

# Troubleshooting

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This “Troubleshooting” volume describes the trouble analysis of the array, etc.

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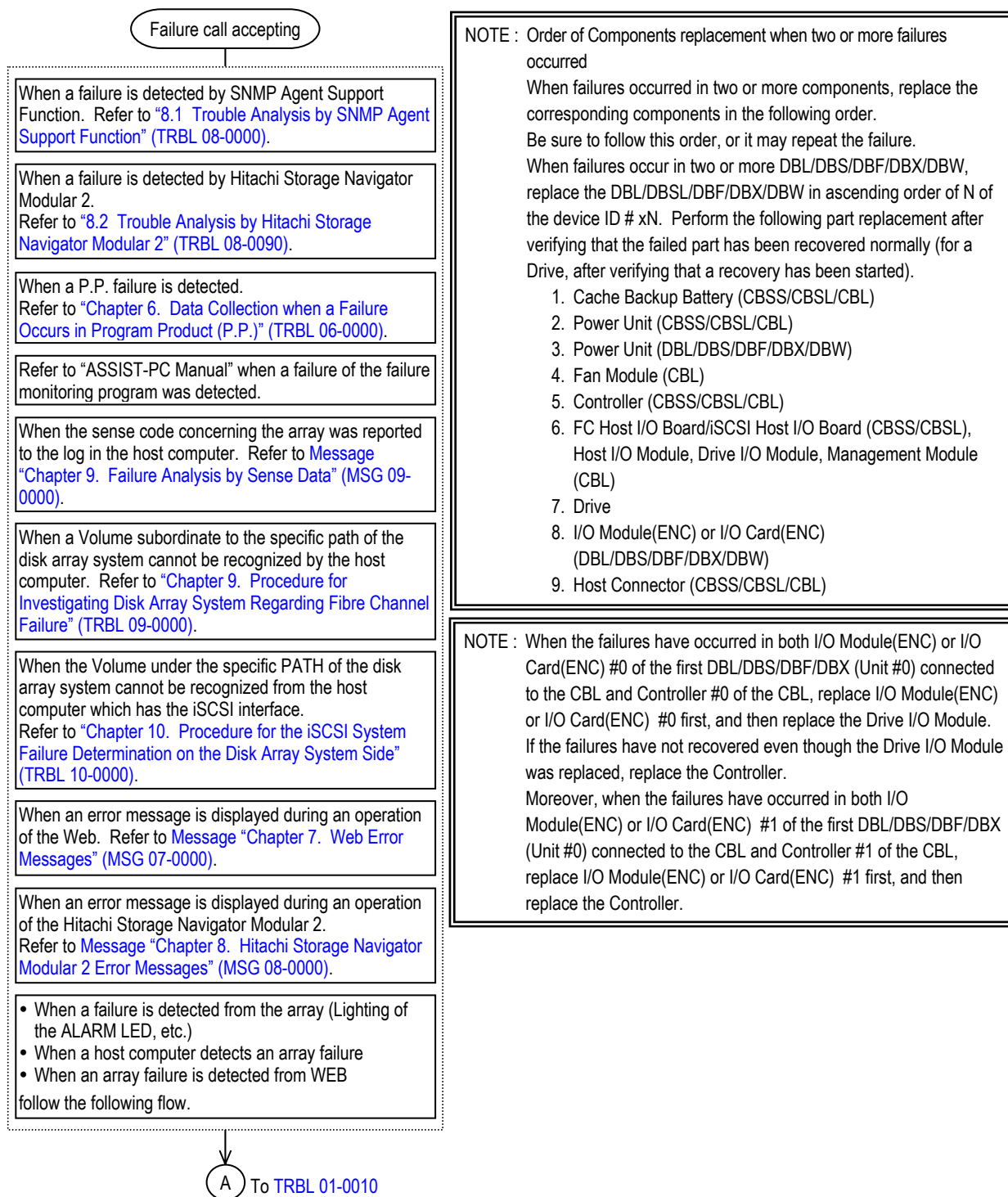


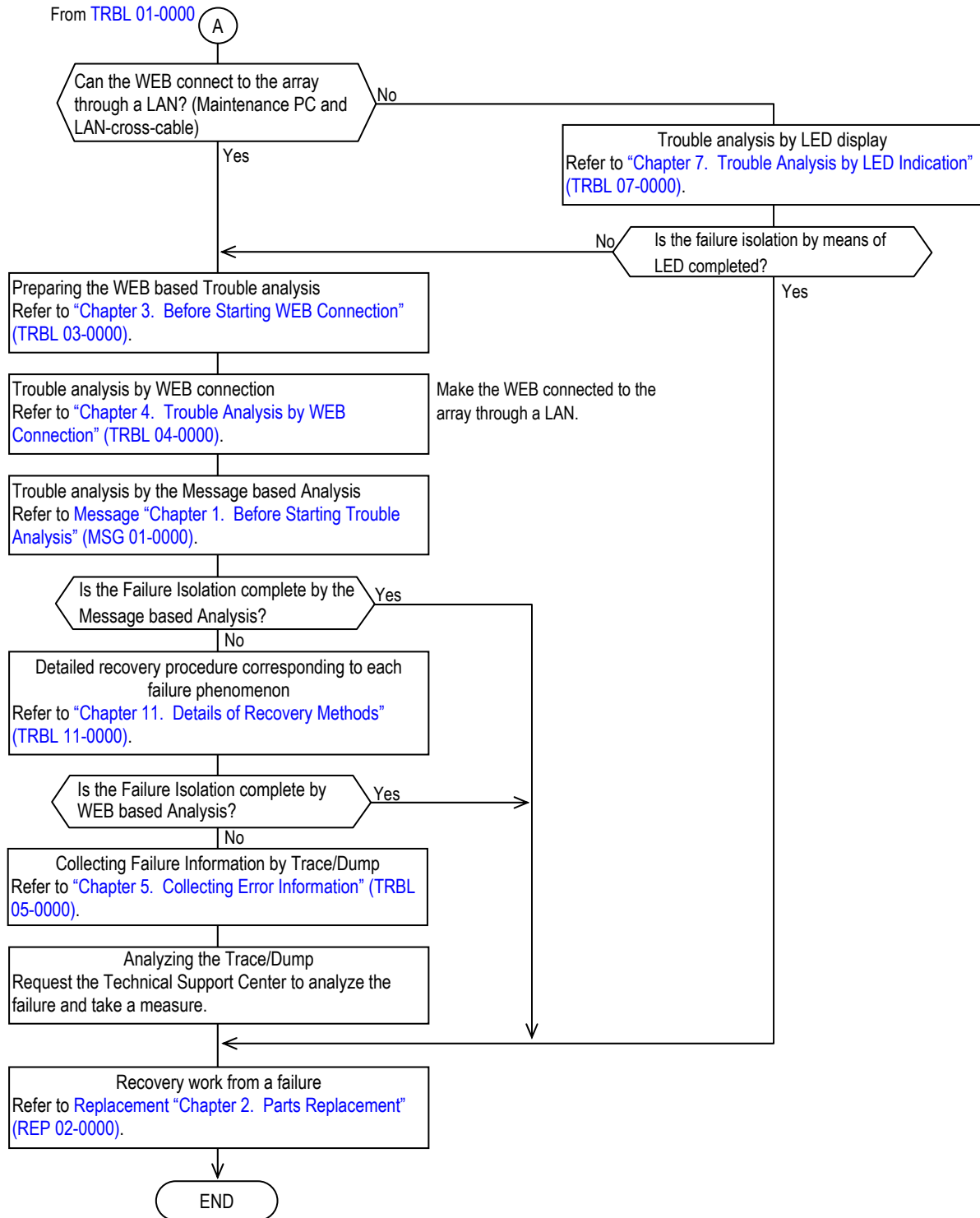
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## Chapter 1. Flowchart for Troubleshooting

This chapter contains information on troubleshooting to be used when failures occur in the unit.  
The following is the flow of troubleshooting to be used when a failure occurs in the unit.





## Chapter 2. Before Maintenance Work

### 2.1 Precautions

#### (1) Note on restarting

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

- If the array used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.
  - The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of E-mail Alert Function, SNMP Agent Support Function, and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE. If the Pair status of TrueCopy remote replication/TrueCopy Extended Distance is either PAIR or COPY, suspend the pairs before restarting the array.
- When using the priced option, Power Saving/Power Saving Plus, and the power saving instruction of the I/O interlock disabled is executed, if the array restarts while the power saving status is "Normal (Command Monitoring)", the status is changed to "Normal (Spindown Failed: PS OFF/ON)".

After executing the power saving instruction of the I/O interlock disabled, check that there is no RAID group whose power saving status is "Normal (Command Monitoring)" and then restart the array.

If the spin-down fails, execute the spin-down again.

#### (2) Notes while the array is being started

Because the status where the array is being started is in the middle of the transition to the status of the array power turned on (Ready status) from the status of the array power turned off, do not perform the following work while the array is being started.

- Isolating the Fibre system failure in the disk array system side
- Trouble analysis by LED indication
- Part replacement
- Data collection when a failure occurs in Program Product (P.P.)
- Troubleshooting of the failure of the failure monitoring program
- Troubleshooting of the WEB error message

Also, the setting function or the reference function using the Hitachi Storage Navigator Modular 2 cannot be executed to the array which is being started.

## 2.2 Confirming and Setting RTC (Real Time Clock)

RTC (Real Time Clock) is a built-in clock in the Controller. It is used to record the time information of messages and trace/dump when an error occurred. Even if the RTC is out of order, the host system may not be affected. However, the time information of messages and trace/dump is not correct. Accordingly, the failure analysis with synchronizing to the host may be affected.

In the following cases, check the RTC and reset it if it varies.

- When the controller was replaced while the array power was turned off.
- When there is something wrong with the time on messages, traces and dump.

Set the time on the Japanese Standard Time basis

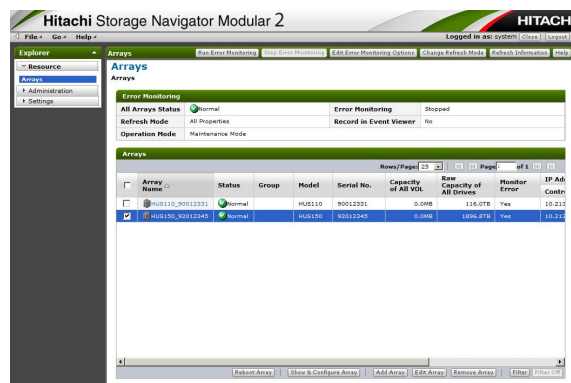
Set RTC using Hitachi Storage Navigator Modular 2. Refer to [System Parameter “1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Array” \(SYSPR 01-0020\)](#) to connect Hitachi Storage Navigator Modular 2.

The setting of RTC can be made without rebooting the array unit.

**NOTE :** If data loss happens with all data in the cache memory gone due to a problem such as system down and the combination of power outage and battery failure, the setting done from the start of the array to the occurrence of data loss will return to where it was before the start of the array. So it is necessary to check and reconfigure the Date & Time (RTC) setting after maintenance work for a failure that leads to data loss.

- (1) Put a checkmark to the arrays to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(‡1)</sup>

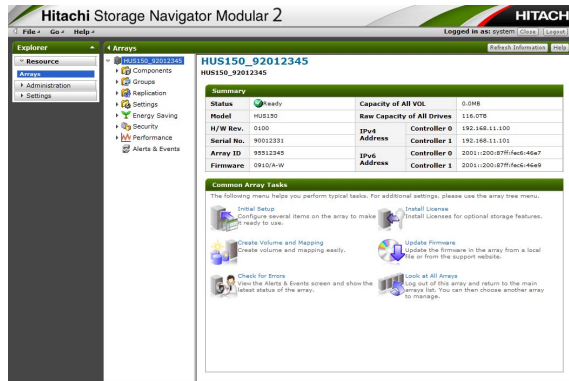
It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



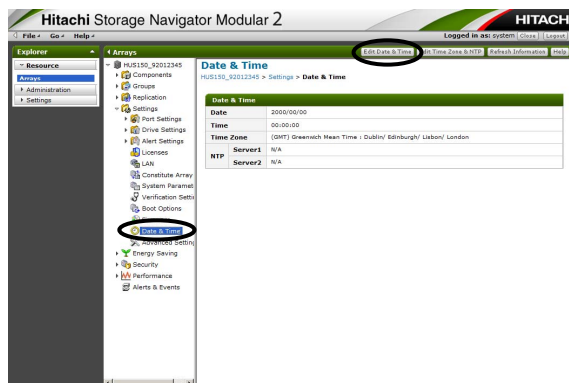
‡1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

- (2) Click the Array Name, and open the unit window.

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



- (3) Select [Settings] - [Date & Time] in the unit window.



- (4) Click the [Edit Date & Time] button in the unit window.

- (5) The Edit Date and Time window is displayed.

Specify the setting method and click the [OK] button.

[Date and Time] : Specifies the setting method.

- Select “Set Automatically” unless it is especially required to set it manually.
- When you have selected “Set Manually”, enter [Date] (you can display or set the date that is set now) and [Time] (you can display or set the time that is set now).



- (6) The completion message is displayed. Click the [Close] button.





## 2.3 Indications and their Functions

### (1) Indication positions and their functions of CBXSL/CBXSS

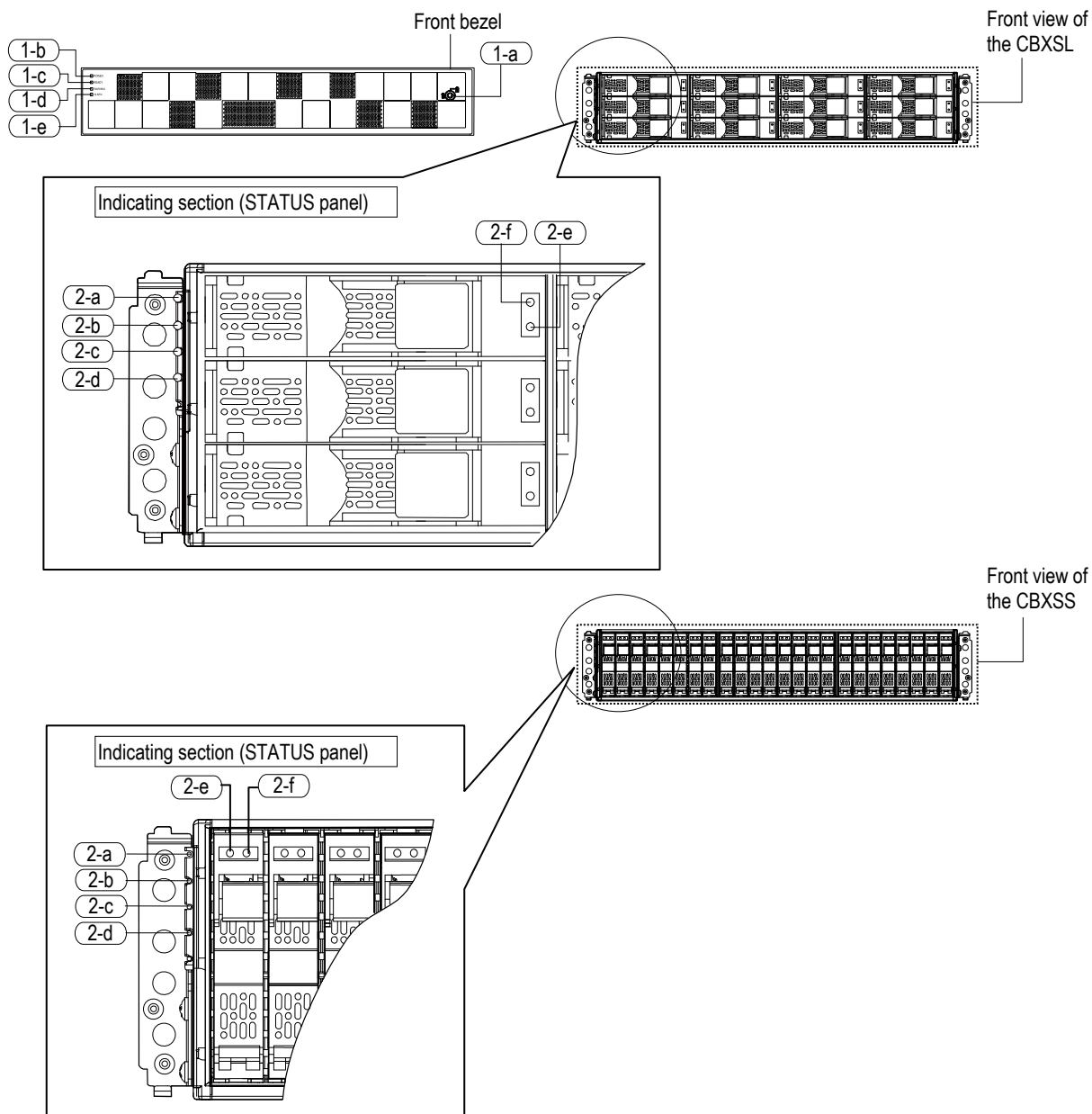


Figure 2.3.1 Indication Locations of Functional Components (Front View)

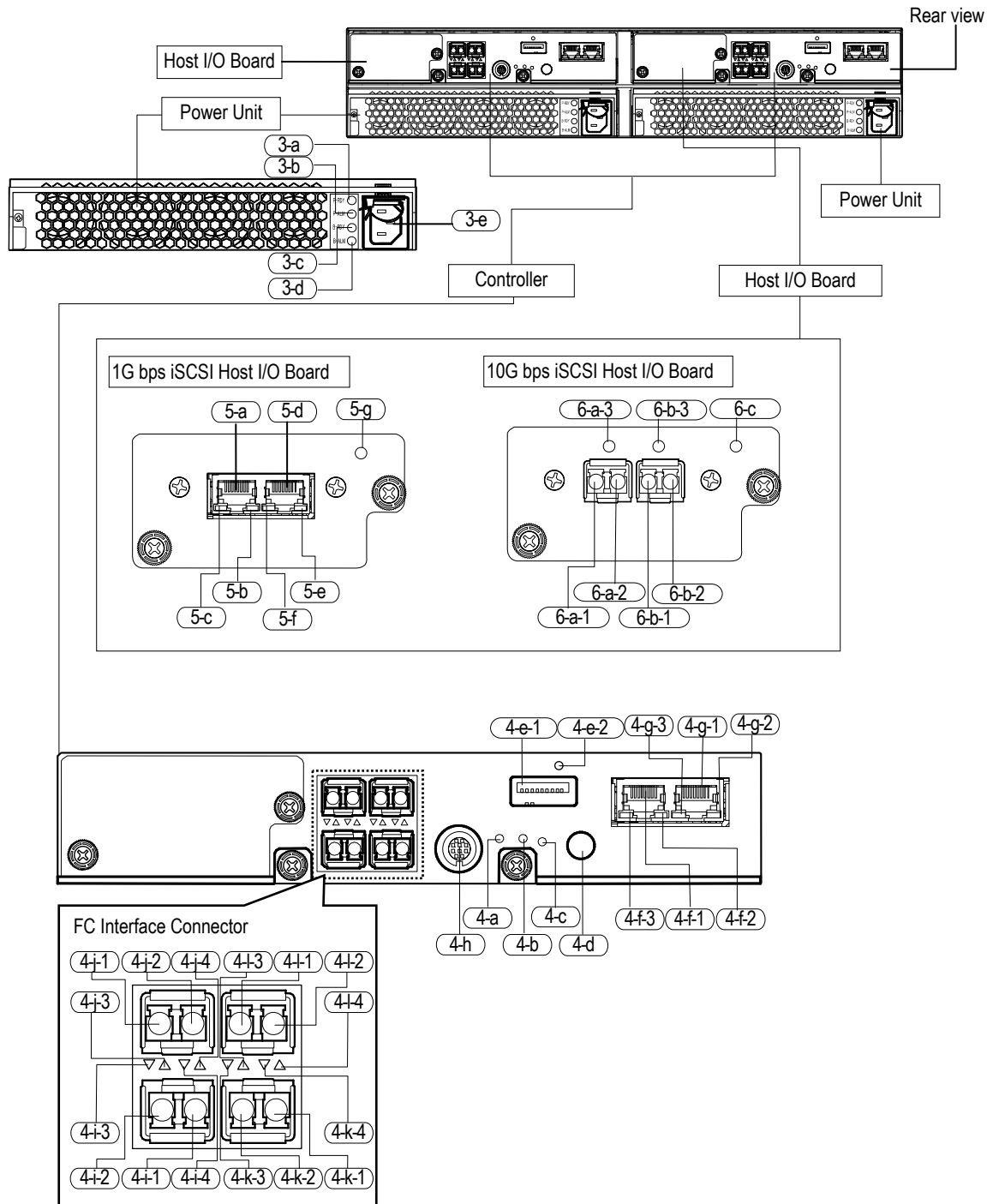


Figure 2.3.2 Indication Locations of Functional Components (Rear View)

Table 2.3.1 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green/ Orange	On in green Indicates that power-on is in progress after the main switch is pushed. Also continues to light up after the array become operable. On in orange Indicates that power cables of the Controller Box are connected and the power is supplied.
1-c		READY	LED	Green	On Indicates that the array can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC firmware and the backup controller firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC firmware is completed offline.
1-d		WARNING	LED	Orange	On Indicates that a failure, which allows the array to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which does not stop operation occurred in array (It must be detected with WEB).
1-e		ALARM	LED	Red	On Indicates that a failure, which does not allow the array to operate, occurred. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.
2-a	STATUS Panel (CBXSL/CBXSS)	POWER	LED	Green/ Orange	On in green Indicates that power-on is in progress after the main switch is pushed. Also continues to light up after the array become operable. On in orange Indicates that power cables of the Controller Box are connected and the power is supplied.
2-b		READY	LED	Green	On Indicates that the array can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC firmware and the backup controller firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC firmware is completed offline.

No.	Section	Name	Classification	Color	Function											
2-c	STATUS Panel (CBXSL/CBXSS)	WARNING	LED	Orange	On Indicates that a failure, which allows the array to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which allows the array to operate, occurred. (It must be detected with WEB).											
2-d		ALARM	LED	Red	On Indicates that a failure occurred which makes the array unable to operate. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.											
2-e		ALM	LED	Red	Indicates that a failure which makes the unable to operate occurred.											
2-f		ACT	LED	Green	<table><tr><td>No.</td><td>LED status</td><td>Meaning</td></tr><tr><td>1</td><td>Blinking</td><td>Shows that the Drive is being accessed.</td></tr><tr><td>2</td><td>On</td><td>Spin up state</td></tr><tr><td>3</td><td>Off</td><td>Spin down state</td></tr></table>	No.	LED status	Meaning	1	Blinking	Shows that the Drive is being accessed.	2	On	Spin up state	3	Off
No.	LED status	Meaning														
1	Blinking	Shows that the Drive is being accessed.														
2	On	Spin up state														
3	Off	Spin down state														
3-a	Power Unit (include the Cache Backup Battery)	P-RDY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation											
3-b		P-ALM	LED	Red	Lights when the Power Unit is in trouble.											
3-c		B-RDY	LED	Green	Shows the state of the battery. On : Battery is in the normal condition. Blinking : Charged up when start-up Off : Abnormal • The battery is not installed.											
3-d		B-ALM	LED	Red	Lights when the Cache Backup Battery has failures.											
3-e		Receptor (J1)	Connector	—	Connector on the array side to connect the power cable.											
4-a	Controller	ALM	LED	Red/ Orange	Red: Indicates that a failure which makes in the Controller unable to operate occurred in it. Orange: Does not light up when the Controller is in the reset status. Or, it indicates that the Controller is being rebooted when the firmware is updated continuing the I/Os of both Controllers.											
4-b		C-PWR	LED	Green	You can check if the Cache memory is being backed up by the indication status of this LED. It is valid when the power cables are connected to the Power Units. On : Indicates that the Controller is in the normal condition. Indicates that the cache is being backed up. (The power is supplied from the battery to the Cache memory.) Blinking : (Including power off process) High-speed blinking : Indicates that data on the Cache Memory is stored in the backup controller (flash memory) in case of electricity failure. Low-speed blinking : Indicates that user data is left in the backup controller (flash memory) after turning off the main switch. Off :Indicates that the power cables are not connected to the Power Units or the Cache memory is not backed up with the main switch off although the power cables are connected.											

No.	Section	Name		Classification	Color	Function
4-c	Controller	RST SW		Switch	—	Used to perform a Full Dump.
4-d		Main switch		Switch	—	Turns on/off the power. When power is off: Turns on by holding for more than 1 second. When power is on: Turns off by holding for more than 3 seconds.
4-e-1		PATH0		Connector	—	Connection connector for SAS(ENC) cable (PATH 0 side).
4-e-2		PATH0 (LINK/LOCATE)		LED	Blue/ Orange	Blue : Link status. Orange : Additional location (locate) Off : Link down.
4-f-1		LAN0	LAN0	Connector	—	Connects the LAN0 cable. (For maintenance)
4-f-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 0.
4-f-3			LINK	LED	Green	Indicates that the link status of the LAN 0 is normal.
4-g-1		LAN1	LAN1	Connector	—	Connects the LAN1 cable. (For User Management)
4-g-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 1.
4-g-3			LINK	LED	Green	Indicates that the link status of the LAN 1 is normal.
4-h		Connector for connecting the UPS interlocking cable (UPS)		Connector	—	Used to connect the UPS for the DF850.
4-i-1	Controller (FC Interface Connector )	Port 0A/ Port 1A	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A/Port 1A side.
4-i-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A/Port 1A side.
4-i-3			HALM	LED	Red	Indicates that the Host Connector is in trouble.
4-i-4			Link	LED	Blue/ Green	Blue : 8 Gbps Link status Green : 2 or 4 Gbps Link status.
4-j-1		Port 0B/ Port 1B	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0B/Port 1B side.
4-j-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0B/Port 1B side.
4-j-3			Link	LED	Blue/ Green	Blue : 8 Gbps Link status Green : 2 or 4 Gbps Link status.
4-j-4			HALM	LED	Red	Indicates that the Host Connector is in trouble.
4-k-1		Port 0C/ Port 1C	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0C/Port 1C side.
4-k-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0C/Port 1C side.
4-k-3			HALM	LED	Red	Indicates that the Host Connector is in trouble.
4-k-4			Link	LED	Blue/ Green	Blue : 8 Gbps Link status Green : 2 or 4 Gbps Link status.
4-l-1		Port 0D/ Port 1D	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0D/Port 1D side.
4-l-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0D/Port 1D side.
4-l-3			Link	LED	Blue/ Green	Blue : 8 Gbps Link status Green : 2 or 4 Gbps Link status.
4-l-4			HALM	LED	Red	Indicates that the Host Connector is in trouble.
5-a	1G bps iSCSI Host I/O Board	Port 0E/ Port 1E	iSCSI	Connector	—	Connects the iSCSI cable (Port 0E/Port 1E side).
5-b			Active	LED	Yellow	Indicates that data is being transferred via a Port 0E/Port 1E side.
5-c			Link	LED	Green	Indicates that the link status of the Port 0E/Port 1E side is normal.
5-d		Port 0F/ Port 1F	iSCSI	Connector	—	Connects the iSCSI cable (Port 0F/Port 1F side).
5-e			Active	LED	Yellow	Indicates that data is being transferred via a Port 0F/Port 1F side.
5-f			Link	LED	Green	Indicates that the link status of the Port 0F/Port 1F side is normal.
5-g		STATUS		LED	Green/ Red Off	Green : Power on Red : Abnormal Off : Power off

No.	Section	Name		Classification	Color	Function
6-a-1	10G bps iSCSI Host I/O Board	Port 0E/ Port 1E	Tx	Connector	—	Connector on the signal output side to connect the 10G iSCSI interface cable in the Port 0E/Port 1E side.
6-a-2			Rx	Connector	—	Connector on the signal input side to connect the 10G iSCSI interface cable in the Port 0E/Port 1E side.
6-a-3			HSTS	LED	Red/ Blue	Red : Host Connector is abnormal. Blue : Link status is normal. Off : Link down/not Ready.
6-b-1		Port 0F/ Port 1F	Tx	Connector	—	Connector on the signal output side to connect the 10G iSCSI interface cable in the Port 0F/Port 1F side.
6-b-2			Rx	Connector	—	Connector on the signal input side to connect the 10G iSCSI interface cable in the Port 0F/Port 1F side.
6-b-3			HSTS	LED	Red/ Blue/ Off	Red : Host Connector is abnormal. Blue : Link status is normal. Off : Link down/not Ready.
6-c		STATUS		LED	Green/ Red	Green : Power on Red : Abnormal Off : Power off

(2) Indication positions and their functions of CBSL/CBSS

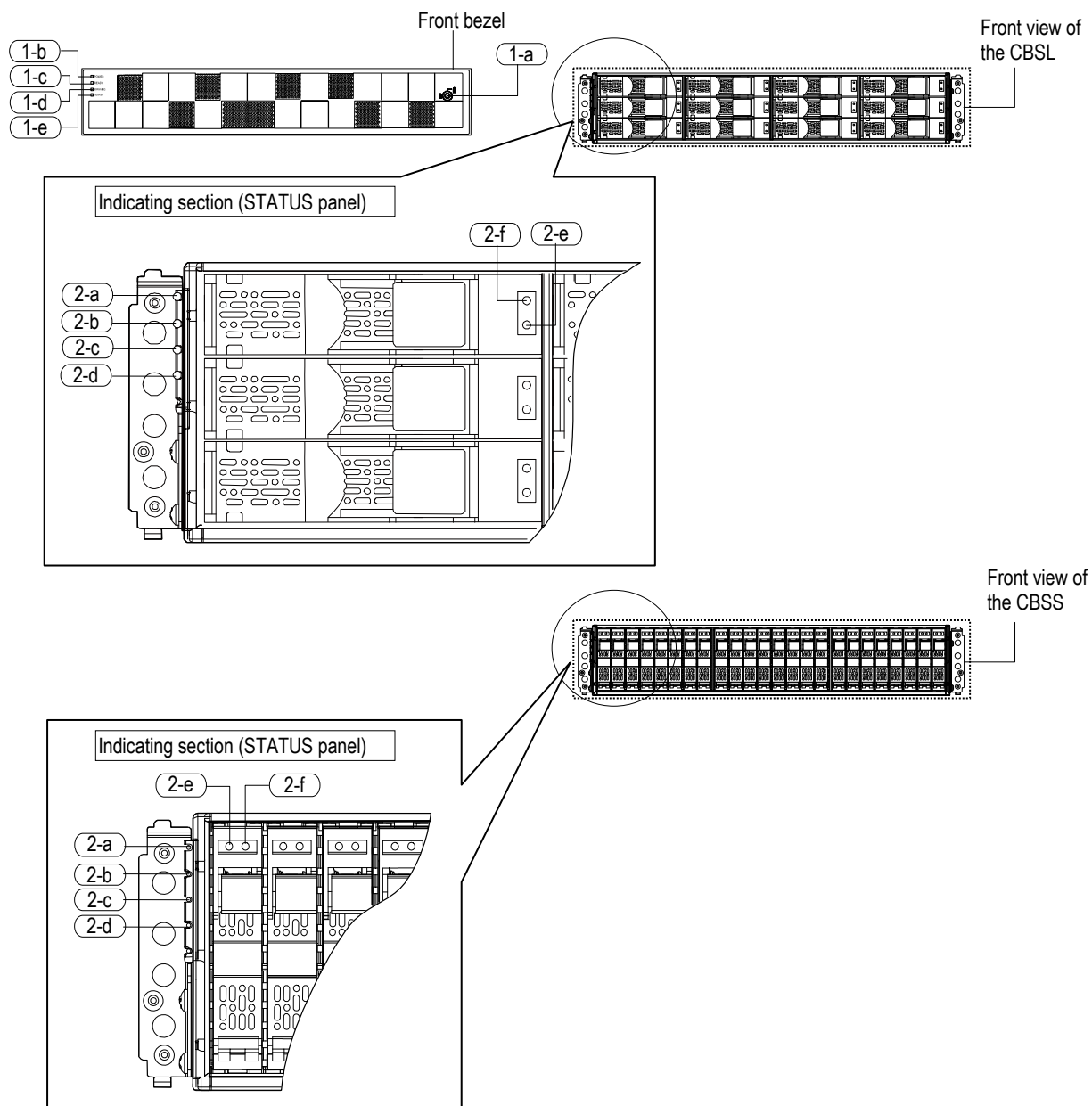


Figure 2.3.3 Indication Locations of Functional Components (Front View)

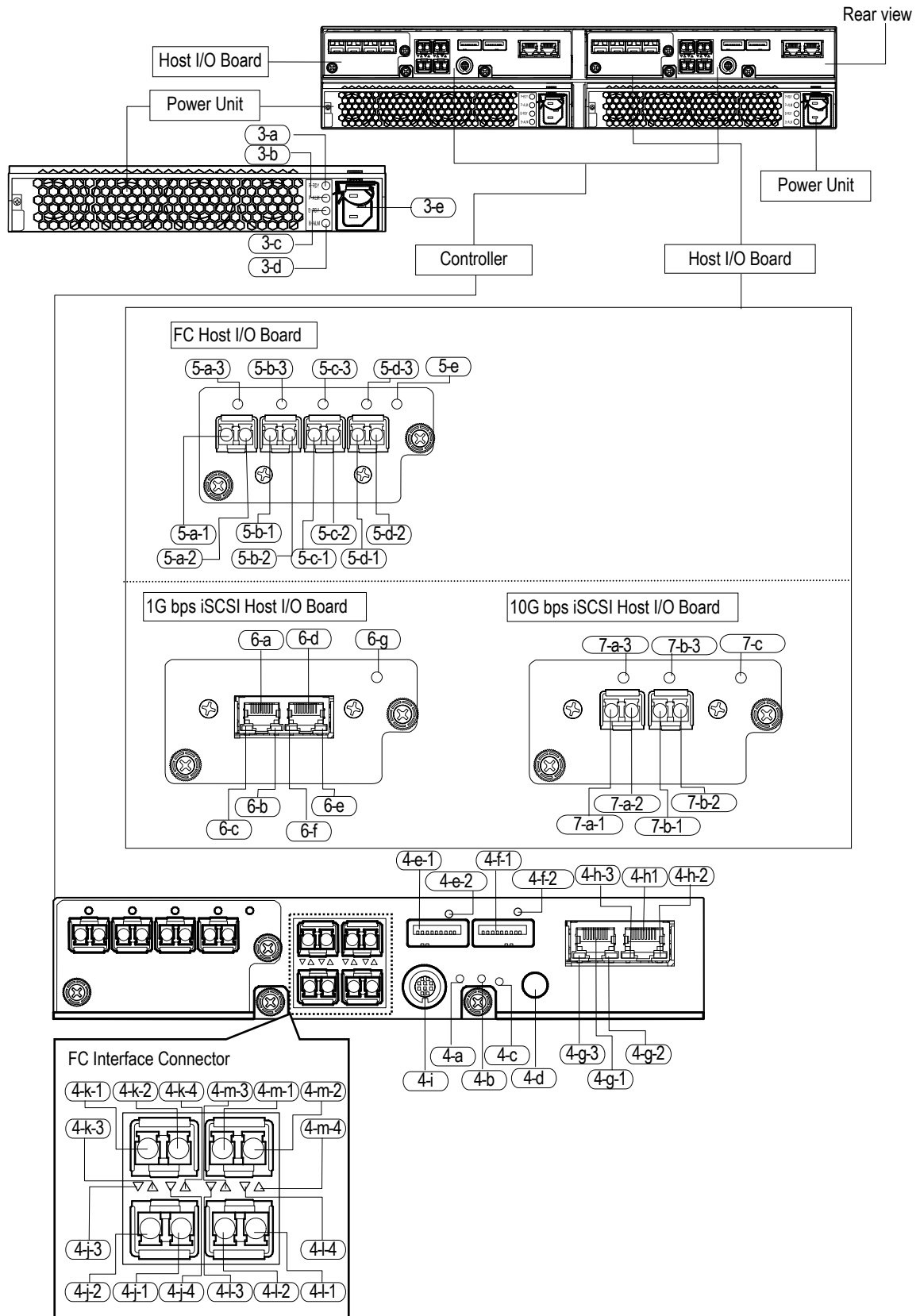


Figure 2.3.4 Indication Locations of Functional Components (Rear View)



Table 2.3.2 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green/ Orange	On in green Indicates that power-on is in progress after the main switch is pushed. Also continues to light up after the array become operable. On in orange Indicates that power cables of the Controller Box are connected and the power is supplied.
1-c		READY	LED	Green	On Indicates that the array can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC firmware and the backup controller firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC firmware is completed offline.
1-d		WARNING	LED	Orange	On Indicates that a failure, which allows the array to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which does not stop operation occurred in array (It must be detected with WEB).
1-e		ALARM	LED	Red	On Indicates that a failure, which does not allow the array to operate, occurred. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.
2-a	STATUS Panel (CBSL/CBSS)	POWER	LED	Green/ Orange	On in green Indicates that power-on is in progress after the main switch is pushed. Also continues to light up after the array become operable. On in orange Indicates that power cables of the Controller Box are connected and the power is supplied.
2-b		READY	LED	Green	On Indicates that the array can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC firmware and the backup controller firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC firmware is completed offline.

No.	Section	Name	Classification	Color	Function											
2-c	STATUS Panel (CBSL/CBSS)	WARNING	LED	Orange	On Indicates that a failure, which allows the array to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which allows the array to operate, occurred. (It must be detected with WEB).											
2-d		ALARM	LED	Red	On Indicates that a failure occurred which makes the array unable to operate. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.											
2-e		ALM	LED	Red	Indicates that a failure which makes the unable to operate occurred.											
2-f		ACT	LED	Green	<table><tr><th>No.</th><th>LED status</th><th>Meaning</th></tr><tr><td>1</td><td>Blinking</td><td>Shows that the Drive is being accessed.</td></tr><tr><td>2</td><td>On</td><td>Spin up state. (SAS)</td></tr><tr><td>3</td><td>Off</td><td>Spin down state. (SAS)</td></tr></table>	No.	LED status	Meaning	1	Blinking	Shows that the Drive is being accessed.	2	On	Spin up state. (SAS)	3	Off
No.	LED status	Meaning														
1	Blinking	Shows that the Drive is being accessed.														
2	On	Spin up state. (SAS)														
3	Off	Spin down state. (SAS)														
3-a	Power Unit (include the Cache Backup Battery)	P-RDY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation											
3-b		P-ALM	LED	Red	Lights when the Power Unit is in trouble.											
3-c		B-RDY	LED	Green	Shows the state of the battery. On : Battery is in the normal condition. Blinking : Charged up when start-up Off : Abnormal • The battery is not installed.											
3-d		B-ALM	LED	Red	Lights when the Cache Backup Battery has failures.											
3-e		Receptor (J1)	Connector	—	Connector on the array side to connect the power cable.											
4-a	Controller	ALM	LED	Red/ Orange	Red: Indicates that a failure which makes in the Controller unable to operate occurred in it. Orange: Does not light up when the Controller is in the reset status. Or, it indicates that the Controller is being rebooted when the firmware is updated continuing the I/Os of both Controllers.											
4-b		C-PWR	LED	Green	You can check if the Cache memory is being backed up by the indication status of this LED. It is valid when the power cables are connected to the Power Units. On : Indicates that the Controller is in the normal condition. Indicates that the cache is being backed up. (The power is supplied from the battery to the Cache memory.) Blinking High-speed blinking : Indicates that data on the Cache Memory is stored in the backup controller (flash memory) in case of electricity failure or power off process (including planned shutdown) is being executing. Low-speed blinking : Indicates that user data is left in the backup controller (flash memory) after turning off the main switch. Off :Indicates that the power cables are not connected to the Power Units or the Cache memory is not backed up with the main switch off although the power cables are connected.											

No.	Section	Name		Classification	Color	Function	
4-c	Controller	RST SW		Switch	—	Used to perform a Full Dump.	
4-d		Main switch		Switch	—	Turns on/off the power. When power is off: Turns on by holding for more than 1 second. When power is on: Turns off by holding for more than 3 seconds.	
4-e-1		PATH0		Connector	—	Connection connector for SAS(ENC) cable (PATH 0 side).	
4-e-2		PATH0 (LINK/LOCATE)		LED	Blue/ Orange	Blue : Link status. Orange : Additional location (locate) Off : Link down.	
4-f-1		PATH1		Connector	—	Connection connector for SAS(ENC) cable (PATH 1 side).	
4-f-2		PATH1 (LINK/LOCATE)		LED	Blue/ Orange	Blue : Link status. Orange : Additional location (locate) Off : Link down.	
4-g-1		LAN0	LAN0	Connector	—	Connects the LAN0 cable. (For maintenance)	
4-g-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 0.	
4-g-3			LINK	LED	Green	Indicates that the link status of the LAN 0 is normal.	
4-h-1		LAN1	LAN1	Connector	—	Connects the LAN1 cable. (For User Management)	
4-h-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 1.	
4-h-3			LINK	LED	Green	Indicates that the link status of the LAN 1 is normal.	
4-i		Connector for connecting the UPS interlocking cable (UPS)		Connector	—	Used to connect the UPS for the DF850.	
4-j-1		Controller (FC Interface Connector )	Port 0A/ Port 1A	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A/Port 1A side.
4-j-2				Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A/Port 1A side.
4-j-3				HALM	LED	Red	Indicates that the Host Connector is in trouble.
4-j-4	Link			LED	Blue/ Green	Blue : 8 Gbps Link status Green : 2 or 4 Gbps Link status.	
4-k-1	Port 0B/ Port 1B		Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0B/Port 1B side.	
4-k-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0B/Port 1B side.	
4-k-3			Link	LED	Blue/ Green	Blue : 8 Gbps Link status Green : 2 or 4 Gbps Link status.	
4-k-4			HALM	LED	Red	Indicates that the Host Connector is in trouble.	
4-l-1	Port 0C/ Port 1C		Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0C/Port 1C side.	
4-l-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0C/Port 1C side.	
4-l-3			HALM	LED	Red	Indicates that the Host Connector is in trouble.	
4-l-4			Link	LED	Blue/ Green	Blue : 8 Gbps Link status Green : 2 or 4 Gbps Link status.	
4-m-1	Port 0D/ Port 1D		Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0D/Port 1D side.	
4-m-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0D/Port 1D side.	
4-m-3			Link	LED	Blue/ Green	Blue : 8 Gbps Link status Green : 2 or 4 Gbps Link status.	
4-m-4			HALM	LED	Red	Indicates that the Host Connector is in trouble.	

No.	Section	Name		Classification	Color	Function
5-a-1	FC Host I/O Board	Port 0E/ Port 1E	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0E/Port 1E side.
5-a-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0E/Port 1E side.
5-a-3			HALM	LED	Red/ Blue/ Green Off	Red : Host Connector is abnormal. Blue : Link status is normal. (8Gbps) Green : Link status is normal. (2Gbps or 4Gbps) Off : Link down/not Ready.
5-b-1		Port 0F/ Port 1F	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0F/Port 1F side.
5-b-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0F/Port 1F side.
5-b-3			HALM	LED	Red/ Blue/ Green Off	Red : Host Connector is abnormal. Blue : Link status is normal. (8Gbps) Green : Link status is normal. (2Gbps or 4Gbps) Off : Link down/not Ready.
5-c-1		Port 0G/ Port 1G	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0G/Port 1G side.
5-c-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0G/Port 1G side.
5-c-3			HALM	LED	Red/ Blue/ Green Off	Red : Host Connector is abnormal. Blue : Link status is normal. (8Gbps) Green : Link status is normal. (2Gbps or 4Gbps) Off : Link down/not Ready.
5-d-1		Port 0H/ Port 1H	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0H/Port 1H side.
5-d-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0H/Port 1H side.
5-d-3			HALM	LED	Red/ Blue/ Green Off	Red : Host Connector is abnormal. Blue : Link status is normal. (8Gbps) Green : Link status is normal. (2Gbps or 4Gbps) Off : Link down/not Ready.
5-e		STATUS		LED	Green/ Red Off	Green : Power on Red : Abnormal Off : Power off
6-a	1G bps iSCSI Host I/O Board	Port 0E/ Port 1E	iSCSI	Connector	—	Connects the iSCSI cable (Port 0E/Port 1E side).
6-b			Active	LED	Yellow	Indicates that data is being transferred via a Port 0E/Port 1E side.
6-c			Link	LED	Green	Indicates that the link status of the Port 0E/Port 1E side is normal.
6-d		Port 0F/ Port 1F	iSCSI	Connector	—	Connects the iSCSI cable (Port 0F/Port 1F side).
6-e			Active	LED	Yellow	Indicates that data is being transferred via a Port 0F/Port 1F side.
6-f			Link	LED	Green	Indicates that the link status of the Port 0F/Port 1F side is normal.
6-g		STATUS		LED	Green/ Red Off	Green : Power on Red : Abnormal Off : Power off

No.	Section	Name		Classification	Color	Function
7-a-1	10G bps iSCSI Host I/O Board	Port 0E/ Port 1E	Tx	Connector	—	Connector on the signal output side to connect the 10G iSCSI interface cable in the Port 0E/Port 1E side.
7-a-2			Rx	Connector	—	Connector on the signal input side to connect the 10G iSCSI interface cable in the Port 0E/Port 1E side.
7-a-3			HSTS	LED	Red/ Blue	Red : Host Connector is abnormal. Blue : Link status is normal. Off : Link down/not Ready.
7-b-1		Port 0F/ Port 1F	Tx	Connector	—	Connector on the signal output side to connect the 10G iSCSI interface cable in the Port 0F/Port 1F side.
7-b-2			Rx	Connector	—	Connector on the signal input side to connect the 10G iSCSI interface cable in the Port 0F/Port 1F side.
7-b-3			HSTS	LED	Red/ Blue/ Off	Red : Host Connector is abnormal. Blue : Link status is normal. Off : Link down/not Ready.
7-c		STATUS		LED	Green/ Red	Green : Power on Red : Abnormal Off : Power off

(3) Indication positions and their functions of CBL/CBDL

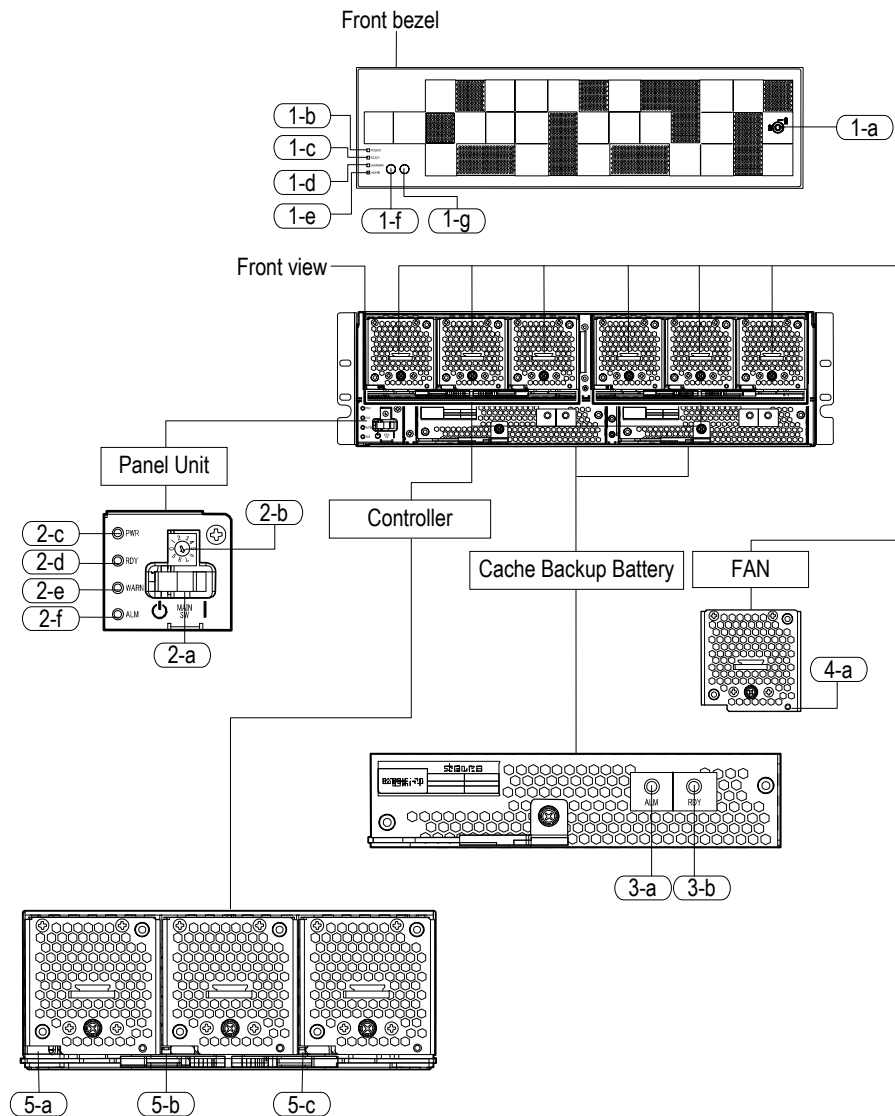


Figure 2.3.5 Indication Locations of Functional Components (Front View)

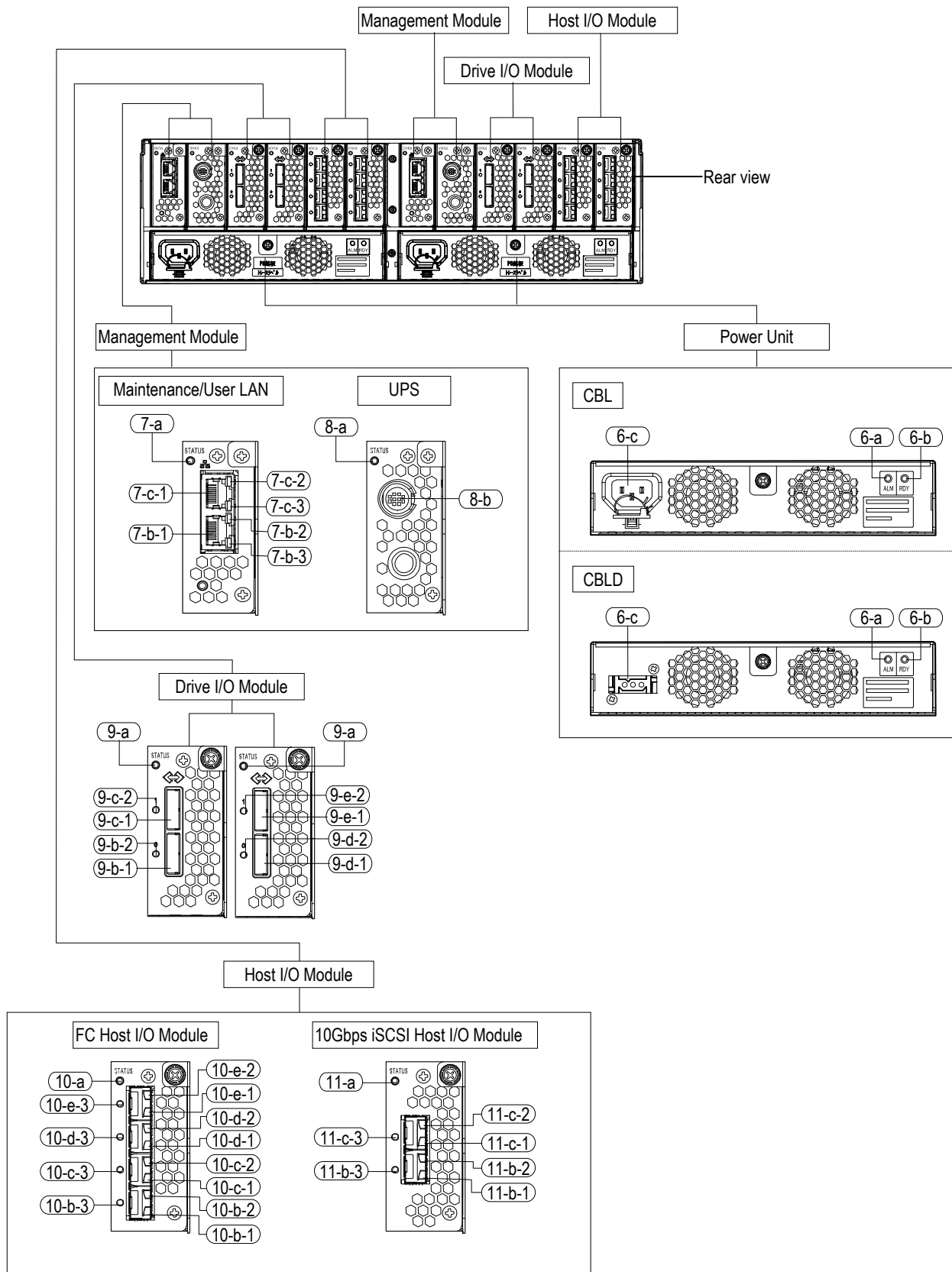



Figure 2.3.6 Indication Locations of Functional Components (Rear View)

Table 2.3.3 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green/ Orange	On in green Indicates that power-on is in progress after the main switch is pushed. Also continues to light up after the array become operable. On in orange Indicates that power cables of the Controller Box are connected and the power is supplied.
1-c		READY	LED	Green	On Indicates that the array can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC firmware and the backup controller firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC firmware is completed offline.
1-d		WARNING	LED	Orange	On Indicates that a failure, which allows the array to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which does not stop operation occurred in array (It must be detected with WEB).
1-e		ALARM	LED	Red	On Indicates that a failure, which does not allow the array to operate, occurred. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.
1-f		Main switch (OFF)	Switch	—	OFF : Presses off the power.
1-g		Main switch (ON)	Switch	—	ON : Presses on the power.
2-a	STATUS Panel	Main switch	Switch	—	Turns on/off the power. I : Power on  : Power off
2-b		Mode switch	Switch	—	Not used.
2-c		POWER	LED	Green/ Orange	On in green Indicates that power-on is in progress after the main switch is pushed. Also continues to light up after the array become operable. On in orange Indicates that power cables of the Controller Box are connected and the power is supplied.



No.	Section	Name	Classification	Color	Function
2-d	STATUS Panel	READY	LED	Green	On Indicates that the array can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC firmware and the backup controller firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC firmware is completed offline.
2-e		WARNING	LED	Orange	On Indicates that a failure, which allows the array to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which allows the array to operate, occurred. (It must be detected with WEB).
2-f		ALARM	LED	Red	On Indicates that a failure occurred which makes the array unable to operate. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.
3-a	Cache Backup Battery	ALM	LED	Red	Lights when the Cache Backup Battery has failures.
3-b		RDY	LED	Green	Shows the state of the battery. On : Battery is in the normal condition. Blinking : Charged up when start-up Off : Abnormal • The battery is not installed.
4-a	Fan Module	ALM	LED	Red	Shows the state of the Fan Module On : Abnormal Off : Normal
5-a	Controller	RST SW	Switch	—	Used to perform a Full Dump.
5-b		ALM	LED	Red/ Orange	Red: Indicates that a failure which makes in the Controller unable to operate occurred in it. Orange: Does not light up when the Controller is in the reset status. Or, it indicates that the Controller is being rebooted when the firmware is updated continuing the I/Os of both Controllers.

No.	Section	Name	Classification	Color	Function
5-c		C-PWR	LED	Green	<p>You can check if the Cache memory is being backed up by the indication status of this LED.</p> <p>It is valid when the power cables are connected to the Power Units.</p> <p>On : Indicates that the Controller is in the normal condition. Indicates that the cache is being backed up. (The power is supplied from the battery to the Cache memory.)</p> <p>Blinking</p> <p>High-speed blinking : Indicates that data on the Cache Memory is stored in the backup controller (flash memory) in case of electricity failure or power off process (including planned shutdown) is being executing.</p> <p>Low-speed blinking : Indicates that user data is left in the backup controller (flash memory) after turning off the main switch.</p> <p>Off : Indicates that the power cables are not connected to the Power Units or the Cache memory is not backed up with the main switch off although the power cables are connected.</p>
6-a	Power Unit	ALM	LED	Red	Lights when the Power Unit is in trouble.
6-b		RDY	LED	Green	<p>Shows the operation state of the Power Unit.</p> <p>On : Normal operation Off : Abnormal operation or out of operation</p>
6-c		Receptor (J1)	Connector	—	Connector on the array side to connect the power cable.
7-a	Management Module (For Maintenance/User LAN)	STATUS	LED	Green/ Red	<p>Green : Power on Red : Abnormal Off : Power off</p>
7-b-1		LAN0	Connector	—	Connects the LAN0 cable. (For maintenance)
7-b-2		ACT	LED	Yellow	Indicates that data is being transferred via a LAN 0.
7-b-3		LINK	LED	Green	Indicates that the link status of the LAN 0 is normal.
7-c-1		LAN1	Connector	—	Connects the LAN1 cable. (For User Management)
7-c-2		ACT	LED	Yellow	Indicates that data is being transferred via a LAN 1.
7-c-3		LINK	LED	Green	Indicates that the link status of the LAN 1 is normal.
8-a	Management Module (UPS)	STATUS	LED	Green	<p>Green : Power on Off : Power off</p>
8-b		Connector for connecting the UPS interlocking cable (UPS)	Connector	—	Used to connect the UPS for the DF850.
9-a	Drive I/O Module	STATUS	LED	Green/ Red	<p>Green : Power on Red : Abnormal Off : Power off</p>
9-b-1		PATH0	Connector	—	Connection connector for SAS(ENC) cable (PATH 0 side).
9-b-2		PATH0 (LINK/LOCATE)	LED	Blue/ Orange	<p>Blue : Link status. Orange : Additional location (locate) Off : Link down.</p>
9-c-1		PATH1	Connector	—	Connection connector for SAS(ENC) cable (PATH 1 side).
9-c-2		PATH1 (LINK/LOCATE)	LED	Blue/ Orange	<p>Blue : Link status. Orange : Additional location (locate) Off : Link down.</p>
9-d-1		PATH2	Connector	—	Connection connector for SAS(ENC) cable (PATH 2 side).
9-d-2		PATH2 (LINK/LOCATE)	LED	Blue/ Orange	<p>Blue : Link status. Orange : Additional location (locate) Off : Link down.</p>

No.	Section	Name		Classification	Color	Function
9-e-1	Drive I/O Module	PATH3		Connector	—	Connection connector for SAS(ENC) cable (PATH 3 side).
9-e-2		PATH3 (LINK/LOCATE)		LED	Blue/ Orange	Blue : Link status. Orange : Additional location (locate) Off : Link down.
10-a	FC Host I/O Module	STATUS		LED	Green/ Red	Green : Power on Red : Abnormal Off : Power off
10-b-1		Port 0A/ Port 1A/ Port 0E/ Port 1E	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A/Port 1A/Port 0E/Port 1E side.
10-b-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A/Port 1A/Port 0E/Port 1E side.
10-b-3			HALM	LED	Red/ Blue/ Green	Red : Host Connector is abnormal. Blue : Link status is normal. (8Gbps) Green : Link status is normal. (2Gbps or 4Gbps) Off : Link down/not Ready.
10-c-1		Port 0B/ Port 1B/ Port 0F/ Port 1F	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0B/Port 1B/Port 0F/Port 1F side.
10-c-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0B/Port 1B/Port 0F/Port 1F side.
10-c-3			HALM	LED	Red/ Blue/ Green	Red : Host Connector is abnormal. Blue : Link status is normal. (8Gbps) Green : Link status is normal. (2Gbps or 4Gbps) Off : Link down/not Ready.
10-d-1		Port 0C/ Port 1C/ Port 0G/ Port 1G	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0C/Port 1C/Port 0G/Port 1G side.
10-d-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0C/Port 1C/Port 0G/Port 1GG side.
10-d-3			HALM	LED	Red/ Blue/ Green	Red : Host Connector is abnormal. Blue : Link status is normal. (8Gbps) Green : Link status is normal. (2Gbps or 4Gbps) Off : Link down/not Ready.
10-e-1		Port 0D/ Port 1D/ Port 0H/ Port 1H	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0D/Port 1D/Port 0H/Port 1H side.
10-e-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0D/Port 1D/Port 0H/Port 1H side.
10-e-3			HALM	LED	Red/ Blue/ Green	Red : Host Connector is abnormal. Blue : Link status is normal. (8Gbps) Green : Link status is normal. (2Gbps or 4Gbps) Off : Link down/not Ready.
11-a	10G bps iSCSI Host I/O Module	STATUS		LED	Green/ Red	Green : Power on Red : Abnormal Off : Power off
11-b-1		Port 0A/ Port 1A/ Port 0E/ Port 1E	Tx	Connector	—	Connector on the signal output side to connect the 10G iSCSI interface cable in the Port 0A/Port 1A/Port 0E/Port 1E side.
11-b-2			Rx	Connector	—	Connector on the signal input side to connect the 10G iSCSI interface cable in the Port 0A/Port 1A/Port 0E/Port 1E side.
11-b-3			HSTS	LED	Red/ Blue/	Red : Host Connector is abnormal. Blue : Link status is normal. Off : Link down/not Ready.
11-c-1		Port 0B/ Port 1B/ Port 0F/ Port 1F	Tx	Connector	—	Connector on the signal output side to connect the 10G iSCSI interface cable in the Port 0B/Port 1B/Port 0F/Port 1F side.
11-c-2			Rx	Connector	—	Connector on the signal input side to connect the 10G iSCSI interface cable in the Port 0B/Port 1B/Port 0F/Port 1F side.

No.	Section	Name		Classification	Color	Function
11-c-3			HSTS	LED	Red/	
					Blue/	
					Off	

(4) Indication positions and their functions of DBL/DBLD/DBS/DBSD

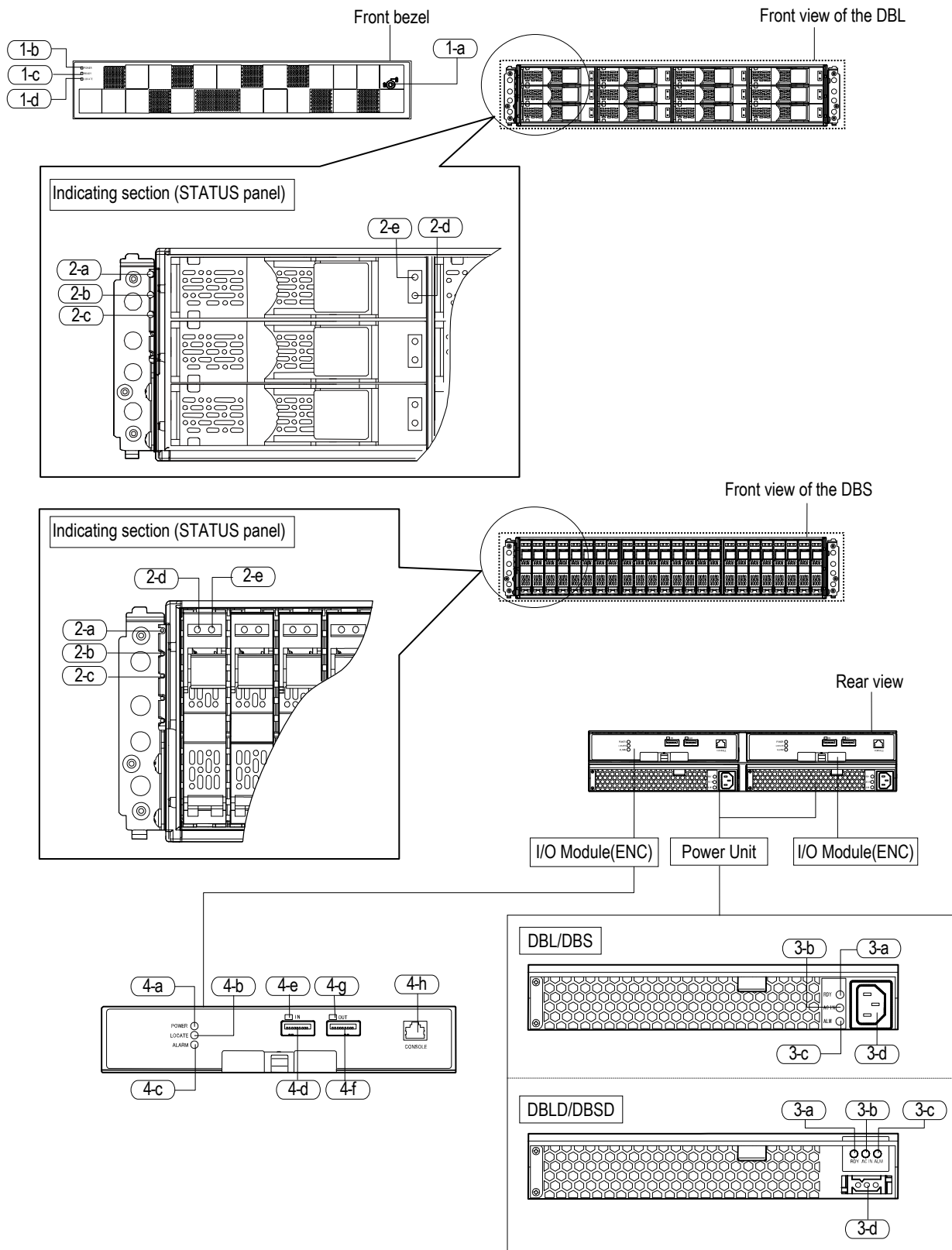
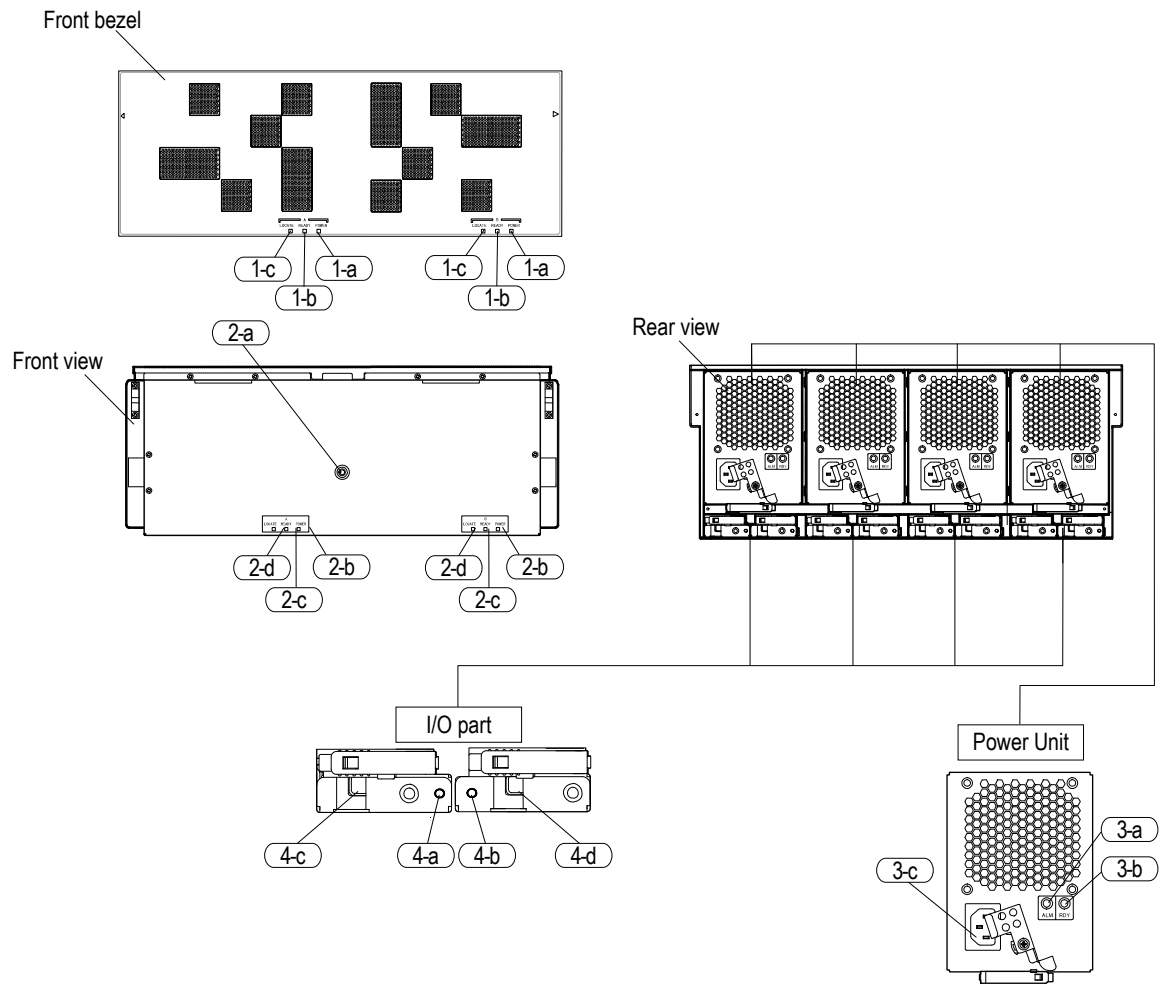


Figure 2.3.7 Indication Locations of Functional Components

Table 2.3.4 Functions of Indications

No.	Section	Name	Classification	Color	Function											
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.											
1-b		POWER	LED	Green	Indicates that the power supply is supplied to the array.											
1-c		READY	LED	Green	Indicates that the array can be operated.											
1-d		LOCATE	LED	Orange	<ul style="list-style-type: none"><li>Indicates that a failure which allows the array operation occurred.</li><li>When adding the chassis with the power turned on, it lights up to indicate the addition source (this is not an error).</li></ul>											
2-a	STATUS Panel	POWER	LED	Green	Indicates that the power is supplied to the array.											
2-b		READY	LED	Green	Indicates that the array can be operated.											
2-c		LOCATE	LED	Orange	<ul style="list-style-type: none"><li>Indicates that a failure which allows the ARRAY operation occurred.</li><li>When adding the chassis with the power turned on, it lights up to indicate the addition source (this is not an error).</li></ul>											
2-d		ALM	LED	Red	Indicates that a failure which makes the unable to operate occurred.											
2-e		ACT	LED	Green	<table><tr><td>No.</td><td>LED status</td><td>Meaning</td></tr><tr><td>1</td><td>Blinking</td><td>Shows that the Drive is being accessed.</td></tr><tr><td>2</td><td>On</td><td>Spin up state. (SAS)</td></tr><tr><td>3</td><td>Off</td><td>Spin down state. (SAS)</td></tr></table>	No.	LED status	Meaning	1	Blinking	Shows that the Drive is being accessed.	2	On	Spin up state. (SAS)	3	Off
No.	LED status	Meaning														
1	Blinking	Shows that the Drive is being accessed.														
2	On	Spin up state. (SAS)														
3	Off	Spin down state. (SAS)														
3-a	Power Unit	RDY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation											
3-b		AC_IN (DBL/DBS)	LED	Green	On : Indicates that the AC input is normal.											
		DC_IN (DBLD/DBSD)	LED	Green	On : Indicates that the DC input is normal.											
3-c		ALM	LED	Red	Lights when the Power Unit is in trouble.											
3-d		Receptor (J1)	Connector	—	Connector on the array side to connect the power cable.											
4-a	I/O Module(ENC)	POWER	LED	Green	Indicates that the power supply is supplied to I/O Module(ENC).											
4-b		LOCATE	LED	Orange	Indicate the Chassis location <ul style="list-style-type: none"><li>The CUDG error detected by the ENC firmware is indicated. On: CUDG error detected by ENC firmware (BOOT section) RAM error detected by ENC firmware ENC hard configuration error High-speed blinking: Once : SRAM error. Twice : CUDG error in ENC hard. Three times : Firmware error in flash memory.</li><li>When adding the chassis with the power turned on, it lights up to indicate the addition source (this is not an error).</li></ul>											
4-c		ALARM	LED	Red	Indicates error factors by means of lighting. Lighting Indicates that a failure, which makes the I/O Module(ENC) unable to operate, occurred.											
4-d		PATH0	(IN side)	Connector	—	Connection connector (for input) for SAS(ENC) cable (PATH0 side).										
4-e			(IN side)	LED	Green	Indicates that the IN side is linked up.										
4-f		PATH0	(OUT side)	Connector	—	Connection connector (for output) for SAS(ENC) cable (PATH 0 side).										
4-g			(OUT side)	LED	Green	Indicates that the OUT side is linked up.										
4-h			CONSOLE	Connector	—	Use prohibited because of the use for factory productivity.										

(5) Indication positions and their functions of DBX



**Figure 2.3.8** Indication Locations of Functional Components

Table 2.3.5 Functions of Indications

No.	Section	Name		Classification	Color	Function
1-a	Front Bezel	POWER		LED	Green	Indicates that the power supply is supplied to ARRAY.
1-b		READY		LED	Green	Indicates that the array can be operated.
1-c		LOCATE		LED	Orange	<ul style="list-style-type: none"><li>Indicates that a failure which allows the ARRAY operation occurred.</li><li>When adding the chassis with the power turned on, it lights up to indicate the addition source (this is not an error).</li></ul>
2-a	STATUS Panel	KEY		Key	—	Locks the front bezel.
2-b		POWER		LED	Green	Indicates that the power is supplied to the ARRAY.
2-c		READY		LED	Green	Indicates that the array can be operated.
2-d		LOCATE		LED	Orange	<ul style="list-style-type: none"><li>Indicates that a failure which allows the ARRAY operation occurred.</li><li>When adding the chassis with the power turned on, it lights up to indicate the addition source (this is not an error).</li></ul>
3-a	Power Unit	ALM		LED	Red	Lights when the Power Unit is in trouble.
3-b		RDY		LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation
3-c		Receptor (J1)		Connector	—	Connector on the array side to connect the power cable.
4-a	I/O Part	ALM		LED	Red/ Blue	Red: Indicates error factors by means of lighting. Lighting Indicates that a failure, which makes the I/O Card(ENC) unable to operate, occurred. Blue: Lighting Indicates that the SAS IN side is linked up.
4-b		LOC		LED	Orange /Blue	Orange: Indicate the Chassis location <ul style="list-style-type: none"><li>The CUDG error detected by the ENC firmware is indicated.</li></ul> On: CUDG error detected by ENC firmware (BOOT section) RAM error detected by ENC firmware ENC hard configuration error High-speed blinking: Once : SRAM error. Twice : CUDG error in ENC hard. Three times : Firmware error in flash memory. <ul style="list-style-type: none"><li>When adding the chassis with the power turned on, it lights up to indicate the addition source (this is not an error).</li></ul> Blue: Lighting Indicates that the SAS OUT side is linked up.
4-c		PATH0	(IN side)	Connector	—	Connection (for input) connector for SAS(ENC) cable (PATH0 side).
4-d		PATH0	(OUT side)	Connector	—	Connection connector (for output) for SAS(ENC) cable (PATH 0 side).



(6) Indication positions and their functions of DBW

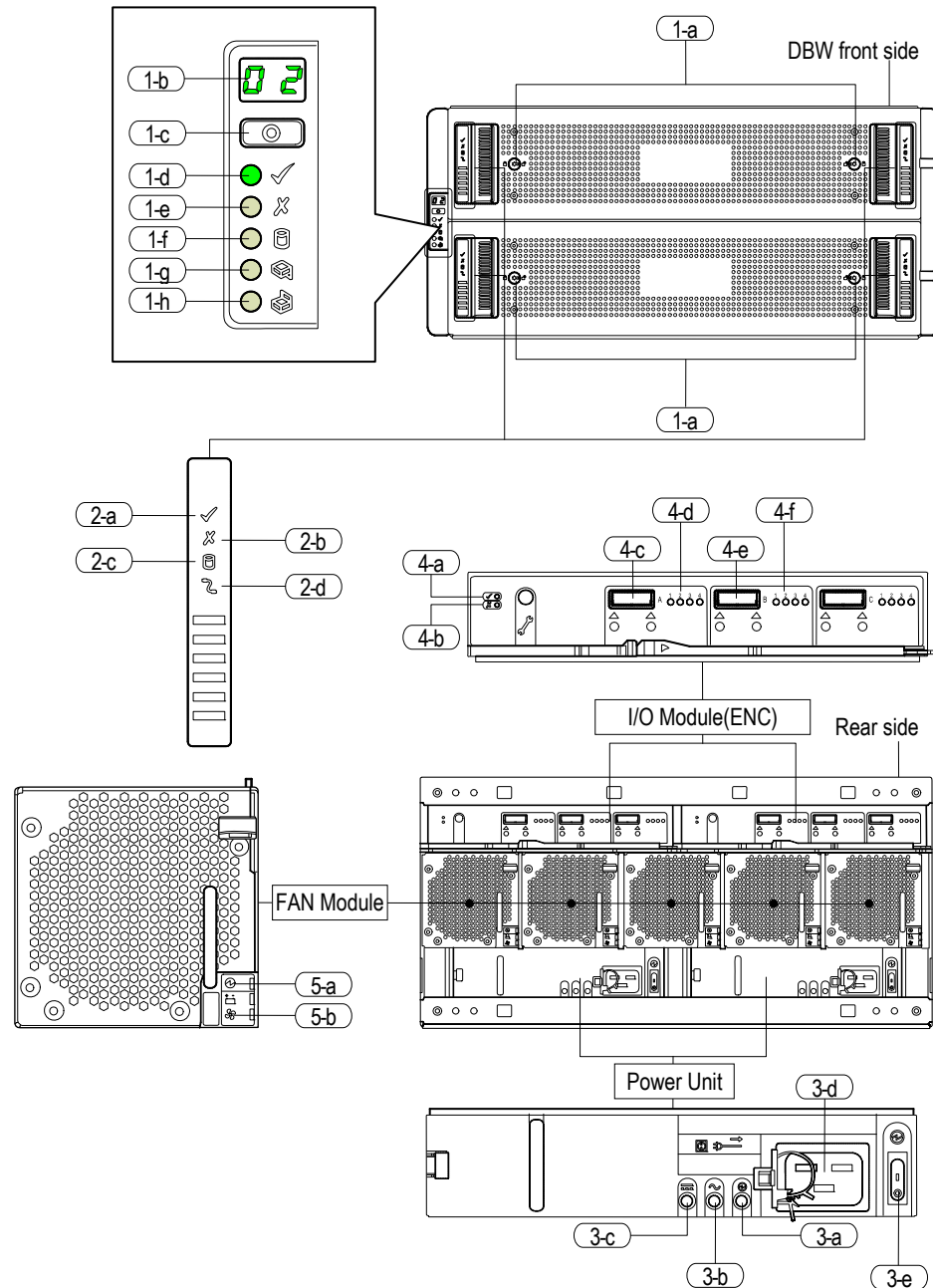


Figure 2.3.9 Indication Locations of Functional Components

Table 2.3.5 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Ops Panel LED	Key	Key	—	Locks a drawer.
1-b		Unit ID Display	LED	Green	Not used. (The number to be displayed may change by pressing the Input Switch (1-c). However, it does not affect the array operation.)
1-c		Input Switch	Switch	—	Not used.
1-d		POWER on/Standby	LED	Green/ Orange	Indicates the array status. Green : Normal operation Orange : Abnormal operation
1-e		Module WNG	LED	Orange	A module in the DBW is abnormal. When a module failure occurs in the DBW, the LED may not light up. In this case, perform the maintenance according to the Web message.
1-f		Logical ALM	LED	Orange	A logical fault was detected.
1-g		Drawer 1 ALM	LED	Orange	The top drawer is abnormal.
1-h		Drawer 2 ALM	LED	Orange	The bottom drawer is abnormal.
2-a	Drawer Indicator	Sideplane OK/Power Good	LED	Green	Indicates that the Sideplane operates normally.
2-b		Sideplane ALM	LED	Orange	On : Indicates that a drive failure occurs.
2-c		Logical ALM	LED	Orange	Blinking : Indicates that a logical failure occurs.
2-d		Cable ALM	LED	Orange	On : Indicates that the cable between the drawer and the I/O Module (ENC) is abnormal.
3-a	Power Unit	Power OK	LED	Green	Lights when the Power Switch is turned on. On : Normal operation Off : Abnormal operation or out of operation
3-b		AC ALM	LED	Orange	Lights when the Power Unit is abnormal.
3-c		PSU ALM	LED	Orange	Lights when the PSU is abnormal.
3-d		Receptor (J1)	Connector	—	Connector on the array side to connect the power cable.
3-e		Power Switch	Switch	—	Power supply switch
4-a	I/O Module(ENC)	RDY	LED	Green	Indicates the operational status of the I/O Module(ENC). On : Normal operation Off : Abnormal operation or out of operation
4-b		ALM	LED	Orange	A failure factor is indicated by lighting or blinking. Lighting Indicates that a failure, which disables the I/O Module(ENC) to operate, occurs. Blinking After a I/O Module(ENC) failure occurs, the logs are collected from the failed I/O Module(ENC). During the collection, it blinks. After the completion of the log collection, it changes from blinking to lighting.
4-c		PAT00	(IN side) Connector	—	Connection (for input) connector for SAS(ENC) cable (PAT00 side).
4-d			(IN side) LED	Green	Blinking : Indicates that the IN side is linked up.
4-e		PAT00	(OUT side) Connector	—	Connection connector (for output) for SAS(ENC) cable (PAT00 side).
4-f			(OUT side) LED	Green	Blinking : Indicates that the OUT side is linked up.

No.	Section	Name	Classification	Color	Function
5-a	Fan Module	Module OK	LED	Green	Indicates the operational status of the Fan Module. On : Normal operation Off : Abnormal or out of operation
5-b		Fan ALM	LED	Orange	Indicates the status of the Fan Module. On : Abnormal Off : Normal

(7) Indication positions and their functions of DBF

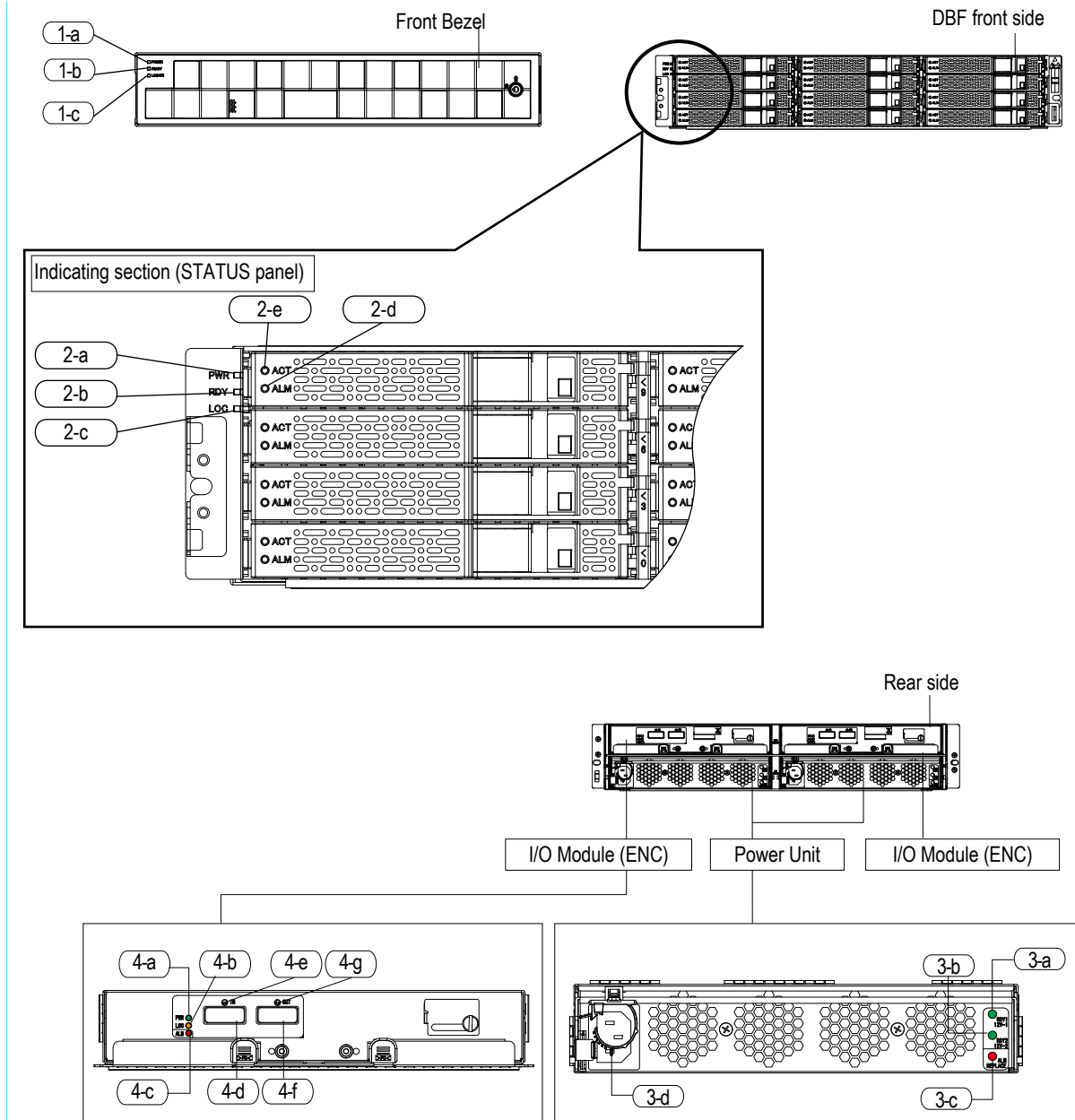


Figure 2.3.10 Indication Locations of Functional Components

Table 2.3.6 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	POWER	LED	Green	Indicates that the power supply is supplied to ARRAY.
1-b		READY	LED	Green	Indicates that the array can be operated.
1-c		LOCATE	LED	Orange	<ul style="list-style-type: none"> <li>Indicates that a failure which allows the ARRAY operation occurred.</li> <li>When adding the chassis with the power turned on, it lights up to indicate the addition source (this is not an error).</li> </ul>
2-a	STATUS Panel	POWER	LED	Green	Indicates that the power is supplied to the ARRAY.
2-b		READY	LED	Green	Indicates that the array can be operated.
2-c		LOCATE	LED	Orange	<ul style="list-style-type: none"> <li>Indicates that a failure which allows the ARRAY operation occurred.</li> <li>When adding the chassis with the power turned on, it lights up to indicate the addition source (this is not an error).</li> </ul>
2-d		ALM	LED	Red	Indicates that a failure which makes the unable to operate occurred.
2-e		ACT	LED	Green	Shows the operation state of the Drive. On : Normal operation
3-a	Power Unit	RDY1	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal or out of operation
3-b		RDY2	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal or out of operation
3-c		ALM	LED	Red	Lights when the Power Unit is in trouble.
3-d		Receptor (J1)	Connector	—	Connector on the array side to connect the power cable.
4-a	I/O Module (ENC)	POWER	LED	Green	Indicates that the power supply is supplied to I/O Module (ENC).
4-b		LOCATE	LED	Orange	Indicate the Chassis location. <ul style="list-style-type: none"> <li>The CUDG error detected by the ENC firmware is indicated. On :                CUDG error detected by ENC firmware (BOOT section)                RAM error detected by ENC firmware                ENC hard configuration error                High-speed blinking:                Once : SRAM error.                Twice : CUDG error in ENC hard.                Three times : Firmware error in flash memory.</li> <li>When adding the chassis with the power turned on, it lights up to indicate the addition source (this is not an error).</li> </ul>
4-c		ALARM	LED	Red	Indicates error factors by means of lighting. Lighting : Indicates that a failure, which makes the I/O Module(ENC) unable to operate, occurred.
4-d		PATH 0	(In side) Connector	—	Connection connector (for input) for SAS(ENC) cable (PATH0 side).
4-e			(In side) LED	Green	Indicates that the IN side is linked up.
4-f		PATH 0	(Out side) Connector	—	Connection connector (for output) for SAS(ENC) cable (PATH 0 side).
4-g			(Out side) LED	Green	Indicates that the OUT side is linked up.

## Chapter 3. Before Starting WEB Connection

### 3.1 Procedure to WEB Connection

#### (1) Points to be confirmed before connecting WEB

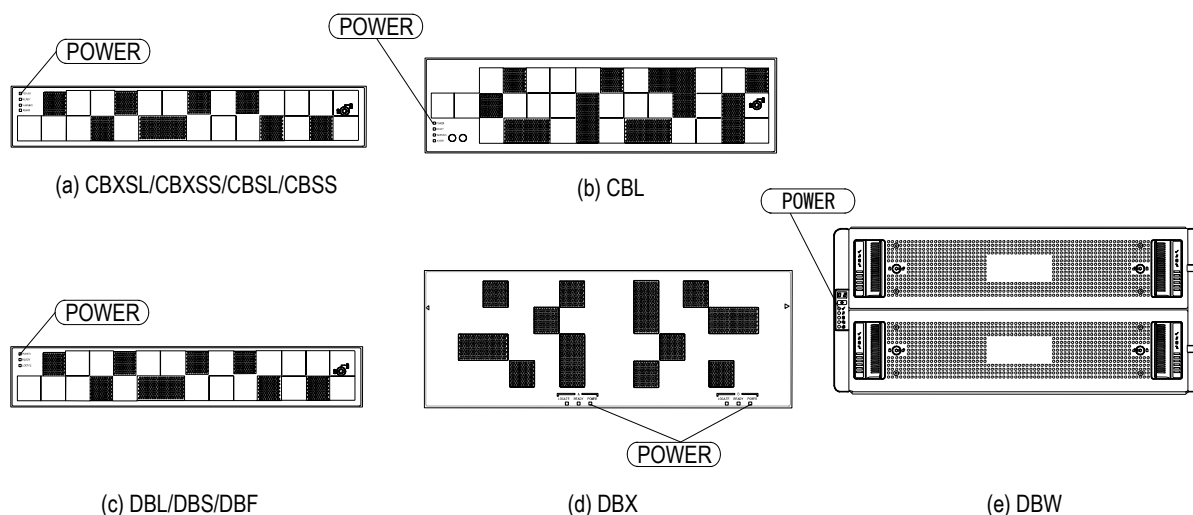
Unless the array is activated, the array cannot be connected to WEB.

Confirming the following LEDs before connecting to WEB.

- Confirming the power status (POWER LED).

Check if the POWER LED on the Front Bezel lights up.

If the Power LED does not light up, see [“Chapter 7. Trouble Analysis by LED Indication” \(TRBL 07-0000\)](#).



**Figure 3.1.1 Power LED Location**

#### (2) Preparation of maintenance terminal to be used

**Table 3.1.1 Decision and Preparation of Maintenance Terminal**

Item	Customer's environment	Maintenance terminal used	Preparation	Connection procedure reference destination
1	Using LAN connectors for maintenance of the array.	Connect the portable Maintenance PC via a LAN.	<ul style="list-style-type: none"> <li>• PC for maintenance<sup>(*)1</sup></li> <li>• LAN cross cable</li> </ul>	<a href="#">“3.1 (4) Procedure to connect portable maintenance PC to WEB” (TRBL 03-0010)</a> .

<sup>(\*)1</sup> : Refer to [“3.3 Note on WEB Connecting” \(TRBL 03-0090\)](#) for recommended PC.

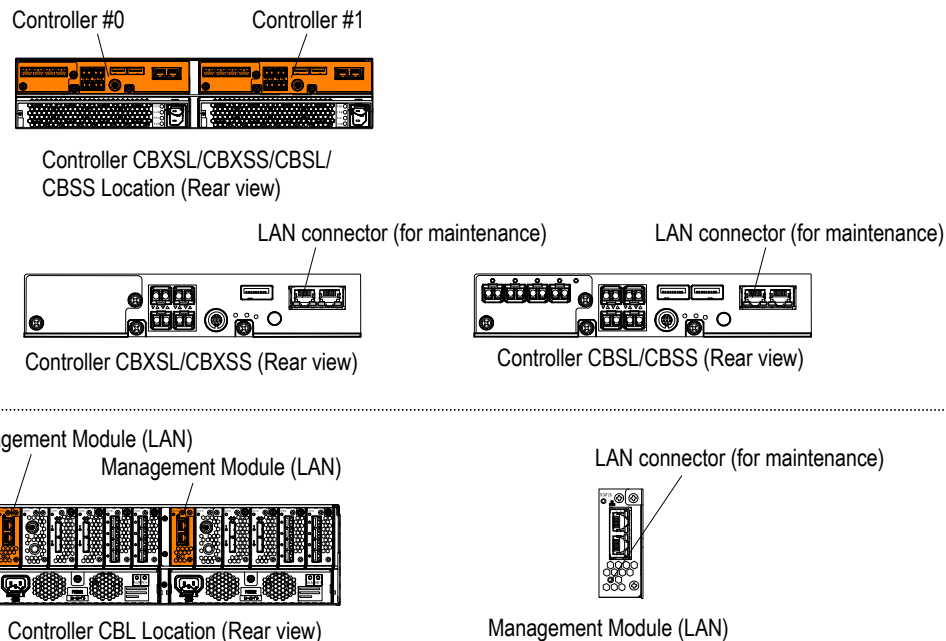
#### (3) Controller to be connection (Management Module in case of CBL)

If a system has a dual Controller, connect to either Controller (Management Module in case of CBL) to connect to the WEB. First, connect to Controller#0 (Management Module #0 in case of CBL).

If Controller #0 is blocked, however, information after the blockage of Controller #0 is referenced on only Controller #1 side. Accordingly, if Controller #0 is blocked, connect to Controller #1 (Management Module #1 in case of CBL).

## (4) Procedure to connect portable maintenance PC to WEB

- (a) Connect the maintenance LAN connector of Controller (Management Module in case of CBL) and the LAN connector of the service PC via the LAN cross cable.



**Figure 3.1.2 LAN Connector Position**

- (b) Start up the Maintenance PC.
- (c) Change the IP Address of the network parameter for the Maintenance Pc.
- (c-1) In case of the IPv4 environment
- (i) Make the setting of the IP Address to be set to the PC as Item 1 in [Table 3.1.2](#).
    - CTL0: 10.0.0.16 (Input example : <http://10.0.0.16/>)
  - (ii) If it is not connectable, by setting the values of Item 2 to Item 5 in [Table 3.1.2](#), specify the connectable value and perform the WEB connection.
    - According to the setting value of “Maintenance PC” of Items 2 to 5 on [Table 3.1.2](#), set the IP Address and the Subnet Mask of the Maintenance PC.
    - According to the “Array (LAN port for maintenance)” information of Items 2 to 5 on [Table 3.1.2](#), enter into “Address” of the WEB browser and connect with the array.
  - (iii) If not connected yet, refer to [“3.4 Procedure for Specifying Maintenance Port IP Address” \(TRBL 03-0120\)](#).

**Table 3.1.2 Operational Environment (IPv4)**

No.	Array (LAN port for maintenance)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 0.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL 0: 192.168.233.16 CTL 1: 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL 0: 172.23.211.16 CTL 1: 172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL 0: 10.197.181.16 CTL 1: 10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

(c-2) In case of the IPv6 environment

(i) Make the setting of the IP Address to be set to the PC as Item 1 in [Table 3.1.3](#).

- CTL0: fe80::16 (Input example : http://[fe80::16]/)

When connecting on WEB by the IPv6 address, put the address in brackets ([ ]).

(ii) If it is not connectable, set the value of Item 2 in [Table 3.1.3](#), and perform the WEB connection.

- According to the setting value of “Maintenance PC” of Item 2 on [Table 3.1.3](#), set the IP Address and the Subnet Mask of the Maintenance PC.
- According to the “Array (LAN port for maintenance)” information of Item 2 on [Table 3.1.3](#), enter into “Address” of the WEB browser and connect with the array.

(iii) If not connected yet, refer to [“3.4 Procedure for Specifying Maintenance Port IP Address” \(TRBL 03-0120\)](#).

**Table 3.1.3 Operational Environment (IPv6)**

No.	Array (LAN port for maintenance)		Maintenance PC	
	IP Address	Length of Subnet Prefix	IP Address	Subnet Mask
1	CTL0: fe80::16 CTL 1: fe80::17 (At the time of shipment)	64 (At the time of shipment)	Automatic	Automatic
2	CTL 0: fe80::f6 CTL 1: fe80::f7	64	Automatic	Automatic



- Manual change of the network parameter of the Maintenance port

When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.

Therefore, in the work other than the installation work of the array at shipment, the maintenance LAN Port for the WEB connection is set to any of Items 1 to 5 in [Table 3.1.2](#) in case of the IPv4 environment and set to either Item 1 or 2 in [Table 3.1.3](#) in case of the IPv6 environment.

NOTE : When the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.

Therefore, use a value other than the network address set to the maintenance port for the LAN device connected to the port for the user management via Gateway. Or change the IP address of the maintenance port to a value other than the network address of the LAN device connected via Gateway by Hitachi Storage Navigator Modular 2. (Refer to [System Parameter “7.1 Setting Maintenance LAN” \(SYSPR 07-0000\)](#).)

- (d) Make sure that negotiation of Maintenance PC is set to auto negotiation.

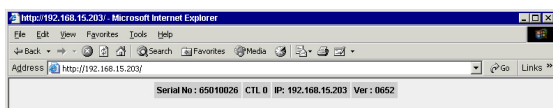
To check negotiation of Maintenance PC, refer to [“3.1 \(6\) Procedure for setting negotiation” \(TRBL 03-0060\)](#).

(5) Setting method of IP Address

- (a) For the IP address setting, follow the setting procedure for each OS.
- (b) Start up the Browser. Enter the URL window with the IP address of maintenance port to which the maintenance PC is connected. When WEB screen appears, the connection is complete.

NOTE : • When the Controller to be connected to WEB is blocked, the WEB connection may not be performed for ten minutes usually (for the maximum of 60 minutes) from the time when the Controller was blocked because the CTL alarm trace is being created.

- When entering IPv6 address in URL, you need to put the IP address in square brackets ([ ]) and specify it as URL (e.g. `http://[fe80::16]`). Not all OS and browsers can be connected to IPv6. Refer to [“3.3 Note on WEB Connecting” \(TRBL 03-0090\)](#) for the detail.



- (c) Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used. To make sure the setting, refer to the instruction manual of the browser to be used. If you cannot connect, the negotiation of Maintenance PC may be changed. Refer to [“6\) Procedure for setting negotiation” \(TRBL 03-0060\)](#), and set negotiation of Maintenance PC to auto negotiation.

This page is for editorial purpose only.

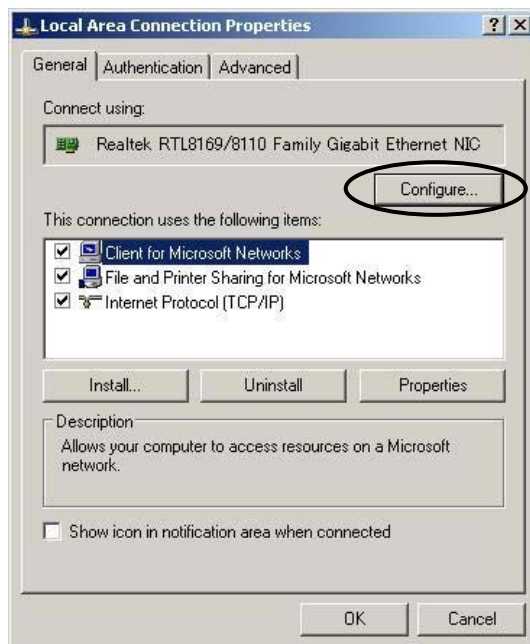
(6) Procedure for setting negotiation

The procedure for setting negotiation of the PC is shown below.

(a) Select [Start]-[Set]-[Control Panel]-[Local Area].

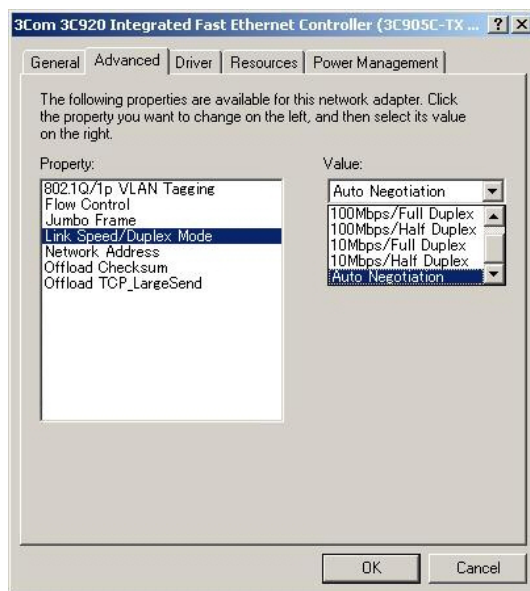
(b) If Windows XP, click the [Configure] button in [Connect using]

Windows XP



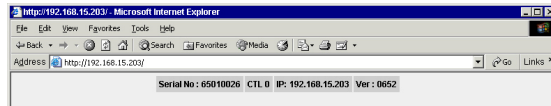
(c) Select [Advanced] tab, click Link speed and duplex mode in [Property].

And set [Value] to auto negotiation.



- (d) After reboot maintenance PC, start up the Browser. Enter the URL window with the IP address of maintenance port to which the maintenance PC is connected. When WEB screen appears, the connection is complete.

NOTE : When the Controller to be connected to WEB is blocked, the WEB connection may not be performed for ten minutes usually (for the maximum of 60 minutes) from the time when the Controller was blocked because the CTL alarm trace is being created.



- (e) Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used. To make sure the setting, refer to the instruction manual of the browser to be used. If you cannot connect, change the LAN-cross-cable.

### 3.2 When the WEB has Already been Connected

If the WEB has been connected, information displayed before may be still displayed. Before starting trouble analysis based on the WEB connection, [Refresh] the WEB window. The time when the WEB window is displayed is referenced as shown below. Window display differs depending on firmware revision.



‡1 : The time determined by the Device Controller RTC (Real Time Clock) is indicated here. (It is not consistent with the main PC clock.)

For setting the Device Controller RTC, refer to “2.2 Confirming and Setting RTC (Real Time Clock)” (TRBL 02-0010).

### 3.3 Note on WEB Connecting

#### (1) Note on WEB using

- (a) The LAN function may become temporarily unable to be connected when the update of the WEB display is repeated frequently. In this case, wait for a short time (at least one minute), then update again.
- (b) When a screen cannot be displayed on the Web browser, confirm whether the array fails. And then, execute ping command to confirm the network between maintenance PC and the array. When ping fails, confirm the network environment. When ping succeeds, restart the Web browser. When it cannot be connected again, restart the maintenance PC and browser.
- (c) When the firmware version is 0940/A or more and the packet filtering is enabled, the LAN function may not be connected temporarily. In such case, update it again after taking a while (one minute or more).
- (d) When the firmware version is 0940/A or more and the Port 80 Block is enabled, the WEB display is impossible. When collecting the trace in the normal mode, change the Port 80 Block to disabled. When using other functions in the normal mode, connection is possible by using https.
- (e) When connecting the WEB of DF850, use the following browsers.

**Table3.3.1 Recommended WEB Hardware**

No.	Item	Description	Remark
1	OS	Microsoft Windows XP, Vista, 7, 8, Server 2008, Server 2012	When connecting with IPv6, Windows 7, 8, Server 2008, Server 2012
2	Drive requirement	<ul style="list-style-type: none"> <li>• 60 M bytes, under ordinary maintenance work</li> <li>• 15.0 G bytes per one Controller, under Full Dump collection(*1)               <div style="margin-left: 20px;">                 { Storing temporary file of Browser : 7.5 G bytes }                  { Storing Full Dump: 7.5 G bytes }               </div> </li> </ul>	<ul style="list-style-type: none"> <li>• Data compression tool is required for Full Dump.</li> <li>• Refer to <a href="#">WEB "3.5.3 Collecting Full Dump" (WEB 03-0470)</a> for the capacity of Full Dump when it is uncompressed.</li> </ul>

\*1 : Full Dump collection may be requested by the Technical Support Center at the time of a tough failure.

Table3.3.2 Support Browser List

(○ : support × : not support)

No.	Platform	OS		Browser		Supported or not supported	Java Applet supported or not supported (*2) (*3)	Supported or not supported (IPv6)
		Type	Ver.	Type	Ver. (*1)			
1	PC	Windows	XP	Internet Explorer	6.0, 7.0, 8.0	○	○	×
			Vista	Internet Explorer	7.0, 8.0, 9.0	○	○	○
			7 (32bit/64bit)	Internet Explorer	8.0	○	○	○
					8.0 (64bit)	○	×	○
					9.0	○	○	○
					10.0	○	○(*4)	○
			8 (32bit/64bit)	Internet Explorer	10.0	○	○(*4)	○
			Server 2008	Internet Explorer	7.0, 8.0	○	○	○
					7.0 (64bit), 8.0 (64bit)	○	×	○
			Server 2012	Internet Explorer	10.0	○	○(*4)	○
		Red Hat Enterprise Linux	6.1	Mozilla Firefox	12.0	○	×	○

\*1 : Service Pack 1 is included.

\*2 : When installing the firmware, the Maintenance PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.

\*3 : Java Applet is used for the following cases.

- Firmware installation
- Host command trace download
- Online ENC firmware download
- Offline Drive Firmware download
- Online Drive Firmware download

\*4 : In 64-bit Windows 7, 64-bit Windows 8 and Windows Server 2012, the expansion protection mode of the internet option newly installed in Internet Explorer 10.0 should be disabled (default is disabled).

#### Notices on (restriction of) the support browser

- In Internet Explorer 10 (IE10), be sure to perform the following settings and enable the IE10 compatibility view function.
  - (1) Press the [Alt] key and display the menu bar.
  - (2) Click [Tools] of the menu bar.
  - (3) Click [Compatibility View Settings].
  - (4) Set the IP address of the target array (as URL) in the [Add this website] column.
  - (5) Click [Add].
  - (6) Check that the address entered at Step (4) is displayed in [Websites you've added to Compatibility View].
  - (7) Click [Close].
- In Windows 7, 8, Server 2008, Server 2012, the value that security strengthened is default, so that the WEB function does not operate as is.  
To solve this, change the browser setting as shown below.
- Register is as the reliable WEB site from [Tool] - [Internet Option] - [Security] - [Reliable Site] - [Site].



- When entering IPv6 address in URL in Windows 7, 8, Server 2008, Server 2012, Vista, you need to put the IP address in square brackets ([ ]) and specify it as URL. (e.g.: `http://[fe80::16]/`).
- The WEB function operates normally in other Windows because the security level is being [Medium]. However, set the following items in [Settings] of [Tools] - [Internet Options ...] - [Security] - [Custom Level ...] to [Enable].
  - Enable the [Active scripting] of the [Scripting].
  - Enable the [File download] of the [Downloads].
- There may be a case where a new line is started in a window depending on a setting of the browser. In such a case, make the character size smaller.
  - < Method of character size change >
  - In the case of IE
    - Select “Middle” or smaller size for the “Character Size” in the “Display”.
- When the window display of the WEB function is invalid (a part of the displayed items is not displayed or others) on Internet Explorer 10 (IE10), turn on the compatible display function of IE10. If you access the WEB page which requires the compatible display, the [Compatibility View] button is displayed on the side of the address bar in the WEB browser. If you click the button, the layout of the WEB page is displayed correctly.
- When using Internet Explorer 8.0, Internet Explorer 9.0 or Internet Explorer 10.0, a display in the WEB window may be slow down or Simple Trace collection may not be completed. Uncheck the checkbox of “Enable SmartScreen Filter” in the Internet Options Advanced Settings. If this problem is not solved, release the DNS server setting.
- When the security information window or security warning window is displayed at the time of starting Java Applet, check the displayed contents. Check the checkbox of “Trust the contents from this issuer at all times” or “Accept risks and execute this application” and click “Execute”.

(2) The procedure for connecting to another array having the same IP address via a LAN.

In the case of connecting and maintaining two or more controllers, whose IP addresses are the same, using a Maintenance PC and cross cable of a LAN, when one of the Controllers is connected to the PC, the PC memorizes the IP address and physical address of the Controller making a pair of them. Therefore, if another Controller is connected to the PC via a LAN, the IP address is not accepted because the physical address is different.

To make the above connection via a LAN, execute the following command from the MS-DOS prompt of Windows PC in order to delete the information on the IP address stored in the arp table in the PC.

```
arp -d IP address
```

- IP address : IP address stored in the arp table

Example : When deleting an IP address 10.0. 0.16 (default) from the table

```
arp -d 10.0.0.16
```

To make sure that the IP address stored in the arp table has been deleted, execute the following command from the MS-DOS prompt of Windows PC.

```
arp -a
```

The IP address has been deleted when a message, “No ARP Entries Found” or the one informing that the specified IP address could not be found is returned from the array.

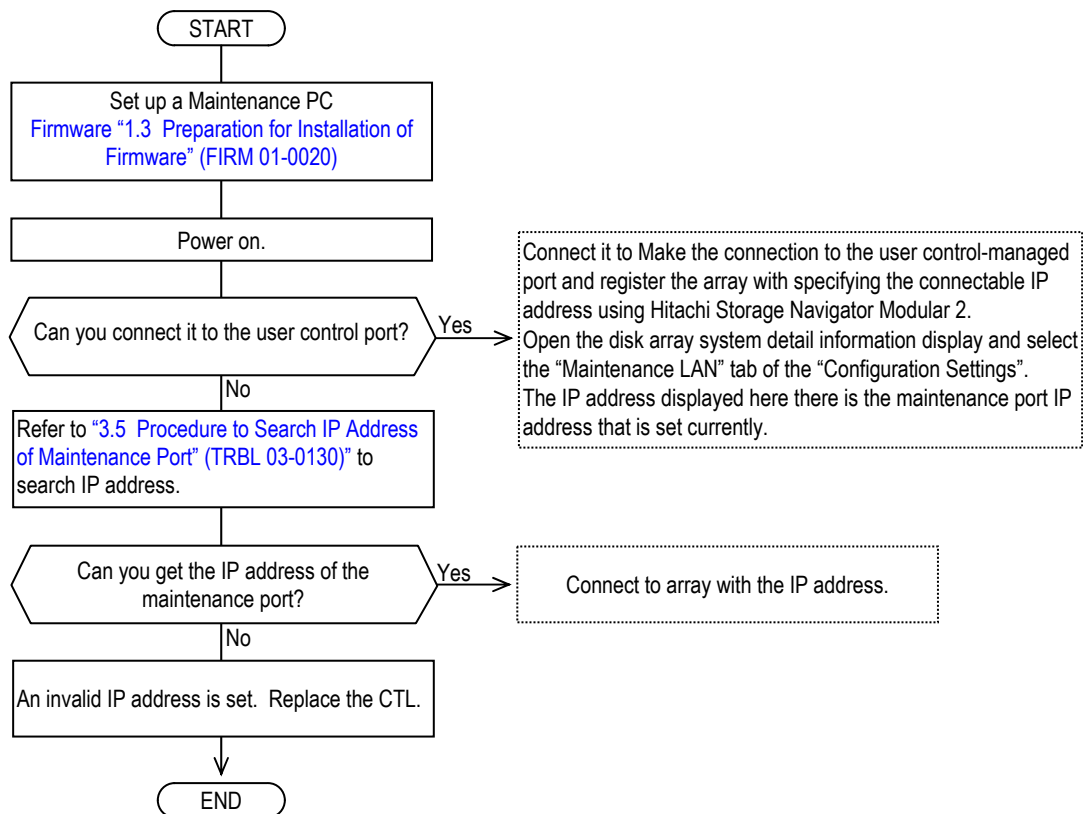
(3) User authentication when connecting the Web

A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].

### 3.4 Procedure for Specifying Maintenance Port IP Address

When the connection cannot be made even with the five patterns of the maintenance port IP addresses, the host address of the maintenance port IP address may have been changed. In this case, specify the maintenance port IP address as shown below.

NOTE : When the array can not communicate with Hitachi Storage Navigator Modular 2, (for example, the controller is blockaded, the array is in Maintenance Mode and so on), this procedure is can not work.



### 3.5 Procedure to Search IP Address of Maintenance Port

(1) Activating the Hitachi Storage Navigator Modular 2

- (a) Check if “SNM2 Server” of the service PC is started from “Services” of “Administrative Tools” of the Control Panel of the Windows.

If not started, make it “Start”.

- (b) Start the browser, and specify an address as follows.

<When connecting with http>

“http://xxx:23015/StorageNavigatorModular/”

<When connecting with https>

<https://xxx:23016/StorageNavigatorModular/>

xxx : IP address of the service PC.

NOTE : • The https is invalid in the status immediately after the installation. Refer to the [“Hitachi Storage Navigator Modular 2 Graphical User Interface \(GUI\) User’s Guide”](#) for the method to enable https.

- When the display of the menu, etc. on the window is broken, select the color palette from the property of the window, and make it other than True Color and 65536 or less.
- When entering IPv6 address in the address column of the WEB browser, you need to put xxx in square brackets ([ ]) and specify it as URL.  
(e.g.: “http://[xxx]:23015/StorageNavigatorModular/”)

- (c) Two windows, a title window and a login window, are displayed automatically.

When the user is registered in Hitachi Storage navigator Modular 2, enter the registered contents in the user ID and the password, and click the login button.

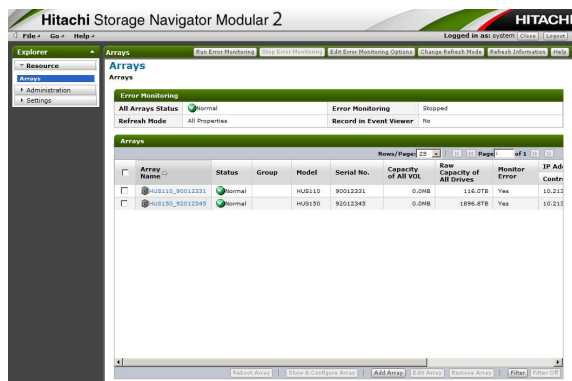
NOTE : • When Hitachi Storage Navigator Modular 2 was newly installed, enter the temporarily registered user ID “system” and password “manager”.

- If the login window is not displayed automatically, the popup may be blocked. Cancel the popup block.

Usually, “Popup is blocked” is displayed on the top of the browser. Click this display and select “Popup in this site is always allowed”.



- (d) The Hitachi Storage Navigator Modular 2 is activated in the Normal Mode and the main window is displayed<sup>(†1)</sup>.



You can execute the display of the Hitachi Storage Navigator Modular 2 Operation Mode and state of the failure monitoring and the following functions in the main window.

For the operation of each function, refer to the page explaining each function.

- Registration of the disk array system (registration, deletion, change, and properties display)
- Execution of the failure monitoring and setting of the failure monitoring option
- Change of the Operation Mode
- Display of the version

<sup>†1</sup> : The mode change cannot be done at the time of the initial activation of the Hitachi Storage Navigator Modular 2.  
A registration of a password validates the mode change.

## (2) Changing the Maintenance Mode

Hitachi Storage Navigator Modular 2 has two Active Modes, that is, the Normal Mode, and Maintenance Mode. In the Normal Mode, the program displays the configuration and statuses of the disk array. In the Maintenance Mode, it can set the configuration of the disk array in addition to the function in the Normal Mode.

## (a) Changing the Normal Mode to the Maintenance Mode

Change the Operation Mode from the Normal Mode to the Maintenance Mode.

## (i) Check that the “mode” file exists in the following directory.

If it exists, go to Procedure (iv).

\HiCommand\StorageNavigatorModular\conf

## (ii) If there is no mode file, create a mode file (without extension) and write the following letters in one line. However, do not insert line feeds.

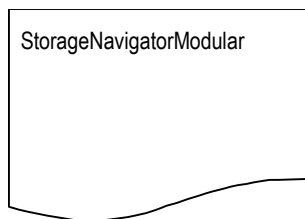


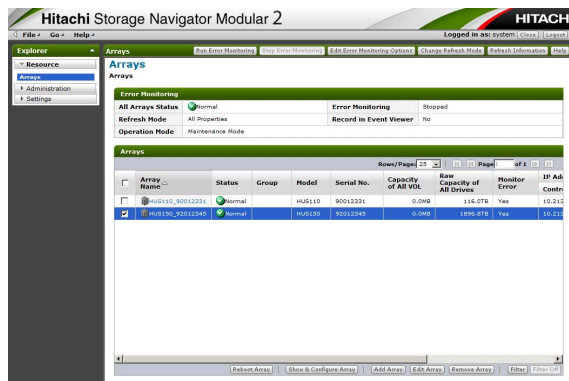
Figure 3.5.1 Mode File

## (iii) Store the created mode file in the following place.

\HiCommand\StorageNavigatorModular\conf

(iv) Put a checkmark in the array to operate on the main window, and press the [Ctrl] key, [Shift] key and the [E] key at the same time.<sup>(#1)</sup>

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

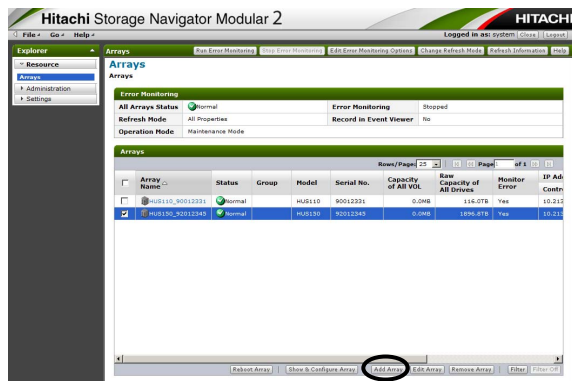


#1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

## (3) Searching for IP address of the disk array system

Search for IP address of the disk array system to be operated in order to operate it from the Hitachi Storage Navigator Modular 2.

## (a) Click the [Add Array] in the main window.



## (b) [HSNM2 \_ Add Array Wizard] is displayed. Click the [Next] button.

## (c) When connecting with IPv4, check the [Scope Search] radio button, check the [Scope of IPv4 Address], and enter the scope of the IP address to search. Then, uncheck the [Scope of IPv6 Address] checkbox.

In the textbox of [From] and [To], input following combination in #1 in [Table 3.5.1](#).

[From] : Input a start IP address of the search range

[To] : Input a end IP address (only host address) of the search range

**Table 3.5.1 Combination of Input to Search IP Address (IPv4)**

No.	From				To
1	10	0	0	16	247
2	192	168	0	16	247
3	192	168	233	16	247
4	172	23	211	16	247
5	10	197	181	16	247

When connecting with IPv6, check the [Scope Search] radio button and check the [Scope of IPv6 Address] checkbox. Then, uncheck the [Scope of IPv4 Address] checkbox.

**HSNM2 - Add Array Wizard**

1. Introduction | 2. Search Array | 3. Add Array | 4. Finish

Enter the information for array searching.

\* Search Method:

☐ IP Address or Array Name: Controller 0:  Controller 1:   
 Enter the IP Address or array name. Array name can't be more than 255 characters.

☒ Range of IP Addresses: ☐ Range of IPv4 Address: From:  To:   
☒ Search for IPv6 Addresses automatically

\* Using Ports:

☒ Non-secure Port  
☐ Secure Port  
☐ Non-secure and Secure Ports(Secure port is searched at first.)

\* Required field

< Back | Next > | Cancel | Help

(d) Press [Next], and the searching is start.

(e) The result of searching is displayed in “Search Results”.

If IP address is not displayed, retry searching with another combination in [Table 3.5.1](#). (When you retry, change network setting of maintenance PC.)

When IP address is displayed

**HSNM2 - Add Array Wizard**

1. Introduction | 2. Search Array | 3. Add Array | 4. Finish

All the detected arrays are added to the navigator. To exclude specific arrays, de-select them from the list.

Arrays to be added:

Search Result

Array Name	Model	Controller 0	Controller 1	Serial No.	Communication type
<input checked="" type="checkbox"/> HUS150_92012345	HUS150	10.113.47.30	N/A	92012345	Non-secure

\* Required field

< Back | Next > | Cancel | Help

When IP address is not displayed

**HSNM2 - Add Array Wizard**

1. Introduction | 2. Search Array | 3. Add Array | 4. Finish

All the detected arrays are added to the navigator. To exclude specific arrays, de-select them from the list.

Arrays to be added:

Search Result

Array Name	Model	Controller 0	Controller 1	Serial No.	Communication type
No Object					

\* Required field

< Back | Next > | Cancel | Help

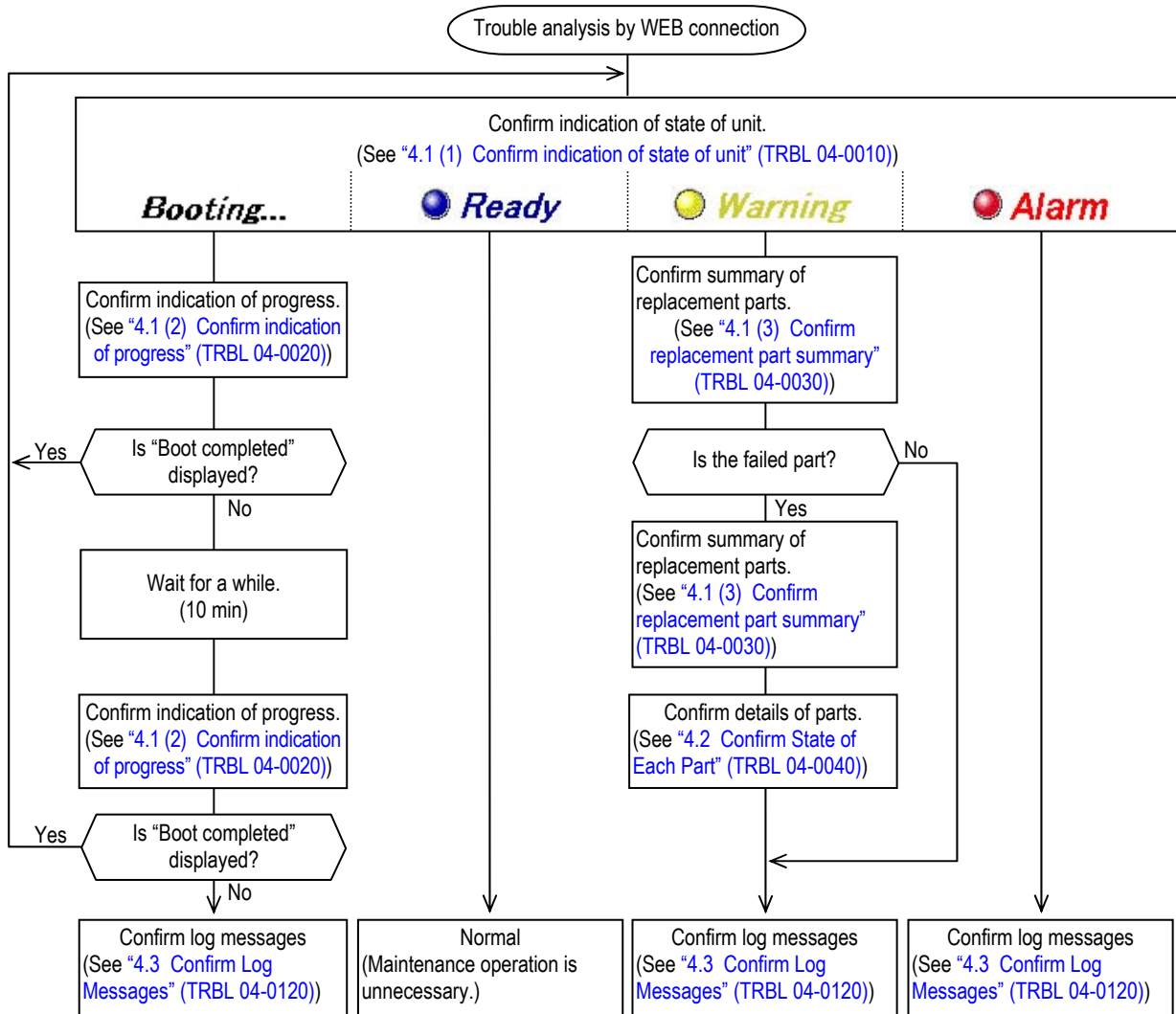


## Chapter 4. Trouble Analysis by WEB Connection

Trouble analysis by WEB connection to locate a failed part in the unit and how to repair that trouble are shown below.

The flow of the trouble analysis by WEB connection is as follows.

Determine the failed part following the procedure below.



**NOTE :** When the log messages are checked while the WARNING LED (orange) on the front of the Controller Box is blinking at low speed, the WARNING LED (orange) goes out if the array is not in the Warning status. If the array is in the Warning status, the WARNING LED (orange) lights up.

While this WARNING LED (orange) is blinking at high speed, the update of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. The WARNING LED (orange) on the front of the Controller Box goes off in the maximum of 30 to 85 minutes, and the READY LED (green) lights up.

4.1 Confirm State of Unit

Check the failed part of the unit on the main window in the normal mode of the WEB.  
For the replacement of the parts and recovery method, see the log messages. (Refer to “4.3 Confirm Log Messages” (TRBL 04-0120).)

(1) Confirm indication of state of unit

The state of the unit can be confirmed in the following window.

