INSTALLATION SECTION
[Addition Procedures]

Contents

1. Before Starting Addition of Optional Components

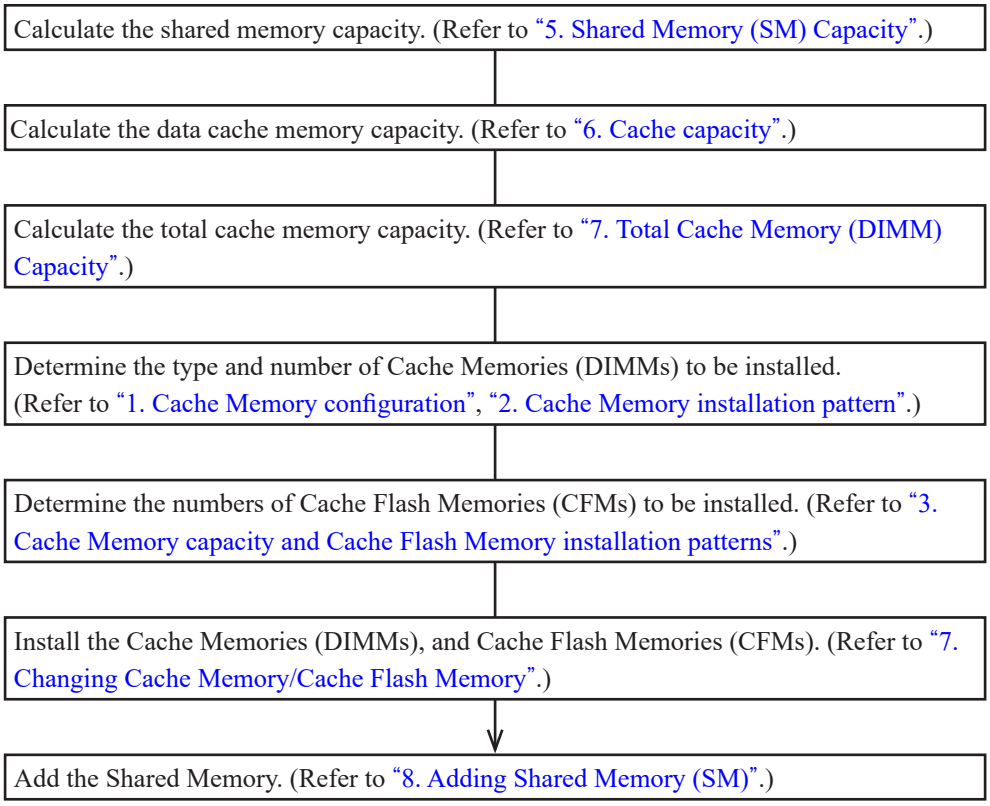
NOTICE:	During the addition work, the part statuses in the Web Console window, Maintenance Utility window, and Maintenance Utility (Sub Panel) window might be displayed differently from the actual statuses. (Example: The Drives during the addition are displayed as the [Blocked] status.) In that case, complete the running maintenance operation, and then refresh the display information in each window.

If you make a mistake in operation during an addition of the optional component, it is feared that user data in the Storage System 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 Storage System 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 Storage System power turned on or off.
   - An addition with the Storage System power turned on :
     A status in which the Storage System power is turned on regardless of whether the system (host computer) is turned on or off.
   - An addition with the Storage System power turned off :
     A status in which the Storage System power is turned off regardless 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 Storage System using a Maintenance PC connected via a LAN. Make the following preparations before starting the addition of the optional component.
   - Ask the customer whether the Storage System is operable via a LAN. If not, obtain customer's permission to operate the Storage System 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 Storage System power turned on, the operation replacing dummy (Drive) with Drive has to be finished within 10 minutes.
6. It is required to install the adaptable micro-program depending on the parts to be added.
   Check the adaptable micro-program revision. See "Relationship between Option and Micro-program Version" (OPTVER01-10).
7. Connect only the regular parts defined in the "Maintenance Manual" for the maintenance parts.

1.1 Cache Capacity and the Number of Required Options

To increase the cache memory and the shared memory, calculate the additional cache memory capacity and shared memory capacity, and then determine the type and number of Cache Memories (DIMMs) to be installed. Follow the steps below to increase the cache memory and the shared memory.



1. Cache Memory configuration
   The following shows the specification of the Cache Memory (DIMM) configuration.
   Addible DIMMs are 32 GiB and 64 GiB.

Table 1-1 Cache Memory Configuration Specification

Item	Maximum number of DIMMs to be installed (DIMMs/CTL)	Minimum number of DIMMs (DIMMs/CTL)	Addition Unit (CMG)
DKC	8 DIMMs	4 DIMMs	4 DIMMs （Replacement for storage capacity expansion or addition to CMG1）

2. Cache Memory installation pattern
   The following table shows Cache Memory installation patterns.
   DKC1 needs to install the memories in CMG0.

Table 1-2 DKC Cache Memory Installation Pattern (For VSP 5500 and VSP 5500H)

Memory capacity/ CBX Pair	DKC-x (x: 0, 2, 4)				DKC-y (y=x+1)			
	CTLx1		CTLx2		CTLy1		CTLy2	
	CMG0	CMG1	CMG0	CMG1	CMG0	CMG1	CMG0	CMG1
512 GB	32 GB × 4	Uninstalled	32 GB × 4	Uninstalled	32 GB × 4	Uninstalled	32 GB × 4	Uninstalled
768 GB				32 GB × 4				32 GB × 4
		32 GB × 4		Uninstalled		32 GB × 4		Uninstalled
1024 GB				32 GB × 4				32 GB × 4
	64 GB × 4	Uninstalled	64 GB × 4	Uninstalled	64 GB × 4	Uninstalled	64 GB × 4	Uninstalled
1536 GB				64 GB × 4				64 GB × 4
		64 GB × 4		Uninstalled		64 GB × 4		Uninstalled
2048 GB				64 GB × 4				64 GB × 4

Table 1-3 DKC Cache Memory Installation Pattern (For VSP 5100 and VSP 5100H)

Memory capacity/ CBX Pair	DKC-0		DKC-1	
	CTL01		CTL12	
	CMG0	CMG1	CMG0	CMG1
256 GB	32 GB × 4	Uninstalled	32 GB × 4	Uninstalled
512 GB		32 GB × 4		32 GB × 4
512 GB	64 GB × 4	Uninstalled	64 GB × 4	Uninstalled
1024 GB		64 GB × 4		64 GB × 4

3. Cache Memory capacity and Cache Flash Memory installation patterns
   You need to add a Cache Flash Memory at the same time depending on the Cache Memory capacity to be added.

Table 1-4 Cache Memory Capacity and Cache Flash Memory Installation Patterns (For VSP 5500 and VSP 5500H)

DIMM capacity	Memory capacity/ CBX Pair	DKC-x (x: 0, 2, 4)		DKC-y (y=x+1)	
		CTLx1	CTLx2	CTLy1	CTLy2
32 GB DIMM	512 GB	BM35/BM3E × 1 (*1)	BM35/BM3E × 1 (*1)	BM35/BM3E × 1 (*1)	BM35/BM3E × 1 (*1)
	768 GB	BM35/BM3E × 1 (*1)	BM35/BM3E × 2 (*1)	BM35/BM3E × 1 (*1)	BM35/BM3E × 2 (*1)
		BM35/BM3E × 2 (*1)	BM35/BM3E × 1 (*1)	BM35/BM3E × 2 (*1)	BM35/BM3E × 1 (*1)
	1024 GB	BM35/BM3E × 2 (*1)	BM35/BM3E × 2 (*1)	BM35/BM3E × 2 (*1)	BM35/BM3E × 2 (*1)
64 GB DIMM	1024 GB	BM45/BM4E × 1 (*2)	BM45/BM4E × 1 (*2)	BM45/BM4E × 1 (*2)	BM45/BM4E × 1 (*2)
	1536 GB	BM45/BM4E × 1 (*2)	BM45/BM4E × 2 (*2)	BM45/BM4E × 1 (*2)	BM45/BM4E × 2 (*2)
		BM45/BM4E × 2 (*2)	BM45/BM4E × 1 (*2)	BM45/BM4E × 2 (*2)	BM45/BM4E × 1 (*2)
	2048 GB	BM45/BM4E × 2 (*2)	BM45/BM4E × 2 (*2)	BM45/BM4E × 2 (*2)	BM45/BM4E × 2 (*2)

*1: BM35 and BM3E cannot be mixed in the same storage system.
*2: BM45 and BM4E cannot be mixed in the same storage system.

Table 1-5 Cache Memory Capacity and Cache Flash Memory Installation Patterns (For VSP 5100 and VSP 5100H)

DIMM capacity	Memory capacity/ CBX Pair	DKC-0	DKC-1
		CTL01	CTL12
32 GB DIMM	256 GB	BM35/BM3E × 1(*1)	BM35/BM3E × 1(*1)
	512 GB	BM35/BM3E × 2(*1)	BM35/BM3E × 2(*1)
64 GB DIMM	512 GB	BM45/BM4E × 1(*2)	BM45/BM4E × 1(*2)
	1024 GB	BM45/BM4E × 2(*2)	BM45/BM4E × 2(*2)

*1: BM35 and BM3E cannot be mixed in the same storage system.
*2: BM45 and BM4E cannot be mixed in the same storage system.

4. Order of Controller Board in which Cache Memory configuration is changed according to the configuration change

Table 1-6 Order of Controller Board in which Cache Memory configuration is changed according to the configuration change (For VSP 5500 and VSP 5500H)

Configuration before change		Configuration after change		Order of Controller Board in which Cache Memory configuration is changed (*1)		
CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CBX Pair 0	CBX Pair 1	CBX Pair 2
256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL02 ② CTL12	① CTL22 ② CTL32	① CTL42 ② CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11	① CTL21 ② CTL31	① CTL41 ② CTL51
		512 GB (32 GB × 8 + 32 GB × 8)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52

(To be continued)

*1: Change Cache Memory configurations in CTLs in order from ① to ④ .

(Continued from preceding page)

Configuration before change		Configuration after change		Order of Controller Board in which Cache Memory configuration is changed (*1)		
CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CBX Pair 0	CBX Pair 1	CBX Pair 2
256 GB (32 GB × 4 + 32 GB × 4)	512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL02 ② CTL12	① CTL22 ② CTL32	① CTL42 ② CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11	① CTL21 ② CTL31	① CTL41 ② CTL51
		512 GB (64 GB × 4 + 64 GB × 4)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52

(To be continued)

*1: Change Cache Memory configurations in CTLs in order from ① to ④ .

(Continued from preceding page)

Configuration before change		Configuration after change		Order of Controller Board in which Cache Memory configuration is changed (*1)		
CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CBX Pair 0	CBX Pair 1	CBX Pair 2
512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11	① CTL21 ② CTL31	① CTL41 ② CTL51
		256 GB (32 GB × 4 + 32 GB × 4)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL02 ② CTL12	① CTL22 ② CTL32	① CTL42 ② CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52

(To be continued)

*1: Change Cache Memory configurations in CTLs in order from ① to ④ .

(Continued from preceding page)

Configuration before change		Configuration after change		Order of Controller Board in which Cache Memory configuration is changed (*1)		
CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CBX Pair 0	CBX Pair 1	CBX Pair 2
512 GB (32 GB × 8 + 32 GB × 8)	512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		256 GB (32 GB × 4 + 32 GB × 4)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11	① CTL21 ② CTL31	① CTL41 ② CTL51
		512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL02 ② CTL12	① CTL22 ② CTL32	① CTL42 ② CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52

(To be continued)

*1: Change Cache Memory configurations in CTLs in order from ① to ④ .

(Continued from preceding page)

Configuration before change		Configuration after change		Order of Controller Board in which Cache Memory configuration is changed (*1)		
CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CBX Pair 0	CBX Pair 1	CBX Pair 2
512 GB (64 GB × 4 + 64 GB × 4)	512 GB (64 GB × 4 + 64 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		256 GB (32 GB × 4 + 32 GB × 4)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL02 ② CTL12	① CTL22 ② CTL32	① CTL42 ② CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11	① CTL21 ② CTL31	① CTL41 ② CTL51
		1024 GB (64 GB × 8 + 64 GB × 8)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52

(To be continued)

*1: Change Cache Memory configurations in CTLs in order from ① to ④ .

(Continued from preceding page)

Configuration before change		Configuration after change		Order of Controller Board in which Cache Memory configuration is changed (*1)		
CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CBX Pair 0	CBX Pair 1	CBX Pair 2
512 GB (64 GB × 4 + 64 GB × 4)	1024 GB (64 GB × 8 + 64 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		256 GB (32 GB × 4 + 32 GB × 4)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL02 ② CTL12	① CTL22 ② CTL32	① CTL42 ② CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11	① CTL21 ② CTL31	① CTL41 ② CTL51

(To be continued)

*1: Change Cache Memory configurations in CTLs in order from ① to ④ .

(Continued from preceding page)

Configuration before change		Configuration after change		Order of Controller Board in which Cache Memory configuration is changed (*1)		
CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CBX Pair 0	CBX Pair 1	CBX Pair 2
1024 GB (64 GB × 8 + 64 GB × 8)	512 GB (64 GB × 4 + 64 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		256 GB (32 GB × 4 + 32 GB × 4)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11	① CTL21 ② CTL31	① CTL41 ② CTL51
		512 GB (64 GB × 4 + 64 GB × 4)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		1024 GB (64 GB × 8 + 64 GB × 8)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL02 ② CTL12	① CTL22 ② CTL32	① CTL42 ② CTL52

(To be continued)

*1: Change Cache Memory configurations in CTLs in order from ① to ④ .

(Continued from preceding page)

Configuration before change		Configuration after change		Order of Controller Board in which Cache Memory configuration is changed (*1)		
CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CTL01 + CTL11/ CTL21 + CTL31/ CTL41 + CTL51	CTL02 + CTL12/ CTL22 + CTL32/ CTL42 + CTL52	CBX Pair 0	CBX Pair 1	CBX Pair 2
1024 GB (64 GB × 8 + 64 GB × 8)	1024 GB (64 GB × 8 + 64 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		256 GB (32 GB × 4 + 32 GB × 4)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (32 GB × 8 + 32 GB × 8)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL01 ② CTL11 ③ CTL02 ④ CTL12	① CTL21 ② CTL31 ③ CTL22 ④ CTL32	① CTL41 ② CTL51 ③ CTL42 ④ CTL52
		512 GB (64 GB × 4 + 64 GB × 4)	1024 GB (64 GB × 8 + 64 GB × 8)	① CTL01 ② CTL11	① CTL21 ② CTL31	① CTL41 ② CTL51
		1024 GB (64 GB × 8 + 64 GB × 8)	512 GB (64 GB × 4 + 64 GB × 4)	① CTL02 ② CTL12	① CTL22 ② CTL32	① CTL42 ② CTL52

*1: Change Cache Memory configurations in CTLs in order from ① to ④ .

Table 1-7 Order of Controller Board in which Cache Memory configuration is changed according to the configuration change (For VSP 5100 and VSP 5100H)

Configuration before change	Configuration after change	Order of Controller Board in which Cache Memory configuration is changed (*1)
CTL01 + CTL12	CTL01 + CTL12	CBX Pair 0
256 GB (32 GB × 4 + 32 GB × 4)	512 GB (32 GB × 8 + 32 GB × 8)	① CTL01 ② CTL12
	512 GB (64 GB × 4 + 64 GB × 4)	
	1024 GB (64 GB × 8 + 64 GB × 8)	
512 GB (32 GB × 8 + 32 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	
	512 GB (64 GB × 4 + 64 GB × 4)	
	1024 GB (64 GB × 8 + 64 GB × 8)	
512 GB (64 GB × 4 + 64 GB × 4)	256 GB (32 GB × 4 + 32 GB × 4)	
	512 GB (32 GB × 8 + 32 GB × 8)	
	1024 GB (64 GB × 8 + 64 GB × 8)	
1024 GB (64 GB × 8 + 64 GB × 8)	256 GB (32 GB × 4 + 32 GB × 4)	
	512 GB (32 GB × 8 + 32 GB × 8)	
	512 GB (64 GB × 4 + 64 GB × 4)	

*1: Change Cache Memory configurations in CTLs in order from ① to ② .

5. Shared Memory (SM) Capacity

The number of pairs, the number of migration plans, and the capacity of pools and virtual volumes, which can be created by the program products, depend on the Shared Memory capacity. To add the Shared Memory capacity, add Shared Memory Function by Maintenance Utility (see Figure 1-1). The Shared Memory capacity allocated by Shared Memory Function and the cache memory capacity required for adding Shard Memory Function vary depending on storage system models.

Table 1-8 Influences on Program Products depending on Shared Memory Capacity

Program product	Items affected by Shared Memory capacity
ShadowImage TrueCopy Universal Replicator global-active device	The number of pairs that can be created. For details, refer to User Guide of the program product.
Volume Migration Volume Migration V2	The number of migration plans that can be executed concurrently. For details, refer to User Guide of the program product.
Dynamic Provisioning Dynamic Tiering active flash Thin Image dedupe and compression	Pool capacity and virtual volume capacity that can be created. For details, see Table 1-9.

Table 1-9 Usable Capacity of Pools/Virtual Volumes

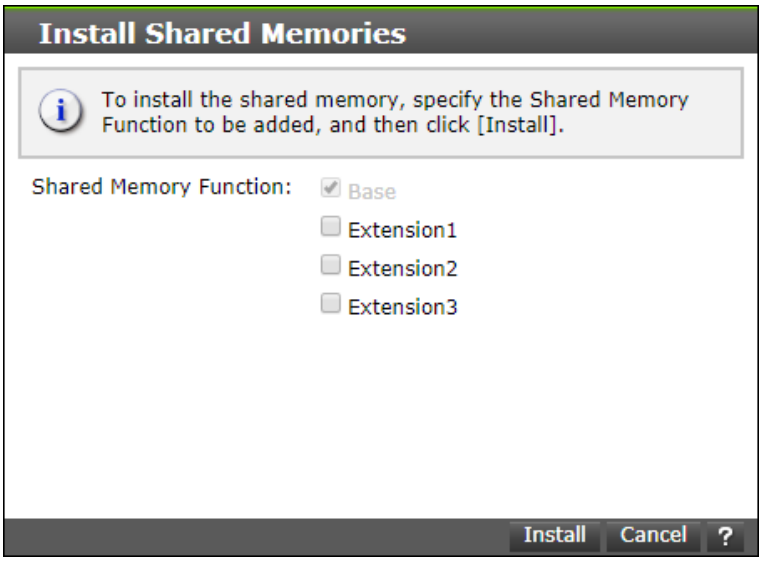
Shared Memory Function		(Unit: PiB)
	OPEN system	Mainframe
Base	~ 4.4	~ 3.9
Extension1	~ 8.05	~ 7.3
Extension2	~ 12.5	~ 11.3
Extension3	~ 16.6	~ 15.0

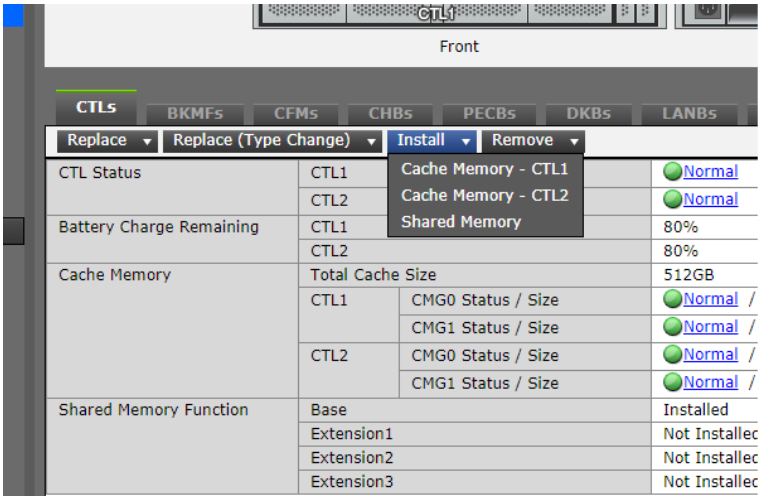
NOTE: When decreasing Shared Memory Function, delete all DP, DT, active flash, TI, and dedupe and compression pools.

Table 1-10 Correspondence Table of Shared Memory Function and Shared Memory Capacity

Shared Memory Function		(Unit: GiB)
	VSP 5100 VSP 5100H	VSP 5500 VSP 5500H
Base	56	112
Extension1	72	144
Extension2	88	176
Extension3	104	208

Figure 1-1 Maintenance Utility Setting Window





6. Cache capacity
The cache capacity is determined by the RAID level, the drives installed in the Storage System, whether Dynamic Provisioning (DP)/Dynamic Tiering (DT)/active flash/XRC/dedupe and compression/Universal Volume Manager (UVM) is applied/not applied so on.

The recommended cache capacity is determined by the Drives installed in the Storage System, whether DP/DT/active flash/XRC/UVM is applied/not applied etc.

(1) In the case of CLPR to which DP/DT/active flash/XRC is not applied
Install the recommended data cache capacity (or more) shown in the table below.

Table 1-11 Recommended Data Cache Capacity in Case DP/DT/active flash/XRC/DCR Is Not Applied

Total logical capacity of External volumes + Internal volumes per CLPR	Recommended data cache capacity per CLPR (*1)
Less than 4 TB	12 GB
4 TB or more	16 GB
16 TB or more	24 GB
48 TB or more	32 GB
96 TB or more	40 GB
160 TB or more	48 GB
240 TB or more	56 GB
360 TB or more	64 GB
600 TB or more	72 GB

*1: When the recommended capacity exceeds the maximum data cache capacity of each model, install the maximum capacity.

(2) In the case of CLPR to which DP, DT or active flash is applied
Install the recommended data cache capacity (or more) shown in the table below for CLPR in which DP, DT or active flash exists.

Table 1-12 Recommended Data Cache Capacity in Case DP, DT or active flash Is Applied

Total logical capacity of External volumes + Internal volumes per CLPR	Recommended data cache capacity per CLPR (*1)
Less than 16 TB	20 GB or more
16 TB or more	24 GB or more
48 TB or more	32 GB or more
96 TB or more	40 GB or more
160 TB or more	48 GB or more
240 TB or more	56 GB or more
360 TB or more	64 GB or more
600 TB or more	72 GB or more

*1: When the recommended capacity exceeds the maximum data cache capacity of each model, install the maximum capacity.

(3) In the case of CLPR to which dedupe and compression is applied
CLPR to which dedupe and compression is applied uses cache for management information on dedupe and compression. Therefore, it is recommended that you install the data cache capacity that is equal to the sum of (a) and (b).

(a) Recommended data cache capacity shown in the tables in (1) and (2)
(b) Total amount of used capacity of virtual volumes to which dedupe and compression is applied × 0.0025

(4) In the case of CLPP exclusively used for UVM
If the configuration of the concerned CLPR meets the conditions described in Table 1-13, you can apply the recommended data cache capacity shown in Table 1-14.

Table 1-13 CLPR for UVM Only

Conditions of CLPR for UVM
• One CLPR consists of only external volumes • Performance is not important • The cache mode of the mapped volumes is “Disable”

Table 1-14 Recommended Cache Memory Capacity of CLPR for UVM Only

Total logical capacity of external volumes in CLPR for UVM only	Recommended cache capacity of CLPR for UVM only
Less than 128 TB	4 GB
128 TB or more	8 GB

(5) In the case of CLPR to which XRC is applied
CLPR to which XRC is applied uses cache for the management information called sidefile. Therefore it is recommended install larger capacity than the recommended data cache capacity calculated in (1) through (4) by taking “the level-1 threshold” of XRC into account. Use the following formula to calculate it.

Recommended data cache capacity ≥
(Recommended data cache capacity calculated in (1) through (4)) × 100 ÷ (100 − (the level-1 threshold))

7. Total Cache Memory (DIMM) Capacity

Total Cache Memory (DIMM) capacity of the storage system is determined by the sum of the shared memory (SM) capacity and the required data cache memory (CM) capacity. The reference tables of the capacity of Cache Memories (DIMMs) per CTL corresponding to the SM capacity and the data CM capacity are shown below.

We recommend that you allocate Cache Memories (DIMMs) to CTLs according to the tables below so that the data CM capacity in each CTL is almost even. For CTL0x and CTL1x (*1), the SM capacity must be secured in addition to the data CM capacity. Therefore, required capacity of Cache Memories (DIMMs) is greater for CTL0x and CTL1x than for CTL2x through CTL5x (*1).

*1: CTL0x, CTL1x : CTL01, CTL02, CTL11, CTL12
CTL2x through CTL5x : CTL21, CTL22, CTL31, CTL32, CTL41, CTL42, CTL51, CTL52

Table 1-15 Capacity of Cache Memories (DIMMs) per CTL Corresponding to SM Capacity and Data CM Capacity (for CTL0x and CTL1x)

CM32G	CM64GL	SM Capacity (GiB)	Data CM Capacity (GiB)
4	0	28	41.5
		36	33.5
		44	25.5
		52	17.5
0	4	28	169.5
		36	161.5
		44	153.5
		52	145.5
8	0	28	169.5
		36	161.5
		44	153.5
		52	145.5
0	8	28	425.5
		36	417.5
		44	409.5
		52	401.5

Table 1-16 Capacity of Cache Memories (DIMMs) per CTL Corresponding to Data CM Capacity (for CTL2x through CTL5x)

CM32G	CM64GL	Data CM Capacity (GiB)
4	0	69.5
0	4	197.5
8	0	197.5
0	8	453.5

1.2 Relational Drive position with Parity Group

Open the reference page in the Table 1-17.

Using the Reference Page

1. Input the Parity Group number in ① and ② .
2. Click [Calcurate Position Number] ③ .
3. Drive number is displayed in ④ .
4. Click [Position Display] ⑤ .
5. Drive Position indicate with color.

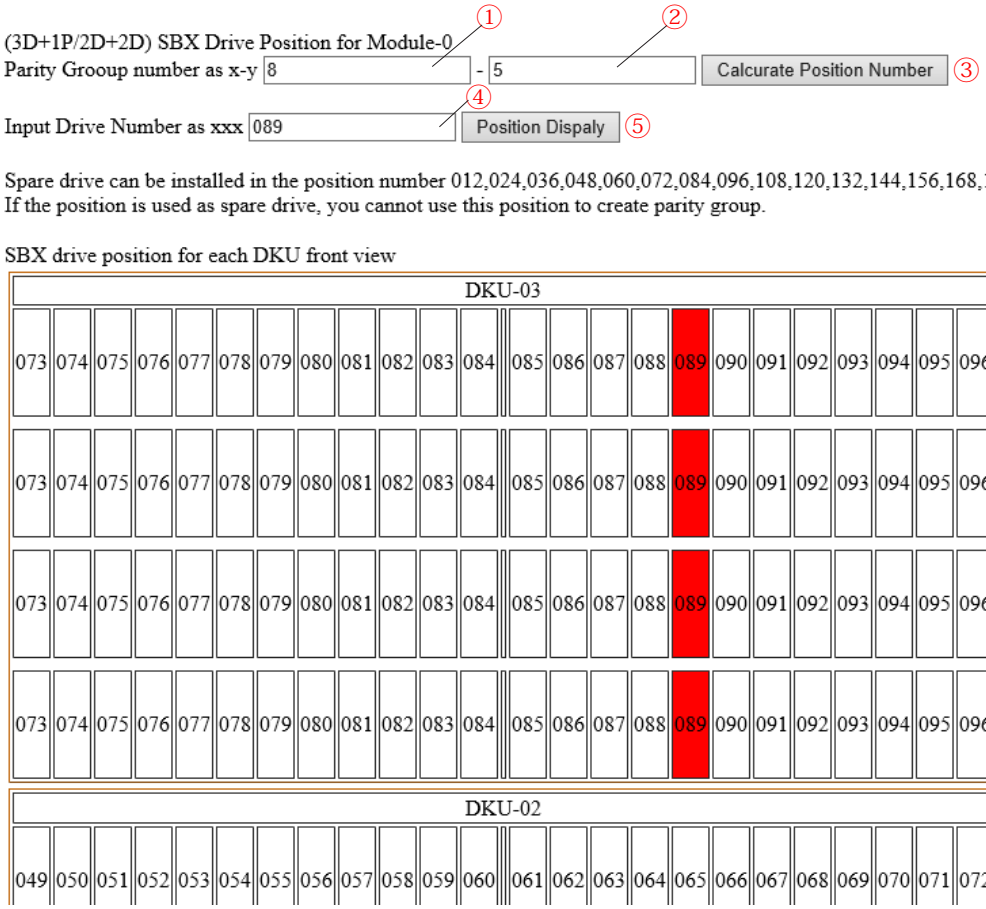


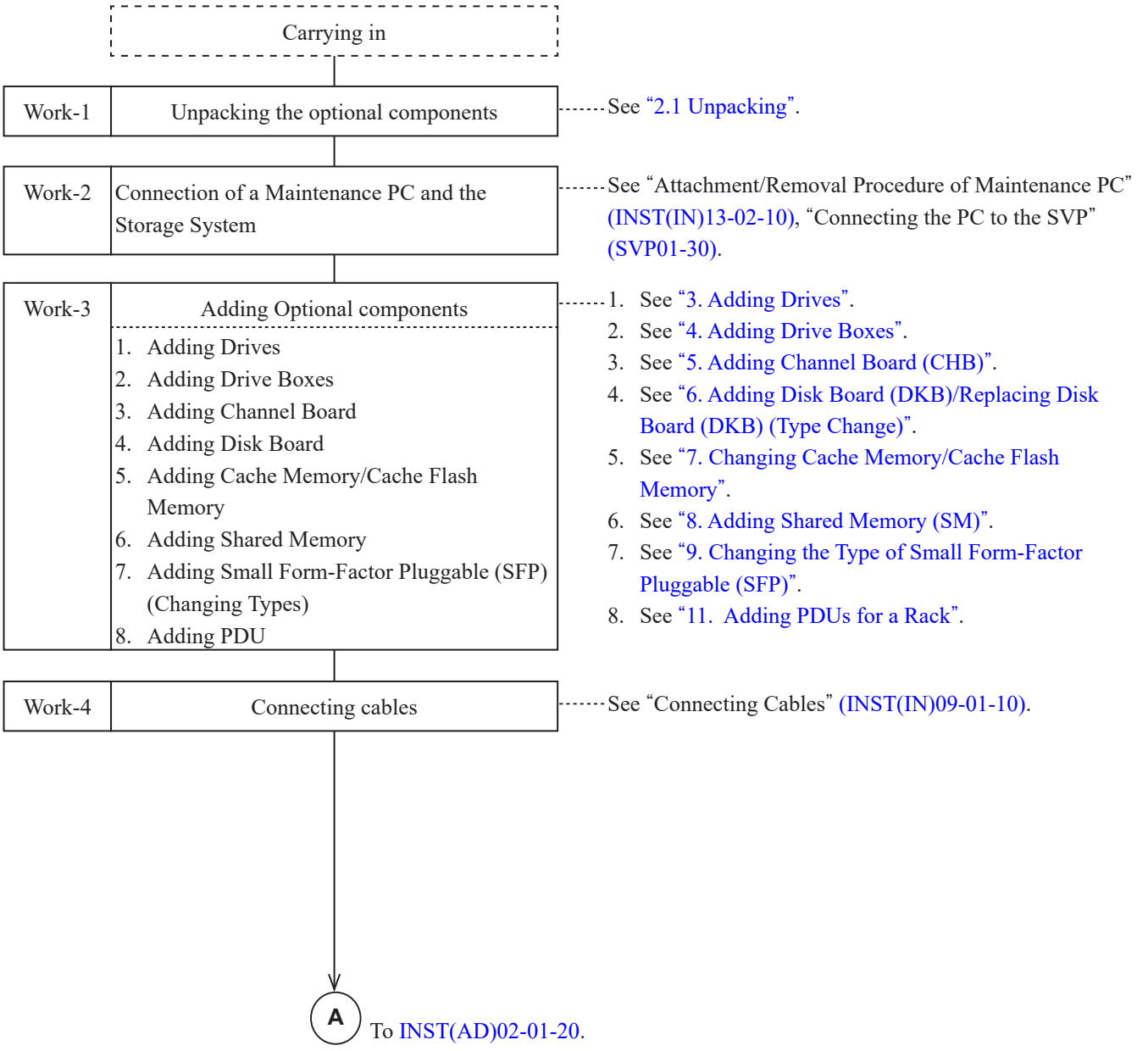
Table 1-17 Relational Drive position with Parity Group

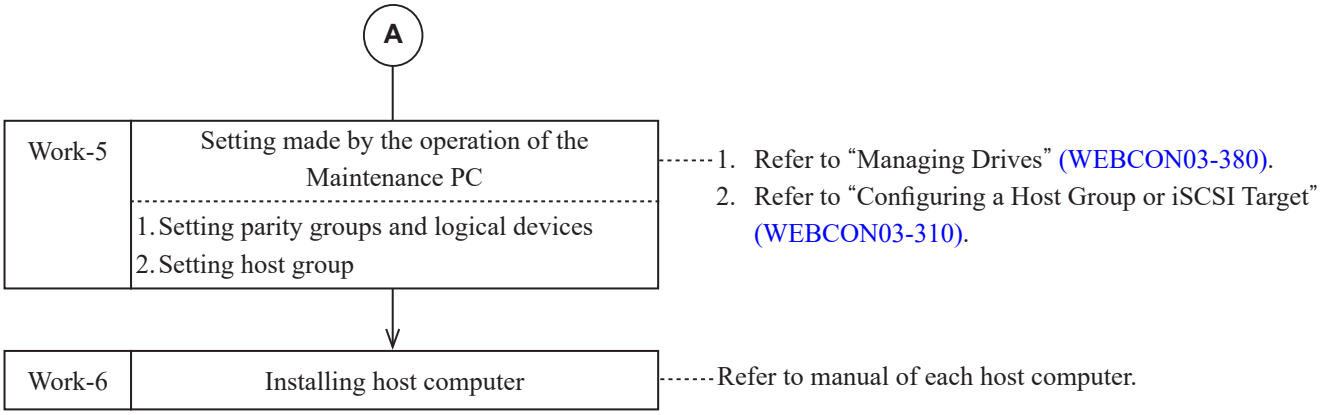
RAID Group	DKU Type	Parity Group	Reference Page
3D+1P/2D+2D	SBX	1-y ～ 16-y	SBX_3D1P_for_Module0.html
		17-y ～ 32-y	SBX_3D1P_for_Module1.html
		33-y ～ 48-y	SBX_3D1P_for_Module2.html
	UBX	3-y ～ 8-y	UBX_3D1P_2D2D_for_Module0_A.html
		9-y ～ 16-y	UBX_3D1P_2D2D_for_Module0_B.html
		19-y ～ 24-y	UBX_3D1P_2D2D_for_Module1_A.html
		25-y ～ 32-y	UBX_3D1P_2D2D_for_Module1_B.html
		35-y ～ 40-y	UBX_3D1P_2D2D_for_Module2_A.html
		41-y ～ 48-y	UBX_3D1P_2D2D_for_Module2_B.html
	FBX	1-y ～ 16-y	FBX_3D1P_2D2D_for_Module0.html
		17-y ～ 32-y	FBX_3D1P_2D2D_for_Module1.html
		33-y ～ 48-y	FBX_3D1P_2D2D_for_Module2.html
	NBX	1-y ～ 2-y	NBX_3D1P_2D2D_for_Module0.html
		17-y ～ 18-y	NBX_3D1P_2D2D_for_Module1.html
		33-y ～ 34-y	NBX_3D1P_2D2D_for_Module2.html
7D+1P/6D+2P	SBX	1-y ～ 15-y	SBX_7D1P_6D2P_for_Module0.html
		17-y ～ 31-y	SBX_7D1P_6D2P_for_Module1.html
		33-y ～ 47-y	SBX_7D1P_6D2P_for_Module2.html
	UBX	3-y ～ 7-y	UBX_7D1P_6D2P_for_Module0_A.html
		9-y ～ 15-y	UBX_7D1P_6D2P_for_Module0_B.html
		19-y ～ 23-y	UBX_7D1P_6D2P_for_Module1_A.html
		25-y ～ 31-y	UBX_7D1P_6D2P_for_Module1_B.html
		35-y ～ 39-y	UBX_7D1P_6D2P_for_Module2_A.html
		41-y ～ 47-y	UBX_7D1P_6D2P_for_Module2_B.html
	FBX	1-y ～ 15-y	FBX_7D1P_6D2P_for_Module0.html
		17-y ～ 31-y	FBX_7D1P_6D2P_for_Module1.html
		33-y ～ 47-y	FBX_7D1P_6D2P_for_Module2.html
	NBX	1-y	NBX_7D1P_6D2P_for_Module0.html
		17-y	NBX_7D1P_6D2P_for_Module1.html
		33-y	NBX_7D1P_6D2P_for_Module2.html
14D+2P	SBX	1-y ～ 15-y	SBX_14D2P_for_Module0.html
		17-y ～ 31-y	SBX_14D2P_for_Module1.html
		33-y ～ 47-y	SBX_14D2P_for_Module2.html
	UBX	3-y ～ 7-y	UBX_14D2P_for_Module0_A.html
		9-y ～ 15-y	UBX_14D2P_for_Module0_B.html
		19-y ～ 23-y	UBX_14D2P_for_Module1_A.html
		25-y ～ 31-y	UBX_14D2P_for_Module1_B.html
		35-y ～ 39-y	UBX_14D2P_for_Module2_A.html
		41-y ～ 47-y	UBX_14D2P_for_Module2_B.html
	FBX	1-y ～ 15-y	FBX_14D2P_for_Module0.html
		17-y ～ 31-y	FBX_14D2P_for_Module1.html
		33-y ～ 47-y	FBX_14D2P_for_Module2.html
	NBX	1-y	NBX_14D2P_for_Module0.html
		17-y	NBX_14D2P_for_Module1.html
		33-y	NBX_14D2P_for_Module2.html

2. Procedures for Adding Optional Component

1. Procedure for adding optional components online

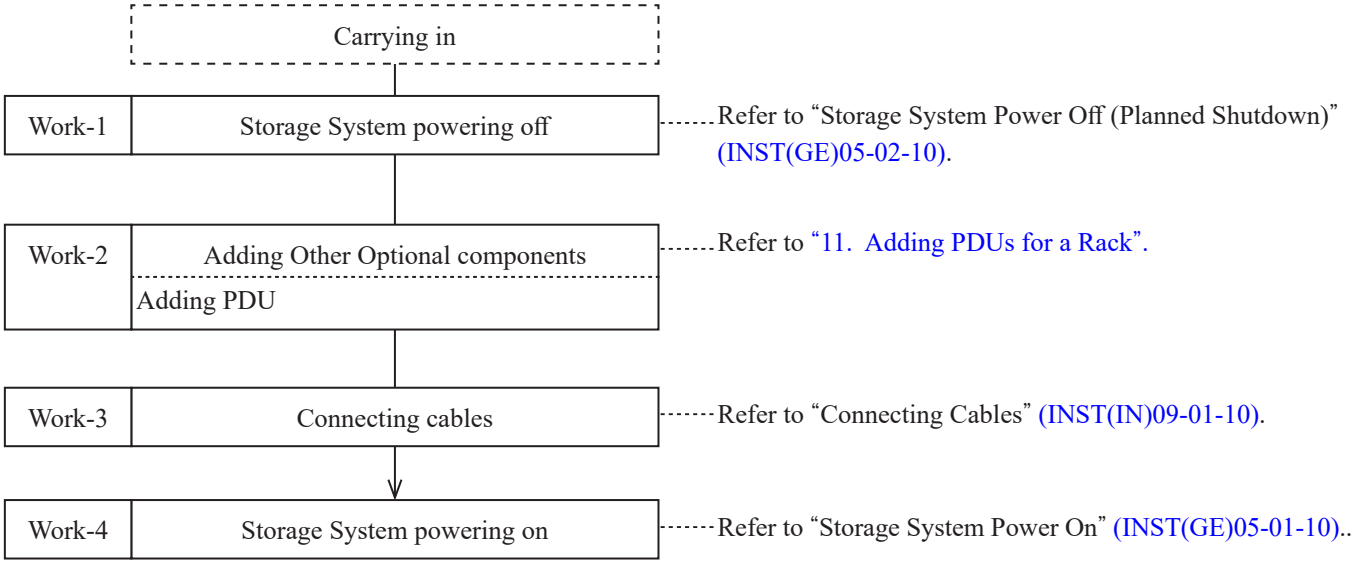
NOTE : • For safety use, always close the Front Bezel after the operation.
• Service personnel must check if a customer has backed up user data.
If the customer does not perform the backup, start the work after getting customer's permission.





2. Procedure for adding the optional components offline

NOTE : For the powering off procedure, refer to “Storage System Power Off (Planned Shutdown)” (INST(GE)05-02-10).



3. Tool for optional addition work

Table 2-1 Tool for Optional Work

Division	Tool names	Specification	Rackmount Model (RKU rack frame)
Tool	Special 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 5e or more	○
	Maintenance PC (*1)	−	○

*1 : More than or equal to 500 M 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.

2.1 Unpacking

NOTE :
- Unpack it indoors.
  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 Storage System, 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 Storage System.

3. Adding Drives

3.1 Before Adding Drives

Decide drive position to be added referring to "1.2 Relational Drive position with Parity Group".

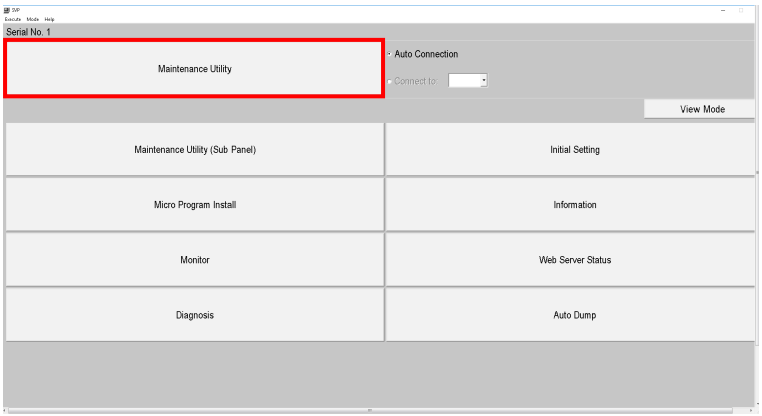
NOTE : • See "Relationship between Option and Micro-program Version" (OPTVER01-10) to check that drives to be added are supported by the Storage System model and Micro-program version.
• Drives cannot be installed in the Controller Chassis.

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the SSVP, and then log in to the SVP.
   • "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10)
   • "Connection to the SVP" (SVP01-30)

2. Starting the SVP window
   From the menu of Web Console, click [Maintenance Components] - [Maintenance Other Components].

3. Changing the operation mode
   Change the mode to [View Mode].

4. Starting Maintenance Utility
   In the SVP window, click [Maintenance Utility] (See "Starting Maintenance Utility" (MU01-10).).



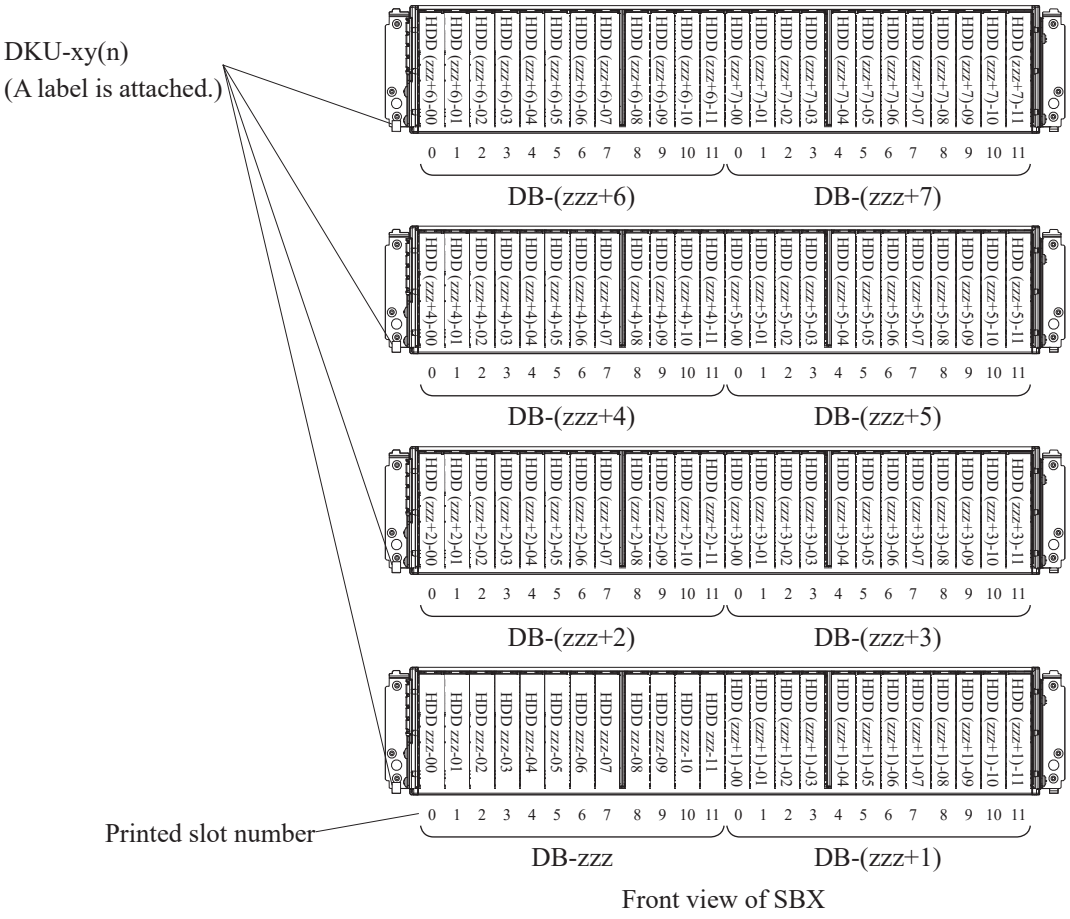
5. Remove the Front Bezel. (Refer to “How to Attach/Remove the Front Bezel” (INST(GE)04-01-10).)

6. Checking the Drives

Table 3-1 List of Mountable Drive Model Names

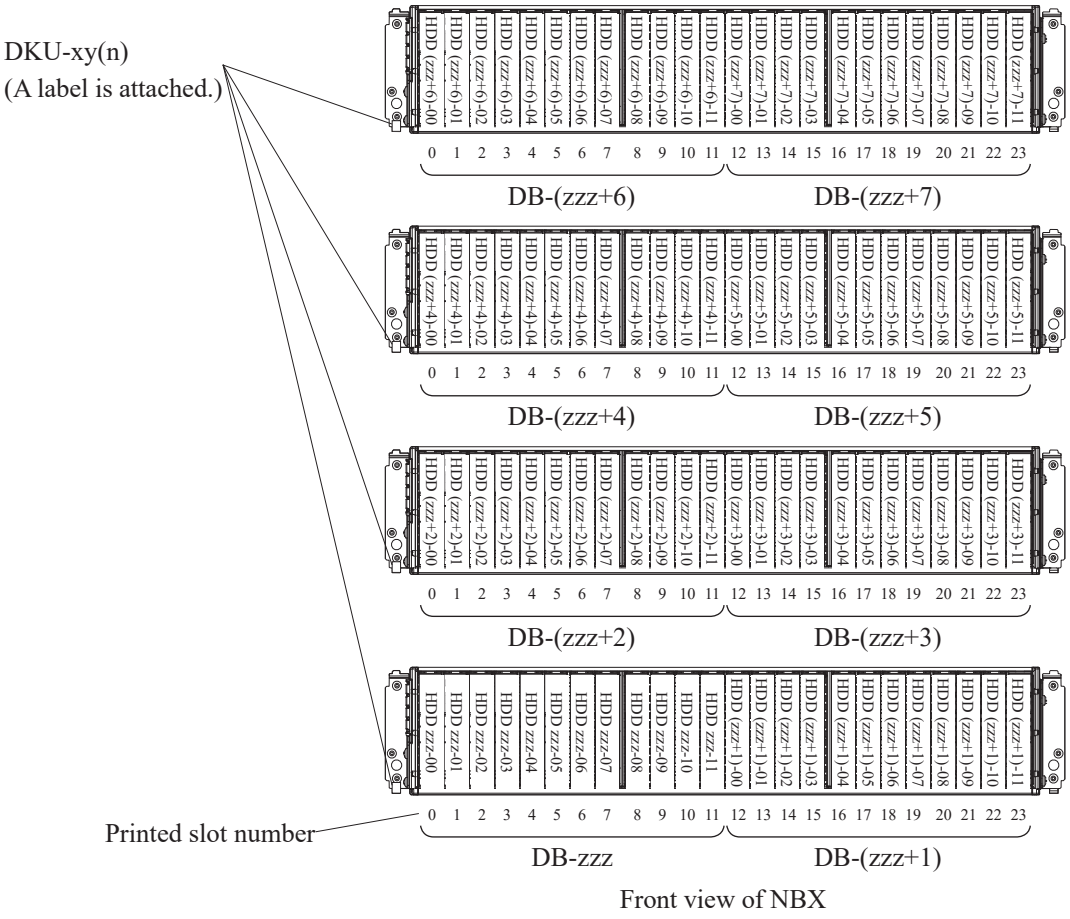
No.	Locations	Model Number	Model Name	Remarks
1	SBX	DKC-F810I-2R4JGM DKC-F810I-960MGM DKC-F810I-1T9MGM DKC-F810I-3R8MGM DKC-F810I-7R6MGM DKC-F810I-15RMGM DKC-F810I-30RMGM	Disk Drive	–
2	UBX	DKC-F810I-10RH9M DKC-F810I-14RH9M	Disk Drive	–
3	FBX	DKC-F810I-7R0FP DKC-F810I-14RFP	Flash Module Drive	–
4	NBX	DKC-F910I-1R9RVM DKC-F910I-3R8RVM DKC-F910I-7R6RVM DKC-F910I-15RRVM	Disk Drive	–

Figure 3-1 Parts Location of SBX (Front View)



Front view of SBX

Figure 3-2 Parts Location of NBX (Front View)



*1 : The name in parentheses in the SVP messages shows HDDxxx-yy here.

*2: DKU-xy(n)
- n: Drive Box number in DKU (0, 1, 2, and 3)
- y: DKU No. (0, 1, 2 ..., 7)
- x: CBX Pair No. (0, 1, 2)

*3: DB-zzz
- DB No. (000, 001, 002, ..., 191)

*4: The slot numbers on DBS2 (SBX) displayed in the DKU-mm: Drive Box window of Maintenance Utility are the same as the slot numbers shown in Figure 3-1.

*5: The slot numbers on DBN (NBX) displayed in the DKU-mm: Drive Box window of Maintenance Utility are the same as the slot numbers shown in Figure 3-2.

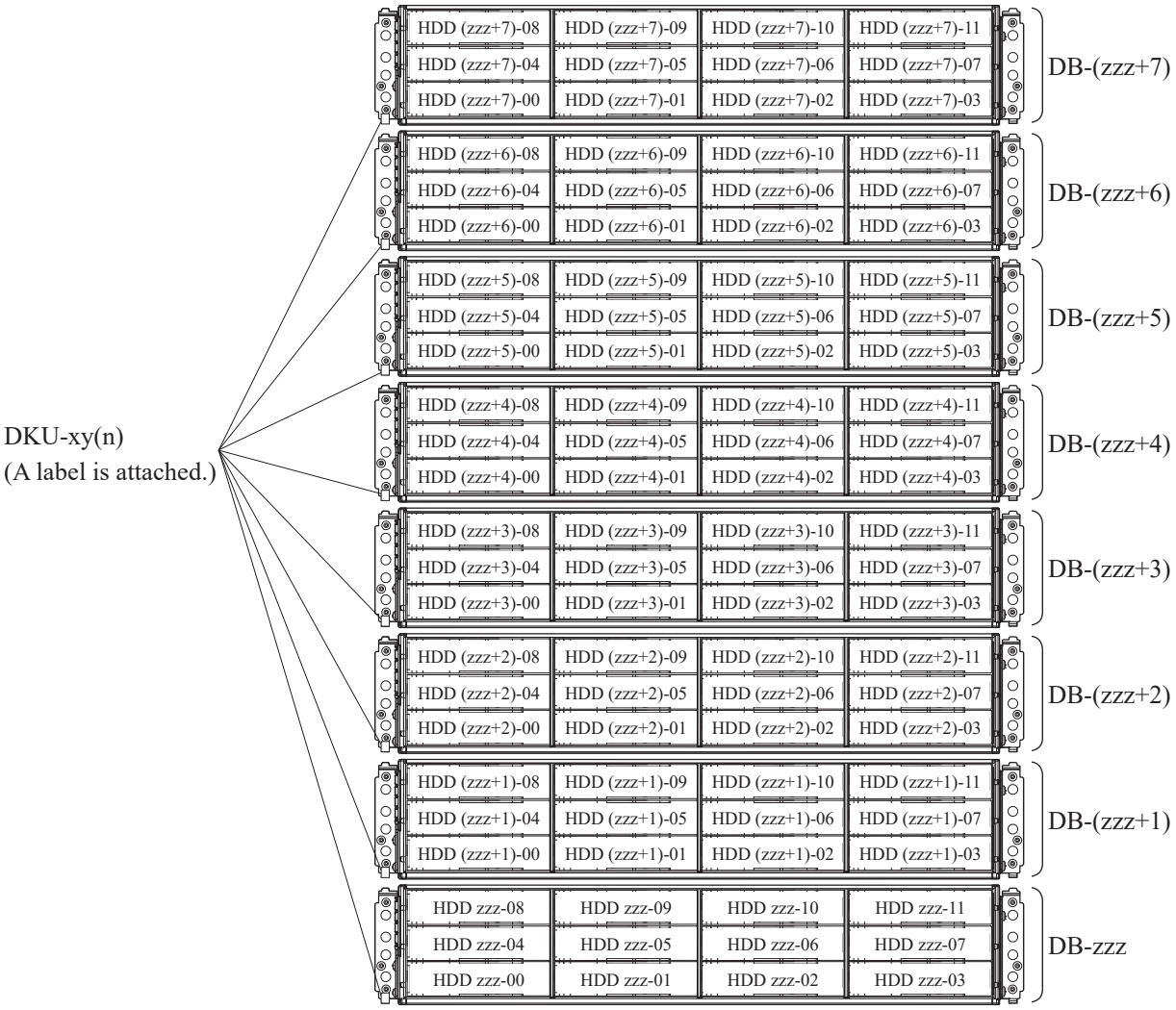
NOTE: Turn on the LOCATE LED by using Maintenance Utility during maintenance work. If you cannot turn on the LOCATE LED, check the number (*2) shown on the label attached to the lower left part of the front side of SBX/NBX so that you do not confuse the maintenance target.

For example, numbers shown on the labels (DKU-xy(n)) and DB numbers (DB-zzz) of DKU-00 and DKU-01 are as follows:
For SBX/NBX, a smaller number on the label (DKU-xy(n)) corresponds to smaller DB numbers (two in total; (DB-zzz+(2n)) and (DB-zzz+(2n+1))).

DKU-00(0) : DB-000, DB-001
DKU-00(1) : DB-002, DB-003
DKU-00(2) : DB-004, DB-005
DKU-00(3) : DB-006, DB-007
DKU-01(0) : DB-008, DB-009
DKU-01(1) : DB-010, DB-011
DKU-01(2) : DB-012, DB-013
DKU-01(3) : DB-014, DB-015
...

When the location of the target drive for maintenance is HDD013-02, the DB number is DB-013. The DKU in which the target drive is installed is DKU-01(2), and the slot number of the target drive is “2” (right side) for SBX, and “14” for NBX.

Figure 3-3 Parts Location of UBX



Front view of UBX

*1 : The name in parentheses in the SVP messages shows HDDxxx-yy here.

*2: DKU-xy(n)
- n: Drive Box number in DKU (0, 1, 2 ..., 7)
- y: DKU No. (1, 2 ..., 7)
- x: CBX Pair No. (0, 1, 2)

*3: DB-zzz
- DB No. (008, 009, 010, ..., 191)

*4: The slot number on DBL (UBX) displayed in the DKU-mm: Drive Box window of Maintenance Utility is the same as “yy” in “HDDxxx-yy”.

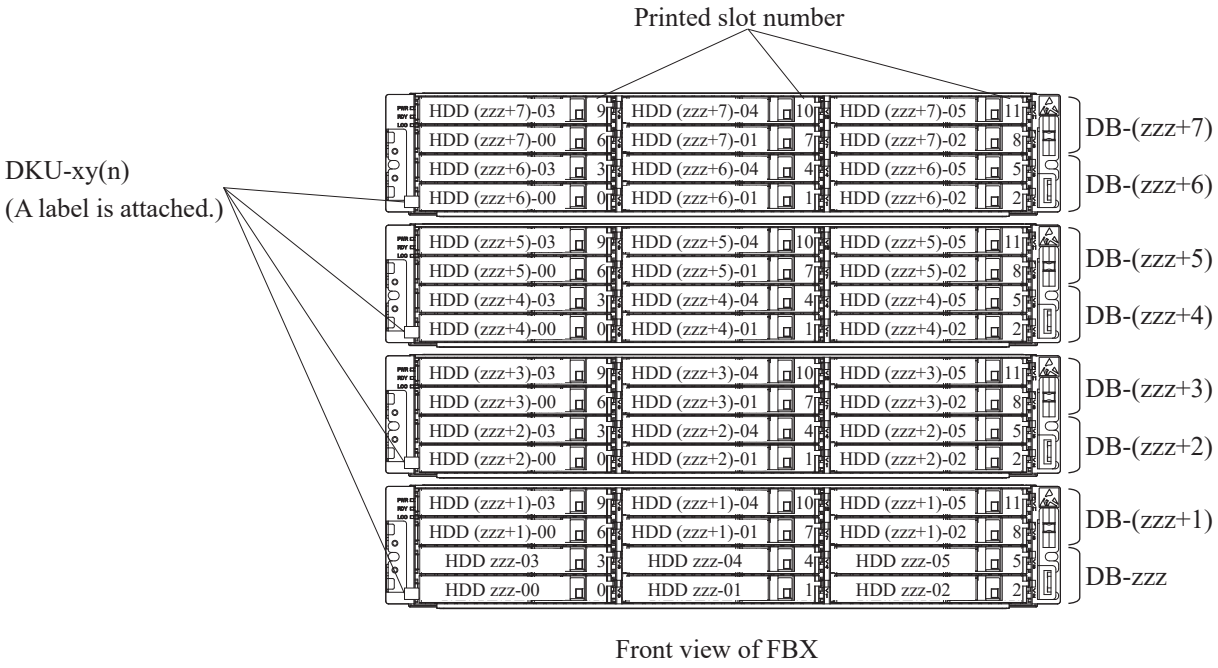
NOTE: Turn on the LOCATE LED by using Maintenance Utility during maintenance work. If you cannot turn on the LOCATE LED, check the number (*2) shown on the label attached to the lower left part of the front side of UBX so that you do not confuse the maintenance target.

For example, numbers shown on the labels (DKU-xy(n)) and DB numbers (DB-zzz) of DKU-01 are as follows:
For UBX, a smaller number on the label (DKU-xy(n)) corresponds to a smaller DB number (DB-zzz+n).

DKU-01(0): DB-008
DKU-01(1): DB-009
DKU-01(2): DB-010
DKU-01(3): DB-011
DKU-01(4): DB-012
DKU-01(5): DB-013
DKU-01(6): DB-014
DKU-01(7): DB-015
...

When the location of the target drive for maintenance is HDD013-02, the DB number is DB-013. The DKU in which the target drive is installed is DKU-01(5), and the slot number of the target drive is “2”.

Figure 3-4 Parts Location of FBX



Front view of FBX

*1 : The name in parentheses in the SVP messages shows HDDxxx-yy here.

*2: DKU-xy(n)
- n: Drive Box number in DKU (0, 1, 2, and 3)
- y: DKU No. (0, 1, 2 ..., 7)
- x: CBX Pair No. (0, 1, 2)

*3: DB-zzz
- DB No. (000, 001, 002, ..., 191)

*4: The slot numbers on DBF (FBX) displayed in the DKU-mm: Drive Box window of Maintenance Utility are the same as the slot numbers shown in Figure 3-4.

NOTE: Turn on the LOCATE LED by using Maintenance Utility during maintenance work. If you cannot turn on the LOCATE LED, check the number (*2) shown on the label attached to the lower left part of the front side of FBX so that you do not confuse the maintenance target.

For example, numbers shown on the labels (DKU-xy(n)) and DB numbers (DB-zzz) of DKU-00 and DKU-01 are as follows:
For FBX, a smaller number on the label (DKU-xy(n)) corresponds to smaller DB numbers (two in total; (DB-zzz+(2n)) and (DB-zzz+(2n+1))).

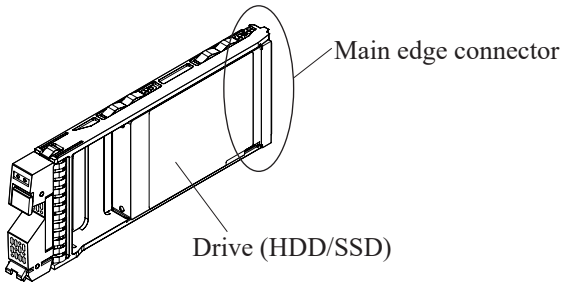
DKU-00(0) : DB-000, DB-001
DKU-00(1) : DB-002, DB-003
DKU-00(2) : DB-004, DB-005
DKU-00(3) : DB-006, DB-007
DKU-01(0) : DB-008, DB-009
DKU-01(1) : DB-010, DB-011
DKU-01(2) : DB-012, DB-013
DKU-01(3) : DB-014, DB-015
...

When the location of the target drive for maintenance is HDD013-02, the DB number is DB-013. The DKU in which the target drive is installed is DKU-01(2), and the slot number of the target drive is “8”.

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 Storage System before starting and do not take it off until you finish. See “Note when Installing and Removing Parts” (INST(GE)01-01-10).

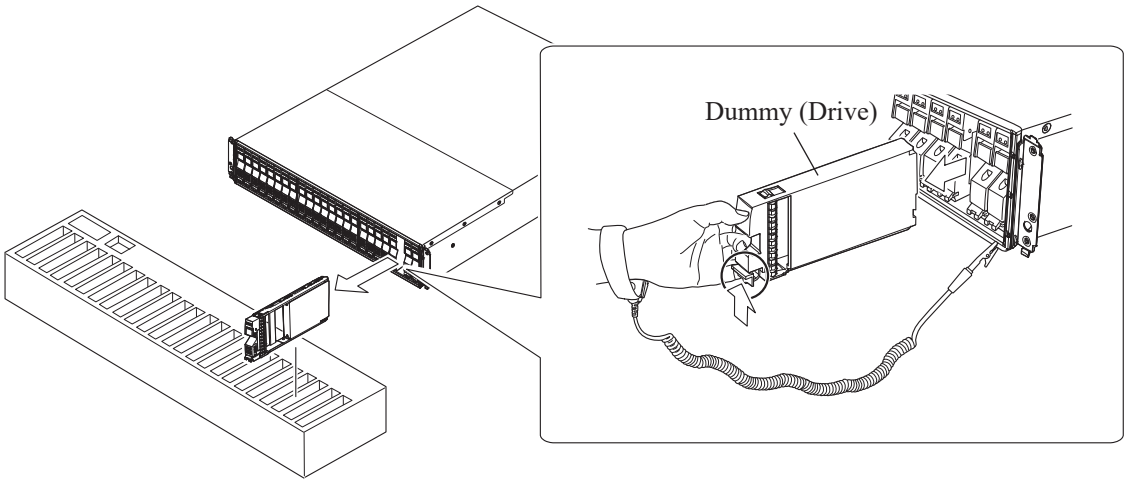
3.2 Adding Work of Drives

NOTICE: Check that the main edge connector of the Drive (HDD/SSD) has no deformation, damage or sticking of dust before installing the Drive.



1. Adding Drives for SBX/NBX
   (1) Removing dummy (Drive).
   Remove the dummy (Drives) from the slots to which Drives are added.

Figure 3-5 Removing Dummy (Drive) (SBX/NBX)



(2) Installing Drives.

NOTICE: Since the Drive is a precision component, handle it very carefully not to apply a vibration or shock to it.

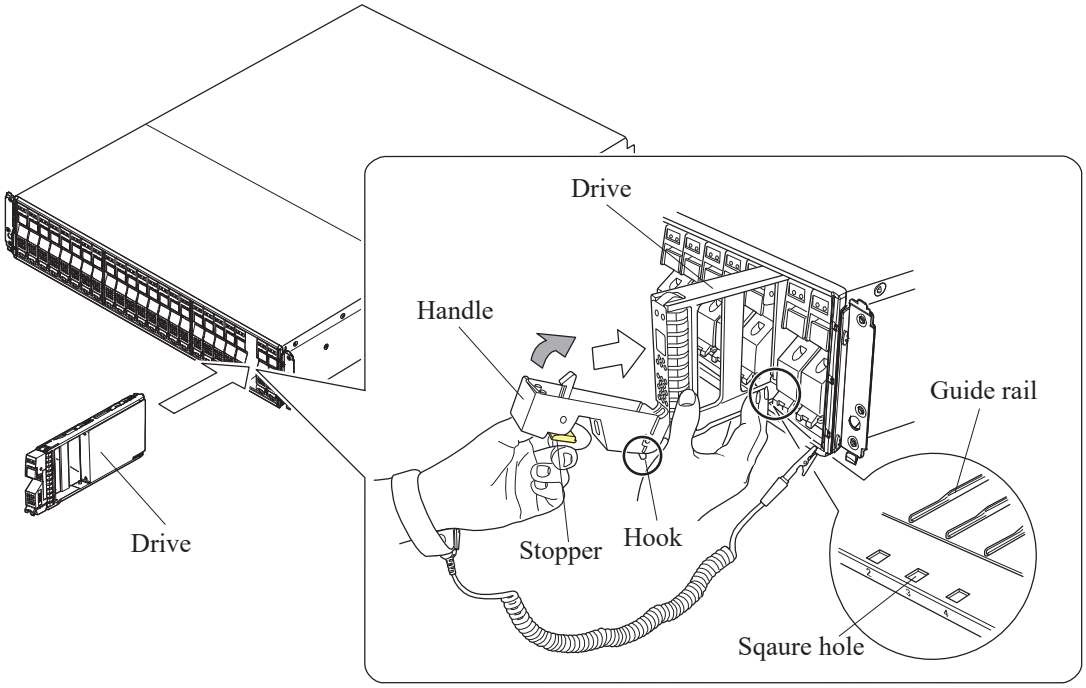
(a) Fit the Drive in the guide rail and slide it in the direction shown by the arrow not to give a shock.
(b) Push the Drive in until it reaches the position where a hook of the handle can be entered into the square hole at the lower part of a frame on the front side of the Drive Box.
(c) Close the opened stopper,and then press the stopper to lock.

NOTE : If the handle is closed 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 Storage System.

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

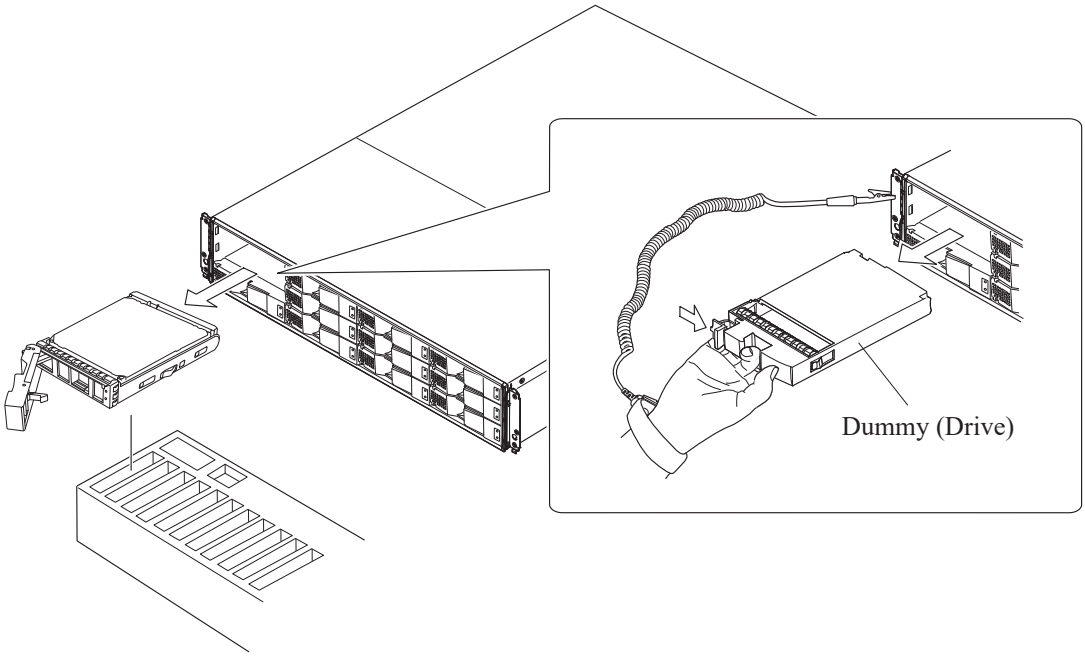
NOTE : At this time. ACT LED (green) of the drive may slightly light. However it is acceptable.

