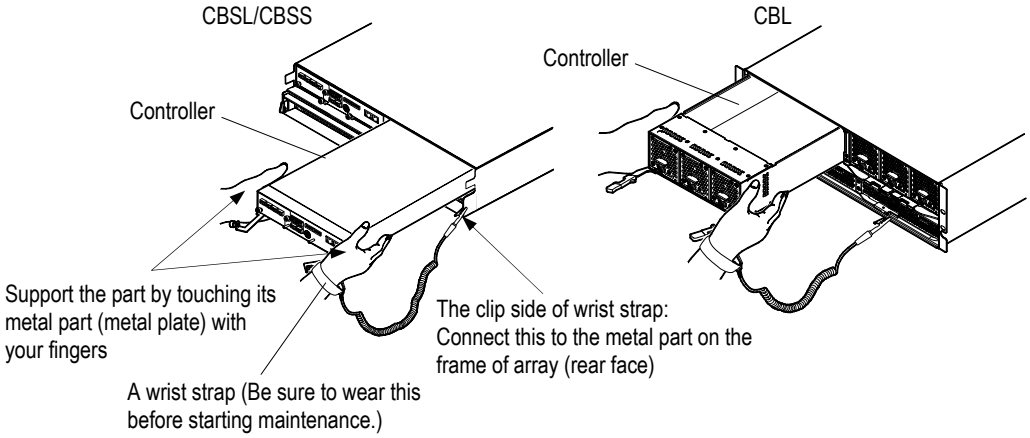
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

NOTICE

- **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 a Controller, 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 Controller is a precision instrument. Be sure to put on the wrist strap before starting work in order to protect Controller 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 Controller into the array, support the Controller as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • Do the work for both Controllers.
• After the work is completed, be sure to return the Controllers #0 and #1 to their original locations.

<Working Procedure>

(1) Turn off the main switch.
For the CBSL/CBSS, press the main switch on either Controller #0 or Controller #1 for three seconds or more.
Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

(2) Remove the power cables from two Power Units.
(3) Remove the Controller.
(3-1) For the CBSL/CBSS
(a) Loosen the right and left screws (blue).
(b) Open the right and left levers forward.
When the levers are completely opened, the Controller comes out forward.
(c) Remove all the cables connected to the Controller (When the Drive Box is connected, remove the SAS(ENC) cable, too.)

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 Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

CAUTION

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

(d) Slide the Controller forward to remove it.

(3-2) For the CBL
(a) Slide the right and left latches (blue), and then open the levers forward.
(b) Pull the right and left levers open.
When the levers are completely opened, the Controller comes out forward.

CAUTION

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

(c) Slide the Controller forward, and then remove it.

(4) Add a Cache Memory.

(4-1) For the CBSL/CBSS

(a) Place the Controller with it's Module revision label facing down and loosen the two screws (blue) from the rear side of the Controller, and then slide the cover to the direction shown by the arrow (⟶) and remove it.

(b) Remove the Cache Memory on the Controller.
Push the slot levers which fix the Cache Memory and pull up the Cache Memory by holding its both ends to remove the Cache Memory.

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

(c) Install the additional Cache Memory in the Controller.
Fit the projection inside the slot to the cut of Cache Memory, and push the Cache Memory in by holding both ends of Cache Memory until the slot levers are completely closed.

NOTE : • Install Cache Memories of the same capacity in the Controller #0 and Controller #1.
• Be sure to install a Cache Memory in both the slot #0 and slot #1.
• Install Cache Memories of the same capacity in the slot #0 and slot #1.

(iv) Slide and install the cover of the Controller, then fix the two screws (blue) from the rear side of the Controller to fix it.

(4-2) For the CBL

(a) Remove the Cache Memory on the Controller.
Push the slot levers which fix the Cache Memory and pull up the Cache Memory by holding its both ends to remove the Cache Memory.

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

(b) Install the additional Cache Memory in the Controller.
Fit the projection inside the slot to the cut of Cache Memory, and push the Cache Memory in by holding both ends of Cache Memory until the slot levers are completely closed.

NOTE : • Install Cache Memories of the same capacity in the Controller #0 and Controller #1.
• Be sure to install a Cache Memory in both the slot #0 and slot #1.
• Install Cache Memories of the same capacity in the slot #0 and slot #1.

(5) Install the Controller.

(5-1) For the CBSL/CBSS

(i) Insert and push the Controller all the way into the slot with its right and left levers completely opened.

NOTE : • Do not catch a SAS(ENC) cable when the Controller for the CBSL/CBSS is inserted.
• Install the Controller for the CBSL/CBSS with its Module revision label facing up.

(ii) Close the levers and tighten the right and left screws (blue) to fix the Controller.

(5-2) For the CBL

(a) Insert and push the Controller all the way into the slot with its right and left levers completely opened.

(b) Close the levers and slide the right and left latches (blue) to fix the Controller.

(6) In the dual Controller configuration, perform the steps (3) to (5) for the other Controller.

(7) For the CBSL/CBSS, connect all the removed cables to the Controller.

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 Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

(8) Connect the two power cables to the Controller Box.

(9) Turn on the main switch.

(10) Check that the READY LED (green) on the front of the Controller Box lights up, and the ALARM LED (red) and the WARNING LED (orange) go out[‡1]. The READY LED (green) on the front of the Controller Box may blink at high speed (for a maximum of 30 to 50 minutes, or 40 to 60 minutes for CBL (80 to 180 minutes when the DBW is connected to the CBL)) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Controller Box lights up.

(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 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 01-1620).)

(12) Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen. (Refer to WEB “2.4 Display of Exchangeable Parts Status (Parts Information)” (WEB 02-0070).)

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

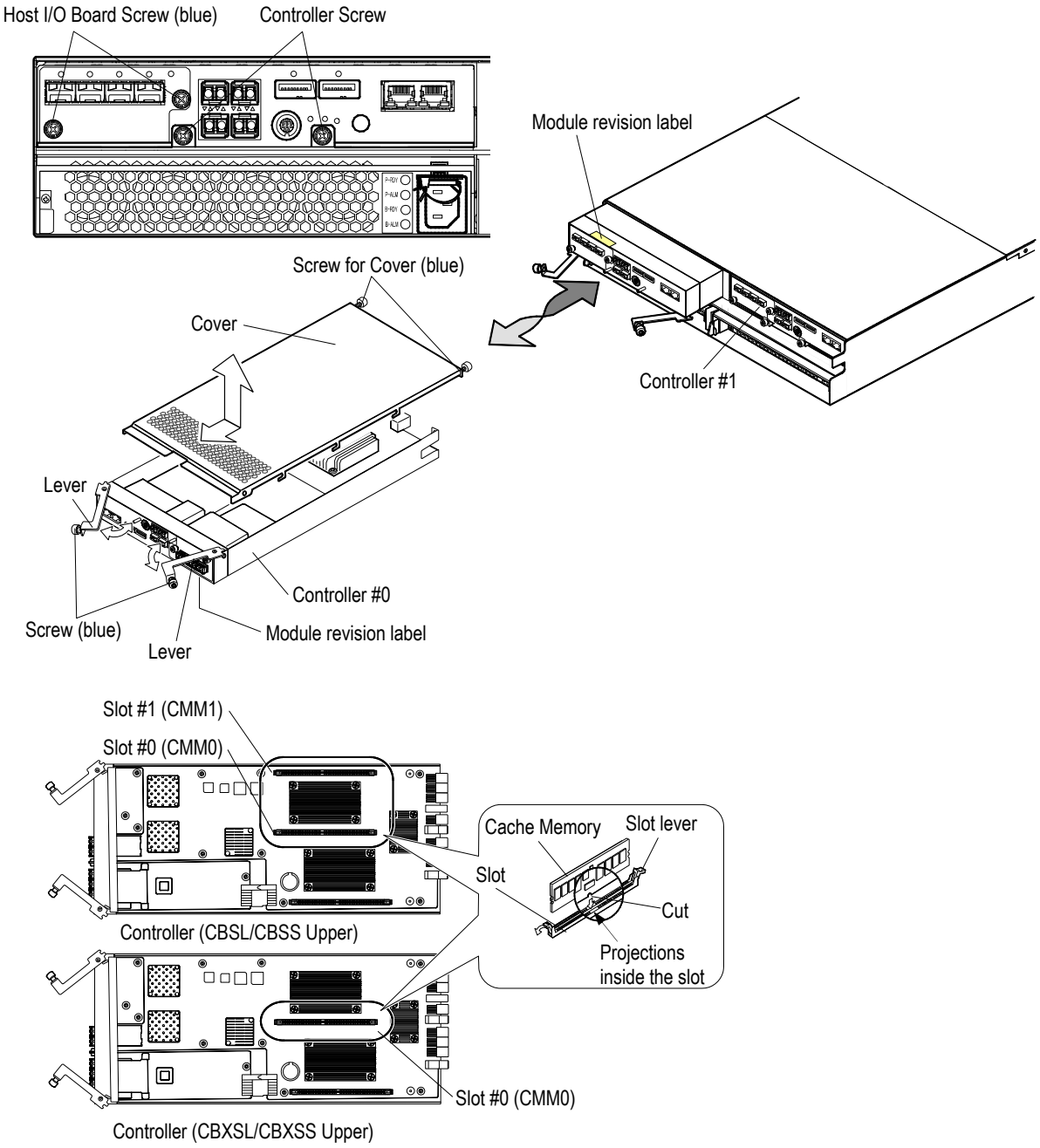


Figure 1.4.10 Adding Cache Memory (CBSL/CBSS)

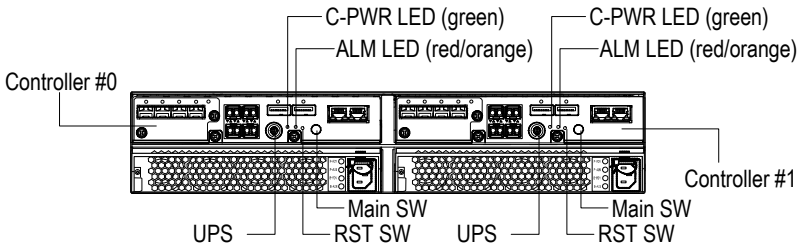


Figure 1.4.10.1 LED Locations on the Controller (CBSL/CBSS)

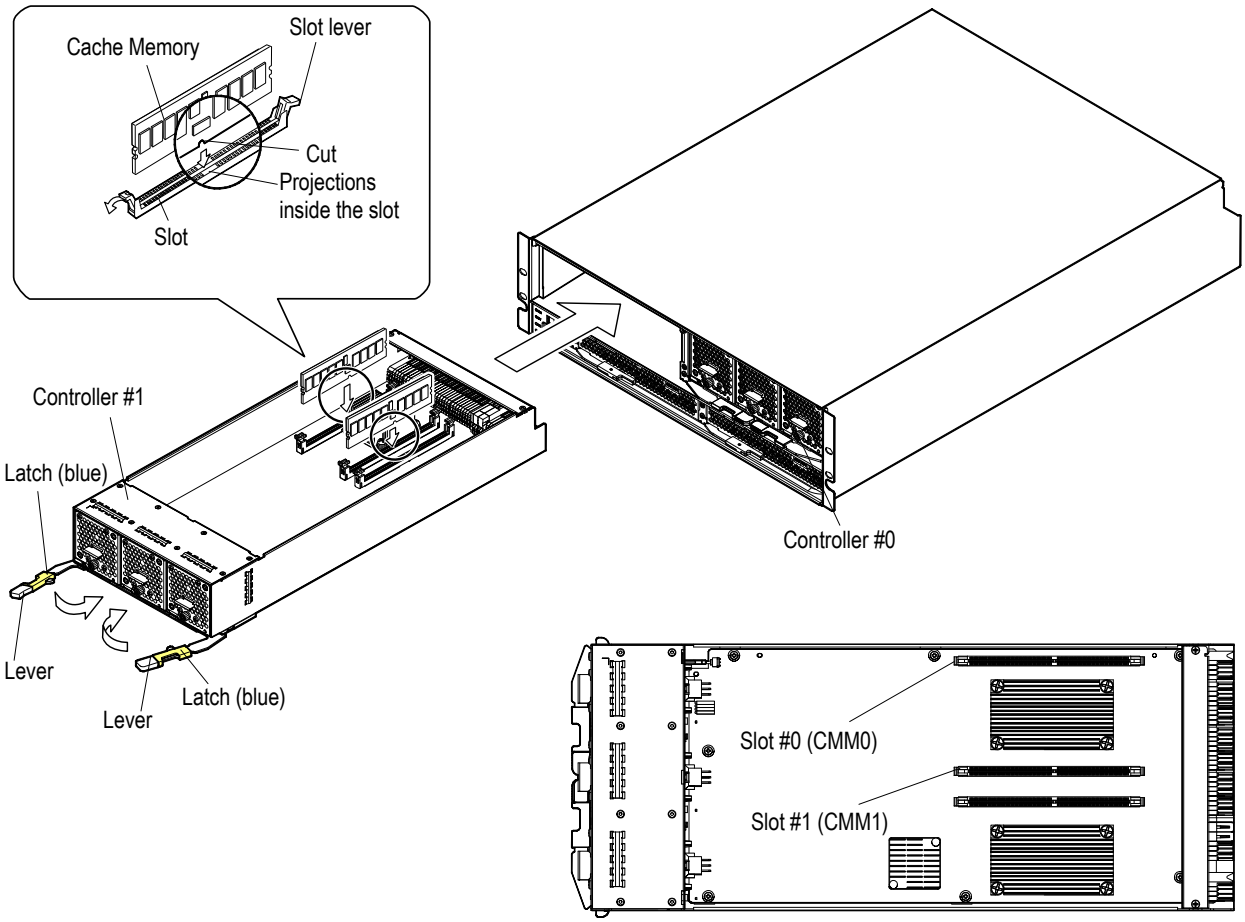


Figure 1.4.11 Adding Cache Memory (CBL)

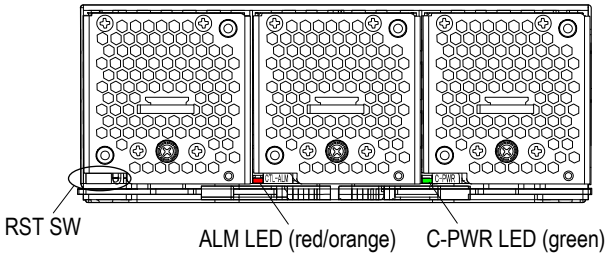


Figure 1.4.11.1 LED Locations on the Controller (CBL)

1.4.4 Adding a FC Host I/O Board/Module

CAUTION

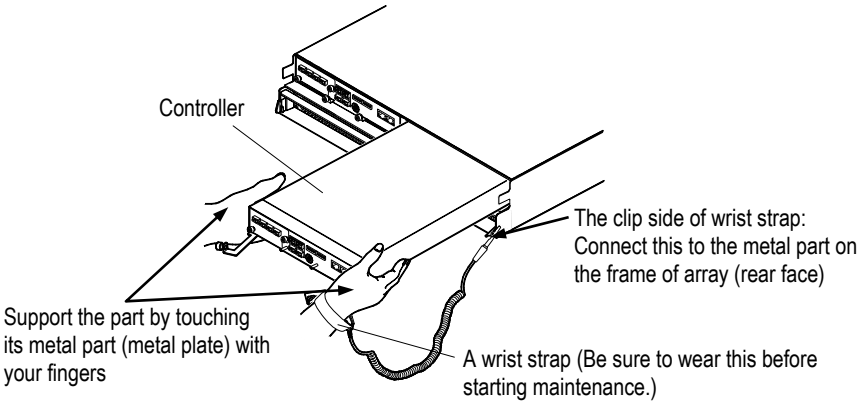
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

NOTICE

- **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 a Controller, 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 Controller is a precision instrument. Be sure to put on the wrist strap before starting work in order to protect Controller 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 Controller into the array, support the Controller as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : In the dual controller configuration, do the works for the both Controllers. In the single controller configuration, do the work for the Controller #0 only.

Addition procedure varies depending on the following.

- OFF (power is off) : "(1) Adding the FC Host I/O Board/Module offline (with the array power turned off)" (ADD 01-0510)
- ON (host is operating) : "(2) Adding the FC Host I/O Board/Module online (A host is in operation)" (ADD 01-0561)"

(1) Adding the FC Host I/O Board/Module offline (with the array power turned off)
The additional procedure for the CBSL/CBSS is different from the one for the CBL.

(1-1) For CBSL/CBSS

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the Host I/O Board of the different type is installed in the position where the Host I/O Board is currently installed(‡1), 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)

(b) Turn off the main switch.
Press the main switch on either Controller #0 or Controller #1 for three seconds or more. Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

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

NOTE : If the addition is performed without removing the power cable, the array cannot be recovered normally.

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

(d) Remove the Host I/O Board or dummy (Board) installed in the Controller.

CAUTION

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

(i) Remove the Host Connector installed in the Host I/O Board to be removed.
(ii) Loosen the two screws (blue) which fix the Host I/O Board.
(iii) Pull out and remove the Host I/O Board.

NOTE : Place the removed Host I/O Board and Host Connector temporarily in the place where anti-static measures are taken.

(e) Install the FC Host I/O Board in the Controller.

CAUTION

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

(i) Remove the Host Connector installed in an additional Host I/O Board.
(ii) Insert and push the additional FC Host I/O Board into the slot in the Controller.

NOTE : In the dual controller configuration, install the Host I/O Boards of the same type in the same position of the Controller #0 and #1.

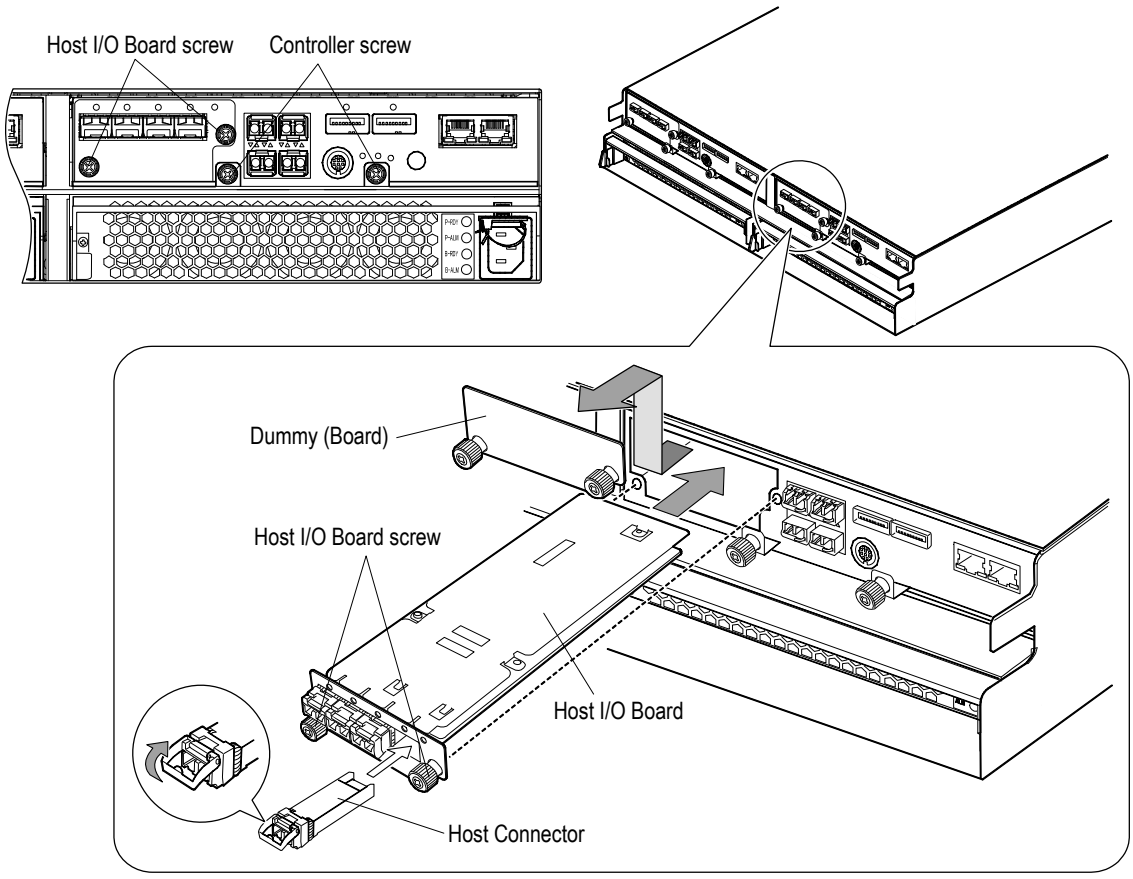
(iii) Tighten the two screws to fix the FC Host I/O Board.
(iv) Install the Host Connector in the Host I/O Board.

(f) In the dual controller configuration, perform the steps (d) to (e) for the other Controller.
(g) Connect the power cables to the Power Units.
(h) Turn on the main switch.
(i) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(j) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 30 to 50 minutes).
(k) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

(l) Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

(m) For the port on the added FC Host I/O Board, configure the host group and Fibre Channel port setting. (Refer to System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000), and Hitachi Storage Navigator Modular 2 Help "FC Settings".)



*1 : The figure shows the case where the FC Host I/O Board is installed in the Controller of the CBSL.

Figure 1.4.12 Adding a FC I Host I/O Board (CBSL/CBSS)

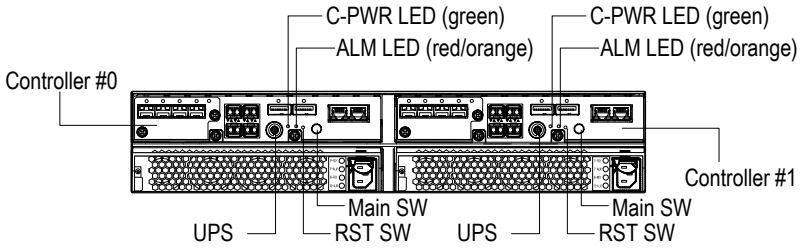


Figure 1.4.13 LED Locations on the Controller (CBSL/CBSS)

(1-2) For CBL

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Module is changed(‡1) or when the Host I/O Module of the different type is installed in the position where the Host I/O Module 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)

(b) Turn off the main switch.

Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

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

NOTE : When the addition is performed without removing the power cable, the array cannot be recovered normally.

(d) Remove the interface cables from the additional Host I/O Module.

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 Interface cables, pull out the interface cables completely from the host connectors.
  If the interface cables are inserted half in the host connectors, the Controller continues to detect the failures, and the I/O processing of the Controller may be deteriorated.

‡1 : Even if the installed Host I/O Module is changed to the uninstalled, the configuration information is maintained in the array.

(e) Remove the Host I/O Module or dummy (Module).

CAUTION

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

(i) Loosen one screw (blue) which fixes the Host I/O Module or dummy (Module) and then tilt the lever toward you. When the lever is completely tilted, the Host I/O Module or dummy (Module) comes out forward.
(ii) Pull out and remove the Host I/O Module or dummy (Module).

NOTE : Place the removed Host I/O Module or dummy (Module) in the place where anti-static measures are taken.

(f) Install the Host I/O Module (FC).

CAUTION

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

(i) Insert and push the additional Host I/O Module (FC) with its lever completely opened.
(ii) Close the lever and tighten one screw (blue) to fix the Host I/O Module (FC).

(g) In the dual controller configuration, perform the steps (d) to (f) for the other Controller.
(h) Connect the interface cable to the added Host I/O Module.

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 Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

(i) Connect the power cables to the Power Units.
(j) Turn on the main switch.
(k) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(l) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 40 to 60 minutes (80 to 180 minutes when the DBW is connected to the CBL)).

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

(m) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

(n) Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

(o) For the port on the added FC Host I/O Module, configure the host group and Fibre Channel port setting. (Refer to System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000), and Hitachi Storage Navigator Modular 2 Help "iSCSI Settings".)

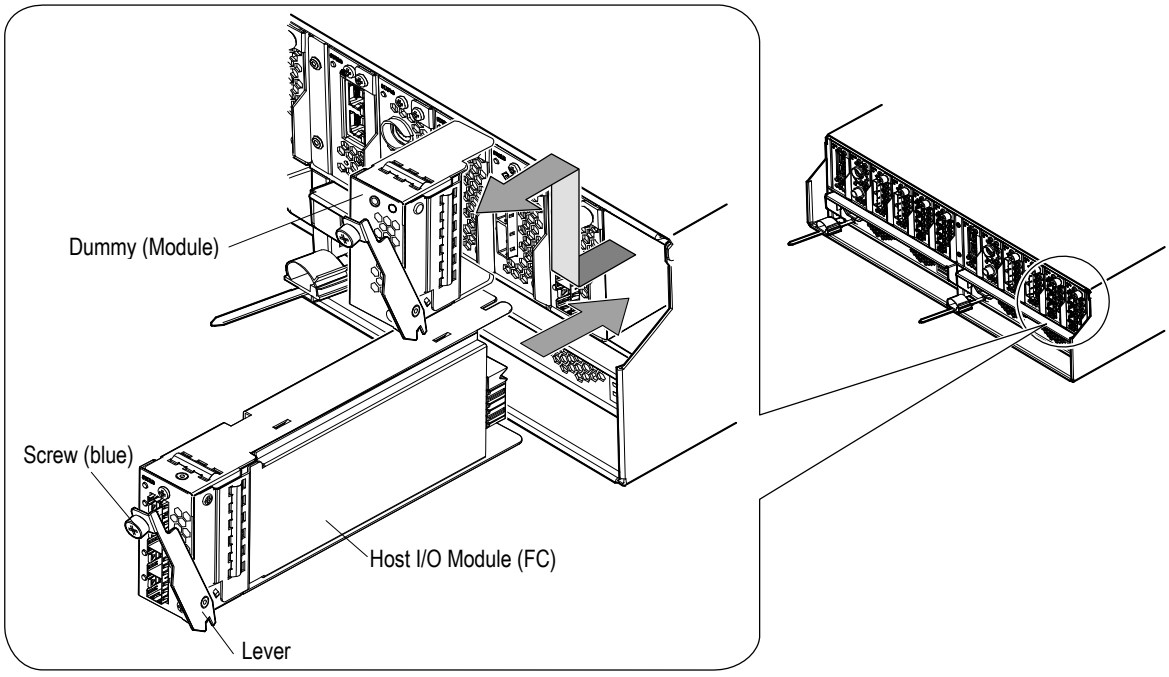


Figure 1.4.14 Adding a FC Host I/O Module (CBL)

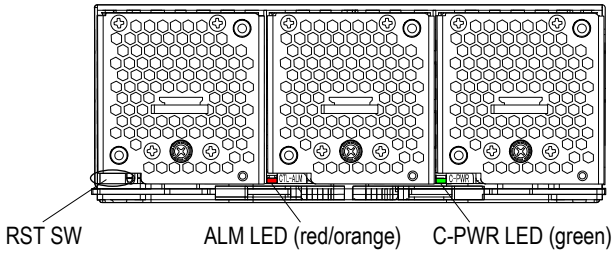


Figure 1.4.15 LED Locations on the Controller (CBL)

(2) Adding the FC Host I/O Board/Module online (A host is in operation)
Perform the additional operation of the Host I/O Board/Module in accordance with the Hitachi Storage Navigator Modular 2 window in the following procedure.

(2-1) Perform the prior check of the addition operation.
Check the following items before adding the Host I/O Board/Module.

(a) Check that the support version is as follows.
Firmware version : 0925/A or later
Hitachi Storage Navigator Modular 2 version : Ver.22.50 or later

(b) Check that the Controller is in the dual configuration.

(c) Check if the slot is empty to which the Host I/O Board/Module will be mounted. If you change the type of the Host I/O Board/Module, refer to "Chapter 5. Host I/O Replacement for Changing the Host I/O Type" (ADD 05-0000).

(d) As the configuration of the Host I/O Module types installed in the Host I/O Module of the CBL, iSCSI is installed in either or both of Slot E and Slot F and the Fibre Channel is not installed (refer to Table 1.4.2 Before addition). Therefore, when adding (including changing types) the Fibre Channel in either Slot E or Slot F, if the firmware version is less than 0935/A, complete the update installation to upgrade the firmware version to 0935/A or more and then perform the addition. (Refer to Firmware "1.3 Preparation for Installation of Firmware" (FIRM 01-0020).)

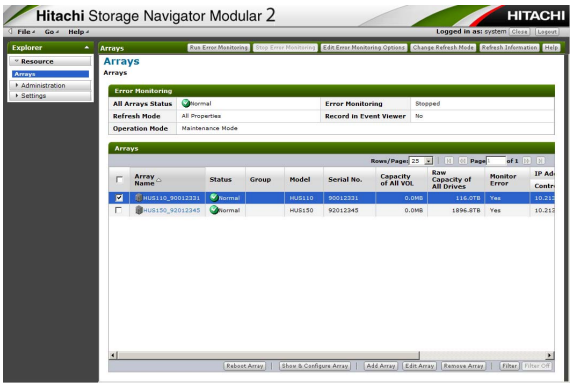
Table 1.4.2 Configuration of Host I/O Module Types

No.	Configuration of Host I/O Modules before addition		Configuration of Host I/O Modules after addition	
	Slot E	Slot F	Slot E	Slot F
1	iSCSI	Unmount	iSCSI	Fibre Channel
2	Unmount	iSCSI	Fibre Channel	iSCSI
3	iSCSI	iSCSI	Fibre Channel	iSCSI
4			iSCSI	Fibre Channel

(2-2) Addition operation

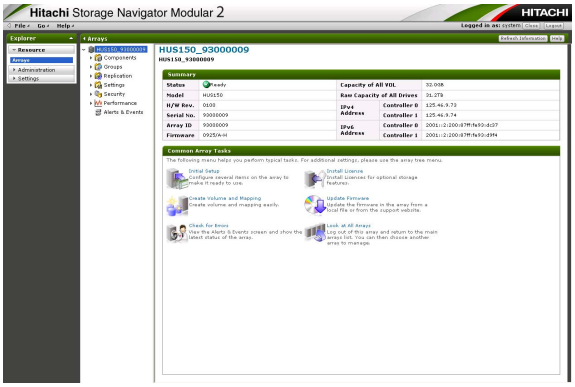
(a) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to be added, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to "Maintenance Mode".(‡1)

Check that "Maintenance Mode" is displayed in [Operation Mode] on the top of the main window.



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

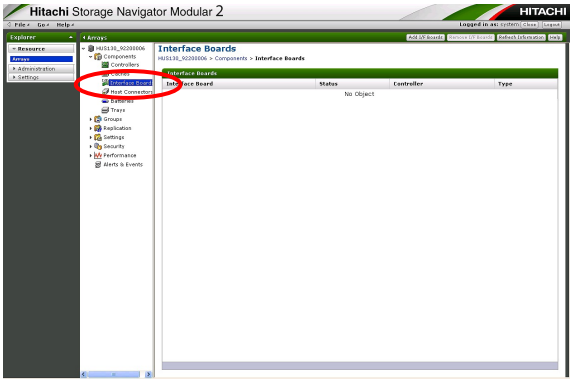
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2" (SYSPR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



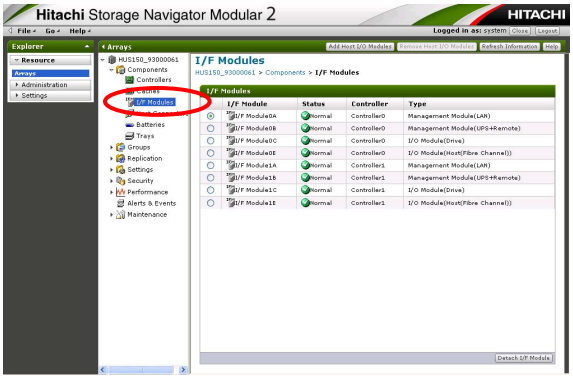
‡1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the "Arrays" window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

(c) Select [Component] – [Interface Boards] ([I/F Modules] in case of CBL) in the unit window.

For CBSS/CBSL

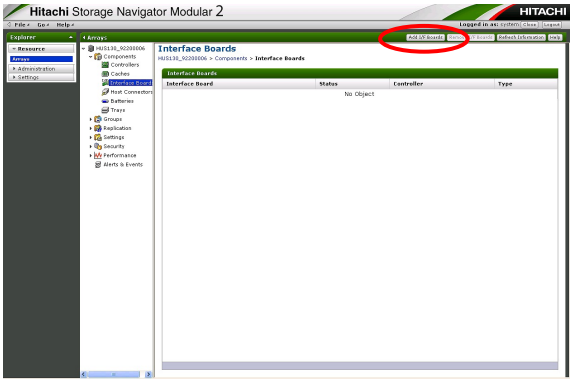


For CBL

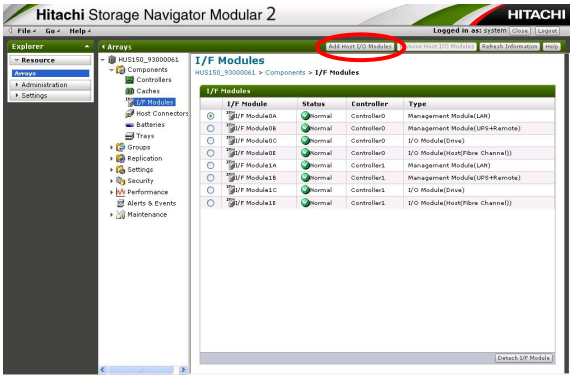


(d) Press the [Add I/F Boards] ([Add Host I/O Modules] in case of CBL) button in the Interface Boards (I/F Modules in case of CBL) window.

For CBSS/CBSL



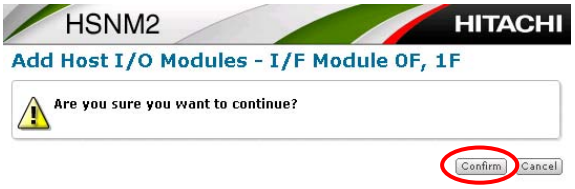
For CBL



(e) The confirmation screen appears for the Add I/F Boards (Add Host I/O Modules in case of CBL). Click [Confirm].

For CBSS/CBSL

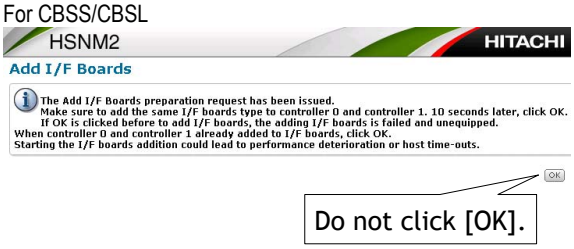
For CBL



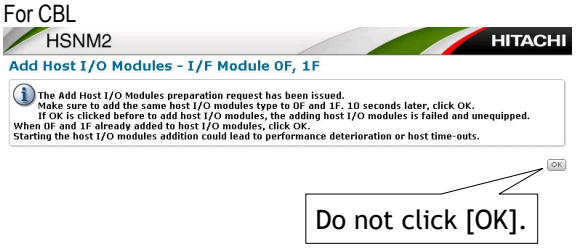
(f) The addition preparation complete screen appears after you complete the addition preparation.

NOTE : Do not click [OK] at this time.

For CBSS/CBSL



For CBL



(g) Remove the dummy (Module/Board).

(i) For CBSS/CBSL, loosen the two screws that fix the dummy (Board). For CBL, loosen the one screw (blue) that fixes the dummy (Module) to pull the lever. If you pull the lever completely, the dummy (Module) sticks out.

(ii) Pull out and remove the dummy (Module/Board).

(h) Install a FC Host I/O Board/Module.

(h-1) For CBSS/CBSL

(i) Remove the Host Connector installed in an additional Host I/O Board.

(ii) Insert and push the additional FC Host I/O Board into the slot in the Controller.

NOTE : Install the Host I/O Boards of the same type in the same position of the Controller #0 and #1.

(iii) Tighten the two screws to fix the FC Host I/O Board.

(iv) Install the Host Connector in the Host I/O Board.

(h-2) For CBL

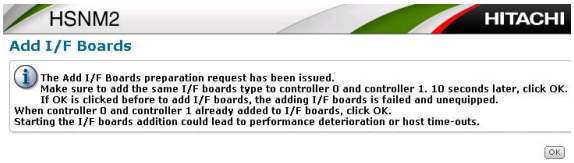
(i) Insert and push the additional Host I/O Module (FC) with its lever completely opened.

NOTE : Install the Host I/O Modules of the same type in the same position of the Controller #0 and #1.

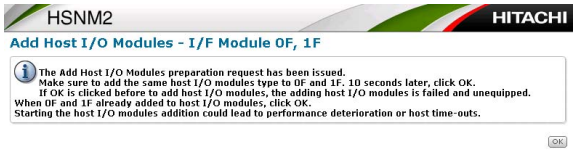
(ii) Close the lever and tighten one screw (blue) to fix the Host I/O Module (FC).

(i) Click [OK] in 10 seconds after the FC Host I/O Board/Module is correctly inserted.

For CBSS/CBSL

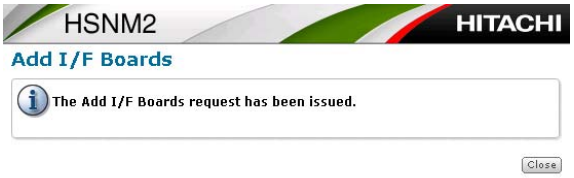


For CBL



(j) Click the [Close] button.

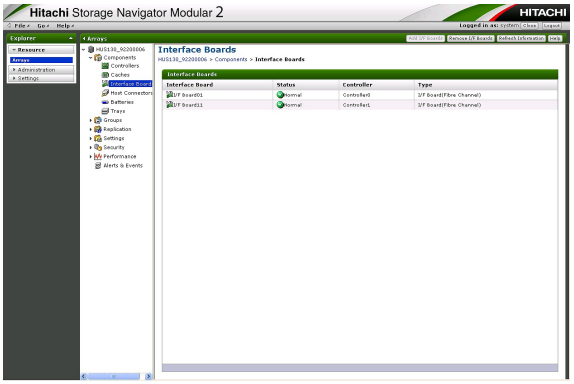
For CBSS/CBSL



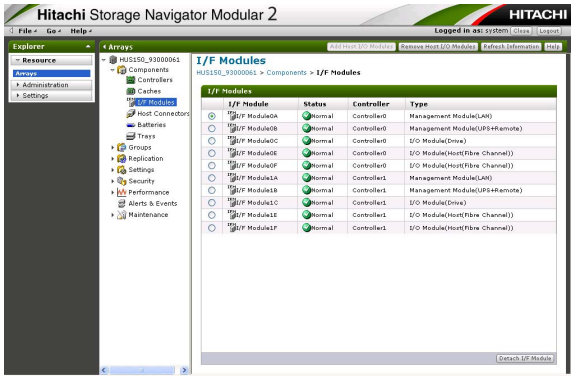
For CBL

(k) If you finish the addition, the [Status] of the [Interface Boards] ([I/F Modules] in case of CBL) becomes “Normal”. Click [Refresh Information] to update the screen, and then check if the [Status] of the [Interface Boards] (I/F Modules in case of CBL) is “Normal”.

For CBSS/CBSL



For CBL



(l) Check that the READY LED (green) on the front of the Controller Box 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.

(m) Connect the interface cable to the added Host I/O Module.

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 Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

(n)Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

(o) For the port on the added FC Host I/O Board/Module, configure the host group and Fibre Channel port setting. (Refer to System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000), and Hitachi Storage Navigator Modular 2 Help "iSCSI Settings".)

1.4.5 Adding an iSCSI Host I/O Board/Module

CAUTION

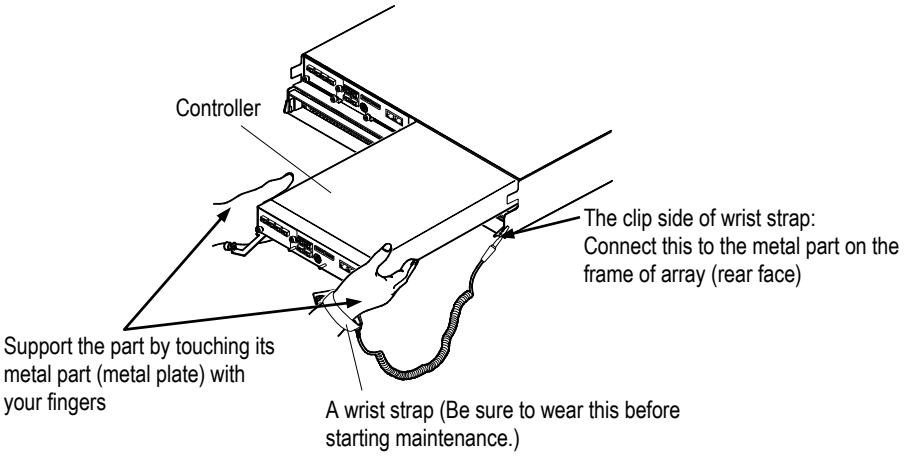
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

NOTICE

- **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 a Controller, 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 Controller is a precision instrument. Be sure to put on the wrist strap before starting work in order to protect Controller 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 Controller into the array, support the Controller as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : In the dual controller configuration, do the works for the both Controllers. In the single controller configuration, do the work for the Controller #0 only.

Addition procedure varies depending on the following.

- OFF (power is off) : "(1) Adding the iSCSI Host I/O Board/Module offline (with the array power turned off)" (ADD 01-0590)
- ON (host is operating) : "(2) Adding the iSCSI Host I/O Board/Module online (A host is in operation)" (ADD 01-0632)"

(1) Adding the iSCSI Host I/O Board/Module offline (with the array power turned off)
The additional procedure for the CBXSL/CBXSS/CBSL/CBSS is different from the one for the CBL.

(1-1) For CBXSL/CBXSS/CBSL/CBSS

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Board is changed(‡1) or when the Host I/O Board of the different type is installed in the position where the Host I/O 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)

(b) Turn off the main switch.
Press the main switch on either Controller #0 or Controller #1 for three seconds or more. Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

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

NOTE : If the addition is performed without removing the power cable, the array cannot be recovered normally.

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

(d) Remove the Host I/O Board or dummy (Board) installed in the Controller.

CAUTION

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

(i) Loosen the two screws (blue) which fix the Host I/O Board.
(ii) Pull out and remove the Host I/O Board.

NOTE : Place the removed Host I/O Board temporarily in the place where anti-static measures are taken.

(e) Install the iSCSI Host I/O Board in the Controller.

CAUTION

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

(i) Insert and push the additional iSCSI Host I/O Board into the slot on the Controller.

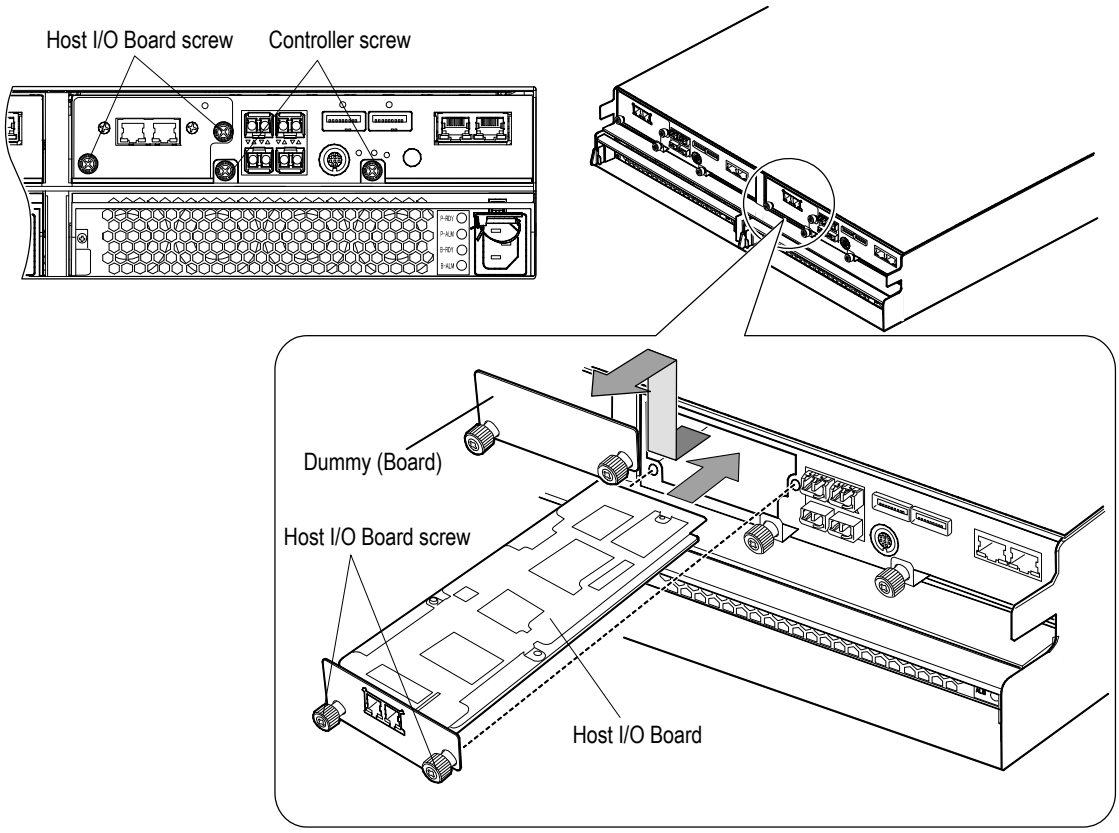
NOTE : In the dual controller configuration, install the Host I/O Boards of the same type in the same position of the Controller #0 and #1.

(ii) Tighten the two screws to fix the iSCSI Host I/O Board.
(f) In the dual controller configuration, perform the steps (d) to (e) for the other Controller.
(g) Connect the power cables to the Power Units.
(h) Turn on the main switch.
(i) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(j) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 30 to 50 minutes).
(k) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

(l) Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

(m) For the port on the added iSCSI Host I/O Board, configure the target and iSCSI port setting. (Refer to System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000), and Hitachi Storage Navigator Modular 2 Help "iSCSI Settings".)



*1 : The figure shows the case where the iSCSI Host I/O Board is installed in the Controller of the CBSL.