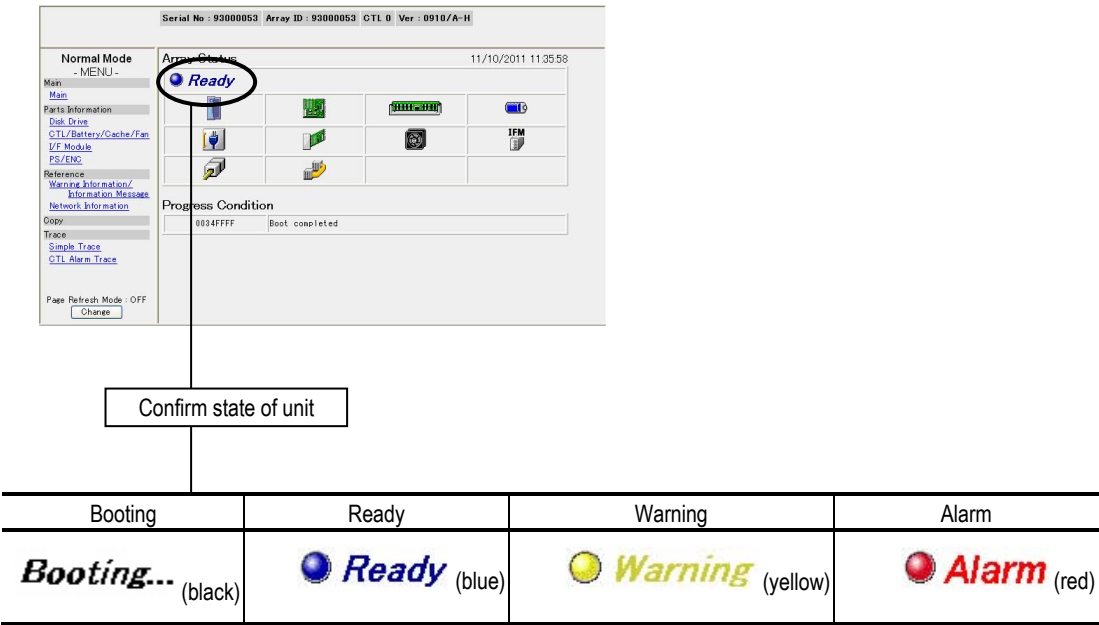
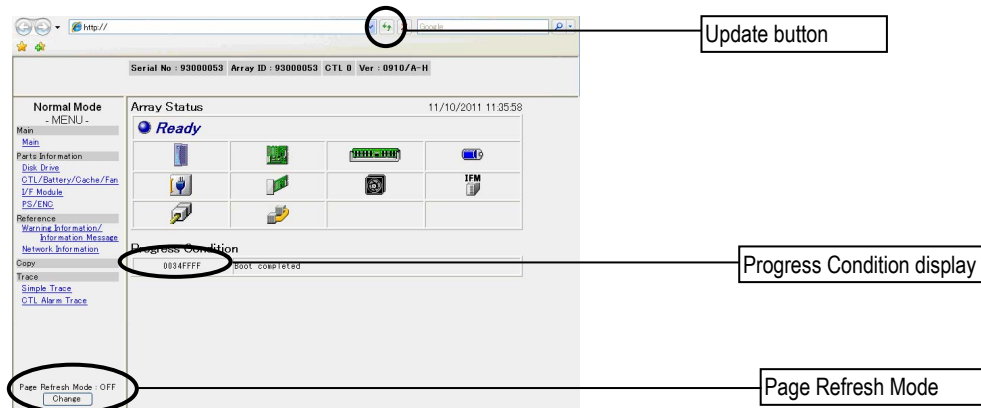


Figure 4.1.1 Main Window in the Normal Mode

## (2) Confirm indication of progress

If “Booting...” is indicated in the window of (1) (the Controller is being started up), the progress of start-up operation can be confirmed according to the following procedure.



### (a) Turn on the page refresh mode (Click the [Change] button).

The window is updated automatically at the interval of 5 seconds. (If the [ON] button of the page refresh mode is indicated, the above operation is not necessary.)

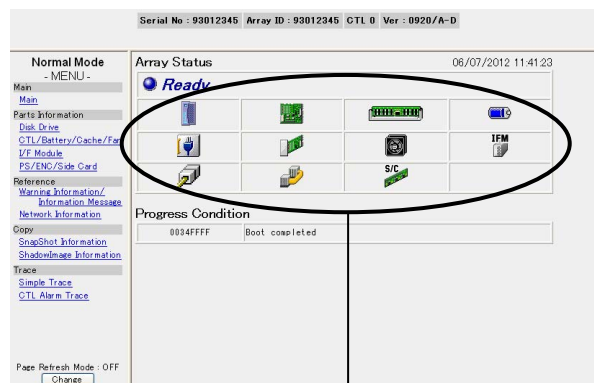
If the page refresh mode is not indicated in the main window, press the update button of the browser to update the window.

### (b) See the indication of progress of the window.






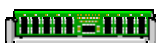






If the start-up operation is completed, “Boot completed” is indicated in this part.

## (3) Confirm replacement part summary

The state of each replacement parts can be confirmed with the replacement part summary.



Summary of exchange parts status

Cache Backup Battery	Power Unit	Fan Module	Drive	Controller
				
Cache Memory	I/F Module	I/O Module(ENC) or I/O Card(ENC)	Host I/O Board	Host Connector
				
Remote Path	Side Card			
				

If any part fails, its summary becomes red.

If the red part summary is clicked, the state confirmation window of the part appears and the position of the failed part is confirmed more in detail. (Refer to “4.2 Confirm State of Each Part” (TRBL 04-0040).)

Also, when the menu frame “Warning Information” is clicked, status of each component is displayed (Refer to “4.2 Confirm State of Each Part” (TRBL 04-0040).) and the status of each component can be checked.

## 4.2 Confirm State of Each Part

When checking the status of a component through an image, a clicking on each component of the “Summary of replacement component statuses” in the main window changes the window to that shown in Item (1) below and a detailed component status is displayed.

In this case, the window is changed in the state in which the selected (clicked) component is positioned at the top of the window. Also, a clicking on the “Parts Information” menu in the main window changes the window.

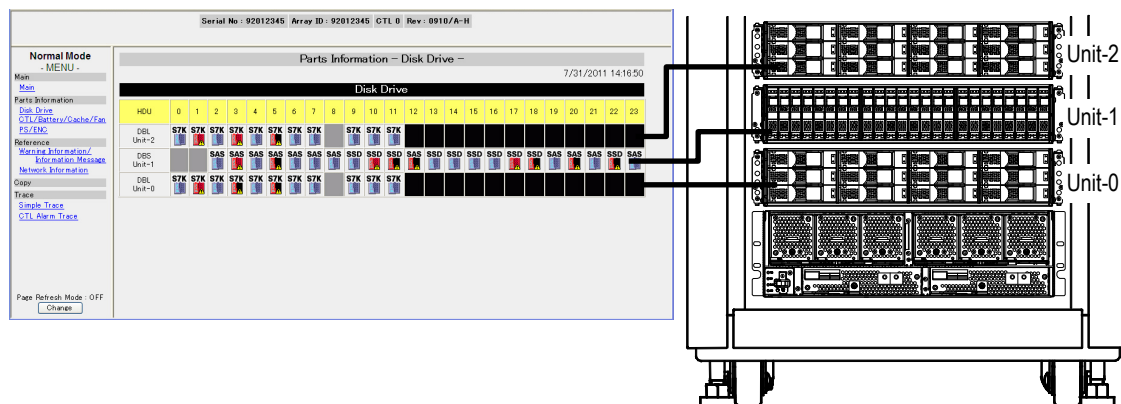
When checking the status of a component through a message, a clicking on the “Warning Information” of the menu frame in the main window changes the window to that shown in Item “(2) [Procedure of the status checking by messages](#)” (TRBL 04-0110) and displays a detailed component status as a message. In this case, detailed status of each component can be checked. For the replacement for maintenance or recovery procedure, refer to a log message (Refer to “4.3 [Confirm Log Messages](#)” (TRBL 04-0120).) and perform a recovery action following the procedure given by the each log message.

## (1) Checking the status through an image










The display screen of exchange part status displays the status of the Drive, Controller, Cache Memory, Fan Module, Cache Backup Battery, Power Unit, I/O Module(ENC) or I/O Card(ENC), and Side Card that are implemented. Furthermore, this is not displayed, if it is not implemented.

Also, the exchange part of abnormal status displays a red image. The Parts Information screen is shown below.

## (a) Disk Drive



## • Drive

Image			Status
SAS	SAS 7.2K	FMD	
 Blue	 Blue	 Blue	Normal
 Red	 Red	 Red	Fault has occurred to the Drive
 Red and Black	 Red and Black	 Red and Black	Drive port that the fault occurred is not implementing the Drive
No display			Drive is not implemented (Except for the status where the Drive that the fault occurred was drawn out), or although a failure occurs in the Drive, the Drive type cannot be determined.





























































































DBX is treated as two units, each of which contains 24 Drives.

Seen from the front bezel side, the left side unit is called Unit A, and right side unit is called Unit B.

The label marked Unit A or Unit B is attached near the LED on the front bezel.

The unit number is assigned the running number of the DBL/DBS/DBF/DBW, and the Unit A and Unit B of the DBX. (The unit number of Unit B is a number adding 1 to the unit number of Unit A.)

DBX (x-A)<sup>(†1)</sup> or DBX (x-B)<sup>(†1)</sup> to be displayed indicates that the unit is Unit A or Unit B of the DBX. When the DBXs are mounted, the status shown below is displayed.

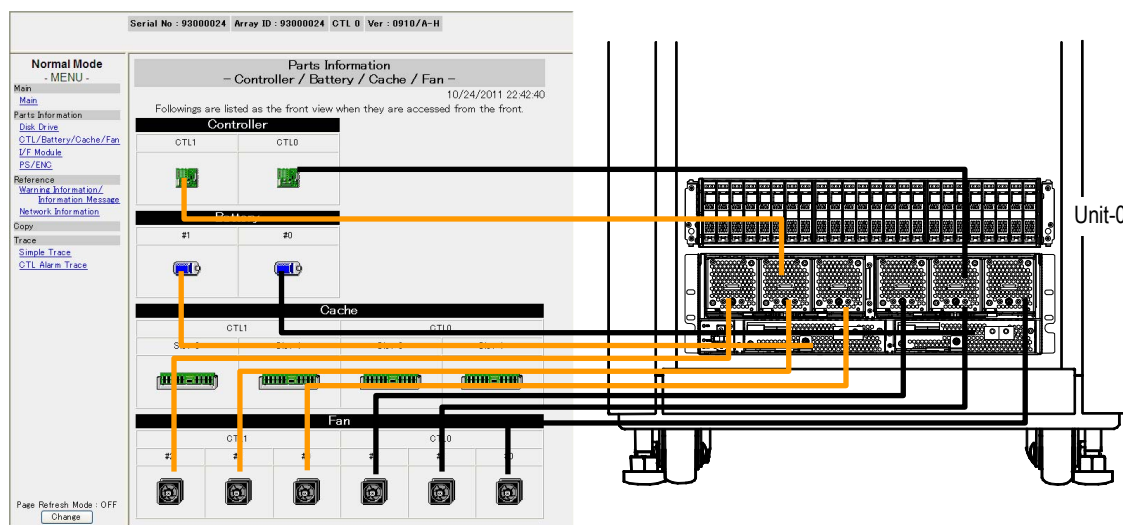
Disk Drive																								
HDU	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DBX(1-B) Unit-3																								
DBX(1-A) Unit-2																								
DBX(0-B) Unit-1																								
DBX(0-A) Unit-0																								

When the DBW is mounted, the status shown below is displayed.




Disk Drive																							
Unit	HDU #																						
DBW Unit-0	70	71	72	73	74	75	76	77	78	79	80	81	82	83	-	-	-	-	-	-	-	-	-
	56	57	58	59	60	61	62	63	64	65	66	67	68	69	-	-	-	-	-	-	-	-	-
	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	-	-	-	-	-	-	-	-	-
	42	43	44	45	46	47	48	49	50	51	52	53	54	55	-	-	-	-	-	-	-	-	-
	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	-	-	-	-	-	-	-	-	-
	28	29	30	31	32	33	34	35	36	37	38	39	40	41	-	-	-	-	-	-	-	-	-
	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	-	-	-	-	-	-	-	-	-
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	-	-	-	-	-	-	-	-	-
	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	S7K	-	-	-	-	-	-	-	-	-
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	-	-	-	-	-	-	-	-	-

†1 : x (integer) is the running number of the DBX. The x is the same number in the Unit A and Unit B in pairs which compose the DBX.





## (b) Controller/Battery/Cache/Fan(In the case of CBL)



## • Controller

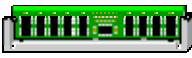

Image	Status
 Green	Normal
 Red	Shutdown of the Controller (Status where it is not implemented with the setting of the dual system configuration is included)
 Yellow	Controller pseudo blockade (The controller concerned becomes inaccessible from the host and the management program because the controller operation stops.)
No display	Even the fault has not occurred without being implemented with the setting of single system configuration

## • Cache Backup Battery



Image	Status
 Blue	• Normal (Cache Backup Battery capacity: 100%) The numeric field on the lower part shows the charged capacity in “%”
 Blue	• Recharging Cache Backup Battery (Cache Backup Battery capacity: from 50% to 99%) The numeric field on the lower part shows the charged capacity in “%”
 Blue	• Not enough Cache Backup Battery capacity. (Cache Backup Battery capacity: from 0% to 49%) The numeric field on the lower part shows the charged capacity in “%” When the capacity can't be collected because of an error, it shows “-”
 Red	• Cache Backup Battery error The numeric field on the lower part shows “-”








• Cache Memory

Image	Status
 Green	Normal
 Red	Fault (Status where is not implemented and extracted the fault Cache Memory is included)
No display	It is not implemented and there is not a fault

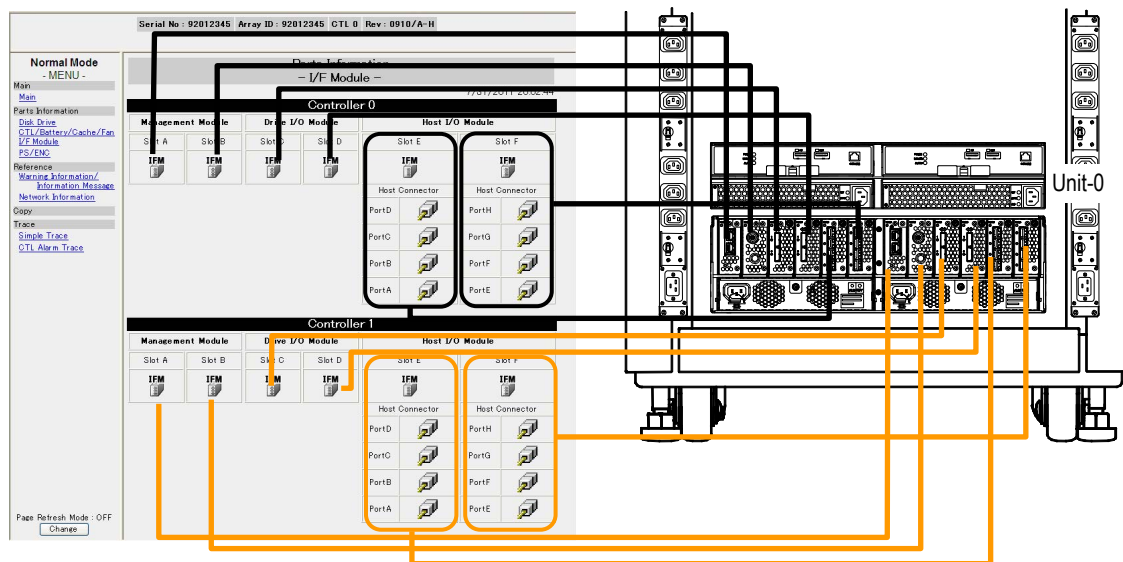
• Fan Module

Image	Status
 Gray	Normal
 Red	Fault



When the DBW is mounted, the status shown below is displayed.

Fan in Drive Box				
DBW Unit-0				
#0	#1	#2	#3	#4
				



## (c) I/F Module(In the case of CBL)



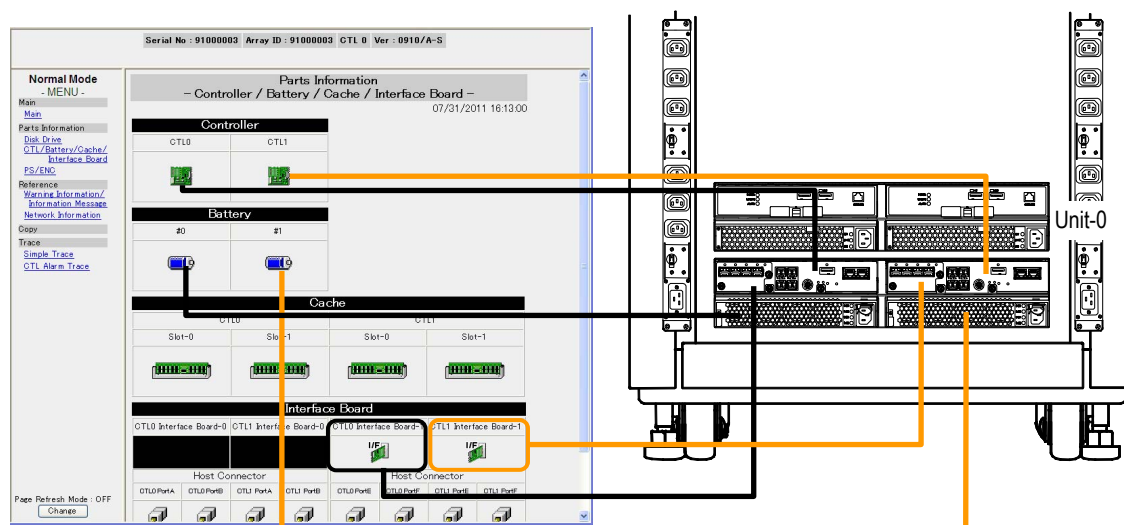
## • Management Module/Drive I/O Module/ Host I/O Module

Image	Status
 IFM Gray	Normal
 IFM Red	Fault

## • Host Connector

Image	Status
 Host Connector Gray	Normal
 Host Connector Red	Fault

## (d) Controller/Battery/Cache/Interface Board(CBSS/CBSL/CBXSS/CBXSL)



## • Controller

Image	Status
Green	Normal
Red	Shutdown of the Controller (Status where it is not implemented with the setting of the dual system configuration is included)
Yellow	Controller pseudo blockade (The controller concerned becomes inaccessible from the host and the management program because the controller operation stops.)
No display	Even the fault has not occurred without being implemented with the setting of single system configuration



## • Cache Backup Battery

Image	Status
Blue	• Normal (Cache Backup Battery capacity: 100%) The numeric field on the lower part shows the charged capacity in “%”
Blue	• Recharging Cache Backup Battery (Cache Backup Battery capacity: from 50% to 99%) The numeric field on the lower part shows the charged capacity in “%”
Blue	• Not enough Cache Backup Battery capacity. (Cache Backup Battery capacity: from 0% to 49%) The numeric field on the lower part shows the charged capacity in “%” When the capacity can't be collected because of an error, it shows “- %”
Red	• Cache Backup Battery error The numeric field on the lower part shows “- %”



## • Cache Memory

Image	Status
Green	Normal
Red	Fault (Status where is not implemented and extracted the fault Cache Memory is included)
No display	It is not implemented and there is not a fault

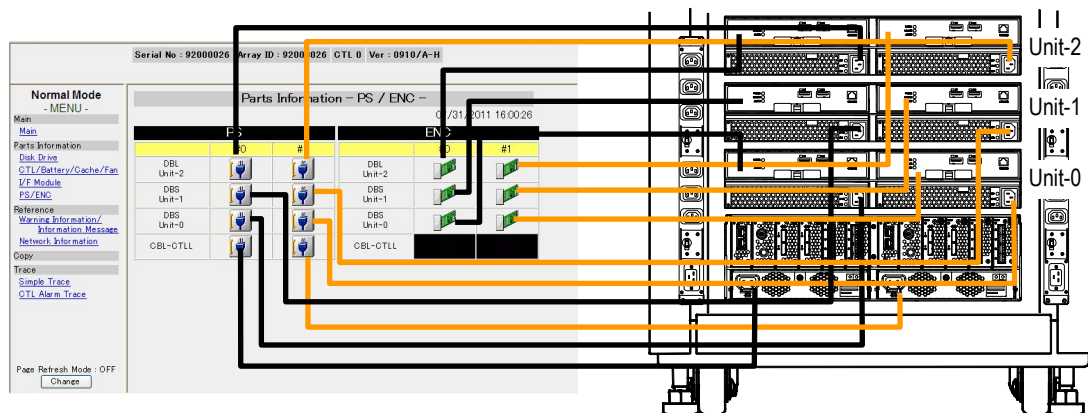
## • Host I/O Board

Image	Status
 Green	Normal
 Red	Fault



## • Host Connector

Image	Status
 Gray	Normal
 Red	Fault



## (e) PS/ENC (When no DBW is mounted)



## • Power Unit

Image	Status
 Blue	Normal
 Red	It is fault occurred or not implemented

## • I/O Module(ENC) or I/O Card(ENC)

Image	Status
 Green	Normal
 Red	It is fault occurred or not implemented

DBX is treated as two units, each of which contains 24 Drives.





















Seen from the front bezel side, the left side unit is called Unit A, and right side unit is called Unit B.

The label marked Unit A or Unit B is attached near the LED on the front bezel.

The unit number is assigned the running number of the DBL/DBS/DBF, and the Unit A and Unit B of the DBX. (The unit number of Unit B is a number adding 1 to the unit number of Unit A.)

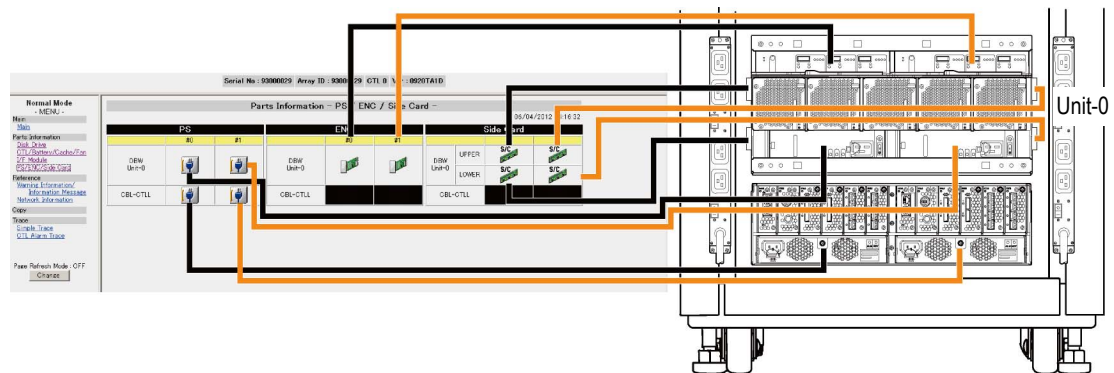
DBX (x-A)<sup>(‡1)</sup> or DBX (x-B)<sup>(‡1)</sup> to be displayed indicates that the unit is Unit A or Unit B of the DBX.

When the DBX is mounted, the status shown below is displayed.



PS			ENC		
	#0	#1		#0	#1
DBX(1-B) Unit-3			DBX(1-B) Unit-3		
DBX(1-A) Unit-2			DBX(1-A) Unit-2		
DBX(0-B) Unit-1			DBX(0-B) Unit-1		
DBX(0-A) Unit-0			DBX(0-A) Unit-0		
CBL-CTLL			CBL-CTLL		

‡1 : x (integer) is the running number of the DBX. The x is the same number in the Unit A and Unit B in pairs which compose the DBX.



(f) PS/ENC/Side Card (When the DBW is mounted)





• Power Unit

Image	Status
 Blue	Normal
 Red	It is fault occurred or not implemented

• I/O Module(ENC)

Image	Status
 Green	Normal
 Red	It is fault occurred or not implemented

• Side Card

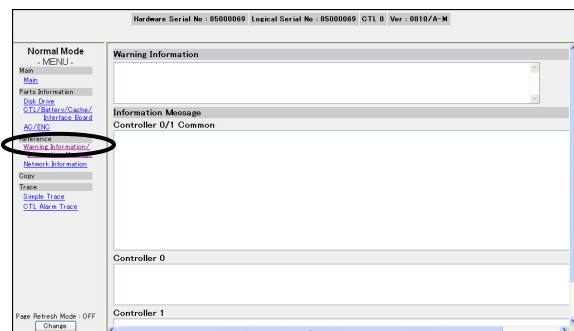
Image	Status
 Green	Normal
 Red	Fault

## (2) Procedure of the status checking by messages

A warning message about the failed part is displayed.

Refer to [“4.3 Confirm Log Messages” \(TRBL 04-0120\)](#) for the details of the warning messages.

When checking the status of a component through a message, a clicking on the “Warning Information” of the menu frame in the main window changes the screen to the one shown below and a detailed message explaining the component status is displayed.

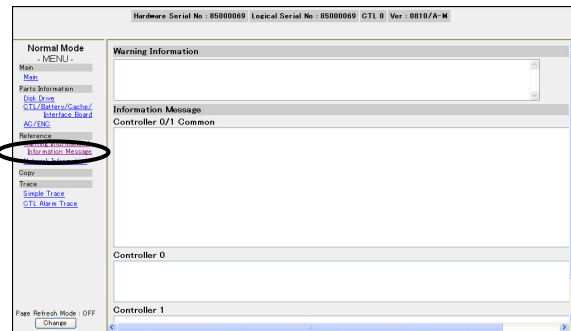


### 4.3 Confirm Log Messages

#### (1) Procedure for confirming log messages

Click the [Information Message] menu in the main window, and the “Information Message window” appears.

In the “Information Message window”, you can identify the cause of the failure and confirm the recovery method.



The information on the failures which were detected during operation of the unit and state of the unit is indicated in the above window.

The information on the failures and state after the unit starts up is indicated in the [Controller 0/1 Common] box.

The information on the failures and state at the time of start-up of the unit is indicated for each Controller in the [Controller 0] and [Controller 1] boxes.

The contents of each message are shown below.





## (b) Flash/RAM firmware detection message

## (i) Indicated message

The Flash/RAM firmware detection message is indicated in the [Controller 0/1 Common], [Controller 0], or [Controller 1] box as shown below.

The latest one is indicated at the top line.

NOTE : As the date and time of occurrence indicated by the message, the RTC set in the detection controller is used.

If the RTC is different from one control to another, the indicated time of occurrence may be different from one message to another (the message on the upper line is indicated earlier than the one on the lower line).

In this case, the actually latest message is indicated at the top, too.

MM/DD/YYYY hh:mm:ss xy □□□□□□ ○○○○○○○○○○○	: △△△△△△/◆◆◆◆
MM/DD/YYYY hh:mm:ss xy □□□□□□ ○○○○○○○○○○○	: △△△△△△/◆◆◆◆
:	

MM/DD/YYYY : Confirmed date

hh:mm:ss : Confirmed times

xy : Detect Controller #/Detect Core #

□□□□□□□ : Message Code<sup>(†1)</sup>

Hxxxxx : Failure messages (See [Message “Chapter 3. Failure Messages” \(MSG 03-0000\)](#))

Ixxxxx : Progress messages (See [Message “Chapter 4. Progress Messages” \(MSG 04-0000\)](#))

Rxxxxx : Flash detected messages (See [Message “Chapter 5. Flash Detected Messages” \(MSG 05-0000\)](#))

Wxxxxx : Warning messages (See [Message “Chapter 6. Warning Messages” \(MSG 06-0000\)](#))

○○○○○○○○○○○○ : Message text (Optional font number)

△△△△△△△△ : Recovery method code (see (ii))

◆◆◆◆ : Collecting error information code (see (ii))

†1 : For the message in which no recovery method is written, follow the recovery method shown in another message issued at the same time.

## (ii) Recovery method

- ① Collect the failure information according to “(◆◆◆◆)”.

**Table 4.3.1 Collecting Error Information List**

Display code	Error information you must collect
STRC	Collect Simple Trace
CTRC	Collect CTL Alarm Trace
FDMP	Collect Full Dump
PLOG	Collect Service PC Log, and Simple Trace
No display	None

Refer to [“Chapter 5. Collecting Error Information” \(TRBL 05-0000\)](#) for the details.

- ② Recover from the failure according to “Recovery method code (△△△△△△△)”.

Refer to the [Message “Chapter 1. Before Starting Trouble Analysis” \(MSG 01-0000\)](#) for the details of the messages.

**Table 4.3.2 Recovery Method Code List**

Display code	Recovery methods	Reference page
CTL	① Replace the Controller, the ALM LED of which is on. ② If the system is still abnormal, replace the other Controller.	<a href="#">Replacement “2.2.5 Replacing Controller” (REP 02-0700)</a>
2CTL	Replace the two Controllers.	<a href="#">Replacement “2.2.5 Replacing Controller” (REP 02-0700)</a>
BAT	Replace the Cache Backup Battery.	<a href="#">Replacement “2.2.2 Replacing Cache Backup Battery” (REP 02-0430)</a>
CACHE	Replace the Cache Memory indicated in the message text.	<a href="#">Replacement “2.2.6 Replacing Cache Memory” (REP 02-0920)</a>
ENC	Replace the I/O Module(ENC) or I/O Card(ENC) indicated in the message text.	<a href="#">Replacement “2.2.11 Replacing an I/O Module(ENC) or I/O Card (ENC)” (REP 02-1500)</a>
FAN	Replace the Fan Module.	<a href="#">Replacement “2.2.3 Replacing Fan Module” (REP 02-0520)</a>
HDU	Replace the Drive indicated in the message text.	<a href="#">Replacement “2.2.1 Replacing Drive” (REP 02-0050)</a>
PON	Turn on the power again.	—
PS	Replace the Power Unit indicated in the message text.	<a href="#">Replacement “2.2.4 Replacing Power Unit” (REP 02-0560)</a>
IFBD	Replace the Host I/O Board/Module, Drive I/O Module or Management Module indicated in the message text.	<a href="#">Replacement “2.2.7 Replacing a Host I/O Board/Module” (REP 02-1100)</a> <a href="#">Replacement “2.2.9 Replacing a Drive I/O Module” (REP 02-1320)</a> <a href="#">Replacement “2.2.10 Replacing a Management Module” (REP 02-1410)</a>
SIDECD	Replace the Side Card indicated in the message text.	<a href="#">Replacement “2.2.16 Replacing a Side Card” (REP 02-2030)</a>
HCNCT	Replace the Host Connector indicated in the message text.	<a href="#">Replacement “2.2.8 Replacing a Host Connector” (REP 02-1230)</a>

Display code	Recovery methods	Reference page
SYSPM	Set the system parameter in the WEB maintenance mode correctly.	<a href="#">WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)</a>
MANUAL	<p>Refer to the manual, and recover from the failure according to the recovery methods for each message code.</p> <p>Hxxxxx : Failure messages (See <a href="#">Message "Chapter 3. Failure Messages (MSG 03-0000)"</a>)</p> <p>Ixxxxx : Progress messages (See <a href="#">Message "Chapter 4. Progress Messages (MSG 04-0000)"</a>)</p> <p>Rxxxxx : Flash detected messages (See <a href="#">Message "Chapter 5. Flash Detected Messages (MSG 05-0000)"</a>)</p> <p>Wxxxxx : Warning messages (See <a href="#">Message "Chapter 6. Warning Messages (MSG 06-0000)"</a>)</p>	<a href="#">Message "Chapter 1. Before Starting Trouble Analysis" (MSG 01-0000)</a>
UPS	When a UPS is connected, take a recovery action referring to the UPS manual.	—
No display	<p>This is not a problem.</p> <p>Recovery operation is not necessary.</p>	—

## (iii) How to read failure information

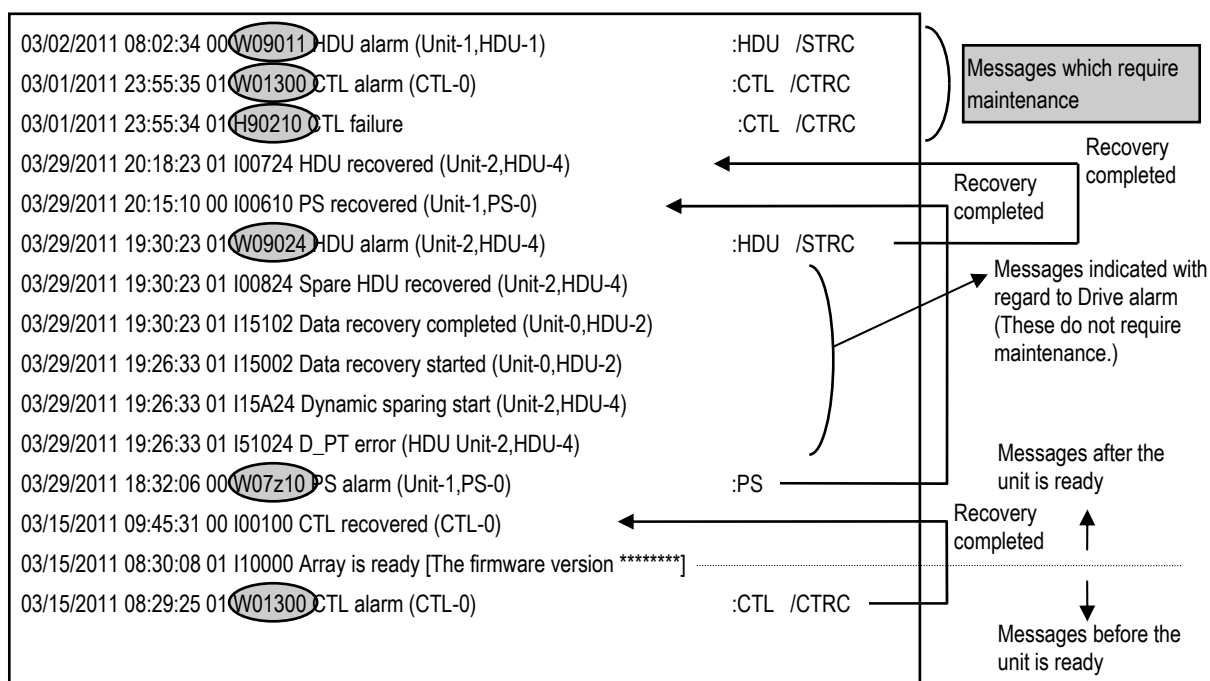
- The history of the unit after it is turned on is indicated in the Information Message.
- The message of Array is Ready indicates the time when the unit is ready.  
The messages made after the power is turned on until the unit is ready are indicated before this message. The messages made after the unit is ready are indicated after this message.
- Particularly pay attention to Wxxxxx (Warning message), Hxxxxx (Failure messages), and Rxxxxx (Flash detection message).
- The following messages are indicated when failures occur and when they are solved. (See [Table 4.3.3.](#)) If the recovery message is indicated after a failure occurrence message, the failure has been solved and you do not need to solve it.

**Table 4.3.3 Failure Message List**

No.	Description	Failure detected messages		Failure recovery messages	
1	Controller failure/recovery	W01z0x	CTL alarm (CTL-x)	I0010x	CTL recovered (CTL-x)
2	Cache Backup Battery failure/recovery	W03z0x	Battery alarm	I0030x	Battery recovered (Battery-x)
3	Battery backup circuit failure/recovery	W0400x	Battery backup circuit alarm (CTL-x)	I0040x	Battery backup circuit recovered (CTL-x)
4	Fan Module failure/recovery	W05z00	FAN alarm (Unit-x, FAN-y)	I00500	FAN recovered (Unit-x, FAN-y)
		W06z00	FAN alarm (CTL-Unit, FAN-xy)		FAN recovered (CTL-Unit, FAN-xy)
5	Power supply failure/recovery	W07zy0	PS alarm (Unit-w, PS-x)	I006z0	PS recovered (Unit-x, PS-y)
		W08zy0	PS alarm (CTL-Unit, PS-x)		PS recovered (CTL-Unit, PS-y)
6	Drive failure/recovery	W09zab	HDU alarm (Unit-x, HDU-y, Type-c)	I007ab	HDU recovered (Unit-x, HDU-y)
7	Spare Drive failure/recovery	W0Bzab	Spare HDU alarm (Unit-x, HDU-y, Type-c)	I009ab	Spare HDU recovered (Unit-x, HDU-y)
8	I/O Module(ENC) or I/O Card (ENC) failure/recovery	W0Fzf0	ENC alarm (Unit-x, ENC-y)	I00Bf0	ENC recovered (Unit-x, ENC-y)
9	UPS failure/recovery	W0Hz0x	UPS alarm (UPS-x)	I00D00	UPS recovered (UPS-x)
10	Path failure (detachment)/recovery	W0K0xy	Path alarm (Remote-x, Path-y)	I030xy	Path recovered by web operation (Remote-x, Path-y)
				I031xy	Path recovered automatically
11	Occurrence/ rectification of an incomplete writing	W0L000	Unreadable PIN detected (Unit-x, HDU-y)	I04000	Unreadable PIN recovered
		W0M000	Unreadable PIN detected (Unit-*, HDU-*)		
12	Host Connector failure/recovery	W0Pz0g	Host connector alarm (Portxy)	I53A0g	Host connector recovered (Portxy)
13	Issue/callback of a resident Volume off warning	W390xy	A permanent LU warning (CTL-x, ERR-y)	I1A2xy	Permanent LU warning recovered (CTL-x, ERR-y)
14	Excess/rectification of the threshold value of the number of pinned sub-segments	W3G000	PIN is over directory threshold [write through] (DIR-x)	I6EG00	PIN over recovered [directory threshold] (DIR-x)
		W3J000	PIN is over partition threshold [write through] (DIR-x, PTT-y)	I6EH00	PIN over recovered [partition threshold] (DIR-x, PTT-y)
		W3L000	PIN is over RAID group threshold [write through] (DIR-x, RG-y)	I6EJ00	PIN over recovered [RAID group threshold] (DIR-x, RG-y)
15	DMLU failure/recovery	W3N000	DM-LU write disable (LU-x)	I6EM00	DM-LU recovered (LU-x)
		W3P000	All DM-LU write disabled		
16	Interface Board failure/recovery	W3Rzhx	Interface Board alarm (CTL-w, I/F-x)	IAIHhy	Interface Board recovered (CTL-x, I/F-y)
17	Backend route failure/recovery	W40000	Backend route warning has been detected (Path-x, Route-y)	I5JBxy	Backend route recovered (Path-x, Route-y)

No.	Description	Failure detected messages		Failure recovery messages	
18	Drive I/O Module failure/ recovery	WA0zj0	Drive I/O module alarm (CTL-w, Slot-l)	IAA0j0	Drive I/O module recovered (CTL-w, Slot-l)
19	Host I/O Module failure/ recovery	WA1zi0	Host I/O module alarm (CTL-w, Slot-l)	IAA1i0	Host I/O module recovered (CTL-w, Slot-l)
20	Management Module failure/ recovery	WA2zk0	Management module alarm (CTL-w, Slot-l)	IAA2k0	Management module recovered (CTL-w, Slot-l)
21	Side Card failure/recovery	WA3zn0	SideCard alarm (Unit-x, SideCard-p-p)	I04500	SideCard recovered (Unit-x, SideCard-p-p)

## Example of message analysis :

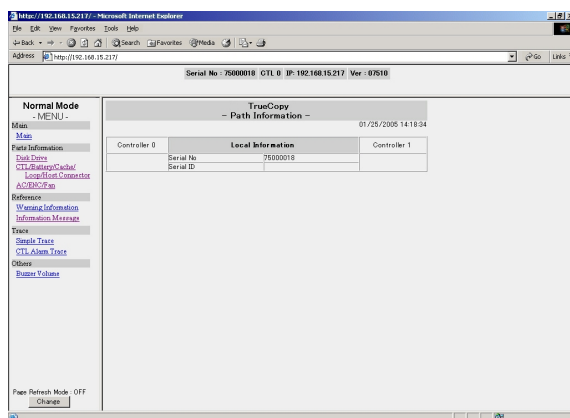


## 4.4 TrueCopy remote replication/TrueCopy Extended Distance Path Confirm State

### (1) Procedure for confirming log messages

By clicking the path of [Summary of the replacement parts state] in the main window, the window is changed to the following one. And the details about the path state are displayed. Also by clicking [TrueCopy Path Information] on the menu frame in the main screen, the window is changed to the following window. And the details about the path state are displayed.

Perform the maintenance operation for replacement and the recovery operation referring to [“11.1.17 Path Blockade Occurs in the TrueCopy remote replication/TrueCopy Extended Distance Function” \(TRBL 11-0910\)](#).



#### 4.5 The Priority Error Messages when “CTL alarm” is Displayed

When the “W01z0x CTL alarm (CTL-x)” message is displayed, if the following message is displayed before “W01z0x CTL alarm (CTL-x)” message, follow the recovery method of the message.

- (1) Failure Messages. (Refer to [Message “Chapter 3. Failure Messages” \(MSG 03-0000\)](#) for the recovery method.)

Message code	Message text
H0AHxy	EDC error was detected (CTL-x, I/F-y)
H0F900	SED Authentication key error was detected
H1710x	ENC error inf. [Two Wire Interface error] (CTL-x)
H21700	EDC error (Port-xy)
H303xy	ECC uncorrectable error was detected (CTL-x, CACHE-y)
H306xy	Please replace cache memory to recover from cache uncorrectable error (CTL-x, CACHE-y)
H30B0x	CACHE uncorrectable ERR [OTH_CTL] (CTL-x)
H30Bxy	CACHE uncorrectable ERR [OTH_CTL] (CTL-x, CACHE-y)
H30Gxy	ECC uncorrectable error (CACHE-x/y)
H410xy	[ECTL]A register access error was detected in synchronize cache command process (CTL-x)
H90320	Watch-dog time-out
HB0Cxx	H-FPC is not detected (Port-xy)
HB0E00	Fatal iSCSI protocol chip error was detected (CTL-x, I/F-y, Code-z)
HD220x	CACHE error over (CACHE-x) [CRECT]
HE21xy	I/F board type error (CTL-x, I/F board-y)
HF0100	Data transfer check error [SEGPOSERR]
HF0103	Data transfer check error [RDSEGERR]
HF0105	Data transfer check error [WSEGPDEV]
HF0106	Data transfer check error [WSEGLOCK]
HF0107	Data transfer check error [CCPLUNERR]
HF0108	Data transfer check error [CCPLBAERR]
HF0109	Data transfer check error [PARLUNERR]
HF010A	Data transfer check error [PARLBAERR]
HF010B	Data transfer check error [QUEUEERR]
HF010C	Data transfer check error [COWDRVERR]
HF010E	Data transfer check error [DSTPOSERR]
HF0117	Data transfer check error [BUFSGQATERR]
HF0118	Data transfer check error [WRBUFTODTY]
HF020x	Directory check error (CTL-x)
HF0300	Data transfer check error [STGLUNERR]
HF0400	Data transfer check error [NTMPRD]
HH0E0x	CACHE access error (CACHE-x) [PON]
HH270x	I/F Board is not installed (CTL-x)
HH2900	Cache capacity reduced although copy function enable
HH7C0x	H-IPC firmware boot up failed (CTL-x)
HH7Gxy	H-IPC soft reset has ended in failure (Port-xy)
HH7Hxy	H-IPC hardware error (Port-xy)
HH7I0x	iSCSI firmware load failed (CTL-x)
HH7J00	H-IPC is not detected (Port-xy)



Message code	Message text
HH7N00	H-IPC PCI STS REG error [OPE]
HH7P00	H-IPC PCI STS REG error [ILE]
HH7Q00	H-IPC PCI STS REG error [ICE]
HH7R00	H-IPC PCI STS REG error [OCE]
HH7S00	H-IPC PCI STS REG error [DPE]
HH7U00	H-IPC PCI ECC error
HH7Wxy	H-IPC firmware initialization failed (CTL-x, I/F-y)
HH8100	Product number error was detected [discrepancy between ENC's of DBX] (DBX- (xx-y))
HH9N0x	ENC recovery failed [Cable error] (CTL-x)
HH9Y0x	ENC recovery failed [linkup error in the other route] (CTL-x)
HHA0xy	H-IPC hardware error was detected (CTL-x, I/F-y)
HHA1xy	iSCSI firmware load failed (CTL-x, I/F-y)
HHA2xy	H-IPC is not detected (CTL-x, I/F-y)
HHA4xy	H-IPC ECC error was detected (CTL-x, I/F-y)
HHC60x	ENC recovery failed [Configuration error] (CTL-x)
HI0100	PS OFF failed [DSTG HUNG]
HI0201	PS OFF failed [POFNONCLD]
HI0202	PS OFF failed [POFNOJOB]
HI0310	OTHPs OFF time-out
HI0420	System down selected [PS OFF]
HI050x	CACHE access error (CACHE-x) [POFF]
HI0600	PS OFF failed [PIN]
HJ4Nxx	Microprogram error was detected [DIR] (CTL-y)
HZ0H0x	Directory reinitialization failed (CTL-x)
HZ0Pxx	Cache capacity reduced although Cache Partition Manager enable

- (2) Flash Detected Messages. (Refer to [Message “Chapter 4. Progress Messages” \(MSG 04-0000\)](#) for the recovery method.)

Message code	Message text
I5L700	ENC error was detected [SES command error] (Unit-x, ENC-y)
IE400x	Access error was detected in Two Wire Interface [TWI-0 ](CTL-x)

- (3) Flash Detected Messages. (Refer to [Message “Chapter 5. Flash Detected Messages” \(MSG 05-0000\)](#) for the recovery method.)

Message code	Message text
R20M00	DCTL CACHE uncorrectable ERR [REG82001238, Bit29] (CTL-x, CACHE-y)
R2720x	Cache initialization failed (CTL-x, CACHE-y)
R312xy	ECC uncorrectable error (CTL-z)
RA30xy	CACHE size mismatch b/w. CTL (CACHE-x/y)
RA7A00	CACHE installation error (CACHE-0/1)
RA7B0x	CACHE size get error (CACHE-x)
RA8S0x	ENC recovery failed [Cable error] (CTL-x)
RB0Cxy	CACHE pair check error (CACHE-x/y)

## Chapter 5. Collecting Error Information

When any failure occurs, the information on it saved in the Controller can be collected.

The purpose of this function is to facilitate pursuit of factors of failures and shorten the time consumed for analysis of them.

The failure information is collected by the following three methods.

### (1) Collection Simple Trace

Use the normal or maintenance mode using a Web browser to download the trace information and configuration information from the controller to the browser terminal.

You can collect a simple trace while the device is running. You can also collect it when the ALARM LED (red) is lit on the device.

For details of the procedure for the collection, refer to [“5.3 Collecting Simple Trace” \(TRBL 05-0040\)](#).

### (2) Collecting CTL Alarm Trace

The controller contains information about the time when the controller is shut down. Use the normal or maintenance mode using a Web browser to download this information from the controller to the browser terminal.

The CTL alarm trace can be collected after recovering the blocked controller.

For details of the procedure for the collection, refer to [“5.4 Collecting CTL Alarm Trace” \(TRBL 05-0130\)](#).

NOTE : When the Controller to be connected to WEB is blocked, the WEB connection may not be performed for ten minutes usually (for the maximum of 60 minutes) from the time when the Controller was blocked because the CTL alarm trace is being created.

### (3) Collecting Full Dump

The information saved in the Controller is downloaded to the browser terminal by using the maintenance mode of WEB.

Controller 0/1 Common

MM/DD/YYYY hh:mm:ss xy	□□□□□□	○○○○○○○○○○○○	:	△△△△△△/◆◆◆◆◆◆
MM/DD/YYYY hh:mm:ss xy	□□□□□□	○○○○○○○○○○○○	:	△△△△△△/◆◆◆◆◆◆
		:		

For details of the procedure for the collection, refer to [“5.5 Collecting Full Dump” \(TRBL 05-0180\)](#).

The failure information is collected by different methods, depending on the configuration and condition of the unit.

Collect the failure information securely according to [“5.2 Judging Collection of Failure Information” \(TRBL 05-0020\)](#).

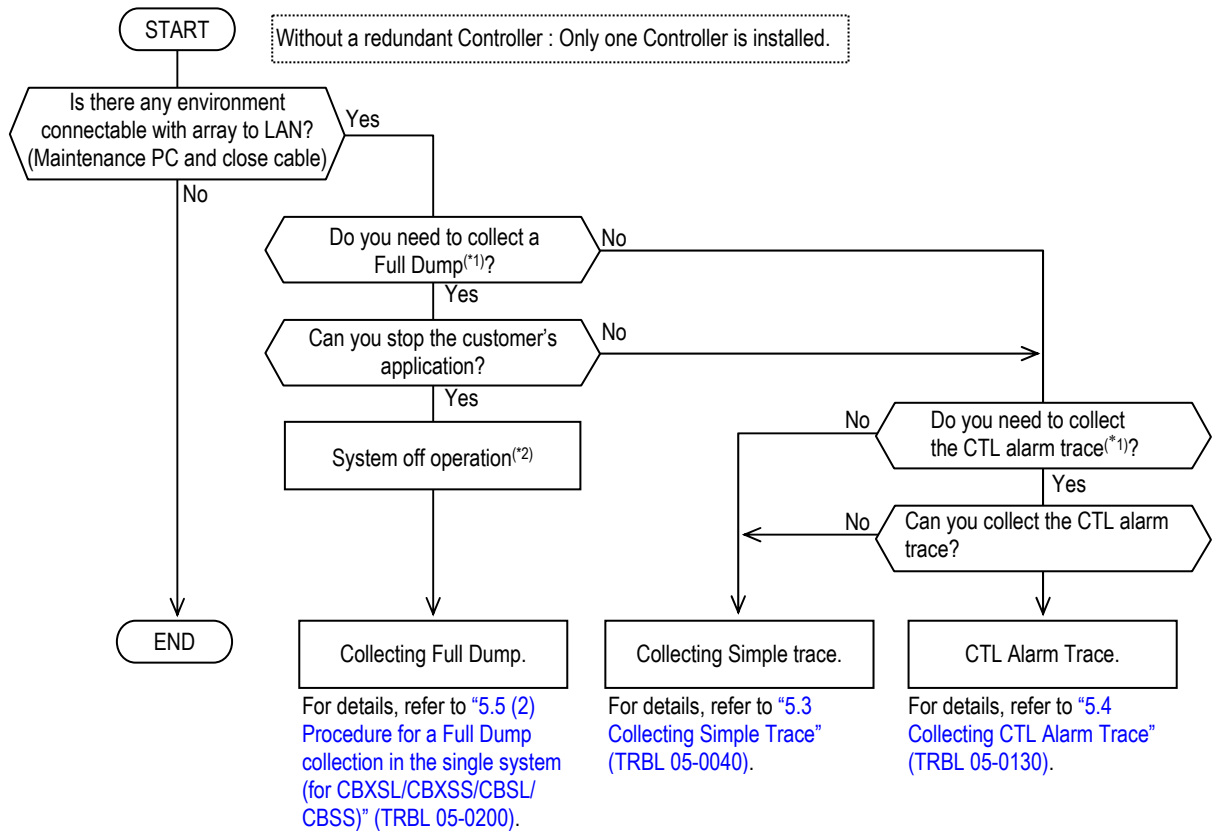
## 5.1 Time to Collect Failure Information

Collect the failure information in the following cases.

- (1) A failure was reported to the work-station server, client for maintenance, WEB browser, or Hitachi Storage Navigator Modular 2.
- (2) The WARNING LED (orange) on the front of the Controller Box blinked or lit up.
- (3) The ALARM LED (red) on the front of the Controller Box lit up.

## 5.2 Judging Collection of Failure Information

### (1) Flow of judgment of collection of failure information for system having single Controller (without a redundancy Controller)

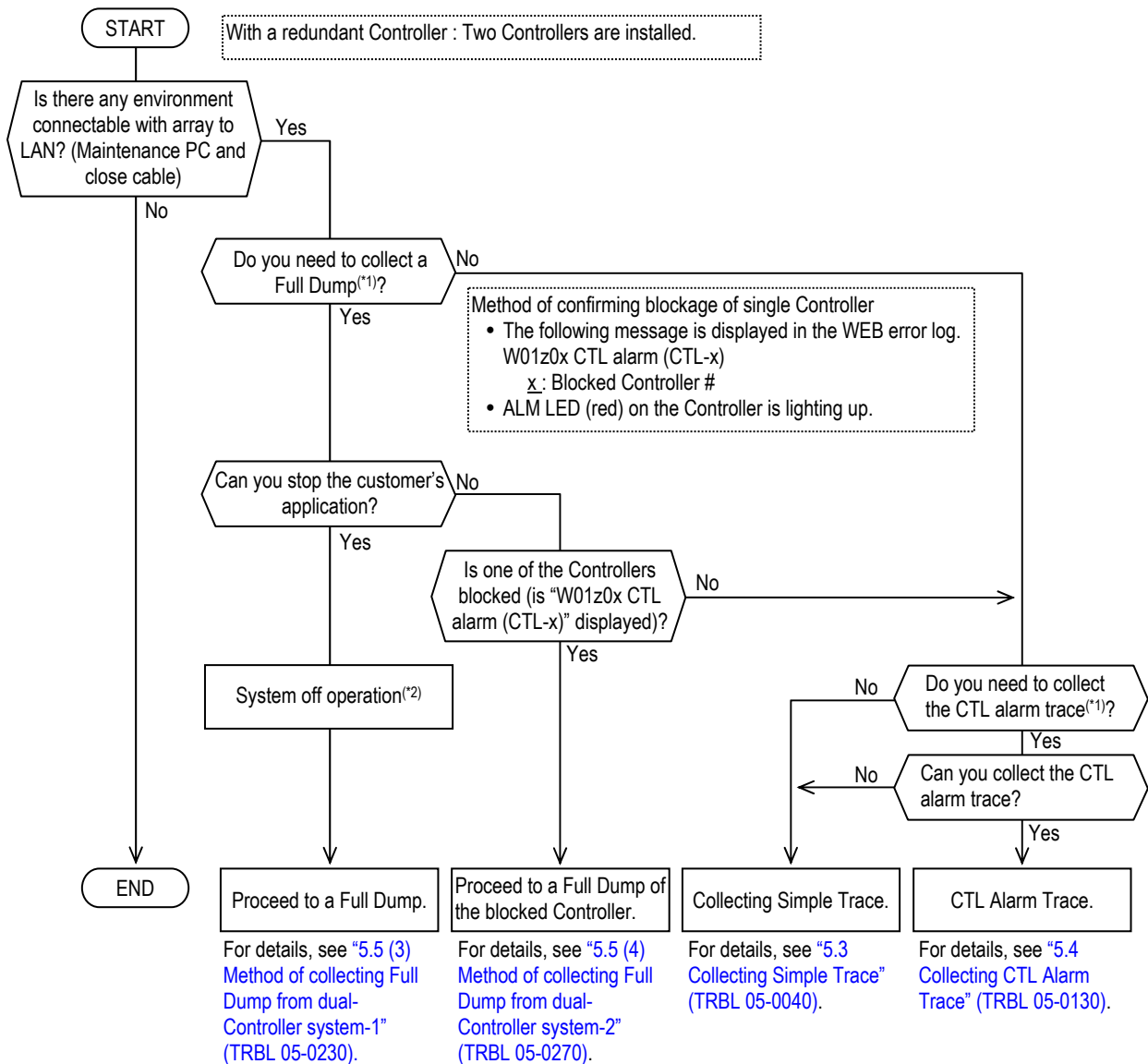


\*1 : How to determine whether you need to collect the Full Dump and controller shutdown trace for a log message

- ① See the last five characters (124th to 128th characters) in the log message.  
(For details about the log messages, refer to "4.3 Confirm Log Messages" (TRBL 04-0120).)
- ② /STRC : You need to collect the Simple Trace.  
/CTRC : You need to collect the CTL Alarm Trace.  
/FDMP : You need to collect the Full Dump.

\*2 : When the Power Interlock Mode is set to UPS, take care that the array power is also turned off if the host computer is powered off. (Refer to the Installation "1.6 Setting the Power Interlock Mode" (INST 01-0270). When the array is powered off, a Full Dump cannot be done.)  
When the mode is set to UPS, perform the Full Dump in the state in which no access (I/O) from the host computer is made. (Refer to "5.5 Collecting Full Dump" (TRBL 05-0180).)

(2) Flowchart for determining to produce a memory dump in the case of the dual configuration.  
(with the redundant Controller.)



\*1 : How to determine whether you need to collect the Full Dump and controller shutdown trace for a log message

- ① See the last five characters (124th to 128th characters) in the log message.  
(For details about the log messages, refer to "4.3 Confirm Log Messages" (TRBL 04-0120).)
- ② /STRC : You need to collect the Simple Trace.  
/CTRC : You need to collect the CTL Alarm Trace.  
/FDMP : You need to collect the Full Dump.

\*2 : When the Power Interlock Mode is set to UPS, take care that the array power is also turned off if the host computer is powered off. (Refer to the [Installation "1.6 Setting the Power Interlock Mode" \(INST 01-0270\)](#). When the array is powered off, a Full Dump cannot be done.)

When the mode is set to UPS, perform the Full Dump in the state in which no access (I/O) from the host computer is made. (Refer to "5.5 Collecting Full Dump" (TRBL 05-0180).)

### 5.3 Collecting Simple Trace

Using Simple Trace Collection, the trace information stored in the controller and the configuration information are collected.

The method of collecting the simple trace is shown below.

(1) Before collecting the simple trace

(a) Items to be prepared

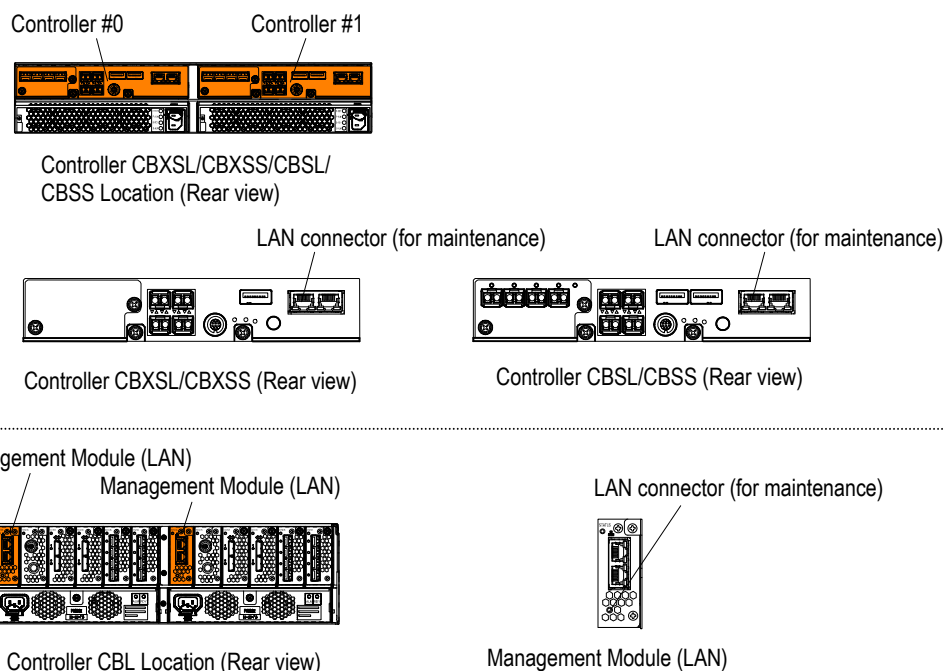
Collection is performed using the Normal mode or Maintenance mode of WEB, or Hitachi Storage Navigator Modular 2.

A maintenance PC installing a browser is required. Also, for collecting simple trace, the free drive space shown in the following table is required. The free drive space required for collecting simple trace is different depending on the array model.

**Table 5.3.1 Free drive space required for collecting simple trace**

	HUS110	HUS130	HUS150
Free drive space on the maintenance PC required for collecting simple trace	2 G bytes or more	2.5 G bytes or more	4 G bytes or more

(b) Connect the LAN connector for maintenance and the LAN connector on the maintenance PC with a LAN-cross-cable.



**Figure 5.3.1 LAN Connector Position**

- (c) Simple Trace needs to be collected from both Controllers. (You may fail to collect accurate information on the failed Controller if you collect Simple Trace only from the normal Controller.)

The first file name during the collection is as follows.

**NOTE :** If the following setting applies to Internet Explorer 8.0 or more, the Simple Trace collection may not be completed.

- The TCP/IP setting of the network may include a non-responding DNS server and an unnecessary default gateway with the Smart Screen filter setting enabled.

In this case, check that the Smart Screen filter setting is disabled. Refer to the manual of the using browser for how to check the setting.

Serial number and the trace collection starting time (year/month/day/hour/minute/seconds) are added to the first file name.

smpL\_trc0\_xxxxxxx\_YYYYMMDDhhmmss\_0E.dat

xxxxxxx : Trace collection serial number

YYYYMMDDhhmmss : Trace collection starting time  
(year/month/day/hour/minute/seconds)

- The first file name when the collection from Controller #0 fits in a file  
“smpL\_trc0\_xxxxxxx\_YYYYMMDDhhmmss\_0E.dat”
- The first file name when the collection from Controller #1 fits in a file  
“smpL\_trc1\_xxxxxxx\_YYYYMMDDhhmmss\_0E.dat”
- The first file names when the collection from Controller #0 fits in two files  
“smpL\_trc0\_xxxxxxx\_YYYYMMDDhhmmss\_0S.dat”  
“smpL\_trc0\_xxxxxxx\_YYYYMMDDhhmmss\_1E.dat”
- The first file names when the collection from Controller #1 fits in two files  
“smpL\_trc1\_xxxxxxx\_YYYYMMDDhhmmss\_0S.dat”  
“smpL\_trc1\_xxxxxxx\_YYYYMMDDhhmmss\_1E.dat”
- The first file names when the collection from Controller #0 fits in three files  
“smpL\_trc0\_xxxxxxx\_YYYYMMDDhhmmss\_0S.dat”  
“smpL\_trc0\_xxxxxxx\_YYYYMMDDhhmmss\_1C.dat”  
“smpL\_trc0\_xxxxxxx\_YYYYMMDDhhmmss\_2E.dat”
- The first file names when the collection from Controller #1 fits in three files  
“smpL\_trc1\_xxxxxxx\_YYYYMMDDhhmmss\_0S.dat”  
“smpL\_trc1\_xxxxxxx\_YYYYMMDDhhmmss\_1C.dat”  
“smpL\_trc1\_xxxxxxx\_YYYYMMDDhhmmss\_2E.dat”

- (d) Check that the READY LED (green) on the front of the Controller Box is not blinking at high speed.

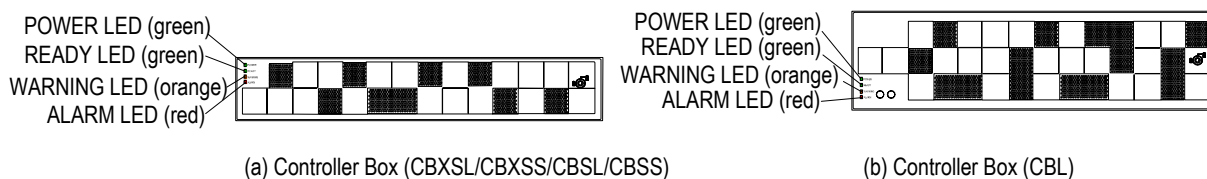
When the READY LED (green) on the front of the Controller Box is blinking at high speed, wait for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)) until the READY LED (green) lights up because the automatic download of the ENC firmware and the backup controller firmware is being executed.

- (e) Check that the WARNING LED (orange) on the front of the Controller Box is not blinking at high speed.

When the WARNING LED (orange) on the front of the Controller Box is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Controller Box goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. There is no problem if it blinks slowly (at intervals of one second).

- (f) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.

- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.



**Figure 5.3.2 Indication Locations and Names of LED (Front Bezel)**



(2) Procedure for a simple trace collection by WEB

When collecting from the Hitachi Storage Navigator Modular 2, refer to (3).

- (a) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button. (For the procedure for connecting the Web, refer to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000).)
- (b) When Windows XP Service Pack2, Windows 2003 Service Pack1 or Windows Vista is used in the OS of the maintenance PC, collect the simple trace after changing the setting of the following Internet Explorer.
- Select [Tools] - [Internet Options] from the Internet Explorer menu.
  - Select the [Privacy] tab, check [Blocked pop-up] of [Pop-up block], and click the [Set] button.
  - Set [Filter level] to [Medium] in the [Setting pop-up block] window and click the [Close] button.
  - Select [OK] button in the [Internet Options] window.

- (c) Collect the simple trace according to the WEB and the following procedure.

Click “Simple Trace” in the menu frame.

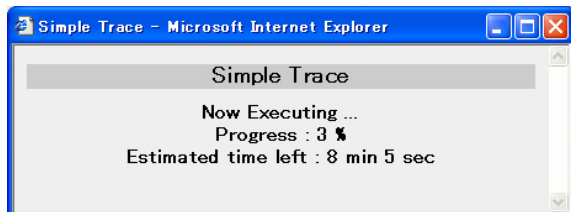


- (d) When the “Simple Trace” is clicked, the following window is displayed.

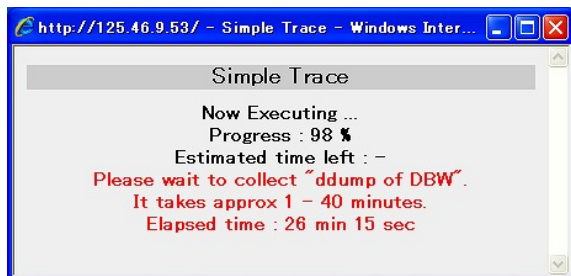


(e) When the [OK] button is clicked, the following window is displayed.

NOTE : If the window update (e.g.: pressing F5 key) is performed in this window, the automatic update stops and so that the trace collection does not make progress. When the automatic update stops due to the window update, close this window and, after 20 minutes or more elapse, perform the simple trace collection again.



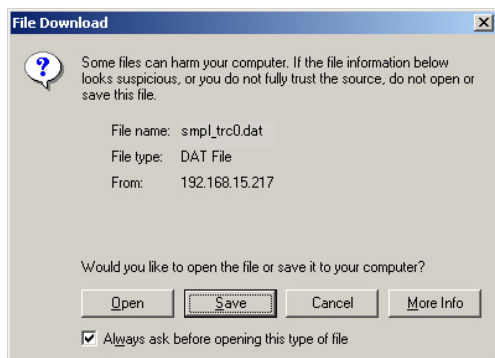
NOTE : If DBW is connected to the array, you may need to wait for one to 40 minutes with the following dialog box.



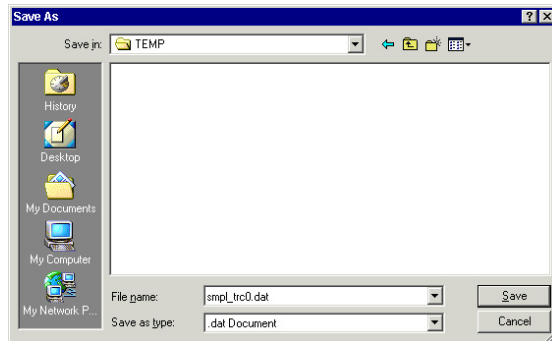
(f) The following window is displayed. Click the [Download] button.



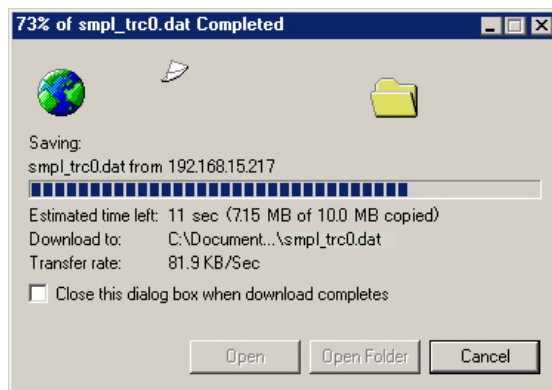
(g) Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



- (h) If the following window is displayed, please click [Save] after file name is setting, if it is continued.<sup>(†1)</sup> Please click [Cancel], if it is stopped.



- (i) The following window is displayed during execution download.



- (j) When the downloading completes, the progress indicating message window is closed.  
 (k) If all traces cannot be collected, the following window is displayed.  
 Click the [Continue], and then collect traces in the next file beginning from the step (e).

NOTE : When performing an array boot or simple trace collection from the same Controller in the same array in the following window without clicking the [Continue], a error window is displayed, and the trace cannot be collected.

When all the traces can't be collected on the first time.



When all the traces can't be collected on the second time.



<sup>†1</sup> : There may be a case where the first file name is given as "smp1\_trc0xxxx.dat..dat" depending on the setting of the PC. In this case, ".dat" is deleted or any other name.

- (l) The following window appears when all traces are collected.  
Click the [Close] button. (If you failed to collect Simple Trace from both Controllers, return to (a) to collect Simple Trace from the other Controller.)

NOTE : Verify that the number of files described in the window is the same as the number of the files actually collected.

When all traces can be collected in one file



When all traces can be collected in two files



In this procedure Simple trace is collected by WEB Normal mode. Similarly, Simple trace can be collected by WEB Maintenance mode through Menu Frame.

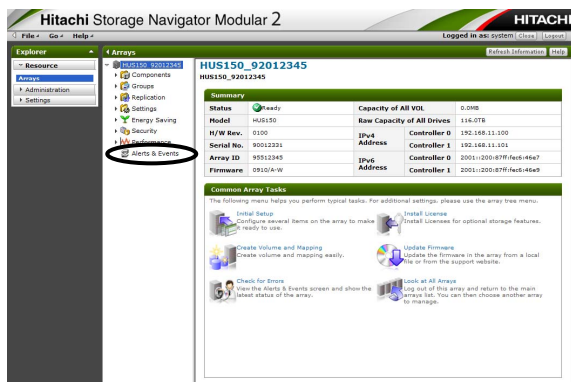
For entering Maintenance mode, refer to the [WEB "3.1 Transferring to the Maintenance Mode" \(WEB 03-0000\)](#).

## (3) Procedure for a simple trace collection by Hitachi Storage Navigator Modular 2

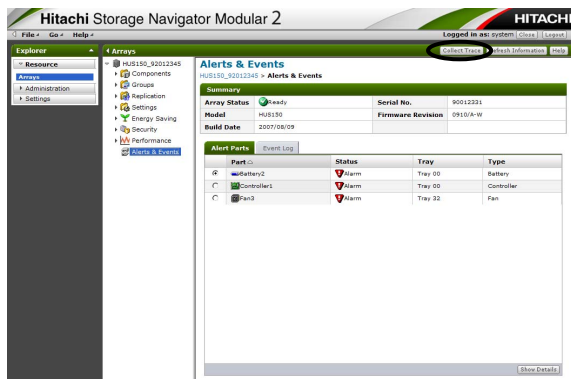
(a) Connect to the array from the Hitachi Storage Navigator Modular 2. (Refer to the [System Parameter “1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Array” \(SYSPR 01-0020\).](#))

(b) Collect the simple trace according to the following procedure.

Start the Hitachi Storage Navigator Modular 2. Select the array to be collected, and click the “Alert & Event” in the tree.

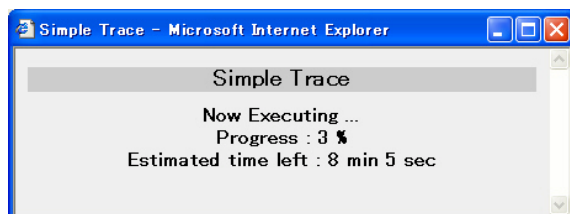


(c) Click the [Collect Trace] button in the [Alert & Event] window.

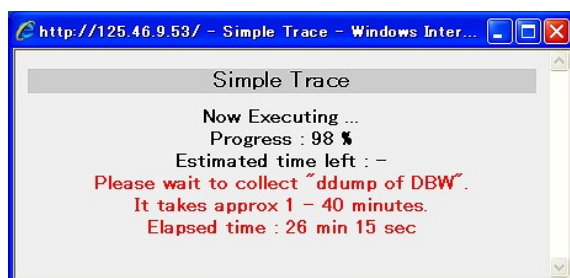


(d) The following window is displayed.

NOTE : If the window update (e.g.: pressing F5 key) is performed in this window, the automatic update stops and so that the trace collection does not make progress. When the automatic update stops due to the window update, close this window and, after 20 minutes or more elapse, perform the simple trace collection again.



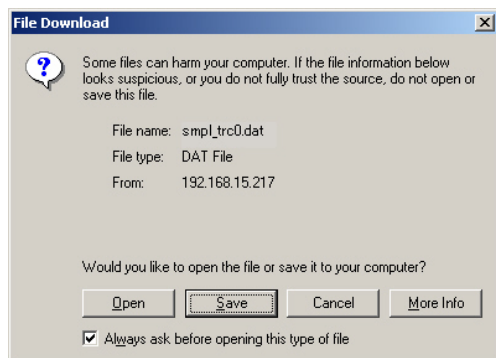
NOTE : If DBW is connected to the array, you may need to wait for one to 40 minutes with the following dialog box.



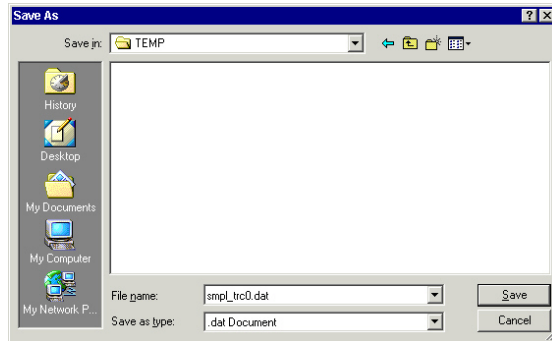
(e) The following window is displayed. Click the [Download] button.



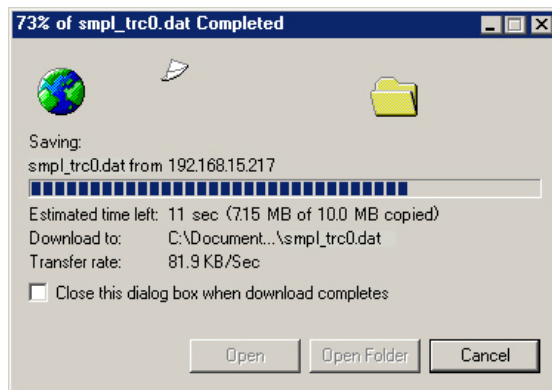
(f) Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



- (g) If the following window is displayed, please click [Save] after file name is setting, if it is continued.<sup>†1</sup> Please click [Cancel], if it is stopped.



- (h) The following window is displayed during execution download.



- (i) When the downloading completes, the progress indicating message window is closed.  
 (j) If all traces cannot be collected, the following window is displayed.  
 Click the [Continue], and then collect traces in the next file beginning from the step (e).

NOTE : When performing an array boot or simple trace collection from the same Controller in the same array in the following window without clicking the [Continue], an error window is displayed, and the trace cannot be collected.

When all the traces can't be collected on the first time.



When all the traces can't be collected on the second time.



<sup>†1</sup> : There may be a case where the first file name is given as "smp1\_trc0xxx.dat..dat" depending on the setting of the PC. In this case, ".dat" is deleted or any other name.

- (k) The following window appears when all traces are collected.  
Click the [Close] button.

NOTE : Verify that the number of files described in the window is the same as the number of the files actually collected.

When all traces can be collected in one file



When all traces can be collected in two files





## 5.4 Collecting CTL Alarm Trace

Through the CTL Alarm Trace collection, detailed information (the CTL Alarm Trace) on the immediately previous Controller blockade stored in the Controller is collected. It may not be collected depending on the types of the failures which cause the controller blockade.

**NOTE :** When the Controller to be connected to WEB is blocked, the WEB connection may not be performed for ten minutes usually (for the maximum of 60 minutes) from the time when the Controller was blocked because the CTL alarm trace is being created.

Since the above-mentioned CTL Alarm Trace information is taken over from the blocked Controller to the replaced Controller, it can be collected after the Controller is recovered from the failure. Even after the collection, the information remains until the controller blockade trace is rewritten in the next controller blockade. If the Controller is blocked while collecting the CTL Alarm Trace may not be collected normally. Therefore, in this case, collect the CTL Alarm Trace again.

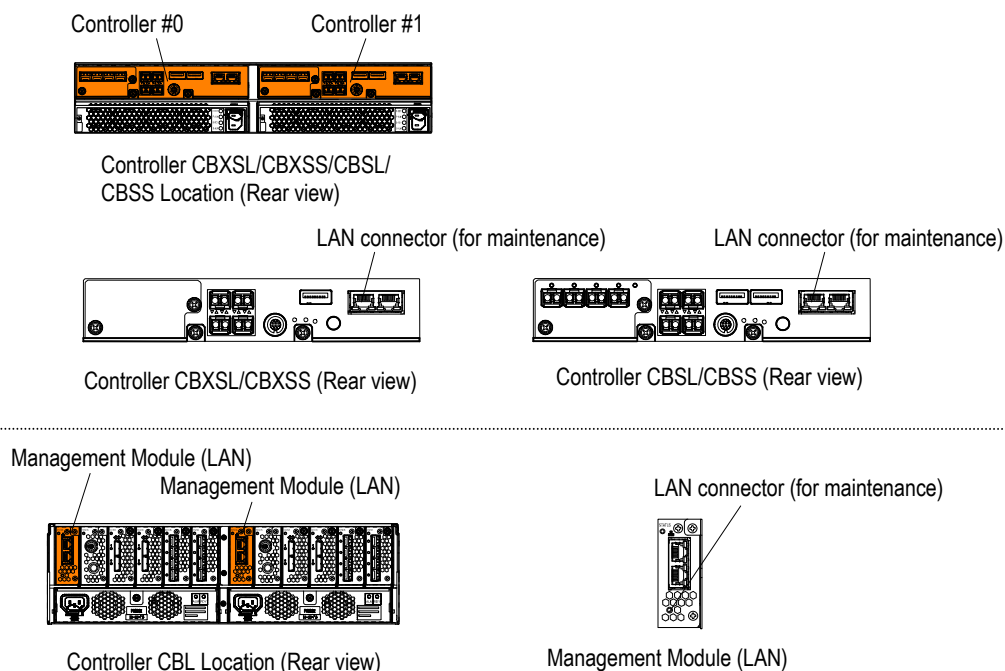
The method of collecting the CTL Alarm Trace is shown below.

### (1) Before collecting the CTL Alarm Trace

#### (a) Items to be prepared

The CTL Alarm Trace is collected in the normal mode or the maintenance mode of the WEB. For connecting to the WEB, a maintenance PC terminal with Browser installed is necessary. For collecting the CTL Alarm Trace, free drive space of 200 M bytes per one Controller is required.

#### (b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN cross cable.



**Figure 5.4.1 LAN Connector Position**

- (c) Collect the CTL Alarm Trace information from each Controller.

Save the files collected from different controllers into different directories or put different names to them so that you will see from which controller they were collected.

- (d) Check that the READY LED (green) on the front of the Controller Box is not blinking at high speed.

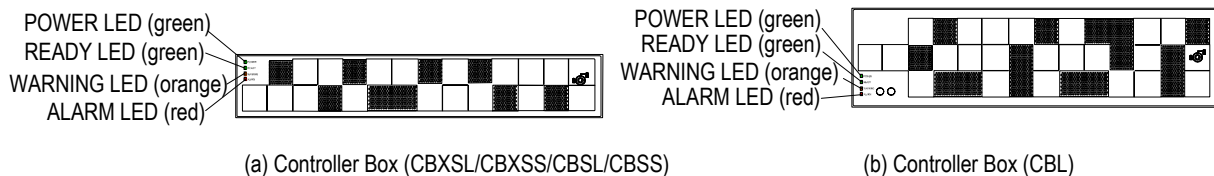
When the READY LED (green) on the front of the Controller Box is blinking at high speed, wait for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)) until the READY LED (green) lights up because the automatic download of the ENC firmware and the backup controller firmware is being executed.

- (e) Check that the WARNING LED (orange) on the front of the Controller Box is not blinking at high speed.

When the WARNING LED (orange) on the front of the Controller Box is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Controller Box goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. There is no problem if it blinks slowly (at intervals of one second).

- (f) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.

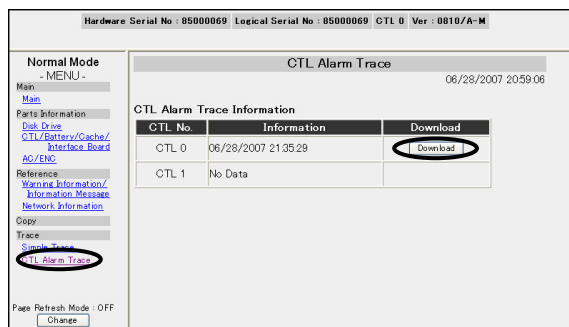
- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.



**Figure 5.4.2 Indication Locations and Names of LED (Front Bezel)**

## (2) Procedure for collecting a CTL Alarm Trace

- (a) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button. (For the procedure for connecting the Web, refer to “[Chapter 3. Before Starting WEB Connection](#)” (TRBL 03-0000).)
- (b) When Windows XP Service Pack2, Windows 2003 Service Pack1 or Windows Vista is used in the OS of the maintenance PC, collect the CTL Alarm Trace after changing the setting of the following Internet Explorer.
  - Select [Tools] - [Internet Options] from the Internet Explorer menu.
  - Select the [Privacy] tab, check [Blocked pop-up] of [Pop-up block], and click the [Set] button.
  - Set [Filter level] to [Medium] in the [Setting pop-up block] window and click the [Close] button.
  - Select [OK] button in the [Internet Options] window.
- (c) Collect the memory dump according to the WEB and the following procedure.  
Click “CTL Alarm Trace” in the menu frame.  
The CTL Alarm Trace Information window is displayed when the CTL alarm trace information is present.



The following is displayed as contents of the information.

[Not Ready] .....: A status in which the trace area is not established in the array

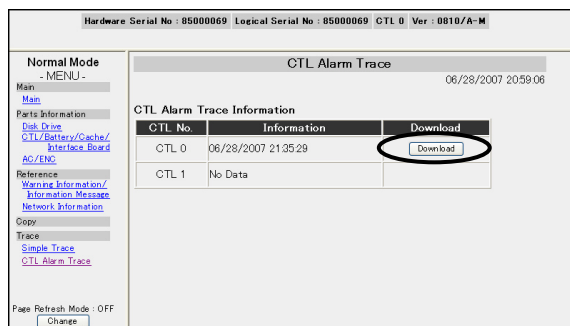
[Not Data] .....: A status in which the CTL Alarm trace information is not present or being generated

[MM/DD/20XY hh:mm:ss] .: A status in which the CTL alarm trace information is present

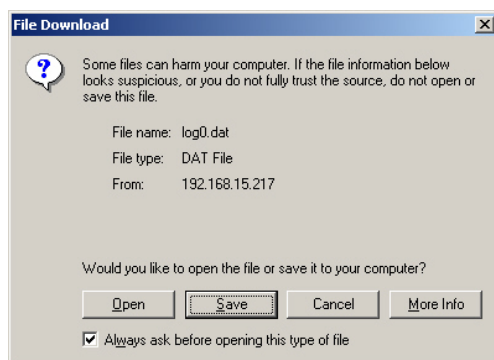
NOTE : When “Not Ready” or “No Data” is displayed on the description of “Information”, or when the date of the information is different from that of the collection of this time, the CTL alarm trace may not be collected normally. Connect the Maintenance PC to the LAN port of the blocked Controller, and collect the simple trace.

If simple trace cannot be obtained through detached Controller, connect the Maintenance PC to the Controller at the opposite side, and collect the simple trace.

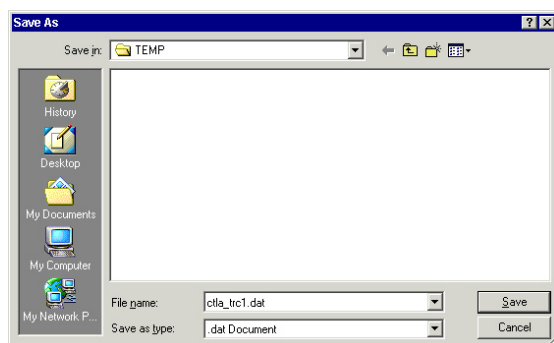
- (d) To download the CTL Alarm trace information, press the “Download” button on the Controller side to be collected in “CTL Alarm Trace information”.



- (e) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.

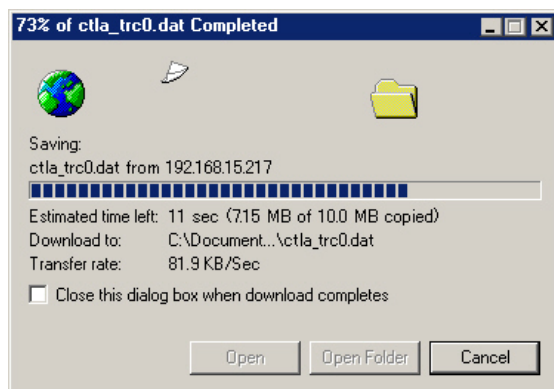


- (f) If the following window is displayed, please click [Save] after file name is setting, if it is continued.<sup>(†1)</sup> Please click [Cancel], if it is stopped.



<sup>†1</sup> : There may be a case where the default file name is given as “ctla\_trc0.dat.dat” depending on the setting of the PC. In this case, “.dat” is deleted or any other name.

- (g) The following window is displayed during execution download.



- (h) When the downloading completes, the progress indicating message window is closed.

This procedure is collected by WEB Normal mode. Similarly, CTL Alarm Trace can be collected by WEB Maintenance mode through Menu Frame.

For entering Maintenance mode refer to [WEB "3.1 Transferring to the Maintenance Mode"](#) (WEB 03-0000).

## 5.5 Collecting Full Dump

The method of collecting the Full Dump is shown below.

### (1) Before collecting the Full Dump

#### (a) Items to be prepared

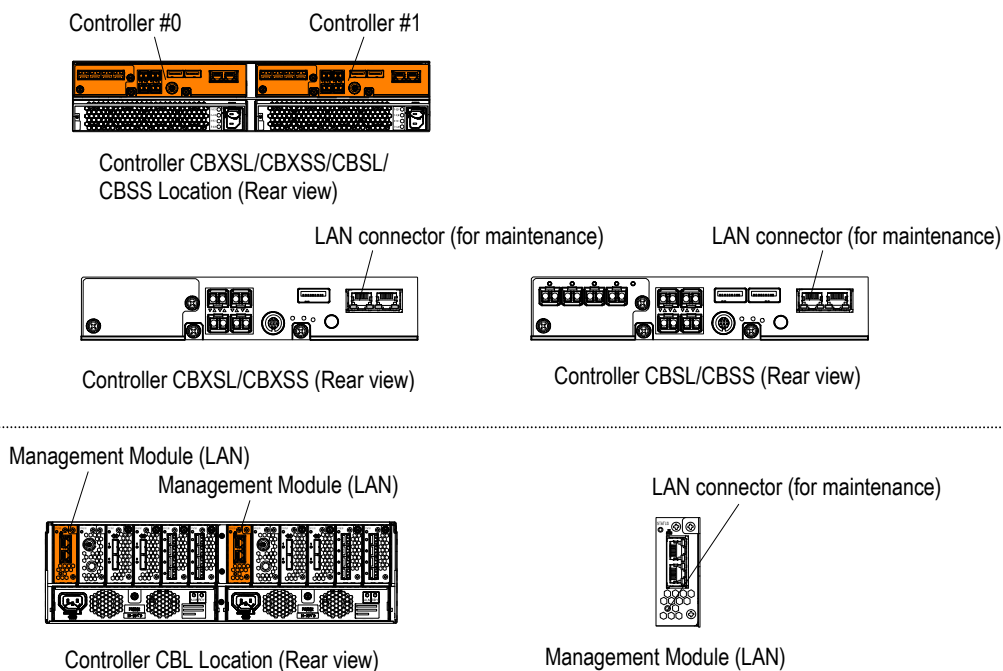
The Full Dump is collected in the maintenance mode of the WEB.

For connecting to the WEB, a maintenance PC terminal with Browser installed is necessary.

For collecting the Full Dump, disk space of 15.0 G bytes per one Controller is required. (7.5 G bytes for temporary data and 7.5 G bytes for Full Dump data)

The Full Dump collection time may take longer than usual depending on the setting of the maintenance PC, so that check the setting of the maintenance PC again (refer to [“Chapter 3. Before Starting WEB Connection” \(TRBL 03-0000\)](#)).

#### (b) Connect the LAN-Connector for maintenance and the LAN-Connector of Maintenance PC with a LAN-cross-cable.



**Figure 5.5.1 LAN Connector Location**

- (c) Collect the Full Dump information from each Controller.

Save the files collected from different controllers into different directories or put different names to them so that you will see from which controller they were collected.

- (d) Check that the READY LED (green) on the front of the Controller Box is not blinking at high speed.

When the READY LED (green) on the front of the Controller Box is blinking at high speed, wait for the maximum of 30 to 60 minutes (or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)) until the READY LED (green) lights up because the automatic download of the ENC firmware and the backup controller firmware is being executed.

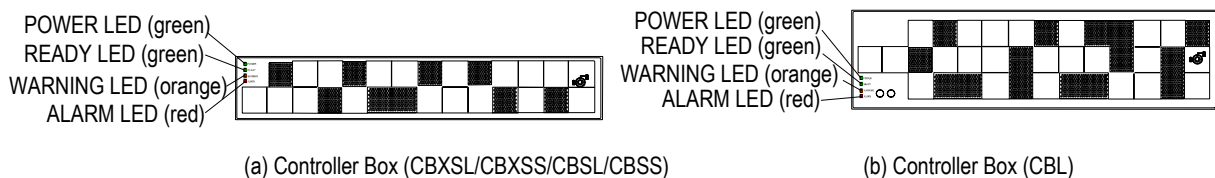
- (e) Check that the WARNING LED (orange) on the front of the Controller Box is not blinking at high speed.

When the WARNING LED (orange) on the front of the Controller Box is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Controller Box goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed. There is no problem if it blinks slowly (at intervals of one second).

- (f) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.

- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - and [Delete Files] in this order.

- (g) When the DBF is connected, collect the simple trace as well. For how to collect the simple trace, refer to [“5.3 Collecting simple trace” \(TRBL 05-0040\)](#).

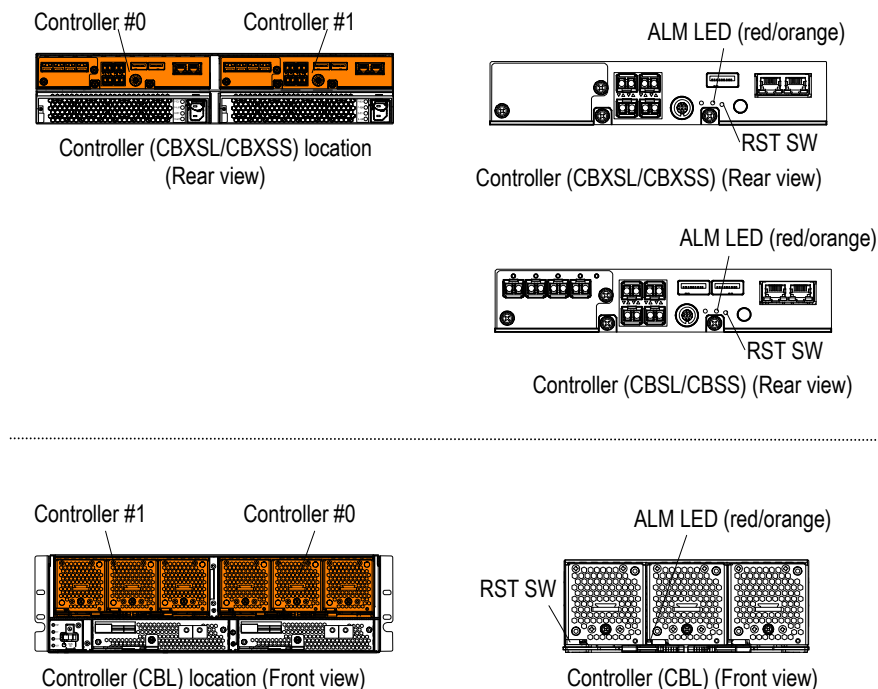


**Figure 5.5.2 Indication Locations and Names of LED (Front Bezel)**

## (2) Procedure for a Full Dump collection in the single system (for CBXSL/CBXSS/CBSL/CBSS)

- NOTE :
- In the array where the Power Saving/Power Saving Plus of the priced option is used, when RAID group whose power saving status is “Normal (command monitoring)” exists, do not change to the Maintenance Mode. Change to the Maintenance Mode after completing the spin-down, or have the user perform the spin-down or spin-up instruction, and then change to the Maintenance Mode after there is no RAID group whose power saving status is “Normal (command monitoring)”.
  - The appropriate Controller is blocked by pushing down the RST SW on the Controller. As this prevents you from accessing the array from the higher level device, verify the effects on your customer’s operation.

- (a) Please push the RST SW of Controller. (While pressing RST SW, the RST LED (orange) is on.) Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter). (The Controller enters the WEB maintenance mode.)

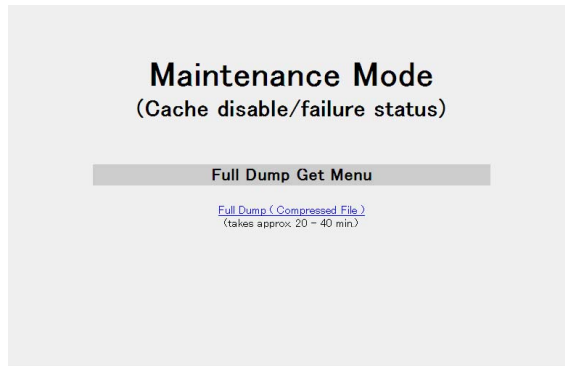


**Figure 5.5.3 Indication Locations of Controller**

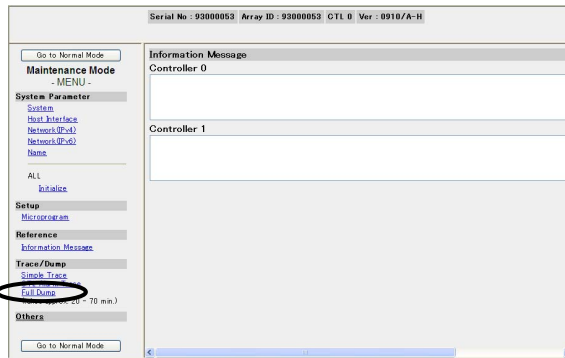
- (b) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Refresh button or click the [View] - [Refresh]. (For the procedure for connecting the Web, refer to [“Chapter 3. Before Starting WEB Connection” \(TRBL 03-0000\)](#).) A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].



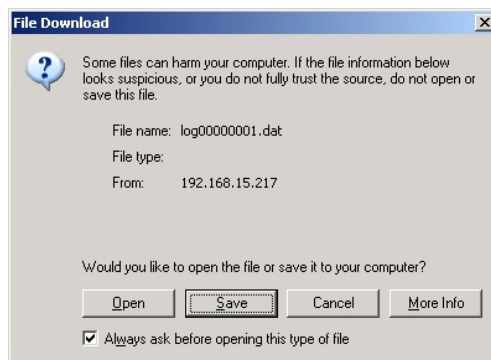
The cache memory access failure occurs when the following window is displayed. Refer to WEB “3.1.1 WEB Operation in the Maintenance Mode during the Cache Memory Access Failure” (WEB 03-0050).



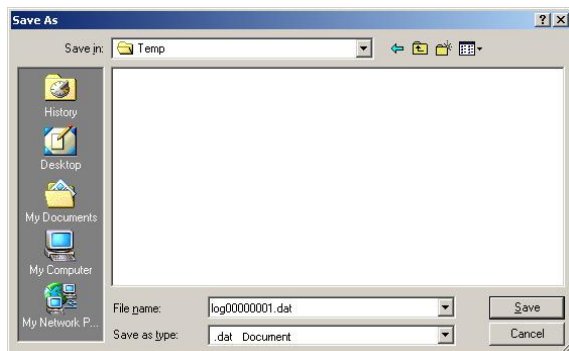
- (c) Collect the Full Dump according to the WEB and the following procedure. Please click “Full Dump”.



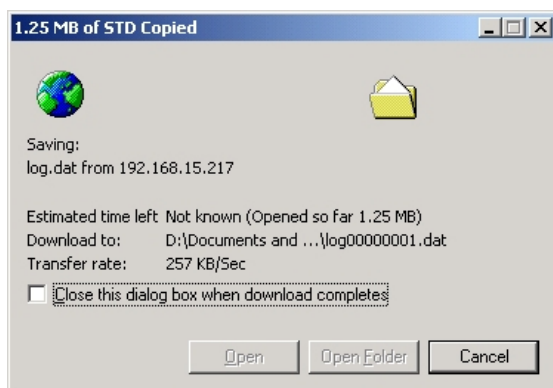
- (d) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



- (e) If the following window is displayed. Please click [Save] after file name is setting, if it is continued.<sup>(†1)</sup> Please click [Cancel], if it is stopped.



- (f) The following window is displayed during execution download.  
There is no problem although it is displayed that the presumption remaining time is uncertain.



- (g) When the downloading completes, the progress indicating message window is closed.

There is no problem although it is displayed that the presumption remaining time is uncertain in the dialog box during the download.

<sup>†1</sup> : There may be a case where the default file name is given as "logx.dat.dat" depending on the setting of the PC.  
In this case, ".dat" is deleted or any other name. (x: Controller serial numbers)

### (3) Method of collecting Full Dump from dual-Controller system-1

Interrupting the customer operation and collecting Full Dump information of the both Controllers under dual system configuration

NOTE : • In the array where the Power Saving/Power Saving Plus of the priced option is used, when RAID group whose power saving status is “Normal (command monitoring)” exists, do not change to the Maintenance Mode. Change to the Maintenance Mode after completing the spin-down, or have the user perform the spin-down or spin-up instruction, and then change to the Maintenance Mode after there is no RAID group whose power saving status is “Normal (command monitoring)”.

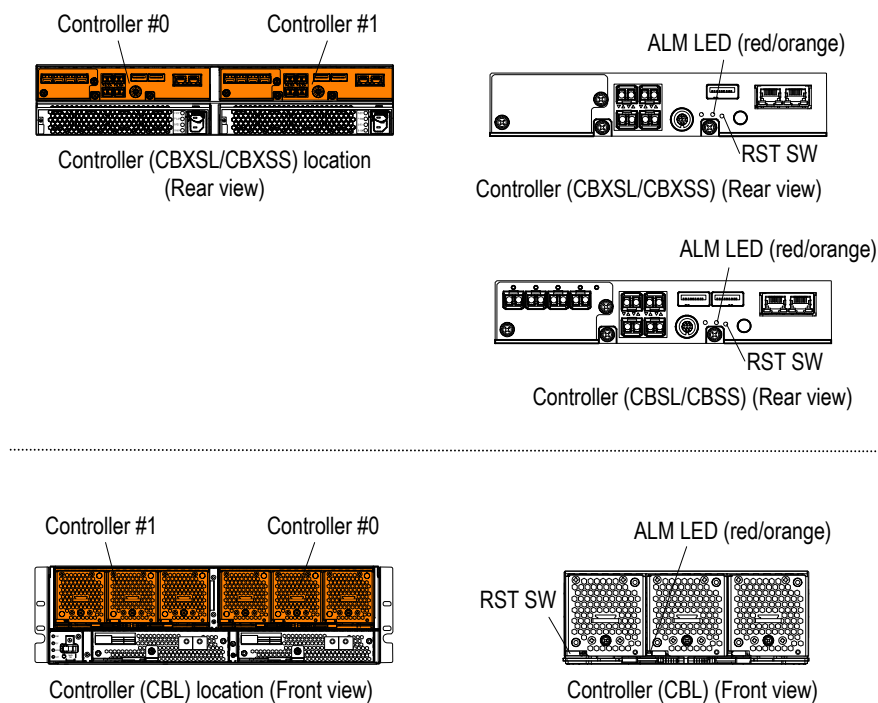
- The appropriate Controller is blocked by pushing down the RST SW on the Controller. As the blockage in both Controllers prevents you from accessing the array from the higher level device, verify the effects on your customer’s operation.
- When the Full Dump is collected with the Controller blocked, it is necessary to collect the Full Dump from the Controller that is blocked.

(a) Press the RST SW of the blocked Controller. (If both Controllers are normal or blocked, press the RST SW of either one.) (While pressing RST SW, the RST LED (orange) is on.

Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

Wait for a while (about ten seconds) and check that the ALM LED (red) of the Controller lights up. Within ten seconds after the ALM LED (red) lights up, press the RST SW of the other Controller.

When ten seconds or longer pass after the ALM LED (red) of the Controller concerned comes on, return to the beginning of the step (a) and execute the procedure over again. (When the above procedure is executed, the both Controllers enter the Maintenance mode of the WEB.) The ALM LED (red) on the Controller of which RST SW was pressed first goes off, and READY LED (green) on the Front Bezel goes off.

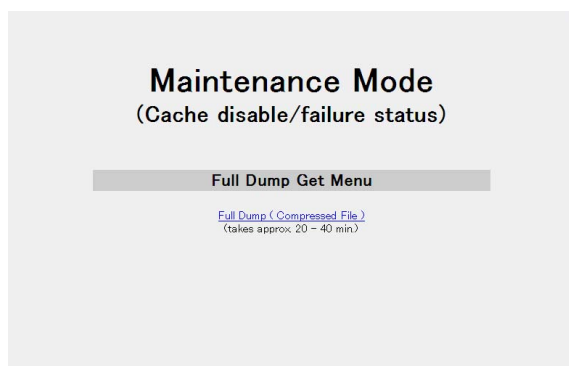


**Figure 5.5.4 Indication Locations of Controller**

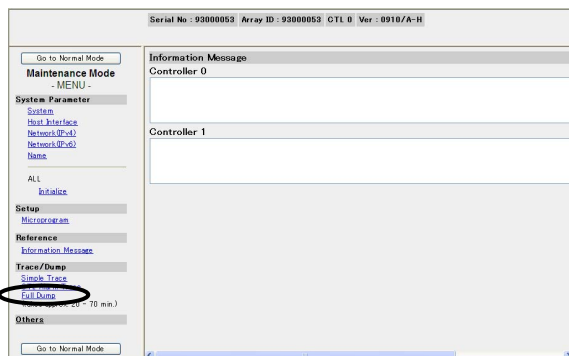
- (b) Input the IP address of the controller from which the Full Dump will be collected, through the browser. If the system has been connected to the WEB, press the “Refresh” button to update the page.

A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].

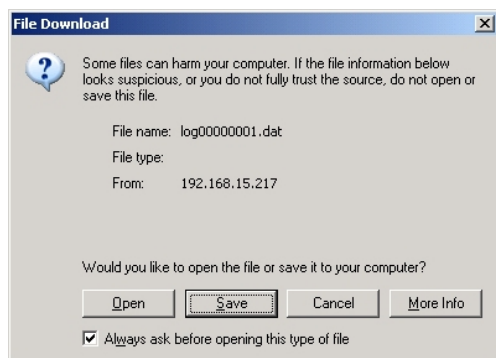
The cache memory access failure occurs when the following window is displayed. Refer to [WEB “3.1.1 WEB Operation in the Maintenance Mode During the Cache Memory Access Failure” \(WEB 03-0050\)](#).



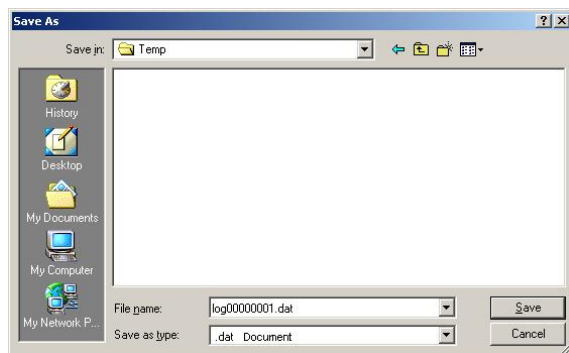
- (c) Collect the Full Dump according to the WEB and the following procedure.  
Please click “Full Dump”.



- (d) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



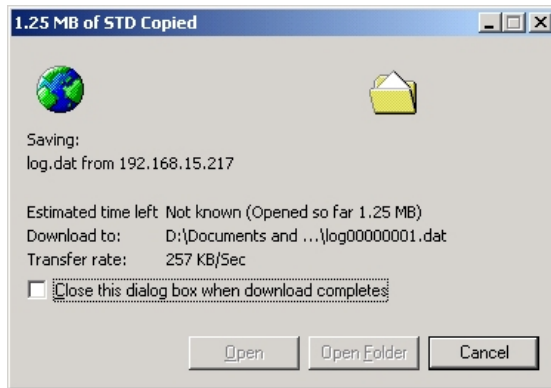
- (e) If the following window is displayed, please click [Save] after file name is setting, if it is continued.<sup>(†1)</sup> Please click [Cancel], if it is stopped.



<sup>†1</sup> : There may be a case where the default file name is given as “logx.dat.dat” depending on the setting of the PC.  
In this case, “.dat” is deleted or any other name.

- (f) The following window is displayed during execution download.

There is no problem although it is displayed that the presumption remaining time is uncertain.



- (g) When the downloading completes, the progress indicating message window is closed.

There is no problem although it is displayed that the presumption remaining time is uncertain in the dialog box during the download.

- (h) Return to (b) and collect the Full Dump from the other Controller.

(Save the Full Dump files collected from different Controllers into different directories or put different names to them so that you will see from which controller they were collected.)

## (4) Method of collecting Full Dump from dual-Controller system-2

## Collecting Full Dump information of detached Controller under dual system configuration

NOTE : • In the array where the Power Saving/Power Saving Plus of the priced option is used, when RAID group whose power saving status is “Normal (command monitoring)” exists, do not change to the Maintenance Mode. Change to the Maintenance Mode after completing the spin-down, or have the user perform the spin-down or spin-up instruction, and then change to the Maintenance Mode after there is no RAID group whose power saving status is “Normal (command monitoring)”.

- Collect the Full Dump from only the blocked Controller. (The ALM LED (red) of the blocked controller is lighting up.)

(a) Press the RST SW of the blocked Controller. (While pressing RST SW, the RST LED (orange) is on.)

Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter). (The Controller will be set in the maintenance mode of the WEB.)

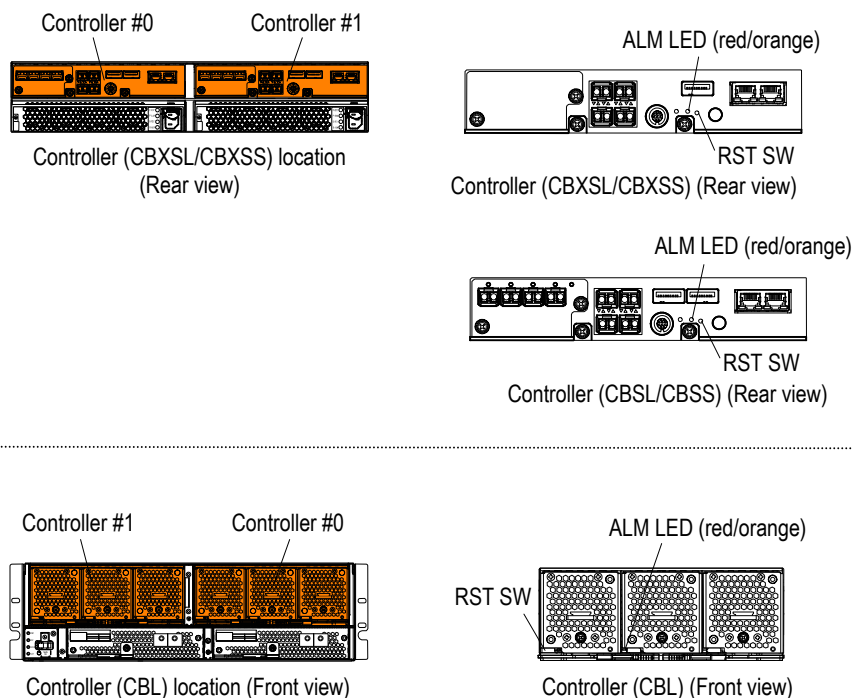


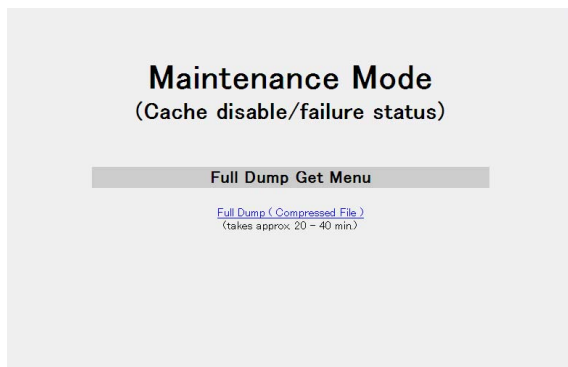
Figure 5.5.5 Indication Locations of Controller

- (b) Input the IP address of the Controller from which the blocked Controller, through the browser.

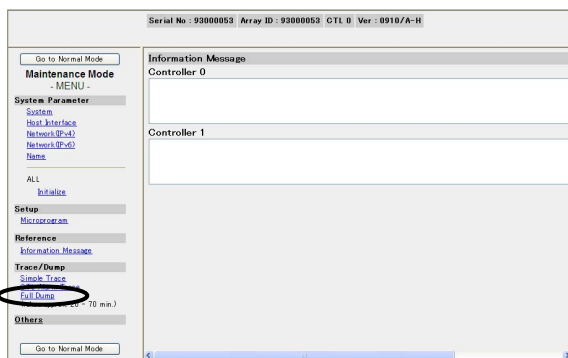
If the system has been connected to the WEB, press the update button to update the page.

A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].

The cache memory access failure occurs when the following window is displayed. Refer to [WEB “3.1.1 WEB Operation in the Maintenance Mode during the Cache Memory Access Failure” \(WEB 03-0050\)](#).



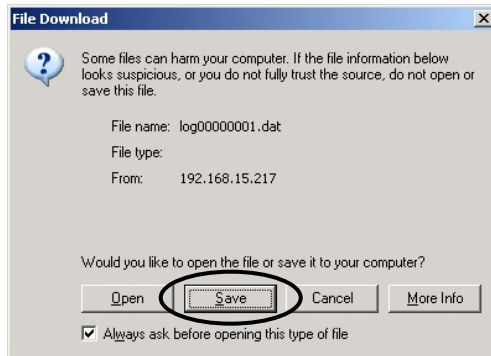
- (c) Collect the Full Dump according to the WEB and the following procedure.  
Click “Full Dump” in the menu frame of “Trace/Dump”.





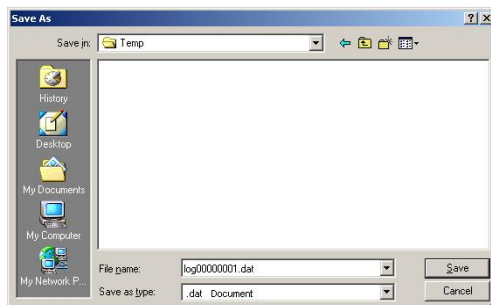
The following dialog is displayed. Click the [Save] button.

If the following dialog is not displayed even after five minutes passed, click the [Close] button on the upper right of the browser and close the browser. After that, open the browser again and retry from the procedure (b).



Select the place to save the file and file name (Default file name: logx.dat <x:Controller serial numbers>) and click [Save]<sup>(#1)</sup>.

When the download is not completed<sup>(#2)</sup> or the message window is not displayed even after five minutes passed, click the [Close] button on the upper right of the browser and close the browser. After that, open the browser again and retry from the procedure (b).



The downloading is started and the progress indicating message window is displayed.

When the downloading completes, the progress indicating message window is closed.

There is no problem although it is displayed that the presumption remaining time is uncertain in the dialog box during the download.

#1 : There may be a case where the default file name is given as "logx.dat.dat" depending on the setting of the PC. In this case, ".dat" is deleted or any other name.

#2 : Refer to the content displayed in "Full Dump" in "Trace/Dump" listed in the menu frame of WEB for the standard at time that the download of the Full Dump is completed.

## 5.6 Dump Collection of Flash Drives (FMD)

This is a function to collect the dump information of the Flash Drives (FMD) installed in the box by the service PC when the performance of the RAID Group configured with the Flash Drives (FMD) deteriorates or the write lifetime rate/battery lifetime rate increases.

### 5.6.1 Restrictions on Dump Collection of Flash Drives (FMD)

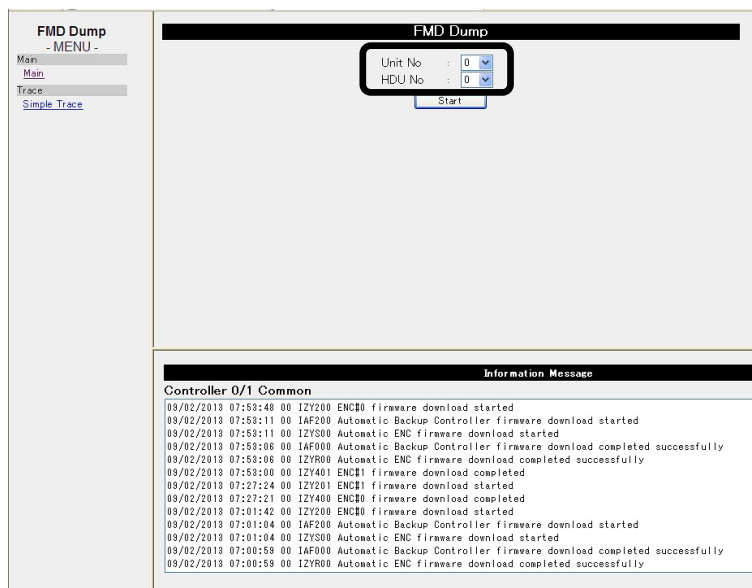
- (1) You cannot collect the dump of the blocked Flash Drives (FMD).
- (2) Do not collect the dump of Flash Drives (FMD) during update installation.  
Collect dump of Flash Drives (FMD) after checking that "I19000 Online microprogram update completed [The firmware version \*\*\*\*\*]" is displayed in the Information Message on WEB.

### 5.6.2 Procedure for Collecting the Dump of Flash Drives (FMD)

- (1) Input "http://IP-Address/fmd\_dmp of Controller #0 connecting WEB/drvfirm" in URL of a browser.  
When the "Enter Network Password" is displayed, enter [User Name] and [Password] and click the [OK] button.

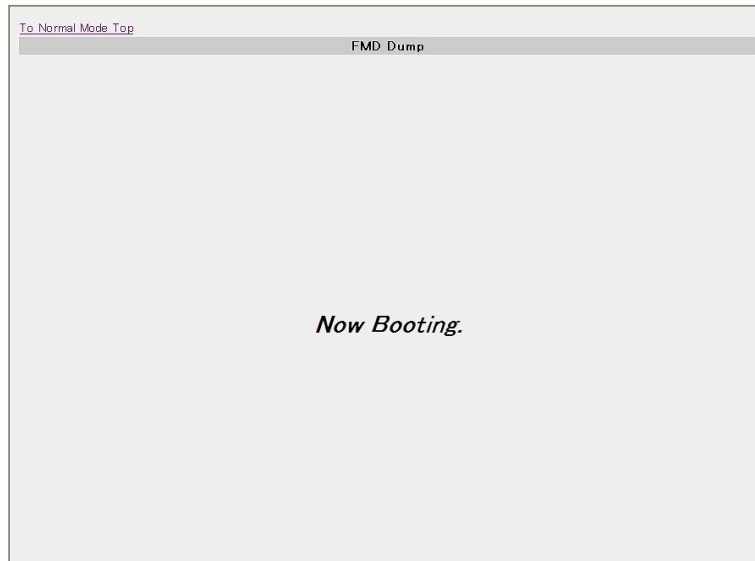


- (2) The dump collection window of Flash Drives (FMD) is displayed. Specify Unit No. and HDU No. of the collection target.



- When the system is starting, the dump collection window of Flash Drives (FMD) is not displayed and the following window is displayed.

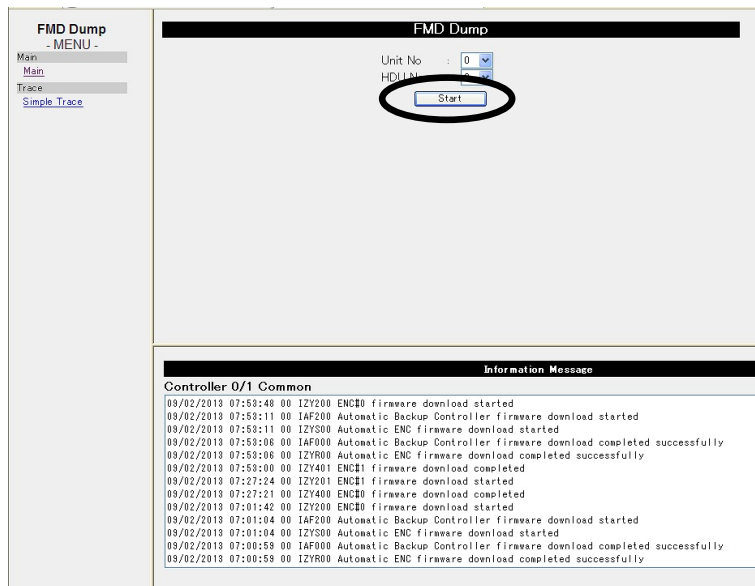
After the system becomes Ready, perform the procedure from Step (1) again.



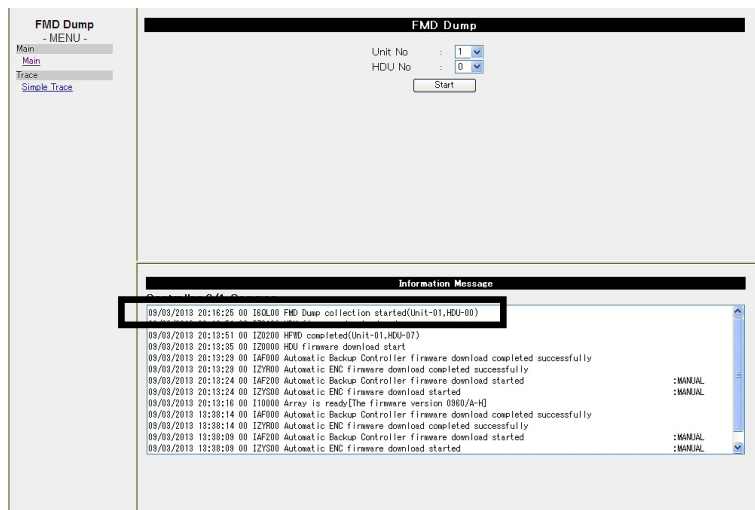
- If no Flash Drive (FMD) is installed in the system, the dump collection window of Flash Drives (FMD) is not displayed and the following window is displayed.



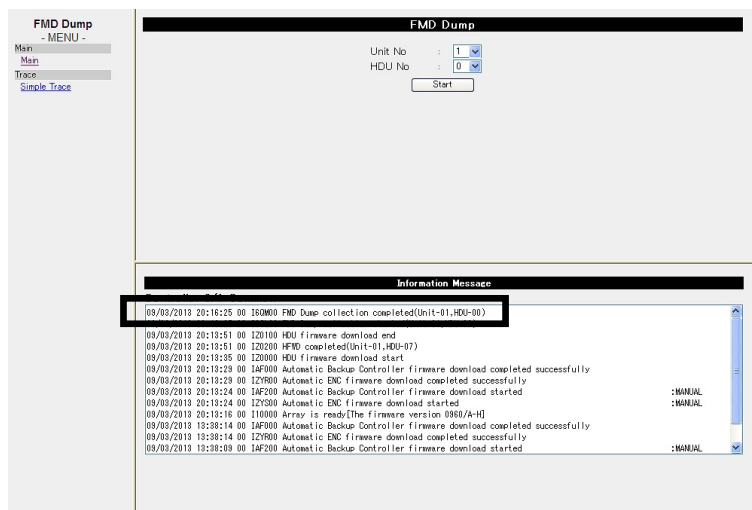
- (3) Click the [Start] button in the dump collection window of Flash Drives (FMD).  
The dump collection function of Flash Drives (FMD) operates.



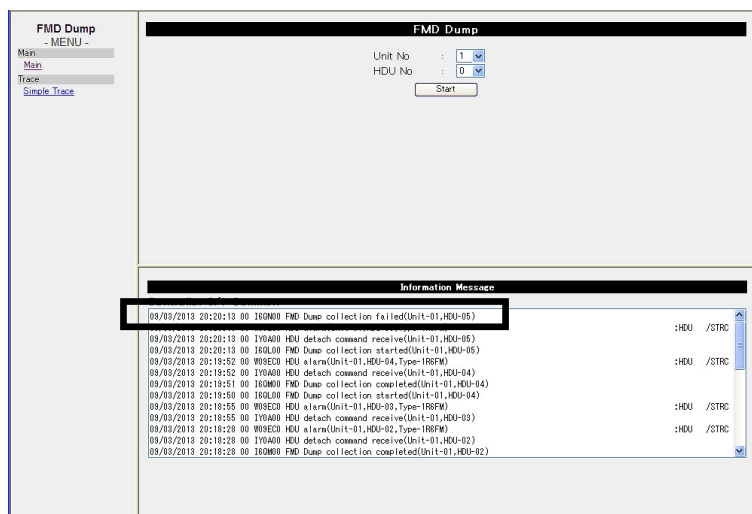
- (4) Press “F5 key” or click the update button in the browser in the dump collection window of Flash Drives (FMD) to reload.  
The message “I6QL00 FMD Dump collection started (Unit-x, HDU-y)” is displayed in Information Message and the dump collection processing of Flash Drives (FMD) starts.  
When it is not displayed, check Information Message. If a failure has occurred, eliminate the failure and perform the procedure from Step (1) again.



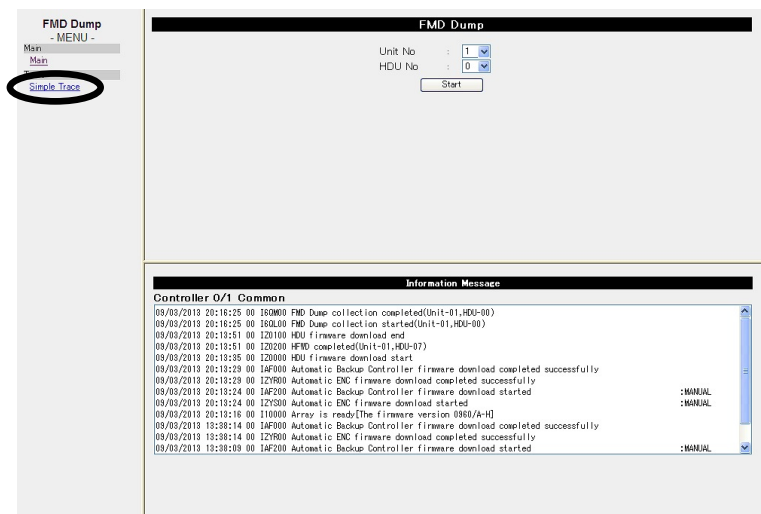
- If the message “I6QM00 FMD Dump collection completed (Unit-x, HDU-y)” is displayed in Information Message, the dump collection of Flash Drives (FMD) is completed.



- If the message “I6QN00 FMD Dump collection failed (Unit-x, HDU-y)” which indicates a dump collection failure of Flash Drives (FMD) is displayed, recover the failure in accordance with Information Message, and then perform the procedure from Step (1) again.



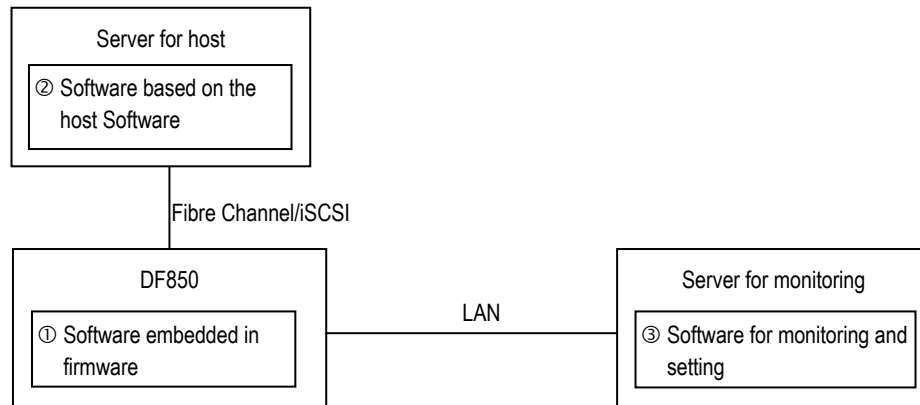
- (5) After completing the dump collection of Flash Drives (FMD), click the [Simple Trace] button to collect the simple trace.



## Chapter 6. Data Collection when a Failure Occurs in Program Product (P.P.)

### 6.1 P.P.s Required for Maintenance

P.P.s included in DF850 required for maintenance are divided mainly into two categories (Fibre Channel/iSCSI) depending on the related part.



**Figure 6.1.1 P.Ps Required for Maintenance and its Related Parts**

- ① Software embedded in Firmware:  
Is software embedded in Firmware in DF850. This software will be enabled by unlocking.
- ② Software based on the host:  
Is software performed and installed on server for host connected to the DF850 with Fibre Channel/iSCSI interface.
- ③ Monitoring, setting software:  
Is software performed and installed on the monitoring server / PC connected to the DF850 with a LAN.

The P.Ps required for maintenance are shown in [Table 6.2.1](#).

## 6.2 Locating Failed Part

Identify a part which presents the phenomenon using [Table 6.2.1](#) and execute an appropriate procedure. Collect a trace from the DF850 in every case.

**Table 6.2.1 Program Product To be Recovered**

No.	Program product	Type	Object for maintenance (*1)	Related part			Related manual
				Basic firmware	Host computer	Monitoring	
1	Hitachi Storage Navigator Modular 2	P-002D-J501	③	○	—	○	• <a href="#">Hitachi Storage Navigator Modular 2 (for GUI) User's Guide</a>
2	ShadowImage in-system replication (include RAID Manager)	P-002D-J511/ P-002D-J511W	①, ②	○	○	—	• <a href="#">ShadowImage in-system replication User's Guide</a> • <a href="#">Command Control Interface Reference Guide</a>
3	TrueCopy remote replication (include RAID Manager)	P-002D-J512/ P-002D-J512W	①, ②	○	○	—	• <a href="#">TrueCopy remote replication User's Guide</a> • <a href="#">Command Control Interface Reference Guide</a>
4	TrueCopy Extended Distance (include RAID Manager)	P-002D-J515/ P-002D-J515W	①, ②	○	○	—	• <a href="#">TrueCopy Extended Distance User's Guide</a> • <a href="#">Command Control Interface Reference Guide</a>
5	Copy-on-write SnapShot (include RAID Manager)	P-002D-J510/ P-002D-J510W	①, ②	○	○	—	• <a href="#">Copy-on-write SnapShot User's Guide</a> • <a href="#">Command Control Interface Reference Guide</a>
6	Data Retention Utility (include RAID Manager)	P-002D-J509/ P-002D-J509W	①, ②	○	○	—	• <a href="#">Data Retention Utility User's Guide</a> • <a href="#">Command Control Interface Reference Guide</a>
7	LUN Manager	P-002D-J508/ P-002D-J508W	①	○	—	—	• <a href="#">LUN Manager User's Guide</a>
8	Cache Residency Manager	P-002D-J505	①	○	—	—	• <a href="#">Cache Residency Manager User's Guide</a>
9	SNMP Agent Support Function	P-002D-J503	①	○	—	—	• <a href="#">SNMP Agent Support Function User's Guide</a>
10	Password Protection	P-002D-J502	①	○	—	—	• <a href="#">Password Protection User's Guide</a>
11	Performance Monitor	P-002D-J506	①	○	—	—	• <a href="#">Performance Monitor User's Guide</a>
12	Cache Partition Manager	P-002D-J507	①	○	—	—	• <a href="#">Cache Partition Manager User's Guide</a>

\*1 : ①: DF850 main body (Refer to [“6.2.1 When a Failure Occurs in the DF850 Main Body”](#) (TRBL 06-0030).)