Figure 3-6 Installing the Drive (SBX/NBX)



2. Adding Drives for UBX
   (1) Removing dummy (Drive).
   Remove the dummies (Drives) from the slots to which the Drives are added.

Figure 3-7 Removing Dummy (Drive) (UBX)



(2) Installing Drives.

NOTICE: Since the Drive is a precision component, handle it very carefully not to apply a vibration or shock to it.

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

(a) Open the handle fully, fit the Drive in the guide rail and slide it in the direction shown by the arrow not to give a shock.

(b) Push it in until it reaches the position where a hook of the handle can be entered into the square hole on the frame.

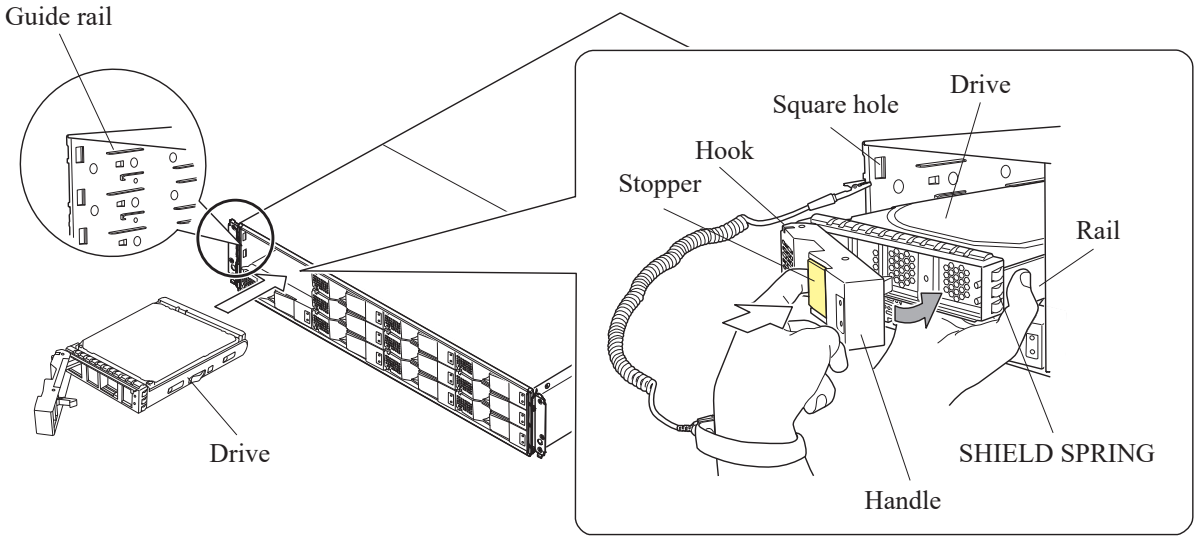
(c) Pull the stopper lightly and close the handle, and then have the lock on by pressing the stopper.

NOTE : If the handle is closed 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 Storage System.

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

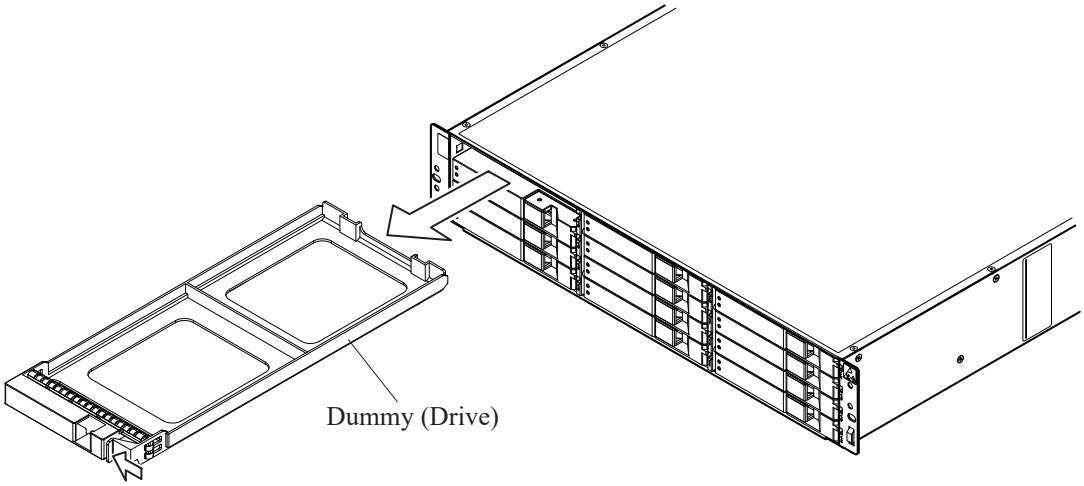
NOTE : At this time. ACT LED (green) of the drive may slightly light. However it is acceptable.

Figure 3-8 Installing the Drive (UBX)



3. Adding Drives for FBX
   (1) Remove dummy (Drive).
   Remove the dummies (Drives) from the slots to which Drives are added.

Figure 3-9 Remove Dummy (Drive) (FBX)



(2) Installing Drives.

NOTICE: Be sure to read "Notes when Handling the Flash Module Drive (FMD)" (INST(GE)01-01-60) before handling the FMD and perform the procedure following the notes.

NOTICE: Since the Drive is a precision component, handle it very carefully not to apply a vibration or shock to it.

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

(a) Open the handle fully, fit the Drive in the guide rail and slide it in the direction shown by the arrow not to give a shock.

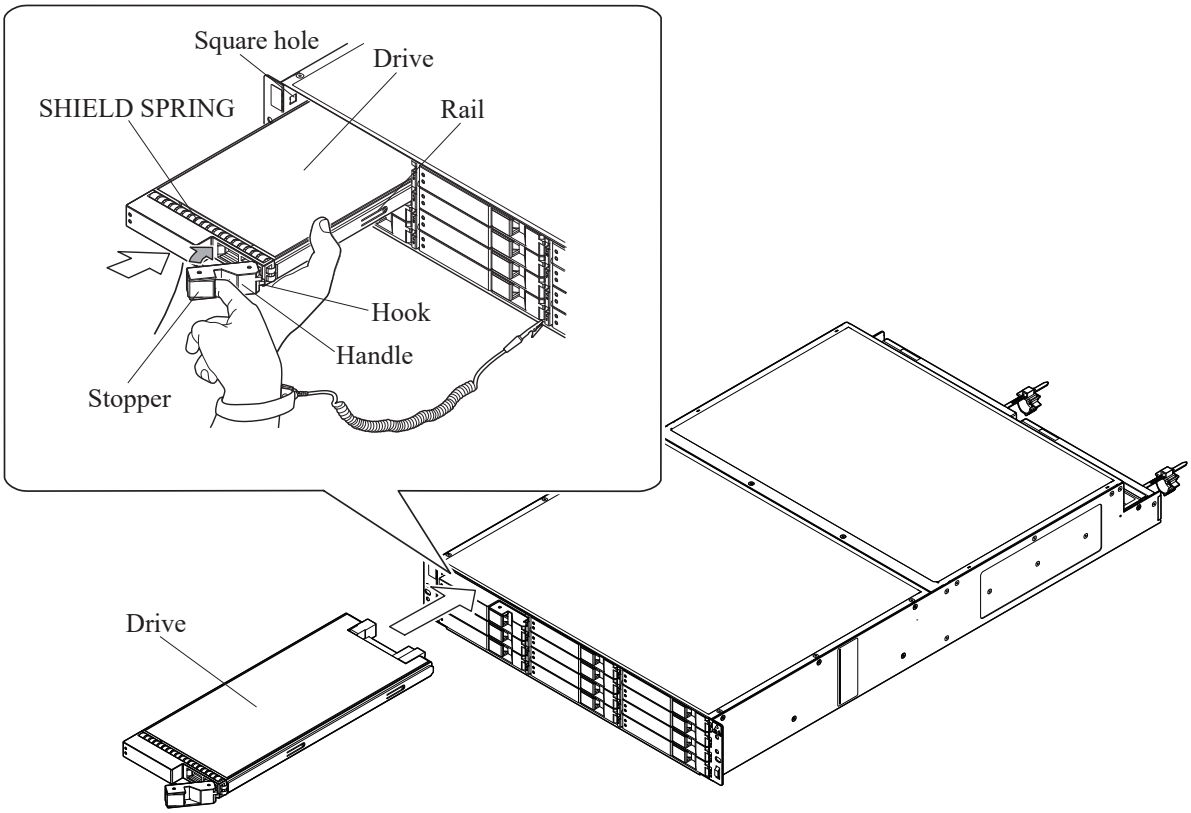
(b) Push the Drive in until it reaches the position where a hook of the handle can be entered into the square hole at the lower part of a frame on the front side of the Drive Box.

(c) Close the opened stopper, and then press the stopper to lock.

NOTE : If the handle is closed 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 Storage System.

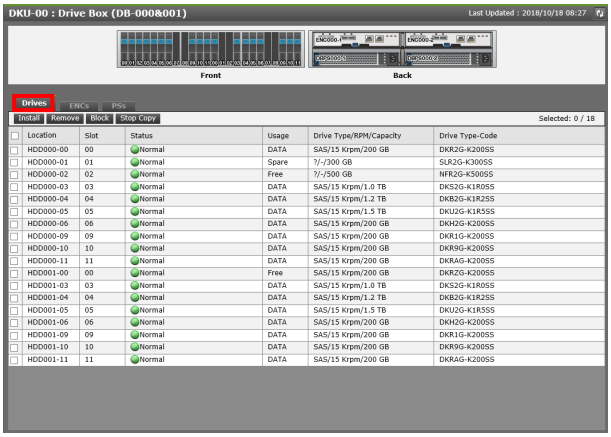
(d) Pull the handle lightly to make sure that the Drive cannot be pulled out.

Figure 3-10 Installing the Drive (FBX)



3.3 Recognizing Drives by Maintenance Utility

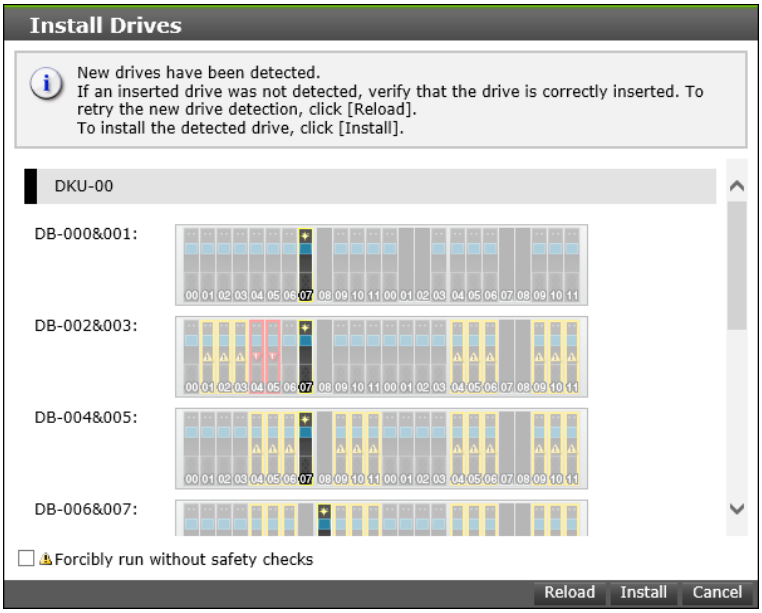
1. <Select Drive Addition Chassis>
   Select the Controller Chassis or the Drive Box that added the Drives from Display Item Selection Panel. Click the [Drives] tab and then [Install].



2. <Drive Detection Window>

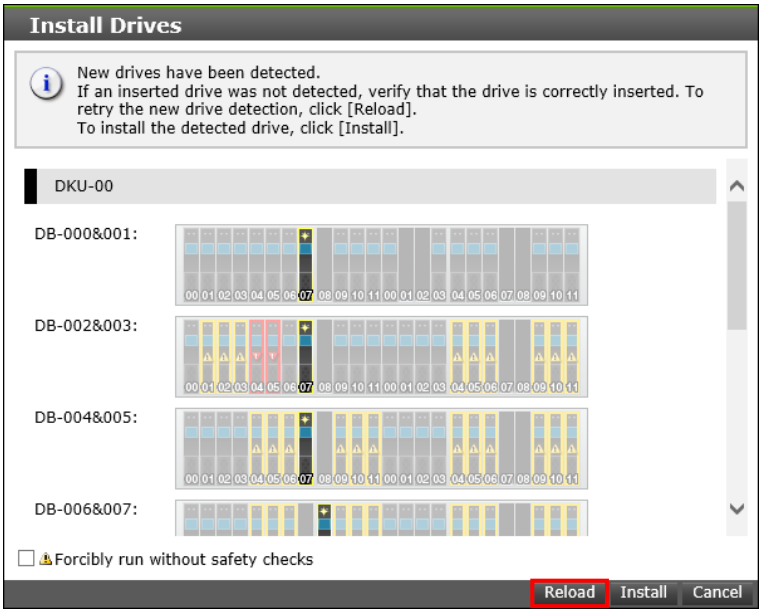
> **⚠ CAUTION**
>
> About "Forcibly run without safety checks":
> If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the message, the manual or the contact described in the manual.

When the added Drives are detected, the following window is displayed.



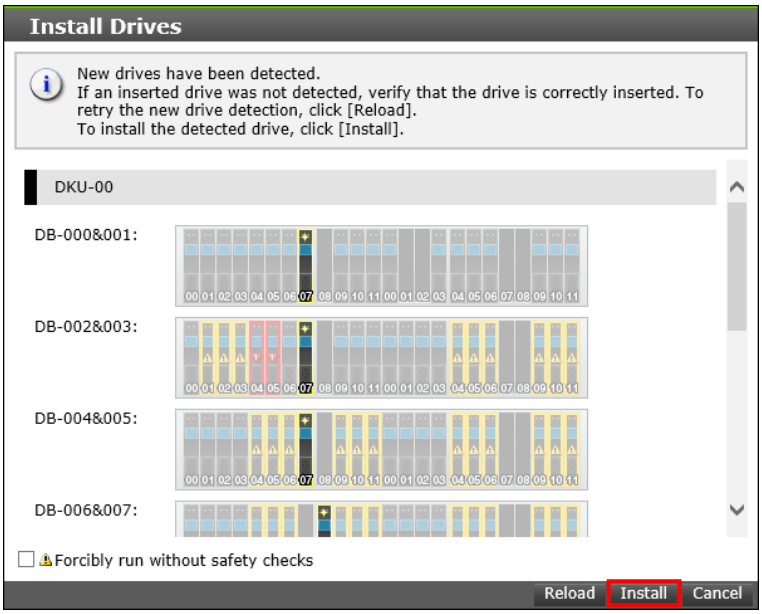
3. <Continued Addition>
To continue adding Drives, perform the Drive addition work (refer to "3.2 Adding Work of Drives"), check the slot positions of the added Drives and click [Reload]. If the addition positions are incorrect, re-install the Drives in the correct positions and click [Reload].

NOTE : Check that the LEDs on the Drives to be re-installed go out.



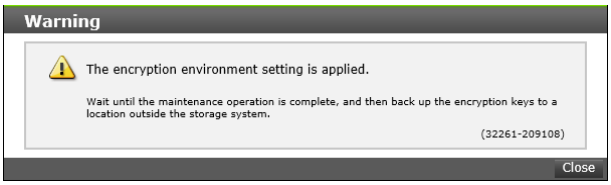
4. <Execute Addition>
Mount all the Drives to be added and click [Install].

NOTE : The error list window is displayed if multiple errors are detected by the prior check. If it is displayed, click the text of "Error Code" and recover the failures or the blockade in accordance with the details of the displayed errors.



5. <Check Addition Completion>
   Check that the following message is displayed and click [Close].
   If a message other than the described is displayed, refer to Message Section (MSG00-00) .

6. <Check back up the encryption key Messages>
   When the encryption environment is applied, the following message is displayed.
   Check the message and click [Close].



7. Click [refresh] to have the latest information displayed on the Maintenance Utility main window, and then check that the added Drives and the Storage System are Normal (See “Checking Normality” (TRBL02-06-10)).

8. Attach the Front Bezel. (See “How to Attach/Remove the Front Bezel” (INST(GE)04-01-10)).

9. Click [Logout] to close the window.

10. Removing the Maintenance PC
    Remove the Maintenance PC from the storage system referring to “Attachment/Removal Procedure of Maintenance PC” (INST(IN)13-02-10).

11. Back up the encryption key
    If the message is displayed in Step 6, ask your customer to back up the encryption key using Storage Navigator (refer to Encryption License Key User Guide).

    NOTE: When a message is not displayed in Step 6, this procedure is not required.

4. Adding Drive Boxes

Perform this work after confirming the following precautions.

NOTICE:
- Check that no Drive is installed in the Drive Boxes to be installed.
- If the Drives are installed, remove them.

4.1 Estimated Work Time

The estimated working hours for Adding Drive Boxes are the total of the following A, B, C, D, and E.

Table 4-1 Estimated Working Hours for Adding Drive Boxes

	Addition type	Process	Estimated work time	Remarks
A	Chassis	Chassis installation time	SBX/UBX/FBX/NBX: 60 min	–
B		Micro-program processing time (path)	90 sec × (The number of existing chassis + number of additional chassis)	(*1)
C	HDD	HDD installation time	1 min / 1 HDD	–
D		Micro-program processing time (HDD) (*2)	• In case of SBX: 30 seconds up to 16, 45 seconds up to 23, 70 seconds up to 24. • In case of UBX: 40 seconds up to 8, 60 seconds up to 11, 80 seconds up to 12. • In case of FBX: 40 seconds up to 8, 60 seconds up to 11, 80 seconds up to 12. • In case of NBX: 280 seconds up to 24.	–
E		LDEV Formatting time	See “Logical Volume Formatting” (THEORY05-01-10)	–

*1: The number of paths of each model is as shown below.
DKC: Four paths or eight paths (when using one Disk Board option (eight paths), and the micro-program processing time includes the time for replacing the micro-program)

*2: The micro-program processing time (HDD) is the time taken for Step 4 and Step 5 in “3.3 Recognizing Drives by Maintenance Utility”.

4.2 Parts List

4.2.1 DKC-F910I-SBX

Table 4-2 Parts List of DKC-F910I-SBX

Item No.	Part Name	Part No.	Quantity	Remarks
1	SFF Drive Box	3292500-A	4	SBX
2	Loop cable ties	5552567-1	8	—
3	Color Code Label (BE)	2857734-1	1	—
4	Color Code Label (SBB)	3292594-1	1	—
5	Label (UL3)	5515795-1	1	—
6	Nameplate (DKC-F910I-SBX)	2857688-6	4	for Hitachi Vantara
7	Nameplate (MDKC910I-SBX)	2857688-29	4	for Hitachi Vantara
8	Nameplate (R0K90-63001)	2857688-16	4	for HPE
9	Label (Regulatory) V	3292680-101	4	for Hitachi Vantara
10	Label (Regulatory) H	3292681-301	4	for HPE

When adding SBX, execute “4.3 Adding Drive Boxes”.

4.2.2 DKC-F910I-UBX/UBXE

Table 4-3 Parts List of DKC-F910I-UBX/UBXE

Item No.	Part Name	Part No.	Quantity	Remarks
1	LFF Drive Box	3292503-A	8	UBX
2	Loop cable ties	5552567-1	16	—
3	Color Code Label (BE)	2857734-1	1	—
4	Color Code Label (SBB)	3292594-1	1	—
5	Location Label (HDD)	5557125-1	2	—
6	Tag (HDD)	5557126-1	2	—
7	Label (UL3)	5515795-1	1	—
8	Nameplate (DKC-F910I-UBX)	2857688-8	8	for Hitachi Vantara
	Nameplate (DKC-F910I-UBXE)	2857688-9	8	for Hitachi Vantara
9	Nameplate (MDKC910I-UBX)	2857688-30	8	for Hitachi Vantara
	Nameplate (MDKC910I-UBXE)	2857688-30	8	for Hitachi Vantara
10	Nameplate (R0K91-63001)	2857688-18	8	for HPE
11	Label (Regulatory) V	3292680-101	8	for Hitachi Vantara
12	Label (Regulatory) H	3292681-301	8	for HPE

When adding UBX, execute “4.3 Adding Drive Boxes”.

4.2.3 DKC-F910I-FBX

Table 4-4 Parts List of DKC-F910I-FBX

Item No.	Part Name	Part No.	Quantity	Remarks
1	Drive Box (FBX)	3286820-A	4	FBX
2	Loop cable ties	5552567-1	8	—
3	Color Code Label (BE)	2857734-1	1	—
4	Color Code Label (SBB)	3292594-1	1	—
5	Label (UL3)	5515795-1	1	—
6	Nameplate (DKC-F910I-FBX)	2857688-33	4	for Hitachi Vantara
7	Nameplate (MNF100R9-BOX)	2857688-32	4	for Hitachi Vantara
8	Nameplate (R0K93-63001)	2857688-34	4	for HPE
9	Label (Regulatory) V	3292680-101	4	for Hitachi Vantara
10	Label (Regulatory) H	3292681-301	4	for HPE

When adding FBX, execute “4.3 Adding Drive Boxes”.

4.2.4 DKC-F910I-NBX

Table 4-5 Parts List of DKC-F910I-NBX

Item No.	Part Name	Part No.	Quantity	Remarks
1	Drive Box (NBX)	3292691-A	4	NBX
2	Loop cable ties	5552567-1	8	—
3	Color Code Label (BE)	2857734-1	1	—
4	Color Code Label (DBN)	3293001-1	1	—
5	Label (UL3)	5515795-1	1	—
6	Nameplate (DKC-F910I-NBX)	2857688-10	4	for Hitachi Vantara
7	Nameplate (MDKC910I-NBX)	2857688-31	4	for Hitachi Vantara
8	Nameplate (R0K92-63001)	2857688-20	4	for HPE
9	Label (Regulatory) V	3292680-101	4	for Hitachi Vantara
10	Label (Regulatory) H	3292681-301	4	for HPE

When adding NBX, execute “4.3 Adding Drive Boxes”.

4.2.5 Parts List of Bezels

Table 4-6 Parts List of Bezel (DBFB/DBFBA/DBFBP)

Item No.	Part Name	Part No.	Quantity	Remarks
1	Front Bezel	3292729-A	1	DBFB (for Hitachi Vantara)
		3292729-B		DBFBA (for Hitachi Vantara)
		3292513-A		DBFBP (for HPE)
2	Accessory Set	5560175-A	1	—
3	Bracket (L)	3282470-1	1	(*1)
4	Bracket (R)	3290548-101	1	(*1)
5	Side Bezel (L)	2855177-1	1	(*1)
6	Side Bezel (R)	2855176-1	1	(*1)
7	Key	3292729-A	1	DBFB (for Hitachi Vantara) (*1)
		3292729-B		DBFBA (for Hitachi Vantara) (*1)
		3292513-A		DBFBP (for HPE) (*1)
8	Bind Screw (M5 × 10)	SB510N	5	(*1)

*1: These parts are included in Item No.2

Table 4-7 Parts List of Bezel (FBFB/FBFBA/FBFBP)

Item No.	Part Name	Part No.	Quantity	Remarks
1	Front Bezel	3286818-B	1	FBFB (for Hitachi Vantara)
		3286818-A		FBFBA (for Hitachi Vantara)
		3286824-A		FBFBP (for HPE)
2	Accessory Set	2856820-1	1	FBFB (for Hitachi Vantara)
		2856823-1		FBFBA (for Hitachi Vantara)
		2856824-A		FBFBP (for HPE)
3	Side Cover	3286646-1	1	(*1)
4	Plate	5550593-1	1	(*1)
5	Key	—	1	(*1)
6	Bind Screw	3261898-512	2	(*1)

*1: These parts are included in Item No.2

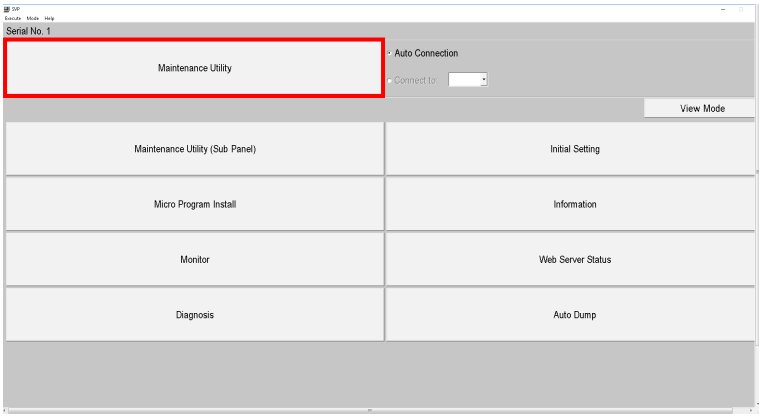
4.3 Adding Drive Boxes

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the SSVP, and then log in to the SVP.
   - "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10)
   - "Connection to the SVP" (SVP01-30)

2. Starting the SVP window
   From the menu of Web Console, click [Maintenance Components] - [Maintenance Other Components].

3. Changing the operation mode
   Change the mode to [View Mode].

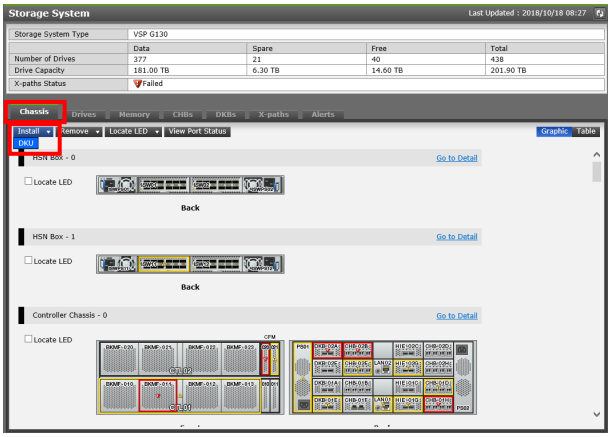
4. Starting Maintenance Utility
   In the SVP window, click [Maintenance Utility] (See "Starting Maintenance Utility" (MU01-10).).



5. Instructing to start addition by Maintenance Utility

(1) <Main Window>

Click [Chassis] tab in the main window and click [Install] and select [DKU].



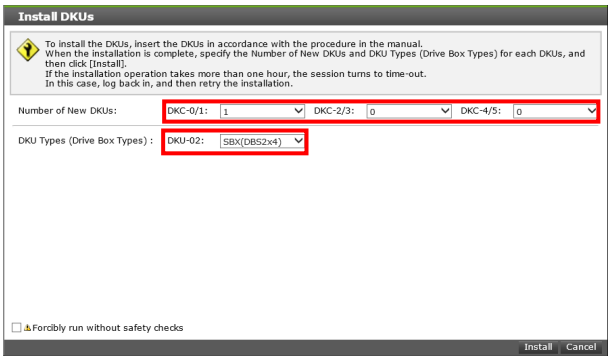
(2) <Set Number of DKU/Types>

> **⚠ CAUTION**
>
> About "Forcibly run without safety checks":
> If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the message, the manual or the contact described in the manual.

Select the number of New DKU.

Select the DKU type in the Selected DKUs.

NOTE : Do not click [Install] at this time.
Click [Install] after completing the addition work.

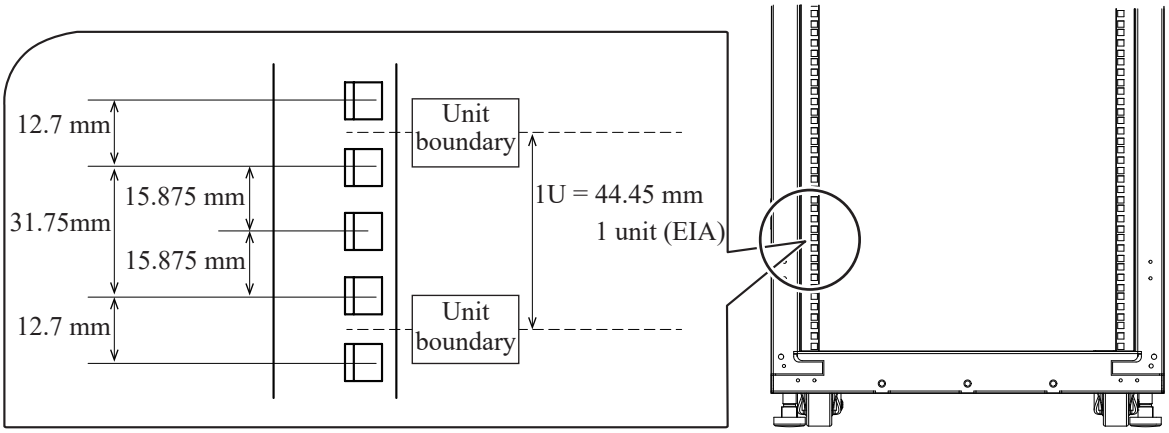


6. Checking the installation location

   EIA units and intervals of mounting holes of RKU rack frame conforming to EIA standard

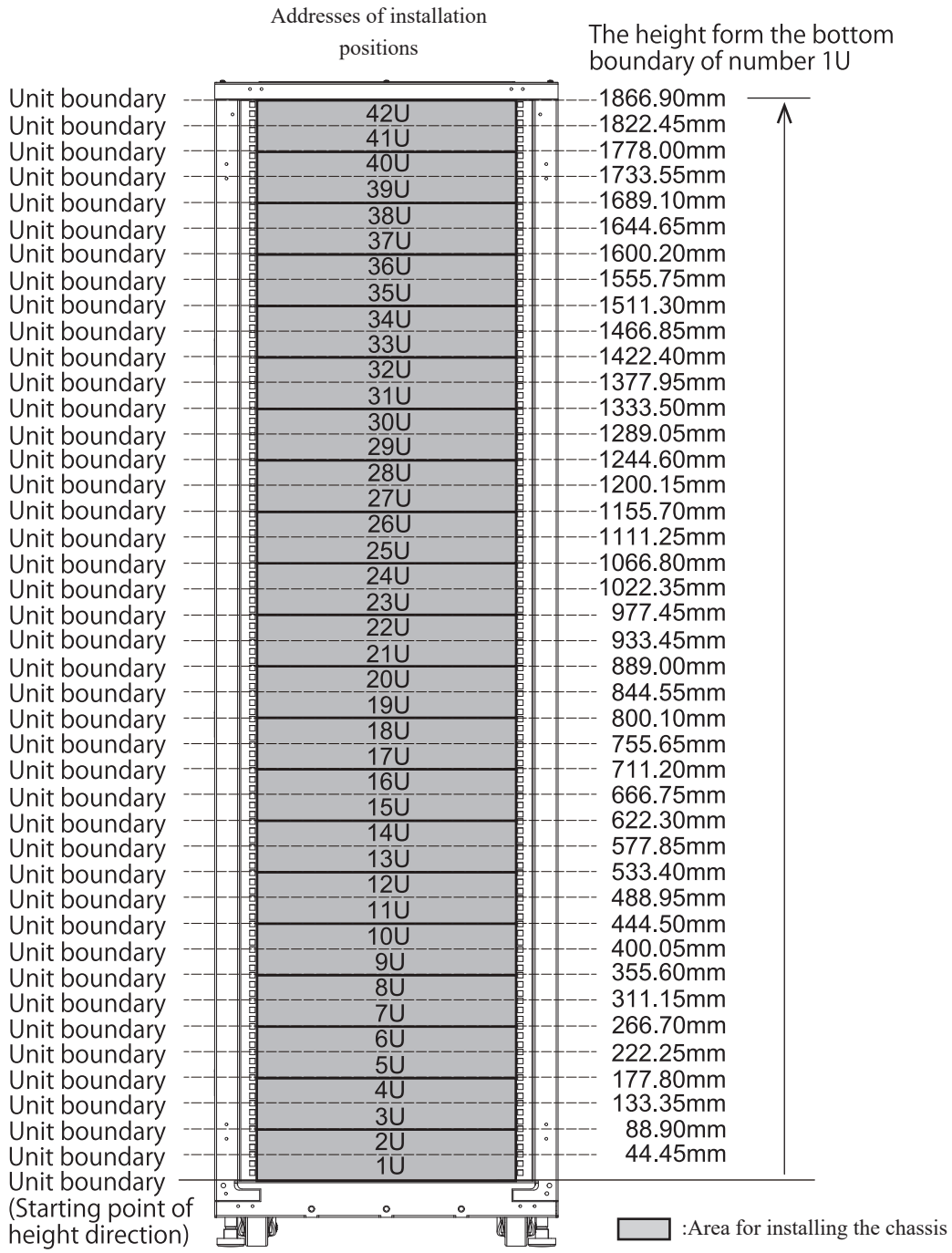
   - A unit (U) space conforming to EIA standard is 44.45 mm as shown in the figure below.
   - The boundary of the unit falls on the middle of the interval of 12.7 mm.
     The boundary of the unit (1 U/1 EIA) is from the center of the interval of 12.7 mm to the center of the next interval of 12.7 mm.
   - For rack, hole size for rack installation is determined based on the EIA standard.
     Hole size for rack installation :
     Universal intervals: Repeat of 44.45 mm (15.875 mm + 15.875 mm + 12.7 mm)

Figure 4-1 Attachment Hole Size of Rack



The addresses are called unit (EIA) numbers and given as 1, 2, 3, and so on counted from the bottom of the rack frame.
The following figures show a layout example of installing Drive Box in 42 units rack frame. However, installing positions of Drive Box may differ according to the construction within the rack frame.

Figure 4-2 Mounting Position of Drive Box



7. Installing rails
The rail install procedure is different depending on the hole shape (circular or square hole) on the rack. Check the holes on the rack before the installation work.

(1) Installation procedure of rails for SBX/UBX

NOTE:
- The shape of the rail (R) and that of the rail (L) are the same. However, the place to attach the nut is different.
  When viewed from the front of the rack, the difference is as follows:
  Right side: The part that can be extended is the rear side. The nut is attached to the rear side.
  Left side: The part that can be extended is the front side. The nut is attached to the rear side.
- These rails extend or shorten back and forth.

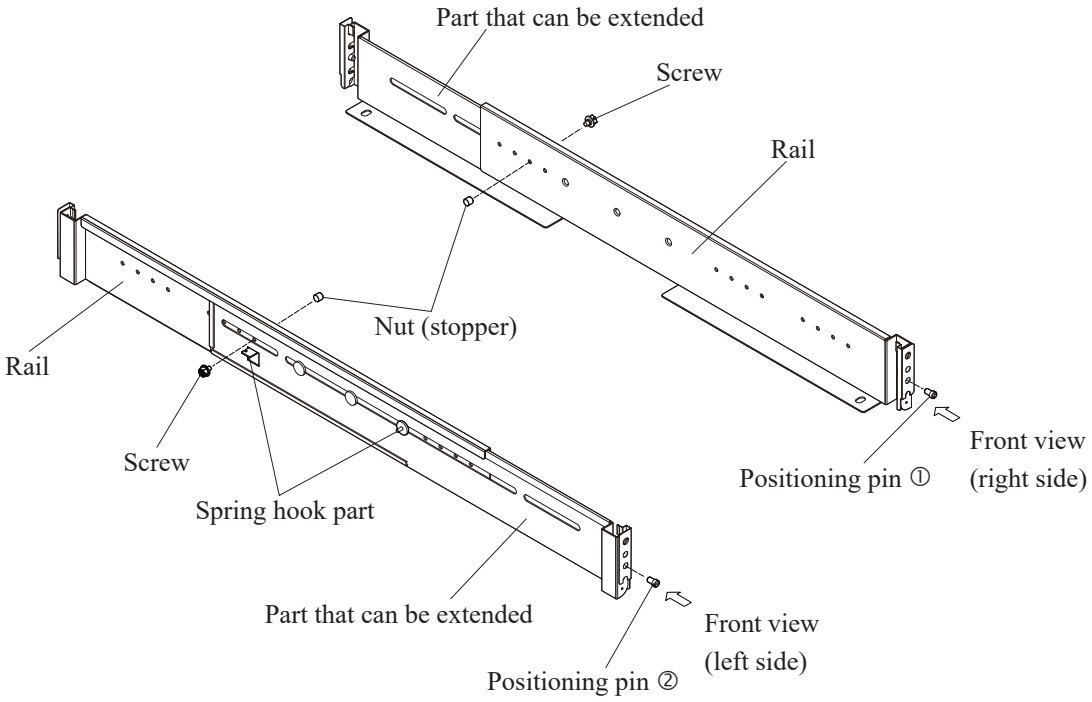
(a) When the length of the rail needs to be adjusted to fit a rack to be used, remove the screw and nut (stopper), adjust the rail length, and then install them again.
In usual cases, only the left rail (when viewed from the front of the rack) needs to be adjusted.
When the length of the rail does not need to be adjusted or when the rail is installed in the RKU rack, leave the screw and nut (stopper) as they are and go to Step (b).

(b) When the rack installation hole is circular, replace positioning pin ① with the supplied pin screw (ϕ 6.8 head screw).
When the rack installation hole is rectangular go to Step (c) (remain the guide screw (ϕ 9.2 head screw) as is).

(c) When the rack installation hole is circular replace positioning pin ② with the supplied pin screw (ϕ 6.8 head screw).
When the rack installation hole is rectangular go to Step (d) (remain the guide screw (ϕ 9.2 head screw) as is).

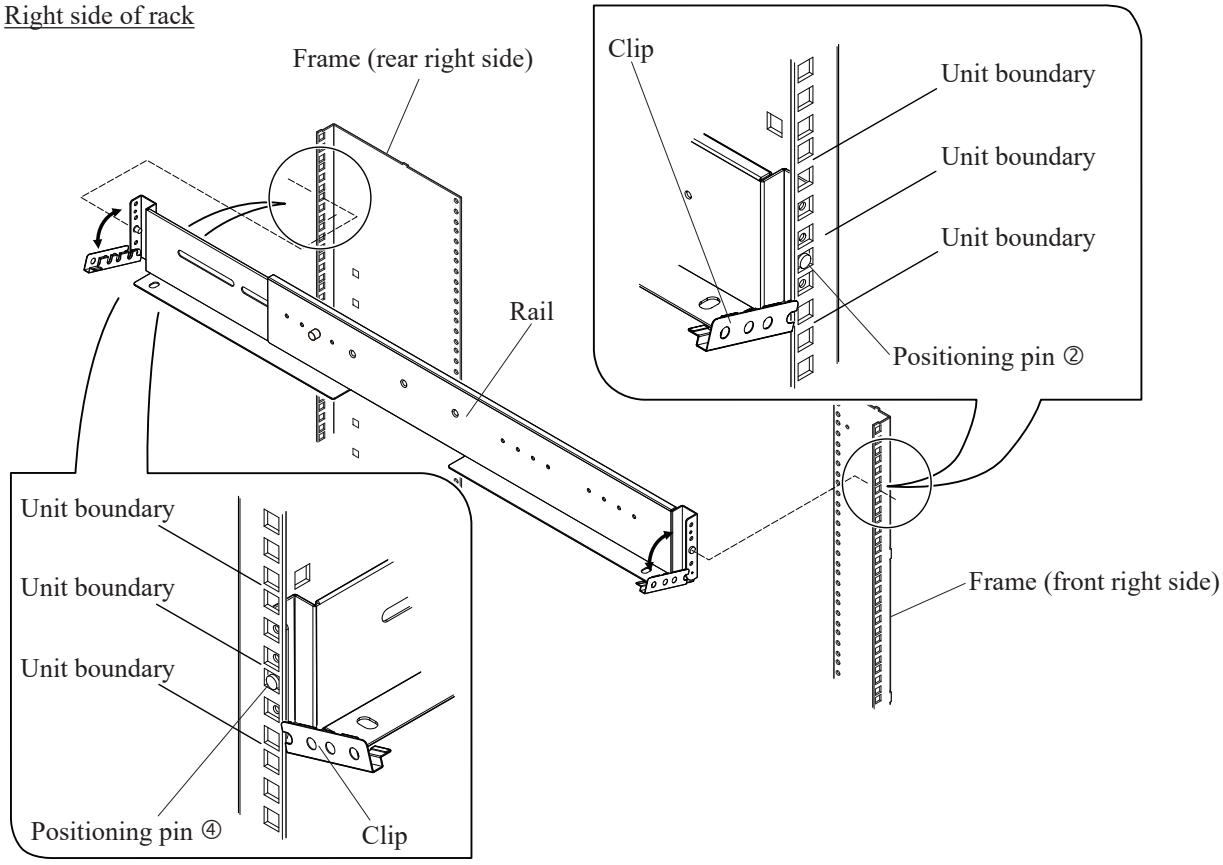
(d) Hook the supplied spring on the spring hook part on the rear of the rail (the direction is not required).
(e) Work on the left rail in the similar procedure.

Figure 4-3 Work before Installing Rails



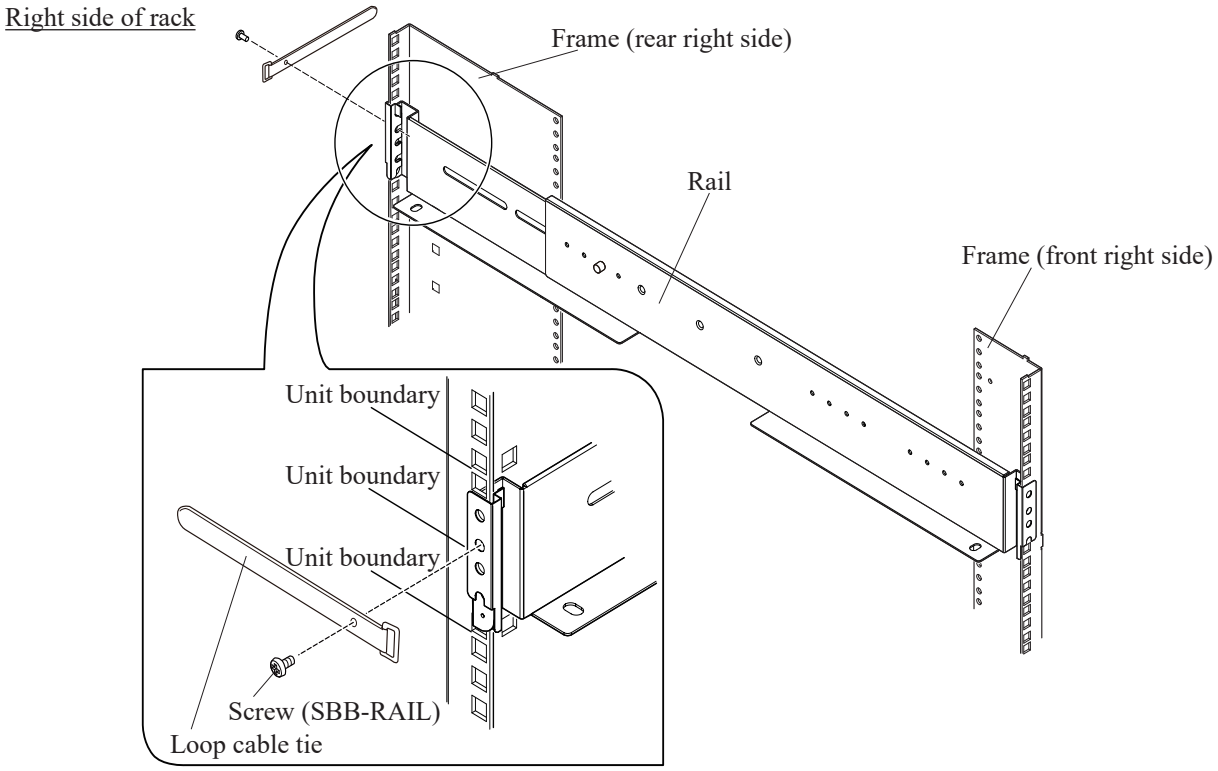
(f) Bring down two Clips on the front and rear edge of the rail.
(g) Fit Positioning Pins ② and ④ of the rail (two pins in total on the front and back edge) into holes on the right side of the rack at the position where you want to install the Drive Box.
(h) Raise the Clips of the rail to fix the rail to the rack.

Figure 4-4 Installing Rails



(i) Tighten the screw (SBB-RAIL) and the loop cable tie on the rear edge of the rail to fit the rail to the rack. The fixing position is the fourth hole from the bottom of the unit boundary line.

Figure 4-5 Fixing the Rails



(j) Install the rail into the left side of the rack in the same way as procedures Step (f) to Step (i). The right and left rails are same in shape. Horizontally turn the left rail in the opposite direction of the right rail (180 degree turn).

(k) Install the other rails in the same way.

(2) Installation procedure of rails for FBX

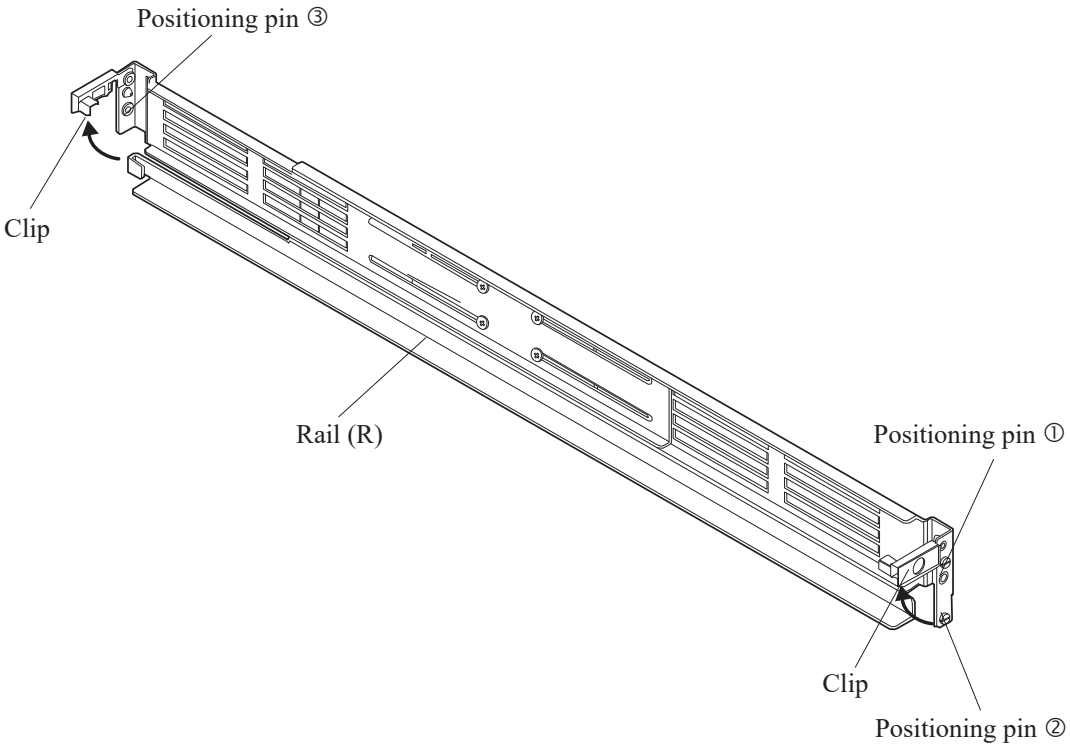
The rail install procedure is different depending on the hole shape (square or circular hole) on the rack.

Check the holes on the rack before the installation work.

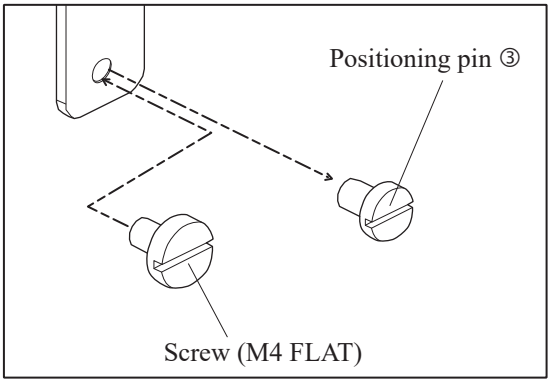
(a) Open two clips on the front and back of the rail (R).

(b) When the rack installation hole is rectangular, replace positioning pins ①, ② and ③ with the supplied screws (M4 FLAT) (ϕ 9.2 head screw).

Figure 4-6 Work before Installing Rails

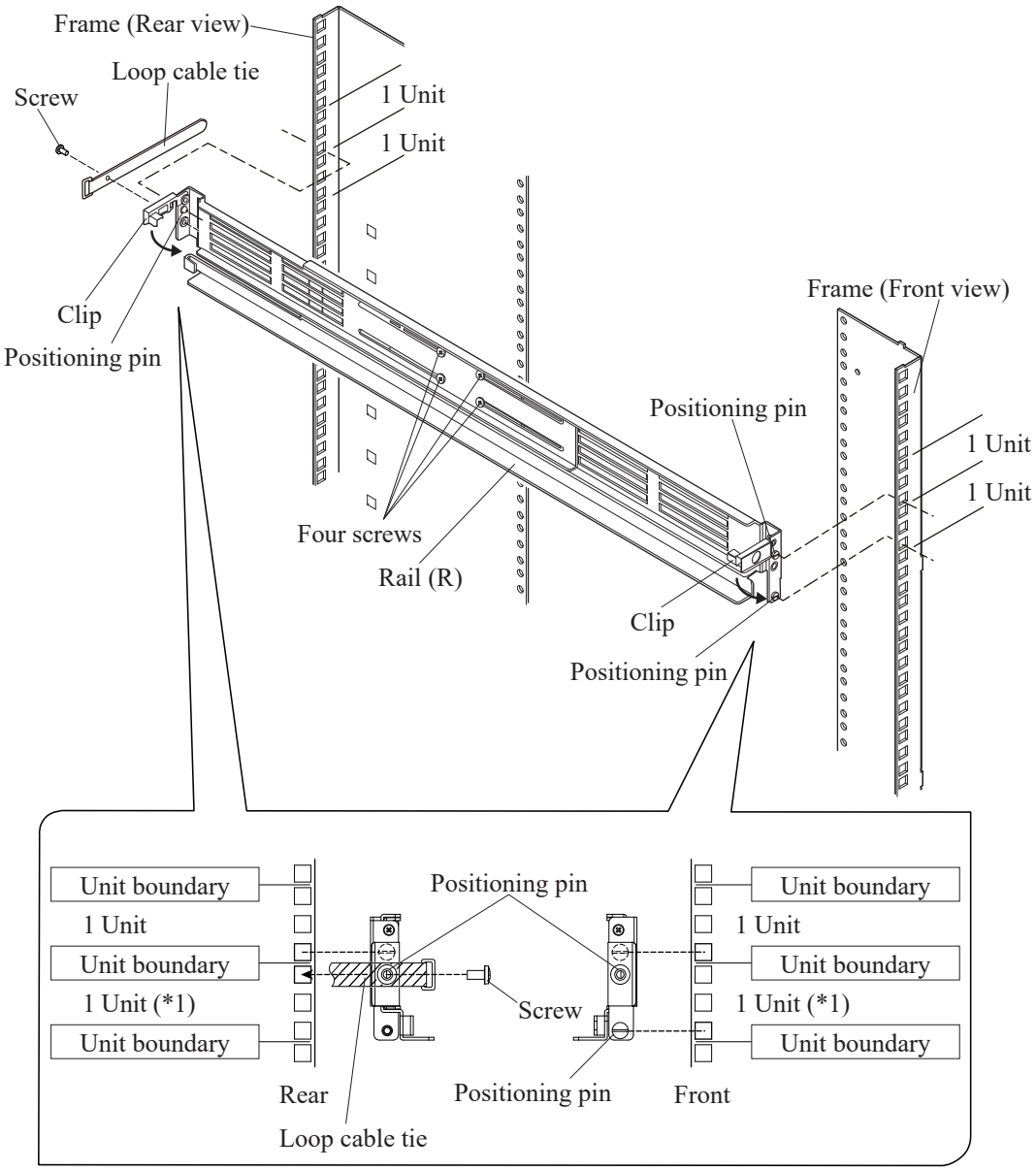


In case of square hole



(c) Loosen the four screws on the side of the rail (R) and adjust the rail (R) length.
When the rack frame and the rail width do not match even if loosening the screws, remove the four screws, adjust the length, and then fix the rail with four screws again.
(d) Fit the positioning pins (at three places in front and rear) in the holes in the position to be installed on the right side of the rack.
(e) Close the clips on the rail (R) and install the rail (R) in the rack.
(f) Tighten the four screws on the side of the rail (R).
(g) Fix the rear side of rail (R) with screw and loop cable tie. The fixing position is the third hole from the bottom of the unit boundary line.
(h) Install a rail (L) on the left side of the rack in the similar procedure.

Figure 4-7 Installing Rails

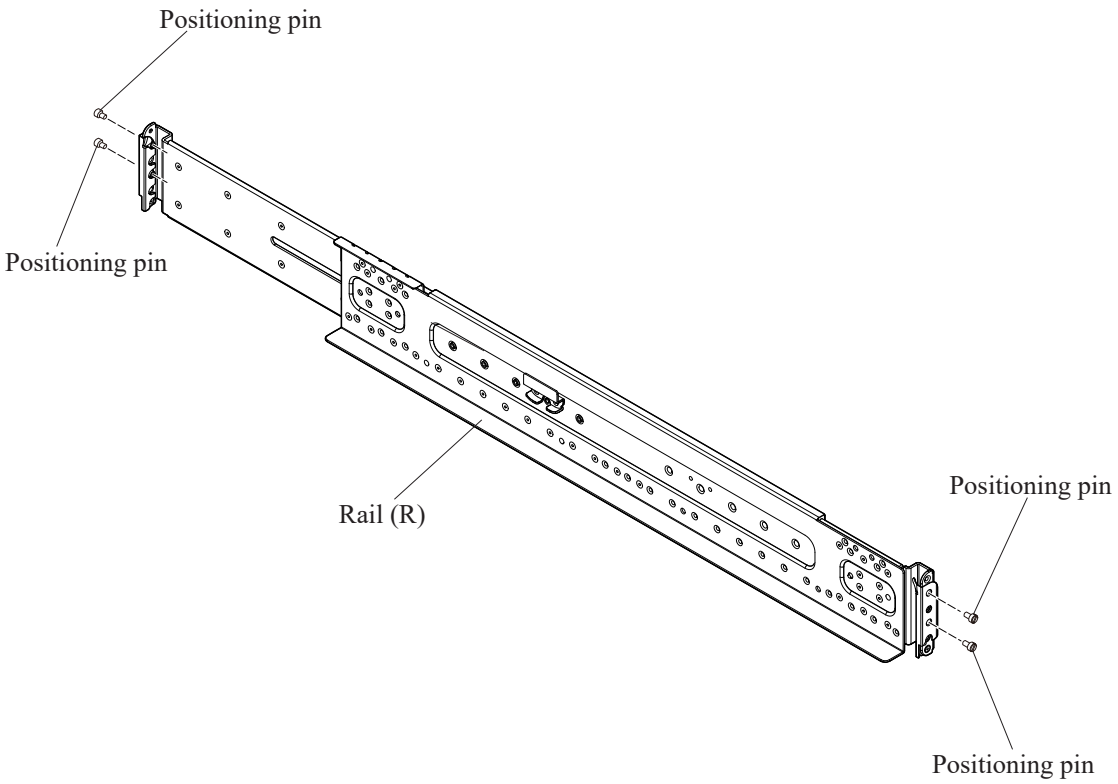


*1: Lowest unit of installing position Unit

(3) Installation procedure of rails for NBX

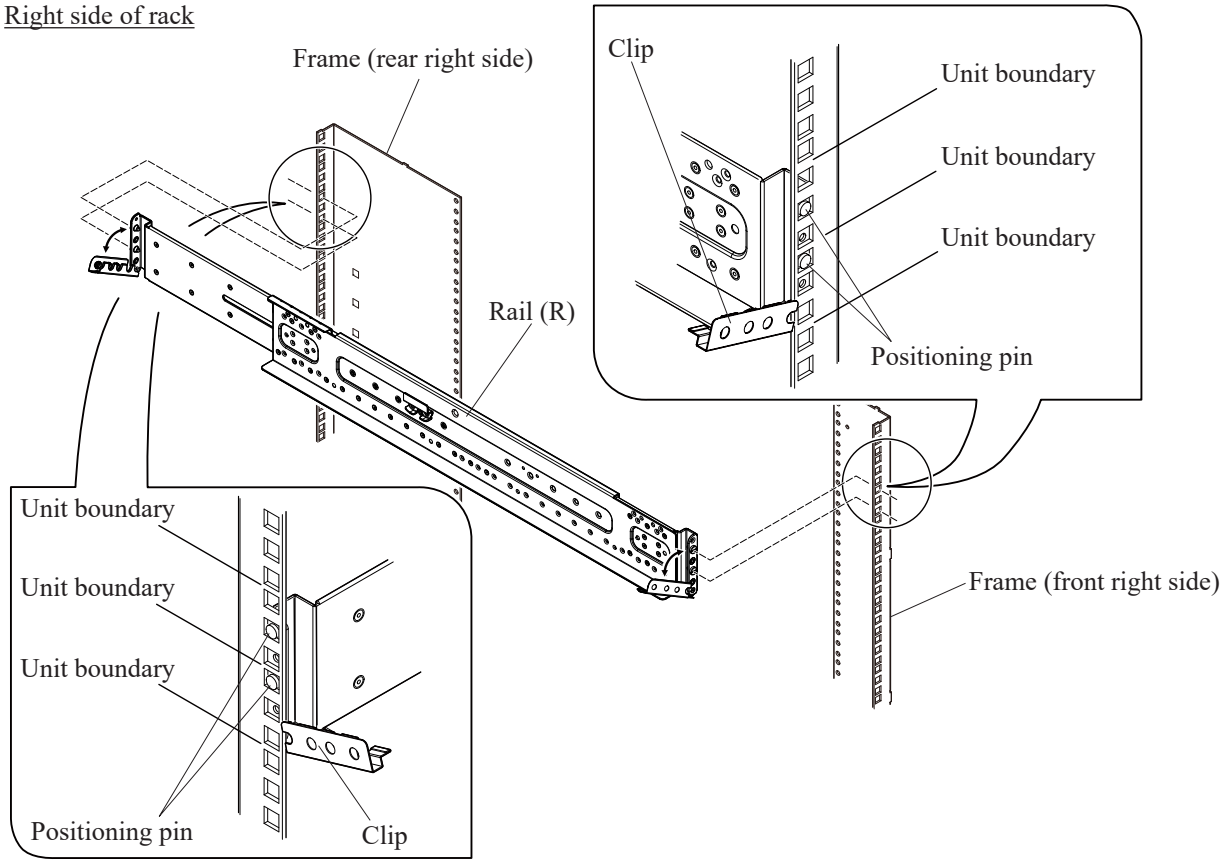
(a) When the rack installation hole is circular, replace positioning pin with the supplied pin screw (ϕ 6.8 head screw).
When the rack installation hole is rectangular, go to Step (b) (remain the guide screw (ϕ 9.2 head screw) as is).

Figure 4-8 Work before Installing Rails



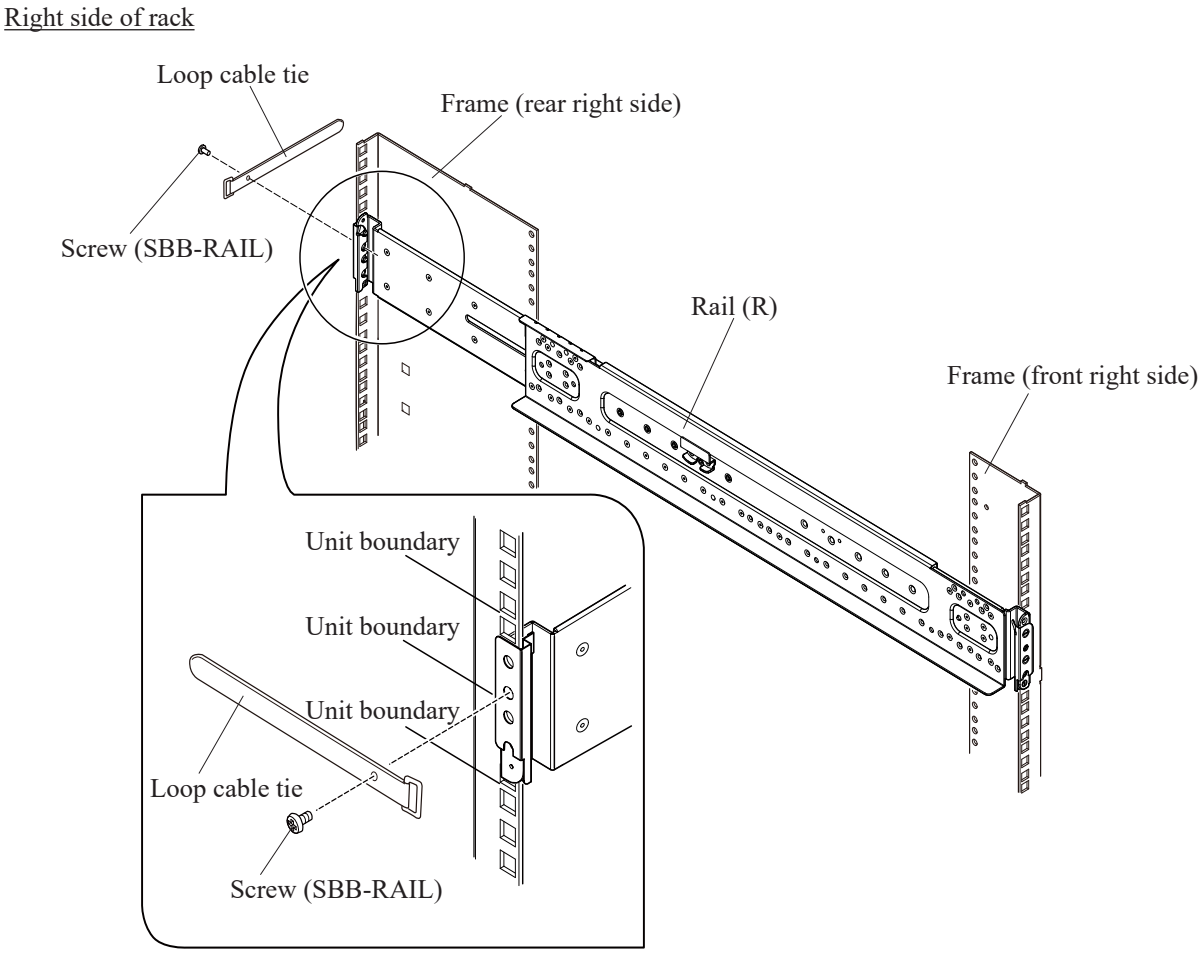
(b) Bring down two Clips on the front and rear edge of the rail.
(c) Fit Positioning Pins of the rail (four pins in total on the front and back edge) into holes on the right side of the rack at the position where you want to install the Drive Box.
(d) Raise the Clips of the rail to fix the rail to the rack.

Figure 4-9 Installing Rails



(e) Tighten the screw (SBB-RAIL) and the loop cable tie on the rear edge of the rail to fix the rail to the rack. The fixing position is the fourth hole from the bottom of the unit boundary line.

Figure 4-10 Fixing the Rails



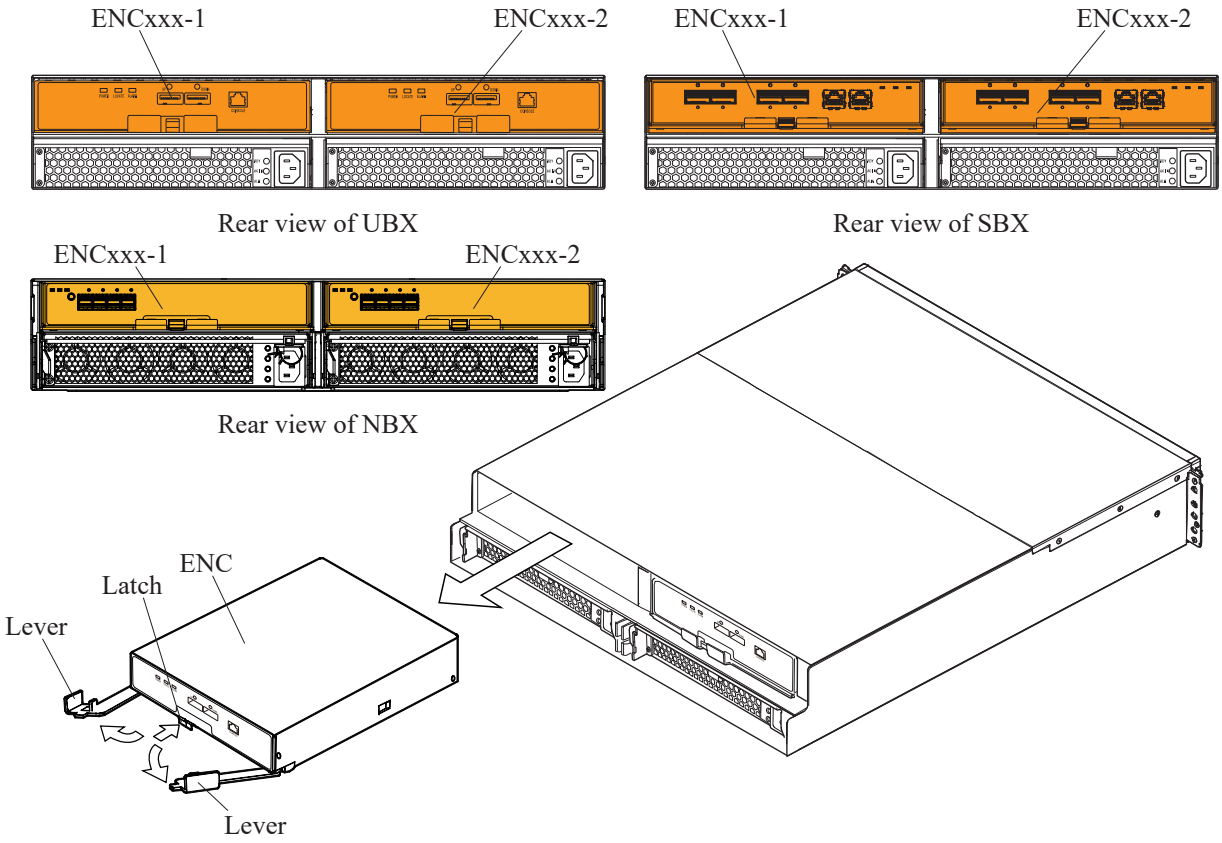
(f) Install a rail (L) on the left side of the rack in the similar procedure.

8. Removing the parts
   If the Drive Box is installed at a height of 1 m or below or installed by using the dedicated lifter, this step is not required because the Drive Box can be installed into the rack frame with its parts mounted. (Go to Step 9.)
   If other than above, remove the parts first and then install the Drive Box into the rack frame.

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 Storage System before starting and do not take it off until you finish. Refer to "Note when Installing and Removing Parts" (INST(GE)01-01-10).