Figure 1.4.16 Adding an iSCSI Host I/O Board (CBXSL/CBXSS/CBSL/CBSS)

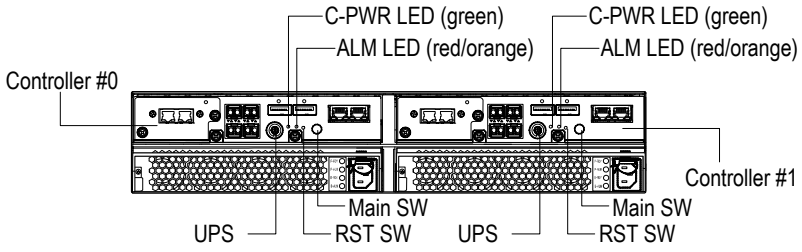


Figure 1.4.17 LED Locations on the Controller (CBXSL/CBXSS/CBSL/CBSS)

(1-2) For CBL

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Module is changed(‡1) or when the Host I/O Module of the different type is installed in the position where the Host I/O Module 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)

(b) Turn off the main switch.

Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

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

NOTE : When the addition is performed without removing the power cable, the array cannot be recovered normally.

(d) Remove the interface cables from the additional Host I/O Module.

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 Interface cables, pull out the interface cables completely from the host connectors.
  If the interface cables are inserted half in the host connectors, the Controller continues to detect the failures, and the I/O processing of the Controller may be deteriorated.

‡1 : Even if the installed Host I/O Module is changed to the uninstalled, the configuration information is maintained in the array.

(e) Remove the Host I/O Module or dummy (Module).

CAUTION

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

(i) Loosen one screw (blue) which fixes the Host I/O Module or dummy (Module) and then tilt the lever toward you. When the lever is completely tilted, the Host I/O Module or dummy (Module) comes out forward.
(ii) Remove the Host I/O Module or dummy (Module).

NOTE : Place the removed Host I/O Module or dummy (Module) in the place where anti-static measures are taken.

(f) Install the Host I/O Module (iSCSI).

CAUTION

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

(i) Insert and push the additional Host I/O Module (iSCSI) with its lever completely opened.
(ii) Close the lever and tighten one screw (blue) to fix the Host I/O Module (iSCSI).

(g) In the dual controller configuration, perform the steps (d) to (f) for the other Controller.
(h) Connect the interface cable to the added Host I/O Module.

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

(i) Connect the power cables to the Power Units.
(j) Turn on the main switch.
(k) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(l) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 40 to 60 minutes (80 to 180 minutes when the DBW is connected to the CBL)).

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

(m) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

(n) Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070)).

(o) For the port on the added iSCSI Host I/O Module, configure the target and iSCSI port setting. (Refer to System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000), and Hitachi Storage Navigator Modular 2 Help "iSCSI Settings".)

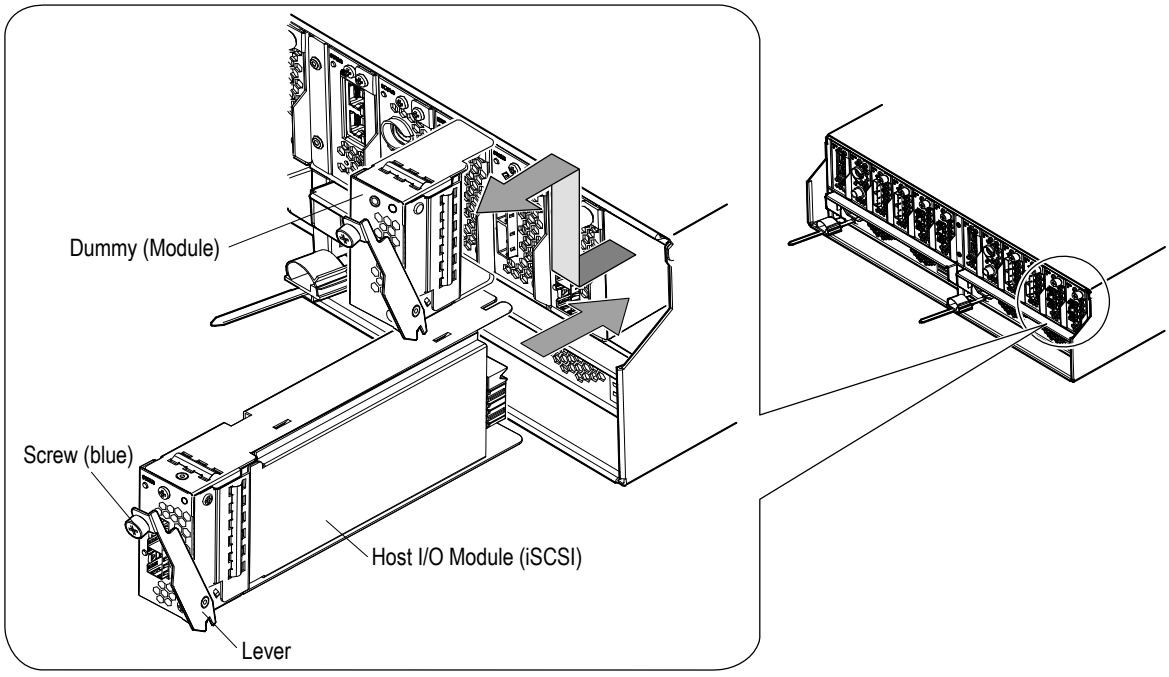


Figure 1.4.18 Adding an iSCSI Host I/O Module (CBL)

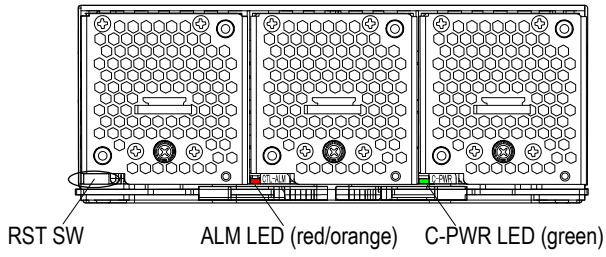


Figure 1.4.19 LED Locations on the Controller (CBL)

(2) Adding the iSCSI Host I/O Board/Module online (A host is in operation)
Perform the additional operation of the iSCSI Host I/O Board/Module in accordance with the Hitachi Storage Navigator Modular 2 window in the following procedure.

(2-1) Perform the prior check of the addition operation.
Check the following items before adding the iSCSI Host I/O Board/Module.

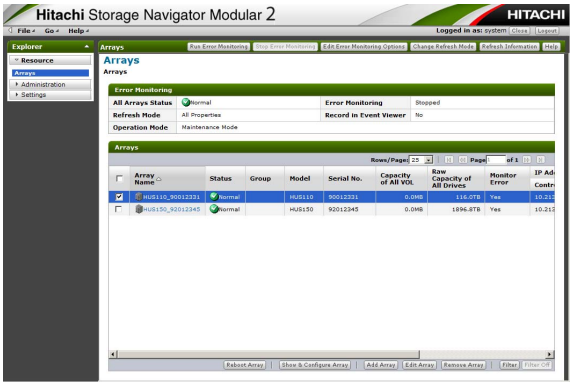
(a) Check that the support version is as follows.
Firmware version : 0925/A or later
Hitachi Storage Navigator Modular 2 version : Ver.22.50 or later

(b) Check that the Controller is in the dual configuration.

(c) Check if the slot is empty to which the iSCSI Host I/O Board/Module will be mounted. If you change the type of the iSCSI Host I/O Board/Module, refer to "Chapter 5. Host I/O Replacement for Changing the Host I/O Type" (ADD 05-0000).

(2-2) Addition operation

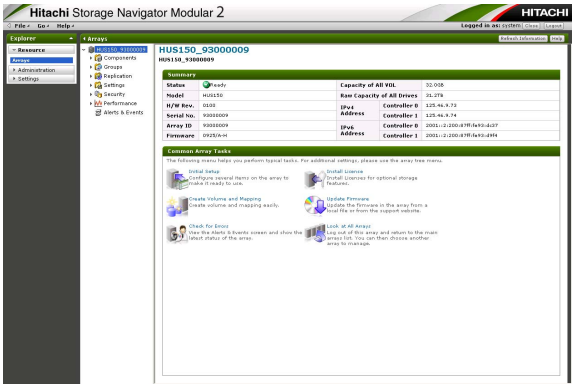
(a) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to be added, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to "Maintenance Mode".(‡1)
Check that "Maintenance Mode" is displayed in [Operation Mode] on the top of the main window.



‡1 : When the array 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.

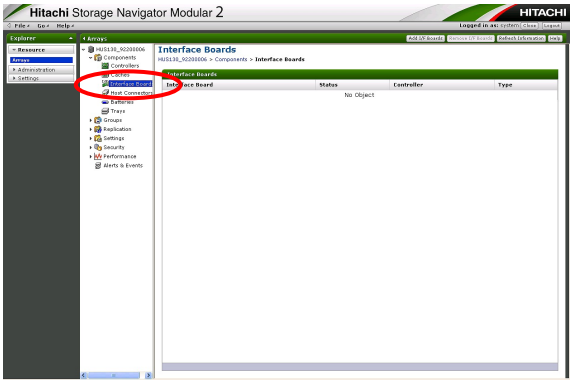
(b) Click the array name, and open the unit window.

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 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).)

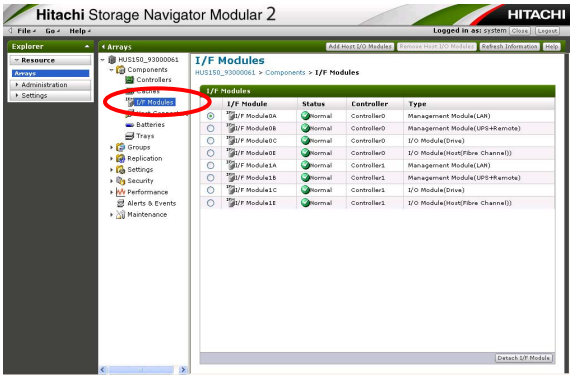


(c) Select [Component] – [Interface Boards] ([I/F Modules] in case of CBL) in the unit window.

For CBXSL/CBXSS/CBSL/CBSS

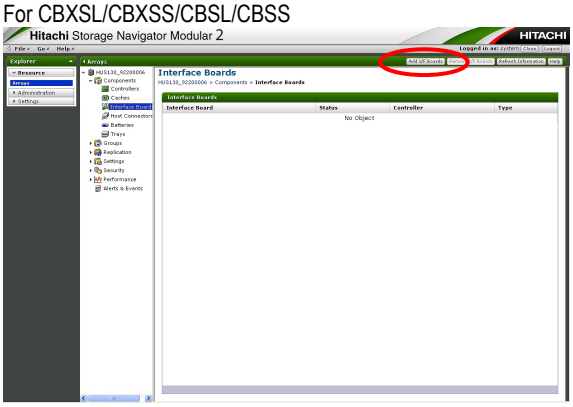


For CBL

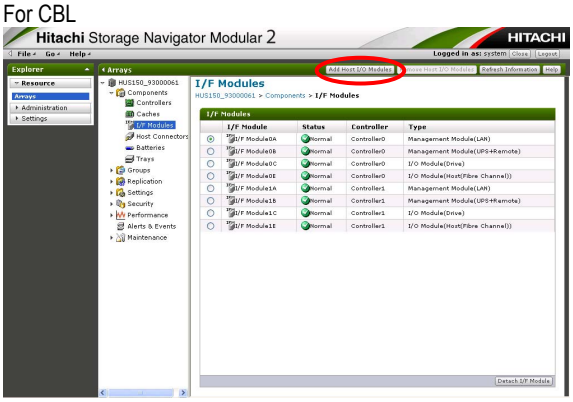


(d) Press the [Add I/F Boards] ([Add Host I/O Modules] in case of CBL) button in the Interface Boards (I/F Modules in case of CBL) window.

For CBXSL/CBXSS/CBSL/CBSS



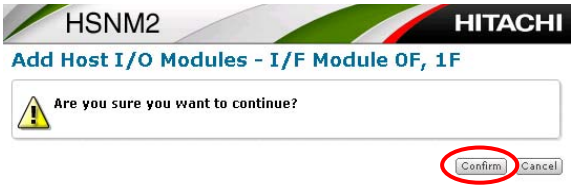
For CBL



(e) The confirmation screen appears for the Add I/F Boards (CBL : Add Host I/O Modules). Click [Confirm].

For CBXSL/CBXSS/CBSL/CBSS

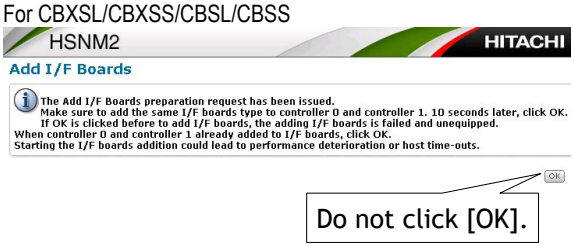
For CBL



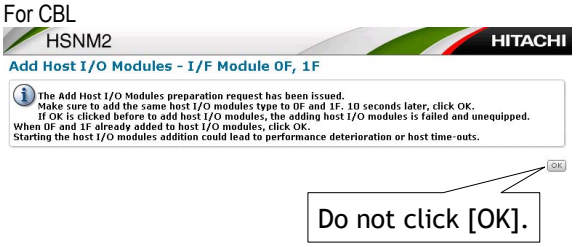
(f) The addition preparation complete screen appears after you complete the addition preparation.

NOTE : Do not click [OK] at this time.

For CBXSL/CBXSS/CBSL/CBSS



For CBL



(g) Remove the dummy (Module/Board).

(i) For CBXSL/CBXSS/CBSL/CBSS, loosen the two screws that fix the dummy (Board). For CBL, loosen the one screw (blue) that fixes the dummy (Module) to pull the lever. If you pull the lever completely, the dummy (Module) sticks out.

(ii) Pull out and remove the dummy (Module/Board).

(h) Install a iSCSI Host I/O Board/Module.

(h-1) CBXSL/CBXSS/CBSL/CBSS

(i) Insert and push the additional iSCSI Host I/O Board into the slot in the Controller.

NOTE : Install the Host I/O Boards of the same type in the same position of the Controller #0 and #1.

(ii) Tighten the two screws to fix the iSCSI Host I/O Board.

(h-2) For CBL

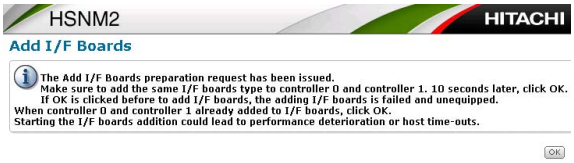
(i) Insert and push the additional iSCSI Host I/O Module with its lever completely opened.

NOTE : Install the Host I/O Modules of the same type in the same position of the Controller #0 and #1.

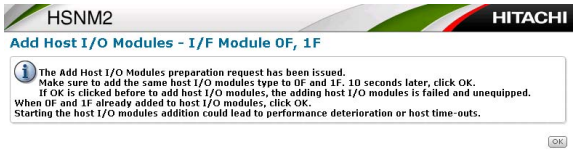
(ii) Close the lever and tighten one screw (blue) to fix the iSCSI Host I/O Module.

(i) Click [OK] in 10 seconds after the iSCSI Host I/O Board/Module is correctly inserted.

For CBXSL/CBXSS/CBSL/CBSS

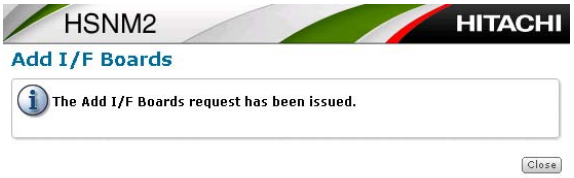


For CBL



(j) Click the [Close] button.

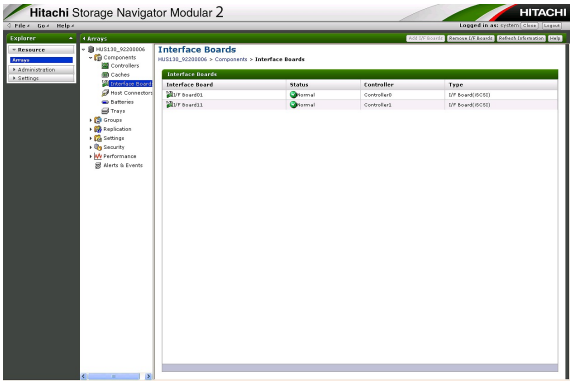
For CBXSL/CBXSS/CBSL/CBSS



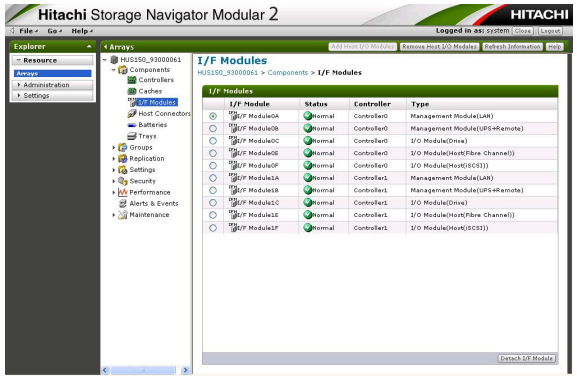
For CBL

(k) If you finish the addition, the [Status] of the [Interface Boards] ([I/F Modules] in case of CBL) becomes “Normal”. Click [Refresh Information] to update the screen, and then check if the [Status] of the [Interface Boards] ([I/F Modules] in case of CBL) is “Normal”.

For CBXSL/CBXSS/CBSL/CBSS



For CBL



(l) Check that the READY LED (green) on the front of the Controller Box 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.

(m) Connect the interface cable to the added Host I/O Board/Module.

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

(n) Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

(o) For the port on the added iSCSI Host I/O Board/Module, configure the target and iSCSI port setting. (Refer to System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000), and Hitachi Storage Navigator Modular 2 Help "iSCSI Settings".)

1.4.6 Adding a Controller

An addition of the Controller is done when duplicating the Controller.

CAUTION

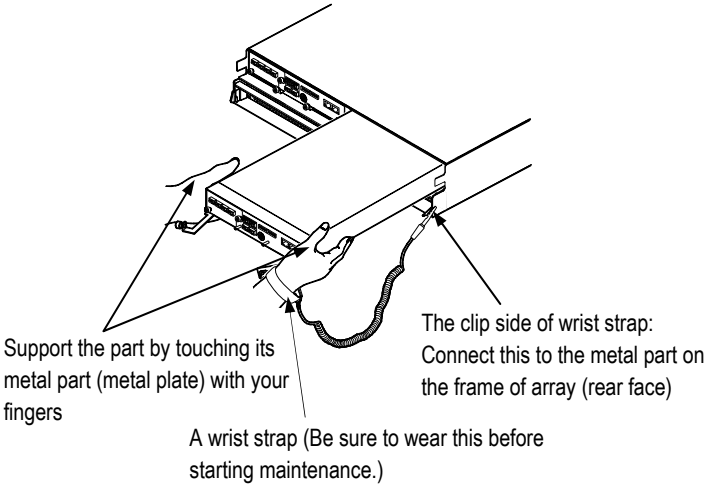
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

NOTICE

- **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 a Controller, 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 Controller is a precision instrument. Be sure to put on the wrist strap before starting work in order to protect Controller 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 Controller into the array, support the Controller as touching its metal part with fingers of your hand that wears a wrist strap.



<Working Procedure>

(1) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Board is changed(‡1) or when the Host I/O Board of the different type is installed in the position where the Host I/O 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.
Press the main switch on the Controller #0 side for three seconds or more. When the main switch is turned off and it is enabled, the C-PWR LED (green) of the Controller goes on after blinking for three seconds, and then it goes out.
Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller is blinking at high speed, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

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

NOTE : If the addition is performed without removing the power cable, the array cannot be recovered normally.

(4) Remove the dummy (Controller).
Loosen the right and left screws (blue) fixing the dummy (Controller), open the lever toward you and remove the dummy (Controller).

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

(5) Add a Controller #1.

NOTE : Make the configuration of the Controller to be added the same as that of Controller #0.

(a) Install the Cache Memory in the Controller #1.

(i) Place the Controller so that the Module revision label facing down, loosen two screws (blue) on the rear of the Controller and slide the cover to the arrow direction (⟶) to remove the cover.

(ii) Install the Cache Memory in the Controller.
Match the slit of the Cache Memory and the projection in the slot, hold both ends of the Cache Memory and press it until the slot lever completely straightens.

(iii) Slide the cover of the Controller to install, tighten two screws on the rear of the Controller and fix the cover.

(b) When the iSCSI Host I/O Board is installed in the Controller #0, install the iSCSI Host I/O Board in the Controller #1.
When the iSCSI Host I/O Board is not installed in the Controller #0, proceed to the procedure (c).

⚠ CAUTION

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

(i) Loosen two screws fixing the dummy (Board), pull out the dummy (Board) and remove it.

(ii) Insert the iSCSI Host I/O Board into the slot of the Controller #1 to be added and push it.

(iii) Tighten two screws and fix the iSCSI Host I/O Board.

(c) Make the right and left levers of the Controller #1 to be added completely open, insert it into the slot and push it all the way.

NOTE : • Do not catch a SAS(ENC) cable when the Controller is inserted.
• Install the Controller with its Module revision label facing up.

(d) Close the levers and tighten the right and left screws (blue) to fix the Controller.

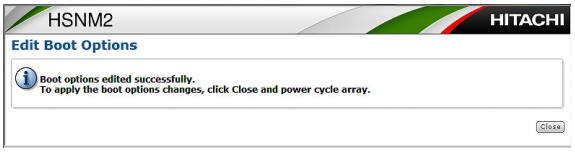
(6) Connect the interface cable, the LAN cable, and the SAS(ENC) cable.

NOTE : • When connecting the Interface cable and the SAS(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 Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

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

(8) Turn on the main switch.
Press the main switch on the Controller #0 side for one second or more.
(9) Make sure that the READY LED (green) on the front side of the Controller BOX comes on.
(10) Connect the PC to be connected with Hitachi Storage Navigator Modular 2 and the Controller #0 with a LAN cable. (Refer to System Parameter "1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Array" (SYSPR 01-0020).)
(11) Set the System Startup Attribute of Boot Option to the Dual Active Mode to operate it by the dual system. (Refer to System Parameter "8.1 Setting Boot Options" (SYSPR 08-0000).)
(12) The following message is displayed. Check the checkbox and click the [Confirm] button.

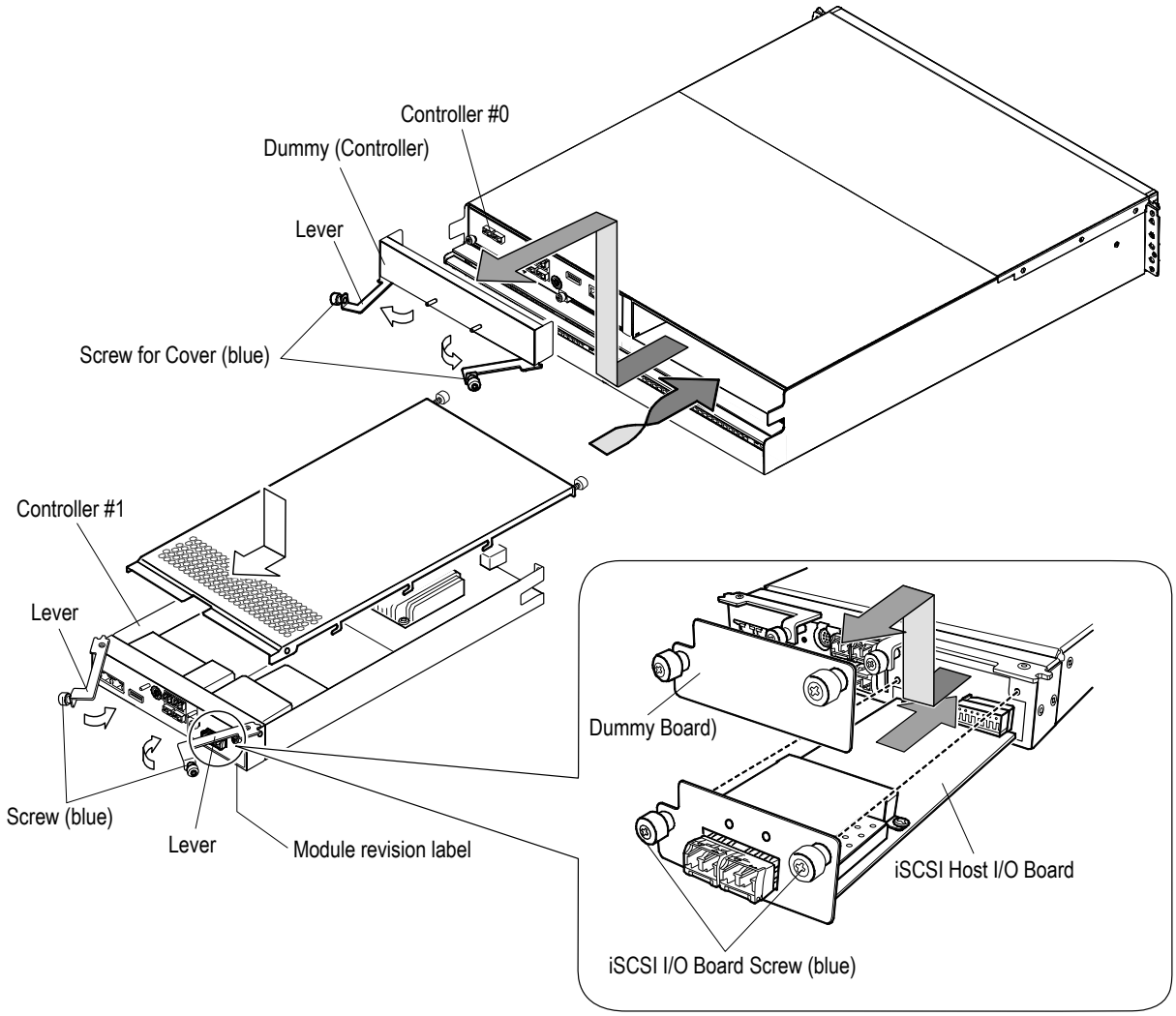
(13) Click the [Close] button.



(14) Turn off the main switch.
Press the main switch on the Controller #0 side for three seconds or more. When the main switch is turned off and it is enabled, the C-PWR LED (green) of the Controller goes on after blinking for three seconds, and then it goes out.
(15) Turn on the main switch after waiting for one minute or longer.
Press the main switch on the Controller #0 side for one second or more.
(16) Make sure that the READY LED (green) on the front side of the Controller Box comes on.
(17) Remove the LAN cross cable from the Controller #0, and connect the LAN cross cable to the LAN port for the maintenance of the Controller #1.
(18) Because the array configuration was changed from the single Controller to the dual controller, register the IP address of the Controller #1 in the array after deleting the target array 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 Array" (SYSPR 01-0020).)
(19) Reset the configurations for the Controller #1.

NOTE : A setup for the dual controller is necessary for the controller #1. (Refer to System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000), System Parameter "Chapter 7. Setting LAN Related" (SYSPR 07-0000), System Parameter "8.2 Setting System Parameters" (SYSPR 008-0040), System Parameter "8.3 Setting Port Options" (SYSPR 08-0080).)
When the cache is in the cache backup state, cancel the status.

(20) Turn off the main switch.
Press the main switch on either Controller #0 or Controller #1 for three seconds or more. Make sure that the POWER LED on the Front Bezel changes from green to orange.
(21) Remove the LAN cross cable connected to the Hitachi Storage Navigator Modular 2 from the Controller #1.
(22) Turn on the main switch.
Press the main switch on either Controller #0 or Controller #1 for one second or more.
(23) Make sure that the READY LED (green) on the front side of the Controller Box 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 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 01-1620).)
(25) Display the Parts Information in the Normal Mode on WEB, and check that the added parts are displayed on the screen. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)



*1 : The figure shows the case where the iSCSI Host I/O Board is installed in the Controller to be added.

Figure 1.4.20 Adding a Controller

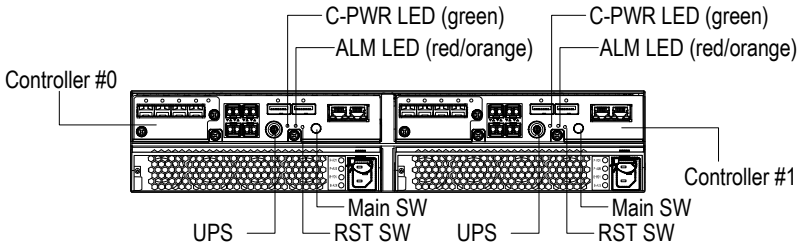


Figure 1.4.21 LED Locations on the Controller

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 array 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 01-0660)	Possible "1.5.2 Mounting a PDB (A-F6516-PDU6)" (ADD 01-0660)

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

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 two or more arrays, connect them avoiding applying the current of more than 16 amperes to a PDB. (CBL one unit : 2.5 A, CBSL/CBXSL one unit : 3.5 A, CBSS/CBXSS one unit : 4.1 A, DBL one unit : 1.9 A, DBS one unit : 2.4 A, DBF one unit : 2.6 A, DBX one unit : 3.7 A, DBW one unit : 8 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 spares are included)	—
3	Bind screw (M5 × 10)	SB510	10	For securing the PDB (2 spares are 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 array 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 01-0020).

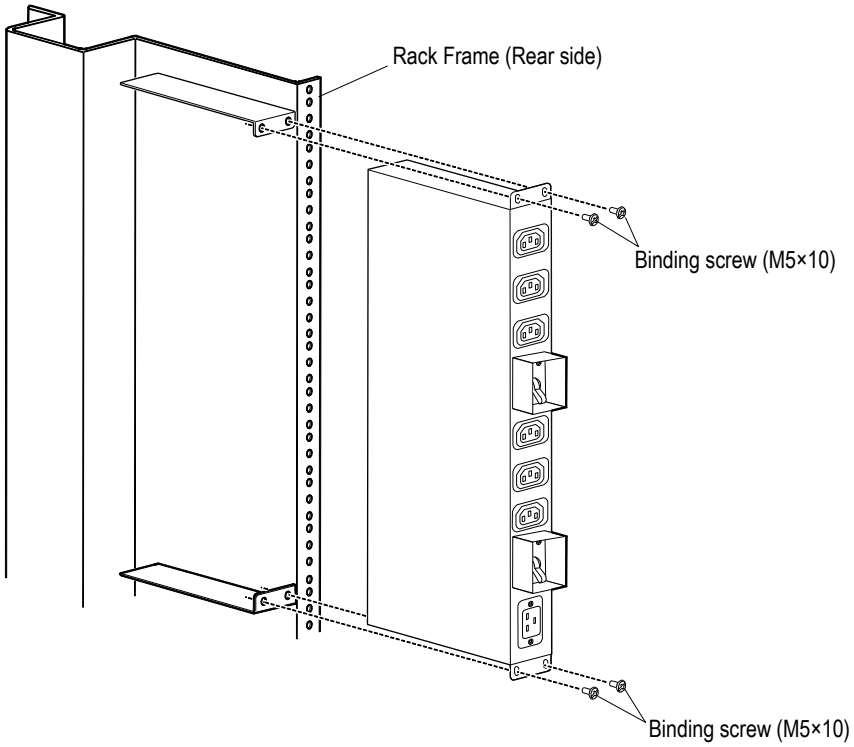


Figure 1.5.1 Installing the PDB (A-F6516-PDU6)

(5) Installing the power cable (The one purchased separately from additional PDBs) 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 01-0210).)
(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.

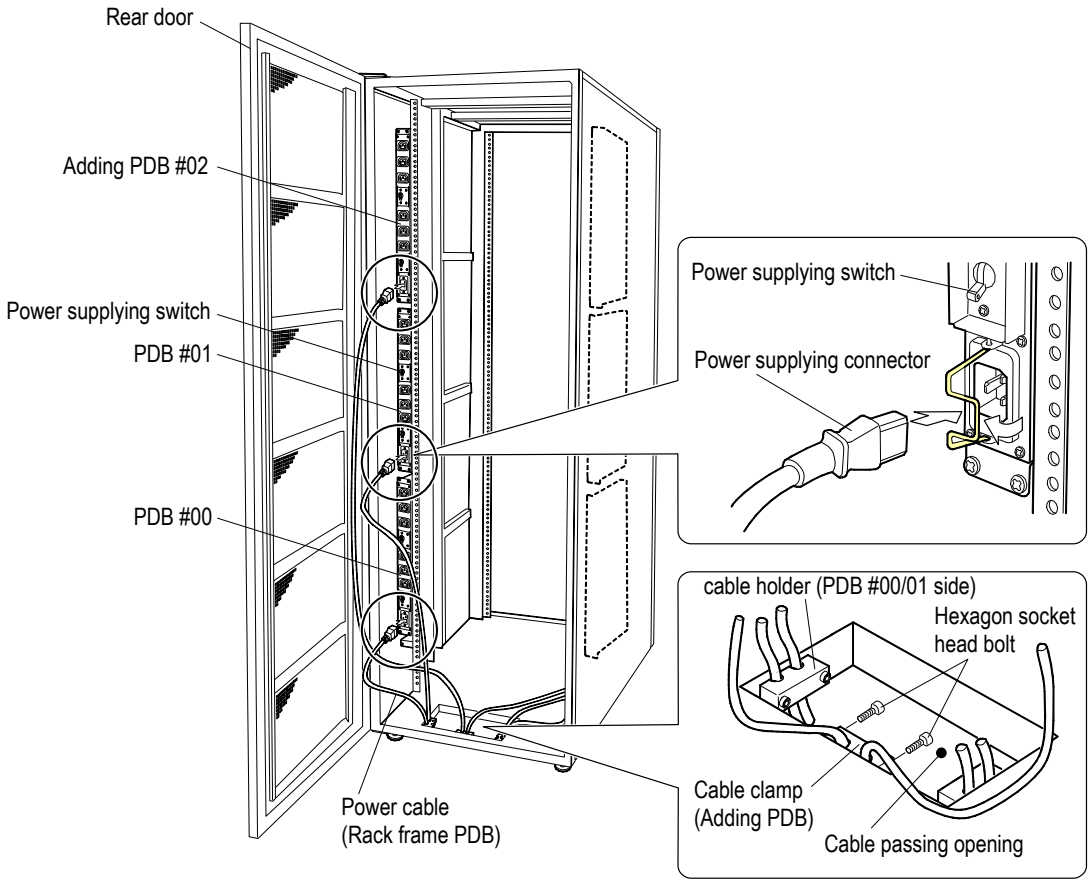


Figure 1.5.2 Installing the PDB (A-F63516-PDU6)

1.6 Adding the Drive Box to the Rack Frame

In the case of adding Drives to an array of the rackmount model, the additional array must be added when vacant slots for the Drives to be added are insufficient in the existing array (‡1).
The procedure for adding the Drive Box to the RK40 rack frame online or offline (with the array power turned off)(‡2) is shown.
When mounting the Drive Boxes on the rack frame, installation of as many rack rail kits (DF-F800-URHT8) as the Drive Boxes 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.

NOTICE

- **The DC Power Supply Model cannot be added to the AC Power Supply Model.**
- **The AC Power Supply Model cannot be added to the DC Power Supply Model.**

‡1 : The existing array is the Controller Box or the Drive Box that configures the array under operation. The Drive Box to be connected is connected to the existing array. The Drive Box that the addition is completed becomes the existing array.

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

1.6.1 Procedure for Adding Drive Box to 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 arrays only when the WARNING LED (orange) and ALARM LED (red) on the array go out and the POWER LED (green) and READY LED (green) light up. (Refer to Troubleshooting "Chapter 7. Trouble Analysis by LED Indication" (TRBL 07-0000).)

(b) Do not make the addition work when the READY LED (green) on the front of the Controller Box is blinking at high speed. When it is high-speed blinking, the ENC firmware and the backup controller firmware is being downloaded. Perform the addition work after checking that the READY LED (green) on the front of the Controller Box lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of CBL (80 to 180 minutes when the DBW is connected to the CBL)).

(c) When the WARNING LED (orange) on the front of the Controller Box 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 and the backup controller 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 Controller Box goes out and the READY LED (green) lights up in the maximum of 30 to 85 minutes.

(2) Restrictions

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

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

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

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

‡1 : The recognition indicates that the Controller of the existing CBXSL/CBXSS/CBSL/CBSS/CBL recognizes the Drive Box.

(3) Specifications

(a) Be sure to connect using one SAS(ENC) cable per I/O Module(ENC) between the Controller Box and the Drive Box and between the Drive Boxes.

(b) The number of Drive Box that can be added is different depending on the Controller Box. Add Drive Boxes so that the total number of the Drive Boxes does not exceed the maximum mountable number of Drive Box after the addition.
The CBXSL can include up to 9 DBLs and 4 DBSs.
The CBXSS can include up to 8 DBLs and 4 DBSs.
The CBSL can include up to 19 DBLs, 14(9) (‡1) DBSs, 7(5) (‡1) DBXs and 4 DBWs.
The CBSS can include up to 19(17) (‡1) DBLs, 14(9) (‡1) DBSs, 7(5) (‡1) DBXs and 4 DBWs.
The CBL can include up to 40 DBLs, 40 DBSs, 20 DBXs, 12(‡2) DBWs, and 40 DBFs.
However, when a mix of DBL, DBS and DBX is installed, the mountable number of Drive Box is different.
For the mountable number of each Drive Box when a mix of DBL, DBS and DBX is installed, refer to Introduction "1.3.4 (2) Mounted number of a mix of DBX" (INTR 01-0320).
DBW can be connected with a CBL/CBSL/CBSS. When the firmware version is 0950/A or less, DBWs cannot be mixed with other Drive Boxes.

(c) If a failure occurs in the Drive Box and the existing chassis (‡3) during the connection and recognition (‡4) of the Drive Box ((5)-Work-9), give priority to the existing chassis (‡4) and perform the maintenance. After that, perform the maintenance of the Drive Box and then restart the addition work.

(d) When adding the Drive Box with the array power turned off, install all the Drives to be added in the chassis, connect between all the chassis with the SAS(ENC) cables, and turn on the array power. (Refer to "(6) Procedure for adding the Drive Box with the array power turned off" (ADD 01-0750).)

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

‡1 : Firmware versions are the 0937/A or more number of the maximum connection. The firmware version of ( ) is the maximum connection number of less than 0937/A.

‡2 : When the firmware version is 0920/A or more and less than 0930/A: When using the Tray Power Saving function, the maximum number of trays to be mounted is four.

‡3 : The existing array is the Controller Box or the Drive Box that configures the array under operation. The Drive Box to be connected is connected to the existing array. The Drive Box that the addition is completed becomes the existing array.

‡4 : The recognition indicates that the Controller of the existing CBXSL/CBXSS/CBSL/CBSS/CBL recognizes the Drive Box.

(4) Procedure for adding the Drive Box

The procedure for adding the Drive Box has two types; one is the procedure to perform it with the array power turned off, and the other is the procedure to perform it with the array power turned on.

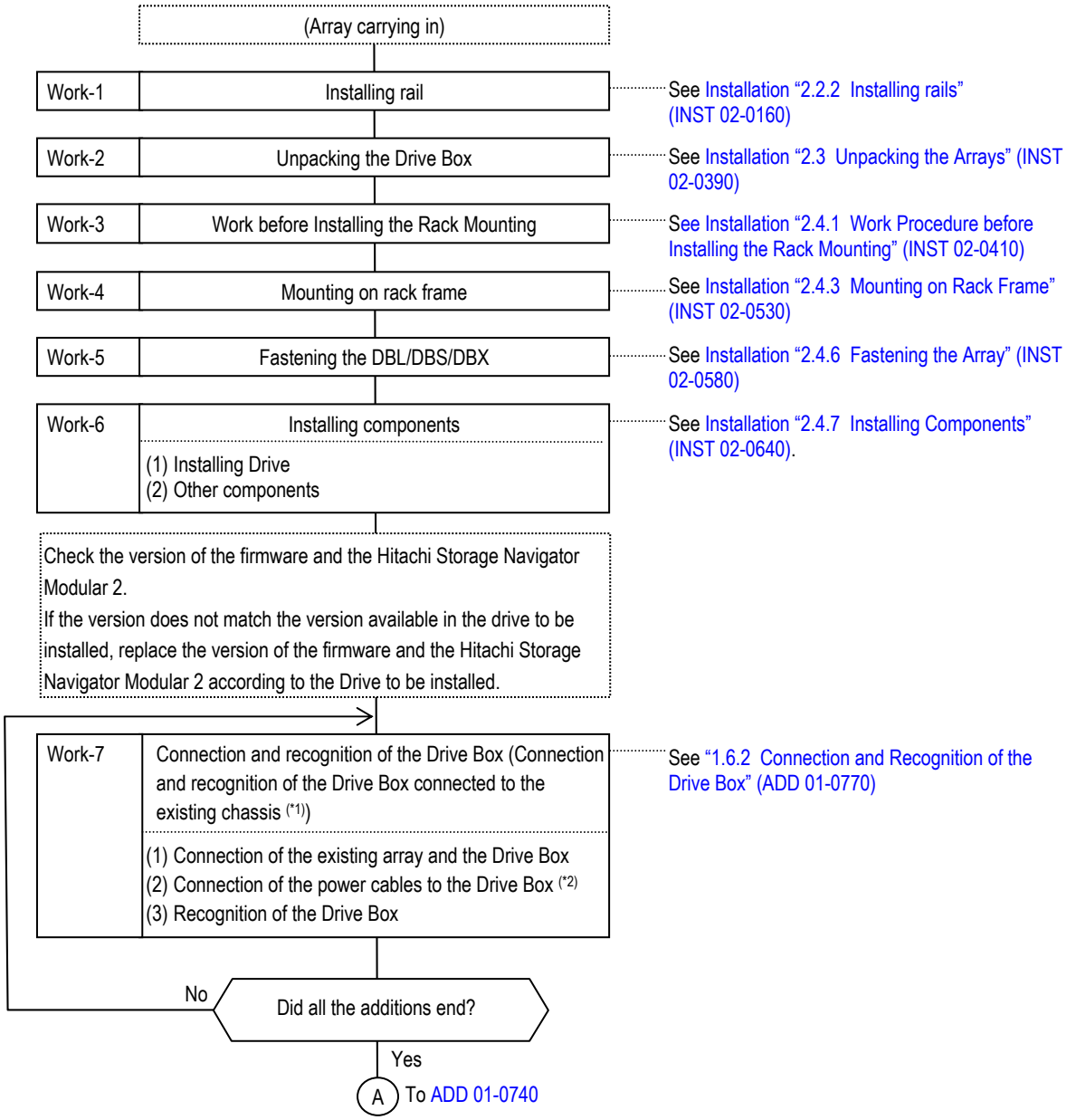
Perform the isolation of the work procedure referring to Table 1.6.1.

Table 1.6.1 Isolation of the Procedure for Adding the Drive Box

Power Status of the array 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 Drive Box with the array power turned on" (ADD 01-0730)
OFF	Single	"(6) Procedure for adding the Drive Box with the array power turned off" (ADD 01-0750)
	Dual	

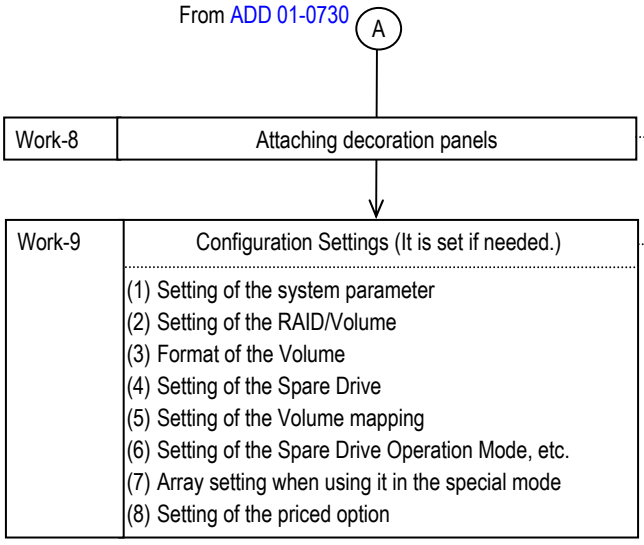
(5) Procedure for adding the Drive Box with the array power turned on

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



*1 : The existing array is the Controller Box or the Drive Box that configures the array under operation. The Drive Box to be connected is connected to the existing array. The Drive Box that the addition is completed becomes the existing array.