②: Host system server connected to the DF850 (Refer to [“6.2.2 When a Failure Occurs in a Host System Server”](#) (TRBL 06-0030).)

③: Server for monitoring and setting connected to the DF850 (Refer to [“6.2.3 When a Failure Occurs in a Server for Monitoring and Setting”](#) (TRBL 06-0030).)



No.	Program product	Type	Object for maintenance (*1)	Related part			Related manual
				Basic firmware	Host computer	Monitoring	
13	In-System Replication Bundle	P-002D-J513/ P-002D-J513W	①	○	—	—	<ul style="list-style-type: none"> <li>ShadowImage in-system replication User's Guide</li> <li>Copy-on-write SnapShot User's Guide</li> <li>Command Control Interface Reference Guide</li> </ul>
14	Modular Volume Migration	P-002D-J516/ P-002D-J516W	①, ②	○	○	—	<ul style="list-style-type: none"> <li>Modular Volume Migration User's Guide</li> <li>Command Control Interface Reference Guide</li> </ul>
15	Account Authentication	P-002D-J517	①	○	—	—	<ul style="list-style-type: none"> <li>Account Authentication User's Guide</li> </ul>
16	Audit Logging	P-002D-J518	①	○	—	—	<ul style="list-style-type: none"> <li>Audit Logging User's Guide</li> </ul>
17	Power Saving	P-002D-J519	①	○	—	—	<ul style="list-style-type: none"> <li>Power Saving User's Guide</li> </ul>
18	Power Saving Plus	P-002D-J530	①	○	—	—	<ul style="list-style-type: none"> <li>Power Saving Plus User's Guide</li> </ul>
19	Tray Power Saving	P-002D-J521	①	○	—	—	<ul style="list-style-type: none"> <li>Tray Power Saving User's Guide</li> </ul>
20	Dynamic Provisioning	P-002D-J523/ P-002D-J523W	①	○	—	—	<ul style="list-style-type: none"> <li>Dynamic Provisioning User's Guide</li> </ul>
21	Dynamic Tiering	P-002D-J528/ P-002D-J528W	①	○	—	—	<ul style="list-style-type: none"> <li>Dynamic Tiering User's Guide</li> </ul>
22	TrueCopy remote replication with Modular Distributed	P-002D-J512M/ P-002D-J512MW	①, ②	○	○	—	<ul style="list-style-type: none"> <li>TureCopy Modular Distributed User's Guide</li> </ul>
23	TrueCopy remote replication with Modular Distributed (Sync)	P-002D-J512N/ P-002D-J512NW	①, ②	○	○	—	<ul style="list-style-type: none"> <li>TureCopy Modular Distributed User's Guide</li> </ul>
24	Upgrade TrueCopy remote replication with Modular Distributed	P-002D-J522/ P-002D-J522N	①, ②	○	○	—	<ul style="list-style-type: none"> <li>TureCopy Modular Distributed User's Guide</li> </ul>
25	Data At Rest Encryption	P-002D-J527	①	○	—	—	<ul style="list-style-type: none"> <li>Data At Rest Encryption User's Guide</li> </ul>

\*1 : ①: DF850 main body (Refer to "6.2.1 When a Failure Occurs in the DF850 Main Body" (TRBL 06-0030).)

②: Host system server connected to the DF850 (Refer to "6.2.2 When a Failure Occurs in a Host System Server" (TRBL 06-0030).)

③: Server for monitoring and setting connected to the DF850 (Refer to "6.2.3 When a Failure Occurs in a Server for Monitoring and Setting" (TRBL 06-0030).)

In the cases of a difficult failure that has a complicated relation with the system configuration, also collect information on configurations of the system and the DF850 and types of program products being used because they may be important.

## 6.2.1 When a Failure Occurs in the DF850 Main Body

Take recovery actions referring to [“Chapter 1. Flowchart for Troubleshooting” \(TRBL 01-0000\)](#) in the Maintenance Manual for Maintenance.

## 6.2.2 When a Failure Occurs in a Host System Server

### (1) In the case of RAID Manager

- ① If a failure has occurred in the DF850, give priority to investigation of it (see [“Troubleshooting”](#)).
- ② Getting an error message  
In the case where an error occurs when a command is input, an error code and an error message are output in the following line.  
A format of a set of an error code and message is shown below.  
[EX-xxxxxx] error message text  
Refer to [Section 2.5, “System Log and Command Error Message”](#) in the [“Command Control Interface Reference Guide”](#) Refer to an error message and recovery measures given based on the error code.
- ③ Collecting the SYS log  
Check the system log because an error message may be written in it.  
Since information on the error code, [HORM-xxx], is related to [Command Control Interface Reference Guide](#), refer to [Section 2.5, “System Log and Command Error Message”](#) and follow instructions given in it.
- ④ For the log peculiar to the product, refer to [Section 3, “Log File for Maintenance and Trace Function”](#) in the [“Command Control Interface Reference Guide”](#) and collect the information.

## 6.2.3 When a Failure Occurs in a Server for Monitoring and Setting

### (1) In the case of Hitachi Storage Navigator Modular 2

- ① Taking an action following an error message  
Since an error message is displayed when an error occurs in operation of Hitachi Storage Navigator Modular 2, take a recovery action following the message.
- ② Collecting log files  
Collect log files of Hitachi Storage Navigator Modular 2.  
Get all files that are subordinate to the log directory under the program installation directory of Hitachi Storage Navigator Modular 2 together with the log directory.  
When no log directory exists under the program installation directory of Hitachi Storage Navigator Modular 2, get all files that are subordinate to the log directory under the directory, for which the environmental variable is specified as STONAVM\_HOME, together with the log directory.
- ③ Getting operation environment  
Get a version number, operation environment (OS and model) and operation of Hitachi Storage Navigator Modular 2.

### 6.3 List of Data to be Collected when a P.P. Failure Occurs

**Table 6.3.1 List of Data of Program Product (to be Recovered) to be Collected**

Legend: ○: Collection is needed.

No.	Program product (P.P.)	Array main body trace	Information needed to be collected			
			P.P LOG	SYS LOG	P.P message	Getting of operation environment
1	Hitachi Storage Navigator Modular 2	○	Get all files that are subordinate to the following log directories together with the log directories. The storage directory A log directory under the program installation directory of Hitachi Storage Navigator Modular 2. When the directory described above does not exist, a log directory under the directory for which the environmental variable is specified as STONAVM_HOME.	—	○	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
2	ShadowImage in-system replication (include RAID Manager)	○	(See <a href="#">Table 6.3.2</a> )			
3	TrueCopy remote replication (include RAID Manager)	○				
4	TrueCopy Modular Distributed	○				
5	TrueCopy Extended Distance (include RAID Manager)	○				
6	Copy-on-write SnapShot (include RAID Manager)	○				
7	Data Retention Utility (include RAID Manager)	○				
8	LUN Manager	○	—	○	—	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
9	Cache Residency Manager	○	—	—	—	—
10	SNMP Agent Support Function	○	—	—	—	—
11	Password Protection	○	—	—	—	—
12	Performance Monitor	○	—	○	—	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
13	Cache Partition Manager	○	—	○	—	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details

Legend: ○: Collection is needed.

No.	Program product (P.P.)	Array main body trace	Information needed to be collected			
			P.P LOG	SYS LOG	P.P message	Getting of operation environment
14	Modular Volume Migration	○	(See <a href="#">Table 6.3.2</a> )			
15	Account Authentication	○	—	—	—	—
16	Audit Logging	○	—	—	—	—
17	Power Saving	○	—	—	—	—
18	Power Saving Plus	○	—	—	—	—
19	Tray Power Saving	○	—	—	—	—
20	Dynamic Provisioning	○	—	—	—	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
21	Dynamic Tiering	○	—	—	—	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
22	Data At Rest Encryption	○	—	—	—	—

Table 6.3.2 List of Collection Information on Program Product Related to RAID Manager

No.	Program product	Information to be collected	Collection method/Storage
1	ShadowImage in-system replication (include RAID Manager)	Trace (dump) of array	Refer to "Chapter 5. Collecting Error Information" (TRBL 05-0000).
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. \$HORCM_LOG (operation log, error log, trace, core) \$HPRCC_LOG (command log) \$HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo \$HORCM_LOG", etc. Windows family: "set," "set HORC," etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog  For the details, refer to Appendix B, "Log File and Trace Function" in the "RAID Manager User's Guide".
		Configuration definition file	UNIX family /etc/horcm*conf *: Instance number
			Windows family Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family Syslog Windows family Eventing
		System configuration diagram	Request of a user
2	TrueCopy remote replication (include RAID Manager)	Trace (dump) of two units of array which make-up a pair	Refer to "Chapter 5. Collecting Error Information" (TRBL 05-0000).
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. \$HORCM_LOG (operation log, error log, trace, core) \$HPRCC_LOG (command log) \$HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo \$HORCM_LOG", etc. Windows family: "set," "set HORC," etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog  For the details, refer to Appendix B, "Log File and Trace Function" in the "RAID Manager User's Guide".
		Configuration definition file	UNIX family /etc/horcm*conf *: Instance number
			Windows family Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family Syslog Windows family Eventing
		System configuration diagram	Request of a user.
		Host OS revision	Request of a user.

No.	Program product	Information to be collected	Collection method/Storage
3	TrueCopy Extended Distance (include RAID Manager)	Trace (dump) of two units of array which make-up a pair	Refer to "Chapter 5. Collecting Error Information" (TRBL 05-0000).
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. \$HORCM_LOG (operation log, error log, trace, core) \$HPRCC_LOG (command log) \$HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo \$HORCM_LOG", etc. Windows family: "set", "set HORC," etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog  For the details, refer to Appendix B, "Log File and Trace Function" in the "RAID Manager User's Guide".
		Configuration definition file	UNIX family /etc/horcm*conf *: Instance number
			Windows family Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family Syslog
			Windows family Eventing
		System configuration diagram	Request of a user.
4	Copy-on-write SnapShot (include RAID Manager)	Trace (dump) of array	Refer to "Chapter 5. Collecting Error Information" (TRBL 05-0000).
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. \$HORCM_LOG (operation log, error log, trace, core) \$HPRCC_LOG (command log) \$HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo \$HORCM_LOG", etc. Windows family: "set", "set HORC", etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog  For the details, refer to Appendix B, "Log File and Trace Function" in the "RAID Manager User's Guide".
		Configuration definition file	UNIX family /etc/horcm*conf *: Instance number
			Windows family Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family Syslog
			Windows family Eventing
		System configuration diagram	Request of a user
		Host OS revision	Request of a user

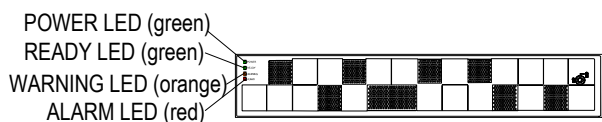
No.	Program product	Information to be collected	Collection method/Storage
5	Data Retention Utility (include RAID Manager)	Trace (dump) of array	Refer to <a href="#">"Chapter 5. Collecting Error Information" (TRBL 05-0000)</a> .
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. \$HORCM_LOG (operation log, error log, trace, core) \$HPRCC_LOG (command log) \$HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo \$HORCM_LOG", etc. Windows family: "set", "set HORC", etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog  For the details, refer to Appendix B, "Log File and Trace Function" in the "RAID Manager User's Guide".
		Configuration definition file	UNIX family /etc/horcm*conf *: Instance number Windows family Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family Syslog Windows family Eventing
		System configuration diagram	Request of a user
		Host OS revision	Request of a user
6	Modular Volume Migration (include RAID Manager)	Trace (dump) of array	Refer to <a href="#">"Chapter 5. Collecting Error Information" (TRBL 05-0000)</a> .
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. \$HORCM_LOG (operation log, error log, trace, core) \$HPRCC_LOG (command log) \$HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo \$HORCM_LOG", etc. Windows family: "set", "set HORC", etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog  For the details, refer to Appendix B, "Log File and Trace Function" in the "RAID Manager User's Guide".
		Configuration definition file	UNIX family /etc/horcm*conf *: Instance number Windows family Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family Syslog Windows family Eventing
		System configuration diagram	Request of a user
		Host OS revision	Request of a user

## Chapter 7. Trouble Analysis by LED Indication

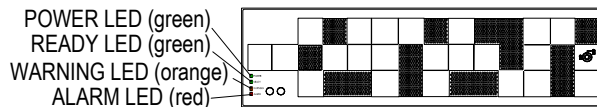
### 7.1 Trouble Analysis by LED Indication of Front Bezel

#### (1) LED locations on Front Bezel

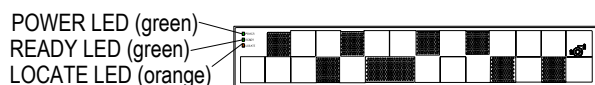
The LED locations are shown below.



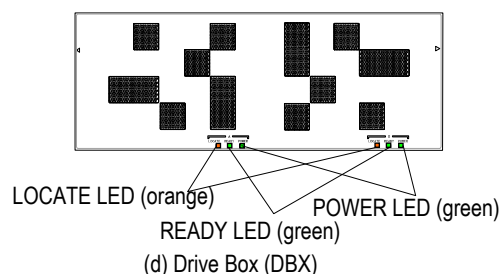
(a) Controller Box (CBXSL/CBXSS/CBSL/CBSS)



(b) Controller Box (CBL)



(c) Drive Box (DBL/DBS/DBF)



(d) Drive Box (DBX)

**Figure 7.1.1 Locations and Names of LED**

#### (2) Trouble analysis procedure

The states of the units indicated by the LED indication patterns of the Front Bezel and the actions to take against them are shown below.

**Table 7.1.1 LED Indication Patterns on Front Bezel**

(○ : On ◇ : Blinking × : Off — : Independent)

No	LEDs								State of unit	Actions to take	Failure
	Controller Box				Drive Box						
	ALARM (R) <sup>(*1)</sup>	WARNING (O) <sup>(*1)</sup>	READY (G) <sup>(*1)</sup>	POWER (G) <sup>(*1)</sup> (O) <sup>(*1)</sup>		POWER (G) <sup>(*1)</sup>	LOCATE (O) <sup>(*1)</sup>	READY (G) <sup>(*1)</sup>			
1 (*2)	×	×	○	○	×	○	×	○	Normal.	Recovery operation is not necessary.	—
2	×	×	×	×	×	—	×	×	<ul style="list-style-type: none"><li>• Power cables are not connected to the Power Units.</li><li>• Trouble of the Power Unit</li><li>• Trouble of two Fan Modules</li><li>• Short failure of each part</li></ul>	Analyze the failure following "7.1 (3) (a) <a href="#">Trouble analysis on the indication on the POWER LED of Controller Box. (When the POWER LED is not on)</a> " (TRBL 07-0040).	Parts failure: (Controller Box) Drive failure: (Controller Box)
	○	×	×	○	×	×	×	×		Analyze the failure following "7.1 (3) (b) <a href="#">Trouble analysis on the indication on the POWER LED of Drive Box. (Not POWER LED on)</a> " (TRBL 07-0120).	Parts failure: (Drive Box) Drive failure: (Drive Box)

\*1 : R: Red, O: Orange, G: Green

\*2 : This is not a failure status



(○ : On ✧ : Blinking × : Off — : Independent)

No	LEDs								State of unit	Actions to take	Failure
	Controller Box					Drive Box					
	ALARM (R) <sup>(*)1</sup>	WARNING (O) <sup>(*)1</sup>	READY (G) <sup>(*)1</sup>	POWER (G) <sup>(*)1</sup> (O) <sup>(*)1</sup>		POWER (G) <sup>(*)1</sup>	LOCATE (O) <sup>(*)1</sup>	READY (G) <sup>(*)1</sup>			
3	○	×	×	×	×	×	×	×	<ul style="list-style-type: none"><li>Is it an error of the Power Unit system</li><li>Dual failure of the Controllers or the I/O Modules(ENC) or I/O Cards(ENC)</li></ul>	<ol style="list-style-type: none"><li>Check that power cable is connected correctly.</li><li>Check LED indication of Power Unit. (Refer to “7.2 (3) Trouble analysis based on LED indication of Power Unit” (TRBL 07-0210).)</li><li>Check LED indication of Controller. (Refer to “7.2 (5) Trouble analysis based on LED indication of Controller” (TRBL 07-0240).)</li><li>Check LED indication of I/O Module(ENC) or I/O Card(ENC). (Refer to “7.2 (7) Trouble analysis based on LED indication of I/O Module(ENC) or I/O Card(ENC)” (TRBL 07-0440).)</li></ol>	Parts failure.
4	×	×	×	○	×	—	—	—	Indicates that the power-on is in progress and that the array can be operated.	<ol style="list-style-type: none"><li>Check LED indication of Controller. (Refer to “7.2 (5) Trouble analysis based on LED indication of Controller” (TRBL 07-0240).)</li><li>If ALM LED (red) of one Controller or more does not light up, wait READY LED (green) to light up (for at least 10 min).</li><li>Proceed to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000), and then detect a failure with WEB.</li></ol>	Parts failure. (Controller Box)  Failure must be detected with WEB.
5 (*)2	×	×	×	×	○	—	—	—	The power cables of the Controller Box were connected and the power is supplied.	The recovery operation is not necessary.	—
6	✧ <sup>(*)3</sup> (Slowly blinking)	×	×	○	×	—	—	—	A serious failure occurred while power on. Example: User data was lost.	Proceed to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000), and then detect a failure with WEB.	Failure must be detected with WEB.

\*1 : R: Red, O: Orange, G: Green

\*2 : This is not a failure status

(○ : On ◇ : Blinking × : Off — : Independent)

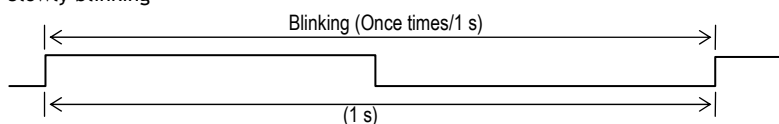
No	LEDs								State of unit	Actions to take	Failure
	Controller Box					Drive Box					
	ALARM (R) <sup>(*)1</sup>	WARNING (O) <sup>(*)1</sup>	READY (G) <sup>(*)1</sup>	POWER (G) <sup>(*)1</sup> (O) <sup>(*)1</sup>		POWER (G) <sup>(*)1</sup>	LOCATE (O) <sup>(*)1</sup>	READY (G) <sup>(*)1</sup>			
7	○	×	×	○	×	—	—	—	A failure occurred during self-test at time when power is turned on.	Check LED indication of Controller. (Refer to “7.2 (5) Trouble analysis based on LED indication of Controller” (TRBL 07-0240)).	Parts failure. (Controller Box)
8	×	○	○	○	×	○	×	○	A failure which does not stop operation occurred in Controller Box.	Check LED indication of each Controller Box part. (Refer to “7.2 Trouble Analysis by LED Indication of Each Part” (TRBL 07-0170)).	Parts error. (Controller Box)
						○	○	○	A failure which does not stop operation occurred in Drive Box. <sup>(*)2</sup>	Check LED indication of each Drive Box part. (Refer to “7.2 Trouble Analysis by LED Indication of Each Part” (TRBL 07-0170)).	Parts error. (Drive Box)
9	×	◇ <sup>(*)3</sup> (Slowly blinking)	○	○	×	—	—	—	A failure which does not stop operation occurred in unit (It must be detected with WEB).	Proceed to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000), and then detect a failure with WEB.	Failure must be detected with WEB.
10	○	◇ <sup>(*)3</sup> (Slowly blinking) ↓ ○ <sup>(*)5</sup>	×	○	×	—	—	—	A failure which does not stop operation occurred in unit.	Proceed to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000), and then detect a failure with WEB.	Failure must be detected with WEB.
11	—	◇ <sup>(*)4</sup> (Fast blinking)	—	—	—	—	—	—	Latest revision maintenance function of flash program is executed.	Wait until fast blinking stops.	No error.

\*1 : R: Red, O: Orange, G: Green

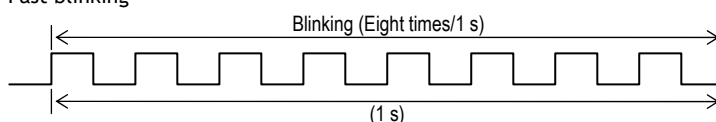
\*2 : Under the following conditions, WARNING LED on the Drive Box could not light up. However, the each part's ALARM LED or ALM LED lights up. (Excluding the condition (2) below.)

- (1) When the ALM LED of the I/O Module(ENC) or I/O Card(ENC) came on before the array became ready during startup of the array.
- (2) When the ALM LED of the I/O Module(ENC) or I/O Card(ENC) came on and the I/O Module(ENC) or I/O Card(ENC) was pulled out.
- (3) When the failed I/O Module(ENC) or I/O Card(ENC) was replaced and the ALM LED of the I/O Module(ENC) or I/O Card(ENC) came on after that (However, the ALM LED is on immediately after the I/O Module(ENC) or I/O Card(ENC) is inserted. If the ALM LED does not go out after one minute elapses, the replaced I/O Module(ENC) or I/O Card(ENC) should be judged out of order.)

\*3 : Slowly blinking



\*4 : Fast blinking



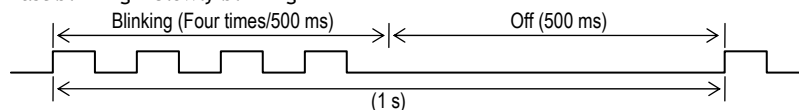
\*5 : If you connect WEB, WARNING LED is changed into lighting from slowly blinking.

(○ : On ◇ : Blinking × : Off — : Independent)

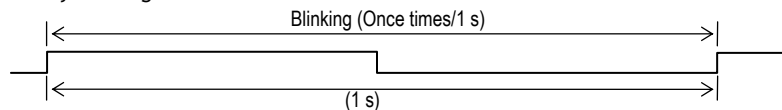
No	LEDs								State of unit	Actions to take	Failure
	Controller Box					Drive Box					
	ALARM (R) <sup>(*)1</sup>	WARNING (O) <sup>(*)1</sup>	READY (G) <sup>(*)1</sup>	POWER (G) <sup>(*)1</sup> (O) <sup>(*)1</sup>		POWER (G) <sup>(*)1</sup>	LOCATE (O) <sup>(*)1</sup>	READY (G) <sup>(*)1</sup>			
12	×	✧ <sup>(*)2</sup> (Fast blinking + Slowly blinking)	○	○	×	—	—	—	The most recent revision maintenance function of the flash program is being executed, and the failure (it must be detected with WEB), which allows the array to operate, occurs.	Wait until fast blinking stops. Then, proceed to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000), and detect the failure with WEB.	Failure must be detected with WEB.
13	×	×	✧ <sup>(*)3</sup> (Slowly blinking)	○	×	—	—	—	The ENC firmware download or Drive firmware download process is completed.	Restart a device.	—
14	×	○	✧ <sup>(*)3</sup> (Slowly blinking)	○	×	—	—	—	The ENC firmware download or Drive firmware download process is terminated abnormally.	Proceed to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000), and detect a failure with WEB.	Failure must be detected with WEB.
15	×	×	✧ <sup>(*)4</sup> (Fast blinking)	○	×	—	—	—	The ENC firmware and the backup controller firmware is being automatic downloaded. The data stored inside the backup controller is being erased.	Wait as it is until there is no high-speed blinking (for the maximum of 30 to 50 minutes, but for the maximum of 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)).	—
16	×	○	×	×	×	—	—	—	A fan failure of the Controller Box occurs in the status that the main Power Unit is OFF.	<ul style="list-style-type: none"><li>• In case of the CBXSL/CBXSS/CBSL/CBSS, replace the Power Unit whose ALM LED is on.</li><li>• In case of the CBL, replace the Fan Module whose ALM LED is on.</li></ul>	Parts error. (Controller Box)
17	×	—	×	×	×	×	○	×	A fan failure of the Drive Box occurs in the status that the main Power Unit is OFF.	Replace the Power Unit whose ALM LED is on.	Parts error. (Drive Box)

\*1 : R: Red, O: Orange, G: Green

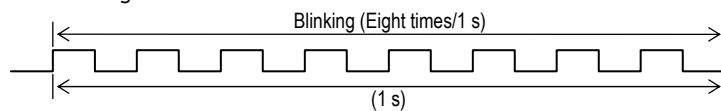
\*2 : Fast blinking + Slowly blinking



\*3 : Slowly blinking



\*4 : Fast blinking



\*5 : This is not a failure status.

(○ : On ✧ : Blinking × : Off — : Independent)

No	LEDs							State of unit	Actions to take	Failure	
	Controller Box				Drive Box						
	ALARM (R) <sup>(*)</sup>	WARNING (O) <sup>(*)</sup>	READY (G) <sup>(*)</sup>	POWER (G) <sup>(*)</sup> (O) <sup>(*)</sup>		POWER (G) <sup>(*)</sup>	LOCATE (O) <sup>(*)</sup>				READY (G) <sup>(*)</sup>
18 ( <sup>2</sup> )	—	—	—	—	—	—	○	—	When adding the chassis with the power turned on, it indicates the addition source.	Recovery operation is unnecessary.	—

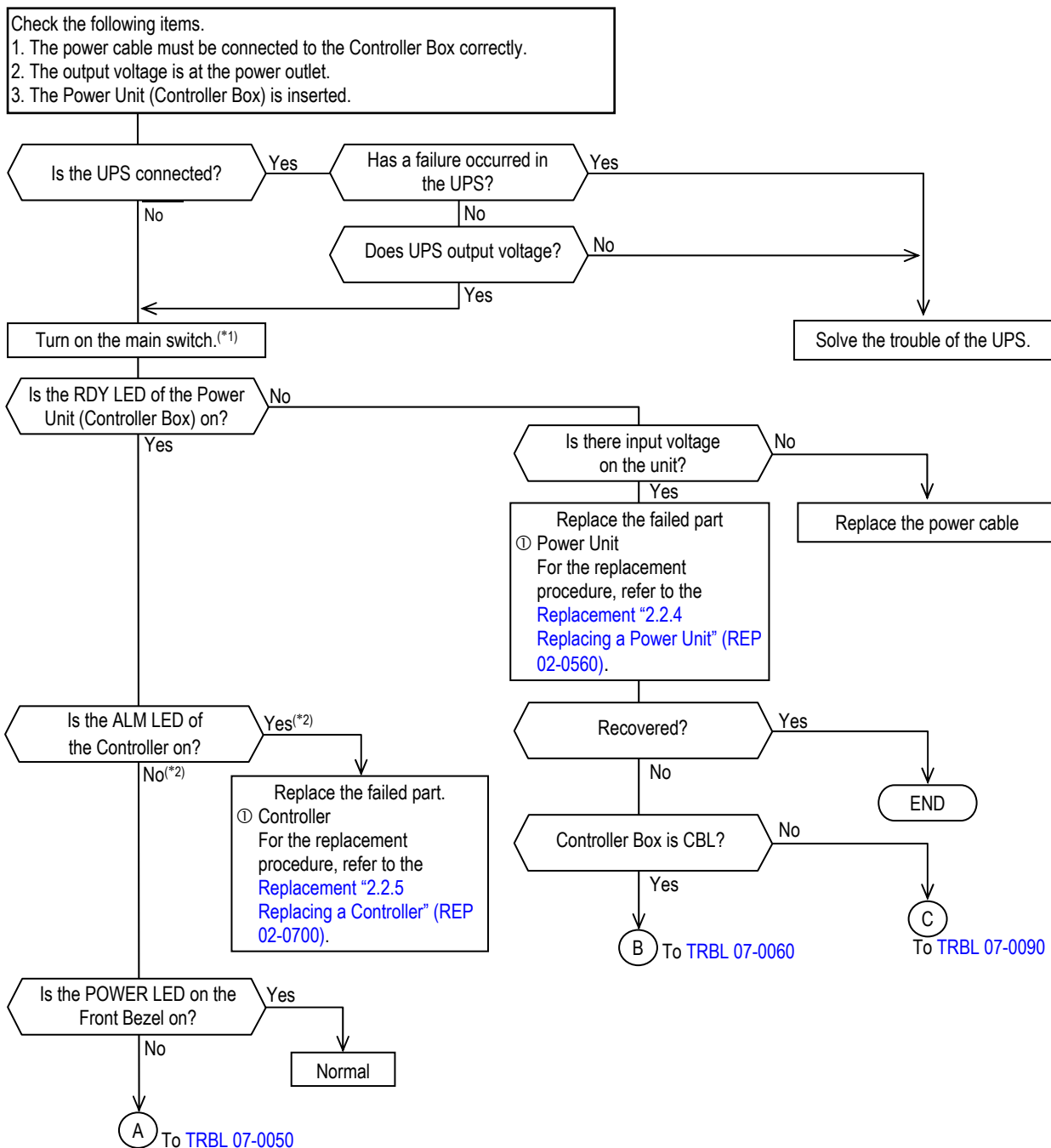
\*1 : R: Red, O: Orange, G: Green

\*2 : This is not a failure status.

## (3) Trouble analysis by the indication of the POWER LED

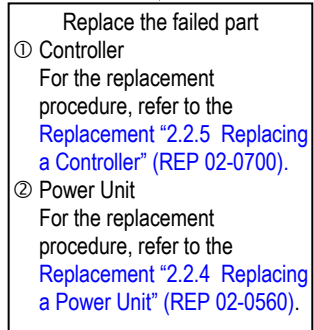
Analyze the cause of the POWER LED failure following the flowchart.

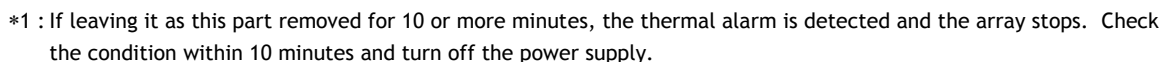
## (a) Trouble analysis on the indication on the POWER LED of Controller Box. (When the POWER LED is not on)



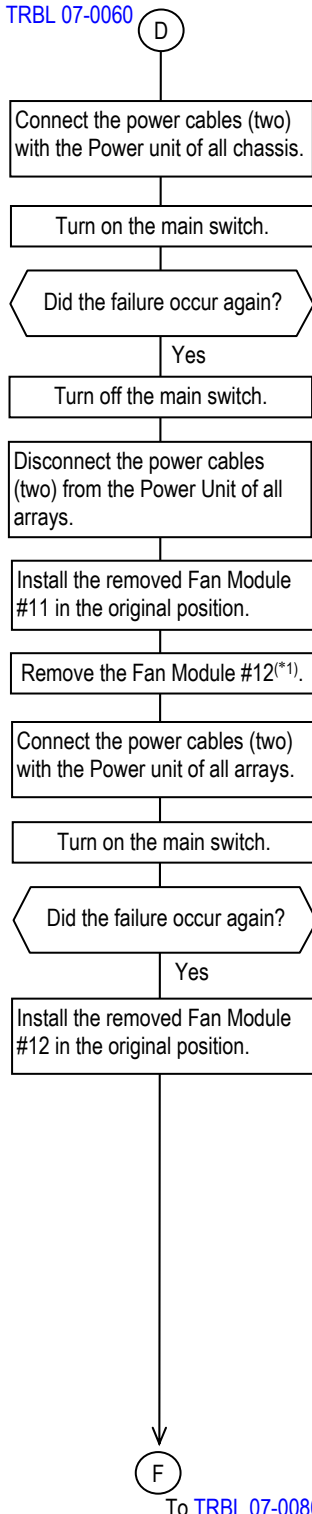
\*1 : This operation is not needed when the main switch have already been turned on.

\*2 : The ALM LED (red) of the Controller is on until the array becomes ready, however, this does not mean that the Controller is faulty. If the ALM LED (red) does not go out after the array has become ready, replace the Controller.

From [TRBL 07-0040](#)

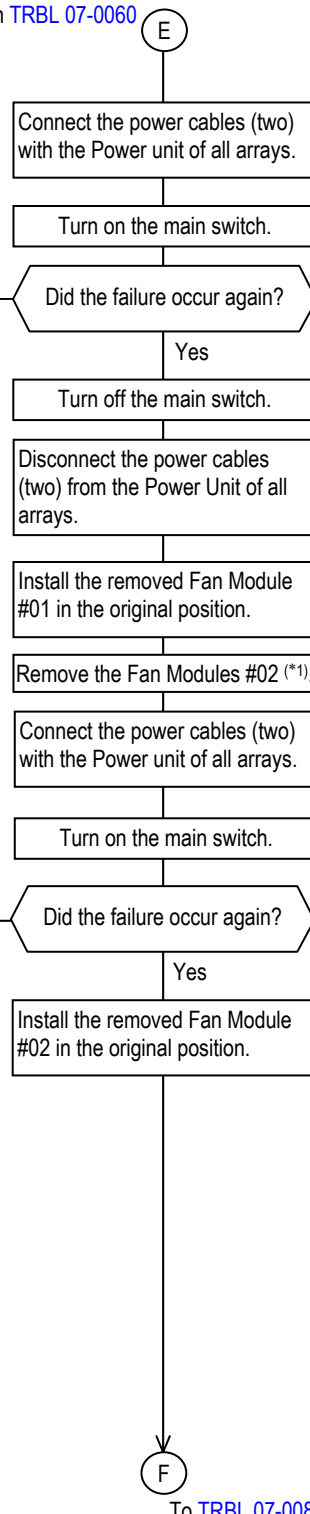


From TRBL 07-0060



To TRBL 07-0080

From TRBL 07-0060

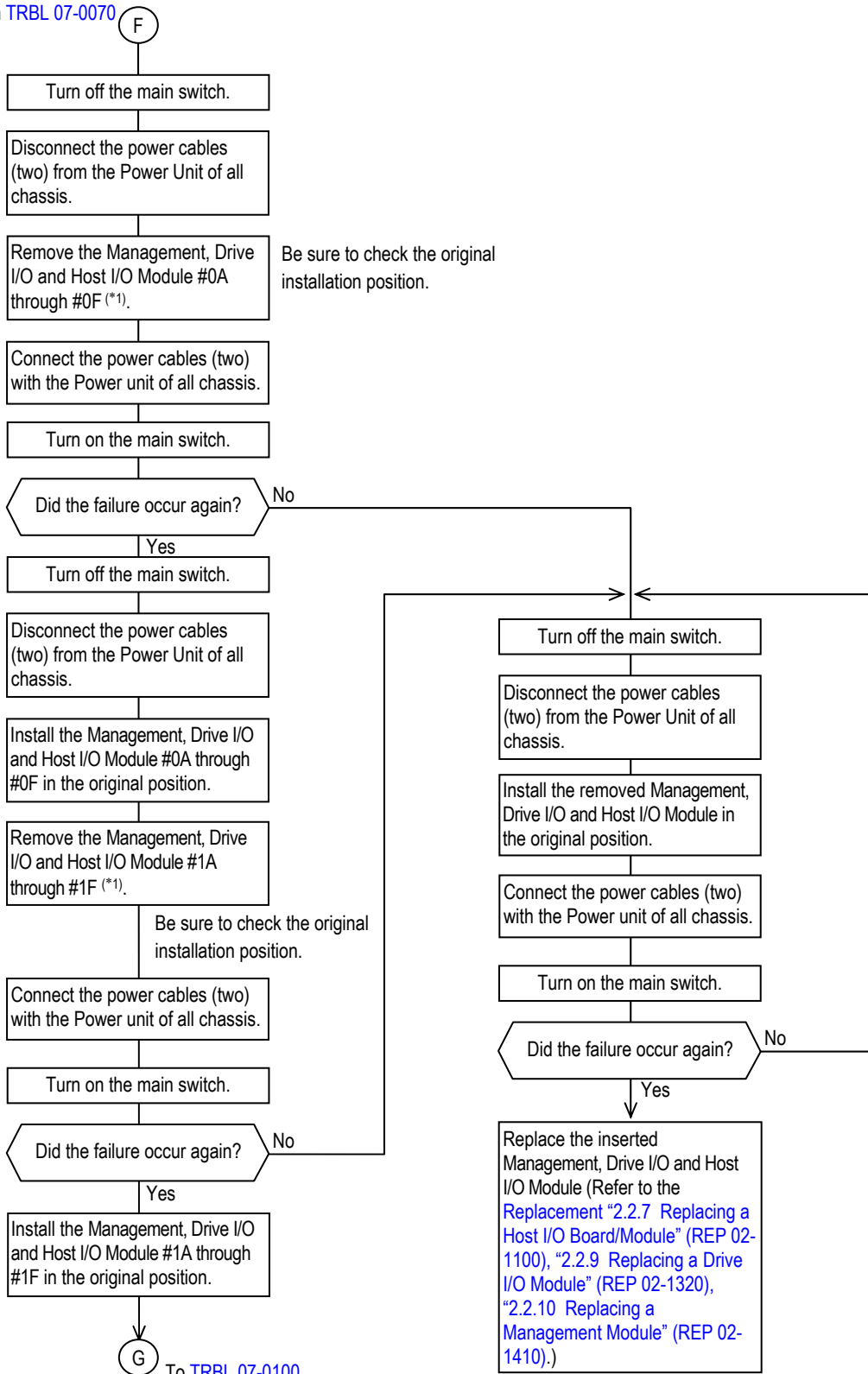


To TRBL 07-0080

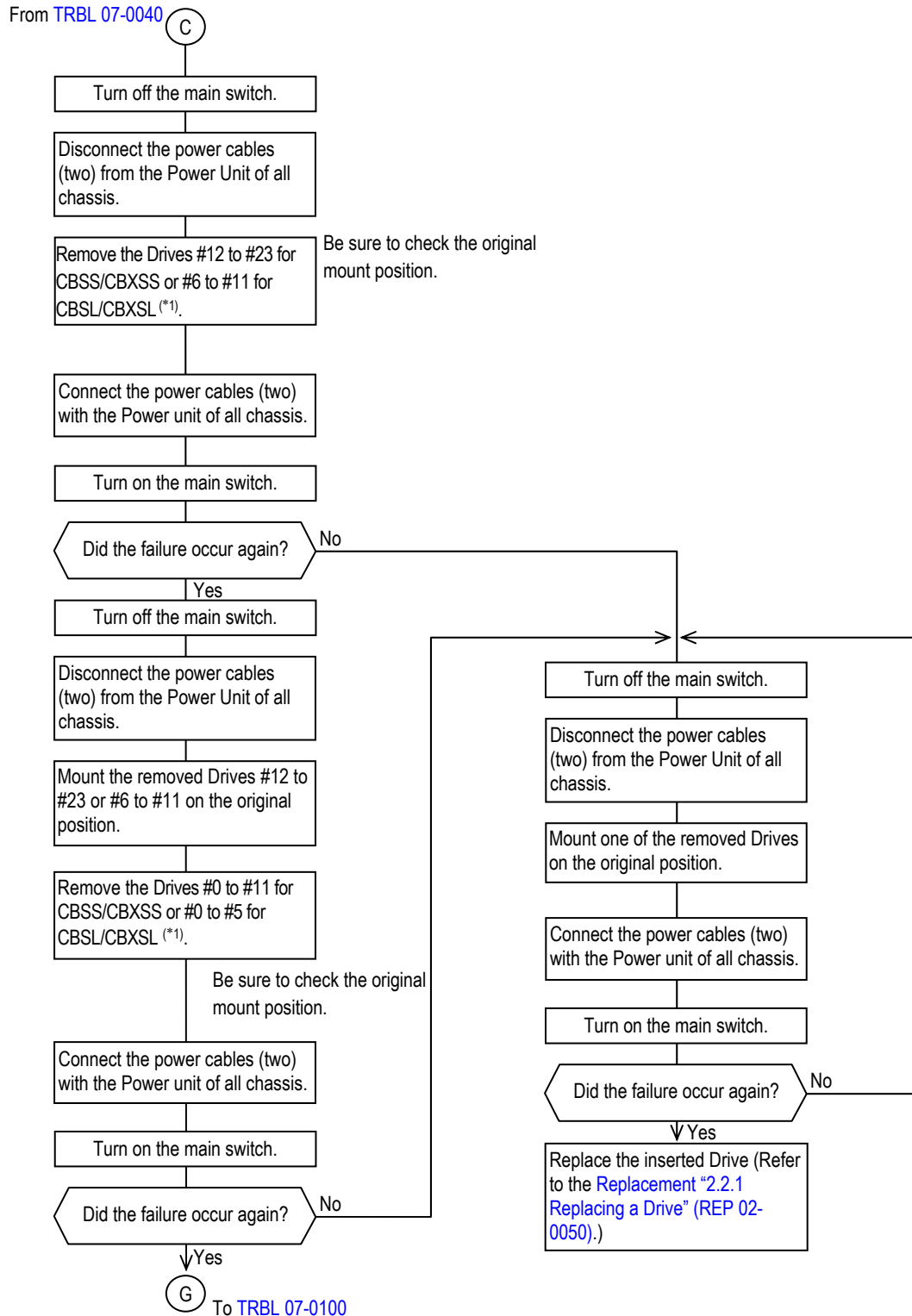
\*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the array stops. Check the condition within 10 minutes and turn off the power supply.



From TRBL 07-0070

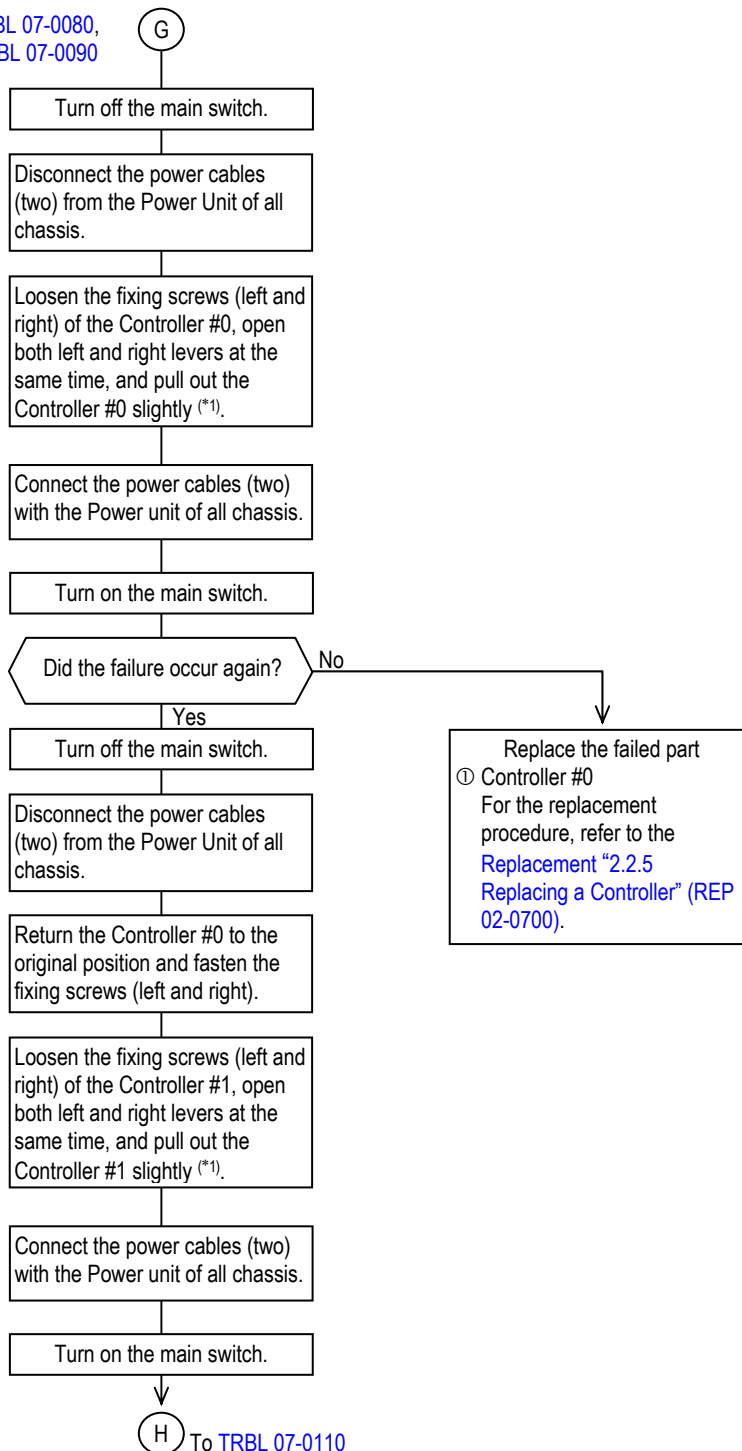


\*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the array stops. Check the condition within 10 minutes and turn off the power supply.



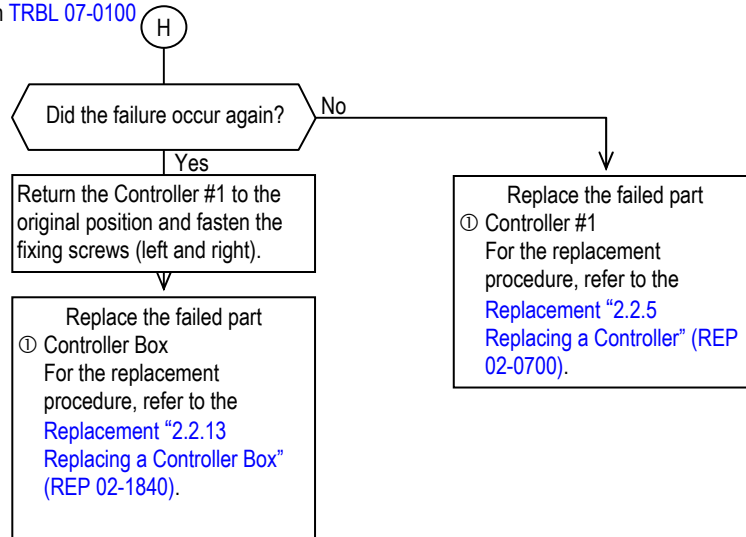
\*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the array stops. Check the condition within 10 minutes and turn off the power supply.

From [TRBL 07-0080](#),  
[TRBL 07-0090](#)

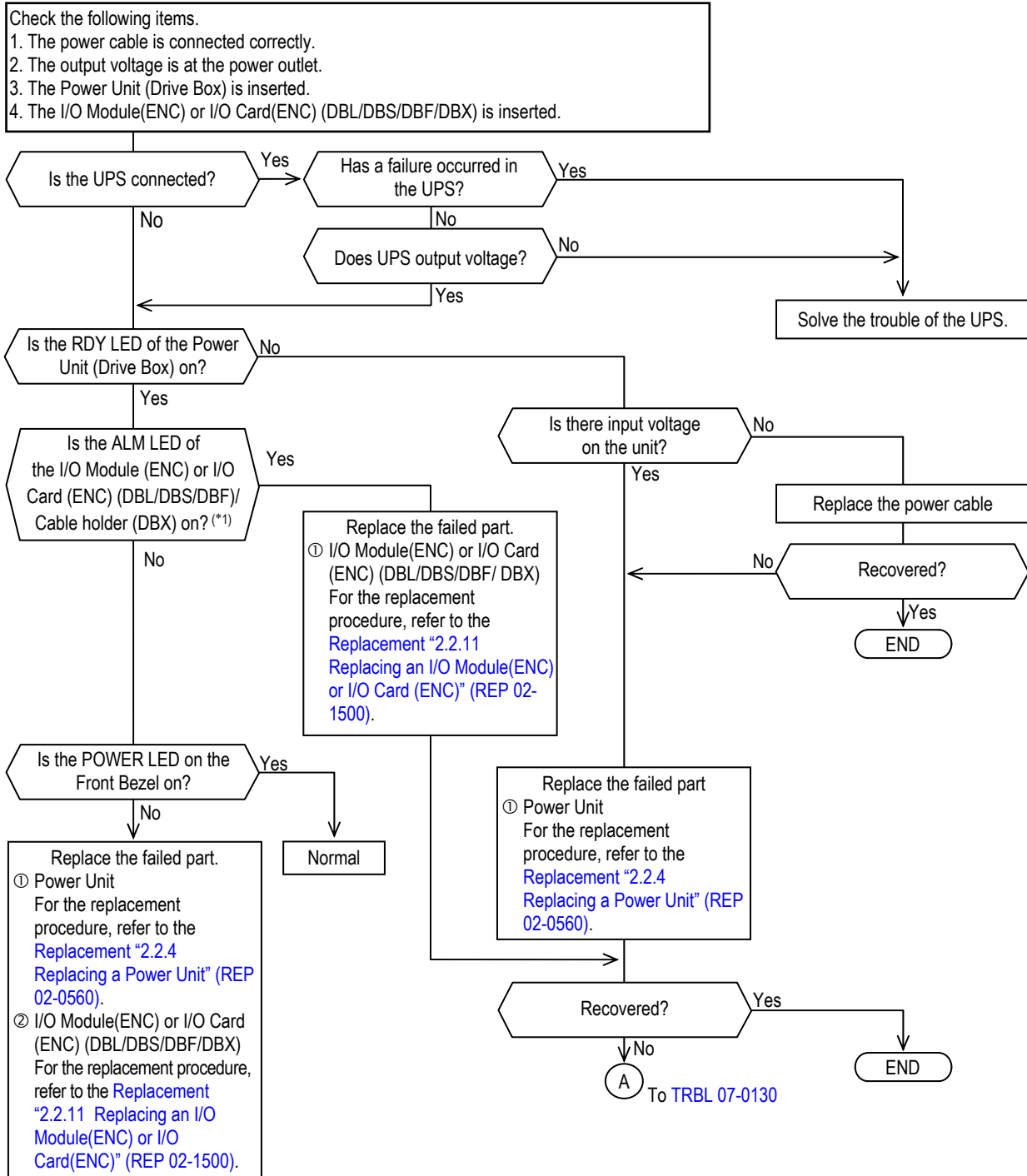


\*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the array stops. Check the condition within 10 minutes and turn off the power supply.

From [TRBL 07-0100](#)

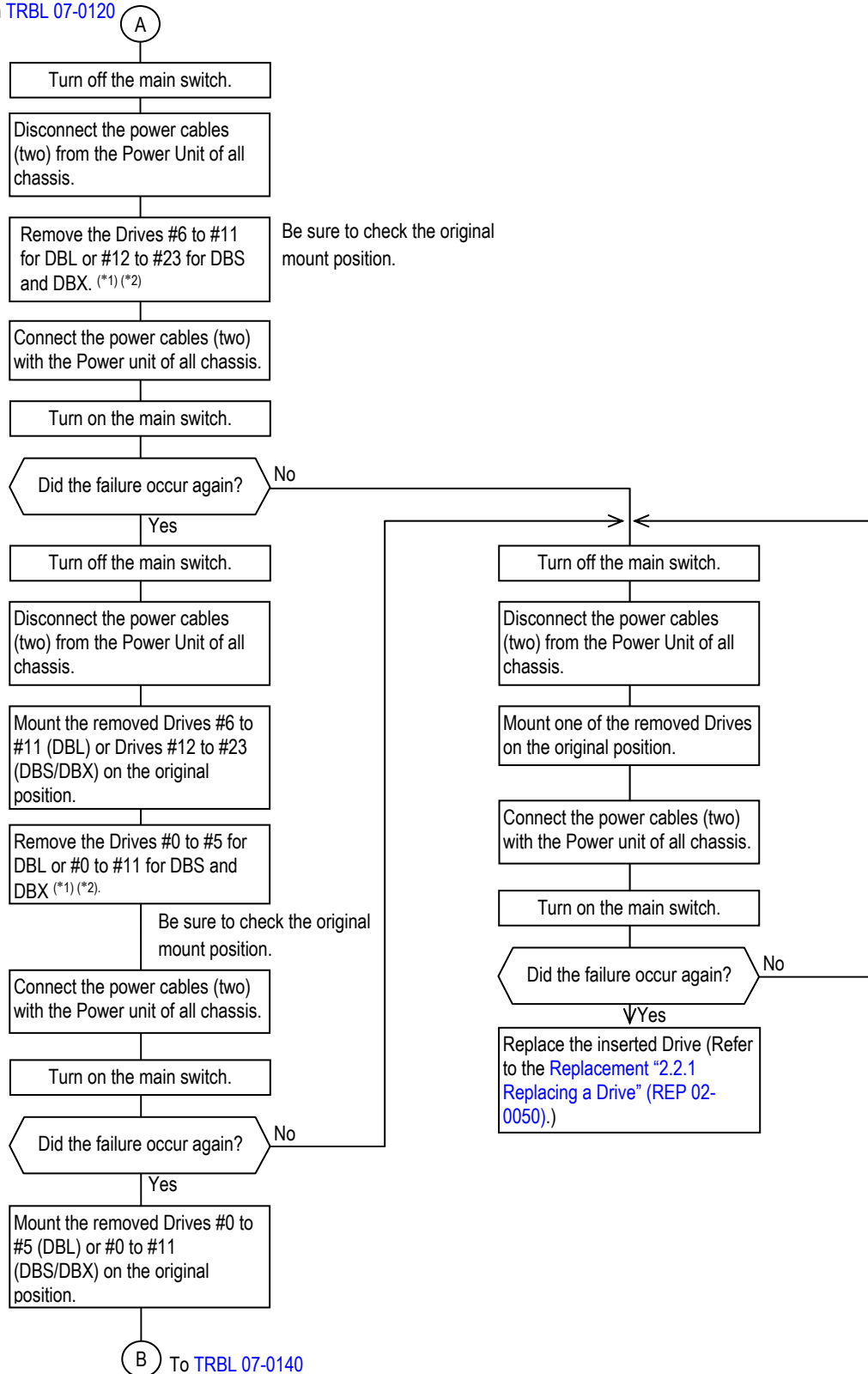


## (b) Trouble analysis on the indication on the POWER LED of Drive Box. (Not POWER LED on)



\*1 : The ALM LED of the I/O Module(ENC) or I/O Card(ENC) is on until the array becomes ready, however, this does not mean that the I/O Module(ENC) or I/O Card(ENC) is faulty. If the ALM LED of the array which has become ready does not go out, replace the I/O Module(ENC) or I/O Card(ENC). (Refer to the [Replacement "2.2.11 Replacing an I/O Module\(ENC\) or I/O Card \(ENC\)" \(REP 02-1500\).](#))

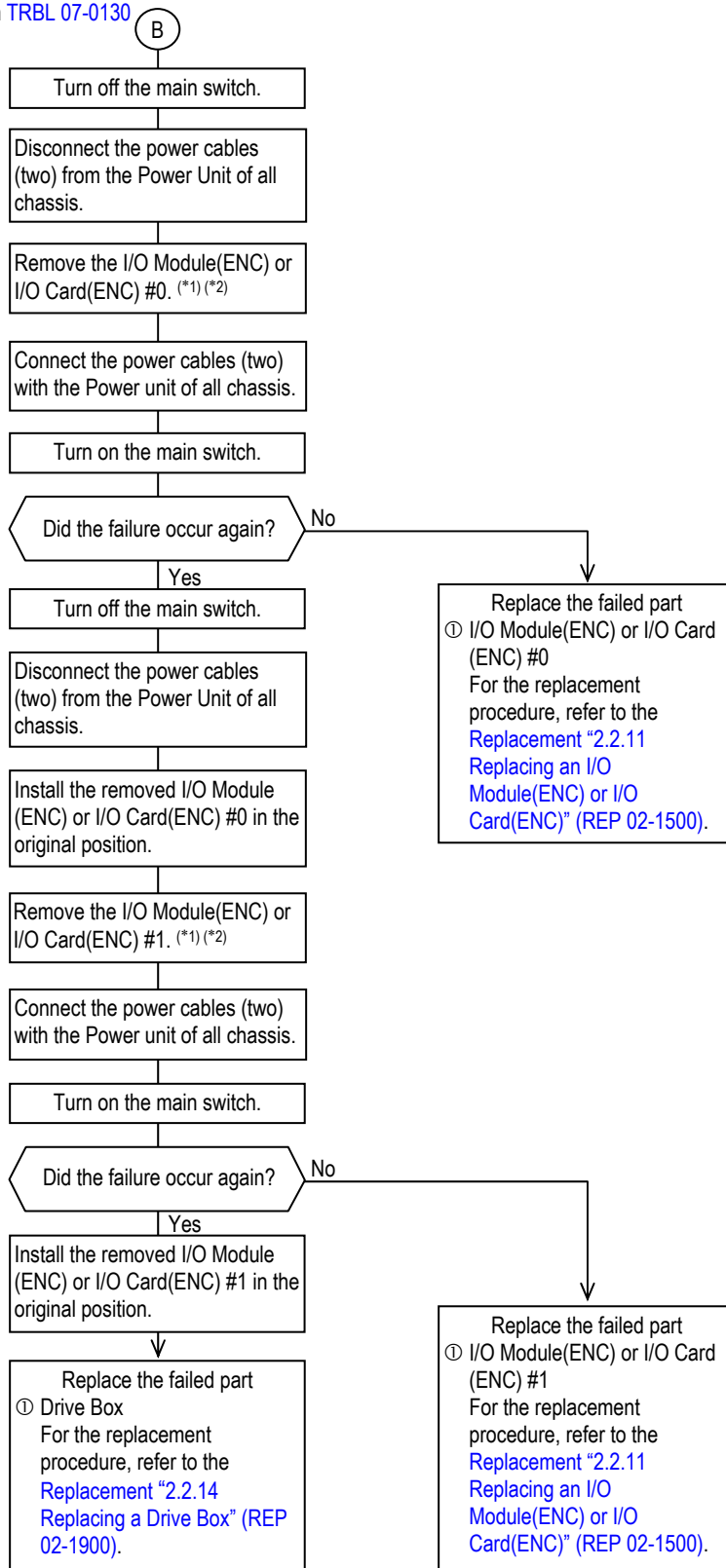
From TRBL 07-0120



\*1 : Drive Box of Drive nearest to Controller Box.

\*2 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the array stops. Check the condition within 10 minutes and turn off the power supply.

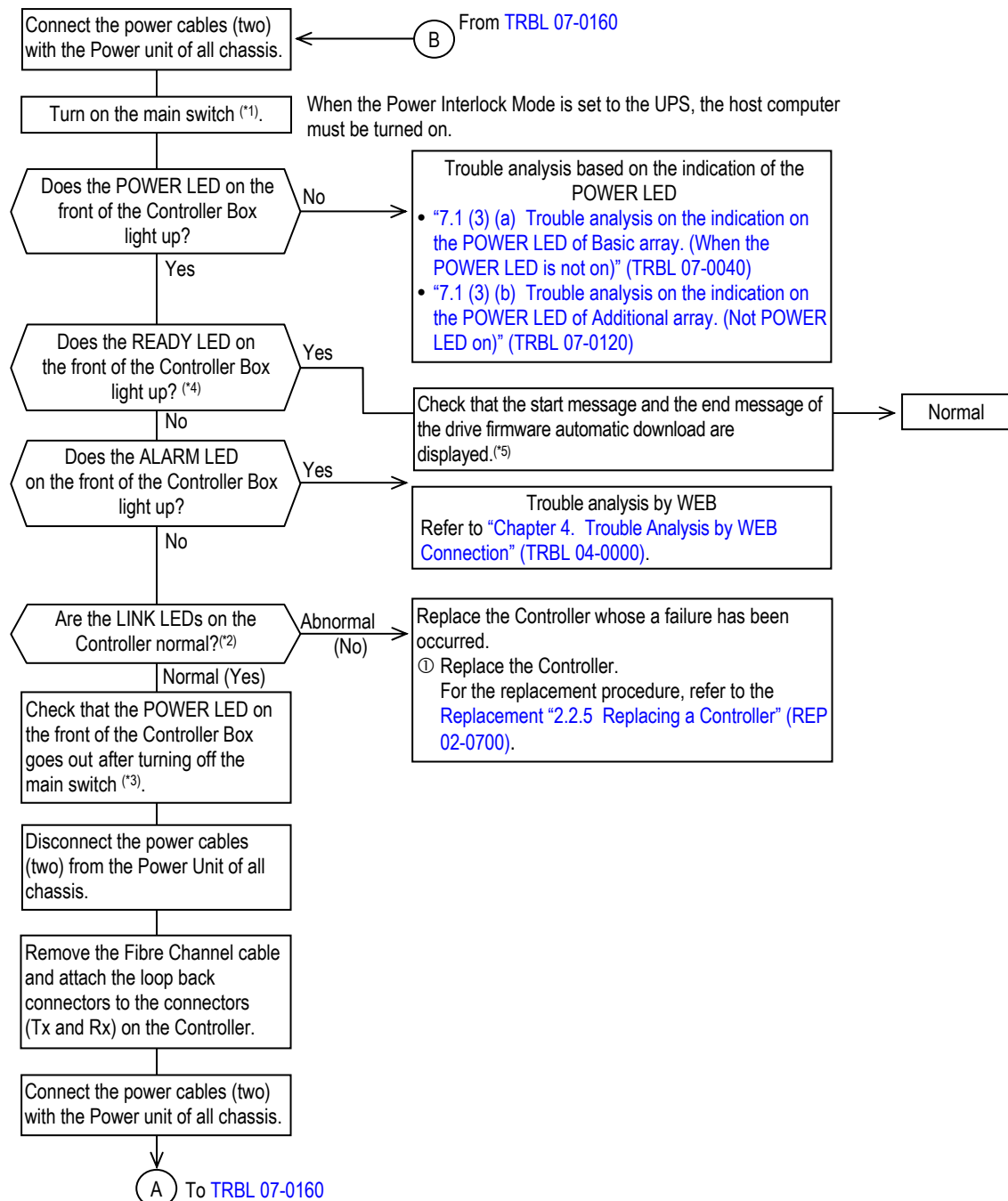
From TRBL 07-0130



\*1 : Drive Box of Drive nearest to Controller Box.

\*2 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the array stops. Check the condition within 10 minutes and turn off the power supply.

(4) Trouble analysis based on the indication of READY LED (When in the Fibre Channel interface)  
Analyze the cause of the READY LED failure following the flowchart.



\*1 : This operation is not needed when the main switch have already been turned on.

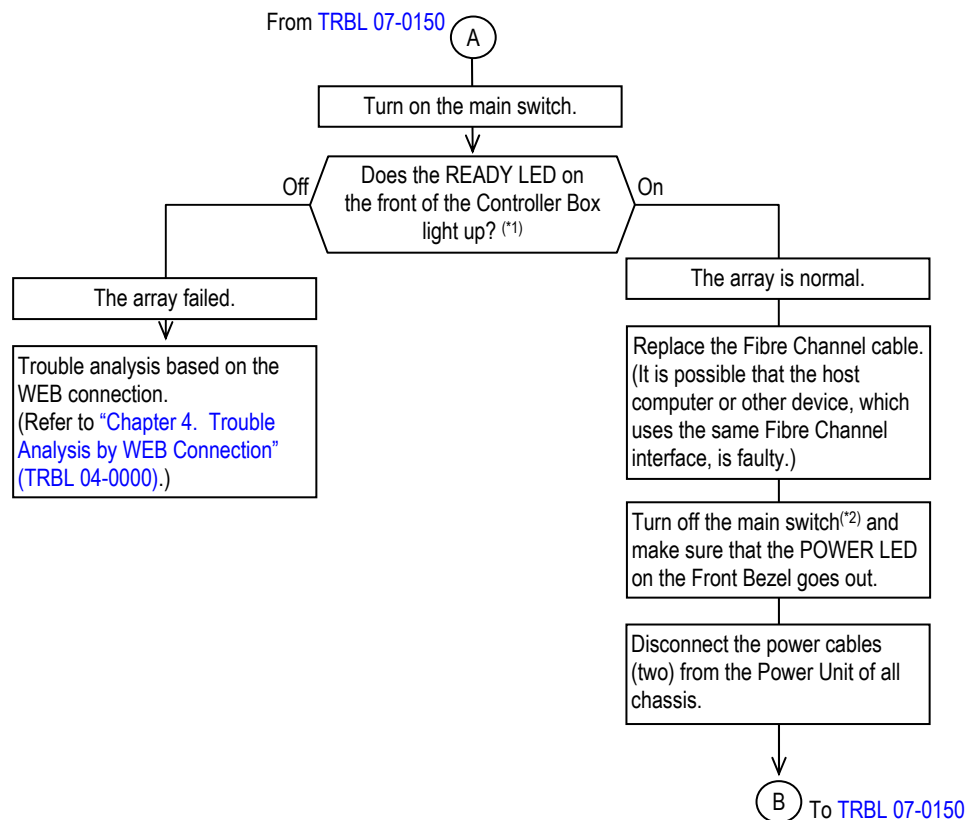
\*2 : Refer to "Table 7.2.9 LED Indication Patterns on FC Interface Connector" in "8.2 (5-4) LED Indication Pattern (FC Interface Connector part) on Controller (CBXSL/CBXSS/CBSL/CBSS)" (TRBL 08-0340).

\*3 : When the Power Interlock Mode is set to UPS Interlock Mode, change it to Standard Mode.

\*4 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*5 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download" (FIRM 01-1620).





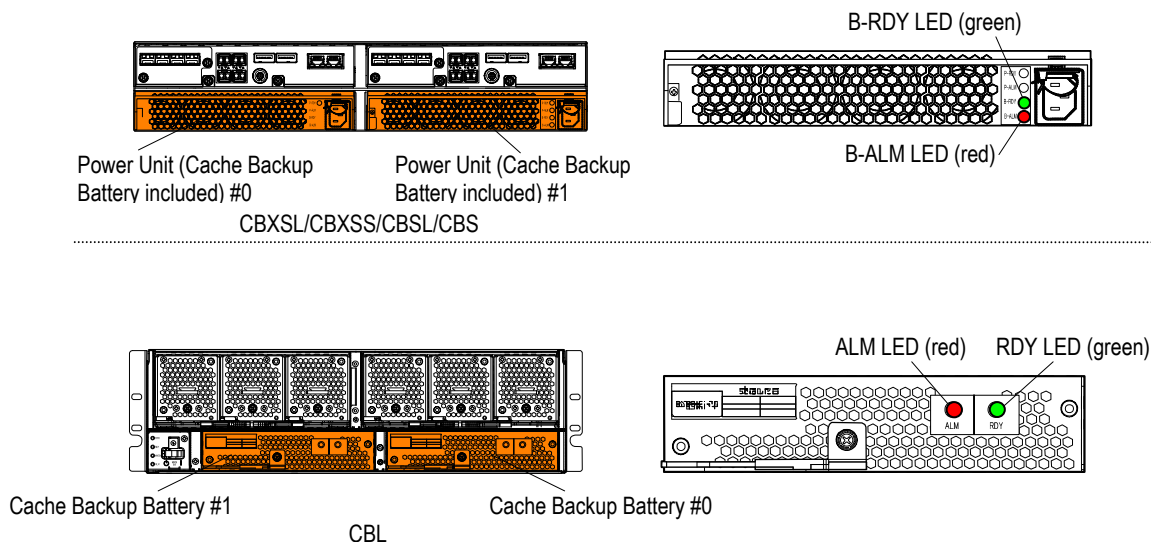
\*1 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*2 : Return the setting of the Power Interlock Mode to the original one. For the setting of the Power Interlock Mode, refer to [Installation "1.6 Setting the Power Interlock Mode \(INST 01-0270\)"](#)

## 7.2 Trouble Analysis by LED Indication of Each Part

Check whether a failure has occurred in each part or not.

### (1) Trouble analysis based on LED indication of Cache Backup Battery



**Table 7.2.1 LED Indication Patterns on Cache Backup Battery**

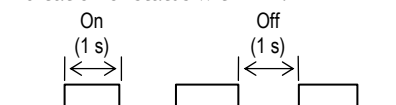
(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	ALM/ B-ALM (red)	RDY/ B-RDY (green)			
1	×	○	Normal. (Full charge)	Recovery operation is unnecessary	—
2 (*1)	×	◇(*3)	Not Full charge.		
3	○(*2)	—	Error on the Cache Backup Battery.	Replace the Cache Backup Battery.	<a href="#">Replacement "2.2.2 Replacing a Cache Backup Battery" (REP 02-0430)</a>

\*1 : This is not a failure status.

\*2 : If the ALM LED on the Cache Backup Battery lights on, be sure to replace the Cache Backup Battery (it cannot be recharged).

\*3 : Indication of status with LED.



(2) Trouble analysis based on LED indication of Drive

(2-1) Drive for the CBXSL/CBXSS/CBSL/CBSS/DBL/DBS/DBF

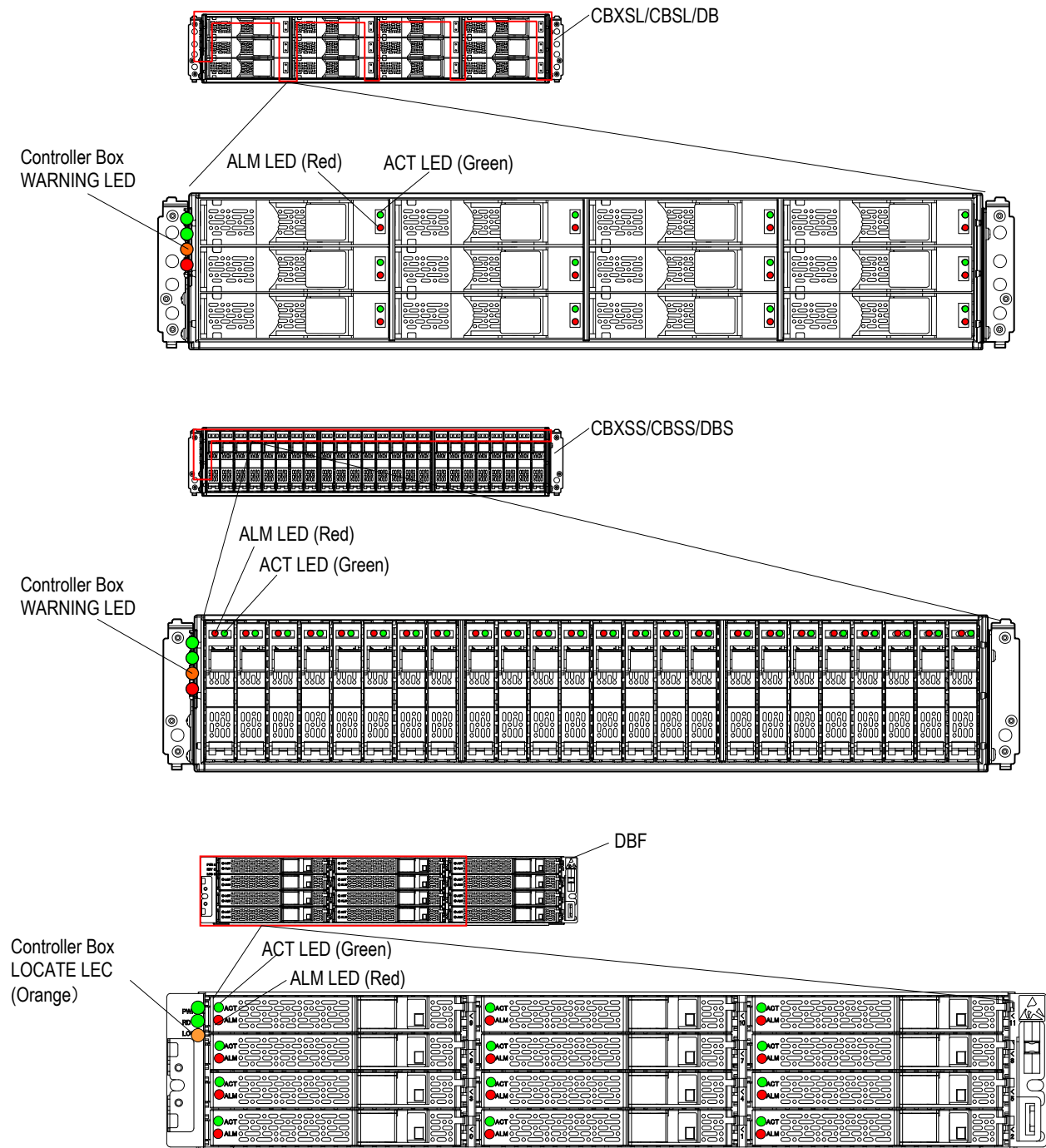


Table 7.2.2 LED Indication Patterns on Drive (CBXSL/CBXSS/CBSL/CBSS/DBL/DBS/DBF)

(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	Green (ACT)	Red (ALM)			
1 (*1)	◇	—	The Drive is being accessed. The Drive is being spun up.	This is not a problem.	—
2 (*1)	○	×	Completed spin up.	This is not a problem.	—
3 (*1)	×	—	Spin down state.	This is not a problem.	—
4	—	○	A failure that makes the Drive of lighting LED unable to operate occurred in it.	1. When the WARNING LED (orange) of Controller Box is blinking, refer to the LOG Message by WEB connection, and check the backup status to the Spare Drive. (*2). 2. Replace the Drive.	<a href="#">Replacement "2.2.1 Replacing a Drive" (REP 02-0050)</a>

\*1 : This is not a failure status.

\*2 : In the case of the recovery failure to the Spare Drive, the recovery failure to the replacement Drive, or the write incomplete recovery, the WARNING LED (orange) on the front of the Controller Box blinks. The WARNING LED (orange) on the front of the Controller Box lights up referring to the log message on WEB.

\*3 : ACT LED indication of the SAS Drive.

Power	OFF	ON				OFF	ON
Spin Up/Down	Down	Up			Down		Up
Being Spin Up/Access		Up	Access	Access			Up
ACT LED SAS	OFF	Blinking	ON/Blinking	OFF/Blinking	OFF	Blinking	ON/Blinking

## (2-2) Drive for the DBX/DBW

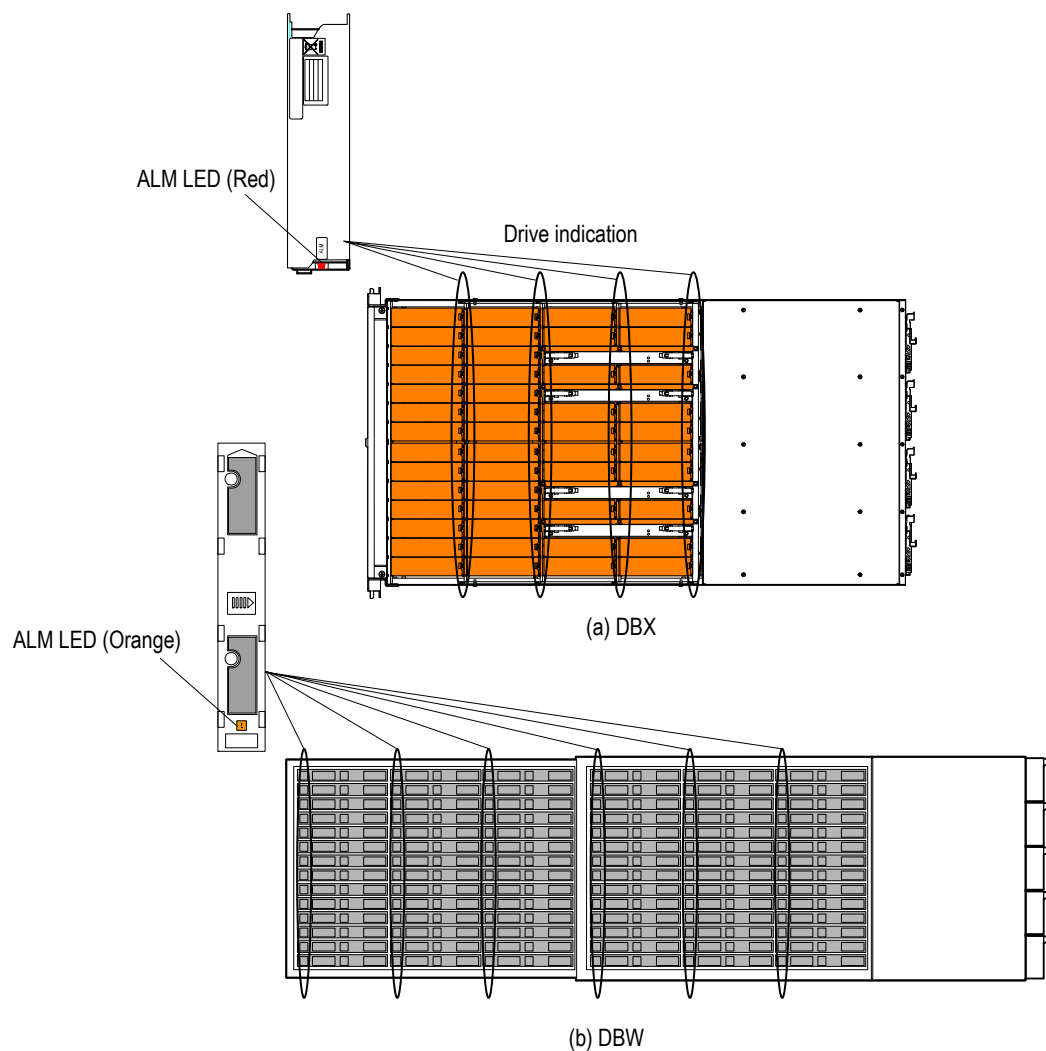


Table 7.2.3 LED Indication Patterns on Drive (DBX/DBW)

(○ : On ✧ : Blinking × : Off — : Independent)				
No.	LEDs Red/Orange <sup>(*)1</sup>	Cause or status	Action(s) to be taken	Reference page
1	○	A failure that makes the Drive of lighting LED unable to operate occurred in it.	1. When the WARNING LED (orange) of Controller Box is blinking, refer to the LOG Message by WEB connection, and check the backup status to the Spare Drive. <sup>(*)2</sup> 2. Replace the Drive.	<a href="#">Replacement "2.2.1 Replacing a Drive" (REP 02-0050)</a>

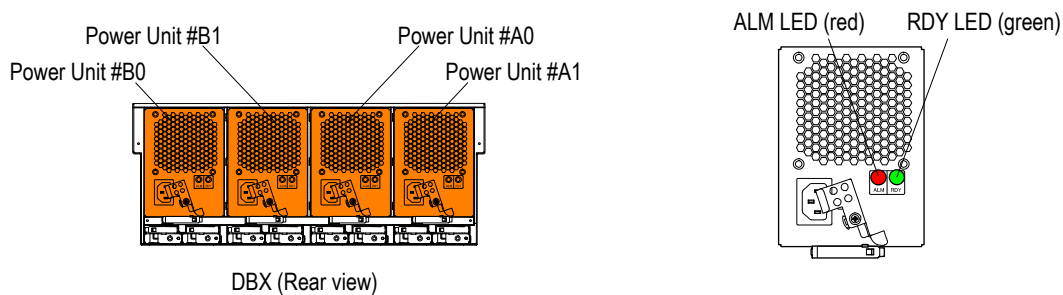
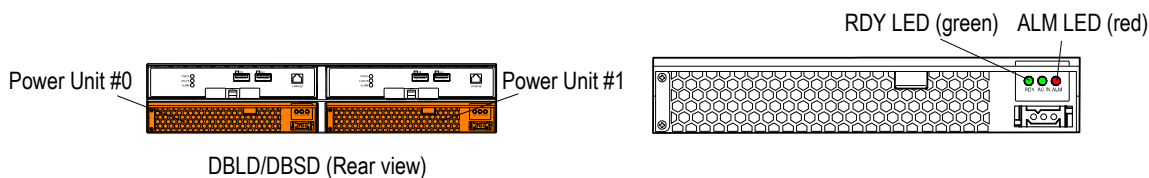
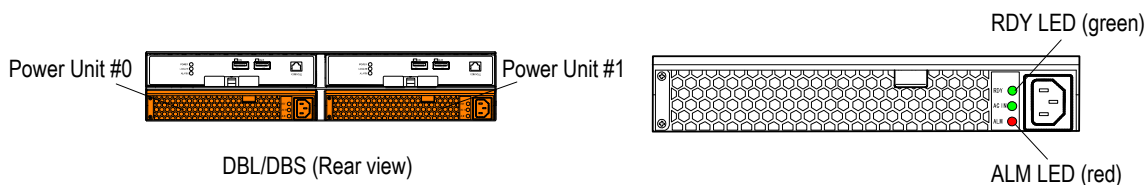
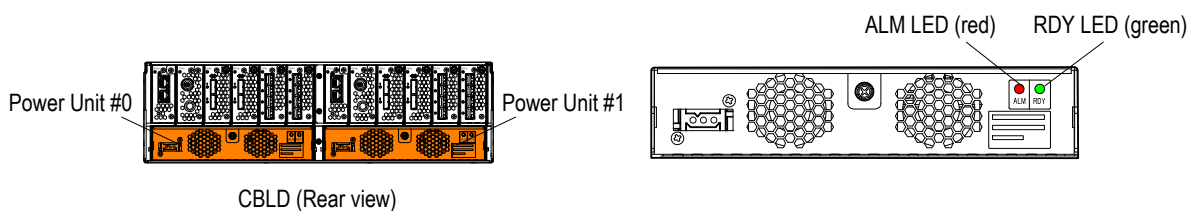
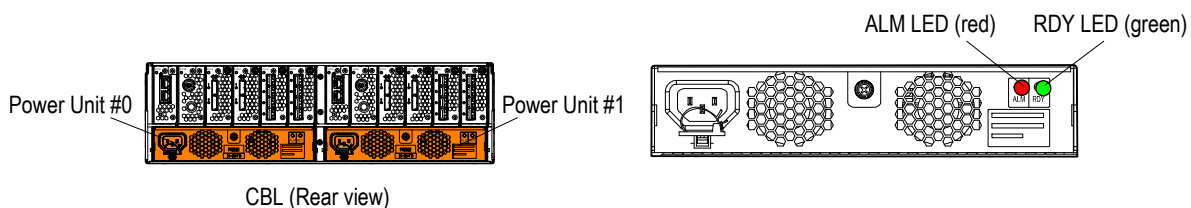
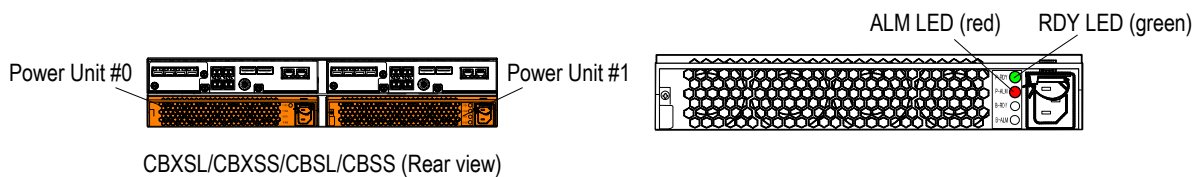
<sup>(\*)1</sup> : The LED on the Drive for DBX is the ALM LED (red), and the one for DBW is the ALM LED (orange).

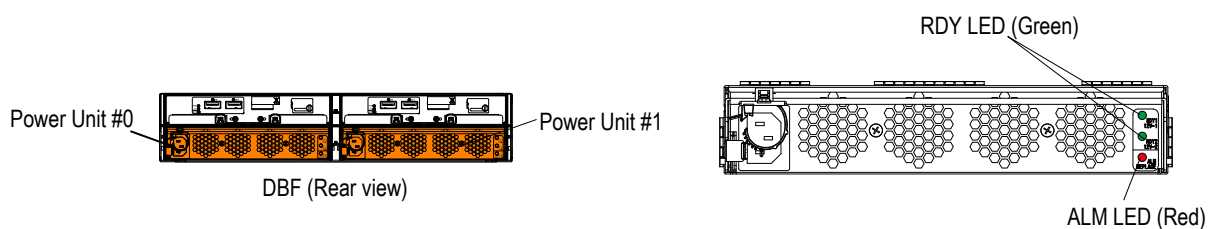
<sup>(\*)2</sup> : In the case of the recovery failure to the Spare Drive, the recovery failure to the replacement Drive, or the write incomplete recovery, the WARNING LED (orange) on the front of the Controller Box blinks. The WARNING LED (orange) on the front of the Controller Box lights up referring to the log message on WEB.

### (3) Trouble analysis based on LED indication of Power Unit

#### (3-1) Power Units of CBXSL/CBXSS/CBSL/CBSS/DBL/DBS/DBX/DBF

NOTE : When the RDY LED (green) is off, it shows that a failure has occurred even if the fan is rotating.





**Table 7.2.4 LED Indication Patterns on Power Unit**

(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	RDY (green)	ALM (red)			
1 (*1)	○	×	This shows the normal operation of the Power Unit.	This is not a problem.	—
2	×	×	In resting.	Check the connection of the power cable. 1. If the RDY LED (green) is kept off, replace the Power Unit.	<a href="#">Replacement "2.2.4 Replacing a Power Unit" (REP 02-0560)</a>
3	×	○	In trouble.	Replace the Power Unit.	<a href="#">Replacement "2.2.4 Replacing a Power Unit" (REP 02-0560)</a>
4	○	○			

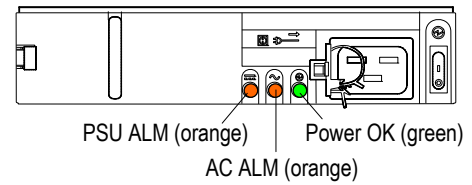
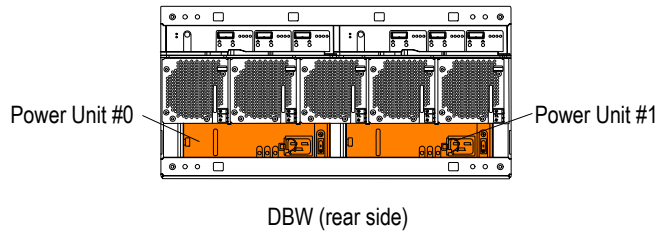
\*1 : This is not a failure status.

### (3-2) Power Units of DBW

For the DBW, failed parts cannot be identified by the LED indications.

Here, just check the LED locations.

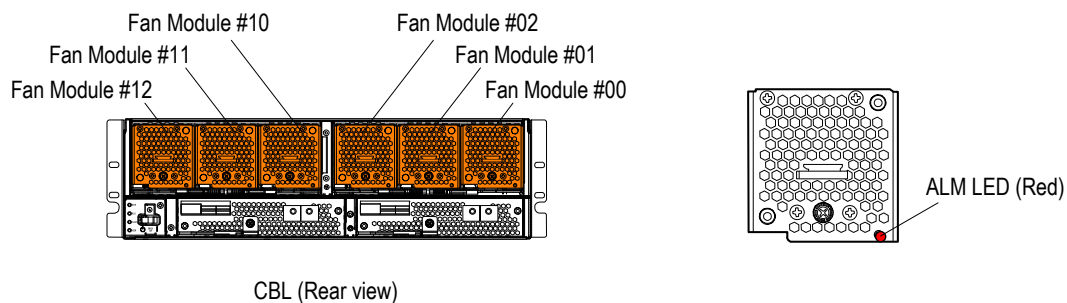
Check the failure isolation in the WEB Information Message, and then perform the maintenance according to its recovery methods.





## (4) Trouble analysis based on LED indication of Fan Module

## (4-1) Fan Module for CBL



NOTE : While the ALM LED of a Fan Module is on, when a Controller has been blocked (the ALM LED (red) is on), be sure to correct the Controller blockade failure first.

**Table 7.2.5 LED Indication Patterns on Fan Module**

(○ : On ✧ : Blinking × : Off — : Independent)

No.	LED ALM (red)	Cause or status	Action(s) to be taken	Reference age
1 (*1)	×	This shows that the Fan Modules are normal.	This is not a problem.	—
2	○	This shows that there is a trouble in the Fan Modules.	Replace the Fan Module.	<a href="#">Replacement "2.2.3 Replacing a Fan Module" (REP 02-0520)</a>

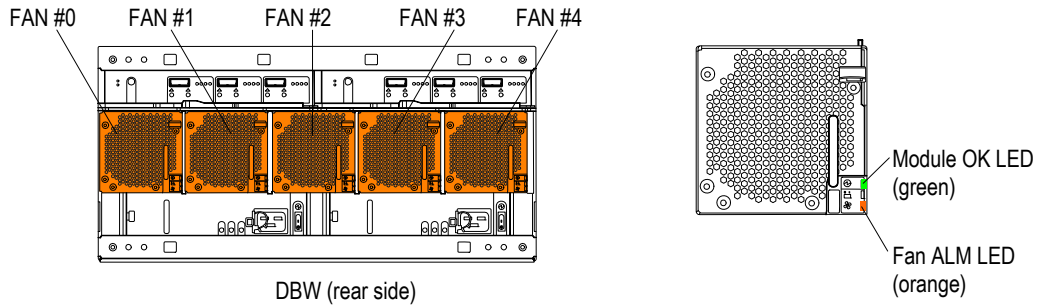
\*1 : This is not a failure status.

#### (4-2) Fan Module for DBW

For the DBW, failed parts cannot be identified by the LED indications.

Here, just check the LED locations.

Check the failure isolation in the WEB Information Message, and then perform the maintenance according to its recovery methods.



(5) Trouble analysis based on LED indication of Controller

(5-1) LED Indication Pattern (Cache memory, CPU, LAN) on Controller (CBXSL/CBXSS/CBSL/CBSS)

NOTE : If all the LEDs on the Controller are turned off, connect to WEB (Refer to [“Chapter 3. Before Starting WEB Connection” \(TRBL 03-0000\)](#)) and check if the Controller is blocked. If the Controller is blocked, replace the blocked Controller. (Refer to the [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\).](#))

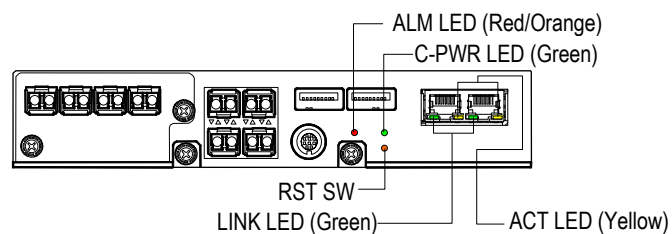
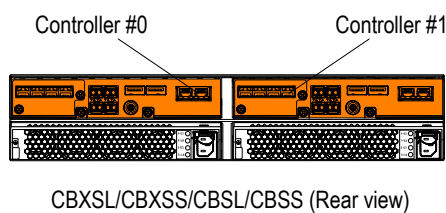


Table 7.2.6 LED Indication Pattern-1 on Controller

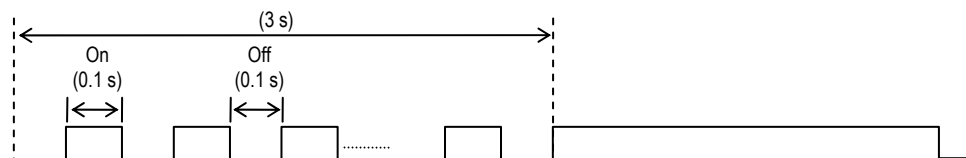
(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs					Cause or status	Action(s) to be taken	Reference page
	C-PWR (green)	ALM		LINK (green)	ACT (yellow)			
		(Red)	(Orange)					
1 (*1)	○	—	—	—	—	This shows that the Controller is normal.	This is not a problem.	—
2 (*1)	○(*2)	—	—	—	—	Power off process (including planned shutdown) is being executing.	This is not a problem.	—
3 (*1)	×	—	—	—	—	This shows that the power cables are not connected to the Power Units or the Cache memory is not being backed up with the main switch off although the power cables are connected.	This is not a problem.	—
4 (*1)	—	—	○	—	—	The LED comes on when the soft reset for WEB maintenance is pressed. When the firmware is updated continuing the I/Os of both Controllers, the ALM LED (orange) lights up for about five seconds.	This is not a problem.	—
5 (*1)	◇(*3) (High-speed blinking)	—	—	—	—	This shows that data on the Cache Memory is stored in the backup controller (flash memory) in case of electricity failure.	Wait until the C-PWR LED (green) lights up or goes out. If the Controller is removed during blinking, data may be lost.	—

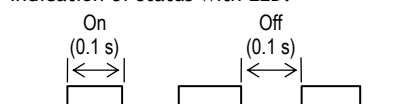
\*1 : This is not a failure status.

\*2 : When the main switch is turned off and it is enabled, the C-PWR LED (green) of the Controller goes on after blinking for three seconds, and then it goes out.

Indication of status with LED.



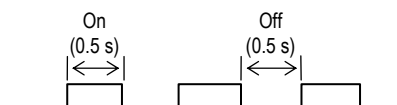
\*3 : Indication of status with LED.



(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs					Cause or status	Action(s) to be taken	Reference page
	C-PWR (green)	ALM		LINK (green)	ACT (yellow)			
		(Red)	(Orange)					
6	◇ <sup>(*)</sup> (Low-speed blinking)	—	—	—	—	This shows that user data is left in the backup controller (flash memory) after turning off the main switch (Unrestored).	Turn on the power switch and restore the user data. If the Controller is removed during blinking, data may be lost.	—
7 (*)	—	—	—	—	○	This shows that data is being transferred via LAN.	This is not a problem.	—
8	—	—	—	×	—	The LINK LED does not light on though the LAN cable in the active status is connected.	Check the LAN cable. If it is normal, replace the Controller.	Replacement "2.2.5 Replacing a Controller" (REP 02-0700)
9	—	○	—	—	—	After turning on the main switch, it lights up for 0.5 seconds.	This is not a problem.	—
						When the Host I/O Board is detached for prevention, it lights up for about three seconds.		
						A failure that makes the Controller unable to operate occurred in it.	① Connect PC to WEB (Refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000)), and check the message, then follow the instruction.  1. Replace the Controller.  2. If the operation is not recovered, replace the following items in order. Replace the Cache Memory.	Message "Chapter 1. Before Starting Trouble Analysis" (MSG 01-0000)  Replacement "2.2.5 Replacing a Controller" (REP 02-0700)  Replacement "2.2.6 Replacing a Cache Memory" (REP 02-0920)

\*1 : Indication of status with LED.

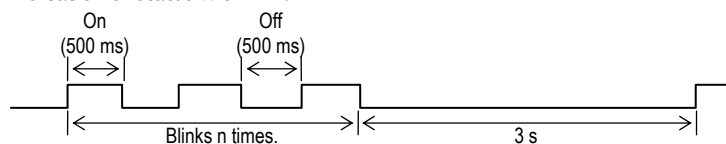


\*2 : This is not a failure status.

(○ : On ◇ : Blinking × : Off — : Independent)

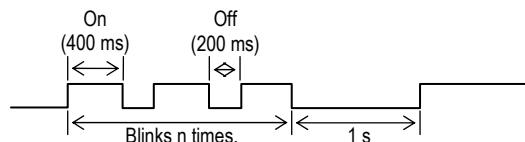
No.	LEDs					Cause or status	Action(s) to be taken	Reference page
	C-PWR (green)	ALM		LINK (green)	ACT (yellow)			
		(Red)	(Orange)					
10	-	✧ <sup>(*1)</sup> (Six)	-	-	-	Voltage on the controller is abnormal. (Resetting of the Controller cannot be cancelled.)	1. Clean it when the air vent of the array is clogged. 2. If there is a thing in front of the Front Bezel, move it. 3. Perform the dummy replacement. <sup>(*2)</sup> 4. When it is not released even if the dummy replacement is performed, replace the Controller.	<a href="#">Replacement "Chapter 3. Periodic Maintenance" (REP 03-0000)</a>  <a href="#">Replacement "2.2.5 Replacing a Controller" (REP 02-0700)</a>
11		✧ <sup>(*3)</sup> (Twice)				I/O Module(ENC) or I/O Card(ENC) CUDG error is occurred. • I/O Module(ENC) or I/O Card(ENC) error	Replace the Controller.	<a href="#">Replacement "2.2.5 Replacing a Controller" (REP 02-0700)</a>

\*1 : Indication of status with LED.



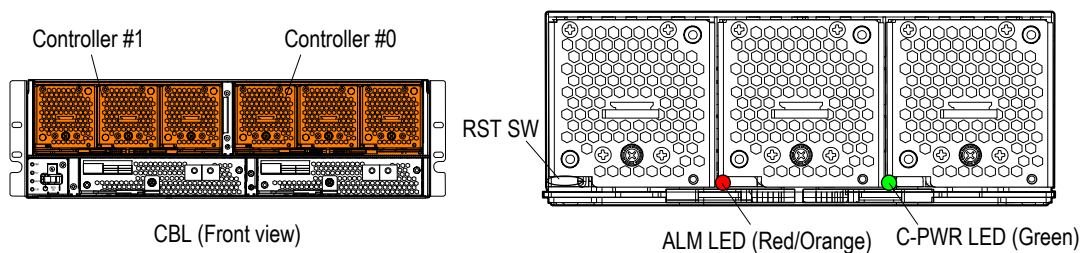
\*2 : This means that the part concerned is removed, and it is reinstalled after 20 seconds or more passed.

\*3 : Indication of status with LED.



(5-2) LED Indication Pattern (Cache memory, CPU) on Controller (CBL)

NOTE : If all the LEDs on the Controller are turned off, connect to WEB (Refer to [“Chapter 3. Before Starting WEB Connection” \(TRBL 03-0000\)](#)) and check if the Controller is blocked. If the Controller is blocked, replace the blocked Controller. (Refer to the [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\)](#).)



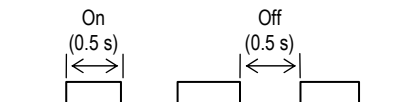




(○ : On ◇ : Blinking × : Off — : Independent)

No.	C-PWR (green)	LEDs		Cause or status	Action(s) to be taken	Reference page
		ALM				
		(Red)	(Orange)			
6	✧(*1) (Low-speed blinking)	—	—	This shows that user data is left in the backup controller (flash memory) after turning off the main switch (Unrestored).	Turn on the power switch and restore the user data. If the Controller is removed during blinking, data may be lost.	—
7	—	○	—	After turning on the main switch, it lights up for 0.5 seconds.	This is not a problem.	—
				When the Host I/O Module, Drive I/O Module or Management Module is detached for prevention, it lights up for about three seconds.		
				A failure that makes the Controller unable to operate occurred in it.	① Connect PC to WEB (Refer to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000)), and check the message, then follow the instruction.  1. Replace the Controller.  2. If the operation is not recovered, replace the following items in order. Replace the Cache Memory.	Message “Chapter 1. Before Starting Trouble Analysis” (MSG 01-0000)  Replacement “2.2.5 Replacing a Controller” (REP 02-0700)  Replacement “2.2.6 Replacing a Cache Memory” (REP 02-0920)

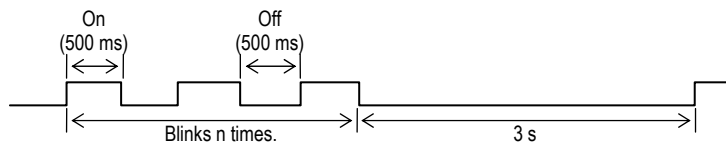
\*1 : Indication of status with LED.



(○ : On ◇ : Blinking × : Off — : Independent)

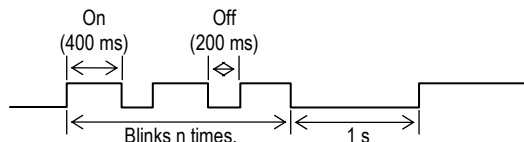
No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	C-PWR (green)	ALM				
		(Red)	(Orange)			
8	—	◇ <sup>(*1)</sup> (Six)	—	Voltage on the controller is abnormal. (Resetting of the Controller cannot be cancelled.)	1. Clean it when the air vent of the array is clogged. 2. If there is a thing in front of the Front Bezel, move it. 3. Perform the dummy replacement. <sup>(*2)</sup> 4. When it is not released even if the dummy replacement is performed, replace the Controller.	<a href="#">Replacement "Chapter 3. Periodic Maintenance" (REP 03-0000)</a>  <a href="#">Replacement "2.2.5 Replacing a Controller" (REP 02-0700)</a>
9	—	◇ <sup>(*3)</sup> (Twice)	—	I/O Module(ENC) or I/O Card(ENC) CUDG error is occurred. • I/O Module(ENC) or I/O Card(ENC) error	Replace the Controller.	<a href="#">Replacement "2.2.5 Replacing a Controller" (REP 02-0700)</a>

\*1 : Indication of status with LED.



\*2 : This means that the part concerned is removed, and it is reinstalled after 20 seconds or more passed.

\*3 : Indication of status with LED.



## (5-3) LED Indication Pattern (Management Module part) on Controller (CBL)

NOTE : If all the LEDs on the Controller are turned off, connect to WEB (Refer to [“Chapter 3. Before Starting WEB Connection” \(TRBL 03-0000\)](#)) and check if the Controller is blocked. If the Controller is blocked, replace the blocked Controller. (Refer to the [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\)](#).)

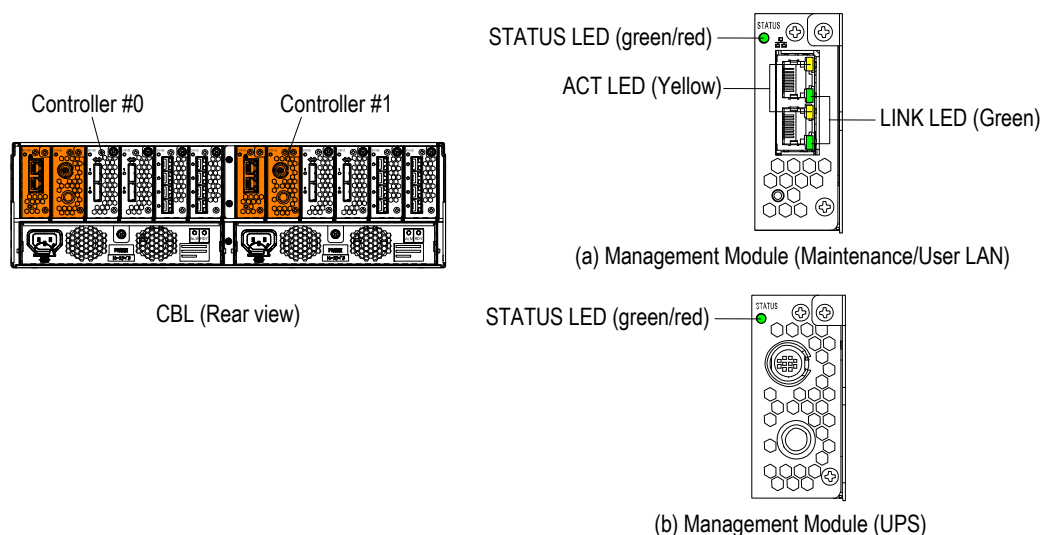


Table 7.2.8 LED Indication Pattern on Management Module

(○ : On ✧ : Blinking × : Off — : Independent)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	STATUS <sup>(*)2</sup>		ACT	LINK			
	(Green)	(Red)	(Yellow)	(Green)			
1	○	×	—	—	This shows that the Management Module is normal.	This is not a problem.	—
2 (*1)	○	×	—	○	This shows that the linkage of LAN is normal.	This is not a problem.	—
3 (*1)	○	×	○	—	This shows that data is being transferred via LAN.	This is not a problem.	—
4	×	○	—	—	This shows that there is a trouble in the Management Module.	Replace the Management Module	<a href="#">Replacement “2.2.10 Replacing a Management Module” (REP 02-1410)</a>
5	×	×	—	×	The LINK LED does not light on though the LAN cable in the active status is connected.	Check the LAN cable. If it is normal, replace the Controller.	<a href="#">Replacement “2.2.10 Replacing a Management Module” (REP 02-1410)</a>

\*1 : This is not a failure status.

\*2 : As for Management Module(UPS), only the STATUS LED(green) lights up/goes out.

(5-4) LED Indication Pattern (FC Interface Connector part) on Controller  
(CBXSL/CBXSS/CBSL/CBSS)

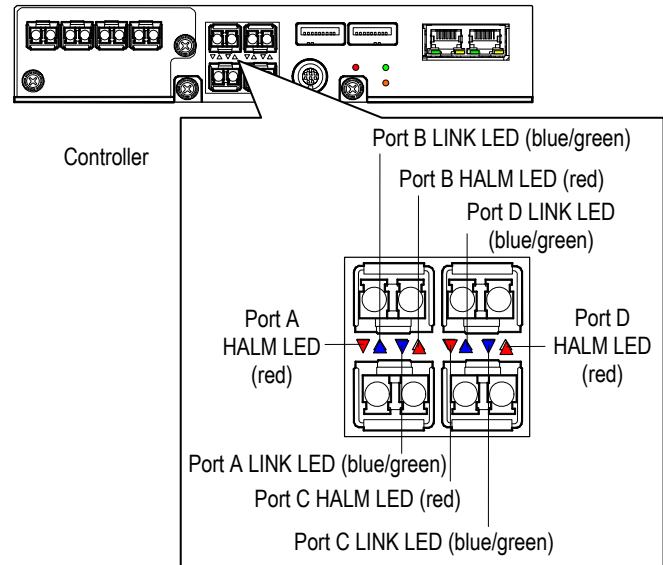
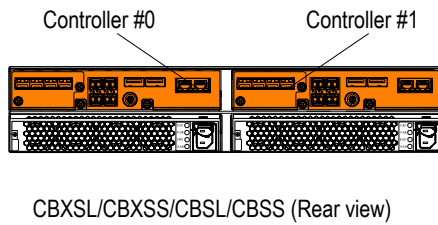


Table 7.2.9 LED Indication Patterns on FC Interface Connector

(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	HALM (red)	Link				
		(blue)	(green)			
1 (*1)	×	○	×	Link-up state. (When the transfer speed of the Fibre Channel is 8Gbps)	This is not a problem.	—
2 (*1)	×	×	○	Link-up state. (When the transfer speed of the Fibre Channel is 4Gbps or 2Gbps)		
3	×	×	○	<ul style="list-style-type: none"><li>• Link failed.</li><li>• Interface is in initial state.</li><li>• Interface is in reset state.</li><li>• Loop port is bypassed.</li><li>• Loop (Link) is being initialized.</li></ul>	<ol style="list-style-type: none"><li>1. There is no problem even if it is in this status when Fibre Channel Cable is not connected. It shows the status such as the array is starting up. This is not a problem.</li><li>2. When rebooting the host computer and the like, it is not abnormal even if it becomes this status.</li><li>3. Check the connections of the following Fibre Channel interfaces.<ul style="list-style-type: none"><li>• Fibre Channel Cable</li><li>• Fibre Channel Switch</li><li>• Host Adapter</li><li>• GBIC (When Host Adapter or Fibre Channel switch is connected)</li></ul></li><li>4. Check if the port setting (transfer speed) and the upper node setting (transfer speed) are consistent.</li><li>5. Check if the port setting (Topology) and the upper node setting (Topology) are the same.</li><li>6. Check if it links up by replacing the equipment listed below sequentially.<ul style="list-style-type: none"><li>• Host Connector</li><li>• FC Host I/O Module</li></ul></li><li>7. When there is a possibility of a failure on the host node side, replace the equipment listed below sequentially and check if it links up.<ul style="list-style-type: none"><li>• Fibre Channel Cable</li><li>• Fibre Channel Switch</li><li>• Host Adapter</li><li>• GBIC (When Host Adapter or Fibre Channel switch is connected)</li></ul></li></ol>	<a href="#">Hitachi Storage Navigator Modular 2 Help "FC Settings"</a>

\*1 : This is not a failure status.

(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	HALM (red)	Link				
		(blue)	(green)			
4	×	✧	×	Link failure often occurs. Loop (Link) is often initialized. (When the transfer speed of the Fibre Channel is 8Gbps)	1. When rebooting the host computer and the like, it is not abnormal even if it becomes this status. 2. Check the connections of the following Fibre Channel interfaces. <ul style="list-style-type: none"><li>• Fibre Channel Cable</li><li>• Fibre Channel Switch</li><li>• Host Adapter</li><li>• GBIC (When Host Adapter or Fibre Channel switch is connected)</li></ul> 3. Check if the port setting (transfer speed) and the upper node setting (transfer speed) are consistent.	Hitachi Storage Navigator Modular 2 Help “FC Settings”
5	×	×	✧	Link failure often occurs. Loop (Link) is often initialized. (When the transfer speed of the Fibre Channel is 4Gbps or 2Gbps)	4. Check if the port setting (Topology) and the upper node setting (Topology) are the same. 5. Check if it links up by replacing the equipment listed below sequentially. <ul style="list-style-type: none"><li>• Host Connector</li><li>• FC Host I/O Module</li></ul> 6. When there is a possibility of a failure on the host node side, replace the equipment listed below sequentially and check if it links up. <ul style="list-style-type: none"><li>• Fibre Channel Cable</li><li>• Fibre Channel Switch</li><li>• Host Adapter</li><li>• GBIC (When Host Adapter or Fibre Channel switch is connected)</li></ul>	
6	○	—	—	The host connector is defective.	Replace the host connector of which the LED lights on.	Replacement “2.2.8 Replacing a Host Connector” (REP 02-1230)

## (5-5) LED Indication Pattern (SAS (ENC) connector part) on Controller (CBXSL/CBXSS/CBSL/CBSS)

NOTE : If all the LEDs on the Controller are turned off, connect to WEB (Refer to [“Chapter 3. Before Starting WEB Connection” \(TRBL 03-0000\)](#)) and check if the Controller is blocked. If the Controller is blocked, replace the blocked Controller. (Refer to the [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\)](#).)

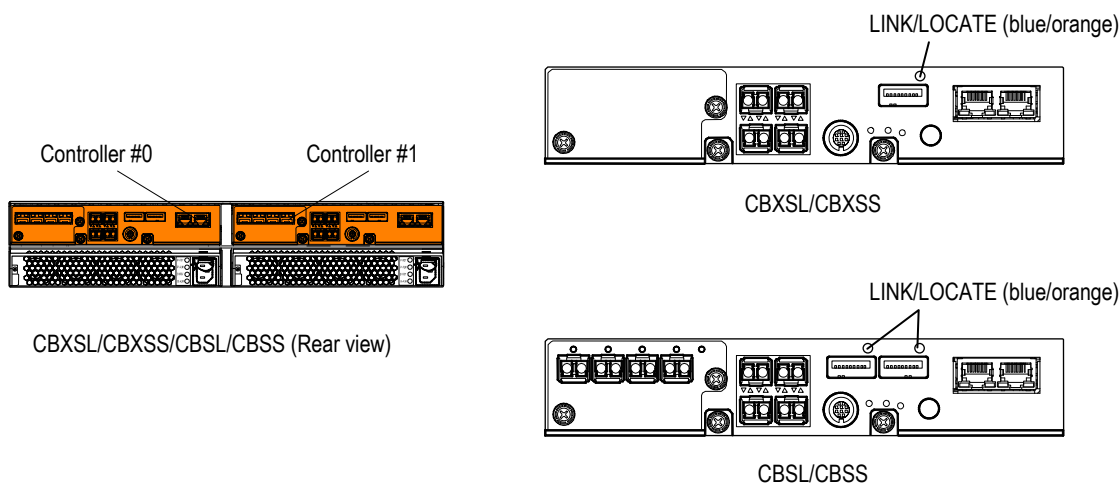


Table 7.2.10 LED Indication Pattern on SAS (ENC) connector part

(○ : On ☆ : Blinking × : Off — : Independent)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	LINK/LOCATE				
	(Blue)	(Orange)			
1	×	×	This shows that the SAS (ENC) cables are not connected or in case the SAS (ENC) cables are connected, it shows that a link down is happening.	Check the SAS (ENC) cables. If they are normal, replace the Controller.	<a href="#">Replacement "2.2.5 Replacing a Controller" (REP 02-0700)</a>
2 (*1)	○	×	This shows that the linkage of SAS is normal. (LINK)	This is not a problem.	—
3 (*1)	×	○	This shows that this is the connecting place of the SAS (ENC) cable When adding a Drive Box. (LOCATE)	This is not a problem.	—

\*1 : This is not a failure status.

\*1 : This is not a failure status.

## (5-6) LED Indication Pattern (Drive I/O Module part) on Controller (CBL)

NOTE : If all the LEDs on the Controller are turned off, connect to WEB (Refer to [“Chapter 3. Before Starting WEB Connection” \(TRBL 03-0000\)](#)) and check if the Controller is blocked. If the Controller is blocked, replace the blocked Controller. (Refer to the [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\)](#).)

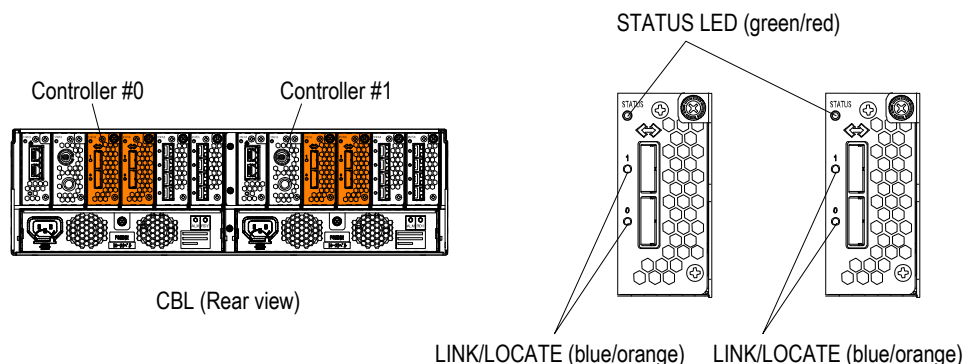


Table 7.2.11 LED Indication Pattern on Drive I/O Module

(○ : On ✧ : Blinking × : Off — : Independent)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	STATUS		LINK/LOCATE				
	(Green)	(Red)	(Blue)	(Orange)			
1	○	×	×	×	This shows that the SAS (ENC) cables are not connected or in case the SAS (ENC) cables are connected, it shows that a link down is happening.	Check the SAS (ENC) cable in case it's connected. If it is normal, replace the Drive I/O Module.	<a href="#">Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320)</a>
2 (*1)	○	×	○	×	This shows that the linkage of SAS is normal. (LINK)	This is not a problem.	—
3 (*1)	○	×	×	○	This shows that this is the connecting place of the SAS (ENC) cable When adding a Drive Box. (LOCATE)	This is not a problem.	—
4	×	○	—	—	This shows that there is a trouble in the Drive I/O Module.	Replace the Drive I/O Module.	<a href="#">Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320)</a>
5	×	×	—	—	This shows that the Drive I/O Module is not connected correctly or that there is a problem on the Drive I/O Module.	In case the Drive I/O Module is connected correctly, replace the Drive I/O Module.	<a href="#">Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320)</a>

\*1 : This is not a failure status.



## (6) LED Indication Patterns on Host I/O Module

### (a) FC Host I/O Module

NOTE : When the ALM LED (red) on the Controller lights up, the LED pattern indication and the failure status in [Table 7.2.8](#) may not match.

Check the failure status after turning off the ALM LED (red) on the Controller.

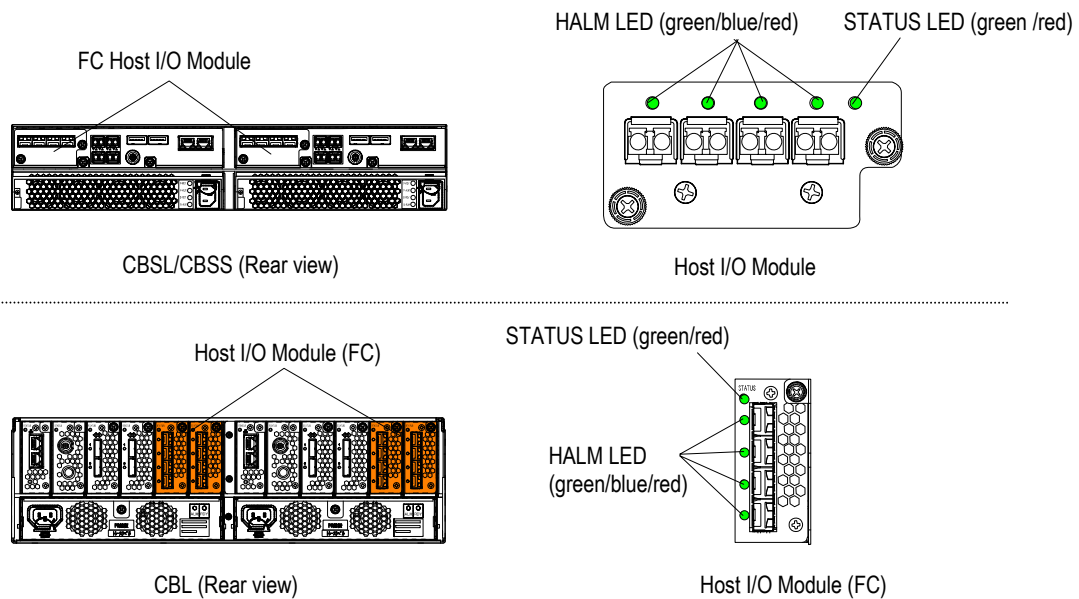


Table 7.2.12 LED Indication Patterns on FC Host I/O Board/Module

(○ : On ◇ : Blinking × : Off — : Independent)

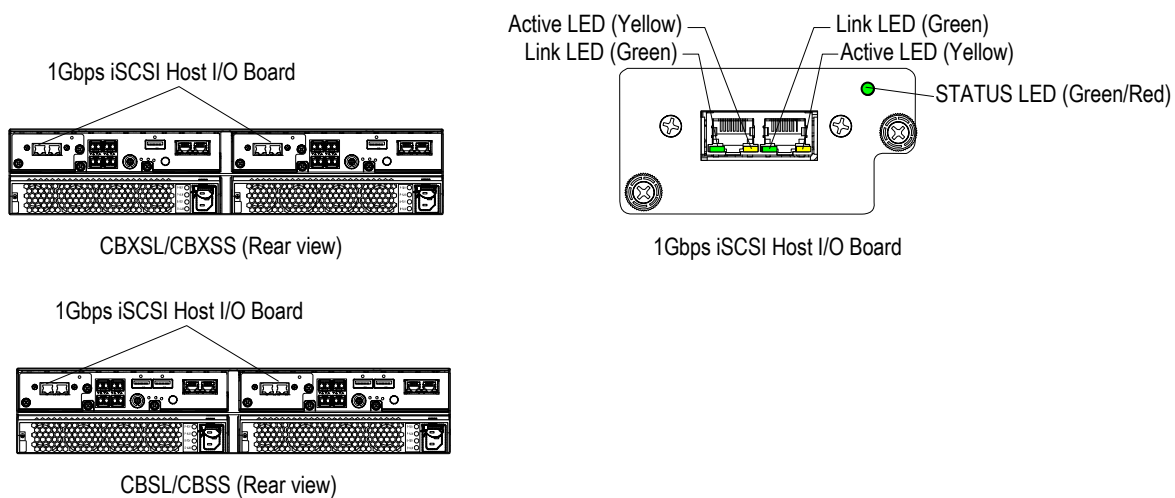
No.	LEDs					Cause or status	Action(s) to be taken	Reference page
	STATUS		HALM					
	(green)	(red)	(red)	(blue)	(green)			
1	○	×	—	—	—	This shows that the FC Host I/O Board/Module is normal.	This is not a problem.	—
2	×	○	—	—	—	This shows that there is a trouble in the FC Host I/O Board/Module.	Replace the FC Host I/O Board/Module	<a href="#">Replacement "2.2.7 Replacing a Host I/O Board/Module" (REP 02-1100)</a>
3 (*1)	—	—	×	○	×	Link-up state. (When the transfer speed of the Fibre Channel is 8Gbps)	This is not a problem.	—
4 (*1)	—	—	×	×	○	Link-up state. (When the transfer speed of the Fibre Channel is 4Gbps or 2Gbps)		
5 (*1)	—	—	×	×	×	<ul style="list-style-type: none"><li>Interface is in initial state.</li><li>Interface is in reset state.</li><li>Loop port is bypassed.</li><li>Loop (Link) is being initialized.</li><li>Link failed.</li></ul>	<ol style="list-style-type: none"><li>There is no problem even if it is in this status when Fibre Channel Cable is not connected. It shows the status such as the array is starting up. This is not a problem.</li><li>When rebooting the host computer and the like, it is not abnormal even if it becomes this status.</li><li>Check the connections of the following Fibre Channel interfaces.<ul style="list-style-type: none"><li>Fibre Channel Cable</li><li>Fibre Channel Switch</li><li>Host Adapter</li><li>GBIC (When Host Adapter or Fibre Channel switch is connected)</li></ul></li><li>Check if the port setting (transfer speed) and the upper node setting (transfer speed) are consistent.</li><li>Check if the port setting (Topology) and the upper node setting (Topology) are the same.</li><li>Check if it links up by replacing the equipment listed below sequentially.<ul style="list-style-type: none"><li>Host Connector</li><li>FC Host I/O Module</li></ul></li><li>When there is a possibility of a failure on the host node side, replace the equipment listed below sequentially and check if it links up.<ul style="list-style-type: none"><li>Fibre Channel Cable</li><li>Fibre Channel Switch</li><li>Host Adapter</li><li>GBIC (When Host Adapter or Fibre Channel switch is connected)</li></ul></li></ol>	<a href="#">Hitachi Storage Navigator Modular 2 Help "FC Settings"</a>

\*1 : This is not a failure status.

(○ : On ✧ : Blinking × : Off — : Independent)

No.	LEDs					Cause or status	Action(s) to be taken	Reference page
	STATUS		HALM					
	(green)	(red)	(red)	(blue)	(green)			
6	—	—	×	✧	×	Link failure often occurs. Loop (Link) is often initialized. (When the transfer speed of the Fibre Channel is 8Gbps)	1. When rebooting the host computer and the like, it is not abnormal even if it becomes this status. 2. Check the connections of the following Fibre Channel interfaces. <ul style="list-style-type: none"><li>• Fibre Channel Cable</li><li>• Fibre Channel Switch</li><li>• Host Adapter</li><li>• GBIC (When Host Adapter or Fibre Channel switch is connected)</li></ul>	<a href="#">Hitachi Storage Navigator Modular 2 Help "FC Settings"</a>
7	—	—	×	×	✧	Link failure often occurs. Loop (Link) is often initialized. (When the transfer speed of the Fibre Channel is 4Gbps or 2Gbps)	3. Check if the port setting (transfer speed) and the upper node setting (transfer speed) are consistent. 4. Check if the port setting (Topology) and the upper node setting (Topology) are the same. 5. Check if it links up by replacing the equipment listed below sequentially. <ul style="list-style-type: none"><li>• Host Connector</li><li>• FC Host I/O Module</li></ul> 6. When there is a possibility of a failure on the host node side, replace the equipment listed below sequentially and check if it links up. <ul style="list-style-type: none"><li>• Fibre Channel Cable</li><li>• Fibre Channel Switch</li><li>• Host Adapter</li><li>• GBIC (When Host Adapter or Fibre Channel switch is connected)</li></ul>	
8	—	—	○	—	—	The host connector is defective.	Replace the host connector of which the LED lights on.	<a href="#">Replacement "2.2.8 Replacing a Host Connector" (REP 02-1230)</a>

## (b) 1G bps iSCSI Host I/O Board

**Table 7.2.13 LED Indication Patterns on iSCSI Host I/O Board**

(○ : On ✧ : Blinking × : Off — : Independent)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	STATUS		Link (green)	Active (yellow)			
	(green)	(red)					
1	○	×	—	—	This shows that the iSCSI Host I/O Board is normal.	This is not a problem.	—
2	×	○	—	—	This shows that there is a trouble in the iSCSI Host I/O Board.	Replace the iSCSI Host I/O Board.	<a href="#">Replacement "2.2.7 Replacing a Host I/O Board/Module" (REP 02-1100)</a>
3 (*1)	—	—	○	—	This indicates that the link status is normal.	This is not a problem.	—

\*1 : This is not a failure status.

(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	STATUS		Link (green)	Active (yellow)			
	(green)	(red)					
4	—	—	×	—	The LINK LED does not light on though the iSCSI interface cable in the active status is connected.	Check the LINK LED for every work of ① to ⑤. Terminate the work if the LINK LED lights up. ① Check the power status of the host computer, Switch or NIC, which is connected to the iSCSI Host I/O Board. When the Power Unit of the host computer, Switch or NIC is turned off, request the customer to turn on the Power Unit.	—
						② Check if the both terminals of the iSCSI interface cable are connected to the connectors. If the iSCSI interface cable connection is loosened, connect it firmly again.	—
						③ Check with the customer if the port transfer speed of the HBA, Switch or NIC, which is connected to the iSCSI Host I/O Board, is 1Gbps(*1). If the port transfer speed is other than 1 Gbps(*1), request the customer to make it 1 Gbps(*1).	—
						④ Replace the iSCSI Host I/O Board.	Replacement “2.2.7 Replacing a Host I/O Board/Module” (REP 02-1100)
						⑤ It is thought that there is a problem in the trouble of the HBA, Switch or NIC, which is connected to the iSCSI Host I/O Board, or the iSCSI interface cable. Request the customer to replace the part.	—
5	—	—	◇	—	Although the active iSCSI interface cable is connected, the LINK LED blinks.	The status such as the devices connected to the iSCSI Host I/O Board are being started is shown. However, it is abnormal when this status continues. Check the LINK LED for every work of ① to ④. Terminate the work if the LINK LED lights up. ① Check if the both terminals of the iSCSI interface cable are connected to the connectors. If the iSCSI interface cable connection is loosened, connect it firmly again.	—
						② Check with the customer if the port transfer speed of the HBA, Switch or NIC, which is connected to the iSCSI Host I/O Board, is 1Gbps(*1). If the port transfer speed is other than 1 Gbps(*1), request the customer to make it 1 Gbps(*1).	—
						③ Replace the iSCSI Host I/O Board.	Replacement “2.2.7 Replacing a Host I/O Board/Module” (REP 02-1100)
						④ It is thought that there is a problem in the trouble of the HBA, Switch or NIC, which is connected to the iSCSI Host I/O Board, or the iSCSI interface cable. Request the customer to replace the part.	—

\*1 : The HBA, Switch or NIC, whose port transfer speed is other than 1Gbps, cannot be connected to the iSCSI Host I/O Board.