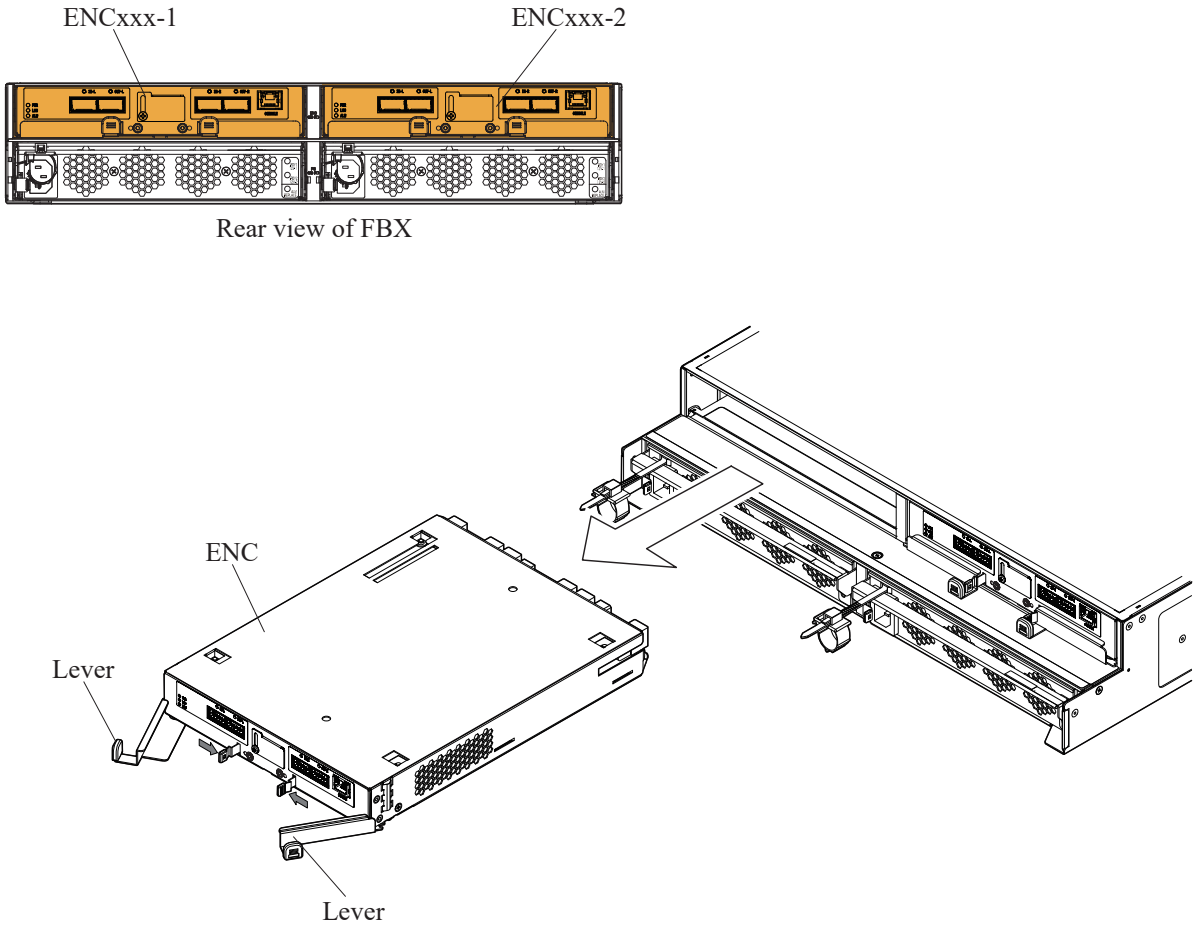
(1) Attach a label or the like for identification of installation location to a removed part so that it can be installed in the same place in the Drive Box.
(2) Removing an ENC
   (a) On the rear of the Drive Box, push the latch on the rear panel of the left ENC toward the arrow direction to unlock the lever.
   (b) Open the right and left levers of the ENC and remove the ENC.
   (c) Remove the other ENC in the same manner.

Figure 4-11 Removing ENCs (SBX/UBX/NBX)



*1: ENCxxx-1
   └> DB No. (000, 001, 002, ...,191)
*2: The overhead view illustration shows UBX. The procedure for SBX/NBX is the same as that for UBX.

Figure 4-12 Removal of ENCs (FBX)



*1: ENCxxx-1
└→ DB No. (000, 001, 002, ..., 191)

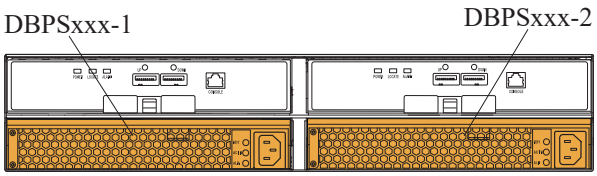
(3) Removing a DBPS

(a) Open the handle (②) while pushing the latch of the DBPS in the left side of the rear of the Drive Box inward (①).

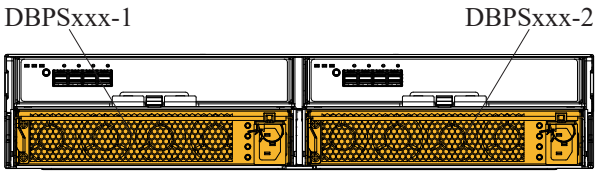
(b) Pull the DBPS and remove it from the Drive Box.

(c) Remove the other DBPS in the same manner.

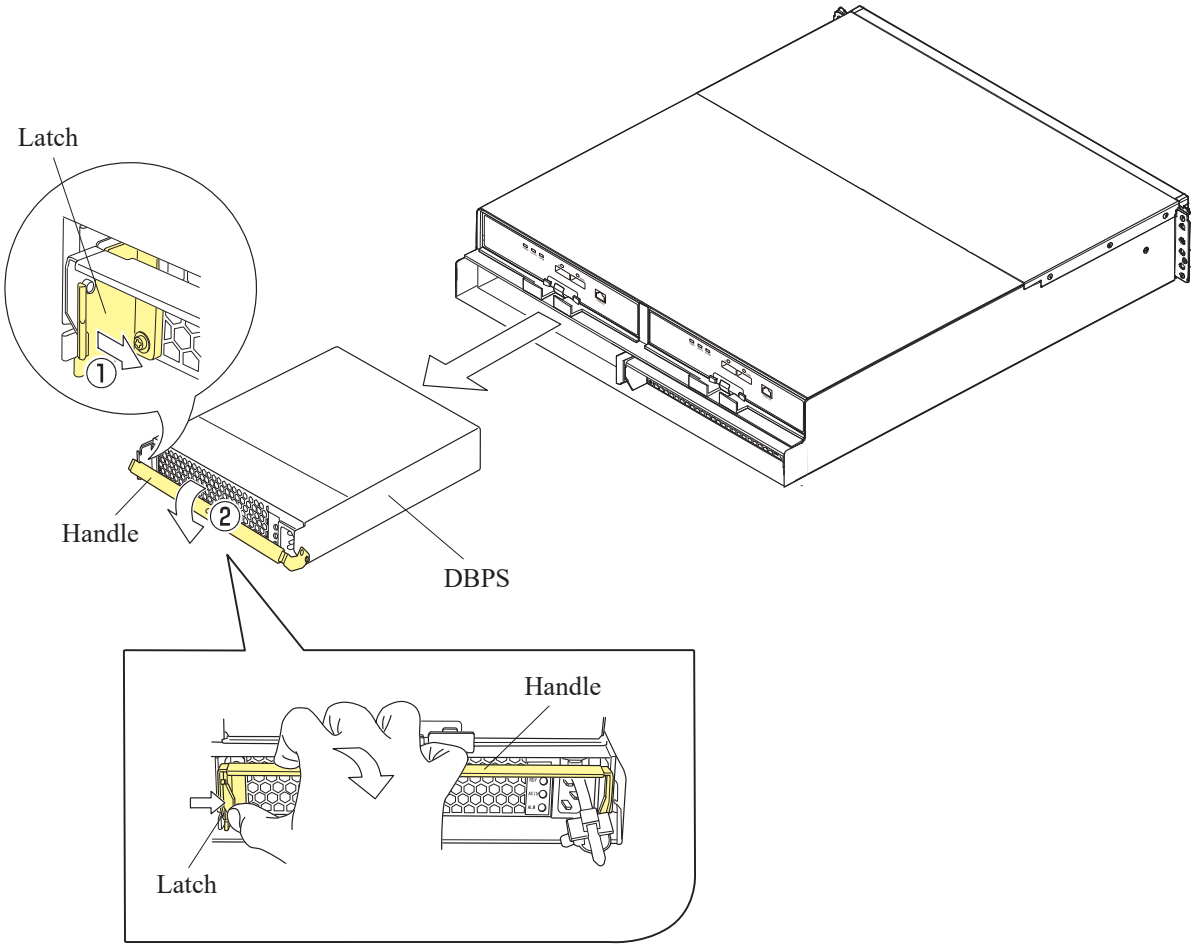
Figure 4-13 Removing DBPS (SBX/UBX/NBX)



Rear view of SBX/UBX

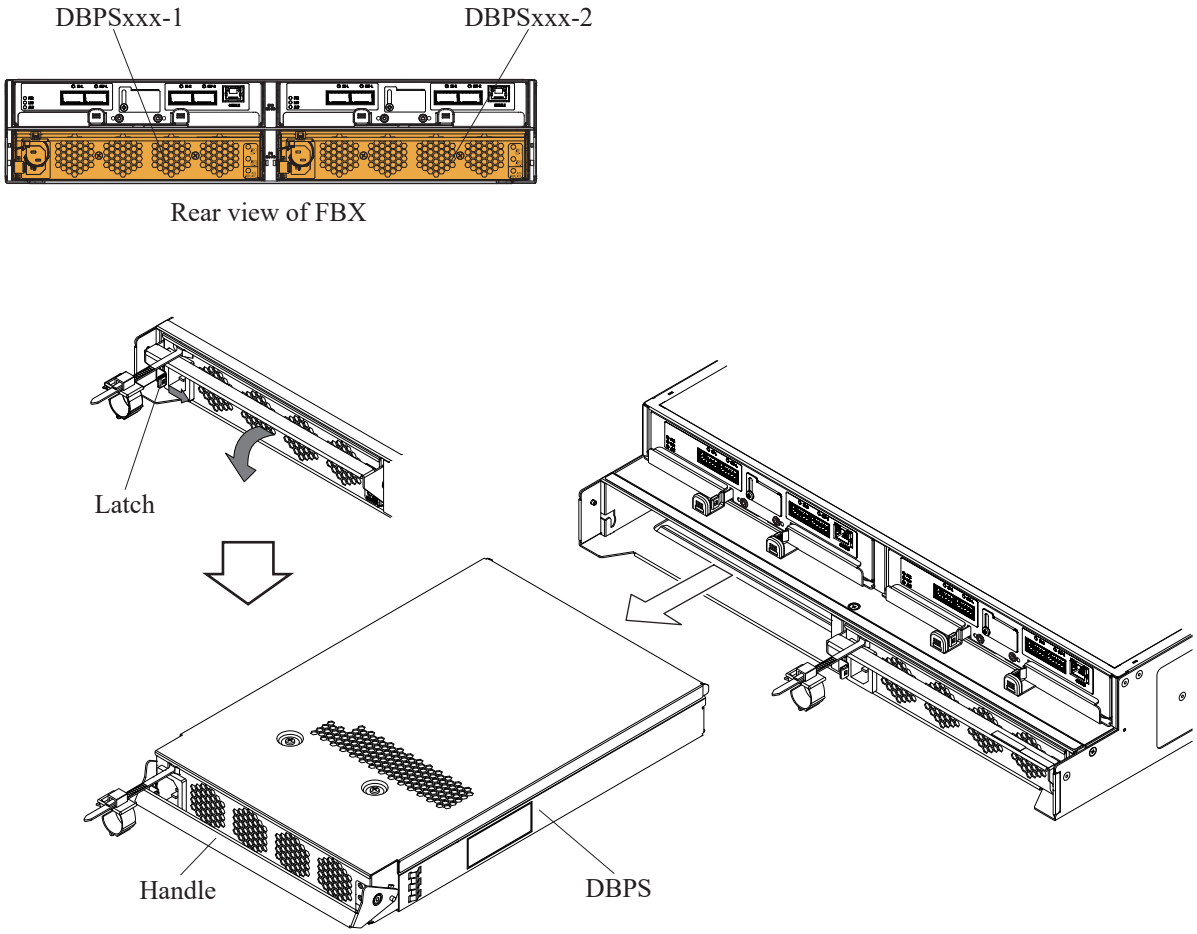


Rear view of NBX



*1: DBPSxxx-1
└→DB No. (000, 001, 002, ...,191)

Figure 4-14 Removing DBPS (FBX)



*1: DBPSxxx-1
└→ DB No. (000, 001, 002, ..., 191)

(4) Remove the parts from the other Drive Boxes in the same manner.

9. Installing the Drive Box

> **⚠ CAUTION**
>
> Be careful of the mass:
> Work carefully because the mass of the SBX is about 24 kg, UBX is about 27 kg, FBX is about 38 kg, and NBX is about 21 kg.
>
> Be careful of falling over and dropping:
> To prevent Drive Box from falling over and dropping, the installation work must be done by two or more personnel.

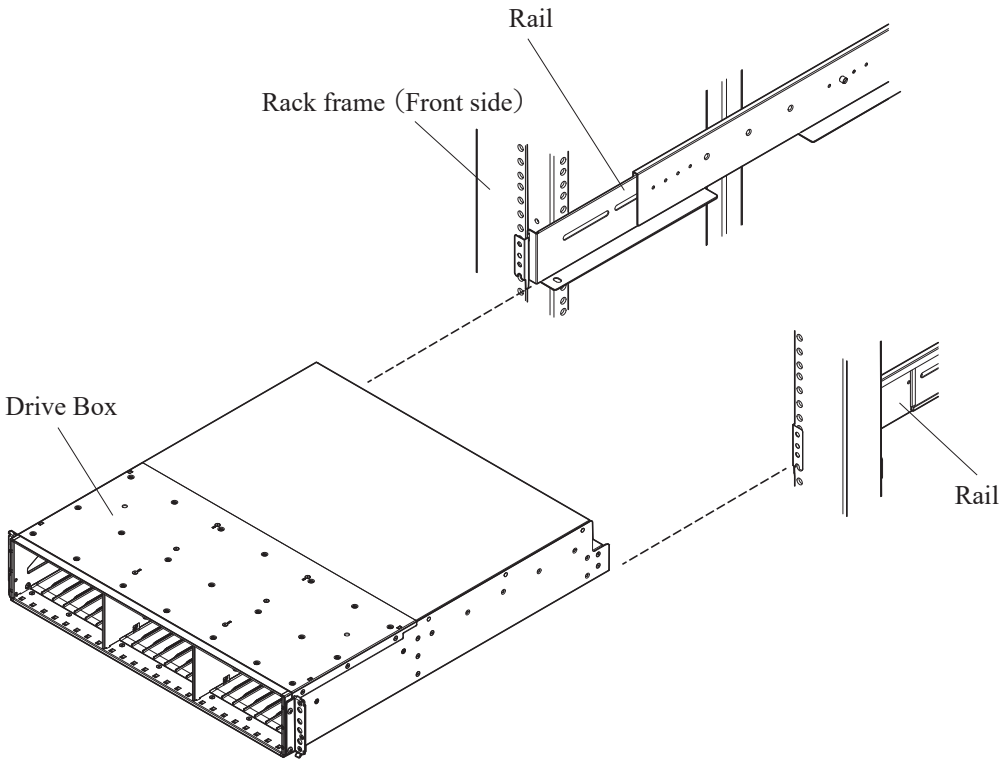
(1) Installation procedure of SBX/UBX/NBX Drive Box

(a) Installing Drive Box

(i) Install the Drive Box on the front side of the rack frame referring to mounting procedure using the special lifter. (Refer to "Mounting Storage System on a Special Lifter" (INST(IN)06-01-10).)

(ii) Install the other Drive Boxes in the same way.

Figure 4-15 Installing Drive Box



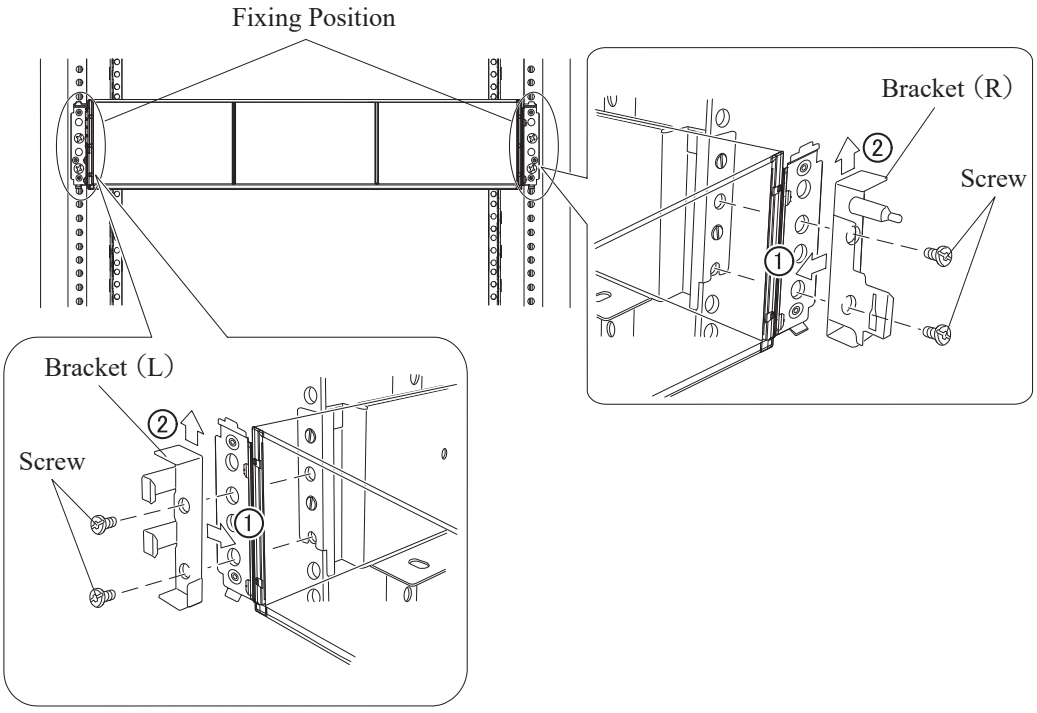
(b) Fixing the Drive Box

(i) Install the Drive Box with two brackets. Fasten the Drive Box to the rack frame with two screws temporarily.

(ii) Tighten the screws pressing the bracket in the direction of ① and ② to fix.

(iii) Fix the other Drive Boxes in the same way.

Figure 4-16 Fixing Drive Box (Front)



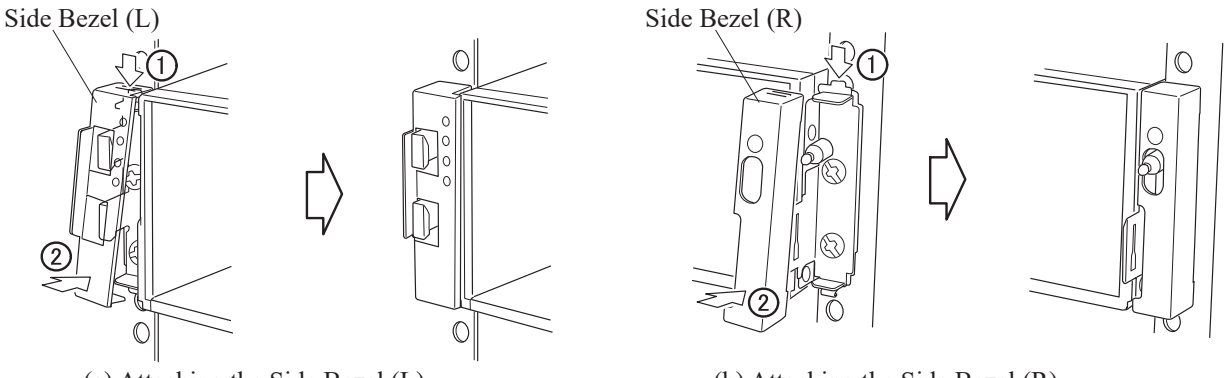
(c) Attaching the side bezel

(i) Attach the side bezel in the procedure ① and ② to cover the left side of the front side of the Drive Box with the side bezel (L) from the top.

(ii) Attach the side bezel in the procedure ① and ② to cover the right side of the front side of the Drive Box with the side bezel (R) from the top.

(iii) Attach the side bezels with the other Drive Boxes in the same way.

Figure 4-17 Attaching Side Bezels



(a) Attaching the Side Bezel (L)

(b) Attaching the Side Bezel (R)

(2) Installation procedure of FBX Drive Box

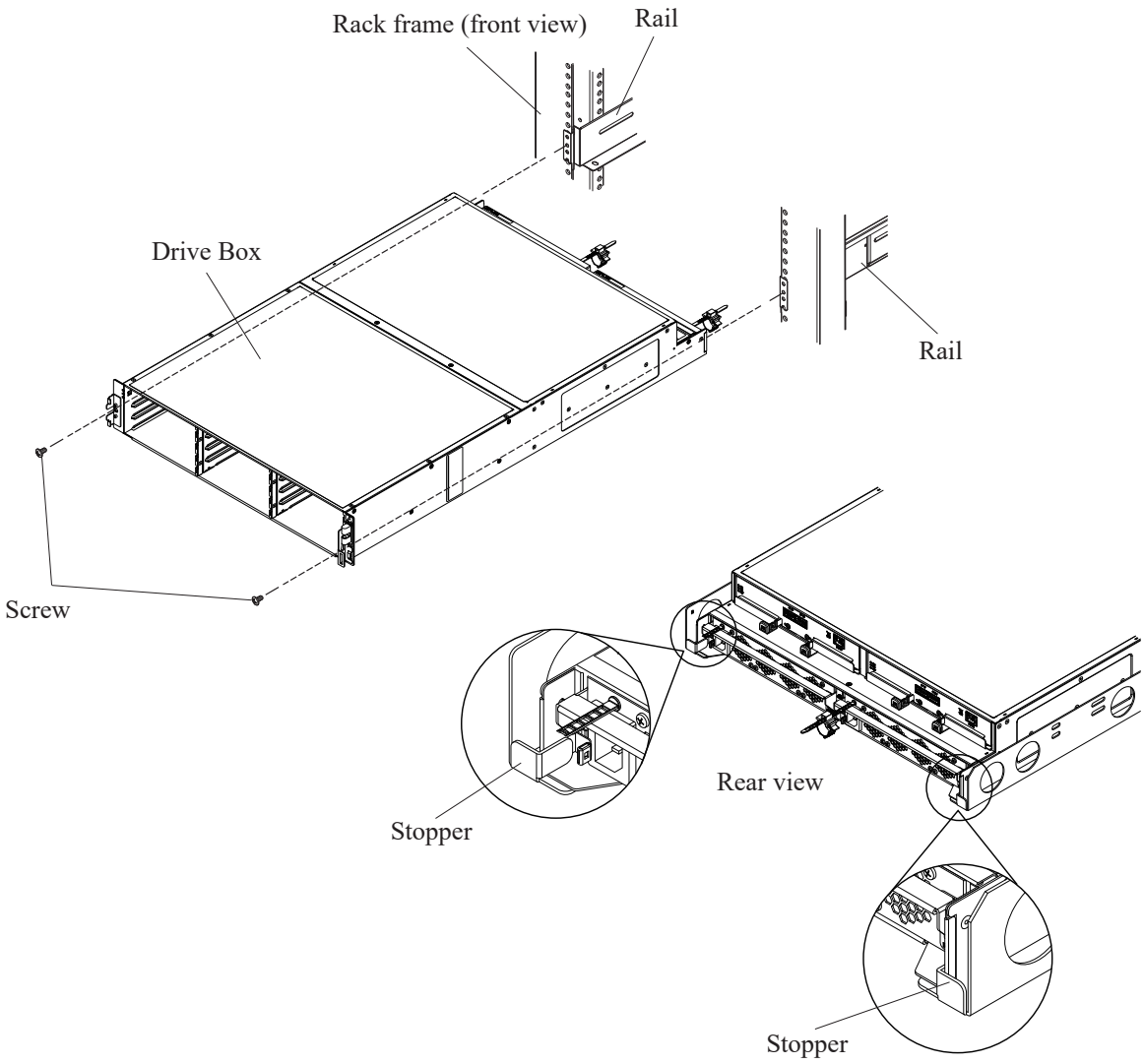
(a) Installing Drive Box

(i) Install the Drive Box on the front side of the rack frame referring to mounting procedure using the special lifter. (Refer to "Mounting Storage System on a Special Lifter" (INST(IN)06-01-10).)

(ii) Fasten two screws and fix the Drive Box.

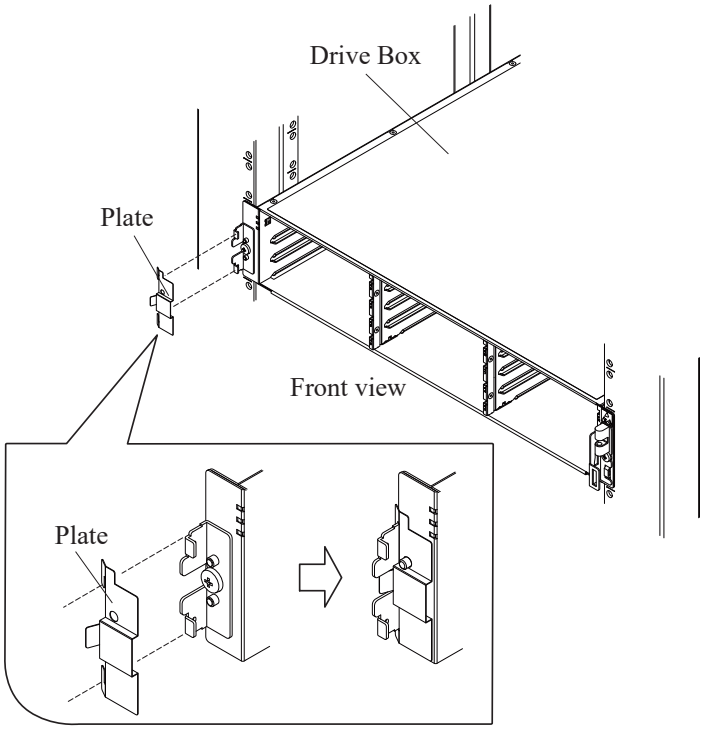
(iii) Install the other Drive Boxes in the same manner.

Figure 4-18 Installing Drive Box



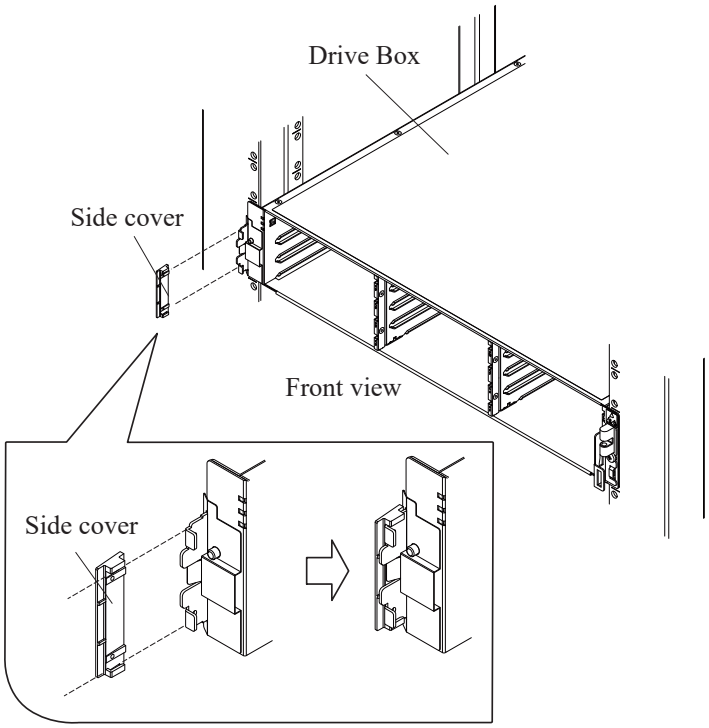
(b) Attaching the plate to the left side of the front of the Drive Box.

Figure 4-19 Attaching the Plate



(c) Attach the side cover to the left side of the front of the Drive Box.

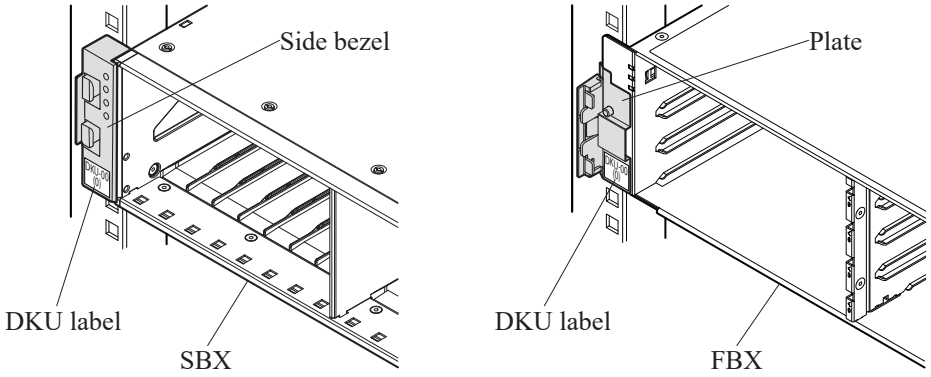
Figure 4-20 Attaching the Side Cover



(d) Attach the plates and side covers to the other Drive Boxes in the same manner.

10. Attach a DKU label to the left side bezel (SBX/UBX/NBX) or the left plate (FBX) on the front side of each installed Drive Box.

Figure 4-21 Attachment Location of DKU Label (Front Side)

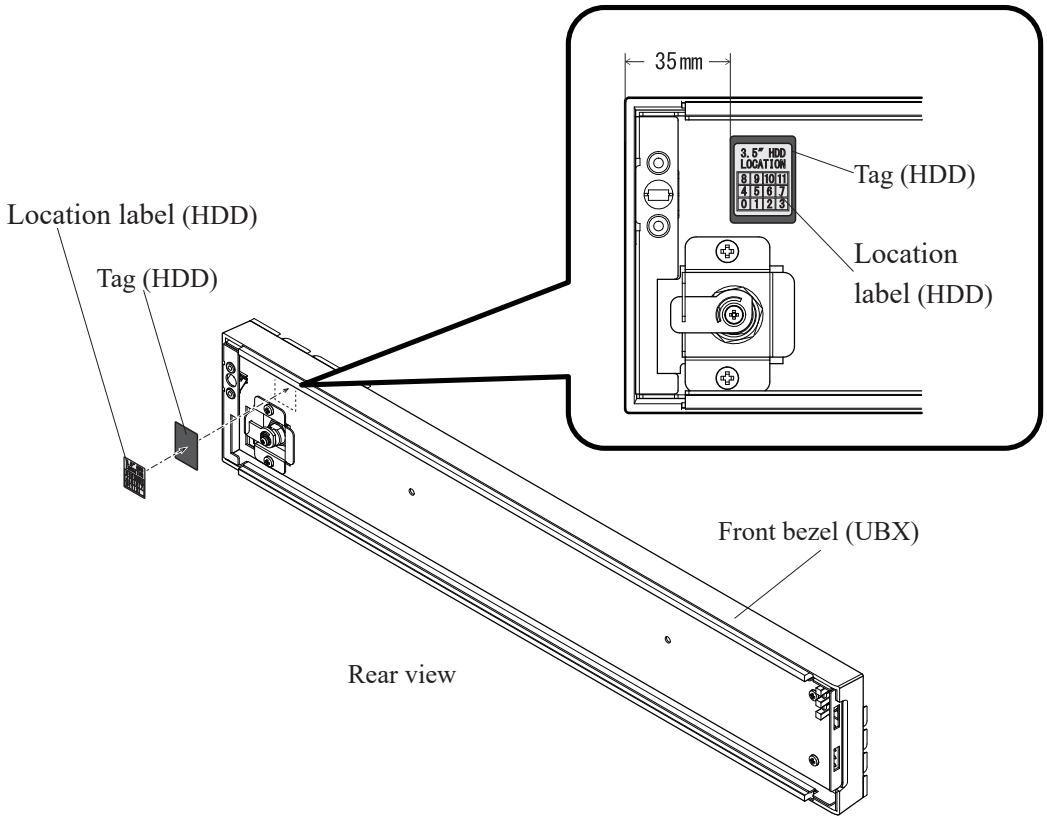


Front view

*1: The above figure shows SBX. The side bezel of UBX/NBX has the same shape as that of SBX.

11. Attaching the location label (HDD) (for UBX only)
    (1) Attach the location label (HDD) to the tag (HDD).
    (2) Attach the tag (HDD) to the rear side of the front bezel.

Figure 4-22 Attachment Location of Location Label (HDD) (UBX Front Bezel)



NOTE: Perform this step for UBX only. The location label (HDD) helps you to identify HDD locations. Attach the label as needed.

12. Reinstalling the removed parts
    If you removed the parts in "8. Removing the parts", install the removed parts again.
    If you did not remove the parts, go to Step 13.

    (1) Installing the DBPS
        (a) With the lever completely opened, insert the Power Supply (DBPS) in to the slot.
            If you cannot insert the Power Supply (DBPS) into the slot easily, insert it after adjusting the position by slightly returning the lever.
        (b) Push the Power Supply (DBPS) in all the way.
        (c) Close the lever completely to fix the Power Supply (DBPS).
        (d) Install the other Power Supply (DBPS) in the same manner.

Figure 4-23 Installing DBPS (SBX/UBX/NBX)

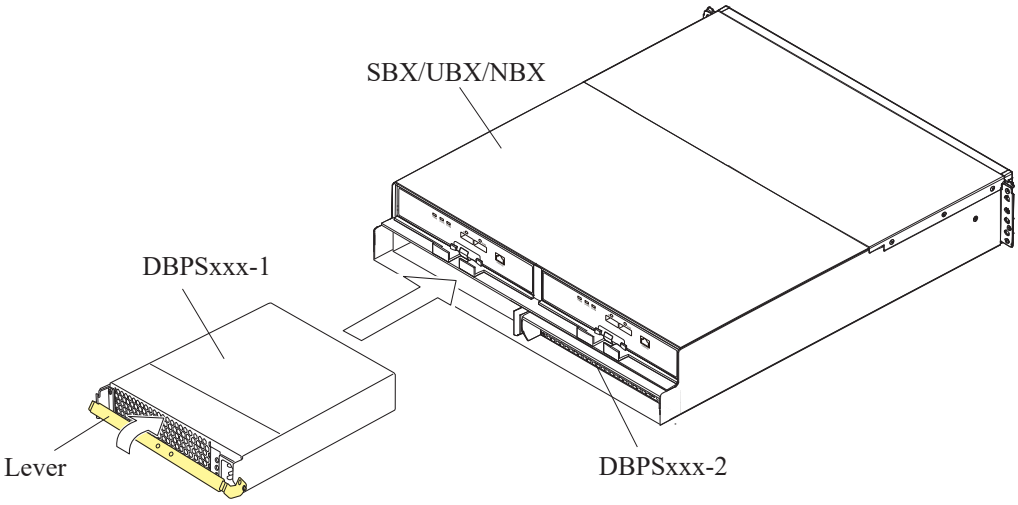
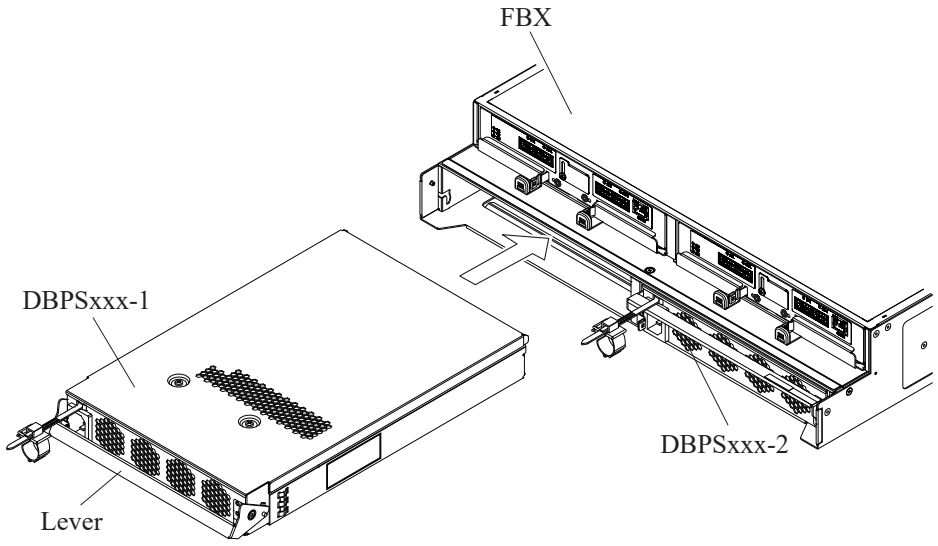


Figure 4-24 Installing DBPS (FBX)



(2) Attaching the ENC

(a) Open the right and left levers of the ENC.

(b) Insert the ENC until the edge of the lever comes in contact with the Drive Box.

(c) Close the right and left levers to insert the ENC completely.

(d) Install the other ENC in the same manner.

Figure 4-25 Installing ENC (SBX/UBX/NBX)

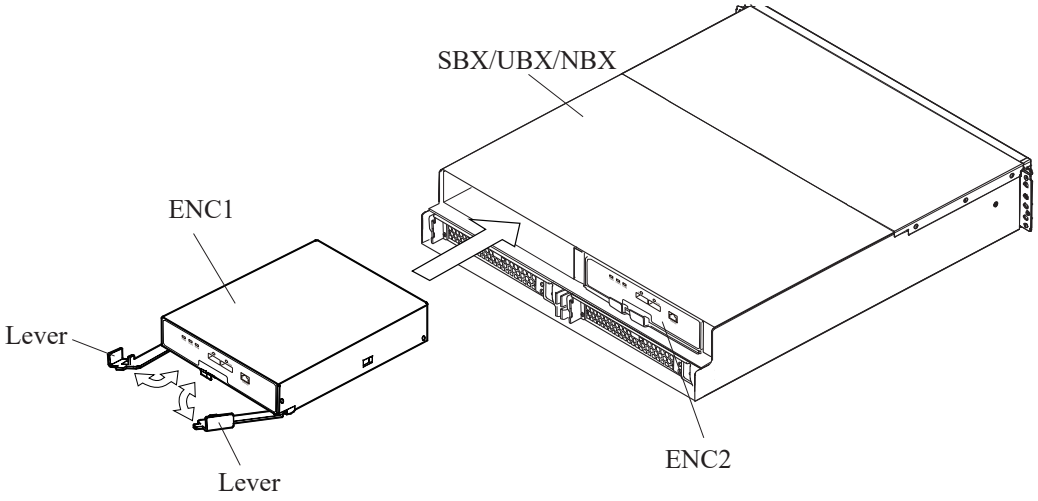
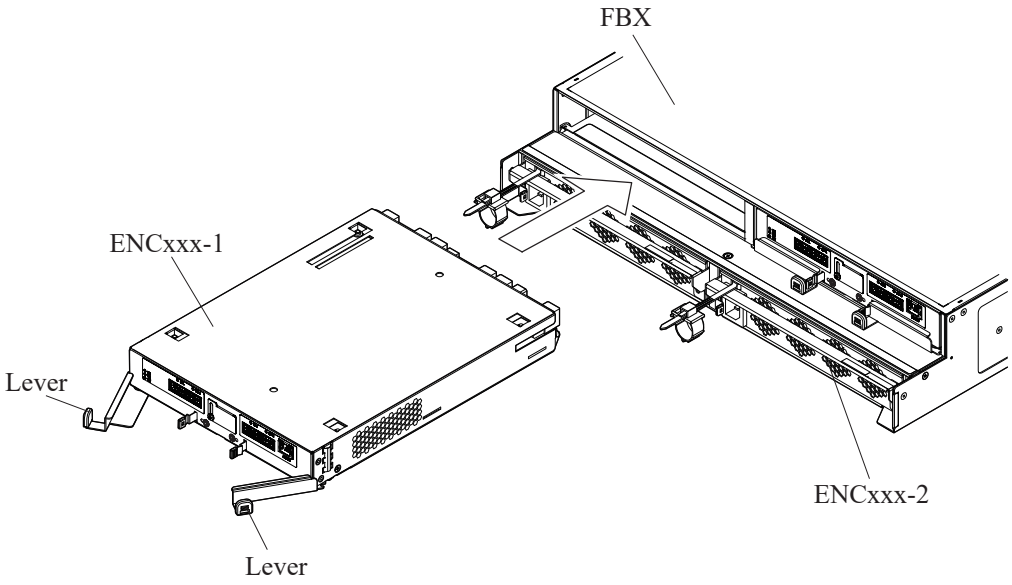


Figure 4-26 Installing ENC (FBX)



(3) Reinstall the removed parts with the other Drive Boxes in the same manner.

13. Attaching the color code labels
    Attach the Color Code Labels under the SAS ports on the ENCs.

Figure 4-27 Locations to Which Color Code Labels are attached (SBX)

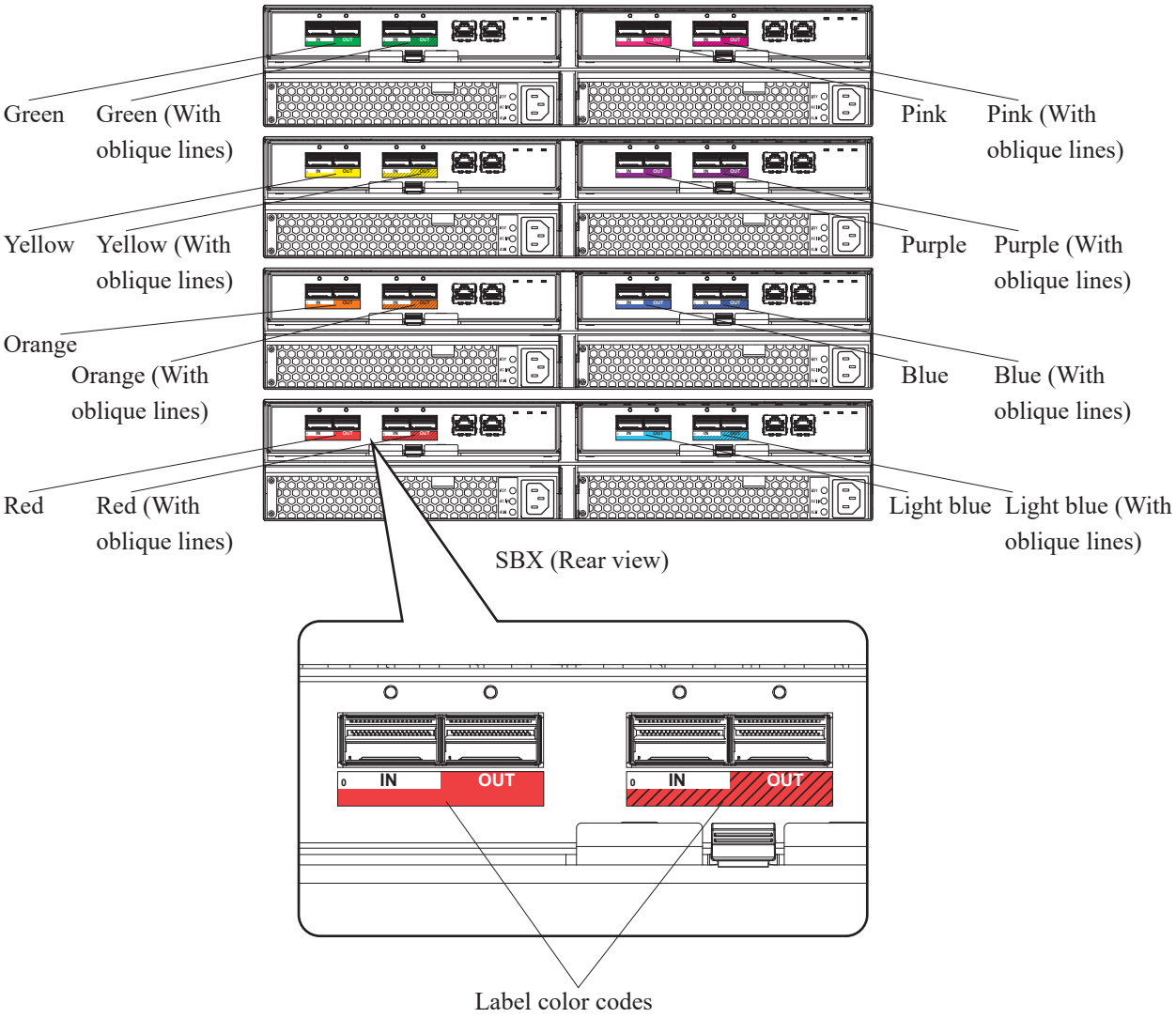


Figure 4-28 Locations to Which Color Code Labels are attached (UBX)

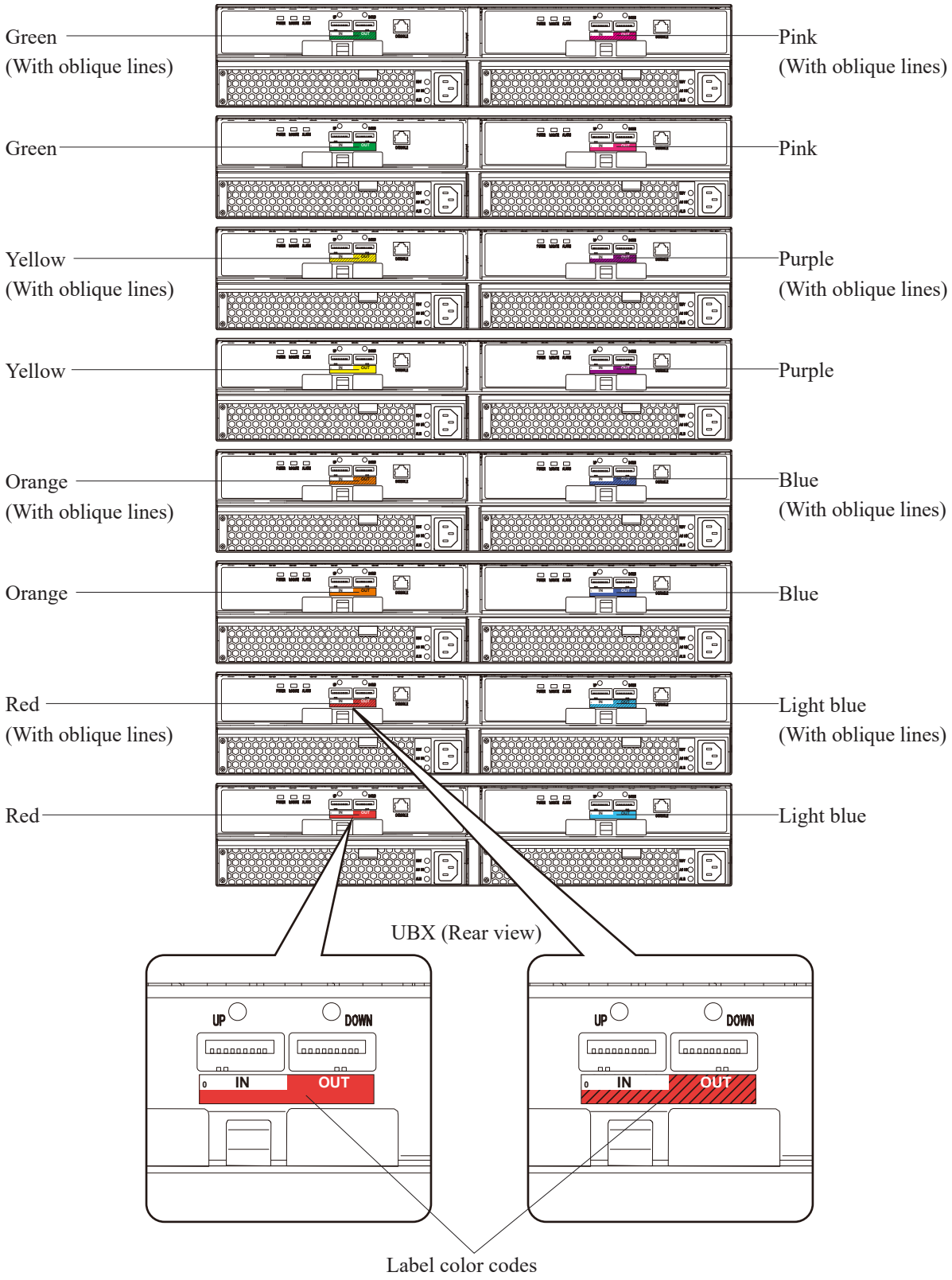


Figure 4-29 Locations to Which Color Code Labels are attached (FBX)

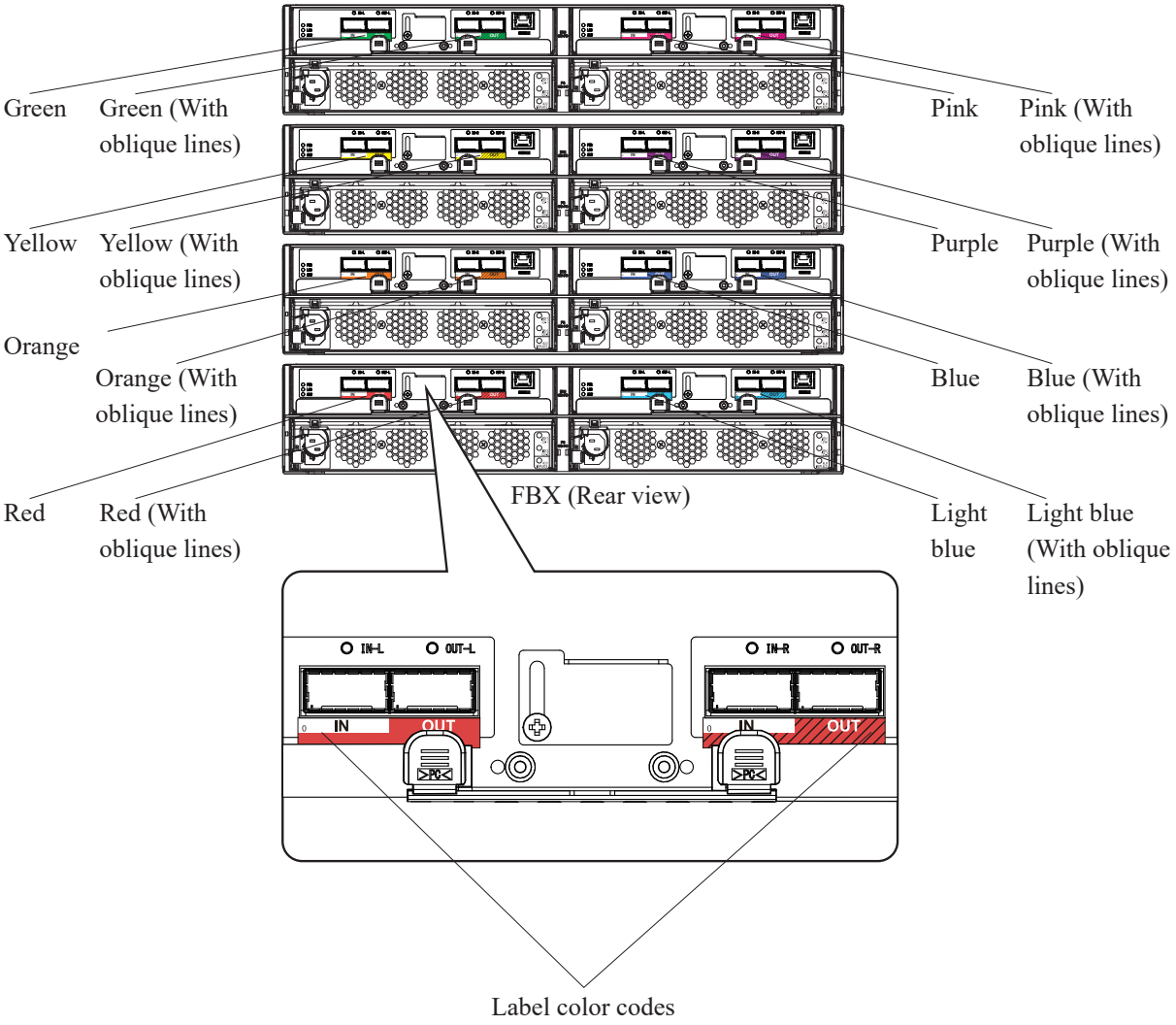
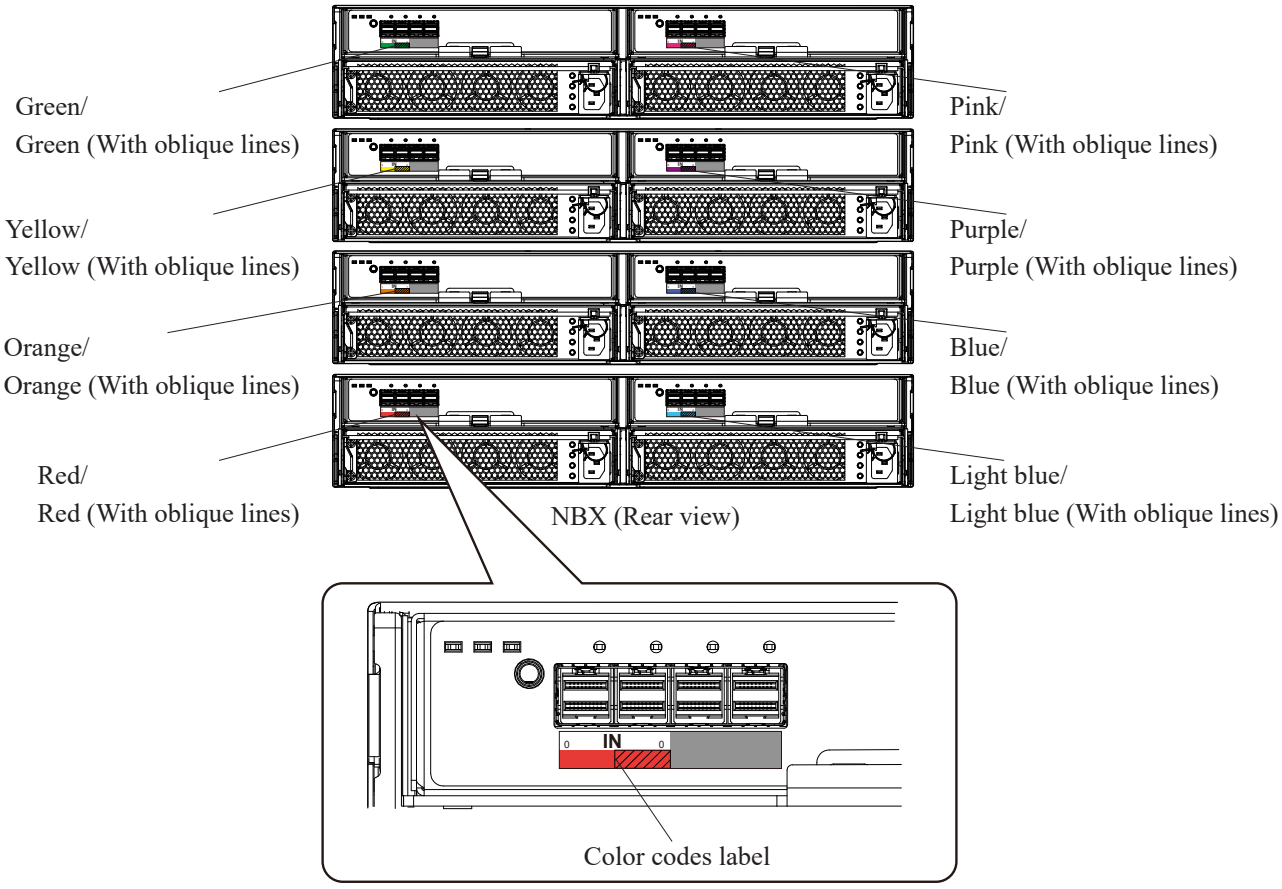


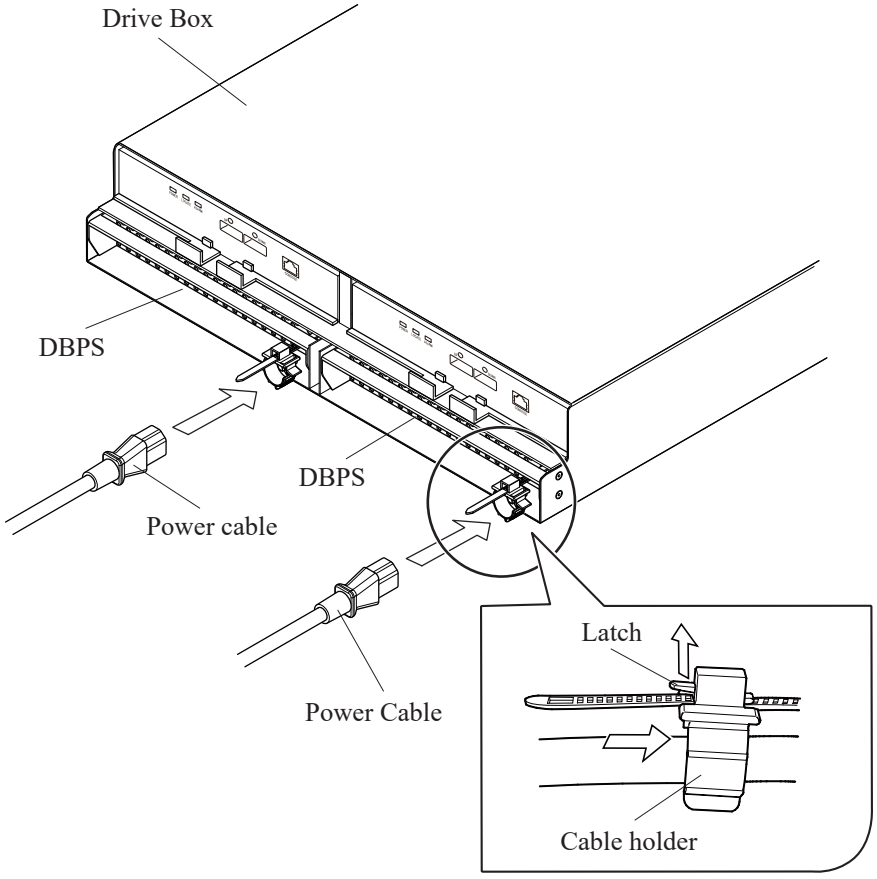
Figure 4-30 Locations to Which Color Code Labels are attached (NBX)



14. Connecting SAS Cables/NVMe Cables
    Connect the SAS cables/NVMe cables, attach the location labels and route the cables referring to "Connecting SAS Cables/NVMe Cables" (INST(IN)09-04-10).

15. Connecting of Power Cables
    (1) Connect two power cables to the DBPSs.
    (2) The following figure shows a power cable connection example in the configuration where only SBX/UBX is installed in the same rack.
    (3) Push the power cable holder toward the DBPS until it stops.

Figure 4-31 Connection of Power Cables



(4) Connect the two power cables to the PDUs and fix them with a stopper.
Connection examples of power cables are as follows:

NOTE : • Connect the power cable for the DBPSxxx-1 to the left PDU.
Connect the power cable for the DBPSxxx-2 to the right PDU.
If they are plugged in the receptacles of the PDUs on the same side, the function of the duplicated power supply does not work.
• Insert only the installed power cable into the PDU outlet.
• Connect DKC-0, DKC-1, HSNBX-0, and HSNBX-1 to the same PDUs (two PDUs in total on the right and left sides).
Connect DKC-2 and DKC-3 to the same PDUs (two PDUs in total on the right and left sides).
Connect DKC-4 and DKC-5 to the same PDUs (two PDUs in total on the right and left sides).
Connect all Drive Boxes (DB-xxx) composing one DKU to the same PDUs (two PDUs in total on the right and left sides). However, when DKU is UBX, Drive Boxes can be separately connected to two different PDUs on the right side and to two different PDUs on the left side (use four receptacles on each PDU).

Figure 4-32 Connection Example of Power Cables

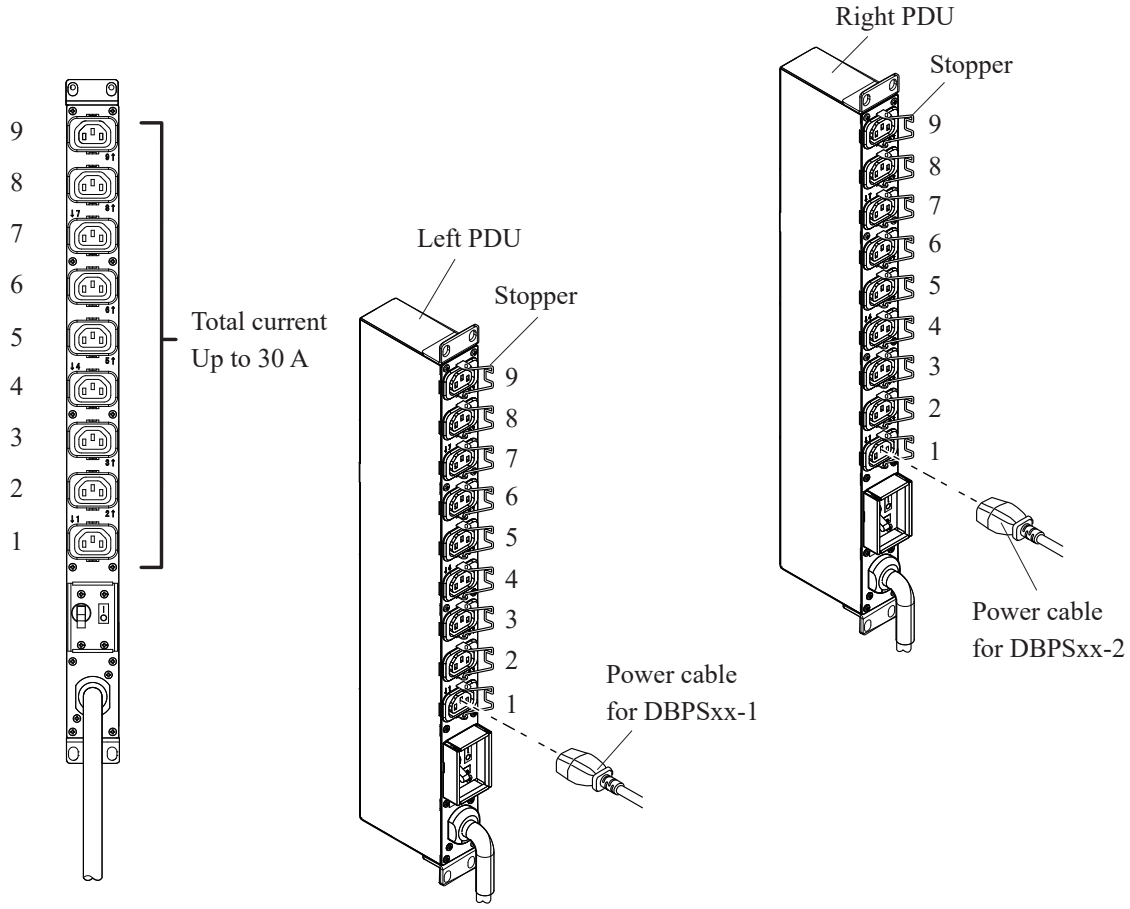
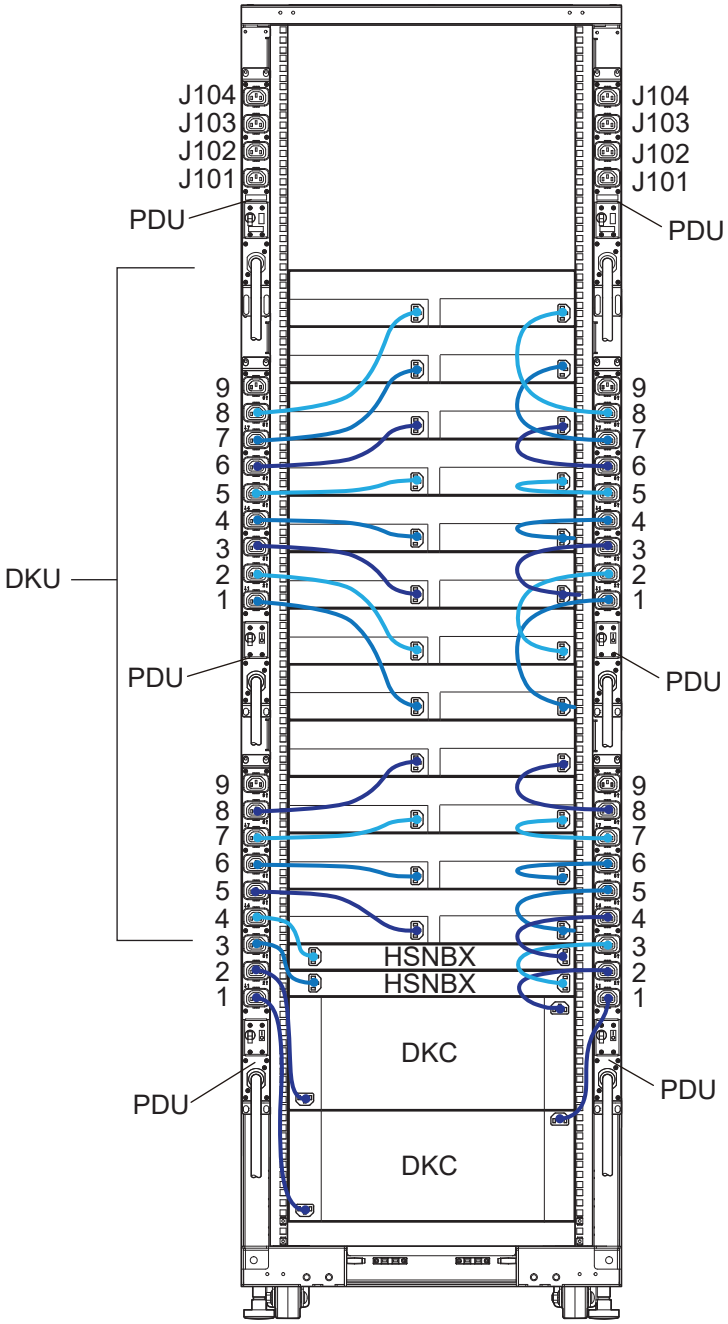


Table 4-4 Load Current of Each Chassis

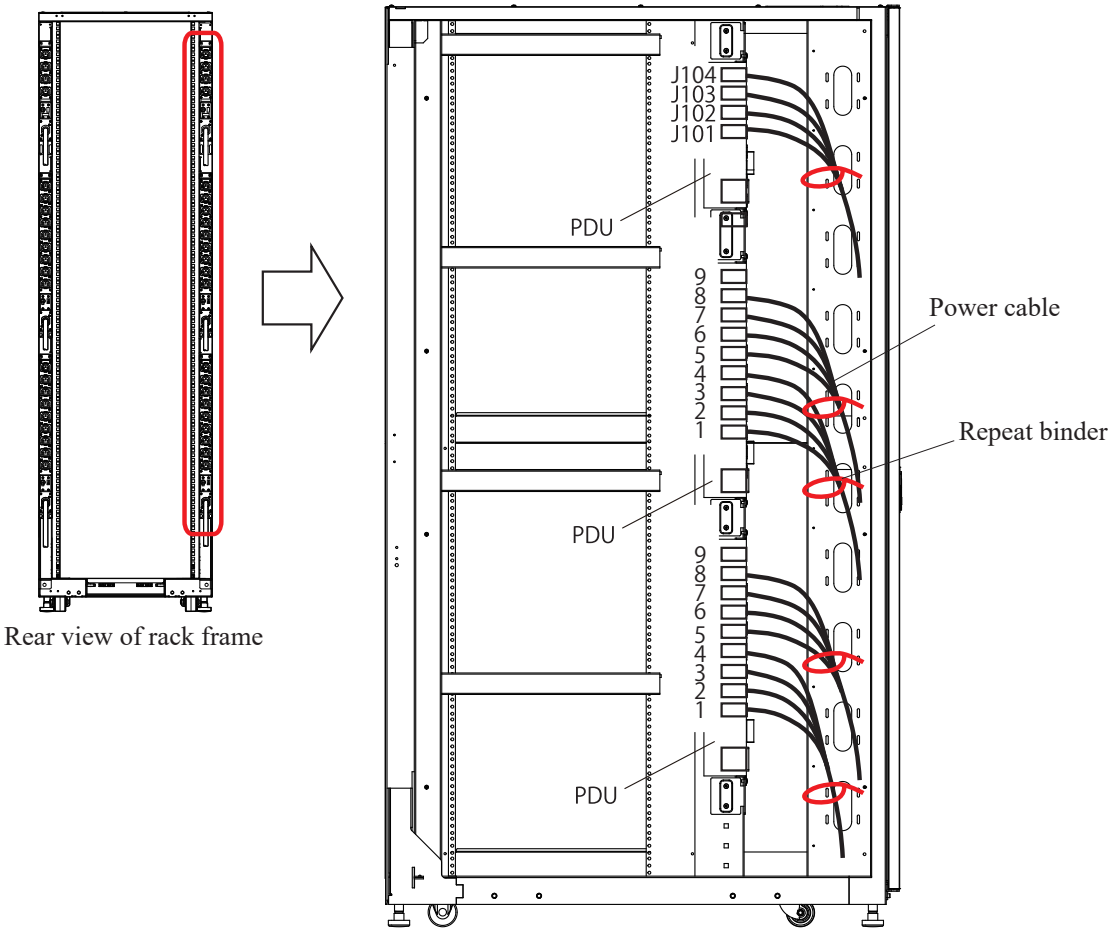
No.	Chassis	Load Current (per PS)
1	CBX	7.2 A
2	HSNBX	1.2 A
3	SBX	3.2 A
4	UBX	2.0 A
5	FBX	3.1 A
6	NBX	4.0 A

Figure 4-33 Connection Example of Power Cables (Configuration Where DKUs Are Installed in the Same Rack)



(a) Fix power cables with repeat binders on the both sides of the rear of the rack frame.
(b) Connect and fix the other power cables in the same way.