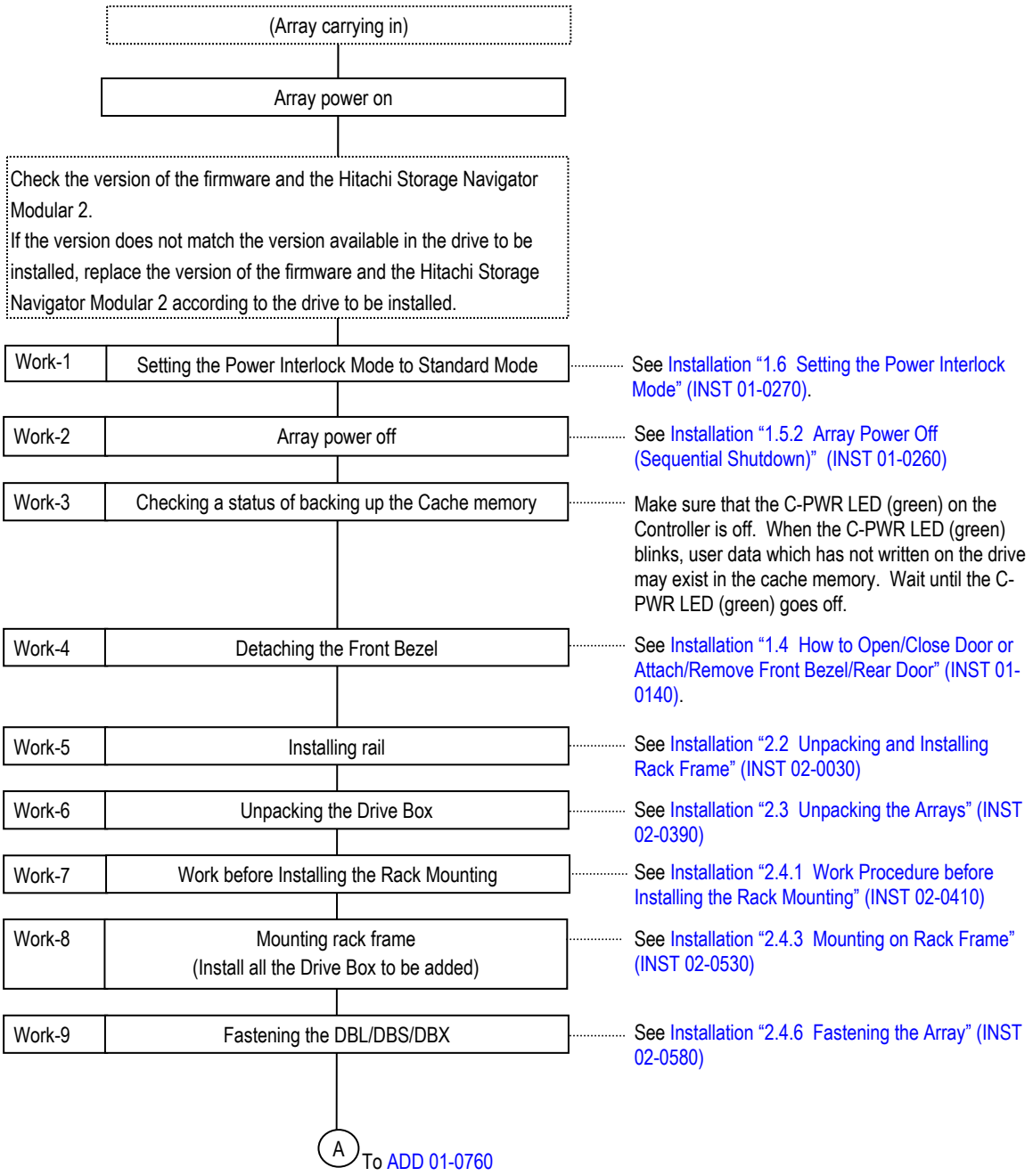
*2 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

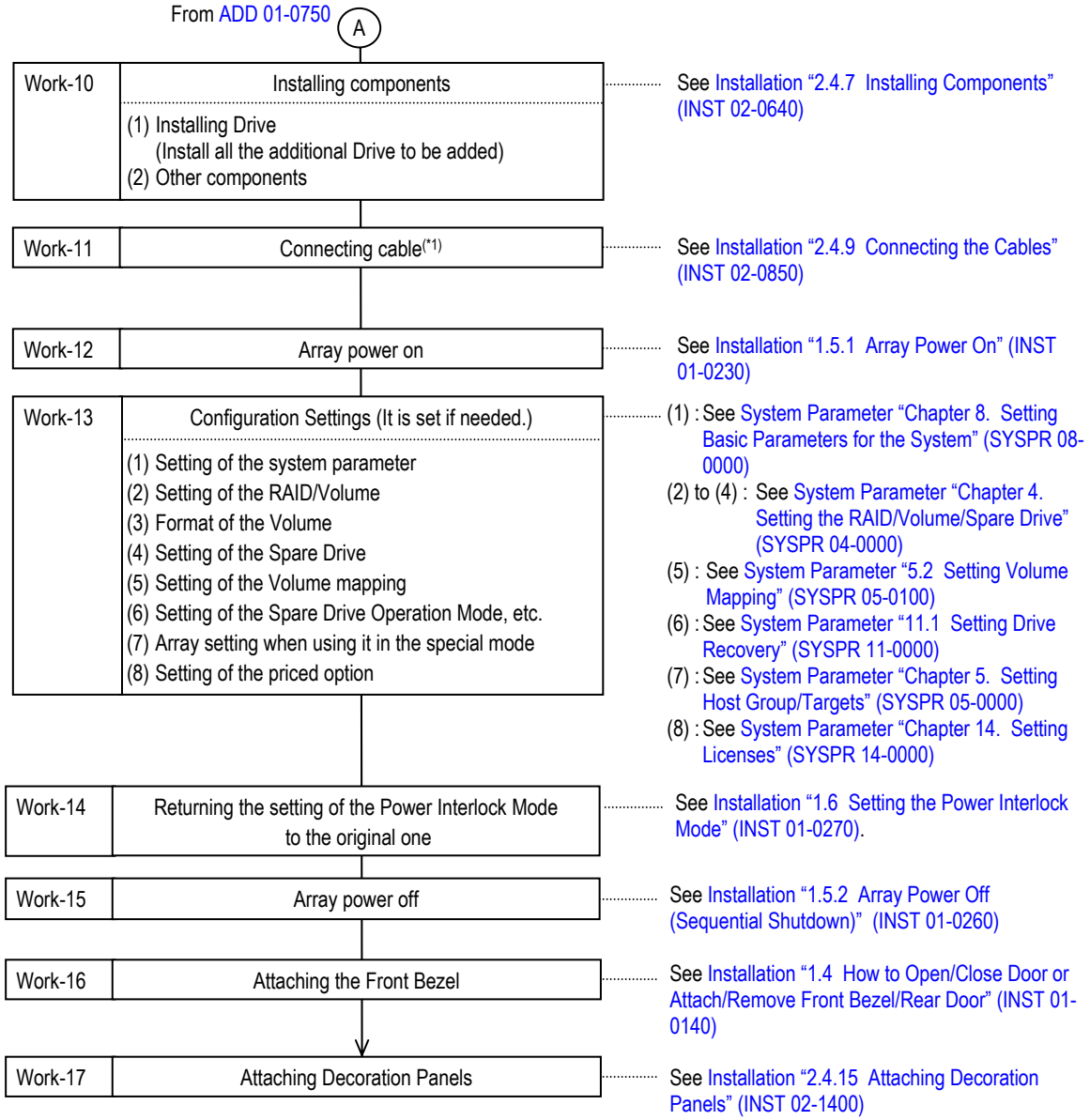


See Installation "2.4.15 Attaching Decoration Panels" (INST 02-1400)

(1) : See System Parameter "Chapter 8. Setting Basic Parameters for the System" (SYSPR 08-0000)
(2) to (4) : See System Parameter "Chapter 4. Setting the RAID/Volume/Spare Drive" (SYSPR 04-0000)
(5) : See System Parameter "5.2 Setting Volume Mapping" (SYSPR 05-0100)
(6) : See System Parameter "11.1 Setting Drive Recovery" (SYSPR 11-0000)
(7) : See System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000)
(8) : See System Parameter "Chapter 14. Setting Licenses" (SYSPR 14-0000)

(6) Procedure for adding the Drive Box with the array 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 Drive Box

Perform the connection and recognition of the Drive Box according to the window of Hitachi Storage Navigator Modular 2 in the following procedure. The existing array is the Controller Box or the Drive Box that configures the array under operation. The Drive Box to be connected is connected to the existing array. The Drive Box that the addition is completed becomes the existing array.

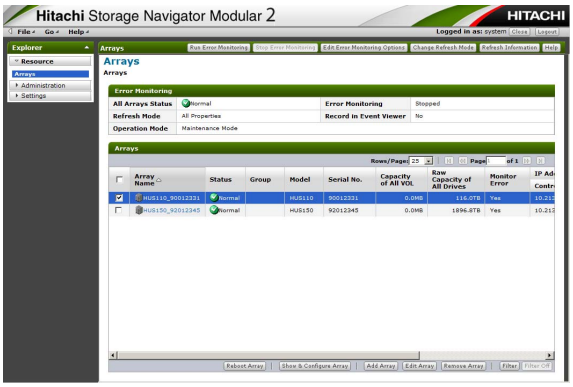
(1) Perform the prior check of the addition work.

Check the items in the following check sheet before connecting and recognizing the Drive Box.

Table 1.6.2 Check Sheet for the Prior Check

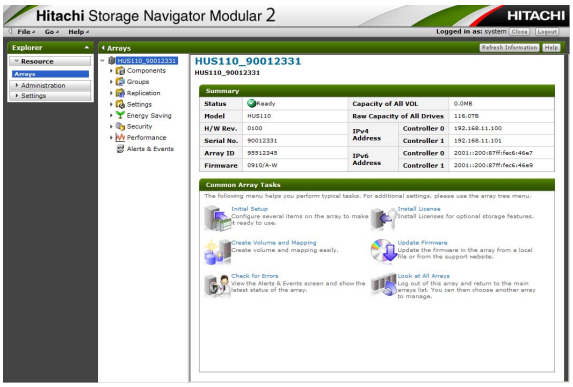
No.	Item to be checked	Matter to be checked	Actions to be taken when the conditions on the left were not satisfied	Check result
1	I/O Module(ENC) or I/O Card(ENC)	The I/O Modules(ENC) or I/O Cards(ENC) must be installed in the additional array to be added. DBL/DBS/DBW/DBF : two units, DBX : four units	Check that it is installed at the time of the shipment.	
2	Power Unit	The two units (four units for DBX) must be installed in the Controller Box to be added.		
3	WARNING LED of the Controller Box	No WARNING LED (orange) on the front of the Controller Box 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 Controller Box was turned off after completing the maintenance work.	
4	ALARM LED of the Controller Box	No ALARM LED (red) on the front of the Controller Box 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 Controller Box 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	Array 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 Array Status is Ready and there is no abnormality in the status of the replacement part.	
7	READY LED on the front of the Controller Box	The READY LED (green) on the front of the Controller Box should light up.	• When the READY LED (green) is blinking at high speed, the automatic download of the ENC firmware and the backup controller firmware is operating. Check that the WANING LED (orange) on the front of the Controller Box goes out in the maximum of 30 to 50 minutes (the maximum of 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), the READY LED (green) lights up, and "IZYR00 Automatic ENC firmware download completed successfully" is displayed in the Information Message on WEB. • After the READY LED (green) on the front of the Controller Box 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 Controller Box 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, put a checkmark to the array to be added, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to "Maintenance Mode".(‡1)
Check that "Maintenance Mode" is displayed in [Operation Mode] on the top of the main window.



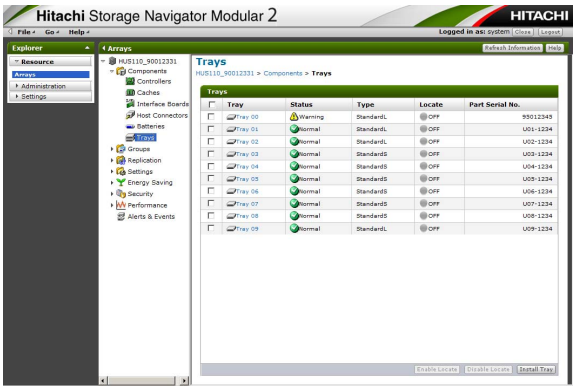
(3) Click the array name, and open the unit window.

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 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 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.

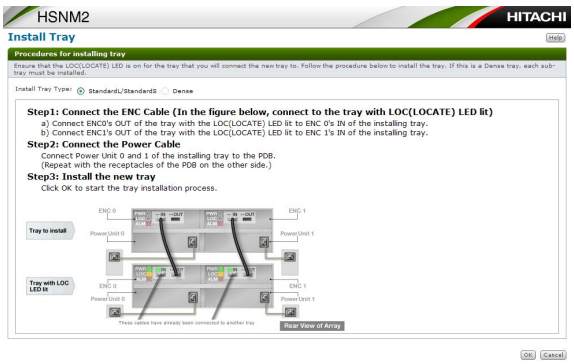
(4) Select [Component] – [Trays] in the main window.



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

(6) Work on Step 1 to Step 3 in the Install Tray window.
The Drive Box may be connected to the Controller Box or the Drive Box may be connected each other.
For connecting the SAS(ENC) cable , refer to Installation "2.4.11 Connecting the SAS(ENC) Cables" (INST 02-0990). For connecting the power cable, refer to Installation "2.4.12 Connecting the Power Cables" (INST 02-1270).
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.

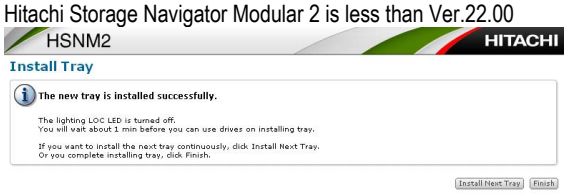
NOTE :
- If you were unable to check the "Addition Completed" window because you closed the dialog while adding the Drive Box, wait for about three minutes and display the "Tray List" window again in Hitachi Storage Navigator Modular 2 following the procedure of (2) to (4).
  If the Drive Box under addition is displayed, the addition is completed.
  If it is not displayed, remove the cables connected at the time of the addition and add the Drive Box again.
- If you connect the power cables to the Power Unit of the Drive Box to be added, the ALARM LED (red) on the I/O Module(ENC) lights up.
  However, it is not an error.
  It will go out when the addition is completed.
- For the DBW, in "Step 3 Install the new tray", turn on the Power Switch on the rear surface of the DBW and, after five minutes elapse, press the [OK] button in the Install Tray window.
- If you press the [Cancel] button in the Install Tray window, the window closes but the LOCATE LED (DBX: LOC LED, DBW: ALM LED of I/O Module(ENC)) 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 LOCATE LED (DBX:LOC LED, DBW:ALM LED of I/O Module(ENC)).
- For the DBX, the addition instruction is required for each chassis.
  Specify the [Dense] on the [Install Tray Type] in the Install Tray window.
- For the DBW, specify the [Dense84] on the [Install Tray Type] in the Install Tray window.



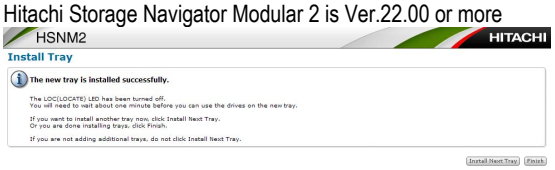
(7) The following window is displayed during the Install Tray process.

(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.
If you are not adding additional trays, do not click Install Next Tray.

Hitachi Storage Navigator Modular 2 is less than Ver.22.00



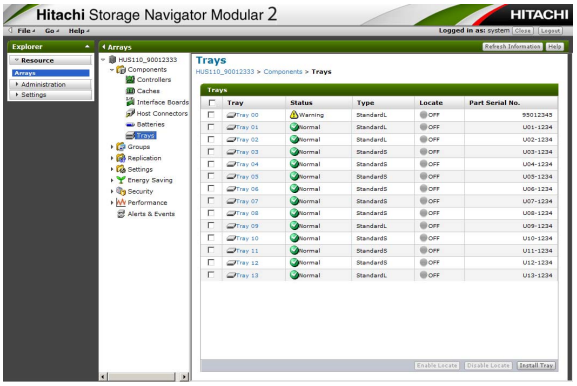
Hitachi Storage Navigator Modular 2 is Ver.22.00 or more



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 Drive Box during the work and the SAS(ENC) cables between the existing chassis and the Drive Box, and start from the procedure (6) again.

• If you stop the Install Tray work, the LOCATE LED (DBX:LOC LED, DBW:ALM LED of I/O Module(ENC)) 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 LOCATE LED (DBX:LOC LED, DBW:ALM LED of I/O Module(ENC)).

(9) Check the added chassis in the Trays list window.
Select [Component] – [Trays] in the main window.
Refer to Installation “2.3 (2) Checking contents of package” (INST 02-0400).



(10) Check that the READY LED (green) on the front of the Controller Box 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 Drives connectable to PATH.
Verify the configuration according to Introduction "1.3 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 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 01-1620).)

Chapter 2. Removing Optional Components

2.1 Before Starting Removal of Optional Components

If you make a mistake in operation while an optional component is removed, user data in the array may be lost. Therefore, perform the followings before starting to remove the optional component to provide against an unexpected accident.

(1) Back up user data.
Back up user data in the array by the operation on the host computer side.

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

(3) When removing the optional component, it is required to change the settings of the array using a service PC connected via a LAN. Make the following preparations before starting to remove 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 array is operable via a LAN. If not, obtain customer's permission to operate the array 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 (Controller) and a dummy (Drive) in a vacant slot because dummy (Controller) and dummy (Drive) are required for adjusting the cooling air flow.
When removing the optional component with the array power on, the operation replacing Drive with dummy (Drive) has to be finished within 10 minutes.

(6) When the Spare Drive Operation Mode (‡1) is set as variable or it was set as variable in the past, the RAID Group configuration and the Spare Drive configuration may be different from the configuration at the time of the introduction depending on the occurrence conditions of the 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 Drive operation mode, refer to System Parameter "11.1 Setting Drive Recovery" (SYSPR 11-0000) and "Introduction "3.6 (3) Operation after replacing failed Drive" (INTR 03-0350).

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

(8) Before the removing work, be sure to collect the simple trace (Refer to Troubleshooting "5.3 Collecting Simple Trace"(TRBL 05-0040).) because the configuration information before the removal is required if the array is returned to the original state during the removing work.

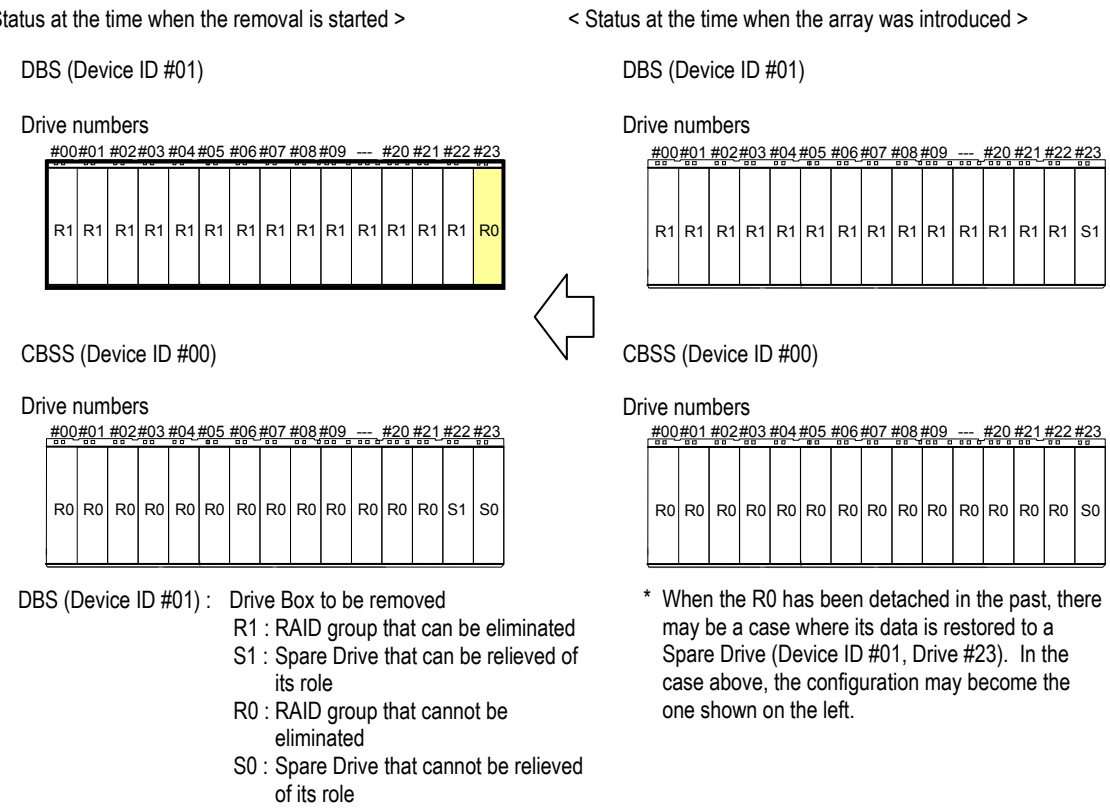
(9) In case of one DBW, 80 dB at the temperature of 32°C, the maximum level is 85 dB.
Do not work behind DBW for a long time.

(10) When removing the Drive Box or Drives, confirm the customer whether the Drive Box or the Drives include the RAID group which configures the DP pool.
If the RAID group is included, request the customer to check all the DP volumes configured by the DP pool which includes the relevant RAID group and then collect the backup. After collecting the backup, request the customer to delete all the DP pools which include the relevant RAID group.

2.1.1 Preparatory Works for Removal

When the Spare Drive Operation Mode is set as variable or it was set as variable in the past, the RAID Group configuration or the Spare 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 Drive Box to be removed was changed from that at the time when the array was introduced, restore the Drive Box to be removed to the configuration at the time when the array was introduced, and then execute the removal work.

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



DBS (Device ID #01) : Drive Box to be removed
- R1 : RAID group that can be eliminated
- S1 : Spare Drive that can be relieved of its role
- R0 : RAID group that cannot be eliminated
- S0 : Spare 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 Drive (Device ID #01, Drive #23). In the case above, the configuration may become the one shown on the left.

(a) Make sure that the model names of Drive (Device ID #01, Drive #23) and the Spare 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 Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "4.5 Checking the Status of Drive" (SYSPR 04-0680).)

(b) Output the text file of the "RAID group/Volume" in the configuration copy information. (For the details, refer to System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

(c) Relieve Spare Drives other than the S1of their roles. (For the details, refer to System Parameter "4.4.3 Deleting Spare Drive" (SYSPR 04-0660).)

(d) Execute the dynamic sparing for the Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "8.3.4 Drive Maintenance" (TRBL 08-0210).)

(e) Make sure that the Drive (Device ID #00, Drive #13) becomes a data Drive that is a component of the R0 and the Drive (Device ID #01, Drive #14) becomes a detached Drive(‡2) as a Spare Drive after the dynamic sparing is completed(‡3).
You can make sure of it by checking the "Type" and "Status" of the Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "4.5 Checking the Status of Drive" (SYSPR 04-0680).)

(f) Reset the Spare 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 "4.4.2 Setting Spare Drive" (SYSPR 04-0650).)
However, the Drive (Device ID #00, Drive #13) cannot be set as a Spare Drive.

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

(h) Output the text file of the "RAID group/Volume" in the configuration copy information again. (For the details, refer to System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

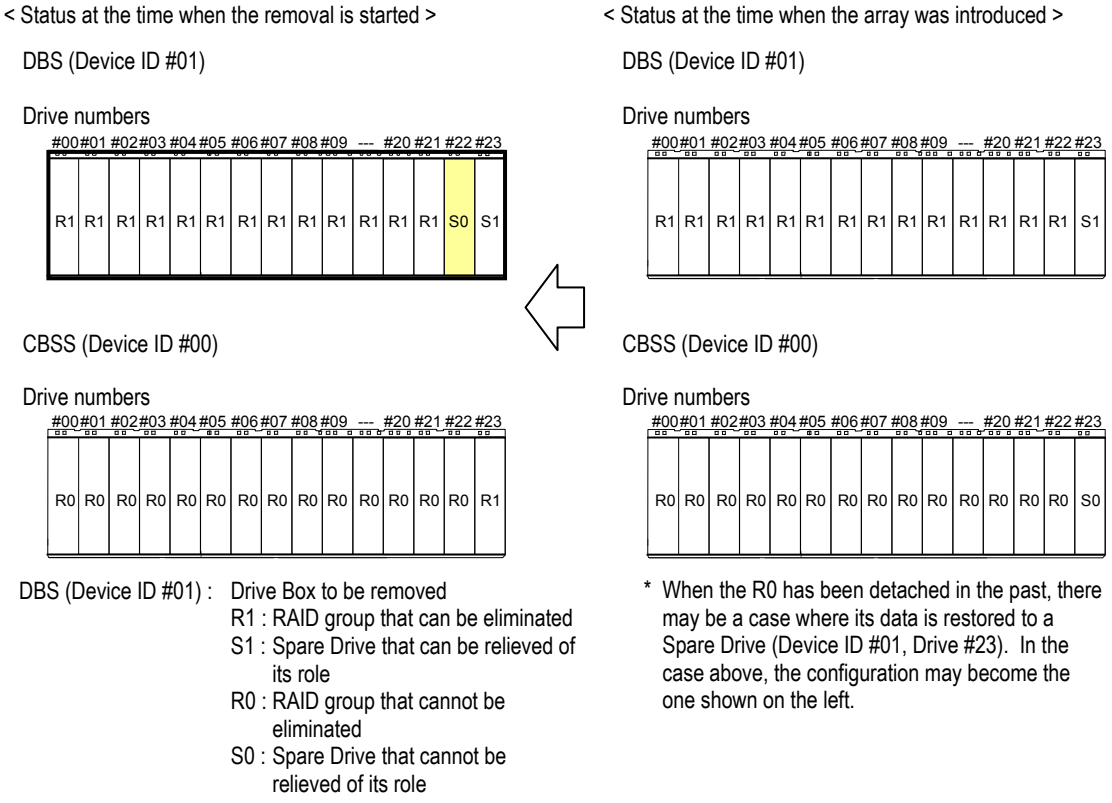
(i) Make sure that the current settings of the RAID groups and Spare Drives are correct and neither more not less by comparing the text file that was output in Step (b) with that output in Step (h). At this time roles of the Drives (Device ID #00, Drive #13 and Device ID #01, Drive #14) as a data Drive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

‡1 : When the "Spare Drive Operation Mode" from [Settings] - [Drive Settings] - [Drive Recovery] - [Edit Recovery Options] in Hitachi Storage Navigator Modular 2 is set to variable (default value), the Spare Drive (S1) of device ID #00/Drive number #22 may not be the same model name as device ID #01/Drive number #23. The Spare Drive (S1) of the device ID #00 and the Drive number #22 may be the same model name as the Drive of the device ID #01 and the Drive number #23 or the Drive whose the rotational speed differs and the capacity is the same as the Drive of the device ID #01 and the Diver number #23.

‡2 : The Drive (Device ID #01, Drive #23) 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 copy back time of table in Replacement "(6) Confirming completion of data recovery or copy back" (REP 02-0370).

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



DBS (Device ID #01) : Drive Box to be removed
- R1 : RAID group that can be eliminated
- S1 : Spare Drive that can be relieved of its role
- R0 : RAID group that cannot be eliminated
- S0 : Spare 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 Drive (Device ID #01, Drive #23). In the case above, the configuration may become the one shown on the left.

(a) Make sure that the model names of Drive (Device ID #01, Drive #23) and the Spare Drive (Device ID #00, Drive #22) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "4.5 Checking the Status of Drive" (SYSPR 04-0680).)

(b) Output the text file of the "RAID group/Volume" in the configuration copy information. (For the details, refer to System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

(c) Relieve Spare Drives other than the S1of their roles. (For the details, refer to System Parameter "4.4.3 Deleting Spare Drive" (SYSPR 04-0660).)

(d) Execute the dynamic sparing for the Drive (Device ID #01, Drive #23). (For the details, refer to Troubleshooting "8.3.4 Drive Maintenance" (TRBL 08-0210).)

‡1 : When the "Spare Drive Operation Mode" from [Settings] – [Drive Settings] – [Drive Recovery] – [Edit Recovery Options] in Hitachi Storage Navigator Modular 2 is set to variable (default value), the Spare Drive (S1) of device ID #00/Drive number #22 may not be the same model name as device ID #01/Drive number #23. The Spare Drive (S0) of the device ID #01 and the Drive number #22 may be the same model name as the Drive of the device ID #00 and the Drive number #23 or the Drive whose the rotational speed differs and the capacity is the same as the Drive of the device ID #00 and the Diver number #23.

(e) Make sure that the Drive (Device ID #00, Drive #22) becomes a data Drive that is a component of the R0 and the Drive (Device ID #01, Drive #23) becomes a detached Drive(‡1) as a Spare Drive after the dynamic sparing is completed(‡2).
You can make sure of it by checking the "Type" and "Status" of the Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "4.5 Checking the Status of Drive" (SYSPR 04-0680).)

(f) Reset the Spare 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 "4.4.3 Setting Spare Drive" (SYSPR 04-0650).)
However, the Drive (Device ID #00, Drive #22) cannot be set as a Spare Drive.

(g) Make sure that there is no other Drive, which composes a RAID group that cannot be eliminated, than the additional unit to be de-installed. If such a Drive exists, make a dummy replacement(‡3) of the Spare Drive (Device ID #00, Drive #23) that was detached and repeat the works from Step (c) after making sure that the Drive was recovered from the detachment(‡4).

(h) Output the text file of the "RAID group/Volume" in the configuration copy information again. (For the details, refer to System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

(i) Make sure that the current settings of the RAID groups and Spare 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 Drives (Device ID #00, Drive #22 and Device ID #01, Drive #14) as a data Drive and Spare Drive are reversed.

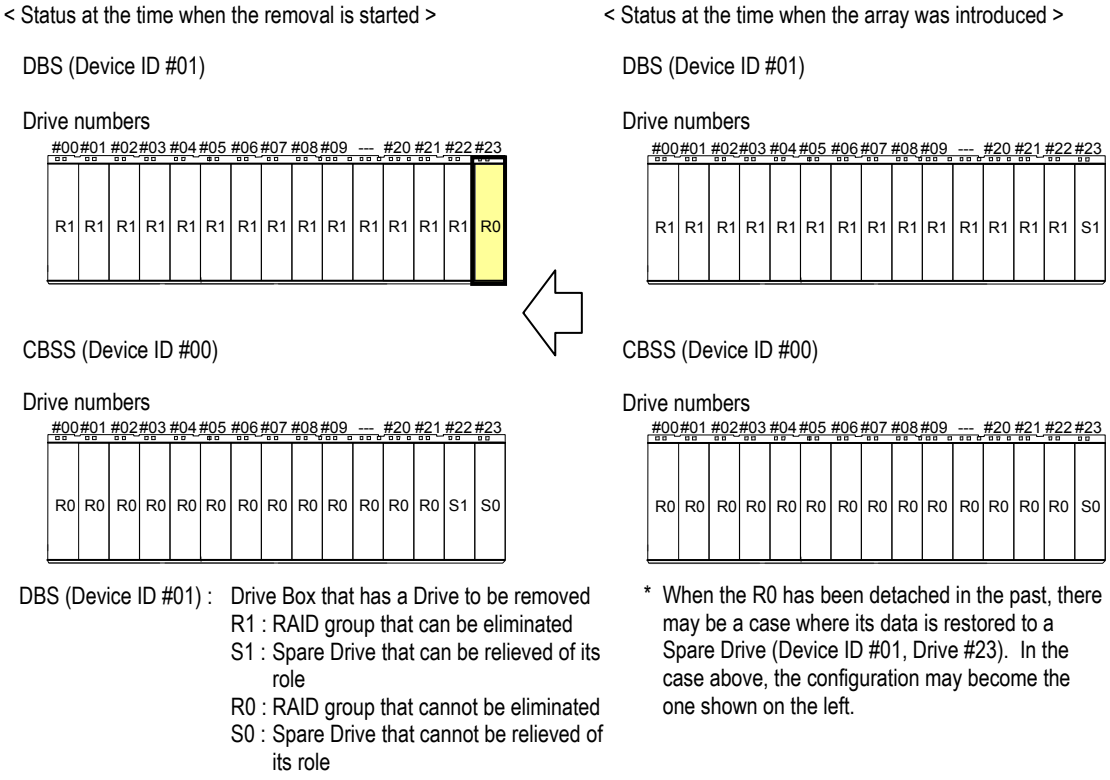
‡1 : The Drive (Device ID #01, Drive #23) is detached. However, do not replace it because the detachment does not mean a trouble.

‡2 : It takes a while to complete the dynamic sparing. For the standard time required, refer to copy back time of table in Replacement "(6) Confirming completion of data recovery or copy back" (REP 02-0370).

‡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 Drive concerned goes out.

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



DBS (Device ID #01) : Drive Box that has a Drive to be removed
R1 : RAID group that can be eliminated
S1 : Spare Drive that can be relieved of its role
R0 : RAID group that cannot be eliminated
S0 : Spare 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 Drive (Device ID #01, Drive #23). In the case above, the configuration may become the one shown on the left.

(a) Make sure that the model names of Drive (Device ID #01, Drive #23) and the Spare Drive (Device ID #00, Drive #22) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "4.5 Checking the Status of Drive" (SYSPR 04-0680).)

(b) Output the text file of the "RAID group/Volume" in the configuration copy information. (For the details, refer to System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

(c) Relieve Spare Drives other than the S1of their roles. (For the details, refer to System Parameter "4.4.3 Deleting Spare Drive" (SYSPR 04-0660).)

(d) Execute the dynamic sparing for the Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "8.3.4 Drive Maintenance" (TRBL 08-0210).)

‡1 : When the "Spare Drive Operation Mode" from [Settings] – [Drive Settings] – [Drive Recovery] – [Edit Recovery Options] in Hitachi Storage Navigator Modular 2 is set to variable (default value), the Spare Drive (S1) of device ID #00/Drive number #22 may not be the same model name as device ID #01/Drive number #23. The Spare Drive (S1) of the device ID #00 and the Drive number #22 may be the same model name as the Drive of the device ID #01 and the Drive number #23 or the Drive whose the rotational speed differs and the capacity is the same as the Drive of the device ID #01 and the Diver number #23.

(e) Make sure that the Drive (Device ID #00, Drive #22) becomes a data Drive that is a component of the R0 and the Drive (Device ID #01, Drive #23) becomes a detached Drive(‡1) as a Spare Drive after the dynamic sparing is completed(‡2).
You can make sure of it by checking the "Type" and "Status" of the Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "4.5 Checking the Status of Drive" (SYSPR 04-0680).)

(f) Reset the spare 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 "4.4.2 Setting Spare Drive" (SYSPR 04-0650).)
However, the Drive (Device ID #00, Drive #22) cannot be set as a Spare Drive.

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

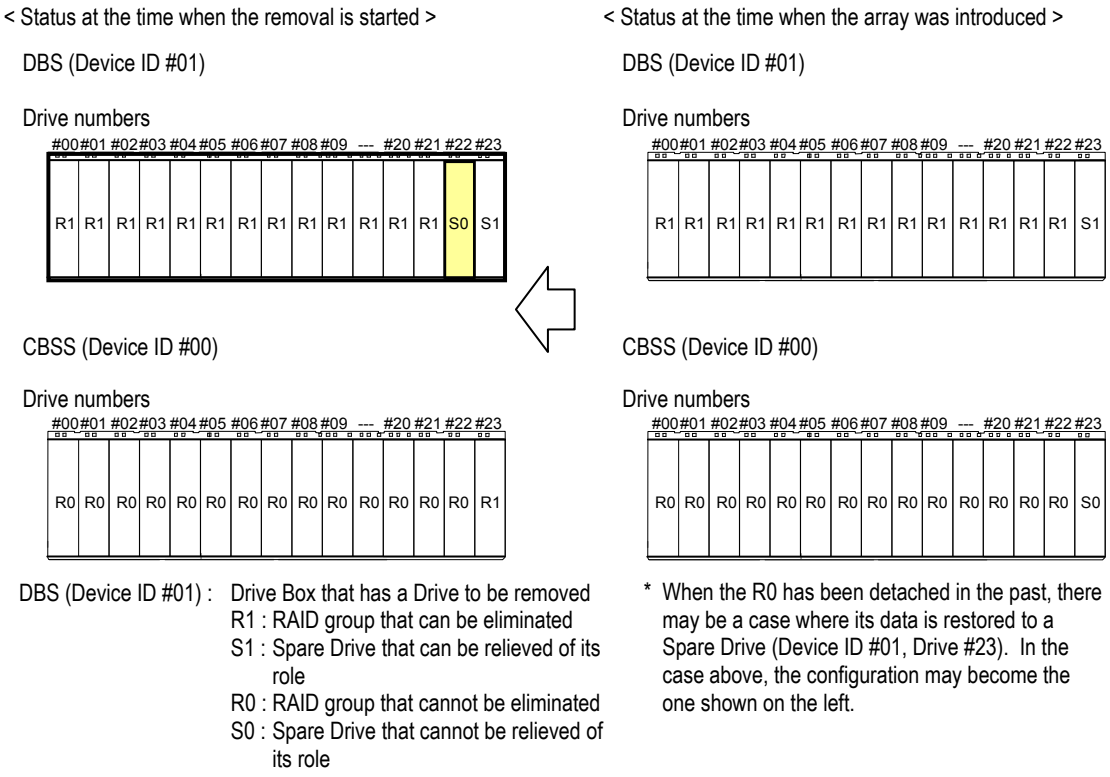
(h) Output the text file of the "RAID group/Volume" in the configuration copy information again. (For the details, refer to System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

(i) Make sure that the current settings of the RAID groups and Spare 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 Drives (Device ID #00, Drive #22 and Device ID #01, Drive #23) as a data Drive and Spare Drive are reversed.

‡1 : The Drive (Device ID #01, Drive #23) 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 copy back time of table in Replacement "(6) Confirming completion of data recovery or copy back" (REP 02-0370).

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



DBS (Device ID #01) : Drive Box that has a Drive to be removed
- R1 : RAID group that can be eliminated
- S1 : Spare Drive that can be relieved of its role
- R0 : RAID group that cannot be eliminated
- S0 : Spare 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 Drive (Device ID #01, Drive #23). In the case above, the configuration may become the one shown on the left.

(a) Make sure that the model names of Drive (Device ID #01, Drive #23) and the Spare Drive (Device ID #00, Drive #22) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "4.5 Checking the Status of Drive" (SYSPR 04-0680).)

(b) Output the text file of the "RAID group/Volume" in the configuration copy information. (For the details, refer to System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

(c) Relieve spare Drives other than the S1of their roles. (For the details, refer to System Parameter "4.4.3 Deleting Spare Drive" (SYSPR 04-0660).)

(d) Execute the dynamic sparing for the Drive (Device ID #01, Drive #23). (For the details, refer to Troubleshooting "8.3.4 Drive Maintenance" (TRBL 08-0210).)

‡1 : When the "Spare Drive Operation Mode" from [Settings] - [Drive Settings] - [Drive Recovery] - [Edit Recovery Options] in Hitachi Storage Navigator Modular 2 is set to variable (default value), the Spare Drive (S1) of device ID #00/Drive number #22 may not be the same model name as device ID #01/Drive number #23. The Spare Drive (S0) of the device ID #01 and the Drive number #22 may be the same model name as the Drive of the device ID #00 and the Drive number #23 or the Drive whose the rotational speed differs and the capacity is the same as the Drive of the device ID #00 and the Diver number #23.

(e) Make sure that the Drive (Device ID #00, Drive #22) becomes a data Drive that is a component of the R0 and the Drive (Device ID #01, Drive #23) becomes a detached Drive(‡2) as a Spare Drive after the dynamic sparing is completed(‡3).
You can make sure of it by checking the "Type" and "Status" of the Drive shown when you select the Component Status tab of Hitachi Storage Navigator Modular 2. (For the details, refer to System Parameter "4.5 Checking the Status of Drive" (SYSPR 04-0680).)

(f) Reset the Spare 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 "4.4.2 Setting Spare Drive" (SYSPR 04-0650).)
However, the Drive (Device ID #00, Drive #22) cannot be set as a spare Drive.

(g) Make sure that there is no other Drive, which composes a RAID group that cannot be eliminated, than the additional unit to be de-installed. If such a Drive exists, make a dummy replacement(‡4) of the Spare Drive (Device ID #00, Drive #23) that was detached and repeat the works from Step (c) after making sure that the Drive was recovered from the detachment(‡5).

(h) Output the text file of the "RAID group/Volume" in the configuration copy information again. (For the details, refer to System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

(i) Make sure that the current settings of the RAID groups and Spare 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 Drives (Device ID #00, Drive #22 and Device ID #01, Drive #23) as a data Drive and Spare Drive are reversed.

‡1 : The Drive (Device ID #01, Drive #23) 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 copy back time of table in Replacement "(6) Confirming completion of data recovery or copy back" (REP 02-0370).

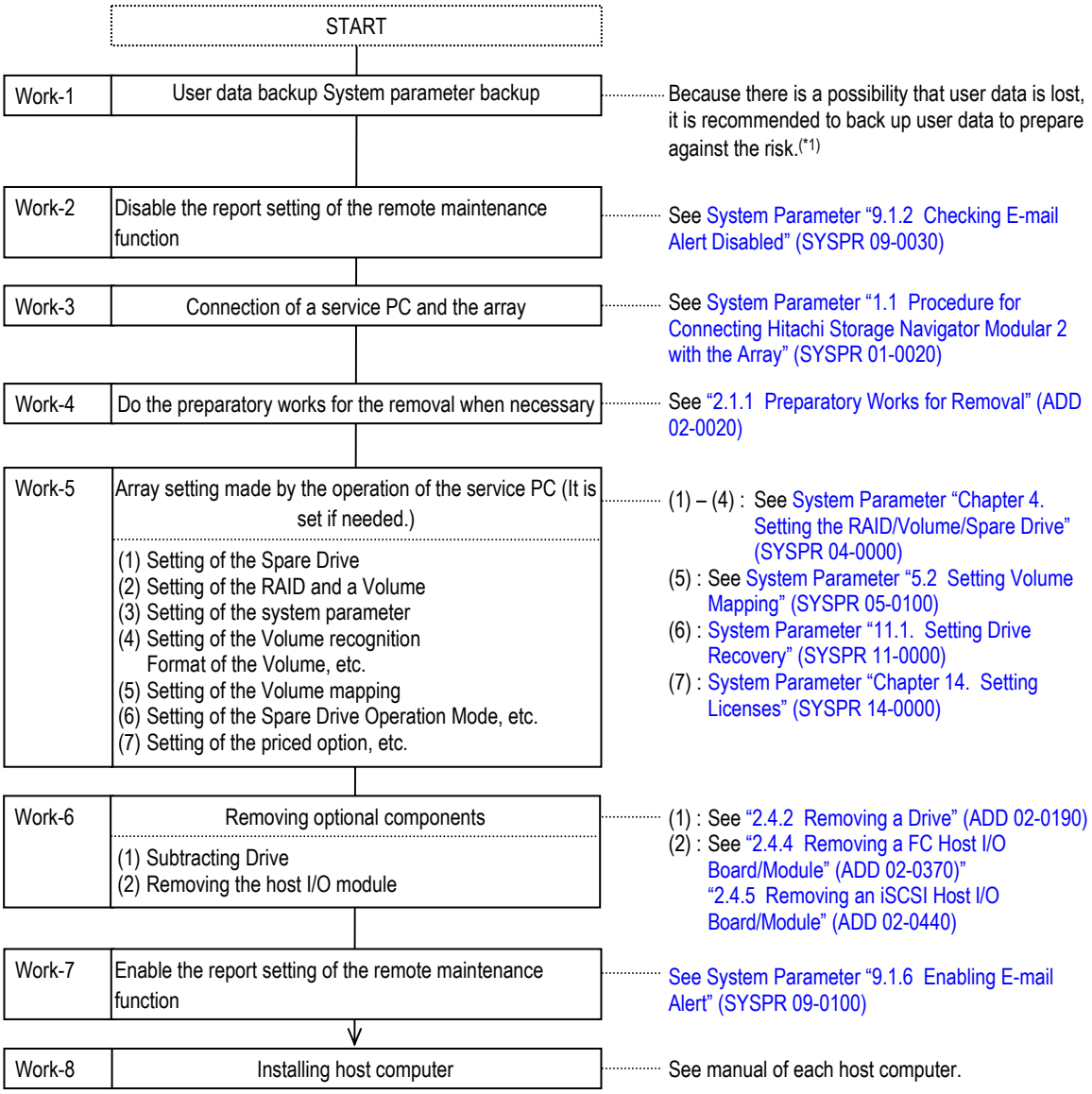
‡3 : This means that the part concerned is removed, and it is reinstalled after 20 seconds or more passed.

‡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 Drive concerned goes out.

2.2 Procedures for Removing Optional Components

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

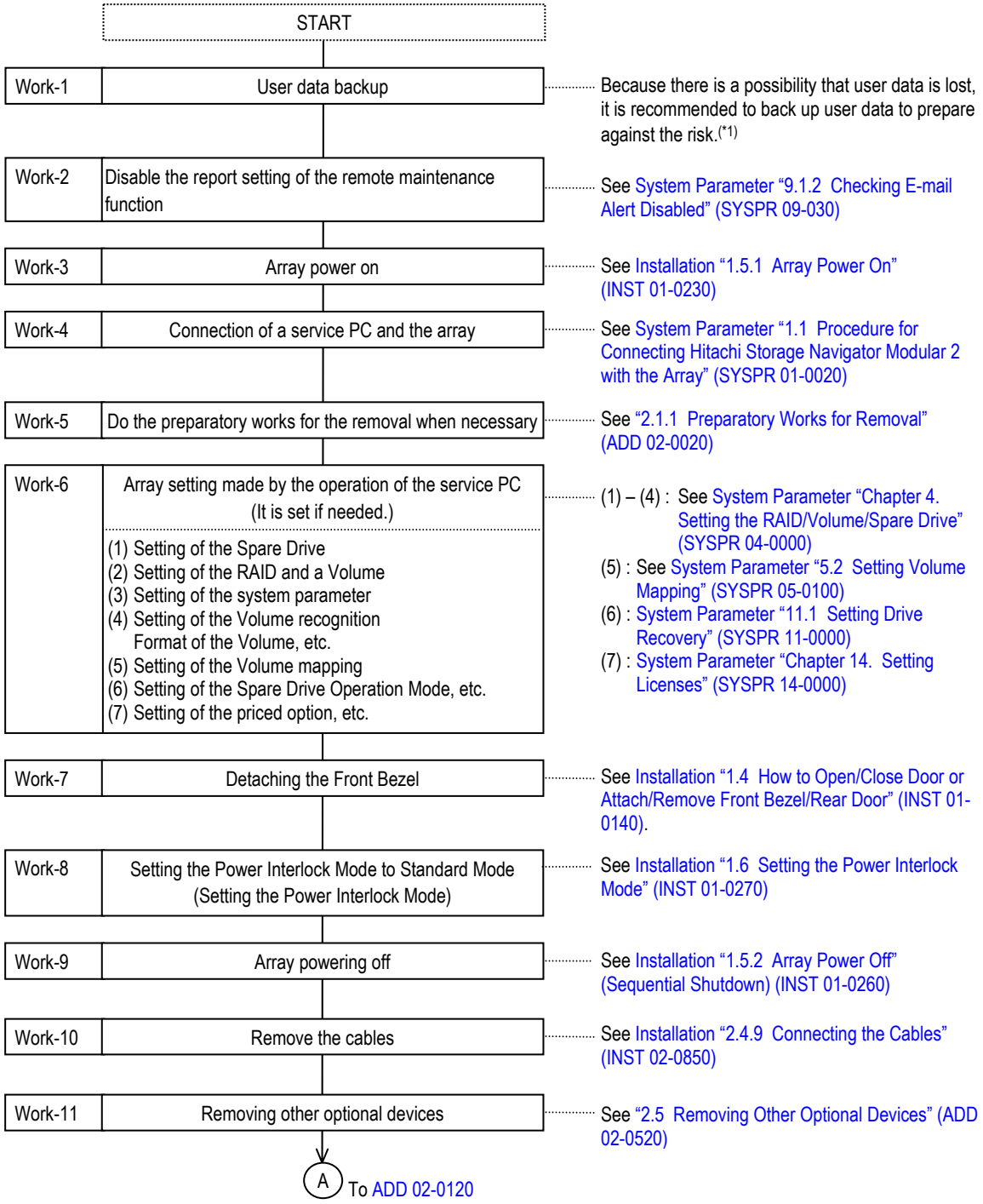
NOTE : For safety use, always close the front bezel after the operation.