(c) 10G bps iSCSI Host I/O Board/Module

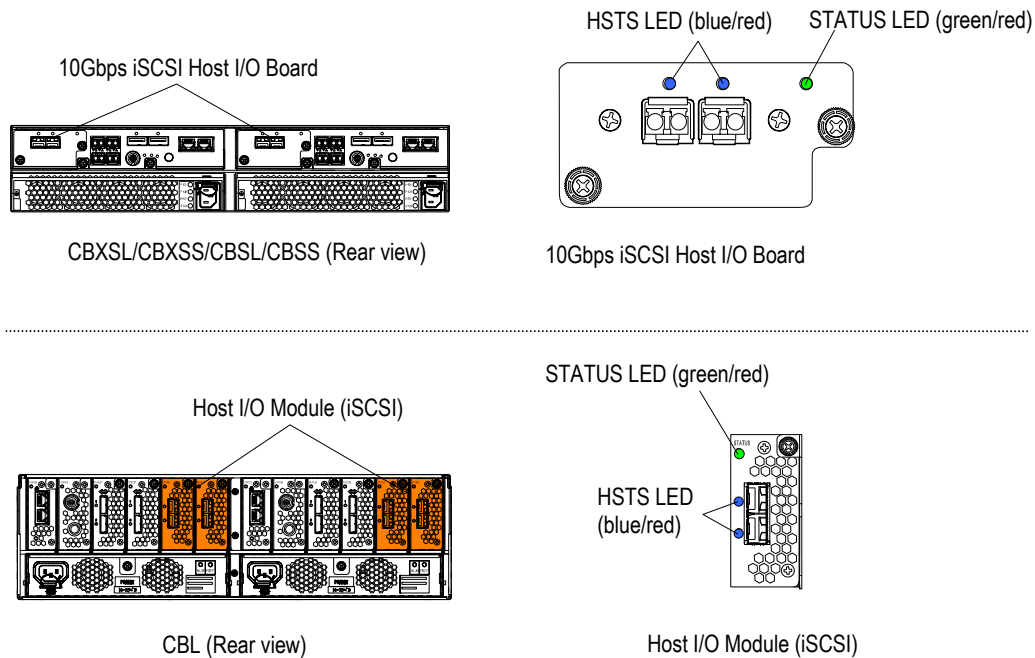


Table 7.2.14 LED Indication Patterns on 10 Gbps iSCSI Host I/O Board/Module

(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	STATUS		HSTS				
	(green)	(red)	(red)	(blue)			
1	○	×	—	—	This shows that the iSCSI Host I/O Board/Module is normal.	This is not a problem.	—
2	×	○	—	—	This shows that there is a trouble in the iSCSI Host I/O Board/Module.	Replace the iSCSI Host I/O Board/Module.	Replacement “2.2.7 Replacing a Host I/O Board/Module” (REP 02-1100)
3 (*1)	—	—	×	○	This indicates that the link status is normal.	This is not a problem.	—

\*1 : This is not a failure status.

(○ : On ✧ : Blinking × : Off — : Independent)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	STATUS		HSTS				
	(green)	(red)	(red)	(blue)			
4	—	—	×	×	The HSTS LED does not light on though the iSCSI interface cable in the active status is connected.	Check the HSTS LED for every work of ① to ⑤. Terminate the work if the HSTS LED lights up. ① Check the power status of the host computer, Switch or NIC, which is connected to the 10G iSCSI Host I/O Board/Module. When the Power Unit of the host computer, Switch or NIC is turned off, request the customer to turn on the Power Unit.	—
						② Check if the both terminals of the iSCSI interface cable are connected to the connectors. If the iSCSI interface cable connection is loosened, connect it firmly again.	—
						③ Check with the customer if the port transfer speed of the HBA, Switch or NIC, which is connected to the iSCSI Host I/O Board/Module, is 10Gbps <sup>(*)</sup> . If the port transfer speed is other than 10 Gbps <sup>(*)</sup> , request the customer to make it 10 Gbps <sup>(*)</sup> .	—
						④ Check if it links up by replacing the equipment listed below sequentially. • Host Connector • 10G bps iSCSI Host I/O Board/Module	<a href="#">Replacement “2.2.8 Replacing a Host Connector” (REP 02-1230)</a> <a href="#">Replacement “2.2.7 Replacing a Host I/O Board/Module” (REP 02-1100)</a>
						⑤ It is thought that there is a problem in the trouble of the HBA, Switch or NIC, which is connected to the iSCSI Host I/O Board/Module, or the iSCSI interface cable. Request the customer to replace the part.	—

\*1 : The HBA, Switch or NIC, whose port transfer speed is other than 1Gbps, cannot be connected to the iSCSI Host I/O Board/Module.

(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	STATUS		HSTS				
	(green)	(red)	(red)	(blue)			
5	—	—	×	◇	Although the active iSCSI interface cable is connected, the LINK LED blinks.	The status such as the devices connected to the iSCSI Host I/O Board/Module are being started is shown. However, it is abnormal when this status continues. Check the HSTS LED for every work of ① to ④. Terminate the work if the HSTS LED lights up. ① Check if the both terminals of the iSCSI interface cable are connected to the connectors. If the iSCSI interface cable connection is loosened, connect it firmly again.	—
					② Check with the customer if the port transfer speed of the HBA, Switch or NIC, which is connected to the iSCSI Host I/O Board/Module, is 10Gbps <sup>(*)</sup> . If the port transfer speed is other than 10 Gbps <sup>(*)</sup> , request the customer to make it 10 Gbps <sup>(*)</sup> .	—	
					③ Check if it links up by replacing the equipment listed below sequentially. • Host Connector • 10G bps iSCSI Host I/O Board/Module	Replacement "2.2.8 Replacing Host Connector" (REP 02-1230) Replacement "2.2.7 Replacing a Host I/O Board/Module" (REP 02-1100)	
					④ It is thought that there is a problem in the trouble of the HBA, Switch or NIC, which is connected to the iSCSI Host I/O Board/Module, or the iSCSI interface cable. Request the customer to replace the part.	—	
6	—	—	○	—	The host connector is defective.	Replace the host connector of which the LED lights on.	Replacement "2.2.8 Replacing a Host Connector" (REP 02-1230)

\*1 : The HBA, Switch or NIC, whose port transfer speed is other than 1Gbps, cannot be connected to the iSCSI Host I/O Module.



## (7) Trouble analysis based on LED indication of I/O Module(ENC) or I/O Card(ENC)

## (7-1) DBL/DBS/DBF

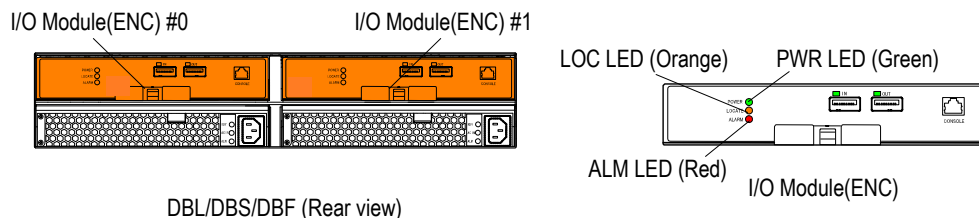


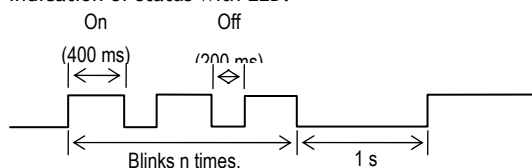
Table 7.2.15 LED Indication Patterns on I/O Module(ENC)

(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	PWR (green)	ALM (red)	LOC (orange)			
1 (*1)	×	—	—	The I/O Module(ENC) Power is turned off.	Recovery operation is unnecessary.	—
2 (*1)	○	×	×	Normal.	Recovery operation is unnecessary.	—
3	○	—	○	I/O Module(ENC) CUDG error is occurred. <ul style="list-style-type: none"><li>ENC firmware (BOOT section) detects CUDG error</li><li>ENC firmware detects RAM error</li><li>I/O Module(ENC) configuration error.</li></ul>	Replace the I/O Module(ENC).	Replacement “2.2.11 Replacing I/O Module(ENC) or I/O Card(ENC)” (REP 02-1500)
4	○	—	✧(*2) (Twice time)	I/O Module(ENC) CUDG error is occurred. <ul style="list-style-type: none"><li>I/O Module(ENC) error</li></ul>		
5	○	—	✧(*2) (Three time)	I/O Module(ENC) CUDG error is occurred. <ul style="list-style-type: none"><li>Firmware error in flash memory.</li></ul>		
6	○	○	—	A failure that makes the I/O Module(ENC) unable to operate occurred in it.		
7 (*1)	○	×	○(*3)	<ul style="list-style-type: none"><li>When adding the chassis with the power turned on, it indicates the addition source.</li><li>The chassis location display is performed from the Storage Navigator Modular 2.</li></ul>	<ul style="list-style-type: none"><li>If the chassis is being added, the LOCs will go out when the chassis addition is completed.</li><li>When the LOCs light up by the instruction of the chassis location display, perform the instruction of disabling the chassis location display from the Hitachi Storage Navigator Modular 2.</li></ul>	—  Addition/Removal/Relocation “1.6.2 (8)” (ADD 01-0810)

\*1 : This is not a failure status.

\*2 : Indication of status with LED.



\*3 : The LOCs on the I/O Module(ENC) #0 and #1 light up.

## (7-2) DBX

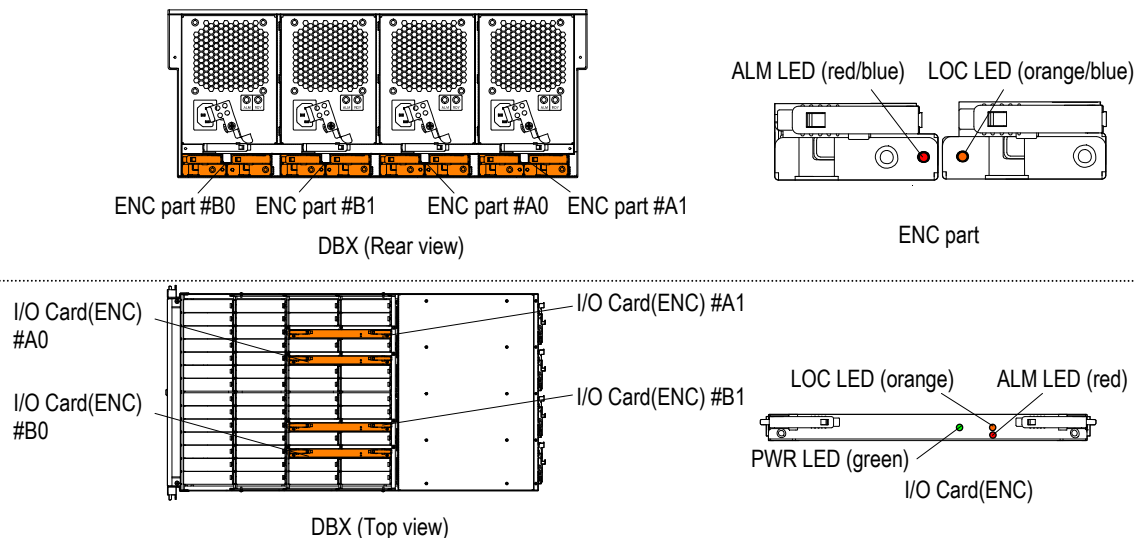


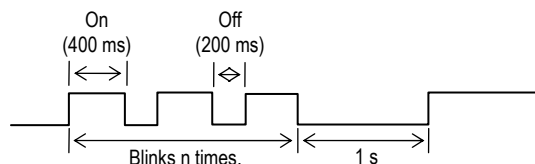
Table 7.2.16 LED Indication Patterns on I/O Card(ENC)

(○ : On ◇ : Blinking × : Off — : Independent)

No.	LEDs					Cause or status	Action(s) to be taken	Reference page
	PWR	ALM		LOC				
	(green)	(red)	(blue)	(orange)	(blue)			
1 (*1)	×	—	—	—	—	The I/O Card(ENC) Power is turned off.	Recovery operation is unnecessary.	—
2 (*1)	○	×	×	×	×	Normal.	Recovery operation is unnecessary.	—
3	○	—	—	○	×	I/O Card(ENC) CUDG error is occurred. <ul style="list-style-type: none"> <li>ENC firmware (BOOT section) detects CUDG error</li> <li>ENC firmware detects RAM error</li> <li>I/O Card(ENC) configuration error.</li> </ul>	Replace the I/O Card(ENC).	Replacement <a href="#">“2.2.11 Replacing I/O Module(ENC) or I/O Card(ENC)”</a> (REP 02-1500)
4	○	—	—	◇(*2) (Twice time)	×	I/O Card(ENC) CUDG error is occurred. <ul style="list-style-type: none"> <li>I/O Card(ENC) error</li> </ul>		
5	○	—	—	◇(*2) (Three time)	×	I/O Card(ENC) CUDG error is occurred. <ul style="list-style-type: none"> <li>Firmware error in flash memory.</li> </ul>		
6	○	○	×	—	—	A failure that makes the I/O Card(ENC) unable to operate occurred in it.		

\*1 : This is not a failure status.

\*2 : Indication of status with LED.



(○ : On ☆ : Blinking × : Off — : Independent)

No.	LEDs					Cause or status	Action(s) to be taken	Reference page
	PWR	ALM		LOC				
	(green)	(red)	(blue)	(orange)	(blue)			
7 (*1)	○	×	×	○(*2)	×	<ul style="list-style-type: none"><li>When adding the chassis with the power turned on, it indicates the addition source.</li></ul>	<ul style="list-style-type: none"><li>If the chassis is being added, the LOCs will go out when the chassis addition is completed.</li></ul>	—
						<ul style="list-style-type: none"><li>The chassis location display is performed from the Storage Navigator Modular 2.</li></ul>	<ul style="list-style-type: none"><li>When the LOCs light up by the instruction of the chassis location display, perform the instruction of disabling the chassis location display from the Hitachi Storage Navigator Modular 2.</li></ul>	<a href="#">Addition/Removal/Relocation "1.6.2 (8)" (ADD 01-0810)</a>
8	○	×	○	—	—	SAS IN side is liked up.	Recovery operation is unnecessary.	—
9	○	—	—	×	○	SAS OUT side is liked up.	Recovery operation is unnecessary.	—

\*1 : This is not a failure status.

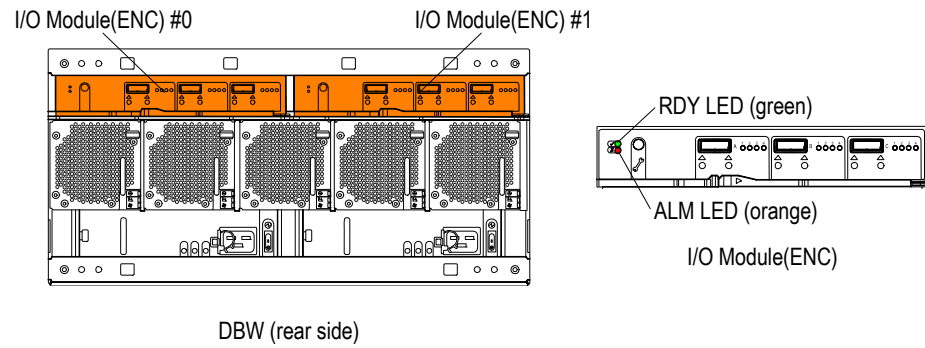
\*2 : The LOCs on the I/O Card(ENC) #A0 and #A1 or #B0 and #B1 light up.

(7-3) DBW

For the DBW, failed parts cannot be identified by the LED indications.

Here, just check the LED locations.

Check the failure isolation in the WEB Information Message, and then perform the maintenance according to its recovery methods.



## Chapter 8. Trouble Analysis by Failure Monitoring Function

### 8.1 Trouble Analysis by SNMP Agent Support Function

The SNMP Agent Support Function notifies a network monitoring personal computer or workstation, in which the SNMP manager program is installed, of failures of the disk array system via the SNMP (Simple Network Management Protocol). This section explains the trouble analysis operation to be performed when the SNMP Agent Support Function is used.

#### 8.1.1 Maintenance with TRAP Codes

##### (1) Ascertaining failure information

An example of an output by the TRAP issued by the disk array system. (a) is an example of output by HP OpenView/NetM-COMET. (b) is an example of output by SunNet Manager.

##### (a) Example of trapped output by HP OpenView/NetM\*COMET

If an error occurs, the following screen is popped up.

		Trap name	
		fan Failure event	
Jan 25 (FRI), 2008 4p.m. 21 minutes 15 seconds			
fan		OK	

“Error event” in the “Event Category” box changes to “■”. Double-clicking this box displays an Error Event browser. For detailed information refer to the browser.

Event Category	
<input checked="" type="checkbox"/> Error event <input type="checkbox"/> Threshold event <input type="checkbox"/> Status event <input type="checkbox"/> Setting event <input type="checkbox"/> Application warning event <input type="checkbox"/> All events	
[Read only]	

		IP address or registered host model name		Generic Trap Code		Specific Trap Code			
Error Event Browser									
File Action View						Help			
Significance		Date	↓	Source	↓	Message	↓		
Important warning area 2011/09/27 16:21:15 DF850 Trap:generic 6 specific:3 args (0):									
1 Event - Dangerous:0 Serious warning:1 Warning:0 Caution:0 Normal:0									

## (b) Example of trapped output by SunNet Manager

		IP address or registered host model name			
Event/Trap Report-DF850					
Save	Device name: _____				
Remarks 6	1		6		
Tue Sep 27 13:29:06 2011 [DF850]: Trap :					
sequence=1					
receive- time= Tue Sep 27 13:29:06 2011					
version=0					
community=public					
enterprise=Hitach,Ltd..system. storage. dfraid. dfraid					
Lan					
source-time=00:00:00.00					
trap- type=Fan_Failure					
		Trap name			

## (2) Trouble analysis method

Perform maintenance referring to the output examples in (1) and according to Table 8.1.1, “Recovery Method for Each Trap Code”. (Refer to [Message “Chapter 6. Warning Messages” \(MSG 06-0000\)](#).)

**Table 8.1.1 Recovery Method for Each Trap Code**

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
1	0	0	coldStart	Power-on, Unlocking the SNMP Agent Support Function or changing the setting of the SNMP Agent Support Function by rebooting the array	This is not an error. Recovery operation is not necessary.
2	1	0	warmStart	Changing the setting of the SNMP Agent Support Function in the status that the array power is turned on	This is not an error. Recovery operation is not necessary.
3	4	0	authenticationFailure	Invalid SNMP access (The community name set for the array differs from the community name accessed by the SNMP manager)	Change the community name set for the array or the community name accessed by the SNMP manager so that they match. When changing the community name set for the array, refer to “SNMP Agent Support Function User’s Guide”. When changing the community name accessed by the SNMP manager, refer to the manual of each manager.
4	6	1	systemDown	Issuer Controller blockade	After a failure occurs, It is shown that the issuer Controller has been blockaded. For the detailed failure information, refer to the display of the WEB log message of the array.
5	6	2	driveFailure	Disk shutdown	It is shown that any of the failures occurred. Message code : W09zab HDU alarm (Unit-x, HDU-y, Type-c) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
6	6	3	fanFailure	Fan failure	It is shown that any of the failures occurred. Message code : W05z00 FAN alarm (Unit-x, FAN-y) W06z00 FAN alarm (CTL-Unit, FAN-xy) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
7	6	4	powerSupplyFailure	Power supply failure	It is shown that any of the failures occurred. Message code : W07zy0 PS alarm (Unit-w, PS-x) W08zy0 PS alarm (CTL-Unit, PS-x) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
8	6	5	batteryFailure	Battery voltage error	It is shown that any of the failures occurred. Message code : W03z0x Battery alarm (Battery-x) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
9	6	7	upsFailure	UPS error	Perform the maintenance instructed. Message code : W0Hz0x UPS alarm (UPS-x) The information corresponding to x is not notified regarding the trap.
10	6	10	otherControllerFailure	Another side controller blockade (For dual configuration only)	Perform the maintenance instructed. Message code : W01z0x CTL alarm (CTL-x) The information corresponding to x in the manual is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details. When this trap is displayed following the No.14 "microprogram Replacement executed", it does not mean a failure because it is reported owing to the firmware replacement.
11	6	11	warning	A Warning was issued in the disk array system.	The TRAP when an error different from a replacement parts error has occurred. (Example: Unfinished Write occurred) For the detailed failure information, refer to the display of the WEB log message of the array. Perform the maintenance instructed for message code W#####. "#####" is optional.
12	6	12	spareDriveFailure	Spare Drive blockade	It is shown that any of the failures occurred. Message code : W0Bzab Spare HDU alarm (Unit-x, HDU-y, Type-c) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
13	6	14	encFailure	ENC failure	It is shown that any of the failures occurred. Message code : W0Fzf0 ENC alarm (Unit-x, ENC-y) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
14	6	16	PathFailure	Path detachment	Perform the maintenance instructed. Message code : W0K0xy Path alarm (Remote-x, Path-y) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.



No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
15	6	20	hostConnectorFailure	Host connector blockade	Perform the maintenance instructed. Message code : W0Pz0g Host connector alarm (Portxy) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
16	6	250	interfaceBoardFailure	Host I/O Board blockade	Perform the maintenance instructed. Message code : W3Rzix Interface Board alarm(CTL-w, I/F-x) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
17	6	254	hostIOModuleFailure	Host I/O Module blockade	Perform the maintenance instructed. Message code : WA1zi0 Host I/O module alarm (CTL-w, Slot-I) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
18	6	255	driveIOModuleFailure	Drive I/O Module blockade	Perform the maintenance instructed. Message code : WA0zj0 Drive I/O module alarm (CTL-w, Slot-I) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
19	6	256	managementModuleFailure	Management Module blockade	Perform the maintenance instructed. Message code : WA2zk0 Management module alarm (CTL-w, Slot-I) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
20	6	257	recoverableControllerFailure	Controller pseudo blockade (The controller concerned becomes inaccessible from the host and the management program because the controller operation stops.)	Perform the maintenance instructed. Message code : W70z00 Recoverable CTL alarm by the maintenance procedures of the blocked component (CTL-x) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
21	6	300	psueShadowImage	PSUE (When ShadowImage is used)	It is shown that PSUE occurred. Refer to WEB, Hitachi Storage Navigator Modular 2.
22	6	301	psueSnapShot	PSUE (When SnapShot is used)	It is shown that PSUE occurred. Refer to WEB, Hitachi Storage Navigator Modular 2.
23	6	302	psueTrueCopy	PSUE (When TrueCopy is used)	It is shown that PSUE occurred. Refer to WEB, Hitachi Storage Navigator Modular 2.
24	6	303	psueTrueCopyExtendedDistance	PSUE (When TrueCopyExtendedDistance is used)	It is shown that PSUE occurred. Refer to WEB, Hitachi Storage Navigator Modular 2.
25	6	304	psueModularVolumeMigration	PSUE (When ModularVolumeMigration is used)	It is shown that PSUE occurred. Refer to WEB, Hitachi Storage Navigator Modular 2.
26	6	305	dataPoolThresholdOver	Threshold over of POOL	It is shown that POOL threshold was exceeded. Refer to WEB, Hitachi Storage Navigator Modular 2.

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
27	6	306	dataPoolNoFree	No empty area of POOL.	It is shown that POOL threshold was exceeded. Refer to WEB, Hitachi Storage Navigator Modular 2.
28	6	307	CycleTimeThresholdOver	Cycle time threshold over	It is shown that cycle time threshold was exceeded. Refer to WEB, Hitachi Storage Navigator Modular 2.
29	6	308	luFailure	Drive multiple trouble	It is shown that any of the failures occurred. Message code : I30100 HDU error(Unit-x, HDU-y) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
30	6	309	replaceAirFilterBezel	Alert for DC power supply filter replacement	It is shown that the replacement time comes described in: Message code : Please replace the Air Filter of Bezel Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
31	6	310	dpPoolEarlyAlert	Early alert for pool capacity depletion	It is shown that the following occurred: Message code : I6GH00 DP Pool Consumed Capacity Early Alert (Pool-x) Ask the customer/SE to add the DP pool capacity referring to the "Dynamic Provisioning User's Guide".
32	6	311	dpPoolDepletionAlert	Depletion alert for pool capacity depletion	It is shown that the following occurred: Message code : I6GI00 DP Pool Consumed Capacity Depletion Alert(Pool-x) Ask the customer/SE to add the DP pool capacity referring to the "Dynamic Provisioning User's Guide".
33	6	312	dpPoolCapacityOver	Pool capacity depletion	It is shown that the following occurred: Message code : I6GJ00 DP Pool Consumed Capacity Over (Pool-x) Ask the customer/SE to add the DP pool capacity referring to the "Dynamic Provisioning User's Guide".
34	6	313	overProvisioningWarningThreshold	Fore alert for over provisioning	It is shown that the following occurred: Message code : I6GK00 Over Provisioning Ratio Forewarning (Pool-x) Ask the customer/SE to add the DP pool capacity referring to the "Dynamic Provisioning User's Guide".
35	6	314	overProvisioningLimitThreshold	Over alert for over provisioning	It is shown that the following occurred: Message code : I6GL00 Over Provisioning Ratio Overwarning (Pool-x) Ask the customer/SE to add the DP pool capacity referring to the "Dynamic Provisioning User's Guide".
36	6	316	portErrorThresholdOver	Over the port error threshold	A failure occurred in the path of the Fibre Channel port, and the failure detection count exceeded the threshold value. <a href="#">Refer to "11.1.28 Failure Determination and Recovery Methods of Fibre Channel Port Path" (TRBL11-1250).</a>
37	6	319	replicationDepletionAlert	Over the replication depletion alert threshold	It is shown that the following occurred: Message code : I6D100 Replication depletion alert threshold is exceeded in DP pool(DP pool-xx) Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
38	6	320	replicationDataReleased	Over the replication data released threshold	It is shown that the following occurred: Message code : I6D000 Replication data released threshold is exceeded in DP pool (DP pool-x)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
39	6	321	ssdWriteCountEarlyAlert	Flash Drive (SSD) write count reached 90 % of the write count limit	It is shown that the following occurred: Message code : I44300 SSD write count Early Alert [z%] (Unit-x, HDU-y)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
40	6	322	ssdWriteCountExceedThreshold	The write count of the Flash Drive (SSD) reached the threshold value of the endurance count	It is shown that the following occurred: Message code : I44200 SSD write count exceeded the threshold (Unit-x, HDU-y)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
41	6	323	sideCardFailure	Side Card blockade	It is shown that the following occurred: Message code : WA3zn0 SideCard alarm(Unit-xx, SideCard-y-y)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
42	6	324	pageRelocationFailure	The page relocation failed due to the destage time-out of the pool management information	It is shown that the following occurred: Message code : IAI500 The page relocation failed due to time-out of the destage of the DP management info  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
43	6	325	arrayRebootRequestForDPPoolInvalid	Array reboot is requested because the DP pool management table is invalid	It is shown that the following occurred: Message code : I6N500 DP management information may be invalid, Please reboot the array with power cycle  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
44	6	326	DPPoolInformationInvalid	The DP pool management table is invalid	It is shown that the following occurred: Message code : I6N600 DP management information is invalid (DP Pool-x)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
45	6	327	fmdWriteCountEarlyAlert	Flash Drive (FMD) write count reached 90 % of the write count limit	It is shown that the following occurred: Message code : I44400 FMD write count Early Alert [z%] (Unit-x, HDU-y)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
46	6	328	fmdWriteCountExceedThreshold	The write count of the Flash Drive (FMD) reached the threshold value of the endurance count	It is shown that the following occurred: Message code : IAJ200 FMD write count exceeded the threshold (Unit-x, HDU-y)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
47	6	329	fmdBatteryLifeEarlyAlert	The battery life ratio of the Flash Drive (FMD) reached the threshold value of the battery life ratio.	It is shown that the following occurred: Message code : I44500 FMD battery life Early Alert [z%] (Unit-x, HDU-x)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
48	6	330	pduConnectionError	Tray power saving PDU connection error alert	It is shown that the following occurred: Message code : IAJ400 A PDU connection error was detected in Tray Power Saving (Unit-x, PS-y, code-z)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.
49	6	331	pduHealthCheckError	Tray power saving health check error alert	It is shown that the following occurred: Message code : IAJ30x A health check error was detected in array, PDU, and/or their connection (CTL-x)  Perform the maintenance corresponding to the message code referring to the WEB log message of the array for the details.

## 8.1.2 Maintenance with MIB (df Regression) Values

### (1) Confirming error information

Examples of output caused by a trap issued by the array are shown below. (a) is an example of output by HP OpenView/NetM\*COMET. (b) is an example of output by SunNet Manager.

For MIB values, refer to “[Table 8.1.3 dfRegressionStatus Value Corresponding to Each Failure](#)” (TRBL 08-0080).

#### (a) Example of MIB value output by HP OpenView/NetM\*COMET

The screenshot shows the 'MIB Browse' window. At the top, there are fields for 'Node name or IP address' (containing 'hsp1FSsw') and 'Community name'. Below these is the 'MIB object ID' field, which contains a long path ending with 'dfWarningCondition'. A tree view shows 'dfRegressionStatus' selected. To the right of the tree are buttons: 'Move tree upward', 'Move tree downward', 'Details', 'Inquiry start' (highlighted), 'Inquiry quit', and 'Graph'. Below the tree are fields for 'MIB interface' and 'SNMP set value', with a 'Setting (Set)' button. The 'MIB value' field displays '0:1048576'. At the bottom, a 'Message' box contains the text 'Note : Community "public" is used for node DF800.' Below the message box are four buttons: 'Close', 'Reselect', 'Save...', and 'Help'. Two arrows point from labels below the window to specific elements: one from 'dfRegressionStatus value' to the MIB value field, and another from 'IP address or registered host model name' to the message box.

(b) Example of MIB value output by SunNet Manager

Event/Trap Report-DF850

Save Device name: \_\_\_\_\_

Remarks 19 1 ☐ \_\_\_\_\_ 19

Tue Sep 27 16:42:07 2011 [DF850] : Event : Hitachi-DF-RAID-LAN-MIB

dfRegressionStatus=1048576 (Greater Than 0 Priority Low)

dfPreventiveMaintenanceInformationn=0

dfRegressionStatus2=0

dfWarningReserve2=0

dfRegressionStatus value

Table 8.1.2 Format of dfRegressionStatus

Bit Byte	7	6	5	4	3	2	1	0
0	0	Host I/O Board	0	Host Connector	0	0	0	Cache
1	Managem nt Module	Host/O Module	0	Fan	0	0	PS	Battery
2	Recoverabl e CTL	Drivel/O	0	0	0	Path	0	UPS
3	CTL	Warning	0	0	ENC	D-Drive	S-Drive	Drive

When a regression is applied to the part concerned, turn on the corresponding bit. Value of the object corresponding to each failure status is shown in [“Table 8.1.3 dfRegressionStatus Value Corresponding to Each Failure” \(TRBL 08-0080\)](#).

**Table 8.1.3 dfRegressionStatus Value Corresponding to Each Failure**

No.	Bit location		Object value (in decimal)	Description
	Byte	Bit		
1	—	—	0	Array normal status
2	3	0	1	Drive blockade
3	3	1	2	Drive (spare drive) blockade
4	3	2	4	Drive (data drive) blockade
5	3	3	8	ENC alarm
6	3	6	64	Warned array
7	3	7	128	Mate controller blockade
8	2	0	256	UPS alarm
9	2	2	1024	Path blockade
10	2	6	16384	Drive I/O Module blockade
11	2	7	32768	Controller pseudo blockade related to parts failure
12	1	0	65536	Battery alarm
13	1	1	131072	Power supply failure
14	1	4	1048576	Fan alarm
15	1	6	4194304	Host I/O Module blockade
16	1	7	8388608	Management Module blockade
17	0	0	16777216	Cache partial blockade
18	0	4	268435456	Host connector alarm
19	0	6	1073741824	Host I/O Board alarm

When two or more failed parts exist, the object value is the sum of each object value.

Example : When failures occur in the battery and the fan, the object value is  
“1114112 (65536+1048576)”.

The object value converted into binary form corresponds to the format shown in “[Table 8.1.2 Format of dfRegressionStatus](#)” (TRBL 08-0070).

**Table 8.1.4 Format of dfRegressionStatus2**

Bit Byte	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	Side Card

When a regression is applied to the part concerned, turn on the corresponding bit.

Value of the object corresponding to each failure status is shown in “[Table 8.1.5 dfRegressionStatus2 Value Corresponding to Each Failure](#)” (TRBL 08-0080).

**Table 8.1.5 dfRegressionStatus2 Value Corresponding to Each Failure**

No.	Bit location		Object value (in decimal)	Description
	Byte	Bit		
1	—	—	0	Array normal status
2	3	0	1	Side Card blockade

(2) Troubleshooting procedure

Perform a maintenance by associating the item in the description column in [“Table 8.1.3 dfRegressionStatus Value Corresponding to Each Failure” \(TRBL 08-0080\)](#) and [“Table 8.1.5 dfRegressionStatus2 Value Corresponding to Each Failure” \(TRBL 08-0080\)](#) with the contents of [“Table 8.1.1 Recovery Method for Each Trap Code” \(TRBL 08-0020\)](#).



## 8.2 Trouble Analysis by Hitachi Storage Navigator Modular 2

The Hitachi Storage Navigator Modular 2 notifies of failures of the disk array system by the failure monitoring function.

This section explains the trouble analysis operation to be performed when the Hitachi Storage Navigator Modular 2 is used.

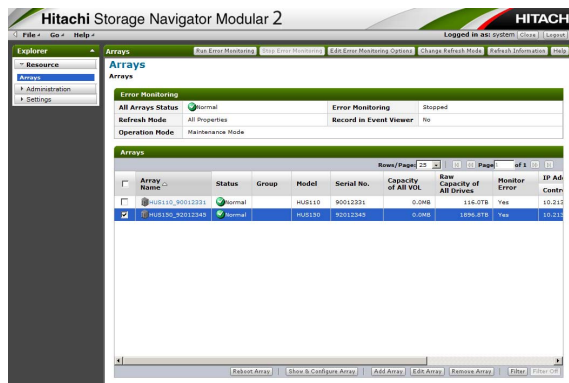
### 8.2.1 Maintenance with the Hitachi Storage Navigator Modular 2 (GUI Version)

#### (1) Display of array status and maintenance

(a) Start the Hitachi Storage Navigator Modular 2.

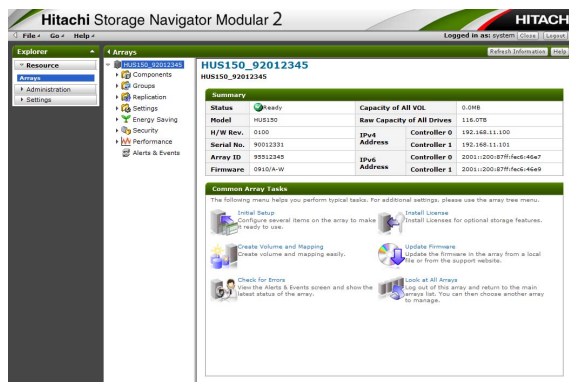
(b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



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

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



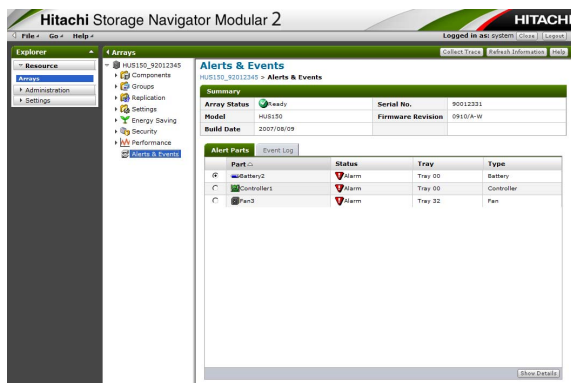
<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

(d) A screen which indicates the status of Array device under Hitachi Storage Navigator Modular 2 is shown below.

When clicking the [Alerts & Events] in the tree, the window which displays alert parts will be displayed.

When a failure occurs in the array, the alert parts will be displayed in the [Alerts & Events] window.

Replace the parts that are displayed.



### 8.3 Hitachi Storage Navigator Modular 2 Maintenance Function

Maintenance functions of the Hitachi Storage Navigator Modular 2 are listed in [Table 8.3.1](#).

**Table 8.3.1 Hitachi Storage Navigator Modular 2 Maintenance Function List**

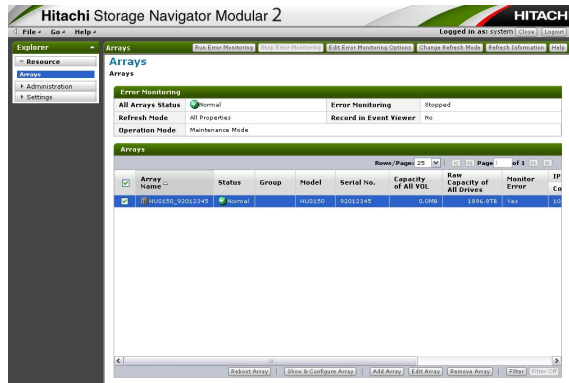
No	Classification	Function name	Outline of function	Notes
1	Display of Volume failure data information	Display of Volume failure data information	The segments for each Volume are displayed.	—
2	Setting a prefetch size	Setting prefetch information	It sets a prefetch staging size by the RAID levels, a next starting opportunity and host data transfer access size.	Prefetch information is set at an optimum value on shipment. If the setting is changed unpreparedly, it will affect performance and may interfere with operation:
3	Setting a threshold	Setting a threshold for preventive maintenance	It sets a threshold for the number of failures of a disk controlled by preventive maintenance.	—
4	Drive maintenance	Detach	Blocks a specified drive forcibly.	—
		Data reconstruction	When the drive restoration option was set automatically, reconstruct the data in the Drive by specifying the drive position of the Drive after replacing the failed Drive.	—
		Copyback	Copies data from a spare drive to a specified drive.	—
		Dynamic sparing	Copies data forcibly from a specified drive to a spare drive, and then blocks the specified drive.	—
		System copy	Copies the system area of a system drive from another system drive.	—
5	Setting a mode for reporting to the host	Setting a mode for reporting to the host using an SSB	When the Warning status of the array occurred, etc., the mode to report with SSB is set.	—
6	System Upgrade	System Upgrade	When upgrading an array, with reference to the variety of information of partner equipment, the information is set as self-equipment.	—
7	Replacing the Online ENC firmware	Download and replacing of ENC firmware.	Download the ENC firmware to the array, and replace it.	—
8	Setting the drive performance delay diagnosis function	Setting the drive performance delay diagnosis function	Refer to or set the operation mode of the drive performance delay diagnosis function.	—
9	Setting the drive firmware download	Setting the automatic download of the drive firmware	Refer to or set Enabled/Disabled for the automatic download of the drive firmware.	—
10	Display of the temperature in the Basic Unit	Display of the temperature in the Basic Unit	The latest temperature in the Basic Unit is displayed.	—

No	Classification	Function name	Outline of function	Notes
11	Setting the host reservation forced release function	Setting the reservation forced release function	The reservation status by the H-LUN is displayed. When it is determined that the reservation release is needed, execute the release.	When the reservation release is wrongly executed, Volume exclusion cannot be performed, data corruption can occur.
12	Checking presence/absence of LRC error block	LRC check	Check the presence/absence of the LRC error block of the Volume which was determined that the LRC check is necessary.	The performance may be affected. Use it only when instructed so.

### 8.3.1 Displaying Volume Failure Data Information

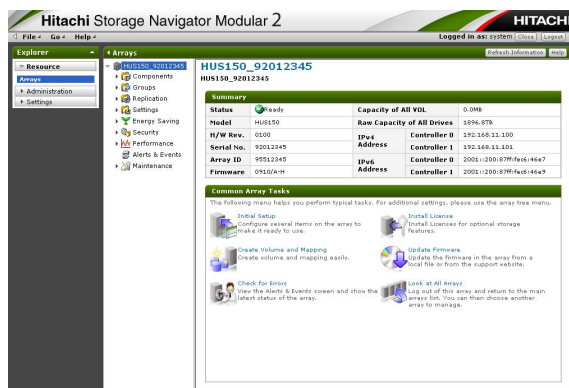
The PIN information of each Volume is displayed.

- (1) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
  - (a) Start the Hitachi Storage Navigator Modular 2.
  - (b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>  
It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



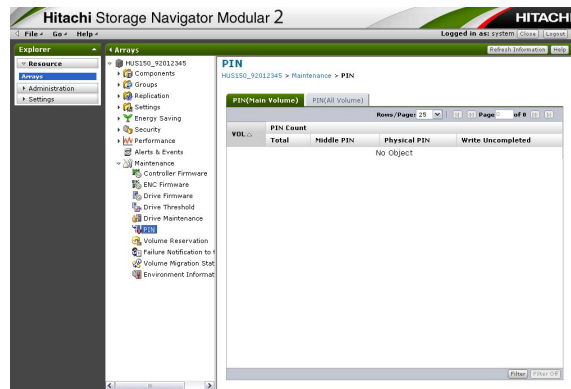
- (c) Click the array name, and open the unit window.

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



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

(d) Select [Maintenance] - [PIN] in the unit window.



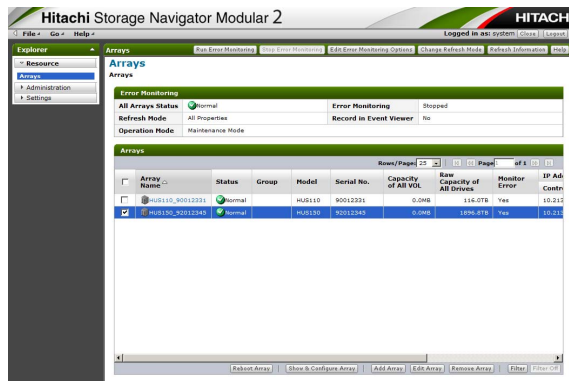
The number of segments, including PIN, in each Volume is displayed.

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

(a) Start the Hitachi Storage Navigator Modular 2.

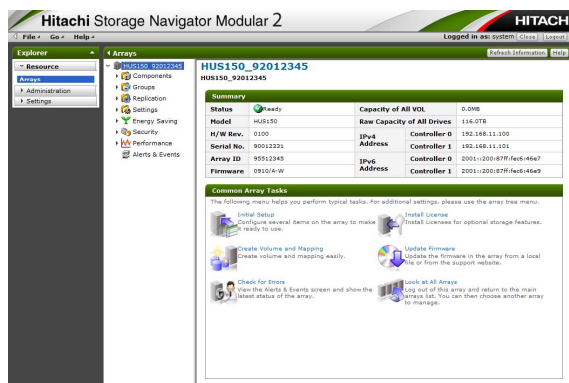
(b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



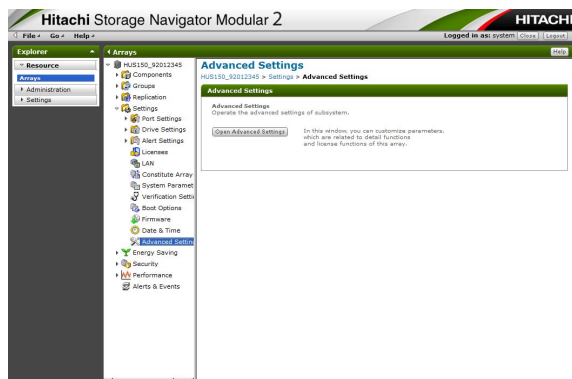
(c) Click the array name, and open the unit window.

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

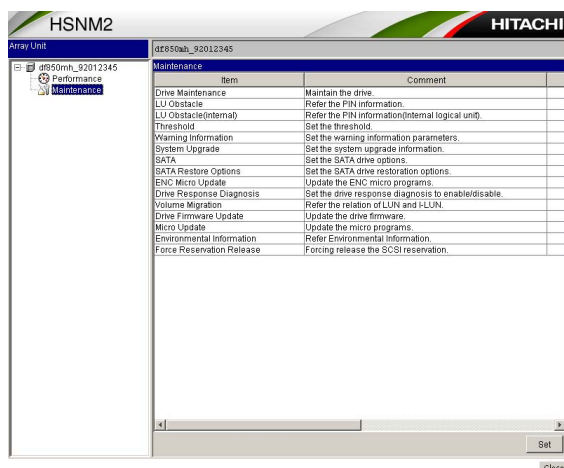


<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

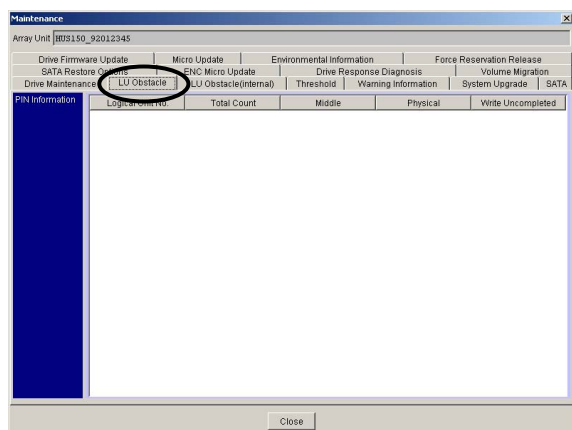
- (d) Select [Settings] - [Advanced Settings] on the unit window, and click the [Open Advanced Settings] button.



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



- (f) Click the LU Obstacle tab on the Maintenance dialog box.



The number of segments, including PIN, in each Volume is displayed.

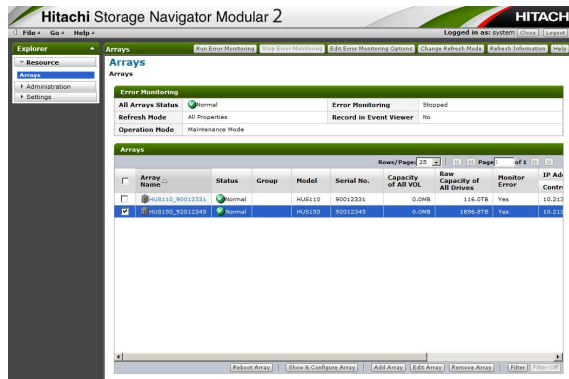
- (g) Click the [Close] button.



### 8.3.2 Setting Pre-fetch Information

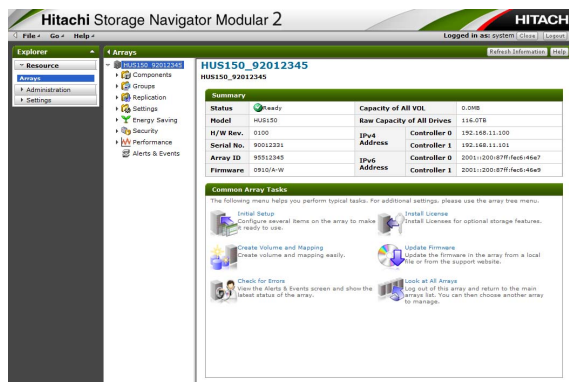
A prefetch staging size for each RAID level, next starting opportunity and host data transfer access size are set.

- (1) Start the Hitachi Storage Navigator Modular 2.
- (2) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>  
It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



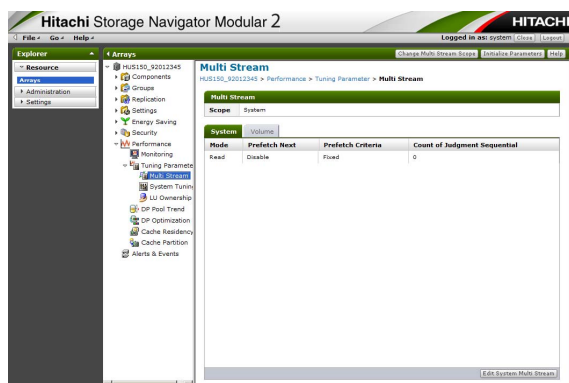
- (3) Click the array name, and open the unit window.

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



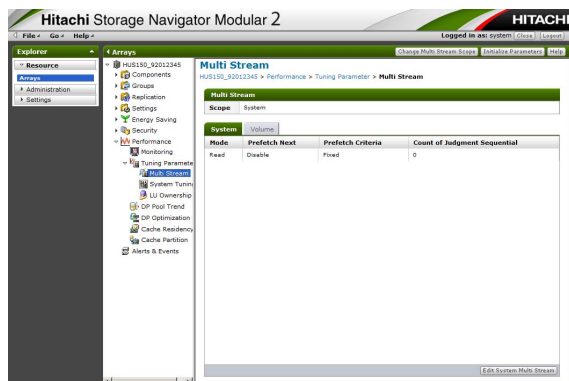
<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

- (4) Select [Performance] - [Tuning Parameters], and select [Multi Stream].

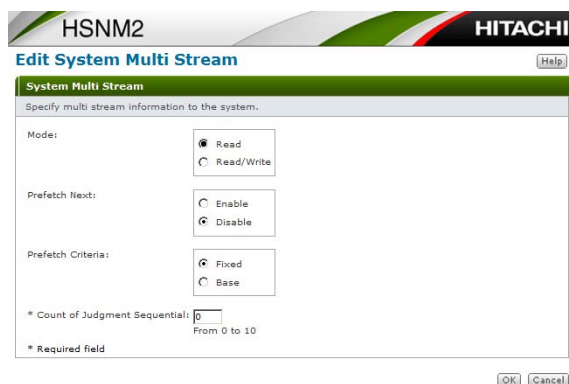


NOTE : The prefetch staging size, next starting opportunity and host data transfer access size are set at optimum values. If the setting is changed unpreparedly, it will affect performance and may interfere with operation. When changing them, contact the manufacturer in advance.

- (5) Select the [System] tab.  
 (6) Click the [Edit System Multi Stream] button.



- (7) The parameter in the system Multi Stream window is set.

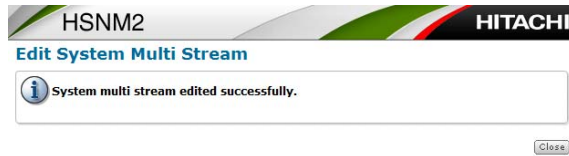


(h) Check that the set contents are correct.

If the [Cancel] button is clicked, the change content is cancelled.

Click the [OK] button to terminate the setting.

(i) Check the contents of the confirmation message window, and click the [Close] button.

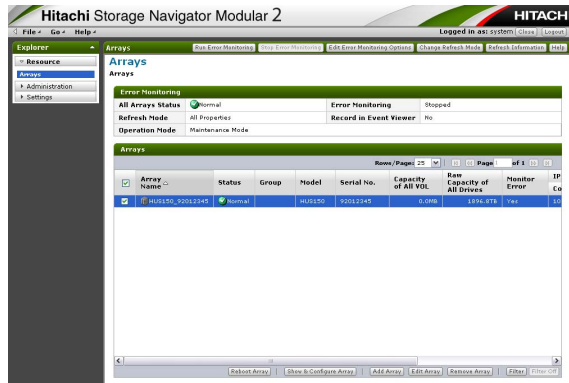


(j) Check that the content set in the Multi Stream window is reflected.

### 8.3.3 Setting a Threshold for Preventive Maintenance

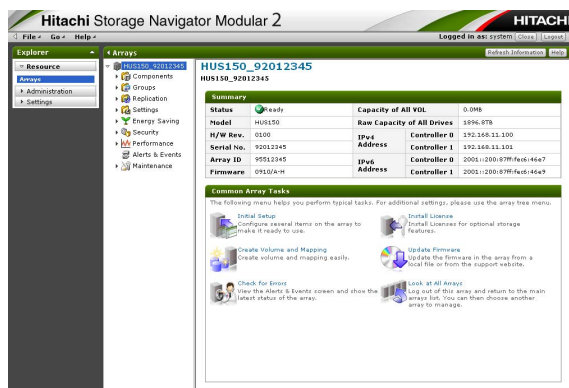
A threshold for the number of drive failure managed in preventive maintenance is set.

- (1) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
  - (a) Start the Hitachi Storage Navigator Modular 2.
  - (b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>  
It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



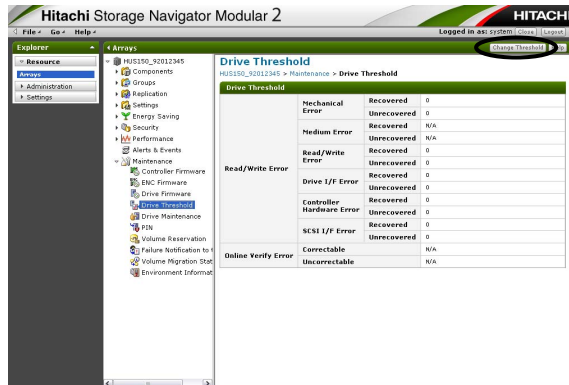
- (c) Click the array name, and open the unit window.

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



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

- (d) Select [Maintenance] - [Drive Threshold] on the unit window, and click the [Change Threshold] button.



- (e) "Change Threshold" window is displayed.

**Change Threshold**

Threshold Property

Specify the threshold to decide that the drive is out of order.

\* Read/Write Error Threshold:

Mechanical Error: Recovered: 0 Unrecoverable: 0  
From 0 to 65535 From 0 to 65535

Medium Error: Recovered: 0 Unrecoverable: 0  
From 0 to 65535 From 0 to 65535

Read/Write Error: Recovered: 0 Unrecoverable: 0  
From 0 to 65535 From 0 to 65535

Drive I/F Error: Recovered: 0 Unrecoverable: 0  
From 0 to 65535 From 0 to 65535

Controller Hardware Error: Recovered: 0 Unrecoverable: 0  
From 0 to 65535 From 0 to 65535

SCSI I/F Error: Recovered: 0 Unrecoverable: 0  
From 0 to 65535 From 0 to 65535

\* Online Verify Error Threshold:

Correctable: 0 Unrecoverable: 0  
From 0 to 65535 From 0 to 65535

\* Required field

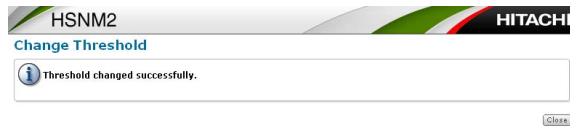
OK Cancel

- Read/Write Error Threshold : Specifies a threshold of a read/write error.
  - Mechanical Errors : Accumulated number of mechanical error occurrences
  - Medium Errors : Accumulated number of medium error occurrences
  - Read/Write Errors : Accumulated number of read/write error occurrences
  - Drive I/F Errors : Accumulated number of drive interface error occurrences
  - Controller Hard Errors : Accumulated number of controller hardware error occurrences
  - SCSI I/F Errors : Accumulated number of SCSI interface error occurrences
- Online Verify Error Threshold : Specifies a threshold of an online verify error.
  - Correctable : Accumulated number of occurrences of correctable error in on-line verify execution
  - Uncorrectable : Accumulated number of occurrences of uncorrective error in on-line verify execution

A threshold is specified in the range of 1 to 65,535 with 1 as a unit. If you specify 0, it will not be an object of preventive maintenance.

NOTE : A threshold is set at an optimum value : If the setting is changed unpreparedly, it may perform preventive maintenance operation outside the range of it or may not operate even though there is an object for it: When changing it, contact the manufacturer in advance.

- (f) Change the value and click the [OK] button.
- (g) A confirming message appears. Click the [Close] button.

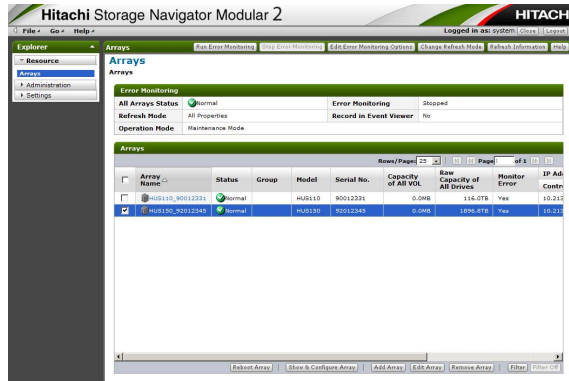


(2) When the Hitachi Storage Navigator Modular 2 version is less than 22.00

(a) Start the Hitachi Storage Navigator Modular 2.

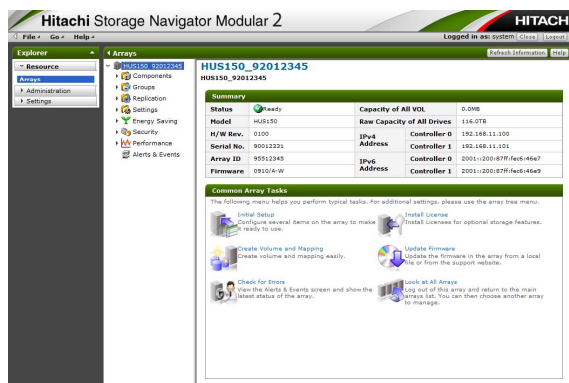
(b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



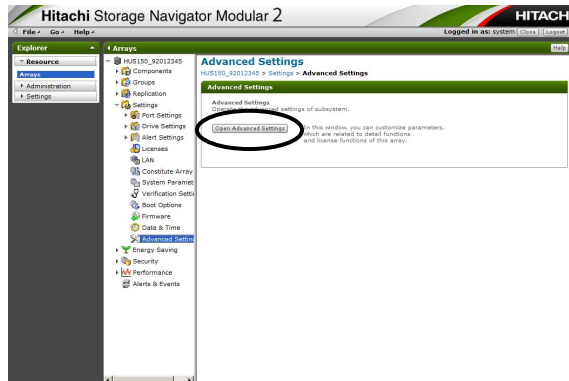
(c) Click the array name, and open the unit window.

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

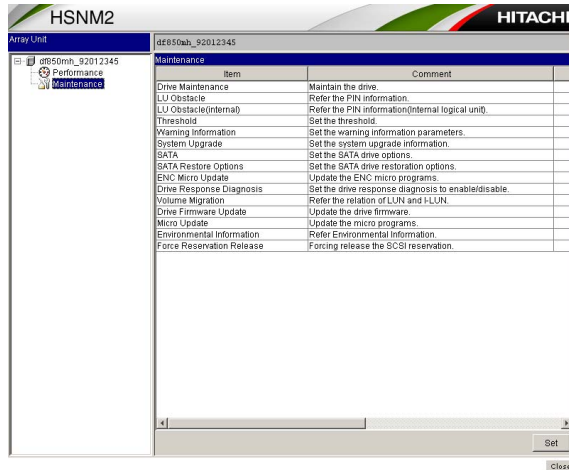


<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

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

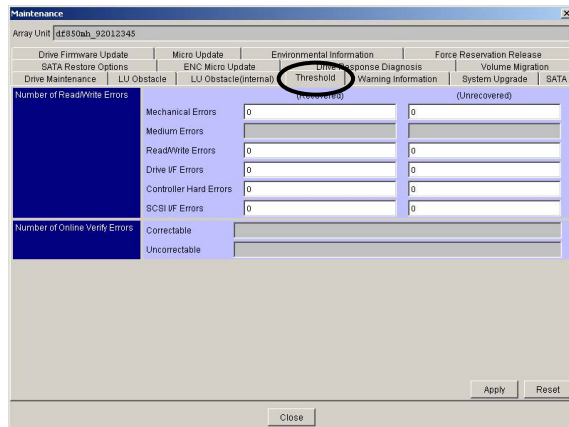


- (e) Select the [Maintenance] on the applet window, and click the [Set] button. Maintenance dialog box is displayed.





(f) Click the Threshold tab on the Maintenance dialog box.



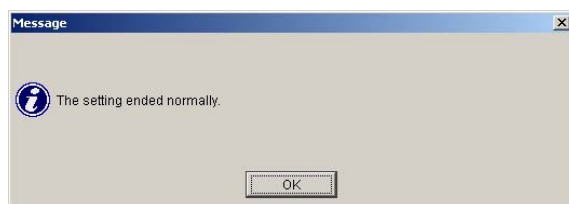
- Number of Read/Write Errors : Specifies a threshold of a read/write error.
  - Mechanical Errors : Accumulated number of mechanical error occurrences
  - Medium Errors : Accumulated number of medium error occurrences
  - Read/Write Errors : Accumulated number of read/write error occurrences
  - Drive I/F Errors : Accumulated number of drive interface error occurrences
  - Controller Hard Errors : Accumulated number of controller hardware error occurrences
  - SCSI I/F Errors : Accumulated number of SCSI interface error occurrences
- Number of Online Verify Errors : Specifies a threshold of an online verify error.
  - Correctable : Accumulated number of occurrences of correctable error in on-line verify execution
  - Uncorrectable : Accumulated number of occurrences of uncorrective error in on-line verify execution

A threshold is specified in the range of 1 to 65,535 with 1 as a unit. If you specify 0, it will not be an object of preventive maintenance.

NOTE : A threshold is set at an optimum value : If the setting is changed unpreparedly, it may perform preventive maintenance operation outside the range of it or may not operate even though there is an object for it: When changing it, contact the manufacturer in advance.

(g) Change the value and click the [Apply] button.

(h) A confirming message appears. Click the [OK] button.

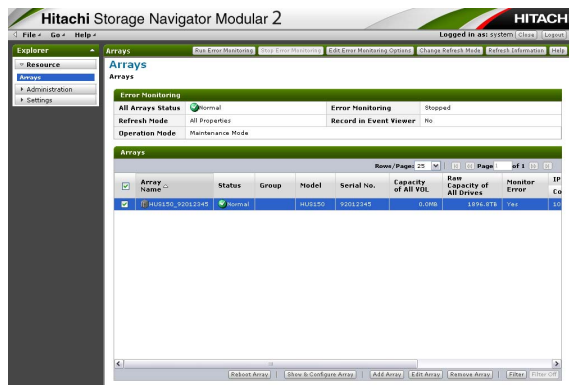


(i) Click the [Close] button.

### 8.3.4 Drive Maintenance

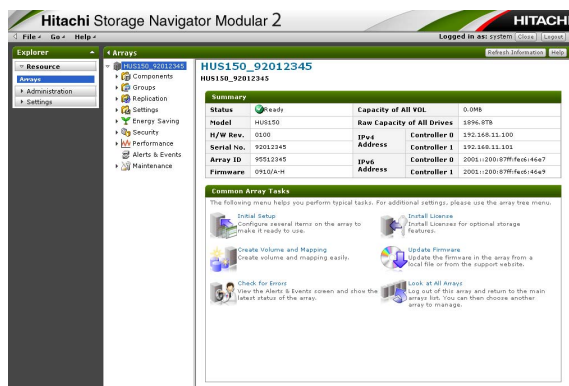
Performs maintenance functions on drives mounted in array units such as blocking a drive forcibly and instructing to restore.

- (1) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
  - (a) Start the Hitachi Storage Navigator Modular 2.
  - (b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>  
It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



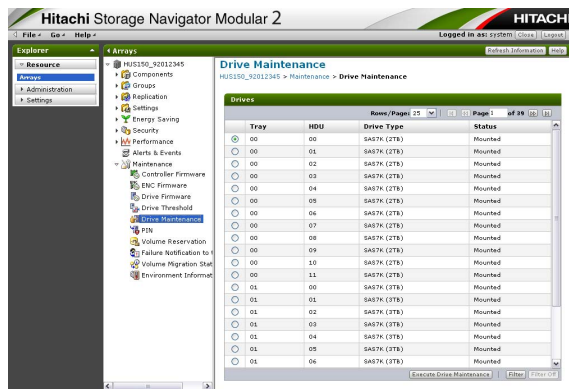
- (c) Click the array name, and open the unit window.

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



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

- (d) Select [Maintenance] - [Drive Maintenance] on the unit window.



- (e) Select a drive to execute the maintenance, and then click the [Execute Drive Maintenance] button.

- (f) The Execute Drive Maintenance window is displayed. Select a maintenance type, and click the [OK] button.



• Drive Maintenance Function:

**Detach** : Blocks a drive specified in the Drive Location box forcibly.<sup>(†1)</sup>

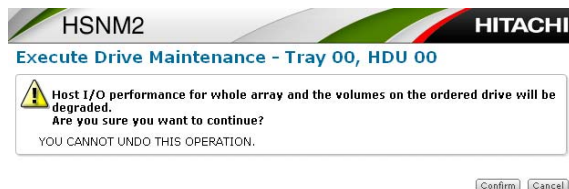
**Data Reconstruction** : Copies the data in the selected Drive from other drive and reconstructs it.

**Copy Back** : Copies data from a spare drive to a drive specified in the Drive Location box.

**Dynamic Sparing** : Copies data forcibly from a drive specified in the Drive Location box to a spare drive.

**System Copy** : Copies the system area from the current system drive to a system drive specified in the Drive Location box.

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



<sup>†1</sup> : When the Auto Reconstruction Mode is disabled, correction copy is not triggered even if a spare drive is available.  
Replace the drive as early as possible because correction copy may be triggered depending on events in the array.

(h) Click the [Close] button.

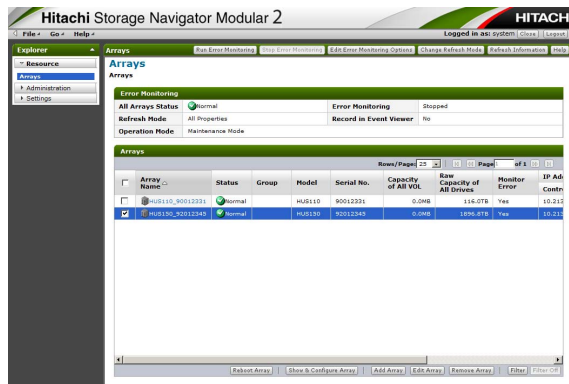


(2) When the Hitachi Storage Navigator Modular 2 version is less than 22.00

(a) Start the Hitachi Storage Navigator Modular 2.

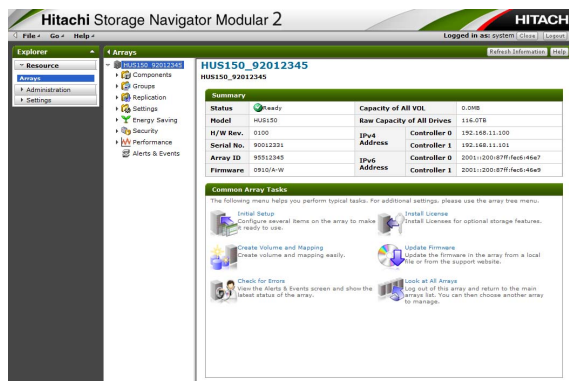
(b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



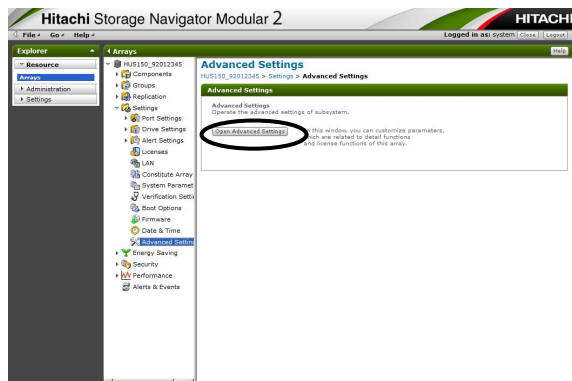
(c) Click the array name, and open the unit window.

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

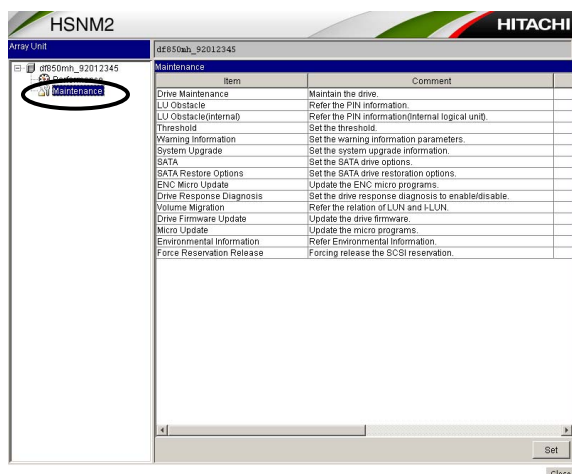


<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

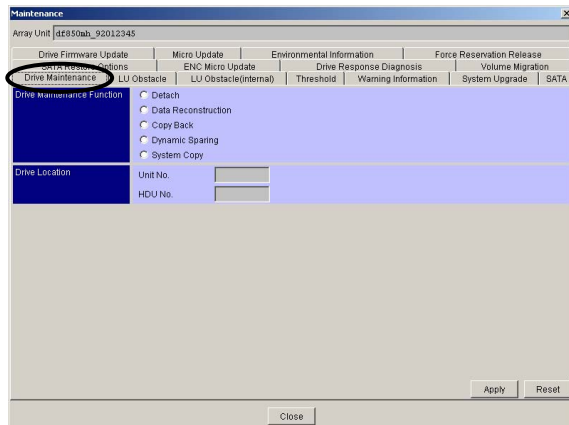
- (d) Select [Settings] - [Advanced Settings] on the unit window, and click the [Open Advanced Settings] button.



- (e) Select the [Maintenance] on the applet window, and click the [Set] button.



- (f) Click the Drive Maintenance tab on the Maintenance dialog box.



- Drive Maintenance Function:

Detach : Blocks a drive specified in the Drive Location box forcibly. <sup>(†1)</sup>

Data Reconstruction : Copies the data in the selected Drive from other drive and reconstructs it.

Copy Back : Copies data from a spare drive to a drive specified in the Drive Location box.

Dynamic Sparing : Copies data forcibly from a drive specified in the Drive Location box to a spare drive.

System Copy : Copies the system area from the current system drive to a system drive specified in the Drive Location box.

- Drive Location:

Unit No. : Unit No. of a drive on which to perform a maintenance function

HDU No. : HDU No. of a drive on which to perform a maintenance function

- (g) Select a Drive Maintenance Function to be executed, and then specify the Drive Location to execute the function.
- (h) If you click the [Apply] button, a selected function will be performed.
- (i) Click the [Close] button.

<sup>†1</sup> : When the Auto Reconstruction Mode is disabled, correction copy is not triggered even if a spare drive is available.  
Replace the drive as early as possible because correction copy may be triggered depending on events in the array.

### 8.3.5 Setting a Mode for Reporting to the Host Using an SSB

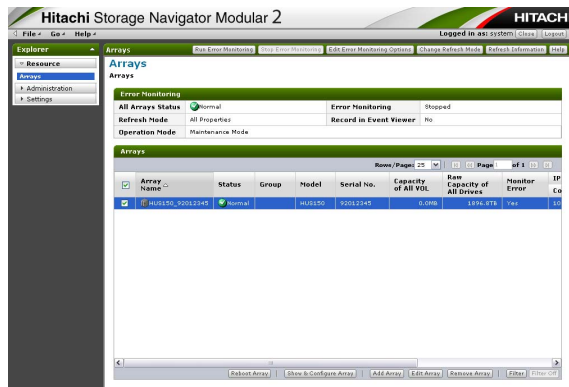
This setting specifies a mode for reporting an SSB to the host when a trouble such as a failure in a part of the disk array system occurs.

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

(a) Start the Hitachi Storage Navigator Modular 2.

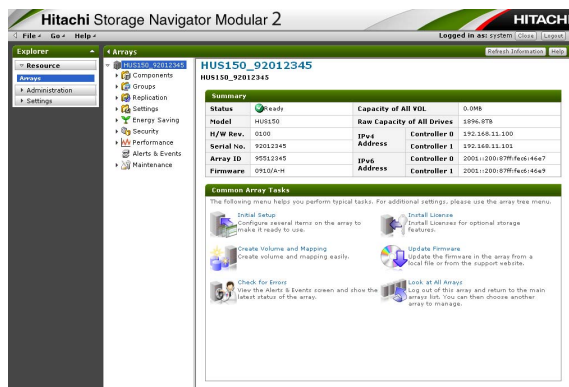
(b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(‡1)</sup>

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



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

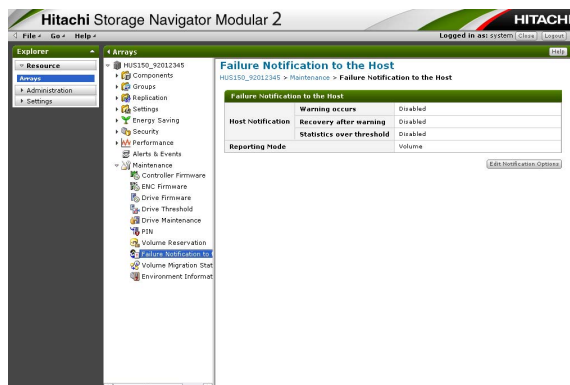
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array is clicked, use the changed LAN Port Number, and execute it again. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR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



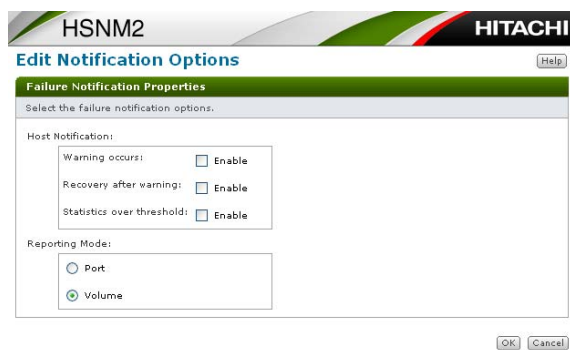
‡1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.



- (d) Select [Maintenance] - [Failure Notification to the Host] on the unit window, and click the [Edit Notification Options] button.



- (e) Select failure notification options on the Edit Notification Options window, and then click the [OK] button.



- (f) The confirmation message is displayed. Click the [Close] button.

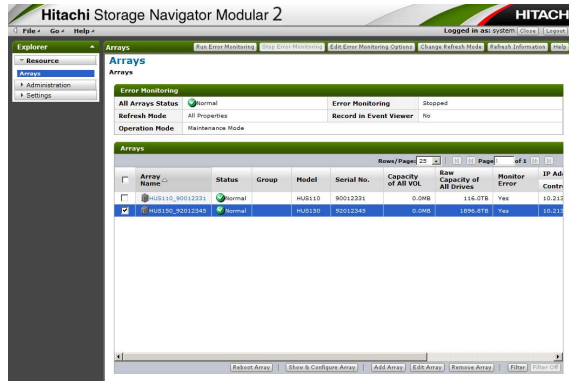


(2) When the Hitachi Storage Navigator Modular 2 version is less than 22.00

(a) Start the Hitachi Storage Navigator Modular 2.

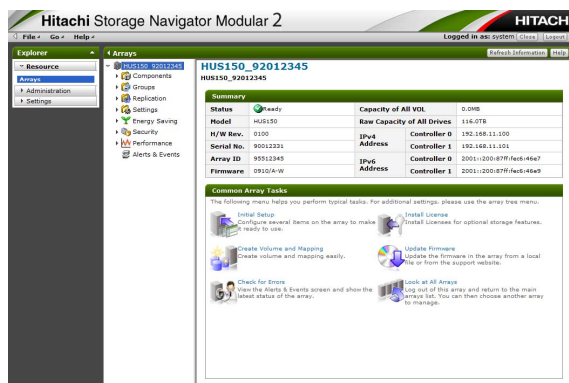
(b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



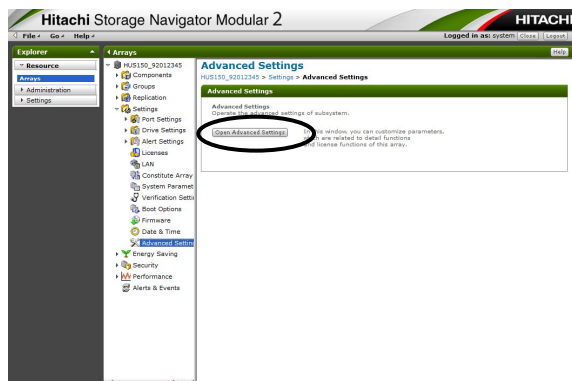
(c) Click the array name, and open the unit window.

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

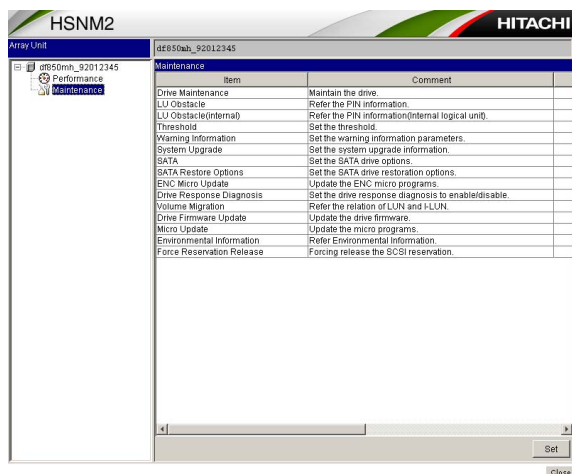


<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

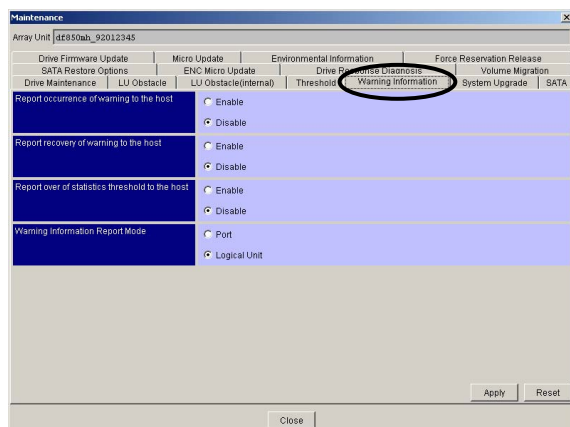
- (d) Select [Settings] - [Advanced Settings] on the unit window, and click the [Open Advanced Settings] button.



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



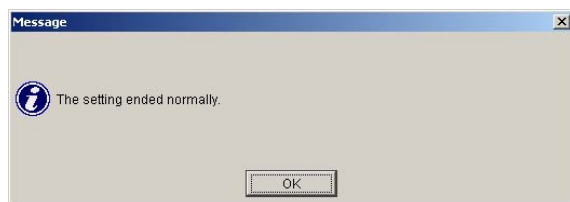
(f) Click the Warning Information tab on the Maintenance dialog box.



- Report occurrence of warning to the host : Reporting an SSB to the host when a failure that causes a warning occurs.
- Report recovery of warning to the host : Reporting an SSB to the host when the array recovers from a failure which caused a warning.
- Report over of statistics threshold to the host : Reporting an SSB to the host when any of the statistical data exceeds its threshold value.
- Warning Information Report Mode:
  - Port : Reports the failure information of the port.
  - Logical Unit : Reports the failure information of the port, initiator, and Volume.

(g) Click on an item you want to set to validate it, and then click the [Apply] button.

(h) A confirming message appears. Click the [OK] button.



(i) Click the [Close] button.

### 8.3.6 Replacing the Online ENC Firmware

The function downloads and updates the ENC firmware in the array unit. When updating the ENC firmware, download it, and then update it.

Perform the update work of the ENC firmware referring to the following Chapter.

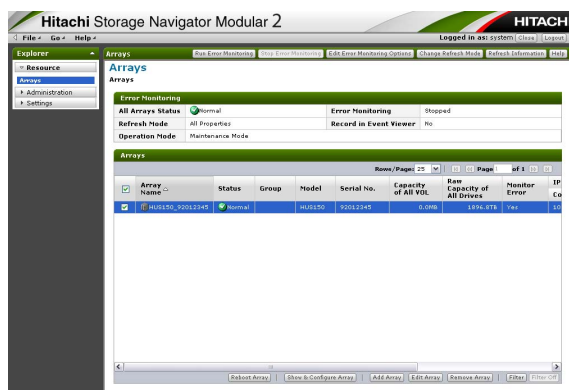
- [Chapter 12. Procedure for Online ENC Firmware Download \(TRBL 12-0000\)](#)

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

(a) Start the Hitachi Storage Navigator Modular 2.

(b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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

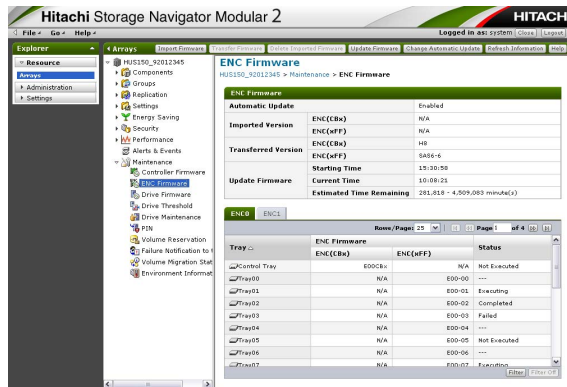


(c) Click the array name, and open the unit window.

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

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

(d) Select [Maintenance] - [ENC Firmware] on the unit window.



- **Automatic Update :**  
Sets the ENC firmware automatic update. When replacing the ENC firmware manually, disable the automatic update by using the [Change Automatic Update] button.
- **Imported Version :**  
The version of the imported ENC firmware is displayed in the Hitachi Storage Navigator Modular 2. If the ENC firmware is not imported, “N/A” is displayed.
- **Transferred Version :**  
The version of the ENC firmware transferred to the array from the Hitachi Storage Navigator Modular 2 is displayed.
- **Update Firmware :**  
It is displayed after the instruction of ENC firmware update.  
Starting Time : The time when the ENC firmware update is instructed.  
Current Time : The time when the window is updated.  
Estimated Time Remaining : The estimated time from the current time until the completion of the ENC firmware update.
- **Tray :**  
The tray number where the ENC is present is displayed.
- **ENC Firmware :**  
The ENC firmware version is displayed.
- **Status :**  
The update status of the ENC firmware is displayed.  
Not executed : The ENC firmware is not updated.  
Executing : The ENC firmware has been completed.  
Failed : The update of the ENC firmware failed.

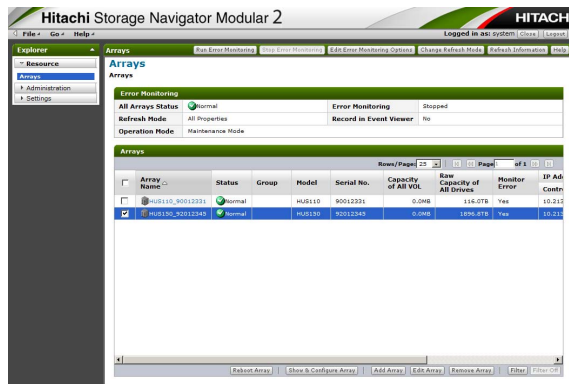
When no firmware is import, the [Transfer Firmware] and [Delete Imported Firmware] buttons are displayed in gray and cannot be selected.

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

(a) Start the Hitachi Storage Navigator Modular 2.

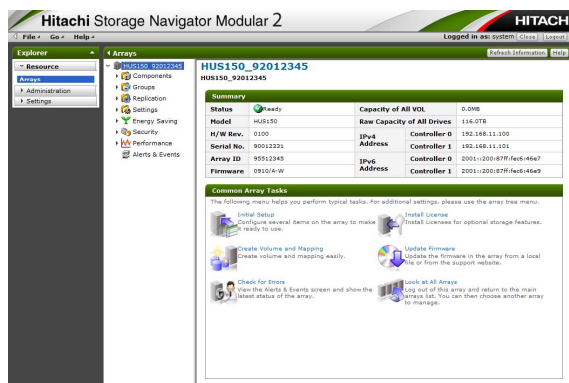
(b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



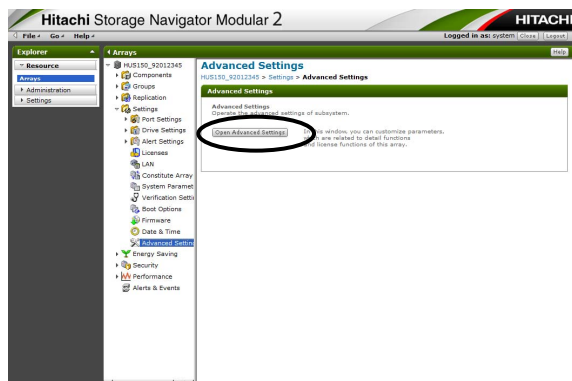
(c) Click the array name, and open the unit window.

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

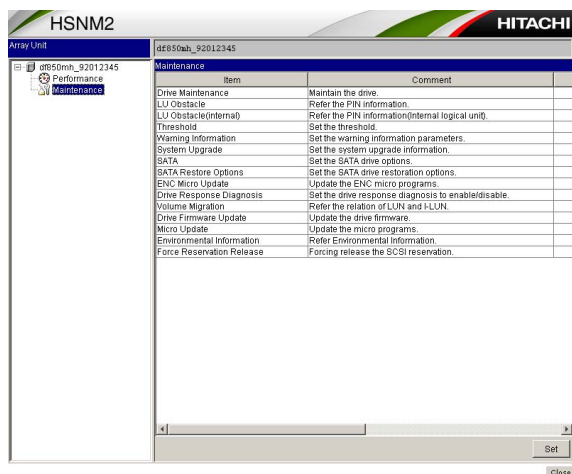


<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

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

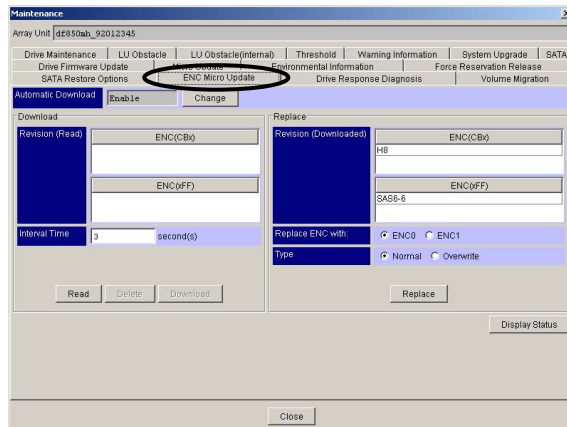


- (e) Select the [Maintenance] on the applet window, and click the [Set] button. Maintenance dialog box is displayed.





(f) Click the [ENC Micro Update] tab on the Maintenance dialog box.



- Automatic Download : Specify whether or not to download the ENC firmware automatically. When you replace the ENC firmware manually, make the automatic downloading invalid using the changing button.
- Revision (Read) : The revisions (ENC <SAS>) for the Controller Box that have been already read are displayed. If they have not been read, nothing is displayed.
- Interval Time : Interval time for download. Specify the time between one second and 60 seconds. For the LAN connection, when the interval time is specified as 3 seconds, the download requires approximately 9 minutes. The time required for the execution varies with the network status and depends on the I/Os issued by the host. When the interval time is specified as one second longer, the time required for the download is prolonged by 3 minutes. This function can be used during execution of the I/O instructed by the host. However, when the download function is executed, I/O performance of the host is reduced. To enhance performance, specify a longer interval time.
- Revision (Downloaded) : The revisions (ENC <SAS>) for the Controller Box that have been already downloaded are displayed. If they have not been downloaded, nothing is displayed.
- Replace ENC with : Specify the ENC whose firmware is to be replaced.
- Type : Specify the Normal or Overwrite.

When no firmware is read, the Delete and Download buttons are displayed in gray and cannot be selected.

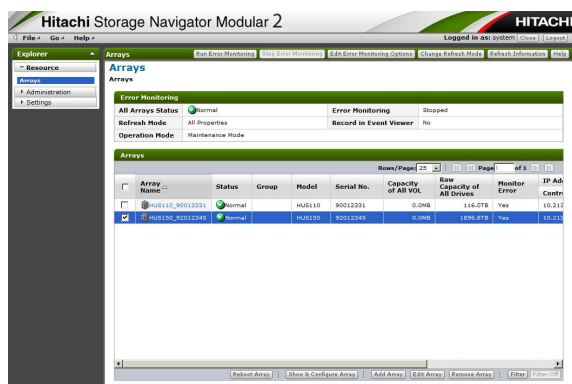
(g) Click the [Close] button.

### 8.3.7 Drive Performance Delay Diagnostic Function

If it is clear that the performance delay problem is caused by the drive, setting this function notifies the drive number of which caused the problem through the message and executes the dynamic sparing.

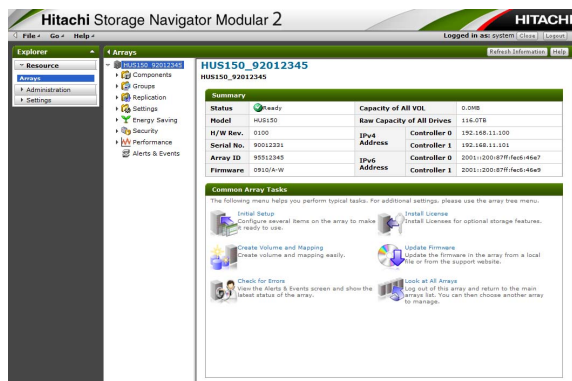
- (1) Start the Hitachi Storage Navigator Modular 2.
- (2) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



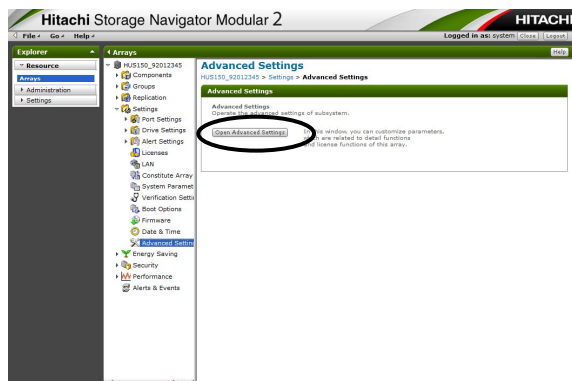
- (3) Click the array name, and open the unit window.

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

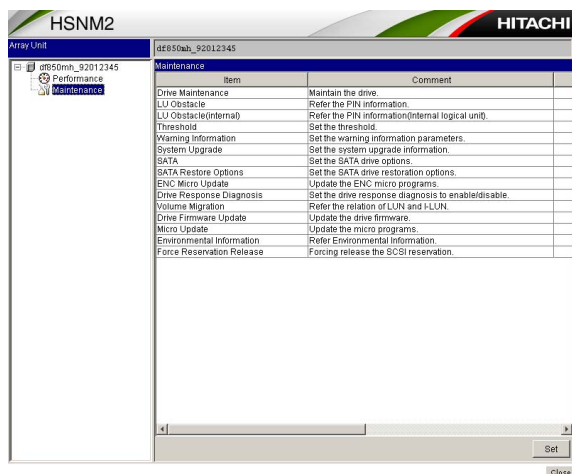


<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

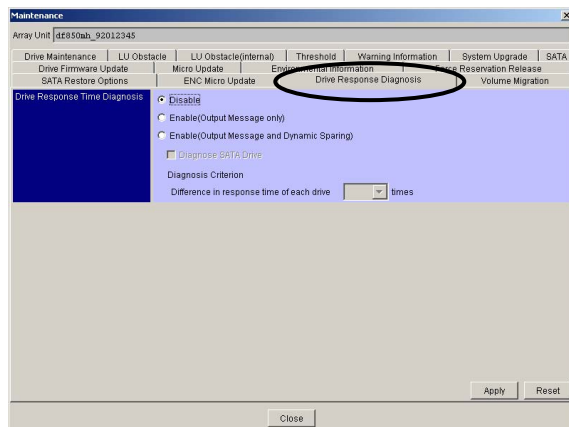
- (4) Select [Settings] - [Advanced Settings] on the unit window, and click the [Open Advanced Settings] button.



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



(6) Click the [Drive Response Diagnosis] tab on the Maintenance dialog box.



- Disable : The drive response time is not diagnosed.

- Enable (Output Message only):

The drive response time is diagnosed and a number of the drive that caused the response delay is displayed in a message.

Difference in response time of each drive:

The response time difference of the normal drive and the delay drive to specify the delay drive in the same RAID group.

NOTE : Specify 2 for the value of Difference in response time of each drive. If setting the value other than 2, contact the Technical Support Center.

- Enable (Output Message and Dynamic Sparing):

The drive response time is diagnosed, a number of the drive that caused the response delay is displayed in a message, and the dynamic sparing is executed.

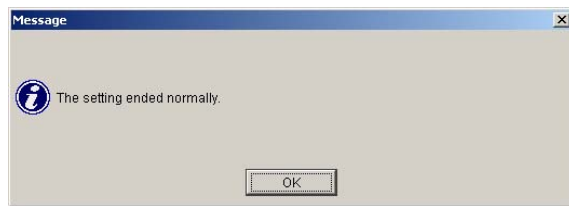
Difference in response time of each drive:

The response time difference of the normal drive and the delay drive to specify the delay drive in the same RAID group.

NOTE : Specify 2 for the value of Difference in response time of each drive. If setting the value other than 2, contact the Technical Support Center.

(7) Click the [Apply] button.

(8) A confirming message appears. Click the [OK] button.

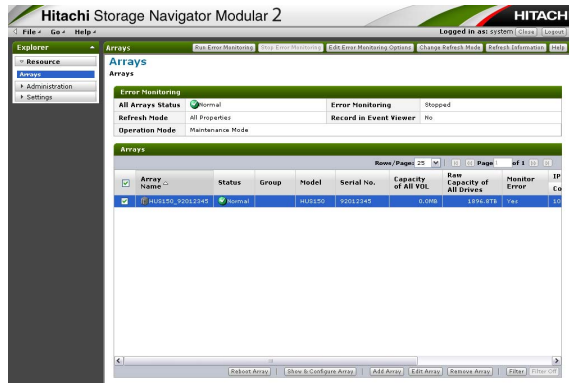


(9) Click the [Close] button.

### 8.3.8 Setting the Drive Firmware Download

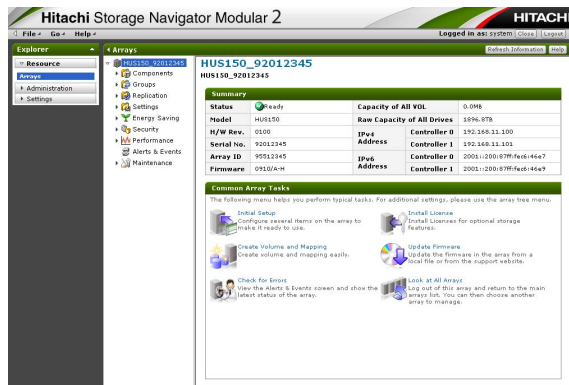
Set whether to update the firmware automatically for the drive in the array.

- (1) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
  - (a) Start Hitachi Storage Navigator Modular 2.
  - (b) Check the array to set in the main window and press the [Ctrl] key, [Shift] key and [E] key at the same time to change the operation mode to “maintenance mode”. (#1)  
 “Maintenance Mode” is displayed in [Operation Mode] in the upper side of the window and Hitachi Storage Navigator Modular 2 operates in the maintenance mode.



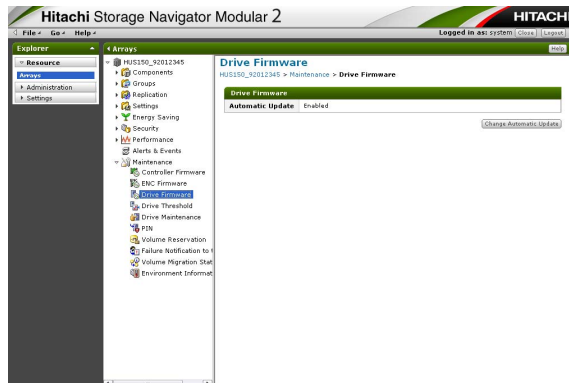
- (c) Click the array name, and open the unit window.

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

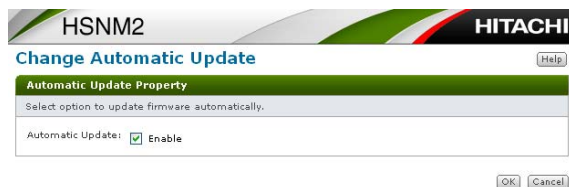


#1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

- (d) Select [Maintenance] - [Drive Firmware] in the unit window and click the [Change Automatic Update] button.



- (e) Select the Automatic Update option on the Change Automatic Update window.



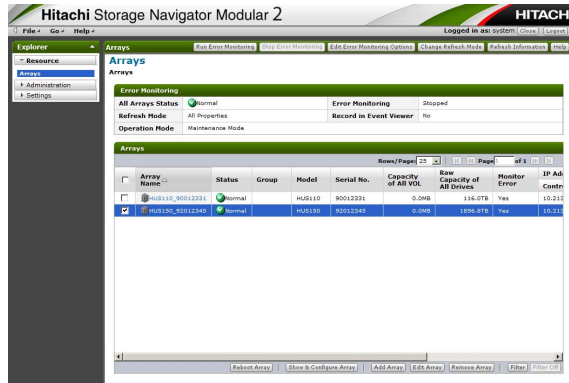
- The Enable checkbox is checked  
The drive firmware is updated automatically. Refer to [Firmware “1.6 Checking the Start and End of the Drive Firmware Automatic Download” \(FIRM 01-1590\)](#).
- The Enable checkbox is unchecked  
The automatic update of the drive firmware is not executed. If this mode is disabled during the drive firmware automatic update, the automatic update is interrupted.

- (g) Click the [OK] button.

- (h) The message is displayed. Click the [Close] button.

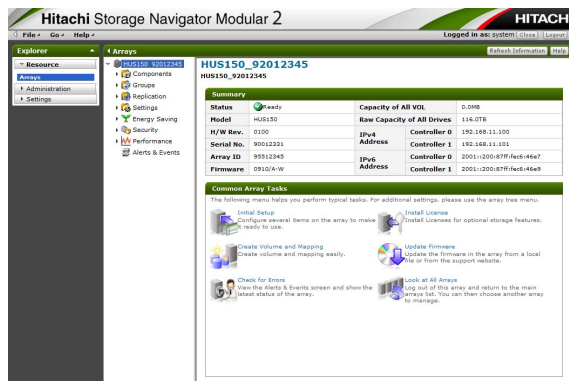


- (2) When the Hitachi Storage Navigator Modular 2 version is less than 22.00
- Start Hitachi Storage Navigator Modular 2.
  - Check the array to set in the main window and press the [Ctrl] key, [Shift] key and [E] key at the same time to change the operation mode to “maintenance mode”. (#1)  
“Maintenance Mode” is displayed in [Operation Mode] in the upper side of the window and Hitachi Storage Navigator Modular 2 operates in the maintenance mode.



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

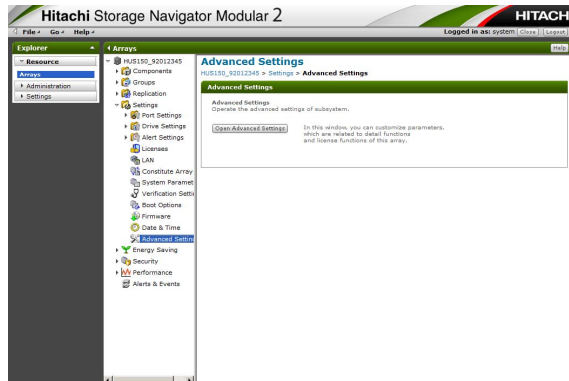
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array is clicked, use the changed LAN Port Number, and execute it again. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR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



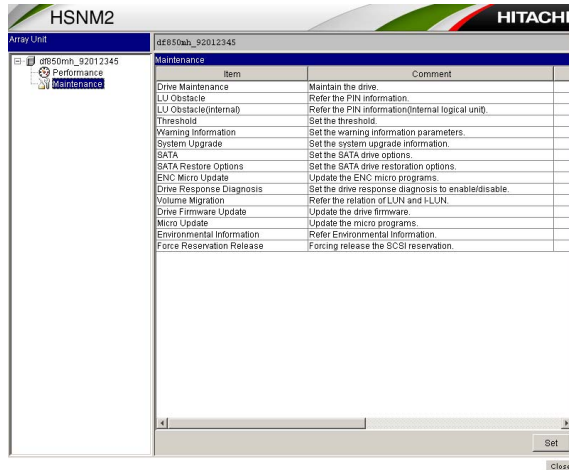
#1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.



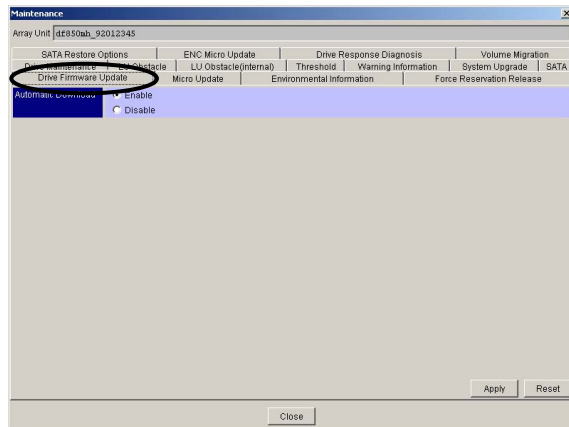
- (d) Select [Settings] - [Advanced Settings] in the unit window and click the [Open Advanced Settings] button.



- (e) Select [Maintenance] in the applet window and click the [Settings] button displayed at the lower right of the window.



(f) The Maintenance dialog is displayed. Click the [Drive Firmware Update] tab.



- Enabled

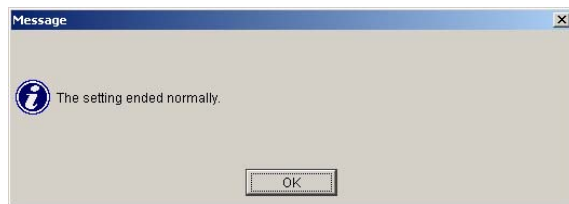
The drive firmware is downloaded automatically. Refer to [Firmware “1.6 Checking the Start and End of the Drive Firmware Automatic Download” \(FIRM 01-1590\)](#).

- Disabled

The automatic download of the drive firmware is not executed. If this mode is disabled during the drive firmware automatic download, the automatic download is interrupted.

(g) Click the [Apply] button.

(h) A normal termination message appears. Click the [OK] button.

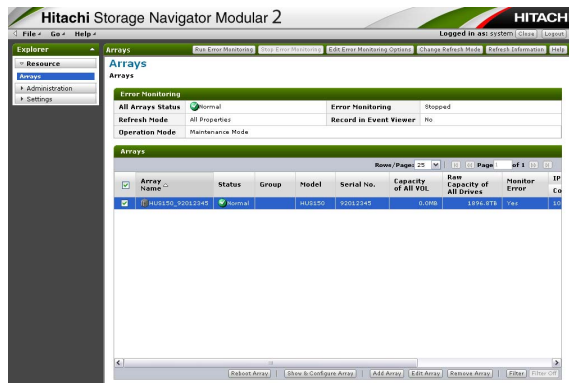


(i) Click the [Close] button.

### 8.3.9 Displaying Temperature in the Basic Unit

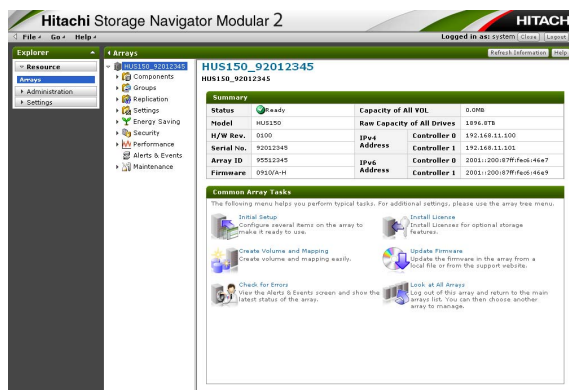
The latest temperature in the Basic Unit is displayed.

- (1) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
  - (a) Start the Hitachi Storage Navigator Modular 2.
  - (b) Check the array to set in the main window and press the [Ctrl] key, [Shift] key and [E] key at the same time to change the operation mode to “maintenance mode”. (#1)  
 “Maintenance Mode” is displayed in [Operation Mode] in the upper side of the window and Hitachi Storage Navigator Modular 2 operates in the maintenance mode.



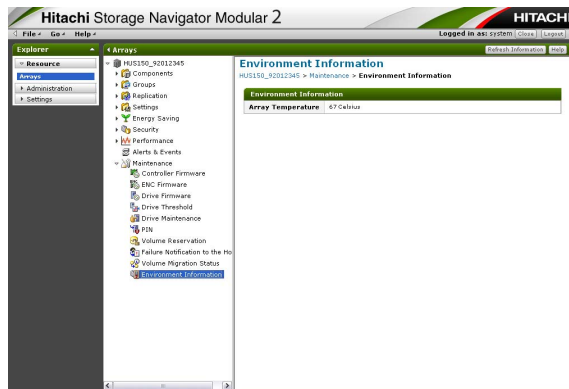
- (c) Click the array name, and open the unit window.

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



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

(d) Select [Maintenance] - [Environment Information] in the unit window.



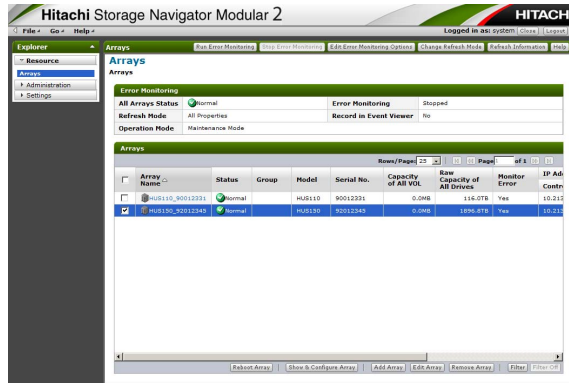
The latest temperature in the Basic Unit is displayed.

For the temperature other than the effective temperature range (over 0 degrees Celsius and lower than 100 degrees Celsius), “out of range” is displayed in the Temperature in the Basic Unit.

When the temperature has never been taken, “-” is displayed in the Temperature in the Basic Unit.

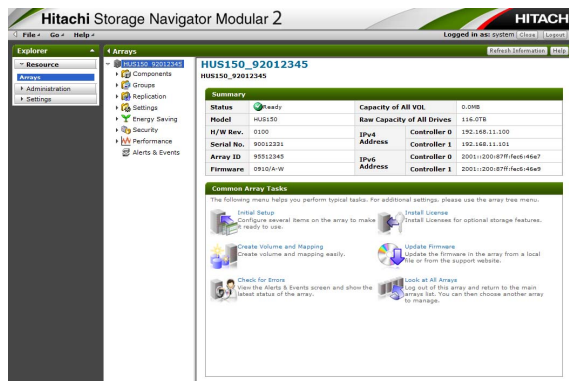
After waiting 10 seconds, retry the procedure (5), and update the display of Temperature in the Basic Unit.

- (2) When the Hitachi Storage Navigator Modular 2 version is less than 22.00
- Start the Hitachi Storage Navigator Modular 2.
  - Check the array to set in the main window and press the [Ctrl] key, [Shift] key and [E] key at the same time to change the operation mode to “maintenance mode”. (#1)  
“Maintenance Mode” is displayed in [Operation Mode] in the upper side of the window and Hitachi Storage Navigator Modular 2 operates in the maintenance mode.



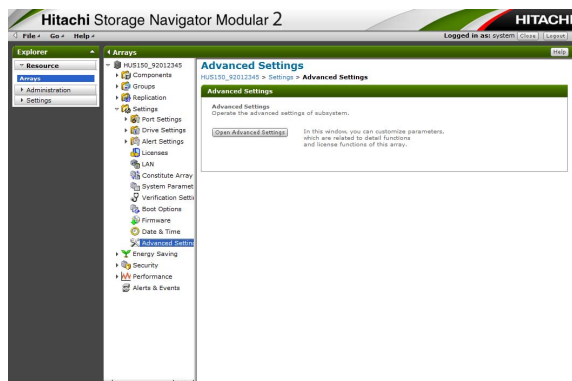
- (c) Click the array name, and open the unit window.

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

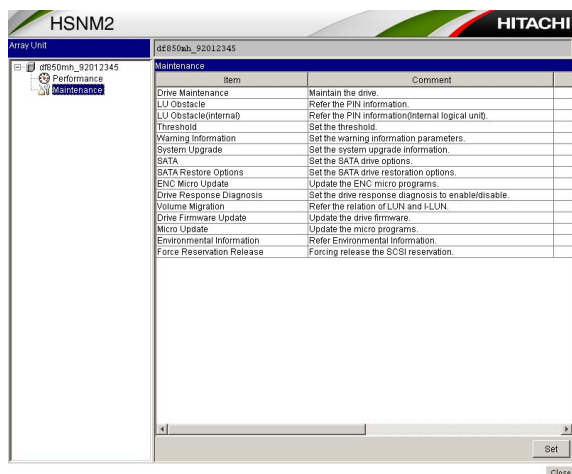


#1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

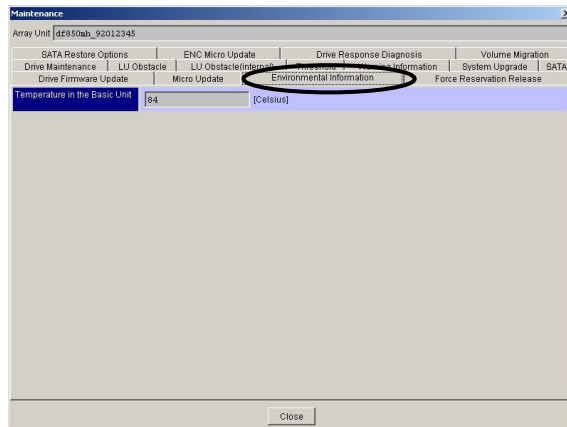
- (d) Select [Settings] - [Advanced Settings] in the unit window and click the [Open Advanced Settings] button.



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



- (f) Click the [Environmental Information] tab on the Maintenance dialog box.



The latest temperature in the Basic Unit is displayed.

For the temperature other than the effective temperature range (over 0 degrees Celsius and lower than 100 degrees Celsius), "out of range" is displayed in the Temperature in the Basic Unit.

When the temperature has never been taken, "- -" is displayed in the Temperature in the Basic Unit.

After waiting 10 seconds, retry the procedure (5), and update the display of Temperature in the Basic Unit.

- (g) Click the [Close] button.

### 8.3.10 Setting the Host Reservation Forced Release Function

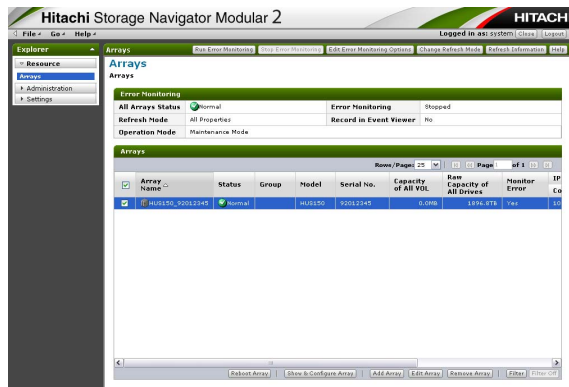
When the host reservation remains falsely, the service personnel performs this work with the system administrator's consent.

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

(a) Start the Hitachi Storage Navigator Modular 2.

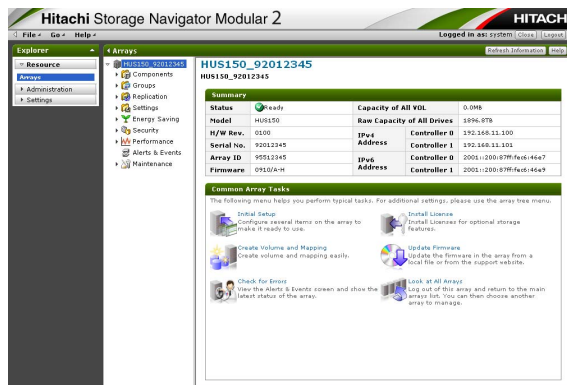
(b) Check the array to set in the main window and press the [Ctrl] key, [Shift] key and [E] key at the same time to change the operation mode to “maintenance mode”.<sup>(†1)</sup>

“Maintenance Mode” is displayed in [Operation Mode] in the upper side of the window and Hitachi Storage Navigator Modular 2 operates in the maintenance mode.



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

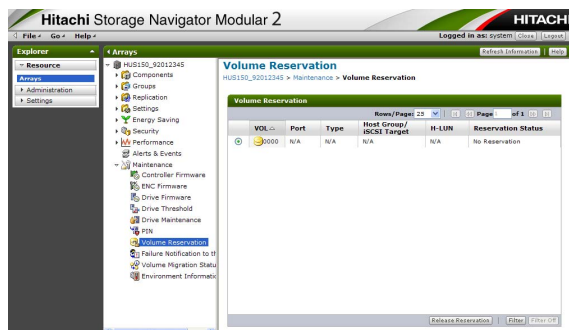
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array is clicked, use the changed LAN Port Number, and execute it again. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR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



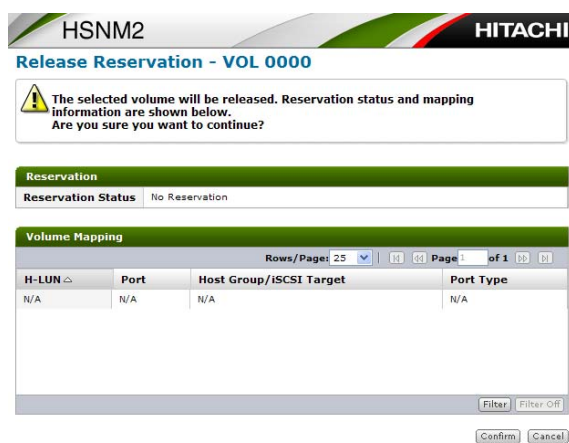
<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.



- (d) Select [Maintenance] - [Volume Reservation] in the unit window and click the [Release Reservation] button.



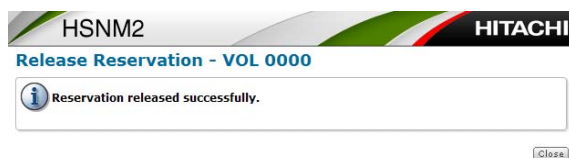
- (e) Click the [Confirm] button on the bottom right corner of the Release Reservation window.



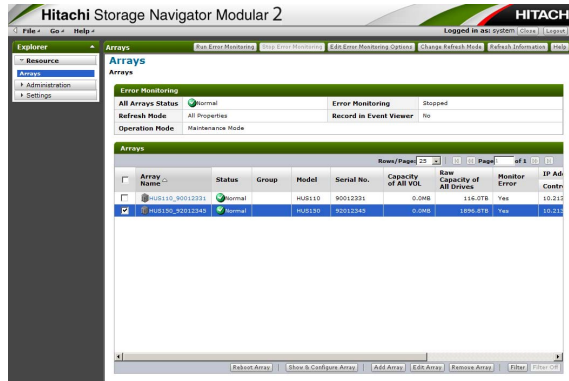
- (f) After confirming whether it is OK to release the reservation, check the checkbox, and click the [Confirm] button.



- (g) Click the [Close] button.

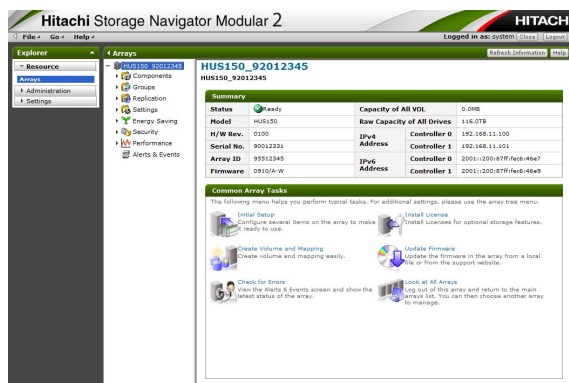


- (2) When the Hitachi Storage Navigator Modular 2 version is less than 22.00
- Start the Hitachi Storage Navigator Modular 2.
  - Check the array to set in the main window and press the [Ctrl] key, [Shift] key and [E] key at the same time to change the operation mode to “maintenance mode”. (#1)  
“Maintenance Mode” is displayed in [Operation Mode] in the upper side of the window and Hitachi Storage Navigator Modular 2 operates in the maintenance mode.



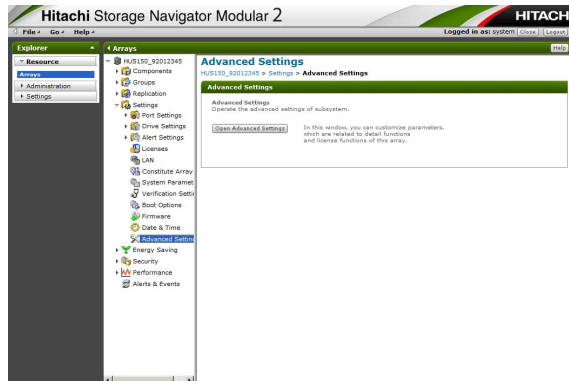
- (c) Click the array name, and open the unit window.

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

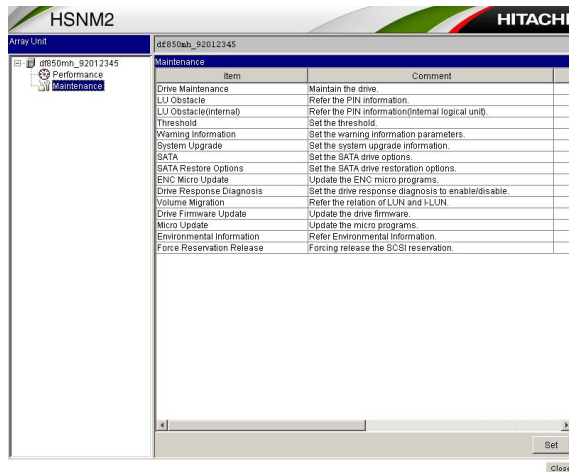


#1 : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

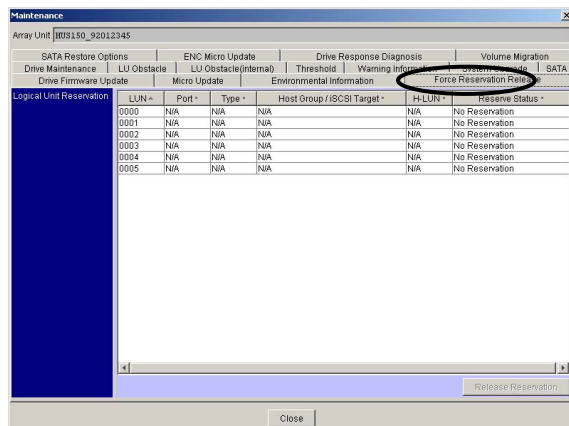
- (d) Select [Settings] - [Advanced Settings] in the unit window and click the [Open Advanced Settings] button.



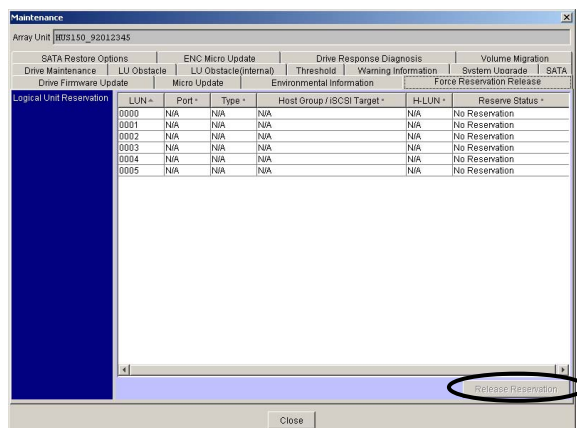
- (e) Select the [Maintenance] on the applet window, and click the [Set] button on the bottom right corner of the window. Maintenance dialog box is displayed.



- (f) Click the [Force Reservation Release] tab on the Maintenance dialog box.  
On this tab, the path and reservation status of the H-LUN can be checked.



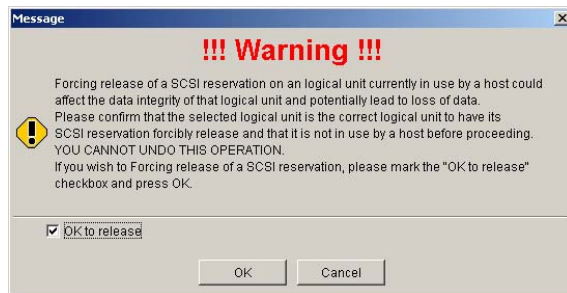
- (g) To release the reservation, click the [Release Reservation] button.



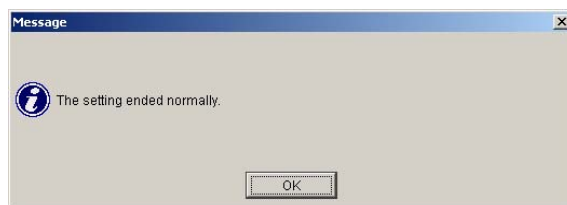
- (h) The Force Reservation Release dialog for the mapping list of the selected H-LUN is displayed.  
After confirming the contents in the window, click the [OK] button.



- (i) After confirming whether it is OK to release the reservation, check the [OK to release] checkbox, and click the [OK] button.

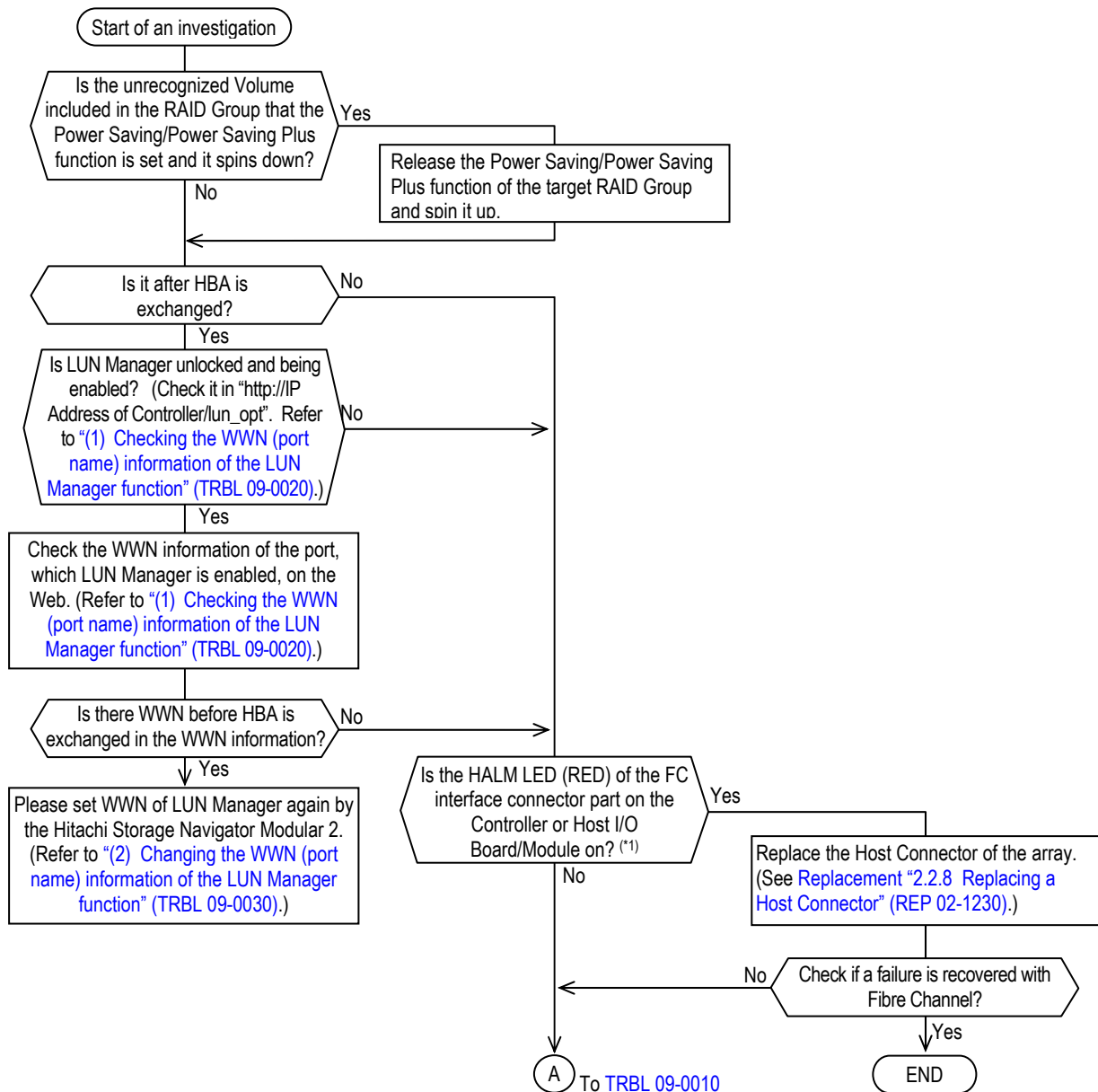


- (j) Click the [OK] button.



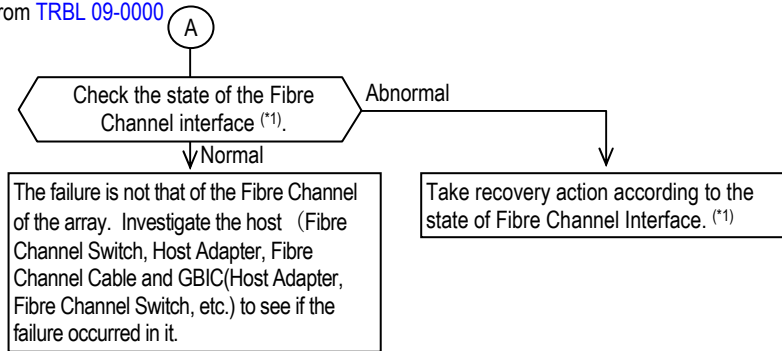
## Chapter 9. Procedure for Investigating Array Regarding Fibre Channel Failure

When a failure occurs in a Fibre Channel Link between a host computer and the array, judge whether or not the failure has occurred in the interface portion of the array following the flowchart shown below.



\*1 : Refer to Table 7.2.8 of "7.2 (6) LED Indication Patterns on FC Host I/O Module" (TRBL 07-0320).

From [TRBL 09-0000](#)



\*1 : Refer to [Table 7.2.8](#) of [“7.2 \(6\) LED Indication Patterns on FC Host I/O Module”](#) ([TRBL 07-0320](#)).

## (1) Checking the WWN (port name) information of the LUN Manager function

- (a) A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].

http://IP address of controller/lun\_opt

unlock and lock state display  
enable and disable state display

Display of state of security of each port, name of node, name of port, and host group

Option Name	Unlock/Lock	Status
LUN Manager	Unlock	Enable

Port	Security	Port Name	Host Group
0A	Enable	AAAAAAAAAAAAAAAA	000
0A	Enable	BBBBBBBBBBBBBBBB	000
0B	Disable		
1A	Enable	CCCCCCCCCCCCCCCC	001
1A	Enable	EEEEEEEEEEEEEEEE	001
1B	Disable		

[To Normal Mode Top](#)

NOTE : If you enter http://IP address/lun\_opt for URL and display the window, the URL changes.

When displaying the WWN (port information) of the LUN Manager function by http://IP address/lun\_opt, specify this URL every time. If you operate with the “Update” button, etc. without specifying http://IP address/lun\_opt, the most recent information is not displayed.



## (2) Changing the WWN (port name) information of the LUN Manager function

When replacing the Fibre Channel host bus adaptor card (HBA) installed in the host computer connected by the array and Fibre Channel, if using the LUN Manager function in the array, it is required to change the setting of LUN Manager on the array side.