Figure 4-34 Fixing Power Cables



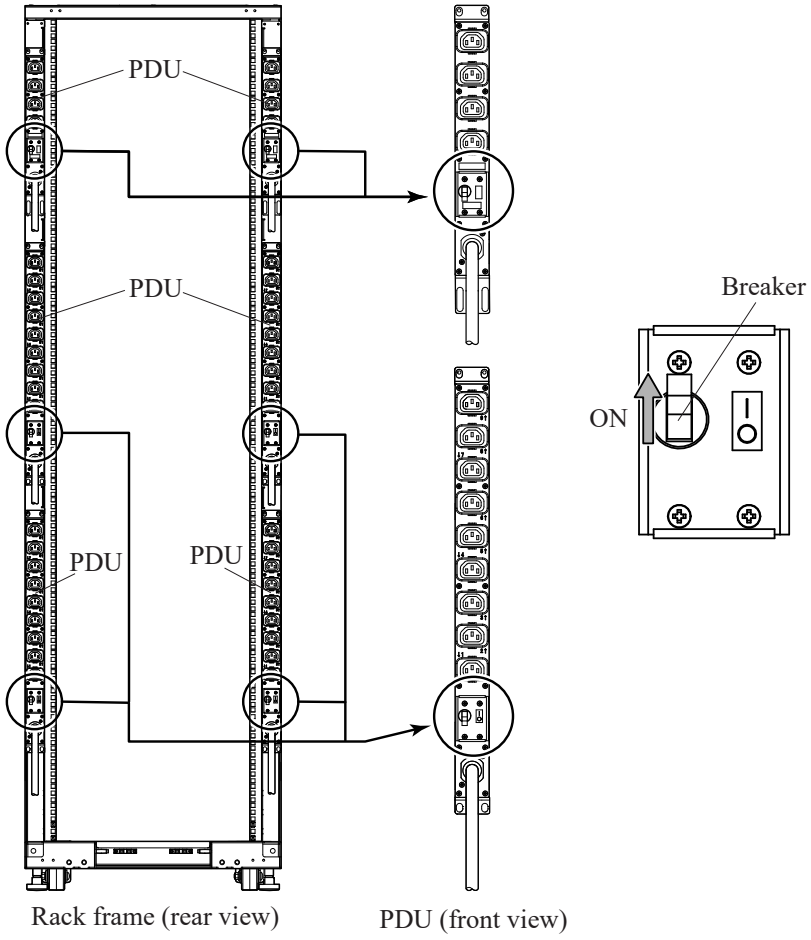
Rear view of rack frame

On the side of the rack frame

*1: The figure shows fixation of the right side.

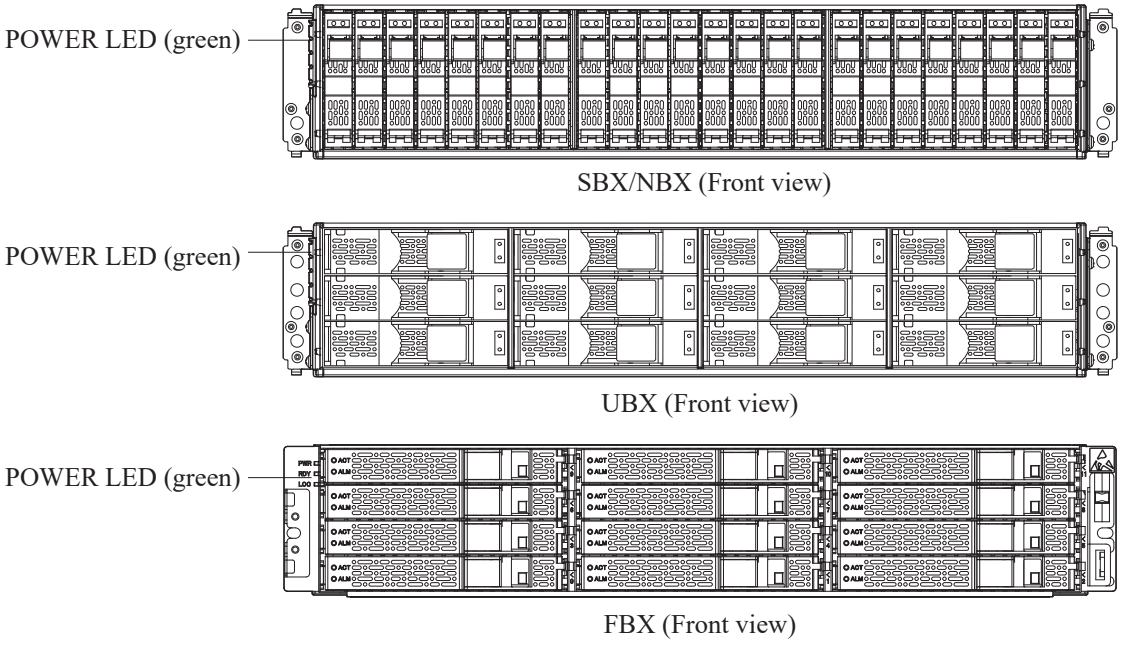
(c) Turn on of the PDU.
Turn it on when the PDU breaker connecting the power cables is turned off.

Figure 4-35 PDU Breaker



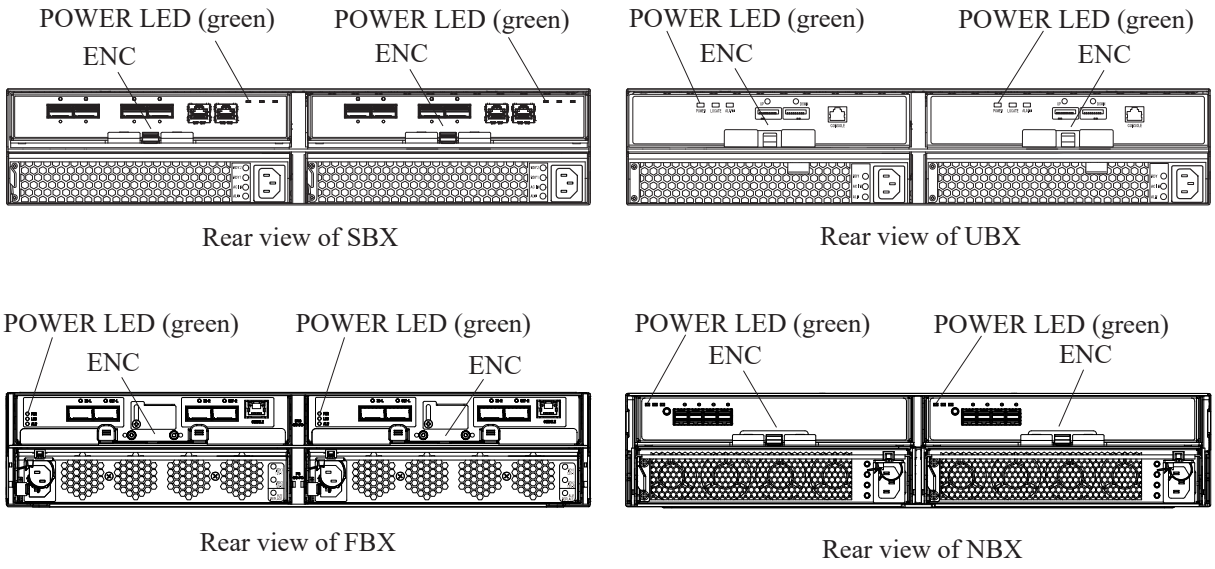
(d) Check that the POWER LED (green) on the front of the SBX/UBX/FBX/NBX lights up.

Figure 4-36 SBX/UBX/FBX/NBX on POWER LED



(e) Check that the POWER LEDs (green) on the ENCs in the rear of the SBX/UBX/FBX/NBX light up.

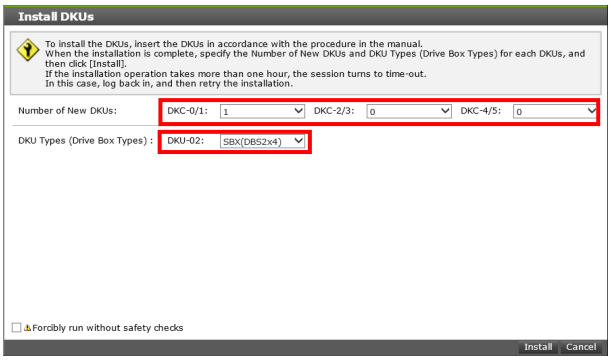
Figure 4-37 Location of POWER LED on ENC



16. Attaching the Front Bezel
    Attach the Front Bezel referring to “How to Attach/Remove the Front Bezel” (INST(GE)04-01-10).

17. Checking addition completion by Maintenance Utility
    (1) <Recognize Drive Boxes>
    Click [Install].

    NOTE : The error list window is displayed if multiple errors are detected by the prior check. If it is displayed, click the text of “Error Code” and recover the failures or the blockade in accordance with the details of the displayed errors.



    (2) <Check Addition Completion>
    Check that the following message is displayed and click [Close].
    If a message other than the described is displayed, refer to Message Section (MSG00-00) .

    (3) <Checking Normality>
    Perform the procedure described in "Checking Normality" (TRBL02-06-10).
    (4) Click [Logout] to close the window.

18. Removing the Maintenance PC
    Remove the Maintenance PC from the storage system referring to “Attachment/Removal Procedure of Maintenance PC” (INST(IN)13-02-10).

5. Adding Channel Board (CHB)

NOTE: You need to install CHBs in pairs in two CTLs. Install one CHB in a pair in one CTL, and the other CHB in the other CTL according to "Channel Board Option Installation Rule" (INST(GE)03-01-40).

- For VSP 5500 and VSP 5500H
  Install one or more pairs of CHBs (*1) in one installation operation on Maintenance Utility.
  *1: When the GUM version is less than 90-02-01/00, only one CHB pair can be installed in one installation operation.
- For VSP 5100 and VSP 5100H
  Install one or more CHBs (*2) in one CTL in one installation operation on Maintenance Utility. To install a pair of CHBs, you need to perform the installation operation on Maintenance Utility twice.
  *2: When the GUM version is less than 90-02-01/00, only one CHB can be installed in one installation operation.

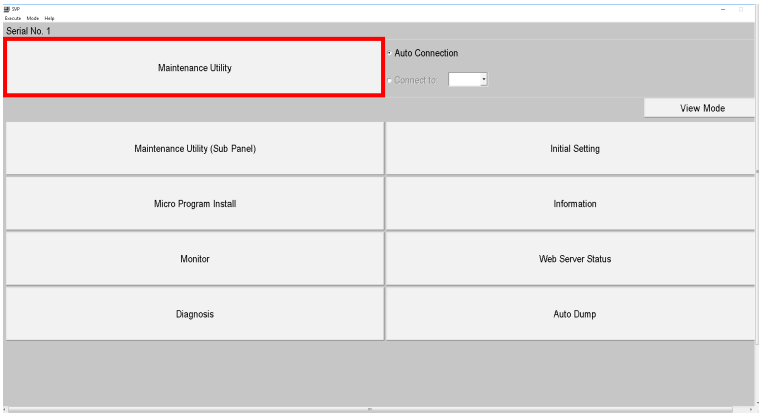
Follow the procedure below.

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the SSVP, and then log in to the SVP.
   - "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10)
   - "Connection to the SVP" (SVP01-30)

2. Starting the SVP window
   From the menu of Web Console, click [Maintenance Components] - [Maintenance Other Components].

3. Changing the operation mode
   Change the mode to [View Mode].

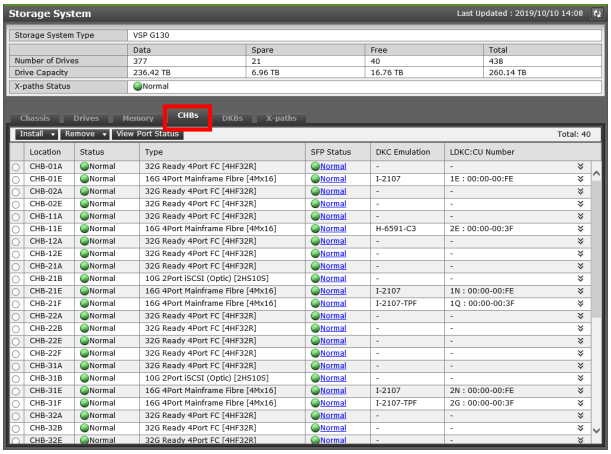
4. Starting Maintenance Utility
   In the SVP window, click [Maintenance Utility] (See "Starting Maintenance Utility" (MU01-10).).



5. Selecting additional parts by Maintenance Utility

(1) <Main Window>

Click the [CHBs] tab in the main window.



Choose either of the following procedures depending on the number of CHB pairs to be installed.

- Procedure for installing multiple CHB pairs
- Procedure for installing one CHB pair

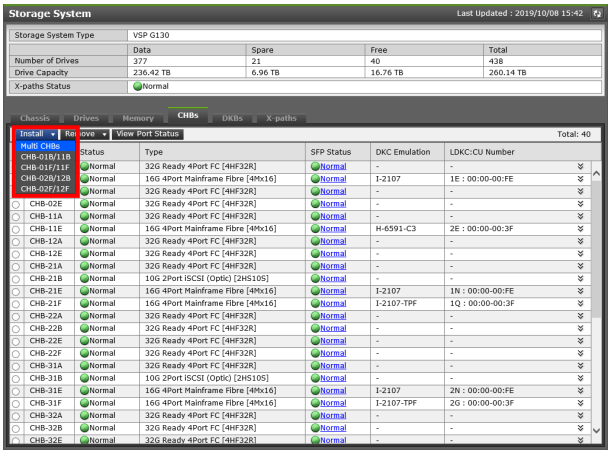
NOTE: Only when the GUM version is 90-02-01/00 or later, you can choose “Procedure for installing multiple CHB pairs”.
When the GUM version is less than 90-02-01/00, choose “Procedure for installing one CHB pair”.

Procedure for installing multiple CHB pairs

(a) <Select Additional Slots>

Click [Install], and select [Multi CHBs].

NOTE: Only when there are free slots to install multiple CHB pairs, [Multi CHBs] is displayed.



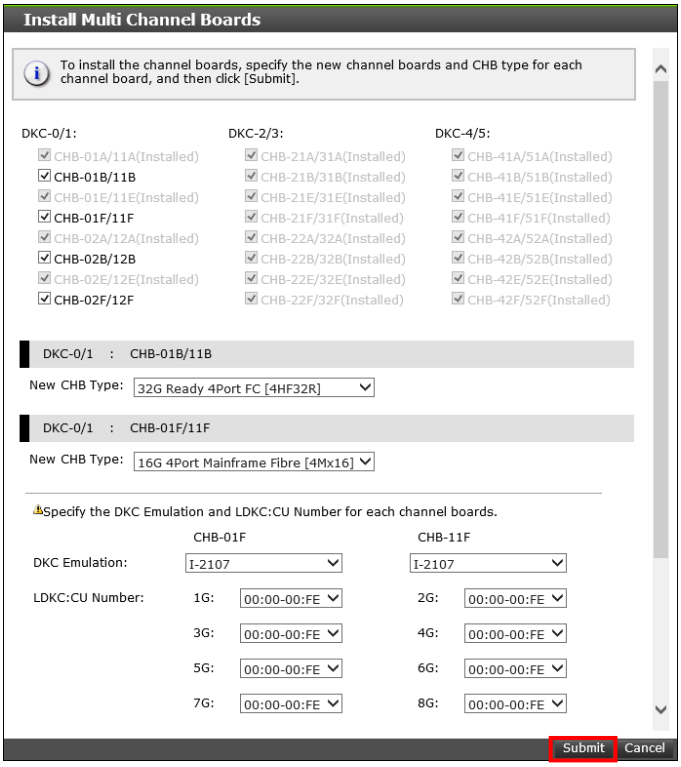
(b) <Select CHB and Type>

⚠ CAUTION

About "Forcibly run without safety checks":
If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the message, the manual or the contact described in the manual.

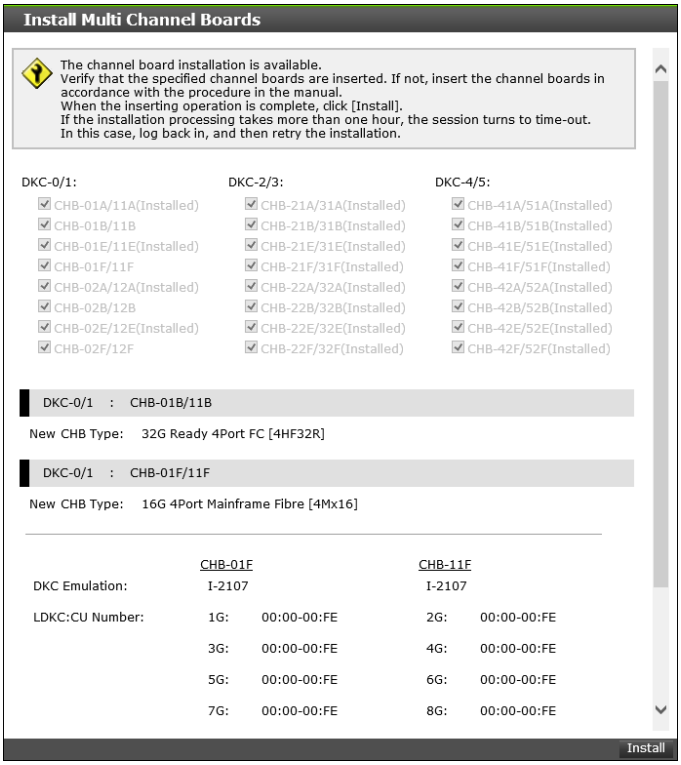
Select the CHBs to be installed and their types, and then click [Submit].
To install CHBs for mainframe systems, select [DKC Emulation] and [LDKC:CU Number], and then click [Submit].

NOTE: For the relation between the type to be selected and the model name, see "Web Console Window Display and Conversion Table of Option Type Names" (INST(GE)02-03-10).



(c) <Check Addition Preparation of CHBs>
Check the set contents in the window shown below, and then go to Step 6.

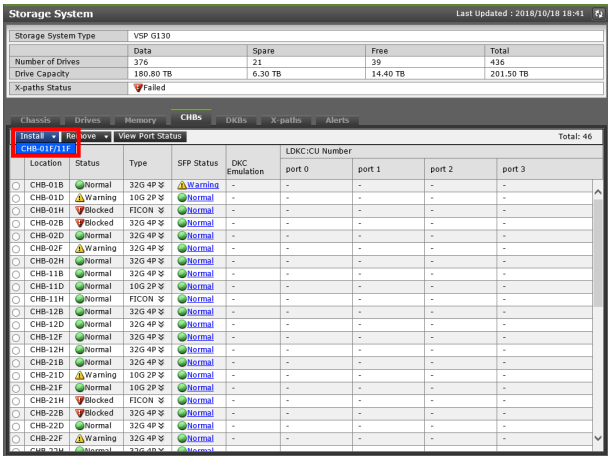
NOTE: Do not click [Install] at this time.
Click [Install] after completing the addition work.



Procedure for installing one CHB pair

(a) <Select Additional Slots>

Click [Install] to select slots to add the Channel Boards.



NOTE:
- For VSP 5500 and VSP 5500H, two slots on the installation destination are displayed.
- For VSP 5100 and VSP 5100H, one slot on the installation destination is displayed.

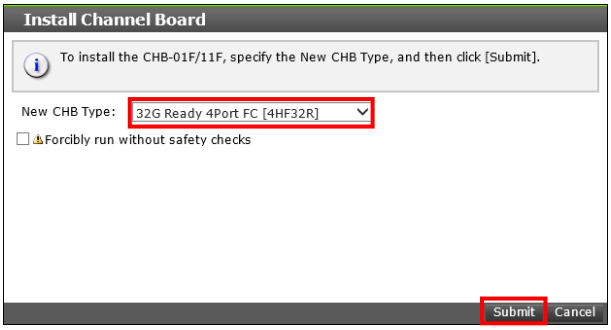
(b) <Select Channel Board>

> **⚠ CAUTION**
>
> About "Forcibly run without safety checks":
> If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the message, the manual or the contact described in the manual.

Select the CHBs to be installed and their types, and then click [Submit].
To install CHBs for mainframe systems, select [DKC Emulation] and [LDKC:CU Number], and then click [Submit].

NOTE: For the relation between the type to be selected and the model name, see "Web Console Window Display and Conversion Table of Option Type Names" (INST(GE)02-03-10).

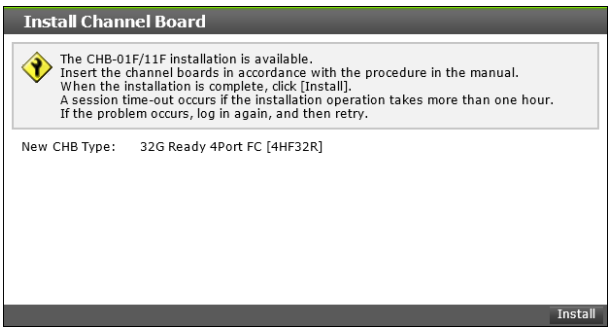
Example: Window displayed for CHBs for open systems



(c) <Check Addition Preparation of Channel Boards>
Check the set contents in the window shown below.

NOTE: Do not click [Install] at this time.
Click [Install] after completing the addition work.

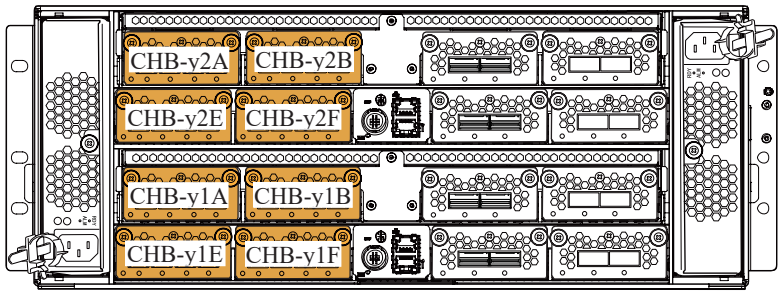
Example: Window displayed for CHBs for open systems



6. Addition work of Channel Boards

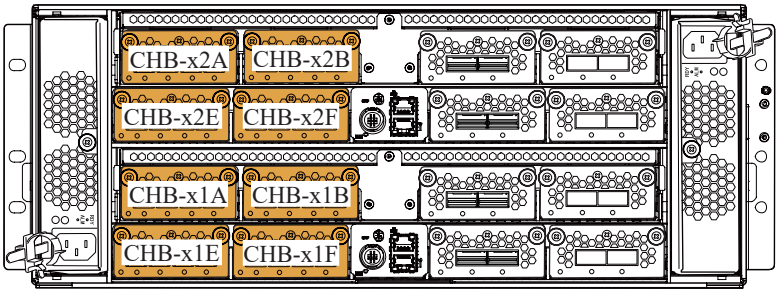
Location	Additional part name		Parts name
Rear View of DKC	1	Channel Board	• CHB (32 G Ready 4Port FC) (4HF32R) • CHB (10 G 2Port iSCSI (Optic)) (2HS10S) • CHB (16 G 4Port Mainframe Fibre SW) (4MS16) • CHB (16 G 4Port Mainframe Fibre LW) (4ML16)

Controller Board y2 (CTLy2)



Controller Board y1 (CTLy1)
DKC-y (Rear view)

Controller Board x2 (CTLx2)



Controller Board x1 (CTLx1)
DKC-x (Rear view)

*1: DKC-x
└→DKC No. (0, 2, 4)
DKC-y
└→ DKC No. (1, 3, 5)

NOTE: The above illustrations are for VSP 5500 and VSP 5500H. For VSP 5100 and VSP 5100H, only CTL01 and CTL12 are installed.

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 Storage System before starting and do not take it off until you finish. Refer to "Note when Installing and Removing Parts" (INST(GE)01-01-10).

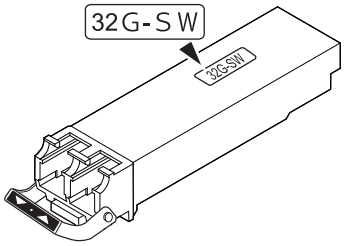
NOTICE: If Channel Boards are inserted randomly, malfunction may occur. Therefore, insert the Channel Boards in two steps, Step (c) and Step (d) shown below.

(1) Adding work of Channel Boards

(a) Pull out and remove the dummy.

(b) When adding 32 Gbps Channel Boards, mount the Small Form Factor Pluggable (SFP) on the Channel Board to be added.
For channel boards other than 32 Gbps ones, this step is not required. Go onto Step (c).
Check the insertion direction of the SFP, and insert it into the Channel Board to be added until it clicks.

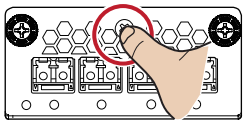
NOTE: The label "32G-SW" is attached to the 32 Gbps Small Form Factor Pluggable (SFP).



(c) Insert the Channel Boards to be added into the slots just before the shield finger.

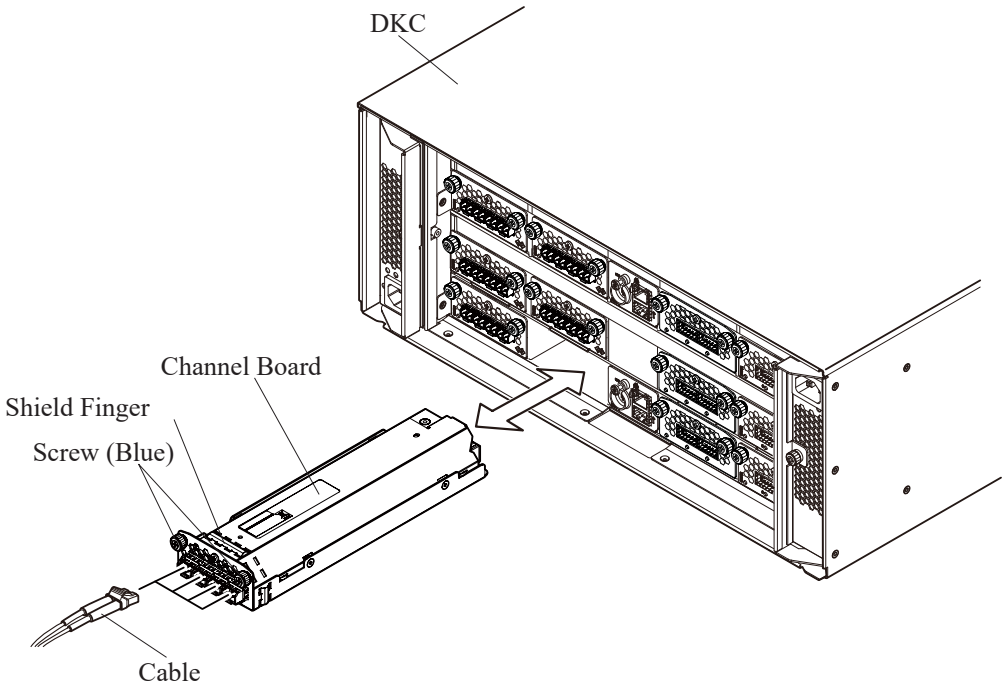
(d) Push the Channel Board gently all the way in.

NOTICE: Push the front side of the Channel Board all the way to insert it to the end.



(e) Tighten two screws (blue) and fix the Channel Board.

Figure 5-1 Adding Channel Board



(2) Connect the cables to the added Channel Board.

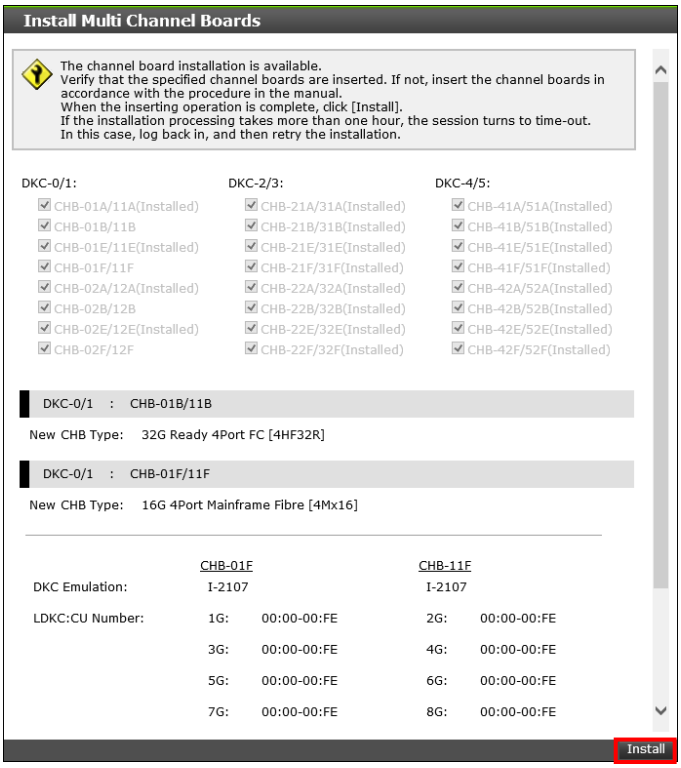
NOTE: Check that cable latch clicks and the cables are surely connected.

(3) If you have specified multiple CHB pairs to be installed before the hardware installation, install the other CHBs by repeating the procedure from Step 6.(1).

7. Checking addition completion by Maintenance Utility
   (1) <Recognize CHB>
   Click [Install].

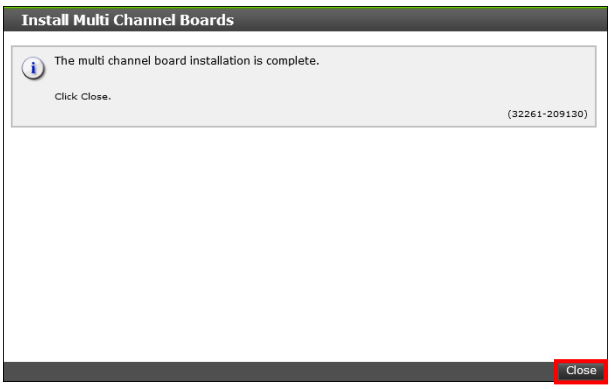
   NOTE: The error list window is displayed if multiple errors are detected by the prior check. If it is displayed, click the text of "Error Code" and recover the failures or the blockade in accordance with the details of the displayed errors.

   Example: Window displayed for installation of multiple CHB pairs



   (2) <Check Addition Completion>
   Check that the following message is displayed and click [Close].
   If a message other than the described is displayed, refer to Message Section (MSG00-00) .

   Example: Window displayed for installation of multiple CHB pairs



8. For VSP 5500 and VSP 5500H, go to Step 9.
   For VSP 5100 and VSP 5100H, repeat the procedure from Step 5 to install CHBs in the other CTL.

9. Checking the SFP status
   Click the [CHBs] tab in the Controller Chassis window, and check if SFP Status is “Normal”.
   If “Not Fix” is displayed in SFP Status, check if the SFP is properly inserted.
   When “Not Fix” is displayed in SFP Status even if the SFP is properly inserted or “Warning” is displayed in SFP Status, replace the SFP with the maintenance part. See “SFP REPLACEMENT PROCESSING - RSFP” (REP(RSFP)00-00).

10. Checking Normality
    Perform the procedure described in “Checking Normality” (TRBL02-06-10).

11. Click [Logout] to close the window.

12. Removing the Maintenance PC
    Remove the Maintenance PC from the storage system referring to “Attachment/Removal Procedure of Maintenance PC” (INST(IN)13-02-10).

6. Adding Disk Board (DKB)/Replacing Disk Board (DKB) (Type Change)

NOTE : There are different types of Disk Boards (DKBs). They are different in interface and support for encryption. Different types of DKBs cannot be mixed in a CBX pair. The DKB that supports encryption and the DKB that does not support it cannot be mixed in a storage system. Before starting the following procedure, check the DKB type.

The DKB installation procedure includes the following cases:

- Addition : Adding DKBs in empty slots
- Replacement (type change) : Replacing the installed DKBs that support encryption with the DKBs that do not support it without changing the interface type, and vice versa

NOTE : All DKBs in a CBX pair must be the same type.

NOTE: The DKBs that support encryption cannot be installed in the storage system containing the DKBs that do not support it, and vice versa.

NOTE: When the encryption policy is set to ON, installation of the DKBs that do not support encryption or replacement (type change) with the DKBs that do not support encryption is not possible.

NOTE: Replacement (type change) is possible only for the SAS-interface DKBs.

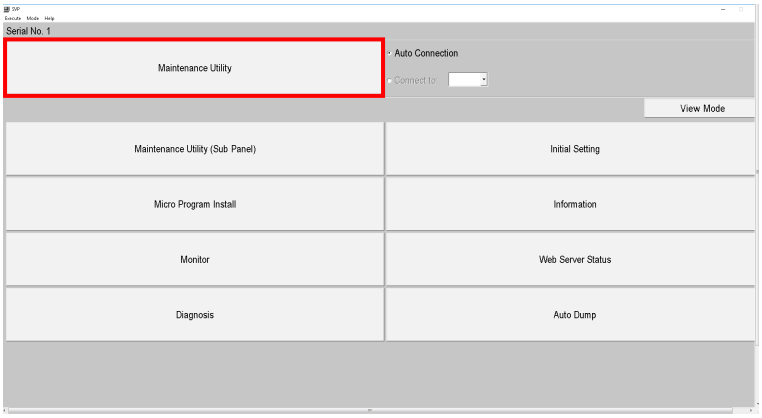
NOTE: When NVMe-interface DKBs and SAS-interface DKBs are installed in a storage system, replacement (type change) of SAS-interface DKBs is not possible.

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the SSVP, and then log in to the SVP.
   - "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10)
   - "Connection to the SVP" (SVP01-30)

2. Starting the SVP window
   From the menu of Web Console, click [Maintenance Components] - [Maintenance Other Components].

3. Changing the operation mode
   Change the mode to [View Mode].

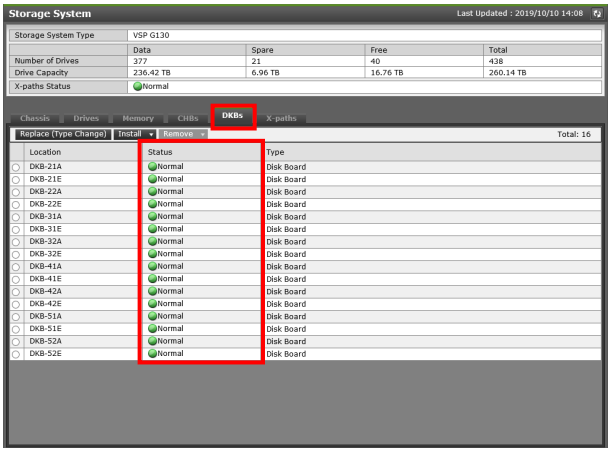
4. Starting Maintenance Utility
   In the SVP window, click [Maintenance Utility] (See "Starting Maintenance Utility" (MU01-10).).



5. Selecting target parts by Maintenance Utility

(1) <Main Window>

Click the [DKBs] tab in the main window and display the Disk Board status.



Choose either of the following procedures:

- Procedure for installing Disk Boards in free slots
  - To install Disk Boards in multiple CBX pairs …… Go to Step (a).
  - To install Disk Boards in one CBX pair …… Go to Step (d).

NOTE: Only when the GUM version is 90-02-01/00 or later, you can start the procedure from Step (a). When the GUM version is less than 90-02-01/00, start the procedure from Step (d).

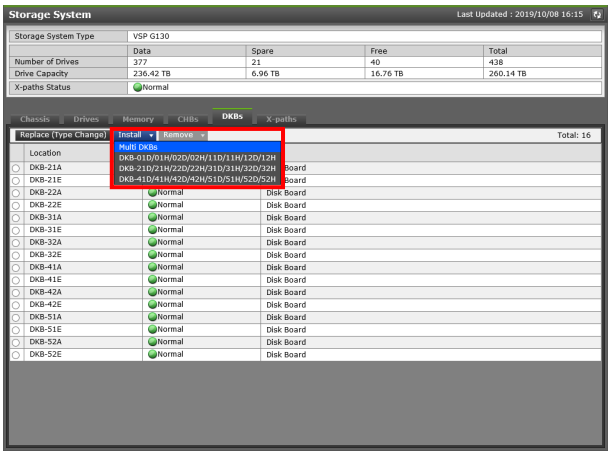
- When replacing Disk Boards (Type Change)

Procedure for installing Disk Boards in free slots

(a) <To install Disk Boards in multiple CBX pairs>

Click [Install], and select [Multi DKBs].

NOTE: Only when there are free slots in multiple CBX pairs, [Multi DKBs] is displayed.



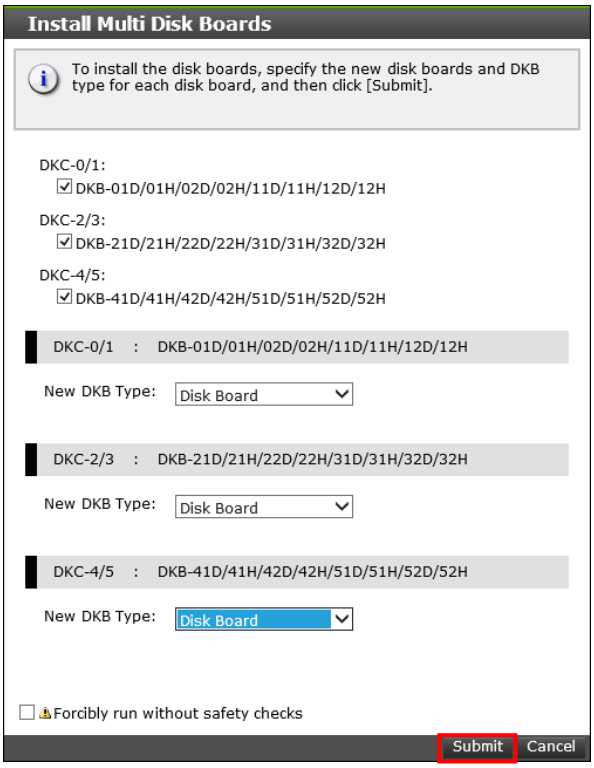
(b) <Select Disk Board>

⚠ CAUTION

About "Forcibly run without safety checks":
If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the message, the manual or the contact described in the manual.

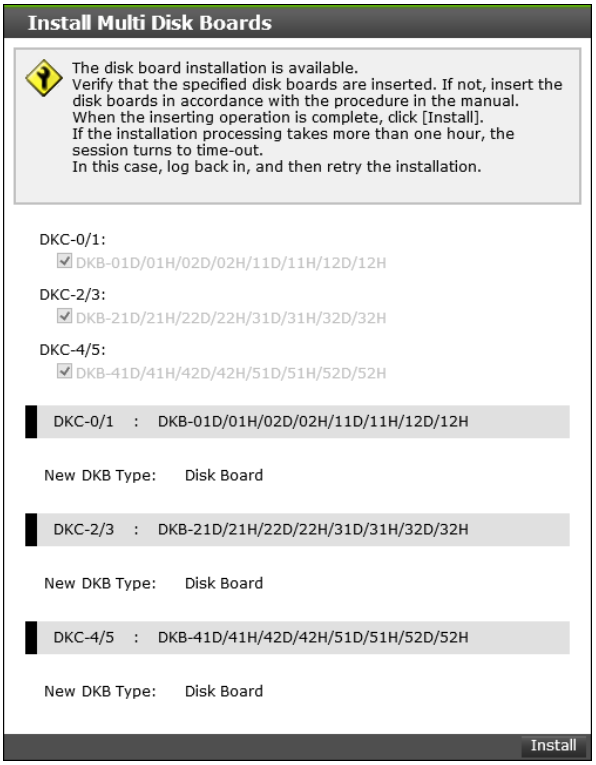
Select the Disk Boards to be installed and their types, and then click [Submit].

NOTE : The error list window is displayed if multiple errors are detected by the prior check. If it is displayed, click the text of "Error Code" and recover the failures or the blockade in accordance with the details of the displayed errors.

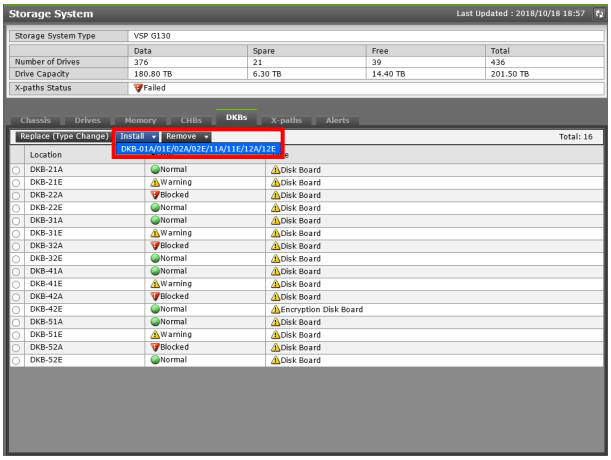


(c) <Check Addition Preparation of Disk Boards>
Check the set contents in the window shown below, and then go to Step 6.

NOTE : Do not click [Install] at this time.
Click [Install] after completing the addition work.



(d) To install Disk Boards in one CBX pair
Click [Install] to select slots to add the Disk Boards.



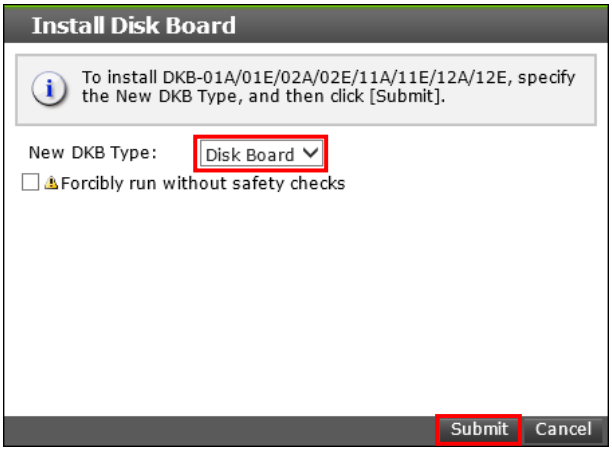
(e) <Select Disk Board>

⚠ CAUTION

About "Forcibly run without safety checks":
If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the message, the manual or the contact described in the manual.

Select the type of a Disk Board to be added and click [Submit].

NOTE : The error list window is displayed if multiple errors are detected by the prior check. If it is displayed, click the text of "Error Code" and recover the failures or the blockade in accordance with the details of the displayed errors.



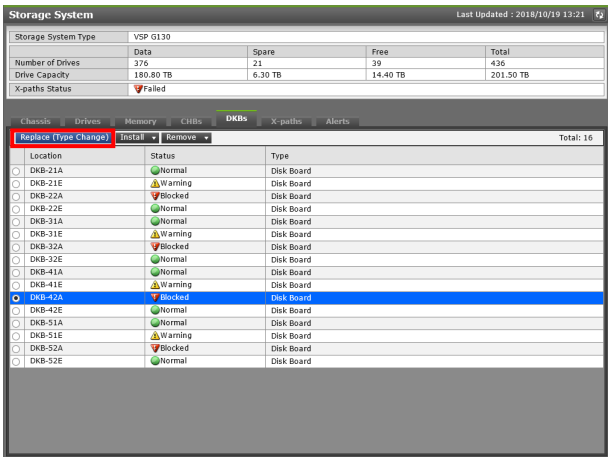
(f) <Check Addition Preparation of Disk Boards>
Check the set contents in the window shown below, and then go to Step 6.

NOTE : Do not click [Install] at this time.
Click [Install] after completing the addition work.

When replacing Disk Boards (Type Change)

(a) <Select Disk Boards>

Select the Disk Boards to be replaced after changing the type and click [Replace (Type Change)].



(b) <Block Disk Boards>

⚠ CAUTION

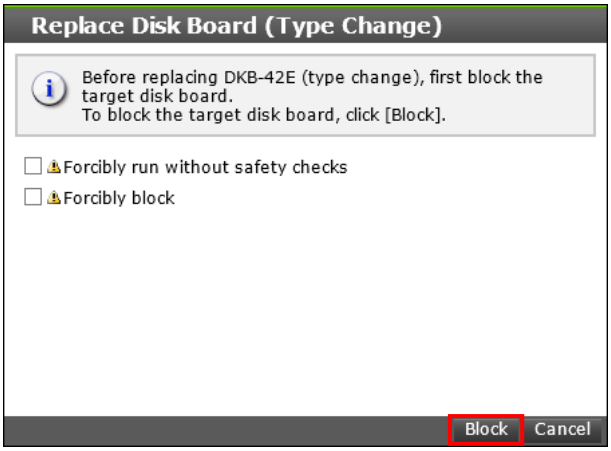
About "Forcibly run without safety checks":

If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the message, the manual or the contact described in the manual.

About "Forcibly block":

If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the contact described in the manual.

Confirm that the following window is displayed, and then click the [Block].



(c) <Displaying the Password entry window>

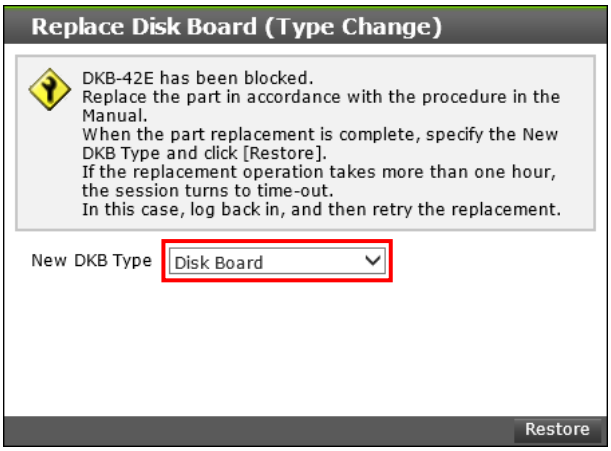
> **⚠ CAUTION**
>
> This operation may cause a serious error such as a system down or a data loss. Confirm the appropriateness of the operation, and then input of the password.

Enter the login password for the maintenance account of the storage system, and then click [OK].

(d) <Select Types>
Select the Disk Boards to be replaced by changing the type.

NOTE: For the relation between the type to be selected and the model name, see "Web Console Window Display and Conversion Table of Option Type Names" (INST(GE)02-03-10).

NOTE : Do not click [Restore] at this time.
Click [Restore] after completing the type change work.

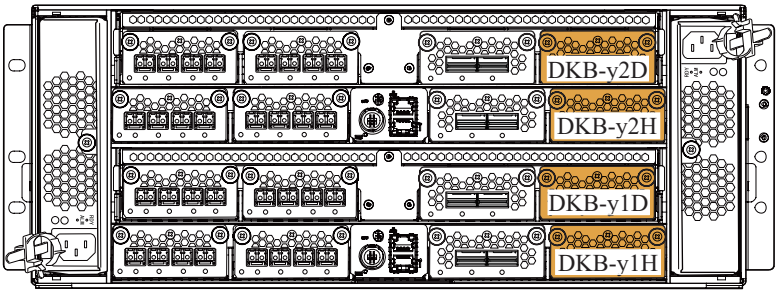


6. Addition work of Disk Boards

Location	Additional part name		Parts name
Rear View of DKC	1	Disk Board	• DKB (BS12G) • EDKB (BS12GE) • DKBN (BN8G)

NOTE : There are multiple types of Disk Boards. Different types of Disk Boards cannot be installed in a CBX pair. Before adding a Disk Board, check the type.

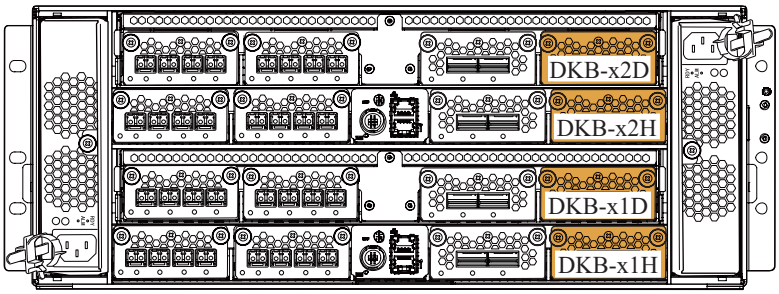
Controller Board y2 (CTLy2)



Controller Board y1 (CTLy1)

DKC-y (Rear view)

Controller Board x2 (CTLx2)



Controller Board x1 (CTLx1)

DKC-x (Rear view)

*1: DKC-x
└→ DKC No. (0, 2, 4)
DKC-y
└→ DKC No. (1, 3, 5)

NOTE: The above illustrations are for VSP 5500 and VSP 5500H. For VSP 5100 and VSP 5100H, only CTL01 and CTL12 are installed.

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 Storage System before starting and do not take it off until you finish. Refer to "Note when Installing and Removing Parts" (INST(GE)01-01-10).

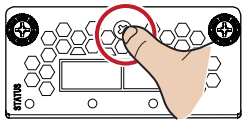
When adding Disk Boards to vacant slots, do the same in all Controller Chassis.
When performing the replacement (Type Change), replace the Disk Board selected in "When replacing Disk Boards (Type Change)".

(1) When replacing the Disk Boards, remove the SAS cables connected to the Disk Boards to be replaced.

NOTICE: If Disk Boards are inserted randomly, malfunction may occur. Therefore, insert the Disk Boards in two steps, Step (b) and Step (c) shown below.

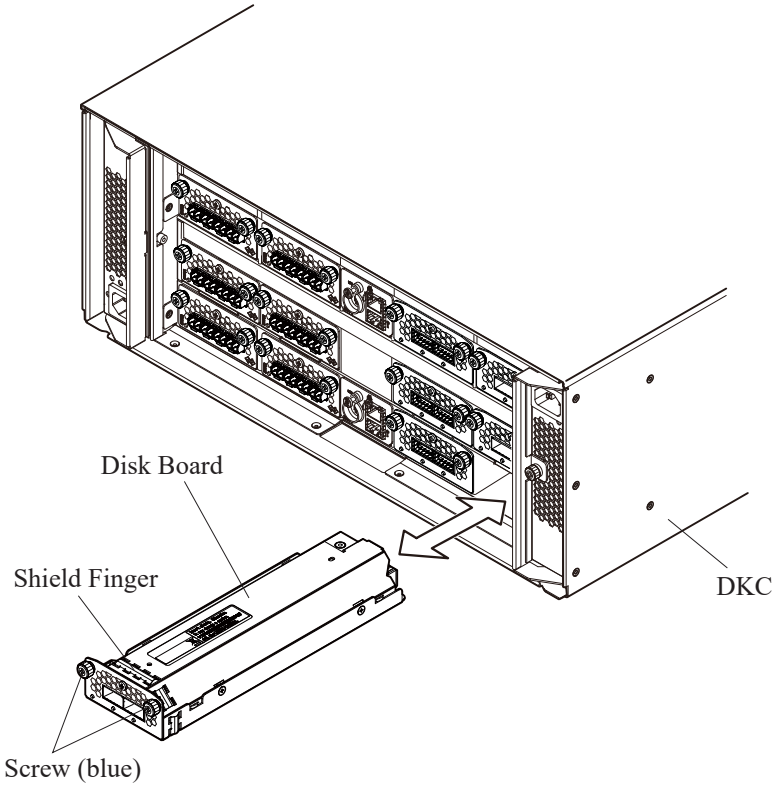
(2) Adding/replacing work of Disk Boards.
  (a) Remove the Disk Board (DKB)
    (i) Loosen two screws (blue) fixing the Disk Boards.
    (ii) Hold the screws (blue) and pull out and remove the Disk Boards.
  (b) Insert the Disk Boards to be added into the slots just before the shield finger.
  (c) Push the Disk Boards gently all the way in.

NOTICE: Push the front side of the Disk Board all the way to insert it to the end.



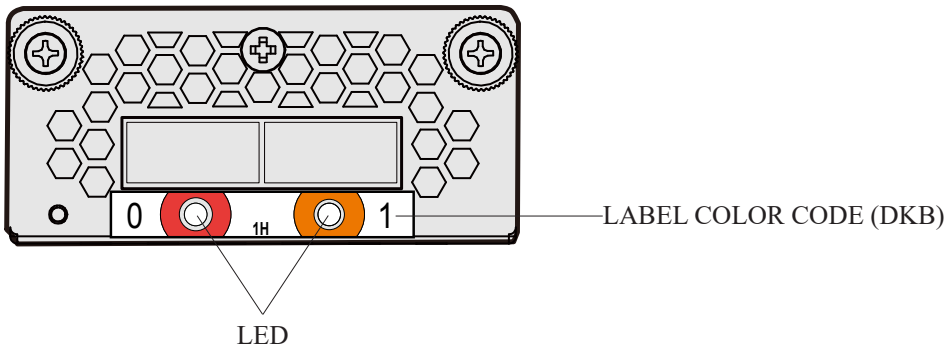
  (d) Tighten two screws (blue) and fix the Disk Board.

Figure 6-1 Adding/Replacing Disk Board



(3) Attaching the color code labels
Attach the color code labels to the LEDs in the lower part of the Disk Board.

Figure 6-2 Locations to Which Color Code Labels (DKB) are attached



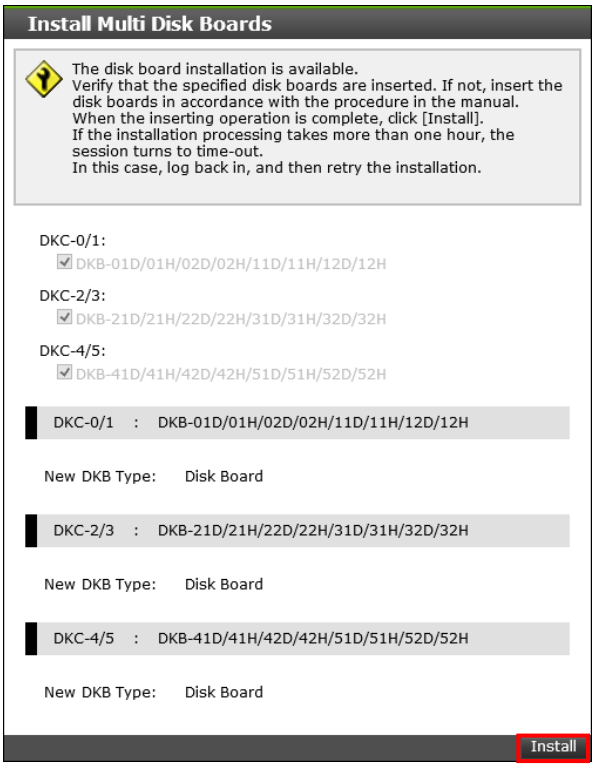
(4) When the Disk Boards were replaced, connect the SAS cables to the replaced Disk Boards, be careful not to damage the tips of the cables. (Refer to "Precautions when Connecting SAS Cables/ NVMe Cables" (INST(IN)09-04-10).)
(5) Add/replace the other Disk Boards in the same way.

7. Checking addition completion by Maintenance Utility
   Procedures differ by the following work.
   - When added Disk Boards to free slots
   - When replaced Disk Boards (Type Change)

   When added Disk Boards to free slots

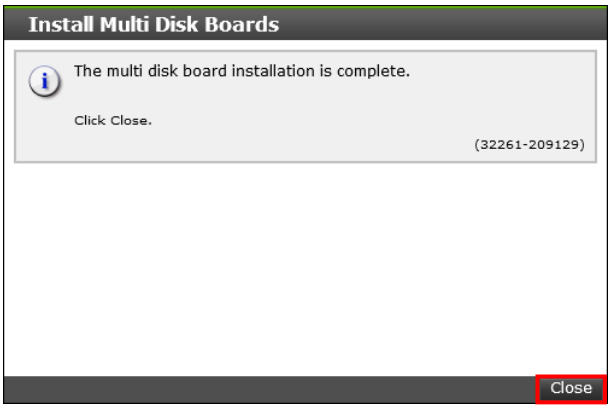
   (1) <Recognize Disk Boards>
   Click [Install].

   Example: Window displayed for installation of Disk Boards in multiple CBX pairs

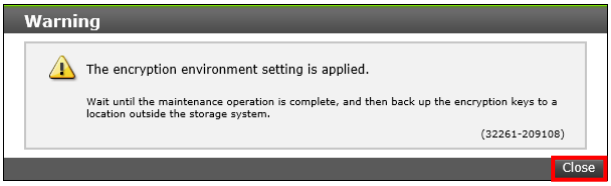


(2) <Check Addition Completion>
Check that the following message is displayed and click [Close].
If a message other than the described is displayed, refer to Message Section (MSG00-00).

Example: Window displayed for installation of Disk Boards in multiple CBX pairs



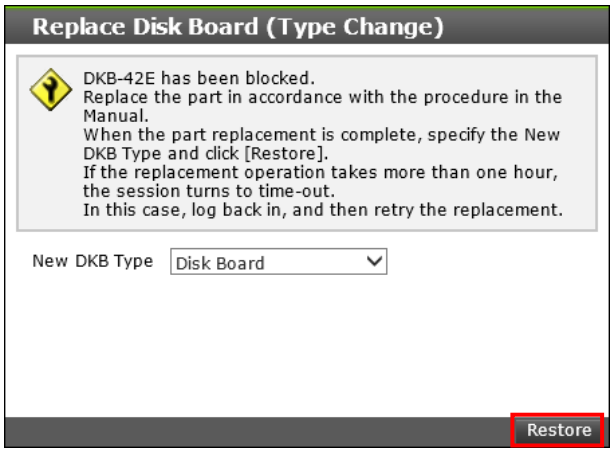
(3) <Check back up the encryption key Messages>
When the encryption environment is applied, the following message is displayed.
Check the message and click [Close].



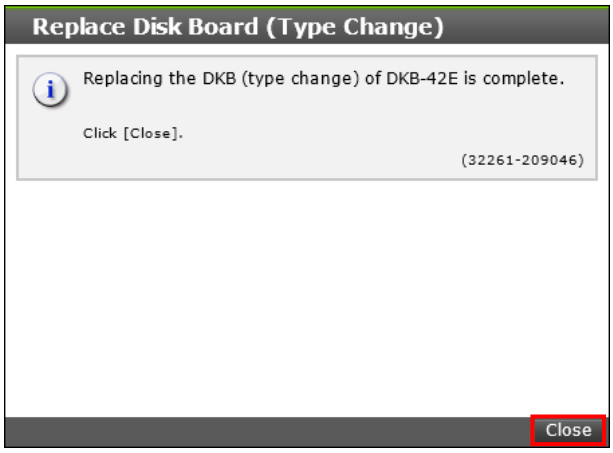
Go to Step 8.

When replaced Disk Boards (Type Change)

(1) <Recognize Disk Boards>
Click [Restore].



(2) <Check Replace Disk Boards (Type Change) Completion>
Check that the following message is displayed and click [Close].
If a message other than the described is displayed, refer to Message Section (MSG00-00).



When different types of Disk Boards exist, the message shown below is displayed. Read the message and click [Close].

NOTE : The message shown below does not disappear until the Disk Board type is consistent.

(3) Click the Storage System name to return to the main window.
When the Disk Boards without performing Replace Disk Boards (Type Change) are installed, the warning sign " ⚠ " is displayed in the [Type] column of the window due to the mixture of the Disk Boards.

(4) Perform the replacement (Type Change) of the other Disk Boards. Repeat the procedure from "When replaced Disk Boards (Type Change)" to perform the replacement (Type Change) of all the other Disk Boards.

8. Checking Normality
Perform the procedure described in "Checking Normality" (TRBL02-06-10).

9. Click [Logout] to close the window.

10. Removing the Maintenance PC
Remove the Maintenance PC from the storage system referring to "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10).

11. Back up the encryption key
If the message is displayed in Step 7.(3), ask your customer to back up the encryption key using Storage Navigator (refer to Encryption License Key User Guide).

NOTE: When a message is not displayed in Step 7.(3), this procedure is not required.

7. Changing Cache Memory/Cache Flash Memory

Decide Cache Memories and Cache Flash Memories to be added referring to "1.1 Cache Capacity and the Number of Required Options".

NOTICE:
- The operation time depends on the I/O load. When the I/O load is extremely high, it might take up to about four hours to complete the procedure on one Controller Board.
- After changing the Cache Flash Memory configuration, you cannot replace the installed Cache Flash Memories with smaller capacity ones.

NOTE : Controller Boards need to be blocked when the following procedure is performed. Check that alternate paths of the paths that use Channel Boards in the Controller Board in which the configuration of Cache Memory/Cache Flash Memory is to be changed are set on another Controller Board. If alternate paths are not set, alternate paths need to be set, or host I/O needs to be stopped. Before starting the procedure, consult with the customer.

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the SSVP, and then log in to the SVP.
   - "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10)
   - "Connection to the SVP" (SVP01-30)

2. Starting the SVP window
   From the menu of Web Console, click [Maintenance Components] - [Maintenance Other Components].

3. Changing the operation mode
   Change the mode to [View Mode].

4. Starting Maintenance Utility
   See "Table 7-1 Order of Controller Board in which Cache Memory configuration is changed and Controller Board to which Maintenance Utility is connected" to check the Controller Board to which Maintenance Utility is connected.
   Specify an appropriate CTL number, and then start Maintenance Utility (See "Starting Maintenance Utility by Specifying CTL" (MU01-50).).

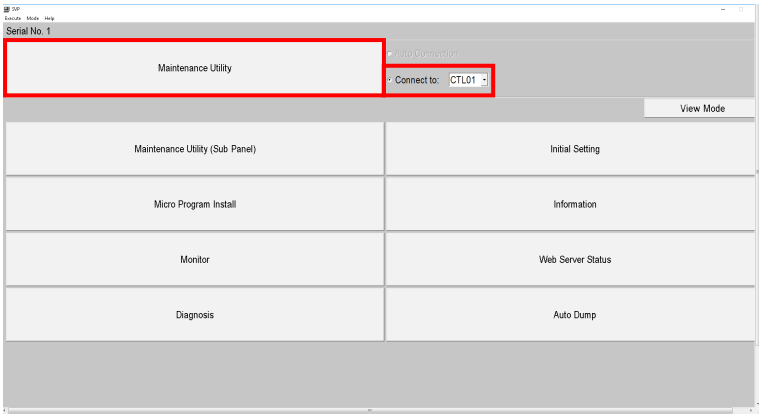


Table 7-1 Order of Controller Board in which Cache Memory configuration is changed and Controller Board to which Maintenance Utility is connected

- Select a CTL number listed under “Controller Board to which Maintenance Utility is connected”.
- In the 1 CBX Pair configuration, change the connection target Controller Board to a CTL number listed under “Controller Board to which Maintenance Utility is connected”.

- For VSP 5100 and VSP 5100H

Target CBX Pair	Target Controller Board	Order of Controller Board in which Cache Memory configuration is changed		Controller Board to which Maintenance Utility is connected
DKC-0/1	CTL01, CTL12	①	CTL01	CTL12
		②	CTL12	CTL01

- For VSP 5500 and VSP 5500H

Target CBX Pair	Target Controller Board	Order of Controller Board in which Cache Memory configuration is changed		Controller Board to which Maintenance Utility is connected	
				Single SVP configuration	Dual SVP configuration
DKC-0/1	CTLx1 only	①	CTL01	CTL11 or CTL12	CTL02 or CTL12
		②	CTL11	CTL01 or CTL02	
	CTLx2 only	①	CTL02	CTL11 or CTL12	CTL01 or CTL11
		②	CTL12	CTL01 or CTL02	
	CTLx1, CTLx2	①	CTL01	CTL11 or CTL12	CTL02 or CTL12
		②	CTL11	CTL01 or CTL02	
		③	CTL02	CTL11 or CTL12	CTL01 or CTL11
		④	CTL12	CTL01 or CTL02	

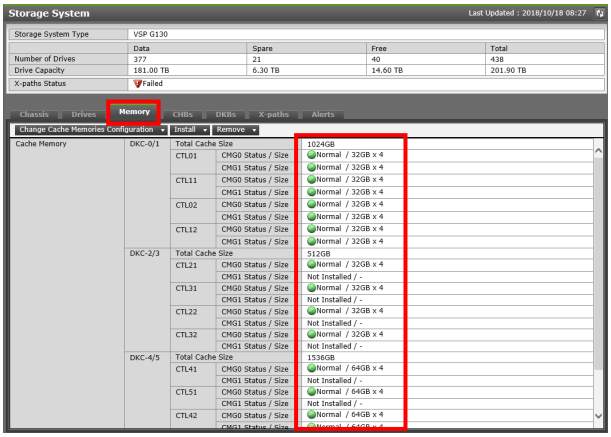
<In the case of 2 CBX Pairs configuration>

Target CBX Pair	Target Controller Board	Order of Controller Board in which Cache Memory configuration is changed		Controller Board to which Maintenance Utility is connected
DKC-0/1	CTLx1 only	①	CTL01	CTL21, CTL31, CTL22 or CTL32
		②	CTL11	
	CTLx2 only	①	CTL02	
		②	CTL12	
	CTLx1, CTLx2	①	CTL01	
		②	CTL11	
		③	CTL02	
		④	CTL12	
DKC-2/3	CTLx1 only	①	CTL21	CTL01, CTL11, CTL02 or CTL12
		②	CTL31	
	CTLx2 only	①	CTL22	
		②	CTL32	
	CTLx1, CTLx2	①	CTL21	
		②	CTL31	
		③	CTL22	
		④	CTL32	

<In the case of 3 CBX Pairs configuration>

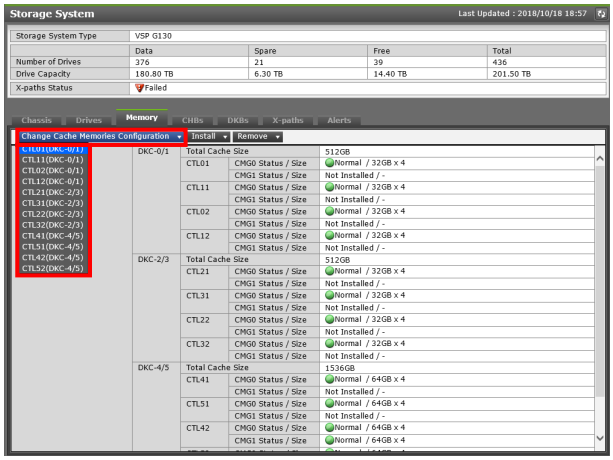
Target CBX Pair	Target Controller Board	Order of Controller Board in which Cache Memory configuration is changed		Controller Board to which Maintenance Utility is connected
DKC-0/1	CTLx1 only	①	CTL01	CTL21, CTL31, CTL41, CTL51, CTL22, CTL32, CTL42 or CTL52
		②	CTL11	
	CTLx2 only	①	CTL02	
		②	CTL12	
	CTLx1, CTLx2	①	CTL01	
		②	CTL11	
		③	CTL02	
		④	CTL12	
DKC-2/3	CTLx1 only	①	CTL21	CTL01, CTL11, CTL41, CTL51, CTL02, CTL12, CTL42 or CTL52
		②	CTL31	
	CTLx2 only	①	CTL22	
		②	CTL32	
	CTLx1, CTLx2	①	CTL21	
		②	CTL31	
		③	CTL22	
		④	CTL32	
DKC-4/5	CTLx1 only	①	CTL41	CTL01, CTL11, CTL21, CTL31, CTL02, CTL12 , CTL22 or CTL32
		②	CTL51	
	CTLx2 only	①	CTL42	
		②	CTL52	
	CTLx1, CTLx2	①	CTL41	
		②	CTL51	
		③	CTL42	
		④	CTL52	

5. Selecting a configuration change location using Maintenance Utility
   (1) <Main Window>
   Click the [Memory] tab in the main window to display the Cache Memory status and the mounted capacity.