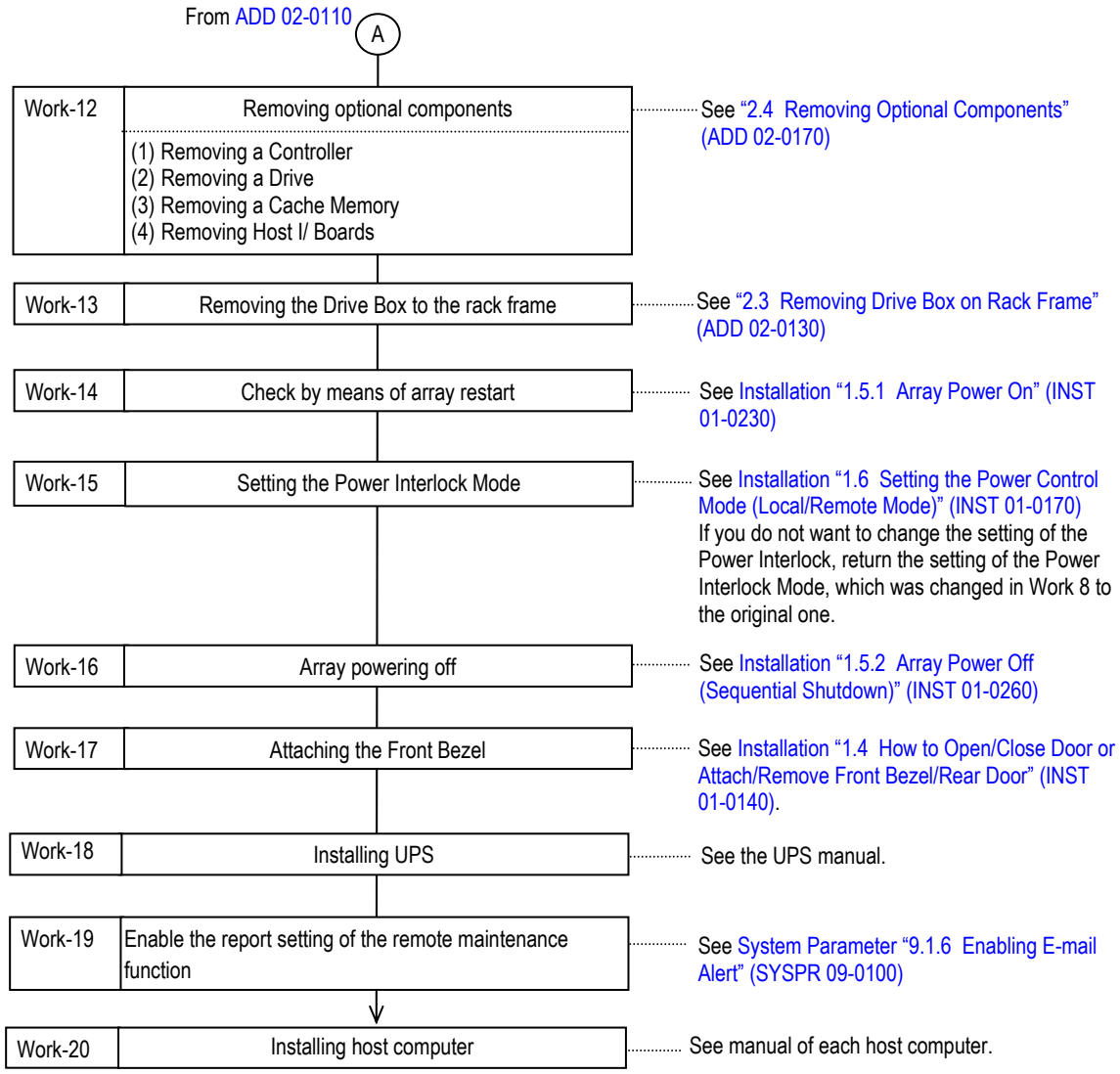
*1 : Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer's permission.

(2) Procedure for the offline removal (with the array 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 01-0220).



‡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 Drive Box on Rack Frame

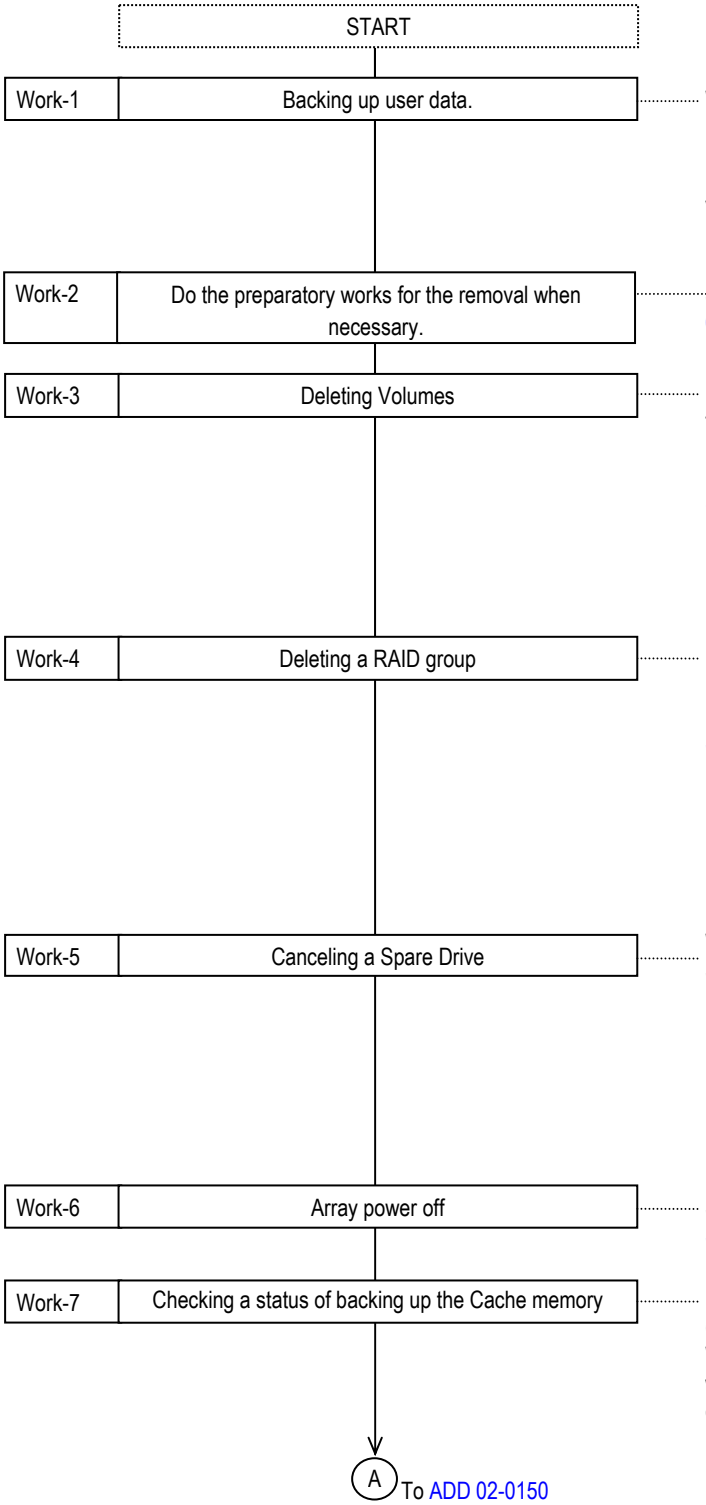
2.3.1 Removing Drive Box on Rack Frame

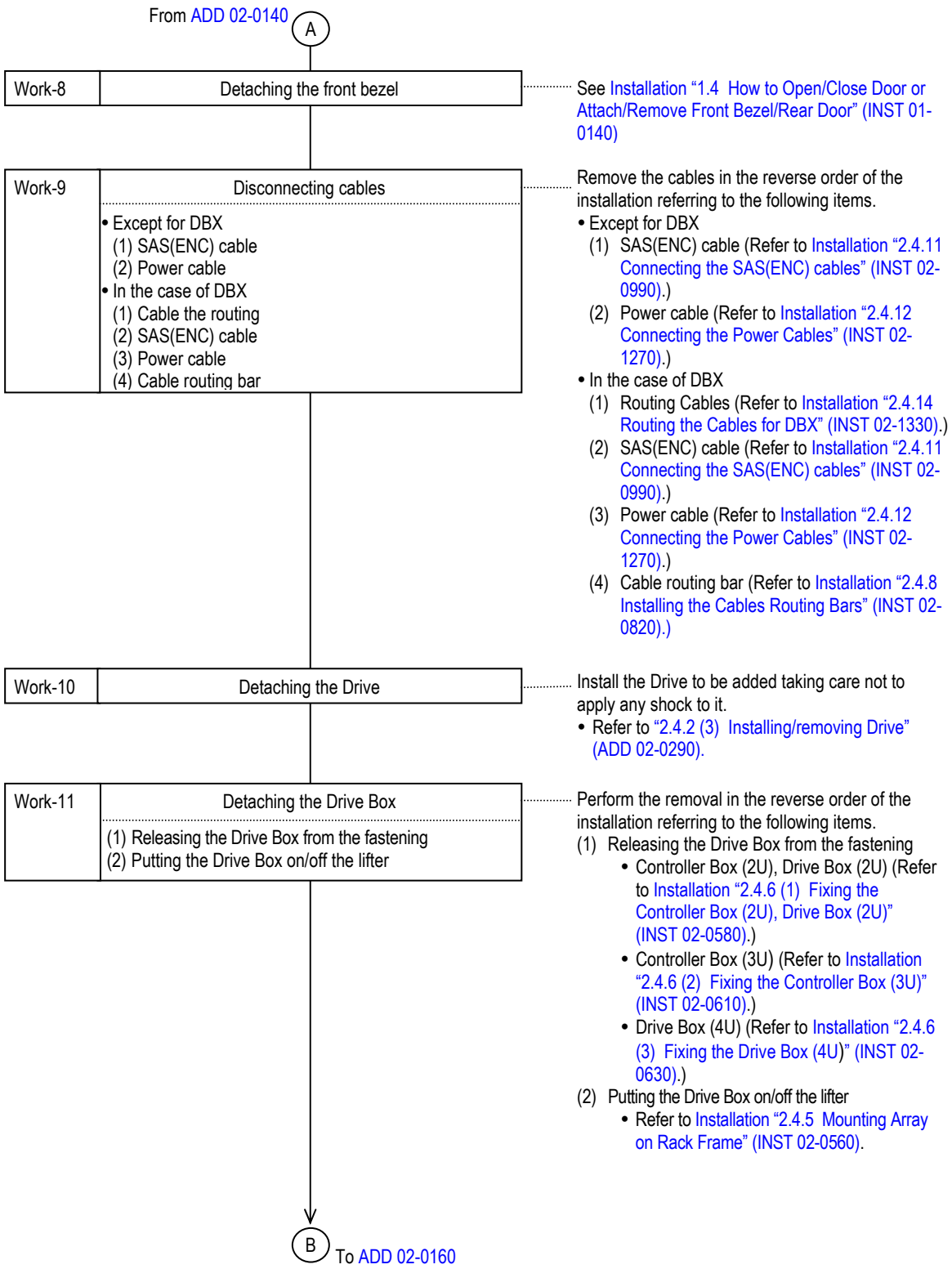
Select a procedure from the following and execute it.

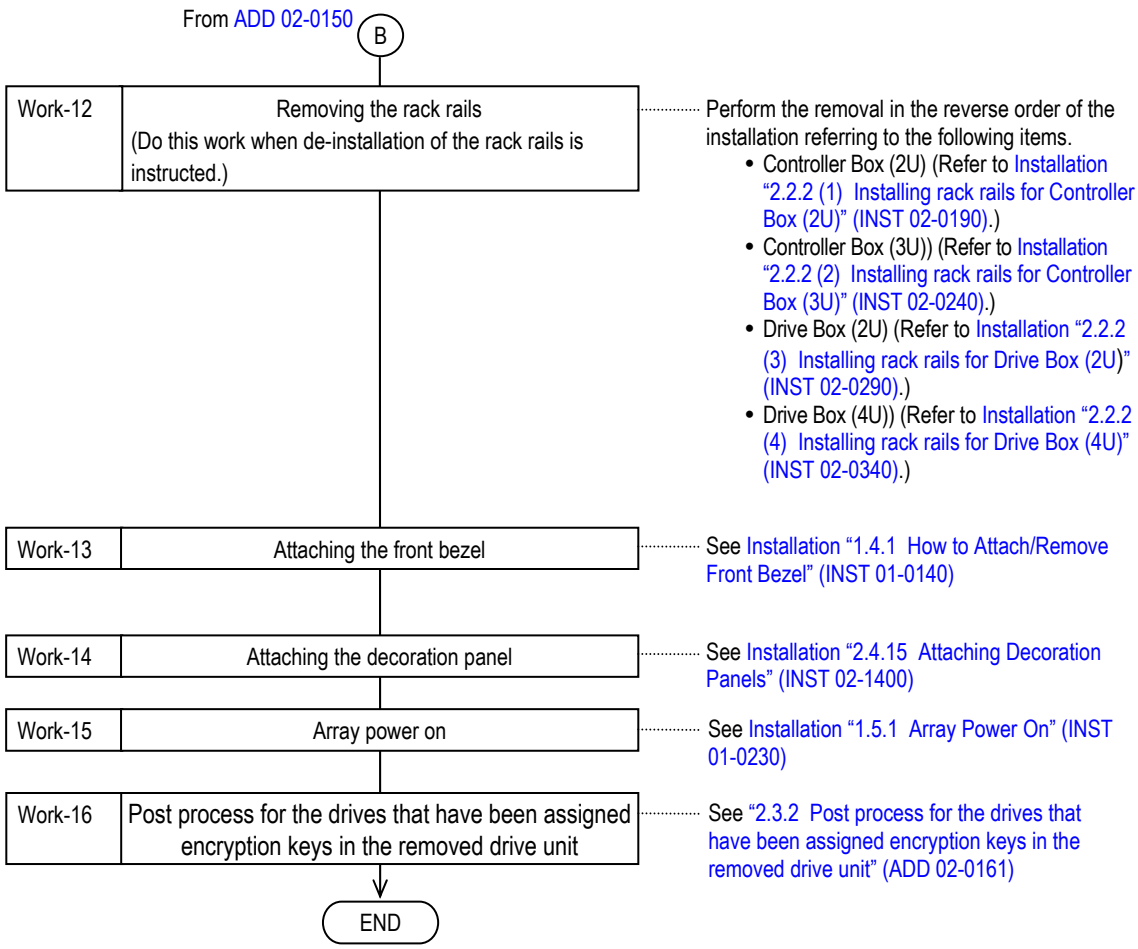
No.	Model	Power status during the removal	Restriction	Removal Process section
1	Rackmount model	Removal with the power turned on	–	Impossible(*1)
2		Removal with the power turned off	1. Remove the Drive. 2. When the Drive Box are removed offline (with the array power turned off), only the last Drive Box of the configuration can be removed. While configuring Drive Box, the Drive Box cannot be removed. 3. Turn off the power of the array. 4. Remove the Drive Box in the opposite procedure of the operation of adding the Drive Box to the rack frame.	Refer to "1.6 Adding the Drive Box to the Rack Frame" (ADD 01-0690)

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

(1) Procedure for removing the Drive Box offline (with the array power turned off)
A procedure for removing the Drive Box after powering off the array is shown below.





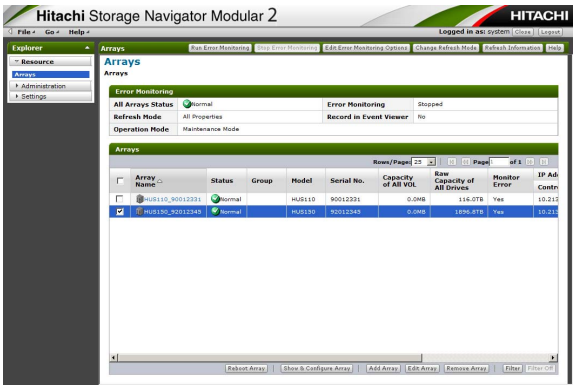


2.3.2 Post process for the drives that have been assigned encryption keys in the removed drive unit

After a drive unit is removed from the array where Data At Rest Encryption (a priced optional feature to encrypt for stored data), post process for removal is required because some drives may have been assigned encryption keys in the removed drive unit.

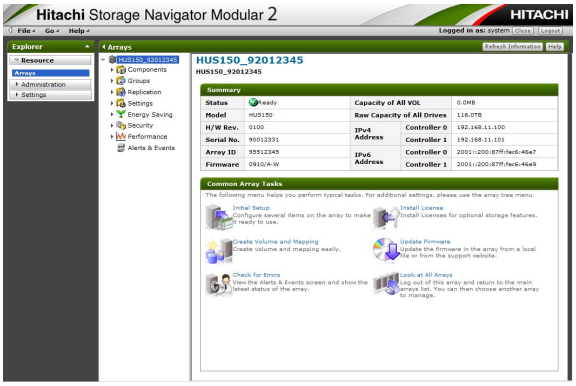
After a drive unit is removed from HUS150, perform the following procedure. If you use HUS130 or HUS110 (not supporting Data At Rest Encryption), or if you have not removed a drive unit, skip the following procedure to perform the subsequent procedure.

(1) Start Hitachi Storage Navigator Modular 2 (for GUI). The Arrays pane is displayed.



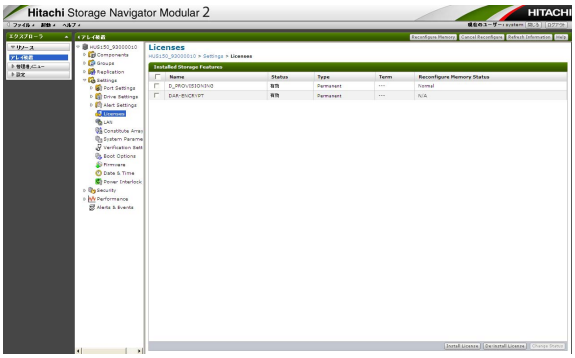
(2) Click the desired array name to display the pane for the array.

NOTE : Note: If the pane for the array is not displayed even after clicking an array name, check whether the LAN port number is changed. (Refer to System Parameter "1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2" (SYSPR 01-0120).) Please retry after setting an appropriate LAN port number.

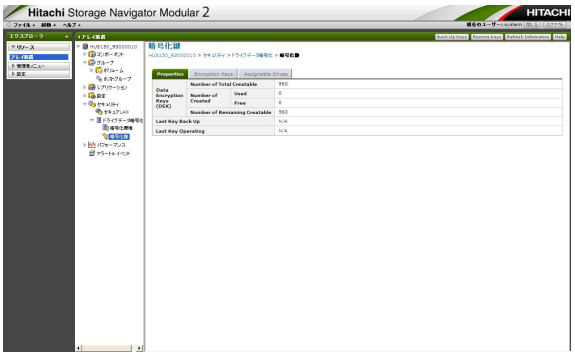


(3) In the Arrays pane, go to [Settings] - [Security] in the tree view. When [Data At Rest Encryption] is displayed under the [Security], go to Step (4) because Data At Rest Encryption is installed. If not, this complete the procedure because Data At Rest Encryption is not installed.

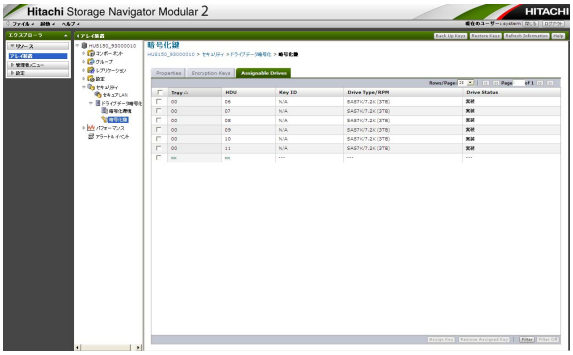
(4) Click [Data At Rest Encryption] to display the Data At Rest Encryption pane.



(5) Click [Encryption Keys] to display the Encryption Keys pane.



(6) Click the Assignable Drives tab to display the Assignable Drives list.

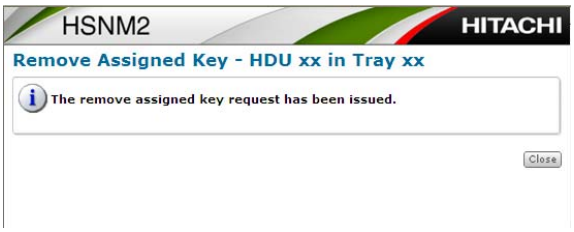


Check whether the items whose Tray and HDU are xx are displayed at the end of the list. If the list spans several pages, click ⏭ in the upper right to display the last page.
(The above figure is an example of the single page that lists an item whose Tray and HDU are xx.)

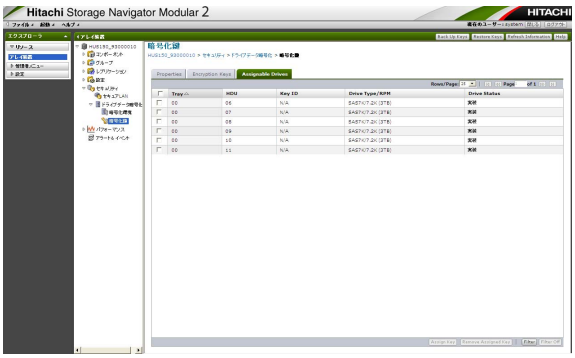
(7) Select the check box of the item whose Tray and HDU are xx and click [Remove Assigned Key]. (This complete post process for removal.)

NOTE : Only one check box for the item whose Tray and HDU are xx must be selected. Do not click [Remove Assigned Key] when the check box of other items are selected.

(8) In the Remove Assigned Key page, click [Close].



In the Assignable Drives list, check that no items whose Tray and HDU are xx are displayed. (This confirms the completion of the post process for removal.)



2.4 Removing Optional Components

2.4.1 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 array power turned off)
Controller	DF-F850-CTLXS/ DF-F850-CTLXSR(*3)	Controller (For CBXS/CBXSS)	–	Impossible	Possible "2.4.6 Removing a Controller" (ADD 02-0510)
Drive(*2) (including Spare Drive)	DF-F850-3HGSS	2.5-inch Drive (287.62 G bytes) (Drive rotational speed : 10,000 min^{-1})	–	Varies depending on the disk array to be removal. "2.4.2 (2) (2-1) Procedure for removing Drive while the array power is online" (ADD 02-0250)	Varies depending on) the disk array to be removal. "2.4.2 (2) (2-2) Procedure for removing the Drive offline (with the array power turned off)" (ADD 02-0270)
	DF-F850-3HGSSH	2.5-inch Drive (287.62 G bytes) (Drive rotational speed : 15,000 min^{-1})			
	DF-F850-6HGSS	2.5-inch Drive (575.30 G bytes) (Drive rotational speed : 10,000 min^{-1})			
	DF-F850-9HGSS	2.5-inch Drive (879.98 G bytes) (Drive rotational speed : 10,000 min^{-1})			
	DF-F850-12HGSS	2.5-inch Drive (1,173.71 G bytes) (Drive rotational speed : 10,000 min^{-1})			
	DF-F850-2TNL	3.5-inch Drive (1,956.94 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-2TNX (DBX)	3.5-inch Drive (1,956.94 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-3TNL	3.5-inch Drive (2,935.96 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-3TNX (DBX)	3.5-inch Drive (2,935.96 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-3TNW (DBW)	3.5-inch Drive (2,935.96 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-4TNL	3.5-inch Drive (3,915.01 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-4TNX (DBX)	3.5-inch Drive (3,915.01 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-4TNW (DBW)	3.5-inch Drive (3,915.01 G bytes) (Drive rotational speed : 7,200 min^{-1})			
	DF-F850-3HGSLH	3.5-inch Drive (287.62 G bytes) (Drive rotational speed : 15,000 min^{-1})			
	DF-F850-9HGSL	3.5-inch Drive (879.98 G bytes) (Drive rotational speed : 10,000 min^{-1})			

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

*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.

*3 : RoHS2 compliant parts.

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 array power turned off)
Drive(*2) (including Spare Drive)	DF-F850-2HGDM	2.5-inch Flash Drive (195.82 G bytes)	–	Varies depending on the disk array to be removal. "2.4.2 (2) (2-1) Procedure for removing Drive while the array power is online" (ADD 02-0250)	Varies depending on) the disk array to be removal. "2.4.2 (2) (2-2) Procedure for removing the Drive offline (with the array power turned off)" (ADD 02-0270)
	DF-F850-4HGDM	2.5-inch Flash Drive (392.73 G bytes)			
	DF-F850-8HGDM	2.5-inch Flash Drive (786.59 G bytes)			
	DF-F850-2HGDML	3.5-inch Flash Drive (195.82 G bytes)			
	DF-F850-4HGDML	3.5-inch Flash Drive (392.73 G bytes)			
	DF-F850-8HGDML	3.5-inch Flash Drive (786.59 G bytes)			
Cache Memory	DF-F850-8GB	Cache memory (8,192 M bytes)	• For the dual Controller, install the Cache Memory of the same capacity in the Controller #0 and #1.	Impossible	Possible "2.4.3 Removing a Cache Memory" (ADD 02-0320)
	DF-F850-CMM8	Cache memory (8,192 M bytes)			
FC Host I/O Board /Module	DF-F850-HBF84/ DF-F850-HBF84R(*3)	8G bps FC Host I/O Board (including host connectors (4))	–	Possible "2.4.4 Removing a FC Host I/O Board/ Module" (ADD 02-0370)	Possible "2.4.4 Removing a FC Host I/O Board/ Module" (ADD 02-0370)
	DF-F850-HF8G/ DF-F850-HF8GR(*3) (CBL)	8G bps FC Host I/O Module (including host connectors (4))			
iSISI Host I/O Board/ Module	DF-F850-HBS12	1G bps iSCSI Host I/O Board	–	Possible "2.4.5 Removing an iSCSI Host I/O Board/Module" (ADD 02-0440)	Possible "2.4.5 Removing an iSCSI Host I/O Board/Module" (ADD 02-0440)
	DF-F850-HBS102	10G bps iSCSI Host I/O Board (including host connectors (2))			
	DF-F850-HS10G (CBL)	10G bps iSCSI Host I/O Module (including host connectors (2))			

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

*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.

*3 : RoHS2 compliant parts.

2.4.2 Removing a Drive

A procedure for removing the Drive varies depending on a location of the Drive and a condition (whether the array power is online or offline (with the array 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 Types of Drive Removal

No.	Unit of addition/ removal	Component to be added/ removed	Removal	
			Removal of the 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 array power turned off)
1	Drive	Drive #0 to #4 in the CBXSL/CBXSS/CBSL/CBSS	Impossible (*2)	Impossible(*2)
		Drive #0 to #4 (#A0 to #A4 for DBX) in the DBL/DBS/DBW/DBX/DBF corresponding to the unit #0 connected to the CBL	–	–
2		Drive #5 or more in the CBXSL/CBXSS/CBSL/ CBSS	Possible	Possible
		Drive #5 or more (#A5 or more for DBX) in the DBL/DBS/DBW/DBX corresponding to the unit #0 connected to the CBL	Refer to "2.4.2 (2-1) Procedure for removing Drive while the array power is online" (ADD 02-0250)	Refer to "2.4.2 (2-2) Procedure for removing the Drives offline (with the array power turned off)" (ADD 02-0270)
3		DBL/DBS/DBW/DBX /DBF corresponding to the unit #1 or more	Possible	Possible
			Refer to "2.4.2 (2-1) Procedure for removing Drive while the array power is online" (ADD 02-0250)	Refer to "2.4.2 (2-2) Procedure for removing the Drives offline (with the array power turned off)" (ADD 02-0270)

*1 : Data is exchanged between a host computer and the array.
*2 : The Drives #0 to #4 of the CBXSL/CBSL cannot be decreased because the firmware is stored in them. The Drives #0 to #4 (#A0 to #A4 for DBX) of the DBL/DBS/DBW/DBX/DBF corresponding to the unit #0 connected to the CBL cannot be decreased because the firmware is stored in them.

(1) Before starting removal of Drive

⚠ CAUTION

- **Do not pull out multiple DBXs/DBWs at a time because the rack can fall over.**
- **Do not put objects on the DBX which has been pulled out of the rack or use it as working space because the rack can fall over.**
- **Do not put objects in the open drawer of the DBW or use it as working space because the rack can fall over.**

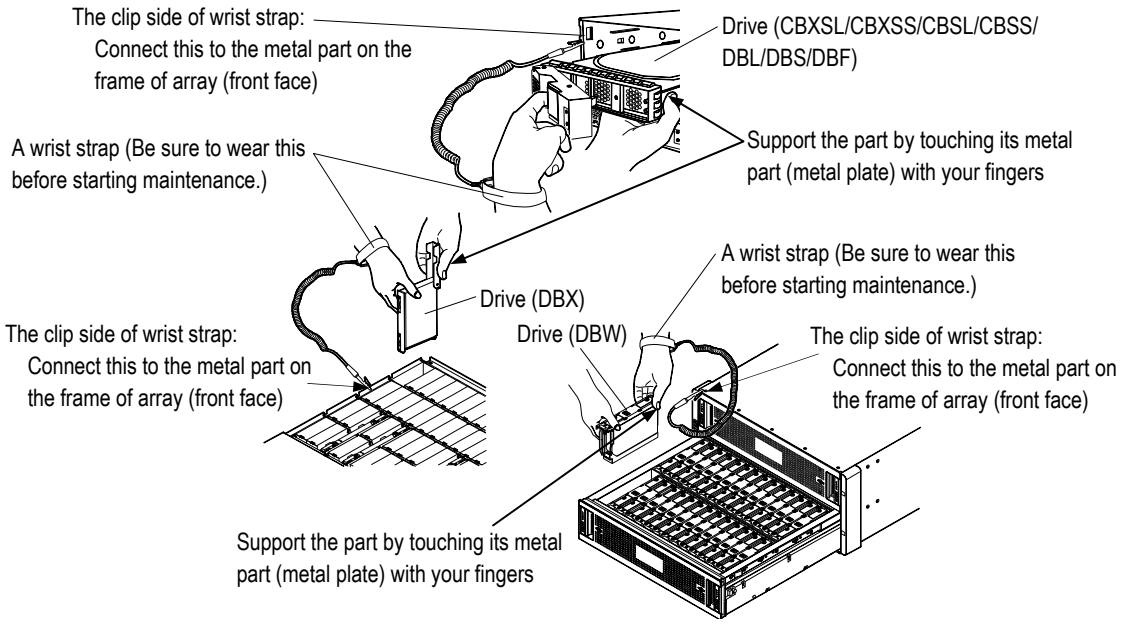
NOTE : • The Drive is a precision machine. Never apply a shock or vibration to it.
• Prepare the dummy (Drive) before removing the Drive.

NOTICE

- **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.**
- **Drives are precision components.**
  Be careful not to expose drives to hard shock.
- **When you remove a 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 Drive is a precision instrument. Be sure to put on the wrist strap before starting work in order to protect 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 Drive into the array, support the Drive as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When removing the Drive from the DBX/DBW, 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 (g) Installing the stabilizer" (INST 02-0150).)
- When pulling out or storing the DBX, perform it for only one DBX at a time slowly and surely. (Refer to Installation "1.4.1 (3) In the case of DBX. (a) How to pull the DBX out of the rack frame" (INST 01-0190) or "1.4.1 (3) In the case of DBX. (b) How to store the DBX in the rack frame." (INST 01-0200).)
- When pulling out or putting a drawer of DBW back, perform it for only one drawer at a time slowly and surely. (Refer to Installation "1.4.1 (4) In the case of DBW. (a) How to open a drawer of DBW out" (INST 01-0201) or "1.4.1 (4) In the case of DBW. (b) How to close a drawer of DBW." (INST 01-0202).)

(1-1) In the case of CBXSL/CBSL/DBL

(a) Installation locations and numbers of Drives

The Drive numbering is #0 to #11 from the bottom left to the top right viewed from the front side of the array.

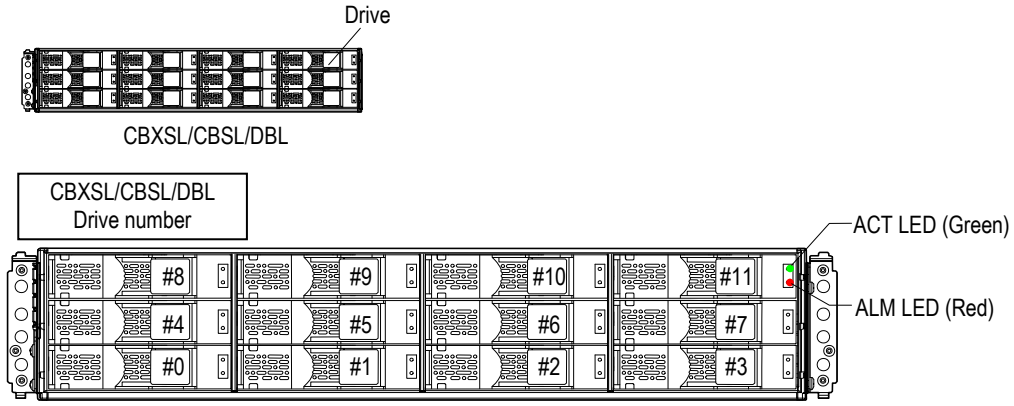


Figure 2.4.1 Drive Installation Locations (CBXSL/CBSL/DBL)

(1-2) In the case of DBF

(a) Installation locations and numbers of Drives

The Drive numbering is #0 to #11 from the bottom left to the top right viewed from the front side of the array.

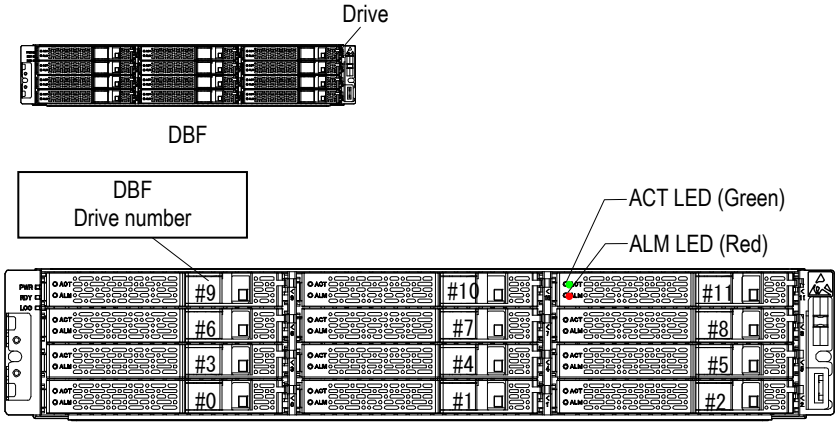


Figure 2.4.1.1 Drive Installation Locations (DBF)

(1-3) In the case of CBXSS/CBSS/DBS

(a) Locations and numbers of Drives

The Drive numbering is #0 to #23 from the left viewed from the front side of the array.

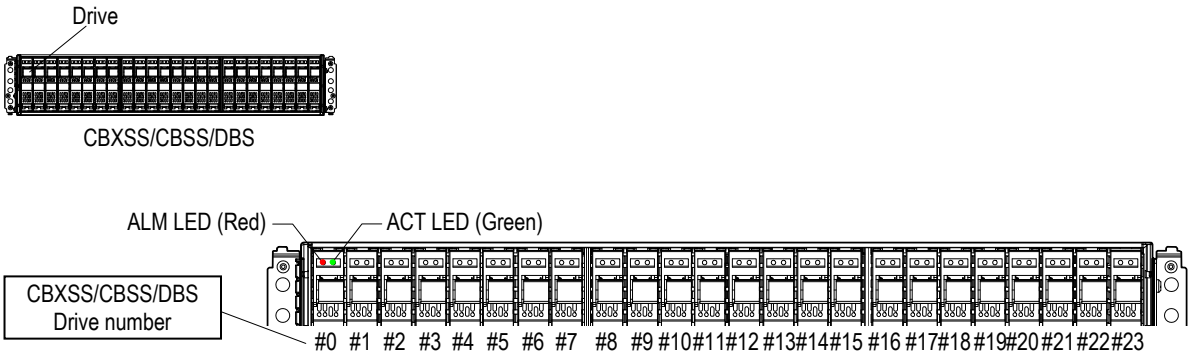


Figure 2.4.2 Drive Mounting Location (CBXSS/CBSS/DBS)

(1-4) In the case of DBX

(a) Locations and numbers of Drives

The Drive numbering is #A0 to #A23, #B0 to #B23 viewed from above. (Refer to Figure 2.4.3)

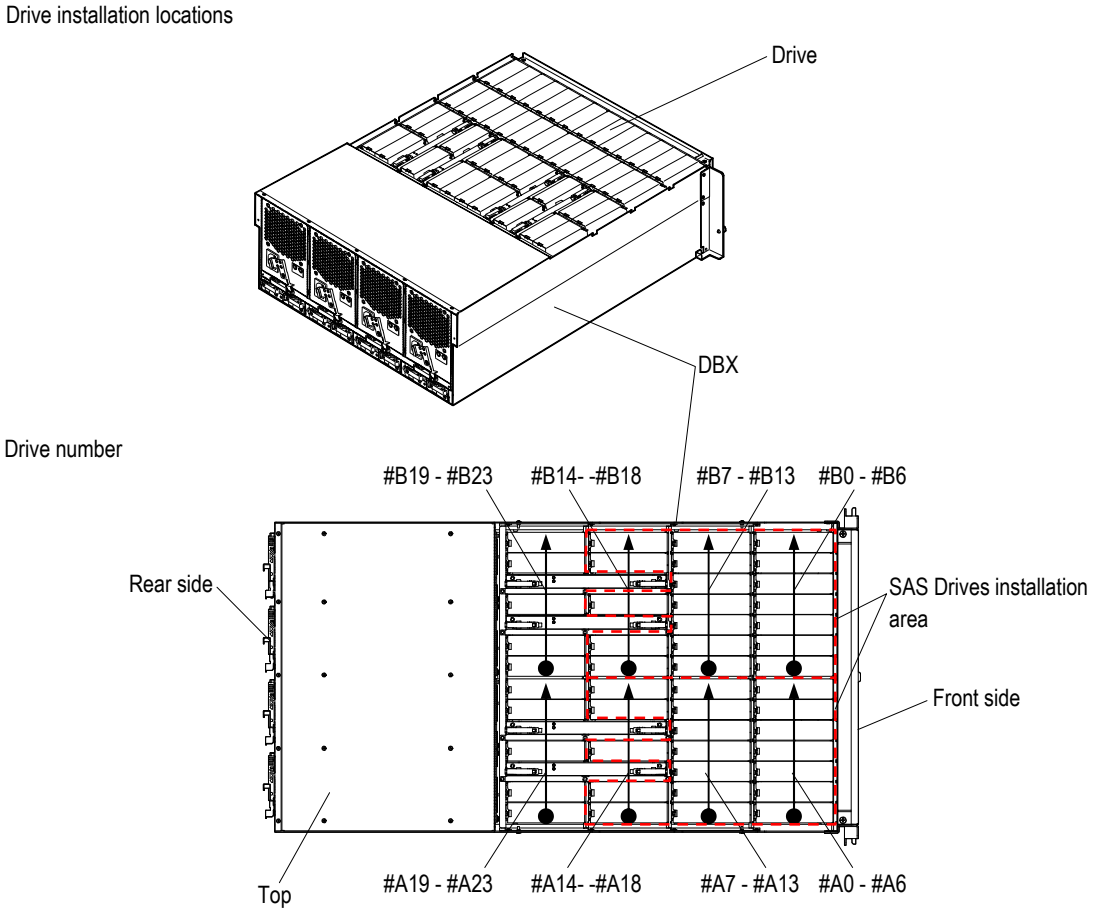


Figure 2.4.3 Drive Installation Locations (DBX)

(1-5) In the case of DBW

(a) Installation locations and numbers of Drives

The Drive numbering is #0 to #41 from the front side of the top drawer and #42 to #83 from the front side of the bottom drawer. (Refer to Figure 2.4.3.1)

NOTE : Follow the drive removal conditions described below. Otherwise, the array will not start up normally.

- The Drives in the row A (#0 to #13) cannot be removed.
- Remove the Drives in drive number descending order in the following order of rows: F (#70 to #83) → E (#28 to #41) → D (#56 to #69) → C (#14 to #27) → B (#42 to #55), not to leave empty slots between Drives.
  For example, when the Drives are installed in up to the row F, remove first from the Drive with the higher drive number in the row F. The Drive with the low drive number or any of Drives in the rows other than the row F cannot be removed.
- In case of the firmware version 0930/A or more, when removing the drives from the DBW of unit #11, remove them in the following order: C (#14 to #21) → B (#42 to #55).