Since the LUN Manager function decides which host can access which Volume, it sets a WWN (port name) of the HBA which allows the access to the host group defined for each port of the array. Therefore, if replacing the HBA, it is required to change the setting which allows the access to the WWN (port name) after the replacement.

## &lt;Advance preparation&gt;

The following preparation is required before starting this work.

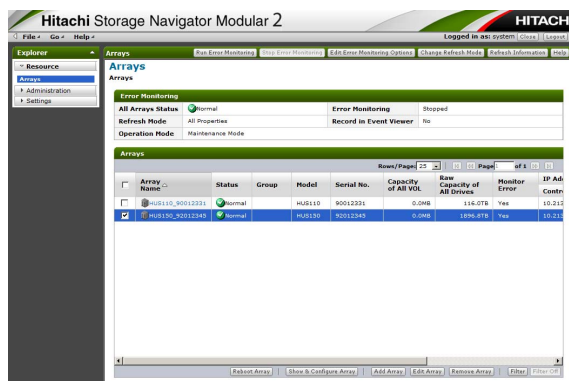
- Acquiring the WWN (port name) of the old (before replacement) HBA
- Acquiring the WWN (port name) of the new (after replacement) HBA

The above-mentioned information is generally attached on the HBA as a label.

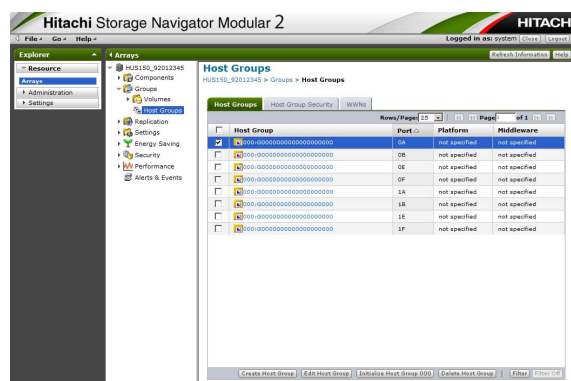
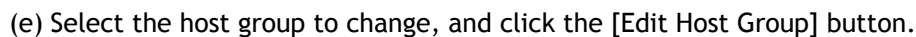
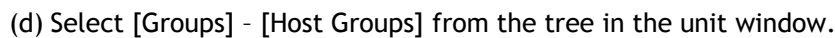
## (a) Turn on the power supply.

## (b) Start Hitachi Storage Navigator Modular 2, check the array to set, and change the operation mode to “Maintenance mode”.

(Refer to [System Parameter “1.1 \(4\)\(c\) Changing the Maintenance Mode” \(SYSPR 01-0110\).](#))



NOTE : When the main window is not displayed even if you select the array, check that the LAN port number is not changed. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\)](#).) Use the changed LAN Port Number, and execute it again.



- [illegible]

- # HSM2

## Edit Host Group - Port0A:000

**Host Group Property**

Enter the information for the host group to be created.

Host Group No.: 000 \* Edit to:

Name: 00000000000000000000  
22 characters or less (HID numeric characters:  
 "0","1","2","3","4","5","6","7","8","9";"  
 "A","B","C","D","E","F","G","H","I","J","K","L","M","N","O","P","Q","R","S","T","U","V","W","X","Y","Z")

Options:

Platform: not specified  
 Middleware: not specified

☐ Forced set to all selected ports

---

**WWNs** | **Volume** | **Options**

Click WWn or enter into port name form and click Add when assign WWN to host group.  
 Check selected WWNs and push Remove when disassign WWN from host group.

☒ Select From List ☐ Enter WWNs Manually

**Selected WWNs**

Row	Page	25	>	<	Page	of 1	
Nickname	Port Name	Port	OK				
<input type="checkbox"/>	Nickname	0123456789ABCDEF	OA				

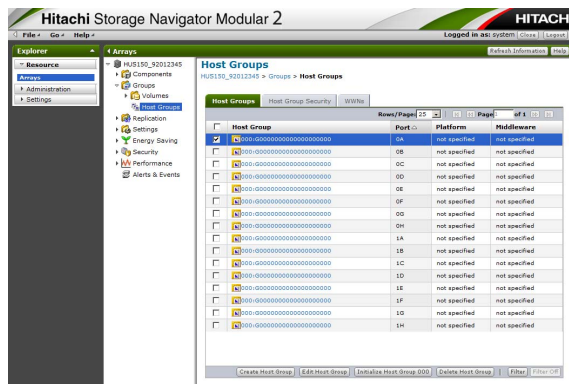
**Selected WWNs\***

Row	Page	25	>	<	Page	of 1	
Nickname	Port Name	Port	OK				
<input type="checkbox"/>	Gw001	00000000000000000001	GA				
<input type="checkbox"/>	Gw002	00000000000000000002	GA				
<input type="checkbox"/>	Gw003	00000000000000000003	GA				
<input type="checkbox"/>	Gw004	00000000000000000004	GA				
<input type="checkbox"/>		00000000000000000005	GA				
<input type="checkbox"/>		00000000000000000006	GA				
<input type="checkbox"/>		00000000000000000007	GA				
<input type="checkbox"/>		00000000000000000008	GA				
<input type="checkbox"/>		00000000000000000009	GA				
<input type="checkbox"/>		00000000000000000010	GA				
<input type="checkbox"/>		00000000000000000011	GA				
<input type="checkbox"/>		00000000000000000012	GA				
<input type="checkbox"/>		00000000000000000013	GA				
<input type="checkbox"/>		00000000000000000014	GA				
<input type="checkbox"/>		00000000000000000015	GA				

(h) When deleting the WWN (port name) before the HBA replacement, select the [WWNs] tab.

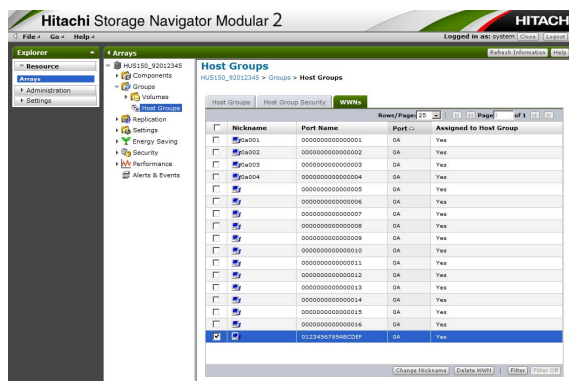
NOTE : • You cannot set the same nickname for the different WWN (port name) in the same port. When setting the nickname which was set for the WWN (port name) before the HBA replacement to the WWN (port name) after the replacement, it is required to change the nickname which was set for the WWN (port name) before the replacement. (Refer to “(4) Setting nicknames” (TRBL 09-0110).)

• If not deleting the WWN (port name), go to the procedure (j).

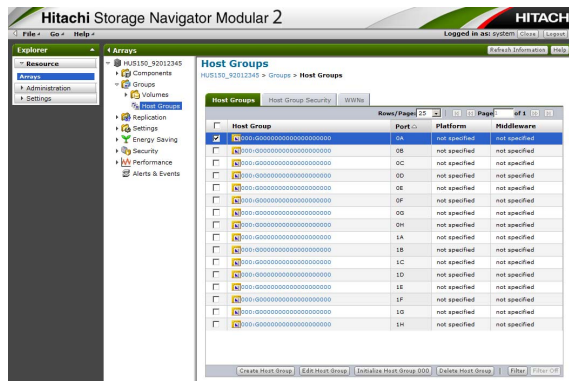


(i) Select the WWN (port name) before the HBA replacement, and click the [Delete WWN] button. Then, the confirmation message is displayed. Click the [Close] button.

NOTE : When setting the nickname which was set for the WWN (port name) before the HBA replacement to the WWN (port name) after the replacement, write down the nickname before deleting the WWN (port name) before the replacement.

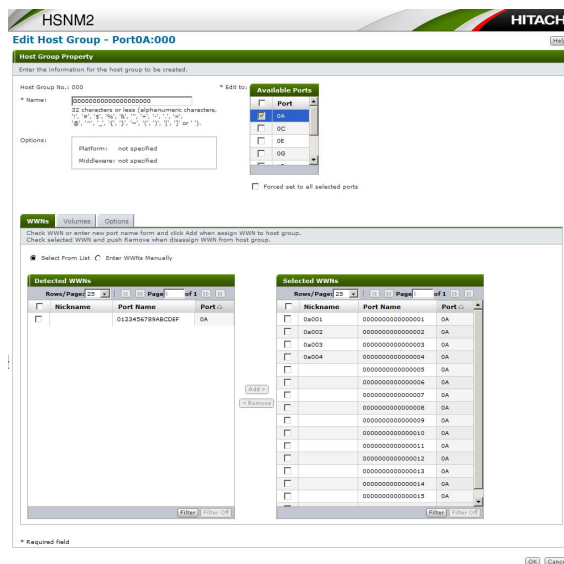


- (j) Select the [Host Groups] tab. After that, select the host group to change, and click the [Edit Host Groups] button.

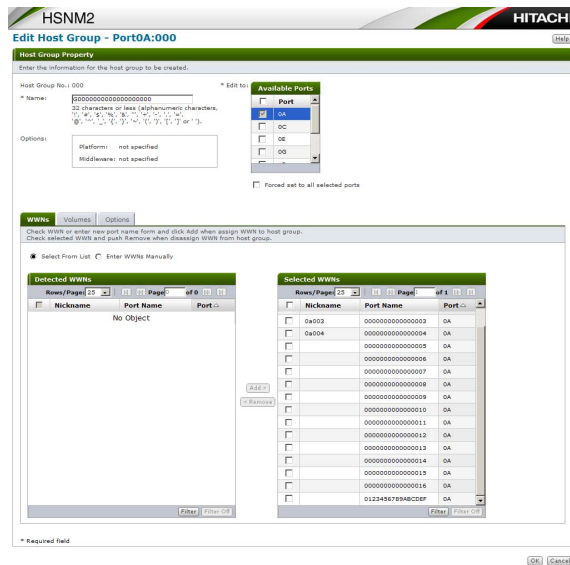


- (k) If the WWN (port name) of the HBA after the replacement is on the list of [Detected WWNs], select this WWN (port name), and click the [Add] button.

NOTE : When the WWN (port name) of the HBA before the replacement is not on the list of [Detected WWNs], click the [Enter WWNs Manually] button, and enter the WWN (port name). (Refer to “(3) Changing the WWN (port name) information by manual input” (TRBL 09-0090).)

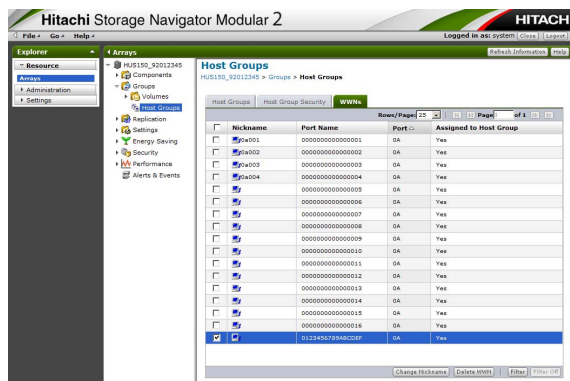


- (l) Check that the WWN (port name) of the HBA after the replacement moved to [Selected WWNs] from the list of [Detected WWNs], and click [OK]. Then, the confirmation message is displayed. Click the [Close] button.



- (m) Select the [WWNs] tab, and check that [Assigned to Host Group] of the assigned WWN (port name) became “Yes”.

NOTE : When setting a nickname to the WWN (port name) of the HBA after the replacement, select the WWN (port name), click the [Change Nickname] button, and enter the nickname. (Refer to “(4) Setting nicknames” (TRBL 09-0110).)



- (n) Recognize the device from the host computer again and check that the host computer can recognize the same Volume as the one before the HBA replacement.

NOTE : The host computer may not be able to recognize the Volume only by recognizing the device again depending on the host computer. In that case, remove the Fibre Channel cable once and insert it again.

- (3) Changing the WWN (port name) information by manual input
  - (a) Display the host group edit window in the procedure (a) to (e) of “(2) Changing the WWN (port name) information of the LUN Manager function”, and check that there is no WWN (port name) to enter manually on the list of [Detected WWNs].

# HSNM2

Edit Host Group - Port0A:000

Host Group Property

Enter the information for the host group to be created.

Host Group No.: 000

\* Name: 00000000000000000000

25 characters or less (alphanumeric characters, 0-9, A-Z, a-z, hyphen, underscore, and apostrophe).

Options:

Platform: not specified

Middleware: not specified

\* Edit to:

**Available Ports**

Port
0A
0C
0E
00

☐ Forced set to all selected ports

Wttn
Volume
Options

Check Wttn or enter new port name form and click Add when enter Wttn to host group.  
 Check selected Wttns and push Remove when deassign Wttns from host group.

☒ Select From List   
 ☐ Enter Wttns Manually

Detected Wttns

Row	Page	25	03	Page	01 of 0	03
Nickname	Port Name	Port				
No Object						

Add
(0 Removed)

Selected Wttns

Row	Page	25	03	Page	01 of 1	03
Nickname	Port Name	Port				
<input type="checkbox"/> 0a001	00000000000000000001	0A				
<input type="checkbox"/> 0a002	00000000000000000002	0A				
<input type="checkbox"/> 0a003	00000000000000000003	0A				
<input type="checkbox"/> 0a004	00000000000000000004	0A				
<input type="checkbox"/>	00000000000000000005	0A				
<input type="checkbox"/>	00000000000000000006	0A				
<input type="checkbox"/>	00000000000000000007	0A				
<input type="checkbox"/>	00000000000000000008	0A				
<input type="checkbox"/>	00000000000000000009	0A				
<input type="checkbox"/>	00000000000000000010	0A				
<input type="checkbox"/>	00000000000000000011	0A				
<input type="checkbox"/>	00000000000000000012	0A				
<input type="checkbox"/>	00000000000000000013	0A				
<input type="checkbox"/>	00000000000000000014	0A				
<input type="checkbox"/>	00000000000000000015	0A				

Filter
Filter Off

\* Required field

Help

OK
Cancel

(b) Click [Enter WWNs Manually], enter the WWN (port name) to assign to the host group in the [Port Name] column, and then click the [Add] button.

[illegible]

- ## HSNM2

[HITACHI](#)

---

### Edit Host Group - Port0A:000

[Help](#)

---

#### Host Group Property

Enter the information for the host group to be created.

Host Group No.: 000	* Edit to:	<b>Available Ports</b>
Name: 00000000000000000000 <small>22 characters or less (alphanumeric characters, %, *, @, ~, !, ", #, \$, %, &amp;, ', (, ), *, +, -, ., /, :; , &lt;, =, &gt;, ? [ \ ] ^ _ {   } ~)</small>		<input type="checkbox"/> 0A <input checked="" type="checkbox"/> 0B <input type="checkbox"/> 0C <input type="checkbox"/> 0D <input type="checkbox"/> 0E <input type="checkbox"/> 0F
Options: Platform: not specified Middleware: not specified		<input type="checkbox"/> Forced set to all selected ports

---

[WWW](#)
[Volume](#)
[Options](#)

Click WWW or enter new port name form and click Add when assign WWW to host group.  
Click selected WWW and push Remove when disassign WWW from host group.

Select From List: [Edit WWW Manually](#)

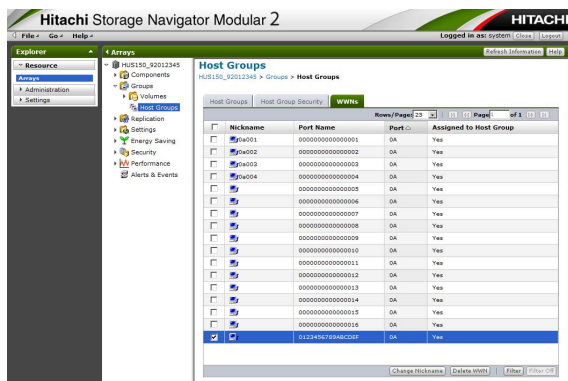
Port Name: 0123456789abcde  
Enter 16 characters(from 0 to F) when add new port name.

Add

Row#	Page#	Nickname	Port Name	Port
<input type="checkbox"/>	0w003	00000000000000000003	GA	
<input type="checkbox"/>	0w004	00000000000000000004	GA	
<input type="checkbox"/>		00000000000000000009	GA	
<input type="checkbox"/>		00000000000000000006	GA	
<input type="checkbox"/>		00000000000000000007	GA	
<input type="checkbox"/>		00000000000000000008	GA	
<input type="checkbox"/>		00000000000000000009	GA	
<input type="checkbox"/>		00000000000000000010	GA	
<input type="checkbox"/>		00000000000000000011	GA	
<input type="checkbox"/>		00000000000000000012	GA	
<input type="checkbox"/>		00000000000000000013	GA	
<input type="checkbox"/>		00000000000000000014	GA	
<input type="checkbox"/>		00000000000000000015	GA	
<input type="checkbox"/>		00000000000000000016	GA	
<input type="checkbox"/>		0123456789ABCDEF	GA	

Filter Filter Off
- \* Required field
- (GO) Home

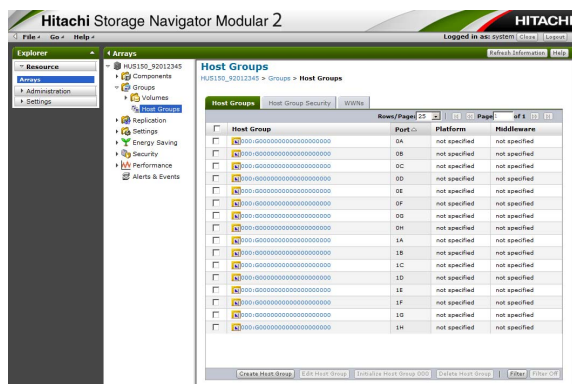
- NOTE : When setting a nickname to the WWN (port name) of the HBA after the replacement, select the WWN (port name), click the [Change Nickname] button, and enter the nickname. (Refer to “(4) Setting nicknames” (TRBL 09-0110).)



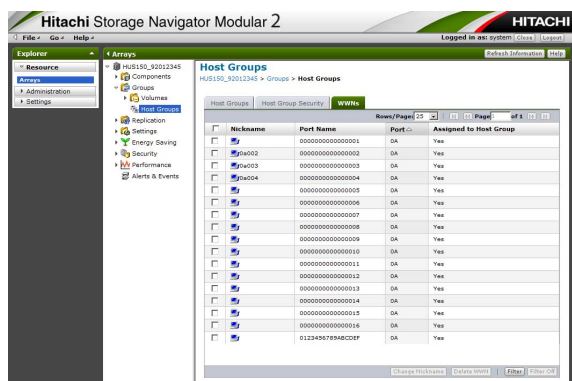


## (4) Setting nicknames

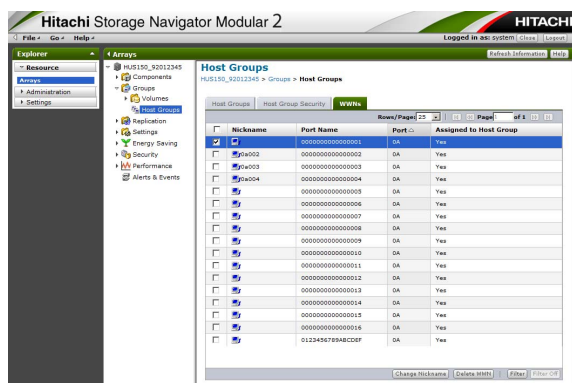
- (a) Display the select host group window in the procedure (a) to (e) of “(2) Changing the WWN (port name) information of the LUN Manager function”.



- (b) Select the [WWNs] tab.



- (c) Select the WWN (port name) to set a nickname, and click the [Change Nickname] button.



- (d) Enter a nickname in the nickname column, and click the [OK] button. Then, the confirmation message is displayed. Click the [Close] button.

Change Nickname - Port0A:0000000000000001

Nickname

Input the nickname of the WWL.

Nickname: da001

32 characters or less (alphanumeric characters, '[!@#%&\*~`^\_<.>?{}|;:\'\"/>

OK Cancel

- (e) Check that the nickname was changed.

Hitachi Storage Navigator Modular 2

Host Groups

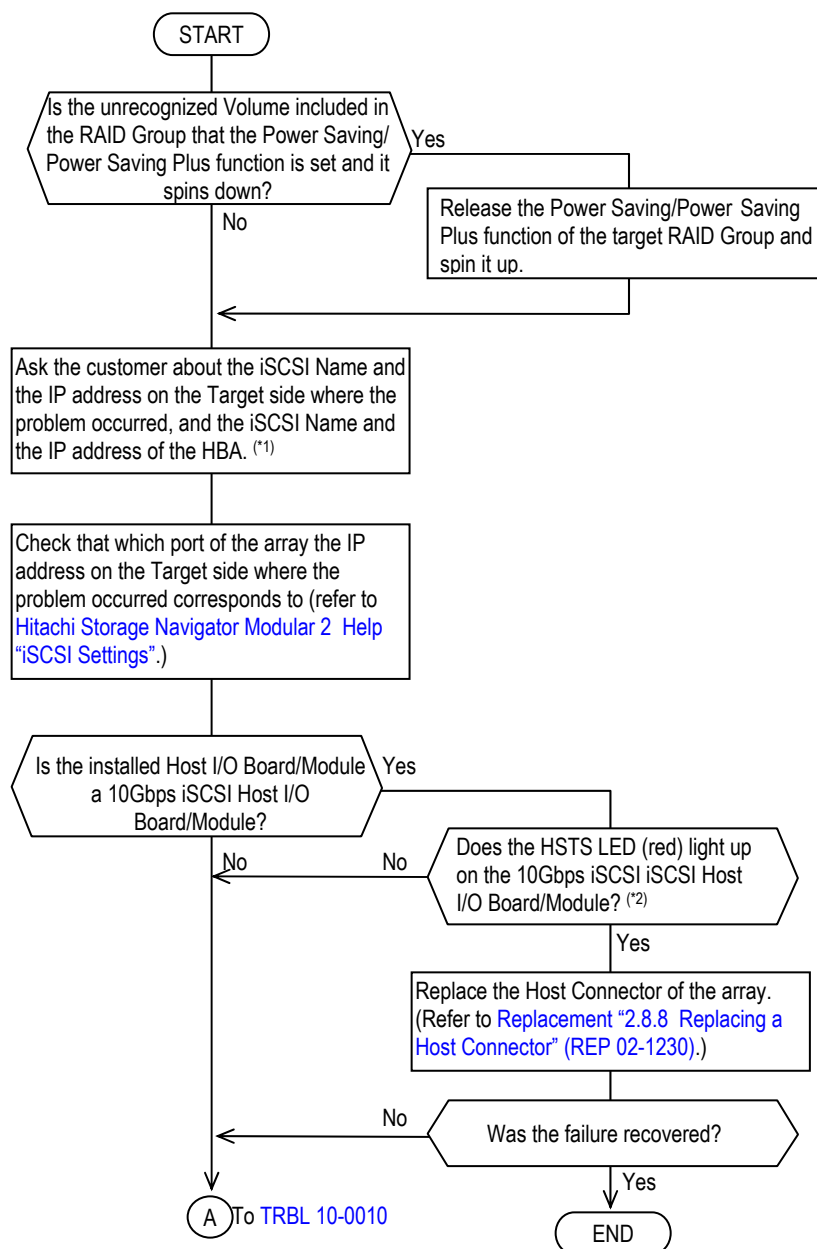
Host Groups

Nickname	Port Name	Port ID	Assigned to Host Group
da001	0000000000000001	0A	Yes
da002	0000000000000002	0A	Yes
da003	0000000000000003	0A	Yes
da004	0000000000000004	0A	Yes
da005	0000000000000005	0A	Yes
da006	0000000000000006	0A	Yes
da007	0000000000000007	0A	Yes
da008	0000000000000008	0A	Yes
da009	0000000000000009	0A	Yes
da010	0000000000000010	0A	Yes
da011	0000000000000011	0A	Yes
da012	0000000000000012	0A	Yes
da013	0000000000000013	0A	Yes
da014	0000000000000014	0A	Yes
da015	0000000000000015	0A	Yes
da016	0000000000000016	0A	Yes
da017	0123456789ABCDEF	0A	Yes

Change Nickname Enter WWW Edit Close

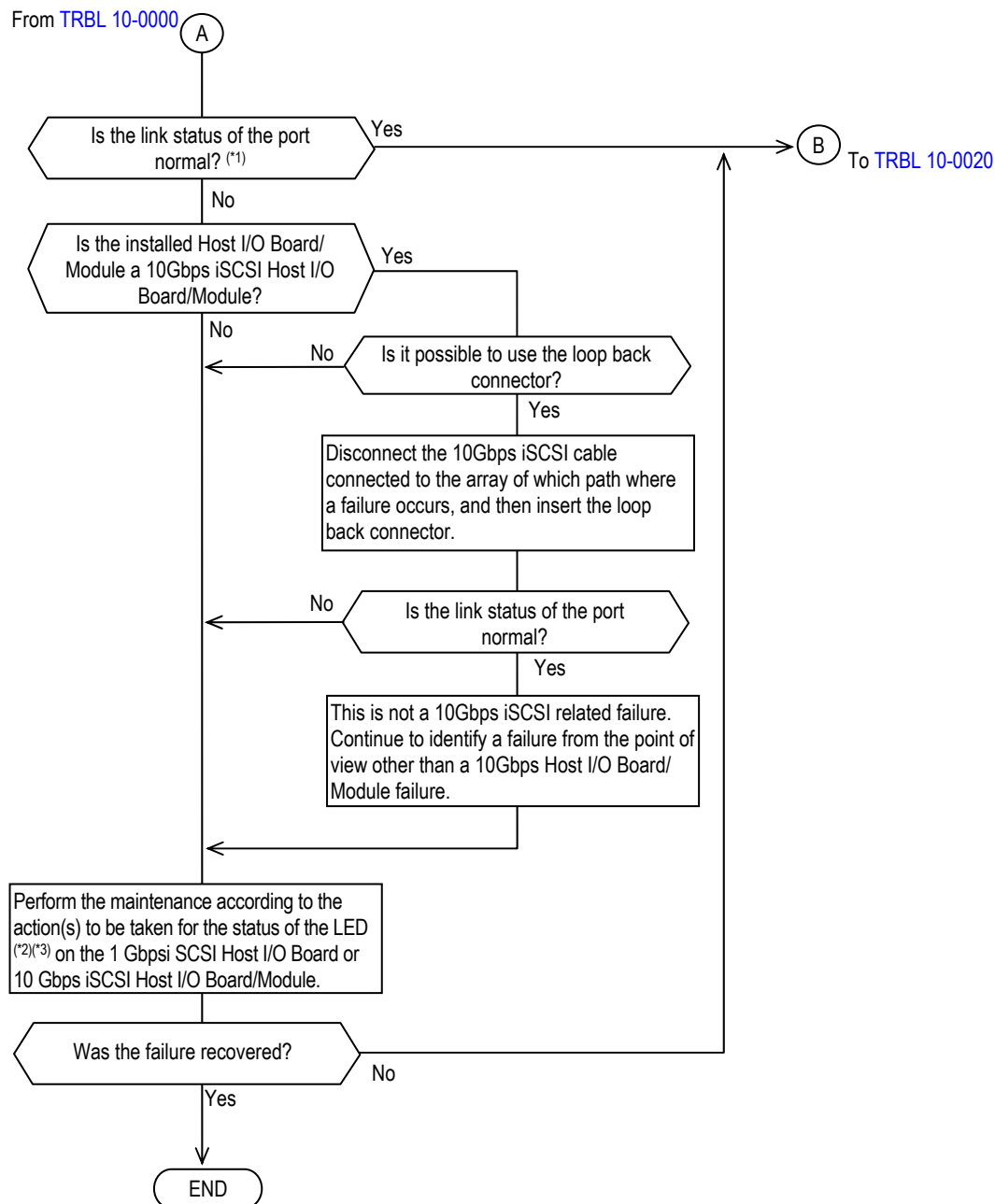
## Chapter 10. Procedure for the iSCSI System Failure Determination on the Array Side

When a failure occurs in the communication by the iSCSI protocol between the host computer and the array, determine if there is a failure in the host interface part of the array according to the following flow.



\*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge. In case of IPv6 connection, check the IPv4 and all IPv6 addresses and IPv6 addresses status

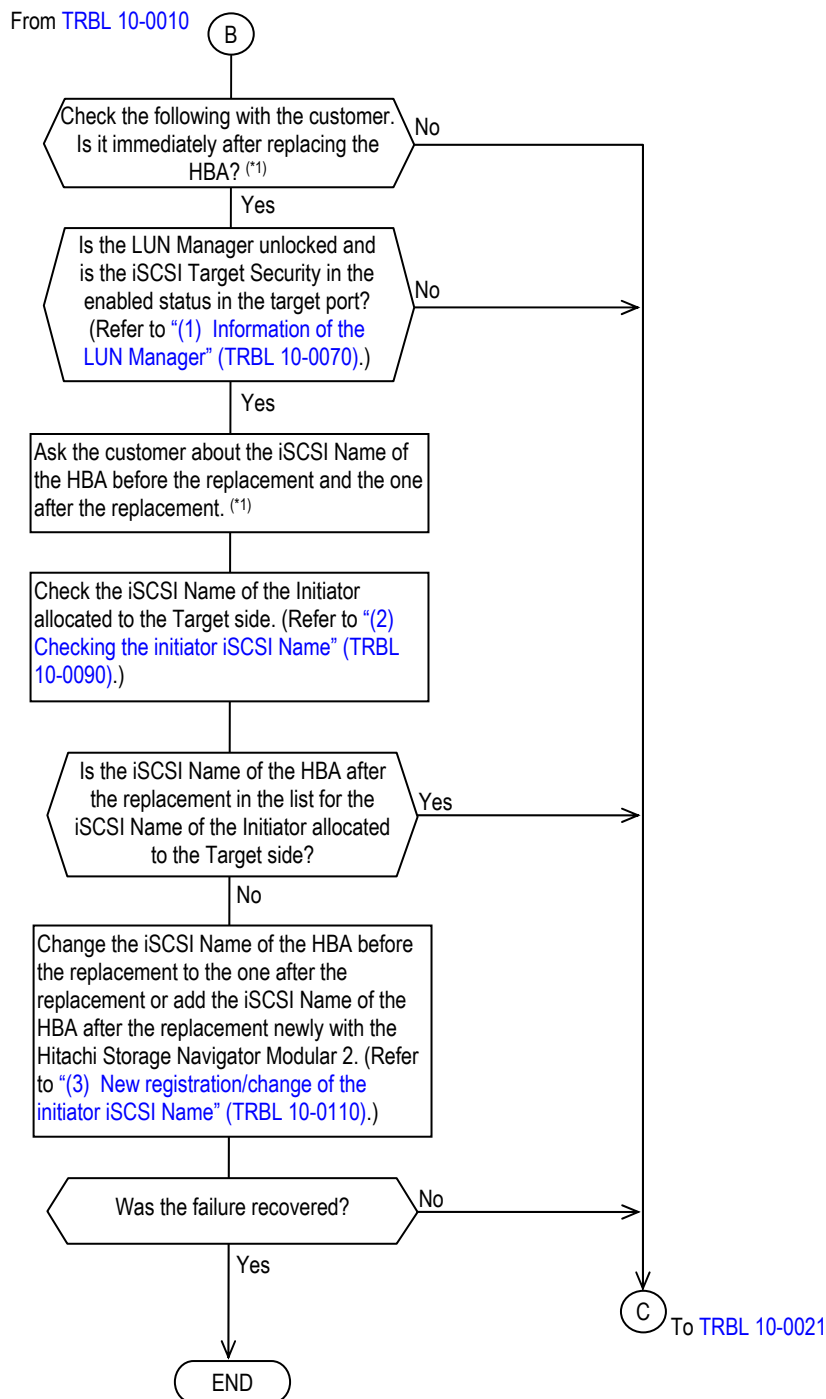
\*2 : It is in the status of [Item 3 on Table 7.2.14](#) in "7.2 (6) (c) 10Gbps iSCSI Host I/O Module" (TRBL 07-0410).



\*1 : It is in the status of [Item 3 on Table 7.2.14](#) in “7.2 (6) (c) 10Gbps iSCSI Host I/O Module” (TRBL 07-0410).

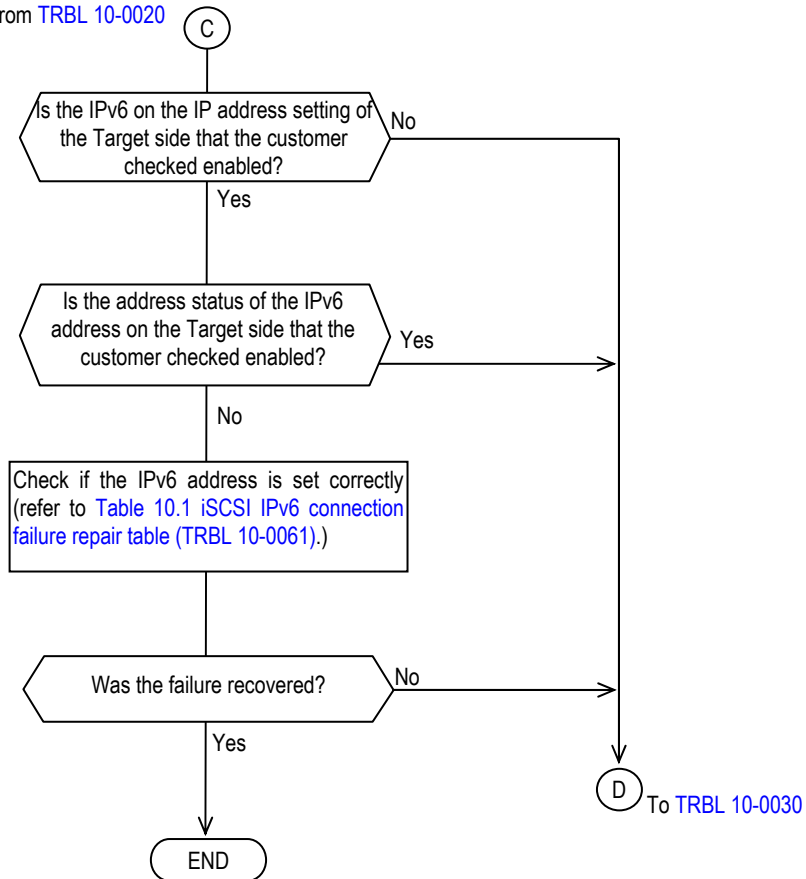
\*2 : It is in the status of [Item 4 on Table 7.2.13](#) in “7.2 (6) (b) 1Gbps iSCSI Host I/O Module” (TRBL 07-0390).

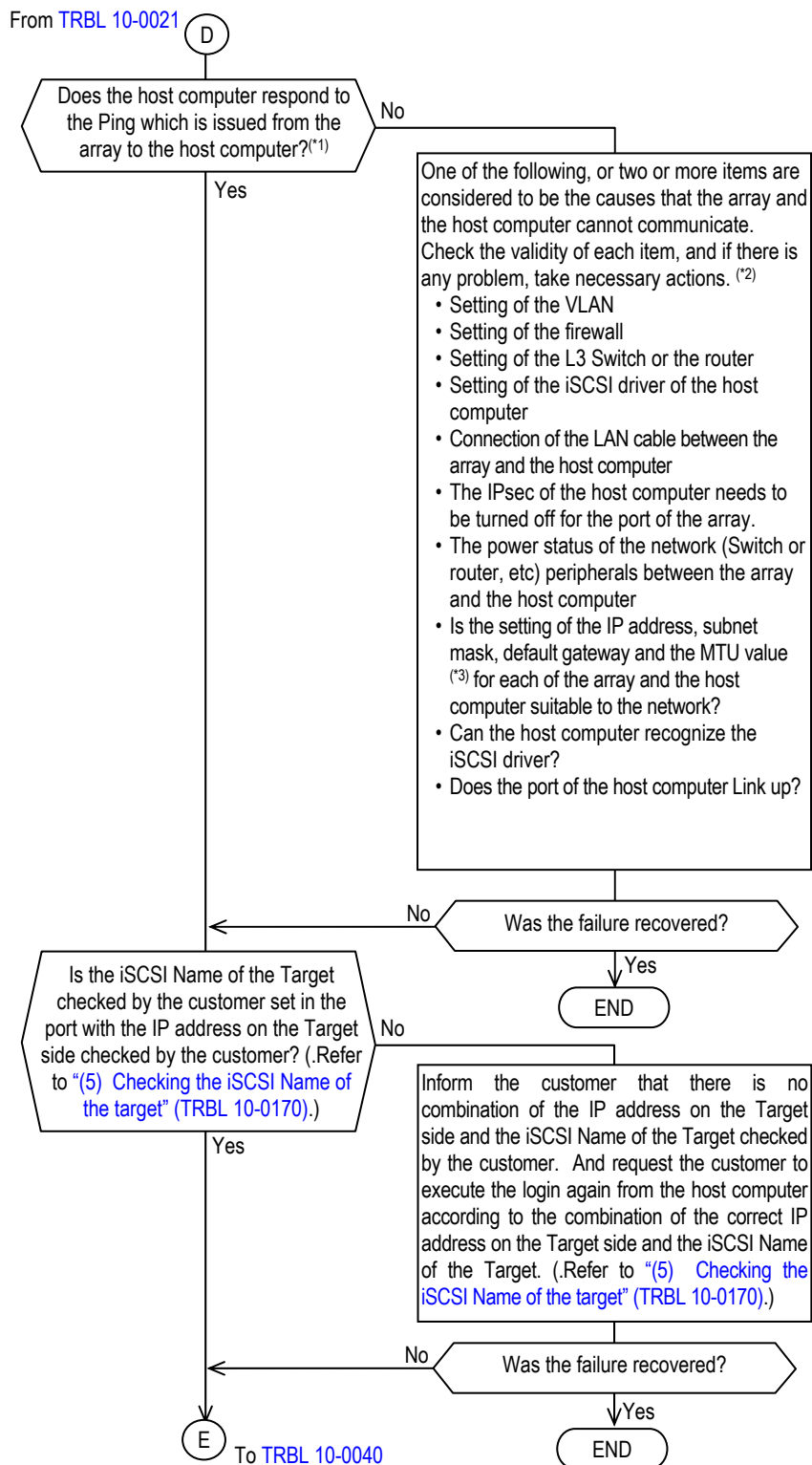
\*3 : It is in the status of [Item 4 on Table 7.2.14](#) in “7.2 (6) (c) 10Gbps iSCSI Host I/O Module” (TRBL 07-0420).



\*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

From TRBL 10-0020



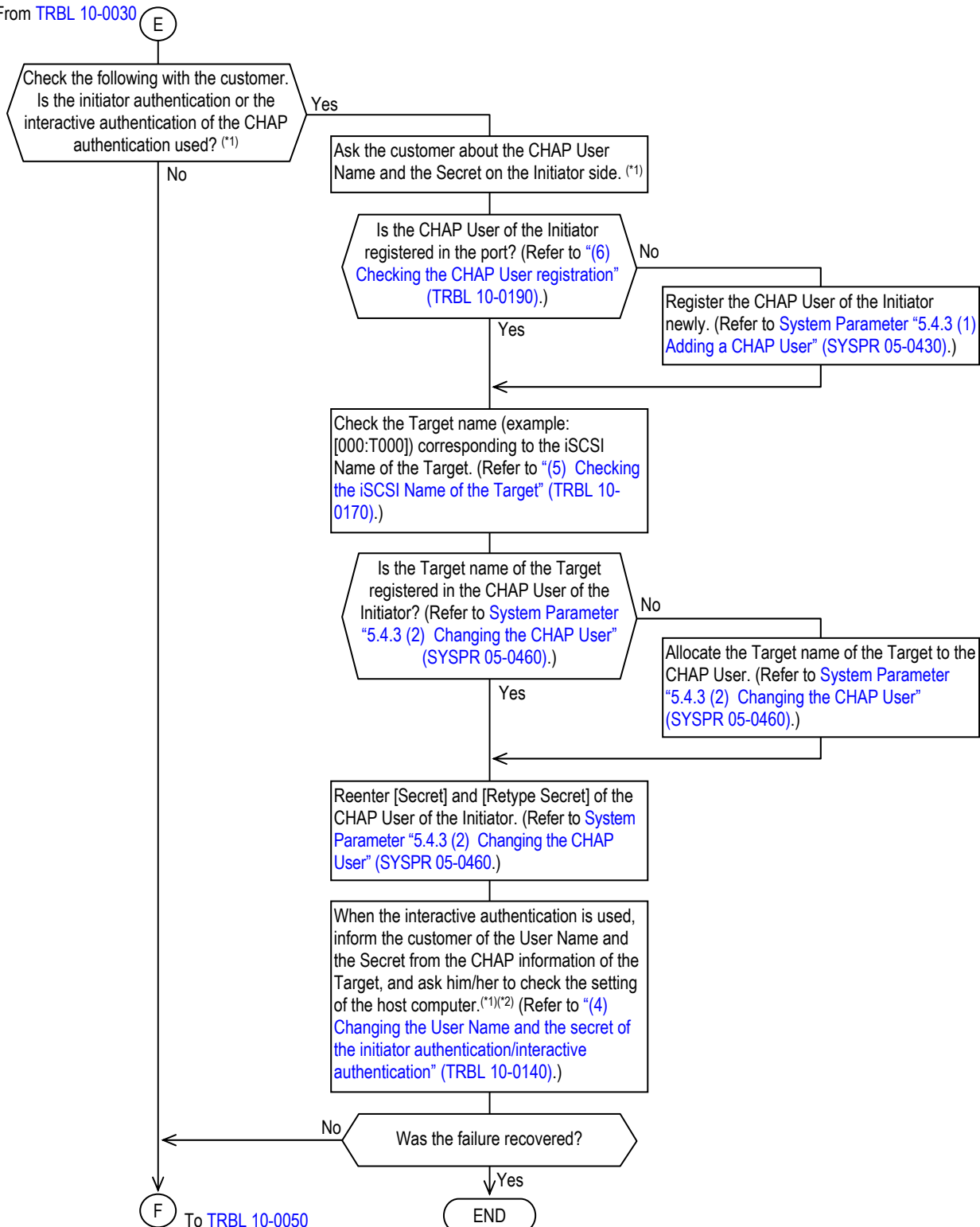


\*1 : Refer to [System Parameter “5.4.5 Sending Ping” \(SYSPR 05-0520\)](#) for the confirmation method of the Ping.

\*2 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

\*3 : The MTU value needs to be set as the same value for all the devices (host computer, Switch, array, etc.) in the LAN network environment. However, the DF850 cannot be set. (Refer to [Hitachi Storage Navigator Modular 2 Help “iSCSI Settings”](#).)

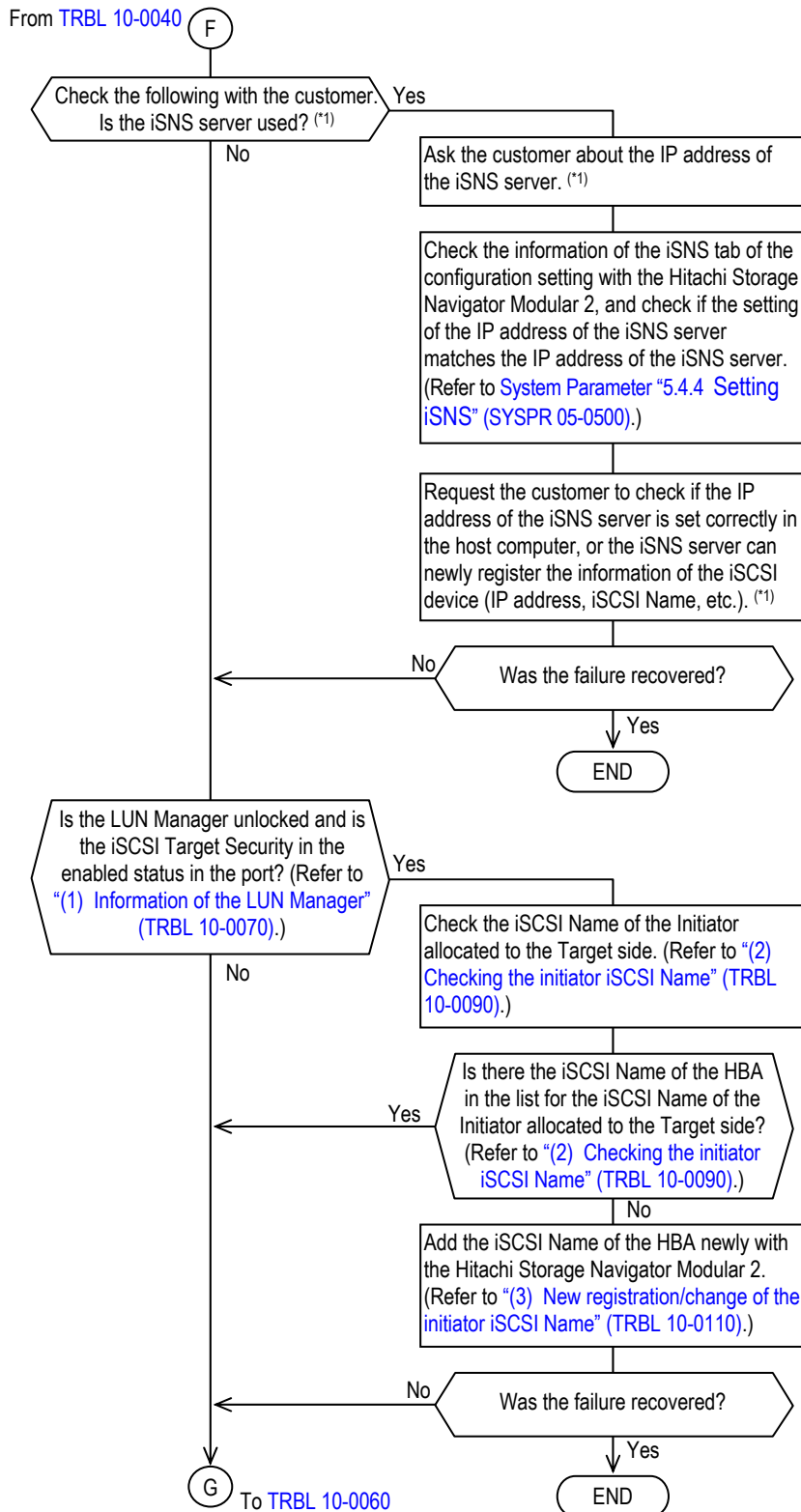
From TRBL 10-0030



\*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

\*2 : When the Microsoft iSCSI Software initiator is used, it is not necessary to check the User Name of the Target on the Initiator side.





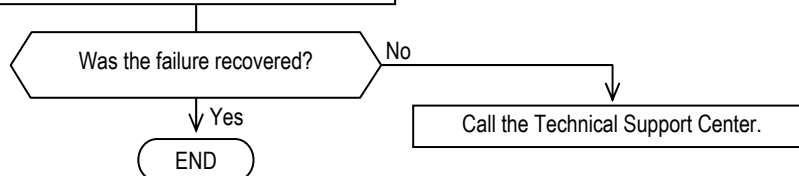
\*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

From TRBL 10-0050

G

One of the following, or two or more items are considered to be the causes that the array and the host computer cannot communicate. Check the validity of each item, and if there is any problem, take necessary actions. (\*1)

- Setting of the firewall
- Setting of the L3 Switch or the router
- Setting of the iSCSI driver of the host computer
- Is the TCP Port number of the port of the array set correctly in the host computer?
- Are [Discovery] and [Login] performed from the host computer? (Refer to [Hitachi Storage Navigator Modular 2 Help "iSCSI Settings"](#).)
- Can the host computer recognize the iSCSI driver?
- Doesn't it login with the incorrect IP address and the iSCSI Name in the Target from the host computer?



\*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

Perform the steps on table 10.1 and confirm that the failure is repaired

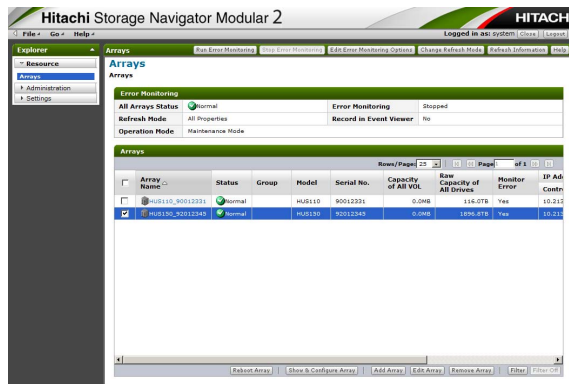
**Table 10.1 iSCSI IPv6 connection failure repair table**

Confirmation Items		Countermeasure
Are the values of the IPv6 address and the default gateway address of the iSCSI port to be connected set correctly?		The IPv6 address and default gateway of the iSCSI Port are generated automatically. When set manually, set the values according to the environment of the customer.
Display of the address status of the iSCSI Port IPv6 address.	Acquiring	The IPv6 is checking if the other hosts and addresses inside the network connection are not overlapped. Confirm that the transition is effective.
	Preferred	The IPv6 address of the iSCSI Port is not overlapped and set correctly so the address is in normal status.
	Invalid	The iSCSI Port is in Link Down status. When the iSCSI Port IPv6 address is going to be used, check that the cable is connected correctly.
	Duplicate	The iSCSI Port IPv6 address overlaps with the address of other hosts in the network connection. Set an IPv6 address that does not overlap manually.
	Unconfirmed	The IPv6 address of the iSCSI Port overlaps with other addresses on the same iSCSI Port. Set an IPv6 address different from the others addresses on the iSCSI Port manually.
Is the value of the MTU size correct?		The IPv6 Link MTU size shows the MTU size current value on the network. When the Link MTU size and the MTU size set on the array iSCSI Port are different, the MTU size of the host or the router/switch is different from the array. Set the MTU sizes to become the same value.
Is the IPv6 address of the remote pass setting on the IPv6 address set correctly?		It's necessary to make the IPv6 address effective. Set the correct IPv6 address of the iSCSI port of both the local and the remote that sets the remote pass.

## (1) Information of the LUN Manager

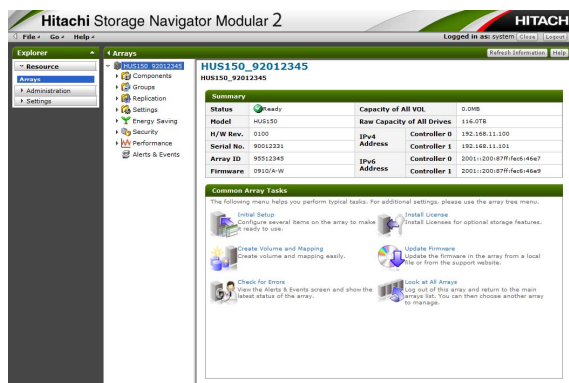
- Turn on the power supply.
- Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



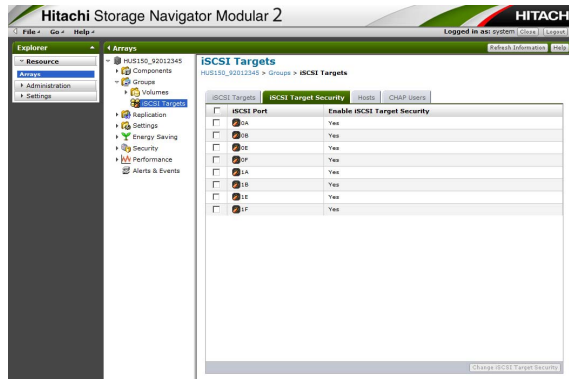
- Click the array name, and open the unit window.

NOTE : When the main window is not displayed even if you select the array, check that the LAN port number is not changed. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\)](#).) Use the changed LAN Port Number, and execute it again.



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

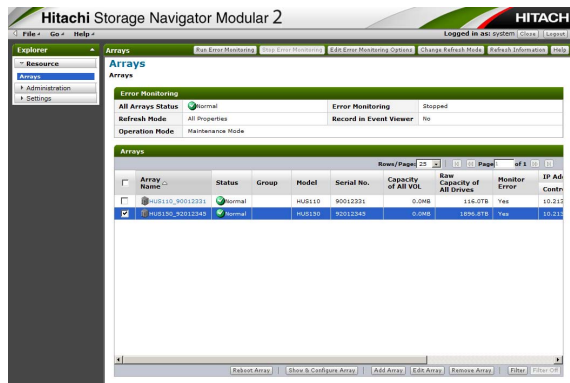
- (d) Select [Groups] - [iSCSI Targets] on the unit window, and click the [iSCSI Target Security] tab. If [Enable iSCSI Target Security] is “Yes”, LUN Manager is unlocked and valid.



## (2) Checking the initiator iSCSI Name

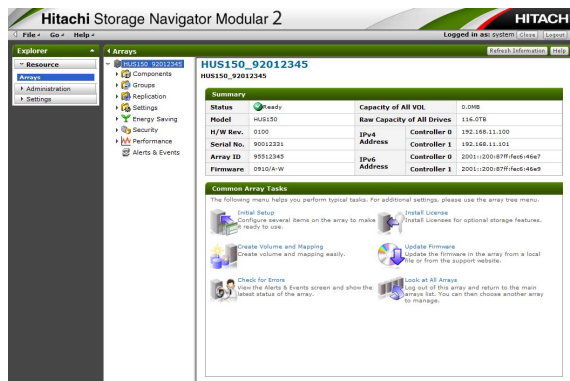
- (a) Turn on the power supply.
- (b) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(#1)</sup>

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



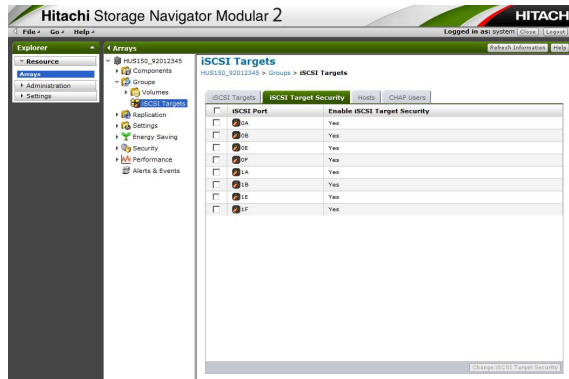
- (c) Click the array name, and open the unit window.

NOTE : When the main window is not displayed even if you select the array, check that the LAN port number is not changed. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\)](#).) Use the changed LAN Port Number, and execute it again.

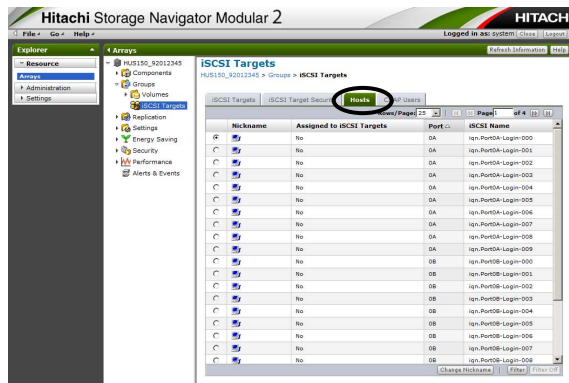


<sup>#1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

- (d) Select [Groups] - [iSCSI Targets] on the unit window, and click the [iSCSI Target Security] tab. If [Enable iSCSI Target Security] is “Yes”, LUN Manager is unlocked and valid.



- (e) Check that the target security of the specified port is [Yes].  
 (f) Select [Hosts] tab. Check the iSCSI Name.

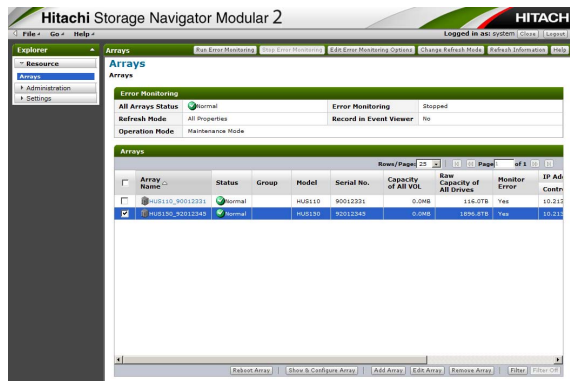


## (3) New registration/change of the initiator iSCSI Name

(a) Turn on the power supply.

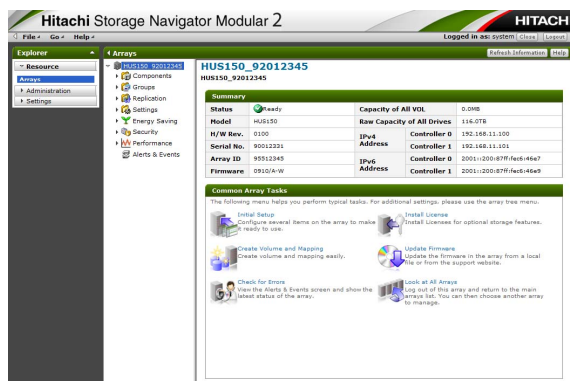
(b) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(#1)</sup>

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



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

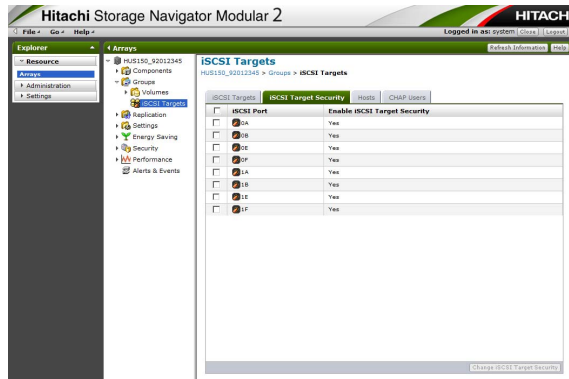
NOTE : When the main window is not displayed even if you select the array, check that the LAN port number is not changed. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\)](#).) Use the changed LAN Port Number, and execute it again.



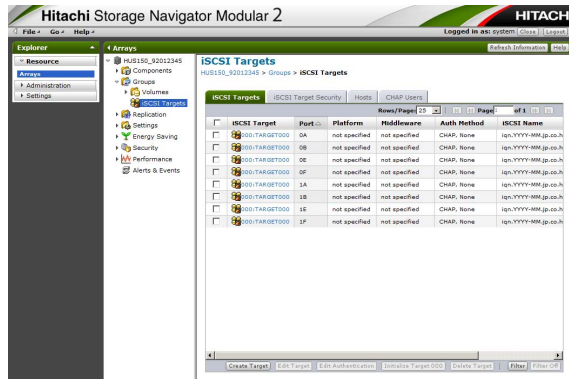
<sup>#1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.



- (d) Select [Groups] - [iSCSI Targets] on the unit window, and click the [iSCSI Target Security] tab. If [Enable iSCSI Target Security] is “Yes”, LUN Manager is unlocked and valid.



- (e) Check that the target security of the specified port became [Yes].  
 (f) Select [iSCSI Targets].



(g) Click the [Create Target] button.

(h) Enter [iSCSI Target No.], [Alias], and [iSCSI Name], and click the [OK] button.

[illegible]

(g) Click the [Edit Target] button.

(h) Enter [iSCSI Name], and click the [OK] button.

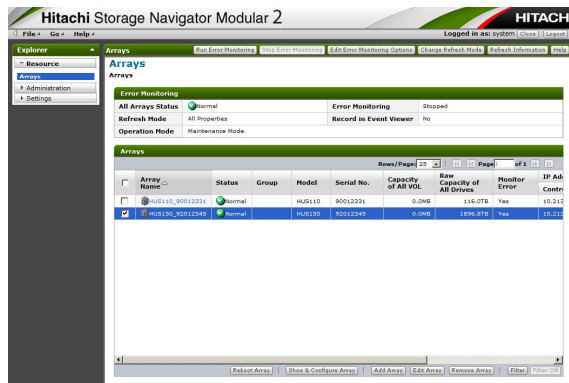
[illegible]

(4) Changing the User Name and the secret of the initiator authentication/interactive authentication

(a) Turn on the power supply.

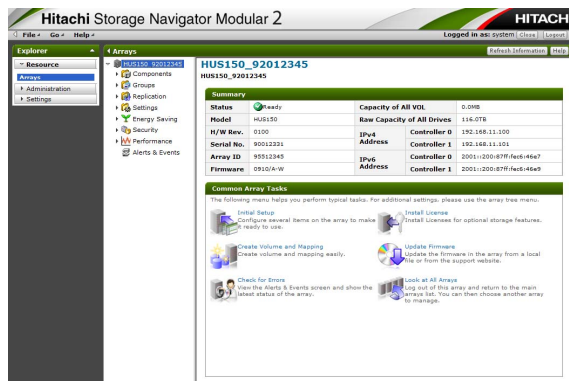
(b) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>†1)</sup>

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



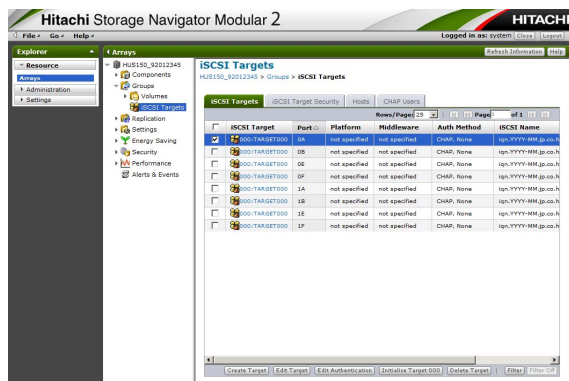
(c) Click the array name, and open the unit window.

NOTE : When the main window is not displayed even if you select the array, check that the LAN port number is not changed. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\)](#).) Use the changed LAN Port Number, and execute it again.

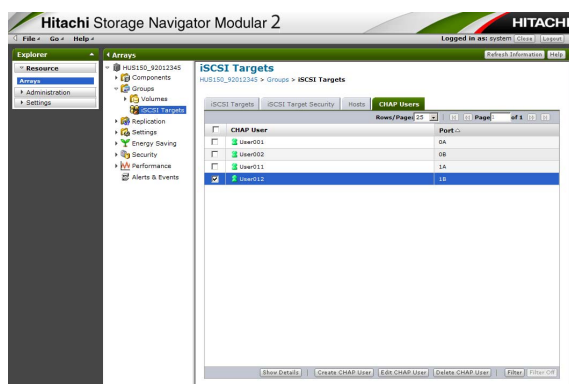


<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

(d) Select the [Groups] - [iSCSI Targets] on the unit window.



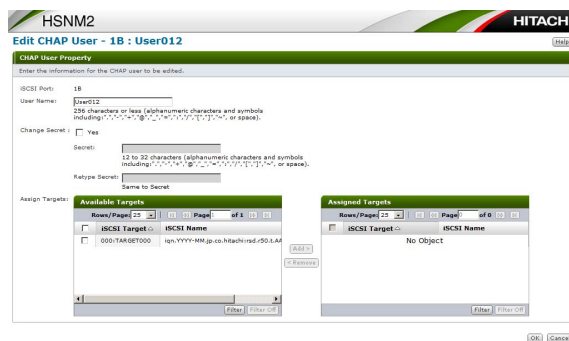
(e) Select the [CHAP Users] tab.



(f) Select the [CHAP Users], and click the [Edit CHAP User] button.

The Edit CHAP User dialog is displayed.

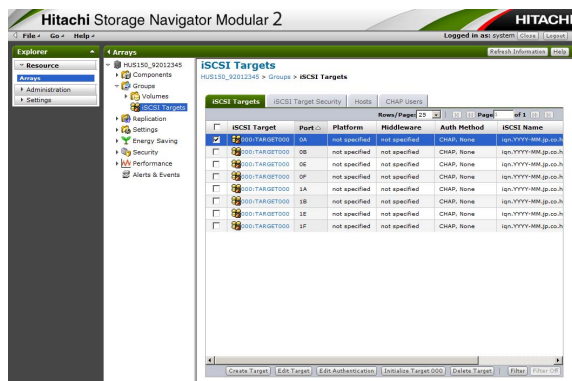
(g) Enter “User Name” and “Secret” which are the same with those on the host computer side in [User Name], [Secret] and [Retype Secret] in the Edit CHAP User dialog, and click the [OK] button.



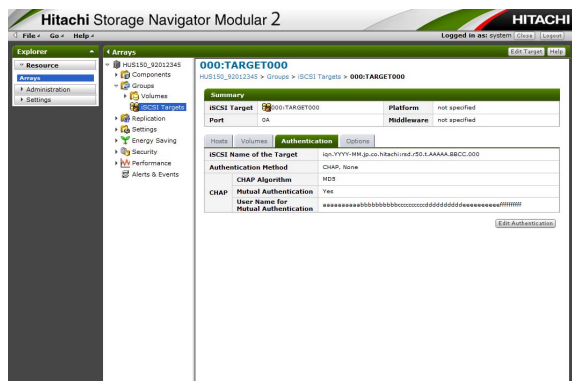
(h) The confirmation window is displayed. Click the [Close] button.



- (i) Select the [iSCSI Targets] tab.
- (j) Double clicking the port which changes the information of the interactive authentication.  
Click the [Authentication] tab.



- (k) Click the [Edit Authentication] button.  
The Target dialog is displayed.



- (l) When the interactive authentication is [Enable], change [User Name] and [Secret] which are the same with those on the host computer.



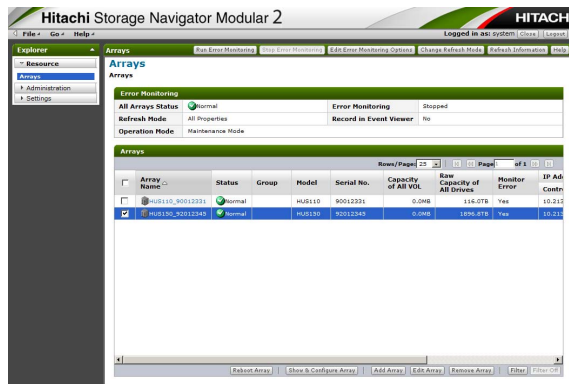
- (m) Click the [OK] button.
- (n) The confirmation window is displayed. Click the [OK] button.



## (5) Checking the iSCSI Name of the target

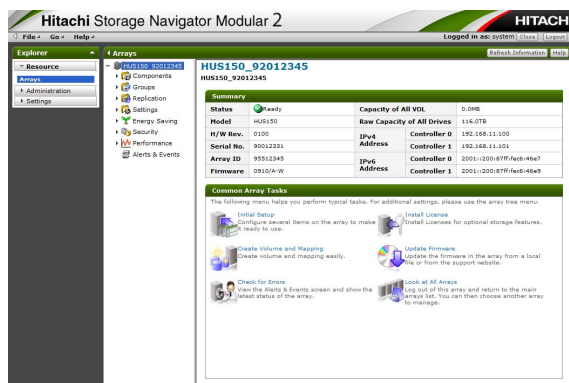
- (a) Turn on the power supply.
- (b) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



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

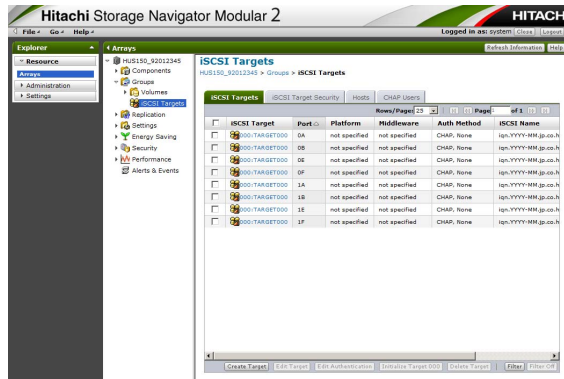
NOTE : When the main window is not displayed even if you select the array, check that the LAN port number is not changed. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\)](#).) Use the changed LAN Port Number, and execute it again.



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

(d) Check the iSCSI Name.

Select [Groups] - [iSCSI Targets] on the unit window, and click the [iSCSI Targets] tab.

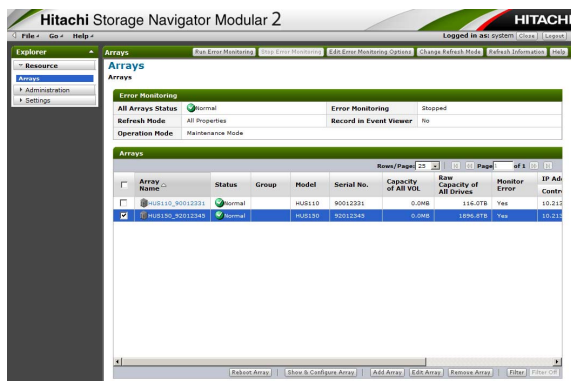


## (6) Checking the CHAP User registration

(a) Turn on the power supply.

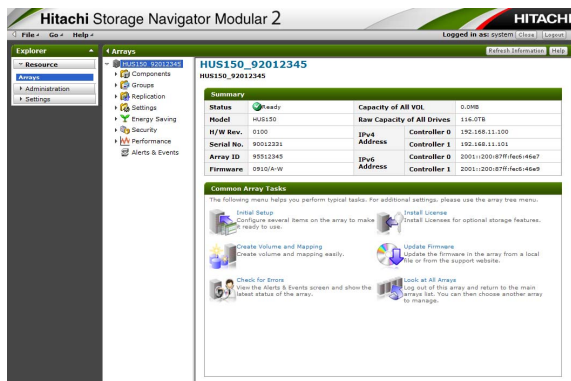
(b) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(#1)</sup>

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



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

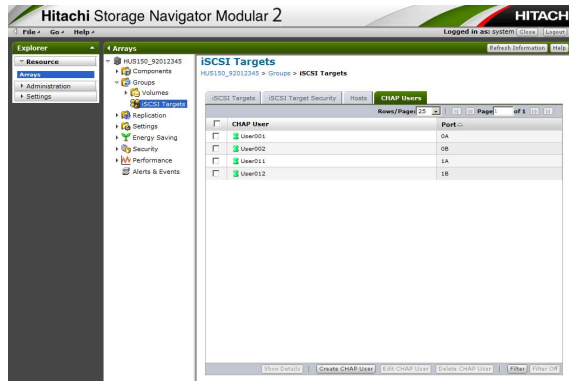
NOTE : When the main window is not displayed even if you select the array, check that the LAN port number is not changed. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\)](#).) Use the changed LAN Port Number, and execute it again.



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



- (d) Select the [Groups] - [iSCSI Targets] on the unit window, and click the [CHAP Users] tab.
- (e) Check that there is the list of the CHAP User by clicking [CHAP User].



## Chapter 11. Details of Recovery Methods

### 11.1 Error Recovery Methods

Table 11.1.1 shows error recovery methods<sup>(#1)</sup>.

**Table 11.1.1 Error Recovery Methods for Each Error**

No.	Classification	Description	Reference page
1	The array was down.	Both controllers are blocked in the dual controller configuration. Only one controller is blocked in the single or dual Controller configuration.	"11.1.1 System Down" (TRBL 11-0040)
2		The load of the DP management information from the Drive failed at the time of starting the array.	"11.1.24 Recovery Method when the Array went Down because the Load of the DP Management Information" (TRBL 11-1120)
3		POWER LED on the array lighted off because a Drive short-circuit failure (on the Controller Box or the Drive Box) occurred.	"Chapter 7. Trouble Analysis by LED Indication" (TRBL 07-0000)
4		The system of the array went down because the array did not become Ready due to the Drive failure. When the array is not Ready, the Drive of the failed part is removed, the array is started, and the maintenance of the failed part is performed.	"11.1.27 Procedure for Starting the Array by Removing the Failed Drive when the Array is not Ready" (TRBL 11-1220)
5	The array does not become ready.	A loading of information from a Drive failed.	"11.1.2 The Array does not Become Ready : Case 1 (Loading Failure)" (TRBL 11-0070)
6		POWER LED on the array lighted off because a Drive short-circuit failure (on the Controller Box or the Drive Box) occurred.	"Chapter 7. Trouble Analysis by LED Indication" (TRBL 07-0000)
7		The system of the array went down because the array did not become Ready due to the Drive failure. When the array is not Ready, the Drive of the failed part is removed, the array is started, and the maintenance of the failed part is performed.	"11.1.27 Procedure for Starting the Array by Removing the Failed Drive when the Array is not Ready" (TRBL 11-1220)
8		The array may not start due to the incorrect setting of the Power Interlock Mode. In that case, set the Power Interlock Mode to the standard mode (which does not interlock with UPS) and set it appropriately again.	"11.1.36 The Array does not Start Due to the Incorrect Setting of the Power Interlock Mode" (TRBL 11-2870)
9	The failure occurred immediately after being ready.	The user data in the cache memory was lost because data stored in the cache memory volatilized. (A forced parity correction is required(*1).)	"11.1.3 The Failure Occurred Immediately after Being Ready (Forced Parity Correction)" (TRBL 11-0150)

\*1 : When user data is lost because of volatilization of data in the Cache Memory, restore it in the procedure given in No.5.

- #1 : • Since the latest state of the unit is always referenced in this recovery operation, turn on the Page Refresh Mode of the WEB. (Click the [ON] button to indicate [OFF].)
- In the recovery operation, when turning on the power again, the WEB connection between the array and the browser are turned off. Perform the WEB connection again (press the refresh button of the browser).

No.	Classification	Description	Reference page
10	The power cannot be turned off.	Planned shutdown cannot be performed because the number of PIN data is too large. (due to Drive and Controller error.)	"11.1.4 The Power cannot be Turned Off : Case 1 (The Number of PIN Data is Too Large)" (TRBL 11-0600)
11		An attempt was made to save PIN data to the Drive during planned shutdown but failed because a hardware error occurred.	"11.1.5 The Power cannot be Turned Off : Case 2 (Hardware Failure)" (TRBL 11-0640)
12		Planned shutdown cannot be performed because all the Drives to which inheritance information is to be saved disappeared due to a DMA double error or a Drive quintuple error.	"11.1.6 The Power cannot be Turned Off : Case 3 (Controller Failure)" (TRBL 11-0660)
13		Planned shutdown cannot be performed because PIN data cannot be saved due to a Cache memory error, etc.	"11.1.7 The Power cannot be Turned Off : Case 4 (Cache Memory Failure)" (TRBL 11-0680)
14	Data recovery does not terminate normally.	<ul style="list-style-type: none"> <li>A read error occurred in the copy source during the correction copy or copy back, and the forced recovery is executed.</li> <li>A read error occurred in the copy source during the correction copy or copy back, and the data recovery terminated abnormally.</li> </ul>	"11.1.8 Data Recovery does not Terminate Normally : Case 1 (Read Error)" (TRBL 11-0700)
15		Data recovery terminated abnormally because a Drive error occurred in the copy source during a correction copy or copy back.	"11.1.9 Data Recovery does not Terminate Normally : Case 2 (Drive Failure)" (TRBL 11-0720)
16		Data recovery terminated abnormally because a Spare Drive error occurred during a copyback.	"11.1.10 Data Recovery does not Terminate Normally : Case 3 (Spare Drive Failure)" (TRBL 11-0740)
17	A failure occurred during operation.	The number of PIN segments exceeded its threshold value. (Actions to be taken when PIN OVER occurs)	"11.1.11 A Failure Occurred during Operation : Case 1 (PIN Over)" (TRBL 11-0760)
18		Data containing a LA/LRC error was detected.	"11.1.12 A Failure Occurred during Operation : Case 2 (LA/LRC Error)" (TRBL 11-0800)
19		Actions to be taken when a Volume blockade occurs.	"11.1.13 A Failure Occurred during Operation : Case 3 (Volume Blockade)" (TRBL 11-0820)
20		<ul style="list-style-type: none"> <li>The command for reassignment was sent from a host computer to a Volume of RAID 0.</li> <li>The write uncompleted area was registered because a read impossible area was found during the RAID group expansion.</li> </ul>	"11.1.14 A Failure Occurred during Operation : Case 4 (Incomplete Writing)" (TRBL 11-0840)
21	The incomplete write area was registered in the restored VOL.	<ul style="list-style-type: none"> <li>The incomplete write area was registered in the P-VOL because there was the unreadable area in the DP Pool during restoring the P-VOL of Copy-on-write SnapShot.</li> <li>The incomplete write was registered in the S-VOL because there was the unreadable area in the DP Pool when restoring the S-VOL due to S-VOL-Takeover as a result of executing the [horctakeover] command with TrueCopy Extended Distance.</li> </ul>	"11.1.15 The Incomplete Write Area was Registered in the Restored VOL" (TRBL 11-0850)
22	The Modular Volume Migration terminated abnormally.	One Modular Volume Migration or two or more Modular Volume Migrations terminated abnormally.	"11.1.16 Recovery Method of the Modular Volume Migration which Terminated Abnormally" (TRBL 11-0880)
23	PATH blockade occurred in the TrueCopy remote replication/TrueCopy Extended Distance function.	Actions to be taken when the PATH blockade occurs.	"11.1.17 Path Blockade Occurs in the TrueCopy remote replication/TrueCopy Extended Distance Function" (TRBL 11-0910)"

No.	Classification	Description	Reference page
24	The drive firmware conversion was skipped for some Drives.	Although the drive firmware conversion was executed, "IZ0EE HDU firmware update was skipped (Unit-x, HDU-y)" was displayed in the Information Message on WEB, and the drive firmware conversion was skipped for some Drives.	<a href="#">"11.1.18 Recovery Method for Drives which Skipped Drive Firmware Replacement" (TRBL 11-1020)</a>
25	The system of the array went down due to the connection error of the SAS (ENC) cable.	When the array was started, the error of the SAS (ENC) cable for the array was detected and the system of the array went down.	<a href="#">"11.1.19 Recovery Method when the Down of the Array Occurred due to the Incorrect SAS(ENC) Cable Connection" (TRBL 11-1030)</a>
26	A Power Unit failure of the Drive Box occurred.	<ul style="list-style-type: none"> <li>The Drive Box could not be recognized temporarily or constantly due to the power unit failure, and the system of the array went down.</li> <li>When the array is Ready, the power unit of the Drive Box was turned off.</li> </ul>	<a href="#">"11.1.20 Recovery Method when a Power Unit Failure of the Drive Box Occurred" (TRBL 11-1050)</a>
27	The update of the SSL user certificate failed.	The creation of the SSL user certificate file failed	<a href="#">"11.1.21 Recovery Method when the Creation of the SSL User Certificate File Failed" (TRBL 11-1060)</a>
28	The mismatch of the Controllers between the Controllers was detected.	The firmware judged that the Controllers between the Controllers differ due to the hardware failure.	<a href="#">"11.1.22 Recovery Method when Detecting the Mismatch of the Controllers between the Controllers" (TRBL 11-1080)</a>
29	The spin-up of the system drive failed.	The spin-up of the system drive failed at the time of starting the array or changing to the maintenance mode.	<a href="#">"11.1.23 Recovery Method when the Spin-up of the System Drive Failed" (TRBL 11-1100)</a>
30	An error of the DP management information was detected.	The firmware detected an error of the DP management information, and either or both Controllers were blocked.	<a href="#">"11.1.25 Recovery Method when the Firmware Detected an Error of the DP Management Information and the Controller was Blocked" (TRBL 11-1180)</a>
31	It was detected that the Drive serial number acquired at the time of starting the array and the serial number of the configuration information do not match.	It was detected that the serial number acquired at the time of starting the array and the serial number of the configuration information do not match in two or more Drives.	<a href="#">"11.1.26 Recovery Method when the Drive Serial Number Acquired at the time of Starting the Array and the Serial Number of the Configuration Information do not Match" (TRBL 11-1200)</a>
32	A failure occurred in the path of the Fibre Channel port, and the failure detection count exceeded the threshold value.	The threshold value was set for an error on the Fibre Channel signal in the path of the Fibre Channel port between the host and the array, but the failure detection count exceeded the threshold value.	<a href="#">"11.1.28 Failure Determination and Recovery Methods of Fibre Channel Port Path" (TRBL 11-1250)</a>
33	Multiple suspected failed parts were detected in the backend.	Actions to be taken when a failed part could not be identified by backend automatic diagnostic and the suspected failed parts were narrowed down only up to two parts.	<a href="#">"11.1.29 Recovery Method when the Multiple Suspected Failed Parts were Detected in the Backend" (TRBL 11-1390)</a>
34	The planned shutdown of the array was executed.	How to deal with the situation when the planned shutdown of the array was executed automatically.	<a href="#">"11.1.30 Recovery Method when the Planned Shutdown of the Array was Executed Automatically" (TRBL 11-1430)</a>
35	A FAN failure of the CBL occurred.	In case of the CBL, the single FAN can be replaced. How to deal with it when the FAN failure occurs.	<a href="#">"11.1.31 Recovery Method when a FAN Failure of the CBL Occurs" (TRBL 11-1450)</a>

No.	Classification	Description	Reference page
36	A failure occurred in the Management Module.	In case of the CBL, the single Management Module can be replaced. How to deal with it when the Management Module is failure occurred.	<a href="#">"11.1.32 Recovery Method at the Time of Management Module Blockade" (TRBL 11-1530)</a>
37	A failure occurred in the Drive I/O Module.	In case of the CBL, the single Management Module can be replaced. How to deal with it when the Drive I/O Module is failure occurred.	<a href="#">"11.1.33 Recovery Method at the Time of Drive I/O Module Blockade" (TRBL 11-1680)</a>
38	A failure occurred in the Host I/O Module.	In case of the CBL, the single Management Module can be replaced. How to deal with it when the Host Module is failure occurred.	<a href="#">"11.1.34 Recovery Method at the Time of Host I/O Module Blockade" (TRBL 11-2180)</a>
39	A failure occurred in the Host I/O Board.	In case of the CBSS/CBSL/CBSS/CBXSL, the single Management Module can be replaced. How to deal with it when the Host Module is failure occurred.	<a href="#">"11.1.35 Recovery Method at the Time of Host I/O Board Blockade" (TRBL 11-2540)</a>
40	Failures occurred in two interfaces in DBW.	How to deal with the failures occurred in two interfaces in DBW.	<a href="#">"11.1.37 Recovery Method of the Failures Occurred in Two Interfaces in DBW" (TRBL 11-2910)</a>
41	This becomes the copy-back operation regardless of the copy-back-less setting at the time of the Drive failure restoration.	The action to be taken when the copy-back operates regardless of the copy-back-less setting because Power Saving/Power Saving Plus is enabled and all the Spare Drives are set for the system drives.	<a href="#">"11.1.38 The Recovery Method when the Copy-Back Operates Regardless of the Copy-Back-Less Setting if Power Saving/Power Saving Plus is Enabled and Performs the Drive Restoration" (TRBL 11-2930)</a>
42	An unsupported I/O Module (ENC) or I/O Card (ENC) in the Drive Box or a Drive Box was detected.	Actions to be taken when the DIP-Switch setting of the I/O Module (ENC) is incorrect for DBF.	<a href="#">"11.1.39 Recovery Method when the DIP-Switch Setting of the I/O Module (ENC) is Incorrect" (TRBL 11-2950)</a>
43	A Flash Drive (FMD) with an uncharged battery exists.	Actions to be taken when the Flash Drive (FMD) battery is uncharged and the Flash Drive (FMD) is blocked.	<a href="#">"11.1.40 Recovery Method when Flash Drives (FMD) are Blocked Due to Uncharged Batteries" (TRBL 11-2970)</a>
44	Since multiple Flash Drives (FMDs) with uncharged batteries exist, the system went down.	Actions to be taken when multiple Flash Drives (FMDs) with uncharged batteries exist and the system goes down.	<a href="#">"11.1.41 Recovery Method when Multiple Flash Drives (FMD) in the Same Array Go Down due to the Uncharged Battery Status" (TRBL 11-2980)</a>
45	Incomplete Write was registered in the DMLU, replication DP Pool or management area DP Pool.	Actions to be taken when incomplete Write was registered in the DMLU, replication DP Pool or management area DP Pool.	<a href="#">"11.1.42 Recovery Method when Incomplete Write was Registered in the DMLU, Replication DP Pool or Management Area DP Pool" (TRBL 11-2990)</a>

### 11.1.1 System Down

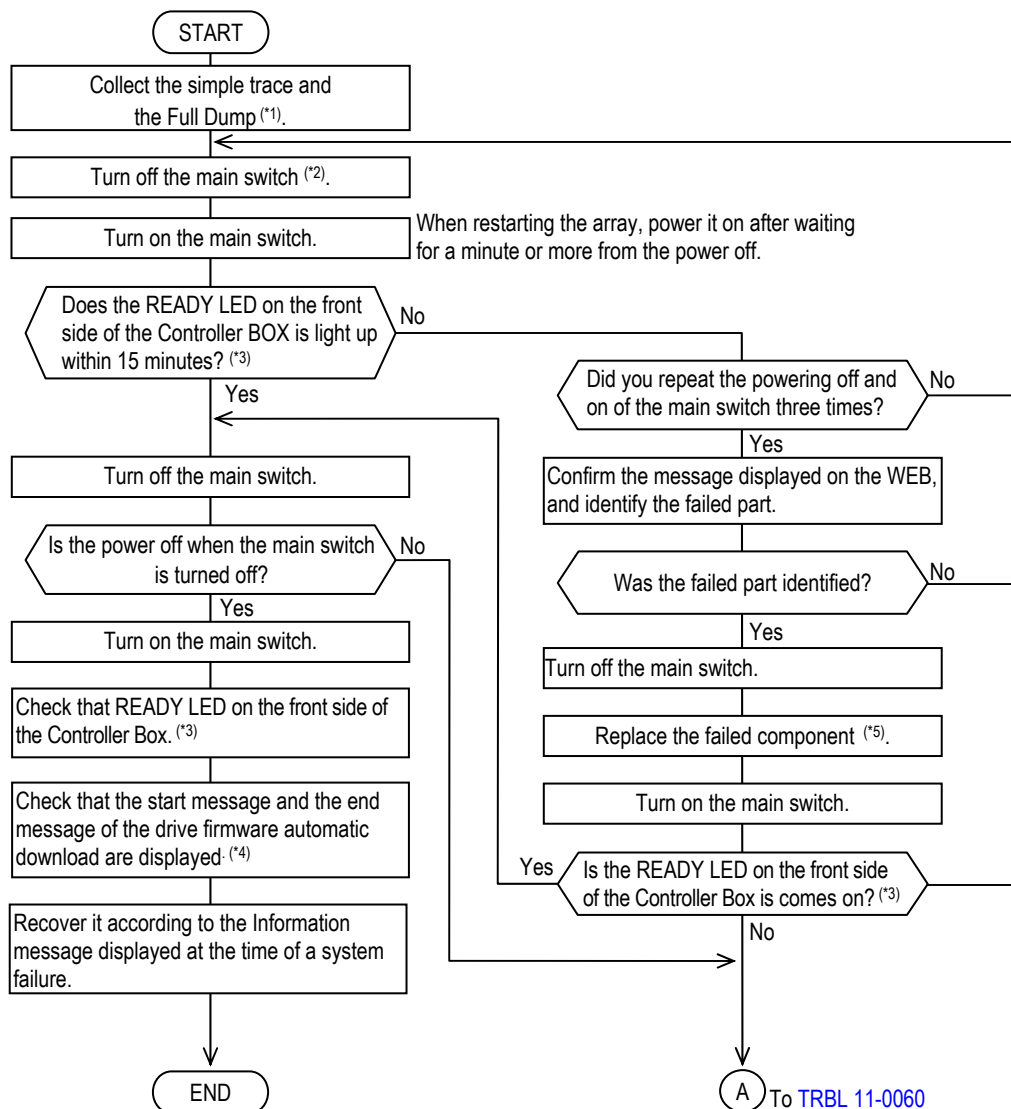
[WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	Hxxxxx	○○○○○○○	:	△△△△△/□□□□
Date	Time	x : Detect Controller # y : Detect Core #				

xxxxx, ○○○○○○○ : △△△△△/□□□□ Optional

- NOTE :
- When the READY LED (green) on the front side of the Controller Box is lights off, refer to [“Chapter 7. Trouble Analysis by LED Indication” \(TRBL 07-0000\)](#) to recover the failures.
  - The recovery method shown below is for the case where blockades of both Controllers in a dual Controller configuration occur.
  - The ALARM LED (red) on the front side of the Controller Box comes on and the both controllers are detached. As to the ALM LED (red) on the controller PCBA, only the ALM LED (red) on one of the controllers, in which the failure was detected earlier, comes on.
- Make sure on which controller the ALM LED (red) is on because the recovery work is to be done starting from the Controller whose ALM LED (red) is on.

## [Recovery method]



\*1 : For Simple Trace Collection, refer to “5.3 Collecting Simple Trace” (TRBL 05-0040), for Full Dump Collection, refer to “5.5 Collecting Full Dump” (TRBL 05-0180).

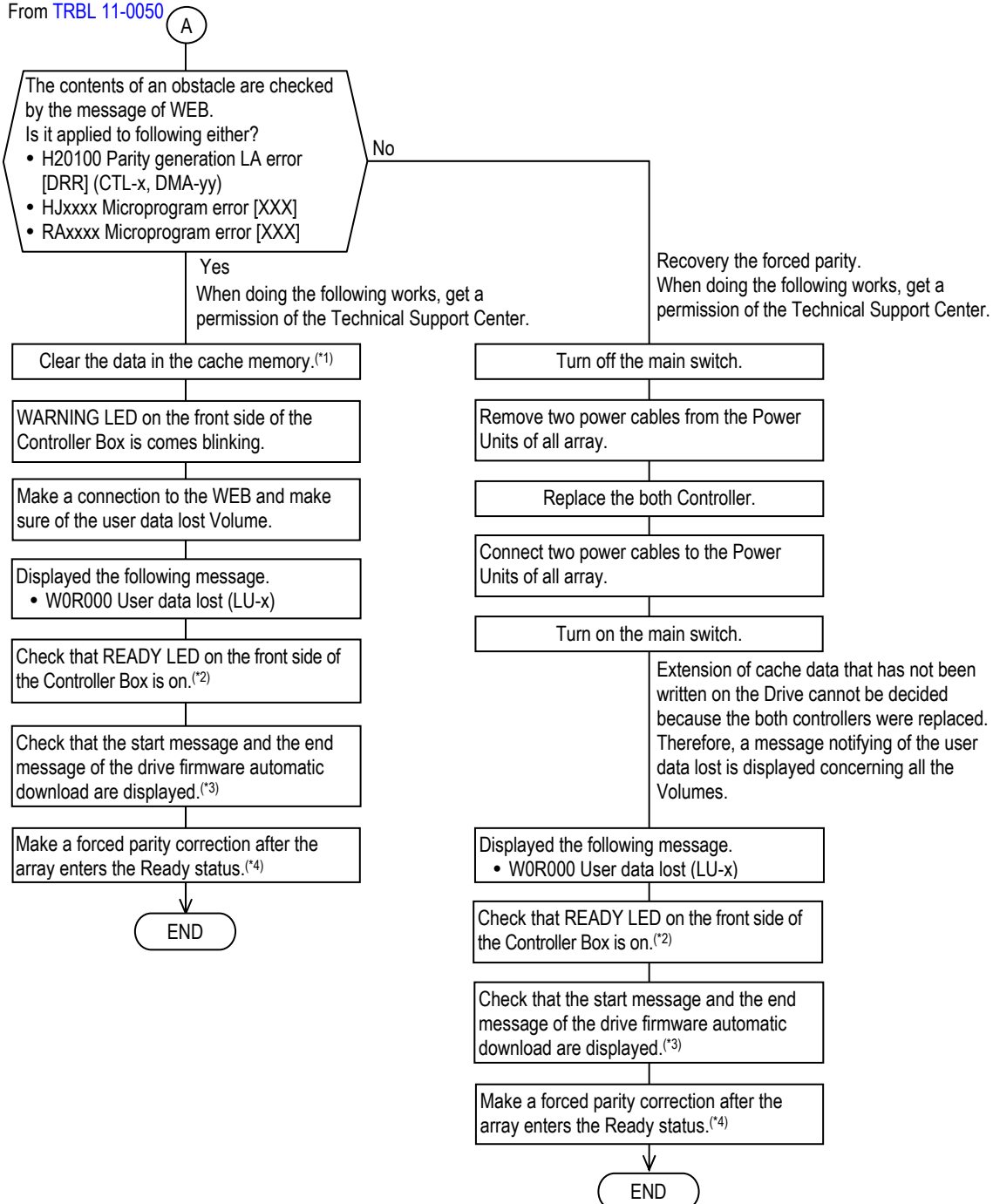
\*2 : When the ALARM LED (red) on the front of the Controller Box does not go out even if five minutes passed after turning off the main switch, remove the power cables from the Power Units.

\*3 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL(80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*4 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware “1.6 \(4\) Checking the start message and end message of the automatic download” \(FIRM 01-1620\)](#).

\*5 : For the replacement of the failed component, refer to [Replacement “Chapter 2. Parts Replacement” \(REP 02-0000\)](#).

From TRBL 11-0050



\*1 : For the clearing procedure the cache memory, refer to “11.1.1 (1) Clearing procedure the cache memory” (TRBL 11-0061).

\*2 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL(80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*3 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to Firmware “1.6 (4) Checking the start message and end message of the automatic download” (FIRM 01-1620).

\*4 : For the forced parity correction, refer to “11.1.3 The Failure Occurred Immediately after Being Ready (Forced Parity Correction)” (TRBL 11-0150).



(1) Clearing procedure the cache memory

NOTE : Be careful that the whole data on the cache memory will be erased when this operation is performed.

(a) To clear the cache memory, you must be in the maintenance mode via the WEB.

- Single Controller

Press the RST SW of the single Controller. (While pressing RST SW, the RST LED (orange) is on.) Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

- Dual Controller

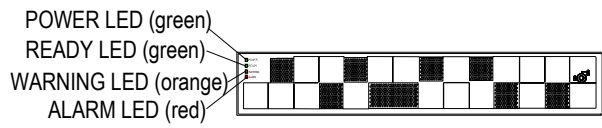
- (i) Press the RST SW of the Controller #0. (While pressing RST SW, the RST LED (orange) is on.) Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).
- (ii) Wait for a while (about ten seconds) and check that the ALM LED (red) of the Controller lights up. Within ten seconds after the ALM LED (red) lights up, press the RST SW of the other Controller.

When the ALM LED (red) of the Controller #0 does not go out in spite of the above operation, power off the array, return to step (1) without pulling out nor insert the Controller, and execute the procedure over again.

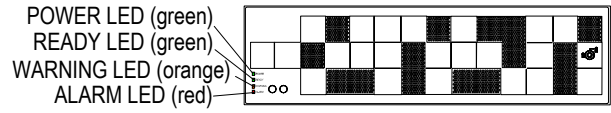
NOTE : Because the Controller is shutdown status for the Maintenance Mode, the command from the host is impossible execution. Please change it to the Maintenance Mode after the confirmation of separation of the device from the host or shutdown of the host.

When ALM LED (red) on Controller #0 turns off and READY LED (green) on the front side of the Controller Box is turns off, it transfers to Maintenance mode.

(a) LED positions on Front Bezel

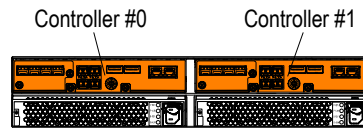


Controller Box (CBXSL/CBXSS/CBSL/CBSS)

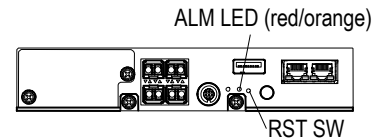


Controller Box (CBL)

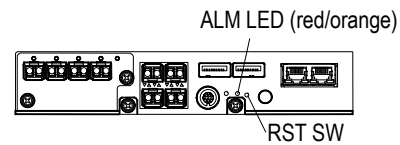
(b) Controller Location



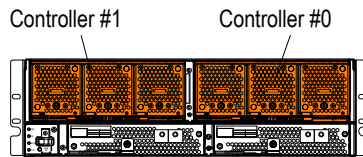
Controller (CBXSL/CBXSS) location  
(Rear view)



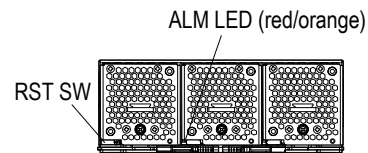
Controller (CBXSL/CBXSS) (Rear view)



Controller (CBSL/CBSS) (Rear view)



Controller (CBL) location (Front view)

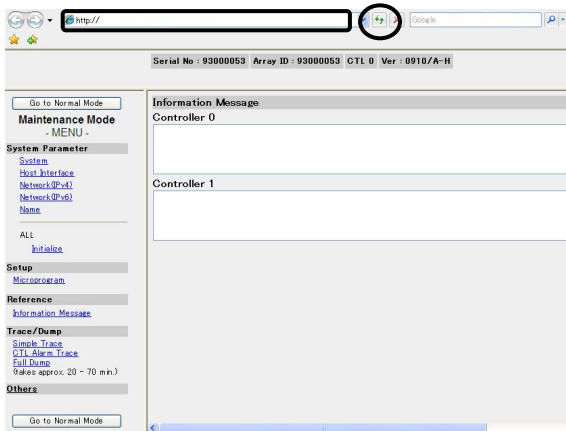


Controller (CBL) (Front view)

Figure 11.1.1 Indication Locations of LED

- (b) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button. (For the procedure for connecting the Web, refer to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000).)

A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].



- (c) Click “Others” in the menu frame.

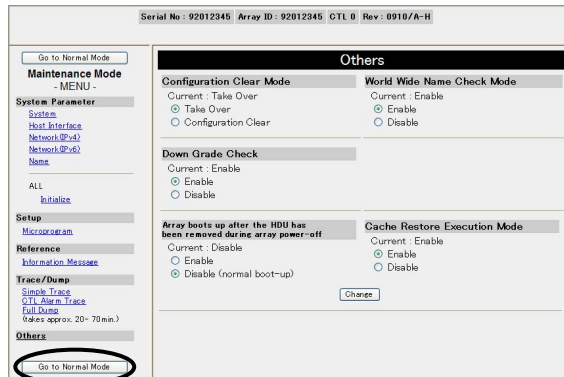
The following window appears.




- (d) Select the “Disable” radio button of [Cache Restore Execution Mode], then click the “Change” button.

“Current” of the “Cache Restore Execution Mode” is displayed as “Disable”.

- (e) Click “Go To Normal Mode”. There are two “Go To Normal Mode” buttons, one at the top of the menu frame and the other at the bottom. Select either of them.




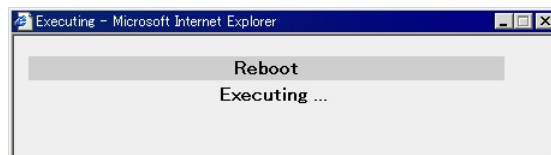
- (f) The following window is displayed during execution. Do not click the  while the window is displayed<sup>(†1)</sup>.



- (g) If the following confirmation message is displayed for a while, click [OK], if it is continued.



- (h) The following window remains displayed during execution. Whether you click the [OK] or [Cancel] in the confirmation message window of (f), do not click the  while the following window is displayed<sup>(†1)</sup>.



- (i) If rebooting is finished, the array is ready. (It usually takes about 5 to 7 minutes for CBXSL/CBXSS, about 5 to 8 minutes for CBSL/CBSS, and about 5 to 10 minutes for CBL.) At this time, check that the READY LED (green) lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)) when the READY LED (green) is blinking at high speed, or waiting for the maximum of 30 to 85 minutes when the WARNING LED (orange) is blinking at high speed.

<sup>†1</sup> : If you click the , reenter the Maintenance Mode, and then click the [Go To Normal Mode] again.

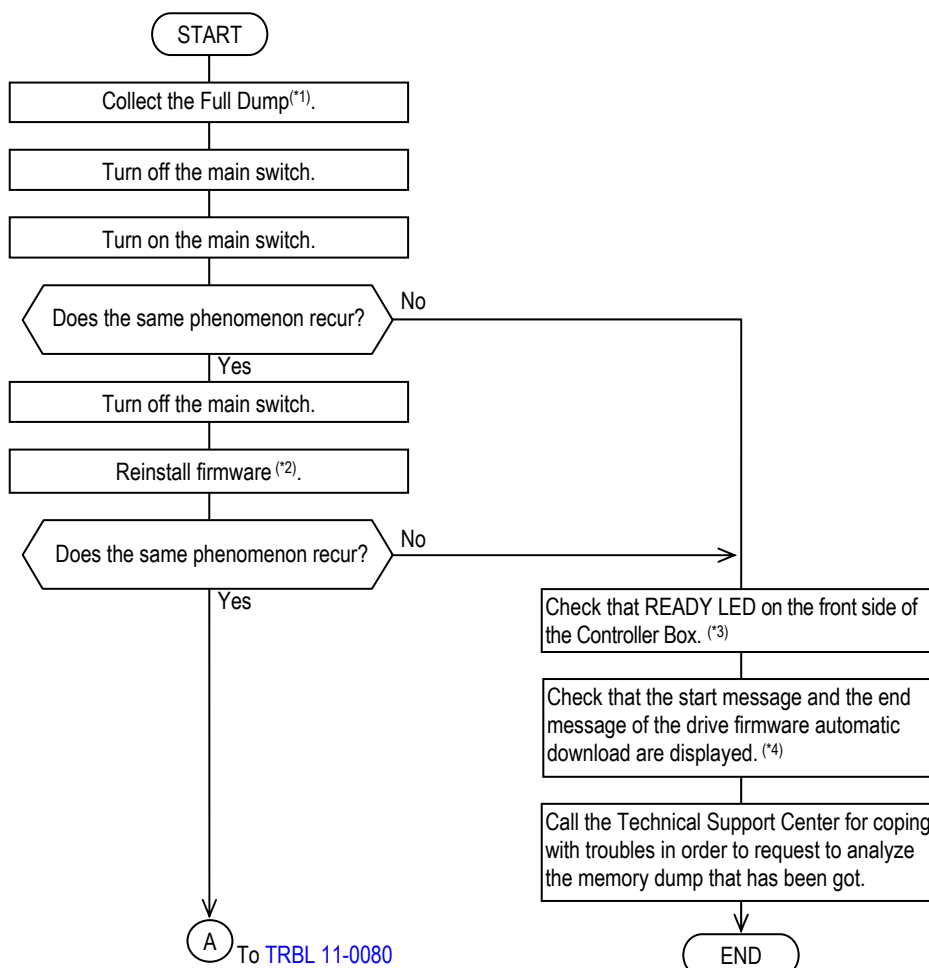
### 11.1.2 The Array does not Become Ready : Case 1 (Loading Failure)

(Information could not be loaded from the Drive.)

[WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy RB8400 Download fail			:MANUAL
Date	Time	x : Detect Controller # y : Detect Core #	

[Recovery method]

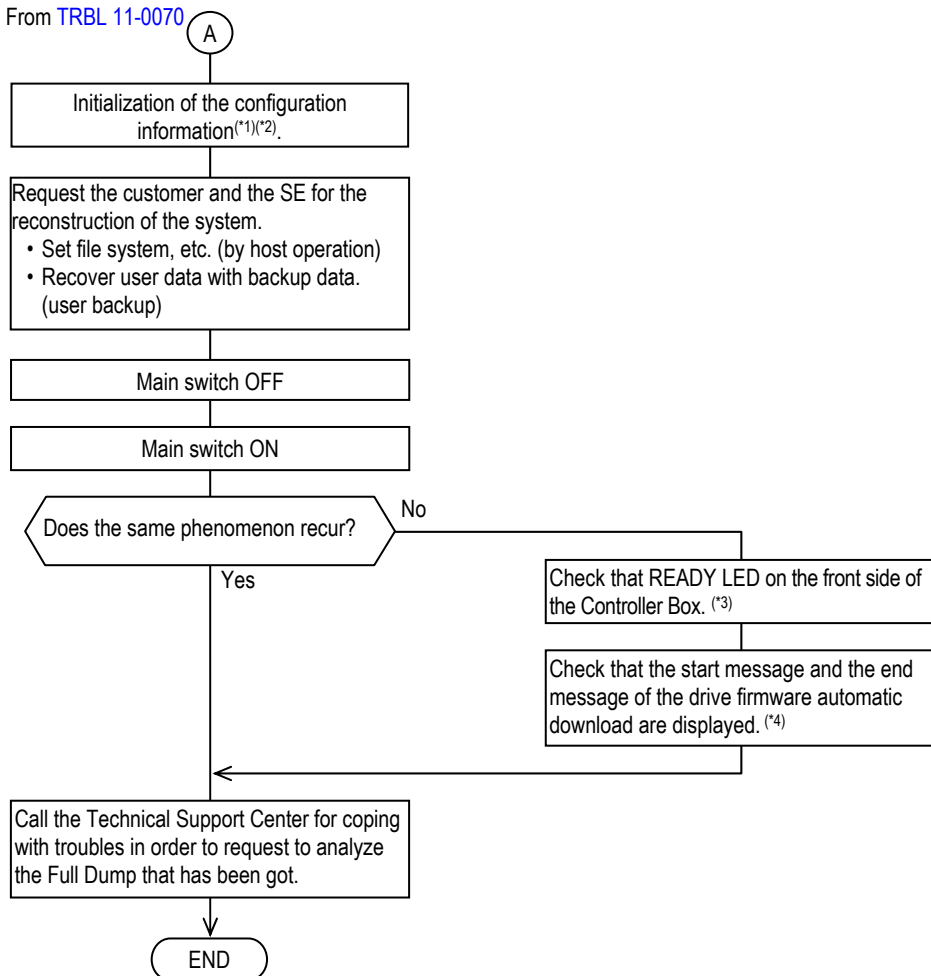


\*1 : For Full Dump Collection, refer to “5.5 Collecting Full Dump” (TRBL 05-0180).

\*2 : Make the array in the maintenance mode referring to WEB “Chapter 3. The Maintenance Mode Operation Procedure” (WEB 03-0000), and refer to WEB “3.3.1 Microprogram” (WEB 03-0270) for the installation procedure of the firmware.

\*3 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL(80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*4 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to Firmware “1.6 (4) Checking the start message and end message of the automatic download” (FIRM 01-1620).

From [TRBL 11-0070](#)

\*1 : If this operation is executed, all the data in the Drive are deleted (the RAID group and Volume definition are initialized).

\*2 : For initialization of the information on configuration, refer to “(1) Initialization procedure for configuration information” ([TRBL 11-0090](#)).

\*3 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL(80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*4 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware “1.6 \(4\) Checking the start message and end message of the automatic download” \(FIRM 01-1620\)](#).

(1) Initialization procedure for configuration information

- NOTE :
- Be careful that the whole data on the Drive will be erased (RAID groups and Volume definitions will be initialized.) when this operation is performed. Even if the configuration information is initialized, the Boot Options (Refer to [System Parameter “8.1 Setting Boot Options” \(SYSPR 08-0000\).](#)) and the System Parameter (Refer to [System Parameter “8.2 Setting System Parameters” \(SYSPR 08-0040\).](#)) maintain the present setting value.
  - Be careful that if there is a Volume whose access attribute is set by Data Retention Utility, initialization of configuration information is not possible.

(a) Turn on the main switch of the array.

(b) Entering the Maintenance mode by WEB is required to initialize Configuration Information.

The method for entering the Maintenance mode varies depending on statuses of the READY LED (green) and ALARM LED (red) on the front side of the Controller Box.

- When the READY LED (green) is on, proceed to the procedure starting from the step (e).
- When the ALARM LED (red) is on, wait for three minutes after making sure of the lighting of it, proceed to the procedure starting from the step (f).
- Also proceed to the procedure starting from the step (c) in the case where the READY LED (green) and ALARM LED (red) do not come on after waiting for ten minutes when the power is turned on.

(c) Check that the READY LED (green) on the front of the Controller Box is not blinking at high speed.

When the READY LED (green) on the front of the Controller Box is blinking at high speed, wait for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)) until the READY LED (green) lights up because the automatic download of the ENC firmware and the backup controller firmware is being executed.

(d) Check that the WARNING LED (orange) on the front of the Controller Box

(CBXSL/CBXSS/CBSL/CBSS/CBL) is not blinking at high speed. When the WARNING LED (orange) on the front of the Controller Box is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Controller Box goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on in the single controller configuration is being executed.

(e) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed.

When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code. (Refer to [Firmware “1.6 \(4\) Checking the start message and end message of the automatic download” \(FIRM 01-1620\).](#))

(f) Changing the Maintenance Mode.

- Single Controller

Press the RST SW of the single Controller. (While pressing RST SW, the RST LED (orange) is on.) Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

- Dual Controller

- (i) Press the RST SW of the Controller #0. (While pressing RST SW, the RST LED (orange) is on.) Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

- (ii) Wait for a while (about ten seconds) and check that the ALM LED (red) of the Controller lights up. Within ten seconds after the ALM LED (red) lights up, press the RST SW of the other Controller.

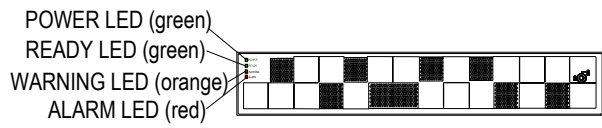
When the ALM LED (red) of the Controller #0 does not go out in spite of the above operation, power off the array, return to step (1) without pulling out nor insert the Controller, and execute the procedure over again.

NOTE : Because the Controller is shutdown status for the Maintenance Mode, the command from the host is impossible execution. Please change it to the Maintenance Mode after the confirmation of separation of the device from the host or shutdown of the host.

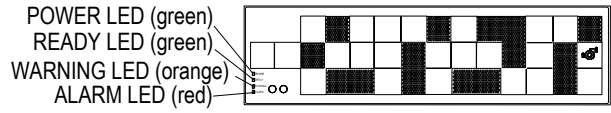
When ALM LED (red) on Controller #0 turns off and READY LED (green) on the front side of the Controller Box is turns off, it transfers to Maintenance mode.



(a) LED positions on Front Bezel

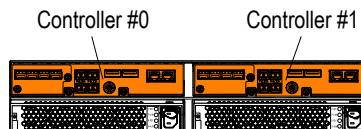


Controller Box (CBXSL/CBXSS/CBSL/CBSS)

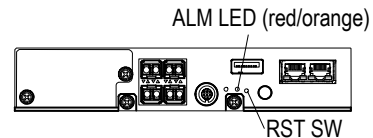


Controller Box (CBL)

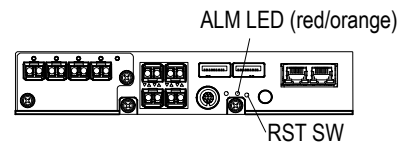
(b) Controller Location



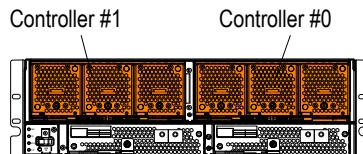
Controller (CBXSL/CBXSS) location  
(Rear view)



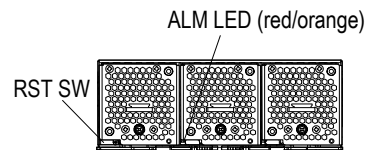
Controller (CBXSL/CBXSS) (Rear view)



Controller (CBSL/CBSS) (Rear view)



Controller (CBL) location (Front view)

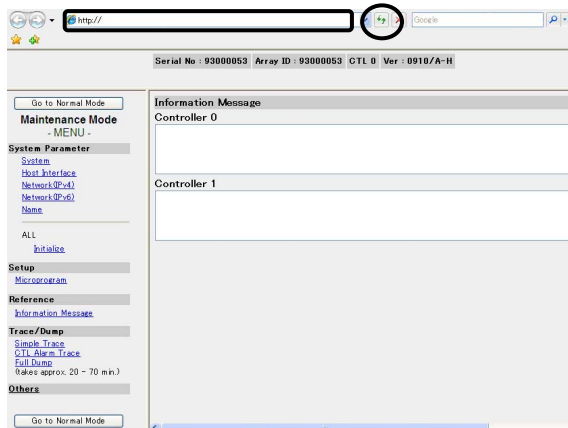


Controller (CBL) (Front view)

Figure 11.1.2 Indication Locations of LED

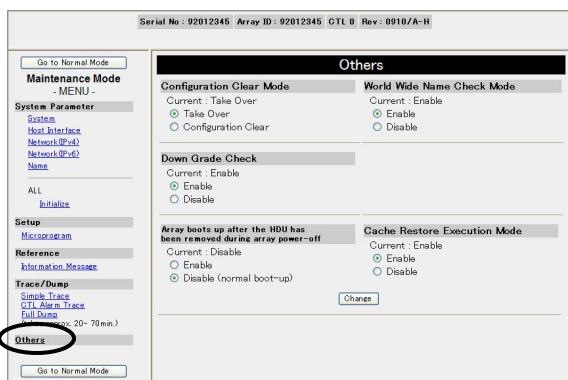
- (g) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button. (For the procedure for connecting the Web, refer to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000).)

A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].



- (h) Click “Others” in the menu frame.

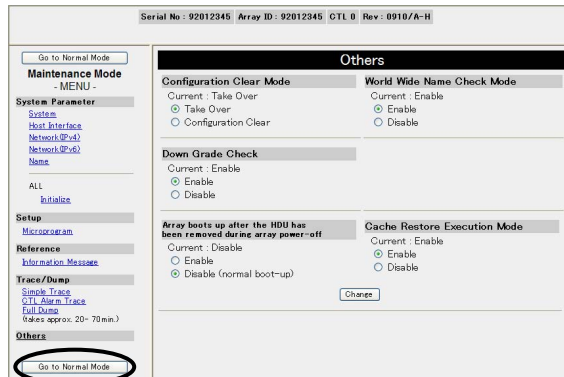
The following window appears.



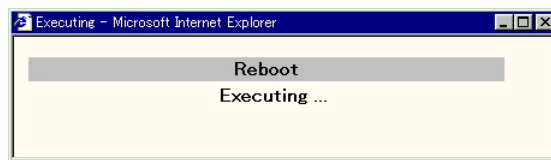
- (i) Select the “Configuration Clear” radio button of [Configuration Clear Mode], then click the “Change” button.

“Current” of the “Configuration Clear Mode” is displayed as “Configuration Clear.”

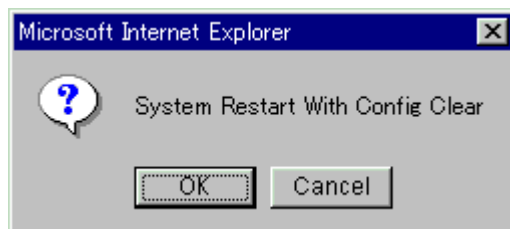
- (j) Click “Go To Normal Mode”. There are two “Go To Normal Mode” buttons, one at the top of the menu frame and the other at the bottom. Select either of them.



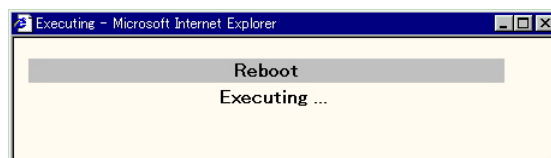
The following window is displayed while the above operation is executed.



- (k) The following confirmation message is displayed at the later time for a while. Please click [OK] for the continuation.



The following window is displayed while the above operation is executed.



- (l) If rebooting is finished, the array is ready. (It usually takes about 5 to 7 minutes for CBXSL/CBXSS, about 5 to 8 minutes for CBSL/CBSS, and about 5 to 10 minutes for CBL.) At this time, check that the READY LED (green) lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)) when the READY LED (green) is blinking at high speed, or waiting for the maximum of 30 to 85 minutes when the WARNING LED (orange) is blinking at high speed.

- (m) Check that the start message and the end message of the drive firmware automatic download are displayed. When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. When the message indicating the abnormal termination is displayed, perform the maintenance according the recovery method in the message code. (Refer to [Firmware “1.6 \(4\) Checking the start message and end message of the automatic download” \(FIRM 01-1620\).](#))

### 11.1.3 The Failure Occurred Immediately after Being Ready (Forced Parity Correction)

A failure occurred immediately after the array had been started up. The user data in the cache memory was lost because data stored in the cache memory volatilized.

[WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy W3D000 Forced parity correction LU is detected			:MANUAL
Date		Time	x : Detect Controller # y : Detect Core #

#### < Explanation >

A forced parity correction is made in order to synchronize parities in the disk array system when data is lost because of volatilization of data in the cache memory caused by a power failure, etc. (when the array cannot execute the deliberate shutdown).

The forced parity correction is made for each Volume. Each Volume can be in the following statuses.

There are the actions to be taken of “Execution of the Forced Parity Correction” and “Skip of the Forced Parity Correction” for the Volume that the array determined the need for the forced parity correction.

Execute the forced parity correction basically for the Volume that the array determined the need for the forced parity correction.

However, the forced parity correction can be skipped in the following cases.

- In the case where the customer/SE can recognize that the system does not access the Volume concerned, so that there is no data loss for the Volume concerned even if the data on the Cache memory is volatilized.
- In the case where the backup data of the customer is restored in the array after discarding the data of this Volume when creating the Volume concerned again by executing the Volume format or deleting the Volume.
- In the case where the status of the forced parity correction of the Volume concerned is “Correction Aborted” and the drive restoration of the blocked Drive which configures this Volume is completed normally afterwards (the consistency of the parity data of this Volume is assured due to the drive restoration, so that if the forced parity correction is skipped after completing the drive restoration normally, the status of the forced parity correction of this Volume is changed to “Restored”).<sup>(#1)</sup>

<sup>#1</sup> : When the status of the forced parity correction of the Volume concerned is “Correction Aborted”, the consistency of the parity data is assured at the time when the drive restoration of the blocked Drive which configures this Volume is completed normally, and the status of the forced parity correction is changed to “Restored”. However, this Volume can be accessed by the host computer at the time of skipping the forced parity correction for the Volume, so that the host computer may access the data whose consistency of the parity data is not taken (the data generated only from the data part and the data generated including the parity data may differ, so that the read data which the array returns to the host computer may be changed when the host computer reads this area).

## &lt; Notes on making forced parity correction &gt;

- The restoration is made using the maintenance function of Hitachi Storage Navigator Modular 2. For the procedure concerned, refer to [“8.3.1 Displaying Volume Failure Data Information” \(TRBL 08-0130\)](#).
- For a failure of a part other than the drive that occurs during forced parity correction, refer to the [Replacement “2.1 Locations of Replacement Components” \(REP 02-0000\)](#). For a drive failure, refer to the [Replacement “2.2.1 Replacing Drive” \(REP 02-0050\)](#).
- The dynamic sparing cannot be instructed in the Hitachi Storage Navigator Modular 2 during the forced parity correction. When the dynamic sparing is required because the threshold value is exceeded, the dynamic sparing is not performed but the correction copy is made through a detachment of the drive concerned.
- The copy back cannot be instructed in the Hitachi Storage Navigator Modular 2 during the forced parity correction. When the copy back is required, the copy back is started automatically after the forced parity correction is completed.
- When a drive failure, PIN Over or incomplete write occurs during the forced parity correction, the data check and the operation using the Hitachi Storage Navigator Modular 2 are required again.
- For the Volume status or its transfer in the forced parity correction described in the maintenance operation flow, refer to [“< Change of the status in the forced parity correction >” \(TRBL 11-0490\)](#). Also, for the standard time required for the recovery, refer to [“< Standard time required for the forced parity correction >” \(TRBL 11-0510\)](#).
- The forced parity correction recovers one Volume per Controller. Therefore, if there are multiple Volumes that need forced parity correction, the order of the forced parity correction should be determined by checking the Controller in charge of each Volume (Refer to [“\[Execution of forced parity correction\]” \(TRBL 11-0370\)](#)).
- If the data on the Cache Memory is volatilized due to a power failure within one minute after performing the following work, all Volumes may be required for the forced parity correction.
  - ① Setting of the configuration information such as the system parameter by the Hitachi Storage Navigator Modular 2
  - ② The pair operation by RAID Manager
- When there is the Volume executing the forced parity correction, if the data on the Cache Memory is volatilized due to the power failure, all the Volumes become the target of the forced parity correction afterwards.
- If the data on the Cache Memory is volatilized due to a power failure within one minute after performing the setting of such as the system parameter configuration information in the Hitachi Storage Navigator Modular 2, the set contents may not be reflected. Check the configuration. Be sure to check the configuration when a power failure occurs. If the configuration is not reflected, set the configuration information again.
- For the Volume that the RAID group expansion is performed, if a drive blockade occurs when the forced parity correction status is “Parity Correction”, “Waiting Parity Correction” or “Uncorrected”, the user data cannot recover and the Volume concerned becomes unformatted. If this status occurs, restore the drive, format the Volume concerned, and then recover the user data from the backup.

- Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/Dynamic Tiering function, and if it is used, restore the backup data according to the user's instruction.

(1) Data reading/writing instructed by a host

- The Volume whose status of the forced parity correction is "Parity Correction", "Waiting Parity Correction", or "Waiting Drive Reconstruction" can read from and write to the host, but the host performance may be deteriorated during the forced parity correction.
- For the Volume that the RAID group expansion processing is performed, when the forced parity correction status is "Parity Correction", "Waiting Parity Correction" or "Waiting Drive Reconstruction", it cannot read/write from/to the host.
- When a Volume, a status of which concerning the forced parity correction is "Parity Correction", exists in the disk array system, performance of host I/Os is lowered.

(2) Relations between statuses of forced parity correction and operations of the other functions

- The operation of other functions for the Volume concerned is partially restricted depending on the status of the Volume which is performing the forced parity correction.

No.	Instruction function	Status of forced parity correction		
		Parity Correction / Waiting Parity Correction / Waiting Drive Reconstruction	Uncorrected / Uncorrected and Drive Detached / Correction Aborted	Correction Skipped / Restored
1	The delete of Volume	×	×	○
2	Volume Unification	×	×	○
3	The change of the controller in charge of a default Volume	○	○	○
4	Instruction to make a Volume resident	○	○	○
5	Volume mapping	○	○	○
6	Setting a prefetch size	○	○	○
7	ShadowImage in-system replication pair formation	○(*1)	×	○
8	ShadowImage in-system replication pair restoration	○(*2)	×	○
9	TrueCopy remote replication pair formation	○(*1)	×	○
10	TrueCopy Extended Distance pair formation	○(*1)	×	○
11	TrueCopy remote replication restoration	○(*2)	×	○
12	TrueCopy Extended Distance restoration	○(*2)	×	○
13	Copy-on-write SnapShot pair formation(*3)	○	×	○
14	Copy-on-write SnapShot pair restoration(*4)	×	×	○
15	Command device registration	○	×	○
16	LUN Manager setting	○	○	○

\*1 : When a status of a Volume concerning the forced parity correction for a secondary Volume is "Waiting Parity Correction" or "Parity Correction", a pair cannot be formed.

\*2 : When a status of a Volume concerning the forced parity correction for a primary Volume is "Waiting Parity Correction" or "Parity Correction", a pair cannot be formed.

\*3 : When a status of either a P-VOL or a POOL (when two or more P-VOLs/POOLS exist, any one of them) is "Uncorrected", "Uncorrected and Drive Detached" or "Correction Aborted" status, a pair cannot be formed. When a POOL (when two or more POOLS exist, any one of them) is in the "Waiting Parity Correction" or "Parity Correction" status, a pair cannot be formed.

\*4 : The restoration cannot be made unless a status of a P-VOL and a POOL (when two or more P-VOLs/POOLS exist, all of them) is "Correction Skipped" or "Restored".

No.	Instruction function	Status of forced parity correction		
		Parity Correction / Waiting Parity Correction / Waiting Drive Reconstruction	Uncorrected / Uncorrected and Drive Detached / Correction Aborted	Correction Skipped / Restored
17	Password protection	○	○	○
18	Format instruction	×	×	○
19	Hot replacement of the firmware	×	×	○
20	Pseudo deliberate shutdown	○	○	○
21	Data Retention Utility	○	○	○
22	Instruction to make forced parity correction	×	○(*1)	○
23	Instruction to skip forced parity correction	×	○	○
24	Instruction to abort forced parity correction	○	×	×
25	RAID Group deletion	×	×	○
26	RAID Group expansion	×	×	○
27	Volume capacity change (expansion/reduction)	×	×	○

\*1 : For "Correction Aborted".

- A part of the execution of the forced parity correction to the Volume and the instruction of the skip is restricted while the other functions are operating or depending on the status of the Volume.

No.	Function in operation	Possibility of forced parity correction	Description
1	Unification Volume	Partially impossible	Though an instruction to make the restoration for a child Volume cannot be issued, the restoration instructed to be made for a parent Volume is also applied to a child Volume.
2	Format instruction	Impossible	An instruction to make the restoration cannot be issued to a Volume being formatted.
3	Firmware hot replacement	Impossible	An instruction to make the parity correction cannot be issued during replacement of the firmware.
4	Pseudo deliberate shutdown	Impossible	An instruction to make the restoration cannot be issued because the disk array system is shut down deliberately.
5	Unformatted	Impossible	The execution of the forced parity correction and the instruction of the skip cannot be performed to the unformatted Volume.
6	V-VOL of Copy-on-write SnapShot	Impossible	The execution of the forced parity correction and the instruction of the skip cannot be performed to the V-VOL of Copy-on-write SnapShot.