(2) <Select Controller Board>

Check the status display and click [Change Cache Memories Configuration] to select Controller Board in which the Cache Memory configuration change is performed.



(3) <Specify Cache Size>

⚠ CAUTION

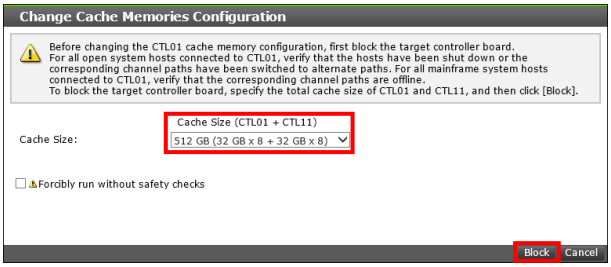
About "Forcibly run without safety checks":
If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the message, the manual or the contact described in the manual. When Universal Volume Manager is used for the target storage system, see "Notes on Maintenance Work for the Storage System for which External Paths Are Configured" (REP(GE)01-61).

Select the size of Cache Memories after the configuration change, and then click [Block]. The Cache Memory size to be selected is the total size of Cache Memories in CTLx1 and CTLy1 or Cache Memories in CTLx2 and CTLy2. For VSP 5100 and VSP 5100H, the size to be selected is the total Cache Memory size in CTL01 and CTL12.

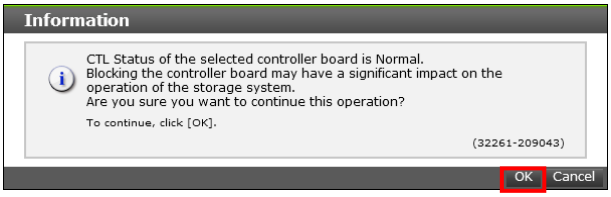
If a message instructing you to change CFMs (Cache Flash Memories) when selecting the size of Cache Memories, change the CFM configuration as instructed (see "(5) Adding the Cache Flash Memory").

Change one of Cache Flash Memories indicated in the message, which is located in the Controller Board being selected (see Figure 7-1 for CFM locations in each Controller Board).

Example: If "CFM-011/111" is displayed when CTL01 is selected, the location of the Cache Flash Memory to be changed is CFM-011.



(4) <Check Controller Board>
Check that the target Controller Board for the Cache Memory configuration change is correct again, and click [OK].



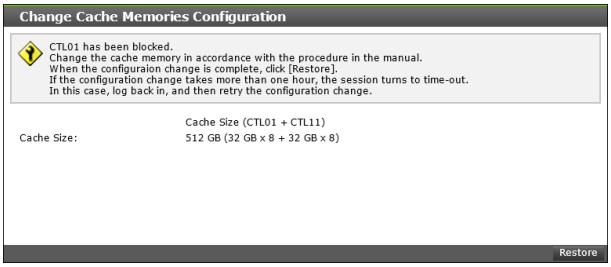
(5) <Enter the password (only when reducing Cache Memories)>

> **⚠ CAUTION**
>
> This operation may cause a serious error such as a system down or a data loss. Confirm the appropriateness of the operation, and then input of the password.

Enter the login password for the maintenance account of the storage system, and then click [OK].

(6) <Confirming that the preparation for the Cache Memory configuration change is completed>
Check that the Controller Board is blocked and that the preparation for the Cache Memory configuration change is completed.

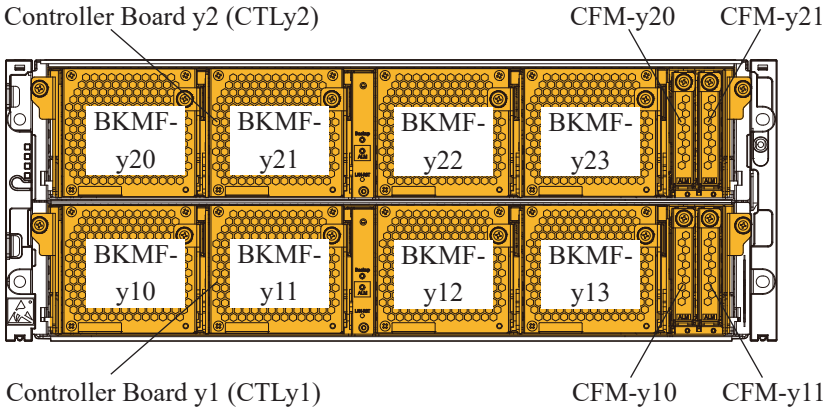
NOTE : Do not click [Restore] at this time.
Click [Restore] after the configuration change is completed.



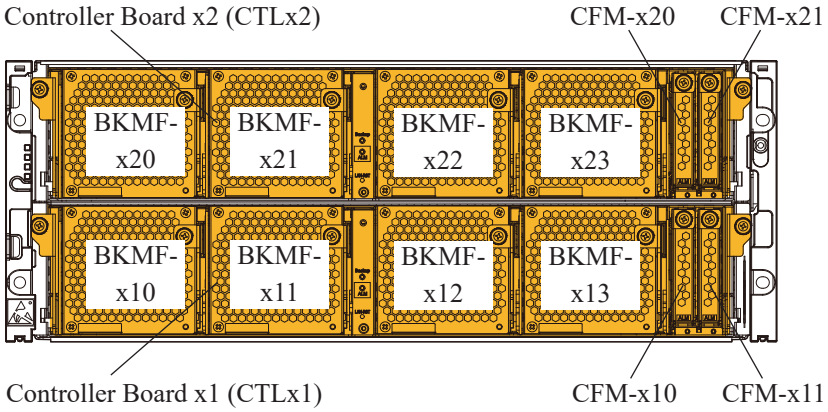
6. Changing work of Cache Memories/Cache Flash Memories

Location	Additional parts name		Parts name
Front View of DKC	1	Cache Memory	• Cache Memory (CM32G) • Cache Memory (CM64GL)
	2	Cache Flash Memory	• CFM (BM35) • CFM (BM45) • CFM (BM3E) • CFM (BM4E)

Figure 7-1 Controller Boards and Cache Flash Memories location



DKC-y (Front view)



DKC-x (Front view)

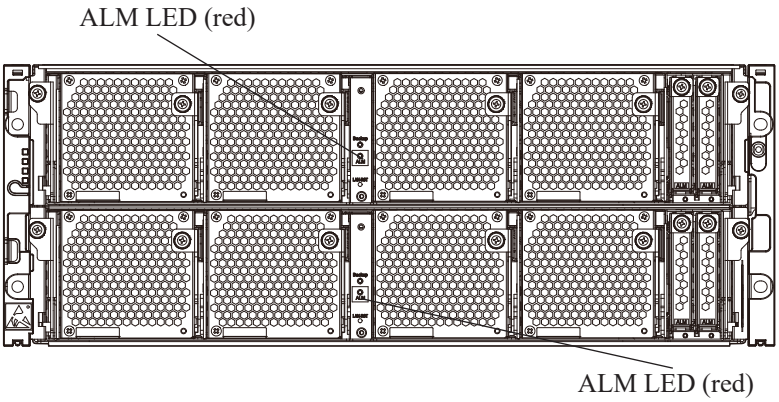
*1: DKC-x
└→ DKC No. (0, 2, 4)
DKC-y
└→ DKC No. (1, 3, 5)

NOTE: The above illustrations are for VSP 5500 and VSP 5500H. For VSP 5100 and VSP 5100H, only CTL01 and CTL12 are installed.

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 Storage System before starting and do not take it off until you finish. Refer to "Note when Installing and Removing Parts" (INST(GE)01-01-10).

(1) Remove the Front Bezel. (Refer to "How to Attach/Remove the Front Bezel" (INST(GE)04-01-10).)
(2) Check that the ALM LEDs (red) on the Controller Board to add a DKC Cache Memory light up.

Figure 7-2 Position of the ALM LED (DKC)



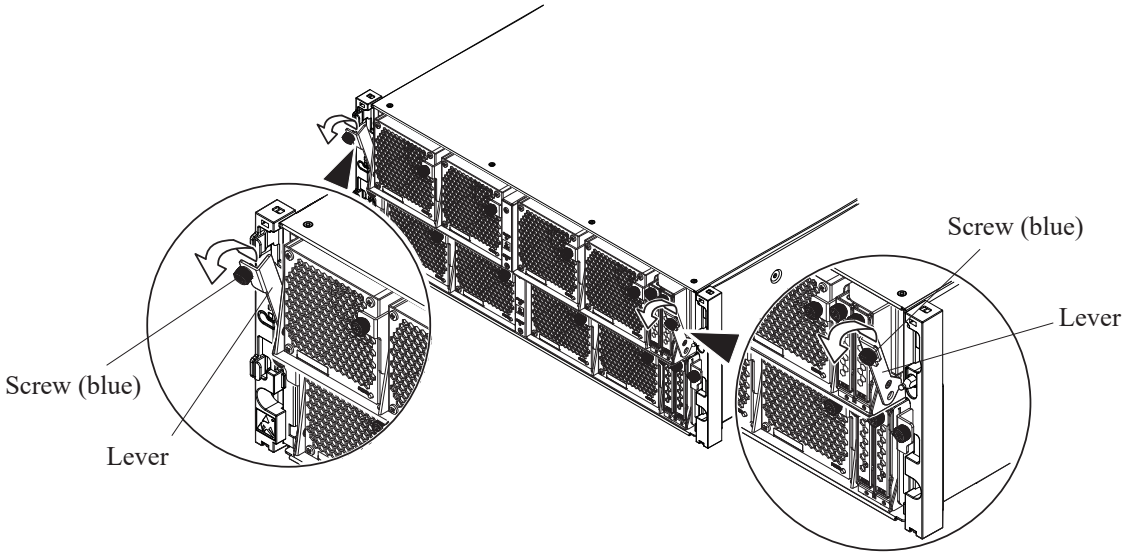
(3) Removing the Controller Board from DKC.

⚠ CAUTION

When removing a Controller Board of the DKC, be sure to remove BKMFs first because the mass of the Controller Board is about 19 kg.

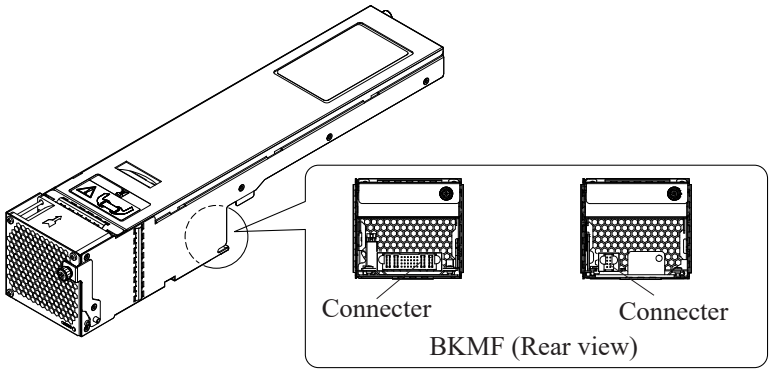
(a) Loosen the right and left screws (blue) on the lever of the Controller Board to add the Cache Memory in the front of the DKC and open the lever.

Figure 7-3 Disengaging Controller Board (DKC)



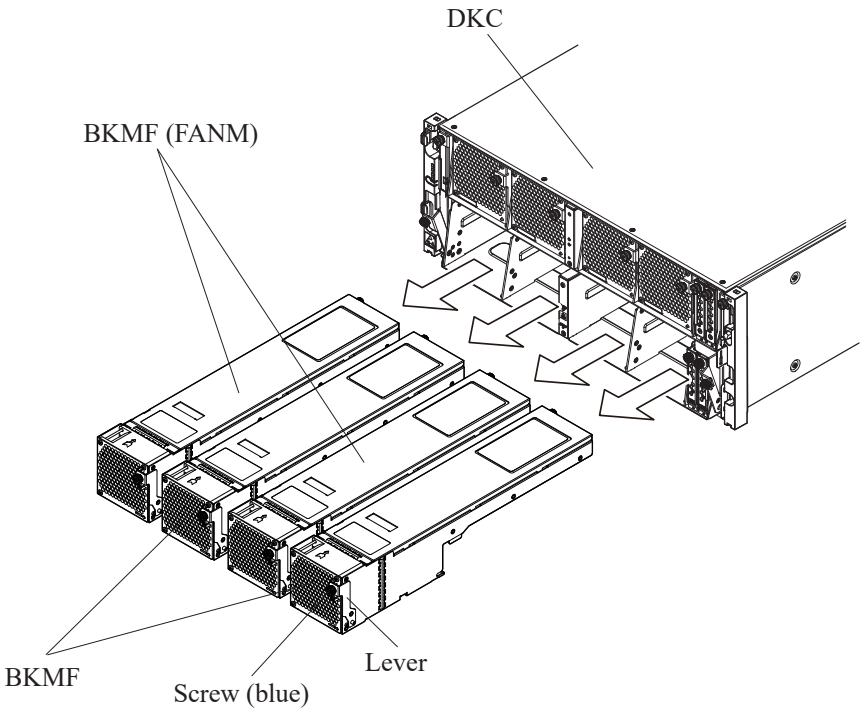
NOTICE: After removing the Controller Board, the LEDs (POWER/READY/ALARM) might go out.
If the LED on the front goes out, check that anything other than the Controller Board is normal in the Maintenance Utility window and continue the work.
The READY LED (green) on the front of DKC lights up after performing "7. Checking addition completion by Maintenance Utility".

NOTICE: When removing the BKMF, hold it with both hands and remove it straight not to apply a shock to the connector.



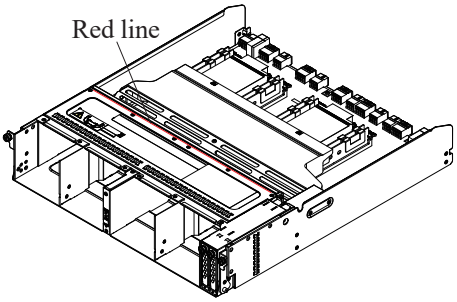
(b) Remove all BKMFs (four) installed in the Controller Board.
(i) Loosen the screws (blue) fixing the BKMF.
(ii) Open the lever and pull out the BKMF to remove.

Figure 7-4 Removing BKMFs (DKC)



⚠ CAUTION

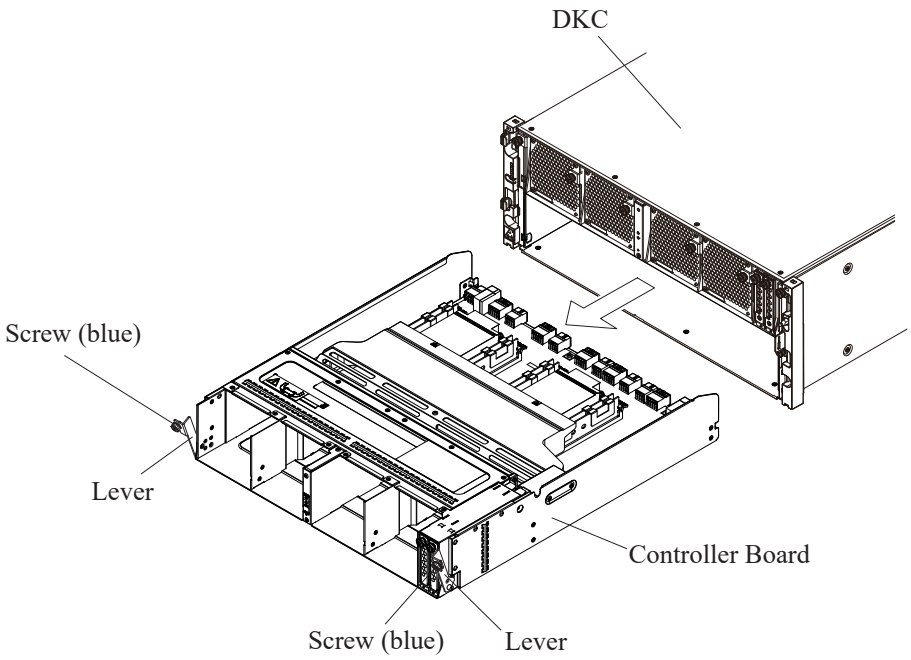
Dropping the Controller Board may cause injury. Be aware of the red line marked on the Controller Board top - when sliding the Controller Board out of the array past this mark, keep a firm hold on the Controller Board.



NOTICE: When removing the Controller Board, hold it with both hands and remove it straight not to apply a shock to with any components.

(c) With the lever opened completely, pull out and remove the Controller Board.

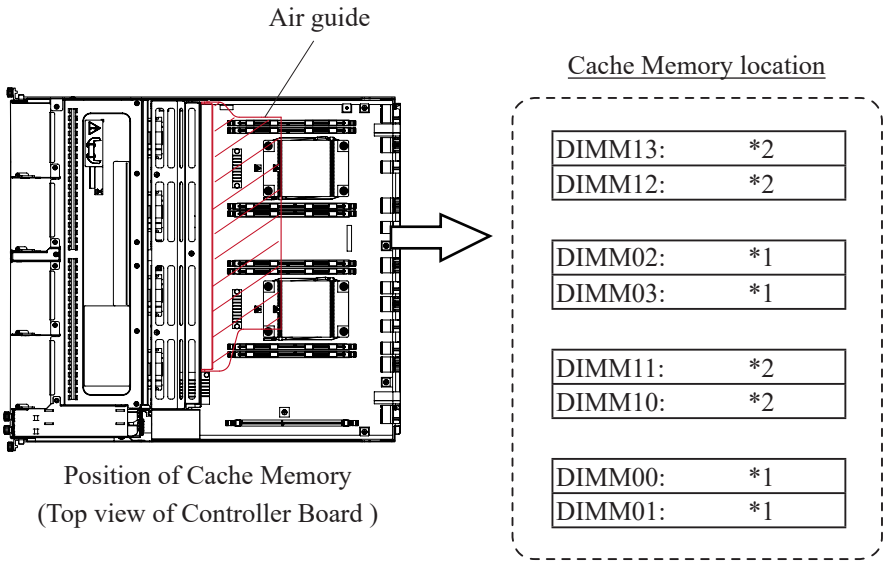
Figure 7-5 Removing Controller Boards (DKC)



(4) Adding the Cache Memories

Change the Cache Memory configuration while being careful of the installation locations of Cache Memories (DIMMs).

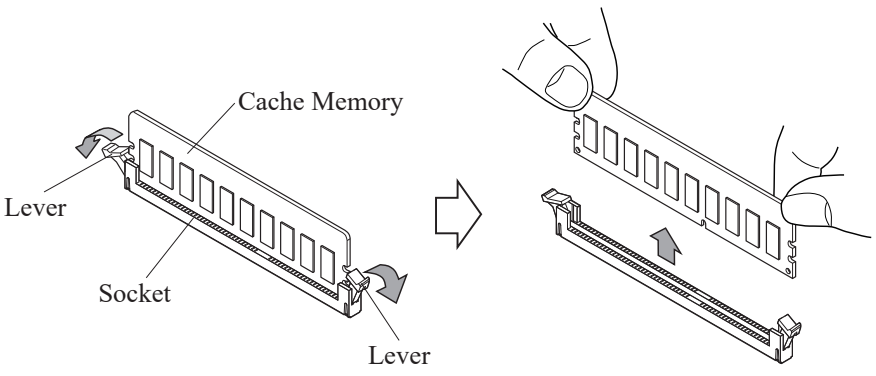
- When changing the configuration to 32GB × 4 or 64GB × 4, install DIMMs in CMG0 locations.
- When changing the configuration to 32GB × 8 or 64GB × 8, install DIMMs in CMG0 and CMG1 locations.



*1 : Belonging to CMG0 (Cache Memory Group 0).
*2 : Belonging to CMG1 (Cache Memory Group 1).
Be sure to install DIMM in CMG0.
CMG1 is an additional slot of DIMM.
Install DIMM in sets of four.

(a) Open the air guide.
(b) When adding the Cache Memories to free slots, go to Step (d).
(c) The procedure for removing
  (i) Open the levers outward.
  (ii) Hold both ends with the fingers and pull out the Cache Memory straight from the socket.

Figure 7-6 Removing the Cache Memory



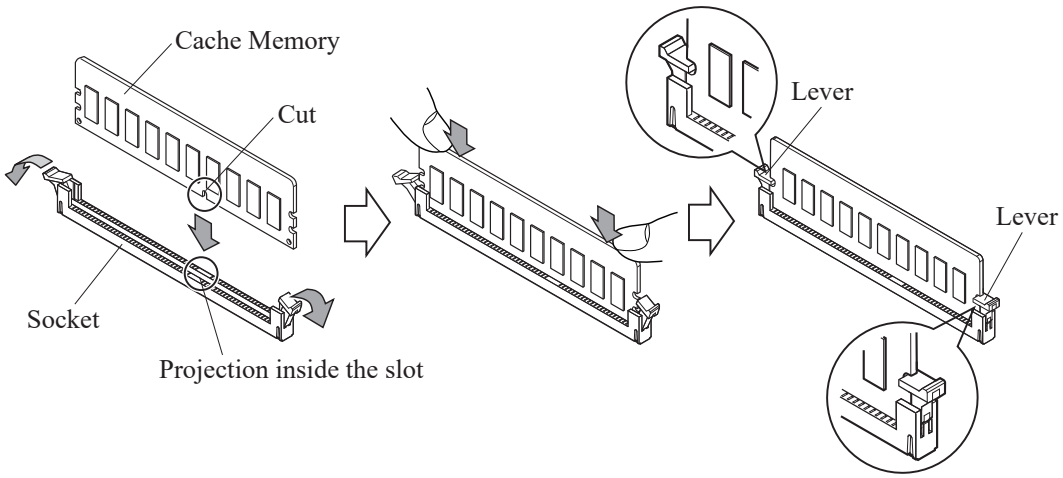
(d) Procedure for installing

NOTICE: Do not put intense pressure on the cache memory to the extent that the printed-circuit board greatly bends after the cache memory is secured with the levers in installation procedure of the cache memory. The printed-circuit board may be damaged when intense pressure is applied.

(i) Position the cut of the Cache Memory with the projection inside the slot of Controller Board and place the Cache Memory on the socket.
(ii) Hold both ends of the Cache Memory with the fingers and fit it into the socket.
(iii) Check that the lever is firmly fit in the Cache Memory.

(e) Close the air guide.

Figure 7-7 Installing the Cache Memory



NOTICE: Do not mix CM64G and CM64GL in a Controller Board. (For example, it is not allowed to install CM64G in CMG0 and CM64GL in CMG1.)

(5) Adding the Cache Flash Memory

NOTE : Add Cache Flash Memories in the removed Controller Board.

<Removal procedure>

(a) Removing the Cache Flash Memory
  (i) Loosen the screw (blue) securing the Cache Flash Memory.
  (ii) Pull down the lever toward you.
  (iii) Pull the Cache Flash Memory while holding it with your hands to remove it.

(b) Removing the dummy.
  Pull the dummy to remove it.

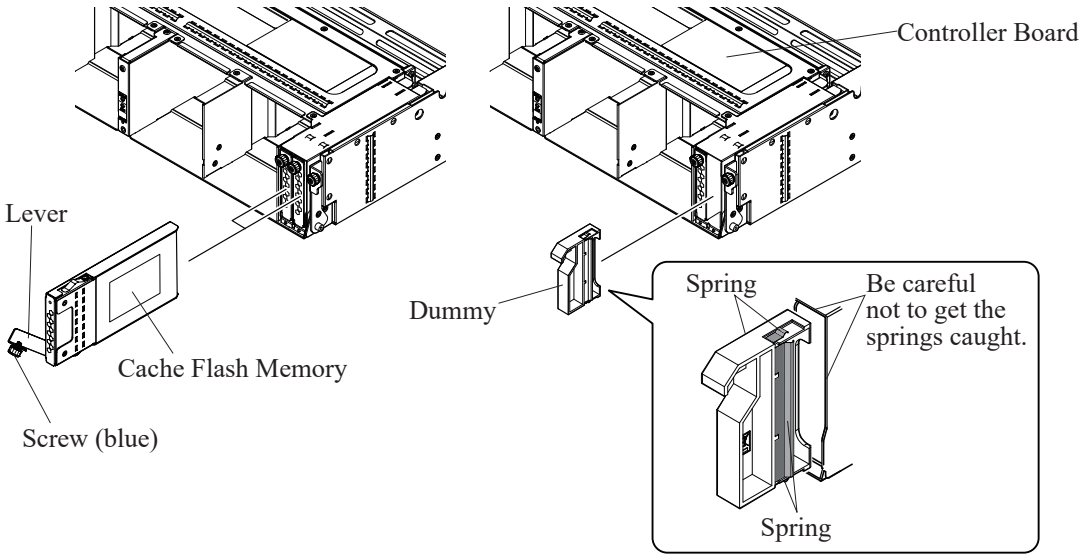
<Installing procedure>

(a) Installing the Cache Flash Memory
  (i) Insert the Cache Flash Memory to be added into the slot with its lever completely pulled down toward you.
  (ii) Insert the Cache Flash Memory to the end and raise the lever completely.
  (iii) Tighten the screw (blue) to secure the Cache Flash Memory.

(b) Install the dummy
  Insert the dummy straight into the slot to the end while paying attention to the springs of the dummy.

  NOTE: If you do not insert the dummy straight, it cannot be inserted to the end because springs get caught in the chassis. If you find that the dummy is not inserted to the end, remove and insert it again.

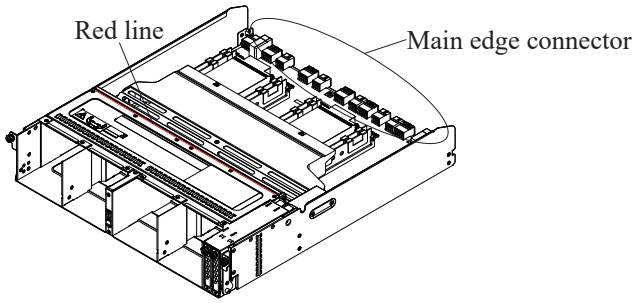
Figure 7-8 Adding the Cache Flash Memory



(6) Installing the Controller Board

⚠ CAUTION

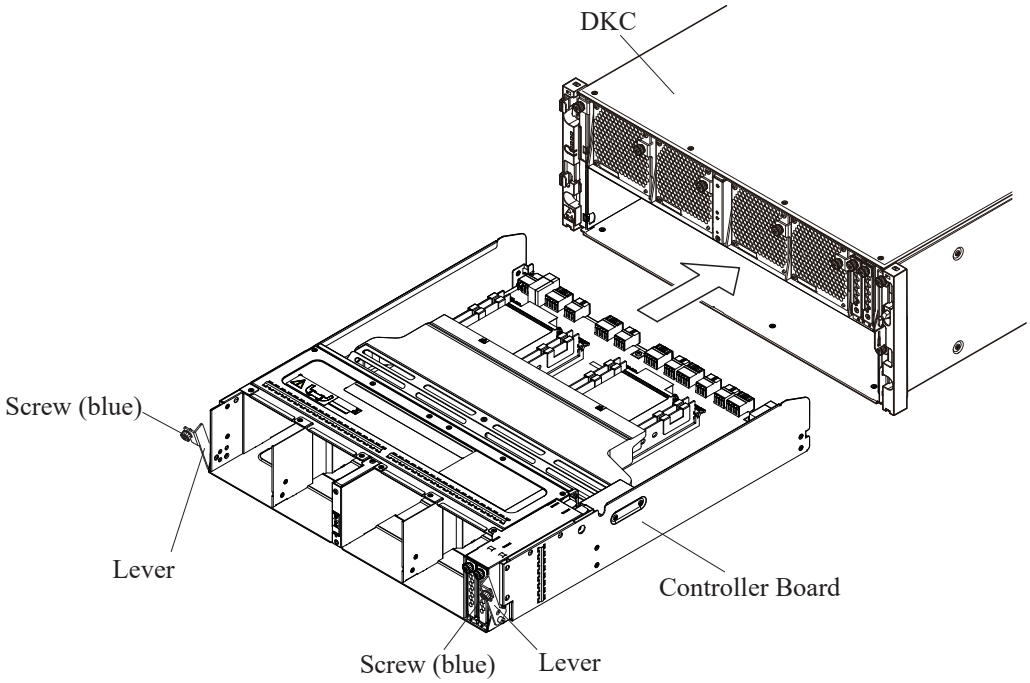
Dropping the Controller Board may cause injury. Be aware of the red line marked on the Controller Board top - when sliding the Controller Board out of the array past this mark, keep a firm hold on the Controller Board.



NOTICE:
- Check that the main edge connector of the Controller Board has no deformation, damage or sticking of dust before installing the Controller Board.
- When installing the Controller Board, hold it with both hands and install it straight not to apply a shock to with any components.

(a) Open the right and left levers of the Controller Board completely and insert the Controller Board into the installation location of the DKC.

Figure 7-9 Installing the Controller Board (DKC)



(b) Install four BKMFs in the Controller Board.

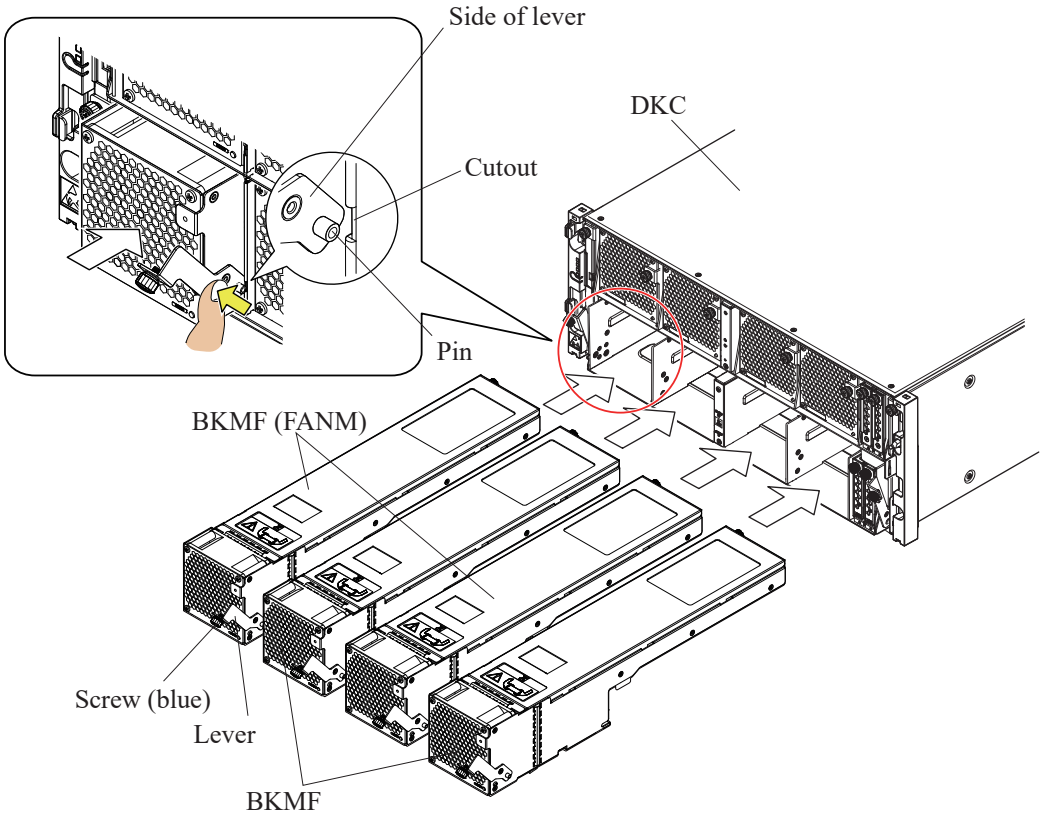
(i) Keep the lever of BKMF pulled down toward you.

(ii) Insert the BKMF up to the front of the shield finger.

(iii) Insert the BKMF while pushing the side of its lever to the left until the pin of the lever goes through the cutout of the chassis and stops.

(iv) Raise the BKMF lever and tighten the screws (blue) and fix it.

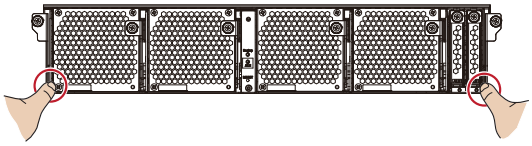
Figure 7-10 Installing the BKMF



NOTE: Components of BKMF (FANM) are different from those of BKMF.
Be careful not to install BKMF (FANM) and BKMF in different locations.

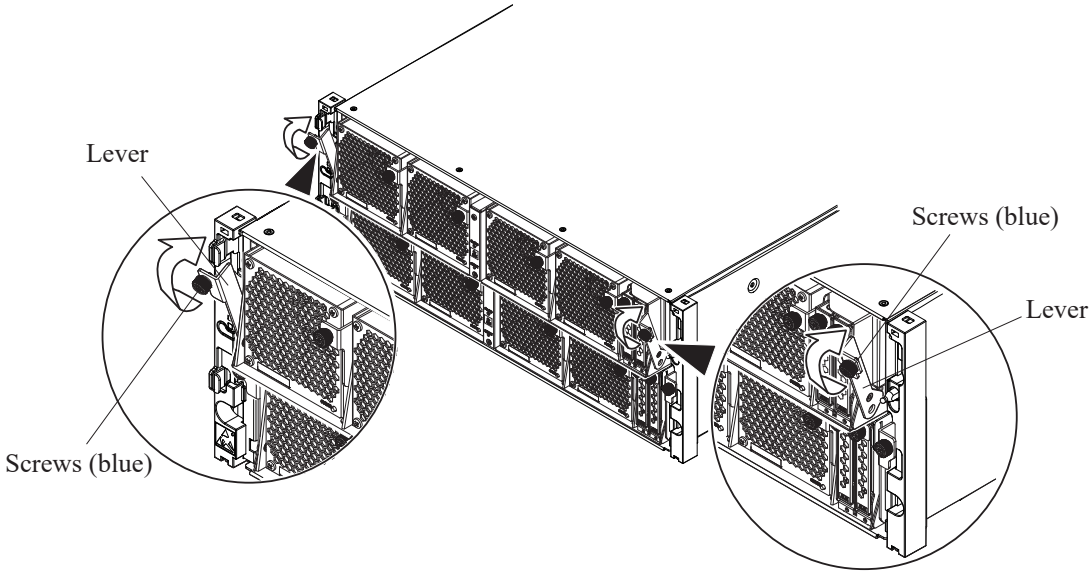
(c) Push the Controller Board all the way in and close the right and left levers completely.

NOTICE: Push the bottom of the front side of the Controller Board all the way to insert it to the end.



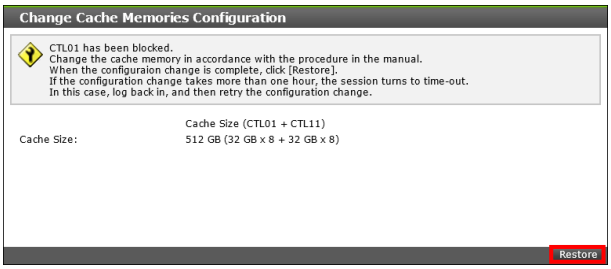
(d) Tighten the screws (blue) and fix the Controller Board.

Figure 7-11 Fixing the Controller Board

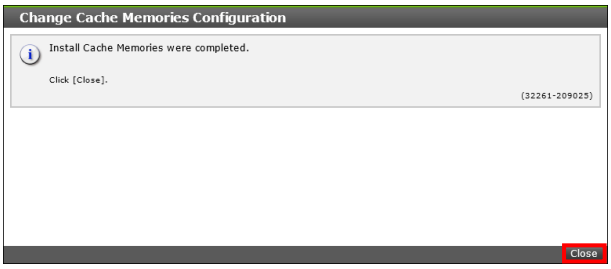


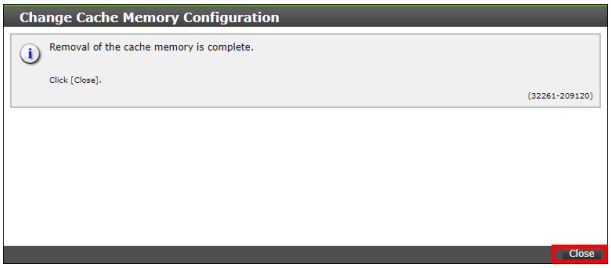
7. Checking addition completion by Maintenance Utility

(1) <Restore Controller Board>
Click [Restore].



(2) <Check Completion>
Check that the following message is displayed and click [Close].
If a message other than the described is displayed, refer to Message Section (MSG00-00).





NOTE: It may take a few minutes to be able to connect to the GUM of the recovered Controller.

(3) Click the Storage System name to return to the main window.

8. Change the configuration of Cache Memories and Cache Flash Memories in all the other Controller Boards according to Table 7-1.

   NOTE: In the case where alternate paths were set on the Controller Board in which the configuration change was performed, ask the customer whether the alternate paths currently function normally.

   NOTE: When performing the configuration change of Cache Memories/Cache Flash Memories, be sure to change the configuration of the same locations in two CBXs composing a CBX pair. For VSP 5100 and VSP 5100H, change the configuration of Cache Memories/Cache Flash Memories in CTL12.

   - When you need to change the Controller Board to which Maintenance Utility is connected:
     (1) Click [Logout] to close the Maintenance Utility window.
     (2) Perform the configuration change of Cache Memories / Cache Flash Memories in all Controller Boards that require the configuration change by repeating the procedure from "4. Starting Maintenance Utility".
   - When you do not need to change the Controller Board to which Maintenance Utility is connected:
     Perform the configuration change of Cache Memories / Cache Flash Memories in all Controller Boards that require the configuration change by repeating the procedure from "5. Selecting a configuration change location using Maintenance Utility".

9. Click [Logout] to close the Maintenance Utility window.

10. Removing the Maintenance PC
    Remove the Maintenance PC from the storage system referring to "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10).

8. Adding Shared Memory (SM)

Decide Cache Memories to be added referring to "1.1 Cache Capacity and the Number of Required Options".

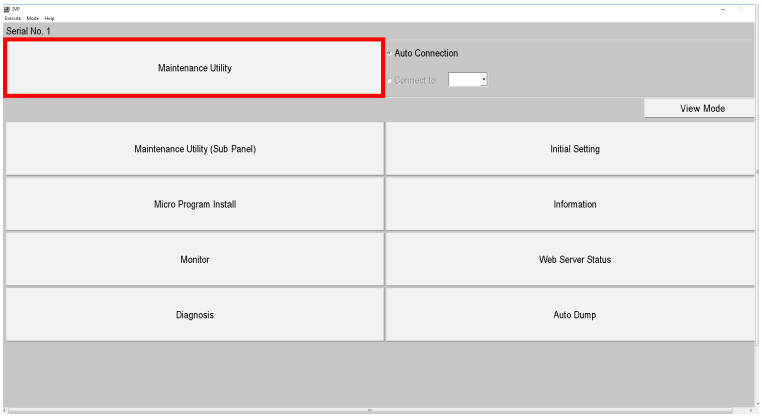
NOTICE:
- As a result of the addition, if the total capacity of Cache Memories is insufficient, the addition processing fails. In that case, add Cache Memories first. (Refer to "7. Changing Cache Memory/Cache Flash Memory".)
  Refer to "1.1 Cache Capacity and the Number of Required Options" for the details of the total capacity of Cache Memories.
- The capacity used for adding Shared Memories (SMs) is assigned by the cache capacity of CLPR0.
  When using Virtual Partition Manager, if the cache capacity becomes less than 4 GB (at least Cache capacity) as a result of the addition, the addition processing fails. Check in advance that the cache capacity of CLPR0 is more than or equal to 4 GB larger than the capacity of the Share Memories (SMs) to be added (Shared Memory capacity (GB) after addition - Current Shared Memory capacity (GB) + 4 $\leqq$ cache capacity (GB) of CLPR0).
  Refer to "5. Shared Memory (SM) Capacity" of "1.1" for the Shared Memory capacity (GB).
- The operation time depends on the I/O load. When the I/O load is extremely high, it might take up to about eight hours to complete the procedure.

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the SSVP, and then log in to the SVP.
   - "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10)
   - "Connection to the SVP" (SVP01-30)

2. Starting the SVP window
   From the menu of Web Console, click [Maintenance Components] - [Maintenance Other Components].

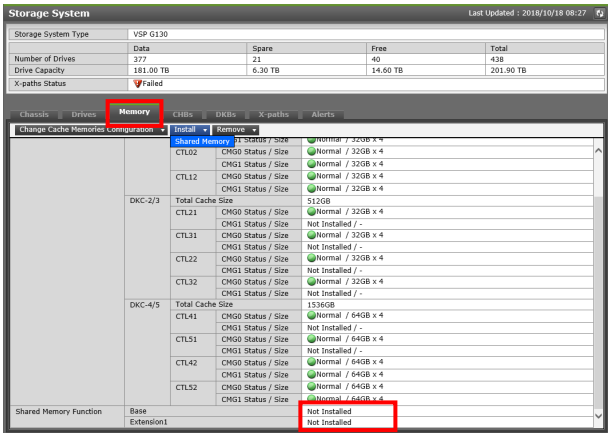
3. Changing the operation mode
   Change the mode to [View Mode].

4. Starting Maintenance Utility
   In the SVP window, click [Maintenance Utility] (See "Starting Maintenance Utility" (MU01-10).).



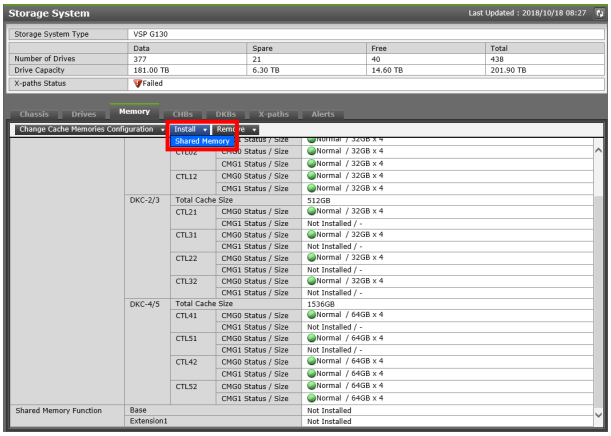
(1) <Main Window>

Click the [Memory] tab in the main window and check the Shared Memory Function status.



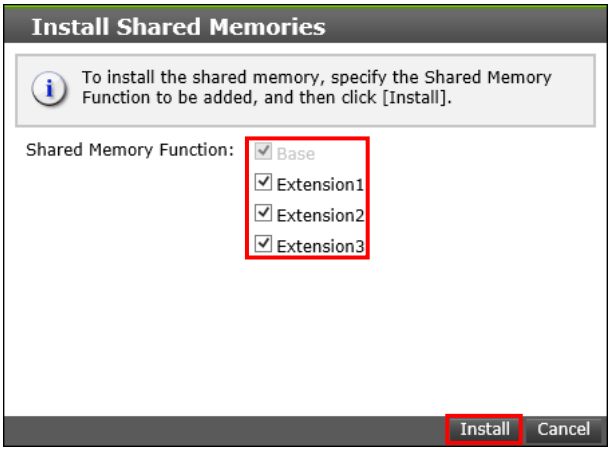
(2) <Shared Memory Addition Execution>

Click [Install] and select [Shared Memory].

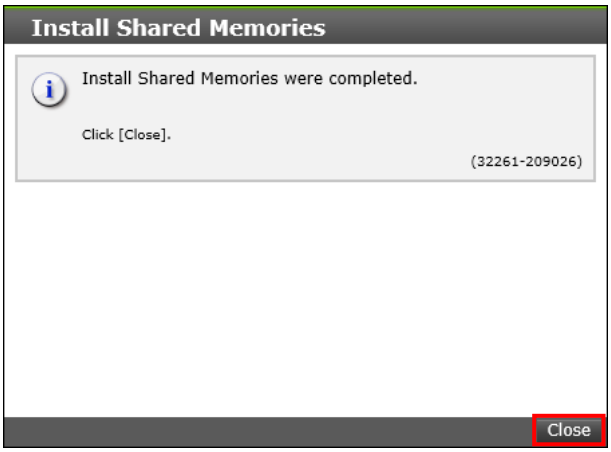


(3) <Shared Memory Addition Window>

Check [Shared Memory Function] to be added in the Install Shared Memories window and click [Install] .



(4) <Shared Memory Addition Completion Window>
Check that the following message is displayed and click [Close].
If a message other than the described is displayed, refer to Message Section (MSG00-00).



(5) Checking Normality
Perform the procedure described in "Checking Normality" (TRBL02-06-10).

(6) Click [Logout] to close the window.

5. Removing the Maintenance PC
Remove the Maintenance PC from the storage system referring to “Attachment/Removal Procedure of Maintenance PC” (INST(IN)13-02-10).

9. Changing the Type of Small Form-Factor Pluggable (SFP)

For Change SFP Type, Wavelength and Data Transfer Rate can be changed.
Data Transfer Rate can be changed for the SFP installed in the 32G Ready 4Port FC Channel Board.

Prerequisites

- The target Channel Board type is “32G Ready 4Port FC”.

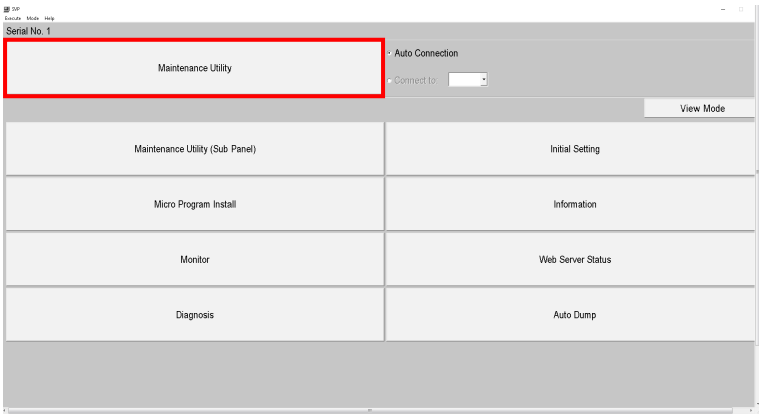
NOTE :
- Perform the SFP type change of the two Channel Boards in a pair shown in “Channel Board Option Installation Rule” (INST(GE)03-01-40).
- Confirm that the customer has disconnected the host connected to the port to be changed.

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the SSVP, and then log in to the SVP.
   - “Attachment/Removal Procedure of Maintenance PC” (INST(IN)13-02-10)
   - “Connection to the SVP” (SVP01-30)

2. Starting the SVP window
   From the menu of Web Console, click [Maintenance Components] - [Maintenance Other Components].

3. Changing the operation mode
   Change the mode to [View Mode].

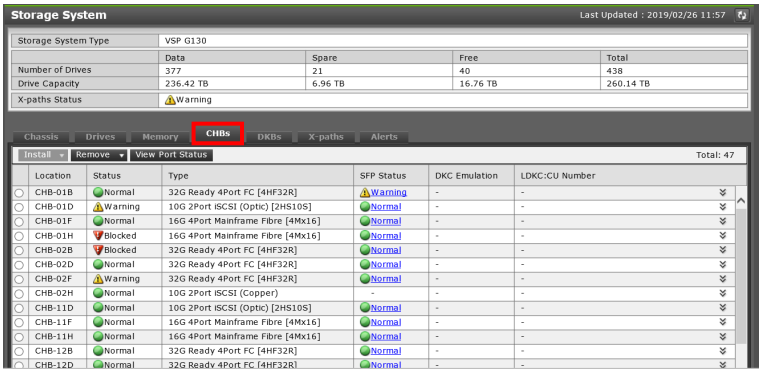
4. Starting Maintenance Utility
   In the SVP window, click [Maintenance Utility] (See “Starting Maintenance Utility” (MU01-10).).



5. Selecting additional parts by Maintenance Utility

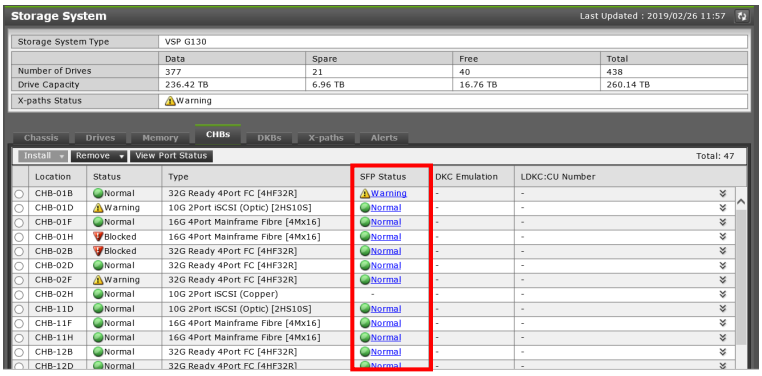
(1) <Main Window>

Click the [CHBs] tab in the Main window.



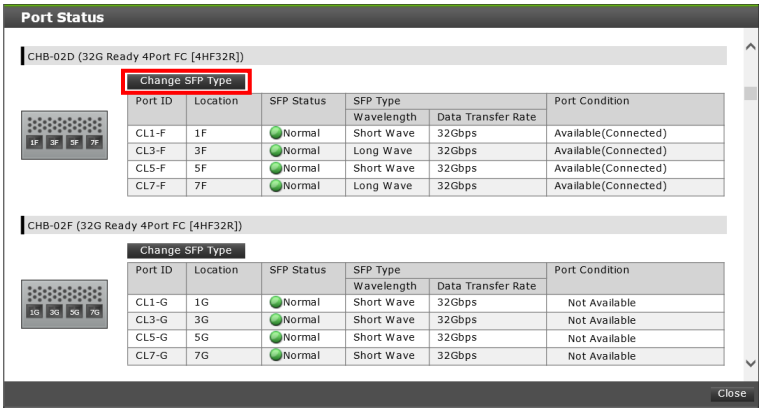
(2) <Select Channel Board>

Click [SFP Status] on the Channel Board to change the type of Small Form-Factor Pluggable (SFP).



(3) <Instruct Type Change>
Click [Change SFP Type] in the Port Status window.

NOTE: The [Data Transfer Rate] column is displayed only for the 32G Ready 4Port FC Channel Board.



Port ID	Location	SFP Status	SFP Type		Port Condition
			Wavelength	Data Transfer Rate	
CL1-F	1F	Normal	Short Wave	32Gbps	Available(Connected)
CL3-F	3F	Normal	Long Wave	32Gbps	Available(Connected)
CL5-F	5F	Normal	Short Wave	32Gbps	Available(Connected)
CL7-F	7F	Normal	Long Wave	32Gbps	Available(Connected)

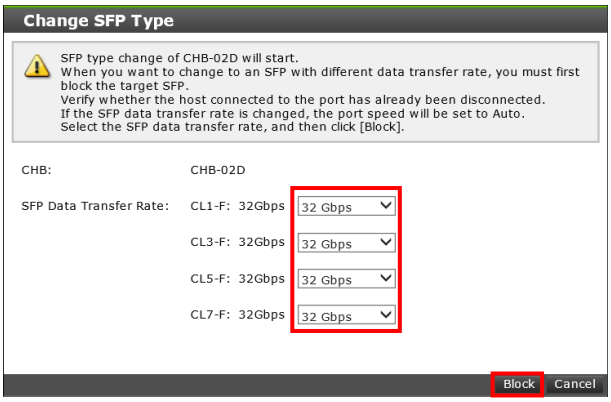
Port ID	Location	SFP Status	SFP Type		Port Condition
			Wavelength	Data Transfer Rate	
CL1-G	1G	Normal	Short Wave	32Gbps	Not Available
CL3-G	3G	Normal	Short Wave	32Gbps	Not Available
CL5-G	5G	Normal	Short Wave	32Gbps	Not Available
CL7-G	7G	Normal	Short Wave	32Gbps	Not Available

(4) <Start Type Change>

⚠ CAUTION

About "Forcibly run without safety checks":
If you check this checkbox and execute the maintenance, the system may go down. Do not check it unless instructed by the message, the manual or the contact described in the manual. When Universal Volume Manager is used for the target storage system, see "Notes on Maintenance Work for the Storage System for which External Paths Are Configured" (REP(GE)01-61).

Select a new transfer rate from the pull-down box for the target [SFP Data Transfer Rate] in the [Change SFP Type] window. When replacing the SFP with an SFP that differs only in wavelength, or when you do not replace the SFP, select [Not Change] for [SFP Data Transfer Rate]. Then click [Block].



(5) <Displaying the Password entry window>

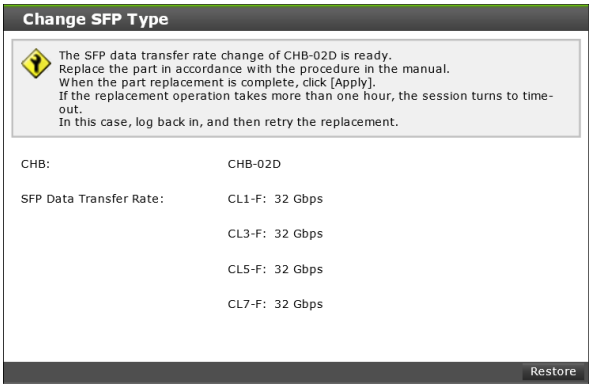
⚠ CAUTION

This operation may cause a serious error such as a system down or a data loss. Confirm the appropriateness of the operation, and then input of the password.

Enter the login password for the maintenance account of the storage system, and then click [OK].

(6) <Check Type Change Preparation>
Check the following type change preparation completion window.
If a message other than the described is displayed, refer to Message Section (MSG00-00).

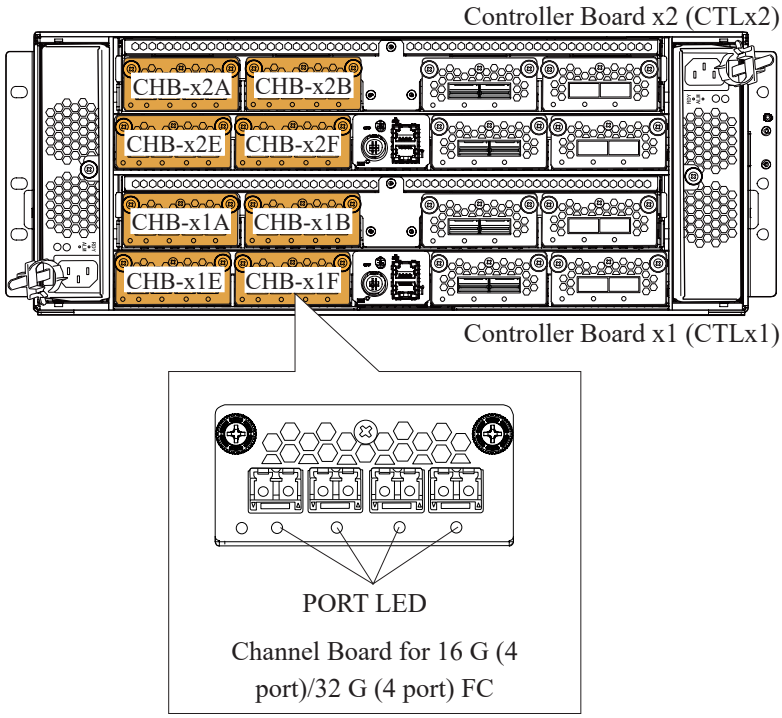
NOTE : Do not click [Restore] at this time.
Click [Restore] after completing the type change work.



NOTE: When the preparation for SFP type change is terminated with the error code [30762-208784], check the prerequisites and procedure, and then retry the operation.
If this problem persists, contact the Technical Support Division.

6. Changing the type of Small Form-Factor Pluggable (SFP)

Location	Changing part name		Parts name
Rear View of DKC	1	Small Form-Factor Pluggable (SFP)	• SFP Shortwave 16 G • SFP Longwave 16 G • SFP Shortwave 32 G



NOTE: The above illustrations are for VSP 5500 and VSP 5500H. For VSP 5100 and VSP 5100H, only CTL01 and CTL12 are installed.

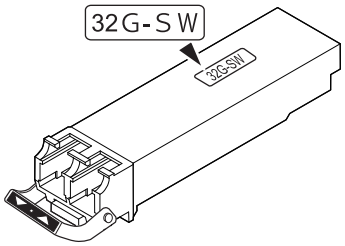
NOTICE: To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the Storage System before starting and do not take it off until you finish. Refer to "Note when Installing and Removing Parts" (INST(GE)01-01-10).

(1) Remove the optical cable from the Small Form-Factor Pluggable (SFP) to be changed.
(2) Changing the Small Form-Factor Pluggable (SFP)
  (a) Pull down the lever of the Small Form-Factor Pluggable (SFP) toward you and pull out the SFP.

    NOTE : If the SFP cannot be removed, pull it out while pushing open the lever toward you.

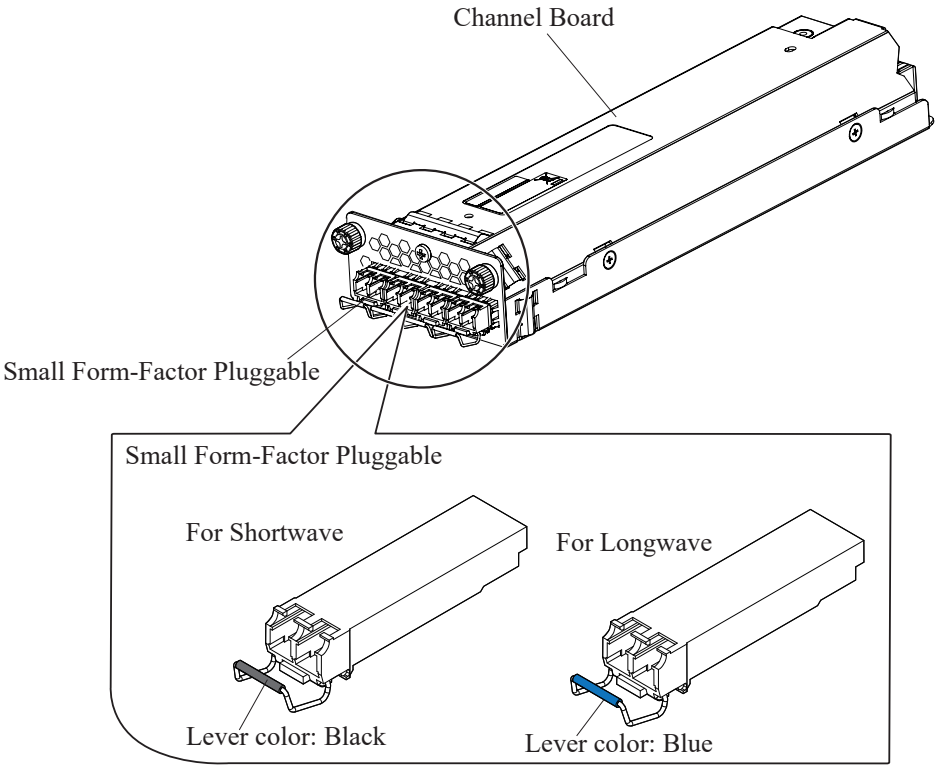
  (b) Check the insertion direction of the Small Form-Factor Pluggable (SFP) to be changed and insert the Small Form-Factor Pluggable (SFP) into the port until it clicks.

    NOTE: The label "32G-SW" is attached to the 32 Gbps Small Form-Factor Pluggable (SFP).



  (c) To change the type of the other SFPs on the same Channel Board, replace the SFPs by using the same procedure.

Figure 9-1 Changing the Small Form-Factor Pluggable (SFP)



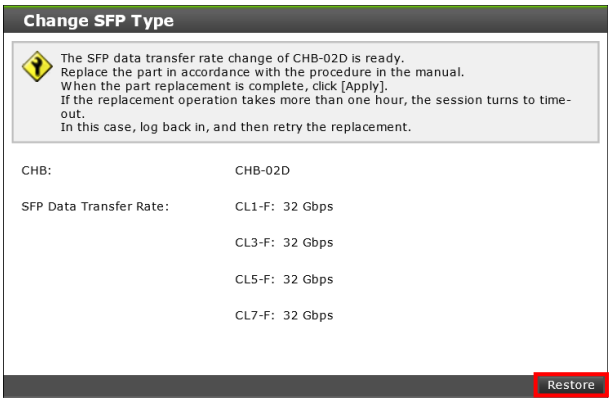
(3) Connect optical cables corresponding to the changed Small Form-Factor Pluggable (SFP).

NOTE: Check that optional cable latch clicks and the cables are surely connected.

7. Changing the types of Small Form-Factor Pluggable (SFP) by Maintenance Utility

(1) <Recognize Small Form-Factor Pluggable>

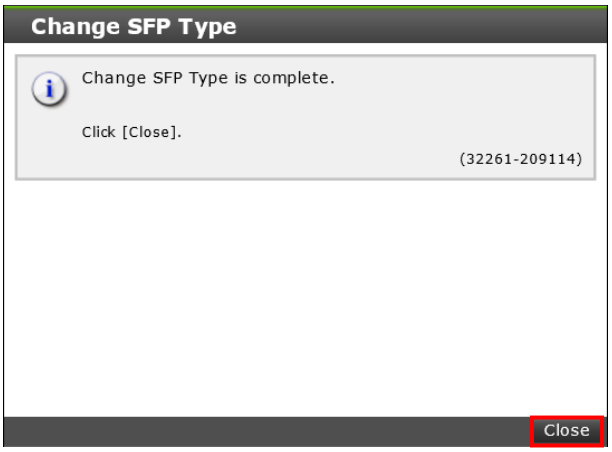
Click [Restore].



(2) <Check Type Change Completion>

Check that the following message is displayed and click [Close].

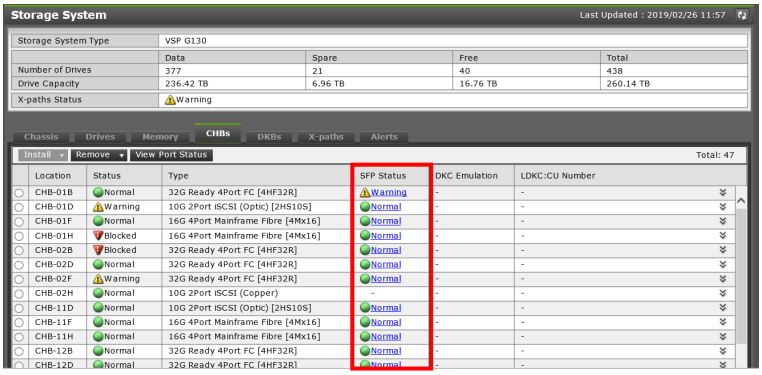
If a message other than the described is displayed, refer to Message Section (MSG00-00).



When the SFP replacement by changing the type fails, click [Close] of the completion message.
Then click the [CHBs] tab in the Main window on Maintenance Utility and check if [SFP Status] is "Normal".
If "Not Fix" is displayed in SFP Status, check if the SFP is properly inserted.
When "Not Fix" is displayed in SFP Status even though the SFP is properly inserted, or when "Warning" is displayed in SFP Status, perform either of the following:
If you have changed the wavelength, perform the procedure described in "SFP REPLACEMENT PROCESSING - RSFP" (REP(RSFP)00-00).
If you have changed the data transfer rate, perform the procedure described in "Recovery Procedure when Procedure for Small Form-Factor Pluggable (SFP) Data Transfer Rate Change fails" (TRBL02-04-340).

(a) Perform the SFP type change of the other Channel Board by repeating the procedure from "5. Selecting additional parts by Maintenance Utility".
(b) After performing the type change of all SFPs, go to Step (3).

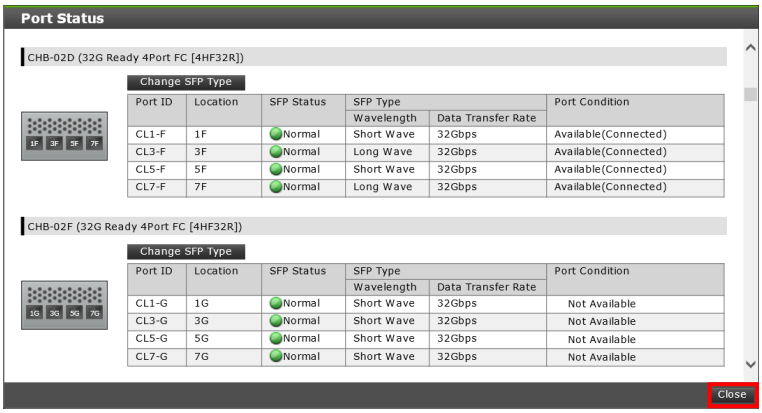
(3) Click the displayed SFP status in [SFP Status] of the Channel Board on which the SFP was replaced.



(4) Check that the Wavelength and Data Transfer Rate of the SFP Type are correct.

NOTE: The [Data Transfer Rate] column is displayed only for the 32G Ready 4Port FC Channel Board.

(5) Click [Close] in the Port Status window.



(6) Checking Normality
Perform the procedure described in "Checking Normality" (TRBL02-06-10).

(7) Click [Logout] to close the window.

8. Removing the Maintenance PC
Remove the Maintenance PC from the storage system referring to “Attachment/Removal Procedure of Maintenance PC” (INST(IN)13-02-10).

10. Adding SVP/SSVP

NOTICE: This work takes about three hours. During the work, the Web Console cannot be used for some time because of a rebooting of the SVP PC and verification.
Inform the customer of the following before starting the addition.

1. During this installation, customer cannot use Web Console/Storage Navigator via a customer PC.
2. When SNMP is being used:
   - 'cold start' trap is reported several times.
   - The obstacle trap which occurred during work may not be notified.
   - SNMP command may not answer normally.
3. The following SIMs may occur during this work. Just complete them when the settings are finished:
   - bfe3a2 - Duplex SVP Setup fail
   - bf86a3 - SVP RAS Switch#1 remains
   - 7ff2xx - Standby SVP fail

Do not open the User Account Control Settings window of the control panel in SVP operation. If the window is opened, the SVP has to be replaced.
Do not change the Internal LAN setting from [Auto Negotiation].

Before performing the LAN cable connection procedure for the additional SVP, execute "10.8 Confirmation Procedure".

10.1 Work to Do before Adding the SSVP Hardware

1. Connecting the Maintenance PC
   (1) Before connecting the Maintenance PC to SVP, launch the Command Prompt on the Maintenance PC.
   - To connect the Maintenance PC to SVP by using SVP Connect Utility in Step (4):
     Launch the Command Prompt with [Run as administrator] selected.
   - To connect the Maintenance PC to SVP by using the remote desktop connection of Windows in Step (4):
     Launch the Command Prompt with [Run as administrator] not selected.

     NOTE: If you select [Run as administrator] when using the remote desktop connection, select [Run as administrator] also when launching the Command Prompt.

   (2) Create a folder to store the configuration information (config) on the Maintenance PC, and mount it to a virtual drive.
   Command example when creating C:\config and mounting it to the K drive:
   ```
   mkdir c:\config
   subst k: c:\config
   ```
   NOTE: The virtual drive might not be displayed in the Explorer window even if you execute the command. However, there is no problem.

   (3) Click the [×] button to close the Command Prompt.

   (4) Connect the Maintenance PC to the Basic SVP.
   [Connected to]
   The Basic SVP xxx.xxx.xxx.15

   NOTE: For the attachment procedure of the Maintenance PC, see “Attachment/Removal Procedure of Maintenance PC” (INST(IN)13-02-10).

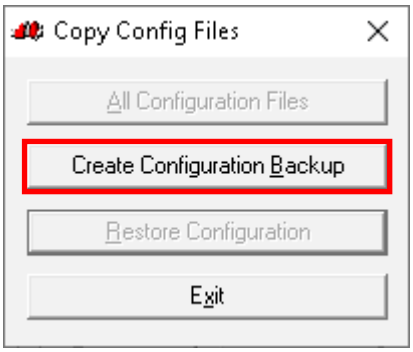
2. <Starting the SVP window>
   From the menu of Web Console, click [Maintenance Components]-[Maintenance Components (General)].