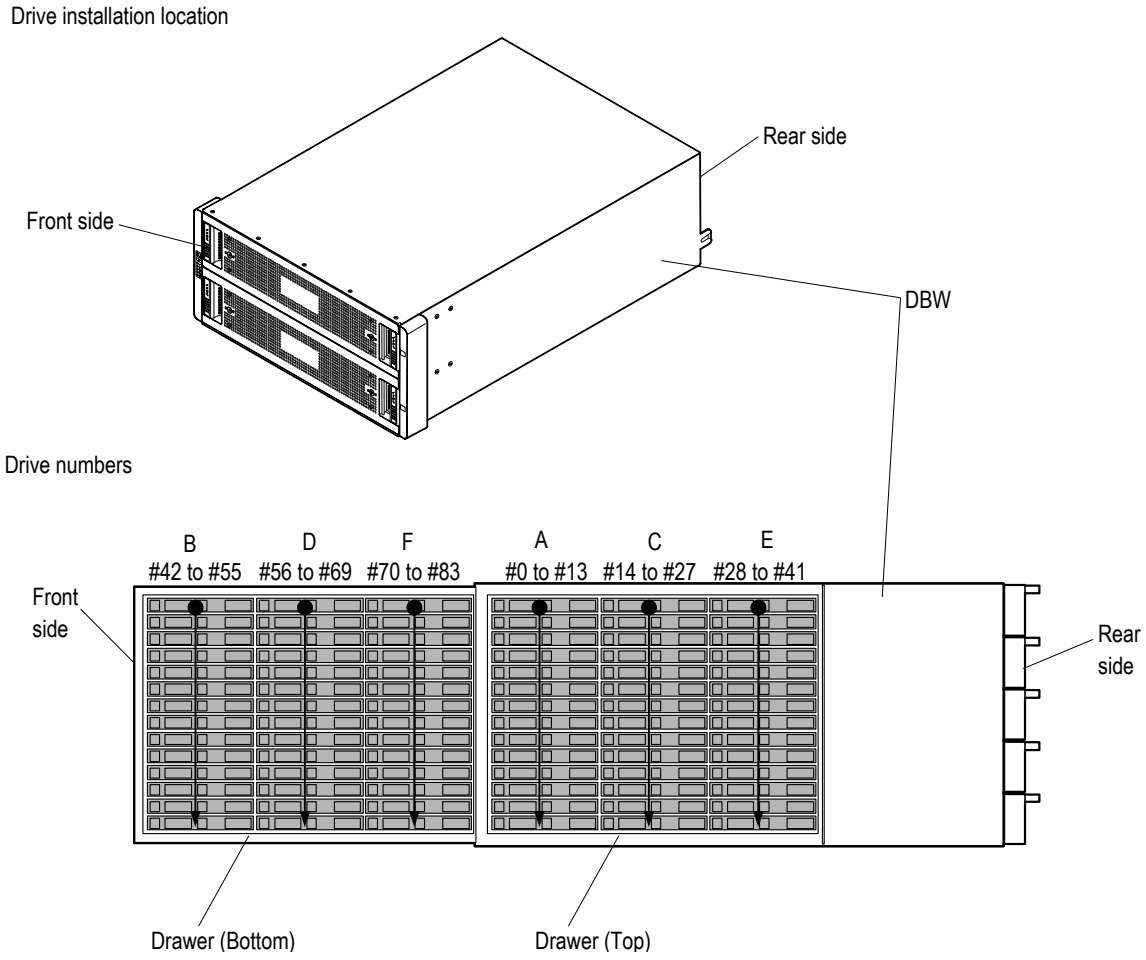


Figure 2.4.3.1 Drive Installation Locations (DBW)

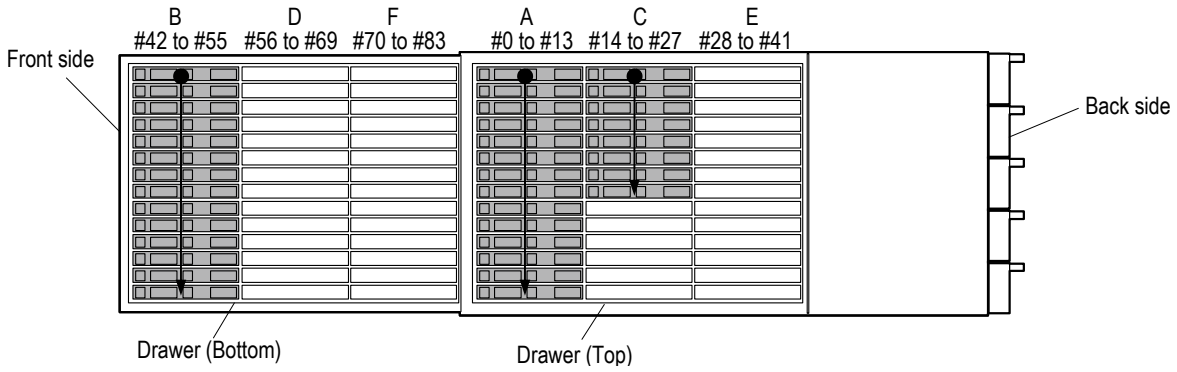


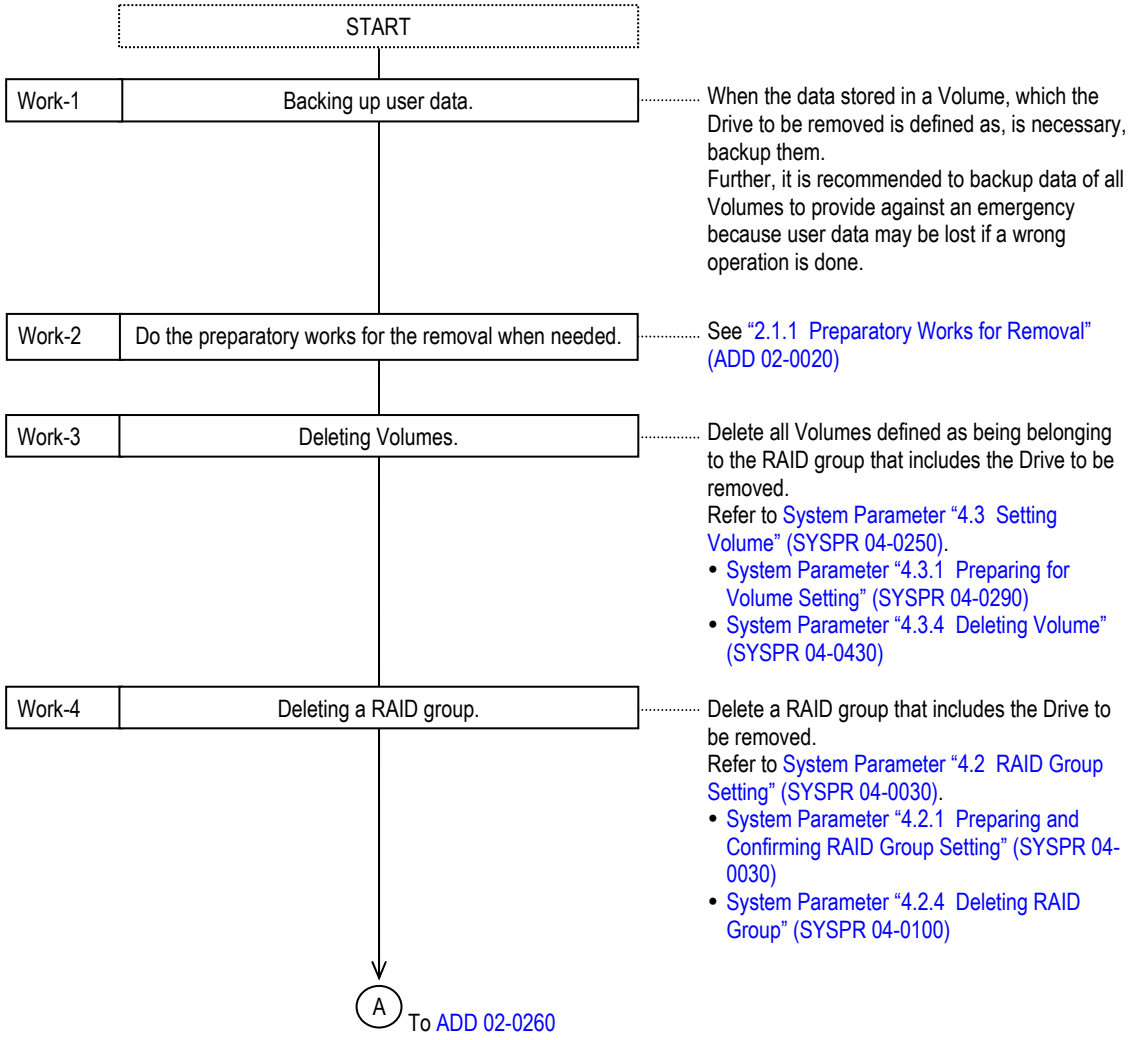
Figure 2.4.3.2 Slots that Drives in DBW of Units #11 Can Be Installed

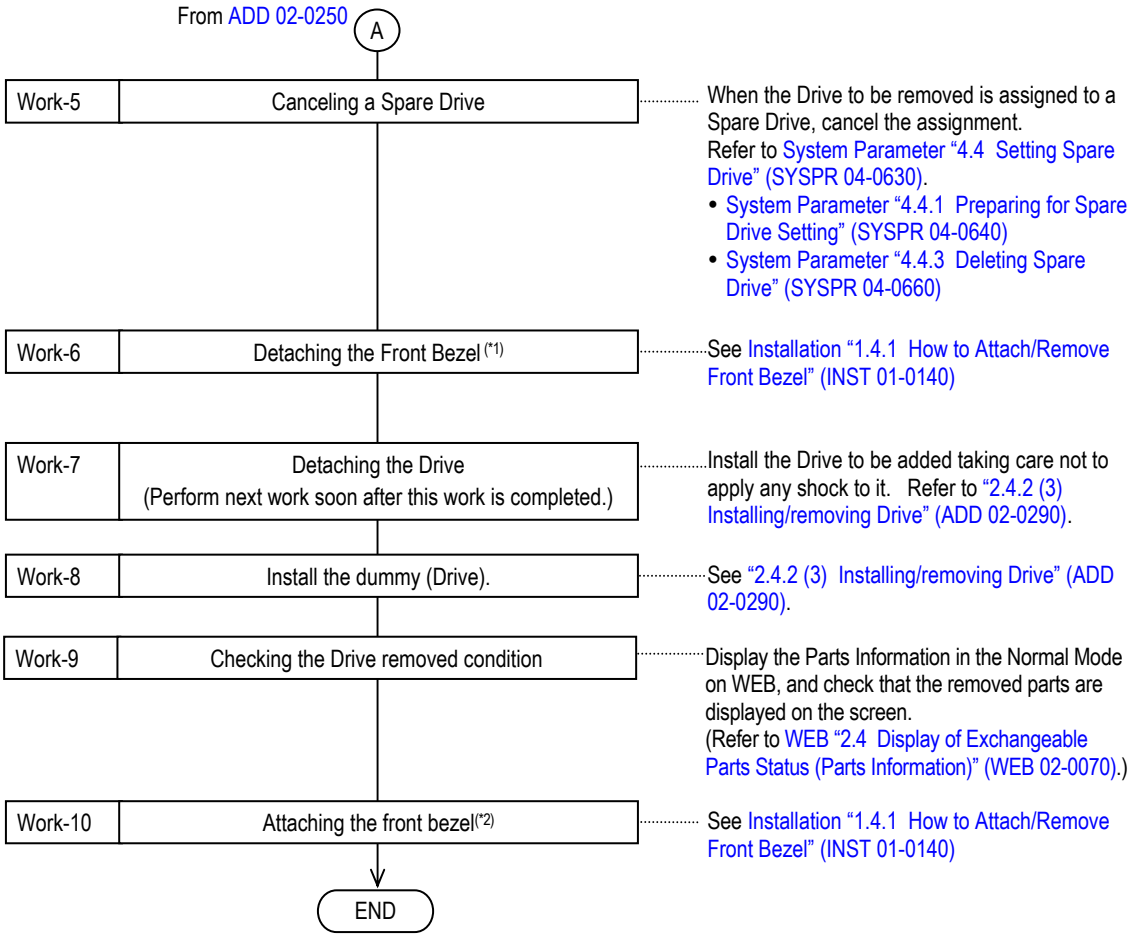
(2) Procedure for removing Drive

- A procedure for removing the Drive installed in the array is shown below.
- Any of the Drives #0 to #4 in the CBXSL/CBSL, or #0 to #4 in the first DBL/DBS/DBF/DBW or #A0 to #A4 of the DBX corresponding to the unit ID #0 connected to the CBL, cannot be removed.
- It is recommended to backup the data of all Volumes to provide against an emergency because user data may be lost if a wrong operation is done.

(2-1) Procedure for removing Drive while the array power is turned on

The procedure for removing the Drive without shutting down the array is shown below.



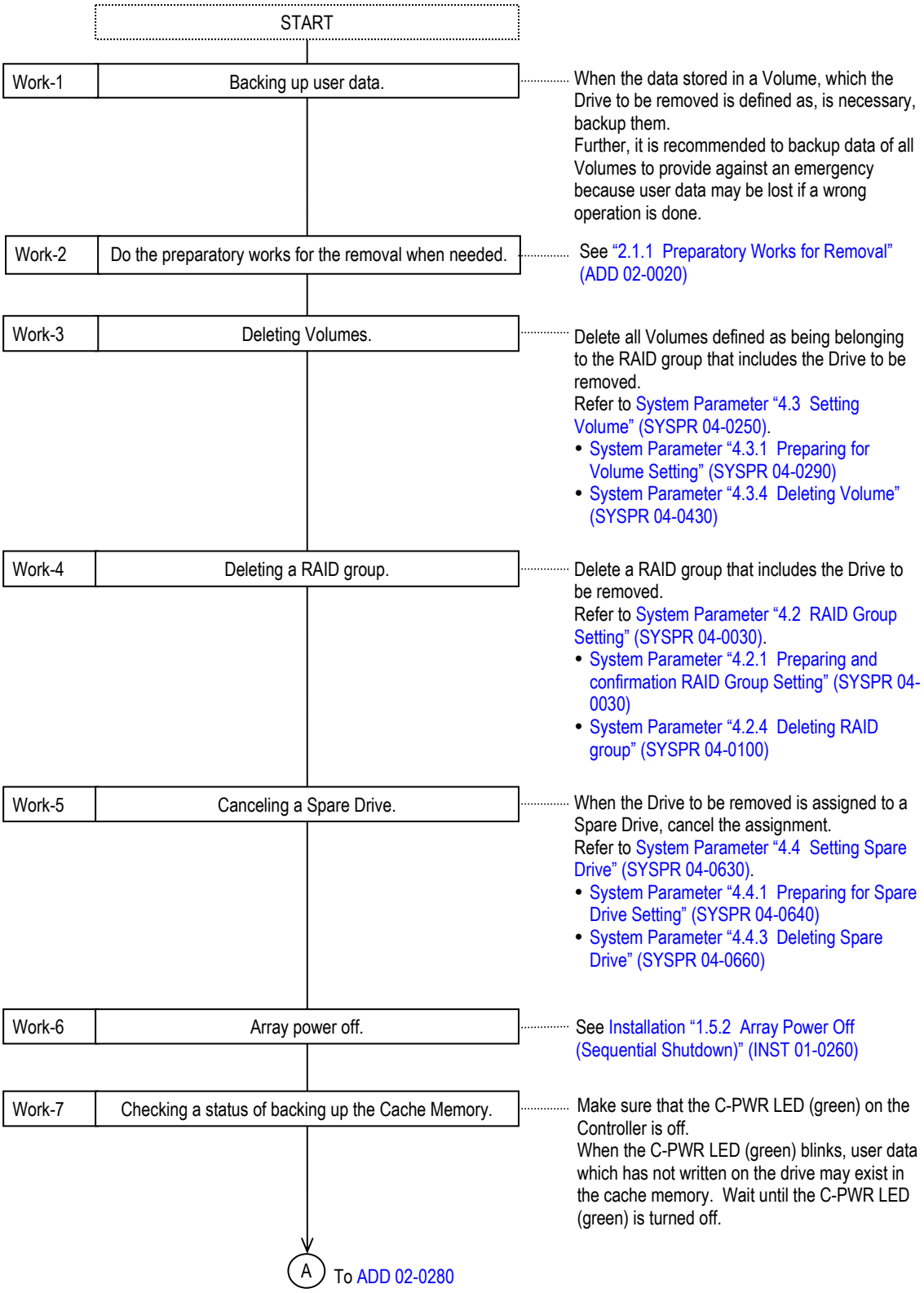


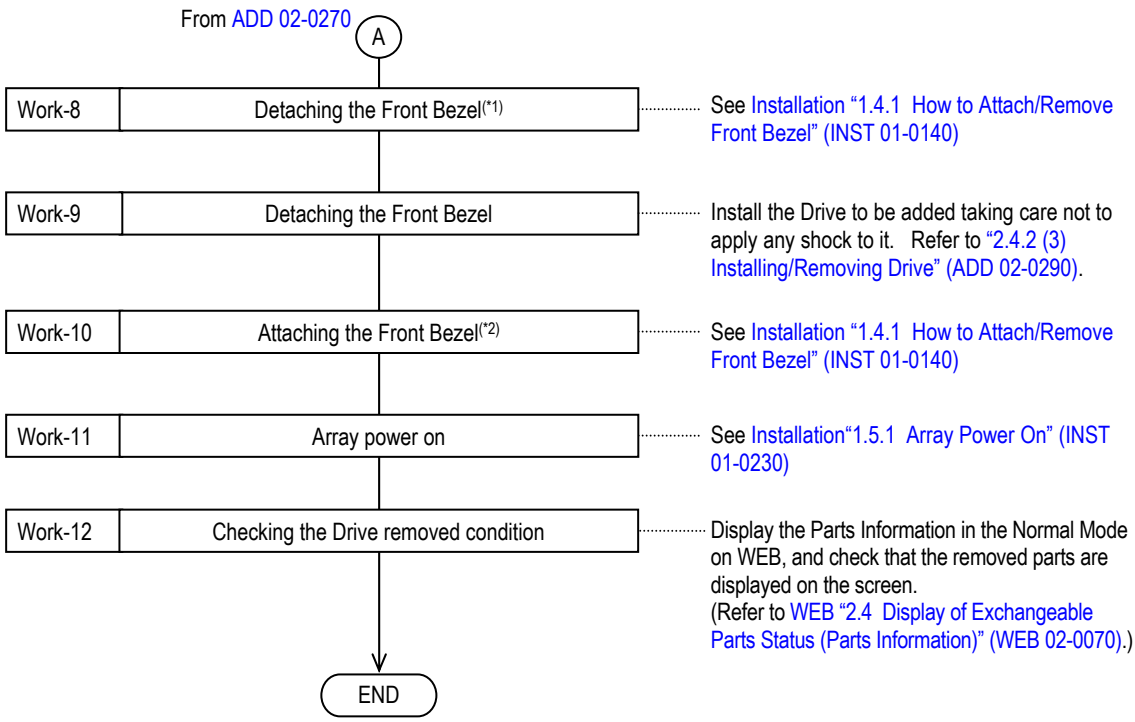
*1 : In the case of the DBX, remove the front bezel, pull the array out of the rack, and then remove the top cover.
In the case of the DBW, the front bezel does not need to be removed. Pull the drawer out of the array.

*2 : In the case of the DBX, attach the top cover, store the array in the rack, and then attach the front bezel.
In the case of the DBW, put the drawer back in the array. The front bezel does not need to be attached.

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

The procedure for removing the Drive after powering off the array is shown below.





*1 : In the case of the DBX, remove the Front Bezel, pull the array out of the rack, and then remove the top cover.
In the case of the DBW, the front bezel does not need to be removed. Pull the drawer out of the array.

*2 : In the case of the DBX, attach the top cover, store the array in the rack, and then attach the front bezel.
In the case of the DBW, put the drawer back in the array. The front bezel does not need to be attached.

(3) Installing/removing Drive

(3-1) In the case of CBXSL/CBSL/DBL/DBF

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

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

NOTE : • When handling the Drive, hold the RAIL side because the SHIELD SPRING is subject to breakage.

• Just after the Flash Drives (FMD) is removed, the fans of the Power Unit equipped in the rear of the DBF rotate at the highest speed.
In 30 minutes after the removal of the Flash Drives (FMD), the fans of the Power Unit rotate at the speed suitable for environmental temperature.

(a) Pull the stopper of the handle toward you to have the lock off, and then remove the Drive by pulling it out taking care not to apply a shock to it.
When using the removed Drive for the purpose of addition to another array, 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 (Drive) in the slot from which the Drive has been removed.
Be sure to insert the dummy (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 part of the dummy (Drive) comes to the left side.

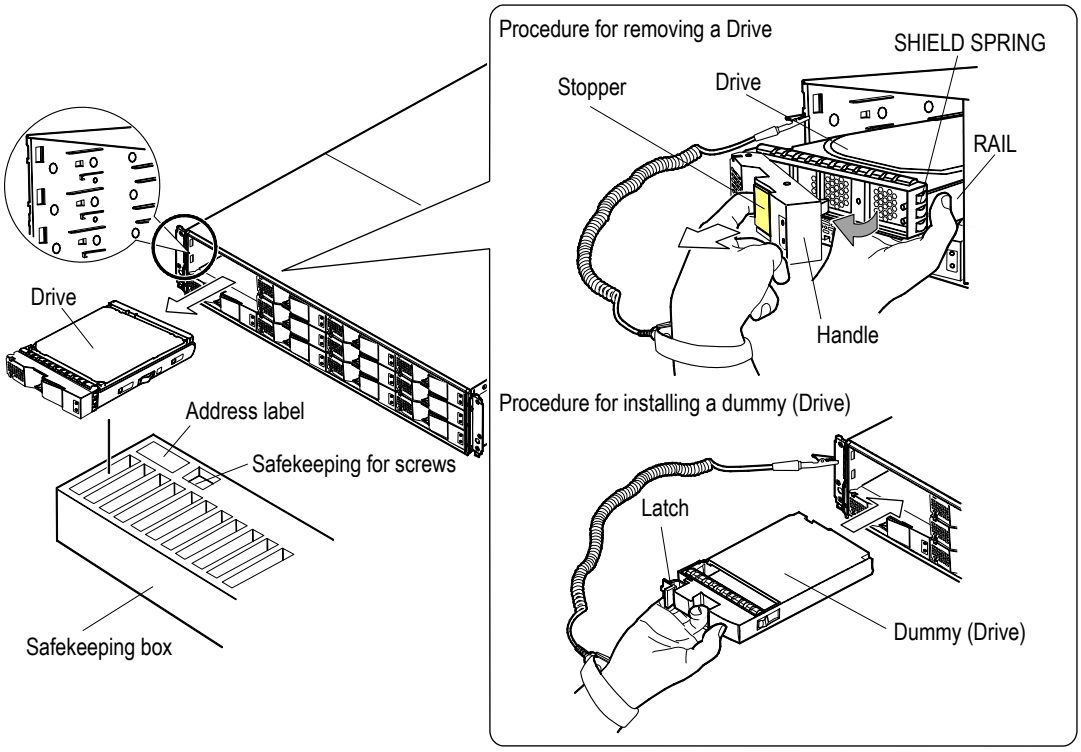


Figure 2.4.4 Removing the Drive and Installing the Dummy (Drive) (CBXSL/CBSL/DBL/DBF)

(3-2) In the case of CBXSS/CBSS/DBS

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

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

(a) Pull the stopper of the handle toward you to have the lock off (①), tilt the handle toward you, and then remove the Drive by pulling it out taking care not to apply a shock to it.
When using the removed 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 (Drive) in the slot from which the Drive has been removed.
Be sure to insert the dummy (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 part of the dummy (Drive) comes to the lower side.

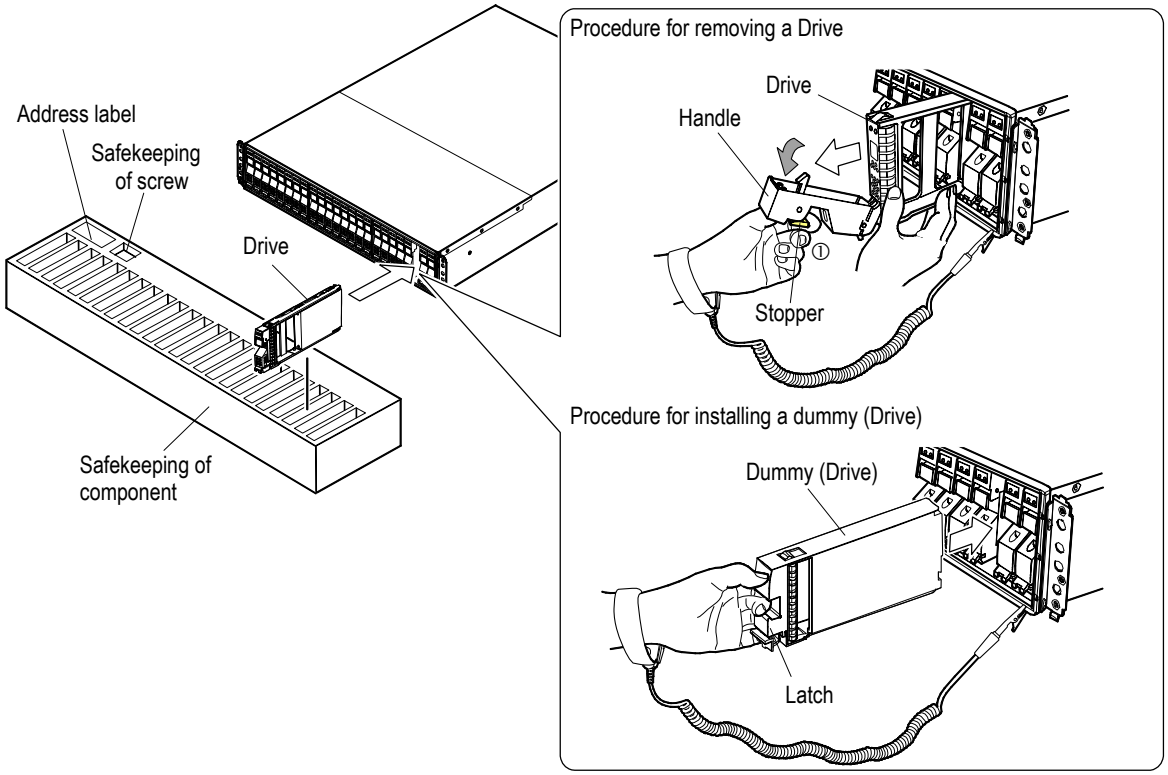


Figure 2.4.5 Removing the Drive and Installing the Dummy (Drive) (CBXSS/CBSS/DBS)

(3-3) In the case of DBX

When installing or removing a Drive in the Drive removal work, follow the procedure below. Perform the following operations (a) and (b) for each of the slots, where the Drive is to be replaced, one by one.

(a) Slide the latch (blue) on the Drive and open the handle, and then pull out and remove the Drive taking care not to apply a shock to it.
When using the removed Drive for the purpose of addition to another disk array unit, keep it in custody with its handle returned to its original state taking care not to apply a shock to it.

(b) Install the dummy (Drive) in the slot from which the Drive has been removed.
Be sure to insert the dummy (Drive) in the vacant slot because it is necessary to regulate a cooling air flow inside the array.
Insert it into the slot slowly so that the latch (round dent) part of the dummy (Drive) comes to the lower side.

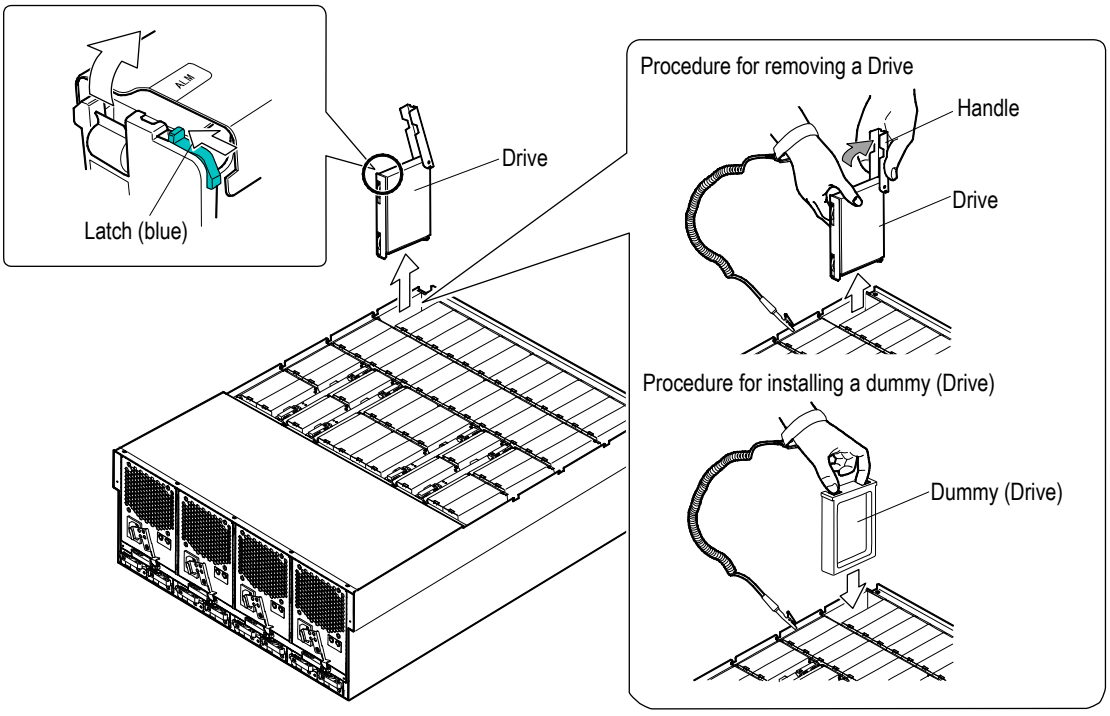


Figure 2.4.6 Removing the Drive and Installing the Dummy (Drive) (DBX)

(3-4) In the case of DBW

When installing or removing a Drive in the Drive removal work, follow the procedure below. Perform the following operations (a) and (c) for each of the slots, where the Drive is to be replaced, one by one.

(a) Slide the release button and the Drive will pop up slightly from the slot.
When the Drive is not lifted after sliding the release button, slide the latch on the Drive toward you (①) while sliding the release button, so that the Drive will be lifted up.

(b) Lift the Drive out of the slot.
When using the removed Drive for the purpose of addition to another DBW, keep it in custody with its handle returned to its original state taking care not to apply a shock to it.

(c) Wait for 10 minutes after removing all the Drives and closing the drawer.
Check that the WARNING LED (orange) on the front of the Controller Box does not light up. If it lights up, perform the maintenance according to the Information Message on WEB.

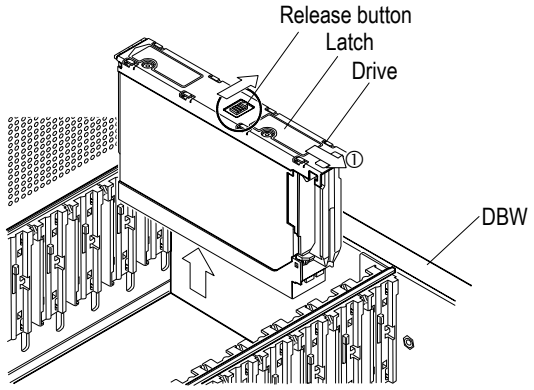


Figure 2.4.6.1 Removing the Drive (DBW)

2.4.3 Removing a Cache Memory

This work is for CBSS/CBSL and for CBL.

NOTE : Cache Memory has the following types; for CBSS/CBSL and for CBL. Be careful not to use the wrong one at the time of replacement.

CAUTION

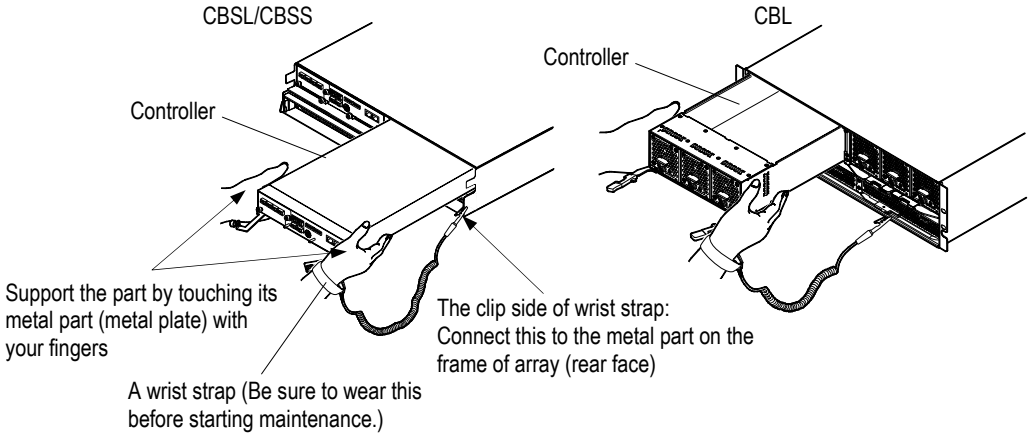
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

NOTICE

- **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 a Controller, 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 Controller is a precision instrument. Be sure to put on the wrist strap before starting work in order to protect Controller 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 Controller into the array, support the Controller as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • Do the work for both Controllers.
• After the work is completed, be sure to return the Controllers #0 and #1 to their original locations.

NOTE : • If you remove the Cache Memory 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 does not become Ready status.
If you remove the Cache Memory 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 does not become Ready status.
If you remove the Cache Memory 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 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 Memory.
Return it to enable after completing the removal.
Request the customer/SE for invalidation/validation of the priced option.

• When removing the cache memory during Volume format, the message "HH9T00 The cache memory capacity has been reduced before background Volume format is completed" is displayed, and the array does not become Ready status.
After verifying that the Volume format is completed" (Refer to System Parameter "4.3.6 Formatting Volume (d)" (SYSPR 04-0500)), remove the cache memory.

<Working Procedure>

(1) Turn off the main switch.
For the CBSL/CBSS, press the main switch on either Controller #0 or Controller #1 for three seconds or more.
Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

(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) Remove the Controller.

(3-1) For the CBSL/CBSS

(a) Loosen the right and left screws (blue).

(b) Open the right and left levers forward.
When the levers are completely opened, the Controller comes out forward.

(c) Remove all the cables connected to the Controller (When the Drive Box is connected, remove the SAS(ENC) cable, too.)

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 Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

CAUTION

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

(d) Slide the Controller forward to remove it.

(3-2) For the CBL

(a) Slide the right and left latches (blue), and then open the levers forward.

(b) Pull the right and left levers open.
When the levers are completely opened, the Controller comes out forward.

CAUTION

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

(c) Slide the Controller forward, and then remove it.

(4) Remove the Cache Memory.

(4-1) For the CBSL/CBSS

(a) Place the Controller with it's Module revision label facing down and loosen the two screws (blue) from the rear side of the Controller, and then slide the cover to the direction shown by the arrow (⟶) and remove it.

(b) Remove the Cache Memory on the Controller.
Push the slot levers which fix the Cache Memory and pull up the Cache Memory by holding its both ends to remove the Cache Memory.

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

(c) Install the removal Cache Memory in the Controller.
Fit the projection inside the slot to the cut of Cache Memory, and push the Cache Memory in by holding both ends of Cache Memory until the slot levers are completely closed.

NOTE :
- Install Cache Memories of the same capacity in the Controller #0 and Controller #1.
- Be sure to install a Cache Memory in both the slot #0 and slot #1.
- Install Cache Memories of the same capacity in the slot #0 and slot #1.

(d) Slide and install the cover of the Controller, then fix the two screws (blue) from the rear side of the Controller to fix it.

(4-2) For the CBL

(a) Remove the Cache Memories on the Controller.
Push the slot levers which fix the Cache Memory and pull up the Cache Memory by holding its both ends to remove the Cache Memory.

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

(b) Install the removal Cache Memory the in the Controller.
Fit the projection inside the slot to the cut of Cache Memory, and push the Cache Memory in by holding both ends of Cache Memory until the slot levers are completely closed.

NOTE :
- Install Cache Memories of the same capacity in the Controller #0 and Controller #1.
- Be sure to install a Cache Memory in both the slot #0 and slot #1.
- Install Cache Memories of the same capacity in the slot #0 and slot #1.

(5) Install the Controller.

(5-1) For the CBSL/CBSS

(i) Insert and push the Controller all the way into the slot with its right and left levers completely opened.

NOTE : • Do not catch a SAS(ENC) cable when the Controller for the CBSL/CBSS is inserted.
• Install the Controller for the CBSL/CBSS with its Module revision label facing up.

(ii) Close the levers and tighten the right and left screws (blue) to fix the Controller.

(5-2) For the CBL

(a) Insert and push the Controller all the way into the slot with its right and left levers completely opened.

(b) Close the levers and slide the right and left latches (blue) to fix the Controller.

(6) In the dual controller configuration, perform the steps (3) to (5) for the other Controller.

(7) For the CBSL/CBSS, connect all the removed cables to the Controller.

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 Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

(8) Connect the two power cables to the Controller Box.

(9) Turn on the main switch.

(10) Check that the READY LED (green) on the front of the Controller Box lights up, and the ALARM LED (red) and the WARNING LED (orange) go out[‡1]. The READY LED (green) on the front of the Controller Box may blink at high speed (for a maximum of 30 to 50 minutes, or 40 to 60 minutes for CBL (80 to 180 minutes when the DBW is connected to the CBL)) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Controller Box lights up.

(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 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 01-1620).)

(12) Display the Parts Information in the Normal Mode on WEB, and check that the removed parts are displayed on the screen. (Refer to WEB “2.4 Display of Exchangeable Parts Status (Parts Information)” (WEB 02-0070).)

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

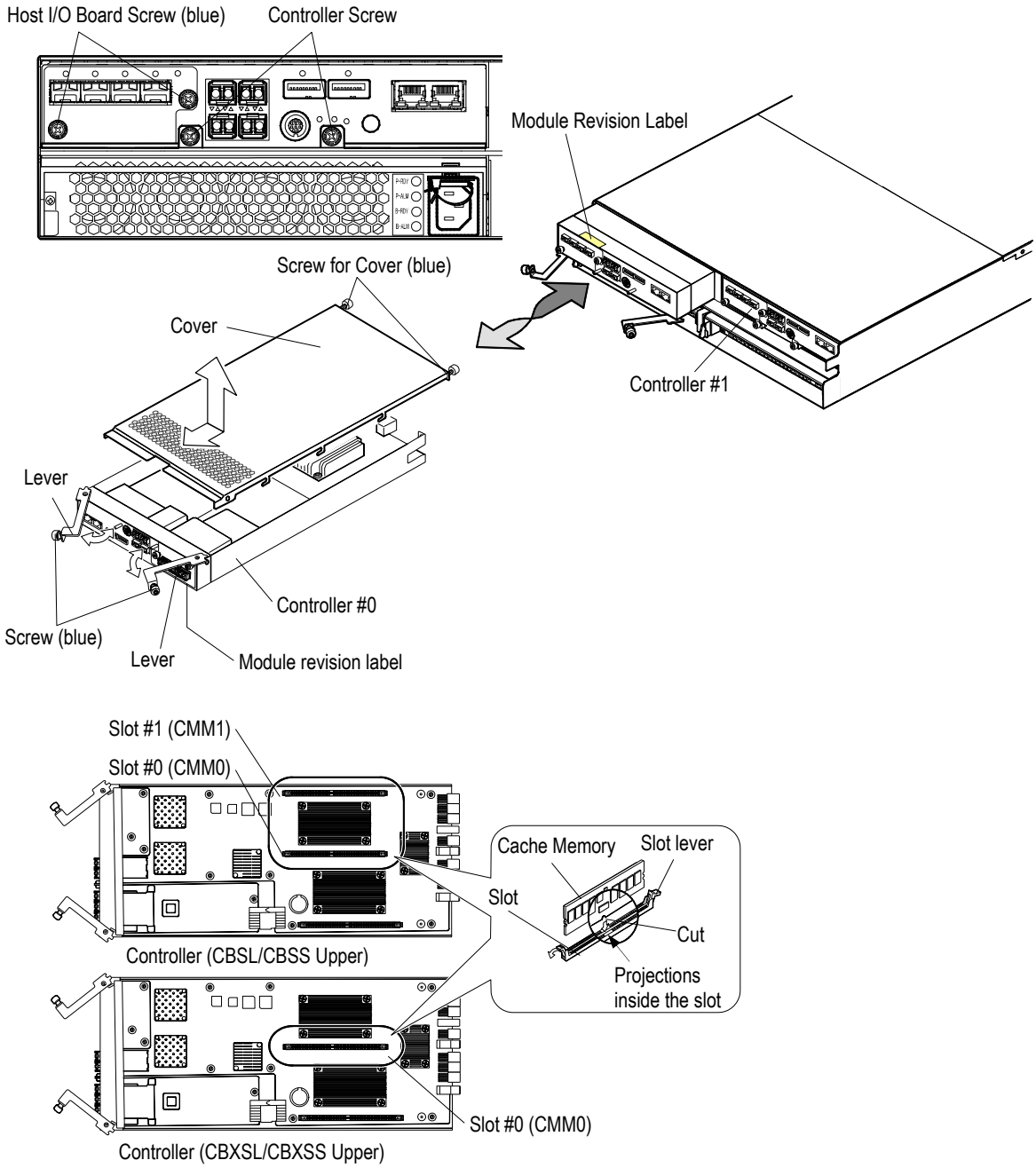


Figure 2.4.7 Removing Cache Memory (CBSL/CBSS)

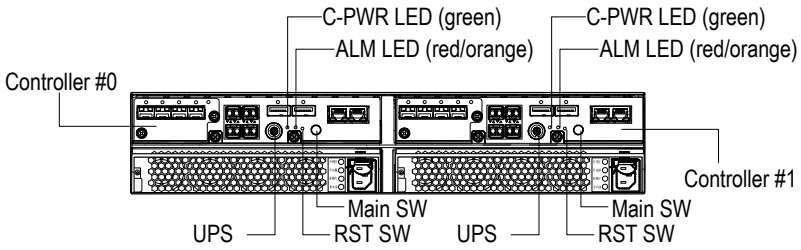


Figure 2.4.7.1 LED Locations on the Controller (CBSL/CBSS)

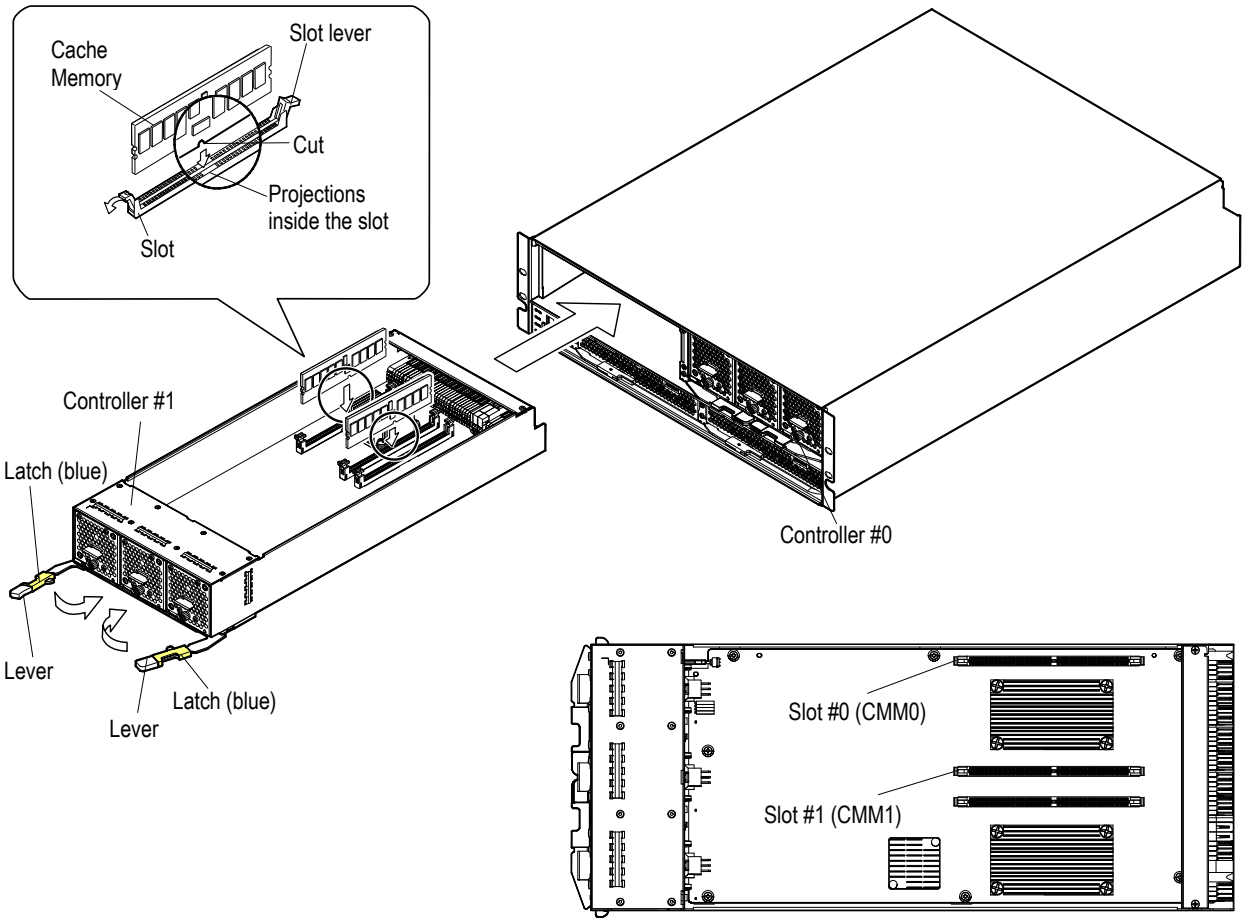


Figure 2.4.8 Removing Cache Memory (CBL)

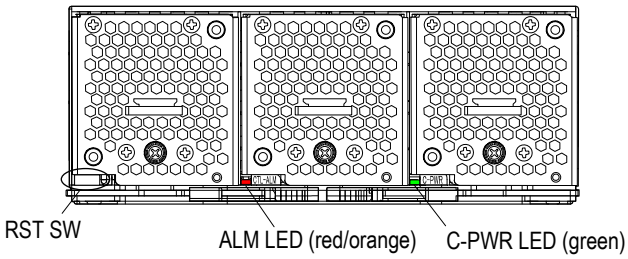


Figure 2.4.8.1 LED Locations on the Controller (CBL)

2.4.4 Removing a FC Host I/O Board/Module

CAUTION

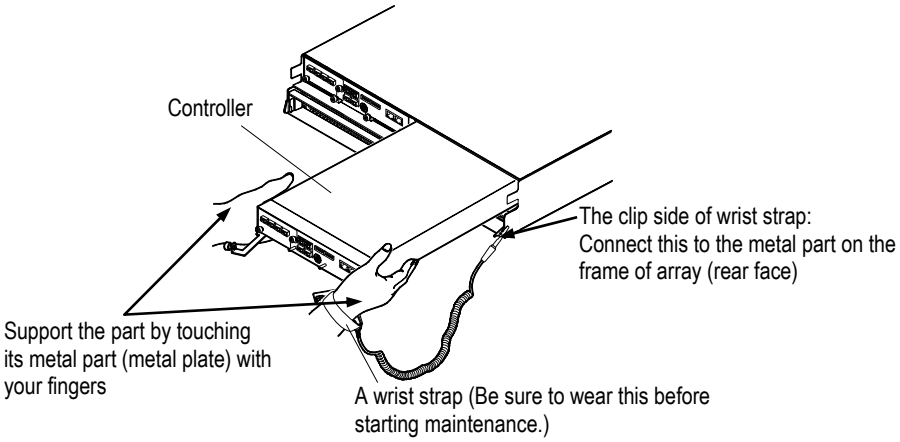
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

NOTICE

- **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 a Controller, 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 Controller is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Controller from electrostatic discharge.

NOTE : Before unpacking and removing 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 Controller into the array, support the Controller as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : In the dual controller configuration, do the works for the both Controllers. In the single controller configuration, do the work for the Controller #0 only.

The removal operation differs depending on whether it is offline work (power-off status) or online work (host is operating).

- Procedure for removing offline (power-off status)
  Refer to "(1) Removing the FC Host I/O Board/Module offline (power-off status)" (ADD 02-0380).
- Procedure for removing online (host is operating)
  Refer to "(2) Removing the FC Host I/O Board/Module online (host is operating)" (ADD 02-0431).

(1) Removing the FC Host I/O Board/Module offline (power-off status)
The removal procedure for CBSL/CBSS is different from the one for CBL.

(1-1) For CBSL/CBSS

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Board is changed (‡1) or when the Host I/O Board of the different type is installed in the position where the Host I/O 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)

(b) Turn off the main switch.
Press the main switch on either Controller #0 or Controller #1 for three seconds or more. Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

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

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

(d) Remove the FC Host I/O Board installed in the Controller.

CAUTION

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

(i) Remove the Host Connector installed in the Host I/O Board to be removed.
(ii) Loosen the two screws (blue) which fix the FC Host I/O Board.
(iii) Pull out and remove the FC Host I/O board.

NOTE : Place the removed FC Host I/O Board and Host Connector temporarily in the place where anti-static measures are taken.

(e) Install a dummy (Board) in the Controller.

CAUTION

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

(i) Insert and push the dummy (Board) into the slot in the Controller.