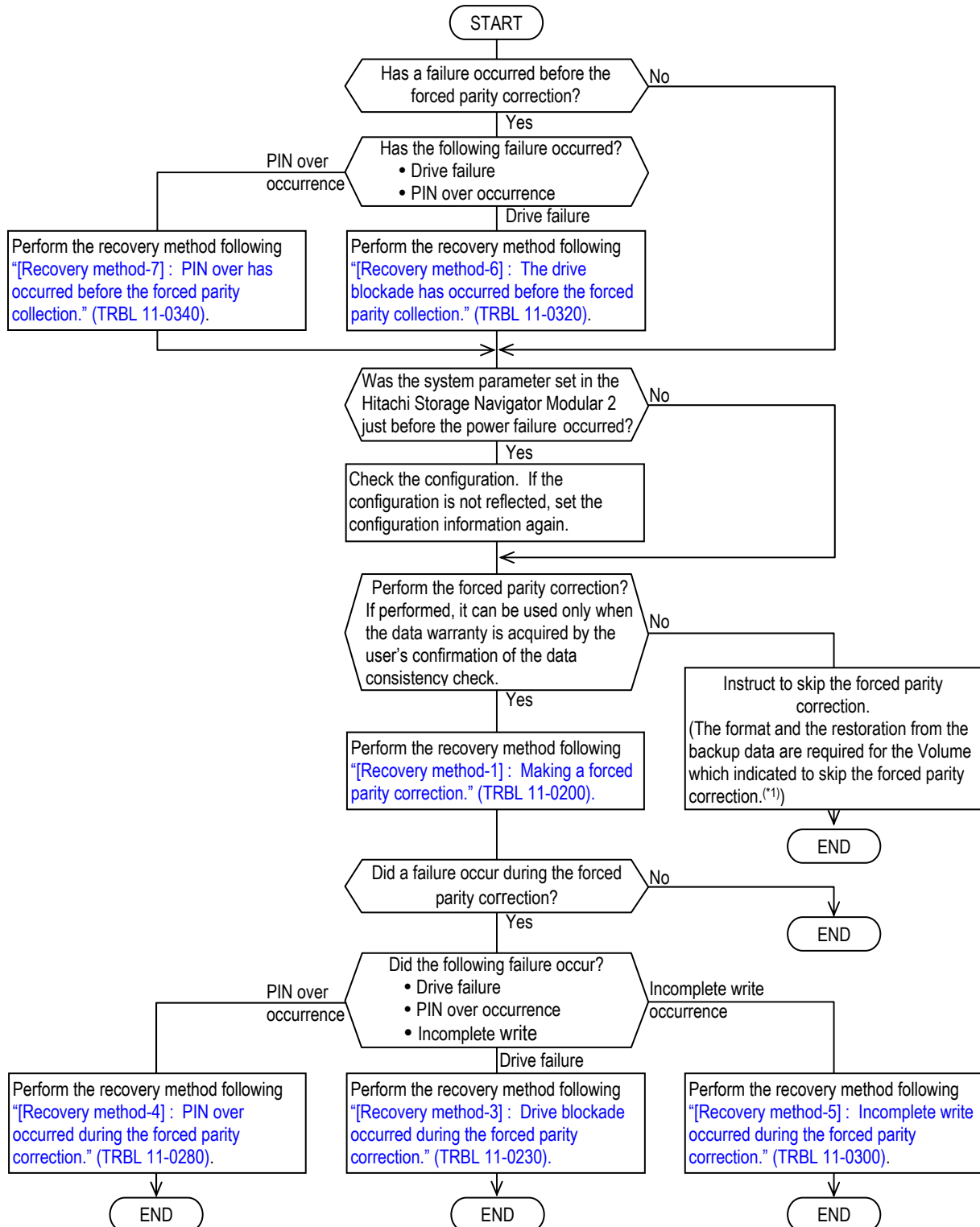
### (3) Process of forced parity correction

- When the array cannot perform the planned shutdown again due to the power failure, etc., the array power is turned off, and the data on the Cache memory volatilizes during the forced parity correction, all Volumes become the target of the forced parity correction.
- When a failure occurs in a Controller that is making the forced parity correction, the restoration is taken over by a mate Controller and continued. However, when the mate Controller is making the forced parity correction, it stands by for the restoration taken over. Also, when the Controller is recovered, perform the parity processing with the recovered Controller.



## &lt; Forced Parity Correction Maintenance Flow &gt;

Perform the maintenance operation for the forced parity correction following the flow shown below.

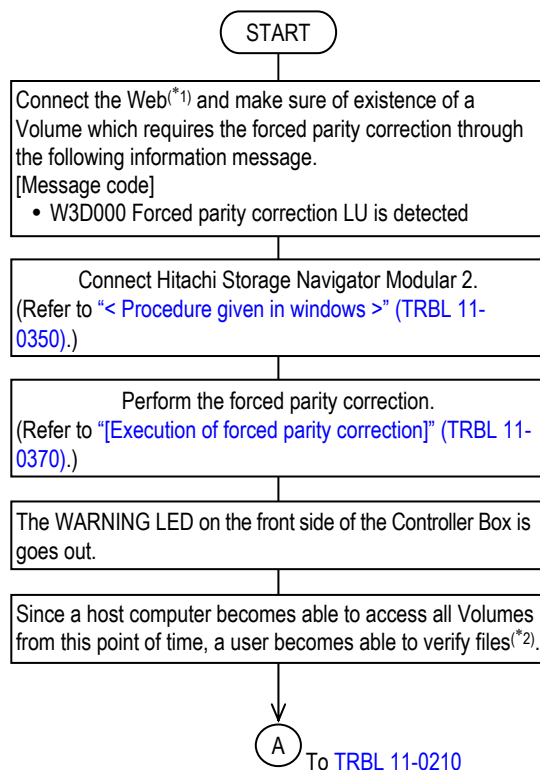


\*1: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

## [Recovery methods]

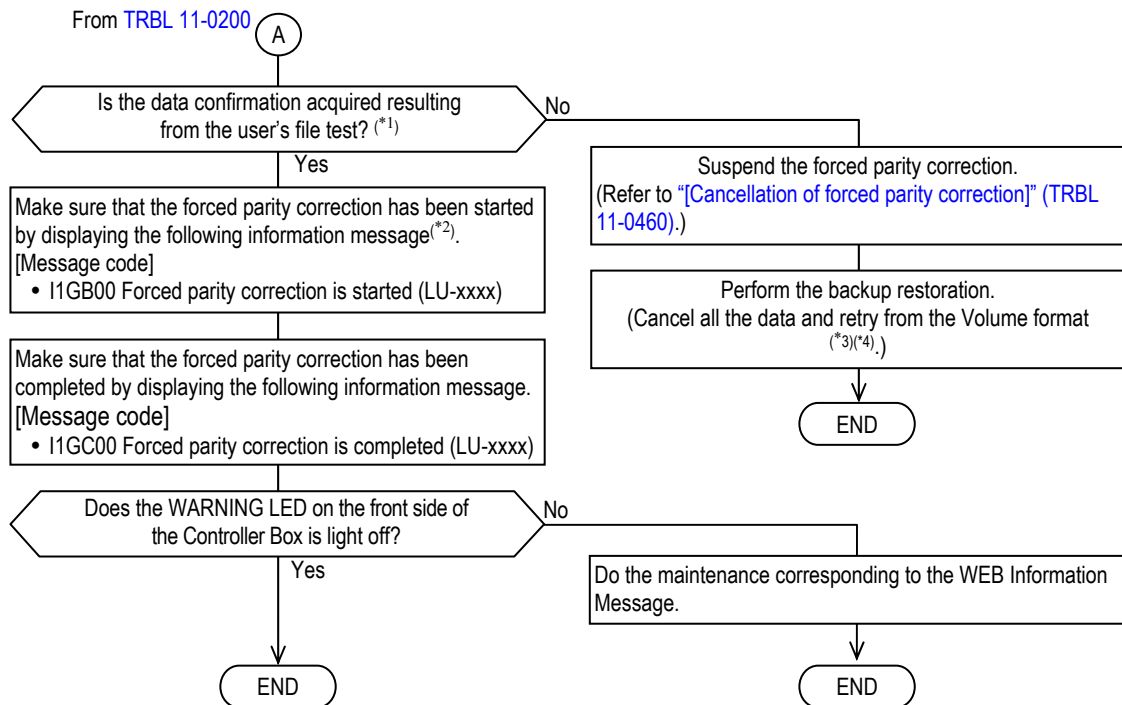
## [Recovery method-1] : Making a forced parity correction.

The forced parity correction resynchronizes data in Drives, however, it cannot restore the data completely. Ask a user to verify the data and restore data that could not be restored using the backup data.



\*1 : For the connection of the WEB, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).

\*2 : When a drive detachment, pin over, or incomplete writing occurs during a period from the verification of files by a user to the completion of the forced parity correction, the verification of files by the user must be done again. When a failure occurs, take recovery actions referring to "[Recovery method-3] : Drive blockade occurred during the forced parity correction." (TRBL 11-0230), "[Recovery method-4] : PIN over occurred during the forced parity correction." (TRBL 11-0280), "[Recovery method-5] : Incomplete write occurred during the forced parity correction." (TRBL 11-0300).



\*1 : Request the customer and the SE for the work.

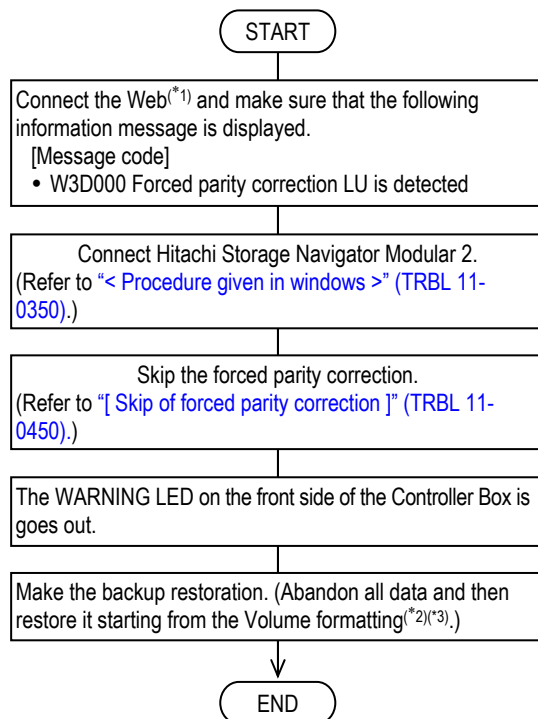
\*2 : For a standard time required for the forced parity correction, refer to "< Standard time required for the forced parity correction >" (TRBL 11-0510).

\*3 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*4 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

[Recovery method-2] : A forced parity correction is not made (a forced parity correction is skipped).

Because a forced parity correction is not made, data in a Drive are not synchronized and an LA error, etc. may occur. Issue an instruction to skip the forced parity correction from Hitachi Storage Navigator Modular 2, format the Volume, and then make a backup restoration. However, for the Volume that the RAID group expansion is performed, do not skip the forced parity correction. Even when restoring the backup data, be sure to perform a forced parity correction before performing the Volume formatting, and then restore the backup data.



\*1 : For the connection of the WEB, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).

\*2 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to System Parameter "4.3.6 Formatting Volume" (SYSPR 04-0500).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*3: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

[Recovery method-3] : Drive blockade occurred during the forced parity correction.

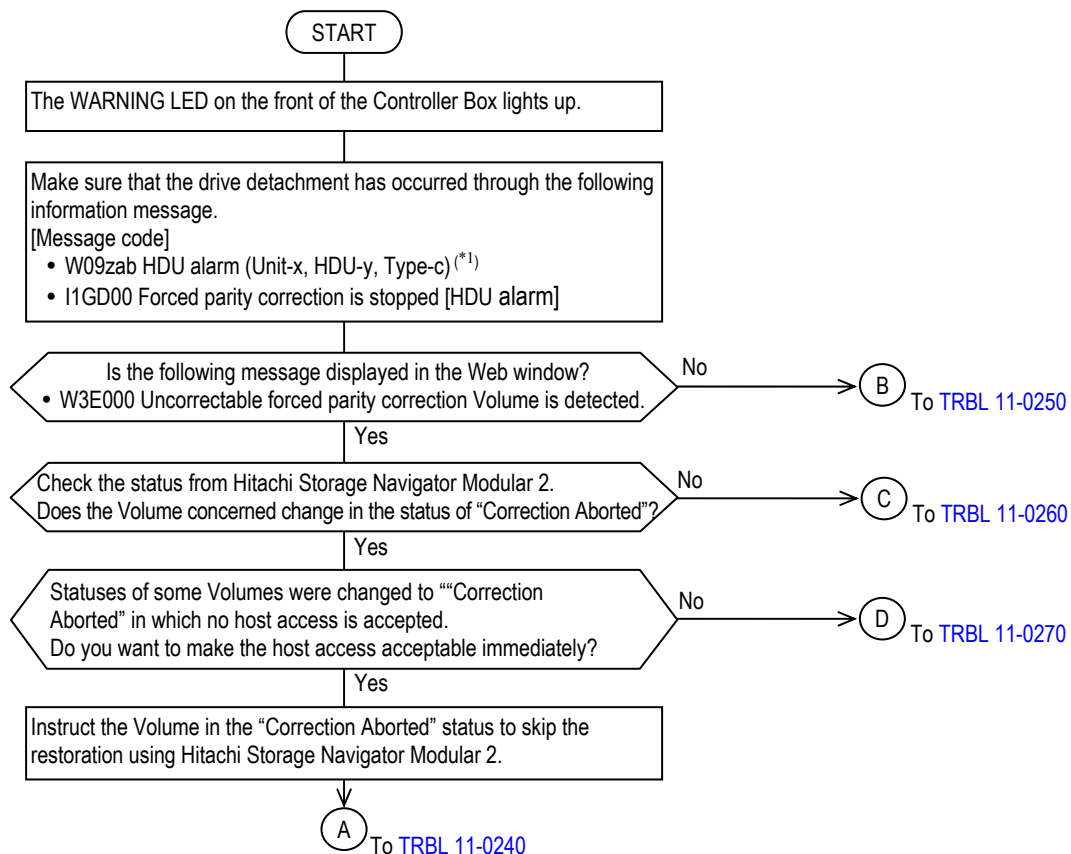
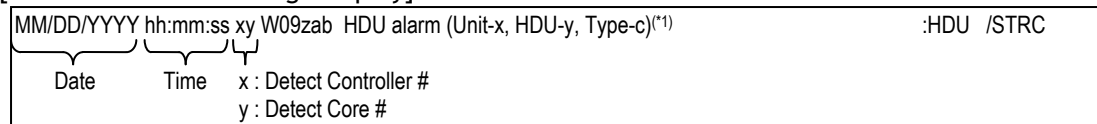
When a Drive is detached during forced parity correction, the restoration is interrupted and a drive recovery action is taken.

When the Drive including the Volume that performs the forced parity correction instruction is blocked in the RAID Group, the status of the Volume concerned changes to “Uncorrected and Drive Detached” or “Correction Aborted”.

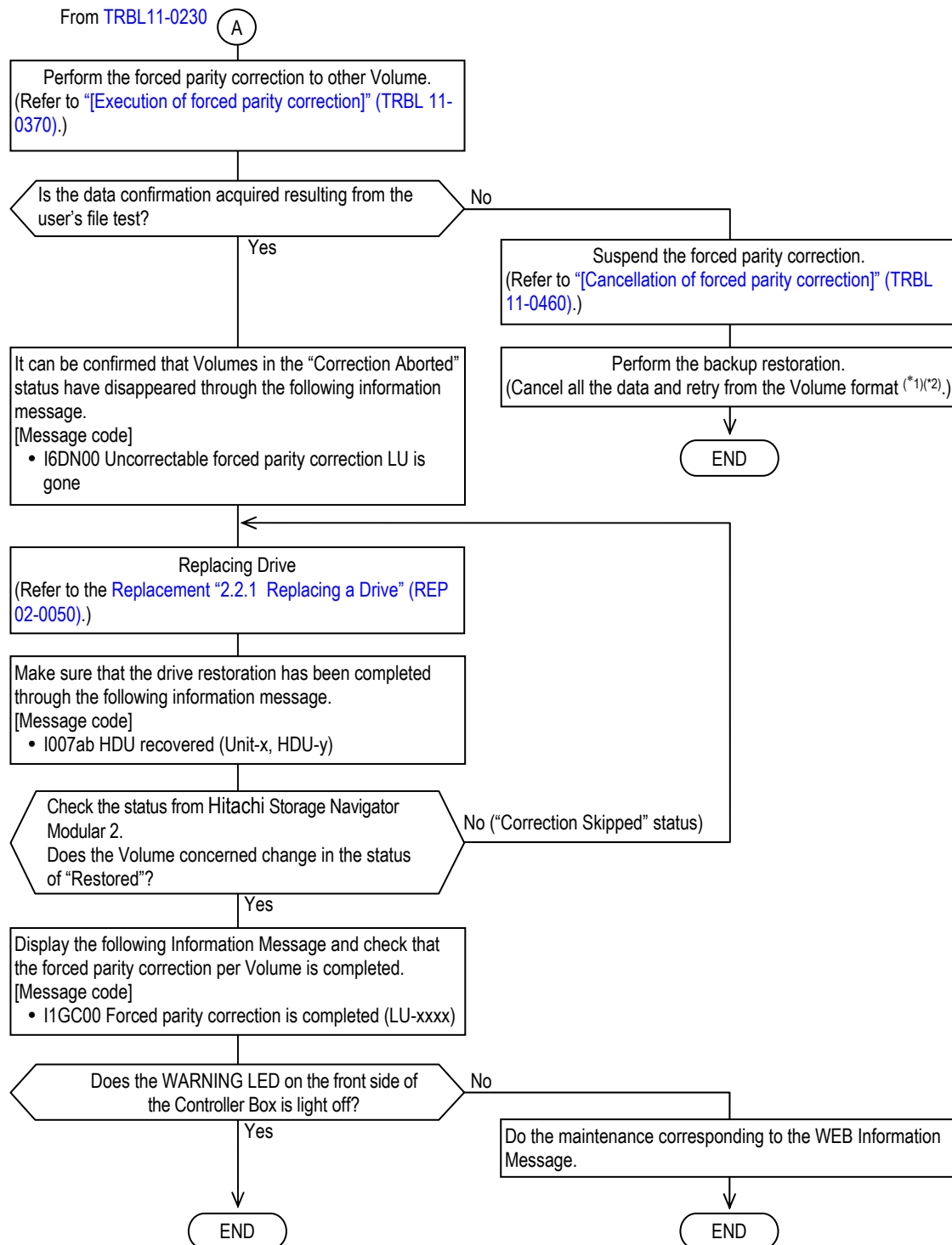
The status is also changes for the Volume that unifies the Volume including the blocked Drive in the RAID Group. The status is not changed for the Volume other than this.

However, for the Volume that the RAID group expansion is performed, if a drive blockade occurs during the forced parity correction the Volume concerned becomes unformatted. If this status occurs, restore the drive, format the volume concerned, and then recover the user data from the backup.

[WEB Information Message display]

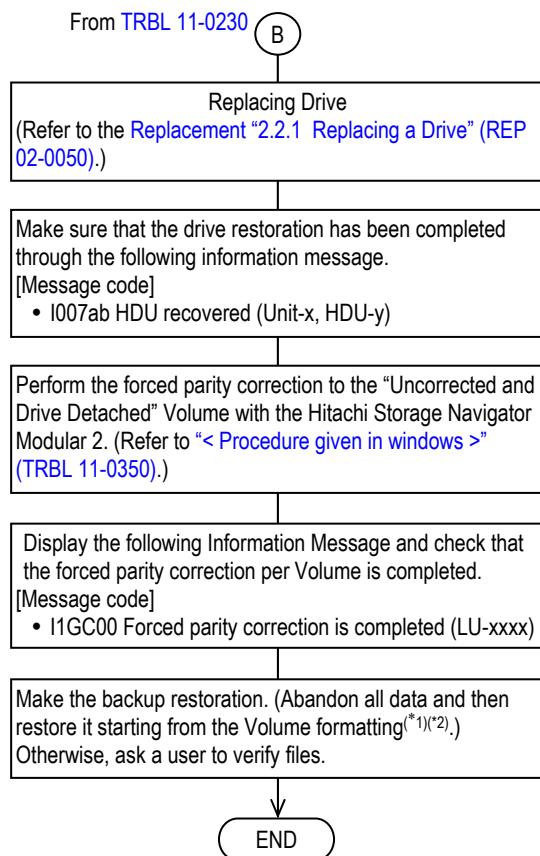


\*1 : When the Spare Drive in use is blocked, W0Bzab is displayed.

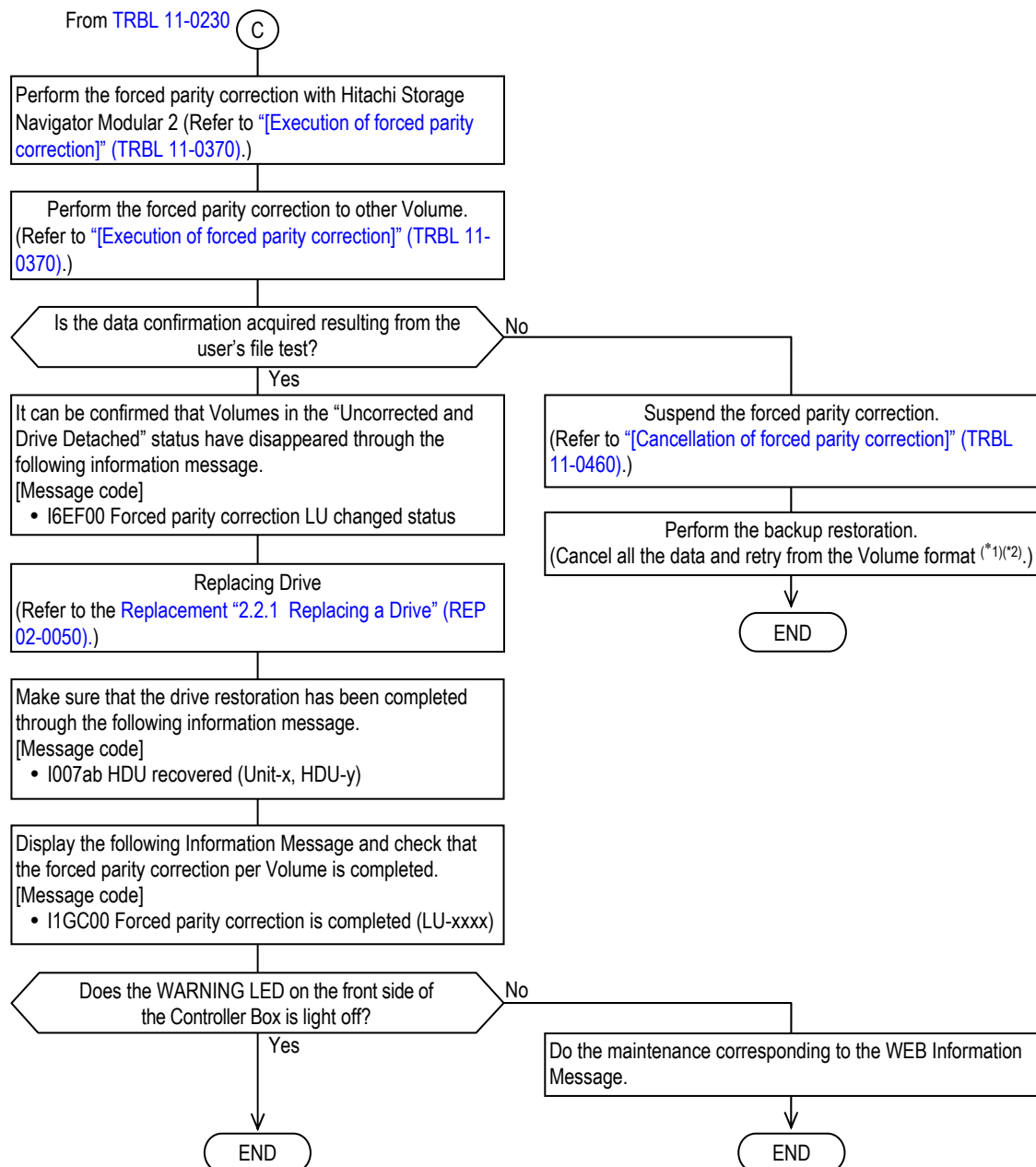


\*1 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to System Parameter "4.3.6 Formatting Volume" (SYSPR 04-0500).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*2: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.



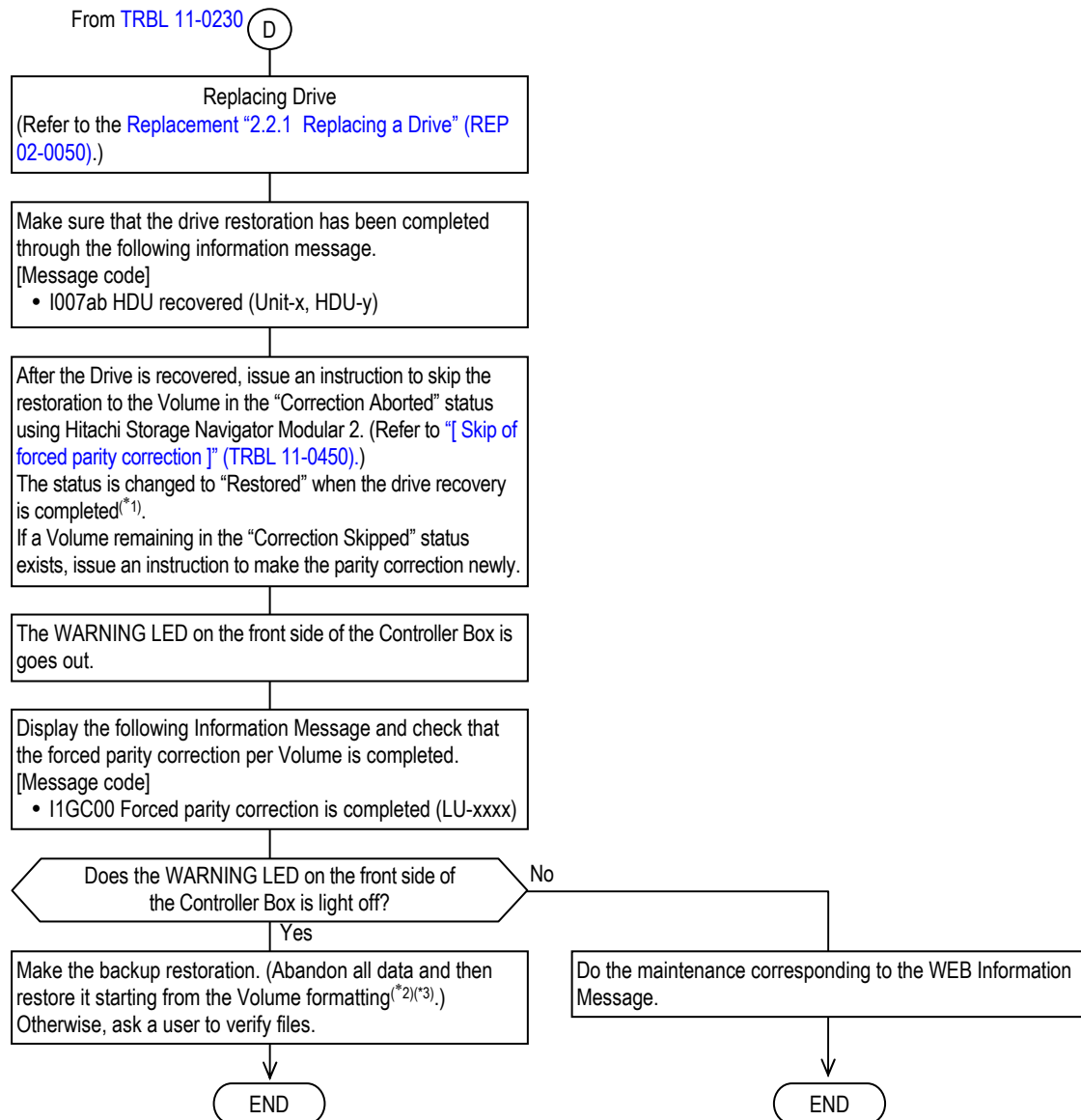
- \*1 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.
- \*2: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.



\*1 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to System Parameter "4.3.6 Formatting Volume" (SYSPR 04-0500).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*2: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.





\*1 : A Volume that conforms to any of the following conditions does not enter the "Restored" status and remains in the "Correction Skipped" status.

If a Volume remaining in the "Correction Skipped" status exists, issue an instruction to make the forced parity correction newly.

- A Volume of RAID 1+0, RAID 6.
- A unified Volume a part of which is included in a RAID group having a drive detachment
- A Volume whose parity group is deeper than 1

\*2 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. ((Refer to [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).)  
Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*3: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

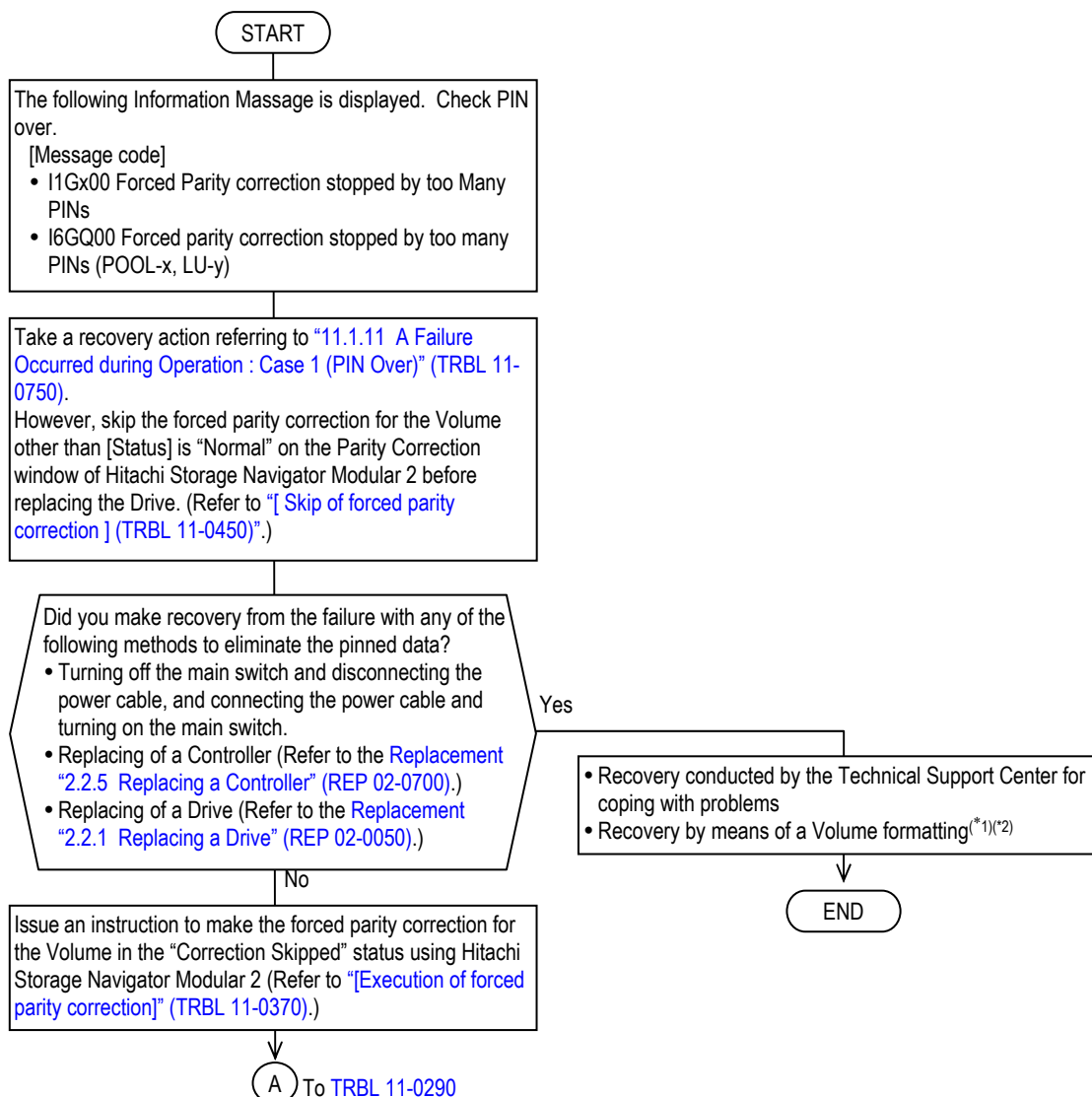
[Recovery method-4] : PIN over occurred during the forced parity correction.

When a pin over occurs, the status of the Volume, the forced parity correction for which has been instructed to be made, is changed to “Uncorrected”.

[WEB Information Message display]

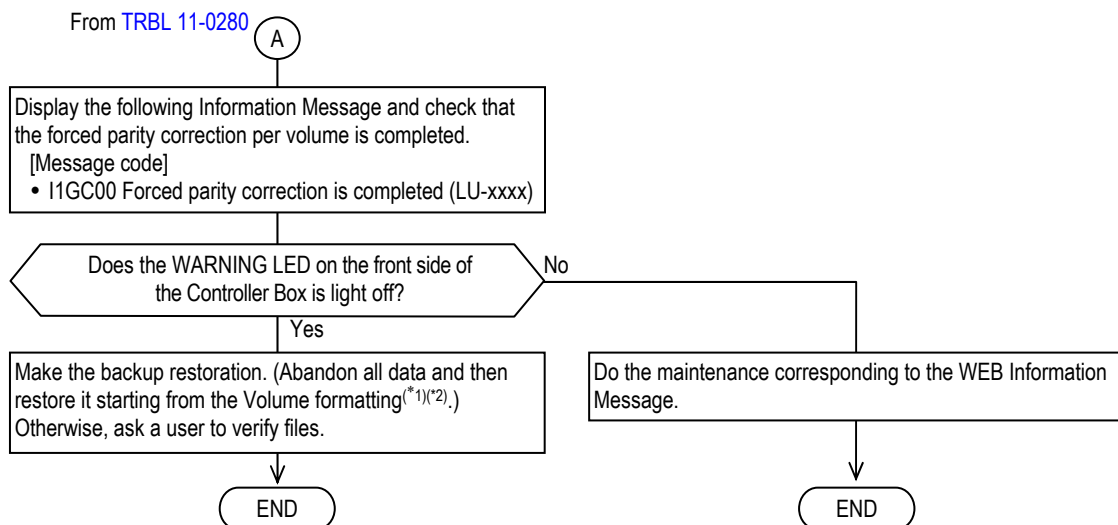
MM/DD/YYYY hh:mm:ss xy I1GH00 Forced parity correction is stopped by too many PINs (RG-x, LU-y)  
MM/DD/YYYY hh:mm:ss xy I1GJ00 Forced parity correction is stopped by too many PINs (PTT-x, LU-y)  
MM/DD/YYYY hh:mm:ss xy I1GK00 Forced parity correction is stopped by too many PINs (DIR-x, LU-y)  
MM/DD/YYYY hh:mm:ss xy I6GQ00 Forced parity correction stopped by too many PINs (POOL-x, LU-y)

Date      Time      x : Detect Controller #  
                             v : Detect Core #



\*1 : To perform recovery by the Volume format, skip the Volume which is in the “Uncorrected” status in the Hitachi Storage Navigator Modular 2 before the Volume format.

\*2: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/  
Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.



\*1 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is “05-9552” or “05-9577”, the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter “4.3.6 Formatting Volume” \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

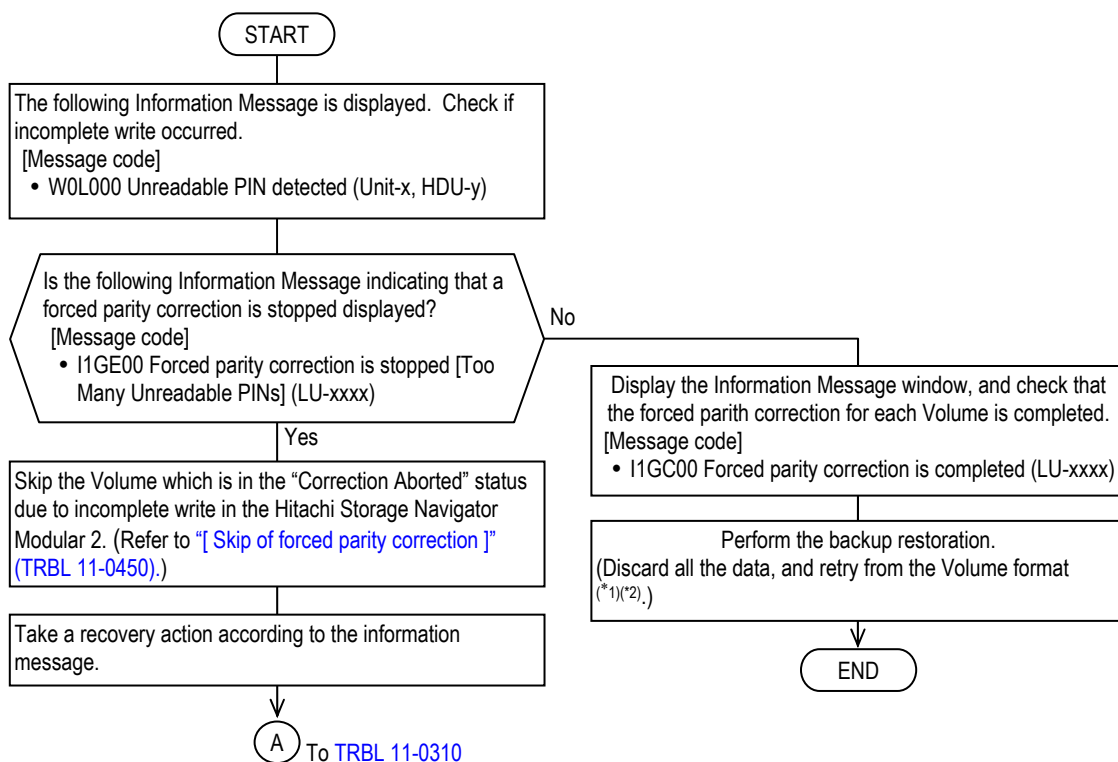
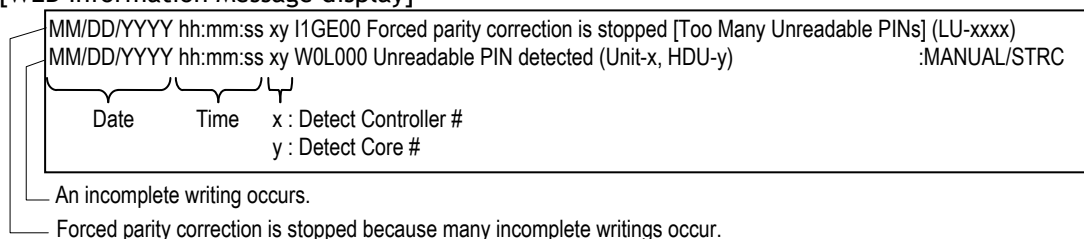
\*2: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user’s instruction.

[Recovery method-5] : Incomplete write occurred during the forced parity correction.

In the part where the data cannot be restored such as the data on Drive cannot be read out during the forced parity correction, an incomplete writing occurs.

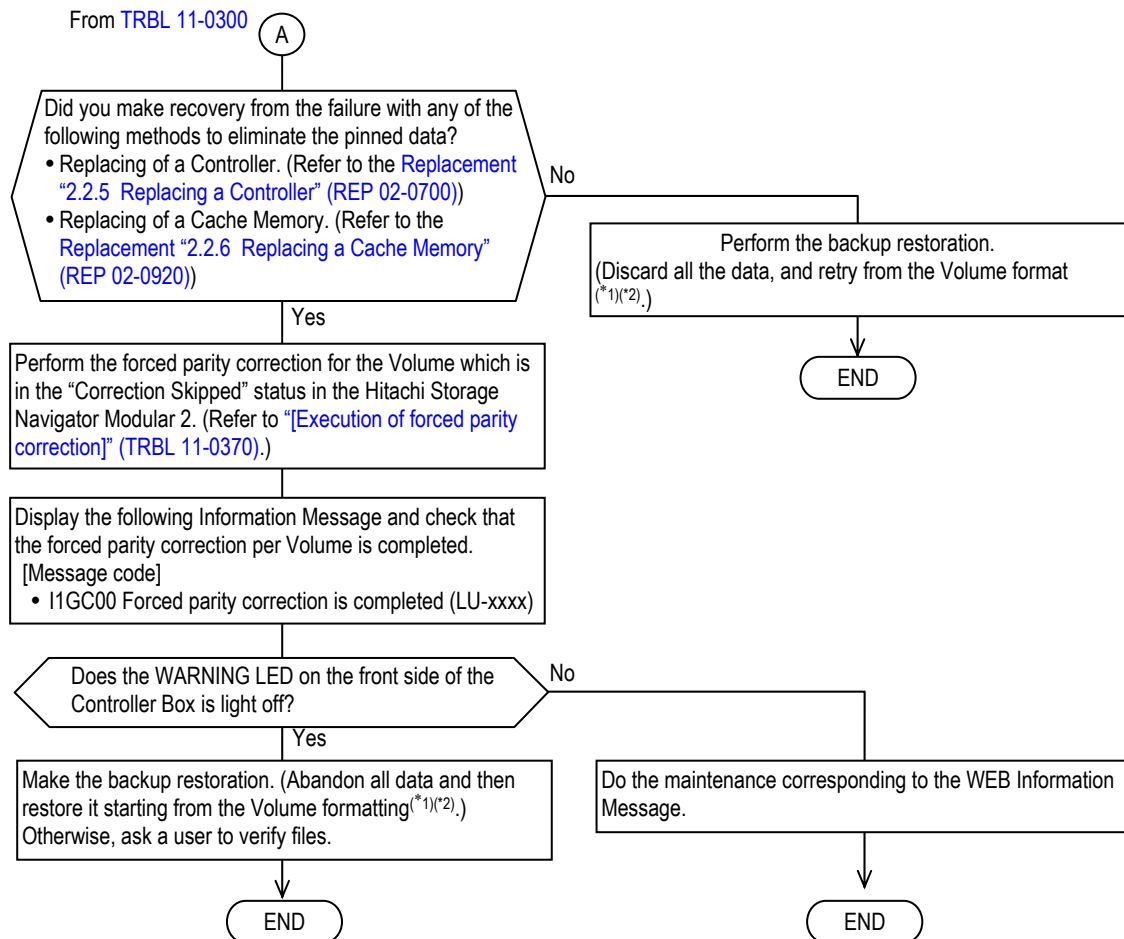
When many incomplete writings occur, the status of the Volume, the forced parity correction for which has been instructed to be made, is changed to “Correction Aborted”, and then the forced parity correction will be stopped.

[WEB Information Message display]



\*1 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is “05-9552” or “05-9577”, the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter “4.3.6 Formatting Volume” \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*2: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/  
Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.



\*1 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*2: Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

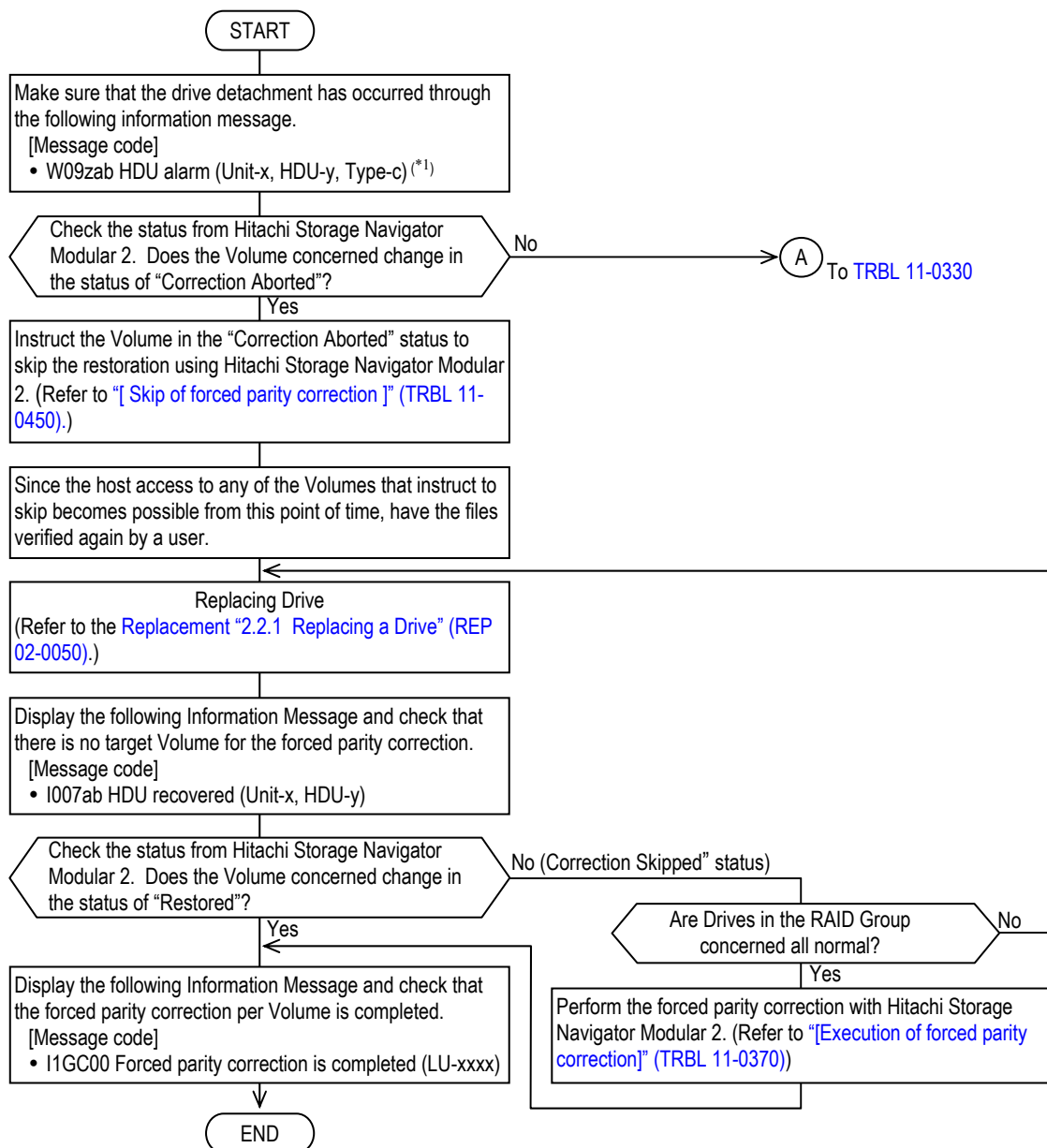
[Recovery method-6] : The drive blockade has occurred before the forced parity correction.

If the Drive has been blocked before the forced parity correction, the drive restoration is already operated.

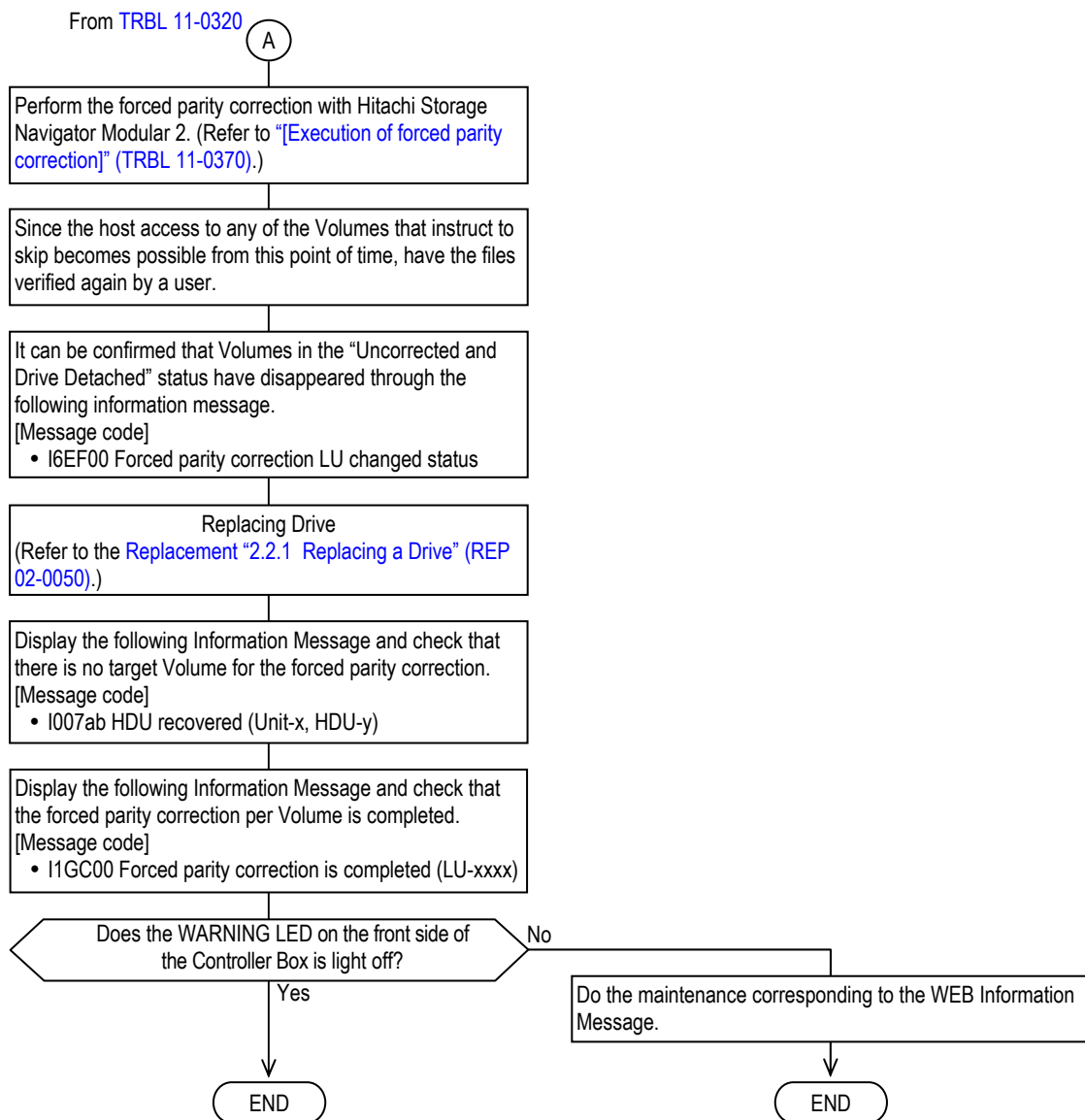
The Volume status in which the drive restoration has already operated is changed to “Correction Aborted”. The other Volume status is changed to “Uncorrected”.

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy W09zab HDU alarm (Unit-x, HDU-y, Type-c) <sup>(*)</sup>			:HDU /STRC
Date	Time	x : Detect Controller # y : Detect Core #	



\*1 : When the Spare Drive in use is blocked, W0Bzab is displayed.



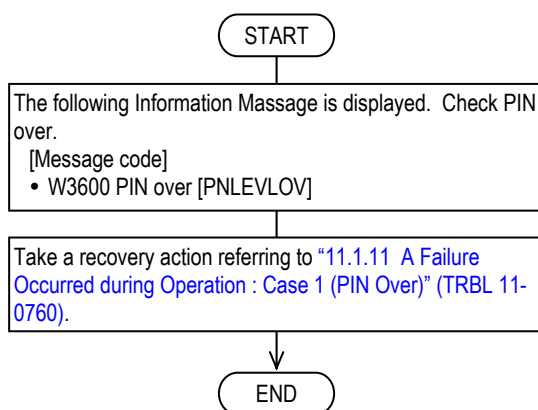
[Recovery method-7] : PIN over has occurred before the forced parity correction.

If PIN over occurred, change the Volume in which PIN over occurred to “Uncorrected” status.

[WEB Information Message display]

```
MM/DD/YYYY hh:mm:ss xy W3G000 PIN is over directory threshold [write through] (DIR-x)
MM/DD/YYYY hh:mm:ss xy W3H000 PIN is over directory threshold [write will not run] (DIR-x)
MM/DD/YYYY hh:mm:ss xy W3J000 PIN is over partition threshold [write through] (DIR-x, PTT-xx)
MM/DD/YYYY hh:mm:ss xy W3K000 PIN is over partition threshold [write will not run] (DIR-x, PTT-xx)
MM/DD/YYYY hh:mm:ss xy W3L000 PIN is over RAID group threshold [write through] (DIR-x, RG-xx)
MM/DD/YYYY hh:mm:ss xy W3M000 PIN is over RAID group threshold [write will not run] (DIR-x, RG-xx)
```

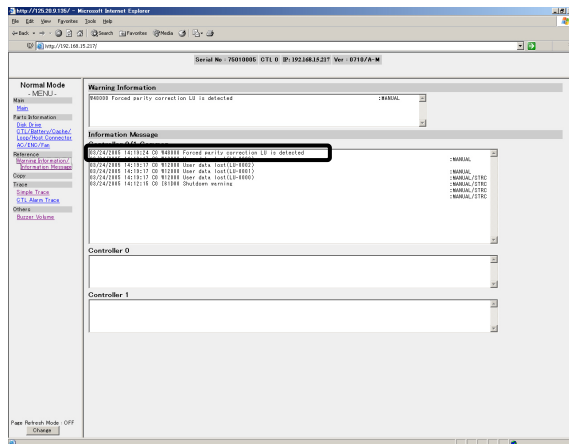
{ Date      Time      x : Detect Controller #  
                                  y : Detect Core #





< Procedure given in windows >

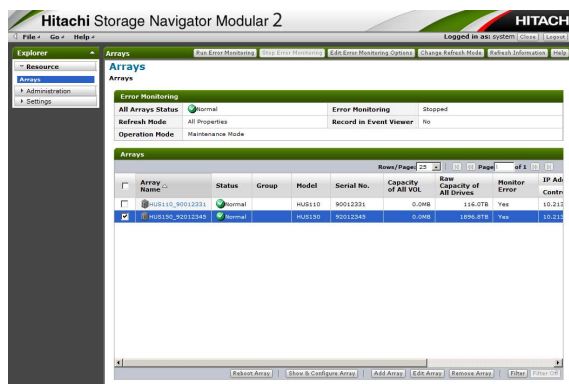
- (a) Connect the Web. (Refer to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000).)
- (b) Check that there is Volume for which the forced parity correction is necessary by the “W3D000” message in the WEB window.



- (c) Connect Hitachi Storage Navigator Modular 2.

- (i) Start the Hitachi Storage Navigator Modular 2, put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

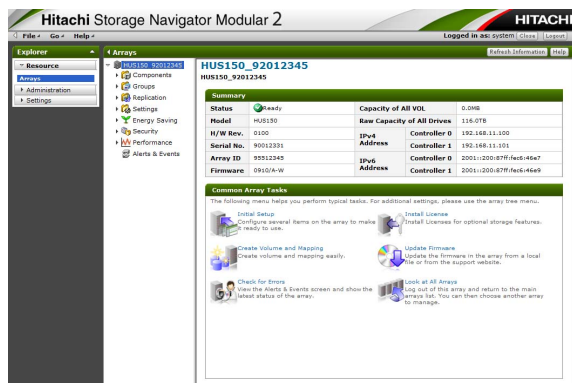
Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



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

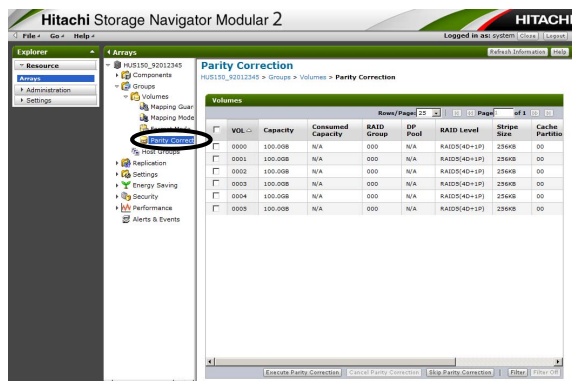
(ii) Click the name of the array to be set from the unit window.

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

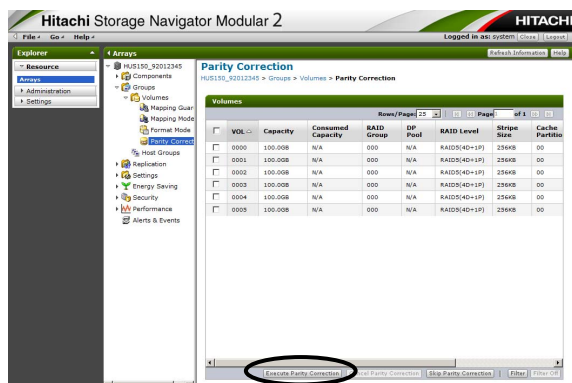


## [Execution of forced parity correction]

(a) Select [Groups] - [Volumes] - [Parity Correction] from the tree.



(b) Click the [Execute Parity Correction] button.



No.	Status Symbol of Hitachi Storage Navigator Modular 2	Meaning	Status seen from a host	Recovery method
1	Uncorrected	A status in which the array is waiting for an instruction to make or skip the forced parity correction issued by Hitachi Storage Navigator Modular 2.	A status in which a host cannot instruct the Volume to read or write.	Perform the forced parity correction or skip in the Hitachi Storage Navigator Modular 2 according to <a href="#">&lt; Procedure given in windows &gt; (TRBL 11-0350)</a> .
2	Parity Correcting (n%)	A status in which Hitachi Storage Navigator Modular 2 has issued an instruction to make the forced parity correction and the restoration is "Parity Correction".	A status in which a host can instruct the Volume to read or write. However, it is impossible for the Volume that the RAID Group is under expansion.	—
3	Waiting Parity Correction(o) (n%)	A status in which Hitachi Storage Navigator Modular 2 has issued an instruction to make the forced parity correction and is waiting for making of the restoration.	A status in which a host can instruct the Volume to read or write. However, it is impossible for the Volume that the RAID Group is under expansion.	—

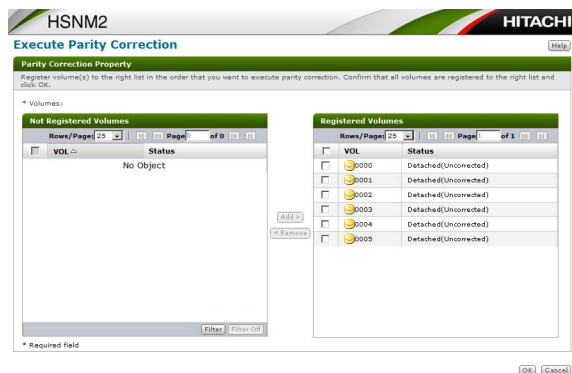
No.	Status Symbol of Hitachi Storage Navigator Modular 2	Meaning	Status seen from a host	Recovery method
4	Waiting Drive Reconstruction	Waiting Drive Reconstruction: The forced parity correction is instructed from Hitachi Storage Navigator Modular 2, and waiting for the replacement of the Drive.	Reading and writing data from the host are enabled. However, it is impossible for the Volume that the RAID Group is under expansion.	① Connect WEB. (Refer to " <a href="#">Chapter 3. Before Starting WEB Connection</a> " (TRBL 03-0000).) ② Replace the blocked Drive referring to the Information Message on WEB. (Refer to <a href="#">Replacement "2.2.1 Replacing a Drive"</a> (REP 02-0050).)
5	Correction Skipped	A status in which Hitachi Storage Navigator Modular 2 has issued an instruction to "Correction Skipped" the forced parity correction.	A status in which a host can instruct the Volume to read or write.	Make a Volume formatting (refer to <a href="#">System Parameter "4.3.6 Formatting Volume"</a> (SYSPR 04-0500).) and backup restoration. However, check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/Dynamic Tiering function, and if it is used, restore the backup data according to the user's instruction.
6	—	Restored : A status in which Hitachi Storage Navigator Modular 2 issued an instruction to make the forced parity correction and the restoration has been completed.	A status in which a host can instruct the Volume to read or write.	—
7	Uncorrected and Drive Detached	The forced parity recovery is aborted due to the Drive blockade although the forced parity recovery was instructed from Hitachi Storage Navigator Modular 2. However, the forced parity recovery is required.	Reading and writing data from the host are disabled.	① Connect the WEB. (Refer to " <a href="#">Chapter 3. Before Starting WEB Connection</a> " (TRBL 03-0000).) ② Replace the blocked Drive referring to the Information Message on the WEB. (Refer to <a href="#">Replacement "2.2.1 Replacing a Drive"</a> (REP 02-0050).) ③ Skip the forced parity correction according to <a href="#">&lt; Procedure given in windows &gt;</a> (TRBL 11-0350) (Refer to "[Skip of forced parity correction]" (TRBL 11-0450).)
8	Correction Aborted	A status in which the forced parity correction is interrupted because of a drive detachment although Hitachi Storage Navigator Modular 2 has issued an instruction to make the restoration.	A status in which a host cannot instruct the Volume to read or write.	① Connect the WEB. (Refer to " <a href="#">Chapter 3. Before Starting WEB Connection</a> " (TRBL 03-0000).) ② Replace the blocked Drive referring to the Information Message on the WEB. (Refer to <a href="#">Replacement "2.2.1 Replacing a Drive"</a> (REP 02-0050).) ③ Skip the forced parity correction according to <a href="#">&lt; Procedure given in windows &gt;</a> (TRBL 11-0350) (Refer to "[Skip of forced parity correction]" (TRBL 11-0450).) ④ Execute the forced parity correction according to <a href="#">&lt; Procedure given in windows &gt;</a> (TRBL 11-0350).

## (c) Status checking and execution of the Volume for the forced parity correction

- When “Uncorrected” exists in the Volume status

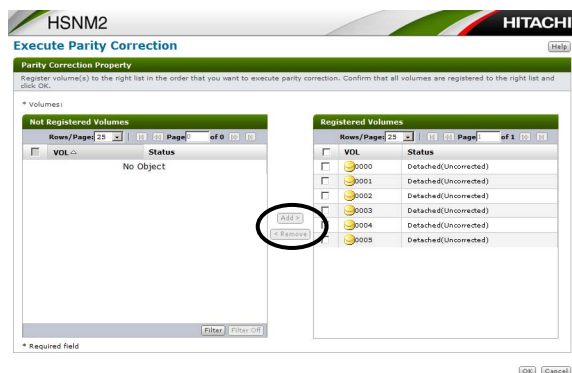
## (i) An “Execute Parity Correction” window is displayed.

Check the Volumes whose status is “Uncorrected” are registered in the right list (the registered Volumes).

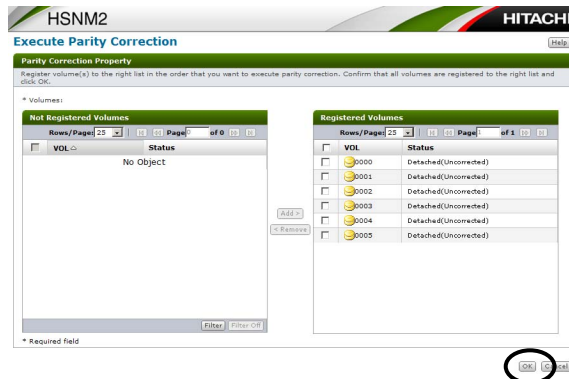


## (ii) List the Volumes in order of executing the forced parity correction.

Select the Volumes from the right list (registered Volume), and click the [Remove] button to move them to the left list (unregistered Volume). Select the Volume in the left list in order of executing the forced parity correction, and then click the [Add] button to move it to the right list.



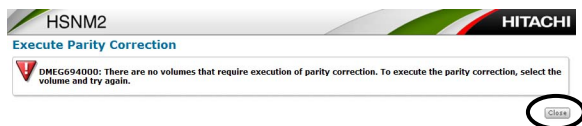
- (iii) Verify that the Volumes in the right list are listed in order of executing the forced parity correction, and click the [OK] button.



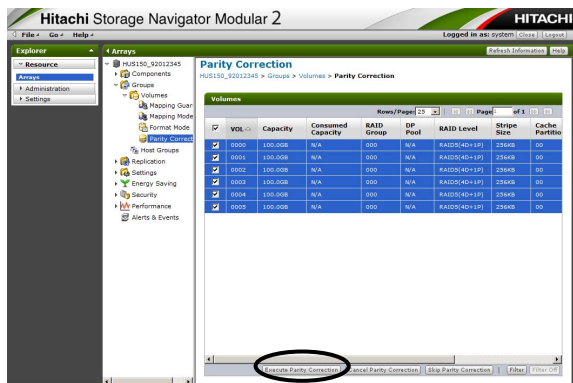
- (iv) Click the [Close] button.



- When the status of the Volume is other than “Uncorrected”
  - (i) Because the dialog, indicating that the Volume for the forced parity correction target does not exist, is displayed, click the [Close] button.

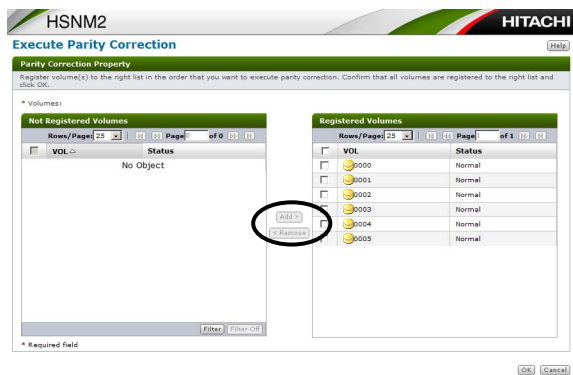


- (ii) Select the Volumes which needs to execute the forced parity correction referring to the status of the Volume, and click the [Execute Parity Correction] button.



- (iii) List the Volumes in order of executing the forced parity correction.

Select the Volumes from the right list, and click the [Remove] button to move them to the left list (unregistered Volume). Select the Volume in the left list in order of executing the forced parity correction, and then click the [Add] button to move it to the right list.



- (iv) Verify that the Volumes in the right list are listed in order of executing the forced parity correction, and click the [OK] button.

HSNM2 HITACHI

**Execute Parity Correction**

Parity Correction Property

Register volume(s) to the right list in the order that you want to execute parity correction. Confirm that all volumes are registered to the right list and click OK.

\* Volumes:

Vol	Status
No Object	

Add Remove

Vol	Status
V000	Normal
V001	Normal
V002	Normal
V003	Normal
V004	Normal
V005	Normal

Filter Filter Off

\* Required field

OK Cancel

- (v) Click the [Close] button.

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**Execute Parity Correction**

Parity correction execution has been requested.  
Click Close and confirm the status in the Parity Correction window.

Close

- (d) Refer to a message in the Web window.

Serial No : 85000049 Array ID : 85000049 CTL 0 Ver : 0831/A-M

Normal Mode - MENU -

Main

Part Information

Disk Drive

CTL/Battery/Cache/Interface Board

AC/ENC

Reference

Warning Information/Information Message

Network Information

Copy

Snapshot Information

Trace

Simple Trace

CTL Alarm Trace

Page Refresh Mode OFF

Change

Warning Information

Information Message

Controller 0/1 Forced parity correction LU is completed

02/28/2008 18:03:55 00 10000 Forced parity correction LU is completed

02/28/2008 18:04:23 00 10000 Quick Format started(LU-1000)

02/28/2008 18:04:17 00 112100 LU deleted(LU-1000)

02/28/2008 18:04:13 00 112100 LU deleted(LU-1000)

02/28/2008 18:04:10 00 10000 Quick Format started(LU-1000)

02/28/2008 18:04:10 00 112100 LU deleted(LU-1000)

02/28/2008 18:04:06 00 112100 LU deleted(LU-1000)

02/28/2008 18:04:00 00 112100 LU deleted(LU-1000)

02/28/2008 18:04:00 00 112100 LU deleted(LU-1000)

02/28/2008 18:04:00 00 10000 Quick Format started(LU-1000)

02/28/2008 18:03:57 00 10000 Quick Format started(LU-1000)

02/28/2008 18:03:55 00 112100 LU deleted(LU-1000)

02/28/2008 18:03:55 00 112100 LU deleted(LU-1000)

02/28/2008 18:03:45 00 112100 LU deleted(LU-1000)

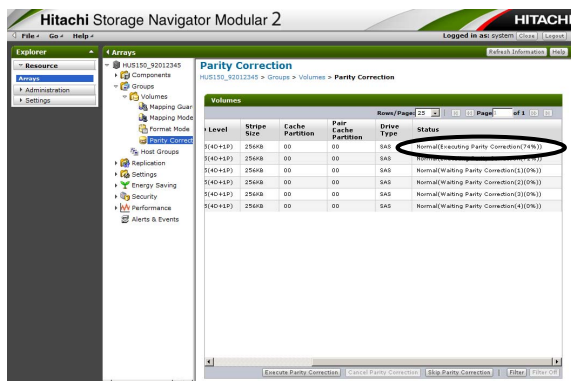
Controller 0

Controller 1



## (e) Displaying a progress rate of the forced parity correction

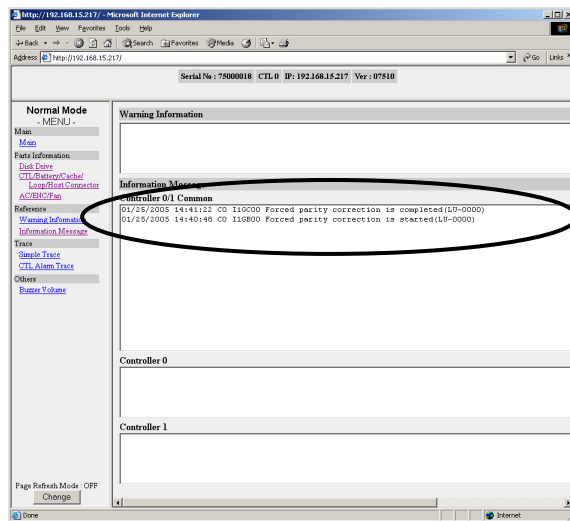
For the Volume, the forced parity correction for which has been instructed to be made, rate of progress of the restoration is displayed in the “Status” column of the Volume concerned.



Volume statuses concerning a forced parity correction and display of statuses by Hitachi Storage Navigator Modular 2.

No.	Status	Remarks
1	Parity Correction (n%)	n: Progress rate
2	Waiting Parity Correction(o) (n%)	o: Waiting order n: Rate of progress
3	Waiting Drive Reconstruction	—
4	Uncorrected	—
5	Uncorrected and Drive Detached	—
6	Correction Aborted	—
7	Restored	—
8	Correction Skipped	—

- (f) Make sure that the forced parity correction has been completed in the Web window.

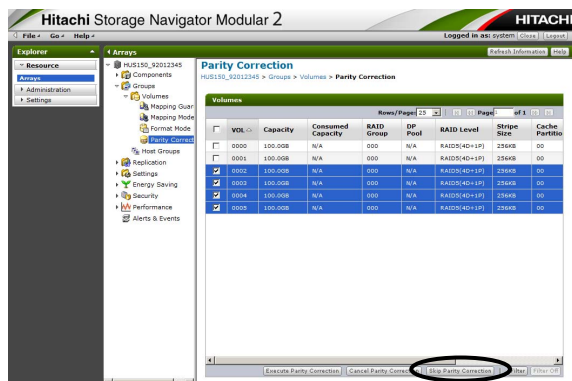


When making the forced parity correction for a Volume in the “Correction Skipped” or “Restored” status, refer to “[ [Instruction to make a forced parity correction for a Volume in the “Correction Skipped” or “Restored” status](#) ]” (TRBL 11-0470).

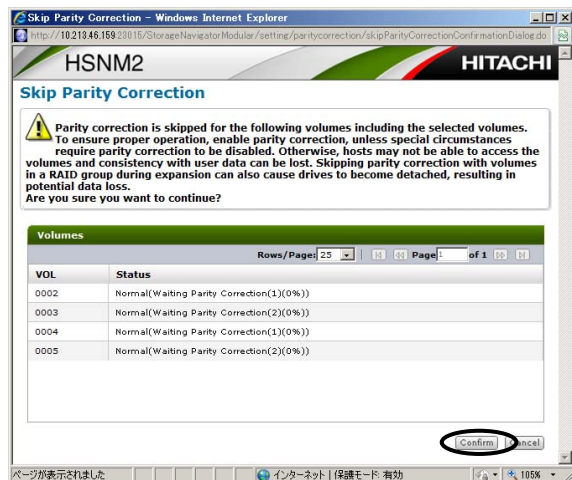
- (g) Make sure that the WARNING LED on the front side of the Controller Box has gone out.
- (h) Make the backup restoration. (Abandon all data and then restore it starting from the Volume formatting.) Otherwise, ask a user to verify files.
- However, check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/Dynamic Tiering function, and if it is used, restore the backup data according to the user’s instruction.

[ Skip of forced parity correction ]

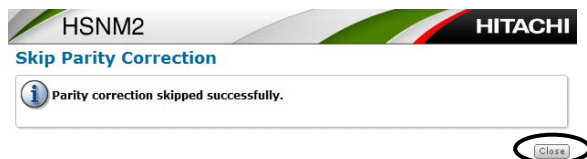
- (a) Select the Volume for which you want to execute the forced parity correction, and click the [Skip Parity Correction] button.



- (b) The list of Volumes to be skipped is displayed. Click the [Confirm] button.



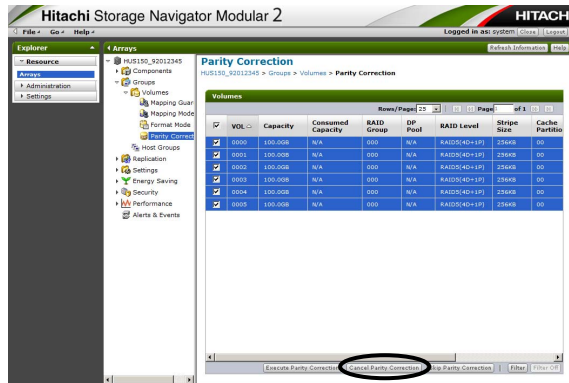
- (c) Click the [Close] button.



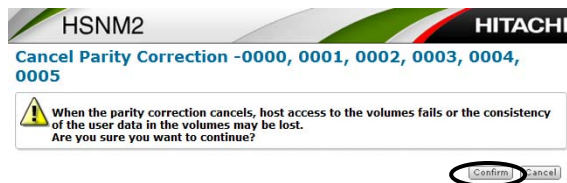
## [ Cancellation of forced parity correction ]

The forced parity correction can be cancelled while the Volume is in progress or after the correction is instructed.

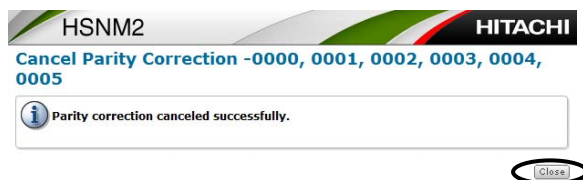
- (a) Select a Volume whose status displayed in the Volume status column is “Parity Correction” or “Waiting Parity Correction”, and click the [Cancel Parity Correction] button.



- (b) Click the [Confirm] button.



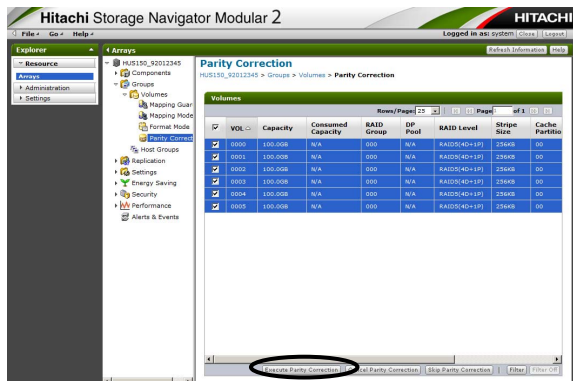
- (c) Click the [Close] button.



[ Instruction to make a forced parity correction for a Volume in the “Correction Skipped” or “Restored” status ]

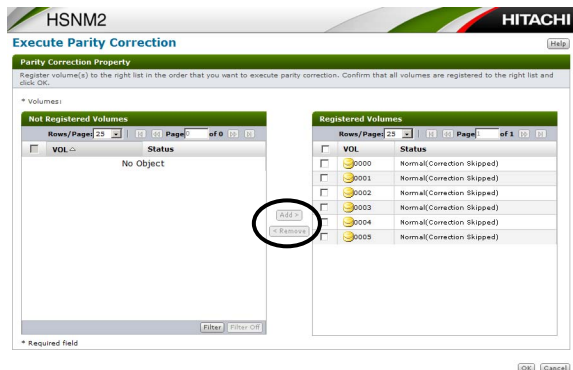
A forced parity correction can be made for a Volume in the “Correction Skipped” status or for a Volume for which the forced parity correction has been made.

- (a) Select a Volume to execute forced parity correction in the status column of the Volume. Click the [Execute Parity Correction] button.

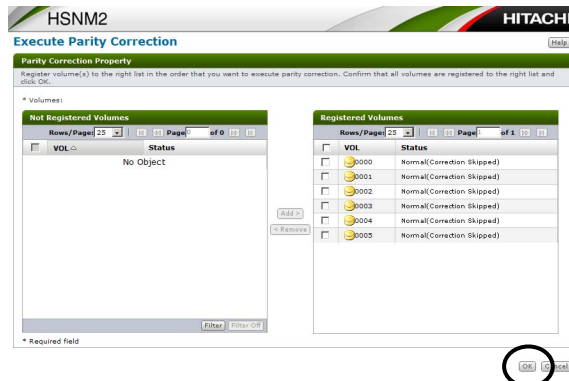


- (b) List the Volumes in order of executing the forced parity correction.

Select the Volumes from the right list (registered Volume), and click the [Remove] button to move them to the left list (unregistered Volume). Select the Volume in the left list in order of executing the forced parity correction, and then click the [Add] button to move it to the right list.



- (c) Verify that the Volumes in the right list are listed in order of executing the forced parity correction, and click the [OK] button.



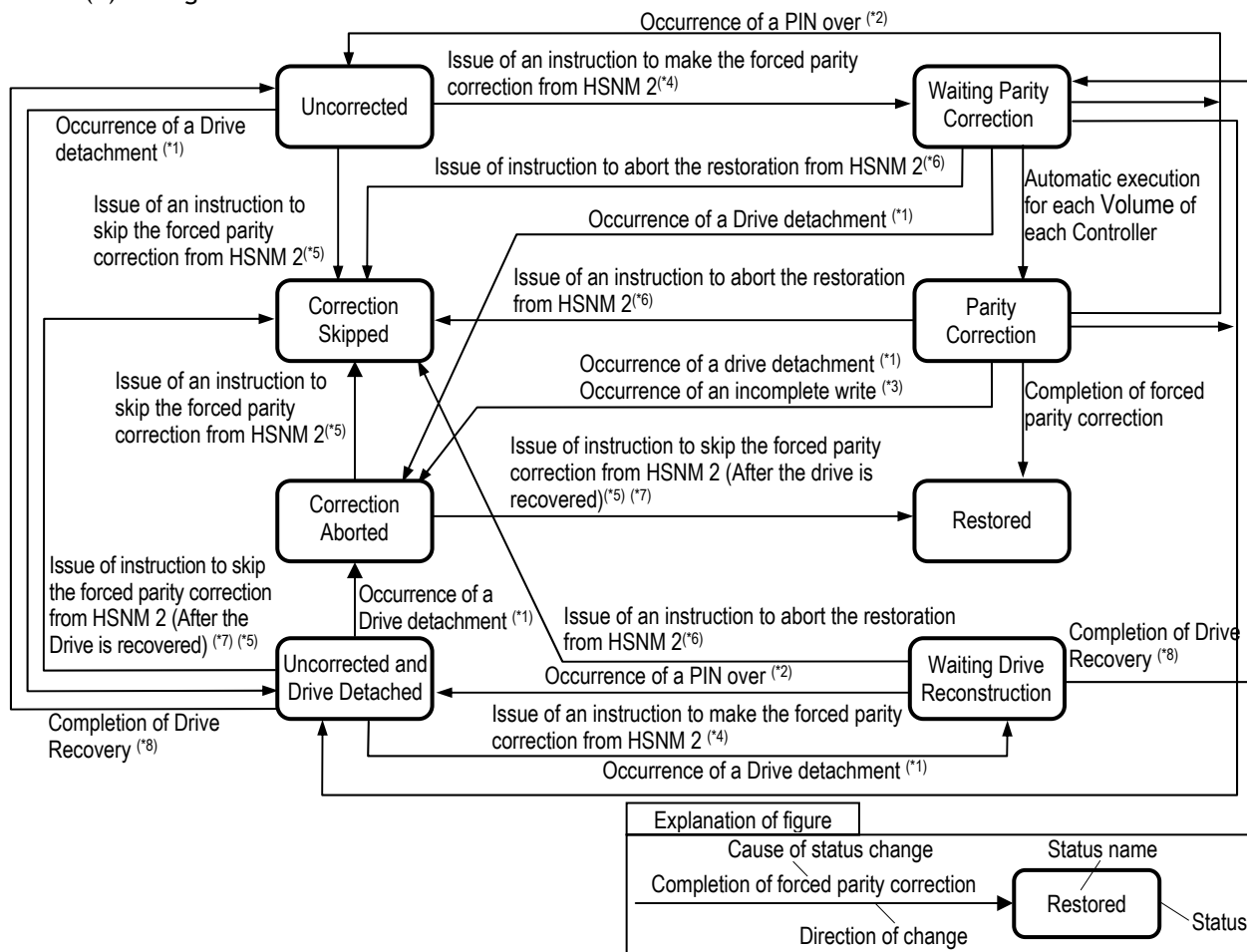
- (d) Click the [Close] button.



< Change of the status in the forced parity correction >

The status of the forced parity correction changes as shown below. The status and progress rate of the restoration can be referred to for each Volume using Hitachi Storage Navigator Modular 2. (Hitachi Storage Navigator Modular 2 is abbreviated to HSNM2 in the status transition chart of the forced parity recovery.)

(a) Change of the status after user data is lost



\*1 : Refer to "[Recovery method-3] : Drive blockade occurred during the forced parity correction." (TRBL 11-0230).

\*2 : Refer to "[Recovery method-4] : PIN over occurred during the forced parity correction." (TRBL 11-0280).

\*3 : Refer to "[Recovery method-5] : Incomplete write occurred during the forced parity correction." (TRBL 11-0300).

\*4 : Refer to "[ Execution of forced parity correction ]" (TRBL 11-0370).

\*5 : Refer to "[ Skip of forced parity correction ]" (TRBL 11-0450).

\*6 : Refer to "[ Cancellation of forced parity correction ]" (TRBL 11-0460).

\*7 : A Volume that conforms to any of the following conditions does not enter the "Restored" status and remains in the "Correction Skipped" status.

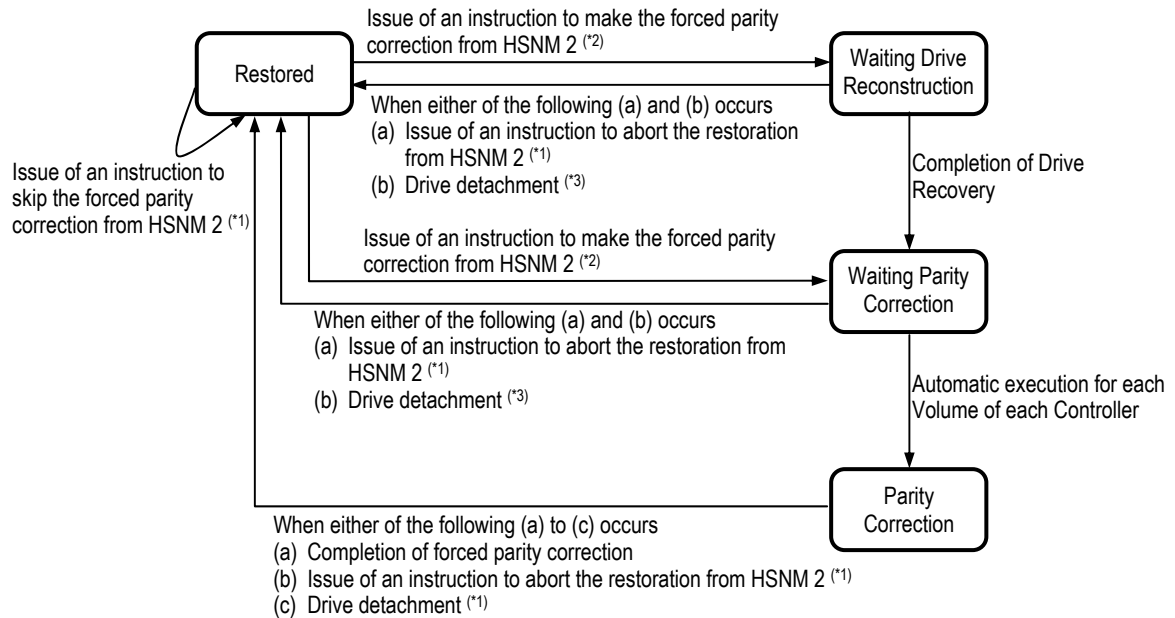
In this case, issue an instruction to skip the forced parity correction and then issue an instruction to make the restoration.

- A Volume of RAID 1+0, RAID 6
- A unified Volume a part of which is included in a RAID group having a drive detachment
- A Volume whose parity group is deeper than 1

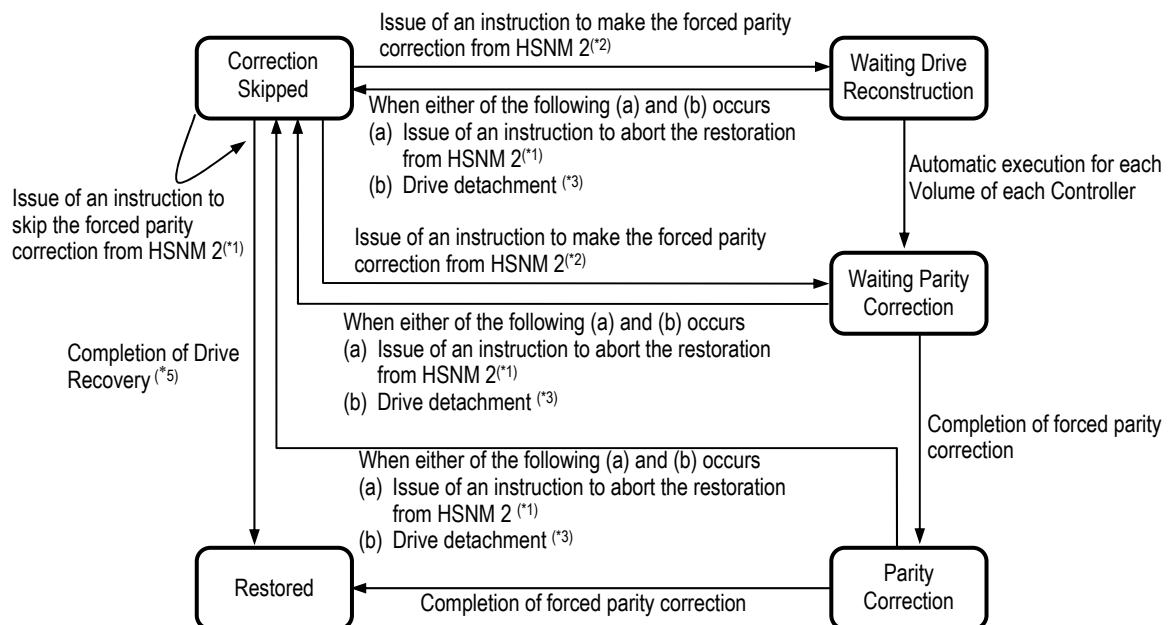
\*8 : The Volume concerned to any of the following conditions does not change to "Drive Restored". In this case, instruct the force parity correction.

- Volume whose Drive of a part of the unified Volume is blocked and included in the RAID Group
- Volume whose depth of the parity group is larger than one

## (b) Forced parity correction for a Volume in the “Restored” status



## (c) Forced parity correction for a Volume in the “Correction Skipped” status



\*1 : Refer to “[ Skip of forced parity correction ]” (TRBL 11-0450)

\*2 : Refer to “[ Execution of forced parity correction ]” (TRBL 11-0370).

\*1 : Refer to “[Recovery method-3] : Drive blockade occurred during the forced parity correction.” (TRBL 11-0230).

\*3 : Refer to “[ Cancellation of forced parity correction ]” (TRBL 11-0460).

\*5 : A Volume that conforms to any of the following conditions does not enter the “Restored” status and remains in the “Correction Skipped” status.

- A Volume of RAID 1+0
- A unified Volume a part of which is included in a RAID group having a drive detachment
- A Volume whose parity group is deeper than 1



< Standard time required for the forced parity correction >

A forced parity correction takes a long time from start to completion. (Refer from [Table 11.1.2](#) to [Table 11.1.7.1](#).)

Standard times required for the forced parity correction are shown below.

NOTE : • The data above are standard times required for a forced parity correction for one or two RAID groups.

Further, the times required for the restoration vary depending on the Drive capacity, number of Drives, and RAID configuration.

Also, the time when the forced parity correction processing takes becomes short about 10 to 20 % depending on the type even by the Drives of the same capacity.

The forced parity correction operates one Volume at a time per Controller. Therefore, when one Controller recovered the parity of two or more Volumes (n Volumes), the time that it takes to complete recovering all the parities of the n Volumes becomes n times the standard time.

- When using the Dynamic Provisioning/Dynamic Tiering function, the recovery time differs depending on the write status to the Drive because the format of the DP pool operates. The recovery time also differs depending on the capacity that uses the DP volume.

**Table11.1.2 Standard Times Required for Forced Parity Correction for One RAID Group  
(SAS Drive) (When No Host I/O Is Executed) (‡1)**

Item				Unit : min						
				287.62 G byte			575.30 G byte	879.98 G byte		1,173.71 G byte
				3HGSS	3HGSSH	3HGSLH	6HGSS	9HGSS	9HGSL	12HGSS
HUS150 HUS130 HUS110	4 Drives	RAID 6	(2D+2P)	50			100	150		160
	6 Drives		(4D+2P)	90			140	220		240
	10 Drives		(8D+2P)	120			230	360		390
	14 Drives		(12D+2P)	160			320	490		530
	18 Drives		(16D+2P)	210			410	630		680
	30 Drives		(28D+2P)	340			680	1040		1110
	3 Drives	RAID 5	(2D+1P)	50			100	150		160
	5 Drives		(4D+1P)	70			140	210		230
	9 Drives		(8D+1P)	110			210	320		350
	11 Drives		(10D+1P)	120			250	380		410
	13 Drives		(12D+1P)	140			280	440		470
	16 Drives		(15D+1P)	170			340	520		560
	4 Drives	RAID 1+0	(2D+2D)	70			140	210		230
	8 Drives		(4D+4D)	130			270	410		440
	16 Drives		(8D+8D)	260			520	800		860
	2 Drives	RAID 1	(1D+1D)	50			100	150		160

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

‡1 : The standard of the forced parity correction time when the parity of one Volume was recovered.

**Table 11.1.3 Standard Times Required for Forced Parity Correction for One RAID Group  
(SAS7.2K Drive) (When No Host I/O Is Executed) (‡1)**

				Unit : min								
Item				Drives (*1)	1,956.94 G byte		2,935.96 G byte			3,915.01 G byte		
					2TNL	2TNX	3TNL	3TNX	3TNW	4TNL	4TNX	4TNW
HUS150 HUS130 HUS110	4 Drives	RAID 6	(2D+2P)		310		460			620		
	6 Drives		(4D+2P)		450		670			900		
	10 Drives		(8D+2P)		720		1080			1440		
	14 Drives		(12D+2P)		1000		1500			2000		
	18 Drives		(16D+2P)		1270		1910			2540		
	30 Drives		(28D+2P)		2100		3150			4200		
	3 Drives	RAID 5	(2D+1P)		310		460			620		
	5 Drives		(4D+1P)		420		640			840		
	9 Drives		(8D+1P)		650		980			1300		
	11 Drives		(10D+1P)		770		1150			1540		
	13 Drives		(12D+1P)		880		1320			1760		
	16 Drives		(15D+1P)		1060		1580			2120		
	4 Drives	RAID 1+0	(2D+2D)		430		650			860		
	8 Drives		(4D+4D)		820		1240			1640		
	16 Drives		(8D+8D)		1610		2410			3220		
	2 Drives	RAID 1	(1D+1D)		310		460			620		

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

‡1 : The standard of the forced parity correction time when the parity of one Volume was recovered.

**Table 11.1.3.1 Standard Times Required for Forced Parity Correction for One RAID Group (Flash Drive) (SSD) (When No Host I/O Is Executed) (†1)**

				Unit : min		
Item				195.82 G byte	392.73 G byte	786.59 G byte
				2HGDM	4HGDM	8HGDM
HUS150 HUS130 HUS110	4 Drives	RAID 6	(2D+2P)	35	70	140
	6 Drives		(4D+2P)	50	100	200
	10 Drives		(8D+2P)	75	150	300
	14 Drives		(12D+2P)	100	200	400
	18 Drives		(16D+2P)	135	270	540
	30 Drives		(28D+2P)	230	460	920
	3 Drives	RAID 5	(2D+1P)	30	60	120
	5 Drives		(4D+1P)	50	100	200
	9 Drives		(8D+1P)	75	150	300
	11 Drives		(10D+1P)	90	180	360
	13 Drives		(12D+1P)	90	180	360
	16 Drives		(15D+1P)	110	220	440
	4 Drives	RAID 1+0	(2D+2D)	50	100	200
	8 Drives		(4D+4D)	100	200	400
	16 Drives		(8D+8D)	200	400	800
	2 Drives	RAID 1	(1D+1D)	35	70	140

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

†1 : The standard of the forced parity correction time when the parity of one Volume was recovered.

**Table 11.1.3.2 Standard Times Required for Forced Parity Correction for One RAID Group (Flash Drive) (FMD) (When No Host I/O Is Executed) (‡1)**

				Unit : min
Item	Drives (*1)			1,758.12
				1R6FM
HUS150	4 Drives	RAID 6	(2D+2P)	300
	6 Drives		(4D+2P)	410
	10 Drives		(8D+2P)	620
	14 Drives		(12D+2P)	800
	18 Drives		(16D+2P)	1100
	30 Drives		(28D+2P)	1850
	3 Drives	RAID 5	(2D+1P)	250
	5 Drives		(4D+1P)	380
	9 Drives		(8D+1P)	600
	11 Drives		(10D+1P)	710
	13 Drives		(12D+1P)	710
	16 Drives		(15D+1P)	880
	4 Drives	RAID 1+0	(2D+2D)	410
	8 Drives		(4D+4D)	810
	16 Drives		(8D+8D)	1600
	2 Drives	RAID 1	(1D+1D)	210

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

‡1 : The standard of the forced parity correction time when the parity of one Volume was recovered.

**Table 11.1.4 Standard Times Required for Forced Parity Correction for Two RAID Groups  
(SAS Drive) (When No Host I/O, Two RAID Group) (‡1)**

Item				Drives (*1)	287.62 G byte			575.30 G byte	879.98 G byte		1,173.71 G byte	Unit : min
					3HGSS	3HGSSH	3HGSLH	6HGSS	9HGSS	9HGSL	12HGSS	
HUS150 HUS130 HUS110	4 Drives x2	RAID 6	(2D+2P)x2	60	120	180	240					
	6 Drives x2		(4D+2P)x2	100	160	250	320					
	10 Drives x2		(8D+2P)x2	130	250	390	500					
	14 Drives x2		(12D+2P)x2	170	340	520	680					
	18 Drives x2		(16D+2P)x2	220	430	660	860					
	30 Drives x2		(28D+2P)x2	350	700	1070	1400					
	3 Drives x2	RAID 5	(2D+1P)x2	50	100	150	200					
	5 Drives x2		(4D+1P)x2	70	150	220	300					
	9 Drives x2		(8D+1P)x2	120	240	360	480					
	11 Drives x2		(10D+1P)x2	140	280	440	560					
	13 Drives x2		(12D+1P)x2	170	330	510	660					
	16 Drives x2		(15D+1P)x2	200	400	610	800					
	4 Drives x2	RAID 1+0	(2D+2D)x2	80	160	240	320					
8 Drives x2	(4D+4D)x2		140	290	440	580						
16 Drives x2	(8D+8D)x2		270	540	830	1080						
	2 Drives x2	RAID 1	(1D+1D)x2	50	100	150	200					

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

‡1 : Two RAID groups = one RAID group/controller0 and one RAID group/controller1.

**Table 11.1.5 Standard Times Required for Forced Parity Correction for Two RAID Groups  
(SAS7.2K Drive) (When No Host I/O, Two RAID Group) (<sup>‡1</sup>)**

				Unit : min								
Item				Drives ( <sup>*1</sup> )	1,956.94 G byte		2,935.96 G byte			3,915.01 G byte		
					2TNL	2TNX	3TNL	3TNX	3TNW	4TNL	4TNX	4TNW
HUS150 HUS130 HUS110	4 Drives x2	RAID 6	(2D+2P)x2	320				480			640	
	6 Drives x2		(4D+2P)x2	460				690			920	
	10 Drives x2		(8D+2P)x2	730				1100			1460	
	14 Drives x2		(12D+2P)x2	1020				1530			2040	
	18 Drives x2		(16D+2P)x2	1300				1950			2600	
	30 Drives x2		(28D+2P)x2	2140				3210			4280	
	3 Drives x2	RAID 5	(2D+1P)x2	320				480			640	
	5 Drives x2		(4D+1P)x2	430				650			860	
	9 Drives x2		(8D+1P)x2	660				990			1320	
	11 Drives x2		(10D+1P)x2	790				1190			1580	
	13 Drives x2		(12D+1P)x2	900				1350			1800	
	16 Drives x2		(15D+1P)x2	1070				1610			2140	
	4 Drives x2	RAID 1+0	(2D+2D)x2	440				660			880	
	8 Drives x2		(4D+4D)x2	840				1260			1680	
	16 Drives x2		(8D+8D)x2	1640				2460			3280	
	2 Drives x2	RAID 1	(1D+1D)x2	320				480			640	

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

<sup>‡1</sup> : Two RAID groups = one RAID group/controller0 and one RAID group/controller1.

**Table 11.1.5.1 Standard Times Required for Forced Parity Correction for Two RAID Groups (Flash Drive) (SSD) (When No Host I/O, Two RAID Group) (†1)**

				Unit : min		
Item				Drives (*1)	195.82 G byte	392.73 G byte
					2HGDM	4HGDM
						786.59 G byte
						8HGDM
HUS150 HUS130 HUS110	4 Drives x2	RAID 6	(2D+2P)x2	310	620	1240
	6 Drives x2		(4D+2P)x2	330	660	1320
	10 Drives x2		(8D+2P)x2	390	780	1560
	14 Drives x2		(12D+2P)x2	430	860	1720
	18 Drives x2		(16D+2P)x2	490	980	1960
	30 Drives x2		(28D+2P)x2	590	1180	2360
	3 Drives x2	RAID 5	(2D+1P)x2	190	390	780
	5 Drives x2		(4D+1P)x2	210	420	840
	9 Drives x2		(8D+1P)x2	250	500	1000
	11 Drives x2		(10D+1P)x2	290	580	1160
	13 Drives x2		(12D+1P)x2	310	620	1240
	16 Drives x2		(15D+1P)x2	350	700	1400
	4 Drives x2	RAID 1+0	(2D+2D)x2	310	620	1240
	8 Drives x2		(4D+4D)x2	650	1300	2600
	16 Drives x2		(8D+8D)x2	1270	2540	5080
	2 Drives x2	RAID 1	(1D+1D)x2	170	340	680

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

†1 : Two RAID groups = one RAID group/controller0 and one RAID group/controller1.



**Table 11.1.5.2 Standard Times Required for Forced Parity Correction for Two RAID Groups  
(Flash Drive) (FMD) (When No Host I/O, Two RAID Group) (‡1)**

				Unit : min
Item	Drives (*1)			1,758.12
				1R6FM
HUS150	4 Drives x2	RAID 6	(2D+2P)x2	2480
	6 Drives x2		(4D+2P)x2	2640
	10 Drives x2		(8D+2P)x2	3120
	14 Drives x2		(12D+2P)x2	3440
	18 Drives x2		(16D+2P)x2	3920
	30 Drives x2		(28D+2P)x2	4720
	3 Drives x2	RAID 5	(2D+1P)x2	1520
	5 Drives x2		(4D+1P)x2	1680
	9 Drives x2		(8D+1P)x2	2000
	11 Drives x2		(10D+1P)x2	2320
	13 Drives x2		(12D+1P)x2	2480
	16 Drives x2		(15D+1P)x2	2800
	4 Drives x2	RAID 1+0	(2D+2D)x2	2480
	8 Drives x2		(4D+4D)x2	5200
	16 Drives x2		(8D+8D)x2	10160
	2 Drives x2	RAID 1	(1D+1D)x2	1360

\*1 : The drive capacity values are calculated as 1 G byte  
=1,000,000,000 bytes. This definition is different from that  
calculated as 1 k byte =1,024 bytes, which are actually  
displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage  
Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

‡1 : Two RAID groups = one RAID group/controller0 and one RAID group/controller1.

NOTE : The data in Table 11.1.6, to Table 11.1.7.1 indicates the standard times required for forced parity correction for two RAID groups when 600 G bytes, 2000 G bytes, and 200 G bytes Drives are used. The times required for recovery processing varies in proportion to Drive capacity.

**Table 11.1.6 Standard Times Required for Forced Parity Correction for Two RAID Groups<sup>‡1)</sup>  
(SAS Drive) (When Host I/Os Are Executed)**

	RAID level	Capacity(*1)	Host performance	Parity correction
HUS110 (575.30 Gbytes HDU used)	RAID 6	(4D+2P)x2 7827.5 Gbytes	1390 IOPS	1130 min
		(28D+2P)x2 54792.5 Gbytes	1260 IOPS	1360 min
	RAID 5	(4D+1P)x2 7827.5 Gbytes	1010 IOPS	780 min
		(15D+1P)x2 29353.1 Gbytes	1240 IOPS	1270 min
	RAID 1+0	(2D+2D)x2 3913.7 Gbytes	1380 IOPS	1070 min
		(8D+8D)x2 15655 Gbytes	1600 IOPS	4120 min
	RAID 1	(1D+1D)x2 1956.8 Gbytes	1070 IOPS	340 min
HUS130 (575.30 Gbytes HDU used)	RAID 6	(4D+2P)x2 7827.5 Gbytes	2020 IOPS	790 min
		(28D+2P)x2 54792.5 Gbytes	2660 IOPS	1570 min
	RAID 5	(4D+1P)x2 7827.5 Gbytes	2370 IOPS	760 min
		(15D+1P)x2 29353.1 Gbytes	3010 IOPS	940 min
	RAID 1+0	(2D+2D)x2 3913.7 Gbytes	2510 IOPS	740 min
		(8D+8D)x2 15655 Gbytes	3410 IOPS	1850 min
	RAID 1	(1D+1D)x2 1956.8 Gbytes	1900 IOPS	350 min
HUS150 (575.30 Gbytes HDU used)	RAID 6	(4D+2P)x2 7827.5 Gbytes	2680 IOPS	380 min
		(28D+2P)x2 54792.5 Gbytes	4170 IOPS	890 min
	RAID 5	(4D+1P)x2 7827.5 Gbytes	2660 IOPS	340 min
		(15D+1P)x2 29353.1 Gbytes	3790 IOPS	550 min
	RAID 1+0	(2D+2D)x2 3913.7 Gbytes	2660 IOPS	380 min
		(8D+8D)x2 15655 Gbytes	4270 IOPS	770 min
	RAID 1	(1D+1D)x2 1956.8 Gbytes	1750 IOPS	260 min

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

‡1 : Two RAID groups = one RAID group/controller 0 and one RAID group/controller1

**Table 11.1.7 Standard Times Required for Forced Parity Correction for Two RAID Groups<sup>‡1</sup>  
(SAS7.2K Drive) (When Host I/Os Are Executed)**

	RAID level		Host performance	Parity correction
HUS110 (1956.94 Gbytes HDU used)	RAID 6	(4D+2P)x2	1130 IOPS	2300 min
		(28D+2P)x2	1130 IOPS	5100 min
	RAID 5	(4D+1P)x2	1130 IOPS	2150 min
		(15D+1P)x2	1310 IOPS	3180 min
	RAID 1+0	(2D+2D)x2	1170 IOPS	2530 min
		(8D+8D)x2	1510 IOPS	5530 min
	RAID 1	(1D+1D)x2	850 IOPS	1500 min
HUS130 (1956.94 Gbytes HDU used)	RAID 6	(4D+2P)x2	1840 IOPS	2130 min
		(28D+2P)x2	1970 IOPS	4670 min
	RAID 5	(4D+1P)x2	1840 IOPS	1720 min
		(15D+1P)x2	1500 IOPS	2950 min
	RAID 1+0	(2D+2D)x2	1880 IOPS	1780 min
		(8D+8D)x2	2480 IOPS	4370 min
	RAID 1	(1D+1D)x2	1310 IOPS	1160 min
HUS150 (1956.94 Gbytes HDU used)	RAID 6	(4D+2P)x2	1880 IOPS	1760 min
		(28D+2P)x2	860 IOPS	4550 min
	RAID 5	(4D+1P)x2	1910 IOPS	1560 min
		(15D+1P)x2	1900 IOPS	2670 min
	RAID 1+0	(2D+2D)x2	1950 IOPS	1640 min
		(8D+8D)x2	2240 IOPS	4650 min
	RAID 1	(1D+1D)x2	1220 IOPS	1140 min

‡1 : Two RAID groups = one RAID group/controller0 and one RAID group/controller1

**Table 11.1.7.1 Standard Times Required for Forced Parity Correction for Two RAID Groups<sup>‡1)</sup>  
(Flash Drive) (SSD) (When Host I/Os Are Executed)**

	RAID level		Capacity(*1)	Host performance	Parity correction
HUS130 HUS110 (195.82 Gbytes HDU used)	RAID 6	(4D+2P)x2	725.4 Gbytes	2500 IOPS	380 min
	RAID 5	(4D+1P)x2	725.4 Gbytes	4000 IOPS	280 min
	RAID 1+0	(2D+2D)x2	362.6 Gbytes	4000 IOPS	400 min
	RAID 1	(1D+1D)x2	181.3 Gbytes	3000 IOPS	220 min
HUS150 (195.82 Gbytes HDU used)	RAID 6	(4D+2P)x2	725.4 Gbytes	4000 IOPS	440 min
	RAID 5	(4D+1P)x2	725.4 Gbytes	7000 IOPS	300 min
	RAID 1+0	(2D+2D)x2	362.6 Gbytes	7000 IOPS	480 min
	RAID 1	(1D+1D)x2	181.3 Gbytes	6000 IOPS	240 min

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

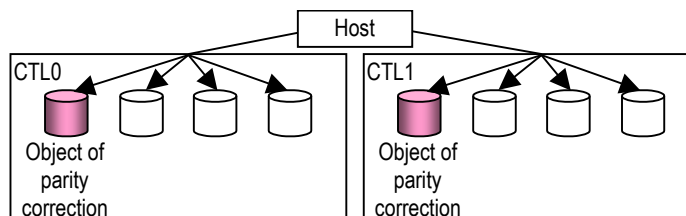
**Table 11.1.7.2 Standard Times Required for Forced Parity Correction for Two RAID Groups<sup>‡1)</sup>  
(Flash Drive) (FMD) (When Host I/Os Are Executed)**

	RAID level		Capacity(*1)	Host performance	Parity correction
HUS150 (1,758.12 Gbytes HDU used)	RAID 6	(4D+2P)x2	5803.2 Gbytes	4000 IOPS	3520 min
	RAID 5	(4D+1P)x2	5803.2 Gbytes	7000 IOPS	2400 min
	RAID 1+0	(2D+2D)x2	2900.8 Gbytes	7000 IOPS	3840 min
	RAID 1	(1D+1D)x2	1450.4 Gbytes	6000 IOPS	1920 min

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

Conditions of measurement of a time required for the forced parity correction are as follows.

- Each of all Volumes belongs to different RAID group.
- Only one Volume per CTL is restored and an host I/O of random reading (75 %) and writing (25 %) of 4-kbyte data TAG8 is executed for all the Volumes.



‡1 : Two RAID groups = one RAID group/controller0 and one RAID group/controller1

### 11.1.4 The Power cannot be Turned Off : Case 1 (The Number of PIN Data is Too Large)

(The planned shutdown cannot be performed due to the Drive/Controller failure)

- (1) A case where “PS OFF failed” is displayed in the WEB Information Message

[WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	HI0600 PS OFF failed [PIN]	:MANUAL/CTRC
Date	Time	x : Detect Controller # y : Detect Core #		

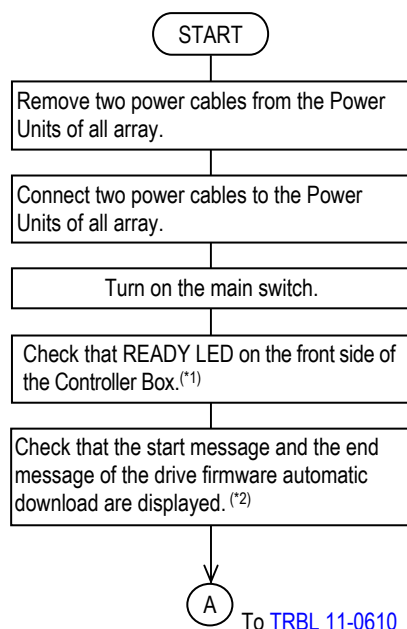
- (2) A case where “PS OFF failed” is not displayed in the WEB Information Message

In the planned shutdown in the PIN Over occurrence status, the WEB Information Message shown below is not displayed and the planned shutdown is not completed for 30 minutes or more.

[WEB Information Message display]

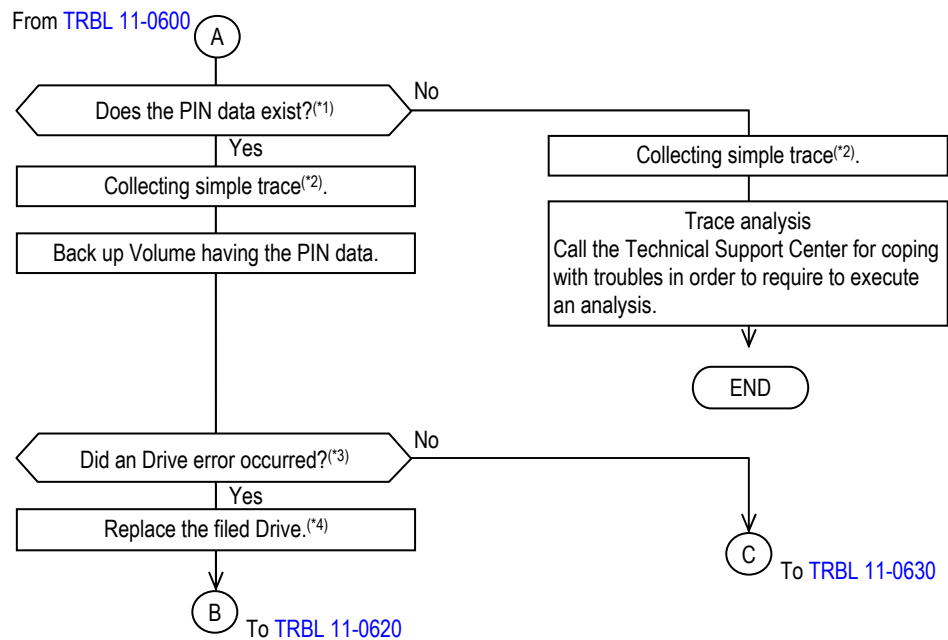
MM/DD/YYYY	hh:mm:ss	xy	HI0600 PS OFF failed [PIN]	:MANUAL/CTRC
Date	Time	x : Detect Controller # y : Detect Core #		

[Recovery method]



\*1 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*2 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware “1.6 \(4\) Checking the start message and end message of the automatic download” \(FIRM 01-1620\)](#).



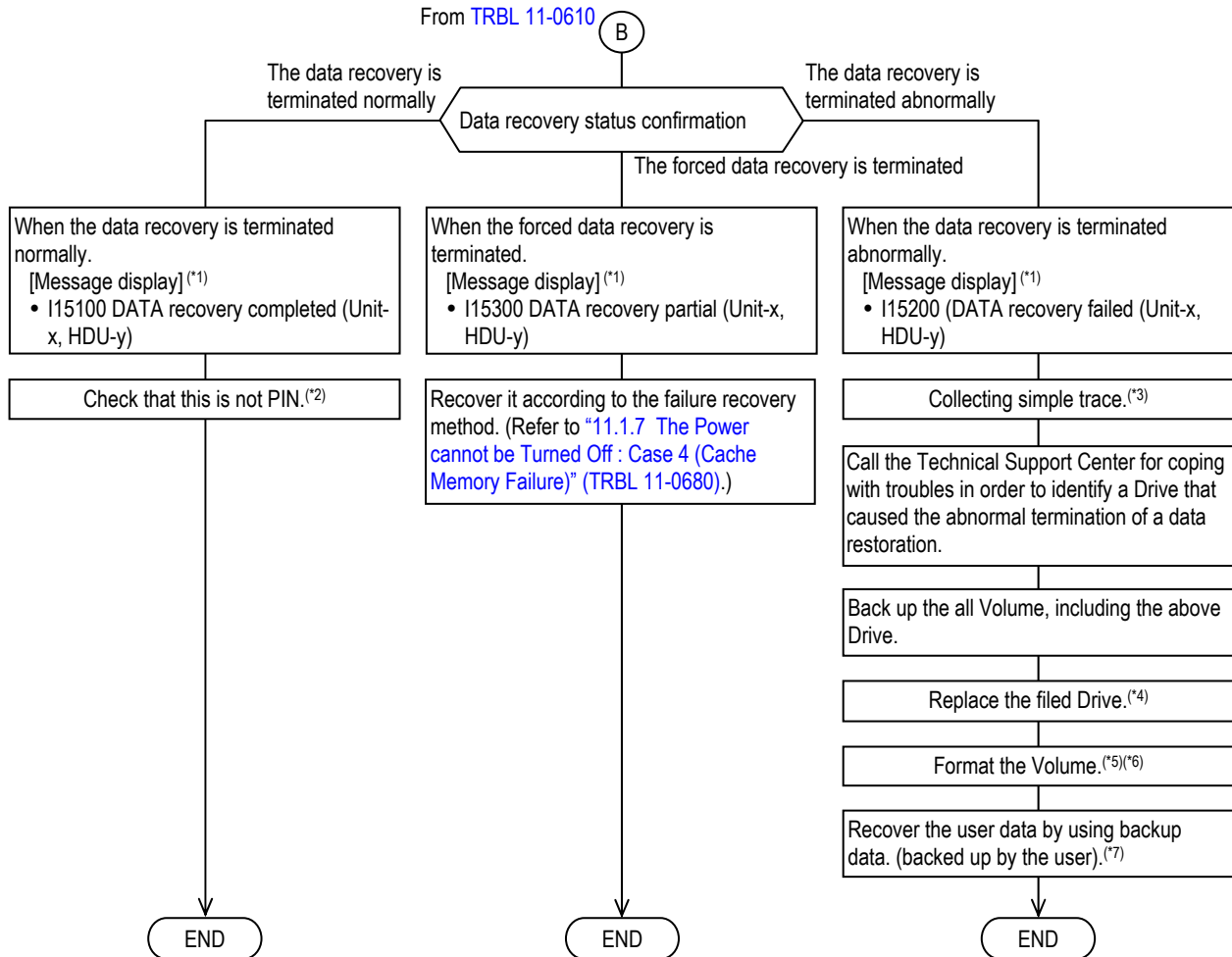
\*1 : Checking the presence of PIN data is performed by the Maintenance function of Hitachi Storage Navigator Modular

2. Refer to [“8.3.1 Displaying Volume Failure Data Information” \(TRBL 08-0130\)](#).

\*2 : For Simple Trace Collection, refer to [“5.3 Collecting Simple Trace” \(TRBL 05-0040\)](#).

\*3 : For checking a Drive error, refer to [“7.2 \(2\) Trouble analysis based on LED indication of Drive” \(TRBL 07-0180\)](#) or [“Chapter 4. Trouble Analysis by WEB Connection” \(TRBL 04-0000\)](#).

\*4 : For the replacement of the Drive, refer to the Replacement [“2.2.1 Replacing a Drive” \(REP 02-0050\)](#).



\*1 : For the connection of the WEB, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).

\*2 : Checking the presence of PIN data is performed by the Maintenance function of Hitachi Storage Navigator Modular 2. Refer to "8.3.1 Displaying Volume Failure Data Information" (TRBL 08-0130).

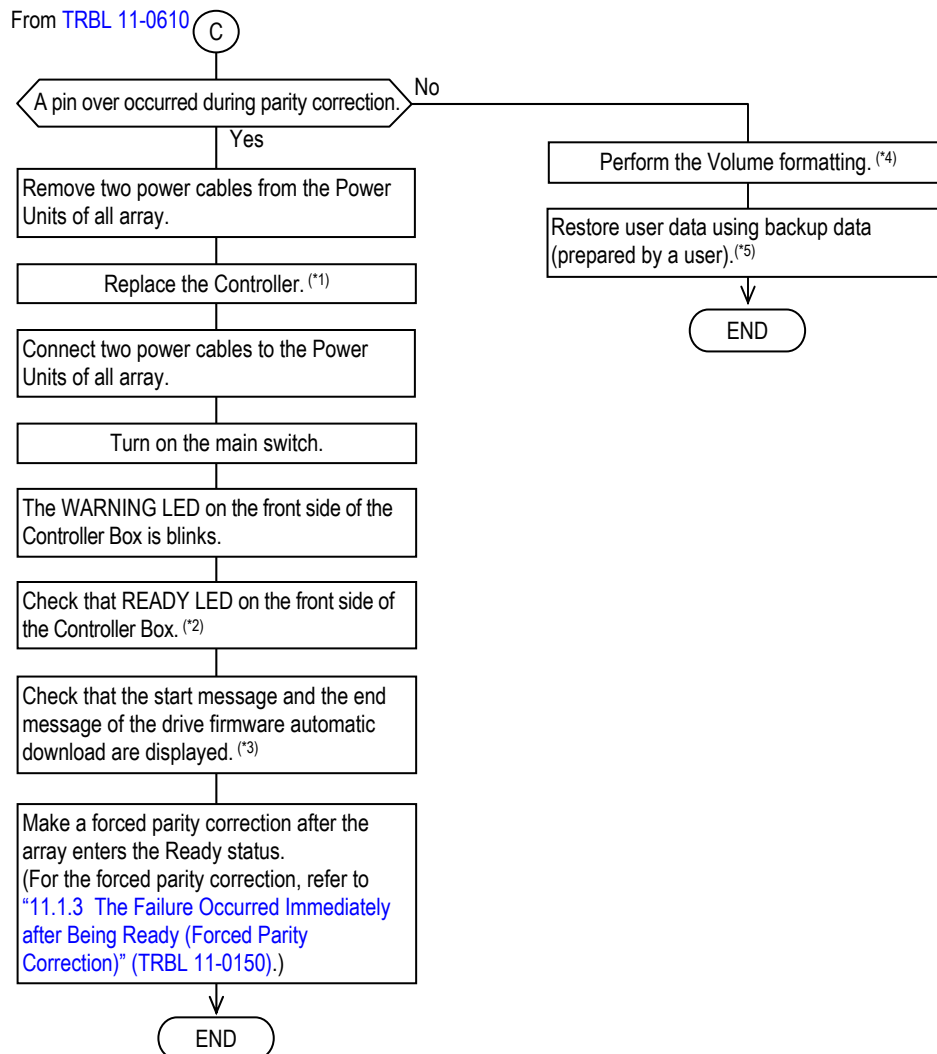
\*3 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

\*4 : For the replacement of the Drive, refer to the Replacement "2.2.1 Replacing a Drive" (REP 02-0050).

\*5 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to System Parameter "4.3.6 Formatting Volume" (SYSPR 04-0500).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*6 : Check with the user whether the Dynamic Provisioning/Dynamic Tiering function is used. If it is used, request the user to reinitializing the DP pool. Moreover, check with the customer for the format status of the DP volume, and if the DP volume is unformatted, perform the Volume format.

\*7 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.



\*1 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

\*2 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*3 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\)](#).

\*4 : For the Volume format, refer to the [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).

\*5 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function.  
If it is used, restore the backup data according to the user's instruction.



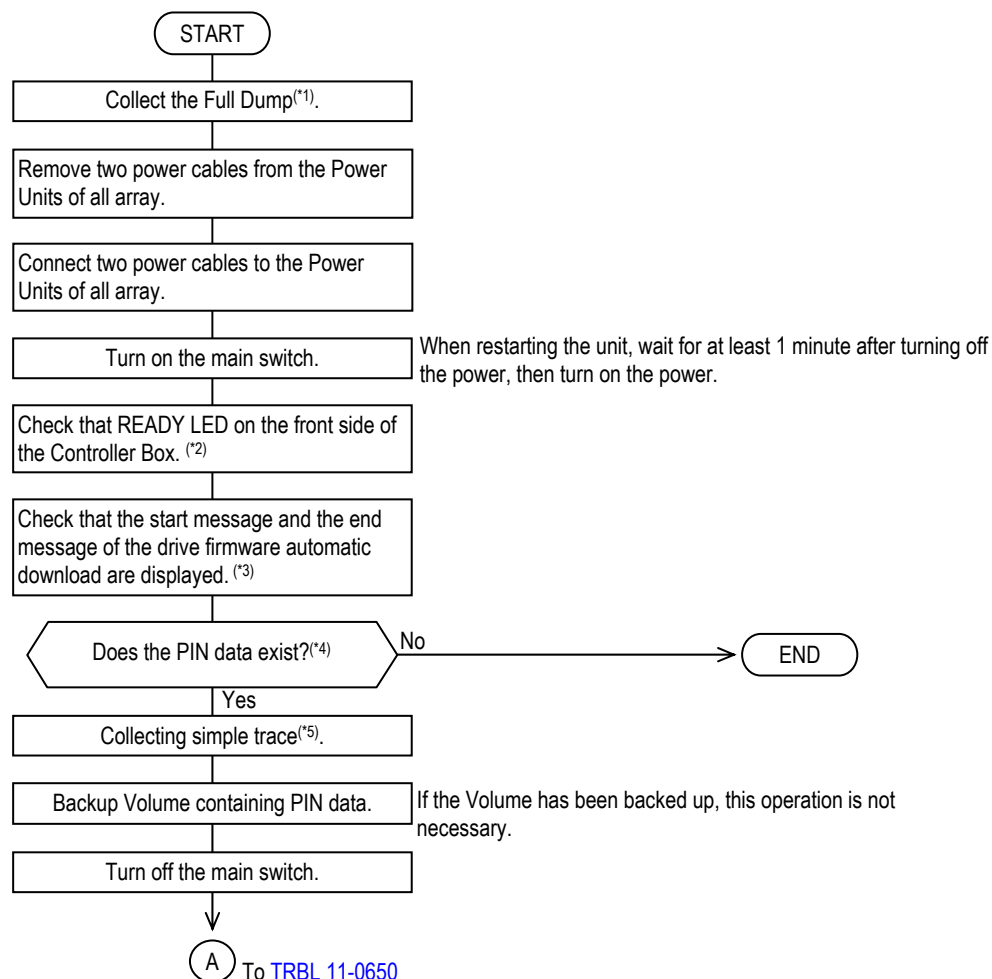
### 11.1.5 The Power cannot be Turned Off : Case 2 (Hardware Failure)

(It tried to store the PIN data in the Drive at the time of the planned shutdown, but it cannot POWER OFF because a hardware failure occurred)

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy W36000 PIN write error			:MANUAL/STRC
MM/DD/YYYY	hh:mm:ss	xy	
Date	Time	x : Detect Controller #	
		y : Detect Core #	

#### [Recovery method]



\*1 : For Full Dump Collection, refer to “5.5 Collecting Full Dump” (TRBL 05-0180).

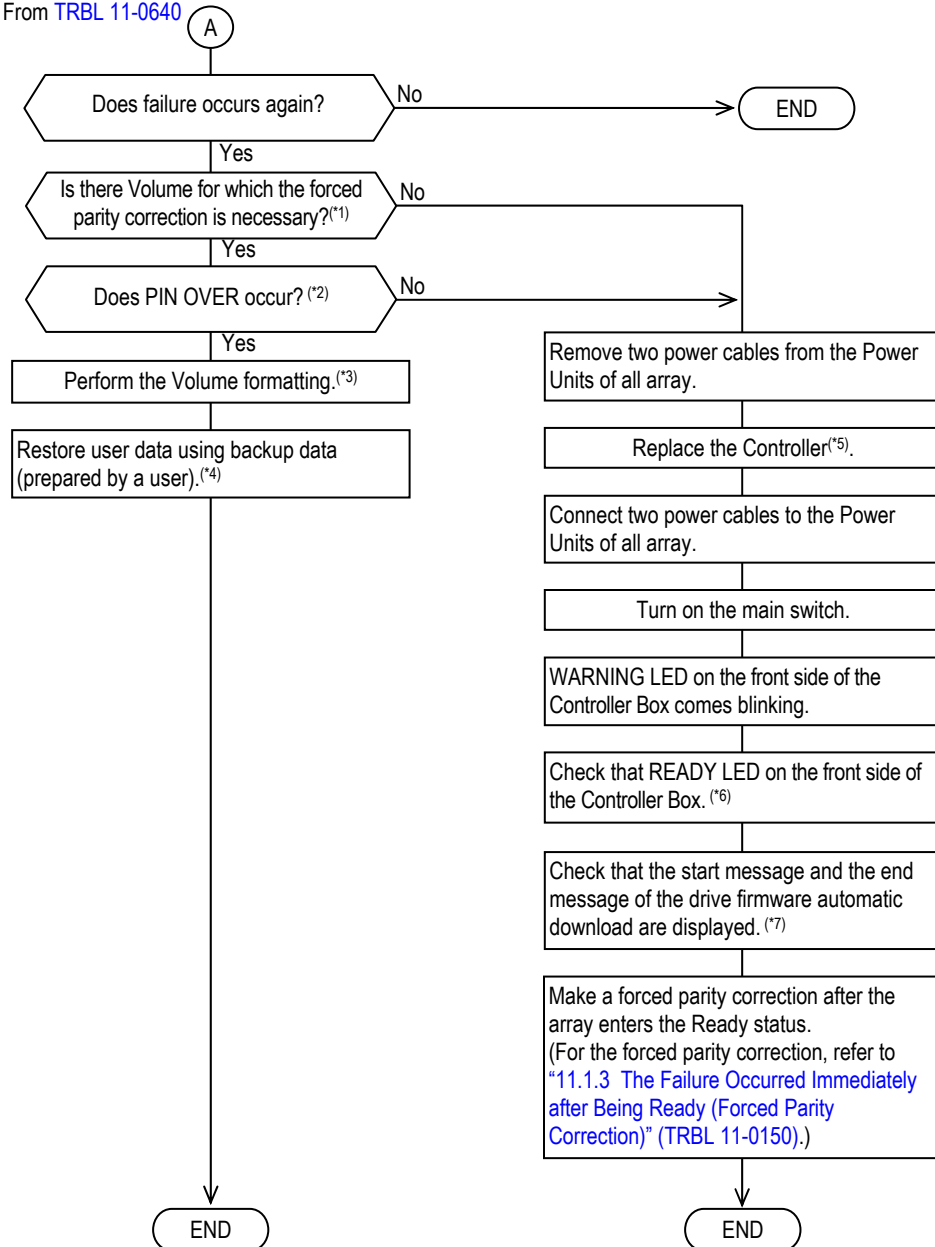
\*2 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*3 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to Firmware “1.6 (4) Checking the start message and end message of the automatic download” (FIRM 01-1620).