3. Config Backup
   (1) <Mode change>
   Change the mode to [Modify Mode].

   (2) Click [Initial Setting] in the SVP window.

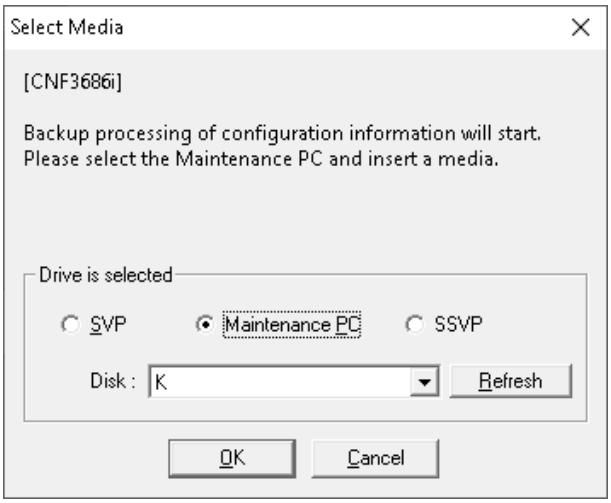
   (3) Click [Copy Config Files] in the Initial Setting window.

   (4) Click [Create Configuration Backup] in the Copy Config Files window.

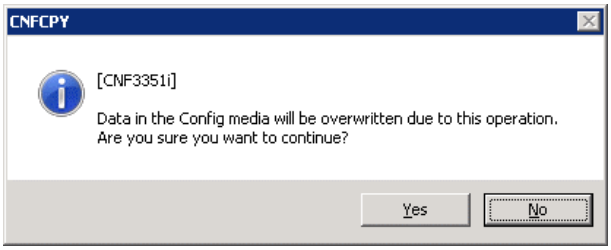


   (5) Execute an operation for backing up the configuration information.
   Select [Maintenance PC], click [Refresh], and select the drive to store the configuration information (config), which is created in Step 1. (2).
   Then, click [OK].

   NOTE: If the drive mounted in Step 1. (2) is not displayed in [Disk], the operation for launching the Command Prompt might have been performed incorrectly in Step 1. (1). In such a case, click [Cancel], disconnect the connection to SVP, and then perform the procedure from Step 1. again.

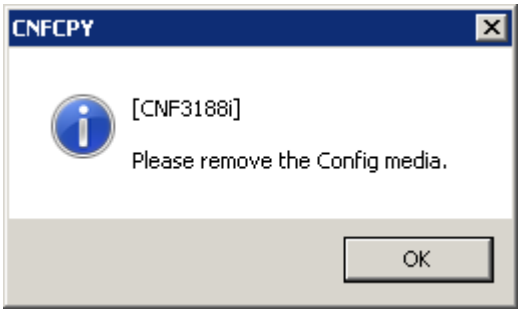


(6) Click [Yes].



(7) The backing up of the configuration information is performed. While this operation is being done, the CNFCPY Wait... window is displayed.

(8) Eject the media, and then click [OK] in response to the message “Please remove the Config media.”.



(9) Click [Exit] in the Copy Config Files window to finish this operation.

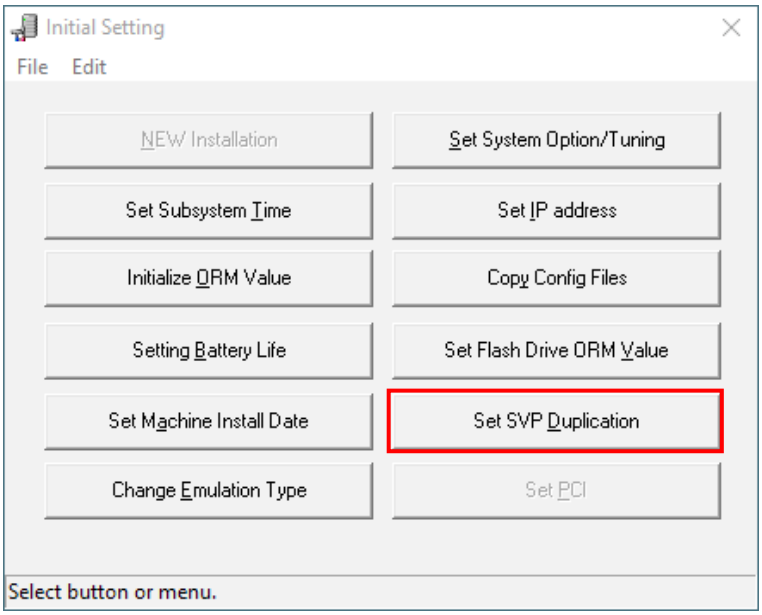
4. Setting of Installation

(1) <Open Initial Setting>

Click [Initial Setting] in the SVP window.

(2) <Select Set SVP Duplication>

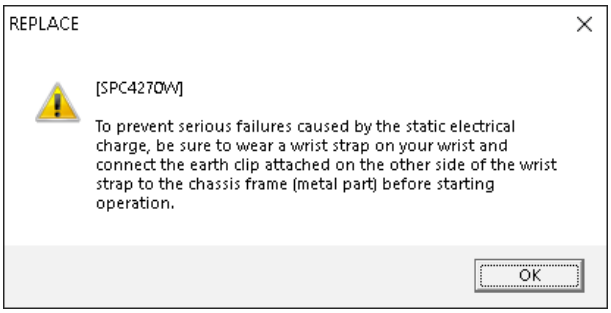
Click [Set SVP Duplication] in the Initial Setting window.



(3) <Enabling SVP Duplication>

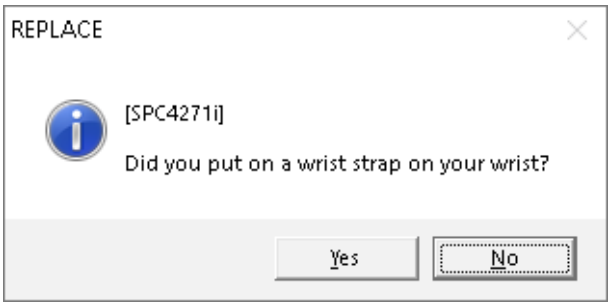
In the SVP Duplication widow, select [Enable], and then click [OK].

(4) <Wear a wrist strap without fail>
The message “To prevent serious failures caused by the static electrical charge, be sure to wear a wrist strap on your wrist and connect the earth clip attached on the other side of the wrist strap to the chassis frame (metal part) before starting operation.” is displayed.



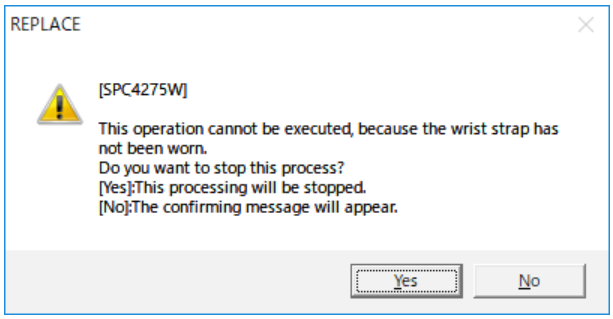
Wear a wrist strap, and then click [OK].

(5) <Confirm wearing wrist strap>
The message “Did you put on a wrist strap on your wrist?” is displayed.
Click [Yes], and then go to Step (6).

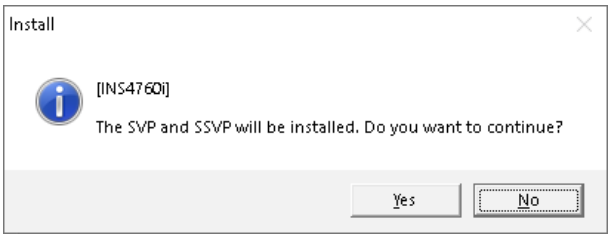


NOTE: If you are not wearing a wrist strap, click [No] in response to the message above. Then, the message below is displayed. Click [Yes] to stop the processing, wear a wrist strap, and then resume the operation.

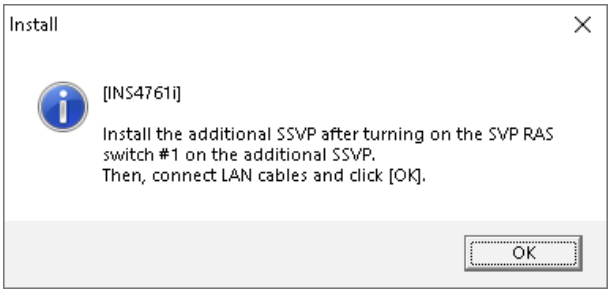
“This operation cannot be executed, because the wrist strap has not been worn. Do you want to stop this process?
[Yes]: This processing will be stopped.
[No]: The confirming message will appear.”.



(6) <Starting the addition>
Click [Yes] in response to the message “The SVP and SSVP will be installed. Do you want to continue?”.



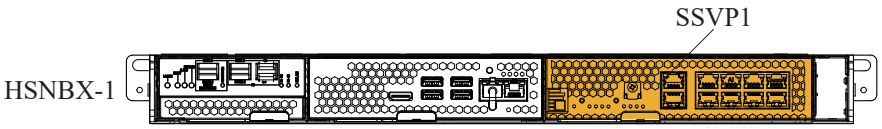
(7) <Starting the procedure for adding the SSVP>
The message “Install the additional SSVP after turning on the SVP RAS switch #1 on the additional SSVP. Then connect LAN cables and click [OK].” is displayed.



NOTE: .Do not click [OK] in this step.
Click [OK] after completing the Procedure for Adding the SSVP Hardware.

10.2 Procedure for Adding SSVP Hardware

Location	Additional parts name		Parts name
Front side of HSNBX	1	SSVP	• SSVP

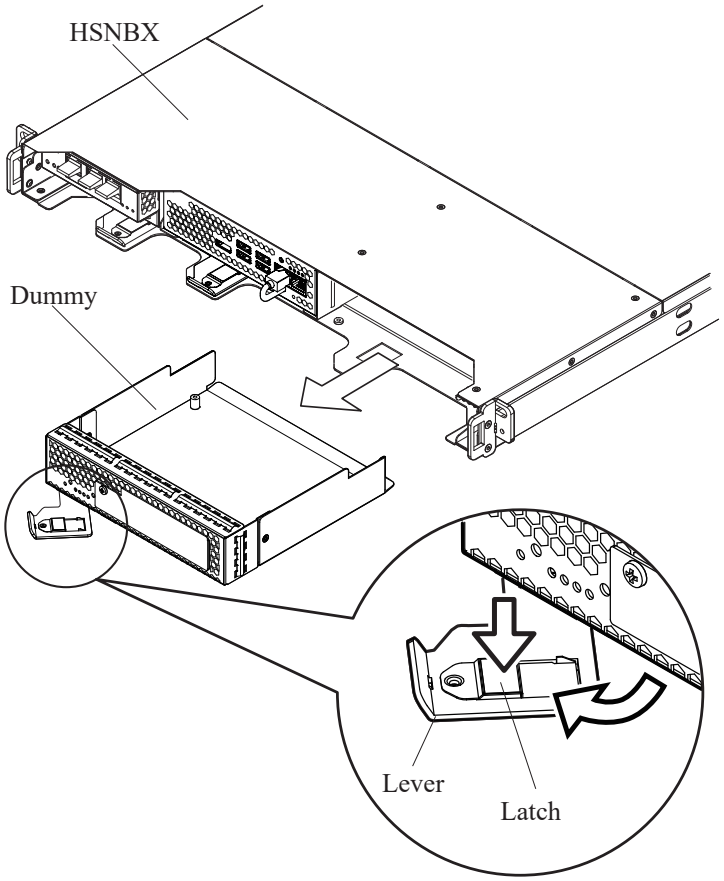


Front View of HSNBX

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 Storage System before starting and do not take it off until you finish. Refer to "Note when Installing and Removing Parts" (INST(GE)01-01-10).

1. Removing the dummy
   (1) Open the lever while pressing its latch securing the dummy.
   (2) Open the lever completely until the dummy is pulled out toward you.
   (3) Remove the dummy by pulling it out while holding it with your hands.

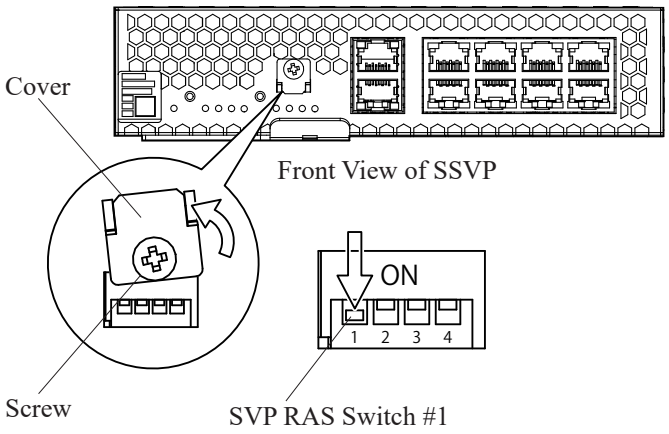
Figure 10-1 Removing the Dummy



2. Turn the SVP RAS switch#1 on the SSVP before installation to ON
   (1) Loosen the screw and rotate the switch cover upward. Then, tighten the screw.
   (2) Set the SVP RAS Switch #1 on the SSVP to ON (lower position).

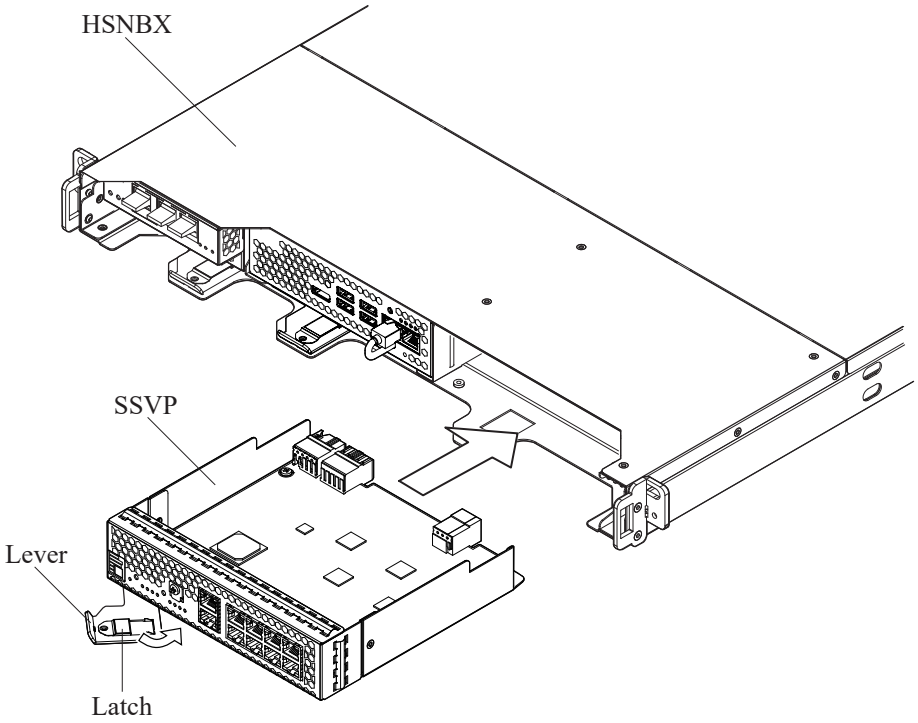
   NOTE: Use an object with a sharp edge such as a pair of tweezers to manipulate the SVP RAS switch.

Figure 10-2 SVP RAS Switch Setting



3. Installing the SSVP
   (1) Completely open the lever of the SSVP toward you.
   (2) Insert the SSVP fully into the HSNBX and push the lever until the latch on the lever clicks and is locked.

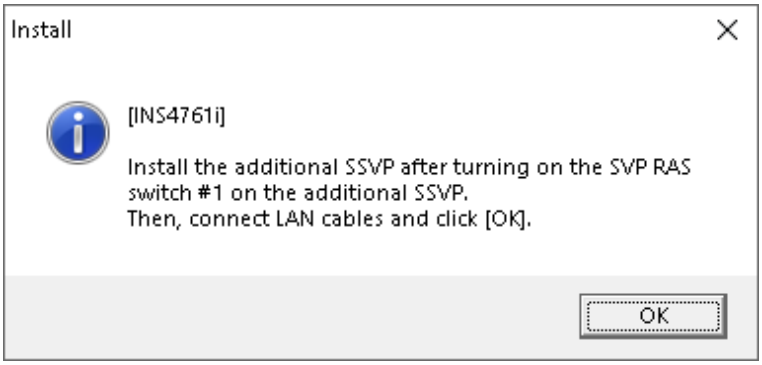
Figure 10-3 Installing the SSVP



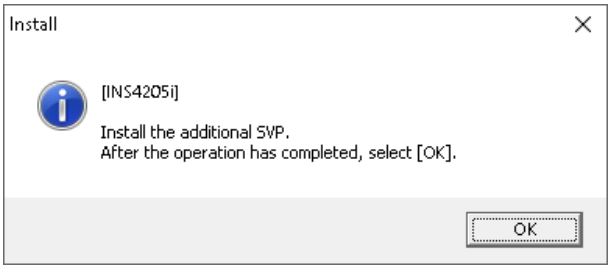
4. Connecting the cables
   Connect the LAN cables, attach the cable labels, and route the cables (see"Connecting LAN Cables" (INST(IN)09-03-10)).

10.3 Work to Do before Adding the SVP Hardware

1. Confirming completion of the addition of the SSVP.
   Click [OK] in response to the following message:
   “Install the additional SSVP after turning on the SVP RAS switch #1 on the additional SSVP. Then connect LAN cables and click [OK]”

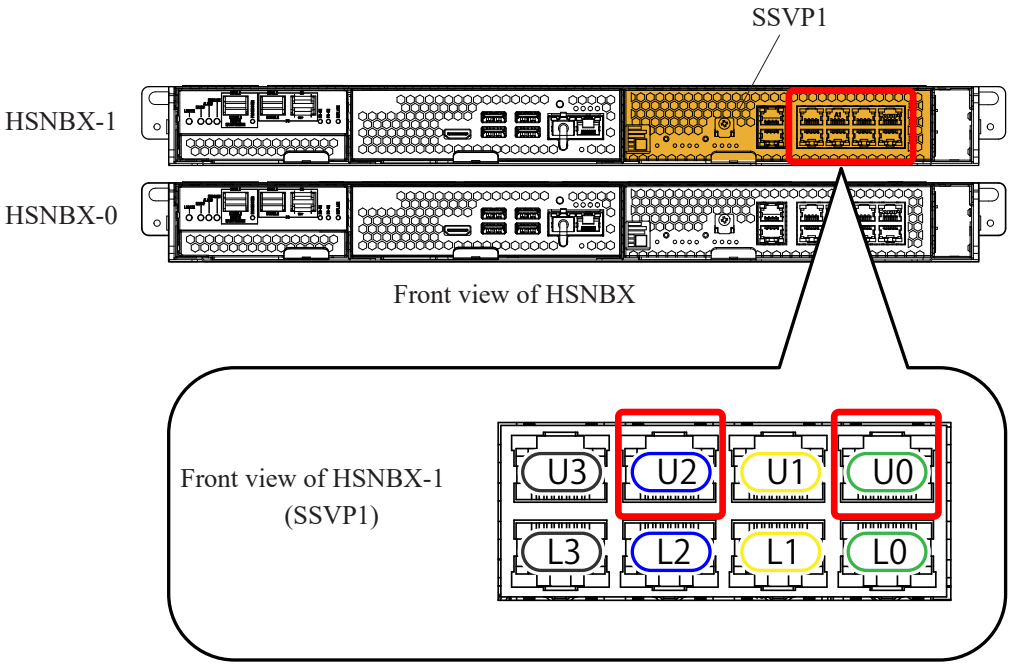


2. Starting the procedure for adding the SVP
   The message “Install the additional SVP. After the operation has completed, select [OK].” is displayed.

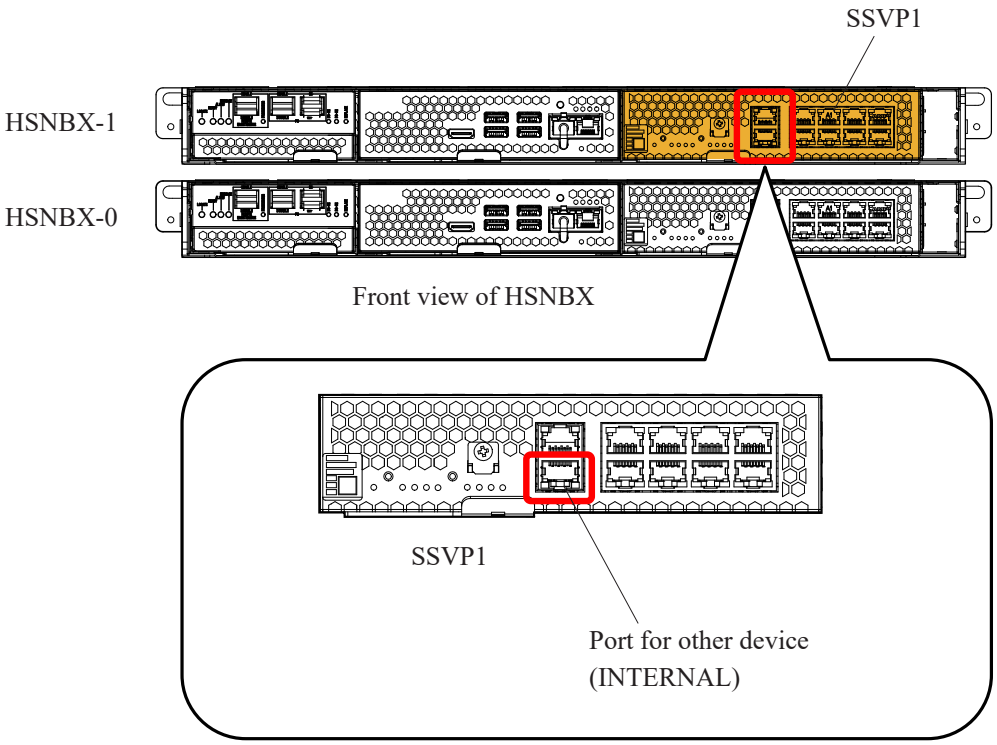


NOTE: Do not click [OK] in this step.
Click [OK] after completing the Procedure for Adding the SVP Hardware.

3. Disconnecting the LAN cables
   When the IP address of the Basic SVP is 126.255.254.15, disconnect the LAN cables from the LAN ports (U0 and U2) on SSVP1.

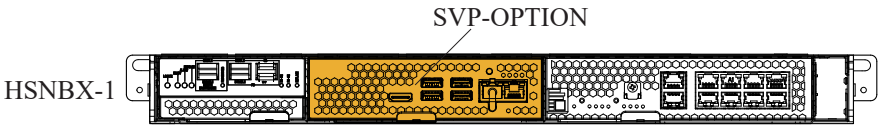


When a LAN cable is connected to the port for other device (INTERNAL) on SSVP1, disconnect it.



10.4 Procedure for Adding the SVP Hardware

Location	Additional parts name		Parts name
Front side of HSNBX	1	SVP	• SVP

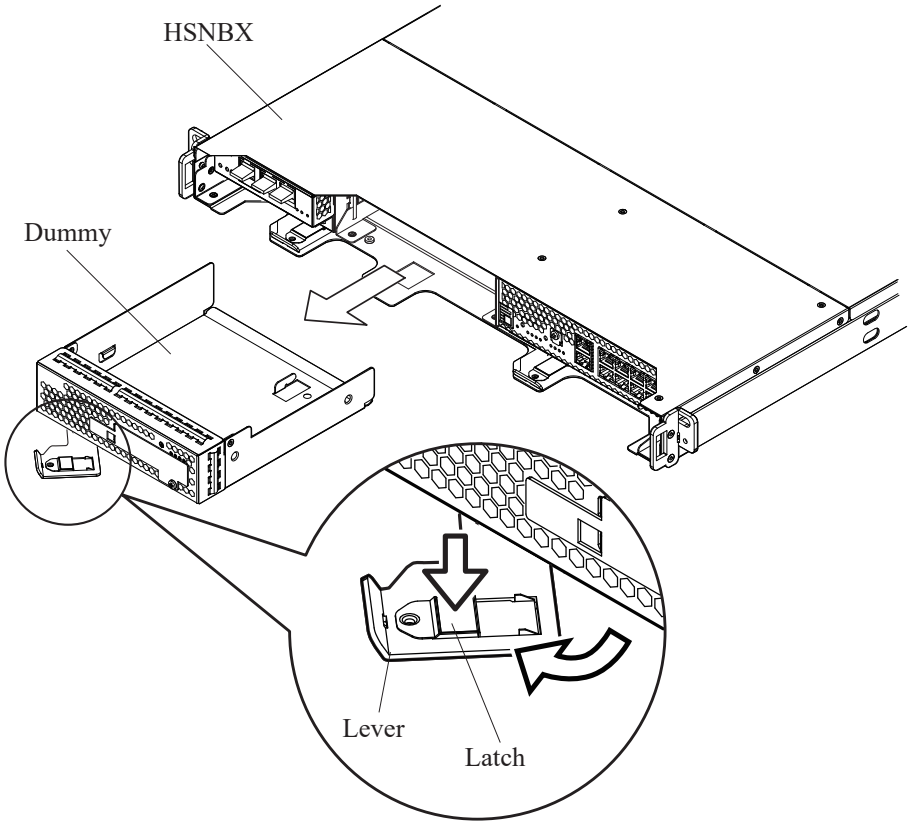


Front View of HSNBX

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 Storage System before starting and do not take it off until you finish. Refer to "Note when Installing and Removing Parts" (INST(GE)01-01-10).

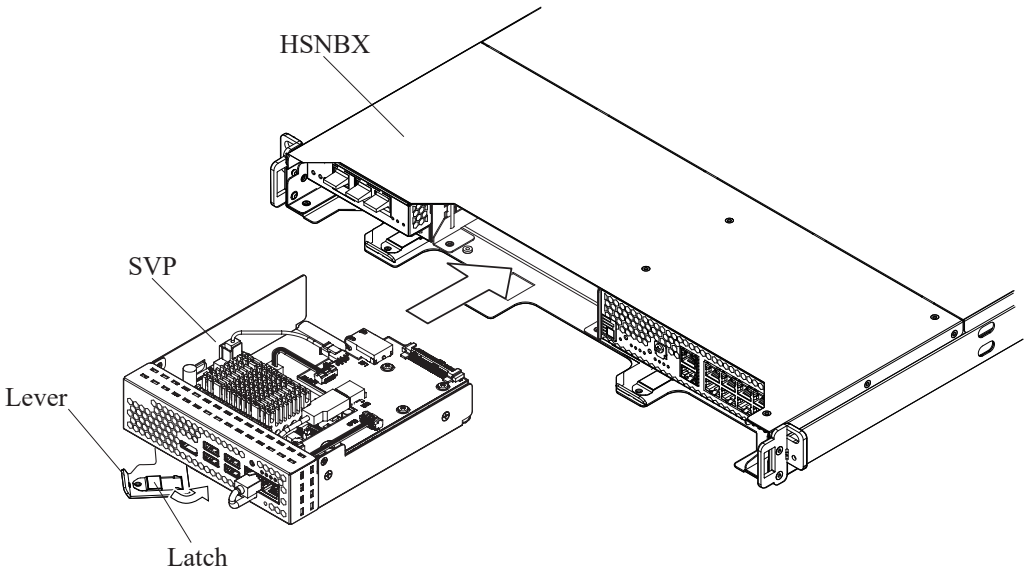
1. Removing the dummy
   (1) Open the lever while pressing its latch securing the dummy.
   (2) Open the lever completely until the dummy is pulled out toward you.
   (3) Remove the dummy by pulling it out while holding it with your hands.

Figure 10-4 Removing the Dummy

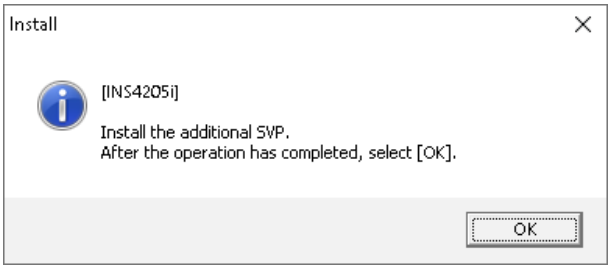


2. Installing the SVP
   (1) Completely open the lever of the SVP toward you.
   (2) Insert the SVP fully into the HSNBX and push the lever until the latch on the lever clicks and is locked.

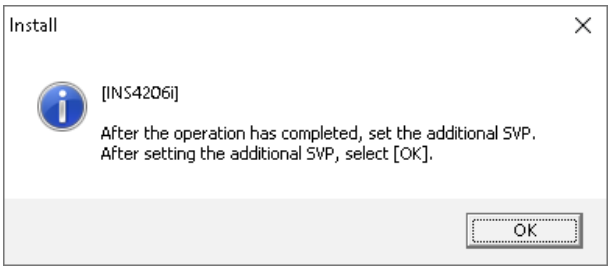
Figure 10-5 Installing the SVP



3. <Confirming completion of the addition of the SVP>
   After installing the Additional SVP, click [OK].



4. <Operation after the addition of the SVP>
   The message "After the operation has completed, set the additional SVP. After setting the additional SVP, select [OK]." is displayed.



NOTE: Do not click [OK] in this step.
Click [OK] after completing the settings of the additional SVP.

10.5 Setup of the Additional SVP

10.5.1 Connecting to the Additional SVP and Setting the Date and Time

1. Connecting the Maintenance PC
   (1) IP address of connection destination

NOTE: When the IP address of the Maintenance PC is not 126.xxx.xxx.13, change the IP address to 126.255.254.13.

NOTE: When the IP address of the Basic SVP is 126.255.254.15, connect the LAN cable between the Maintenance PC and the console port on SSVP1.

Connect the Maintenance PC to the added SVP using the connection utility.
[Connection destination]
Additional SVP 126.255.254.15

When the connection to the added SVP is successful, go to Step (2).
When it is unsuccessful, initialize the IP address (*1), and then connect to the added SVP.

*1: For the initialization procedure, see (LOC03-44). The login password and maintenance password of the SVP are also initialized when the IP address is initialized.

If the connection fails again, the added SVP might have a failure. Perform the following steps:

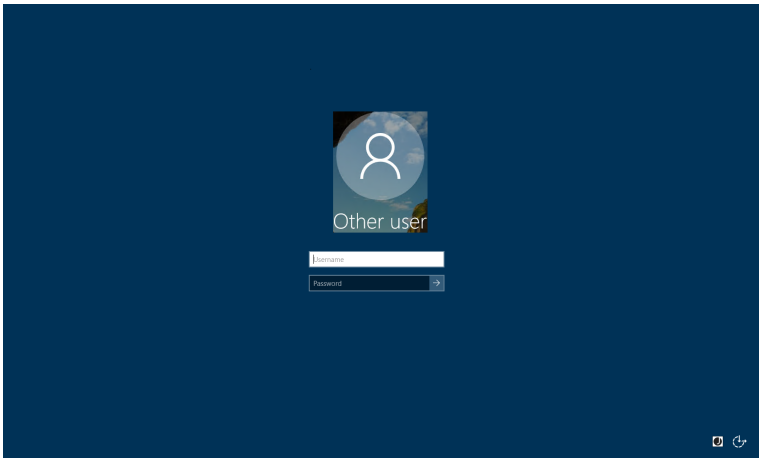
(a) Press the SVP PS ON/OFF switch on the SVP for 5 seconds or more to power off the SVP forcibly (LOC03-30).
(b) Check that the SVP POWER LED is off.
(c) Get another maintenance part, and perform the procedure from "10.4 Procedure for Adding the SVP Hardware" again.

(2) User name and password for login to SVP

There are two types of user names used for connection to the SVP.
One is the user name for connecting to the SVP on which the SVP microprogram is installed, and the other is the user name for connecting to the SVP on which the SVP microprogram is not installed.
In this procedure, use the latter to login to the SVP because the SVP microprogram is not installed in the added SVP.
Ask the Technical Support Division about the user name and password.

NOTE: If you have initialized the login password of the SVP in Step (1), ask the Technical Support Division about the initial password of the user name for connecting to the SVP on which the SVP microprogram is installed.

NOTE: If the "Other user" window shown below is displayed when you connect to the SVP, enter the user name and password for connecting to the SVP on which the SVP microprogram is not installed.



NOTE: When the IP address of the Basic SVP is 126.255.254.15, perform the following:

If the following window appears when you connect to SVP, an IP address conflict might occur. Check that the LAN cables are disconnected (see "3. Disconnecting the LAN cables").

When the LAN cables are not disconnected, perform [1] and [2], and then perform the procedure from Step (1) again.

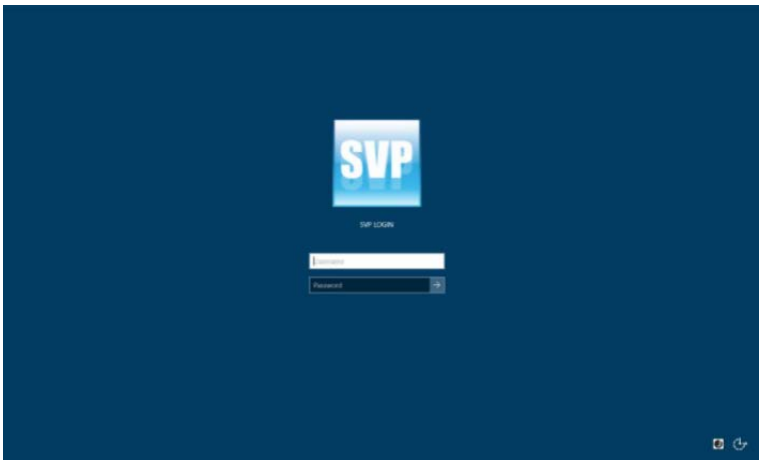
[1] Disconnect the LAN cable (see "3. Disconnecting the LAN cables").

[2] Power off and then on the Additional SVP (see "Power Off" (SVP01-200) and "Power On" (SVP01-190)).

When the LAN cables are disconnected, check whether the Additional SVP has been used before.

If the Additional SVP has been used before, the following window certainly appears. Continue the operation.

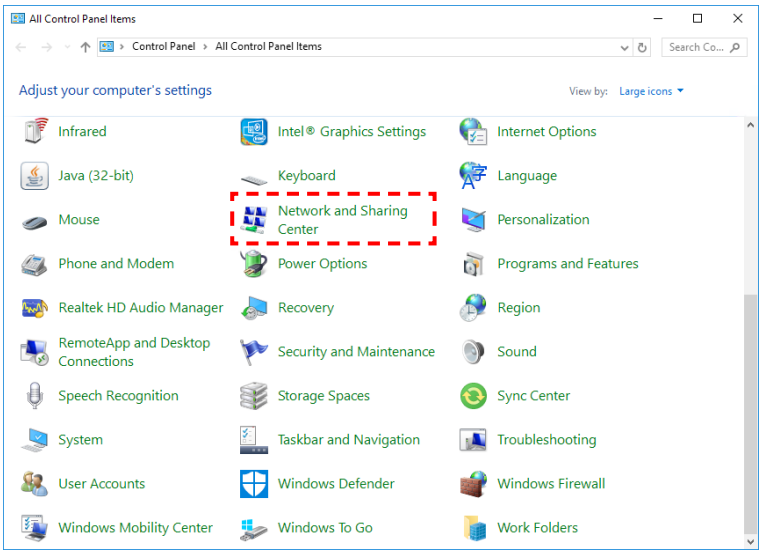
If the Additional SVP has not been used before, get another maintenance part, and perform the procedure from "10.4 Procedure for Adding the SVP Hardware" again.



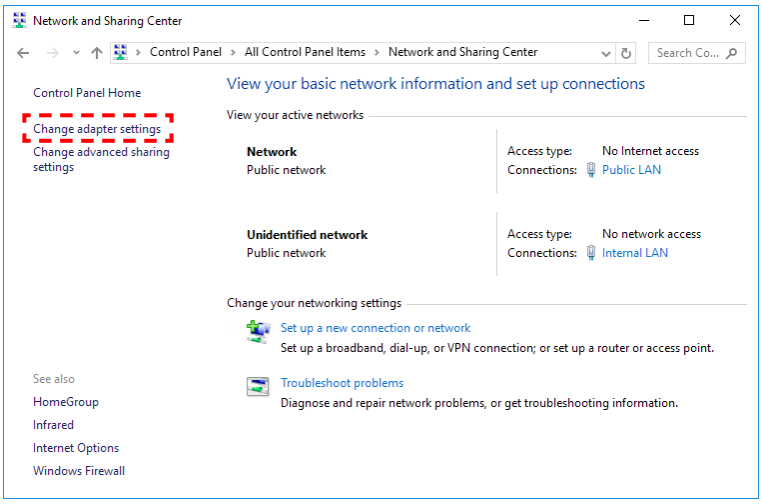
2. <IP address settings of Additional SVP>
When the IP address of the Basic SVP is 126.255.254.15, perform the following steps.

(1) <Opening the Control Panel window>
Click [Start], and then select [Control Panel] from [Windows System].

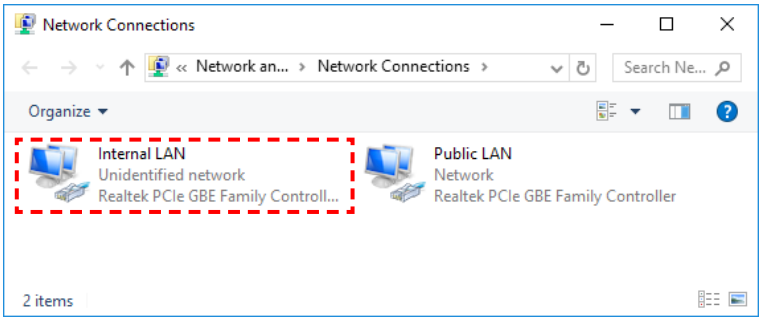
(2) <Opening the Network and Sharing Center window>
Select [Network and Sharing Center] in the Control Panel window.



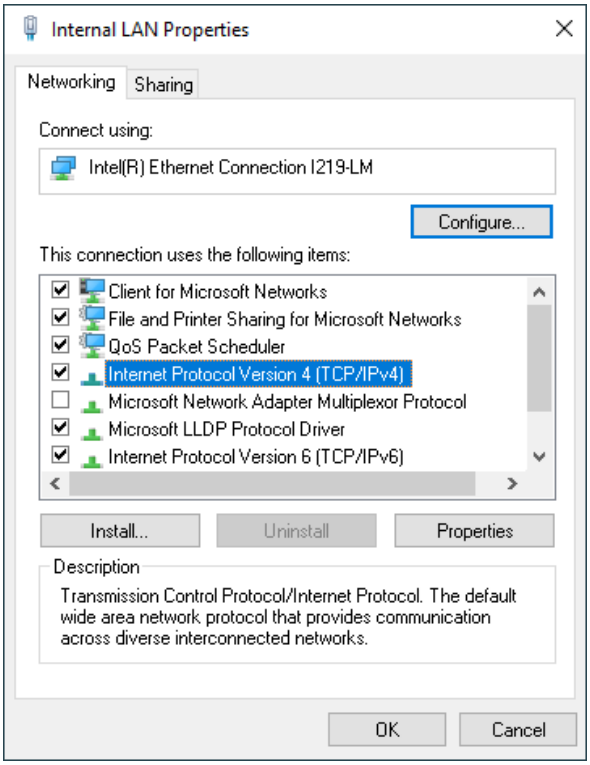
(3) <Opening the Network Connections window>
Select [Change adapter settings] in the Network and Sharing Center window.



(4) <Opening the Internal LAN Properties window>
Right-click [Internal LAN], and then click [Properties].



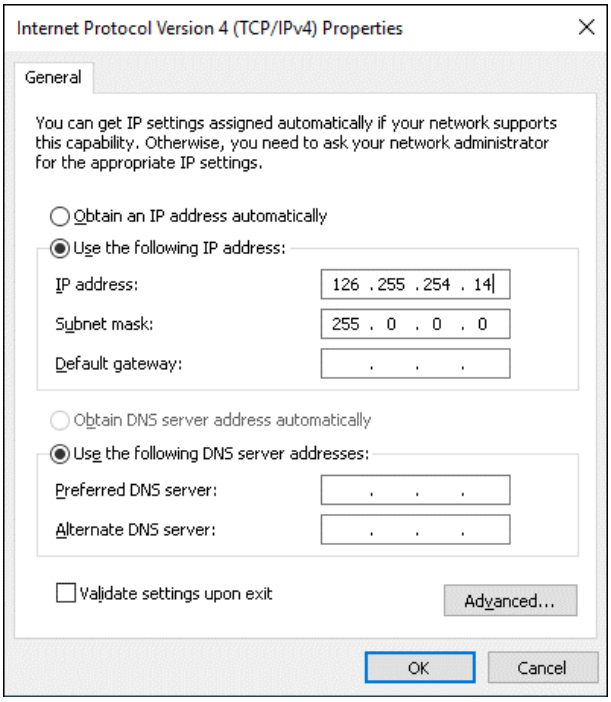
(5) In the Internal LAN Properties window, select [Internet Protocol Version 4 (TCP/IPv4)] and click [Properties].



(6) Set the following values for “IP address” and “Subnet mask” and click [OK].

NOTE: When the “Set Network Location” dialog (TRBL03-30-60) is displayed, click [Cancel].

IP address 126.255.254.14
Subnet mask 255.0.0.0



(7) In the Internal LAN Properties window, click [OK].
Close the Network Connections window.
Disconnects the connection between the Maintenance PC and the SVP.

(8) Connecting to the SVP again.
Connect to the SVP shown below and log in to it again.

[Connect to]
The Additional SVP 126.255.254.14

3. Setting the Data and Time

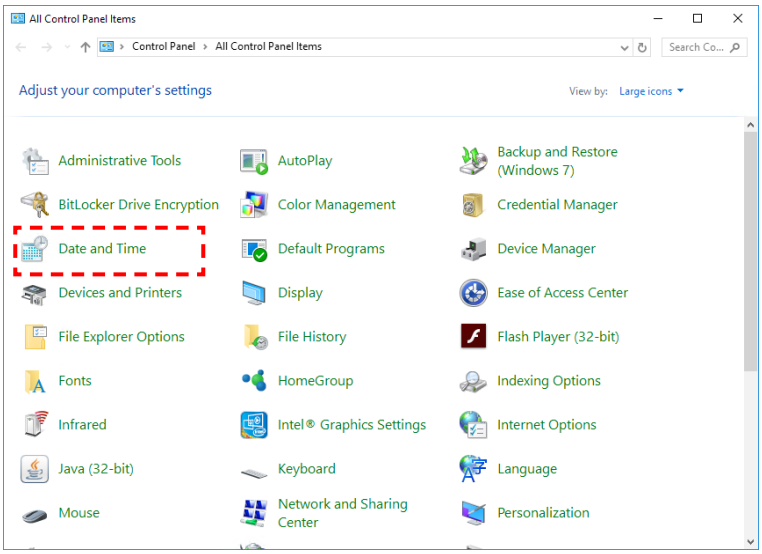
<Making sure of the setting of a time zone>

(1) Open the Control Panel window.

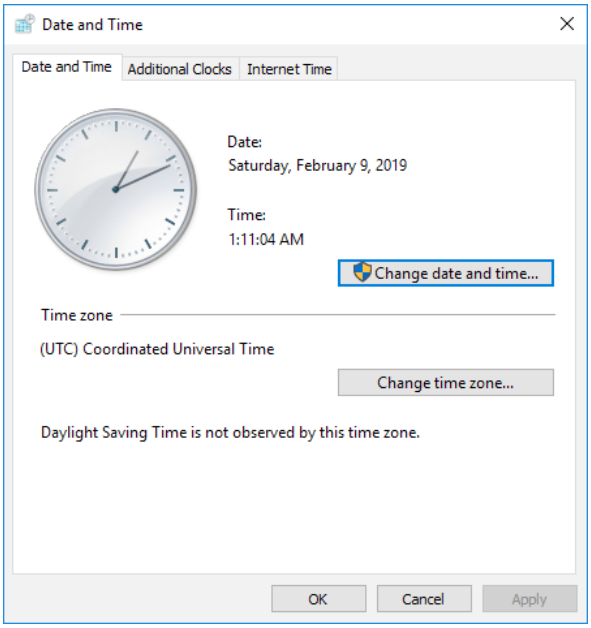
Click [Start], and then select [Control Panel] from [Windows System].

(2) Open the Date and Time window.

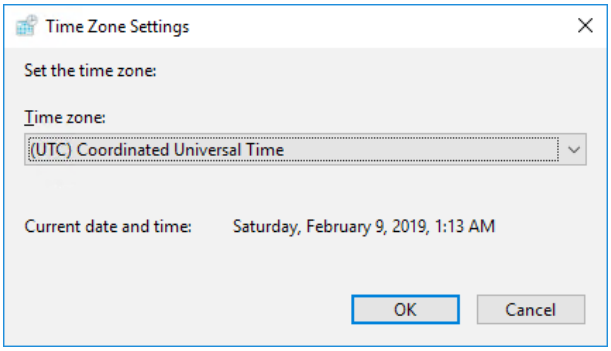
Click [Date and Time] in the Control Panel window.



(3) Selecting [Change time zone].
Click [Change time zone...] in Date and Time window.

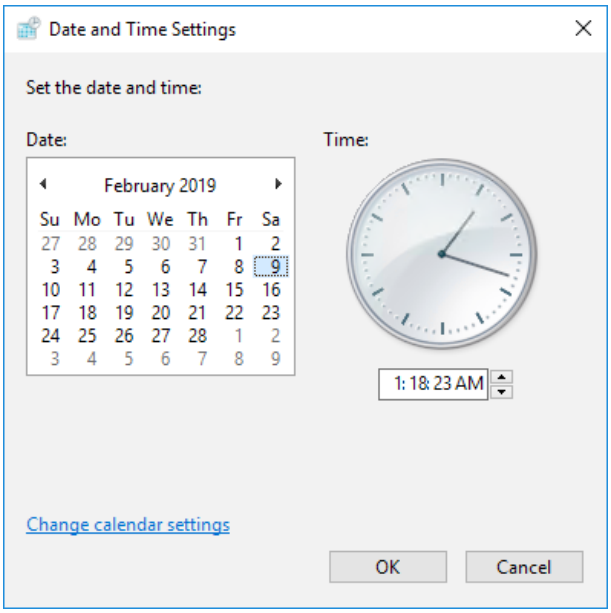


(4) Check the [Time Zone Settings].
Set the same time zone (*1) as that set on the Basic SVP.
*1: The time zone is set in the [Change time zone] menu in the Set Subsystem Time window of the SVP.



(5) Set the [Date and Time Settings].
Click [Change date and time...] in Date and Time window.

(6) Check the settings.
Check if the [Date and Time Settings] is set to the current date and time where the storage system is placed.
If it is not set as above, correct the settings. Then, click [OK].



(7) Close the Control Panel window.

10.5.2 Install the Micro-program

The processing time of the SVP micro-program installation is about 30 minutes.
When the SVP micro-program is installed, OSSs are installed at the same time. For the OSSs to be installed and their versions, see (MICRO07-10).

NOTICE: When Apache is updated, the SSL communication key and the certificate files for Apache return to the defaults.
Notify the customer that the setting operations for the SSL communication key and the certificate files are customer's responsibility, and ask the customer to perform the operations according to "System Administrator Guide" after the update of Apache.

1. Starting Installation
   (1) Insert the micro-program media into the drive of the Maintenance PC and wait 1 minute.

   (2) Open the Run window
   Right-click [Start], and then select [Run].

   (3) Enter "\\tsclient\E\xxxxx.exe (*1)", and click [OK]

   NOTE: • Select the drive which inserted a micro-program media.
   "\\tsclient\E\xxxxx.exe (*1)"
   Enter the drive letter of the drive of the Maintenance PC.
   Indicate Maintenance PC. (Use this spelling as it is.)
   • If the SVP is unintentionally rebooted while "xxxxx.exe (*1)" is performed, perform the SVP micro-program installation again.
   • The installation process might take time. Also, it might take up to 15 minutes before the processing is started.

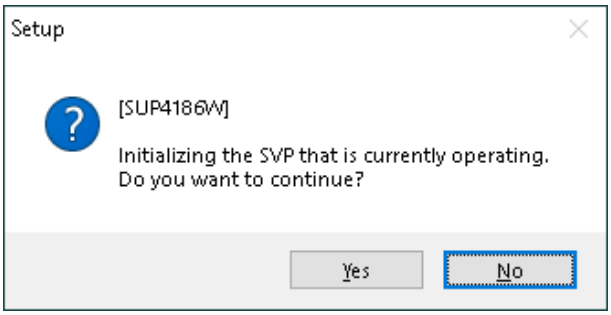
   *1: The executable file name varies depending on the micro-program version.

DKCMAIN version	Executable file name
90-01-01-x0/xx or later and less than 90-01-51-x0/xx	setup.exe
90-01-51-x0/xx or later and less than 90-01-61-x0/xx	svpsetup.exe
90-01-61-x0/xx or later and less than 90-02-01-x0/xx	setup.exe
90-02-01-x0/xx or later	svpsetup.exe

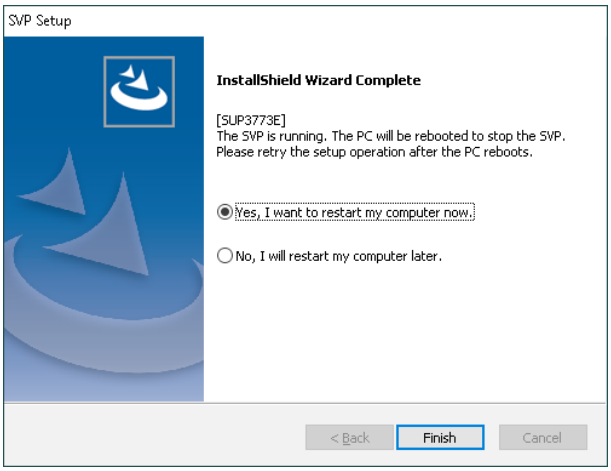
(4) When the SVP micro-program is not installed in the installed SVP (*1), go to Step (8).

*1: A maintenance part SVP is shipped without SVP micro-program installed. If you have installed an SVP in which the SVP micro-program is installed, the message shown in Step (5) is displayed.

(5) The message [SUP4186W] is displayed. Click [Yes].

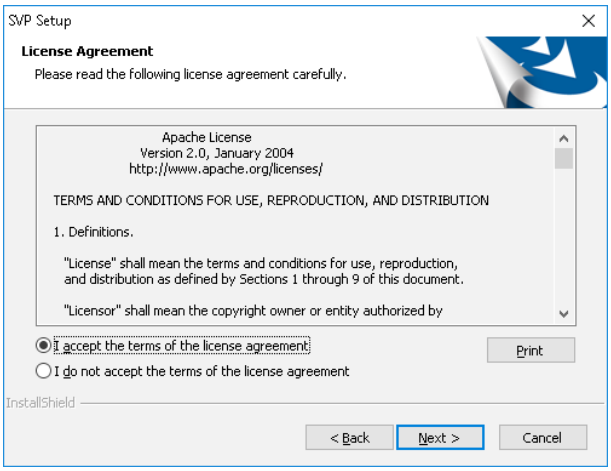


(6) The window to reboot the SVP is displayed. Click [Finish] after check [Yes] in radio buttons. After rebooting the SVP (after waiting for about five minutes), install the microprogram again from Step (3).
Specify “the user name for connecting to the SVP on which the SVP micro-program is not installed” for the login user to the SVP.



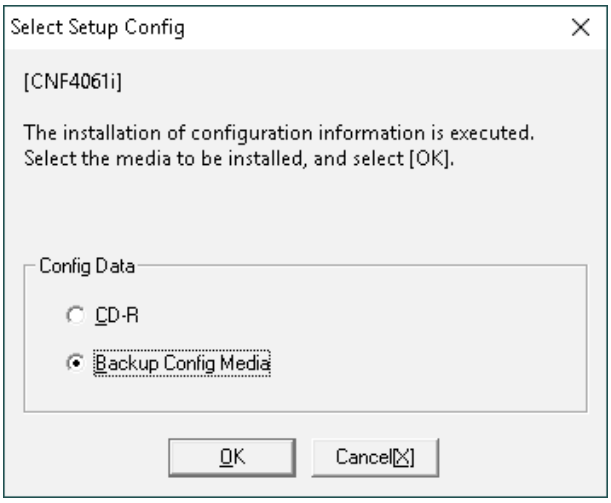
(7) When you retry the installation microprogram after the SVP reboot, the following message is displayed. Click [Run].

(8) The confirmation window of the OSS license agreement is displayed. Select [I accept the terms of the license agreement], and then click [Next >].

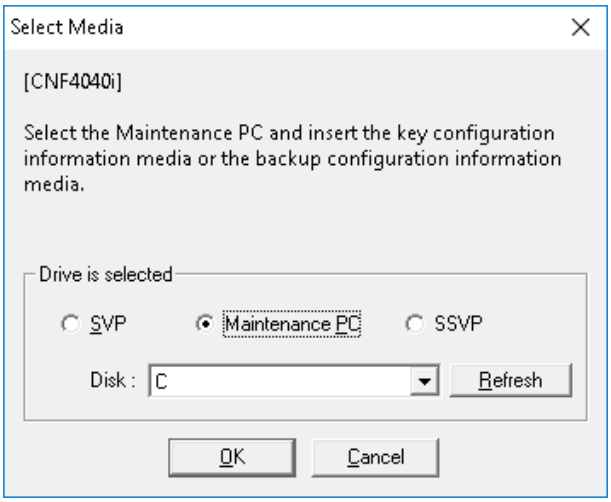


2. Installing the Configuration Information

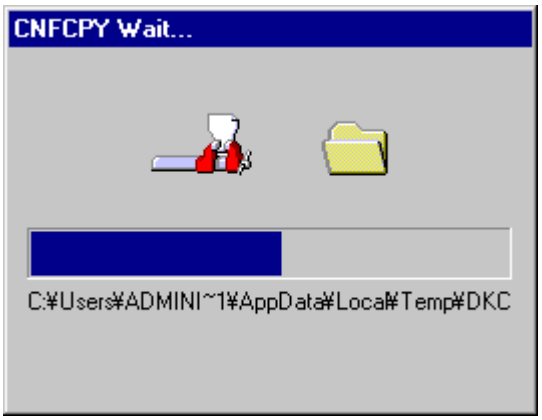
(1) When installation processing advances, the following window is displayed. Select “Backup Config Media”, and click [OK].



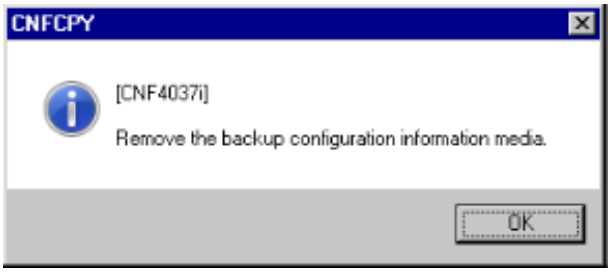
(2) Select [Maintenance PC], select the drive to store the configuration information (config), which is created in “10.1 Work to Do before Adding the SSVP Hardware” Step 1 (2), and then click [OK]. When [Refresh] is clicked, the Disk is updated to the latest information.



(3) The copy processing of the configuration information from the Backup Config Media to the SVP is executed.
The 'CNFCPY Wait...' window is displayed during this time.

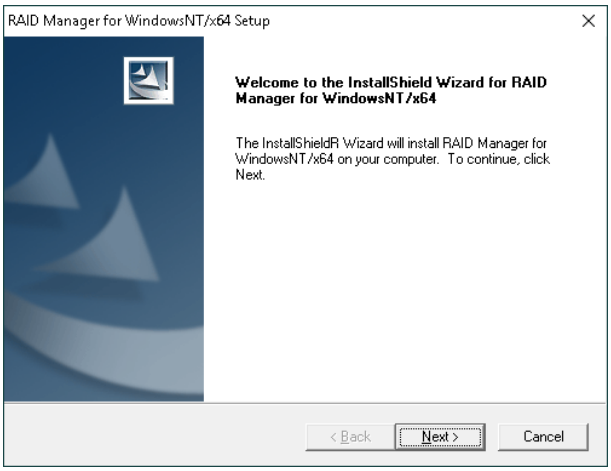


(4) Click [OK] after removing the configuration information media.

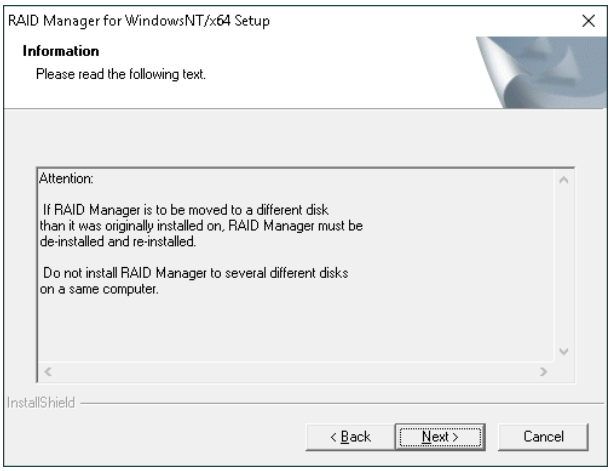


3. Installing the RAID Manager

(1) When the installation of the configuration information finishes, the following window is displayed. Click [Next >].

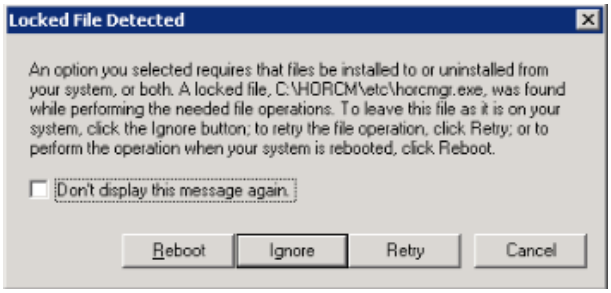


(2) Click [Next >].

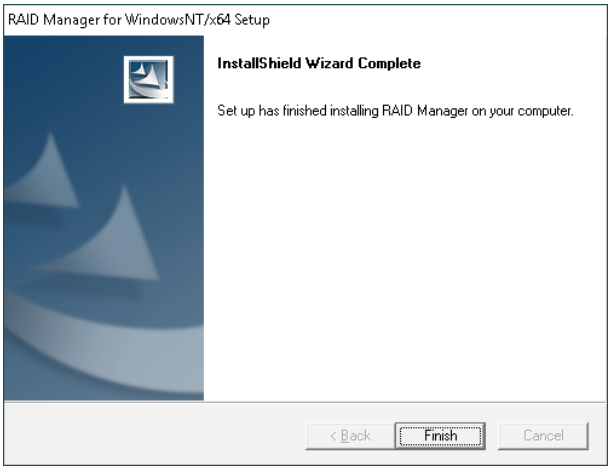


When “Locked File Detected” is displayed, click [Retry] after waiting for about five minutes.

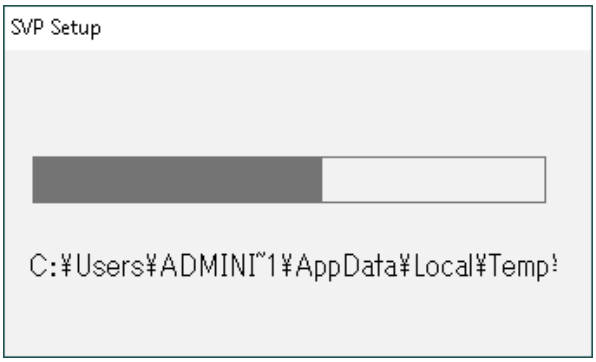
NOTE: “Locked File Detected” is displayed when RAID Manager process is not terminated. At this time, you should wait until RAID Manager process is terminated.



(3) Click [Finish].



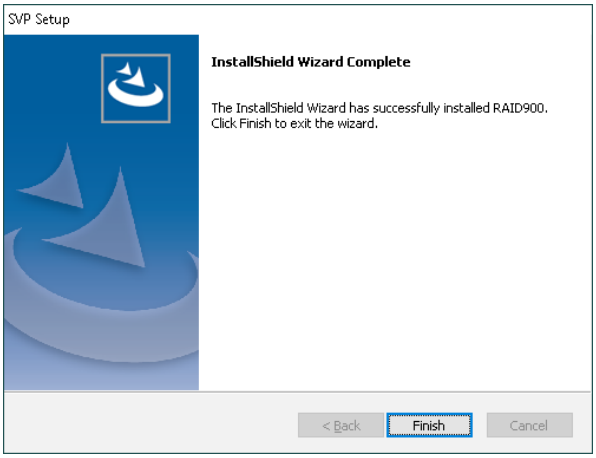
4. OSS Installation
   Wait for about 5 minutes until the OSS installation is completed. The following window is displayed during the OSS installation.



5. Restarting the SVP
When the installation of the micro-program is completed, the following window is displayed. Take out the micro-program media and click [Finish]. The SVP is restarted (disconnected from the Maintenance PC).

After waiting for about five minutes, reconnect the Maintenance PC to the Additional SVP. When reconnecting to the Additional SVP, use the user name and password for the SVP on which the SVP microprogram is already installed (see INST(AD)10-05-10) to log in to the Additional SVP.

[Connected to]
The Additional SVP 126.255.254.15



NOTE: When the IP address of the Basic SVP is 126.255.254.15, perform the following steps.

(1) Connect the LAN cable between the Maintenance PC and the console port on SSVP0.

(2) Connect the LAN cables that were disconnected according to "3. Disconnecting the LAN cables" to the same ports as before.
- Connect the LAN port (U0) on SSVP0 and the LAN port (U0) on SSVP1.
- Connect the LAN port (U2) on SSVP0 and the LAN port (U2) on SSVP1.
- Connect the LAN cable to the port for other device (INTERNAL) on SSVP1, if you want to do.

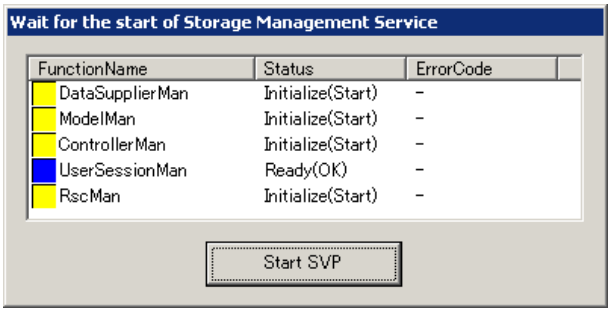
(3) Connect to the SVP shown below and log in to it.
[Connect to]
The Additional SVP 126.255.254.14

10.5.3 Various Settings of the Additional SVP

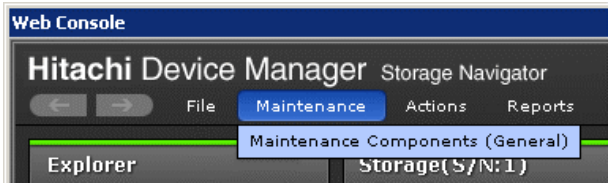
1. <Setting an IP Address and Duplication of Additional SVP>
   (1) <Starting SVP window>

   NOTE: The SVP4756W message might be displayed when the SVP window is started. However, there is no problem.

   <When Web Console isn't working>
   Click [Start SVP] when the following window is displayed.

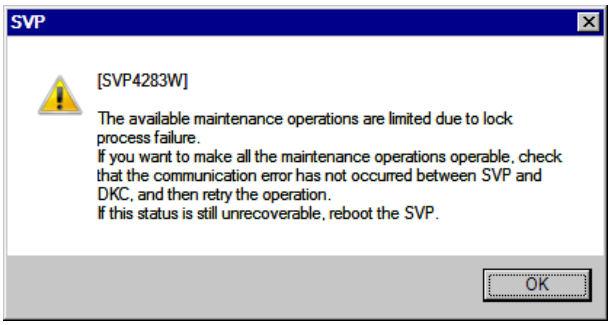


   <When Web Console is working>
   Select [Maintenance]-[Maintenance Components (General)].



   (2) <Mode change>
   Click [View Mode] in SVP main window. When it becomes [Modify Mode (Unlocked)] and the next message is displayed, click [OK] and go to Step (3).
   "The available maintenance operations are limited due to lock process failure.
   If you want to make all the maintenance operations operable, check that the communication error has not occurred between SVP and DKC, and then retry the operation. If this status is still unrecoverable, reboot the SVP.".

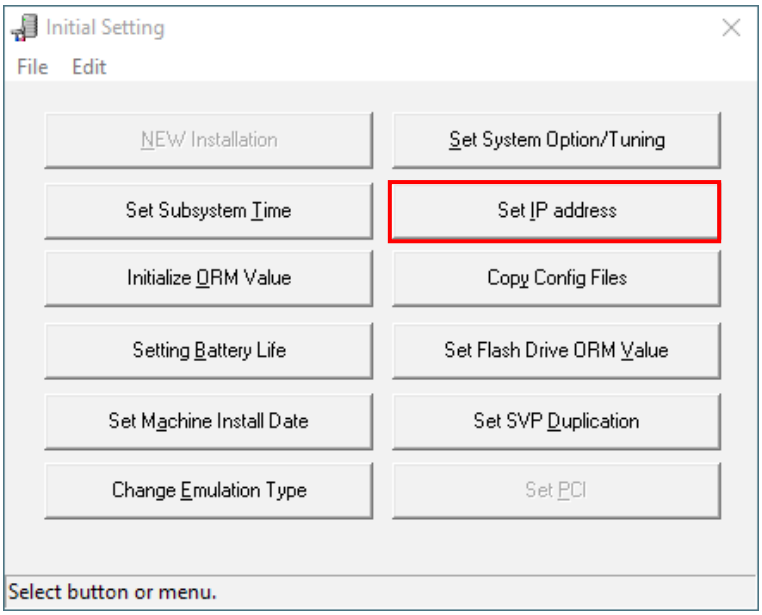
   Click [View Mode] in the SVP main window. When it becomes to [Modify Mode] from [View Mode], also click [OK] and go to Step (3).



(3) <Opening the Initial Setting window>
Click [Initial Setting] in the SVP window.

(4) <Selecting Set IP address>
Click [Set IP address] in the Initial Setting window.

NOTE: Although it may be an error display if the Web Server Status window is displayed before the IP address setting work of SVP is completed, there is no problem because it is the one by the process of the SVP addition.



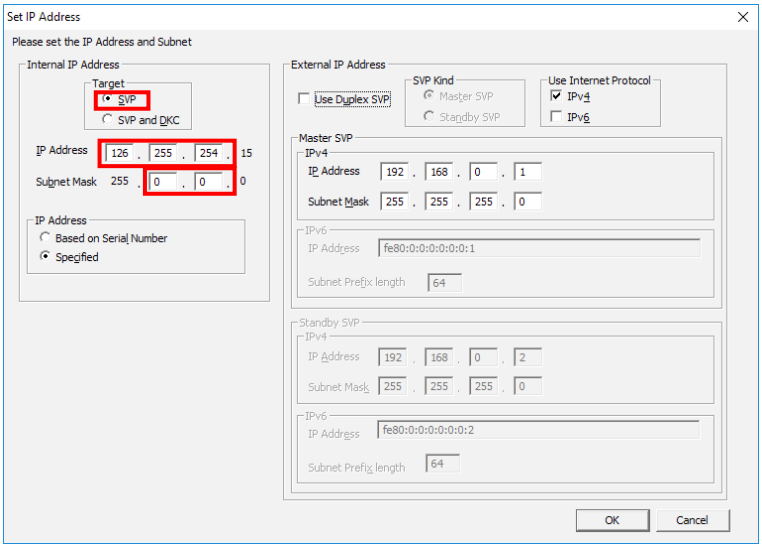
(5) <Setting Internal IP Address>

(a) Click [SVP] in Internal IP Address. The default IP address and subnet mask are displayed.

(b) Enter the same values as those of the SVP already installed before adding the SVP in the first, second, and third octets of IP Address and the second and third octets of Subnet Mask.

NOTE: The fourth octet of IP Address is automatically set to the value of the Standby SVP in the next step.

Do not click [OK] in this step. Go to the next step.



(6) <Setting the SVP duplication>

(a) Check [Use Duplex SVP] in the External IP address box.