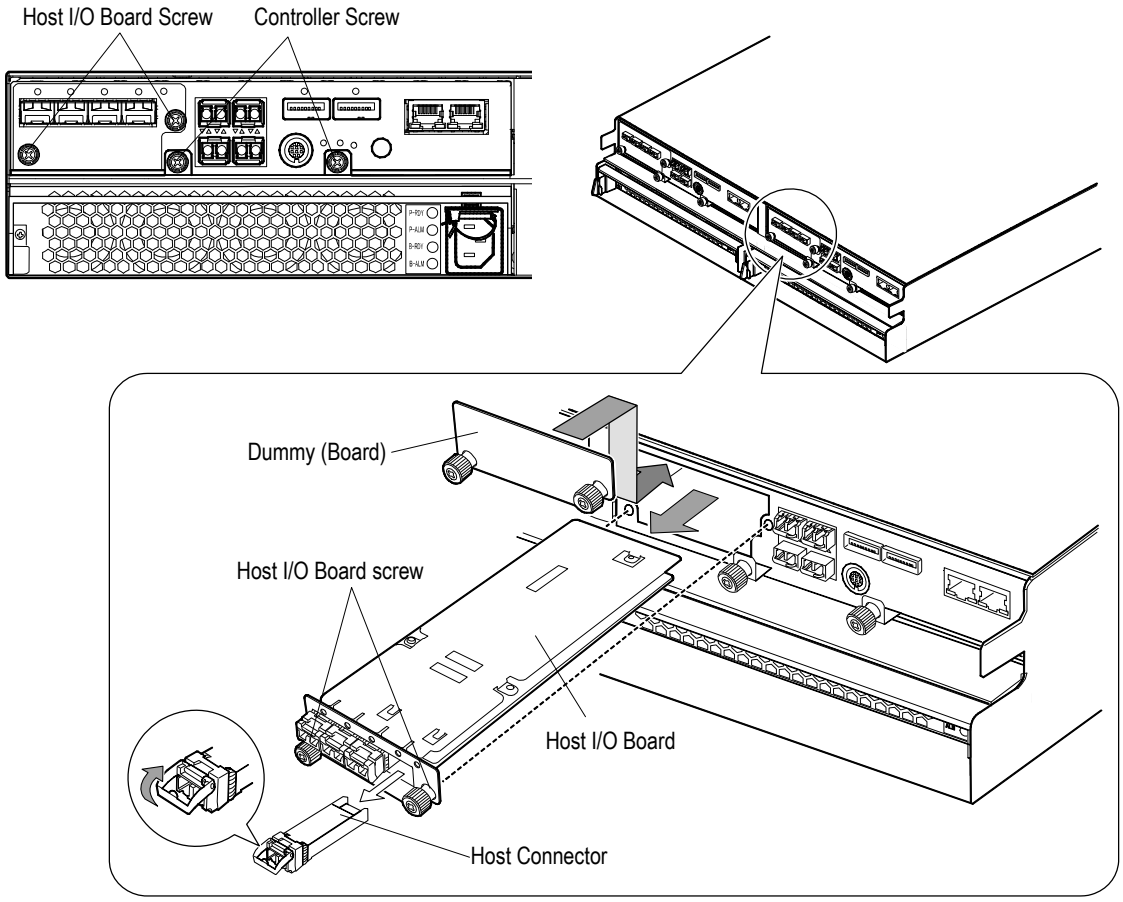
NOTE : In the dual controller configuration, install the dummy (Board) in the same location of the Controller #0 and #1.

(ii) Tighten the two screws to fix the dummy (Board).

(f) In the dual controller configuration, perform the steps (d) to (e) for the other Controller.
(g) Connect the power cables to the Power Units.
(h) Turn on the main switch.
(i) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1). The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(j) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 30 to 50 minutes).
(k) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

(l) Display the Parts Information in the Normal Mode on WEB, and check that the removed parts are not displayed on the screen. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)



*1 : The figure shows the case where the FC Host I/O Board is removed from the Controller of the CBSL.

Figure 2.4.9 Removing a FC Host I/O Board (CBSL/CBSS)

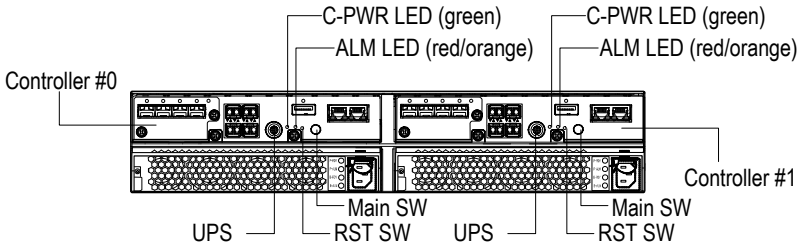


Figure 2.4.10 LED Locations on the Controller (CBSL/CBSS)

(1-2) For CBL

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Module is changed(‡1) or when the Host I/O Module of the different type is installed in the position where the Host I/O Module 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)

(b) Turn off the main switch.

Make sure that the POWER LED (green) on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

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

NOTE : When the removal is performed without removing the power cable, the array cannot be recovered normally.

(d) Remove the interface cables from the Host I/O Module (FC) to be removed.

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 Interface cables, pull out the interface cables completely from the host connectors.
  If the interface cables are inserted half in the host connectors, the Controller continues to detect the failures, and the I/O processing of the Controller may be deteriorated.

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

(e) Remove the Host I/O Module (FC).

CAUTION

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

(i) Loosen one screw (blue) which fixes the Host I/O Module or dummy (Module) and then tilt the lever toward you. When the lever is completely tilted, the Host I/O Module or dummy (Module) comes out forward.
(ii) Pull out and remove the Host I/O Module (FC).

NOTE : Place the removed Host I/O Module or dummy (Module) in the place where anti-static measures are taken.

(f) Install a dummy (Module).

CAUTION

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

(i) Insert and push the dummy (Module) with its lever completely opened.
(ii) Close the lever and tighten one screw (blue) to fix the dummy (Module).

(g) In the dual controller configuration, perform the steps (d) to (f) for the other Controller.
(h) Connect the power cables to the Power Units.
(i) Turn on the main switch.
(j) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(k) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 40 to 60 minutes (80 to 180 minutes when the DBW is connected to the CBL)).
(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 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 01-1620).)
(m) Display the Parts Information in the Normal Mode on WEB, and check that the removed parts are not displayed on the screen. (Refer to WEB “2.4 Display of Exchangeable Parts Status (Parts Information)” (WEB 02-0070).)

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

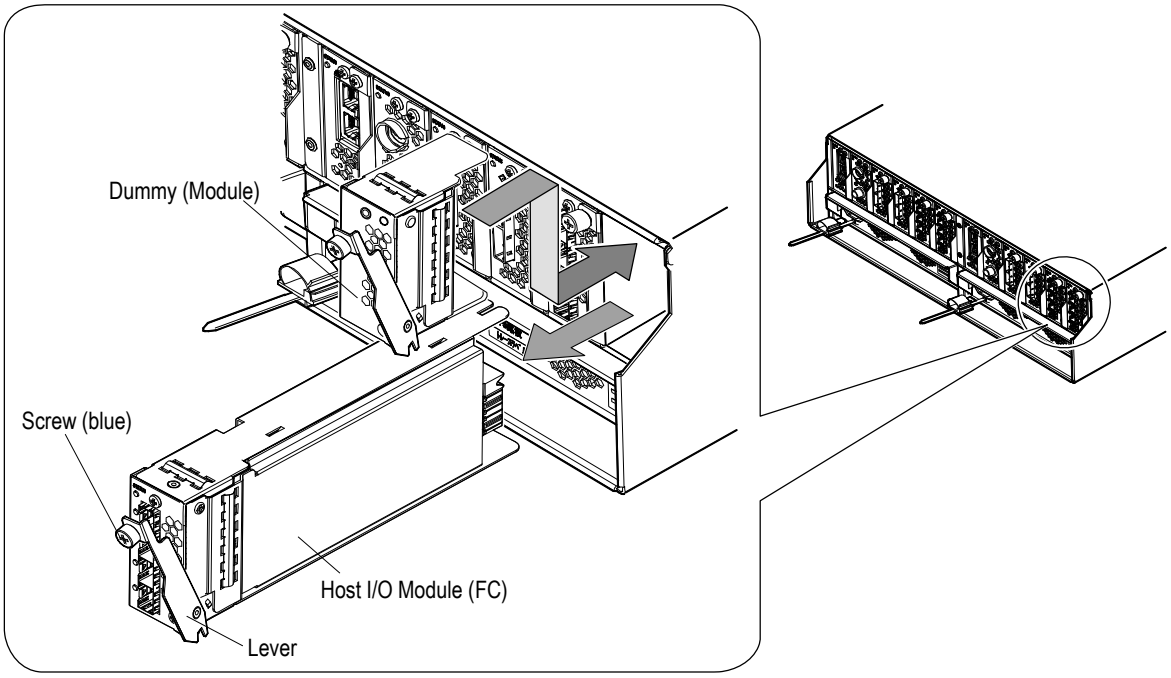


Figure 2.4.11 Removing a FC Host I/O Module (CBL)

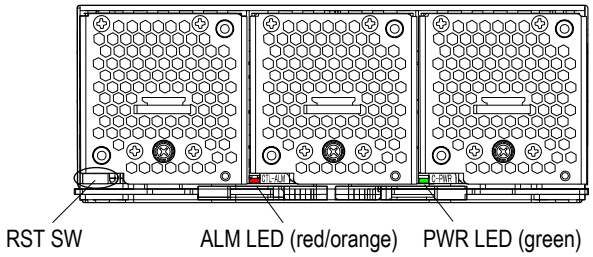


Figure 2.4.12 Position of the LED on the Controller (CBL)

(2) Removing the FC Host I/O Board/Module online (host is operating)
Perform the removal operation of the Host I/O Board/Module in accordance with the Hitachi Storage Navigator Modular 2 window in the following procedure.

(2-1) Perform the prior check of the removal operation.
Check the following items before removing the Host I/O Board/Module.

(a) Check that the support version is as follows.
Firmware version : 0925/A or later
Hitachi Storage Navigator Modular 2 version : Ver.22.50 or later

(b) Check that the Controller is in the dual configuration.

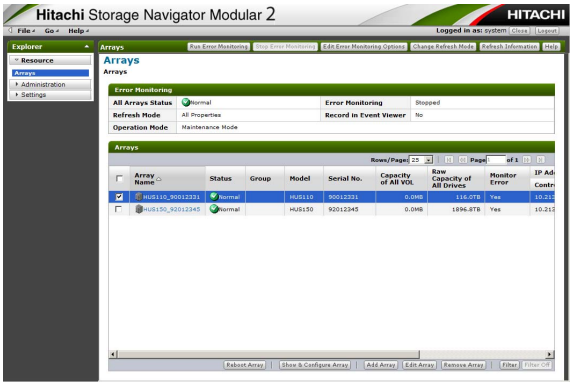
(c) Check that the remote path of the TrueCopy remote replication, TrueCopy Extended Distance and TrueCopy Modular Distributed functions is not set for the Host I/O Module to be removed from the Controller Box.

(d) Check that there is no access from the host to the Host I/O Board/Module to be removed.

(2-2) Removal operation

(a) Remove the interface cable connected to the Host I/O Board/Module to be removed.

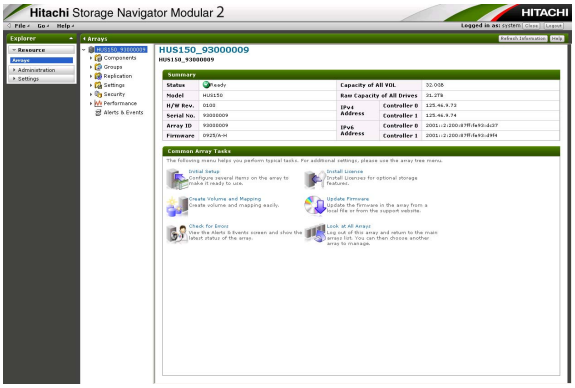
(b) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to be removed, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to "Maintenance Mode".(‡1)
Check that "Maintenance Mode" is displayed in [Operation Mode] on the top of the main window.



‡1 : When the array 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.

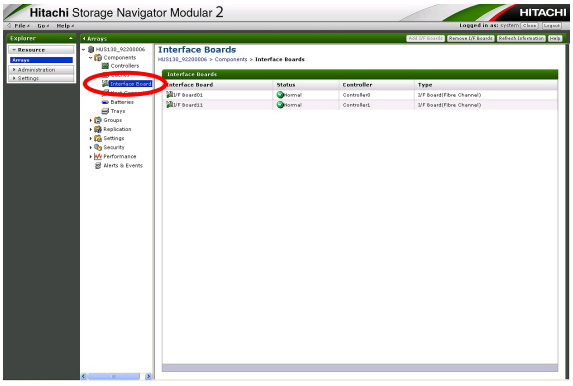
(c) Click the array name, and open the unit window.

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 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).)

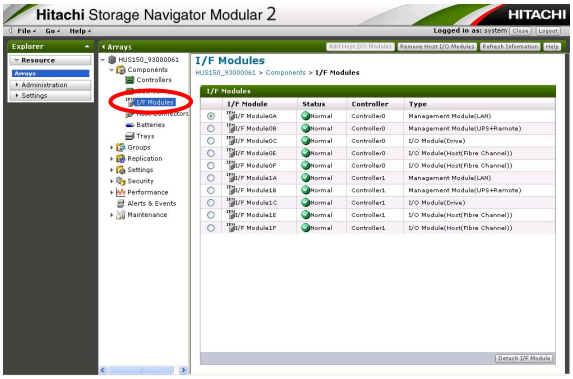


(d) Select [Component] – [Interface Boards] ([I/F Modules] in case of CBL) in the unit window.

For CBSS/CBSL

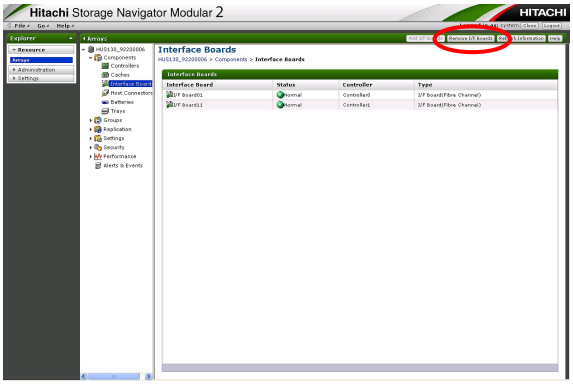


For CBL

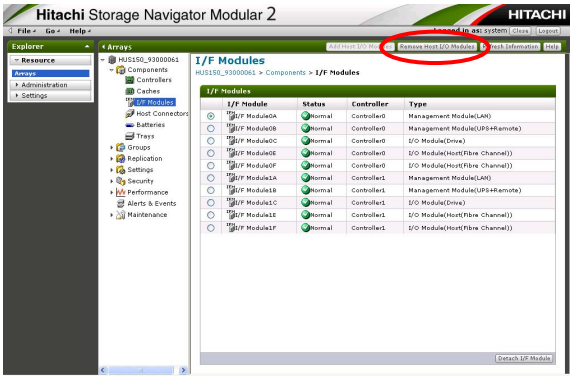


(e) Press the [Remove I/F Boards] ([Remove Host I/O Modules] in case of CBL) button in the Interface Boards (I/F Modules in case of CBL) window.

For CBSS/CBSL



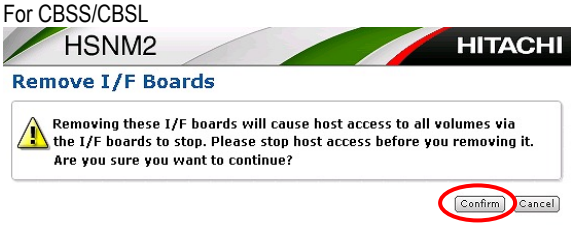
For CBL



(f) In case of CBL, select the Host I/O Module to be removed.

(g) The confirmation window is displayed. Click the [Confirm] button.

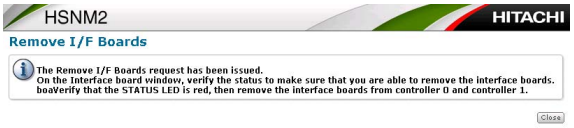
For CBSS/CBSL



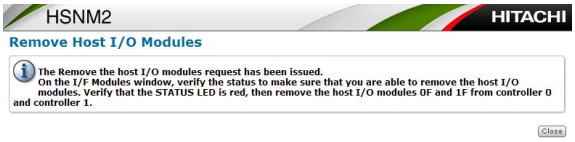
For CBL

(h) Click the [Close] button.

For CBSS/CBSL



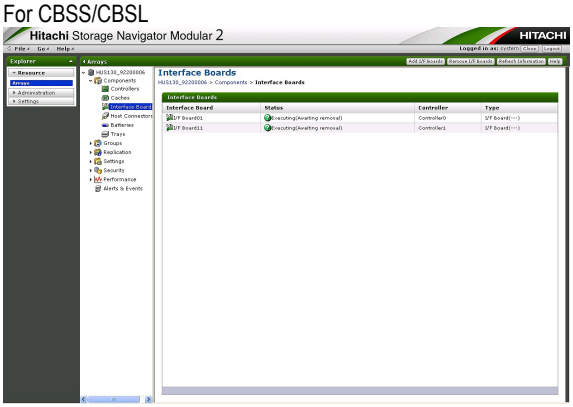
For CBL



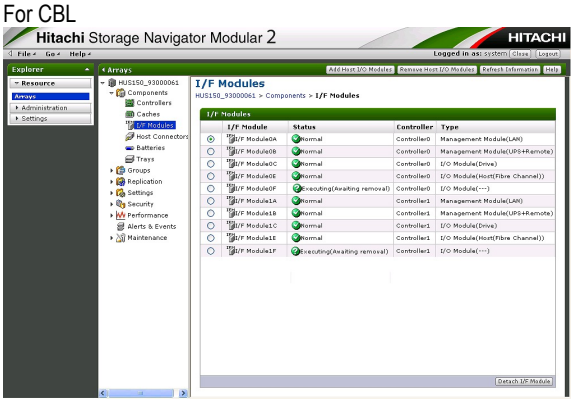
(i) Start the removal of the Host I/O Board/Module. During the removal, the [Status] of the [Interface Boards] ([I/F Modules] in case of CBL) in the Interface Boards (I/F Modules in case of CBL) window is displayed as "Executing(Removal)". When the removal is completed, the [Status] of the [Interface Boards] ([I/F Modules] in case of CBL) is displayed as "Executing(Awaiting removal)". Press the [Refresh Information] button to update the window and check the [Status] of the [Interface Boards] ([I/F Modules] in case of CBL).

NOTE : During the removal of the Host I/O Board/Module, if the dialog is closed and the removal completion window cannot be checked, display the Interface Boards (I/F Modules in case of CLB) window again by Hitachi Storage Navigator Modular 2 in the procedure from (b) to (h).

For CBSS/CBSL



For CBL



(j) Remove the Host I/O Board/Module whose STATUS LED (red) lights up.

CAUTION

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

(j-1) For CBSS/CBSL

(i) Remove the Host Connector installed in the Host I/O Board to be removed.

(ii) Loosen the two screws which fix the FC Host I/O Board.

(iii) Pull out and remove the FC Host I/O Board.

NOTE : • Place the removed FC Host I/O Board and Host Connector temporarily in the place where anti-static measures are taken.
• Remove the Host I/O Modules on both of Controller #0 and #1.

(j-2) For CBL

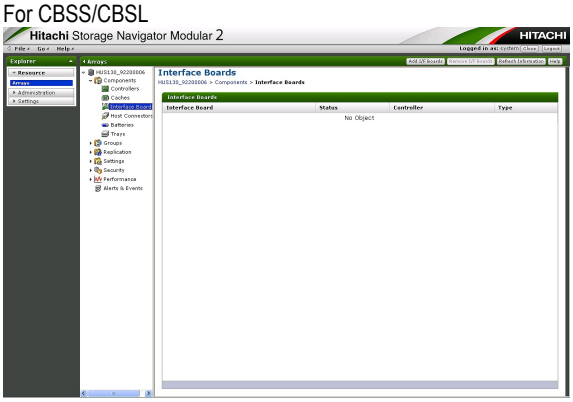
(i) Loosen one screw (blue) which fixes the Host I/O Module (FC) or dummy (Module) and then tilt the lever toward you. When the lever is completely tilted, the Host I/O Module (FC) or dummy (Module) comes out forward.

(ii) Pull out and remove the Host I/O Module (FC).

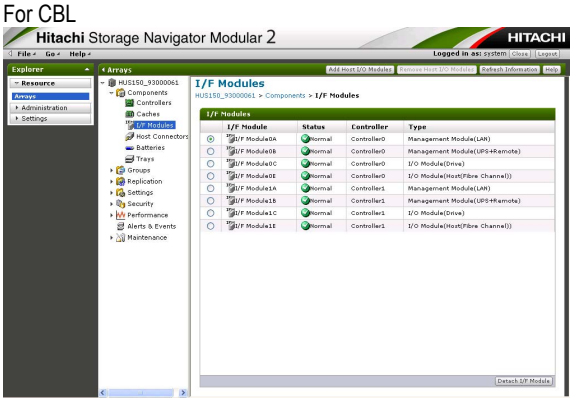
NOTE : • Place the removed Host I/O Module (FC) temporarily in the place where anti-static measures are taken.
• Remove the Host I/O Modules on both of Controller #0 and #1.

(k) When the removal is completed, the display of the removed Host I/O Board/Module disappears from the Interface Boards (I/F Modules in case of CBL) window. Check that the removed Host I/O Boards/Modules of Controller #0 and #1 are not displayed.

For CBSS/CBSL



For CBL



(l) Install a dummy (Module/Board).

(l-1) For CBSS/CBSL

(i) Insert and push the dummy (Board) into the slot in the Controller.

NOTE : Install the dummy (Board) in the same location of the Controller #0 and #1.

(ii) Tighten the two screws to fix the dummy (Board).

(l-2) For CBL

(i) Insert and push the dummy (Module) with its lever completely opened.

(ii) Close the lever and tighten one screw (blue) to fix the dummy (Module).

2.4.5 Removing an iSCSI Host I/O Board/Module

CAUTION

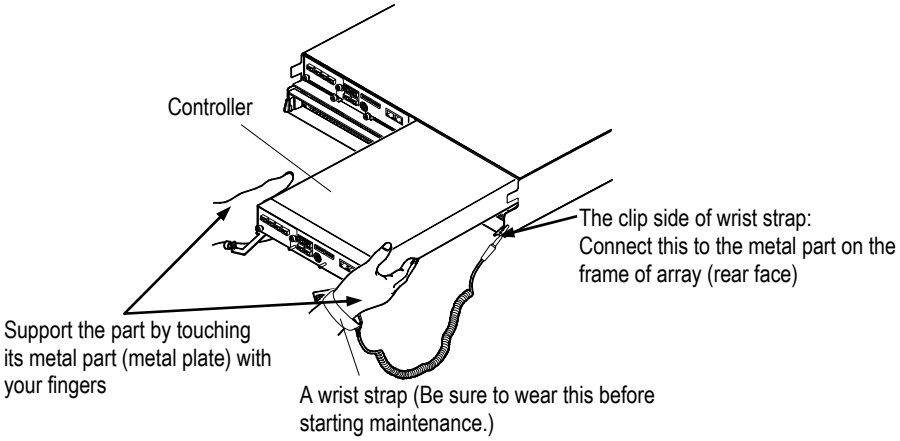
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

NOTICE

- **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 a Controller, 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 Controller is a precision instrument. Be sure to put on the wrist strap before starting work in order to protect Controller from electrostatic discharge.

NOTE : Before unpacking and removing 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 Controller into the array, support the Controller as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : In the dual controller configuration, do the works for the both Controllers. In the single controller configuration, do the work for the Controller #0 only.

The removal operation differs depending on whether it is offline work (power-off status) or online work (host is operating).

- Procedure for removing offline (power-off status)
  Refer to "(1) Removing the iSCSI Host I/O Board/Module offline (power-off status)" (ADD 02-0450).
- Procedure for removing online (host is operating)
  Refer to "(2) Removing the FC Host I/O Board/Module online (host is operating)" (ADD 02-0501).

(1) Removing the iSCSI Host I/O Board/Module offline (power-off status)
The removal procedure for CBSL/CBSS is different from the one for CBL.

(1-1) For CBXSL/CBXSS/CBSL/CBSS

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Board is changed [‡1] or when the Host I/O Board of the different type is installed in the position where the Host I/O 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)

(b) Turn off the main switch.
For the CBXSL/CBXSS/CBSL/CBSS, press the main switch on either Controller #0 or Controller #1 for three seconds or more.
Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

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

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

(d) Remove the iSCSI Host I/O Board installed in the Controller.

CAUTION

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

NOTE : Be sure to close the levers. Otherwise, the Host I/O Board cannot be removed because it is caught in the levers.

(i) Loosen the two screws (blue) which fix the iSCSI Host I/O Board.
(ii) Pull out and remove the iSCSI Host I/O board.

NOTE : Place the removed iSCSI Host I/O Board temporarily in the place where anti-static measures are taken.

(e) Install a dummy (Board) in the Controller.

CAUTION

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

(i) Insert and push the dummy (Board) into the slot in the Controller.

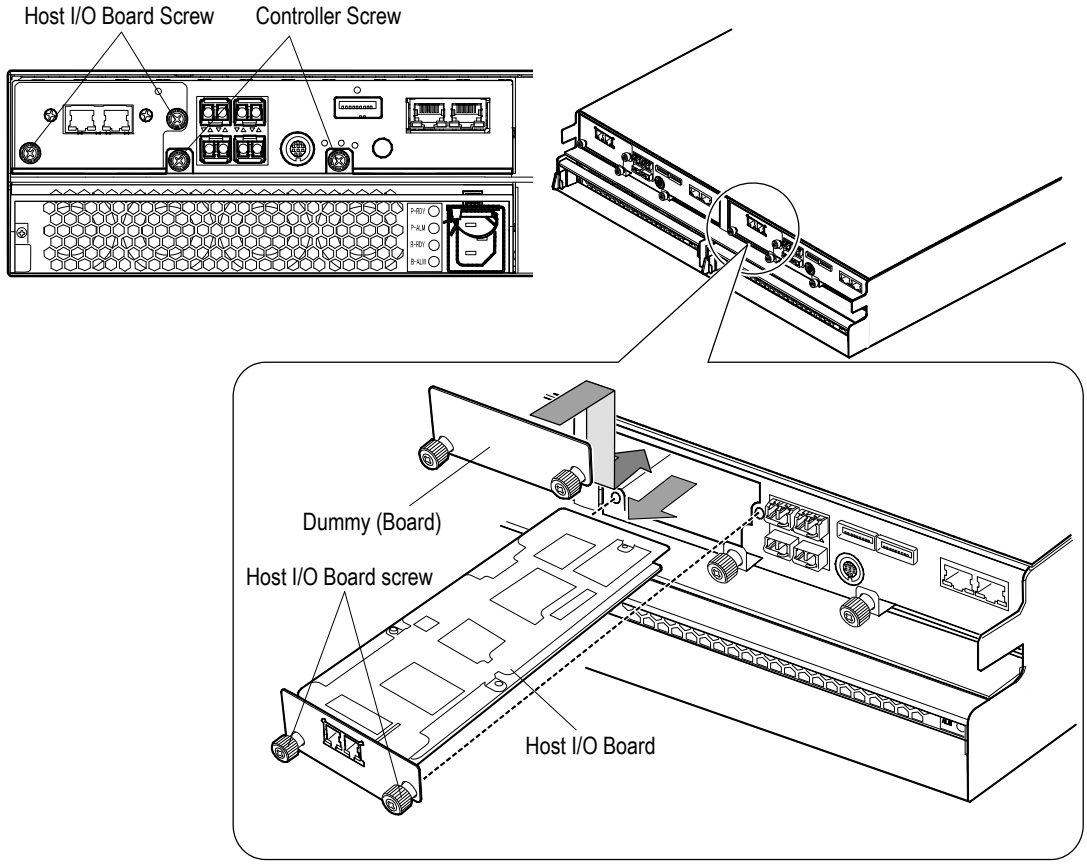
NOTE : In the dual controller configuration, install the dummy (Board) in the same location of the Controller #0 and #1.

(ii) Tighten the two screws to fix the dummy (Board).

(f) In the dual controller configuration, perform the steps (d) to (e) for the other Controller.
(g) Connect the power cables to the Power Units.
(h) Turn on the main switch.
(i) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(j) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 30 to 50 minutes).
(k) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

(l) Display the Parts Information in the Normal Mode on WEB, and check that the removed parts are not displayed on the screen. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)



*1 : The figure shows the case where the iSCSI Host I/O Board is removed from the Controller of the CBSL.

Figure 2.4.13 Removing iSCSI Host I/O Board (CBXSL/CBXSS/CBSL/CBSS)

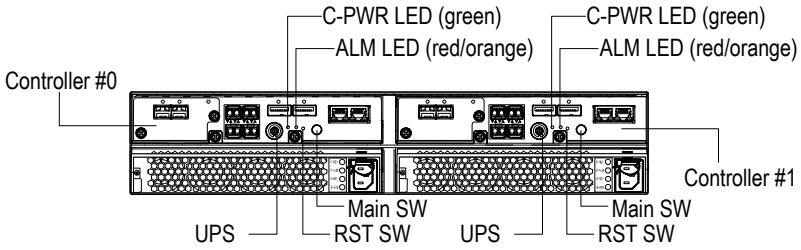


Figure 2.4.14 LED Locations on the Controller (CBXSL/CBXSS/CBSL/CBSS)

(1-2) For CBL

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Module is changed(‡1) or when the Host I/O Module of the different type is installed in the position where the Host I/O Module 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)

(b) Turn off the main switch.

Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

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

NOTE : When the removal is performed without removing the power cable, the array cannot be recovered normally.

(d) Remove the interface cables from the additional Host I/O Module.

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 Interface cables, pull out the interface cables completely from the host connectors.
  If the interface cables are inserted half in the host connectors, the Controller continues to detect the failures, and the I/O processing of the Controller may be deteriorated.

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

(e) Remove the Host I/O Module (iSCSI).

CAUTION

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

(i) Loosen one screw (blue) which fixes the Host I/O Module or dummy (module) and then tilt the lever toward you. When the lever is completely tilted, the Host I/O Module or dummy (module) comes out forward.
(ii) Remove the Host I/O Module or dummy (module).

NOTE : Place the removed Host I/O Module or dummy (module) in the place where anti-static measures are taken.

(f) Install a dummy (module).

CAUTION

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

(i) Insert and push the dummy (module) with its lever completely opened.
(ii) Close the lever and tighten one screw (blue) to fix the dummy (module).

(g) In the dual controller configuration, perform the steps (d) to (f) for the other Controller.
(h) Connect all the removed interface cable to the added Host I/O Module.

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

(i) Connect the power cables to the Power Units.
(j) Turn on the main switch.
(k) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(l) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 40 to 60 minutes (80 to 180 minutes when the DBW is connected to the CBL)).

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

(m) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

(n) Display the Parts Information in the Normal Mode on WEB, and check that the removed parts are not displayed on the screen. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

(o) When the Host I/O Module (iSCSI) is removed and replaced with the Host I/O Module (FC), perform the Host Group Setting for interface and Fibre Channel setting. (Refer to System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000), and Hitachi Storage Navigator Modular 2 Help "iSCSI Settings".)

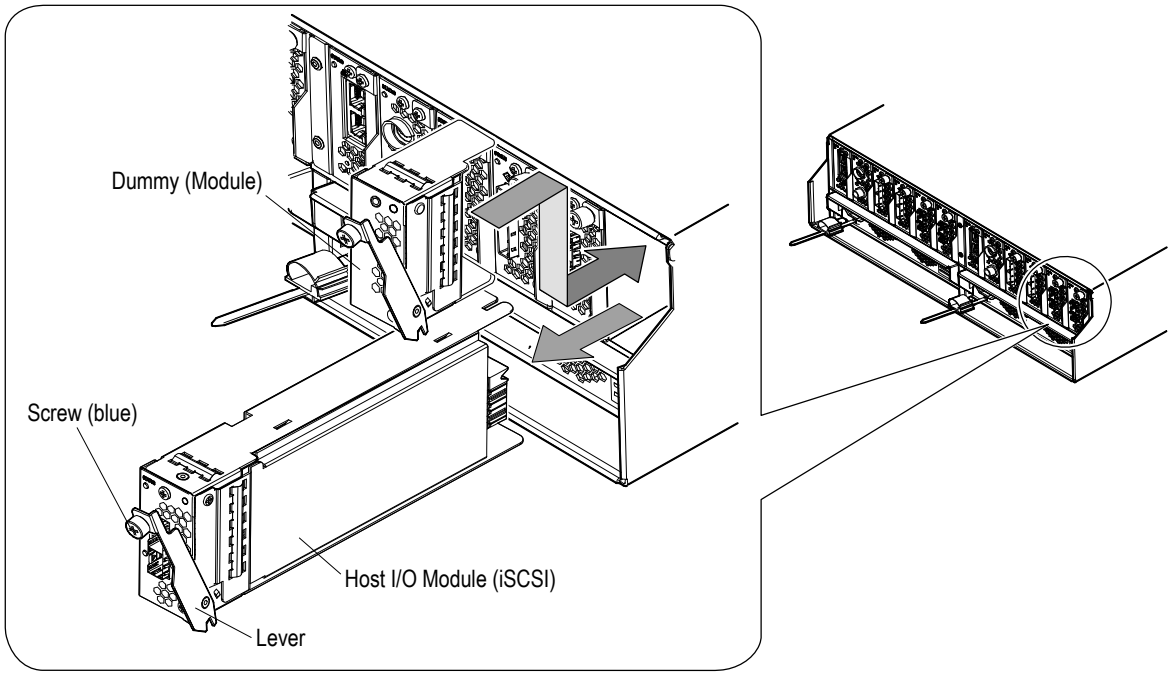


Figure 2.4.15 Removing a iSCSI Host I/O Module (CBL)

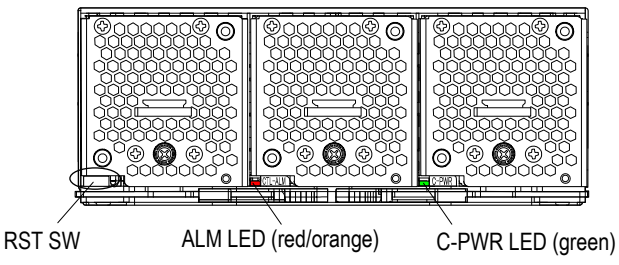


Figure 2.4.16 LED Locations on the Controller (CBL)

(2) Removing the iSCSI Host I/O Board/Module online (host is operating)
Perform the removal operation of the Host I/O Board/Module in accordance with the Hitachi Storage Navigator Modular 2 window in the following procedure.

(2-1) Perform the prior check of the removal operation.
Check the following items before removing the Host I/O Board/Module.

(a) Check that the support version is as follows.
Firmware version : 0925/A or later
Hitachi Storage Navigator Modular 2 version : Ver.22.50 or later

(b) Check that the Controller is in the dual configuration.

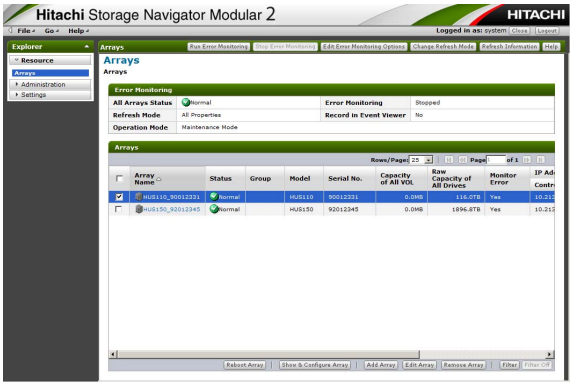
(c) Check that the remote path of the TrueCopy remote replication, TrueCopy Extended Distance and TrueCopy Modular Distributed functions is not set for the Host I/O Board/Module to be removed from the Controller Box.

(d) Check that there is no access from the host to the Host I/O Board/Module to be removed.

(2-2) Removal operation

(a) Remove the interface cable connected to the Host I/O Board/Module to be removed.

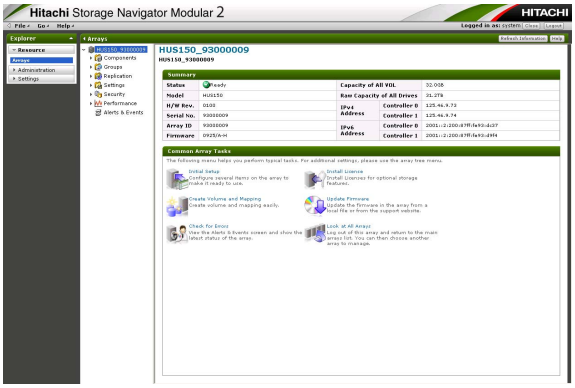
(b) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to be removed, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to "Maintenance Mode".(‡1)
Check that "Maintenance Mode" is displayed in [Operation Mode] on the top of the main window.



‡1 : When the array 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.

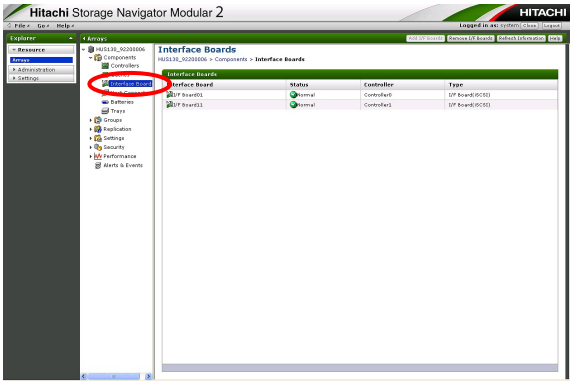
(c) Click the array name, and open the unit window.

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 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).)

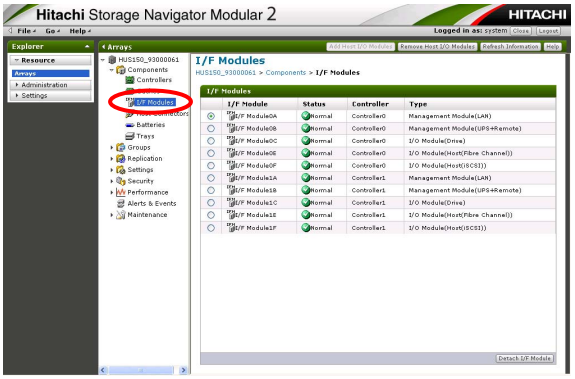


(d) Select [Component] – [Interface Boards] ([I/F Modules] in case of CBL) in the unit window.

For CBXSS/CBXSL/CBSS/CBSL

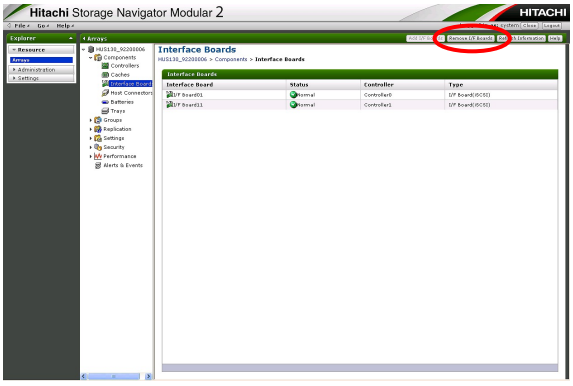


For CBL

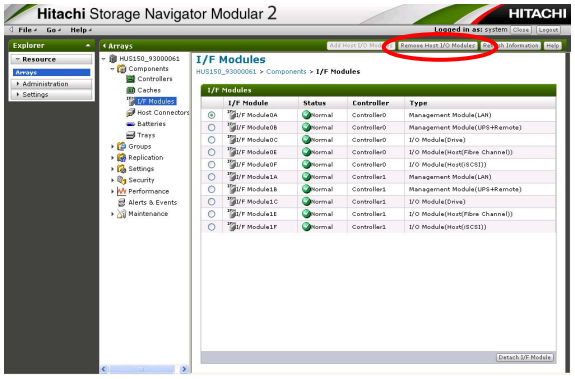


(e) Press the [Remove I/F Boards] ([Remove Host I/O Modules] in case of CBL) button in the Interface Boards (I/F Modules in case of CBL) window.

For CBXSS/CBXSL/CBSS/CBSL



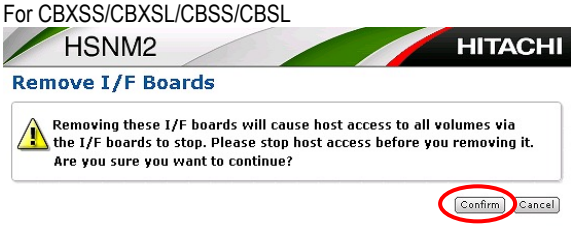
For CBL



(f) In case of CBL, select the Host I/O Module to be removed.

(g) The confirmation window is displayed. Click the [Confirm] button.

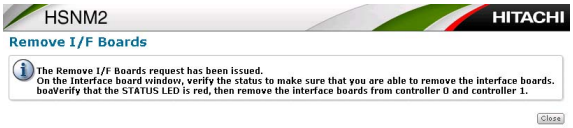
For CBXSS/CBXSL/CBSS/CBSL



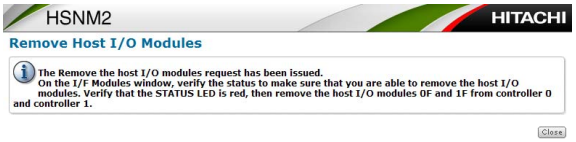
For CBL

(h) Click the [Close] button.

For CBXSS/CBXSL/CBSS/CBSL



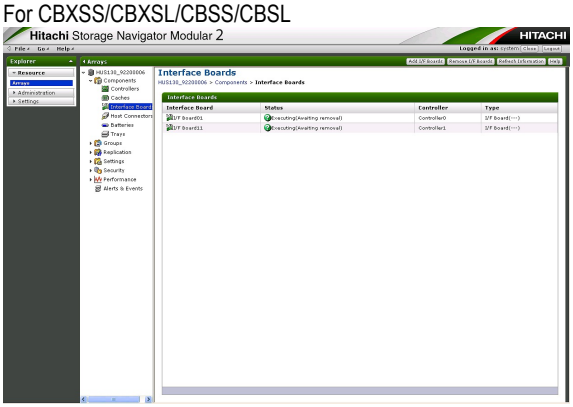
For CBL



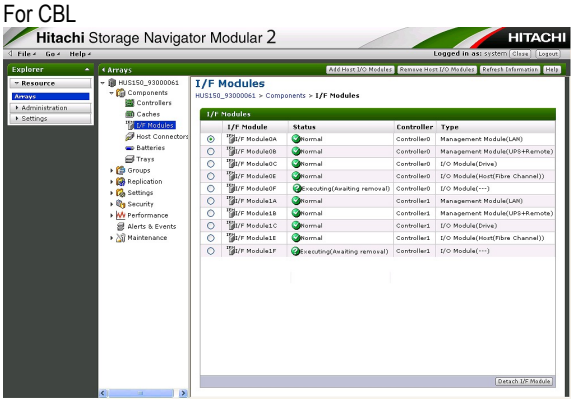
(i) Start the removal of the Host I/O Board/Module. During the removal, the [Status] of the [Interface Boards] ([I/F Modules] in case of CBL) in the Interface Boards (I/F Modules in case of CBL) window is displayed as "Executing(Removal)". When the removal is completed, the [Status] of the [Interface Boards] ([I/F Modules] in case of CBL) is displayed as "Executing(Awaiting removal)". Press the [Refresh Information] button to update the window and check the [Status] of the [Interface Boards] ([I/F Modules] in case of CBL).

NOTE : During the removal of the Host I/O Board/Module, if the dialog is closed and the removal completion window cannot be checked, display the Interface Board (I/F Module in case of CLB) window again by Hitachi Storage Navigator Modular 2 in the procedure from (b) to (h).

For CBXSS/CBXSL/CBSS/CBSL



For CBL



(j) Remove the Host I/O Board/Module whose STATUS LED (red) lights up.

CAUTION

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

(j-1) For CBXSS/CBXSL/CBSS/CBSL

(i) Loosen the two screws which fix the iSCSI Host I/O Board.

(ii) Pull out and remove the iSCSI Host I/O Board.

NOTE : • Place the removed iSCSI Host I/O Board and Host Connector temporarily in the place where anti-static measures are taken.
• Remove the Host I/O Modules on both of Controller #0 and #1.

(j-2) For CBL

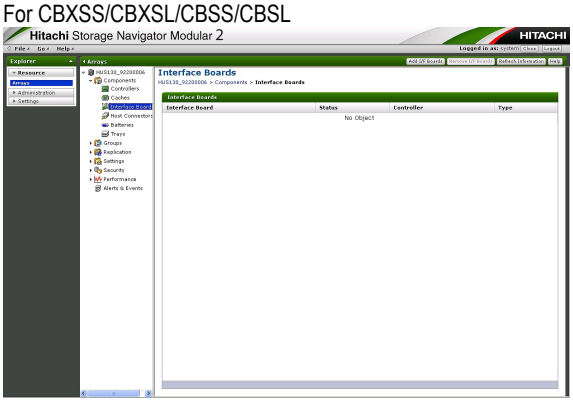
(i) Loosen one screw (blue) which fixes the iSCSI Host I/O Module or dummy (Module) and then tilt the lever toward you. When the lever is completely tilted, the iSCSI Host I/O Module or dummy (Module) comes out forward.

(ii) Pull out and remove the iSCSI Host I/O Module.

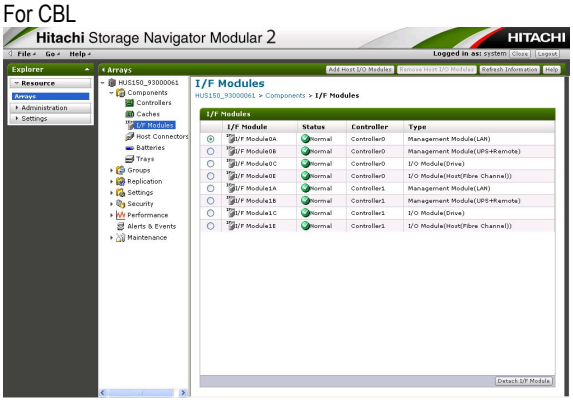
NOTE : • Place the removed iSCSI Host I/O Module temporarily in the place where anti-static measures are taken.
• Remove the Host I/O Modules on both of Controller #0 and #1.

(k) When the removal is completed, the display of the removed Host I/O Board/Module disappears from the Interface Boards (I/F Modules in case of CBL) window. Check that the removed Host I/O Boards/Modules of Controller #0 and #1 are not displayed.

For CBXSS/CBXSL/CBSS/CBSL



For CBL



(l) Install a dummy (Module/Board).

(l-1) For CBXSS/CBXSL/CBSS/CBSL

(i) Insert and push the dummy (Board) into the slot in the Controller.

NOTE : Install the dummy (Board) in the same location of the Controller #0 and #1.