\*4 : Checking the presence of PIN data is performed by the Maintenance function of Hitachi Storage Navigator Modular 2. Refer to “8.3.1 Displaying Volume Failure Data Information” (TRBL 08-0130).

\*5 : For Simple Trace Collection, refer to “5.3 Collecting Simple Trace” (TRBL 05-0040).

From TRBL 11-0640



\*1 : The message code "W3D000 Forced parity correction Volume is detected" is displayed in the Information Message on the WEB, and the WARNING LED (orange) on the Controller Box (front side of the array) lights on or blinks.

\*2 : The message codes "W3G000", "W3H000", "W3J000", "W3K000", "W3L000" and "W3M000" are displayed in the Information Message on the WEB, and the WARNING LED (orange) on the Controller Box (front side of the array) lights on or blinks.

\*3 : For the Volume format, refer to the [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).

\*4 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

\*5 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

\*6 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*7 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\)](#).

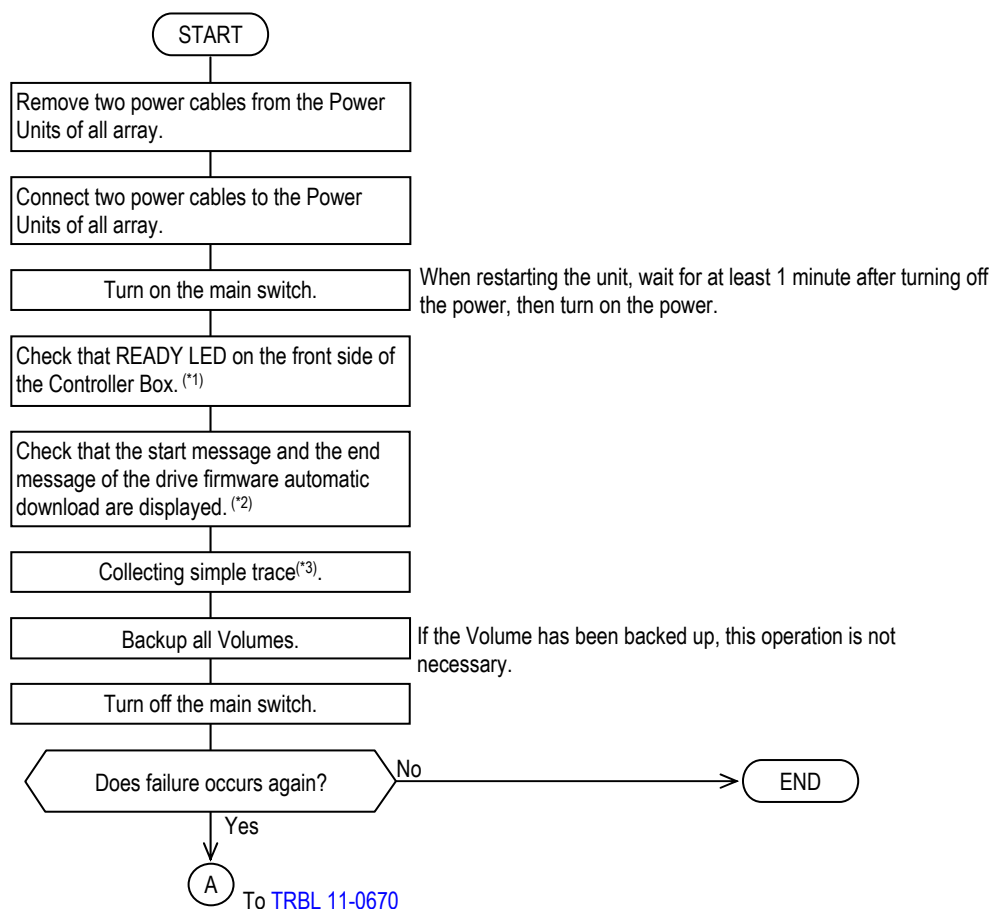
### 11.1.6 The Power cannot be Turned Off : Case 3 (Controller Failure)

(Planned shutdown cannot be performed because all the Drives to which inheritance information is to be saved disappeared due to a DMA double error or a drive quintuple error.)

#### [WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	W0S000 PS OFF failed [NO HDU]	:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #		

#### [Recovery method]

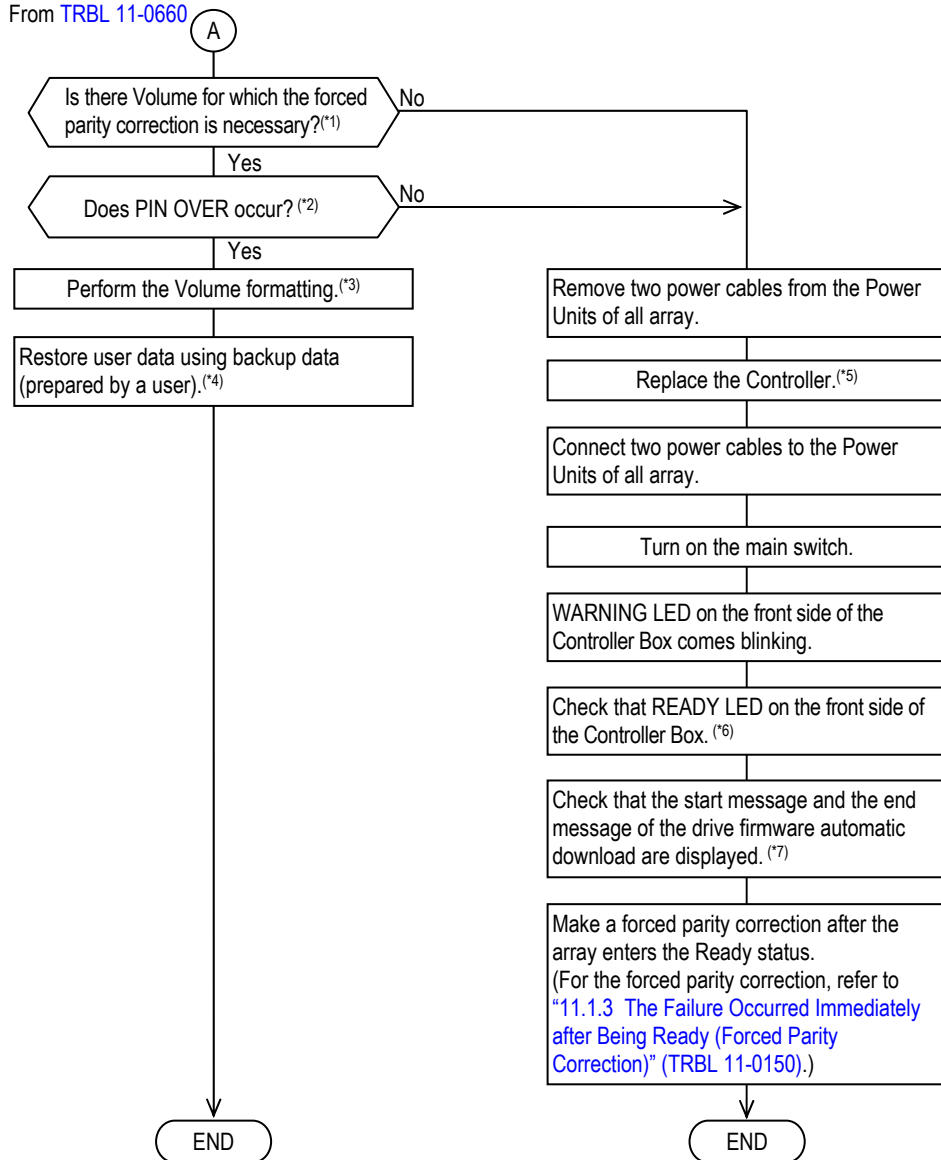


\*1 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*2 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\)](#).

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-0660



\*1 : The message code "W3D000 Forced parity correction LU is detected" is displayed in the Information Message on the WEB, and the WARNING LED (orange) on the Controller Box (front side of the array) lights on or blinks.

\*2 : The message codes "W3G000", "W3H000", "W3J000", "W3K000", "W3L000" and "W3M000" are displayed in the Information Message on the WEB, and the WARNING LED (orange) on the Controller Box (front side of the array) lights on or blinks.

\*3 : For the Volume format, refer to the [System Parameter "4.3.6 Formatting Volume"](#) (SYSPR 04-0500).

\*4 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

\*5 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller"](#) (REP 02-0700).

\*6 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*7 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download"](#) (FIRM 01-1620).

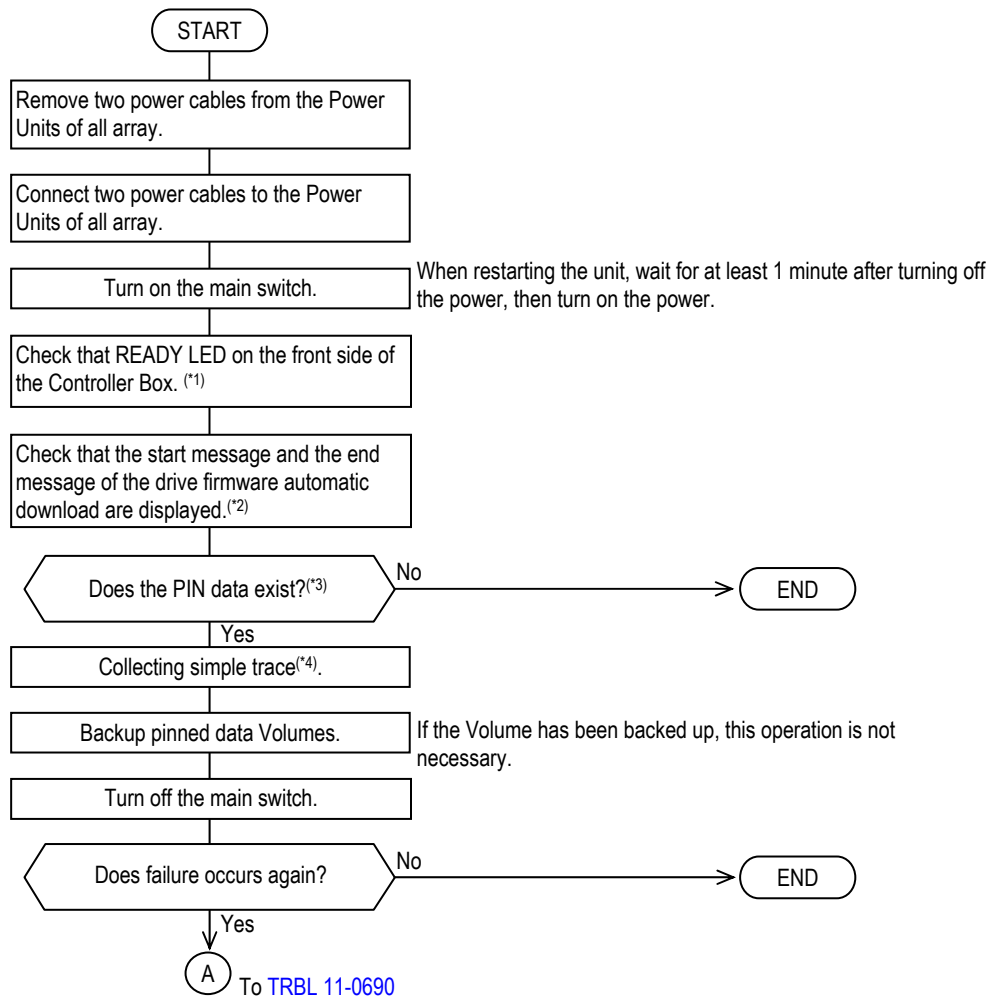
### 11.1.7 The Power cannot be Turned Off : Case 4 (Cache Memory Failure)

(The PIN data cannot be saved because a Cache memory or other failure occurs, and the planned shutdown cannot be performed)

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy W0T000 PS OFF failed [CACHE ERR]			:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #	

#### [Recovery method]



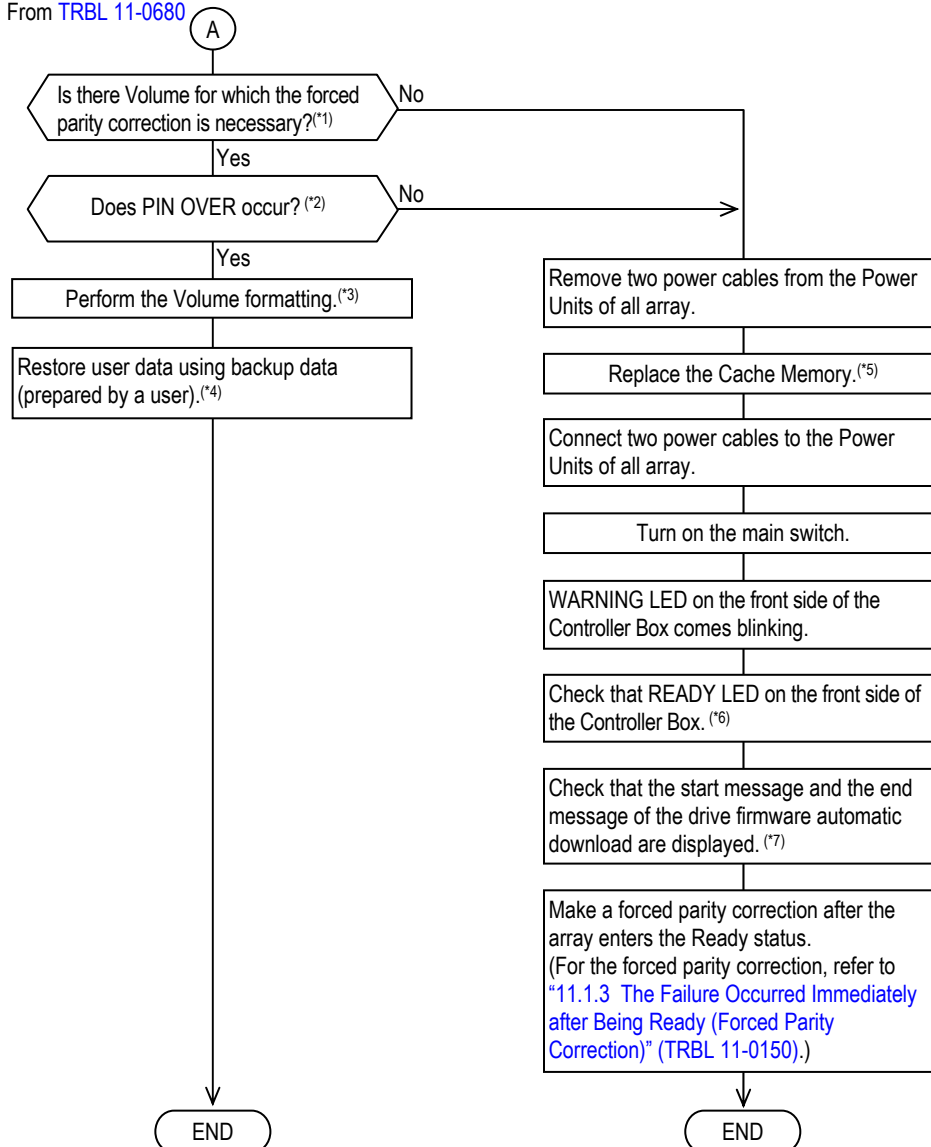
\*1 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*2 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\)](#).

\*3 : Checking the presence of PIN data is performed by the Maintenance function of Hitachi Storage Navigator Modular 2. Refer to ["8.3.1 Displaying Volume Failure Data Information" \(TRBL 08-0130\)](#).

\*4 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-0680



\*1 : The message code "W3D000 Forced parity correction Volume is detected" is displayed in the Information Message on the WEB, and the Warning LED (orange) on the Controller Box (front side of the array) lights on or blinks.

\*2 : The message codes "W3G000", "W3H000", "W3J000", "W3K000", "W3L000" and "W3M000" are displayed in the Information Message on the WEB, and the WARNING LED (orange) on the Controller Box (front side of the array) lights on or blinks.

\*3 : For the Volume format, refer to the [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).

\*4 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

\*5 : For the replacement of the Cache Memory, refer to the [Replacement "2.2.6 Replacing a Cache Memory" \(REP 02-0920\)](#).

\*6 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*7 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\)](#).

### 11.1.8 Data Recovery does not Terminate Normally : Case 1 (Read Error)

When a read error occurred in the copy source during the correction copy or copy back, the recovery procedure differs depending on the case that the forced recovery is executed or the data recovery terminated abnormally.

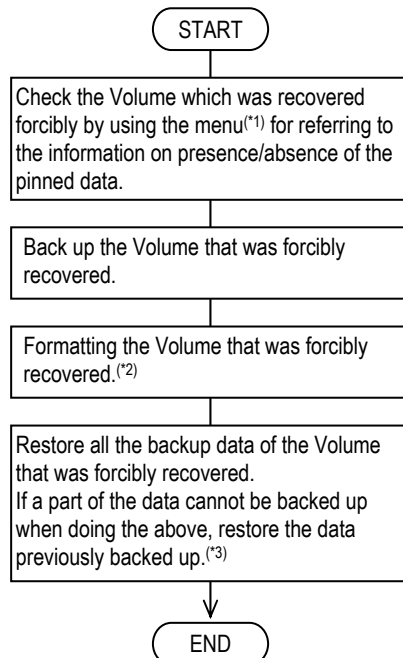
- (1) When a read error occurred in the copy source during the correction copy or copy back, and the forced recovery was executed

Forced recovery ..... When attempting to read the data which was recovered forcibly, it is reported as a read error.

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy l15300 Data recovery partial			:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #	

#### [Recovery method]



\*1 : Checking the presence of PIN data is performed by the Maintenance function of Hitachi Storage Navigator Modular 2. Refer to [“8.3.1 Displaying Volume Failure Data Information” \(TRBL 08-0130\)](#).

\*2 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is “05-9552” or “05-9577”, the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter “4.3.6 Formatting Volume” \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

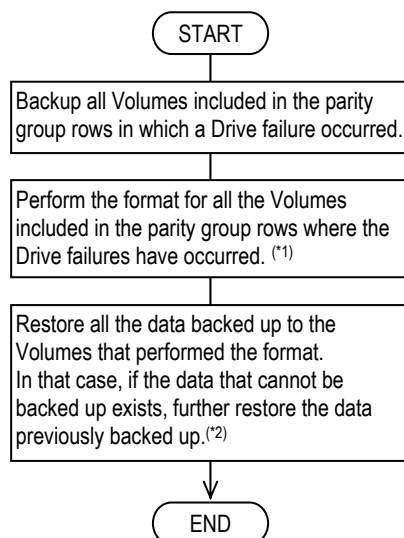
\*3 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user’s instruction.

- (2) When a read error occurred in the copy source during the correction copy or copy back, and the data recovery terminated abnormally

[WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy I15200 Data recovery failed (Unit-x, HDU-y)			:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #	

[Recovery method]



\*1 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*2 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

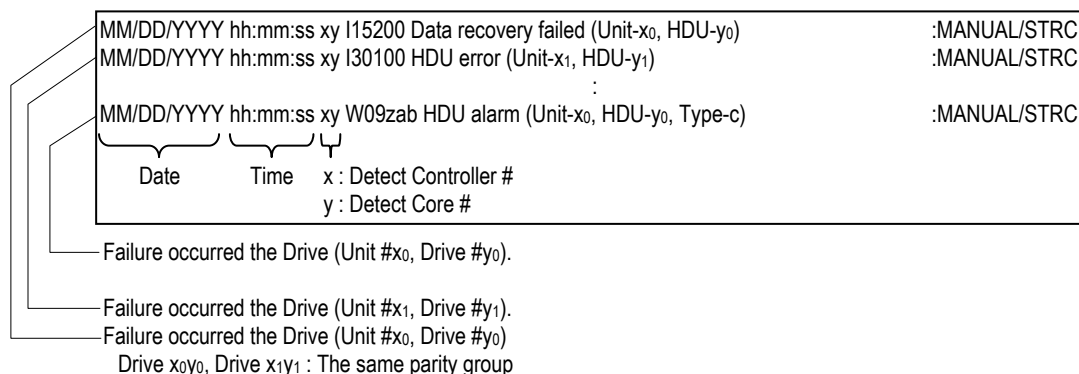


### 11.1.9 Data Recovery does not Terminate Normally : Case 2 (Drive Failure)

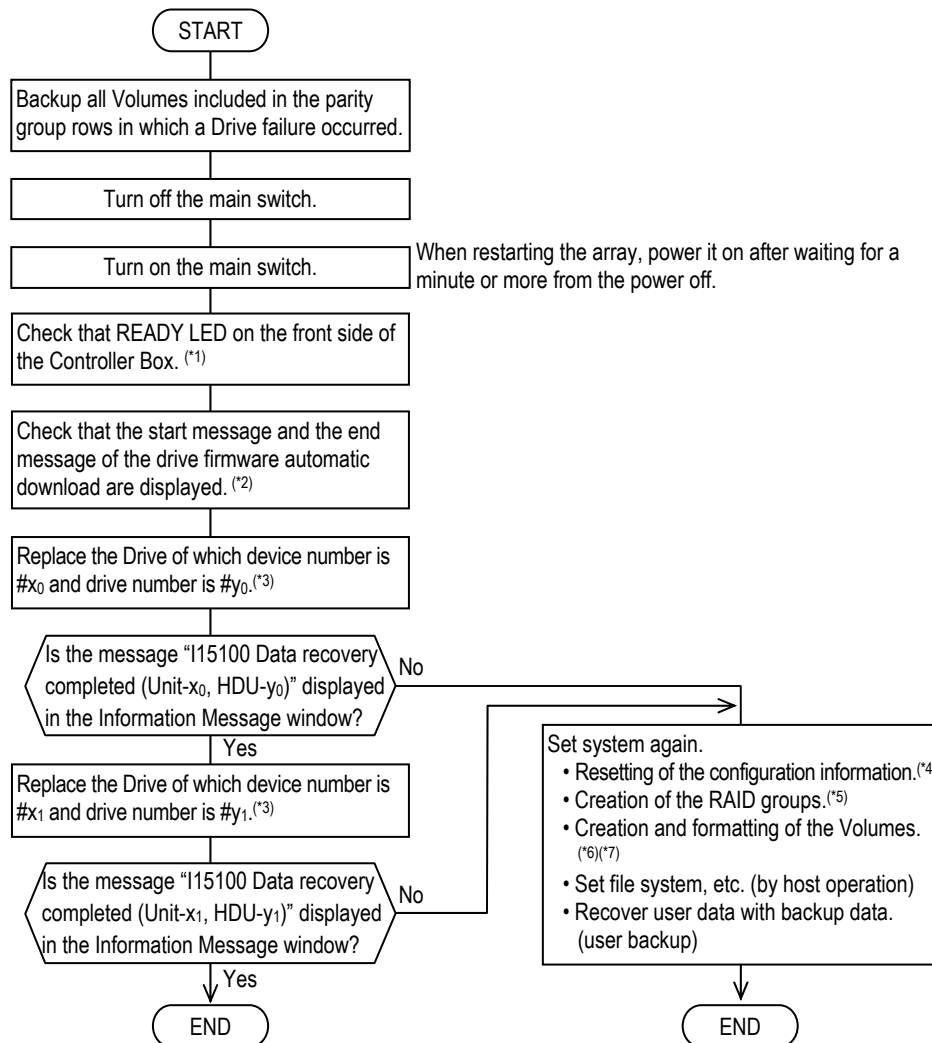
(The Drive failures (two Drive failures in the same parity group line, and three Drive failures in case of the parity group of the RAID level 6) occurred in the Drives of the copy source during the correction copy or the copy back, and the data restoration was terminated abnormally.)

[WEB Information Message display]

(1) Example of the SAS Drive failure.



## [Recovery method]



\*1 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*2 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\)](#).

\*3 : W09zab is displayed as the message code of the Drive failure. Also, when a failure occurs in the Spare Drive in use, W0Bzab is displayed as the message code. For the replacement of the Drive, refer to the [Replacement "2.2.1 Replacing a Drive" \(REP 02-0050\)](#).

\*4 : Refer to [System Parameter "Chapter 8. Setting Basic Parameter of the System" \(SYSPR 08-0000\)](#).

\*5 : Refer to [System Parameter "4.2 Setting RAID Group" \(SYSPR 04-0030\)](#).

\*6 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*7 : Check with the user whether the Dynamic Provisioning/Dynamic Tiering function is used, and if it is used, request the user to create a DP pool and a DP volume.

#### 11.1.10 Data Recovery does not Terminate Normally : Case 3 (Spare Drive Failure)

(A Spare Drive failure occurred while the correction is copied and the recovery failed.)

[WEB Information Message display]

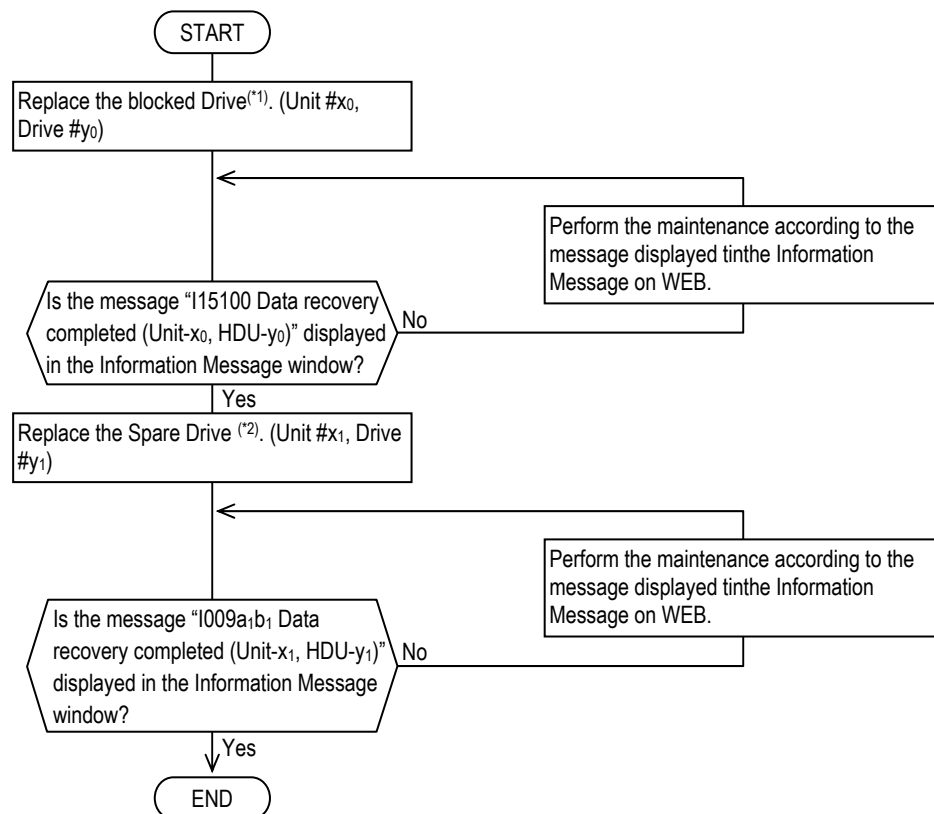
(1) Example of SAS Spare Drive trouble.

	MM/DD/YYYY hh:mm:ss xy I15200 Data recovery failed (Unit-x <sub>1</sub> , HDU-y <sub>1</sub> )	:MANUAL/STRC
	MM/DD/YYYY hh:mm:ss xy W0Bzab Spare HDU alarm (Unit-x <sub>1</sub> , HDU-y <sub>1</sub> , Type-c)	:MANUAL/STRC
	MM/DD/YYYY hh:mm:ss xy I15000 Data recovery started (Unit-x <sub>1</sub> , HDU-y <sub>1</sub> )	
	MM/DD/YYYY hh:mm:ss xy W09zab HDU alarm (Unit-x <sub>0</sub> , HDU-y <sub>0</sub> , Type-c)	:MANUAL/STRC
	<div style="display: flex; justify-content: space-around;"> <span>{ Date }</span> <span>{ Time }</span> <span>x : Detect Controller #</span> </div> <div style="margin-left: 180px;">y : Detect Core #</div>	

- Failure occurred the Spare Drive (Unit#x<sub>0</sub>, Drive #y<sub>0</sub>).
- Recovery start the Spare Drive (Unit#x<sub>1</sub>, Drive #y<sub>1</sub>).
- Failure occurred the Spare Drive (Unit#x<sub>1</sub>, Drive #y<sub>1</sub>).
- Failure occurred the Spare Drive (Unit#x<sub>1</sub>, Drive #y<sub>1</sub>).

## [Recovery method]



\*1 : W09zab is displayed as the message code of the Drive failure. Also, when a failure occurs in the Spare Drive in use, W0Bzab is displayed as the message code. For the replacement of the Drive, refer to the [Replacement "2.2.1 Replacing a Drive" \(REP 02-0050\)](#).

\*2 : W0Bzab is displayed as the message code of the Spare Drive failure. For the replacement of the Spare Drive, refer to the [Replacement "2.2.1 Replacing a Drive" \(REP 02-0050\)](#).

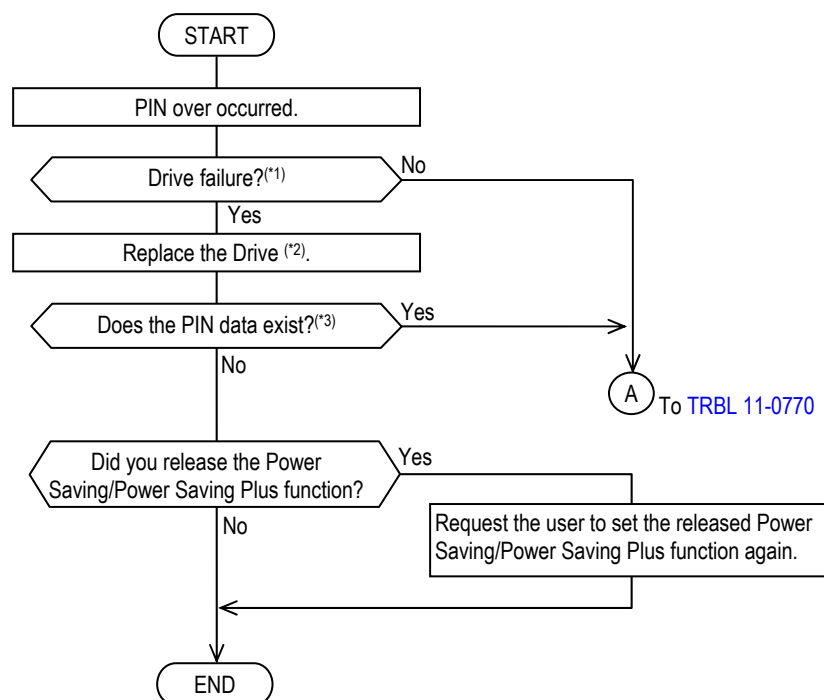
#### 11.1.11 A Failure Occurred during Operation : Case 1 (PIN Over)

[WEB Information Message display]

```
MM/DD/YYYY hh:mm:ss xy W3G000 PIN is over directory threshold [write through] (DIR-x)
MM/DD/YYYY hh:mm:ss xy W3H000 PIN is over directory threshold [write will not run] (DIR-x)
MM/DD/YYYY hh:mm:ss xy W3J000 PIN is over partition threshold [write through] (DIR-x, PTT-xx)
MM/DD/YYYY hh:mm:ss xy W3K000 PIN is over partition threshold [write will not run] (DIR-x, PTT-xx)
MM/DD/YYYY hh:mm:ss xy W3L000 PIN is over RAID group threshold [write through] (DIR-x, RG-xx)
MM/DD/YYYY hh:mm:ss xy W3M000 PIN is over RAID group threshold [write will not run] (DIR-x, RG-xx)
MM/DD/YYYY hh:mm:ss xy W71000 The number of PINs exceeded partition threshold [write through] (DIR-x, Management Area)
MM/DD/YYYY hh:mm:ss xy W72000 Number of PINs exceeded partition threshold [write will not run] (DIR-x, Management Area)

    Date      Time      x : Detect Controller #
                        y : Detect Core #
```

[Recovery method]



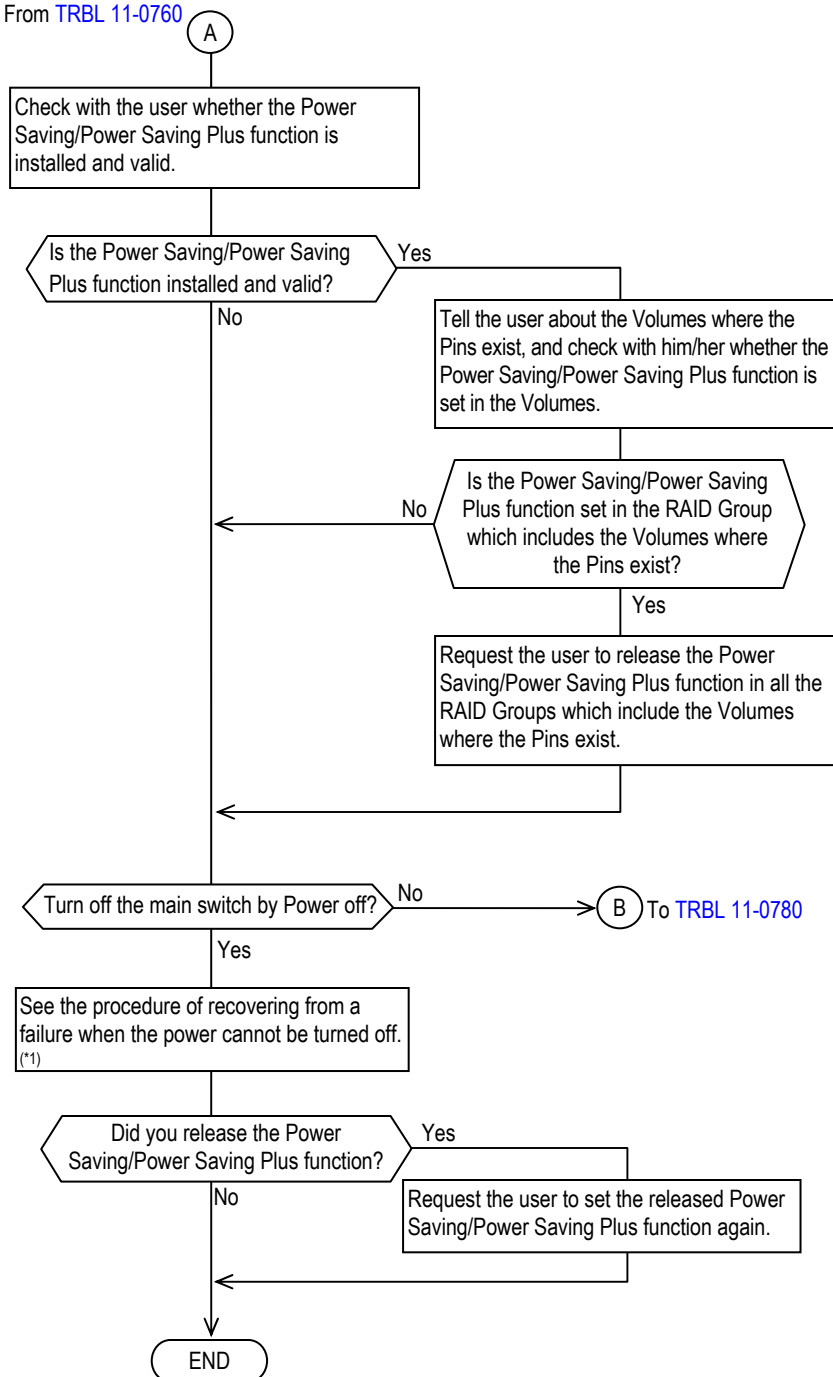
\*1 : For checking a Drive error, refer to “7.2 (2) Trouble analysis based on LED indication of Drive” (TRBL 07-0180) or “Chapter 4. Trouble Analysis by WEB Connection” (TRBL 04-0000).

\*2: For the replacement of the failed component, refer to the [Replacement “Chapter 2. Parts Replacement” \(REP 02-0000\)](#).

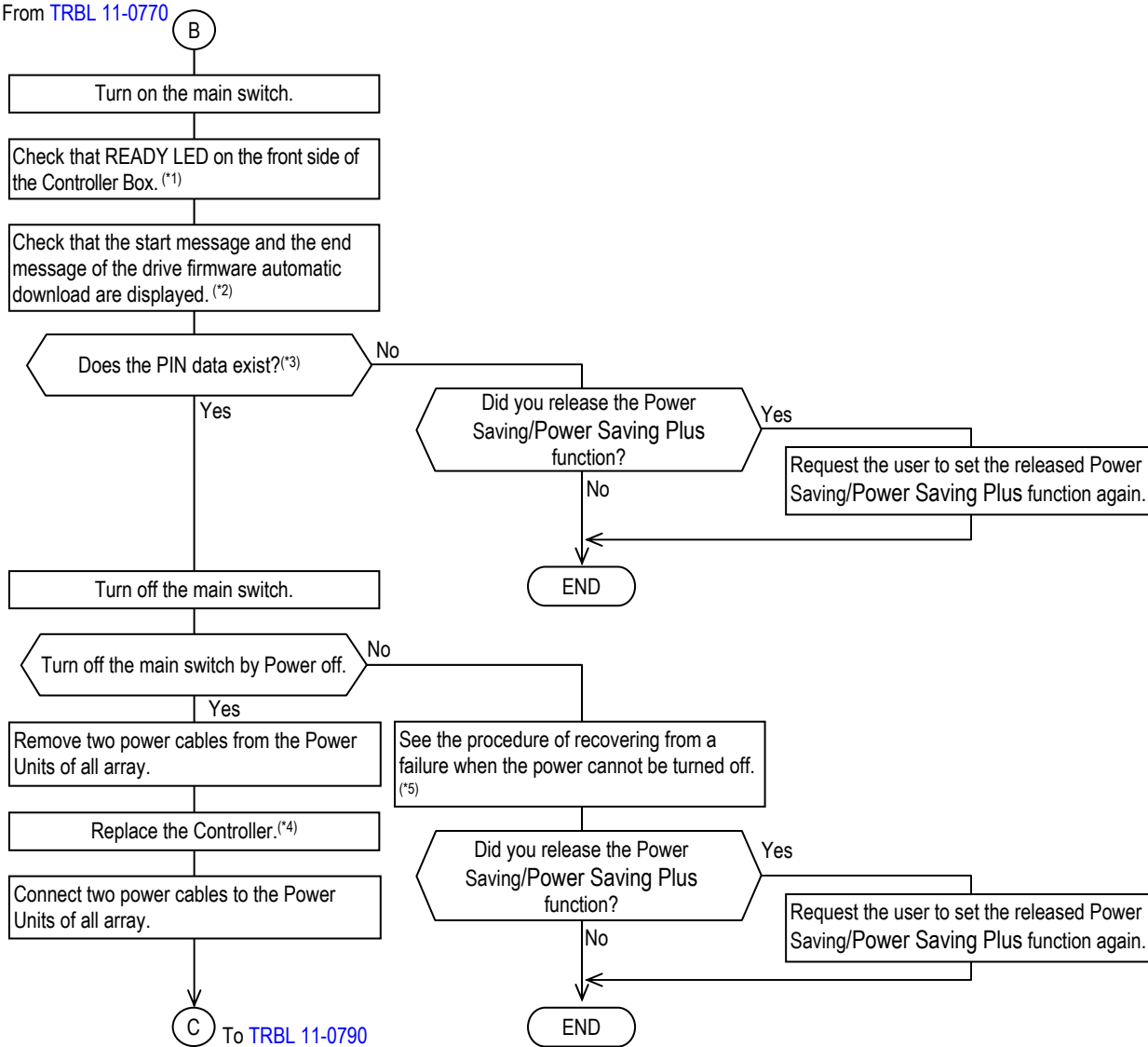
\*3 : Checking the presence of PIN data is performed by the Maintenance function of Hitachi Storage Navigator Modular.

2. Refer to [“8.3.1 Displaying Volume Failure Data Information” \(TRBL 08-0130\)](#).

From TRBL 11-0760



\*1 : Refer to "11.1.4 The Power cannot be Turned Off : Case 1 (The Number of PIN Data is Too Large)" (TRBL 11-0600) to "11.1.7 The Power cannot be Turned Off : Case 4 (Cache Memory Failure)" (TRBL 11-0680).

From [TRBL 11-0770](#)

\*1 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

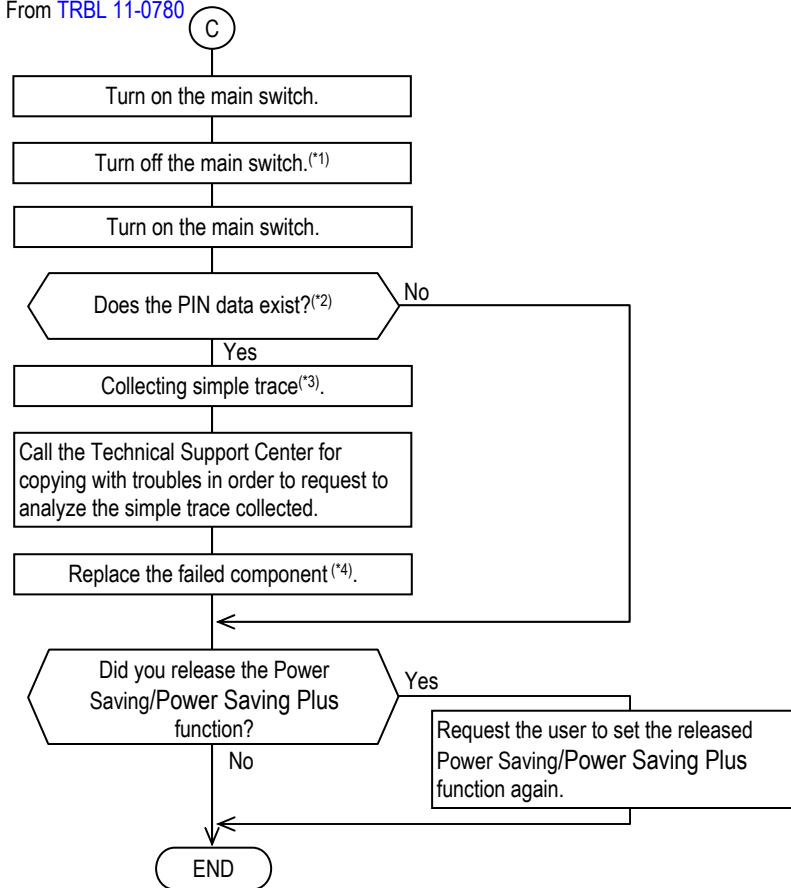
\*2 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\)](#).

\*3 : When restarting the array, power it on after waiting for a minute or more from the power off.

\*4 : For the replacement of the failed component, refer to the [Replacement "Chapter 2. Parts Replacement" \(REP 02-0000\)](#)

\*5 : Refer to ["11.1.4 The Power cannot be Turned Off : Case 1 \(The Number of PIN Data is Too Large\)" \(TRBL 11-0600\)](#) to ["11.1.7 The Power cannot be Turned Off : Case 4 \(Cache Memory Failure\)" \(TRBL 11-0680\)](#).

From TRBL 11-0780



\*1 : To write pinned data on a drive, replace the Controller, and then execute the deliberate shutdown.

\*2 : Checking the presence of PIN data is performed by the Maintenance function of Hitachi Storage Navigator Modular 2. Refer to [“8.3.1 Displaying Volume Failure Data Information”](#) (TRBL 08-0130).

\*3 : For Simple Trace Collection, refer to [“5.3 Collecting Simple Trace”](#) (TRBL 05-0040).

\*4 : For the replacement of the failed component, refer to the [Replacement “Chapter 2. Parts Replacement”](#) (REP 02-0000).



## 11.1.12 A Failure Occurred during Operation : Case 2 (LA/LRC Error)

[WEB Information Message display]

Any one of the following is displayed.

MM/DD/YYYY hh:mm:ss xy W0N00x Parity generation LA error [DRR] (CTL-x, DMA-yy)	:MANUAL/DMP
MM/DD/YYYY hh:mm:ss xy W0V0xy LA error [errcode:LUN] (D-PT-00,CTL=x, TRNS-y)	:MANUAL/STRC
MM/DD/YYYY hh:mm:ss xy W0W0xy LA error [errcode:LUN] (D-PT-01,CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W0Y0xy LA error [errcode:LBA] (H-PT-00,CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W0Z0xy LA error [errcode:LBA] (H-PT-01,CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W100xy LA error [errcode:LUN] (D-PT-00,CTL=x, TRNS-y)	:MANUAL/STRC
MM/DD/YYYY hh:mm:ss xy W120xy LA error [errcode:LUN] (D-PT-01,CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W130xy LA error [errcode:LBA] (H-PT-00,CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W140xy LA error [errcode:LBA] (H-PT-01,CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W150xy LA error [errcode:LUN] (D_PT-02, CTL=x, TRNS-y)	:MANUAL/STRC
MM/DD/YYYY hh:mm:ss xy W160xy LA error [errcode:LUN] (D_PT-03, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W170xy LA error [errcode:LBA] (D_PT-02, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W180xy LA error [errcode:LBA] (D_PT-03, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W190xy LA error [errcode:LUN] (H_PT-02, CTL=x, TRNS-y)	:MANUAL/STRC
MM/DD/YYYY hh:mm:ss xy W1A0xy LA error [errcode:LUN] (H_PT-03, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1B0xy LA error [errcode:LBA] (H_PT-02, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1C0xy LA error [errcode:LBA] (H_PT-03, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1D0xy LRC error [errcode:LUN] (D-PT-00,CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1E0xy LRC error (D-PT-01,CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1F0xy LRC error (D_PT-02, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1G0xy LRC error (D_PT-03, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1H0xy LRC error (H_PT-02, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1J0xy LRC error (H_PT-03, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1K00x Data transfer check error [SEGPOSERR] (CTL-x)	:MANUAL/DMP
MM/DD/YYYY hh:mm:ss xy W1V0xy LRC error (H-PT-00, CTL=x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY hh:mm:ss xy W1W0xy LRC error (H-PT-01,CTL=x,TRNS-y)	:MANUAL/ STRC

Date

Time

x : Detect Controller #  
y : Detect Core #x : Controller# (0-1), y : Transfer direction (R : Read, W : Write)  
xx : DMA#(0-F)

[WEB Information Message display]

Any one of the following is displayed.

MM/DD/YYYY hh:mm:ss xy HF0100 Data transfer check error [SEGPOSERR]	:MANUAL/DMP
MM/DD/YYYY hh:mm:ss xy H20100 Parity generation LA error [DRR] (CTL-x, DMA-yy)	:MANUAL/DMP
MM/DD/YYYY hh:mm:ss xy HD21xy Host transfer DMA error over (DMA-xx)	:MANUAL/DMP
MM/DD/YYYY hh:mm:ss xy HD27xx Drive transfer DMA error over (DMA-xx)	:MANUAL/DMP

⏟

Date

⏟

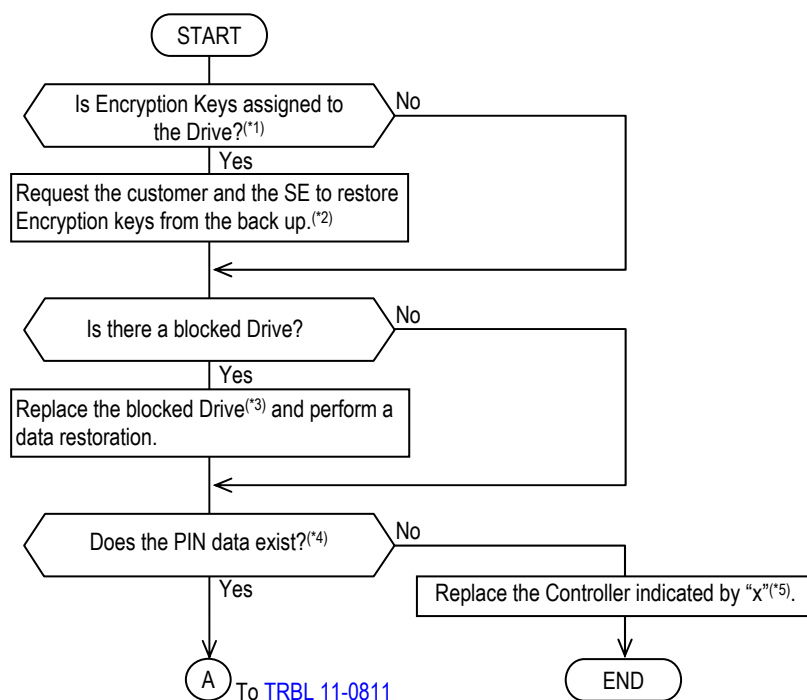
Time

⏟

x : Detect Controller #  
y : Detect Core #

x : Controller# (0-01), y : Transfer direction (R : Read, W : Write)  
xx : DMA#(0-F)

[Recovery method]



\*1 : Start Hitachi Storage Navigator Modular 2 (for GUI). Click the array in Arrays page.

Click [Security] in the tree of Common Array Tasks. If [Data At Rest Encryption] is not displayed in the tree, select the “No” branch.

If [Data At Rest Encryption] is displayed, click [Data At Rest Encryption] - [Encryption Keys]. [Encryption Keys] pane will be displayed. Click [Encryption Keys] tab. The list of Encryption Keys will be displayed. If the Unit number and the HDU number of the Drive of the LA/LRC error are displayed in [Assigned to] column of the list, select the “Yes” branch. Otherwise select the “No” branch. Unit number and HDU number are displayed as “HDU <HDU number> in Tray <Unit number>” in Assigned to column.

\*2 : For the restoration of Encryption keys, refer to the [“Hitachi Unified Storage 150 Data At Rest Encryption User’s Guide”](#).

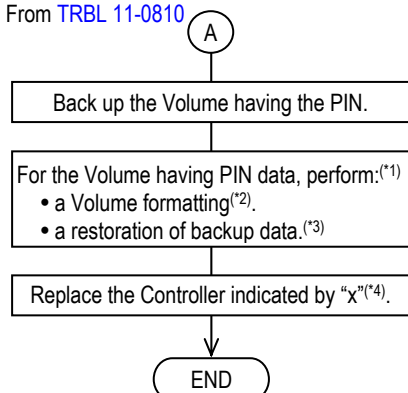
\*3 : For the replacement of the Drive, refer to the [Replacement “2.2.1 Replacing a Drive” \(REP 02-0050\)](#).

\*4 : Checking the presence of PIN data is performed by the Maintenance function of Hitachi Storage Navigator Modular.

2. Refer to [“8.3.1 Displaying Volume Failure Data Information” \(TRBL 08-0130\)](#).

\*5 : For the replacement of the Controller, refer to the [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\)](#).

From TRBL 11-0810



\*1 : This operation is required because an LA/LRC error occurs even after the controller has been replaced if the LA/LRC data remains in the cache as PIN data.

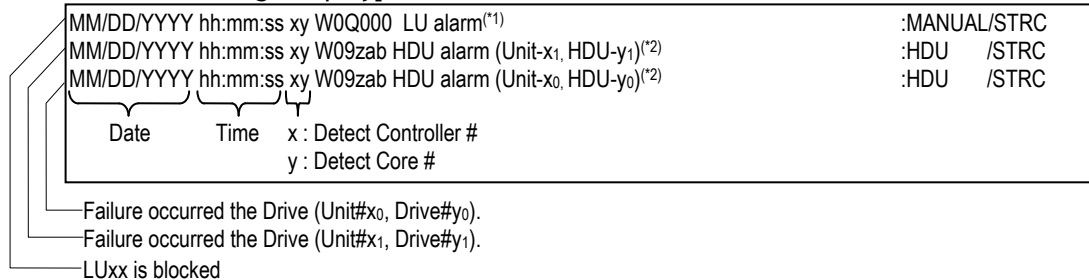
\*2 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*3 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

\*4 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

### 11.1.13 A Failure Occurred during Operation : Case 3 (Volume Blockade)

#### [WEB Information Message display]

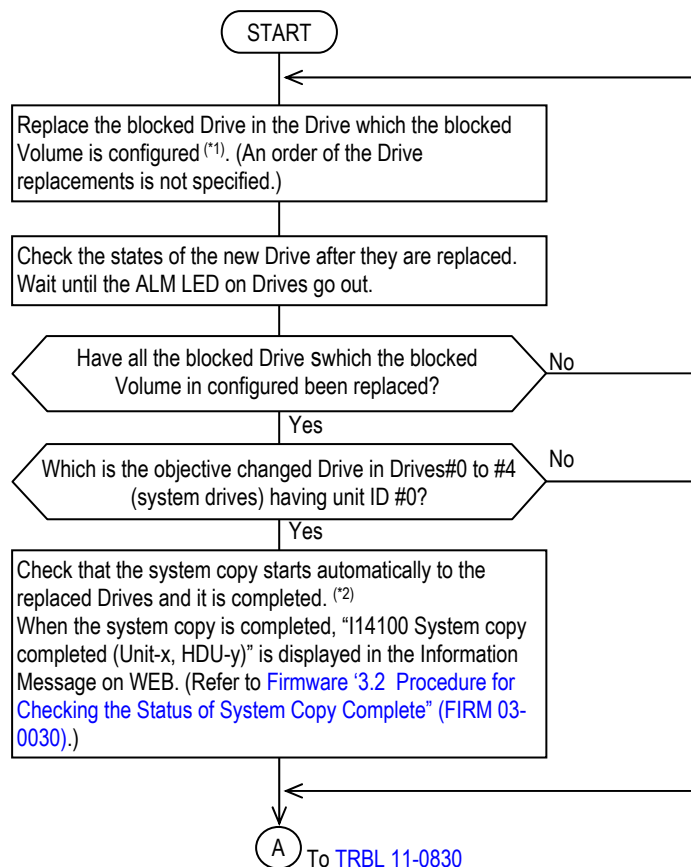


\*1 : The blocked Volume number is not displayed, with the message code "W0Q000 LU alarm". Check the blocked Volume in the Hitachi Storage Navigator Modular 2.

\*2 : When the Spare Drive in use is blocked, W0Bzab is displayed.

#### [Recovery method]

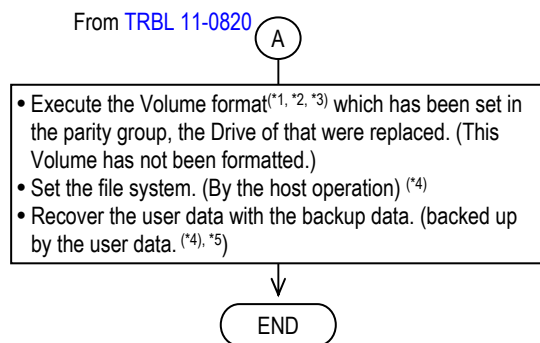
- The recovery operation must be reformed with the array power turned on.



\*1 : For the replacement of the Drive, refer to the [Replacement "2.2.1 Replacing a Drive" \(REP 02-0050\)](#).

\*2 : The system copy is completed in approximately 1 minute 30 seconds for each Drive.

Select the [Settings] - [Drive Recovery] - [Drive Recovery] on the unit window of Hitachi Storage Navigator Modular 2, and click the [Edit Recovery Options] button at the upper right of the window. If [Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Hitachi Storage Navigator Modular 2. For the operating procedure, refer to the [Addition/Removal/Relocation "1.4.2 \(5\) Restoring the System information" \(ADD 01-0420\)](#).



\*1 : For the operating procedure, refer to the [System Parameter “4.3 Setting Volume” \(SYSPR 04-0250\)](#).

\*2 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is “05-9552” or “05-9577”, the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter “4.3.6 Formatting Volume” \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

\*3 : Check with the user whether the Dynamic Provisioning/Dynamic Tiering function is used.

If it is used, request the user to reinitializing the DP pool.

Moreover, check with the customer for the format status of the DP volume, and if the DP volume is unformatted, perform the Volume format.

\*4 : Request the customer and the SE for the work.

\*5 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/Dynamic Tiering function. If it is used, restore the backup data according to the user’s instruction.

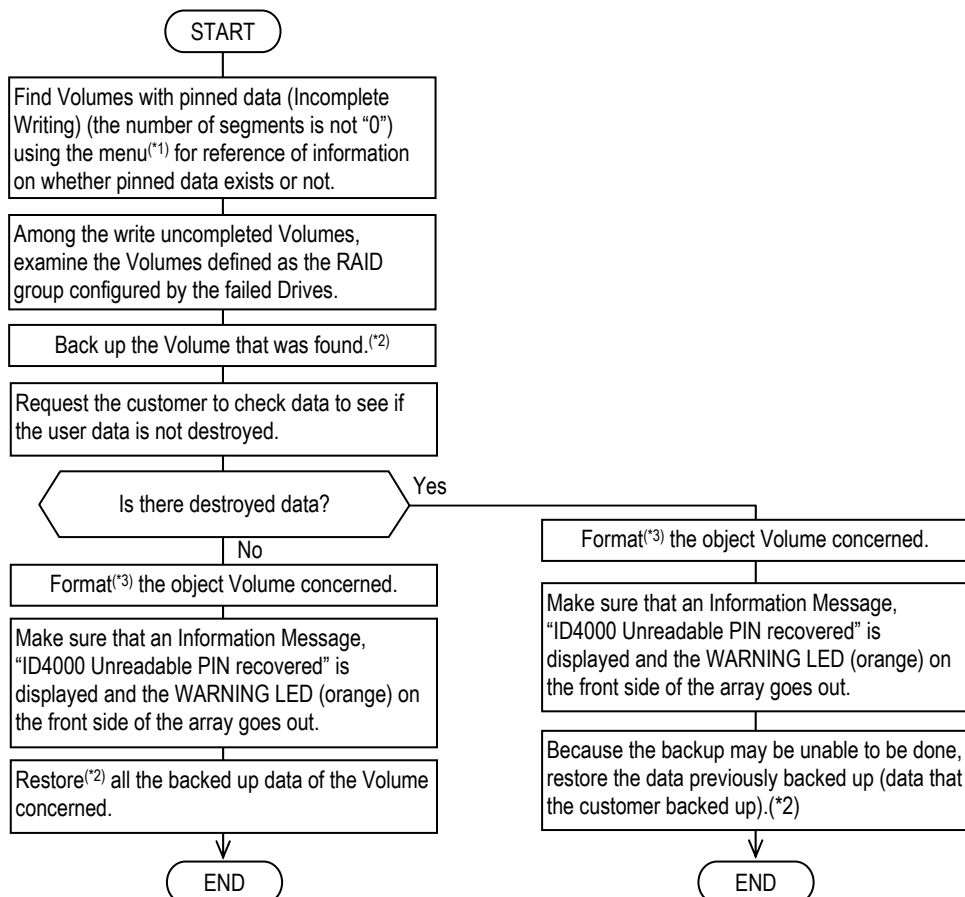
### 11.1.14 A Failure Occurred during Operation : Case 4 (Incomplete Writing)

(The command for reassignment was sent from a host computer to a Volume of RAID 0. Or, the write uncompleted area was registered because a read impossible area was found during the RAID group expansion.)

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy			WOL000 Unreadable PIN detected (Unit-x, HDU-y)	:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #		

#### [Recovery method]



\*1 : Checking the presence of PIN data is performed by the Maintenance function of Hitachi Storage Navigator Modular 2. Refer to ["8.3.1 Displaying Volume Failure Data Information" \(TRBL 08-0130\)](#).

\*2 : Concerning the backup and restoration, request the customer to do them.

However, check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/Dynamic Tiering function, and if it is used, restore the backup data according to the user's instruction.

\*3 : There may be a case that the Volume formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the Volume concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the Volume formatting again after it is released. (Refer to [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).) Also, the backup restoration cannot be done for the Volume whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

### 11.1.15 The Incomplete Write Area was Registered in the Restored VOL

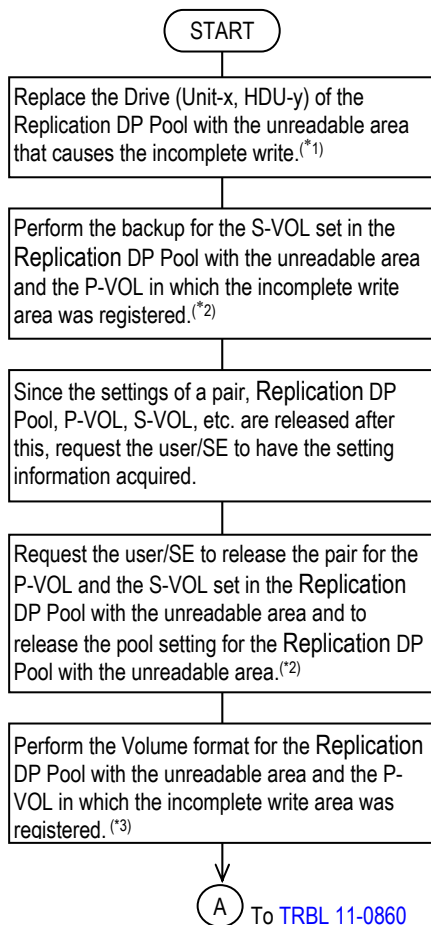
(The write incomplete area was registered in the P-VOL because there was the unreadable area in the Replication DP Pool during the restoration of the P-VOL of Copy-on-write SnapShot. Or the incomplete write area was registered in the S-VOL because there was the unreadable area in the Replication DP Pool when restoring the S-VOL due to S-VOL-Takeover as a result of executing the horctakeover command with TrueCopy Extended Distance.)

#### (1) In case of the failure with Copy-on-write SnapShot

##### [WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	I6D300 Unreadable PIN resisted (Unit-x, HDU-y, LU-z)	:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #	Replication DP Pool Drive <sup>(*1)</sup>	Primary VOL <sup>(*2)</sup>

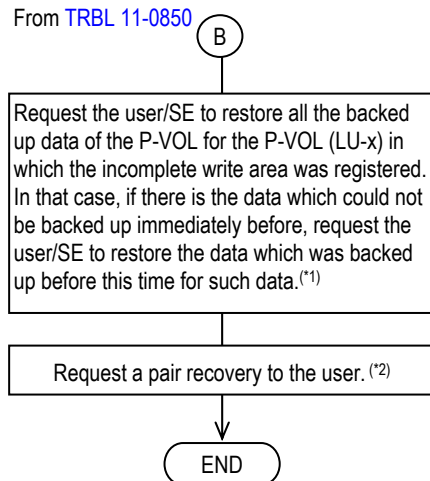
##### [Recovery method]



\*1 : For the replacement of the Drive, refer to the [Replacement "2.2.1 Replacing a Drive" \(REP 02-0050\)](#).

\*2 : If the pair release is performed, the data of the S-VOL is lost. Therefore, be sure to execute the backup of the S-VOL before performing the pair release.

\*3 : For the Volume format, refer to the [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).



\*1 : The secondary VOL data backed up and the primary VOL have the same capacity. Therefore, do not restore the secondary VOL data backed up for the secondary VOL, which executed pair setting again. Also, execute ①setting of the P-VOL, ②setting of the V-VOL and ③pair formation to restore the pair.

\*2 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function.  
If it is used, restore the backup data according to the user's instruction.

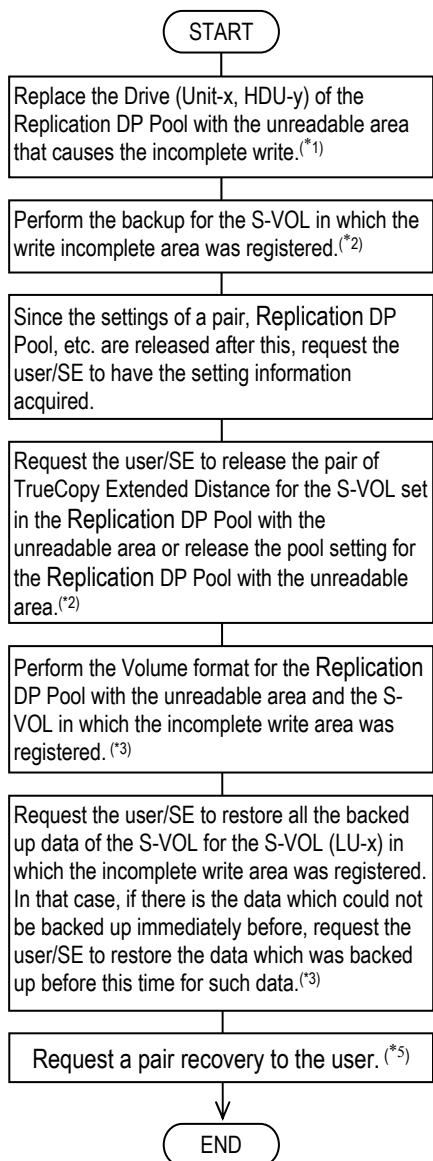


## (2) In case of the failure with TrueCopy Extended Distance

## [WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	I6D300 Unreadable PIN resisted (Unit-x, HDU-y, LU-z)	:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #	Replication DP Pool Drive <sup>(*)</sup>	Primary VOL <sup>(*)2</sup>

## [Recovery method]



\*1 : For the replacement of the Drive, refer to the [Replacement "2.2.1 Replacing a Drive" \(REP 02-0050\)](#).

\*2 : If the pair release is performed, the data of which the previous cycle was determined and saved in the DP Pool was lost. Therefore, be sure to execute the backup of the S-VOL before performing the pair release.

\*3 : For the Volume format, refer to the [System Parameter "4.3.6 Formatting Volume" \(SYSPR 04-0500\)](#).

\*4 : Check with the user whether the Volume to be restored from the backup data is using the Dynamic Provisioning/ Dynamic Tiering function. If it is used, restore the backup data according to the user's instruction.

\*5 : Execute ① setting of the DP Pool and ② pair formation to restore the pair.

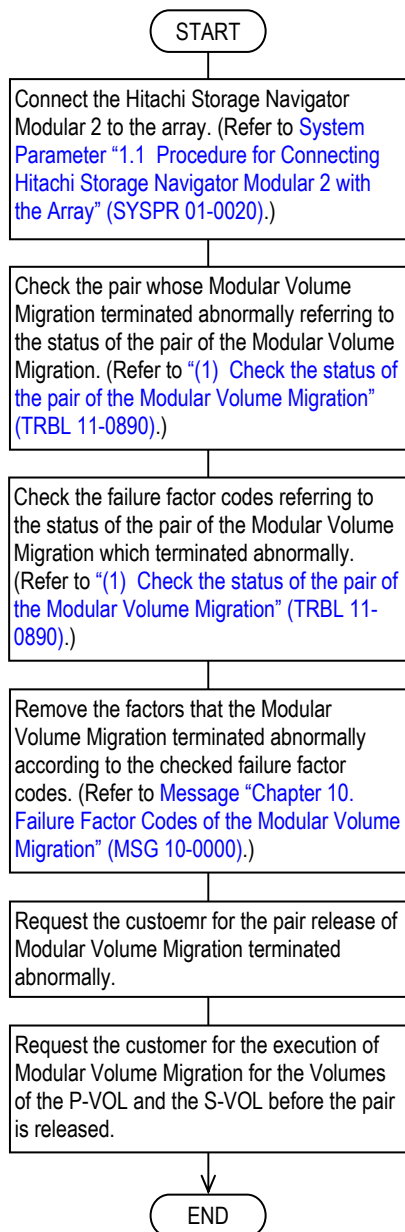
### 11.1.16 Recovery Method of the Modular Volume Migration which Terminated Abnormally

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy I6ER00 Modular Volume Migration failed (LU-x/y)	:MANUAL/STRC
MM/DD/YYYY hh:mm:ss xy I6ES00 Modular Volume Migration failed	

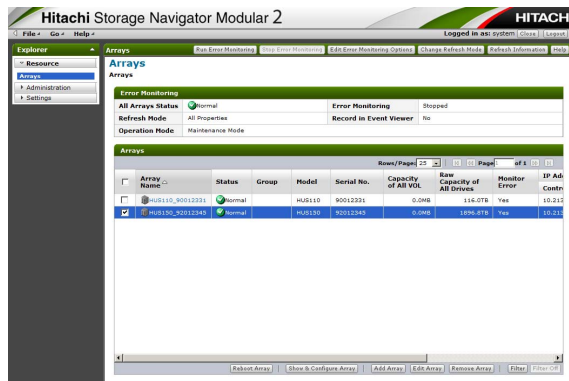
Date      Time      x : Detect Controller #  
    y : Detect Core #

#### [Recovery method]



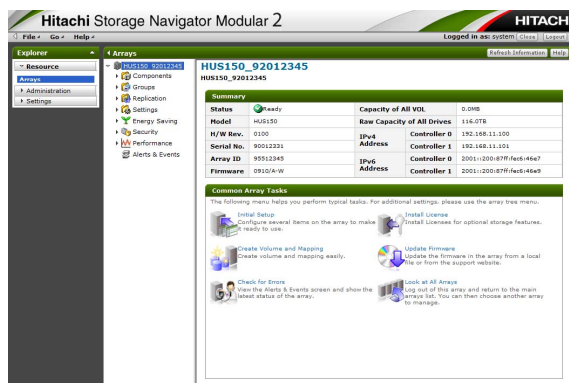
- (1) Check the status of the pair of the Modular Volume Migration
  - (a) Start the Hitachi Storage Navigator Modular 2.
  - (b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



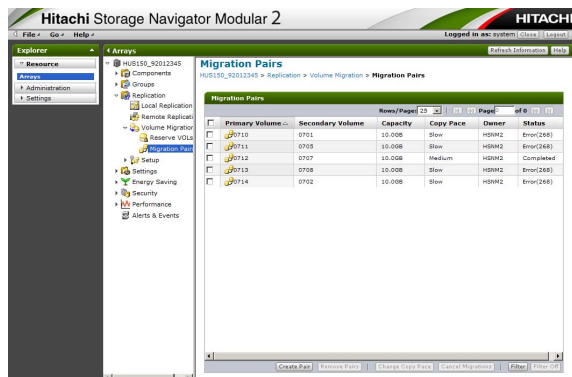
- (c) Click the array name, and open the unit window.

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



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

- (d) Click the [Replication] - [Volume Migration] - [Migration Pairs] on the unit window.  
The list of the pairs and the information of each pair are displayed.



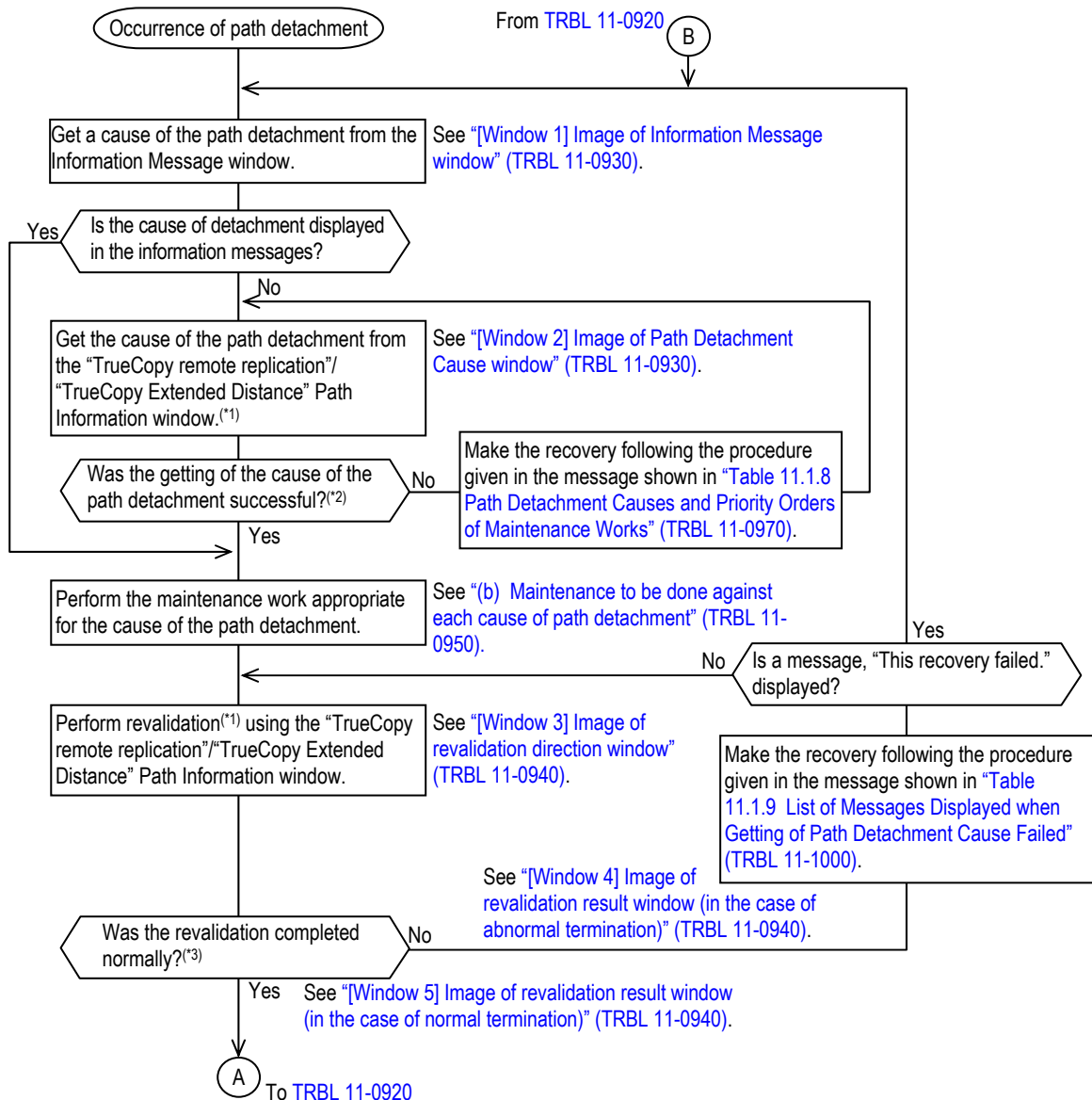
- (e) When the Modular Volume Migration terminated abnormally and the pair changed to PSUE, "Error (failure factor code)" is displayed in [Pair Status]. The pair displayed [Error] in [Pair Status] is the pair whose Modular Volume Migration terminated abnormally.
- (f) Check the failure factor code for each pair whose Modular Volume Migration terminated abnormally referring to [Pair Status]. (Refer to [Message "Chapter 10. Failure Factor Codes of the Modular Volume Migration" \(MSG 10-0000\)](#) for the details.)

### 11.1.17 Path Blockade Occurs in the TrueCopy remote replication/TrueCopy Extended Distance Function

When the pair of TrueCopy remote replication and the pair of TrueCopy Extended Distance share the Path, the Path blockade can be recovered by satisfying the recovery condition of each program product.

#### (1) Procedure for recovery from path detachment

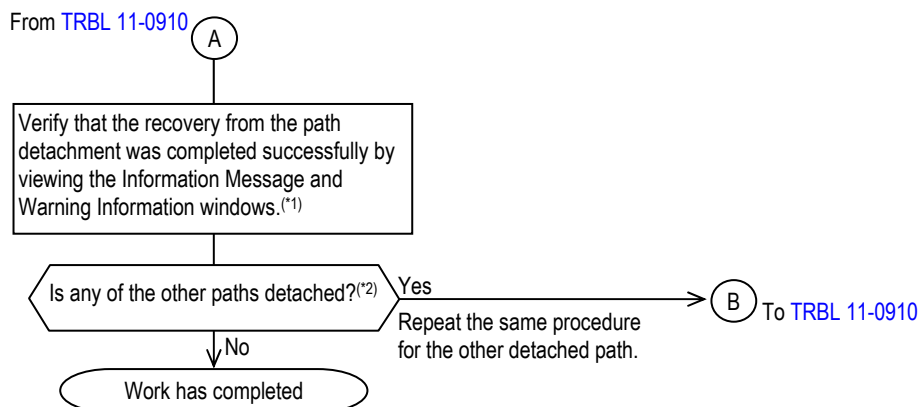
##### (a) General flowchart of procedure for recovery from path detachment



\*1 : The recovery from the path detachment may have been made by virtue of the automatic path recovery function. When a message informing of the completion of the recovery is displayed in the Information Message window, no revalidation is necessary. If the recovery has not been made, be sure to perform the revalidation.

\*2 : For the message when the acquisition of the cause of the path detachment was unsuccessful, refer to "Table 11.1.8 Path Detachment Causes and Priority Orders of Maintenance Works" (TRBL 11-0970).

\*3 : For the message when the revalidation is performed, refer to "Table 11.1.9 List of Messages Displayed when Getting of Path Detachment Cause Failed" (TRBL 11-1000).

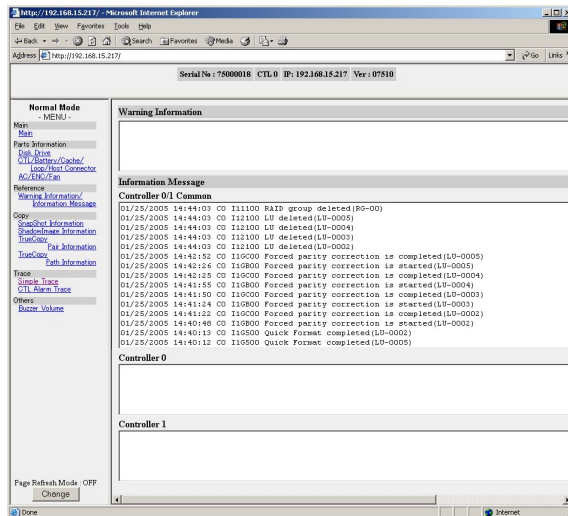


\*1 : When the PATH blockade recovers, “I030xy Path recovered by web operation (Remote-x, Path-y)”, or “I031xy Path recovered automatically (Remote-x, Path-y)” is displayed in the Information Message on WEB, and the display of “W0K0xy Path alarm (Remote-x, Path-y) disappears from the Warning Information on WEB.

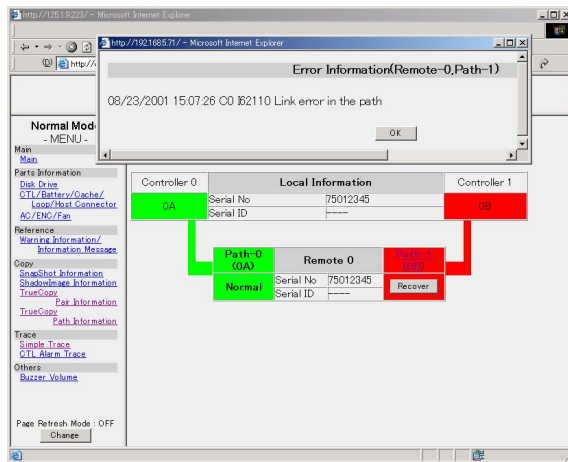
\*2 : Other system PATH indicates Path-1 when the PATH which recovered the PATH blockade is Path-0, and Path-0 when the PATH which recovered the PATH blockade is Path-1.

The example of the WEB window when the PATH blockade of TrueCopy remote replication occurs is shown below.

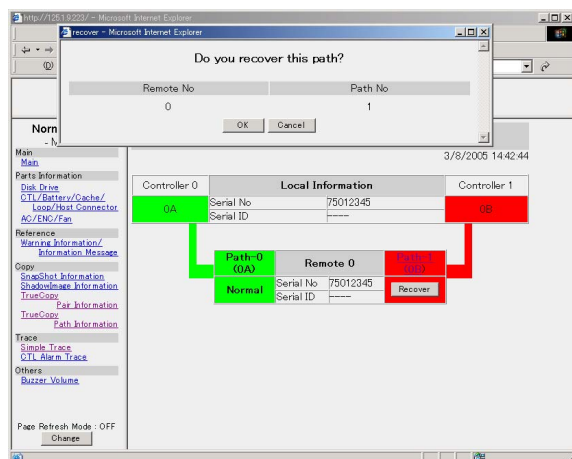
[Window 1] Image of Information Message window



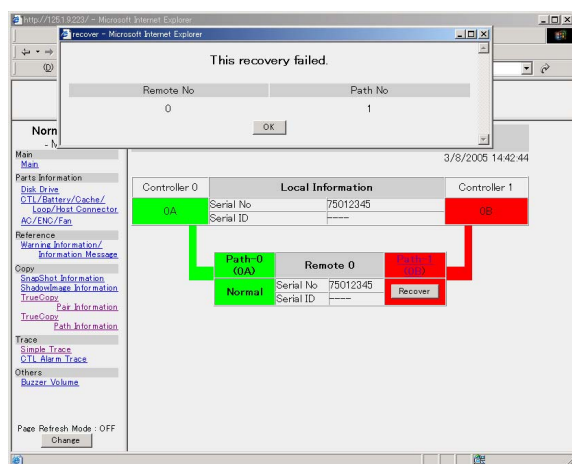
[Window 2] Image of Path Detachment Cause window



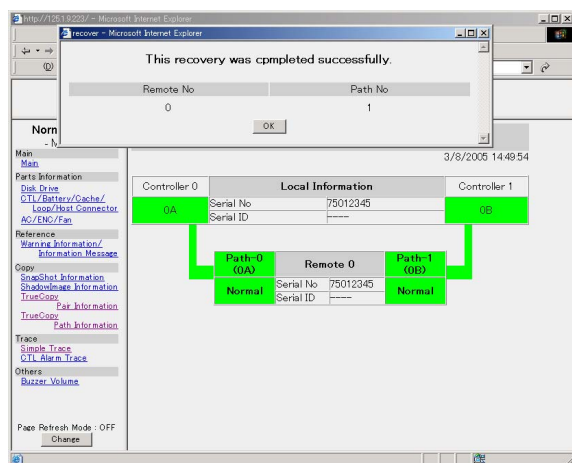
[Window 3] Image of revalidation direction window



[Window 4] Image of revalidation result window (in the case of abnormal termination)



[Window 5] Image of revalidation result window (in the case of normal termination)



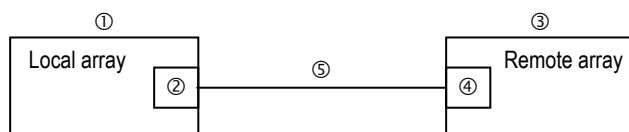


## (b) Maintenance to be done against each cause of path detachment

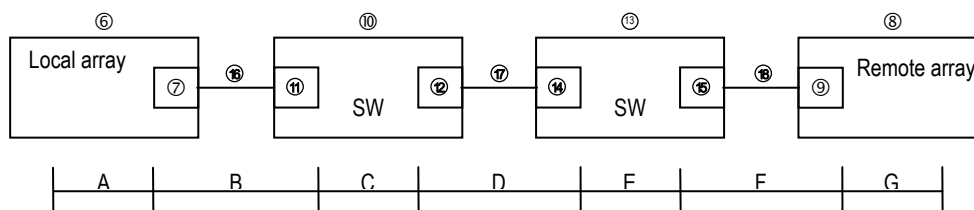
The failed part cannot be ascertained depending on the type of the failure because the path detachment is a route failure.

Therefore, this manual only defines zones where a failure occurs for each path connection form and make the priority order of the zones and parts within the each zone clear.

## [Procedure 1] Make sure of the path connection form.



- ① : Local array main body
- ② : Local array interface
- ③ : Remote array main body
- ④ : Remote array interface
- ⑤ : Connecting cable between the arrays



- ⑥ : Local array main body
- ⑦ : Local array interface
- ⑧ : Remote array main body
- ⑨ : Remote array interface
- ⑩ : Local side SW
- ⑪ : Local side GBIC of the local side SW
- ⑫ : Remote side GBIC of the local side SW
- ⑬ : Remote side SW
- ⑭ : Local side GBIC of the remote side SW
- ⑮ : Remote side GBIC of the remote side SW
- ⑯ : Connection cable between the local array and the local side SW
- ⑰ : Connection cable between the local side SW and the remote side SW
- ⑱ : Connection cable between the remote array and the remote side SW

- Zone A : ⑥
- Zone B : ⑦ ⑪ ⑮
- Zone C : ⑩
- Zone D : ⑫ ⑭ ⑰
- Zone E : ⑬ ⑯ ⑱
- Zone F : ⑨
- Zone G : ⑧

[Procedure 2] Perform a maintenance work referring to the priority order of zones and parts shown in [Table 11.1.8](#) according to a cause of the path detachment.

- NOTE :
- Every time when a part is replaced from the order with a high priority, go to “[Procedure 3]” (TRBL 11-1000), and perform the revalidation in the TrueCopy Path Information window of the WEB following “(1) (a) [General flowchart of procedure for recovery from path detachment](#)” (TRBL 11-0910).
  - The maintenance method varies depending on the reference number (① to ⑩) that represents each part.

The maintenance method corresponding to each number is shown below.

①③⑥⑧ → Since a failure of some kind has occurred in each DF850 array, perform a maintenance work according to the LED indications or the Information Message on WEB.

②④⑦⑨ → Replacement of the I/F portion is required.

When replacing the I/F portion, an entire CTL must be replaced in the case of the part of the basic port (Port #0) because the part is integrated with the CTL, whereas only the Host I/O Module is to be replaced in the case of the part of the added port (Port #1).

Other than the above → Replacement the SW main body, the GBIC, or the cable.

Table 11.1.8 Path Detachment Causes and Priority Orders of Maintenance Works

No.	Message text	Path detachment cause	Failure symptom	Priority order of maintenance objects(*1)	Path recovery method
1	Link error in the attached link (Port-x)	The threshold value of the route failure counter on the local side was exceeded.	<ul style="list-style-type: none"> <li>A link down was detected.</li> <li>A link failure was detected.</li> </ul>	Direct : ② → ④ → ⑤ SW : B → C	<ul style="list-style-type: none"> <li>The path revalidation from the WEB must be done.</li> </ul>
2	Link error in the path	The threshold value of the path route failure counter was exceeded.	<ul style="list-style-type: none"> <li>An illegal transferred data length was detected.</li> </ul>	Direct : ② → ④ → ⑤ SW : B → F → D → C → E	
3	Link down time-out (Port-x)	The link down time of the path set for the port concerned elapsed longer than 15 seconds.	<ul style="list-style-type: none"> <li>The link down time of the port for which a path has already been set elapsed longer than 15 seconds.</li> </ul>	Direct : ② → ④ → ⑤ SW : B → C	<ul style="list-style-type: none"> <li>Automatic recovery</li> </ul>
4	Path not connected	<ul style="list-style-type: none"> <li>The remote Disk array concerned is not connected.</li> <li>The firmware is not supported</li> </ul>	<ul style="list-style-type: none"> <li>No remote Disk array, for which a path was to be set, existed on the loop though a log-in was requested.</li> <li>The WWN which has been set was not registered in the SW.</li> <li>At either following condition, the path was detached. <ul style="list-style-type: none"> <li>The firmware of the remote side DF is not updated.</li> <li>The FC Host I/O Module on remote or local DF was not installed.</li> </ul> </li> </ul>	Direct : a → ④ → ③ → ② → ⑤ SW : a → G → F → D → E → C a : Firstly, check if the remote array is connected and if the connection is correctly made.	<ul style="list-style-type: none"> <li>Automatic recovery</li> <li>Replace to the firmware.</li> </ul>
5	Path login failed	The log-in to the path concerned failed.	<ul style="list-style-type: none"> <li>Though a log-in to a port expected to exist was attempted, it failed because allowable number of retrials were not successful.</li> </ul>	Direct : ④ → ② → ⑤ SW : G → F → D → B → E → C (F : ⑨ → ⑮ → ⑯)	<ul style="list-style-type: none"> <li>The path revalidation from the WEB must be done.</li> </ul>
6	Path login resource shortage	Resource of the path concerned was insufficient.	<ul style="list-style-type: none"> <li>Insufficiency of the resource was reported in a response made at the time of the log-in. (The insufficient resource means that 128 log-in's have already been made for the port when 128 log-in's per port are allowed.)</li> </ul>	Direct : ④ SW : ⑨ The system configuration is illegal. (Propriety of the system configuration must be checked by an SE or a user.)	<ul style="list-style-type: none"> <li>The path revalidation from the WEB must be done.</li> </ul>

\*1 : A numeral and alphabetic character denote a part and zone respectively.

- Priority order of failed parts in each zone (a zone contains more than one part) is shown below.

Zone B : ⑩ → ⑦ → ⑭

Zone D : ⑥ → ③ → ①

Zone F : ⑧ → ⑨ → ⑫

No.	Message text	Path detachment cause	Failure symptom	Priority order of maintenance objects(*1)	Path recovery method
7	Fabric connection failed (Port-x)	Switch trouble	• The FLOGI sequence terminated abnormally. (Sending and response of FLOGI/ PLOGI/ RCS_ID/ RFT_ID/ PRT_ID/ SCR/RSCN terminated abnormally.)	Direct : None SW : B → C	• The path revalidation from the WEB must be done.
8	RSP not ready (Key [02], Code [xxyy])	Command RSP failure (Failure of the command issued from an array another array)	Not Ready	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done.
9	RSP medium error (Key [03], Code [xxyy])		Medium Error	Direct : ③ SW : ⑧	
10	RSP hard error (Key [04], Code [xxyy])		Hard Error	Direct : ③ SW : ⑧	
11	RSP illegal request (Key [05], Code [xxyy])		Illegal Request	Direct : ① → ③ SW : ⑥ → ⑧	
12	RSP abort command P (Key [0B], Code [xxyy])		Aborted Command (path)	Direct : ④ → ② → ⑤ SW : F → B → D → E → C	
13	RSP abort command C (Key [0B], Code [xxyy])		Aborted Command (CTL)	Direct : ③ SW : ⑧	
14	RSP miscompare (Key [0E], Code [xxyy]) RSP status error [xx] RSP other field error[x] RSP etc. (Key [xx])		Others	Direct : ① → ③ SW : ⑥ → ⑧	
15	Command time out	Command time-out (Failure of the command issued from an array to another array)	• Two or more times of time-out were detected in execution of the same command.	Direct : ④ → ② → ⑤ SW : G → F → D → B → E → C (F : ⑨ → ⑬ → ⑭)	• The path revalidation from the WEB must be done.
16	Remote sequence number error	Inconsistency of the remote array sequence No.	• The sequence No. of the remote array is inconsistent.	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done.
17	Path alarm for CTL alarm	CTL detachment	• A detachment of the own controller occurred.	Direct : ① SW : ⑥	• Automatic recovery
18	Port un-mounting error	Non-installation of the port	• The port is not installed.	Direct : ② SW : ⑦	• The path revalidation from the WEB must be done.
19	Remote option disable [TrueCopy Basic]	Locking of the remote array [TrueCopy remote replication]	• The [TrueCopy remote replication] priced optional function of the remote array is locked.	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done
20	Remote option disable [TrueCopy Extended Distance]	Locking of the remote array [TrueCopy Extended Distance]	• The [TrueCopy Extended Distance] priced optional function of the remote array is locked.	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done

\*1 : A numeral and alphabetic character denote a part and zone respectively.

• Priority order of failed parts in each zone (a zone contains more than one part) is shown below.

Zone B : ① → ⑦ → ⑧

Zone D : ② → ④ → ⑤

Zone F : ③ → ⑥ → ⑨

No.	Message text	Path detachment cause	Failure symptom	Priority order of maintenance objects(*1)	Path recovery method
21	Remote pate setting unsupported on the remote Array	The function for setting paths between arrays of different models is not supported.	• The function for setting paths between arrays with different system settings is not supported.	Direct : ㉓ SW : ㉔	<ul style="list-style-type: none"> <li>• The path revalidation from the WEB must be done</li> <li>• Update the firmware of the remote array.</li> </ul>

\*1 : A numeral and alphabetic character denote a part and zone respectively.

- Priority order of failed parts in each zone (a zone contains more than one part) is shown below.

Zone B : ㉑ → ㉒ → ㉓

Zone D : ㉔ → ㉕ → ㉖

Zone F : ㉗ → ㉘ → ㉙

[Procedure 3] Proceed to the procedure subsequent to “(1) (a) General flowchart of procedure for recovery from path detachment” (TRBL 11-0910).

When the getting of the path detachment cause has failed or the revalidation has terminated abnormally, perform a maintenance work following the recovery procedure shown in Table 11.1.9 and Table 11.1.10 according to the message displayed.

**Table 11.1.9 List of Messages Displayed when Getting of Path Detachment Cause Failed**

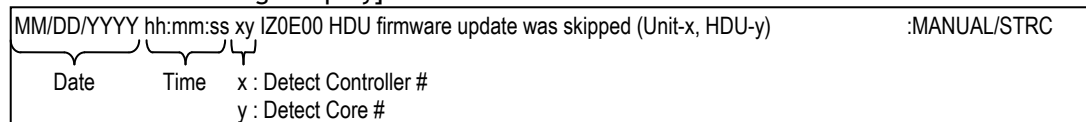
No.	Sub-window message	Meaning of message	Recovery method
1	Cannot get alarm information because specified function is lock.	The cause cannot be get because the [TrueCopy remote replication] or [TrueCopy Extended Distance] function is locked.	Unlock and validate the [TrueCopy remote replication] or [TrueCopy Extended Distance] function and get the cause of the path detachment again.
2	Cannot get alarm information because it is booting now.	The cause cannot be get because the array is being booted.	Get the cause of the path detachment again after the array enters the Ready status.
3	Cannot get alarm information because it does not register for remote equipment.	The cause cannot be get because the specified remote DF number is illegal.	Update the browser. If the path is still detached, get the cause of the path detachment again.
4	Cannot get alarm information because specified function is disable.	The cause cannot be get because the [TrueCopy remote replication] or [TrueCopy Extended Distance] function is invalid although it is unlocked.	Validate the [TrueCopy remote replication] or [TrueCopy Extended Distance] function and get the cause of the path detachment again.
5	Cannot get alarm information because it does not register for this path.	The cause cannot be get because the specified path does not exist.	Update the browser. If the path is still detached, get the cause of the path detachment again.
6	Cannot get alarm information because this path's status is normally.	The cause cannot be get because the specified path has already become normal.	Update the browser. If the path is still detached, get the cause of the path detachment again.

Table 11.1.10 List of Messages Displayed when Path is Revalidated

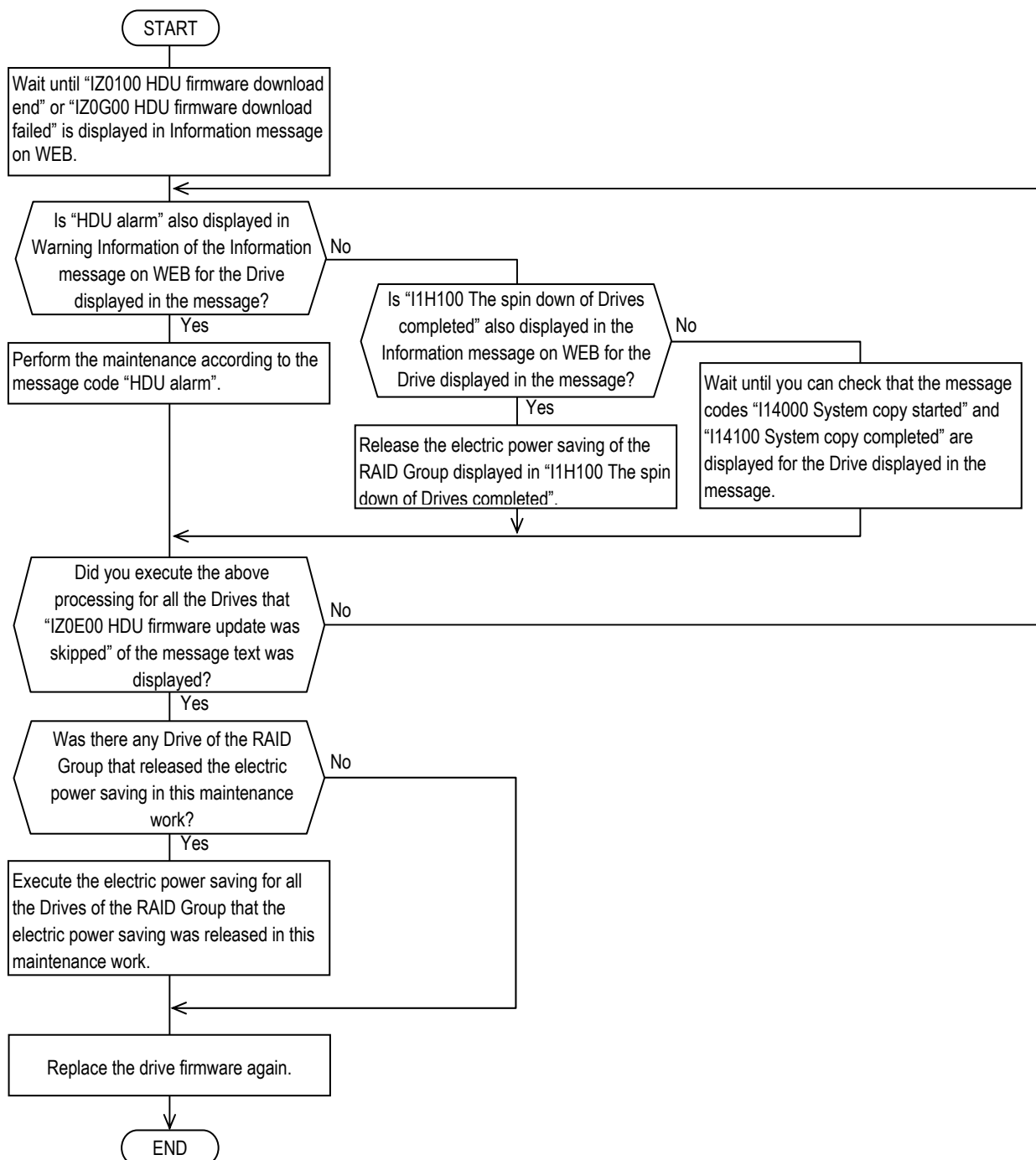
No.	Sub-window message	Meaning of message	Recovery method
1	Do you recover this path?	Do you want to revalidate the specified path?	—
2	Executing...	The revalidation of the specified path is being executed.	—
3	This recovery was completed successfully.	The revalidation of the specified path was completed normally.	—
4	This recovery failed.	The revalidation of the specified path terminated abnormally.	It is presumed that the path was detached owing to another cause or the replaced part was not correct. Perform a maintenance work again following the procedure against the path detachment.
5	Cannot recover this path because specified function is lock.	The path revalidation cannot be done because the [TrueCopy remote replication] or [TrueCopy Extended Distance] function is locked.	Unlocked and validate the [TrueCopy remote replication] or [TrueCopy Extended Distance] function and execute the path revalidation again.
6	Cannot recover this path because it is booting now.	The path revalidation cannot be done because the array is being booted.	Execute the path revalidation again after the array enters the Ready status.
7	Cannot recover this path because it does not register for this remote equipment.	The path revalidation cannot be done because the specified remote DF number is illegal.	Execute the path revalidation again after updating the browser.
8	Cannot recover this path because CTL is alarm.	The path revalidation cannot be done because the controller is detached.	Execute the path revalidation again after recovering the controller from the detachment.
9	Cannot recover this path because specified function is disable.	The path revalidation cannot be done because the [TrueCopy remote replication] or [TrueCopy Extended Distance] function is invalid though it is unlocked.	Execute the path revalidation again after validating the [TrueCopy remote replication] or [TrueCopy Extended Distance] function.
10	Cannot recover this path because it does not register for this path.	The path revalidation cannot be done because the specified path does not exist.	Execute the path revalidation again after updating the browser.
11	Cannot recover this path because this path's status is normally.	The path revalidation cannot be done because the specified path has already become normal.	Execute the path revalidation again after updating the browser.
12	Cannot recover this path because it is executing LU Format.	The path revalidation cannot be done because a Volume formatting is being executed.	Execute the path revalidation again after the Volume formatting is completed.
13	Cannot recover this path because it is executing Synchronized cache.	The path revalidation cannot be done because the SyncCache command is being executed.	Execute the path revalidation again after the execution of the SyncCache command is completed.
14	Cannot recover this path because it is executing Array unit shutdown.	The path revalidation cannot be done because the pseudo-deliberate shutdown is being executed.	Execute the path revalidation again after the pseudo-deliberate shutdown has been completed.
15	Cannot recover this path because Power OFF>	The path revalidation cannot be done because the deliberate shutdown is being executed.	Execute the path revalidation again after starting up the array.

### 11.1.18 Recovery Method for Drives which Skipped Drive Firmware Replacement

#### [WEB Information Message display]



#### [Recovery method]



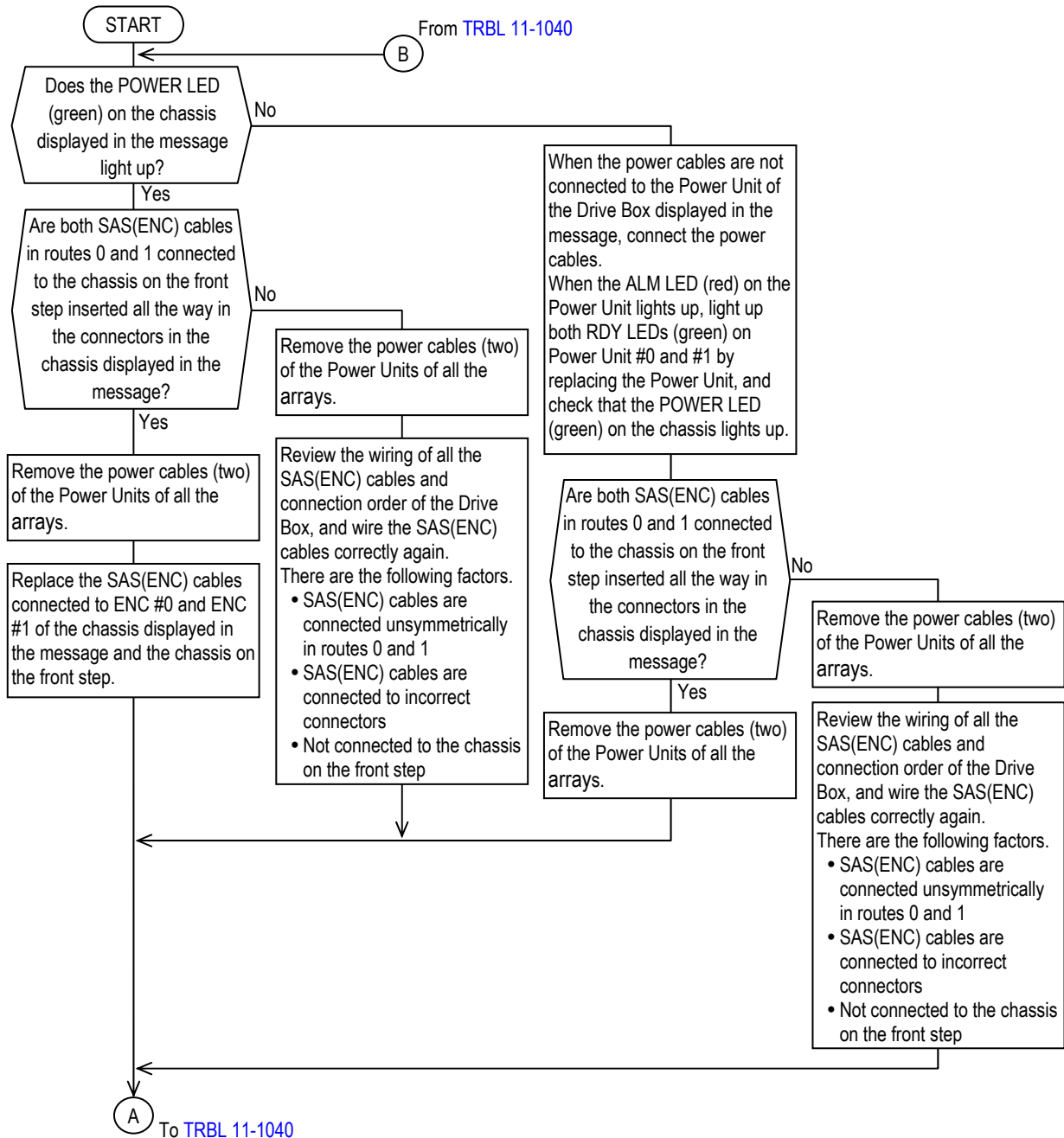


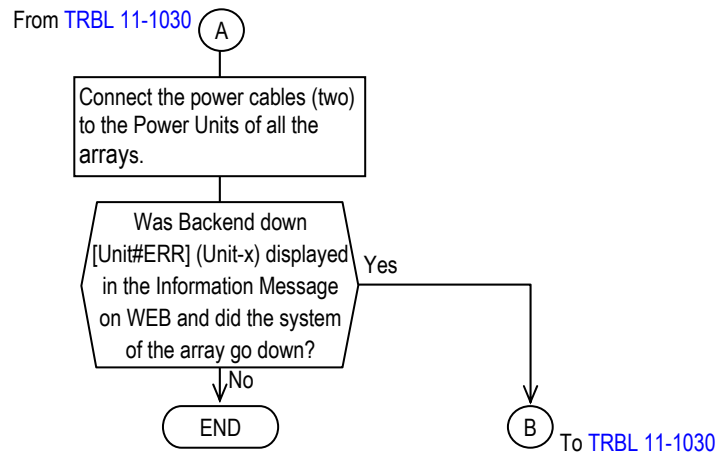
### 11.1.19 Recovery Method when the Down of the Array Occurred due to the Incorrect SAS(ENC) Cable Connection

[WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy HH9H00 Backend down [Unit#ERR] (Unit-x)			:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #	

[Recovery method]



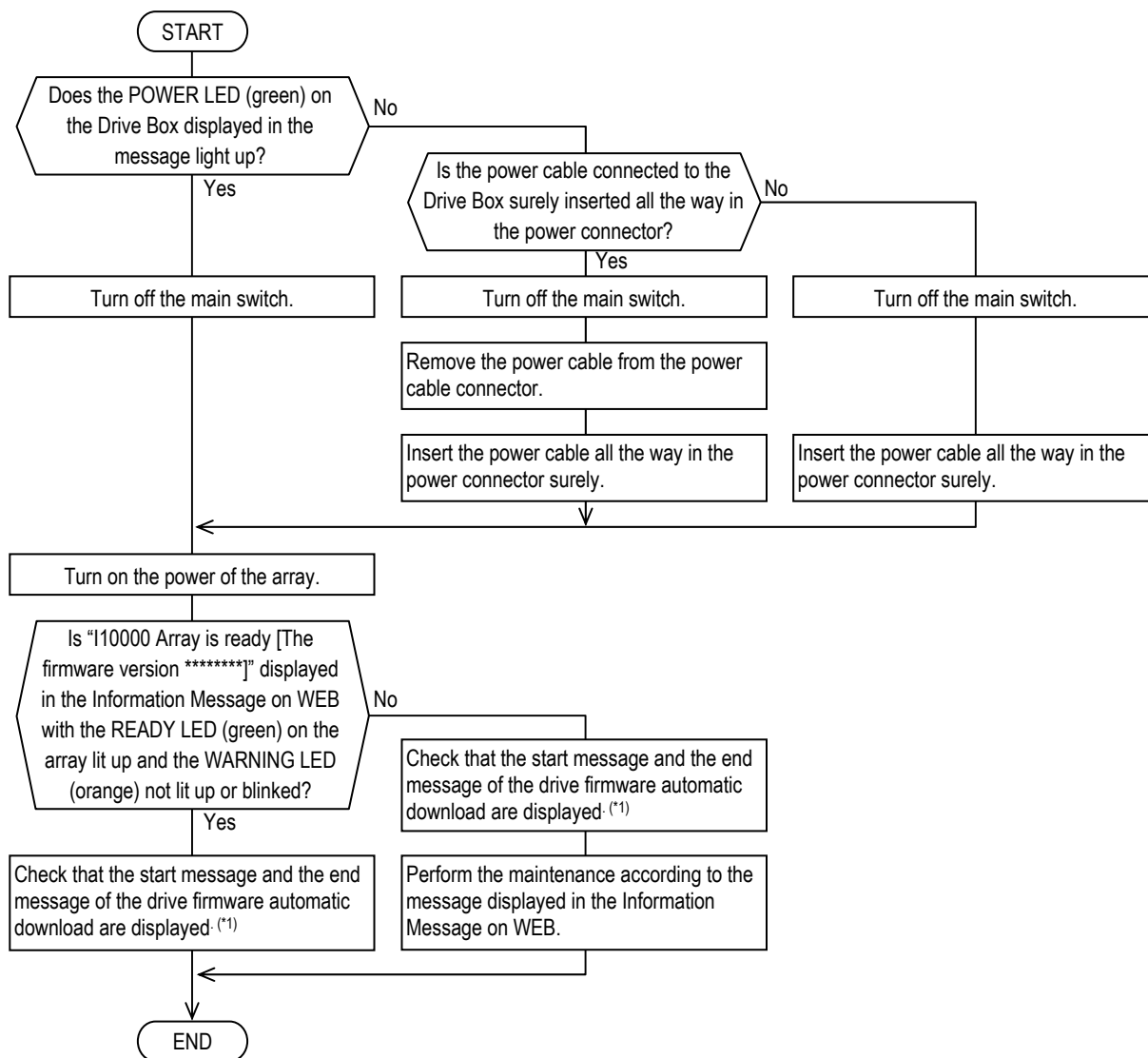


### 11.1.20 Recovery Method when a Power Unit Failure of the Drive Box Occurred

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy HH7800 The array unit is missing (Unit-x)				:MANUAL
Date	Time	x : Detect Controller #	y : Detect Core #	

#### [Recovery method]



\*1 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\)](#).

### 11.1.21 Recovery Method when the Creation of the SSL User Certificate File Failed

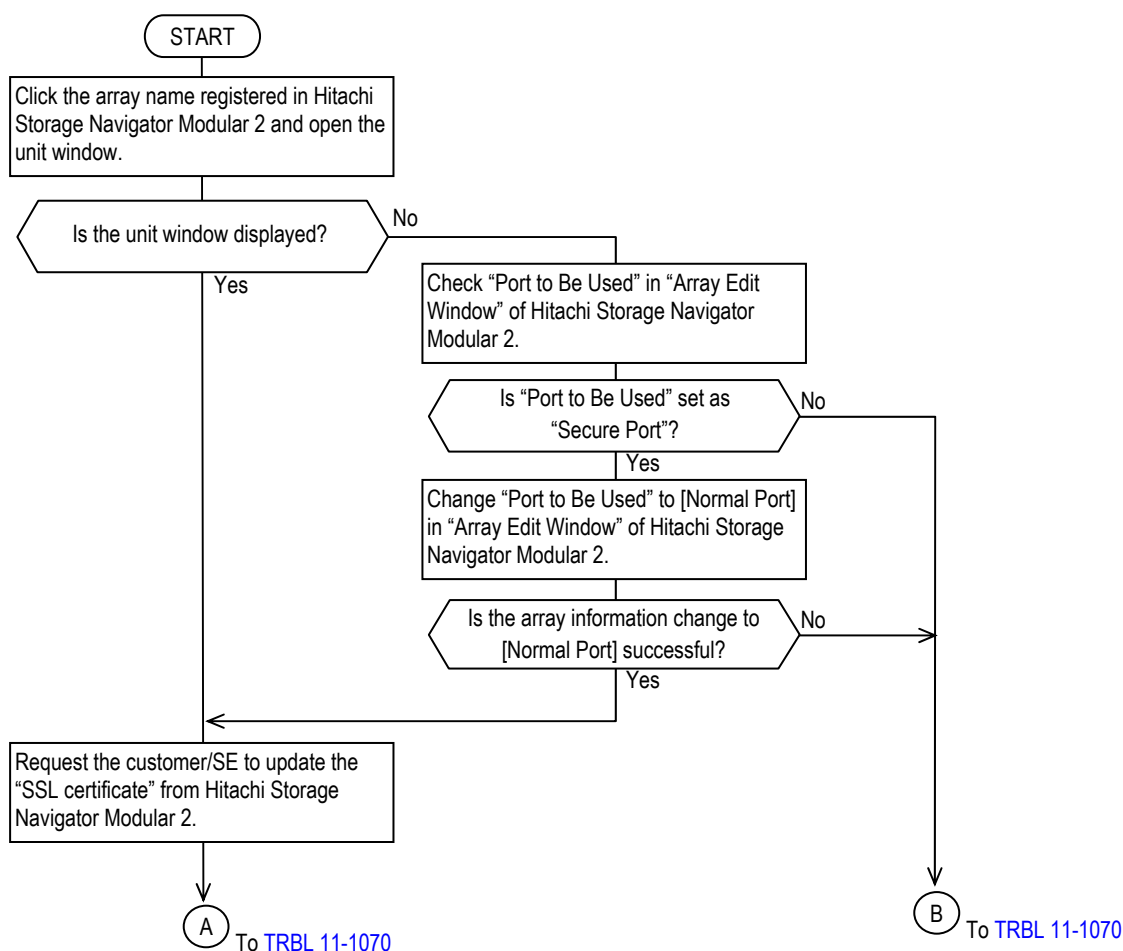
#### [WEB Information Message display]

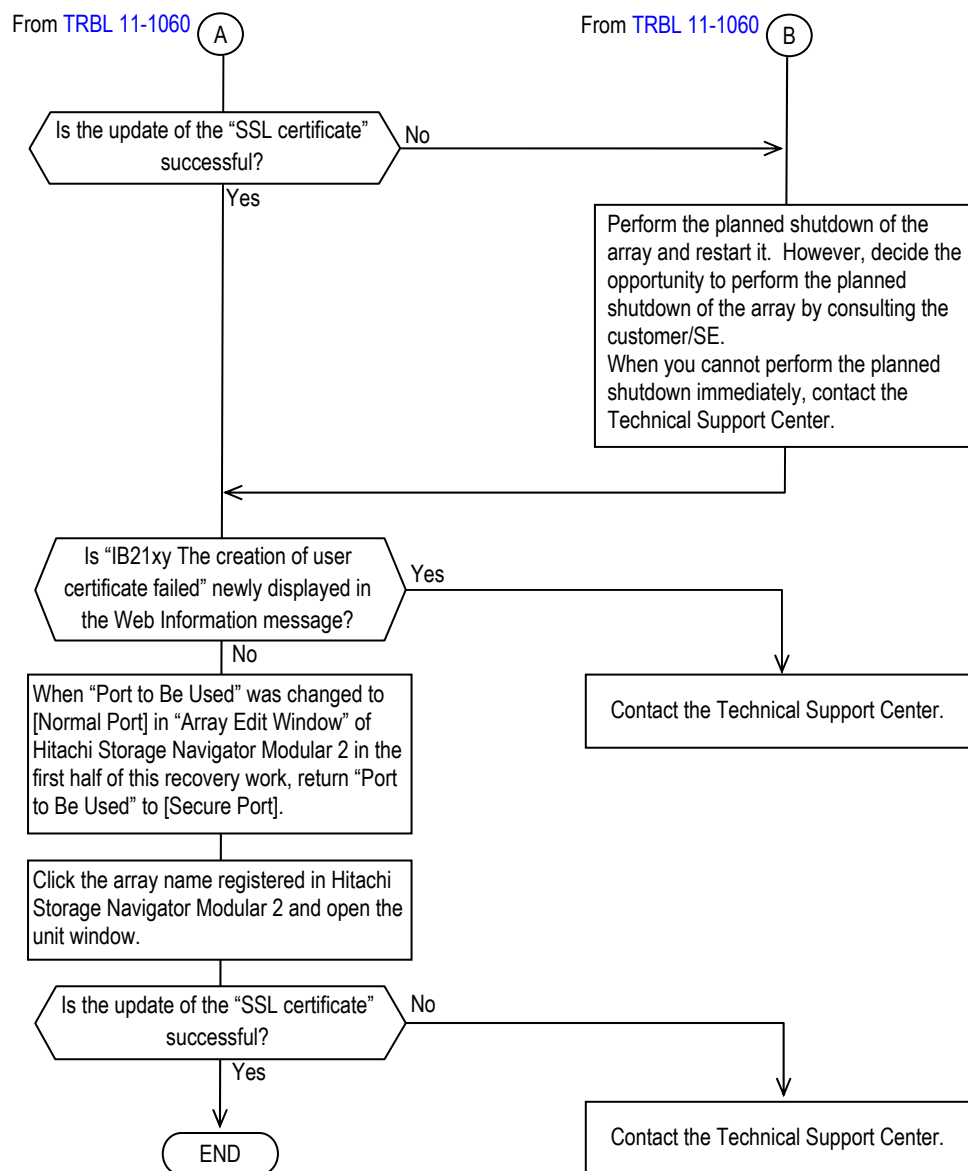
MM/DD/YYYY hh:mm:ss xy IB21xy The creation of user certificate failed (CTL-x)			:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #	

This message indicates the failure to make the SSL User Certification resident in the memory inside the array in the following opportunities.

- Starting the array
- Inserting the Controller
- Replacing the firmware
- Updating the SSL certification

#### [Recovery method]



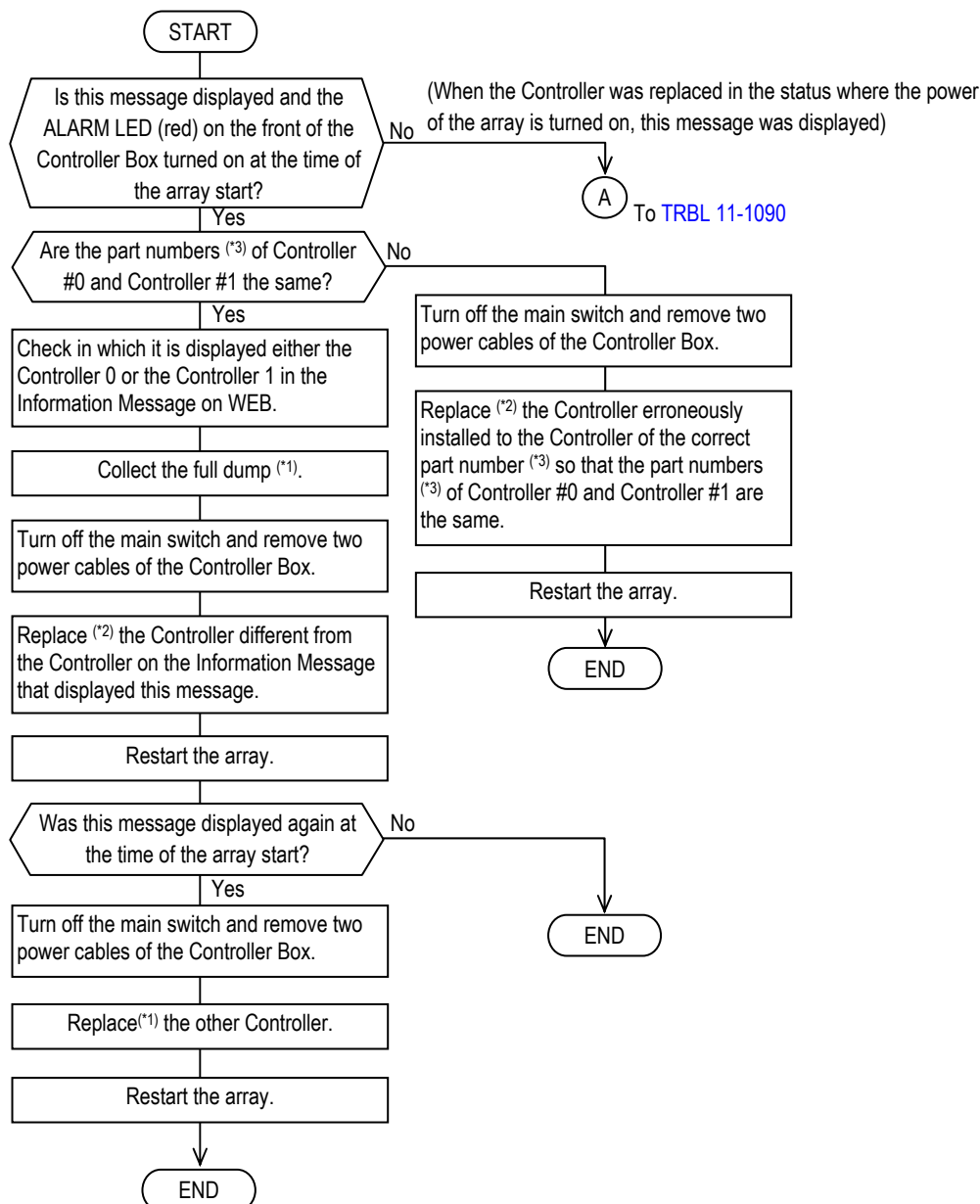


## 11.1.22 Recovery Method when Detecting the Mismatch of the Controllers between the Controllers

### [WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	RA7600 CTL unit type is different between the controller	:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #		

### [Recovery method]

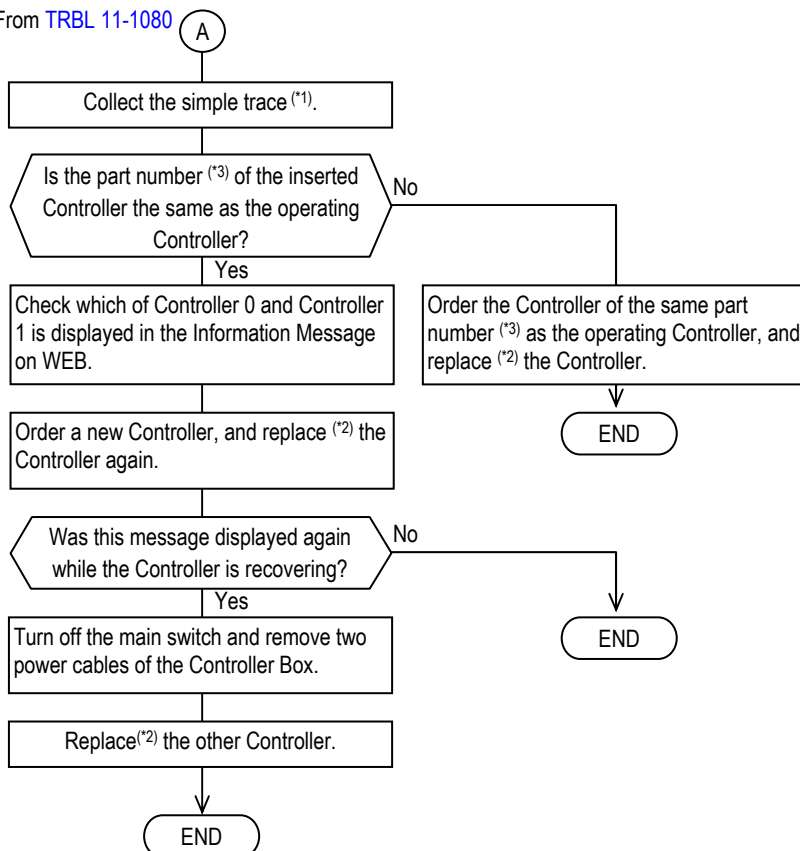


\*1 : For Full Dump Collection, refer to “5.5 Collecting Full Dump” (TRBL 05-0180).

\*2 : For the replacement of the Controller, refer to the Replacement “2.2.5 Replacing a Controller” (REP 02-0700).

\*3 : For the part numbers, refer to the Parts Catalog “Chapter 1. Parts Catalog” (PARTS 01-0000).

From TRBL 11-1080



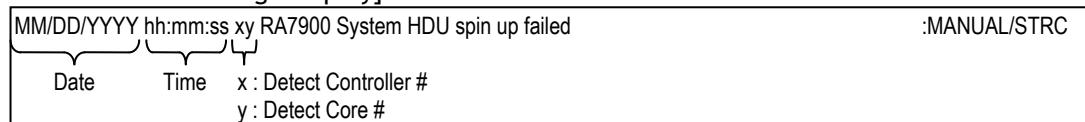
\*1 : For Simple Trace Collection, refer to “5.3 Collecting Simple Trace” (TRBL 05-0040).

\*2 : For the replacement of the Controller, refer to the Replacement “2.2.5 Replacing a Controller” (REP 02-0700).

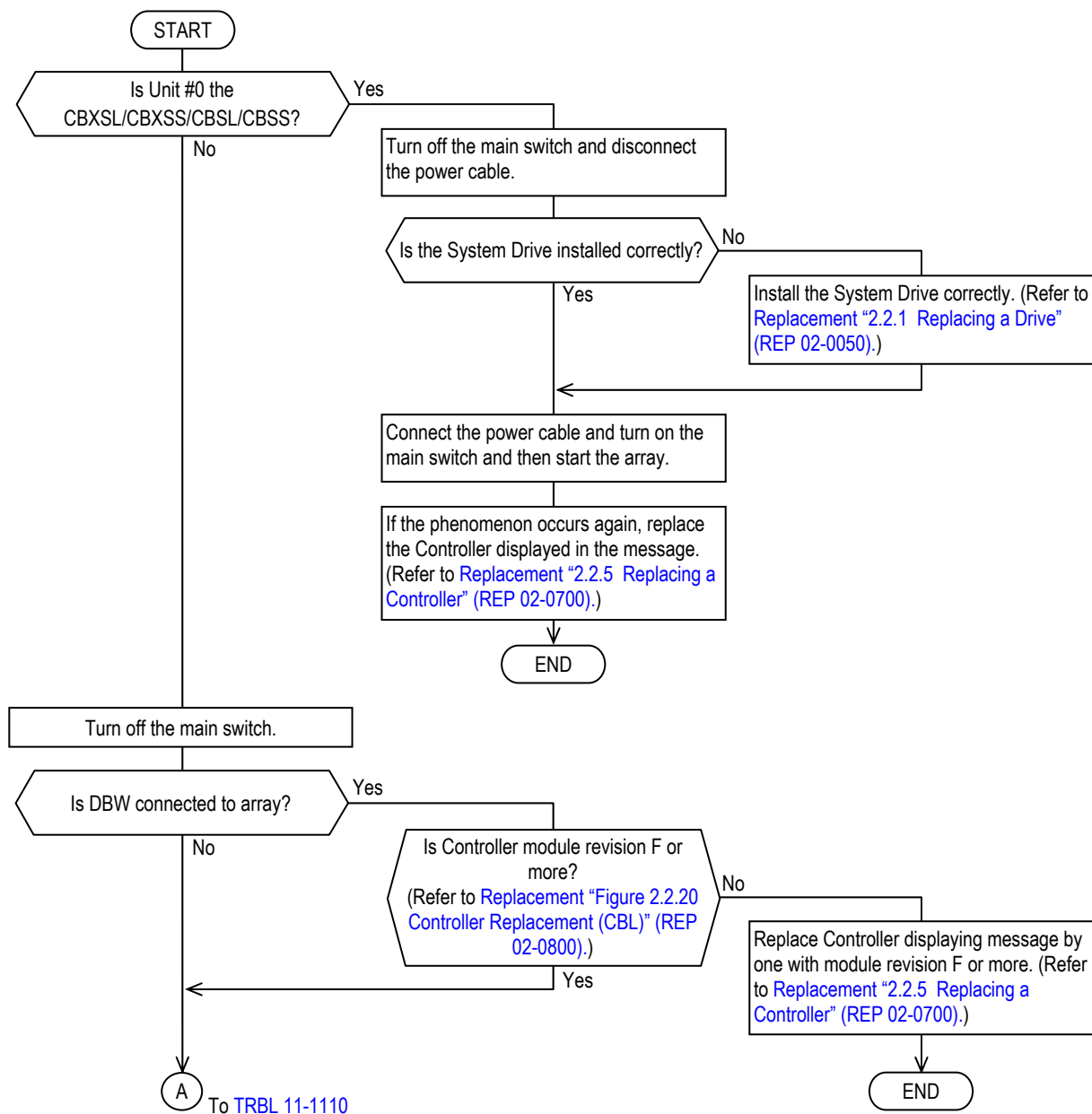
\*3 : For the part numbers, refer to the Parts Catalog “Chapter 1. Parts Catalog” (PARTS 01-0000).