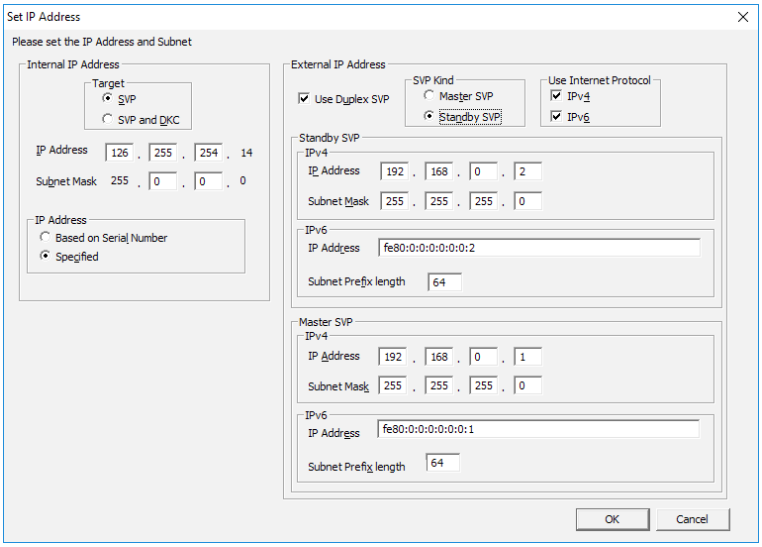
(b) Select [Standby SVP] in the SVP Kind box.

(c) Enter the IP addresses and subnet masks of the Master and Standby SVPs, and then click [OK].

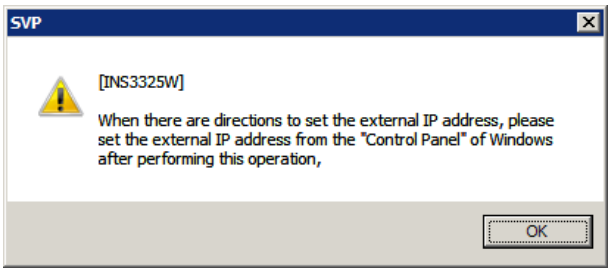
NOTE: When the IP address change fails, repeat the procedure from Step (4), and make sure to perform (a), (b), and (c) correctly. If the failure persists, see (TRBL02-04-170).

NOTE: You do not have to enter the information of Item (c) above when the setting of the external IP address is not required.
Go to Step (e).

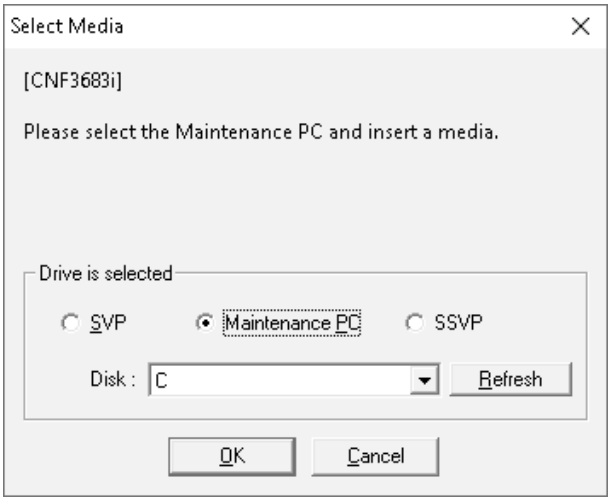
NOTE: When the Service Processor is installed, information transmission to Standby SVP is performed once per a day. The Standby SVP reboots for the application after the information transfer. Even if a Standby SVP does not have setting of periodical reboot, Standby SVP reboots. For example, Standby SVP reboots at around 13:30 with the equipment which transmits at 13:00. The time of a reboot changes by transfer information quantity.



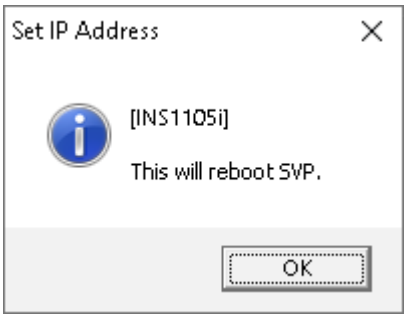
(d) <Confirming the external IP address setting>
When a message, “When there are directions to set the external IP address, please set the external IP address from the Control Panel of Windows after performing this operation,” is displayed, click [OK].



(e) <Configuration information backup>
Click [Cancel] when the following window is displayed.



(f) <Confirming rebooting of the SVP>
Click [OK] in response to a message, "This will reboot SVP."



When the setting up is completed, the SVP reboots automatically. When it reboots, the connection between the Maintenance PC and the Additional SVP is cut off.
Wait for about five minutes, and then reconnect the Maintenance PC to the Additional SVP.

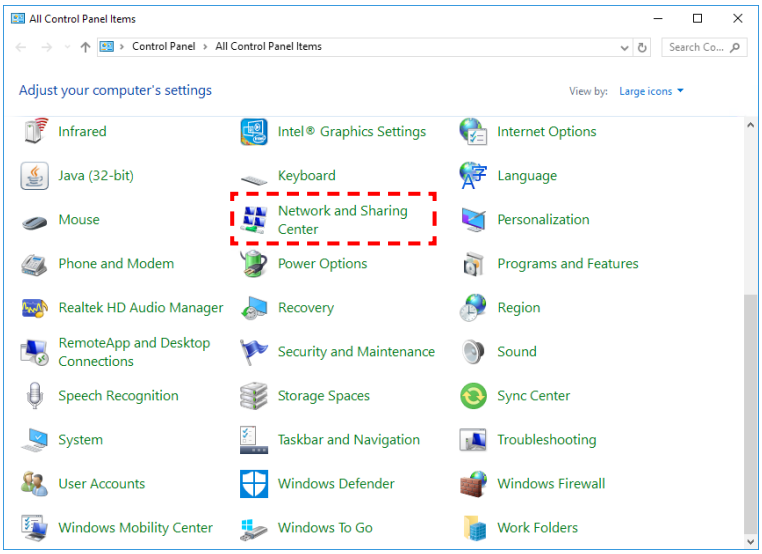
[Connected to]
The IP Address xxx.xxx.xxx.14 which is setup in the Additional SVP by Step (5) in the storage system concerned.

NOTE: When the IP address of the Maintenance PC is changed in "1. Connecting the Maintenance PC", return the IP address of the Maintenance PC to xxx.xxx.xxx.13, and then connect it to SVP.

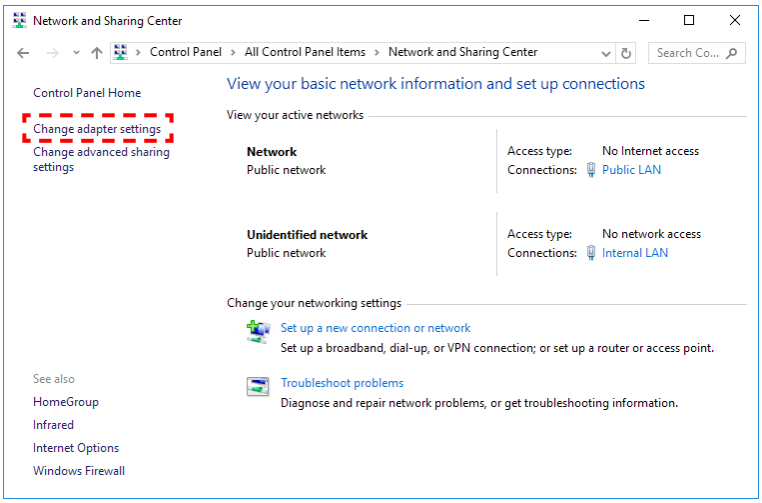
2. <Setting an external IP address>
When the setting of the external IP address is not required, go to Step 3.

(1) <Opening the Control Panel window>
Click [Start], and then select [Control Panel] from [Windows System].

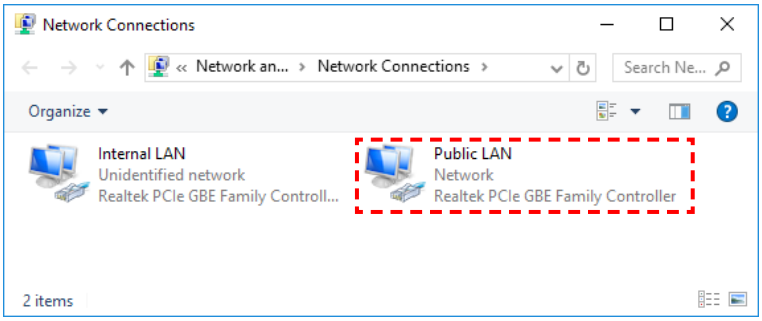
(2) <Opening the Network and Sharing Center window>
Select [Network and Sharing Center] in the Control Panel window.



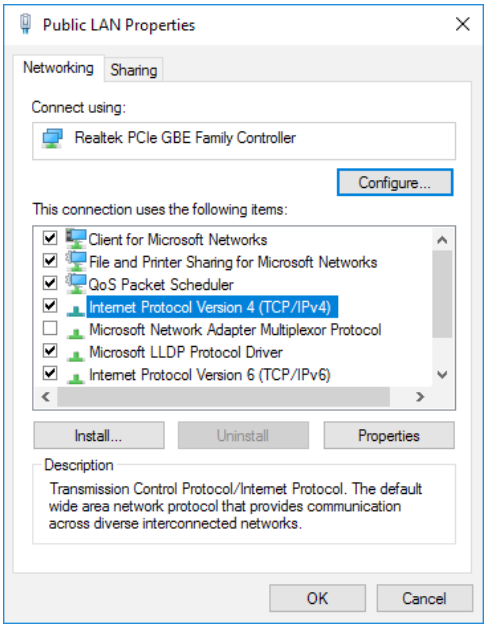
(3) <Opening the Network Connections window>
Select [Change adapter settings] in the Network and Sharing Center window.



(4) <Opening the Public LAN Properties window>
Right-click [Public LAN], and then click [Properties].



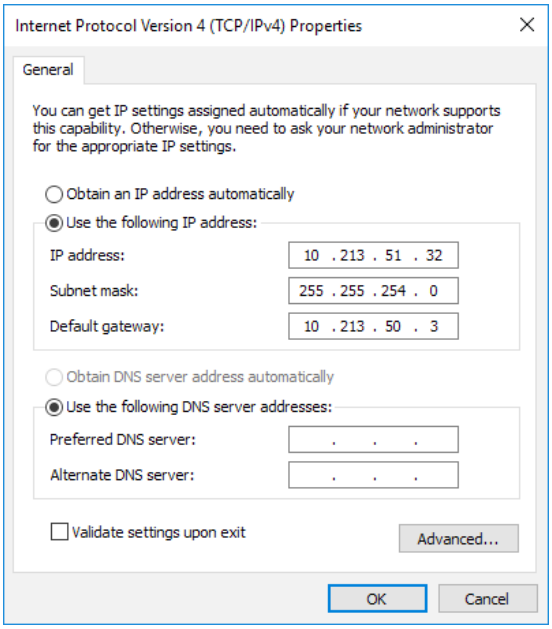
(5) Select [Internet Protocol Version 4 (TCP/IPv4)] in the Public LAN Properties window and click [Properties].



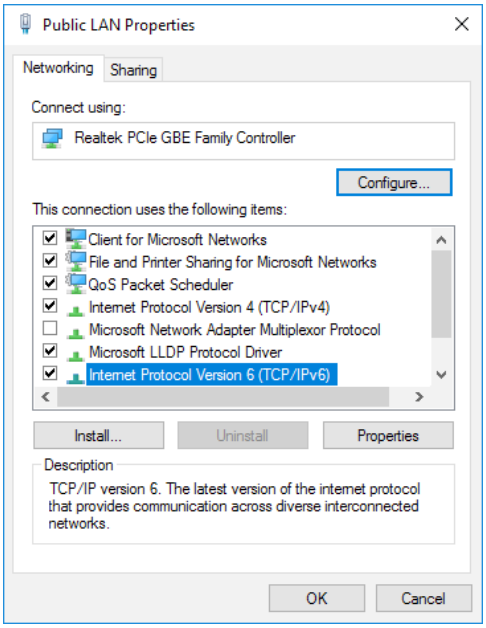
(6) <Setting the external IP address>
Set the “IP address”, “Subnet mask”, “Default gateway”, “Preferred DNS server” and “Alternate DNS server” and click [OK].
When you do not set IPv6, go to Step (9).

NOTE: When the ‘Set Network Location’ dialog (TRBL03-30-60) is displayed, click [Cancel].

NOTE: Set the same default gateway and DNS servers for Master SVP and Standby SVP when configuring a network.

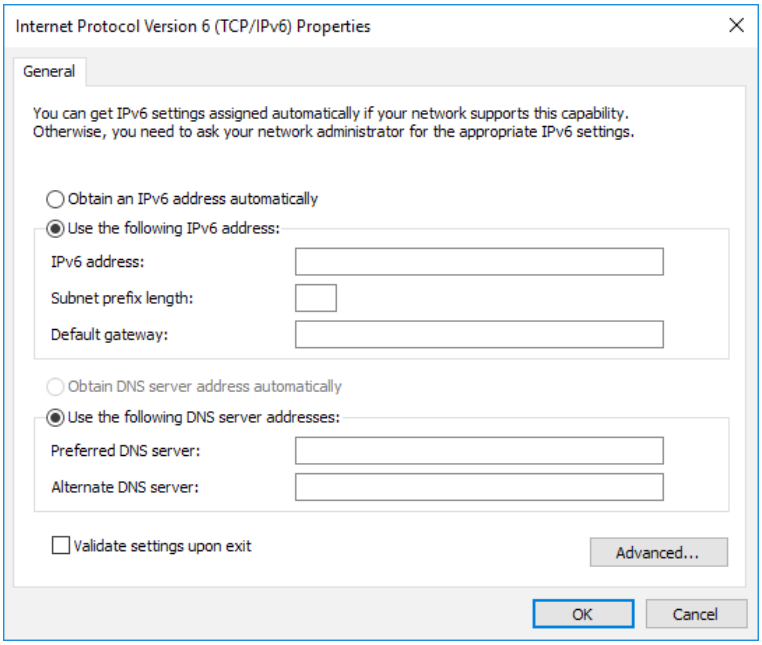


(7) Select [Internet Protocol Version 6 (TCP/IPv6)] in the Public LAN Properties window and click [Properties].



(8) <Setting the external IP address>
Set the “IPv6 address”, “Subnet prefix length”, “Default gateway”, “Preferred DNS server”, “Alternate DNS server” and click [OK].

NOTE: Set the same default gateway and DNS servers for Master SVP and Standby SVP when configuring a network.



(9) After the setting is completed, click [OK] in the Public LAN Properties window.
Close the Network Connections window.

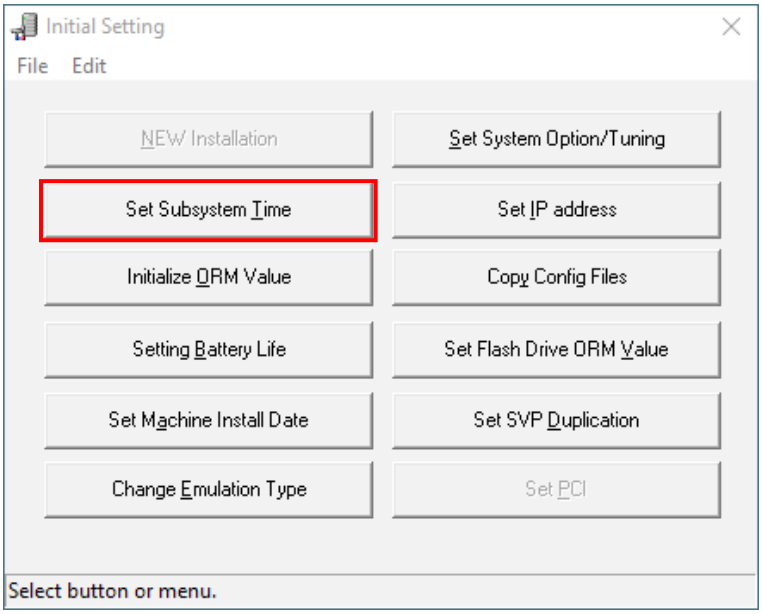
3. <Setting the time zone>

NOTE:
- When the customer uses a Kerberos server for the authentication for login to the storage system:
  Ask the customer about the time zone of the Kerberos server, and then set the same time zone as that of the Kerberos server according to the steps shown below.
- When the customer uses an authentication server other than Kerberos for login to the storage system, or when the customer does not use an authentication server:
  If a time zone other than "(UTC) Coordinated Universal Time" is set on the Basic SVP (*1), set the time zone by following the steps below.
  *1: Time zone that is set in the setting window opened by clicking "Change time zone" in the Set Subsystem Time window of SVP.
- If neither of the above is true, the time zone setting is not required.
  Go to Step 4.

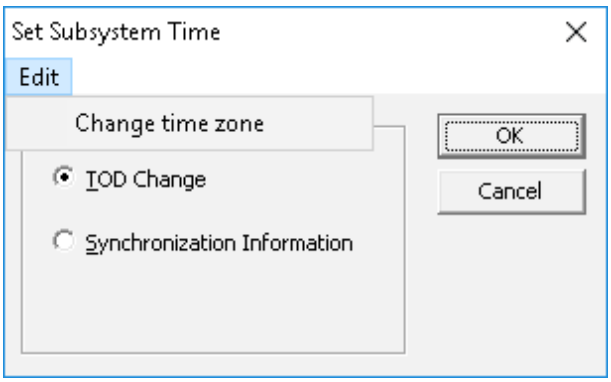
(1) Change the mode from [View Mode] to [Modify Mode].

(2) Click [Initial Setting] in [Modify Mode].

(3) Click [Set Subsystem Time] in the Initial Setting window.



(4) Select [Change time zone] from the [Edit] menu of the Set Subsystem Time window.

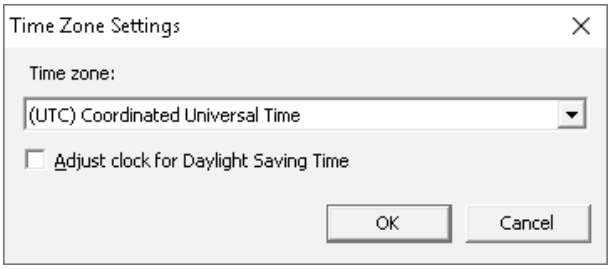


(5) The Time Zone Settings window appears. Set the time zone and click [OK].

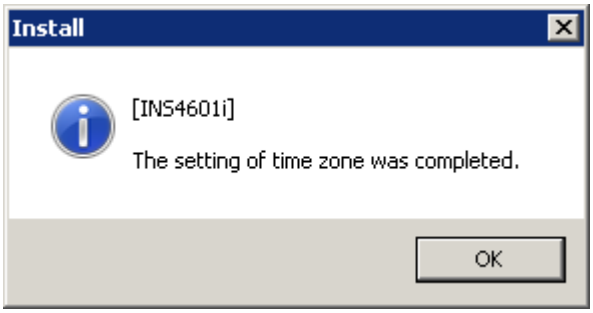
[Adjust clock for Daylight Saving Time] ☑ Selected : Daylight Saving Time adjusting function is enabled.

Not selected : Daylight Saving Time adjusting function is disabled.

NOTE: Disable this function in a time zone where the Daylight Saving Time is not implemented.



(6) The message “The setting of time zone was completed.” appears. Click [OK].



(7) Close the Initial Setting window.

(8) Change the SVP mode to [View Mode].

4. <Setting Web Console>
   Make a setting of the Web Console. (“Before using Web Console” (WEBCON01-10))

5. <Erasing logs>
   Erase all logs that were made during operation of the SVP. (SVP02-03-10)

10.6 Settings of the Basic SVP

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the Basic SVP.

   [Connected to]
   The Basic SVP xxx.xxx.xxx.15

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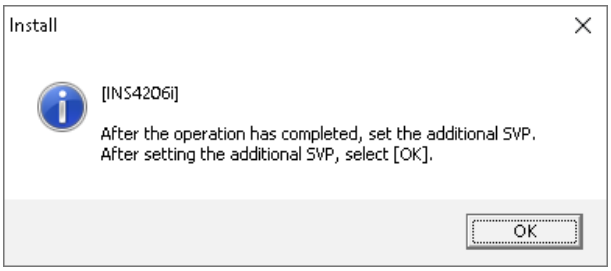
2. <Operation of SVP installation>
   Click [OK], in response to "After the operation has completed, set the additional SVP. After setting the additional SVP, select [OK]."



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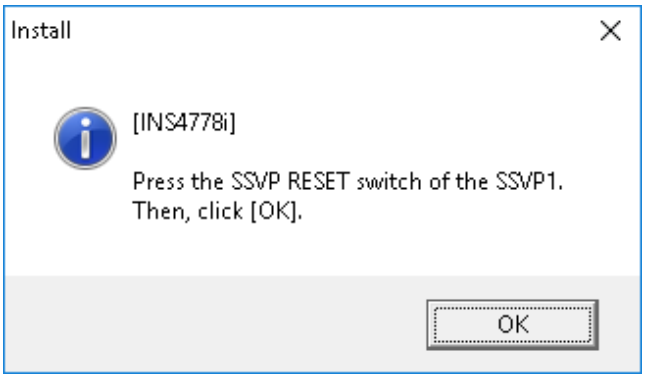
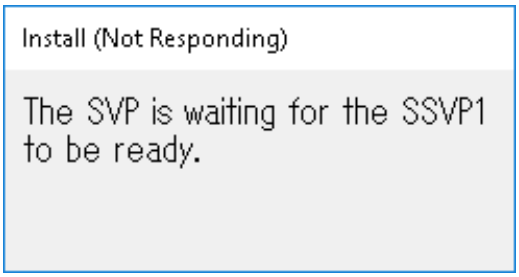
3. <Operation of SSVP reset>
   The message "Press the SSVP RESET switch of the SSVP1. Then, click [OK]." is displayed.
   Reset the additional SSVP, and then click [OK].

   NOTE: Press the SSVP RESET switch for 3 seconds or more. It takes about 1 minute to reset the SSVP (See (LOC03-40)).



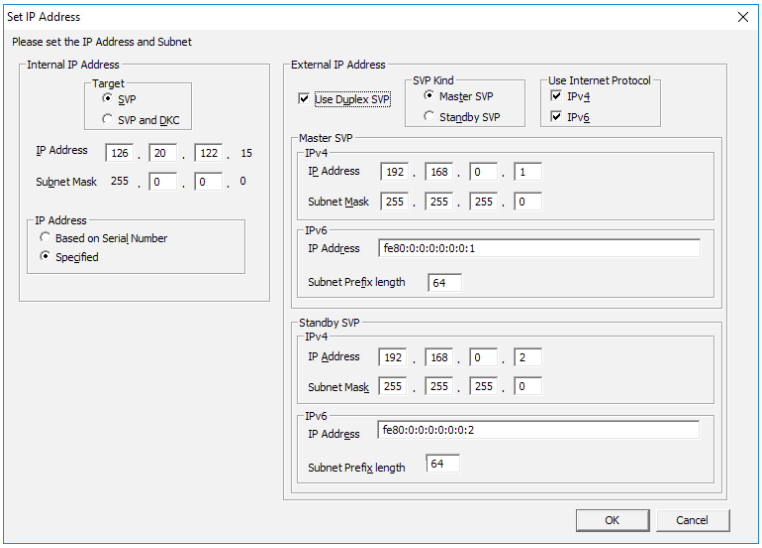
4. <Waiting for the additional SSVP to be ready>
   The message “The SVP is waiting for the SSVP1 to be ready.” is displayed.
   Wait for a while.



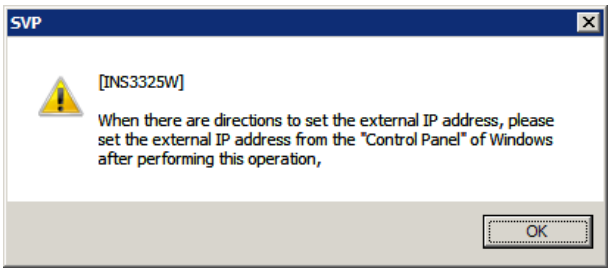
5. <SSVP micro-program exchange>
   The SSVP micro-program exchange is executed. It takes about 15 minutes for the SSVP micro-program exchange to be completed.

6. <Setting the SVP duplication>
   (1) Check [Use Duplex SVP] in the External IP Address box.
   (2) Select [Master SVP] in the SVP Kind box.
   (3) Enter the IP addresses and subnet masks of the Master and Standby SVPs, and then click [OK].

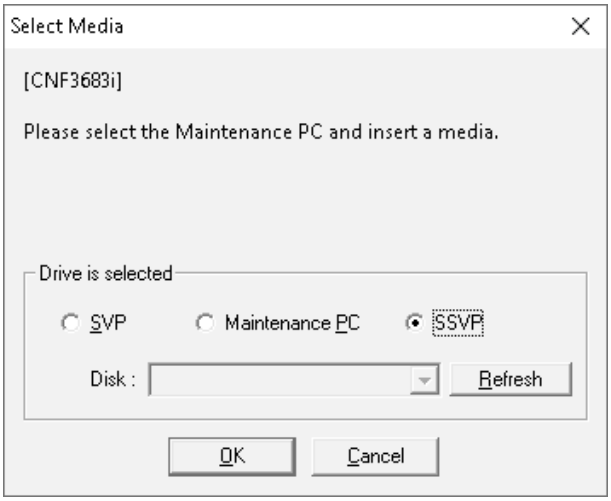
   NOTE: You do not have to enter the information of Item (3) above when the setting of the external IP addresses is not required.
   Go to Step 8.



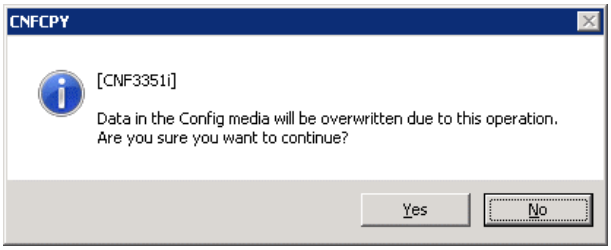
7. <Confirming the external IP address setting>
   When a message, “When there are directions to set the external IP address, please set the external IP address from the “Control Panel” of Windows after performing this operation,” is displayed, click [OK].



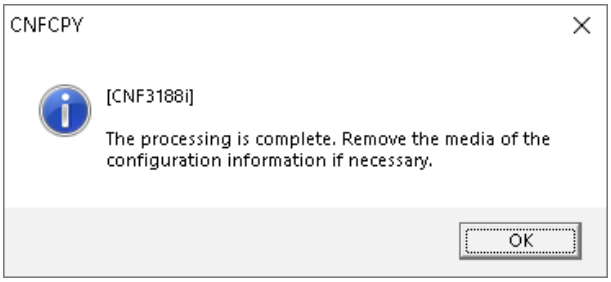
8. <Backing up the configuration information>
   Select SSVP as the location to back up the configuration information.
   Then, click [OK].



9. <Confirming the configuration information backup>
   Click [Yes].



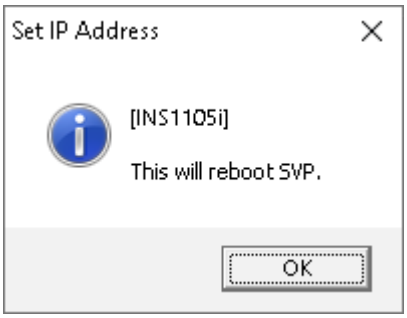
10. <Taking out the Config media>
    When the configuration information backup is complete, the message “The processing is complete. Remove the media of the configuration information if necessary.” is displayed. Click [OK].



11. <Confirming rebooting of the SVP>
    Click [OK].

    When the SVP reboots, the connection between the Maintenance PC and the Basic SVP is cut off. Wait for about five minutes, and then reconnect the Maintenance PC to the Basic SVP.

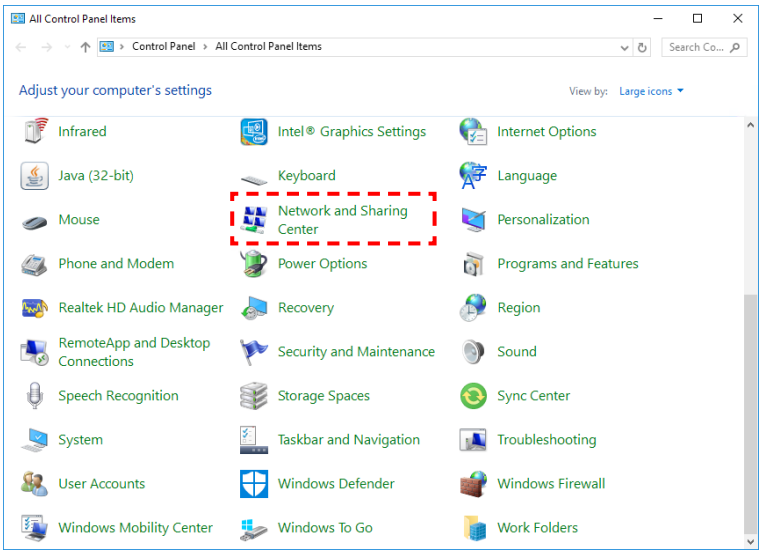
    [Connected to]
    The Basic SVP xxx.xxx.xxx.15



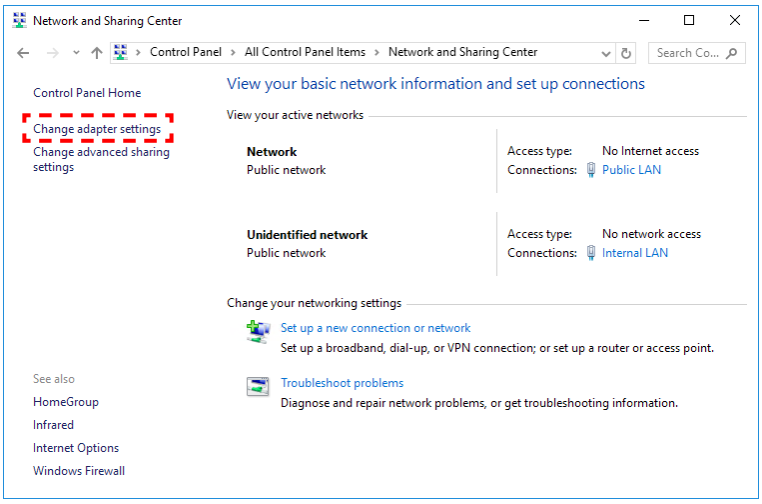
12. <Setting an external IP address>
When the setting of the external IP address is not required, go to "10.7 End-procedure".

(1) <Opening the Control Panel window>
Click [Start], and then select [Control Panel] from [Windows System].

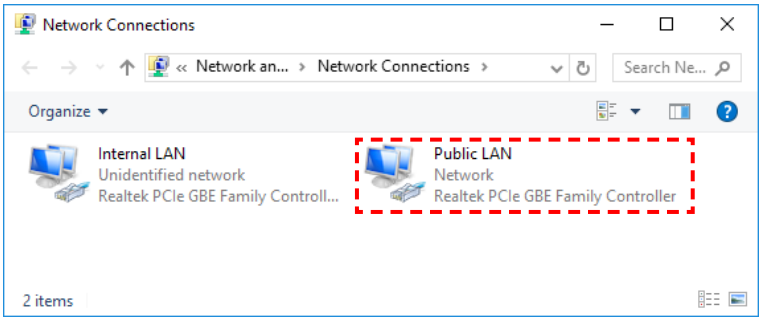
(2) <Opening the Network and Sharing Center window>
Select [Network and Sharing Center] in the Control Panel window.



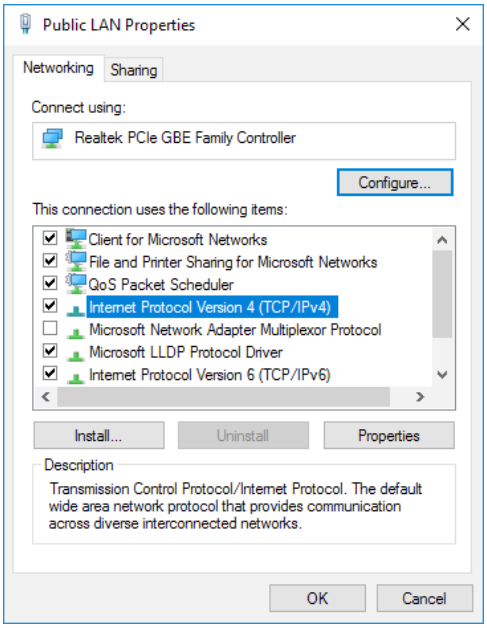
(3) <Opening the Network Connections window>
Select [Change adapter settings] in the Network and Sharing Center window.



(4) <Opening the Public LAN Properties window>
Right-click [Public LAN], and then click [Properties].



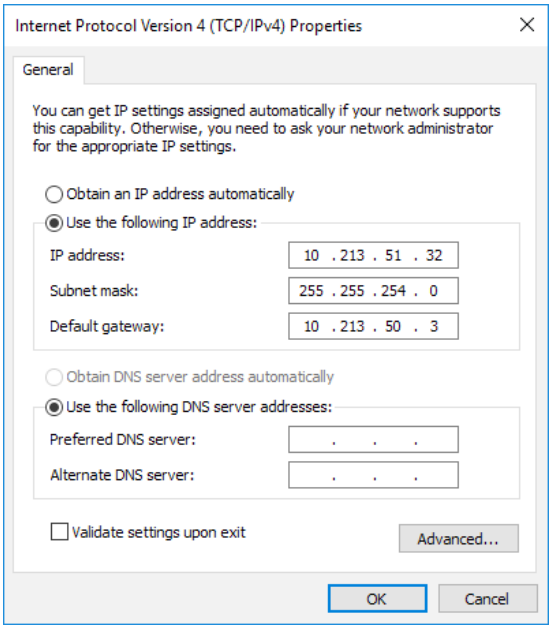
(5) Select [Internet Protocol Version 4 (TCP/IPv4)] in the Public LAN Properties window and select [Properties].



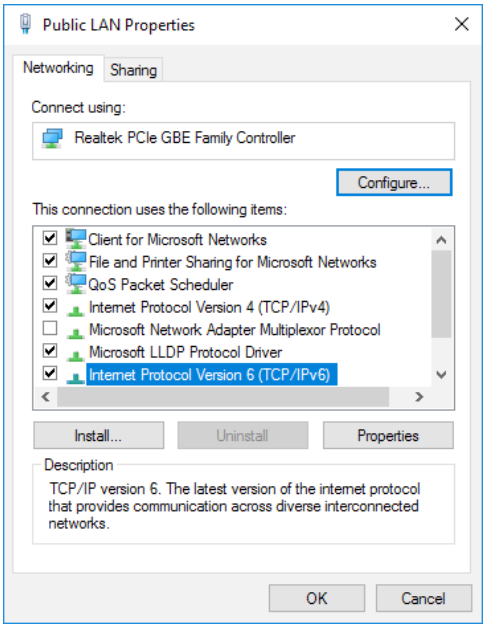
(6) <Setting the external IP address>
Set the “IP address”, “Subnet mask”, “Default gateway”, “Preferred DNS server” and “Alternate DNS server” and click [OK].
When you do not set IPv6, go to Step (9).

NOTE: When the ‘Set Network Location’ dialog (TRBL03-30-60) is displayed, click [Cancel].

NOTE: Set the same default gateway and DNS servers for Master SVP and Standby SVP when configuring a network.

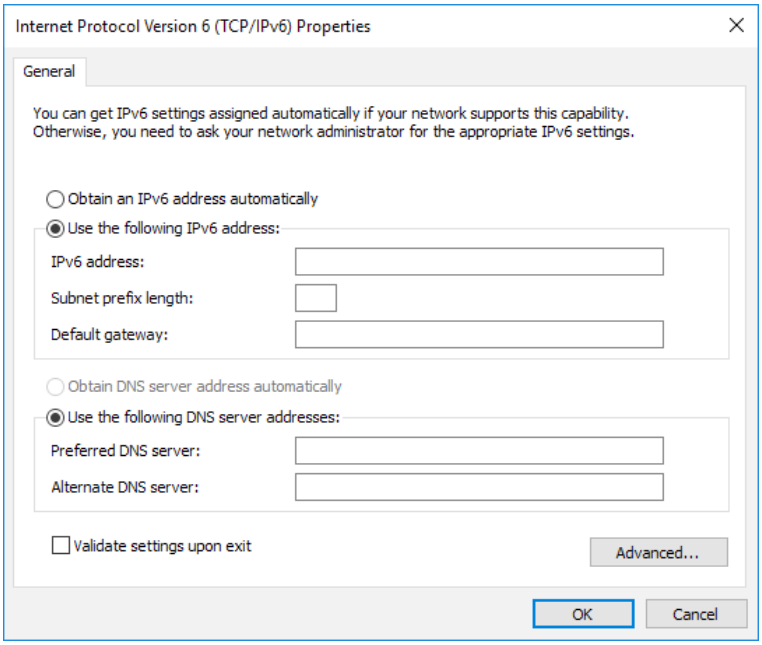


(7) Select [Internet Protocol Version 6 (TCP/IPv6)] in the Public LAN Properties window and click [Properties].



(8) <Setting the external IP address>
Set the “IPv6 address”, “Subnet prefix length”, “Default gateway”, “Preferred DNS server”, “Alternate DNS server” and click [OK].

NOTE: Set the same default gateway and DNS servers for Master SVP and Standby SVP when configuring a network.



(9) After the setting is completed, click [OK] in the Public LAN Properties window.
Close the Network Connections window.

10.7 End-procedure

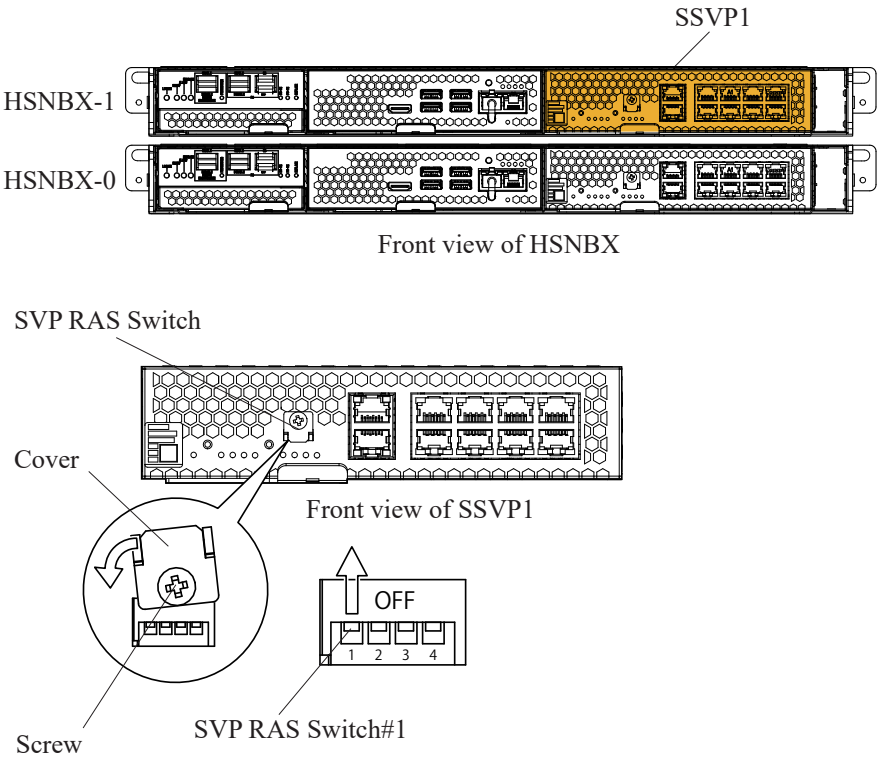
1. Turn the SVP RAS switch on the SSVP that has been installed to OFF.

   (1) Set the SVP RAS Switch #1 on the SSVP1 to OFF (upper position).

   NOTE: Use an object with a sharp edge such as a pair of tweezers to manipulate the SVP RAS switch.

   (2) Loosen the screw and put the cover of the SVP RAS switch back in place. Then, tighten the screw.

Figure 10-6 Location of SVP RAS Switch on SSVP1

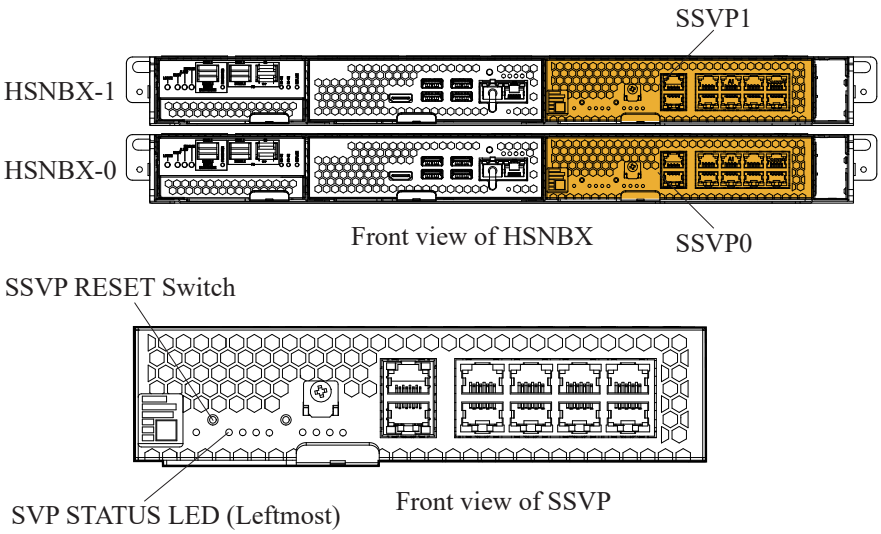


2. Reset the SSVPs

(1) Press the SSVP RESET Switch on the SSVP0 for 3 seconds or more.
It takes about 1 minute to reset the SSVP. The status of the leftmost SVP STATUS LED changes as shown below due to the SSVP reset.
Off (for about 30 seconds) → Off, blinking, or On (for about 30 seconds) → normal blinking status (at 1 second intervals) after completion of reset

(2) Press the SSVP RESET Switch on the SSVP1 for 3 seconds or more.
It takes about 1 minute to reset the SSVP. The status of the leftmost SVP STATUS LED changes as shown below due to the SSVP reset.
Off (for about 30 seconds) → Off, blinking, or On (for about 30 seconds) → normal blinking status (at 1 second intervals) after completion of reset

Figure 10-7 Location of SSVP RESET Switch



3. Deleting the folder to store the configuration information
   (1) Launch the Command Prompt on the Maintenance PC.
   - When the Maintenance PC is connected to SVP by using SVP Connect Utility:
     Launch the Command Prompt with [Run as administrator] selected.
   - When the Maintenance PC is connected to SVP by using the remote desktop connection of Windows:
     Launch the Command Prompt with [Run as administrator] not selected.

     NOTE: If you have selected [Run as administrator] when using the remote desktop connection, select [Run as administrator] also when launching the Command Prompt.

   (2) Substitute the virtual drive on the Maintenance PC, and remove the folder to store the configuration information (config).
   Command example where C:\config is created and the folder is mounted to the K drive:
   ```
   subst k: /d
   rd /s /q c:\config
   ```

   (3) Click the [×] button to close the Command Prompt.

---

4. Checking Normality
   Perform the procedure described in "Checking Normality" (TRBL02-06-10).

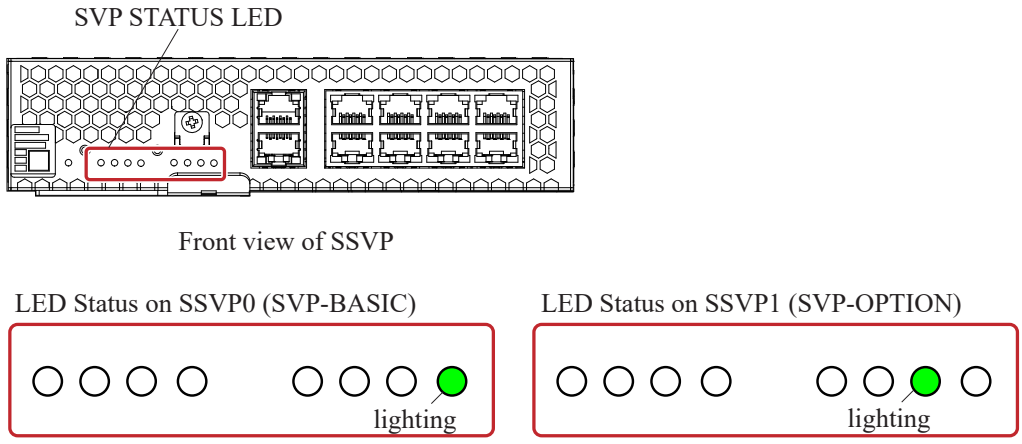
---

5. Executing LAN Check
   Perform a diagnosis of LAN Check (DIAG03-10).
   When there is an error, perform “Recovery Procedure for Error Parts Detected by LAN Check” (TRBL02-04-440).

10.8 Confirmation Procedure

1. Verifying the LED
   Make sure that statuses of LEDs on the SSVP0 and SSVP1 are those shown in the figure below in a lighting part.

Figure 10-8 Confirmation of LEDs



2. Operating the Basic SVP

NOTE: This operation needs that Standby SVP is [View mode].

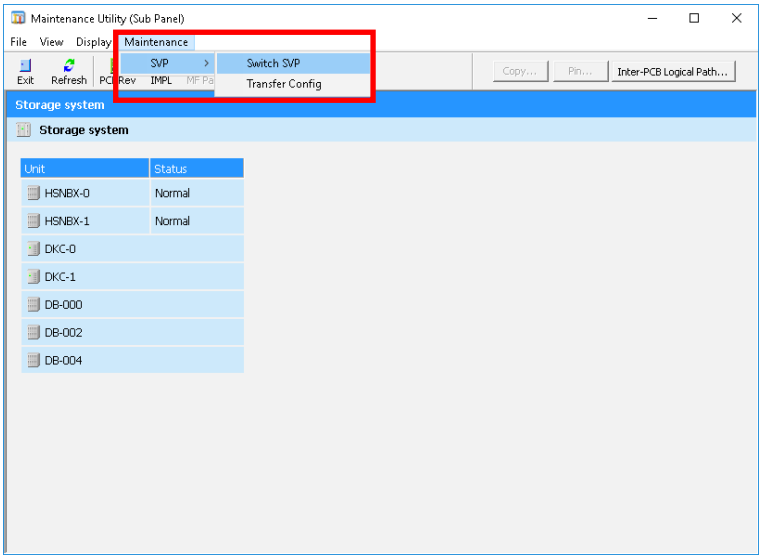
(1) Connecting the Maintenance PC
Check if the Maintenance PC is connected to the Basic SVP.
If not connected, connect it.

[Connected to]
The Basic SVP xxx.xxx.xxx.15

(2) <Operation mode change>
Change the mode to [Modify Mode].

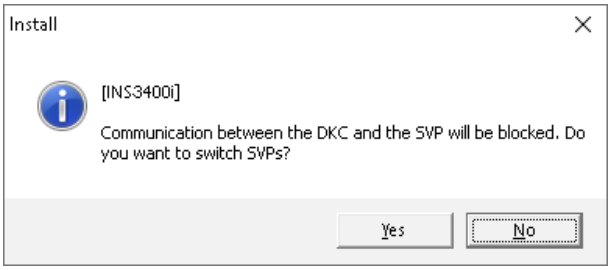
(3) Click [Maintenance Utility (Sub Panel)].

(4) Select [Maintenance]-[SVP]-[Switch SVP] from the menu.

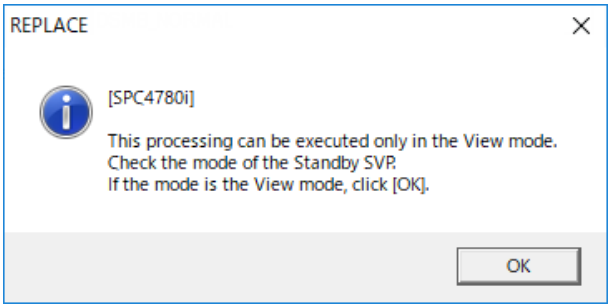


(5) <Execution>
Execute switching.
Click [Yes].

NOTE: Switching might take up to 50 minutes.

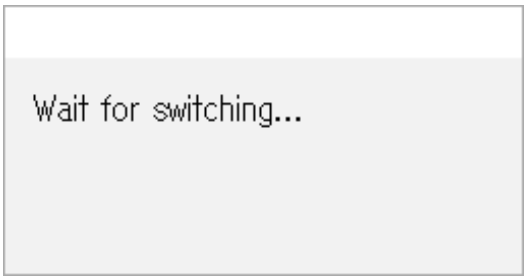


(6) <Checking the mode of standby SVP>
Check the mode of the Standby SVP.
If the mode is View mode, click the [OK].



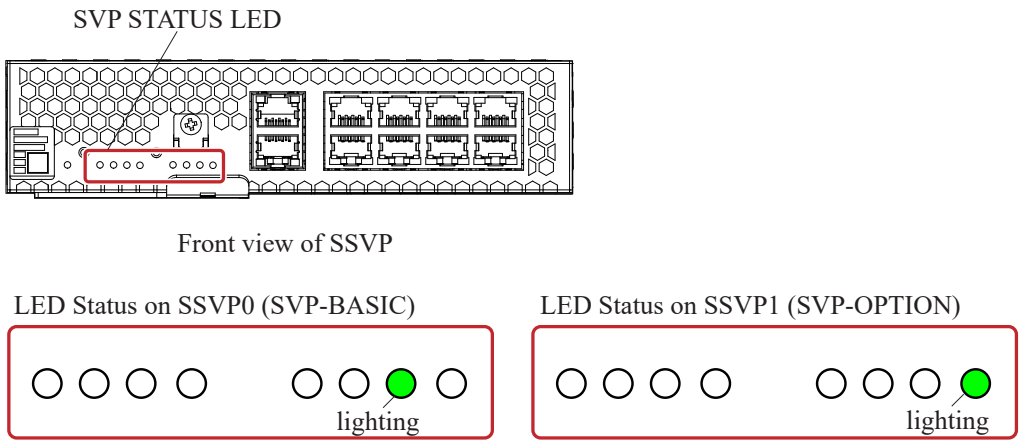
(7) <Configuration Information Transfer>
The message “Transferring storage system configuration data...” is displayed.

(8) <SVP Switching Start>
The message “Wait for switching...” is displayed. The Basic SVP and the Maintenance PC are disconnected for the SVP switching process.
Wait for about three minutes until the switching is completed.



(9) Verifying the LED
Make sure that statuses of LEDs on the SSVP0 and SSVP1 are those as shown in the figure below in a lighting part.

Figure 10-9 Confirmation of LEDs



3. Operating the Additional SVP

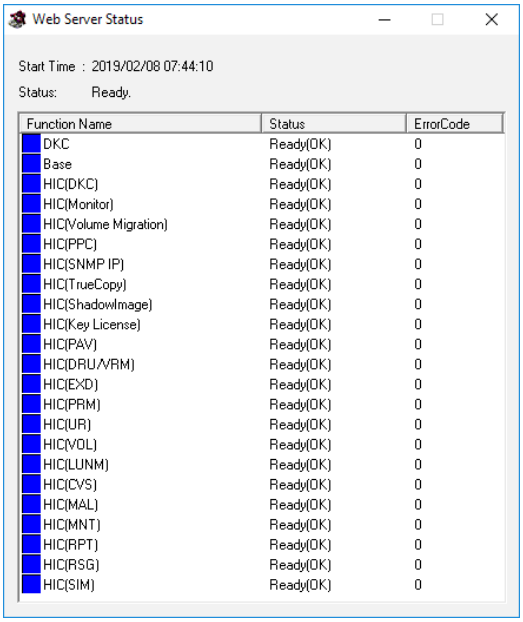
NOTE: This operation needs that Standby SVP is a [View mode].

(1) <Connection to the Additional SVP>
The Additional SVP restarts by the SVP switching instruction from the Basic SVP.
Connect the Maintenance PC to the Additional SVP.

[Connected to]
The Additional SVP xxx.xxx.xxx.15

(2) <Initial Window>
Press [Web Server Status].

(3) <Web Server Status Window>
Check if all function's Status displays Ready.
After confirmation, close Web Server Status window.



(4) <Operation mode change>
Change the mode to [Modify Mode].

(5) Click [Maintenance Utility (Sub Panel)].

(6) <Maintenance Utility (Sub Panel) window>
Maintenance Utility (Sub Panel) window is displayed.
Make sure that the Maintenance Utility (Sub Panel) window can be opened normally.
Close Maintenance Utility (Sub Panel) window.

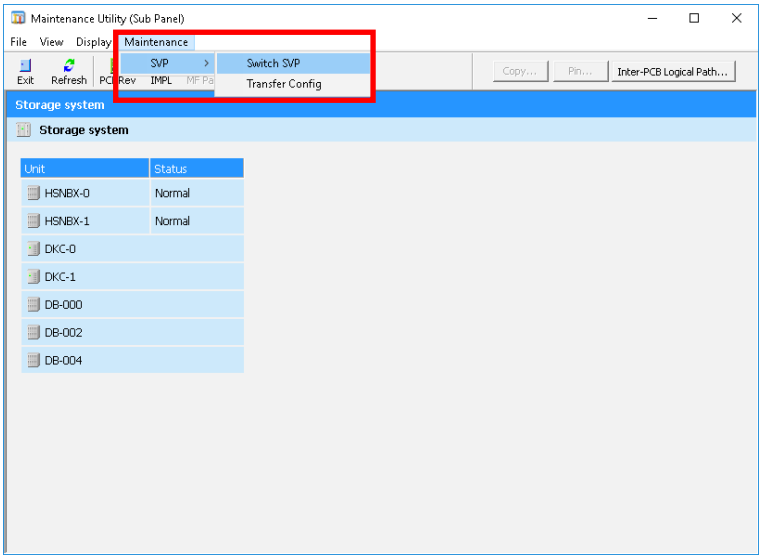
(7) <Web Console>
If Customer does not use Web Console/Storage Navigator via a customer PC, it does not need to do the following confirmation work.
Ask customer to run Web Console/Storage Navigator from customer PC, and to check whether he or she can login using by Customer user-id and password.

NOTE: The user-id and password are defined by customer. Therefore, entrust the login test to the customer.

If you can see the main window of Web Console/Storage Navigator, the confirmation work is done.

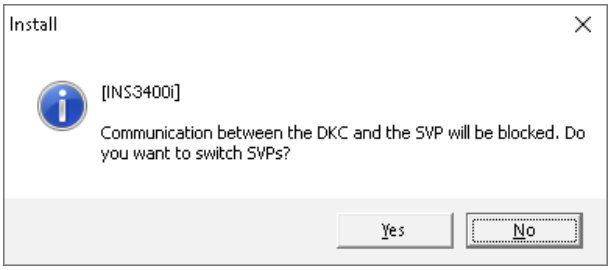
(8) <Open Maintenance Utility (Sub Panel) window>
Click [Maintenance Utility (Sub Panel)].

(9) Click [Maintenance]-[SVP]-[Switch SVP] from the menu.

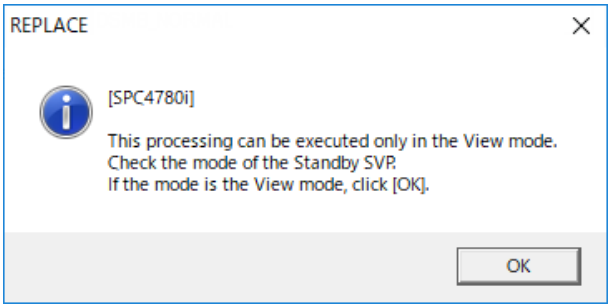


(10) <Execution>
Execute switching.
Click [Yes].

NOTE: Switching might take up to 50 minutes.



(11) <Checking the mode of standby SVP>
Check the mode of the Standby SVP.
If the mode is View mode, click the [OK].

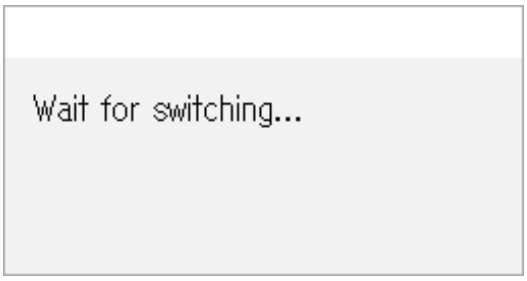


(12) <Configuration Information Transfer>
The message “Transferring storage system configuration data...” is displayed.

(13) <SVP Switching Start>

The message “Wait for switching...” is displayed. The Additional SVP and the Maintenance PC are disconnected for the SVP switching process.

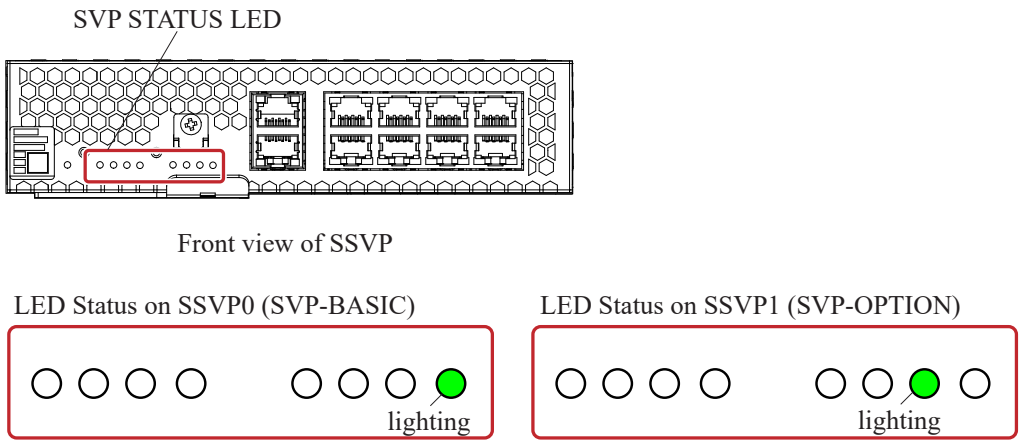
Wait for about three minutes until the switching is completed.



(14) Verifying the LED

Make sure that statuses of LEDs on the SSVP0 and SSVP1 are those shown in the figure below in a lighting part.

Figure 10-10 Confirmation of LEDs



4. Operating the Basic SVP

(1) Connecting the Maintenance PC

Connect the Maintenance PC to the Basic SVP.

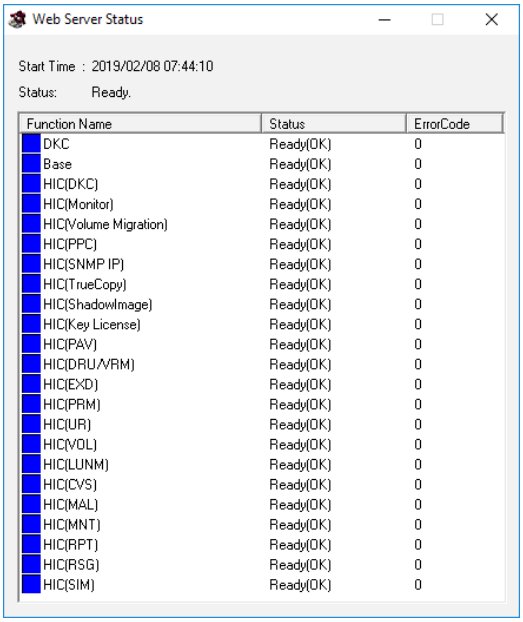
[Connected to]
The Basic SVP xxx.xxx.xxx.15

(2) <Initial Window>

Press [Web Server Status].

(3) <Web Server Status Window>

If all function's Status displays Ready, switching is completed.



11. Adding PDUs for a Rack

Table 11-1 Parts List

No.	Model Number	Model Name	Parts No	Quantity	Remarks
1	A-F6516-PDU930	PDU 1PH 30A 9P	3287320-C	2	PDU
		Binding screw (M5 × 10)	SB510N	4	—
		Nameplate	3292769-002	1	—
2	A-F6516-PDU430	PDU 1PH 30A 4P	3284050-B	2	PDU
		Binding screw (M5 × 10)	SB510N	4	—
		Nameplate	3292769-003	1	—

11.1 Procedure for Adding PDUs for a Rack

Install the PDUs for the rack (A-F6516-PDU930/PDU430) as follows:

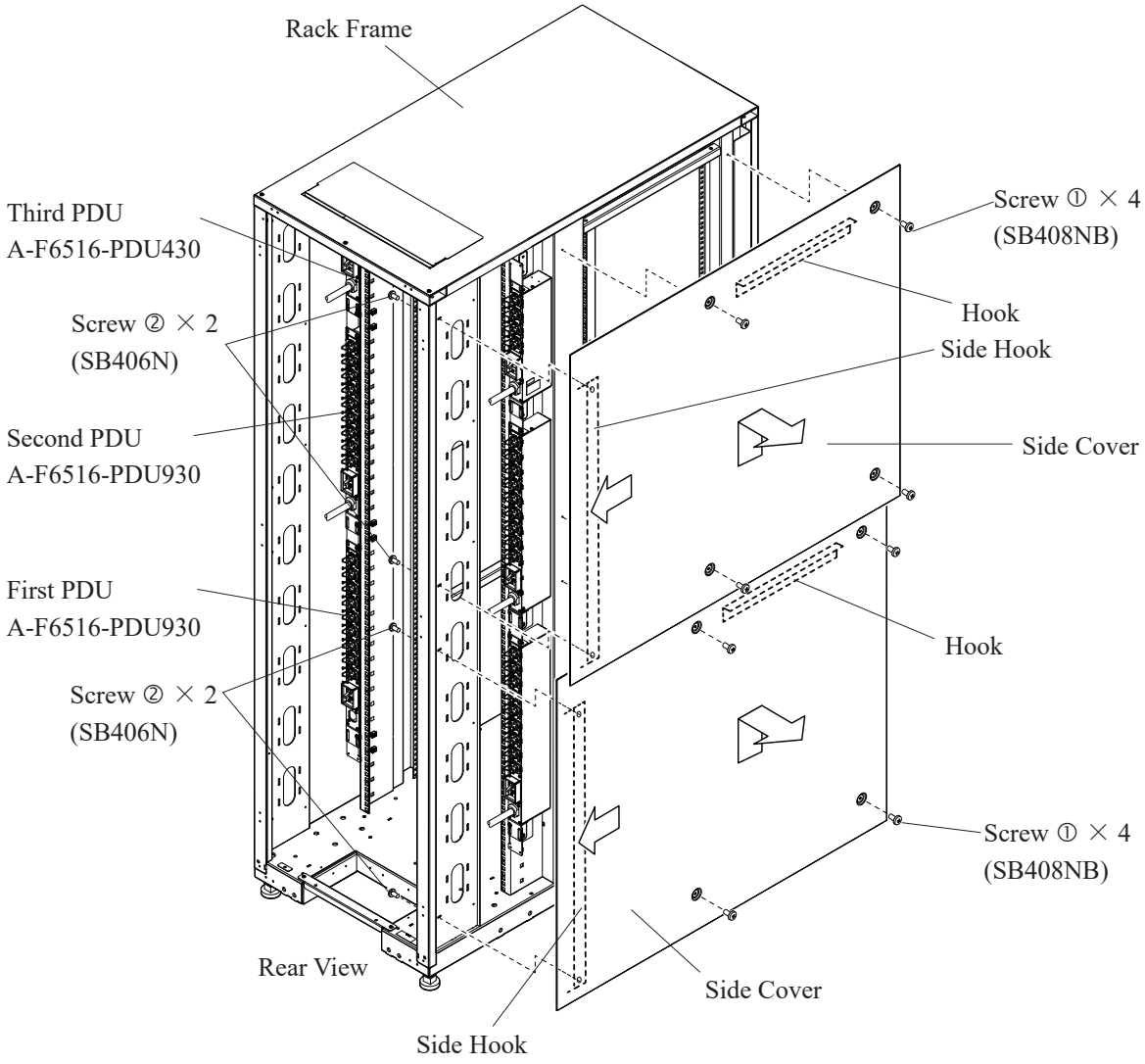
1. Removing side covers
   When PDU brackets need not to be attached, go to Step 4.

> **⚠ CAUTION**
>
> Paying attention to falls:
> Dropping a side cover may cause injury.
> When installing or removing the side cover, hold the cover firmly with both hands and be careful not to drop it on your feet. Make sure the side cover is hung on the hook of the rack frame side when it is installed.

NOTE: When removing the side covers, remove them in order from the upper part.

(1) Remove the four screws ① and two screws ② from the upper side cover on the left side of the rack frame, slide the side cover to the rear side, and lift it up to remove it.
(2) Remove the upper side cover on the right side of the rack frame in the same way.

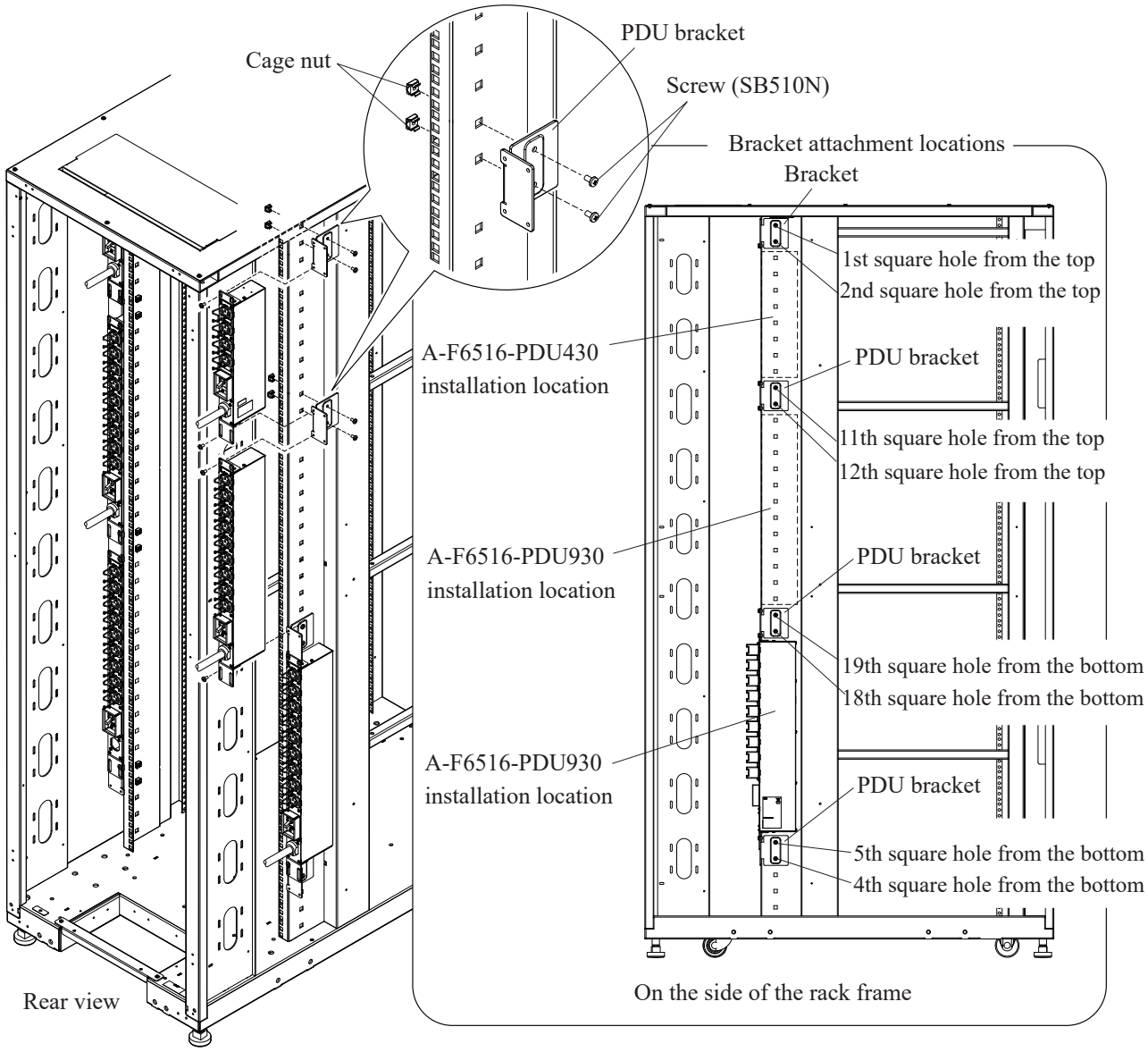
Figure 11-1 Removal of Side Cover



2. Attaching PDU brackets
   (1) Attach the PDU brackets to the left side.
   - For the second PDU (A-F6516-PDU930)
     Insert the two cage nuts into the 11th and 12th square holes from the top and tighten the two screws (SB510N) to secure the PDU bracket.
   - For the third PDU (A-F6516-PDU430)
     Insert the two cage nuts into the first and second square holes from the top and tighten the two screws (SB510N) to secure the PDU bracket.