(ii) Tighten the two screws to fix the dummy (Board).

(l-2) For CBL

(i) Insert and push the dummy (Module) with its lever completely opened.

(ii) Close the lever and tighten one screw (blue) to fix the dummy (Module).

2.4.6 Removing a Controller

A removing the Controller, do the work for the CBXSL/CBXSS only.

CAUTION

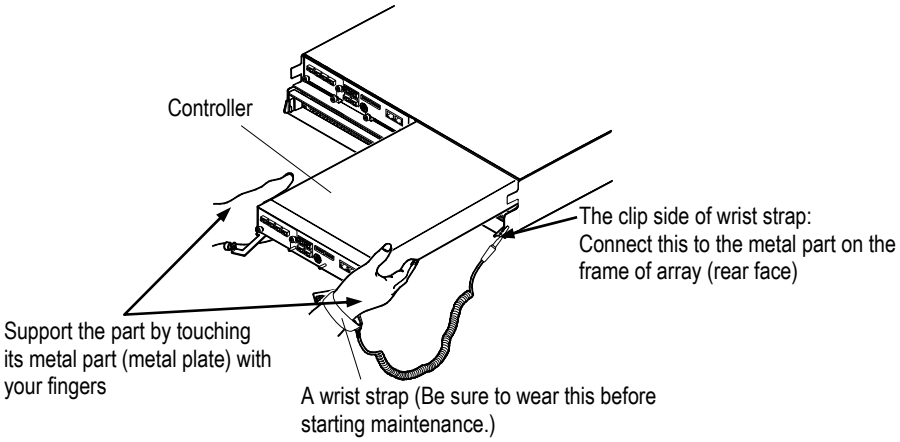
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

NOTICE

- **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 a Controller, 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 Controller is a precision instrument. Be sure to put on the wrist strap before starting work in order to protect Controller 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 Controller into the array, support the Controller as touching its metal part with fingers of your hand that wears a wrist strap.



<Working Procedure>

(1) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Board is changed (‡1) or when the Host I/O Board of the different type is installed in the position where the Host I/O 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.

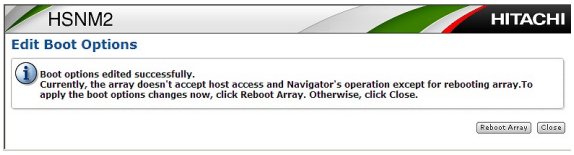
- Host Group Information/Target Information
- Host Group Option/Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/iSCSI port setting information
- CHAP security information (iSCSI)

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

(3) Set the System Startup Attribute of Boot Option to the Single Mode to operate it by the single system. (Refer to System Parameter "8.1 Setting Boot Options" (SYSPR 08-0000).)

(4) The following message is displayed. Check the checkbox and click the [Confirm] button.

(5) Click the [Close] button.



(6) Turn off the main switch.

Press the main switch on the Controller #0 side for three seconds or more. When the main switch is turned off and it is enabled, the C-PWR LED (green) of the Controller goes on after blinking for three seconds, and then it goes out.

Make sure that the POWER LED on the Front Bezel changes from green to orange.

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

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

NOTE : If the addition is performed without removing the power cable, the array cannot be recovered normally.

(8) Remove the interface cable, LAN, and SAS(ENC) cable connected to the Controller #1.

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

(9) Remove the Controller #1.
(a) Loosen the right and left screws (blue) fixing the Controller.
(b) Open the right and left levers forward.
When the levers are completely opened, the Controller comes out forward.

CAUTION

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

(c) Slide the Controller forward to remove it.

(10) Install the Dummy (Controller).
Close the levers, and then fix the left and right screws (blue) to fix the Controller.

NOTE : When installing the dummy (Controller), be careful not to get the SAS(ENC) cable stuck.

(11) Connect the power cables to the Power Units.
(12) Turn on the main switch.
Press the main switch on the Controller #0 side for one second or more.
(13) Make sure that the READY LED (green) on the front side of the Controller BOX comes on.
(14) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)
(15) Display the Parts Information in the Normal Mode on WEB, and check that the removed parts are displayed on the screen. (Refer to WEB “2.4 Display of Exchangeable Parts Status (Parts Information)” (WEB 02-0070).)

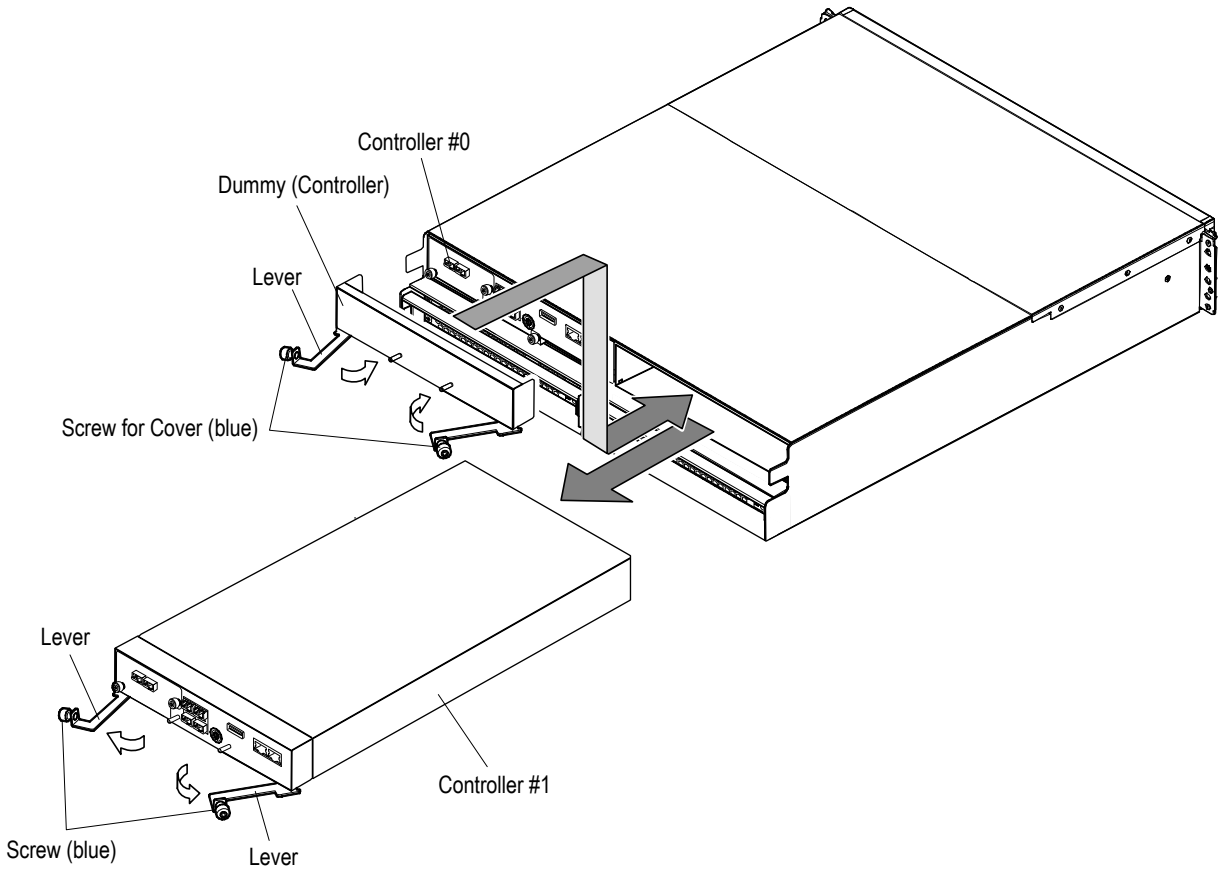


Figure 2.4.17 Removing a Controller

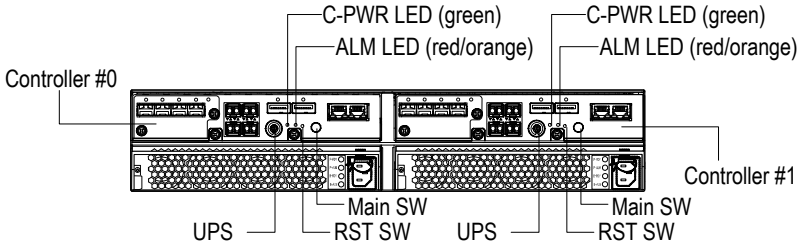


Figure 2.4.18 LED Locations on the Controller

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 array 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 02-0530)	Possible Refer to "2.5.2 Removing a PDB (A-F6516-PDU6)" (ADD 02-0530)

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

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 02-0530)
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 01-0660).

Keep the removed components as the occasion demands.

Chapter 3. Relocation/Removal Work

3.1 Before Starting Relocation/Removal Work

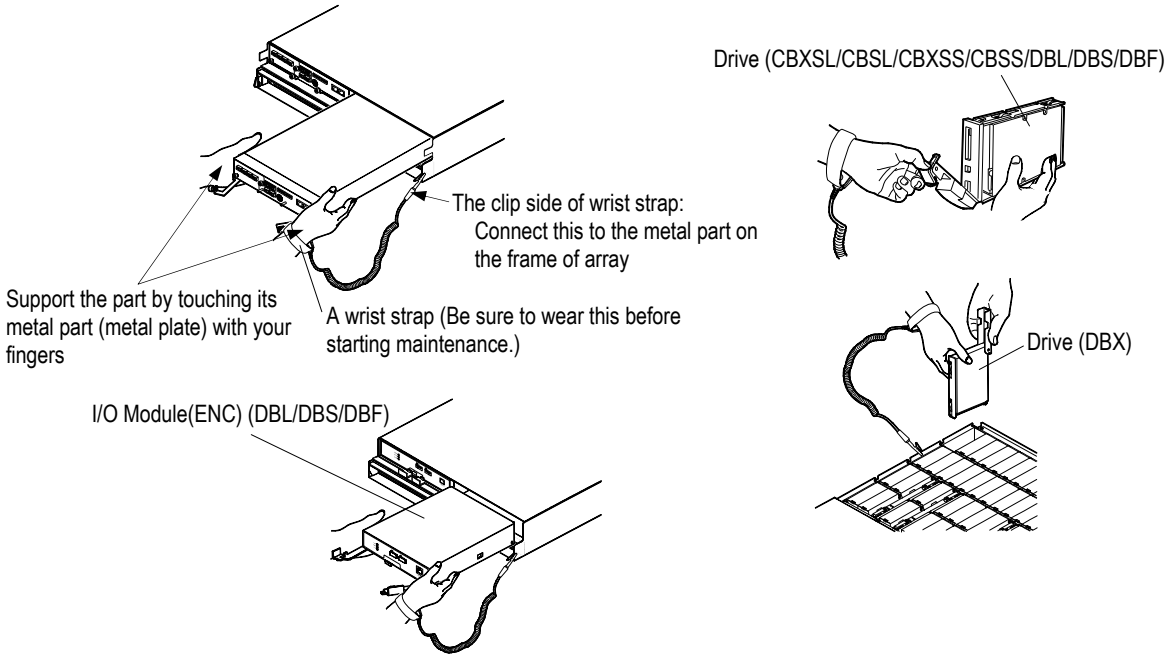
Take notice of the following when performing an installation work for the array.
When moving or removing an array, take care of the following matters.

(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.

NOTICE

- **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 a Drive, Controller, and I/O Module(ENC), 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 Drive, Controller or I/O Module(ENC) is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Drive, Controller or I/O Module(ENC) from electrostatic discharge.



(2) Note on cable routing

(a) Handling of cables on the floor

- Protect cables which cannot be accommodated by the array 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 array 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 SAS (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 array, 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

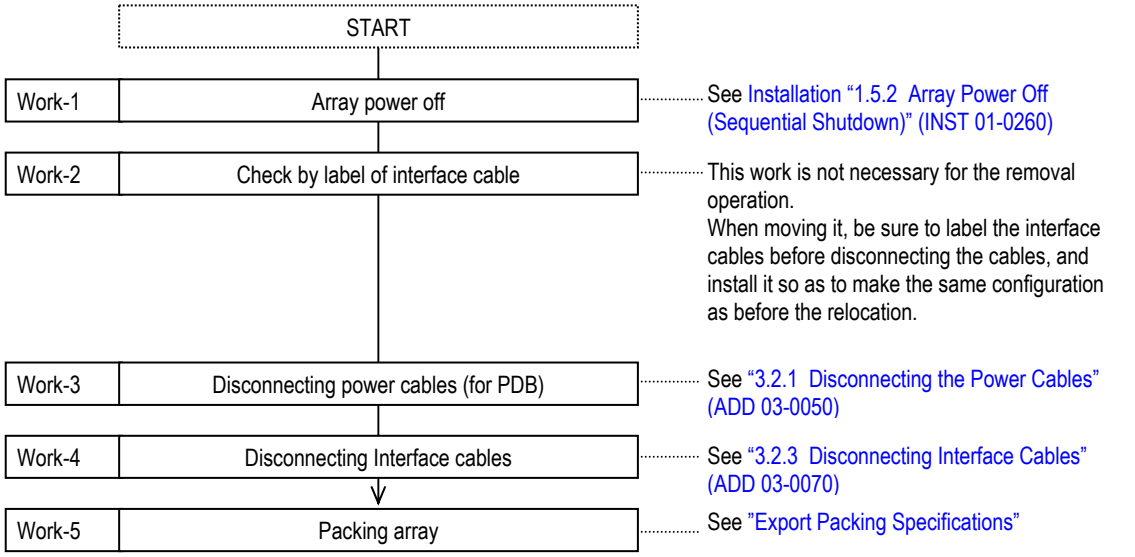
Close all the external covers when a maintenance work is completed.
It is required to make all the external covers closed to operate the array properly.
(Be sure to close all the external covers during operation because it is indispensable to maintain the performance of the array including prevention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

3.2 Procedures for Relocating or Removing Array

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

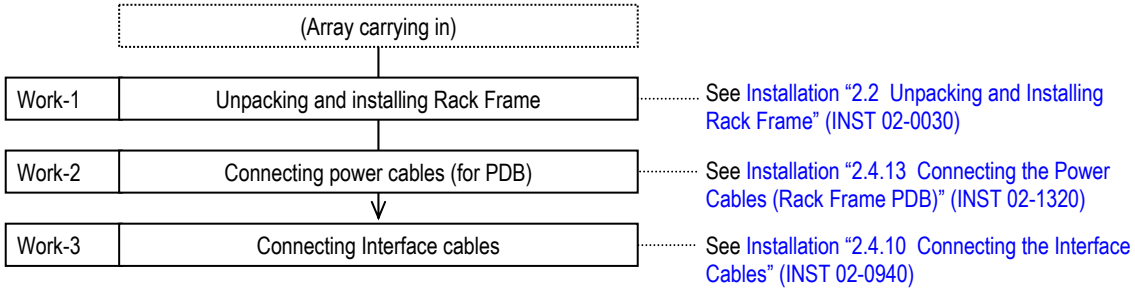
(a) Procedure for removal from where the array is currently installed

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



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

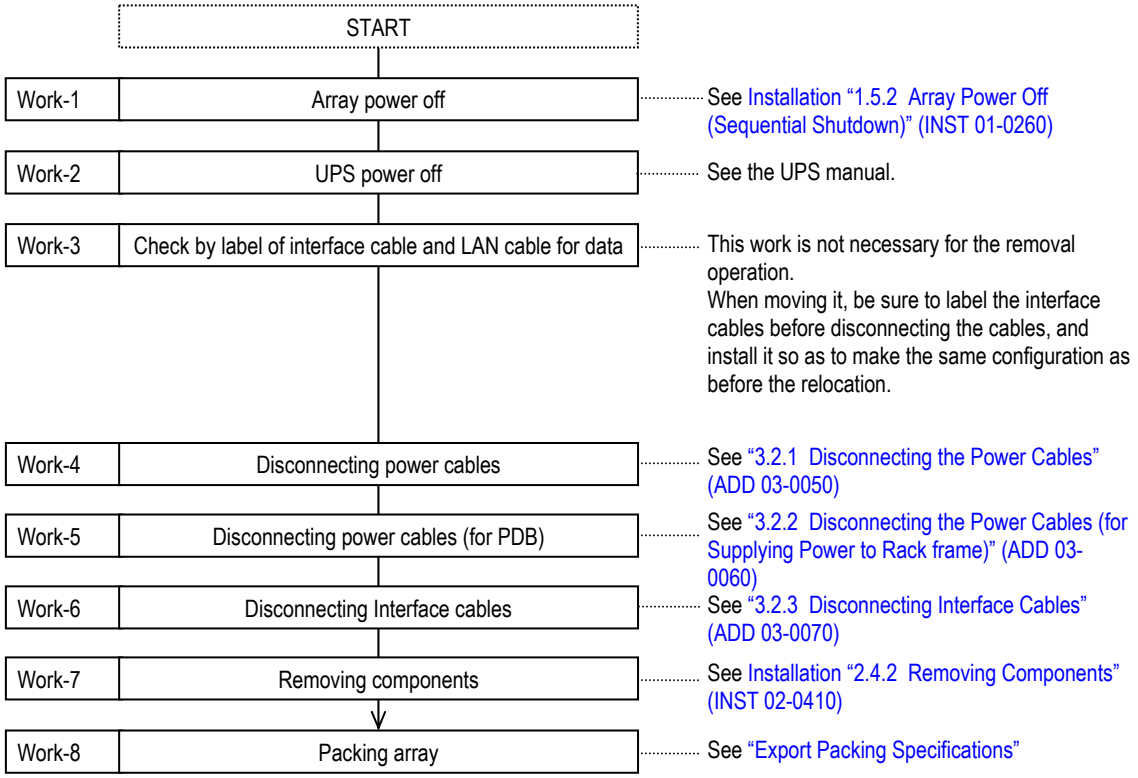
Before performing installation at a place where the array is moved to, make sure of work items to be done shown below.



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

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

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



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

Before performing installation at a place where the array 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.

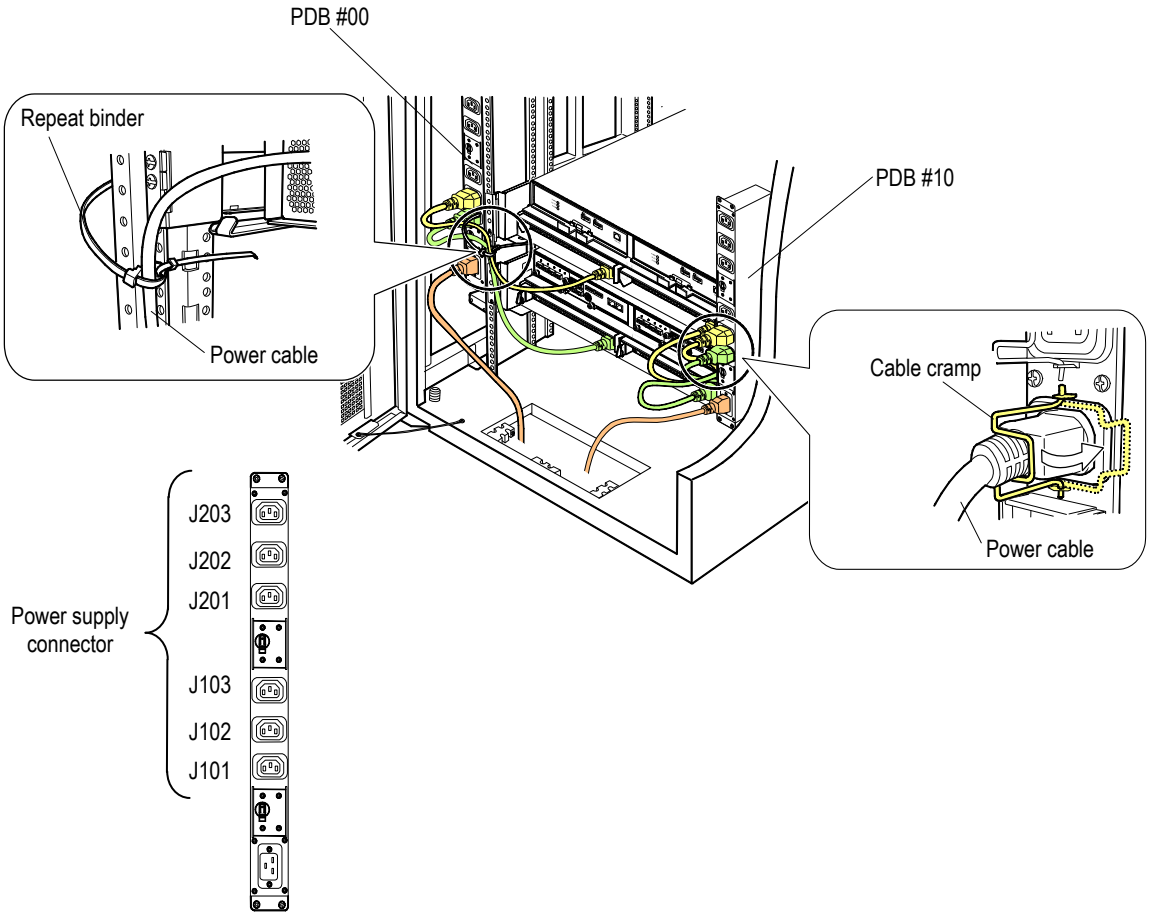


Figure 3.2.1 Disconnecting Power Cables

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 01-0210).)
(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.

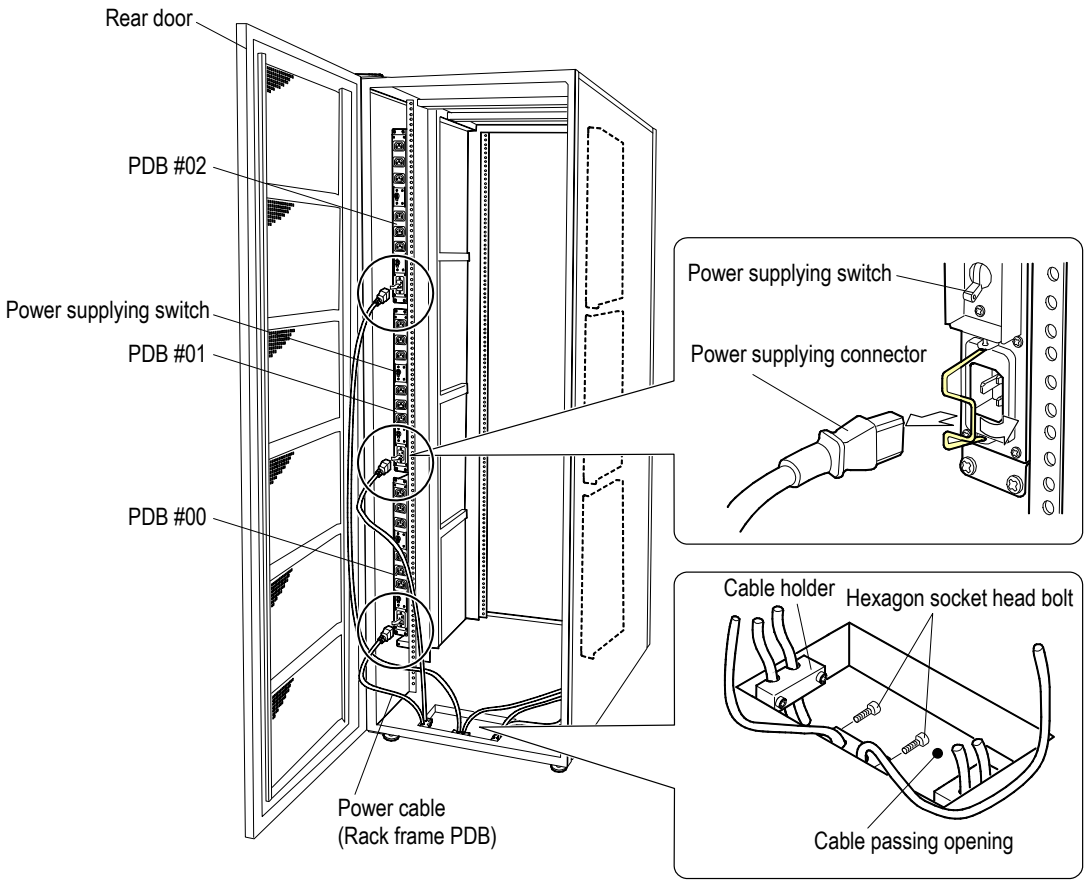


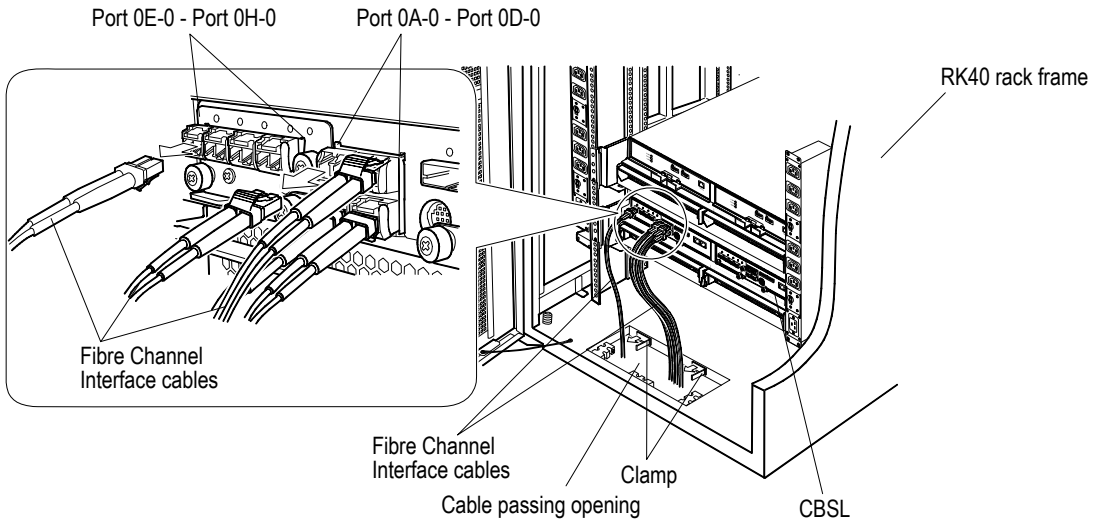
Figure 3.2.2 Disconnecting Power Cables

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 Controller.



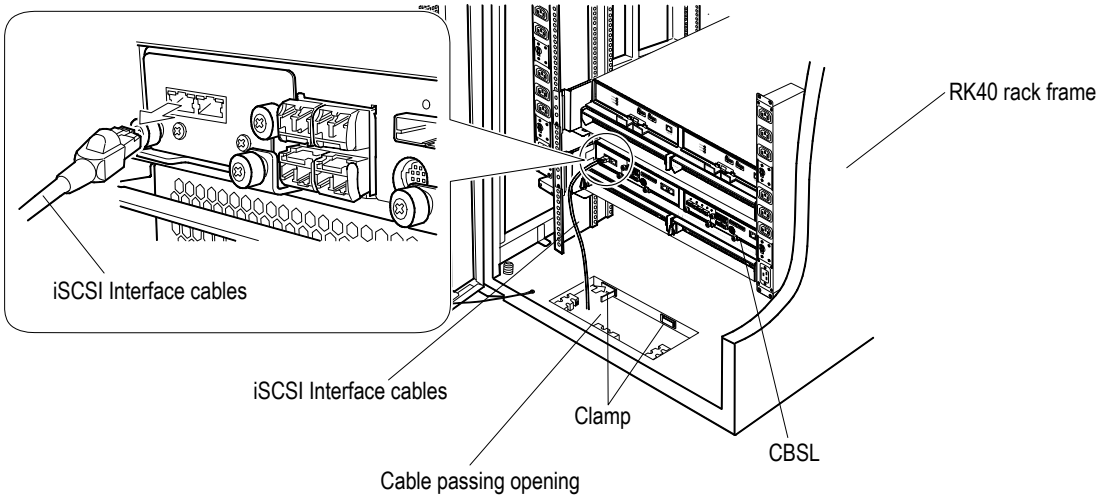
*1 : The figure shows the CBSL.

Figure 3.2.3 Disconnecting Interface Cable (Controller Box)

(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 Controller.



*1 : The figure shows the CBSL.

Figure 3.2.4 Disconnecting Interface Cable (Controller Box)

Chapter 4. Drive Replacement for Changing the Drive Type

When the system Drives (Drives #0 to #4 in the CBXSL/CBXSS/CBSL/CBSS, or the Drives #0 to #4 of the DBL/DBS/DBF corresponding to the unit ID #0 connected to the CBL, the Drive #A0 to #A4 of the DBX) are changed to the different drive type of Drives, the system reconfiguration (initial setup of the firmware) is needed. When a change is needed, contact the Technical Support Center beforehand.

The following describes the procedure for replacing the Drives installed in the DBX with different drive type of drives.

4.1 Before Starting Replacement

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

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

(2) In the operation, it is required to change the settings of the array using a service PC connected via a LAN. Make the following preparations before starting the operation.
- 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 array is operable via a LAN. If not, obtain customer's permission to operate the array via a LAN.

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

(4) Do not make the work when the READY LED (green) on the front of the Controller Box is blinking at high speed. When it is high-speed blinking, the ENC firmware and the backup controller firmware is being downloaded. Perform the work after checking that the READY LED (green) on the front of the Controller Box lights up after waiting for the maximum of 30 to 50 minutes and 40 to 60 minutes for the CBL (80 to 180 minutes when the DBW is connected to the CBL).

(5) When the WARNING LED (orange) on the front of the Controller Box is blinking at high speed, do not perform the 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 and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. Perform the work after checking that the WARNING LED (orange) on the front of the Controller Box goes out and the READY LED (green) lights up in the maximum of 30 to 85 minutes.

(6) Do not work while the array is being started.
When the array is being started, work after the array becomes the Ready status.

(7) It is required to install the adaptable firmware depending on the parts to be replaced.
Check the adaptable firmware revision referring to Firmware "1.8 Adaptable Firmware Revision" (FIRM 01-1670).
If the Hitachi Storage Navigator Modular 2 compatible with the adaptable firmware is not installed, the setting 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.

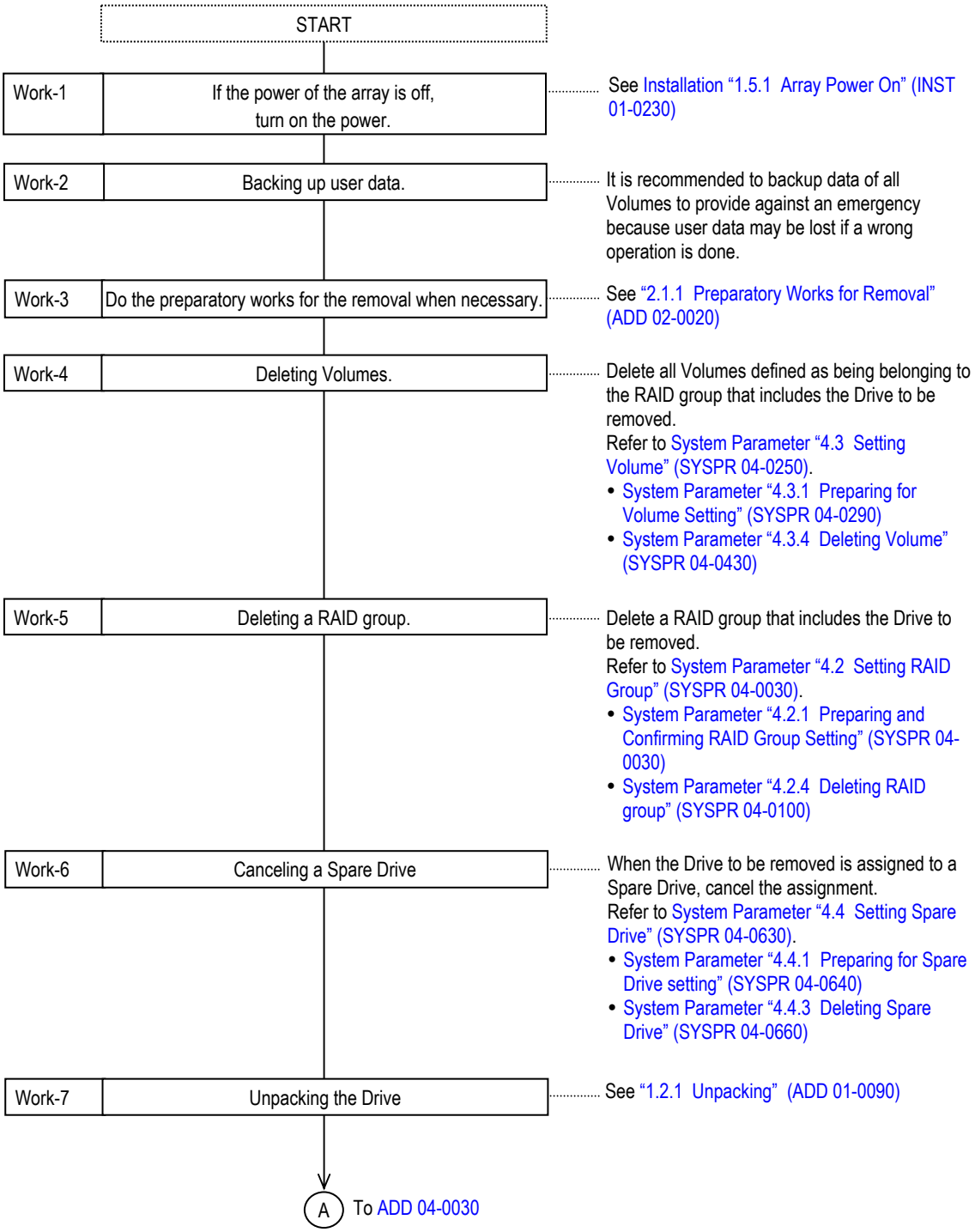
(8) Do not execute the work while rewriting the drive firmware ("IZ0000 HDU firmware download start" is displayed in the Information Message on WEB). Execute the work after checking that "IZ0100 HDU firmware download end" is displayed in the Information Message on WEB.

(9) Before the work, be sure to collect the simple trace (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040).) because the configuration information before the replacement is required if the array is returned to the original state during the work.

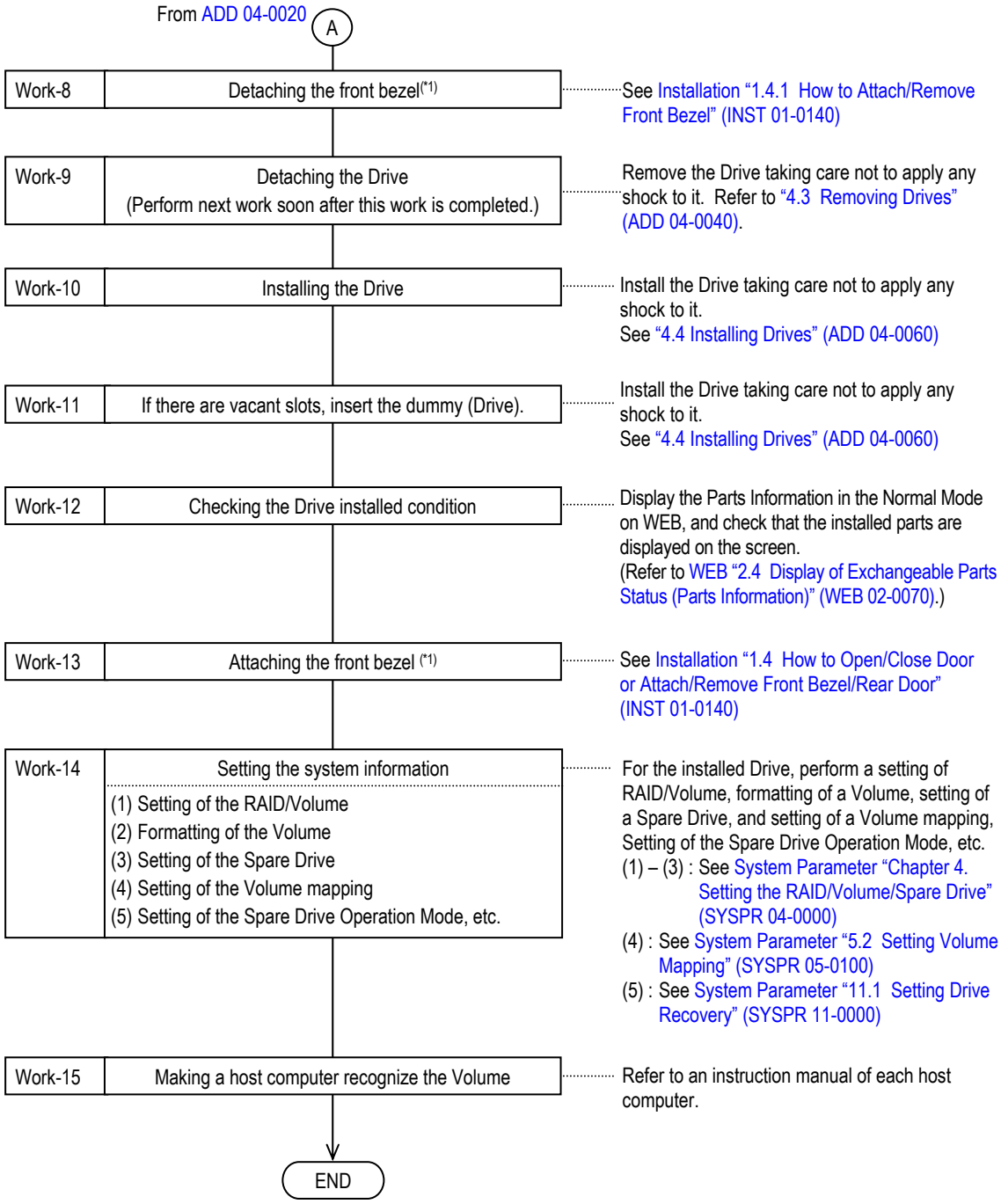
(10) In the first DBX to be connected with CBL, the drive replacement for changing the drive type cannot be performed.

4.2 Procedure for Replacing Drives for Changing the Drive Type

(1) Procedure for replacing the Drive with different drive type of drives.



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



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

4.3 Removing the Drives

(1) Before starting removal of Drives

⚠ CAUTION

- **Do not pull out multiple DBXs at a time because the rack can fall over.**
- **Do not put objects on the DBX which has been pulled out of the rack or use it as working space because the rack can fall over.**

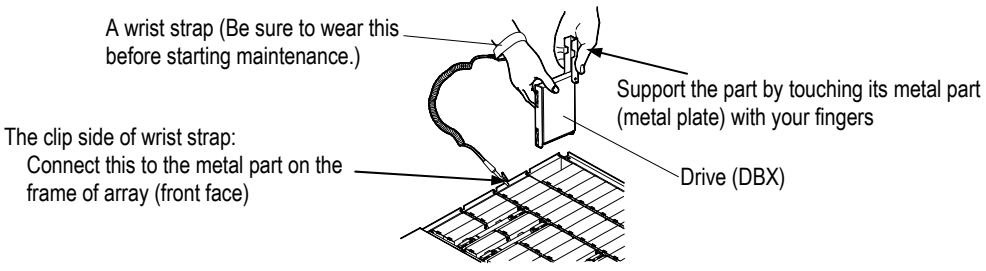
NOTE : • The Drive is a precision machine. Never apply a shock or vibration to it.
• Prepare the dummy (Drive) before removing the Drive.

NOTICE

- **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.**
- **Drives are precision components.**
  Be careful not to expose drives to hard shock.
- **When you remove a 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 Drive is precision instrument. Be sure to put on the wrist strap before starting work in order to protect Drive from electrostatic discharge.

NOTE : Before the Drive removal work, 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 Drive into the array, support the Drive as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • 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 (1) (g) Installing the stabilizer" (INST 02-0150).)
• When pulling out or storing the DBX, perform it for only one DBX at a time slowly and surely. (Refer to Installation "1.4.1 (3) In the case of DBX. (a) How to pull the DBX out of the rack frame" (INST 01-0190) or "1.4.1 (3) In the case of DBX. (b) How to store the DBX in the rack frame." (INST 01-0200).)

(2) Removal procedure
Open the handle toward you, and then remove the Drive by pulling it out taking care not to apply a shock to it.
When using the removed 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.

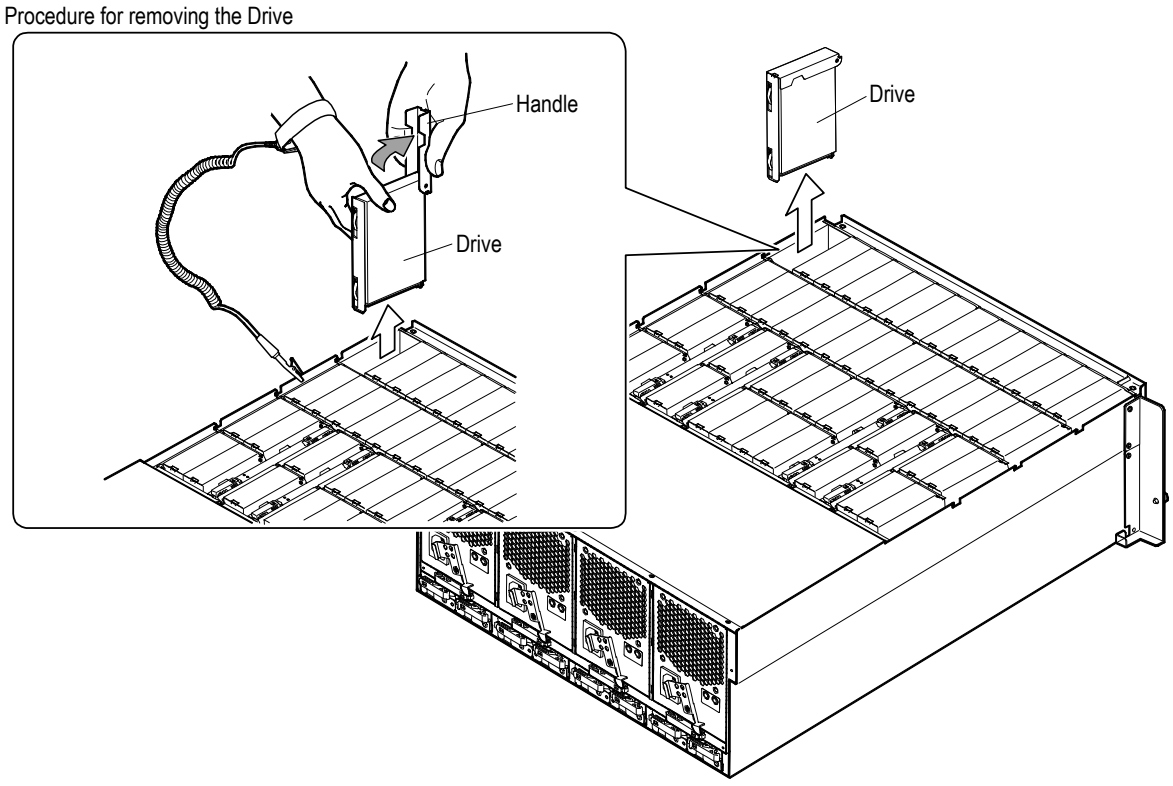


Figure 4.3.1 Removing the Drive

4.4 Installing Drives

(1) Locations and numbers of Drives

The Drive numbering is #A0 to #A23, #B0 to #B23 sequentially viewed from the above of the array. (Refer to Figure 4.4.1)

NOTE : Install the Drives in order from the front side of the array (in ascending order of the Drives number).

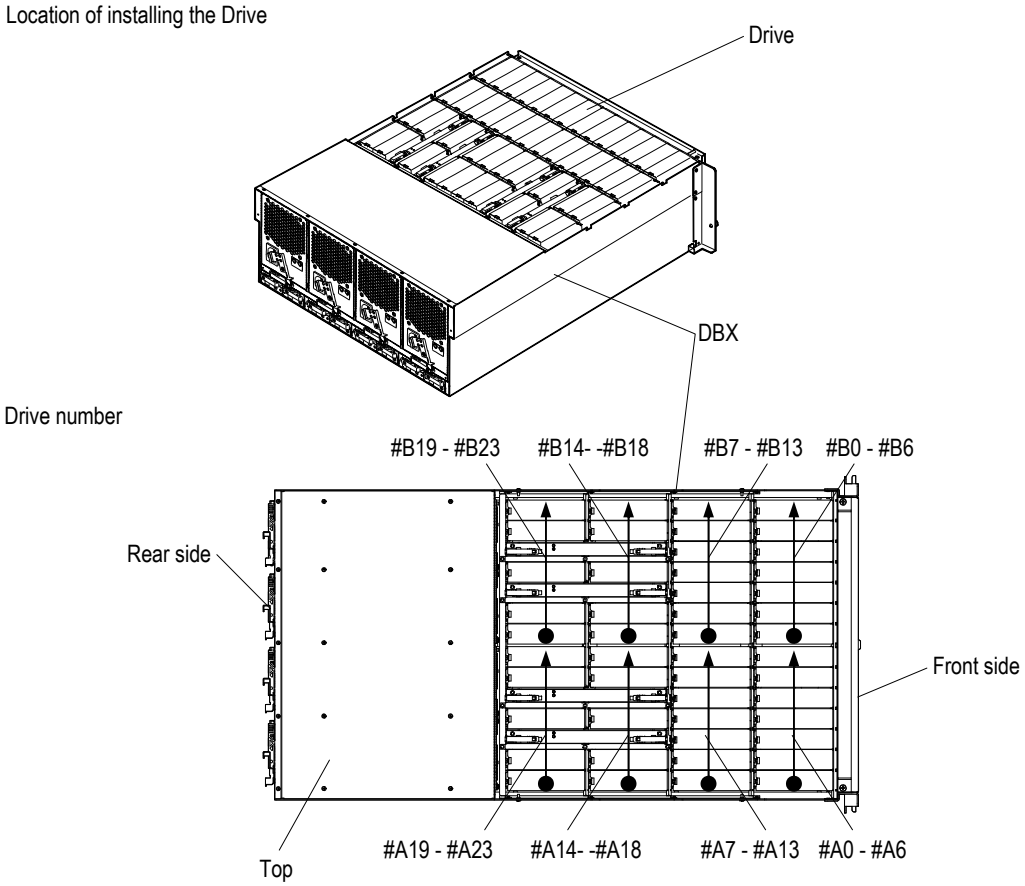


Figure 4.4.1 Drive Installing Location (DBX)

(2) Installation procedure

(a) Install all the Drives taking care not to apply any shock to it.

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

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

(ii) Close the handle, and lock it.

(b) The Alarm LED on the Drive will go out a few minutes after the Drive has been inserted. Make sure that the LED goes out.

(c) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

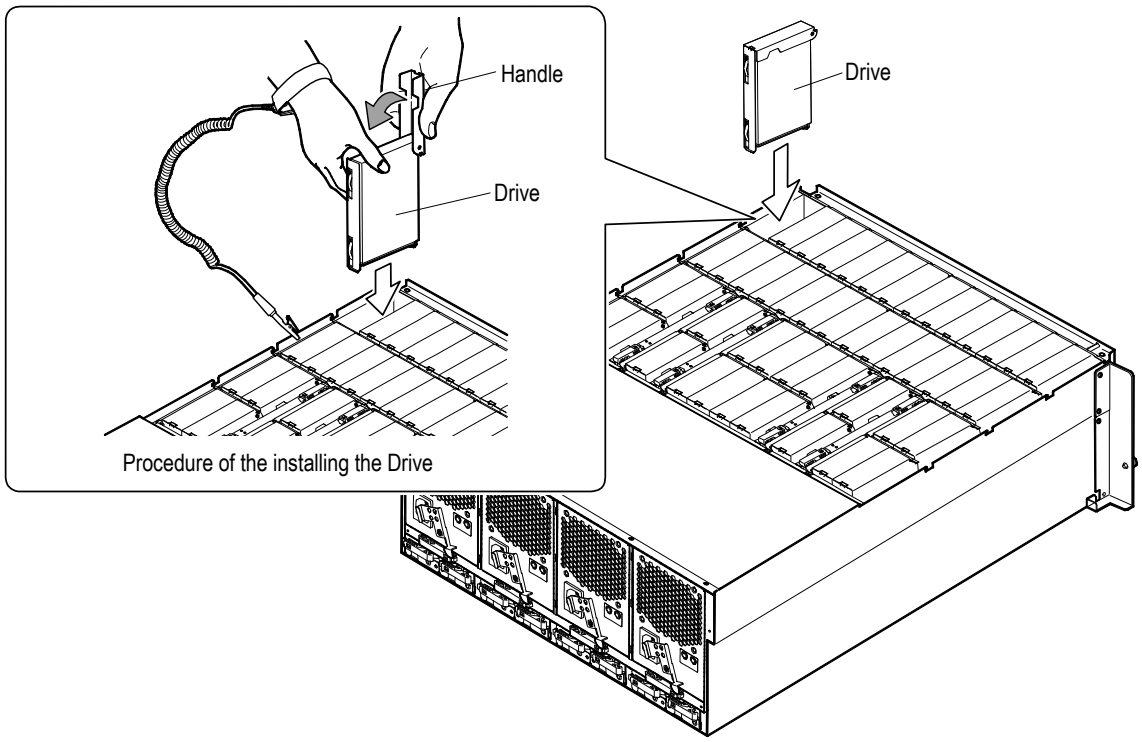


Figure 4.4.2 Operation of Installing the Drive (DBX)

(3) Install the dummy (Drive) in the vacant slot.

Be sure to insert the dummy (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 (Drive) comes to the lower side.

Chapter 5. Host I/O Replacement for Changing the Host I/O Type

The following table describes the types of Host I/O Boards and Host I/O Modules which can be replaced.

	1G bps iSCSI	10G bps iSCSI	Fiber Channel
CBXSL/CBXSS	Host I/O Board (HBS12)	Host I/O Board (HBS102)	None
CBSL/CBSS	Host I/O Board (HBS12)	Host I/O Board (HBS102)	Host I/O Board (HBF84)
CBL	None	Host I/O Module (HS10G)	Host I/O Module (HF8G)

The procedure for changing the Host I/Os to different types is shown below.

5.1 Before Starting Replacement

Therefore, perform the following before starting the operation to provide against an unexpected accident.

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

(2) In the operation, it is required to change the settings of the array using a service PC connected via a LAN. Make the following preparations before starting the operation.
- 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 array is operable via a LAN. If not, obtain customer's permission to operate the array via a LAN.

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

(4) Do not make the work when the READY LED (green) on the front of the Controller Box is blinking at high speed. When it is high-speed blinking, the ENC firmware and the backup controller firmware is being downloaded. Perform the work after checking that the READY LED (green) on the front of the Controller Box lights up after waiting for the maximum of 30 to 50 minutes and 40 to 60 minutes for the CBL (80 to 180 minutes when the DBW is connected to the CBL).

(5) When the WARNING LED (orange) on the front of the Controller Box is blinking at high speed, do not perform the 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 and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. Perform the work after checking that the WARNING LED (orange) on the front of the Controller Box goes out and the READY LED (green) lights up in the maximum of 30 to 85 minutes.

(6) Do not work while the array is being started.
When the array is being started, work after the array becomes the Ready status.

(7) It is required to install the adaptable firmware depending on the parts to be replaced. Check the adaptable firmware revision referring to Firmware "1.8 Adaptable Firmware Revision" (FIRM 01-1670).
If the Hitachi Storage Navigator Modular 2 compatible with the adaptable firmware is not installed, the setting 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.

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

(9) Before the work, be sure to collect the simple trace (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040).) because the configuration information before the replacement is required if the array is returned to the original state during the work.

(10) The following setting information may be deleted or maintained depending on the types to be replaced.
- Setting Host Group/Targets
- Setting Mapping Volume
- Setting Fibre Channel/iSCSI
- Setting Port Options

If necessary, perform the setting after the replacement in accordance with Table 5.1.1.

Table 5.1.1 Host I/O Board/Module Replacement Patterns and Settings

No.	Model name	Types before replacement		Types after replacement (*1)		Settings
		Specification	Type Name	Specification	Type Name	
1	CBXSL/CBXSS	1G bps iSCSI Host I/O Board	DF-F850-HBS12	10G bps iSCSI Host I/O Board (including Host Connectors (2))	DF-F850-HBS102	Unnecessary (*2)
2		10G bps iSCSI Host I/O Board (including Host Connectors (2))	DF-F850-HBS102	1G bps iSCSI Host I/O Board	DF-F850-HBS12	Unnecessary (*2)
3	CBSL/CBSS	1G bps iSCSI Host I/O Board	DF-F850-HBS12	10G bps iSCSI Host I/O Board (including Host Connectors (2))	DF-F850-HBS102	Unnecessary (*2)
4		1G bps iSCSI Host I/O Board	DF-F850-HBS12	8G bps Fibre Channel Host I/O Board (including Host Connectors (4))	DF-F850-HBF84	Necessary (*3)
5		10G bps iSCSI Host I/O Board (including Host Connectors (2))	DF-F850-HBS102	1G bps iSCSI Host I/O Board	DF-F850-HBS12	Unnecessary (*2)
6		10G bps iSCSI Host I/O Board (including Host Connectors (2))	DF-F850-HBS102	8G bps Fibre Channel Host I/O Board (including Host Connectors (4))	DF-F850-HBF84	Necessary (*3)

*1 : Install the same types of Host I/O Boards/Modules in the same slots in both Controllers.
*2 : The iSCSI interface setting to make the array recognized on the server is taken over after the replacement.
*3 : The iSCSI interface setting to make the array recognized on the server is deleted.
Perform the connection setting by the FC interface in accordance with System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000) and System Parameter "8.3 Setting Port Options" (SYSPR 08-0080).
*4 : The FC interface setting to make the array recognized on the server is deleted.
Perform the connection setting by the FC interface in accordance with System Parameter "Chapter 5. Setting Host Group/Targets" (SYSPR 05-0000) and System Parameter "8.3 Setting Port Options" (SYSPR 08-0080).

No.	Model name	Types before replacement		Types after replacement (*1)		Settings
		Specification	Type Name	Specification	Type Name	
7	CBSL/CBSS	8G bps Fibre Channel Host I/O Board (including Host Connectors (4))	DF-F850-HBF84	1G bps iSCSI Host I/O Board	DF-F850-HBS12	Necessary (*2)
8		8G bps Fibre Channel Host I/O Board (including Host Connectors (4))	DF-F850-HBF84	10G bps iSCSI Host I/O Board (including Host Connectors (2))	DF-F850-HBS102	Necessary (*2)
9	CBL	Host I/O Module (iSCSI 10G bps)	DF-F850-HS10G	Host I/O Module (FC 8G bps) (including Host Connectors (4))	DF-F850-HF8G	Necessary (*3)
10		Host I/O Module (FC 8G bps) (including Host Connectors (4))	DF-F850-HF8G	Host I/O Module (iSCSI 10G bps)	DF-F850-HS10G	Necessary (*2)

*1 : Install the same types of Host I/O Boards/Modules in the same slots in both Controllers.

*2 : The FC interface setting to make the array recognized on the server is deleted.
Perform the connection setting by the FC interface in accordance with System Parameter “Chapter 5. Setting Host Group/Targets” (SYSPR 05-0000) and System Parameter “8.3 Setting Port Options” (SYSPR 08-0080).

*3 : The iSCSI interface setting to make the array recognized on the server is deleted.
Perform the connection setting by the FC interface in accordance with System Parameter “Chapter 5. Setting Host Group/Targets” (SYSPR 05-0000) and System Parameter “8.3 Setting Port Options” (SYSPR 08-0080).

5.2 Replacing Host I/O for Changing the Host I/O Type

CAUTION

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

NOTICE

- **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 a Host I/O Board/Module, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

The offline work (with the power turned off) and the online work (host is operating) differ.

- Procedure for online (host is operating) replacement
  Refer to "5.2.1 Replacing Host I/O Boards/Modules Online (Host is Operating)" (ADD 05-0040).
- Procedure for offline (power-off status) replacement
  Refer to "5.2.2 Replacing Host I/O Boards/Modules Offline (Power is Turned Off)" (ADD 05-0150).

5.2.1 Replacing Host I/O Boards/Modules Online (Host is Operating)

Perform the replacement operation of the Host I/O Board/Module in accordance with the Hitachi Storage Navigator Modular 2 window in the following procedure.

(1) Perform the prior check of the operation.
Check the following items before replacing the Host I/O Boards/Modules.

(a) Check that the support version is as follows.
Firmware version : 0925/A or later
Hitachi Storage Navigator Modular 2 version : Ver.22.50 or later

(b) Check that the Controller is in the dual configuration.

(c) For the Host I/O Boards/Modules to be replaced from the Controller Box, check if the remote paths of the TrueCopy remote replication, TrueCopy Extended Distance and TrueCopy Modular Distributed functions are not set.

(d) Check that there is not access from the host to the Host I/O Board/Module to be replaced.

(e) As the configuration of the Host I/O Module types installed in the Host I/O Module of the CBL, iSCSI is installed in either or both of Slot E and Slot F and the Fibre Channel is not installed (refer to Table 5.2.1 Before addition). Therefore, when adding (including changing types) the Fibre Channel in either Slot E or Slot F, if the firmware version is less than 0935/A, complete the update installation to upgrade the firmware version to 0935/A or more and then perform the addition. (Refer to Firmware "1.3 Preparation for Installation of Firmware" (FIRM 01-0020).)

Table 5.2.1 Configuration of Host I/O Module Types

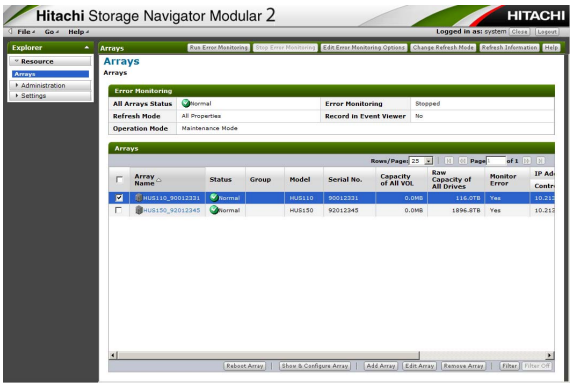
No.	Configuration of Host I/O Modules before addition		Configuration of Host I/O Modules after addition	
	Slot E	Slot F	Slot E	Slot F
1	iSCSI	Unmount	iSCSI	Fibre Channel
2	Unmount	iSCSI	Fibre Channel	iSCSI
3	iSCSI	iSCSI	Fibre Channel	iSCSI
4			iSCSI	Fibre Channel

(2) Removing the Host I/O Board/Module

(a) Remove the Interface cables connected to the Host I/O Board/Module.

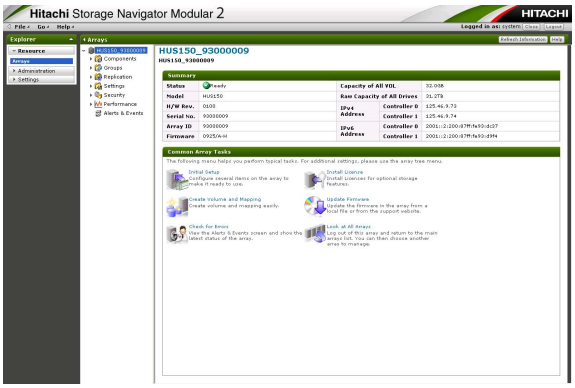
(b) Start Hitachi Storage Navigator Modular 2, put a checkmark the target array and press the [Ctrl] key, [Shift] key and [E] key at the same time to change the operation mode to "Maintenance Mode".(‡1)

Check that "Maintenance Mode" is displayed in [Operation Mode] on the top of the main window.



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

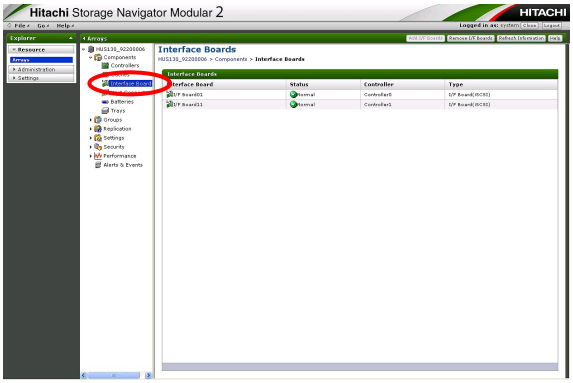
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2" (SYSPR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



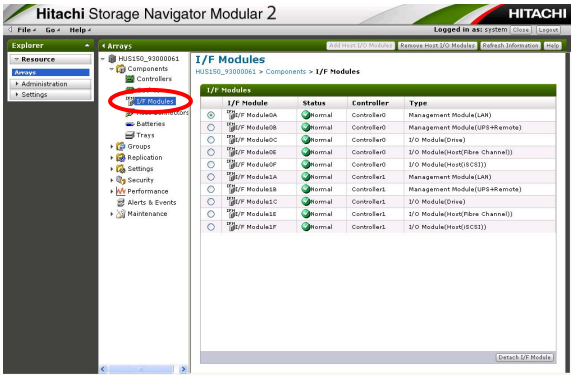
‡1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the "Arrays" window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

(d) Select [Component] – [Interface Boards] ([I/F Modules] in case of CBL) in the unit window.

For CBXSS/CBXSL/CBSS/CBSL

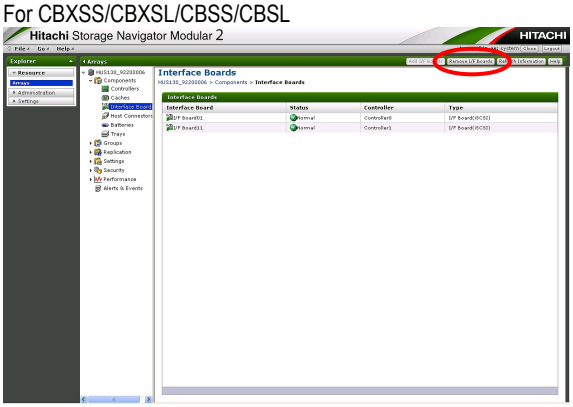


For CBL

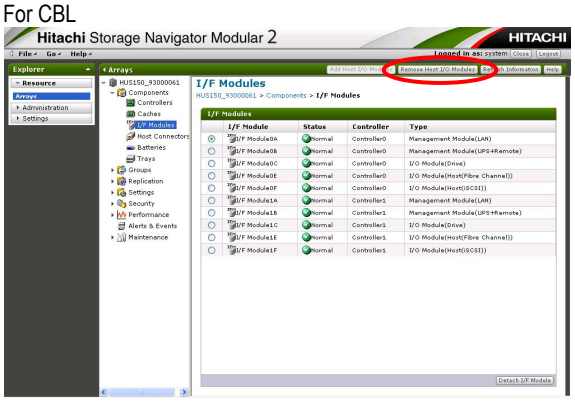


(e) Press the “Remove I/F Boards” (“Remove Host I/O Modules” in case of CBL) button in the Interface Boards (I/F Modules in case of CBL) window.

For CBXSS/CBXSL/CBSS/CBSL



For CBL

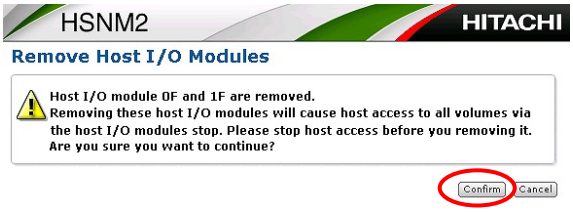


(f) In case of the CBL, select the Host I/O Module to be removed.

(g) The confirmation window is displayed. Click the [Confirm] button.

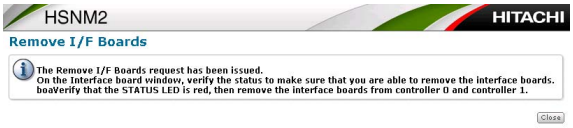
For CBXSS/CBXSL/CBSS/CBSL

For CBL

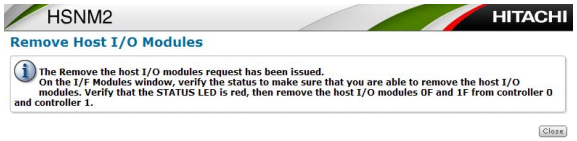


(h) Click the [Close] button.

For CBXSS/CBXSL/CBSS/CBSL



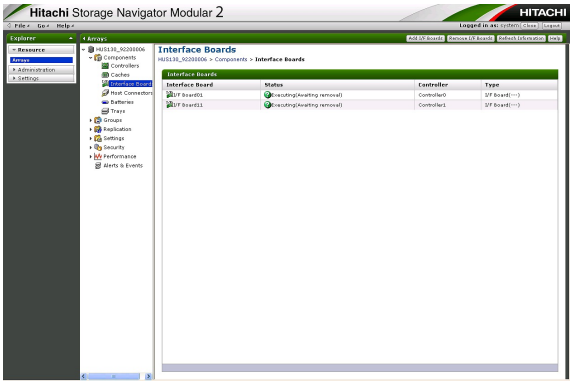
For CBL



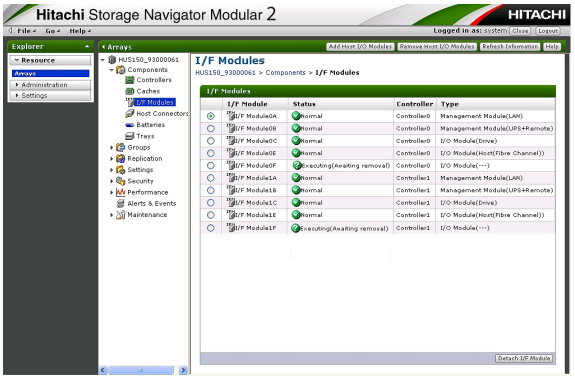
(i) Start the removal of the Host I/O Board/Module. During the removal, the status of the Interface Boards (I/F Modules in case of CBL) in the Interface Boards (I/F Modules in case of CBL) window is displayed as “Executing(Removal)”. When the removal is completed, the status of the Interface Boards (I/F Modules in case of CBL) is displayed as “Executing(Awaiting removal)”. Press the “Refresh Information” button to update the window and check the status of the Interface Boards (I/F Modules in case of CBL).

NOTE : During the removal of the Host I/O Board/Module, if the dialog is closed and the removal completion window cannot be checked, display the Interface Board (I/F Module in case of CLB) window again by Hitachi Storage Navigator Modular 2 in the procedure from (b) to (h).

For CBXSS/CBXSL/CBSS/CBSL



For CBL



(j) Remove the Host I/O Board/Module whose STATUS LED (red) lights up.

CAUTION

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

(j-1) For CBXSS/CBXSL/CBSS/CBSL

(i) In case of the FC Host I/O Board, remove the installed Host Connector.

(ii) Loosen the two screws which fix the Host I/O Board.

(iii) Pull out and remove the Host I/O Board.

NOTE : • Place the removed iSCSI Host I/O Board and Host Connector temporarily in the place where anti-static measures are taken.

• Remove the Host I/O Modules on both of Controller #0 and #1.

(j-2) For CBL

(i) Loosen one screw (blue) which fixes the Host I/O Module, and then pull the lever open. When the lever is completely opened, the Host I/O Module comes out forward.

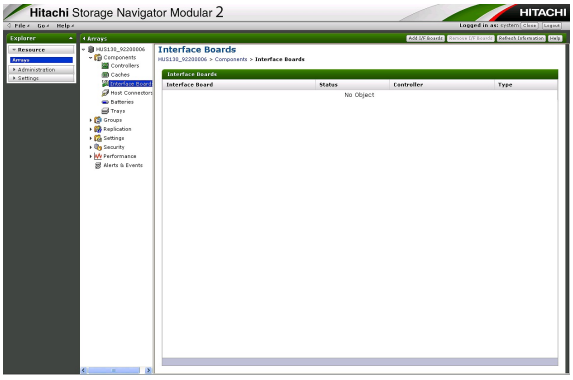
(ii) Pull out and remove the Host I/O Module.

NOTE : • Place the removed Host I/O Module temporarily in the place where anti-static measures are taken.

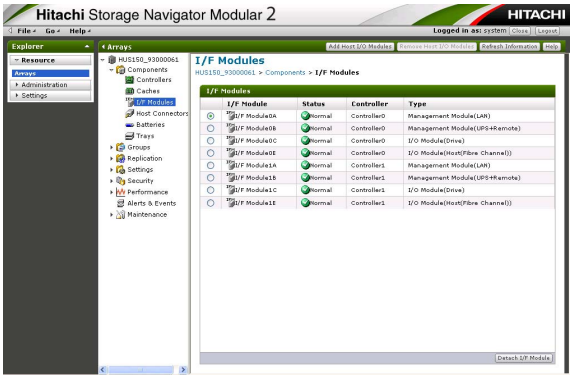
• Remove the Host I/O Modules on both of Controller #0 and #1.

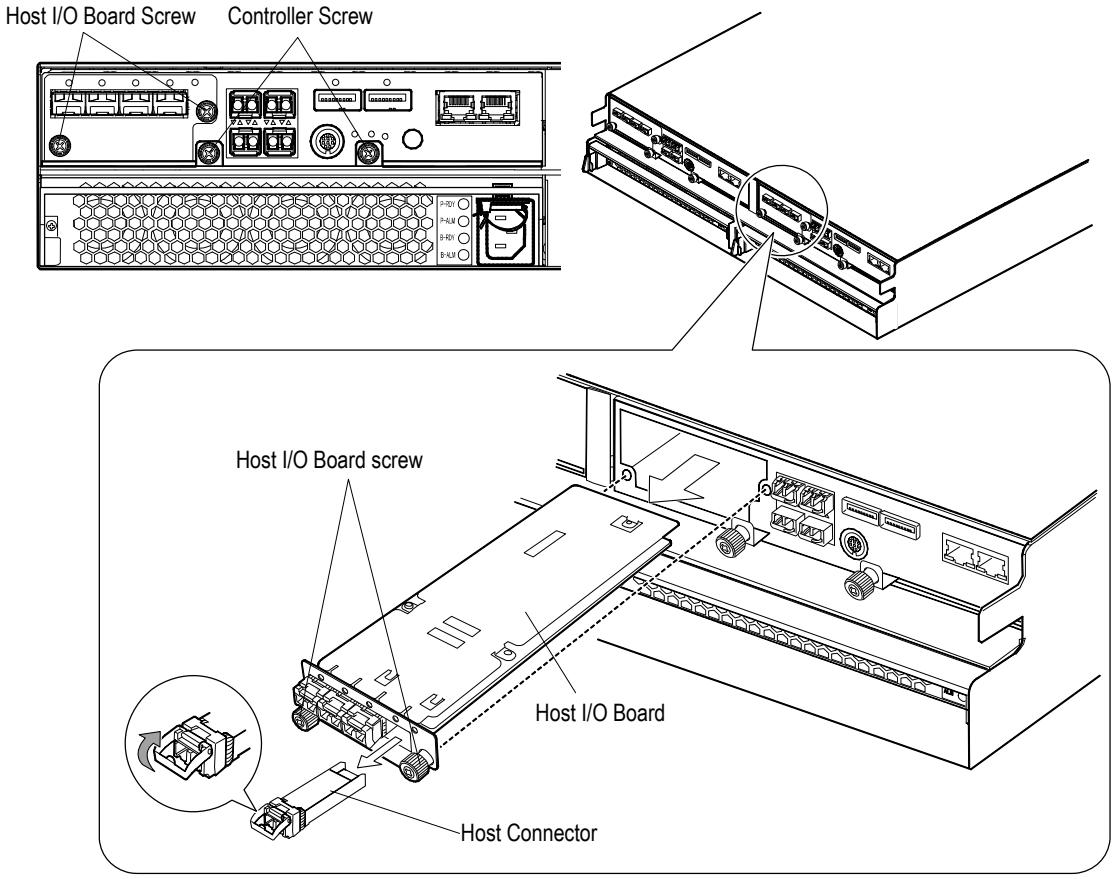
(k) If the removal is completed, the display of the removed Host I/O Boards/Modules disappears from the Interface Boards ([I/F Modules] in case of CBL) window. Check that the Host I/O Boards/Modules of Controllers #0 and #1 are not displayed.

For CBXSS/CBXSL/CBSS/CBSL



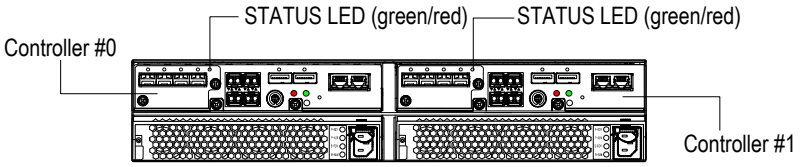
For CBL





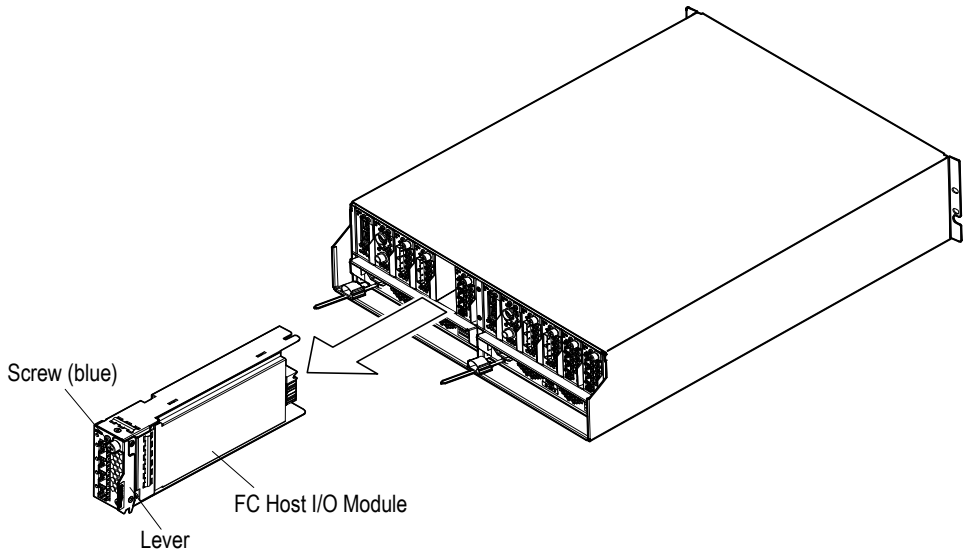
*1 : The figure shows the case where the FC Host I/O Boards are installed in the CBSL Controllers.

Figure 5.2.1 Replacing Host I/O Board (CBXSL/CBXSS/CBSL/CBSS)



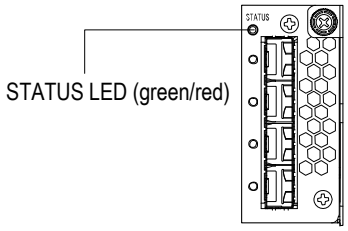
*1 : The figure shows the case where the FC Host I/O Boards are installed in the CBSL Controllers.

Figure 5.2.2 Position of the STATUS LED on the Host I/O Board (CBXSL/CBXSS/CBSL/CBSS)



*1 : The figure shows the case where the FC Host I/O Modules is installed.

Figure 5.2.3 Replacing Host I/O Module (CBL)



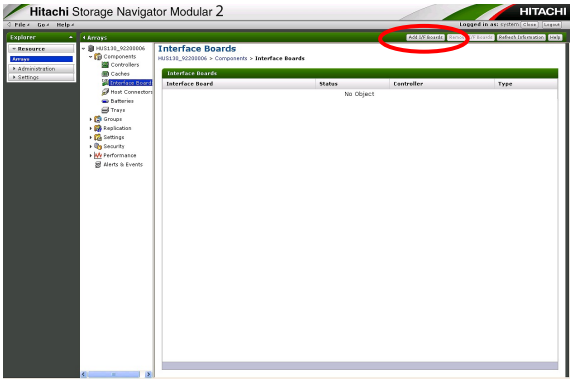
*1 : The figure shows the case where the FC Host I/O Modules is installed.

Figure 5.2.4 STATUS LED Locations on the Host I/O Module (CBL)

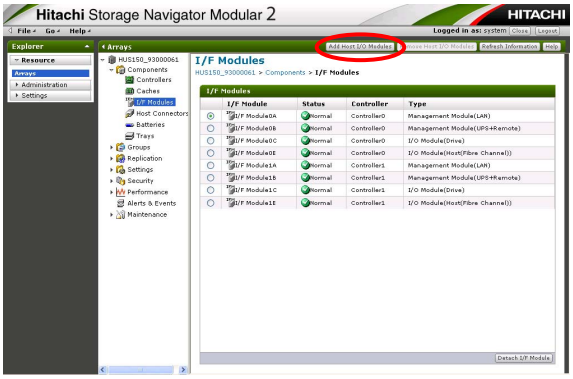
(3) Installing the Host I/O Board/Module

(a) Press the “Add I/F Boards” (“Add Host I/O Modules” in case of CBL) button in the Interface Boards (I/F Modules in case of CBL) window.

For CBXSL/CBXSS/CBSL/CBSS



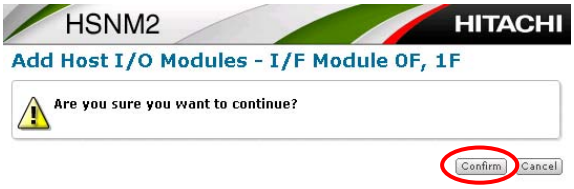
For CBL



(b) The confirmation screen appears for the Add I/F Boards (“Add Host I/O Modules” in case of CBL). Click [Confirm].

For CBXSL/CBXSS/CBSL/CBSS

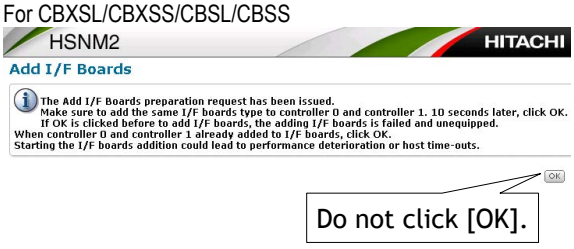
For CBL



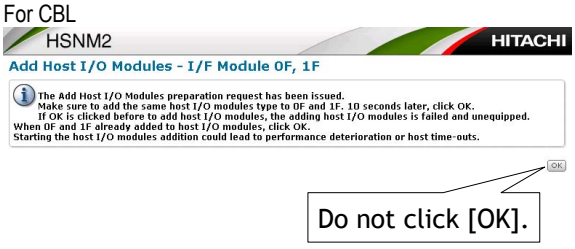
(c) The addition preparation complete screen appears after you complete the addition preparation.

NOTE : Do not click [OK] at this time.

For CBXSL/CBXSS/CBSL/CBSS



For CBL



(d) Install a Host I/O Board/Module.

(d-1) CBXSL/CBXSS/CBSL/CBSS

(i) In case of the FC Host I/O Board, remove the Host Connector installed in the Host I/O Board to be installed.

(ii) Insert and push the Host I/O Board into the slot in the Controller.

NOTE : Install the Host I/O Boards of the same type in the same position of the Controller #0 and #1.

(iii) Tighten the two screws to fix the Host I/O Board.

(iv) In case of the FC Host I/O Board, install the Host Connector.

(d-2) For CBL

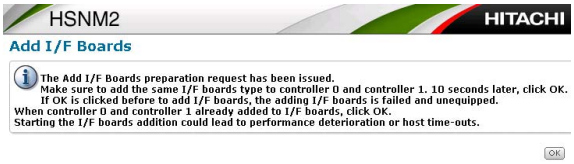
(i) Insert and push the Host I/O Module with its lever completely opened.

NOTE : Install the Host I/O Modules of the same type in the same position of the Controller #0 and #1.

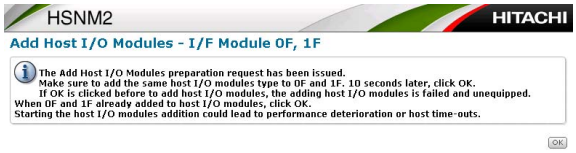
(ii) Close the lever and tighten one screw (blue) to fix the Host I/O Module.

(e) Click [OK] in 10 seconds after the Host I/O Board/Module is correctly inserted.

For CBXSL/CBXSS/CBSL/CBSS

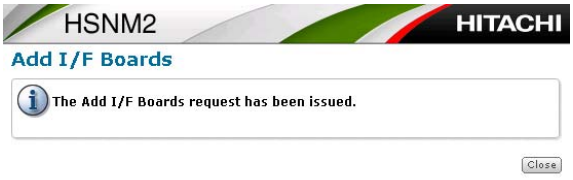


For CBL



(f) Click the [Close] button.

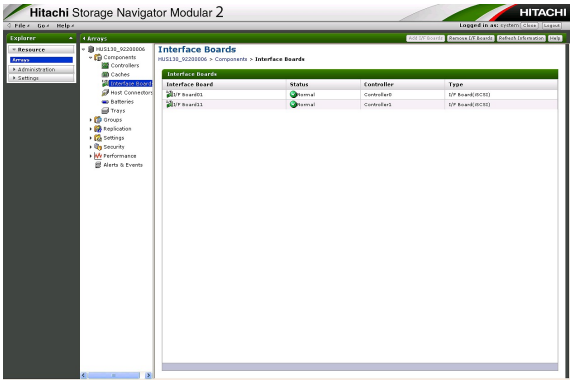
For CBXSL/CBXSS/CBSL/CBSS



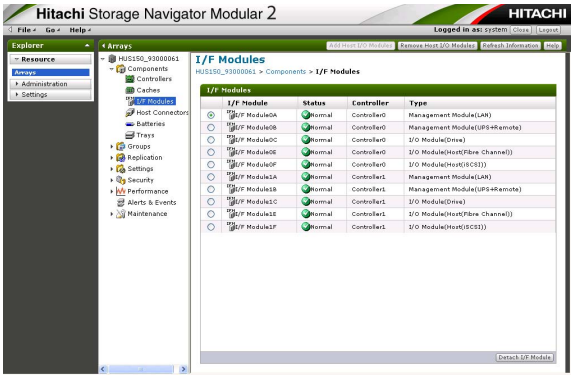
For CBL

(g) If you finish the addition, the status of the Interface Boards (I/F Modules in case of CBL) becomes “Normal”. Click [Refresh Information] to update the screen, and then check if the status of the Interface Boards (I/F Modules in case of CBL) is “Normal”.

For CBXSL/CBXSS/CBSL/CBSS



For CBL



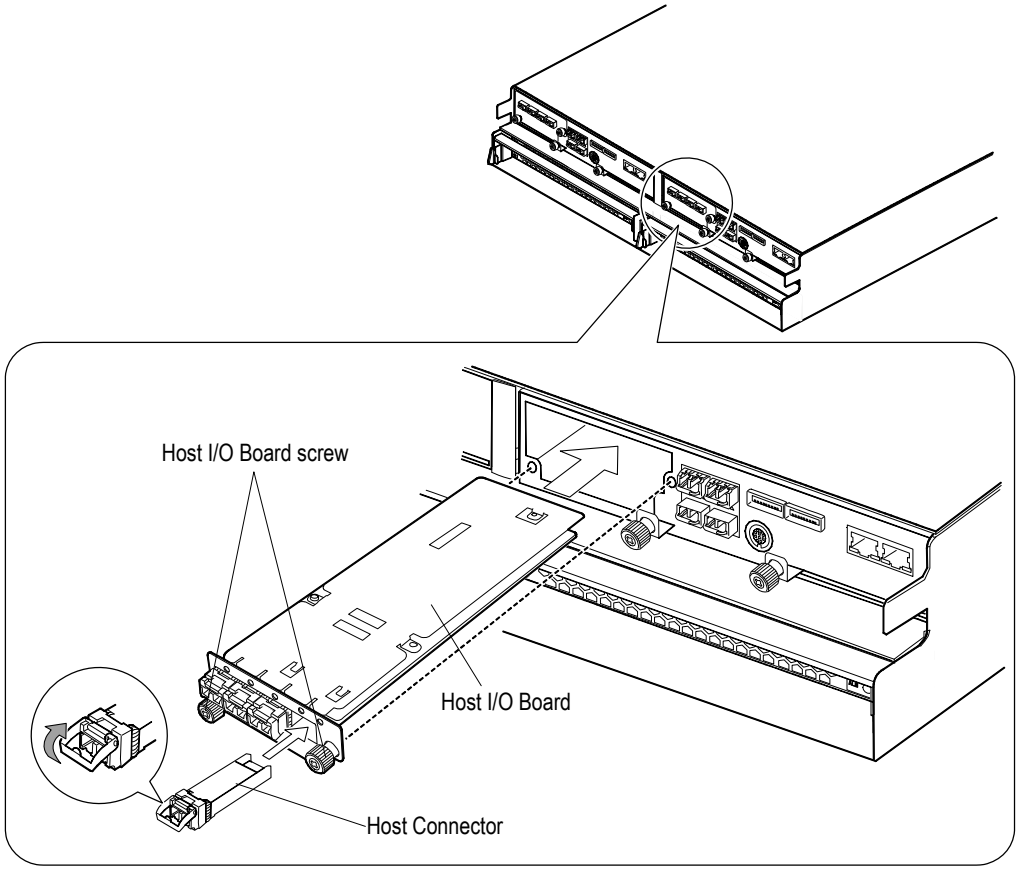
(h) Check that the READY LED (green) on the front of the Controller Box lights up, and the WARNING LED (orange) go out.
When the WARNING LED (orange) light up or blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB.

(i) Connect the interface cables to the installed Host I/O Board/Module.

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

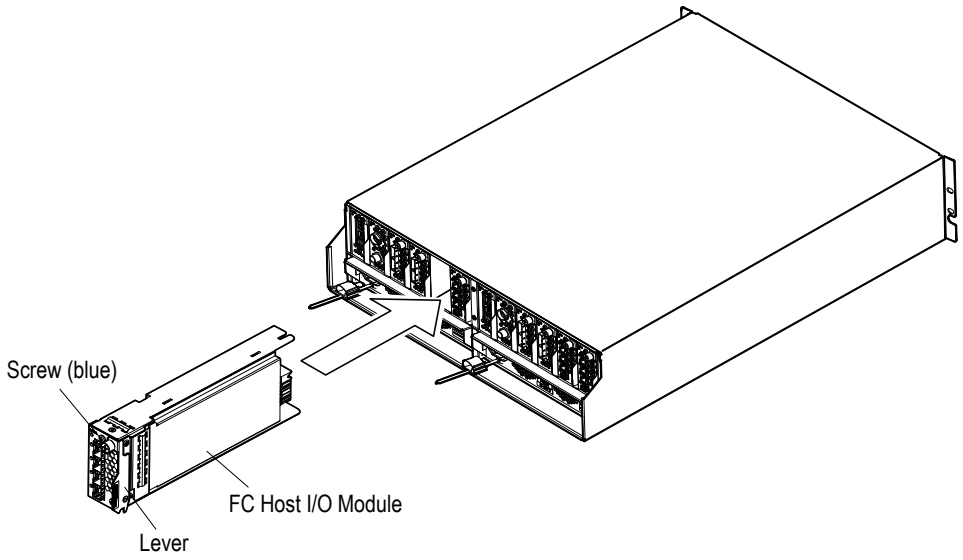
(j) Display the Parts Information window in the normal mode on WEB and check that the installed parts are displayed in the window. (Refer to WEB “2.4 Display of Exchangeable Parts Status (Parts Information)” (WEB 02-0070).)

(k) Perform the port setting referring to “5.1 Before Starting Replacement (10)” (ADD 05-0010).



*1 : The figure shows the case where the FC Host I/O Board are installed in the CBSL Controllers.

Figure 5.2.5 Replacing Host I/O Board (CBXSL/CBXSS/CBSL/CBSS)



*1 : The figure shows the case where the FC Host I/O Module is installed.

Figure 5.2.6 Replacing Host I/O Module (CBL)

5.2.2 Replacing Host I/O Boards/Modules Offline (Power is Turned Off)

The procedure for CBXSL/CBXSS/CBSL/CBSS is different from the one for CBL.

(1) For CBXSL/CBXSS/CBSL/CBSS

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Board is changed [‡1] or when the Host I/O Board of the different type is installed in the position where the Host I/O 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)

(b) Turn off the main switch.

Press the main switch on either Controller #0 or Controller #1 for three seconds or more. Make sure that the POWER LED on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

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

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

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

(d) Remove the Host I/O Board installed in the Controller.

CAUTION

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

(i) In case of the FC Host I/O Board, remove the installed Host Connector.
(ii) Loosen the two screws (blue) which fix the Host I/O Board.
(iii) Pull out and remove the Host I/O board.

NOTE : Place the removed Host I/O Board and Host Connector temporarily in the place where anti-static measures are taken.

(e) Install the Host I/O Board in the Controller. (Refer to Figure 5.2.5.)

CAUTION

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

(i) In case of the FC Host I/O Board, remove the Host Connector installed in the FC Host I/O Board to be installed.
(ii) Insert and push the Host I/O Board into the slot in the Controller.

NOTE : In the dual Controller configuration, install the Host I/O Boards of the same type in the same position of the Controller #0 and #1.

(iii) Tighten the two screws to fix the Host I/O Board.
(iv) In case of the FC Host I/O Board, install the removed Host Connector in the Host I/O Board.

(f) In the dual controller configuration, perform the steps (e) for the other Controller.
(g) Connect the power cables to the Power Units.
(h) Turn on the main switch.
(i) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1). The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(j) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 30 to 50 minutes).

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

(k) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

(l) Display the Parts Information window in the normal mode on WEB and check that the installed parts are displayed in the window. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

(m) Perform the port setting referring to "5.1 Before Starting Replacement (10)" (ADD 05-0010).

(2) For CBL

(a) Collect Simple Trace and output the port information from the Constitute Array to a text file. (Refer to Troubleshooting "5.3 Collecting Simple Trace" (TRBL 05-0040) and System Parameter "Chapter 10. Setting Constitute Array" (SYSPR 10-0000).)

NOTE : When the installation position of the Host I/O Module is changed(‡1) or when the Host I/O Module of the different type is installed in the position where the Host I/O Module 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)

(b) Turn off the main switch.

Make sure that the POWER LED (green) on the Front Bezel changes from green to orange. It takes about 10 minutes at the maximum before the POWER LED turns orange. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the C-PWR LED (green) on the Controller blinks, it may be that some of the Cache Memory data has not been written into the Drive. Wait until the C-PWR LED (green) goes off.
If the Controller is removed from the array when the C-PWR LED (green) blinks, user data may be lost.

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

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

(d) Remove all the interface cables from the Host I/O Module.

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 Interface cables, pull out the interface cables completely from the connectors.
  If the interface cables are inserted half in the connectors, the Controller continues to detect the failures, and the I/O processing of the Controller may be deteriorated.

‡1 : Even if the installed Host I/O Board is changed to the uninstalled, the configuration information is maintained in the array.

(e) Remove the Host I/O Module. (Refer to Figure 5.2.6.)

CAUTION

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

(i) Loosen one screw (blue) which fixes the Host I/O Module, and then pull the lever open. When the lever is completely opened, the Host I/O Module comes out forward.
(ii) Pull out and remove the Host I/O Module.

NOTE : Place the removed Host I/O Module temporarily in the place where anti-static measures are taken.

(f) Install the Host I/O Module.

CAUTION

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

(i) Insert and push the Host I/O Module with its lever completely opened.
(ii) Close the lever and tighten one screw (blue) to fix the Host I/O Module.

(g) In the dual controller configuration, perform the steps (f) for the other Controller.
(h) Connect the interface cables to the Host I/O Module.

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

(i) Connect the power cables to the Power Units.
(j) Turn on the main switch.
(k) Check that the WARNING LED (orange) on the front of the Controller Box goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(l) Check that the READY LED (green) on the front of the Controller Box lights up. The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 40 to 60 minutes (80 to 180 minutes when the DBW is connected to the CBL)).
(m) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the 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 01-1620).)

‡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 array is in the Warning status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Controller Box lights up, and if the array is not in the Warning status, the WARNING LED (orange) goes out.

(n) Display the Parts Information window in the normal mode on WEB and check that the installed parts are displayed in the window. (Refer to WEB "2.4 Display of Exchangeable Parts Status (Parts Information)" (WEB 02-0070).)

(o) Perform the port setting referring to "5.1 Before Starting Replacement (10)" (ADD 05-0010).