   (2) Attach the PDU brackets to the right side in the same way.

Figure 11-2 Attaching PDU Brackets



3. Installation of Side Covers

⚠ CAUTION

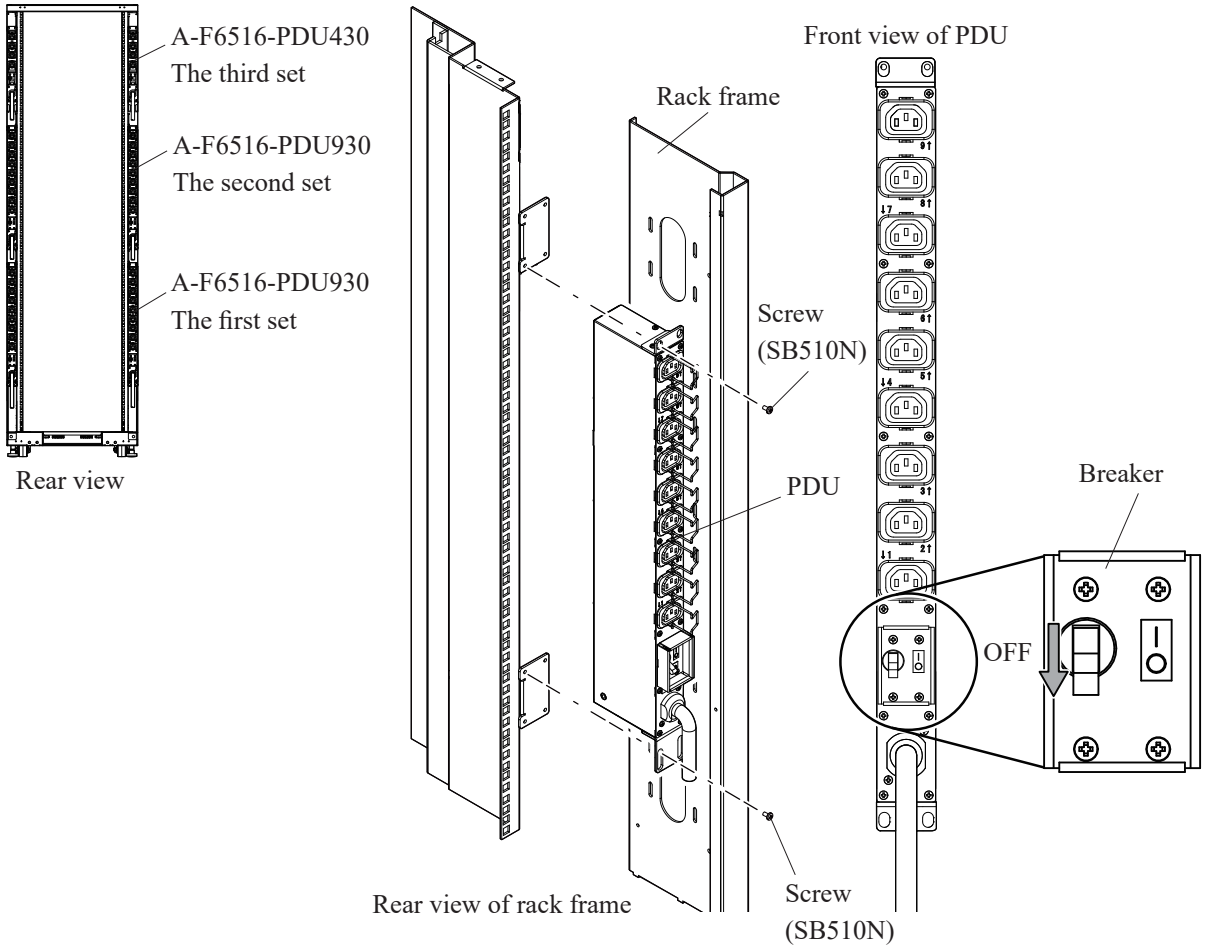
Paying attention to falls:
Dropping a side cover may cause injury.
When installing or removing the side cover, hold the cover firmly with both hands and be careful not to drop it on your feet. Make sure the side cover is hung on the hook of the rack frame side when it is installed.

NOTE: When installing the side covers, install them in order from the lower part.

(1) Hang the hook of the side cover on the upper part of the left side of the rack frame, slide the side cover to the front of the rack frame, and then secure the side cover with the four screws ① and the two screws ②. (see Figure 11-1)
(2) Install the side covers on the right side of the rack frame in the same way.

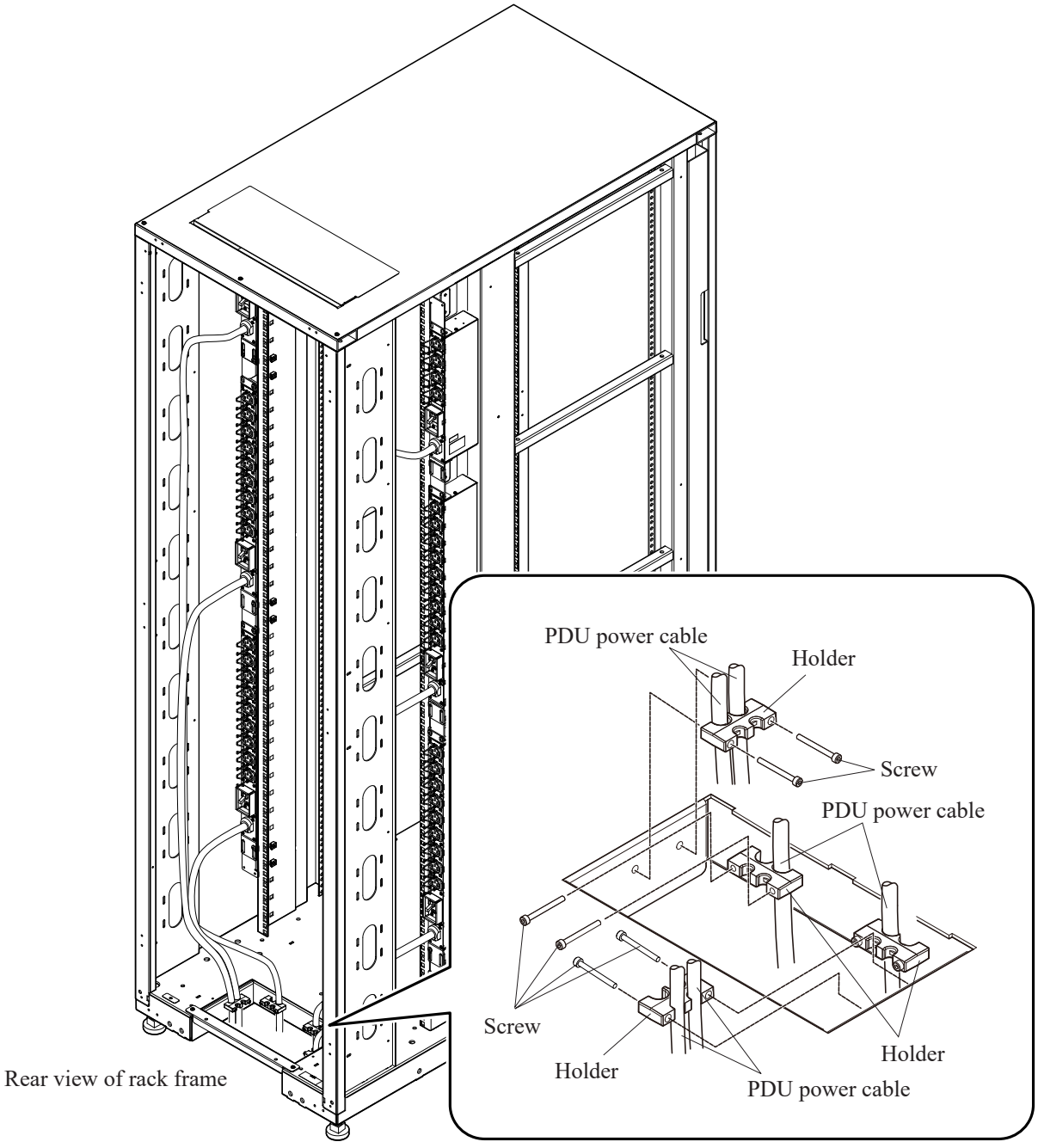
4. Installing PDUs
   (1) Turn off the breaker of the PDU to be installed.
   (2) Install the PDU in the right side of the rear of the rack frame and fix it with two screws.
   (3) Install the PDU in the left side in the similar procedure.

Figure 11-3 Installing PDU



5. Fix power cables by the holder of the opening at the lower part of the rack frame.

Figure 11-4 Fixing PDU Power Cables



12. Adding Controller Chassis

NOTICE:
- The adding procedure of Controller Chassis does not include the addition of Channel Board (CHB)/Disk Board (DKB).
- Perform the addition of CHB/DKB after completion of the adding procedure of Controller Chassis.
- If any of the following conditions is met, the addition of Controller Chassis is suppressed. Check the system status before the addition.
  - The system has a failure part.
  - A drive for which drive copy or correction copy is in progress exists in the system.
  - Maintenance work including micro-program exchange is in progress.
  - The configuration is being changed.
- If you perform any of the following operations during the addition of Controller Chassis, a serious error such as system down and data loss might be caused. Never do the following:
  - Removing a CTL
  - Changing X-path cable connections
  - Turing off PDU breakers

After you press the Add button, if you find that X-path cables are wrongly connected or that PDU breakers are not turned on, wait for the adding operation to fail. Then, correct the wrong cable connections and so on, and press the Add button again.

12.1 Estimated Work Time

To estimate the total time required for adding Controller Chassis, sum up relevant items in the table below.

Table 12-1 Estimated Working Hours for Adding Controller Chassis

Process	Estimated work time		Remarks
	When adding two DKCs	When adding four DKCs	
Chassis installation time	12 min	24 min	
Component installation time	76 min	152 min	Installation of DIMMs, CFMs, BKMFs, and batteries to Controller Boards, and installation of Controller Boards and HIEs to Controller Chassis in the rack
Label attaching time	15 min	30 min	Attachment of labels to Controller Chassis, Controller Boards, HIEs, X-path cables, and LAN cables
Cable routing time	22 min	44 min	Routing of power cables, X-path cables, and LAN cables
Micro-program processing time	70 min	90 min	

12.2 Parts List

The components shown below are required per Controller Chassis to be added.

Table 12-2 Components of Controller Chassis

No.	Model Name	Parts No	Quantity	Remarks
1	Controller Chassis	3292481-A	1	
2	Controller Board	3292483-A	2	
3	Front Bezel	–	1	(for Hitachi Vantara)
	Front Bezel	3292504-A	1	(for HPE)
4	BKMF (FANM)	3292494-A	4	
5	BKMF	3294485-A	4	
6	Battery	3292486-A	4	
7	DKCPS	3289056-K	2	
8	LAN Board	3292482-A	2	
9	HIE	3292484-A	4	
10	X-Path cable	–	8	
11	Pewor cable	–	2	

In addition to the above-listed components, Cache Flash Memories and Cache Memories are necessary. Check their configurations while referring to “Cache Memory Installation Rule” (INST(GE)03-04-10).

Before adding Controller Chassis, perform the procedure in “12.3 Confirming the Normality of the Storage System before Adding Controller Chassis”.

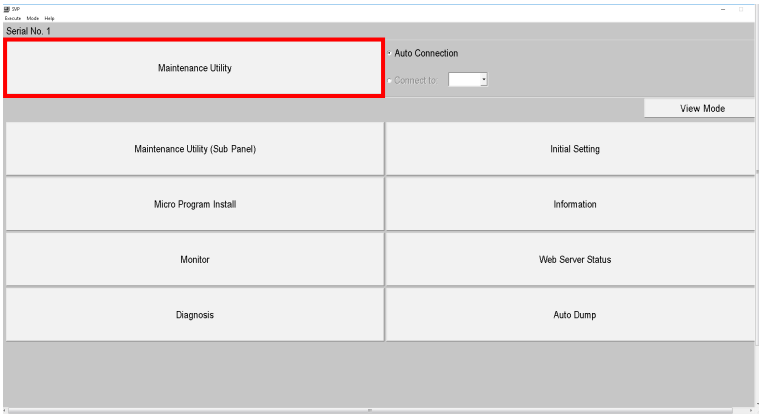
12.3 Confirming the Normality of the Storage System before Adding Controller Chassis

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the SSVP, and then log in to the SVP.
   - "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10)
   - "Connection to the SVP" (SVP01-30)

2. Starting the SVP window
   From the menu of Web Console, click [Maintenance Components] - [Maintenance Other Components].

3. Changing the operation mode
   Changing the mode to [View Mode].

4. Starting the Maintenance Utility
   In the SVP window, click [Maintenance Utility] (see "Starting Maintenance Utility" (MU01-10).).



5. Checking the status before starting the adding procedure
   Check that the storage system status is Ready (MU03-30).

   *: If the status is Failed or Warning, perform recovery actions according to "Flow of failed part isolation" (TRBL02-03-10).

   Check that there is no uncompleted SIM (SVP02-02-70).

   *: If there are uncompleted SIMs, follow the procedure shown in (TRBL02-01-10).

12.4 Installing Controller Chassis

1. Installing Rails
   Check the locations to add Controller Chassis in the rack, and install the rails for installing Controller Chassis (see “Installing Rails” (INST(IN)03-01-10).)
   Be sure to install all rails for all Controller Chassis to be added.

   NOTE : • There are the rail (R) and the rail (L). Check that with the marking on the rail.
   • These rails extend or shorten back and forth.
   • There are the rail type with a stopper and the rail type without a stopper.

2. Removing Components
   Remove the Controller Boards, components, and power supplies from the Controller Chassis. Then, attach labels or something to show their locations to them because you need to return them to the same locations later (see “Removing Components” (INST(IN)05-01-10).)

3. Installing Chassis
   (1) Install the Controller Chassis on the rack
   (see “Mounting on a Rack Frame” (INST(IN)06-01-10).)
   (2) Fix the Controller Chassis to the rack
   (see “Fastening Storage System” (INST(IN)07-01-10).)

4. Attach the CHB port number label
   Attach the CHB port number label to the Controller Board. (see “Attach the CHB port number labels” (INST(IN)08-05-10).)

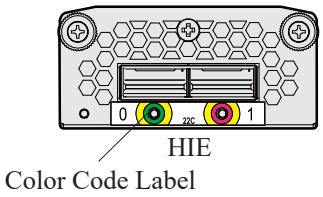
5. Installing Components
   Install the Controller Boards, components, and power supplies in the Controller Chassis (see “Installing Components” (INST(IN)08-01-10).)

   If they are already installed, this step is not necessary.

   NOTE: In the adding procedure of Controller Chassis, do not add CHB/DKB. After completion of the adding procedure of Controller Chassis, add CHB/DKB by referring to the adding procedure of CHB/DKB.

6. Attaching Color Code Label
   Attach the color code label to the HIE

Figure 12-1 Attaching Color Code Label (HIE)



7. Connecting X-Path Cables
   Connect the X-Path calbes, attach the cable labels, and route the cables (see"Connecting X-Path Cables" (INST(IN)09-01-10)).

8. Connecting LAN Cables
   Connect the LAN calbes, attach the cable labels, and route the cables (see"Connecting LAN Cables" (INST(IN)09-03-10)).

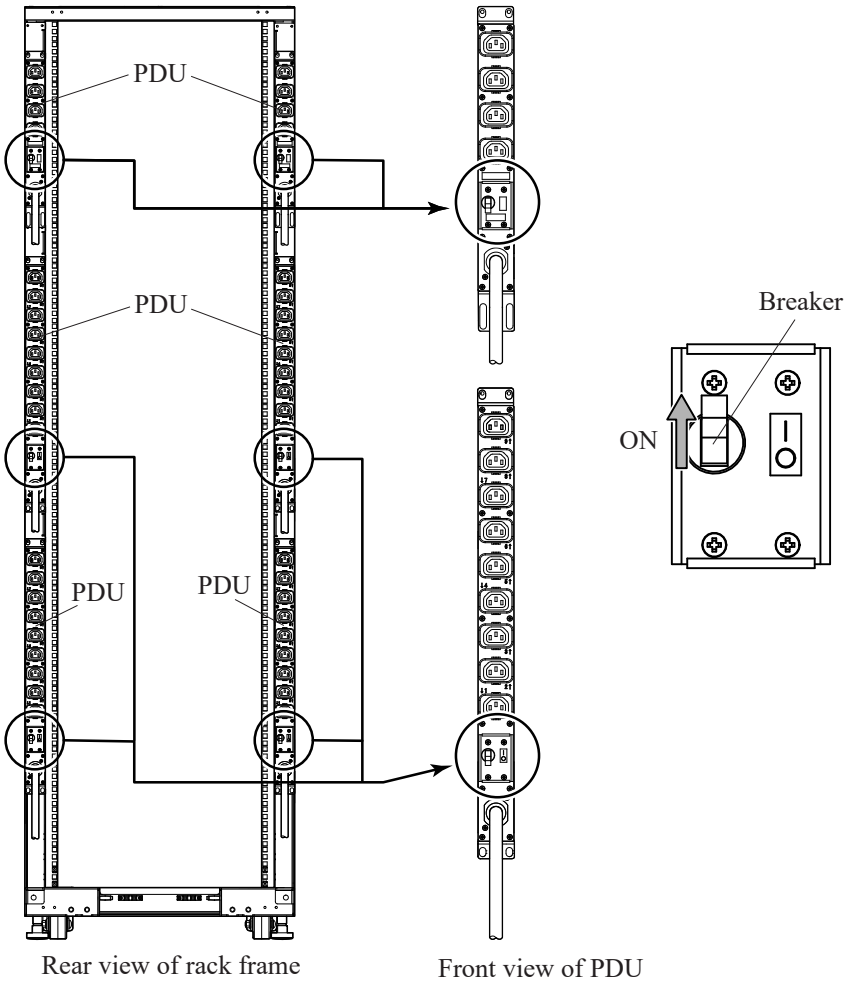
9. Connecting Power Cables

(1) Route and connect the power cables (see “Connecting Power Cables” (INST(IN)09-05-10).)

(2) Secure the power cables of PDUs
(see “Connecting Power Cables (Rack Frame PDU)” (INST(IN)09-06-10).)

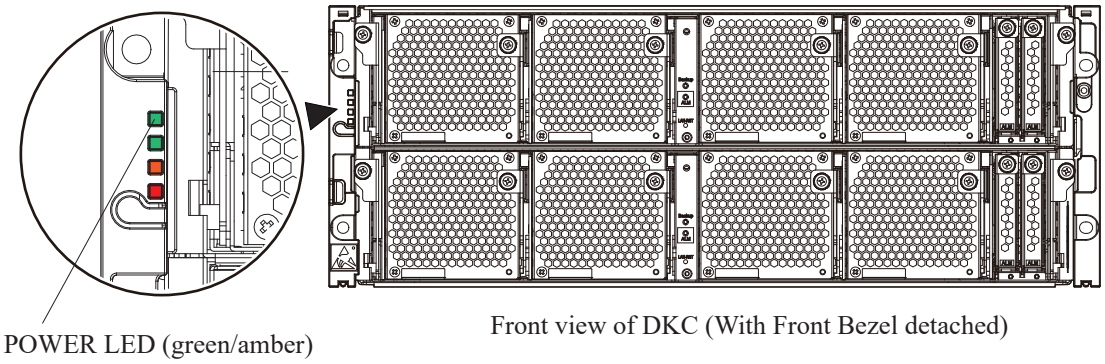
(3) Turn on of the PDU
Turn it on when the PDU breaker connecting the power cables is turned off.

Figure 12-2 Turning on Breakers



(4) Check that the POWER LED (green) on the front of th Controller Chassis lights up.
If the POWER LED lights up in amber, wait until the LED light changes to green.

Figure 12-3 Verifying the LED

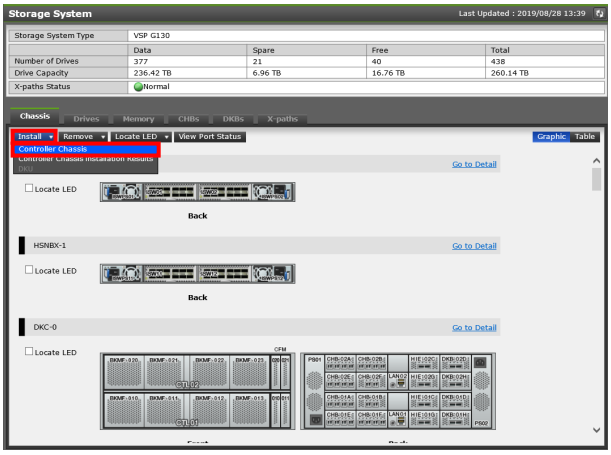


10. Check the LAN ports on SSVP which LAN cable connected are link up.
If the LAN ports are not link up, then check LAN cables are connected correctly.
If LAN cables are not connected or connected incorrectly, then update GUM Micro-program at installed Controller Chassis may fail.

11. Attaching Front Bezel
Attach the Front Bezel to the Controller Chassis. (see “How to Attach/Remove Front Bezel” (INST(GE)04-01-10).)

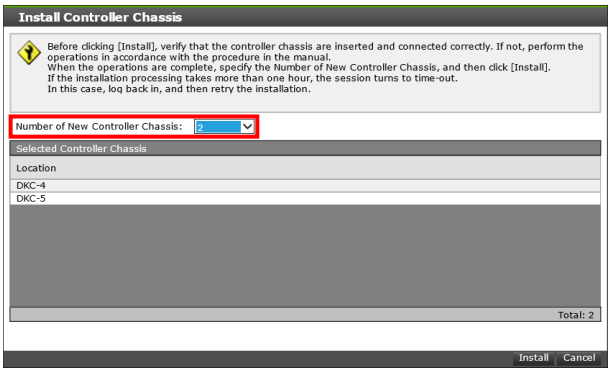
12.5 Maintenance Utility Operations for the Adding Procedure

1. <Main Window>
   Click the [Chassis] tab in the main window, and click [Install] and select [Controller Chassis].



2. <Set number of Controller Chassis>
   Select the number of Controller Chassis to be added, and click [Install].

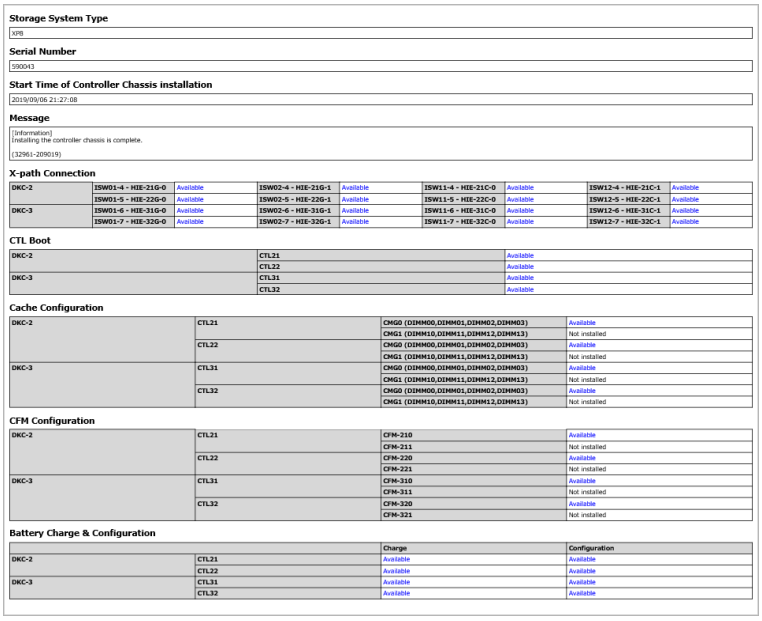
   NOTE : The error list window is displayed if multiple errors are detected by the prior check. If it is displayed, click the text of "Error Code" and recover the failures or the blockade in accordance with the details of the displayed errors.



3. Check Addition Completion
   Check that the following message is displayed and click [Close].
   If a message other than the described is displayed, refer to Message Section (MSG00-00).

NOTE: If 60 minutes have passed since the start of the adding work on Maintenance Utility, a session timeout occurs before this message window appears.
When a session timeout occurs, check [Message] in [Controller Chassis Installation Results].
"processing"displayed in [Message] indicates that the adding process is in process.

4. Checking Controller Chassis Installation Results
   Click [Chassis]-[Install]-[Controller Boards/Controller Chassis Installation Results], and check that there is no abnormality.
   For details of the Controller Chassis Installation Results window, see (MU02-230).



NOTE: If the results show errors, perform "Recovery Procedure When Adding Controller Chassis Fails" (TRBL02-04-450).

5. Checking Normality
   Perform the procedure described in “Checking Normality” (TRBL02-06-10).

6. Executing LAN Check
   Perform a diagnosis of LAN Check (DIAG03-10).
   When there is an error, perform “Recovery Procedure for Error Parts Detected by LAN Check” (TRBL02-04-440).

7. Click [Logout] to close the window.

8. Click [Execute]-[Exit] in the SVP window to exit the window.

   NOTE: At this point, the added CTLs are not displayed as selectable CTLs for “Connect to”.

9. Removing the Maintenance PC
   Remove the Maintenance PC from the storage system referring to “Attachment/Removal Procedure of Maintenance PC” (INST(IN)13-02-10).

   NOTE: If you try to use the SVP window for another maintenance after this procedure, the SVP window might not be able to be opened from the Web Console window.
   In such a case, log off the SVP and log on it again. Then, before the Web Console window is opened, click [Start SVP] in the Wait for the start of Storage Management Service window to open the SVP window.

13. Adding Controller Boards

NOTICE: When adding Controller Boards, you need to remove the LAN cable between the Maintenance LAN port on the LAN board 1 in DKC-0 and the Maintenance LAN port on the LAN board 2 in DKC-1. After removal of the LAN cable, until completion of the addition of Controller Boards, the following information might be missing:

- Monitoring information (Performance Monitor and monitoring on SVP)
- Log information (SSB log, Reset log, HTP log, Power Event log, Incident log, and Detail log)
- If you perform any of the following operations during the addition of Controller Board, a serious error such as system down and data loss might be caused. Never do the following:
  - Removing a CTL
  - Changing X-path cable connections
  - Turing off PDU breakers

  After you press the Add button, if you find that X-path cables are wrongly connected or that PDU breakers are not turned on, wait for the adding operation to fail. Then, correct the wrong cable connections and so on, and press the Add button again.
- The work time becomes longer depending on I/O load and write pending.
  When the write pending rate of any of MPUs/CLPRs in the system exceeds 40%, the addition of Controller Boards is suppressed.
  Before adding the Controller Boards, lower the I/O load and write pending rate.

13.1 Estimated Work Time

To estimate the total time required for adding Controller Boards, sum up relevant items in the table below.

Table 13-1 Estimated Working Hours for Adding Controller Boards

Process	Estimated work time	Remarks
Component installation time	38 min	Installation of DIMMs, CFMs, BKMFs, and batteries to Controller Boards, and installation of Controller Boards, CHBs, DKBs (DKBNs) and HIEs to Controller Chassis in the rack
Label attaching time	15 min	Attachment of labels to Controller Chassis, Controller Boards, HIEs, DKBs (DKBNs), X-path cables, and SAS cables (NVMe cables)
Cable routing time	17 min	Routing of X-path cables, LAN cables, and SAS cables (NVMe cables)
Micro-program processing time	70 min	The start time is when the [Install] button is clicked on Maintenance Utility.

13.2 Parts List

The components shown below are required per a pair of Controller Boards.

Table 13-2 Components of a Pair of Controller Boards

No.	Model Name	Parts No	Quantity	Remarks
1	Controller Board	3292483-A	2	
2	BKMF (FANM)	3292494-A	4	
3	BKMF	3294485-A	4	
4	Battery	3292486-A	4	
5	HIE	3292484-A	4	
6	X-Path cable	–	8	
7	DKB, DKBN	–	4	Not required for the DKB-less configuration
8	SAS cable, NVMe cable	–	8	Not required for the DKB-less configuration

In addition to the above-listed components, Cache Flash Memories, Cache Memories and Channel Boards are necessary.

When adding Controller Boards, execute “13.3 Confirming the Normality of the Storage System before Adding Controller Boards”.

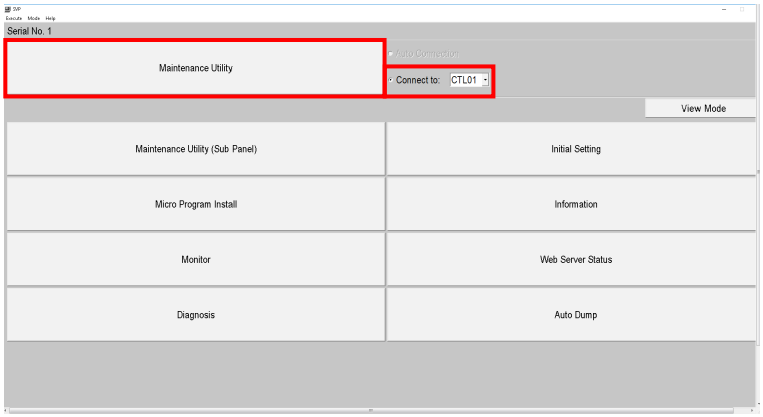
13.3 Confirming the Normality of the Storage System before Adding Controller Boards

1. Connecting the Maintenance PC
   Connect the Maintenance PC to the SSVP, and then log in to the SVP.
   - "Attachment/Removal Procedure of Maintenance PC" (INST(IN)13-02-10)
   - "Connection to the SVP" (SVP01-30)

2. Starting the SVP window
   From the menu of Web Console, click [Maintenance Components] - [Maintenance Other Components].

3. Changing the operation mode
   Changing the mode to [View Mode].

4. Starting the Maintenance Utility
   Specify CTL01, and then start Maintenance Utility (see "Starting Maintenance Utility by Specifying CTL" (MU01-50)).



5. Checking the status before starting the adding procedure
   Check that the storage system status is Ready (MU03-30).

   *: If the status is Failed or Warning, perform recovery actions according to "Flow of failed part isolation" (TRBL02-03-10).

   Check that there is no uncompleted SIM (SVP02-02-70).

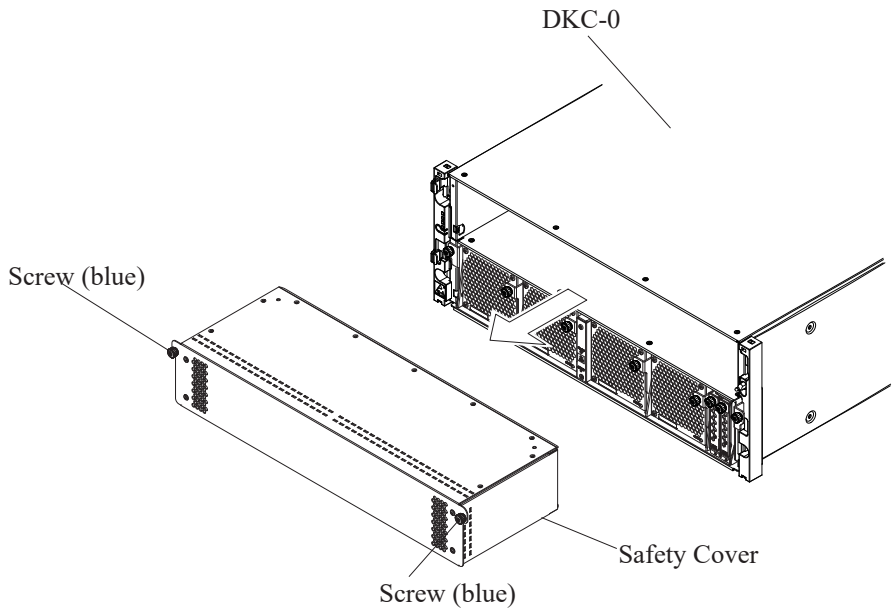
   *: If there are uncompleted SIMs, follow the procedure shown in (TRBL02-01-10).

13.4 Installing Controller Boards

1. Removing Front Bezel
   Remove the Front Bezel. (Refer to “How to Attach/Remove the Front Bezel” (INST(GE)04-01-10).)

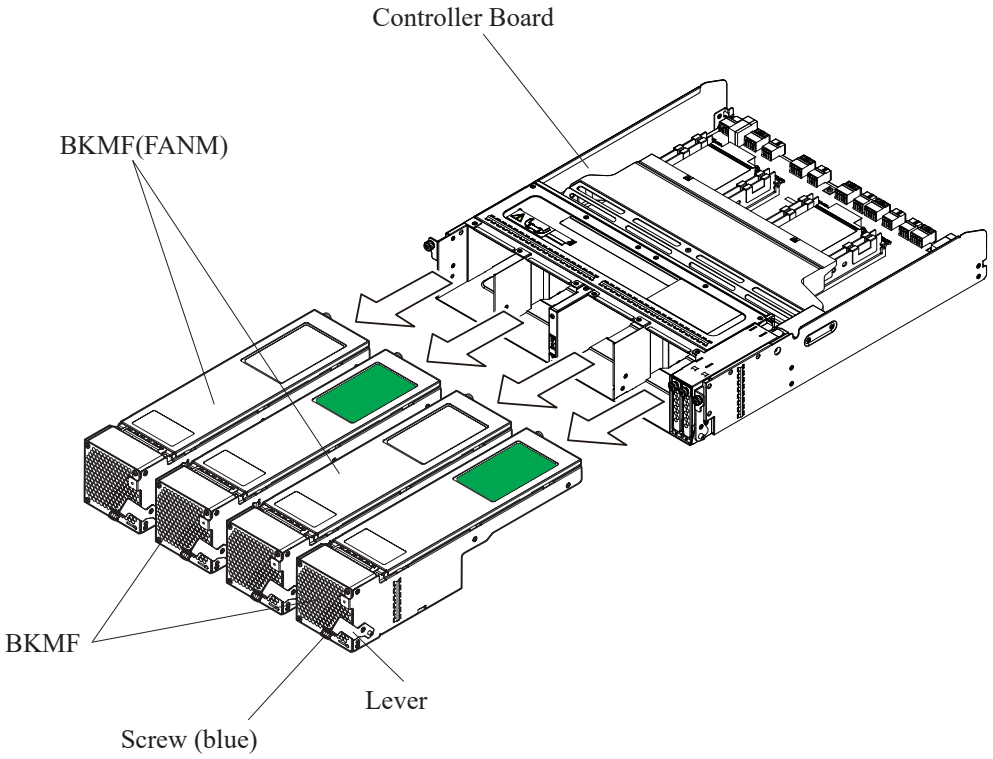
2. Removing the Safety Cover from DKC
   (1) Loosen the right and left screws (blue).
   (2) Pull out and remove the Safety Cover.

Figure 13-1 Removing Safety Cover



3. Removing the parts
   (1) Remove all BKMF (four) installed in the Controller Board.
      (a) Loosen the screw (blue) fixing the BKMF.
      (b) Open the lever and pull out the BKMF to remove.

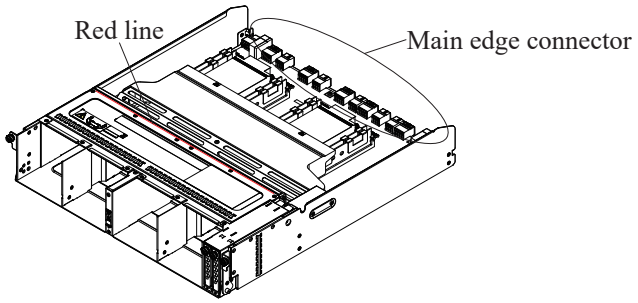
Figure 13-2 Removing BKMFs



4. Installing the Controller Board

⚠ CAUTION

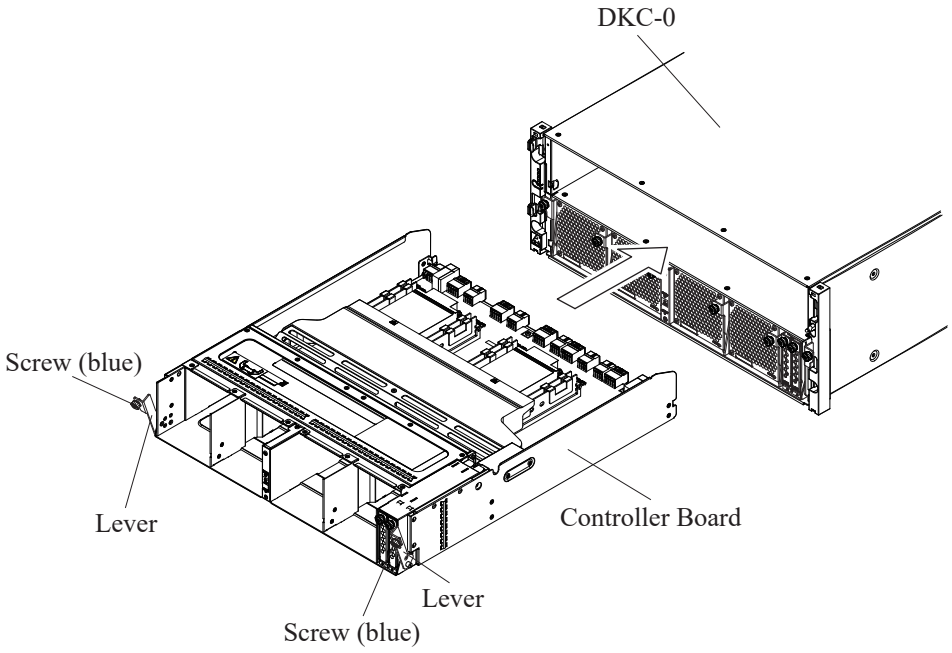
Dropping the Controller Board may cause injury. Be aware of the red line marked on the Controller Board top - when sliding the Controller Board out of the array past this mark, keep a firm hold on the Controller Board.



NOTICE:
- Check that the main edge connector of the Controller Board has no deformation, damage or sticking of dust before installing the Controller Board.
- When installing the Controller Board, hold it with both hands and install it straight not to apply a shock to with any components.

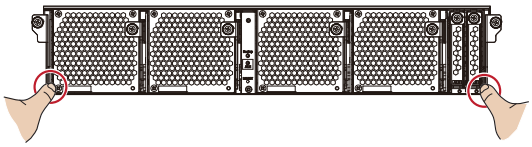
(a) Open the right and left levers of the Controller Board completely and insert the Controller Board into the installation location of the DKC.

Figure 13-3 Installing the Controller Board



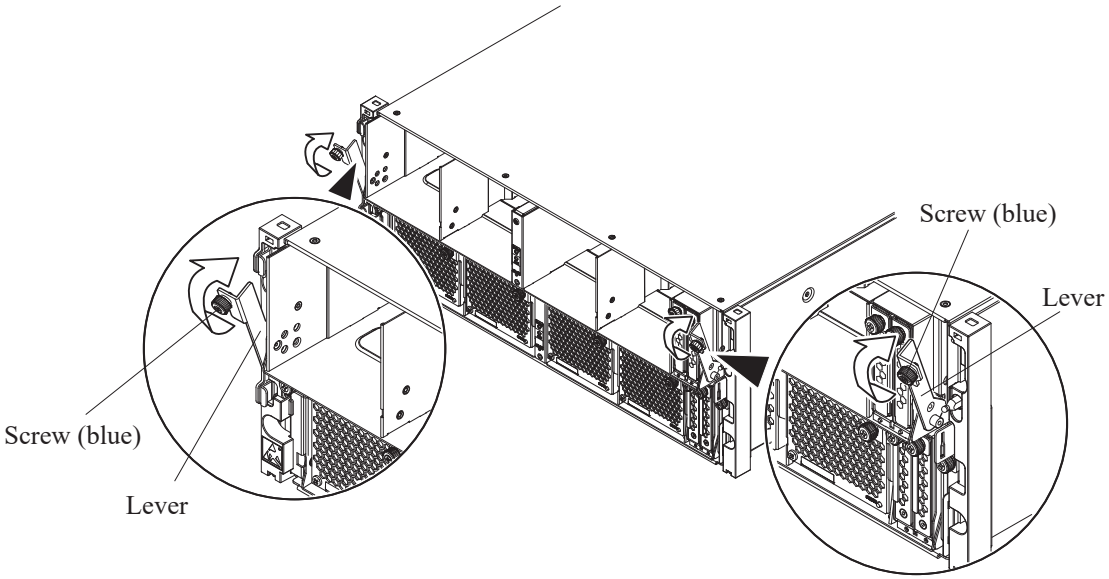
(b) Push the Controller Board all the way in and close the right and left levers completely.

NOTICE: Push the bottom of the front side of the Controller Board all the way to insert it to the end.



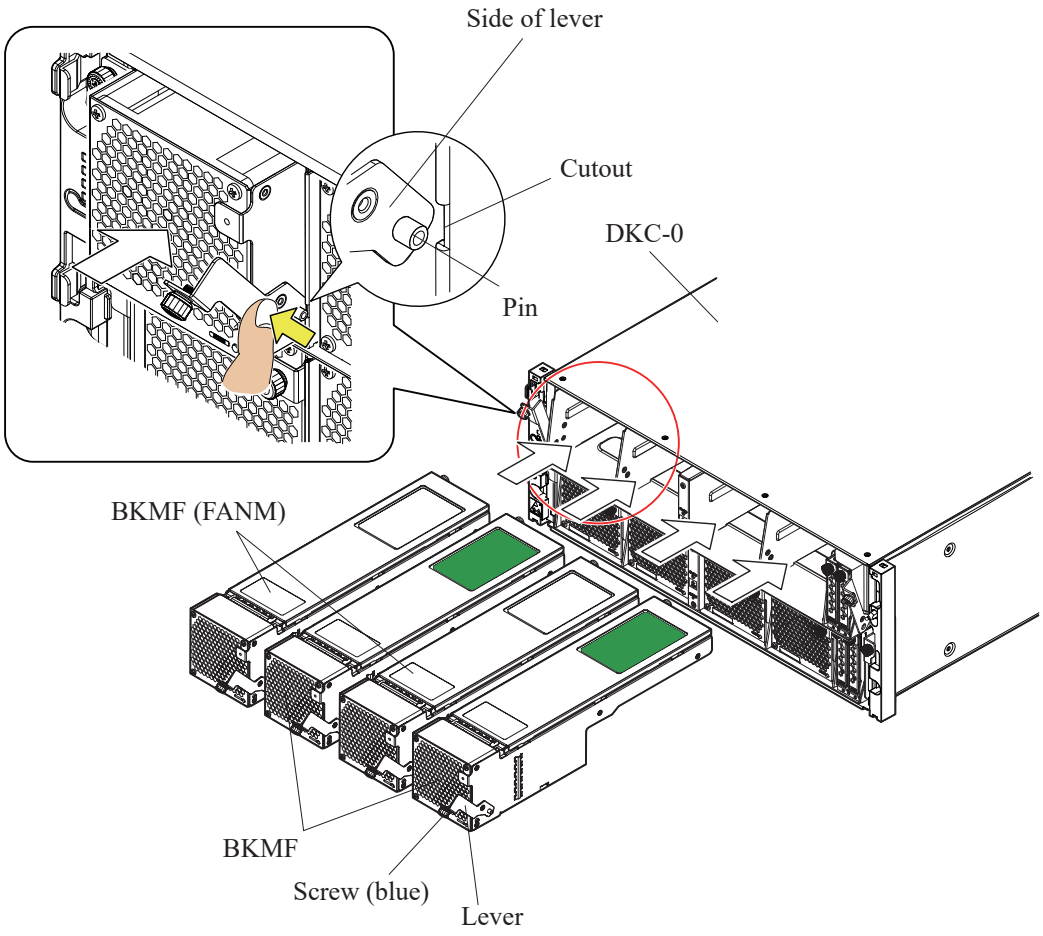
(c) Tighten the screws (blue) and fix the Controller Board.

Figure 13-4 Fixing the Controller Board



5. Installing the BKMFs
   (1) Install four BKMFs in the Controller Board.
      (a) Keep the lever of BKMF pulled down toward you.
      (b) Insert the BKMF up to the front of the shield finger.
      (c) Insert the BKMF while pushing the side of its lever to the left until the pin of the lever goes through the cutout of the chassis and stops.
      (d) Raise the BKMF lever and tighten the screws (blue) and fix it.

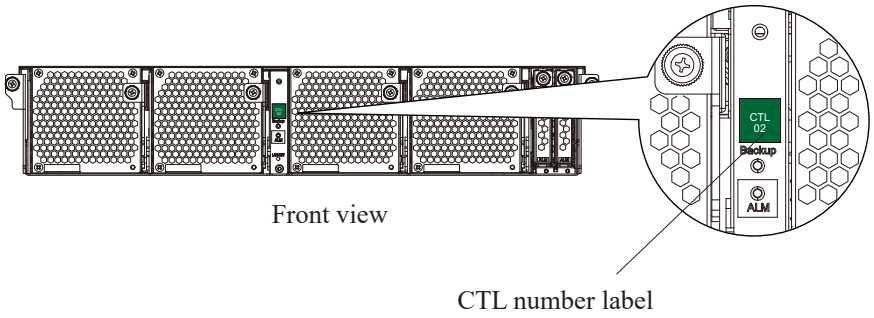
Figure 13-5 Installing the BKMF



NOTE: Components of BKMF (FANM) are different from those of BKMF.
Be careful not to install BKMF (FANM) and BKMF in different locations.

6. Attaching the label
   (1) Attach the CTL number label to the installed Controller Board.

Figure 13-6 Location to Attach the Label to



7. Install a Controller Board in the lower front side of the Controller Chassis (DKC-1) in the same way.

8. Adding work of Channel Boards (CHB), Disk Boards (DKB), HIEs.
   Install Channel Boards, Disk Boards, and HIEs in the installed Controller Boards (CTL02 and CTL11).

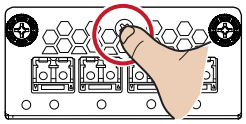
NOTICE: To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the Storage System before starting and do not take it off until you finish. Refer to "Note when Installing and Removing Parts" (INST(GE)01-01-10).

(1) Adding work of Channel Boards.
Check the installation locations and types of the Channel Boards in CTL01, and install the same types of Channel Boards in the same locations in CTL11.
Then, check the installation locations and types of the Channel Boards in CTL12, and install the same types of Channel Boards in the same locations in CTL02.

NOTICE: If Channel Boards are inserted randomly, malfunction may occur. Therefore, insert the Channel Boards in two steps, Step (b) and Step (c) shown below.

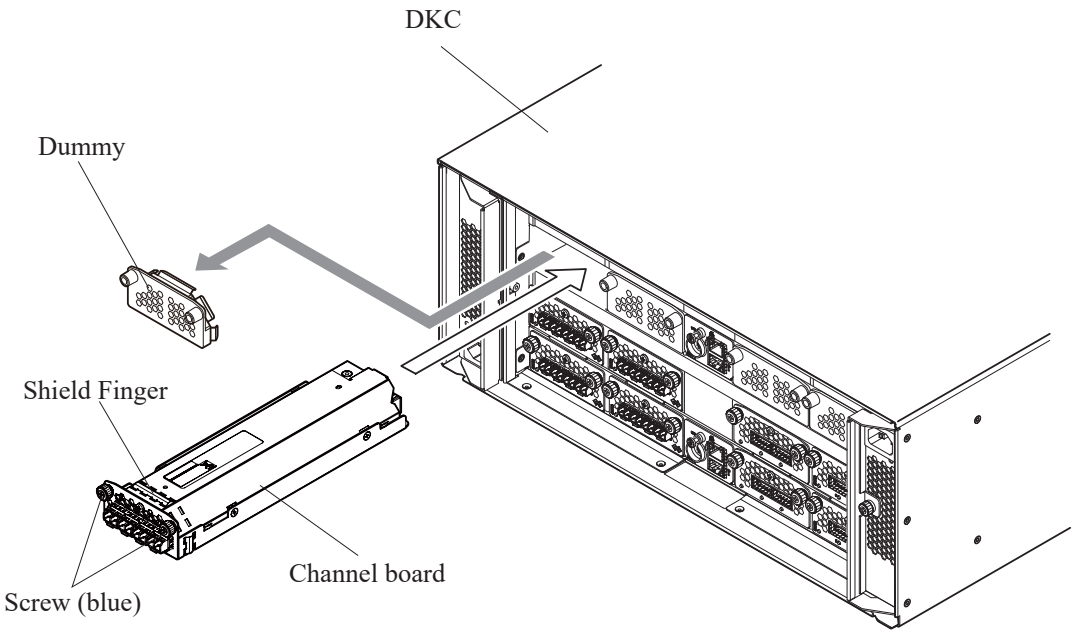
(a) Pull out and remove the dummy
(b) Insert the Channel Board to be added into the slot just before the shield finger.
(c) Push the Channel Board gentrly all the way in.

NOTICE: Push the front side of the Channel Board all the way to insert it to the end.



(d) Tighten two screws (blue) and fix the Channel Board.

Figure 13-7 Installing the Channel Board



(e) Add the other Channel Boards in the same way.

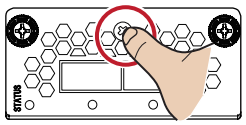
(2) Adding work of Disk Boards

If there is no Disk Board in CTL01 or CTL12, the adding work of Disk Boards for CTL02 and CTL11 is not necessary. Go to the "(3) Adding work of HIEs".

NOTICE: If Disk Boards are inserted randomly, malfunction may occur. Therefore, insert the Disk Boards in two steps, Step (b) and Step (c) shown below.

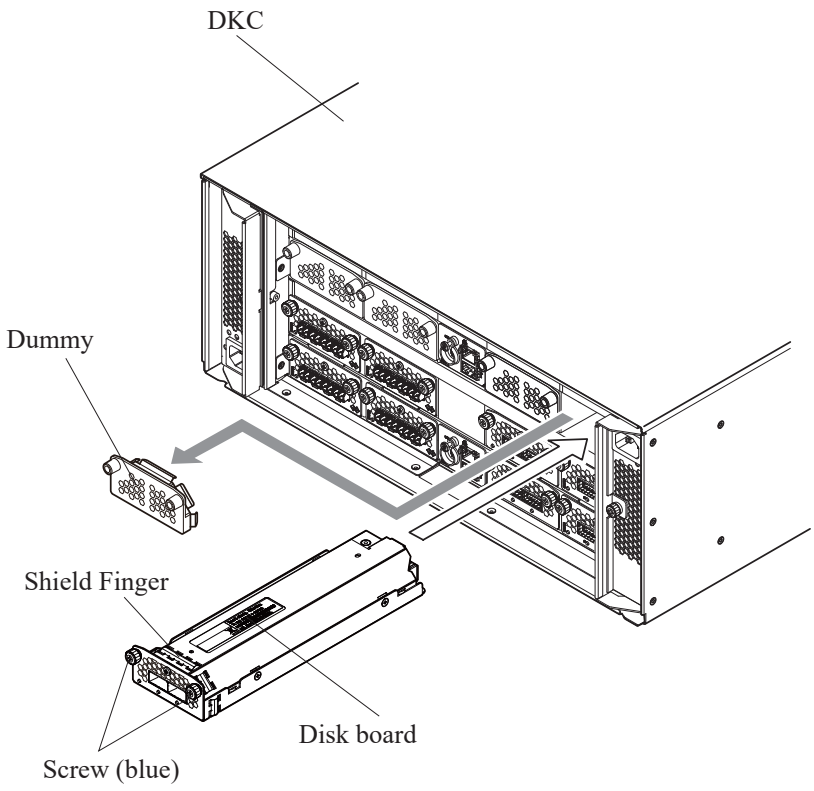
(a) Pull out and remove the dummy.
(b) Insert the Disk Board to be into the slot just before the shield finger.
(c) Push the Disk Board gently all the way in.

NOTICE: Push the front side of the Disk Board all the way to insert it to the end.



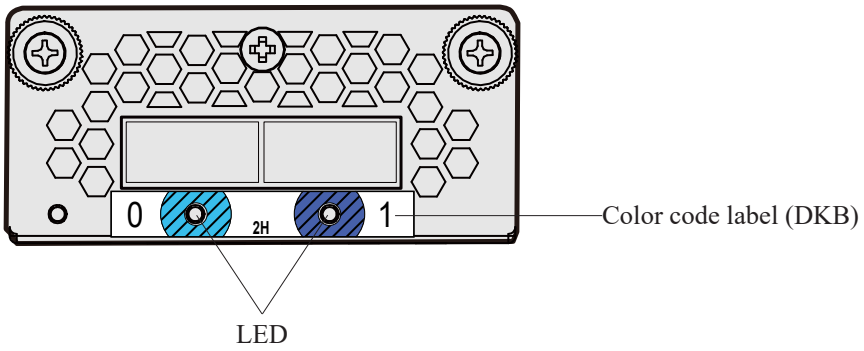
(d) Tighten two screws (blue) and fix the Disk Board.

Figure 13-8 Installing the Disc Board



(e) Attaching the color code label
Attach the color code label (DKB) to the LEDs in the lower part of the Disk Board.
(Attach a color code label with the location number of the Disk Board (see (LOC02-40)).)

Figure 13-9 Location to Attach Color Code Label (DKB) to



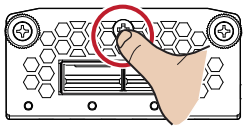
(f) Add the other Disk Boards in the same way.

(3) Adding work of HIEs

(a) Pull out and remove the dummy.

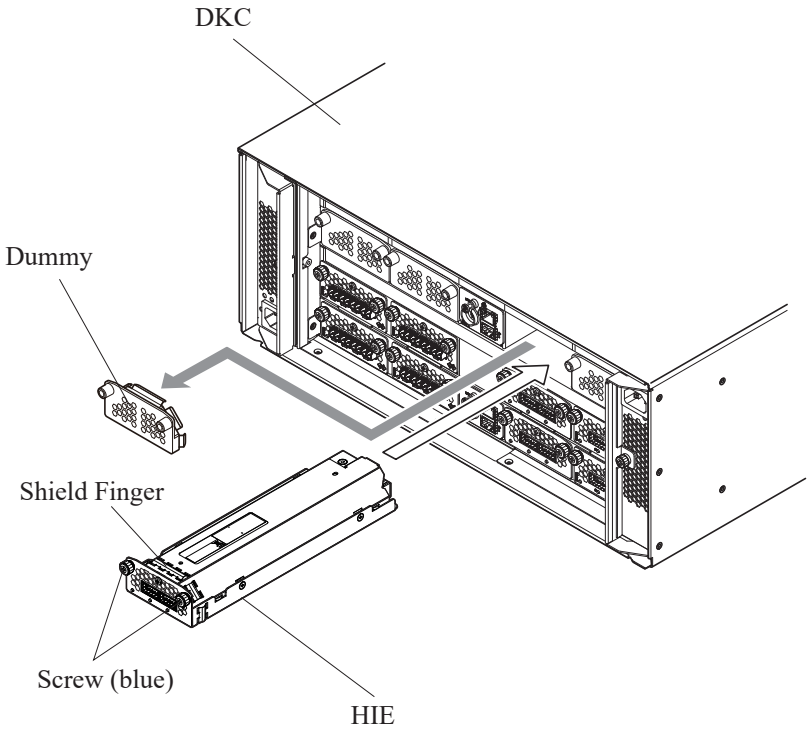
(b) Push the HIE gently all the way in.

NOTICE: Push the front side of the HIE all the way to insert it to the end.



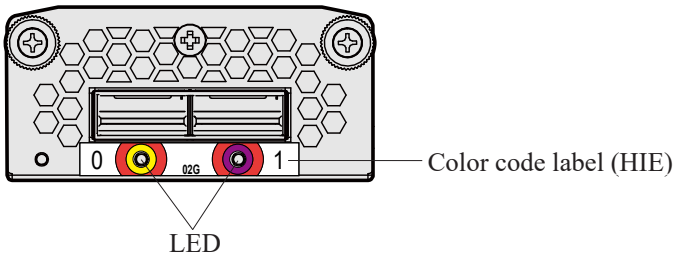
(c) Tighten two screws (blue) and fix the HIE.

Figure 13-10 Installing the HIE



Attach the color code label (HIE) to the LEDs in the lower part of the HIE.
(Attach a color code label with the location number of the HIE (see (LOC02-40).)

Figure 13-11 Location to Attach Color Code Label (HIE) to



(d) Add the other HIEs in the same way.

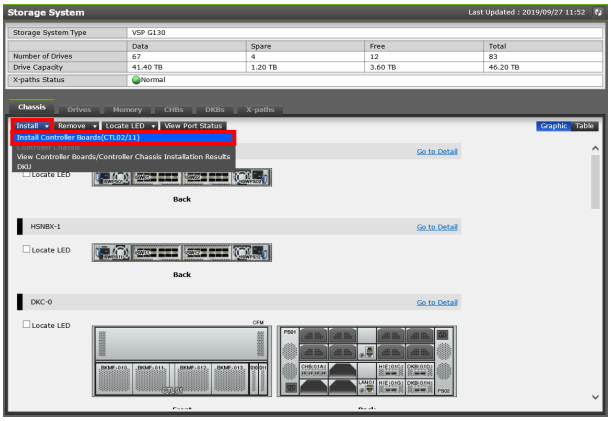
9. Connecting SAS Cables (NVMe Cables)
   Connect the SAS Cables (NVMe Cables), attach the cable labels, and rout the cables. (see “Connecting X-Path Cables” (INST(IN)09-04-10).)

10. Connecting X-Path Cables
    Connect the X-Path cables, attach the cable labels, and route the cables. (see “Connecting X-Path Cables” (INST(IN)09-02-10).)

11. Attaching Front Bezel
    Attach the Front Bezel to the Controller Chassis. (see “How to Attach/Remove Front Bezel” (INST(GE)04-01-10).)

13.5 Maintenance Utility Operations for the Adding Procedure

1. <Main Window>
   Click the [Chassis] tab in the main window, and click [Install] and select [Install Controller Boards(CTL02/11)].



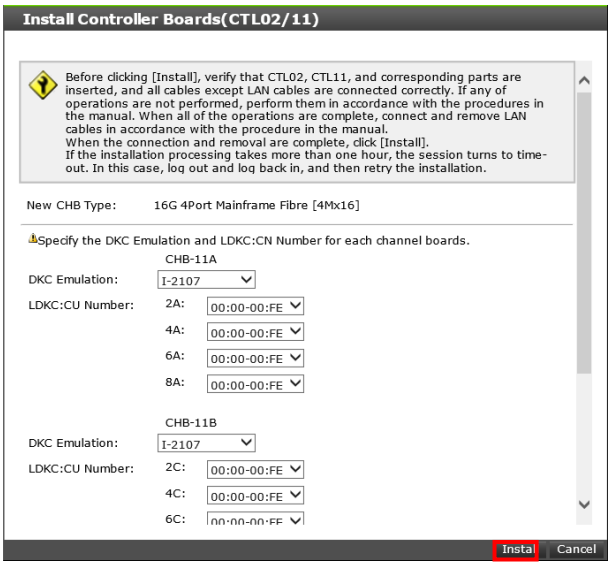
2. LAN cable connection change and additional settings

(1) After the message shown below is displayed, change LAN cable connections.

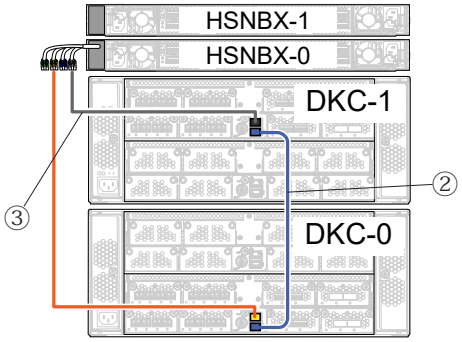
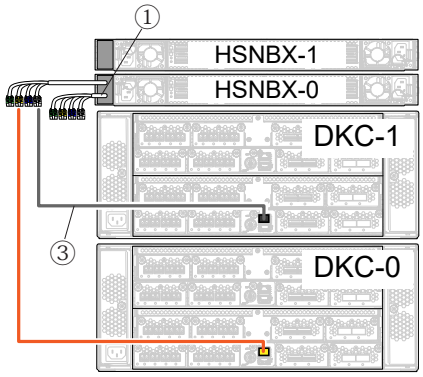
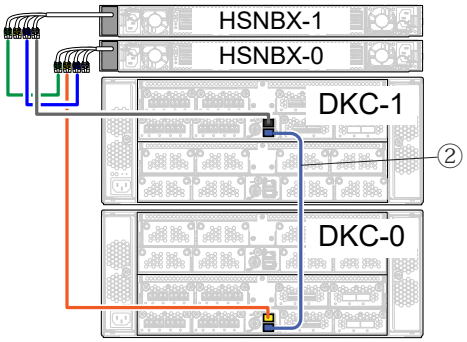
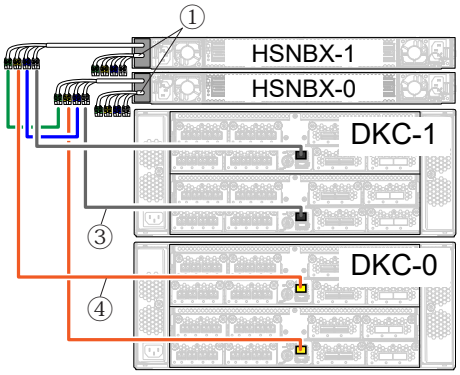
- For open systems

If mainframe channel boards are to be installed, set [DKC Emulation:] and [LDKC: CU Number:].

- For mainframe systems



(2) Connecting LAN cables

	Routing before change (VSP 5100 and VSP 5100H)	Routing after change (VSP 5500 and VSP 5500H)
SSVP1 is not installed		
SSVP1 is installed		

For SSVP1 is not installed

(a) Insert a LAN cable kit to HSNBX-0. (①)
(see (INST(IN)09-03-20))

(b) Connect the LAN cable kit to the LAN ports (L0 through L3) on SSVP0, and then attach four labels.
(see (INST(IN)09-03-30))

(c) Attach four labels to the connectors on the other end of the LAN cable kit.
(see (INST(IN)09-03-40))

(d) Remove the LAN cable between the Maintenance LAN port on the LAN board 1 in DKC-0 and the Maintenance LAN port on the LAN board 2 in DKC-1. (②)

(e) Remove the LAN cable from LAN port on the LAN board 2 in DKC-1, and then connect to the LAN port on the LAN board 1 in DKC-1. (③)
(see (INST(IN)09-03-50))

For SSVP1 is installed

(a) Insert a LAN cable kit to each HSNBX-0 and HSNBX-1. (①)
(see (INST(IN)09-03-20))

(b) Connect each LAN cable kit to each SSVP0 and SSVP1 (L0 through L3), and then attach the labels to the LAN cable kits.
(see (INST(IN)09-03-30))

(c) Attach four labels to the connectors on the other end of the LAN cable kit.
(see (INST(IN)09-03-40))

(d) Remove the LAN cable between the Maintenance LAN port on the LAN board 1 in DKC-0 and the Maintenance LAN port on the LAN board 2 in DKC-1.

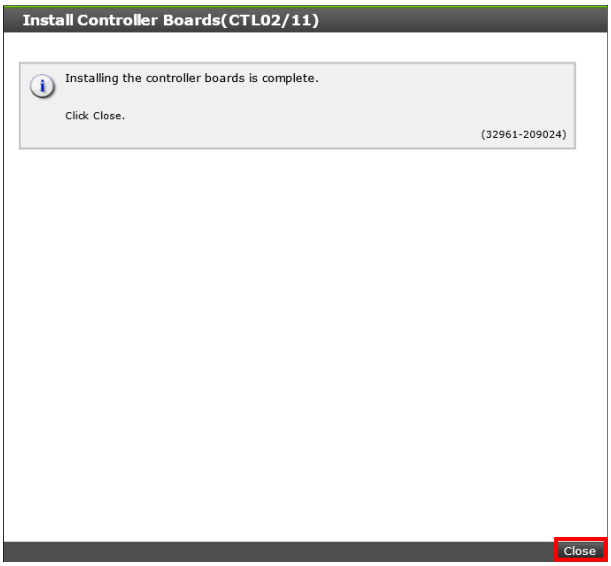
(e) Connect the LAN cables between the LAN port (U1) on SSVP1 and the LAN board 2 (Management LAN port) on DKC-0. (③)
(see (INST(IN)09-03-53))

(f) Connect the LAN cables between the LAN port (U3) on SSVP1 and the LAN board 2 (Management LAN port) on DKC-1. (④)
(see (INST(IN)09-03-53))

(3) Click [Install].

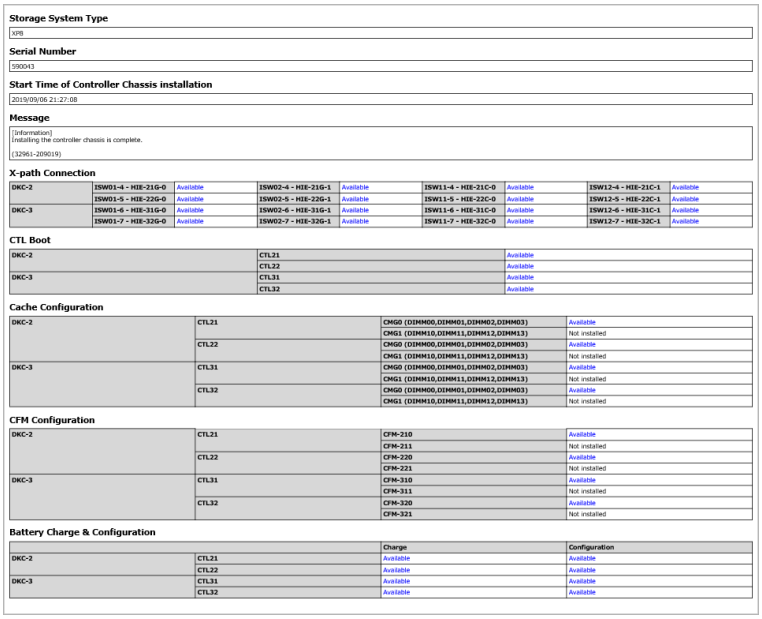
NOTE: The error list window is displayed if multiple errors are detected by the prior check. If it is displayed, click the text of "Error Code" and recover the failures or the blockade in accordance with the details of the displayed errors.

3. Check Addition Completion
Check that the following message is displayed and click [Close].
If a message other than the described is displayed, refer to "Message Section" (MSG00-00).



NOTE: If 60 minutes have passed since the start of the adding work on Maintenance Utility, a session timeout occurs before this message window appears.
When a session timeout occurs, check [Message] in [View Controller Boards Installation Results].
"processing"displayed in [Message] indicates that the adding process is in process.

4. Checking Controller Boards Installation Results
   Click [Chassis]-[Install]-[View Controller Boards/Controller Chassis Installation Results], and check that there is no abnormality.
   For details of the Controller Boards Installation Results window, see (MU02-230).



   NOTE: If the results show errors, perform “Recovery Procedure When Adding Controller Boads Fails” (TRBL02-04-540).

5. Checking Normality
   Perform the procedure described in "Checking Normality" (TRBL02-06-10).

6. Executing LAN Check
   Perform a diagnosis of LAN Check (DIAG03-10).
   When there is an error, perform “Recovery Procedure for Error Parts Detected by LAN Check” (TRBL02-04-440).

7. Click [Logout] to close the window.

8. Click [Execute]-[Exit] in the SVP window to exit the window.

   NOTE: At this point, the added CTLs are not displayed as selectable CTLs for “Connect to”.

9. Removing the Maintenance PC
   Remove the Maintenance PC from the storage system referring to “Attachment/Removal Procedure of Maintenance PC” (INST(IN)13-02-10).

   NOTE: If you try to use the SVP window for another maintenance after this procedure, the SVP window might not be able to be opened from the Web Console window.
   In such a case, log off the SVP and log on it again. Then, before the Web Console window is opened, click [Start SVP] in the Wait for the start of Storage Management Service window to open the SVP window.