### 11.1.23 Recovery Method when the Spin-up of the System Drive Failed

#### [WEB Information Message display]

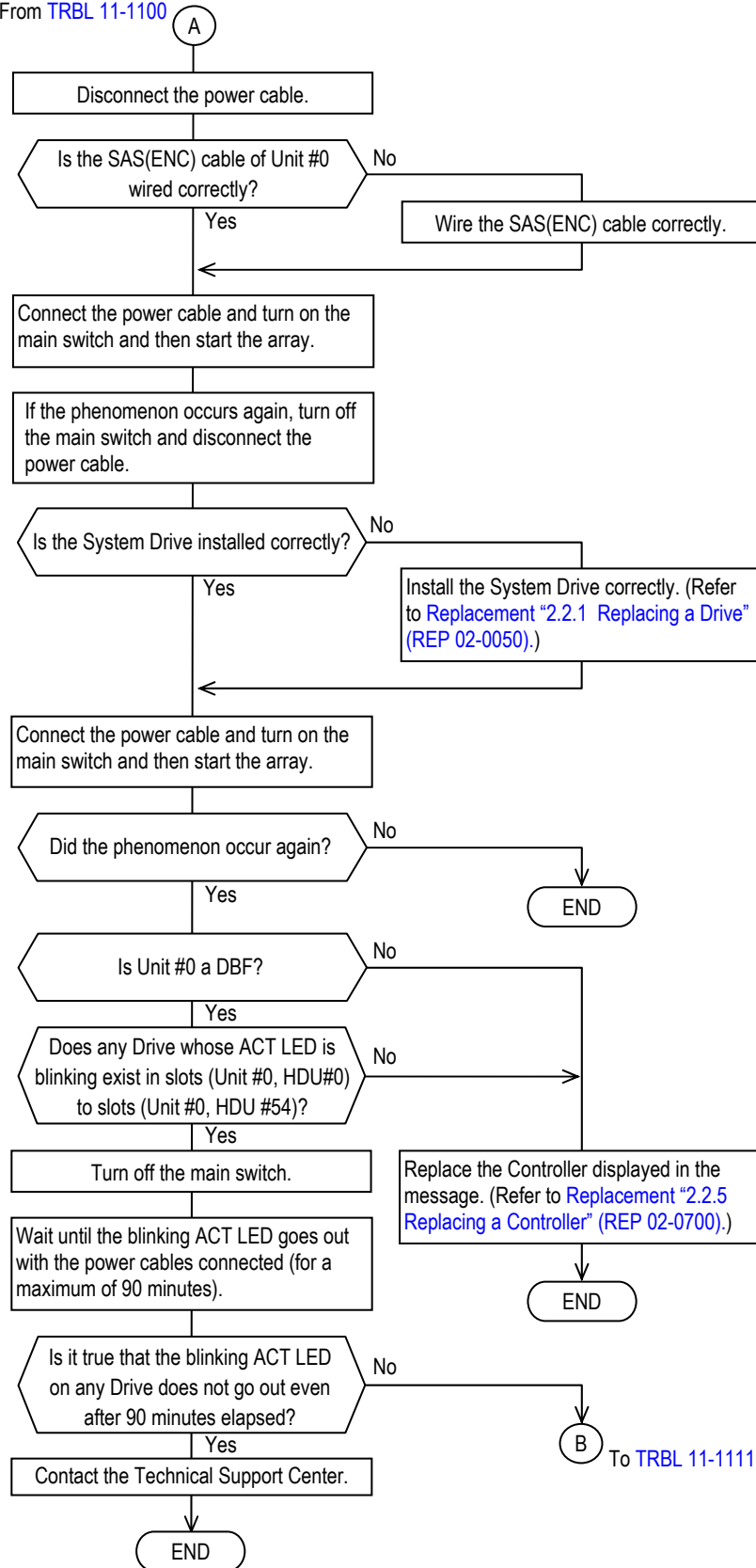


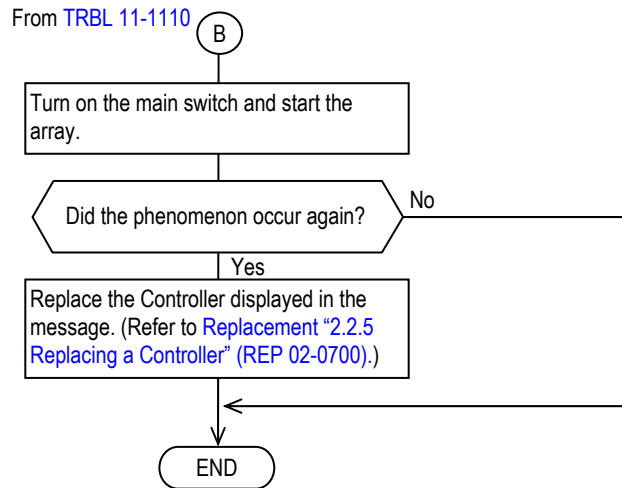
#### [Recovery method]





From TRBL 11-1100





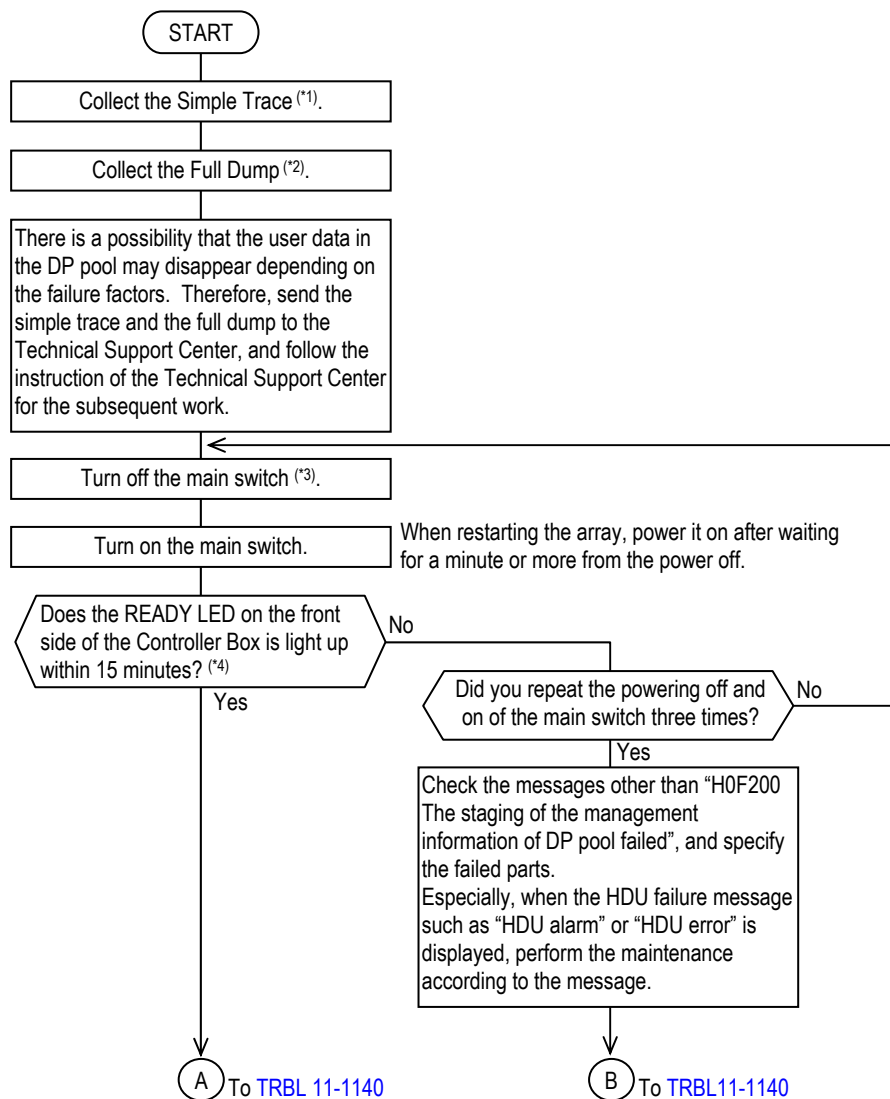
### 11.1.24 Recovery Method when the Array went Down because the Load of the DP Management Information

[WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	H0F200 The staging of the management information of DP pool failed	:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #		

- NOTE :
- When the READY LED (green) on the front side of the Controller Box is lights off, refer to [“Chapter 7. Trouble Analysis by LED Indication” \(TRBL 07-0000\)](#) to recover the failures.
  - The recovery method shown below is for the case where blockades of both Controllers in a dual Controller configuration occur.
  - The ALARM LED (red) on the front side of the Controller Box comes on and the both controllers are detached. As to the ALM LED (red) on the controller PCBA, only the ALM LED (red) on one of the controllers, in which the failure was detected earlier, comes on.
- Make sure on which controller the ALM LED (red) is on because the recovery work is to be done starting from the controller whose ALM LED (red) is on.

## [Recovery method]

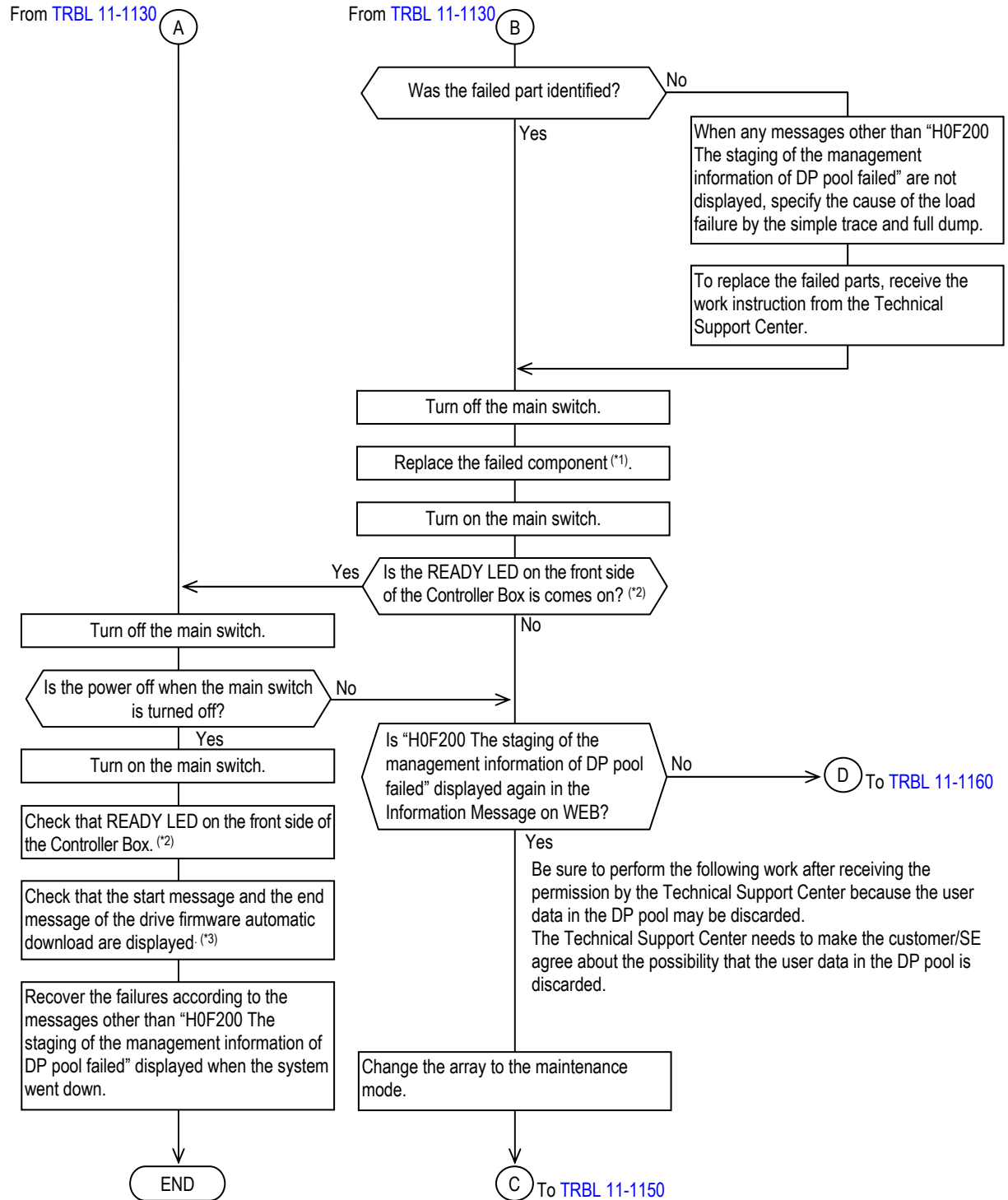


\*1 : For Simple Trace Collection, refer to “5.3 Collecting Simple Trace” (TRBL 05-0040).

\*2 : For Full Dump Collection, refer to “5.5 Collecting Full Dump” (TRBL 05-0180).

\*3 : When the ALARM LED (red) on the front of the Controller Box does not go out even if the main switch was turned off and five minutes or more passed, remove the power cables from the Power Unit once. After a while, install the power cables in the Power Unit.

\*4 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

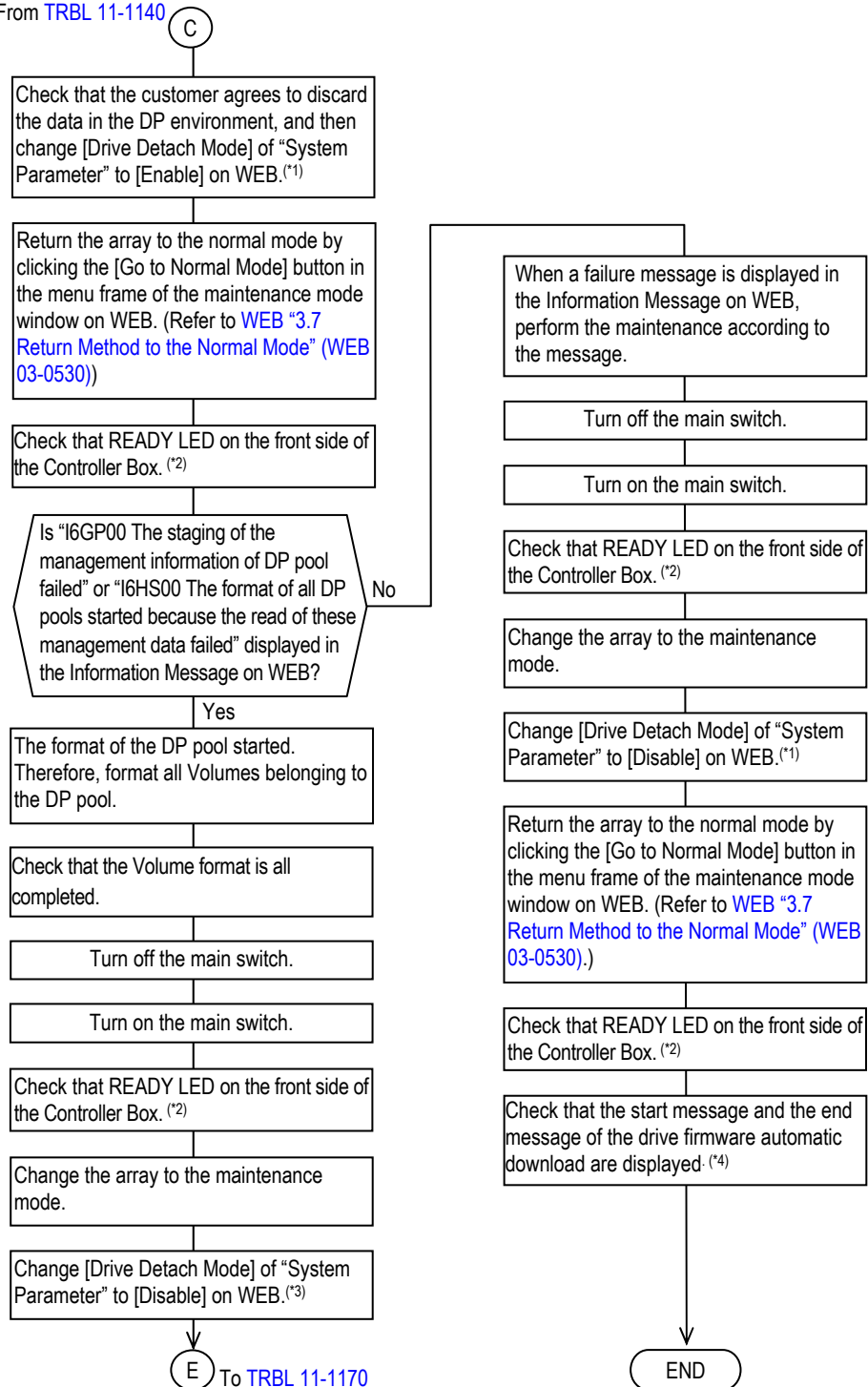


\*1 : For the replacement of the failed component, refer to [Replacement "Chapter 2. Parts Replacement" \(REP 02-0000\)](#).

\*2 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*3 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\)](#).

From TRBL 11-1140



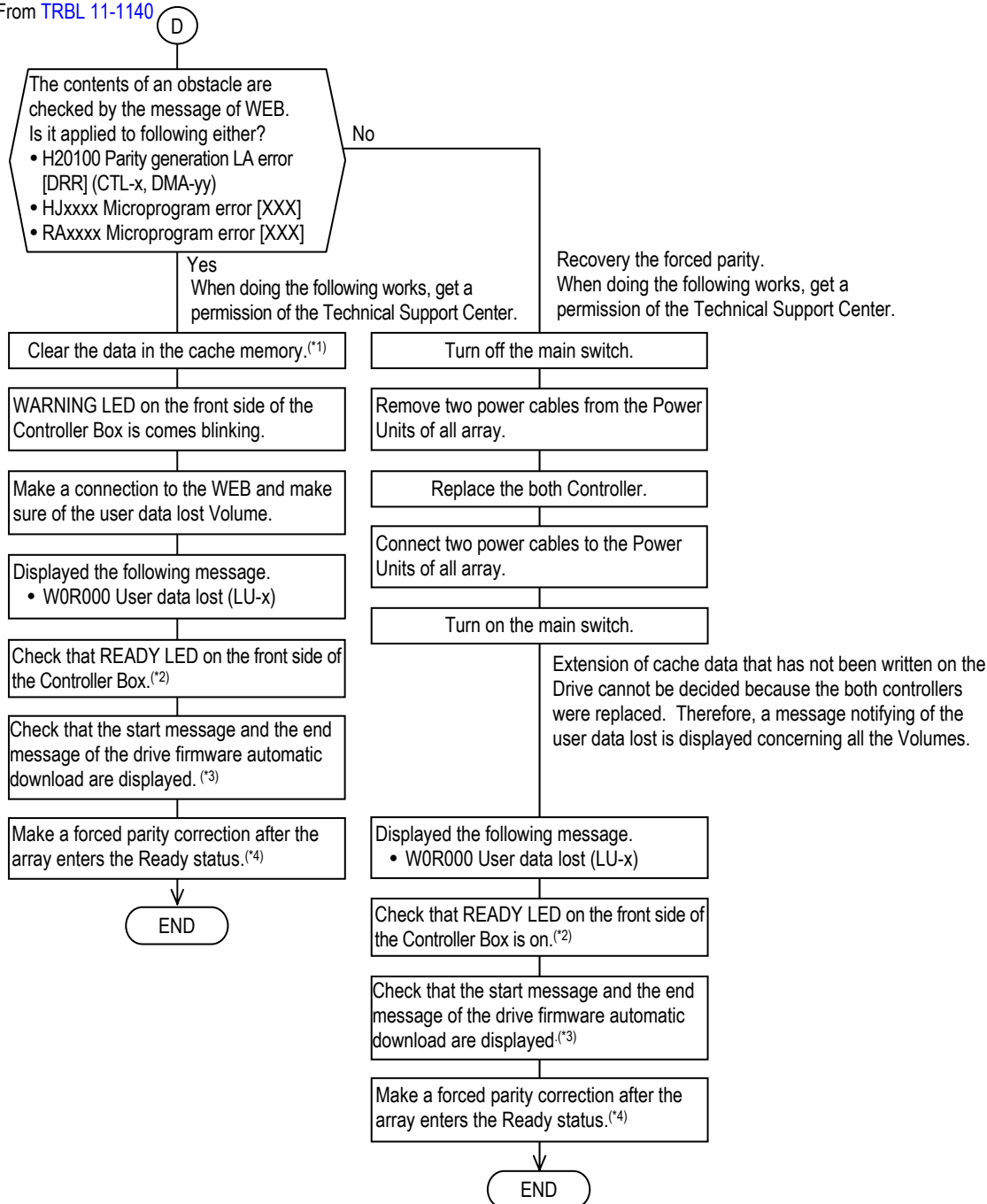
\*1 : Refer to WEB "3.2.1 System" (WEB 03-0070) for setting the Drive Detach Mode.

\*2 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*3 : Refer to WEB "3.2.1 System" (WEB 03-0070) for setting the Drive Detach Mode.

\*4 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to Firmware "1.6 (4) Checking the start message and end message of the automatic download" (FIRM 01-1620).

From TRBL 11-1140

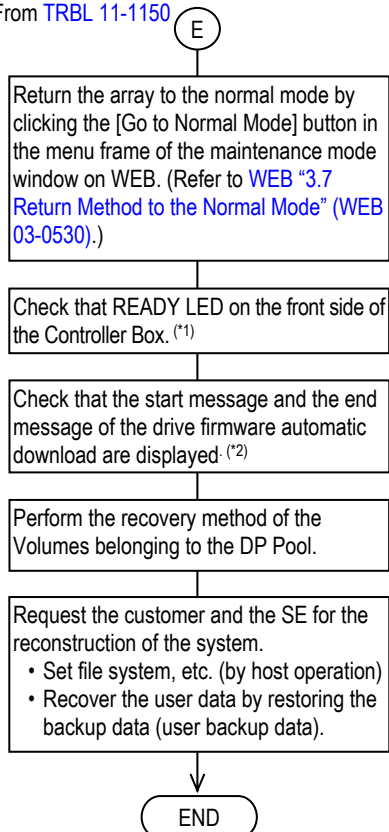


\*1 : For the clearing procedure the cache memory, refer to “11.1.1 (1) Clearing procedure the cache memory” (TRBL 11-0061).

\*2 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*3 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to Firmware “1.6 (4) Checking the start message and end message of the automatic download” (FIRM 01-1620).

\*4 : For the forced parity correction, refer to “11.1.3 The Failure Occurred Immediately after Being Ready (Forced Parity Correction)” (TRBL 11-0150).

From [TRBL 11-1150](#)

\*1 : Wait if the READY LED (green) on the front of the Controller Box is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

\*2 : When the drive firmware version of the Drive is new, the start message and completion message of the drive firmware automatic download are not displayed. To check the drive firmware automatic download, refer to [Firmware "1.6 \(4\) Checking the start message and end message of the automatic download" \(FIRM 01-1620\).](#)



### 11.1.25 Recovery Method when the Firmware Detected an Error of the DP Management Information and the Controller was Blocked

[WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	H0F600 The firmware has detected the error data		
				in the DP management information of the array	:MANUAL/FDMP
Date	Time	x : Detect Controller # y : Detect Core #			

[Recovery method]

- (1) Collect the Controller blockade trace of the Controller displayed in the message. (Refer to [“5.4 Collecting CTL Alarm Trace” \(TRBL 05-0130\)](#).)
- (2) Request the Technical Support Center for the analysis, and inform the customer/SE of the analysis result.
- (3) Explain the possibility that the user data loss may have occurred in the Volumes of the DP Pool due to a failure of the array and the following maintenance work may cause a user data loss by discarding the dirty data to the customer/SE, and ask him/her for accepting the maintenance work.

Perform the following work after obtaining the permission from the Technical Support Center.

- (4) When the message is output from both Controllers or the ALARM LED (red) on the front of the Controller Box lights up, the DP management information in the Cache memory of the array has an error. Inform the customer/SE of “The user data (dirty data) in the Cache memory of the array is discarded”. In this case, go to the procedure (7).  
When the message is only output from one Controller and the other Controller is operating (ALARM LED (red) on the front of the Controller Box goes out), go to the next procedure.
- (5) Request the customer/SE for “Since the DP management information in the Cache memory of the array has an error, the user data (dirty data) in the Cache memory of the array is discarded. Therefore, the operation of the customer who is using this array is stopped to backup the user data”.  
When the customer/SE backs up the user data, request him/her to start the backup from the data of the Volumes which do not use the DP pool first and backup the data of the Volumes which used the DP pool at last.
- (6) Wait until the customer/SE stops the operation and backs up the user data.  
When the customer/SE is backing up the data of the Volume which uses the DP pool, the controller during the operation may be blocked due to the illegal management information of the DP pool, and the system of the array may go down. In this case, inform the customer/SE of “The user data of the volumes of the DP Pool cannot be backed up anymore”.
- (7) Collect the full dump of both Controllers. (Refer to [“5.5 Collecting Full Dump” \(TRBL 05-0180\)](#).)  
When changing the mode to the maintenance mode, the array stops the Controller without the message output.

- (8) Clear the data in the cache memory. For the clearing procedure the cache memory, refer to [“11.1.1 \(1\) Clearing procedure the cache memory” \(TRBL 11-0061\)](#).
- (9) Check that the READY LED (green) on the front of the Controller Box is on.  
The READY LED (green) on the front of the Controller Box may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the CBL (80 to 180 minutes when the DBW is connected to the CBL)) before it lights up.
- (10) When “W0R000 User data lost” or “W3D000 Forced parity correction LU is detected” is displayed in the Information Message on WEB, perform the maintenance referring to [“11.1.3 The Failure Occurred Immediately after Being Ready \(Forced Parity Correction\) \(TRBL 11-0150\)”](#).
- (11) Request the customer/SE to verify the file if can be read or it is the most recent for all the Volumes which used the DP Pool.  
When the files which cannot be read or not the most recent are confirmed, request the customer/SE to restore the file from the backup data, format the Volumes which have the problems, and restore the backup data.

### 11.1.26 Recovery Method when the Drive Serial Number Acquired at the time of Starting the Array and the Serial Number of the Configuration Information do not Match

[WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy HH9R00	Two or more HDUs have serial number problem	:MANUAL/STRC
MM/DD/YYYY hh:mm:ss xy I6GV00	Move drive (Unit-x1, HDU-y1) to slot (Unit-x2, HDU-y2) because of serial number problem	:MANUAL/STRC
	x : Detect Controller #	
	y : Detect Core #	

[Recovery method]

One or more messages “I6GV00 Move drive (Unit-x1, HDU-y1) to slot (Unit-x2, HDU-y2) because of serial number problem” are displayed in WEB Information Message at the same time as this message. For all those messages, check the Drive slot # (Unit-x1, HDU-y1) currently installed and the Drive slot # (Unit-x2, HDU-y2) to be originally installed. The following three procedures are for the recovery.

(1) When the Drives in the chassis are all replaced

When trying to replace the Drive according to all the displayed messages “I6GV00 Move drive (Unit-x1, HDU-y1) to slot (Unit-x2, HDU-y2) because of serial number problem”, if all the Drives in certain chassis A and in certain chassis B are all replaced, the SAS(ENC) cables connected to the chassis A and chassis B are connected incorrectly.

- (a) Do not replace the Drives in chassis A and chassis B, review the connection of the SAS(ENC) cables, and connect the SAS(ENC) cables correctly again.
- (b) Turn off the main switch.
- (c) Remove the power cables of all the chassis.
- (d) Connect the power cables of all the chassis.
- (e) Turn on the array power.

(2) When the Drive is installed in the Drive slot (Unit-x2, HDU-y2)

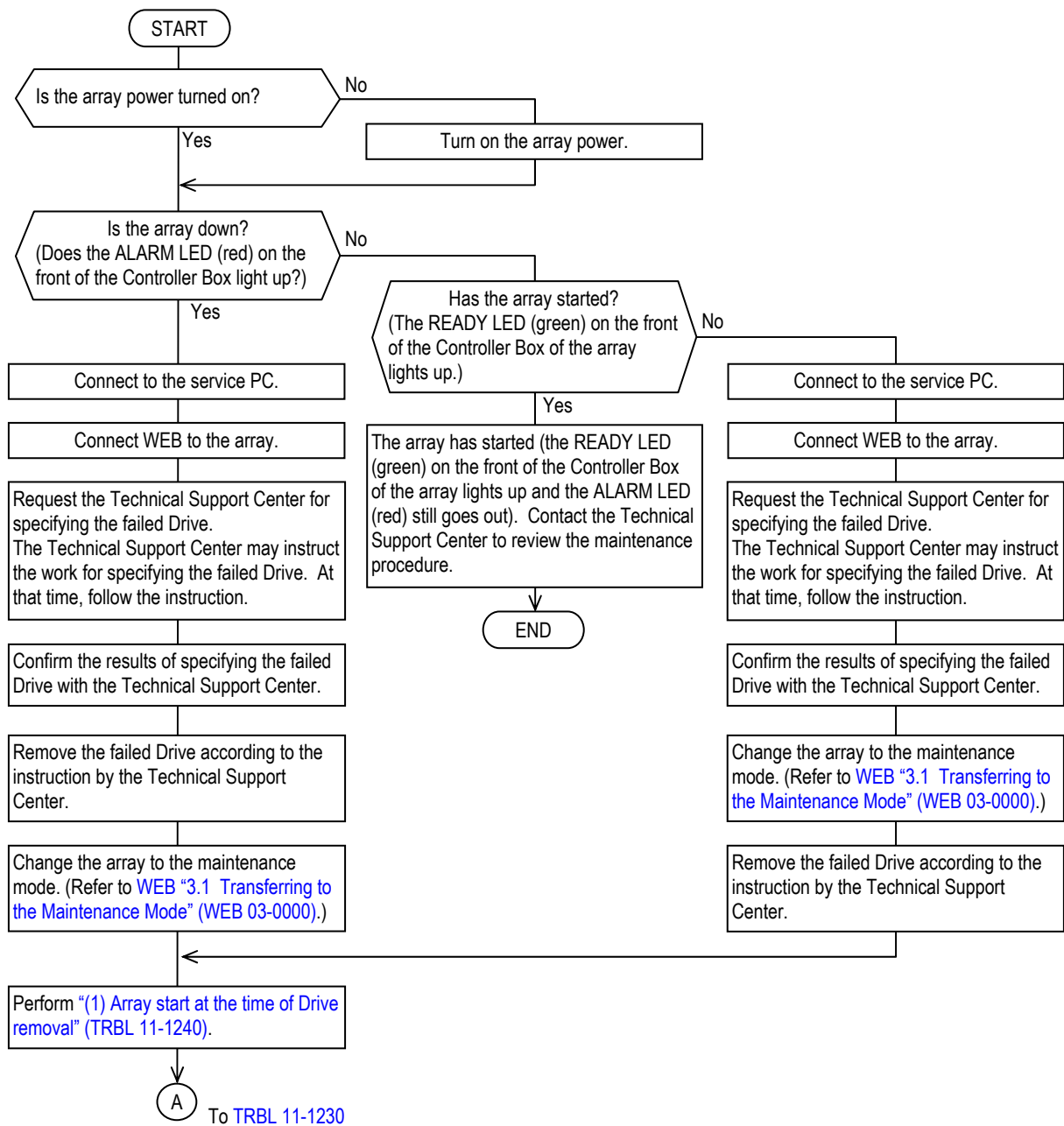
In case when trying to replace the Drive to the Drive slot (Unit-x2, HDU-y2) according to all the displayed messages “I6GV00 Move drive (Unit-x1, HDU-y1) to slot (Unit-x2, HDU-y2) because of serial number problem”, the Drive is already installed in the Drive slot (Unit-x2, HDU-y2) and the message indicating to which slot the Drive slot (Unit-x2, HDU-y2) is moved is not displayed.

- (a) Remove the Drive from the Drive slot (Unit-x2, HDU-y2).
- (b) Check with the administrator of the array configuration to which slot the Drive installed in the Drive slot (Unit-x2, HDU-y2) is installed or if it cannot be installed.
- (c) Replace the Drive in the Drive slot (Unit-x1, HDU-y1) to the Drive slot (Unit-x2, HDU-y2).
- (d) Turn off the main switch.
- (e) Remove the power cables of all the chassis.
- (f) Connect the power cables of all the chassis.
- (g) Turn on the array power.

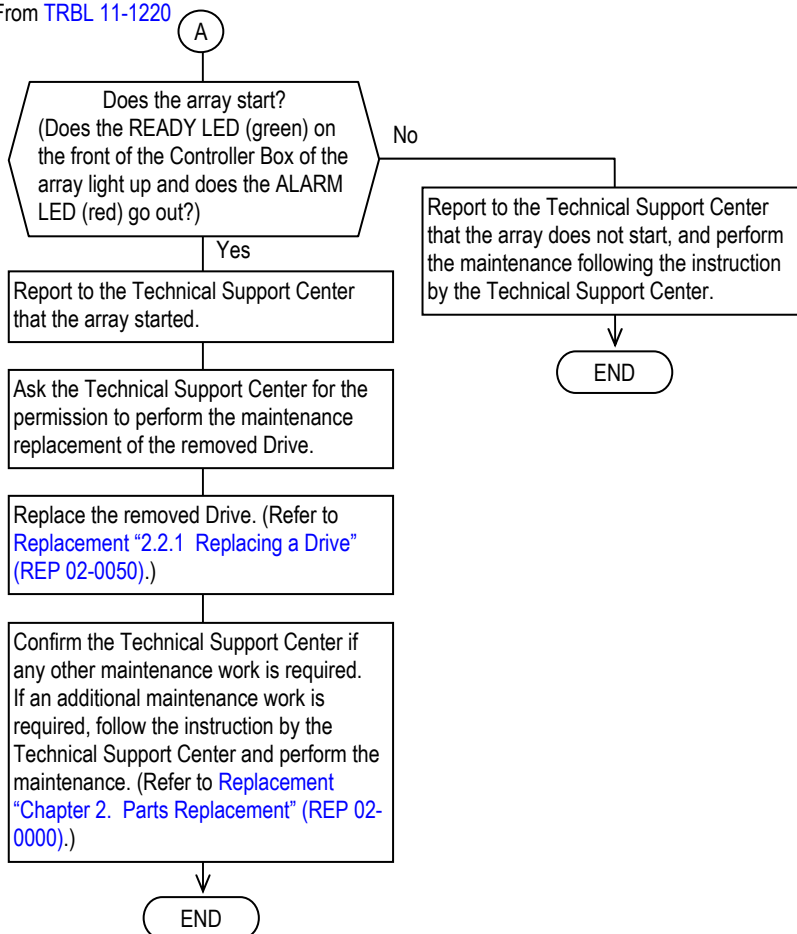
- (3) Other than the above-mentioned (1) and (2)
  - (a) Replace the Drive to the Drive slot (Unit-x2, HDU-y2) according to all the displayed message “I6GV00 Move drive (Unit-x1, HDU-y1) to slot (Unit-x2, HDU-y2) because of serial number problem”.
  - (b) Turn off the main switch.
  - (c) Remove the power cables of all the chassis.
  - (d) Connect the power cables of all the chassis.
  - (e) Turn on the array power.

## 11.1.27 Procedure for Starting the Array by Removing the Failed Drive when the Array is not Ready

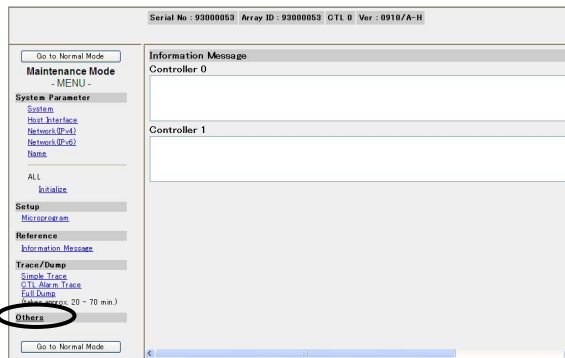
[Recovery method]



From TRBL 11-1220



- (1) Array start at the time of Drive removal  
 (a) Click “Other” in the WEB window.



- (b) The current setting (current value) is displayed.

CBL/CBSS/CBSL



CBXSS/CBXSL

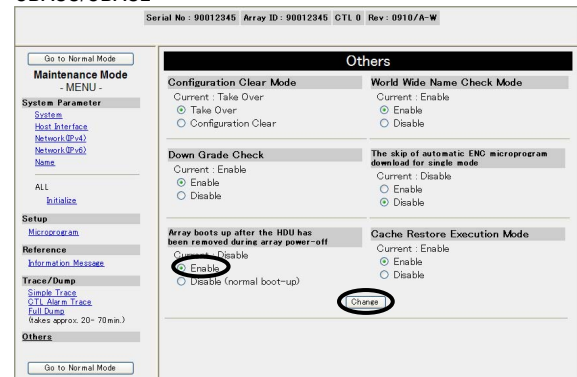


- (c) Click “Enable” of “Array boots up after HDU has been removed during array power-off”.

CBL/CBSS/CBSL



CBXSS/CBXSL



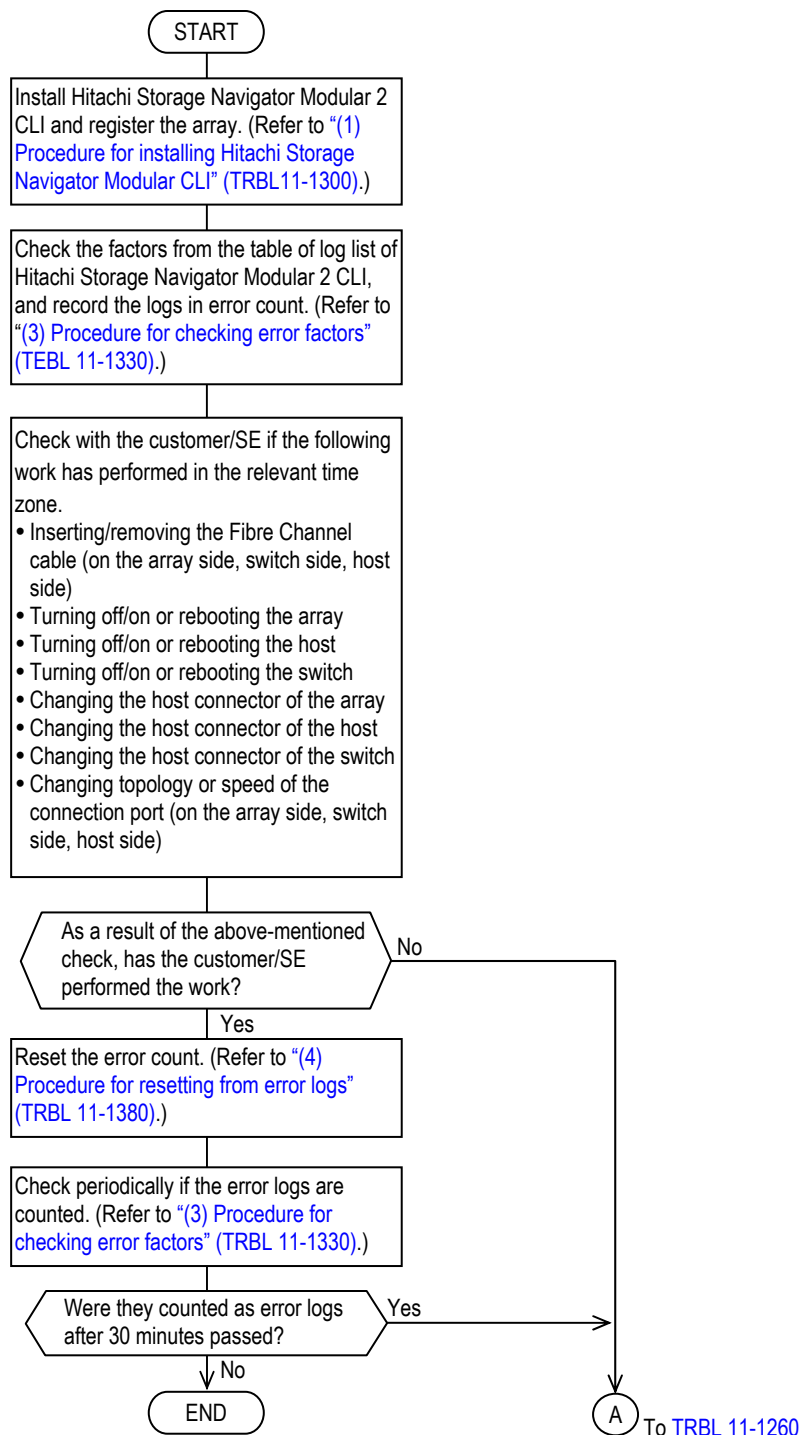
- (d) Click [Change].  
 (e) Check that “Current” of “Array boots up after HDU has been removed during array power-off” is displayed as “Enable”.  
 (f) Click [Go to Normal Mode] and start the Array. The button of [Go to Normal Mode] is in the top and down on the menu window. Please select either button.

### 11.1.28 Failure Determination and Recovery Methods of Fibre Channel Port Path

#### [WEB Information Message display]

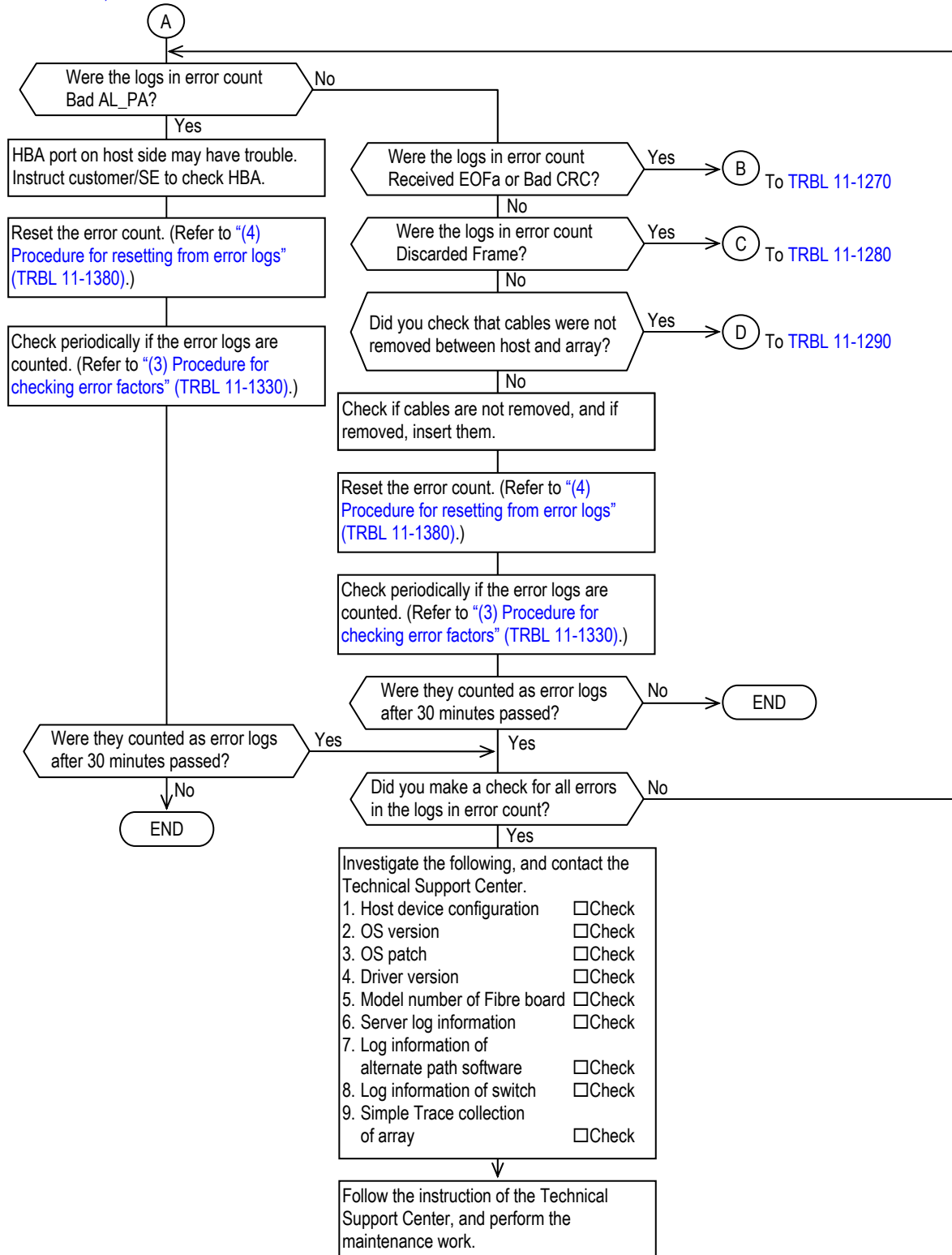
MM/DD/YYYY hh:mm:ss xy I6GZ00 The number of the channel port error has exceeded the threshold (PortXX) :MANUAL/STRC		
Date	Time	x : Detect Controller # y : Detect Core #

#### [Recovery method]

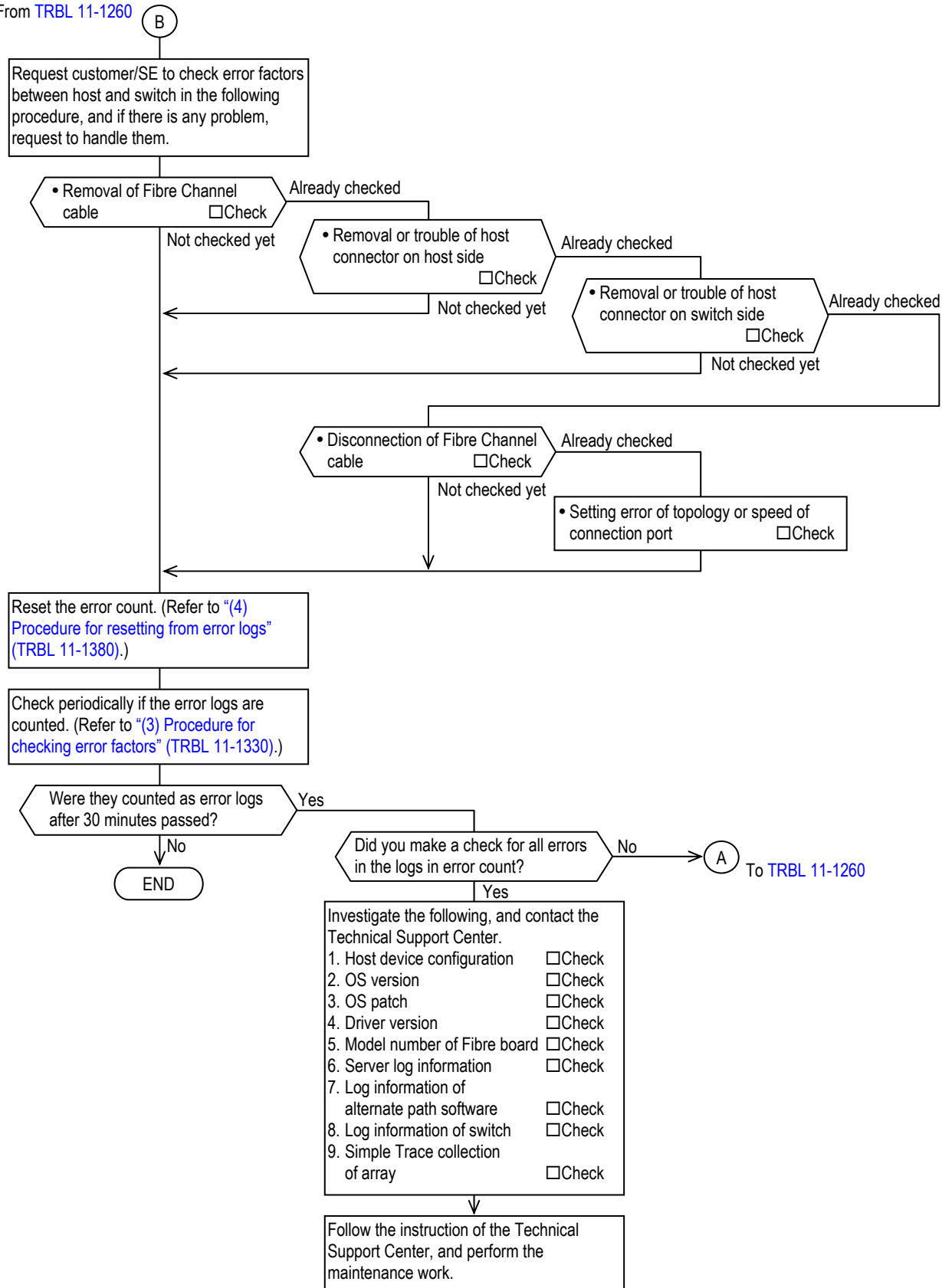




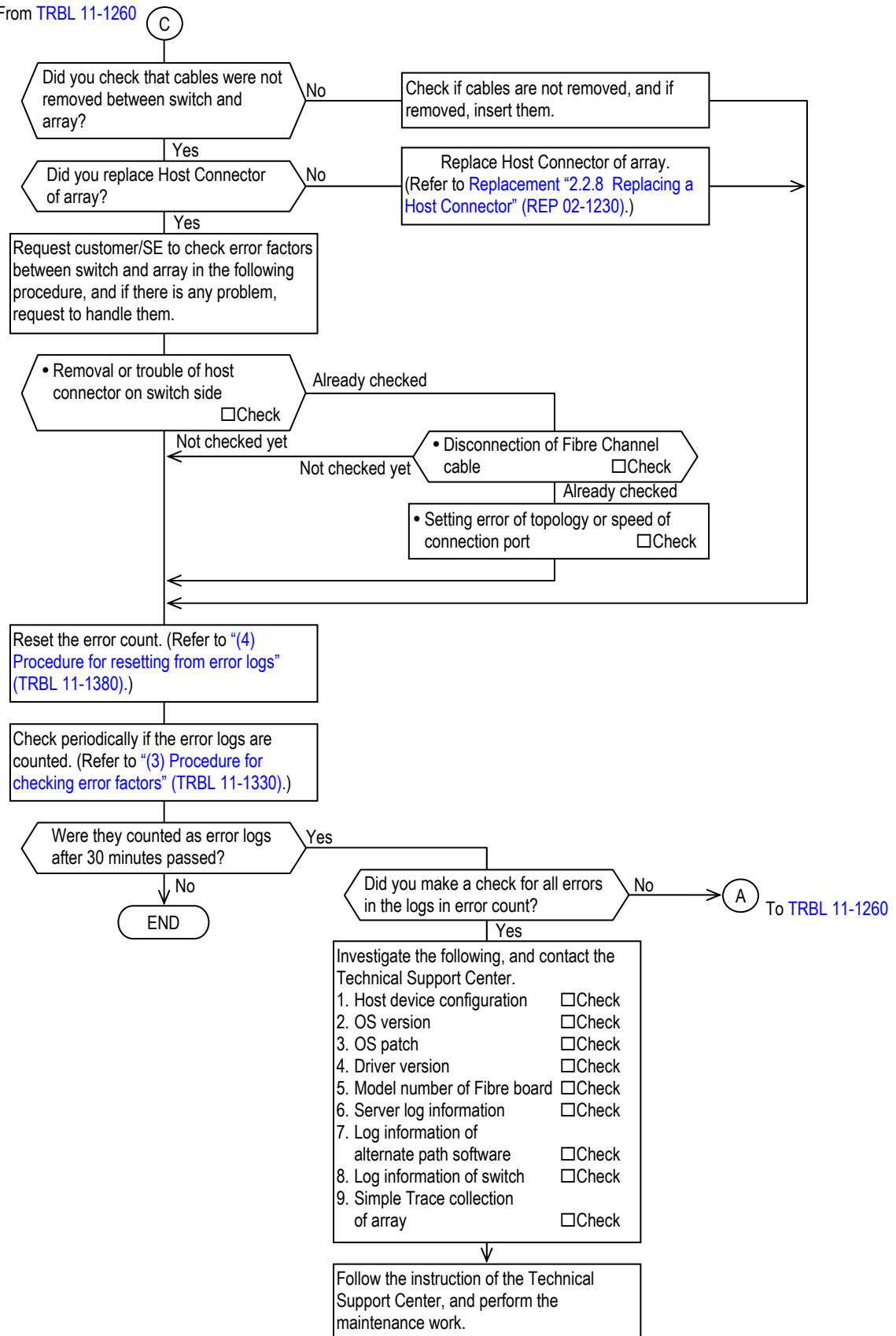
From TRBL 11-1250, TRBL 11-1270,  
TRBL 11-1280, TRBL 11-1290

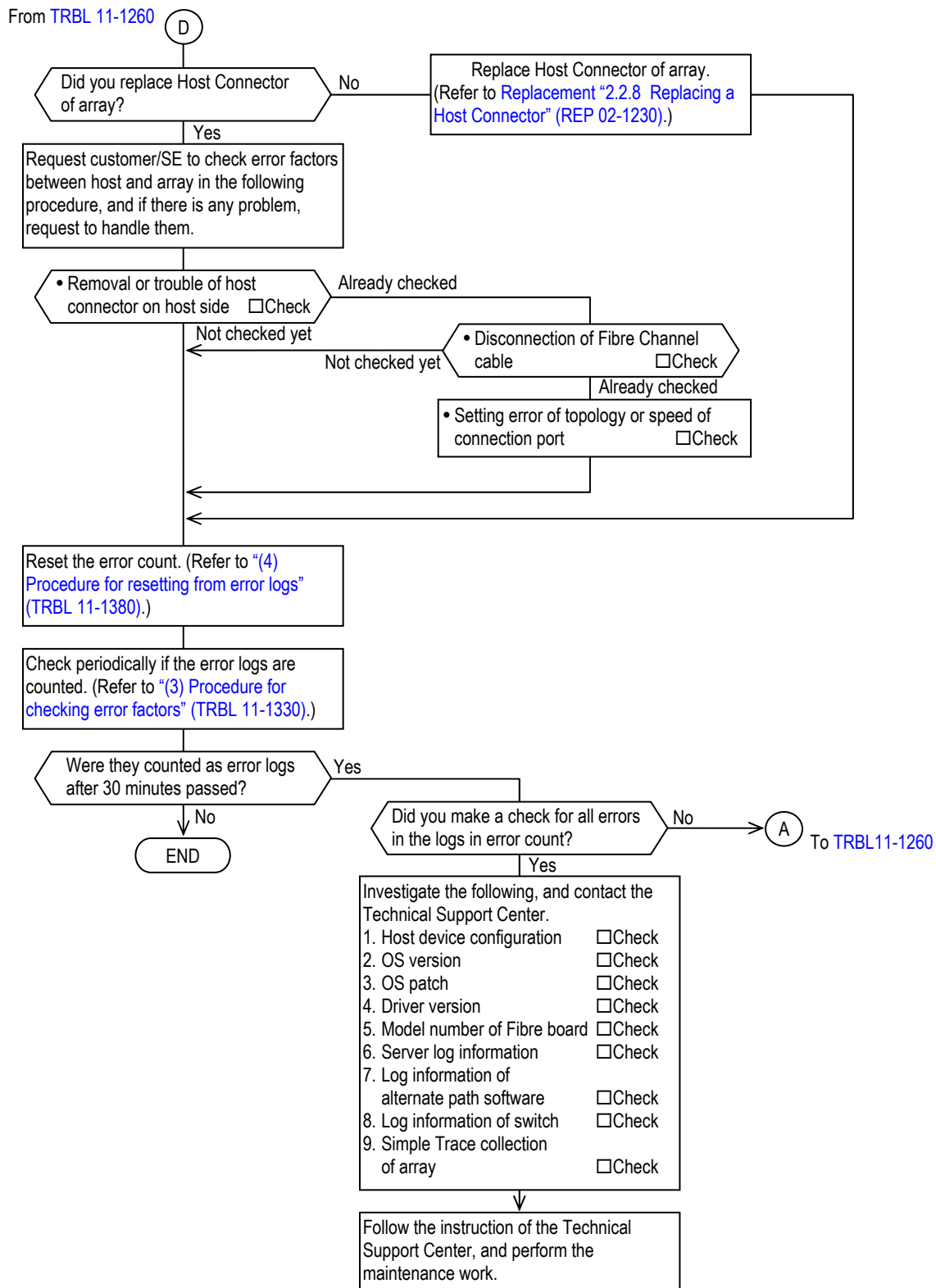


From TRBL 11-1260



From TRBL 11-1260





(1) Procedure for installing Hitachi Storage Navigator Modular CLI

- (a) Start the PC, then boot up Windows.
- (b) Execute the HSNM2-xxxx-W-CLI.exe in the program\hsnm2\_win\_CLI directory of the provided CD-R. (The portion xxxx of file names varies with the version of Navigator, etc.)
- (c) Execute the startsnmen.bat, which is a Windows batch file that is used to start Navigator. A prompt window will be displayed and Navigator commands can be executed from this window.

```
set STONAVM_HOME=.  
set LANG=ja
```

NOTE : When executing commands from locations other than a directory in which Navigator has been installed, edit the STONAVM\_HOME environment variable of the startsnmen.bat in the developed file. Set up the install directory of Navigator in the STONAVM\_HOME environment variable. However, if the LANG environment variable is not specified, Navigator operates in English language mode.

Example : If Navigator has been installed in C:\Storage Navigator Modular 2 CLI.

```
set STONAVM_HOME=C:\Storage Navigator Modular 2 CLI  
set LANG=ja  
command.com
```

- (d) Perform registration of array (auunitadd command).

**(2) Command of Fibre Channel Port Error**

Describes the Format, Description or Options of auloginfo command.

**(a) Command name**

auloginfo Referencing/Setting/Resetting the Log Information

**(b) Format**

```
auloginfo -unit unit_name -refer -porterror [ ctl_no port_no ]  
                                     [ -item [ threshold ]  
                                     [ portinfo ]  
                                     [ errorinfo ]  
                                     [ todayinfo ] ]
```

```
auloginfo -unit unit_name -set -porterror ctl_no port_no  
                                     -threshold num
```

```
auloginfo -unit unit_name -reset -porterror ctl_no port_no  
                                     -item errorinfo
```

**(c) Description**

This command references, sets, or resets the log information.

**(d) Options**

**-unit unit\_name**

Specify the name of the array unit for which to reference, set, or reset the log information.

Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “\_ (underline)”, “.” (period), “@”, or “ (space)”.

Space in front and in the rear of the character string is removed.

**-refer**

References the log information.

**-set**

Sets the log information.

**-reset**

Resets the log information.

**-porterror ctl\_no port\_no**

References, sets, or resets the log information of the specified port.

When the -refer option is specified:

When the specification is omitted, error information of all the ports are displayed.

ctl\_no : Controller number (0, 1)

port\_no: Port number (A, B, C, D, E, F, G, H)

-item [ threshold ] [ portinfo ] [ errorinfo ] [ todayinfo ]

When the -refer option is specified:

Specify a item you want to refer to.

When the specification is omitted, all the item are displayed.

One or more of the items can be specified.

When the -reset option is specified:

Specify a item you want to reset to.

threshold: Threshold of error alert

portinfo : Port information

errorinfo: Error information

todayinfo: Today's error information

-threshold num

Specify the threshold of error count for the alert.

When 0 is specified, the error alert is not carried out.

## (3) Procedure for checking error factors

## (a) Display of error factors

auloginfo – unit unit\_name –refer –porterror [ctl\_no port\_no] [-item [threshold] [portinfo] [errorinfo] [todayinfo] ]

## (b) Error contents

No.	Name	Error contents
1	Loss Of Signal	Indicates that optical signal is cut off.
2	Bad Received Character	Indicates that 8-bit/10-bit conversion failed.
3	Loss of Synchronization	Indicates that synchronization of signal failed.
4	Link Failure	Indicates the following link failures. <ul style="list-style-type: none"> <li>• Status that cannot detect optical input signal</li> <li>• Status that cannot detect synchronous pattern passed 100 ms or more</li> <li>• Status that cannot detect lip signal at the time of loop configuration</li> </ul>
5	Discarded Frame	Indicates that frame was discarded by receiving illegal frame.
6	Received EOFa	Indicates that frame was received from destination port but EOF delimiter was disabled.
7	Bad CRC	Indicates that CRC error occurred in frame received from destination port.
8	OLS/NOS Received	Indicates that it was issued for initializing when remote port detected error (PointToPoint connection only)
9	LIPf Received	Indicates that it was issued for initializing when remote port detected error (loop connection only).
10	Bad AL_PA	Indicates that OPEN was transmitted but OPEN was received as is (at the time of loop connection only).
11	Link Down	Indicates that status was changed from normal to Initialization, Loop Fail states or OFFLINE state.

## (c) The count method for every error factor

No.	Name	Treatment at the time of counting up
1	Loss Of Signal	Equivalent to the actual number of times of occurrence
2	Bad Received Character	Treat the actual number of times of occurrence as "0" or "1 in case it is other than 0"
3	Loss of Synchronization	The value of which the actual number of times of occurrence is "divided by 256"
4	Link Failure	Equivalent to the actual number of times of occurrence
5	Discarded Frame	Equivalent to the actual number of times of occurrence
6	Received EOFa	Equivalent to the actual number of times of occurrence
7	Bad CRC	Equivalent to the actual number of times of occurrence
8	OLS/NOS Received	The value of which the actual number of times of occurrence is "divided by 512"
9	LIPf Received	Equivalent to the actual number of times of occurrence
10	Bad AL_PA	Equivalent to the actual number of times of occurrence
11	Link Down	The value of which the actual number of times of occurrence is "divided by 256"

The error count is automatically reset to "0" in the following conditions.

- When the array is stopped
- For the port of the failed Controller when a Controller failure occurs



## (d) External reasons for error occurrence

No.	Name	Occurrence factors	Causes
1	Loss Of Signal	Quality loss in the optical signals of the connection destination and local port	<ul style="list-style-type: none"> <li>• The connection cable coming-out</li> <li>• The connection cable disconnection (contact failure)</li> </ul>
2	Bad Received Character	Quality loss in the optical signals of the connection destination and local port	<ul style="list-style-type: none"> <li>• The destination host connector coming-out or failure</li> </ul>
3	Loss of Synchronization	Quality loss in the optical signals of the connection destination and local port	<ul style="list-style-type: none"> <li>• Error in speed setting/topology</li> </ul>
4	Link Failure	Quality loss in the optical signals of the connection destination and local port	<ul style="list-style-type: none"> <li>• Host connector failure on the array side</li> </ul> <p>It is detected when the connection configuration is changed (cable connection change, reboot and powering-on/off on the connection destination)</p>
5	Discarded Frame	<ul style="list-style-type: none"> <li>• The problem with the output Frame on the connection destination</li> <li>• The problem with the input Frame on the array</li> </ul>	<ul style="list-style-type: none"> <li>• The connection cable coming-out</li> <li>• The connection cable disconnection (contact failure)</li> <li>• The destination host connector coming-out or failure</li> <li>• Error in speed setting/topology</li> <li>• Host connector failure on the array side</li> </ul>
6	Received EOFa	The problem with the signal quality between host and switch	<ul style="list-style-type: none"> <li>• The connection cable coming-out</li> <li>• The connection cable disconnection (contact failure)</li> <li>• The host connector coming-out between host and switch or failure</li> <li>• Error in speed setting/topology</li> </ul>
7	Bad CRC	The problem with the signal quality between host and switch	<ul style="list-style-type: none"> <li>• The connection cable coming-out</li> <li>• The connection cable disconnection (contact failure)</li> <li>• The Host side/Switch side host connector coming-out or failure</li> <li>• Error in speed setting/topology</li> <li>• Host connector failure on the array side</li> </ul>
8	OLS/NOS Received	Quality loss in the optical signals of the connection destination and local port	<ul style="list-style-type: none"> <li>• The connection cable coming-out</li> <li>• The connection cable disconnection (contact failure)</li> </ul>
9	LIPf Received	Quality loss in the optical signals of the connection destination and local port	<ul style="list-style-type: none"> <li>• The destination host connector coming-out or failure</li> <li>• Error in speed setting/topology</li> <li>• Host connector failure on the array side</li> </ul> <p>It is detected when the connection configuration is changed (cable connection change, reboot and powering-on/off on the connection destination)</p>
10	Bad AL_PA	<ul style="list-style-type: none"> <li>• HBA port failure</li> <li>• The poor quality of the HBA port signal</li> </ul>	It may be a HBA failure.

No.	Name	Occurrence factors	Causes
11	Link Down	Quality loss in the optical signals of the connection destination and local port	<ul style="list-style-type: none"> <li>• The connection cable coming-out</li> <li>• The connection cable disconnection (contact failure)</li> <li>• The destination host connector coming-out or failure</li> <li>• Error in speed setting/topology</li> <li>• Host connector failure on the array side</li> </ul> <p>It is detected when the connection configuration is changed (cable connection change, reboot and powering-on/off on the connection destination)</p>

## (e) Displaying information of all ports (all ports)

auloginfo -unit unit\_name -refer -porterror

```
C:\Program Files\Hitachi Storage Navigator Modular 2 CLI>auloginfo -unit 101-102 -refer -porterror
Port Error
Threshold
Port Threshold
0A 1
0B 0
1A 0
1B 0

Port Information
Port Alert Time
0A 2010/02/08 23:55
0B None
1A None
1B None

Error Information : Alert Timing
Port 0A
Alert Time : 2010/02/08 23:55
Threshold : 1
Transfer Rate
Setting : Auto
Current : 40Gbps
Topology : Loop
Error Count
Total Loss of Bad Received Loss of Link Discarded Received Bad OLS/NOS LIPf Bad AL_PA Link Down
5882 Signal Character Synchronization Failure Frame EOFA CRC Received Received Received AL_PA Down
0 1 5885 8 0 0 0 0 5 0 0 3

Port 0B
None
Port 1A
None
Port 1B
None

Error Information : 2010/02/09
Port 0A
Error Count
Total(00:00-24:00) : 0
Detail
Time Total Loss of Bad Received Loss of Link Discarded Received Bad OLS/NOS LIPf Bad AL_PA Link Down
00:00-00:30 0 0 0 0 0 0 0 0 0 0 0 0
00:30-01:00 0 0 0 0 0 0 0 0 0 0 0 0
01:00-01:30 0 0 0 0 0 0 0 0 0 0 0 0
01:30-02:00 0 0 0 0 0 0 0 0 0 0 0 0
```

## (f) Displaying information of all ports (specified port)

auloginfo -unit unit\_name -refer -porterror ctl\_no port\_no

```
C:\Program Files\Hitachi Storage Navigator Modular 2 CLI>auloginfo -unit 101-102 -refer -porterror 0 A
Port Error
Threshold
Port   Threshold
0A     1

Port Information
Port   Alert Time
0A     2010/02/08 23:55

Error Information : Alert Timing
Port 0A
Alert Time : 2010/02/08 23:55
Threshold : 1
Transfer Rate
Setting : Auto
Current : 4Gbps
Topology : Loop
Error Count

          Total   Loss of   Bad Received   Loss of   Link   Discarded   Received   Bad CRC   OLS/NOS   LIPf   Bad AL_PA   Link Down
          5882     Signal     Character     Synchronization   Failure   Frame        EOFa        0         Received  0      0           3
                                     1          5865              8              0              0              5          0           0

Error Information : 2010/02/09
Port 0A
Error Count
Total(00:00-24:00) : 0
Detail

          Time          Total   Loss of   Bad Received   Loss of   Link   Discarded   Received   Bad CRC   OLS/NOS   LIPf   Bad AL_PA   Link Down
          00:00-00:30      0         0         0             0           0         0          0         0         0         0           0
          00:30-01:00      0         0         0             0           0         0          0         0         0         0           0
          01:00-01:30      0         0         0             0           0         0          0         0         0         0           0
          01:30-02:00      0         0         0             0           0         0          0         0         0         0           0
          02:00-02:30      0         0         0             0           0         0          0         0         0         0           0
          02:30-03:00      0         0         0             0           0         0          0         0         0         0           0
          03:00-03:30      0         0         0             0           0         0          0         0         0         0           0
          03:30-04:00      0         0         0             0           0         0          0         0         0         0           0
          04:00-04:30      0         0         0             0           0         0          0         0         0         0           0
          04:30-05:00      0         0         0             0           0         0          0         0         0         0           0
          05:00-05:30      0         0         0             0           0         0          0         0         0         0           0
          05:30-06:00      0         0         0             0           0         0          0         0         0         0           0
          06:00-06:30      0         0         0             0           0         0          0         0         0         0           0
          06:30-07:00      0         0         0             0           0         0          0         0         0         0           0
          07:00-07:30      0         0         0             0           0         0          0         0         0         0           0
          07:30-08:00      0         0         0             0           0         0          0         0         0         0           0
          08:00-08:30      0         0         0             0           0         0          0         0         0         0           0
          08:30-09:00      0         0         0             0           0         0          0         0         0         0           0
          09:00-09:30      0         0         0             0           0         0          0         0         0         0           0
          09:30-10:00      0         0         0             0           0         0          0         0         0         0           0
          10:00-10:30      0         0         0             0           0         0          0         0         0         0           0
          10:30-11:00      0         0         0             0           0         0          0         0         0         0           0
          11:00-11:30      0         0         0             0           0         0          0         0         0         0           0
          11:30-12:00      0         0         0             0           0         0          0         0         0         0           0
          12:00-12:30      0         0         0             0           0         0          0         0         0         0           0
          12:30-13:00      0         0         0             0           0         0          0         0         0         0           0
          13:00-13:30      0         0         0             0           0         0          0         0         0         0           0
```

## (g) Displaying error factor

auloginfo -unit unit\_name -refer -porterror [ctl\_no port\_no] -item errorinfo

```
C:\Program Files\Hitachi Storage Navigator Modular 2 CLI>auloginfo -unit 101-102 -refer -porterror 0 A -item errorinfo
Port Error
Error Information : Alert Timing
Port 0A
Alert Time : 2010/02/08 23:55
Threshold : 1
Transfer Rate
Setting : Auto
Current : 4Gbps
Topology : Loop
Error Count

          Total   Loss of   Bad Received   Loss of   Link   Discarded   Received   Bad CRC   OLS/NOS   LIPf   Bad AL_PA   Link Down
          5882     Signal     Character     Synchronization   Failure   Frame        EOFa        0         Received  0      0           3

C:\Program Files\Hitachi Storage Navigator Modular 2 CLI>
```

## (h) Displaying information of port status

auloginfo -unit unit\_name -refer -porterror [ctl\_no port\_no] -item portinfo

```
C:\Program Files\Hitachi Storage Navigator Modular 2 CLI>auloginfo -unit 101-102 -refer -porterror 0 A -item portinfo
Port Error
Port Information
Port   Alert Time
0A     2010/02/08 23:55

C:\Program Files\Hitachi Storage Navigator Modular 2 CLI>
```

## (i) Displaying information every 30 minutes

```

auloginfo -unit unit_name -refer -porterror [ctl_no port_no] -item todayinfo

```

```

C:\Program Files\Storage Navigator Modular 2 CLI>auloginfo -unit 101-102 -refer -porterror 0 A -item todayinfo
Port Error
Error Information : 2010/02/09
Port 0A
Error Count
Total(00:00-24:00) : 0
Detail

```

Time	Total	Loss of Signal	Bad Received Character	Loss of Synchronization	Link Failure	Discarded Frame	Received EDFA	Bad CRC	OLS/NOS Received	LIPF Received	Bad AL_PA	Link Down
00:00-00:30	0	0	0	0	0	0	0	0	0	0	0	0
00:30-01:00	0	0	0	0	0	0	0	0	0	0	0	0
01:00-01:30	0	0	0	0	0	0	0	0	0	0	0	0
01:30-02:00	0	0	0	0	0	0	0	0	0	0	0	0
02:00-02:30	0	0	0	0	0	0	0	0	0	0	0	0
02:30-03:00	0	0	0	0	0	0	0	0	0	0	0	0
03:00-03:30	0	0	0	0	0	0	0	0	0	0	0	0
03:30-04:00	0	0	0	0	0	0	0	0	0	0	0	0
04:00-04:30	0	0	0	0	0	0	0	0	0	0	0	0
04:30-05:00	0	0	0	0	0	0	0	0	0	0	0	0
05:00-05:30	0	0	0	0	0	0	0	0	0	0	0	0
05:30-06:00	0	0	0	0	0	0	0	0	0	0	0	0
06:00-06:30	0	0	0	0	0	0	0	0	0	0	0	0
06:30-07:00	0	0	0	0	0	0	0	0	0	0	0	0
07:00-07:30	0	0	0	0	0	0	0	0	0	0	0	0
07:30-08:00	0	0	0	0	0	0	0	0	0	0	0	0
08:00-08:30	0	0	0	0	0	0	0	0	0	0	0	0
08:30-09:00	0	0	0	0	0	0	0	0	0	0	0	0
09:00-09:30	0	0	0	0	0	0	0	0	0	0	0	0
09:30-10:00	0	0	0	0	0	0	0	0	0	0	0	0
10:00-10:30	0	0	0	0	0	0	0	0	0	0	0	0
10:30-11:00	0	0	0	0	0	0	0	0	0	0	0	0
11:00-11:30	0	0	0	0	0	0	0	0	0	0	0	0
11:30-12:00	0	0	0	0	0	0	0	0	0	0	0	0
12:00-12:30	0	0	0	0	0	0	0	0	0	0	0	0
12:30-13:00	0	0	0	0	0	0	0	0	0	0	0	0
13:00-13:30	0	0	0	0	0	0	0	0	0	0	0	0
13:30-14:00	0	0	0	0	0	0	0	0	0	0	0	0
14:00-14:30	Not Collected	---	---	---	---	---	---	---	---	---	---	---
14:30-15:00	Not Collected	---	---	---	---	---	---	---	---	---	---	---
15:00-15:30	0	0	0	0	0	0	0	0	0	0	0	0
15:30-16:00	0	0	0	0	0	0	0	0	0	0	0	0
16:00-16:30	0	0	0	0	0	0	0	0	0	0	0	0
16:30-17:00	Not Collected	---	---	---	---	---	---	---	---	---	---	---
17:00-17:30	Not Collected	---	---	---	---	---	---	---	---	---	---	---
17:30-18:00	Not Collected	---	---	---	---	---	---	---	---	---	---	---
18:00-18:30	Not Collected	---	---	---	---	---	---	---	---	---	---	---
18:30-19:00	Not Collected	---	---	---	---	---	---	---	---	---	---	---
19:00-19:30	Not Collected	---	---	---	---	---	---	---	---	---	---	---
19:30-20:00	Not Collected	---	---	---	---	---	---	---	---	---	---	---
20:00-20:30	Not Collected	---	---	---	---	---	---	---	---	---	---	---
20:30-21:00	Not Collected	---	---	---	---	---	---	---	---	---	---	---
21:00-21:30	Not Collected	---	---	---	---	---	---	---	---	---	---	---
21:30-22:00	Not Collected	---	---	---	---	---	---	---	---	---	---	---
22:00-22:30	Not Collected	---	---	---	---	---	---	---	---	---	---	---
22:30-23:00	Not Collected	---	---	---	---	---	---	---	---	---	---	---
23:00-23:30	Not Collected	---	---	---	---	---	---	---	---	---	---	---
23:30-24:00	Not Collected	---	---	---	---	---	---	---	---	---	---	---

```

C:\Program Files\Storage Navigator Modular 2 CLI>

```

## (j) Displaying set threshold value

```

auloginfo -unit unit_name -refer -porterror [ctl_no port_no] -item threshold

```

```

C:\Program Files\Storage Navigator Modular 2 CLI>auloginfo -unit 101-102 -refer -porterror 0 A -item threshold
Port Error
Threshold
Port Threshold
0A 1

C:\Program Files\Storage Navigator Modular 2 CLI>

```

#### (4) Procedure for resetting from error logs

##### (a) Resetting error factor

`auloginfo -unit unit_name -reset -porterror ctl_no port_no -item errorinfo`

##### (b) Example of window display

```
C:\Program Files\Storage Navigator Modular 2 CLI>auloginfo -unit 101-102 -reset -porterror 0 E -item errorinfo
Are you sure you want to reset the log information? (y/n [n]): y
The log information has been reset successfully.
```

#### (5) Setting threshold value

##### (a) Setting threshold value

`auloginfo -unit unit_name -set -porterror ctl_no port_no -threshold threshold_num`

##### (b) Example of window display

```
C:\Program Files\Storage Navigator Modular 2 CLI>auloginfo -unit 101-102 -set -porterror 0 F -threshold 1
Are you sure you want to set the log information? (y/n [n]): y
The log information has been set successfully.
```

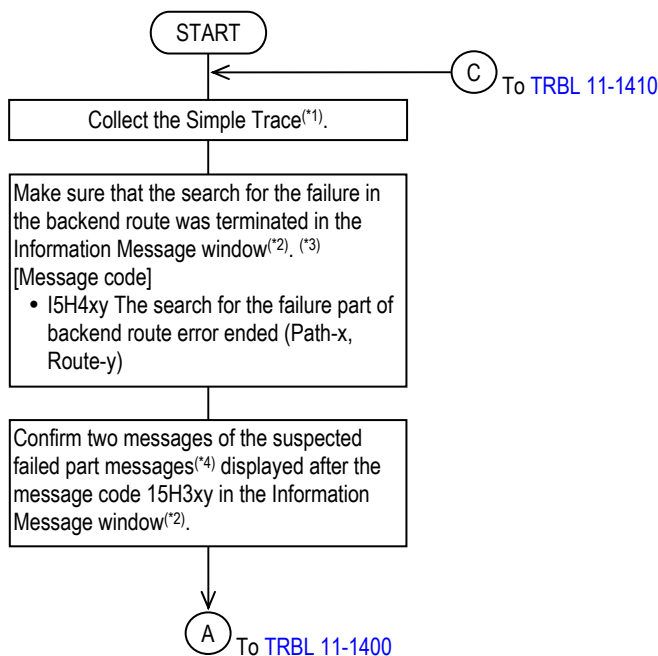
### 11.1.29 Recovery Method when the Multiple Suspected Failed Parts were Detected in the Backend

This section describes the actions to be taken in case where a failed part could not be identified by backend automatic diagnostic and the suspected failed parts were narrowed down only up to two parts.

#### [WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	W40000 Backend route warning has been detected (Path-x, Route-y)	:MANUAL/STRC
Date	Time	x: Detect Controller # y: Detect Core #		
MM/DD/YYYY	hh:mm:ss	xy	I5H4AB The search for the failure part of backend route error ended (Path-x, Route-y)	
MM/DD/YYYY	hh:mm:ss	xy	I5JEab Suspected failure part has been detected (Unit-x, HDU-y)	
MM/DD/YYYY	hh:mm:ss	xy	I5JDe0 Suspected failure part has been detected (Unit-x, ENC-y)	
MM/DD/YYYY	hh:mm:ss	xy	I5H3AB The search for the failure part of backend route error started (Path-x, Route-y)	
MM/DD/YYYY	hh:mm:ss	xy	I5JM0x Suspected failure part has been detected (CTL-x, Slot-l)	

#### [Recovery method]



\*1 : For the Simple Trace Collection, refer to “5.3 Collecting Simple Trace” (TRBL 05-0040).

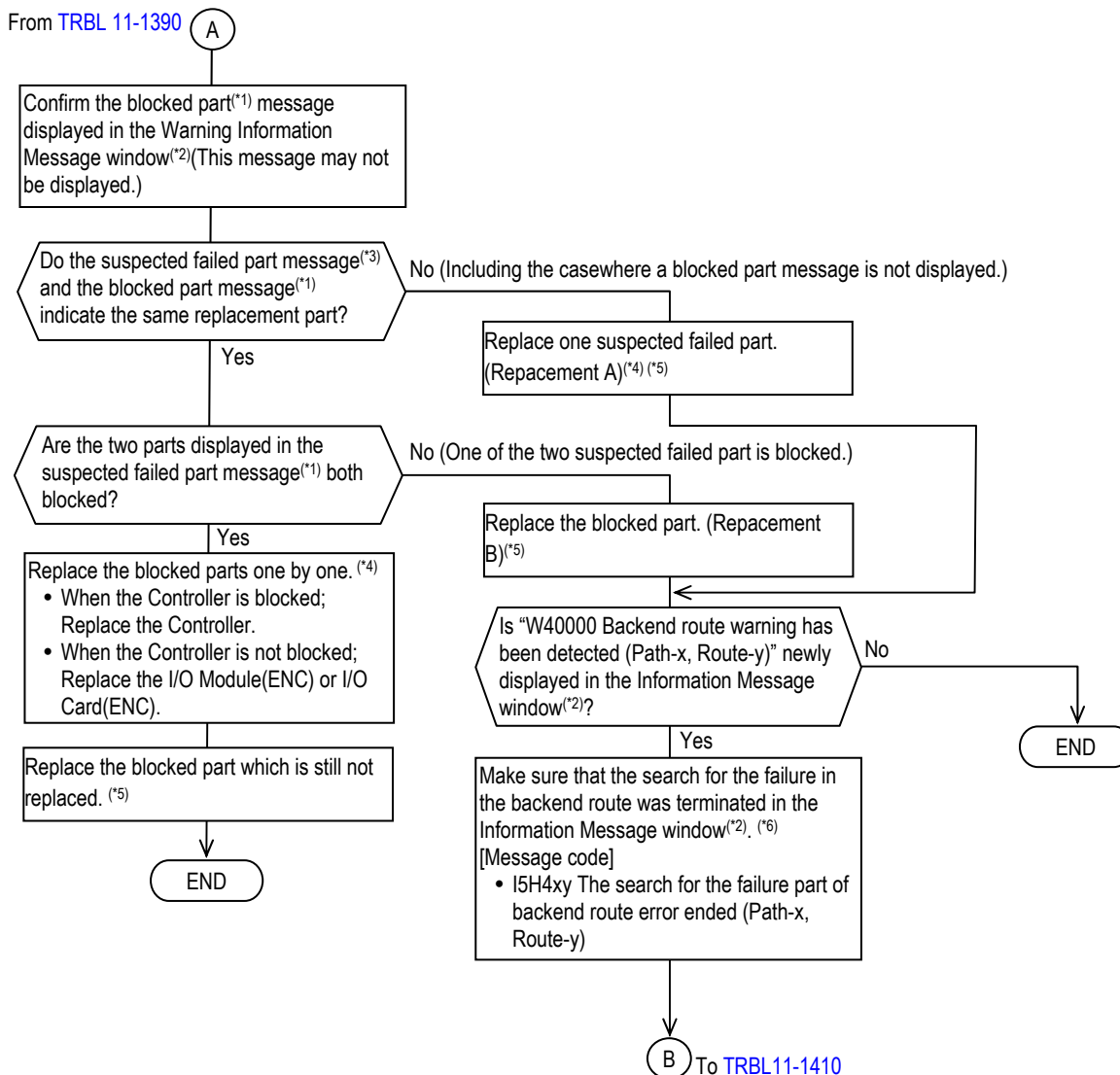
\*2 : For the connection of the WEB, refer to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000).

\*3 : When the Controller # (Route # displayed in the message code I5H3xy) which displays this message is blocked after the search for the failure in the backend route starts (message code I5H3xy), the termination message (message code I5H4xy) is not displayed on the Information Message. Perform the next work.

\*4 : Suspected failed part message:

- I5JCzx Suspected failure part has been detected (CTL-x)
- I5JDe0 Suspected failure part has been detected (Unit-x, ENC-y)
- I5JEab Suspected failure part has been detected (Unit-x, HDU-y)
- I5JM0x Suspected failure part has been detected (CTL-x, Slot-l)

From TRBL 11-1390



\*1 : Blocked part message:

- WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- W01z0x CTL alarm (CTL-x)
- W09zab HDU alarm (Unit-x, HDU-y, Type-c)
- W0Fzf0 ENC alarm (Unit-x, ENC-y)

\*2 : For the connection of the WEB, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).

\*3 : Suspected failed part message:

- I5JCzx Suspected failure part has been detected (CTL-x)
- I5JDe0 Suspected failure part has been detected (Unit-x, ENC-y)
- I5JEab Suspected failure part has been detected (Unit-x, HDU-y)
- I5JM0x Suspected failure part has been detected (CTL-x, Slot-l)

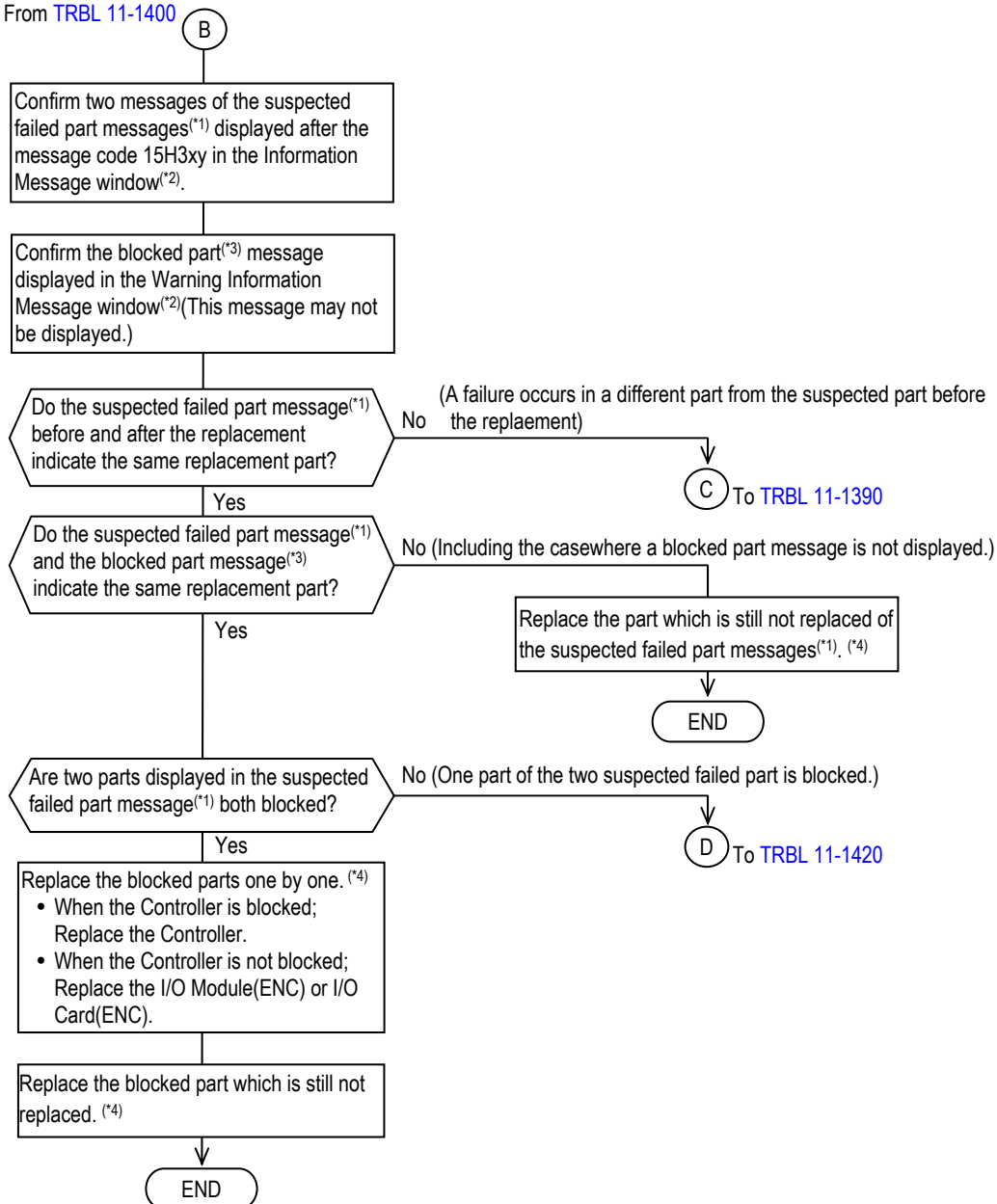
\*4 : Contact the Technical Support Center, and confirm the replacement order of the suspected failed part.

The two suspected failed part displayed cannot be determined. Replace the part displayed after the message code I5H3xy first. However, when "I5JCzx Suspected failure part has been detected (CTL-x)" and "I5JEab Suspected failure part has been detected (Unit-x, HDU-y)" are displayed after I5JCzx message, it is possible to replace the Drive first considering the effect on the customer's operation and the maintenance work.

\*5 : For the part replacement, refer to Replacement "Chapter 2. Parts Replacement" (REP 02-0000).

\*6 : When the Controller # (Route # displayed in the message code I5H3xy) which displays this message is blocked after the search for the failure in the backend route starts (message code I5H3xy), the termination message (message code I5H4xy) is not displayed on the Information Message. Perform the next work.

From TRBL 11-1400



\*1 : Suspected failed part message:

- I5JCzx Suspected failure part has been detected (CTL-x)
- I5JDe0 Suspected failure part has been detected (Unit-x, ENC-y)
- I5JEab Suspected failure part has been detected (Unit-x, HDU-y)
- I5JM0x Suspected failure part has been detected (CTL-x, Slot-l)

\*2 : For the connection of the WEB, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).

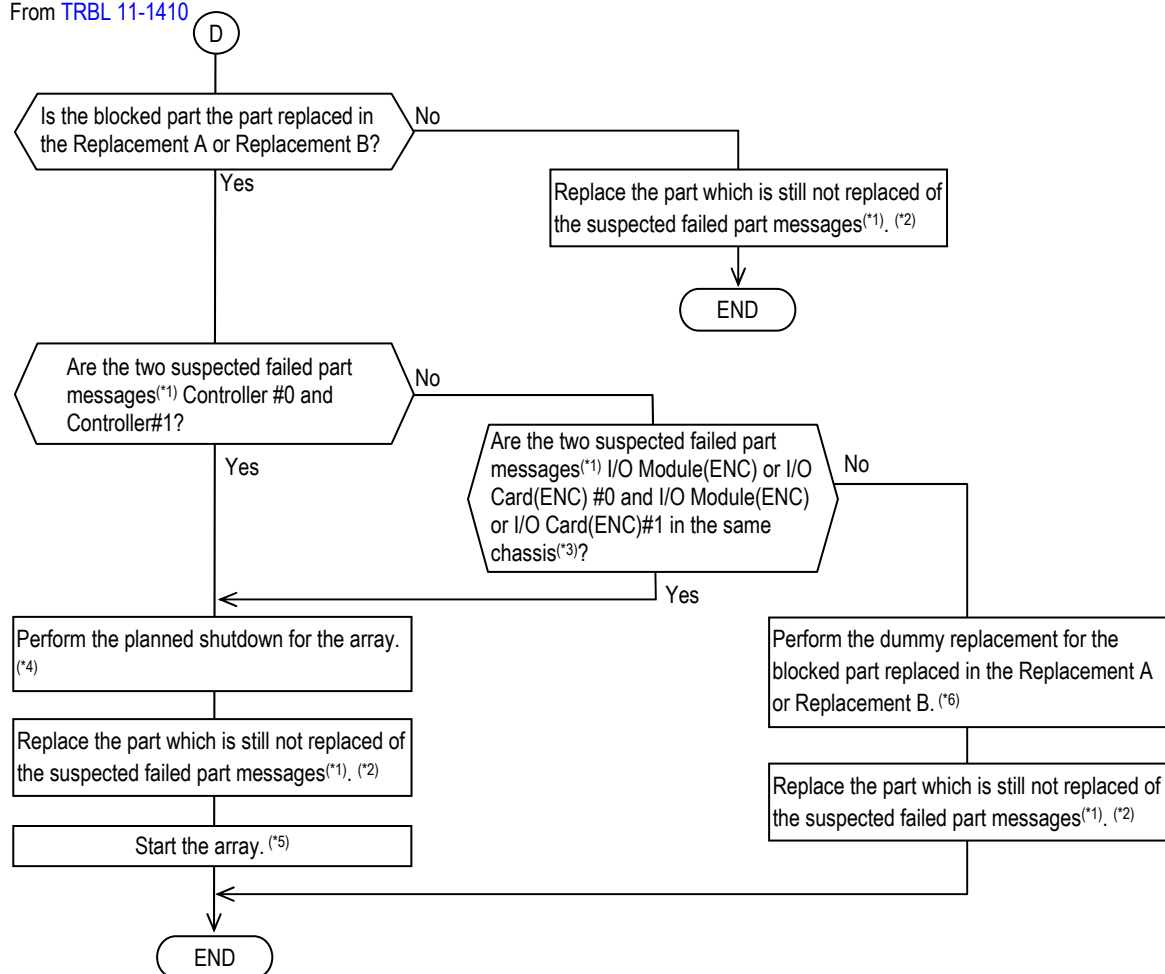
\*3 : Blocked part message:

- WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- W01z0x CTL alarm (CTL-x)
- W09zab HDU alarm (Unit-x, HDU-y, Type-c)
- W0Fzf0 ENC alarm (Unit-x, ENC-y)

\*4 : For the part replacement, refer to Replacement "Chapter 2. Parts Replacement" (REP 02-0000).



From TRBL 11-1410



\*1 : Suspected failed part message:

- I5JCzx Suspected failure part has been detected (CTL-x)
- I5JDe0 Suspected failure part has been detected (Unit-x, ENC-y)
- I5JEab Suspected failure part has been detected (Unit-x, HDU-y)
- I5JM0x Suspected failure part has been detected (CTL-x, Slot-l)

\*2 : For the part replacement, refer to [Replacement "Chapter 2. Parts Replacement" \(REP 02-0000\)](#).

\*3 : It is the same chassis when the Unit # in the message code I5JDe0 is the same.

\*4 : Refer to [Installation "1.5.2 Array Power Off \(Sequential Shutdown\)" \(INST 01-0260\)](#).\*5 : Refer to [Installation "1.5.1 Array Power On" \(INST 01-0230\)](#).

\*6 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

### 11.1.30 Recovery Method when the Planned Shutdown of the Array was Executed Automatically

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy HE0C00 Controller thermal error was detected [own controller] (CTL-x)	:CTL/STRC
MM/DD/YYYY hh:mm:ss xy HE0D00 Controller thermal error was detected [the other controller] (CTL-x)	:CTL/STRC
MM/DD/YYYY hh:mm:ss xy HE0E00 Array shutdown was automatically executed due to thermal alarm (CTL-x)	:CTL/STRC
MM/DD/YYYY hh:mm:ss xy I54K00 Array shutdown was automatically executed due to FAN alarm (CTL-Unit)	:FAN/STRC
MM/DD/YYYY hh:mm:ss xy IAH100 Array shutdown was automatically executed due to PS alarm (Unit-x)	:PS/STRC
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <div style="border-top: 1px solid black; width: 100px; margin: 0 auto;"></div> Date </div> <div style="text-align: center;"> <div style="border-top: 1px solid black; width: 100px; margin: 0 auto;"></div> Time </div> <div style="text-align: center;"> <div style="border-top: 1px solid black; width: 100px; margin: 0 auto;"></div> x : Detect Controller # y : Detect Core # </div> </div>	

#### [Recovery method]

##### [In case of CBL]

- (1) Check that the planned shutdown of the array is executed in the following situation.
  - The main switch is ON
  - The POWER LED (orange) on the front of the Controller Box lights up
  - The READY LED (green) on the front of the Controller Box goes out
- (2) Replace all FANs whose ALM LEDs (red) light up. (Refer to [Replacement “2.2.3 Replacing a Fan Module” \(REP 02-0520\)](#).)
- (3) Be sure to fix the power cable to the slot and insert it.
  - Check if the power cable is surely inserted into the slot without loose.
  - Check if the power cable is not pulled out from the slot.
- (4) Check for all Drive Boxes if there is a Drive Box whose ALM LED (red) lights up in two Power Units in one Drive Box.  
If there is, replace two Power Units of the Drive Box.
- (5) Turn off the main switch.
- (6) Turn on the main switch and start the array.
- (7) Check that the array becomes Ready.
- (8) Check any of the following message codes was displayed immediately before the planned shutdown of the array was executed automatically.
  - HE0C00 Controller thermal error was detected [own controller] (CTL-x)
  - HE0D00 Controller thermal error was detected [the other controller] (CTL-x)
  - HE0E00 Array shutdown was automatically executed due to thermal alarm (CTL-x)
  - I54K00 Array shutdown was automatically executed due to FAN alarm (CTL-Unit)
  - IAH100 Array shutdown was automatically executed due to PS alarm (Unit-x)
- (9) When any of the following codes was displayed in step (8), check if the indoor temperature where the array is installed is within the range of the specification.
  - HE0C00 Controller thermal error was detected [own controller] (CTL-x)
  - HE0D00 Controller thermal error was detected [the other controller] (CTL-x)
  - HE0E00 Array shutdown was automatically executed due to thermal alarm (CTL-x)

If the indoor temperature is the temperature of the specification or more, request the customer/SE to set it to the temperature within the specification.

If there is no problem on the indoor temperature, replace the Controller displayed in the message code in step (8). (Refer to [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\)](#).)

[In case of CBSL/CBSS/CBXSL/CBXSS]

- (1) Check that the planned shutdown of the array is executed in the following situation.
  - The POWER LED (orange) on the front of the Controller Box lights up
  - The READY LED (green) on the front of the Controller Box goes out
- (2) Be sure to fix the power cable to the slot and insert it.
  - Check if the power cable is surely inserted into the slot without loose.
  - Check if the power cable is not pulled out from the slot.
- (3) Check for all boxes if there is a box whose ALM LED (red) lights up in two Power Units in one box.

If there is, replace two Power Units of the box. (Refer to [Replacement “2.2.4 Replacing a Power Unit” \(REP 02-0560\).](#))

- (4) Turn on the main switch and start the array.
- (5) Check that the array becomes Ready.
- (6) Check any of the following message codes was displayed immediately before the planned shutdown of the array was executed automatically.
  - HE0C00 Controller thermal error was detected [own controller] (CTL-x)
  - HE0D00 Controller thermal error was detected [the other controller] (CTL-x)
  - HE0E00 Array shutdown was automatically executed due to thermal alarm (CTL-x)
  - IAH100 Array shutdown was automatically executed due to PS alarm (Unit-x)
- (7) When any of the following codes was displayed in step (6), check if the indoor temperature where the array is installed is within the range of the specification.
  - HE0C00 Controller thermal error was detected [own controller] (CTL-x)
  - HE0D00 Controller thermal error was detected [the other controller] (CTL-x)
  - HE0E00 Array shutdown was automatically executed due to thermal alarm (CTL-x)

If the indoor temperature is the temperature of the specification or more, request the customer/SE to set it to the temperature within the specification.

If there is no problem on the indoor temperature, replace the Controller displayed in the message code in step (6). (Refer to [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\).](#))

### 11.1.31 Recovery Method when a FAN Failure of the CBL Occurs

[WEB Information Message display]

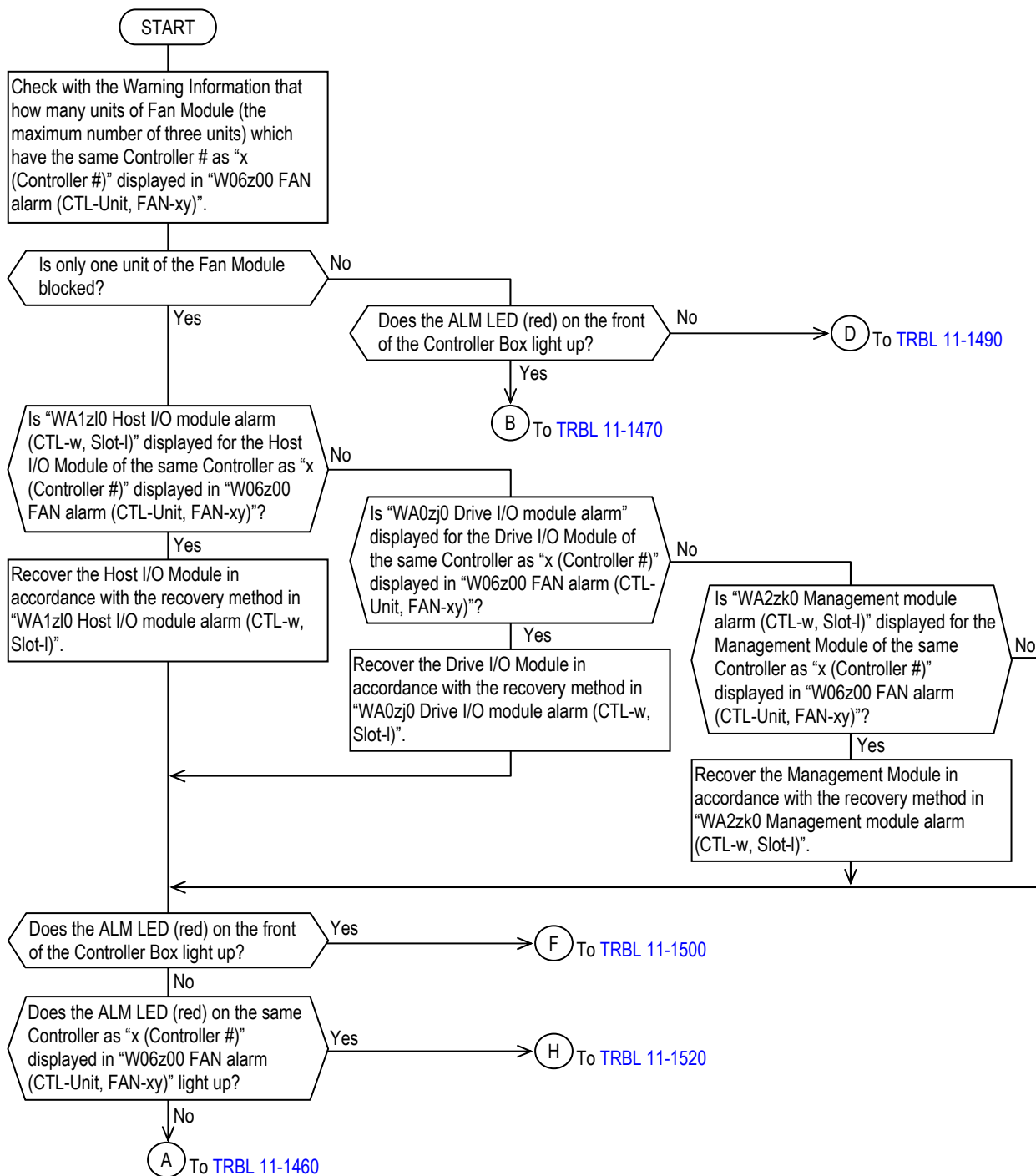
MM/DD/YYYY hh:mm:ss xy W06z00 FAN alarm (CTL-Unit, FAN-xy)			:FAN/
Date	Time	x : Detect Controller # y : Detect Core #	

In the same Controller, the module blockade (Drive I/O Module blockade, Host I/O Module blockade, Management Module blockade) or the total of two or more Fan Module blockades may occur in multiple slots and the Controller may have the pseudo blockade<sup>(†1)</sup>. In that case, by removing all the factors of the Controller pseudo blockade<sup>(†1)</sup>, the Controller reboots automatically and recovers from the pseudo blockade<sup>(†1)</sup>.

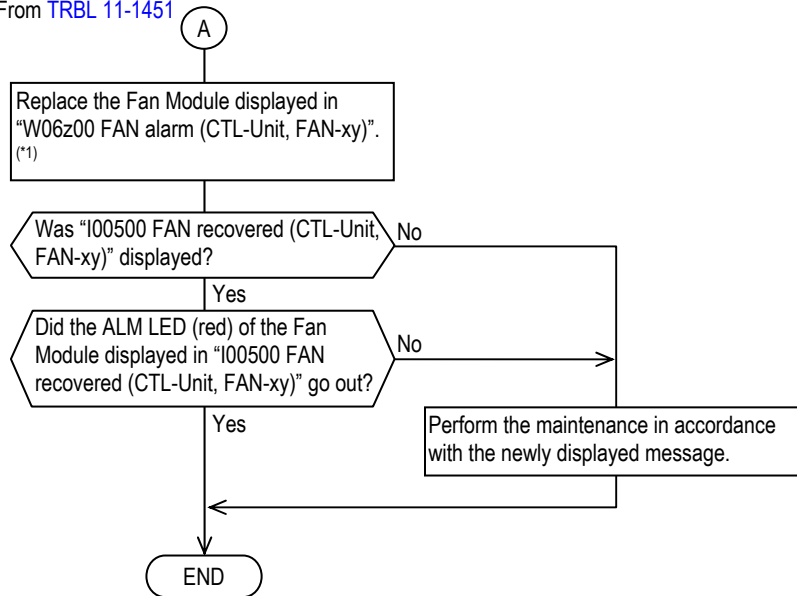
- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)
- Controller pseudo blockade<sup>(†1)</sup> : W70z00 Recoverable CTL alarm by the maintenance procedures of the blocked component (CTL-x)

<sup>†1</sup> : The controller concerned becomes inaccessible from the host and the management program because the controller operation stops.

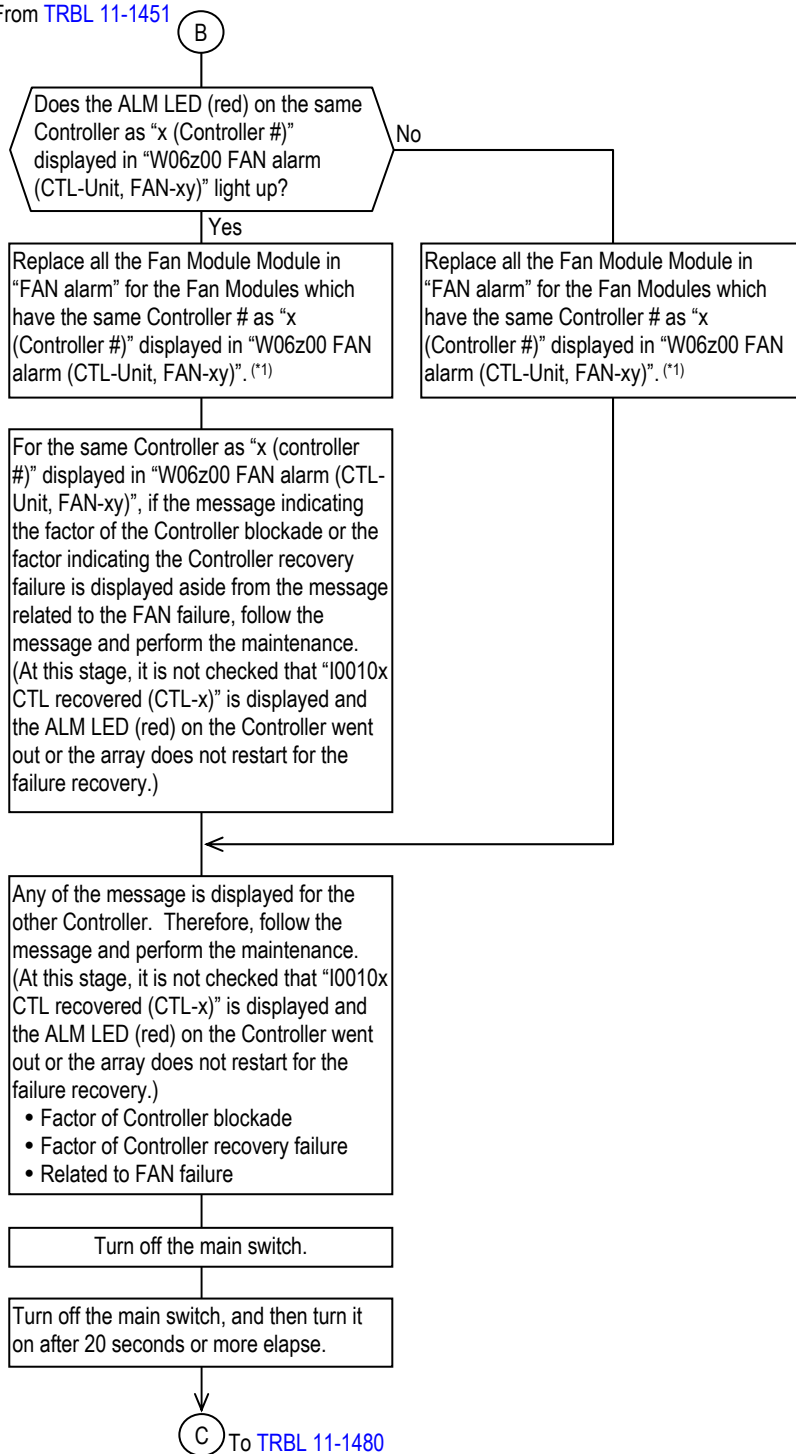
## [Recovery method]



From [TRBL 11-1451](#)

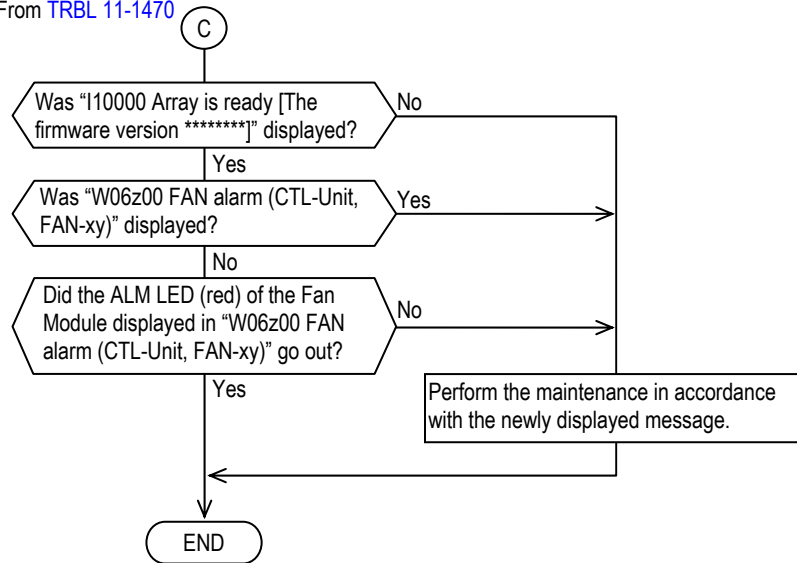


\*1 : For the replacement of the Fan Module, refer to the [Replacement "2.2.3 Replacing a Fan Module" \(REP 02-0520\)](#).

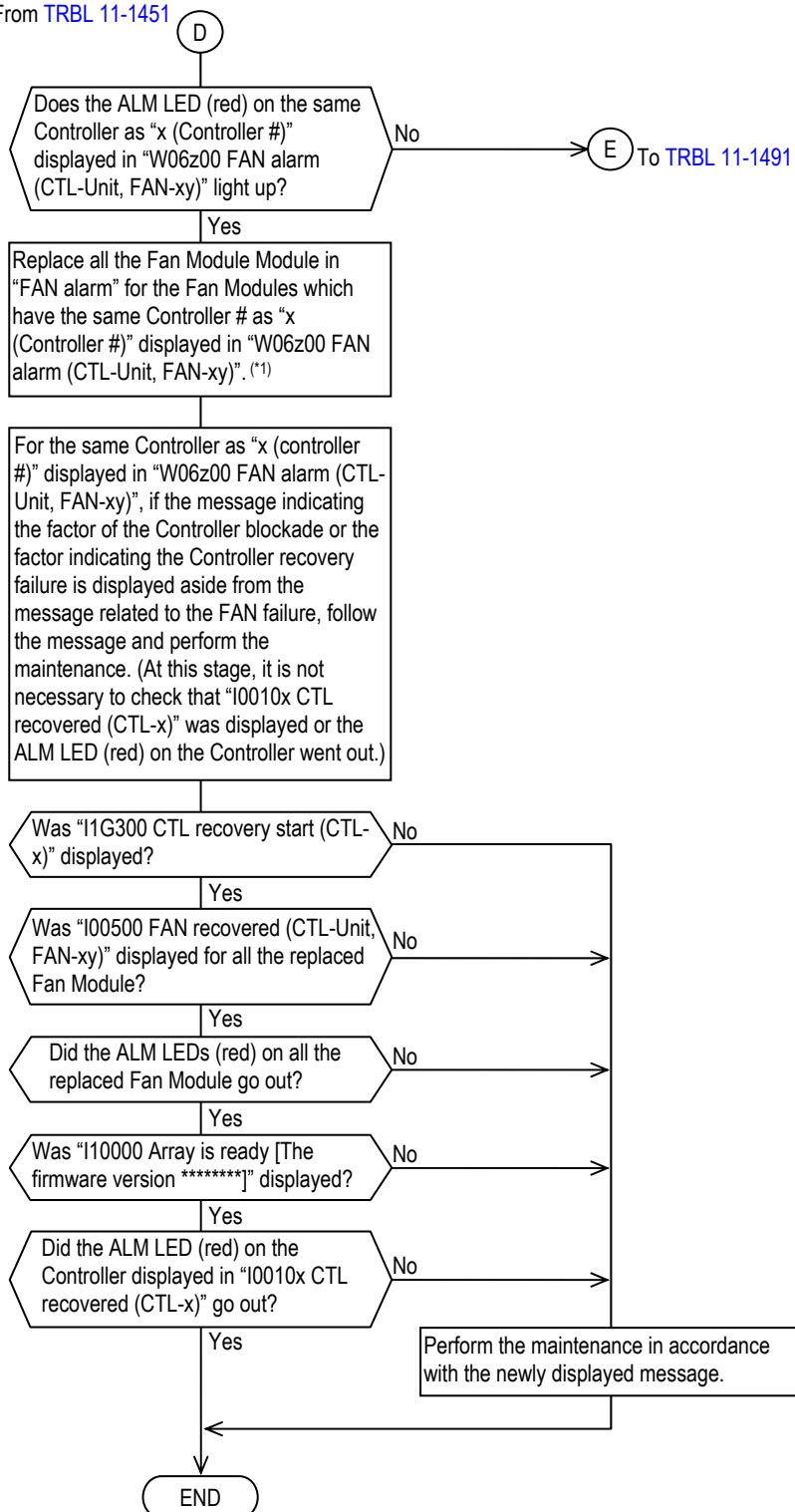
From [TRBL 11-1451](#)

\*1 : For the replacement of the Fan Module, refer to the [Replacement "2.2.3 Replacing a Fan Module" \(REP 02-0520\)](#).

From TRBL 11-1470

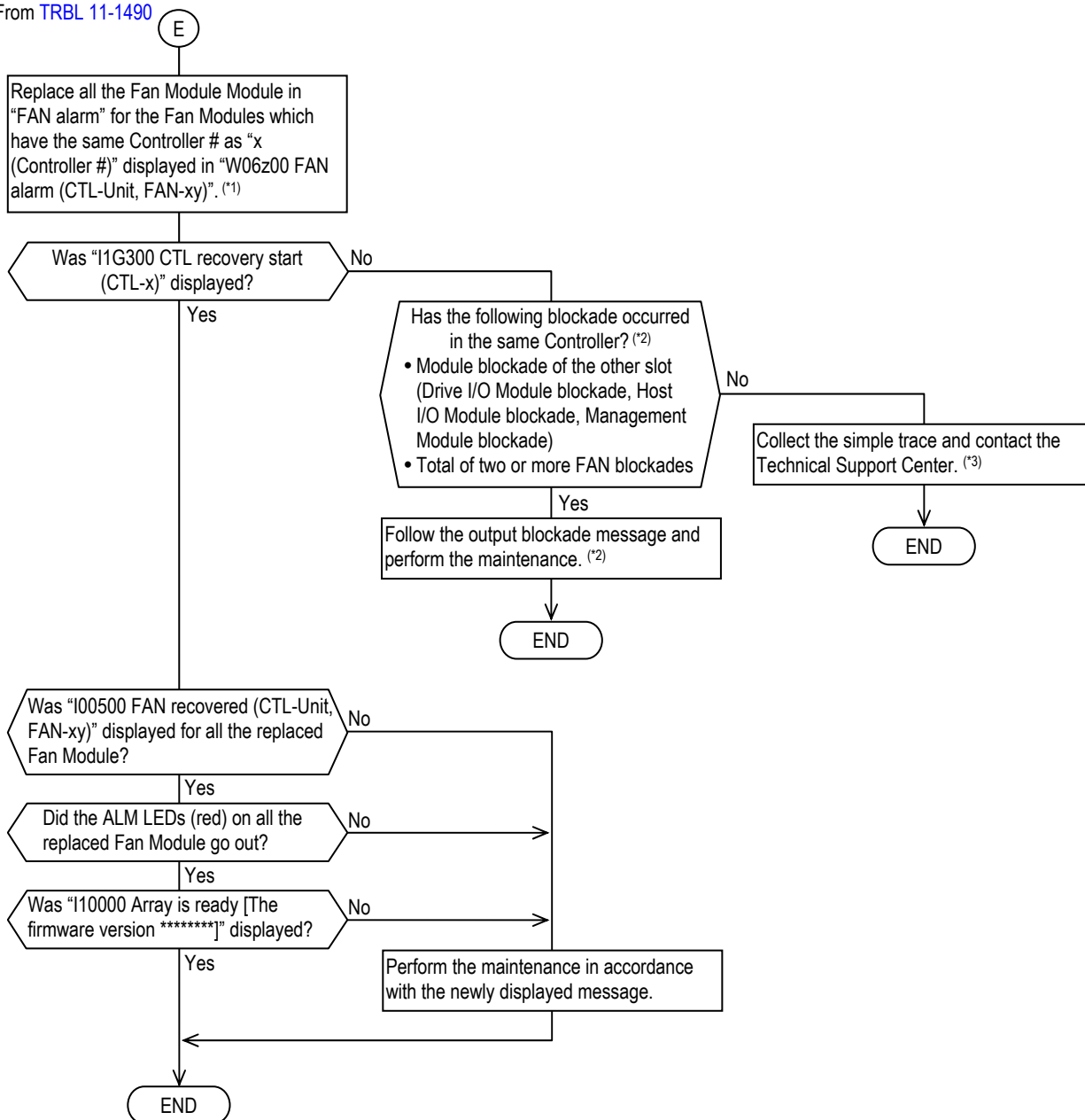




From [TRBL 11-1451](#)

\*1 : For the replacement of the Fan Module, refer to the [Replacement "2.2.3 Replacing a Fan Module" \(REP 02-0520\)](#).

From TRBL 11-1490

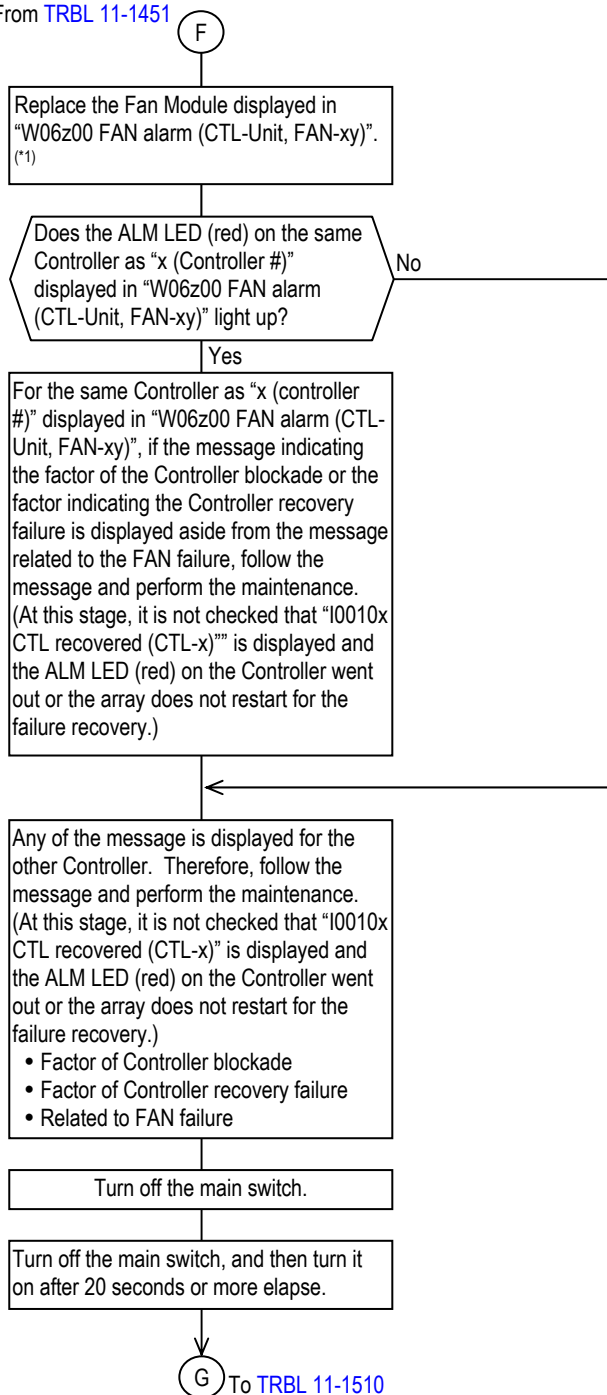


\*1 : For the replacement of the Fan Module, refer to the [Replacement "2.2.3 Replacing a Fan Module" \(REP 02-0520\)](#).

\*2 : Blockade message

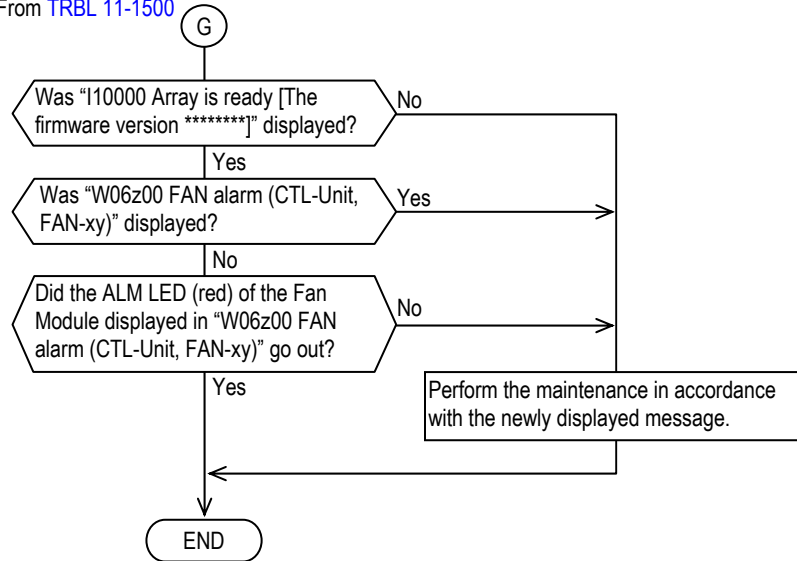
- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

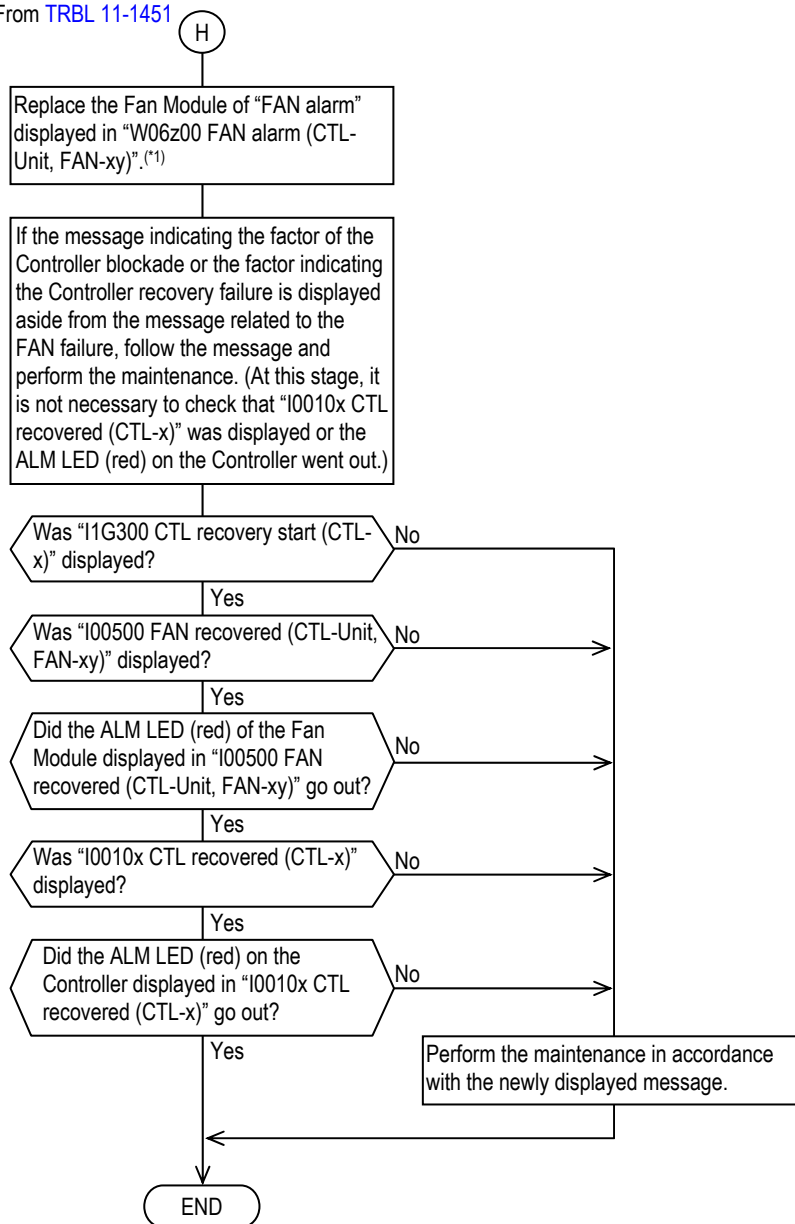
From [TRBL 11-1451](#)

\*1 : For the replacement of the Fan Module, refer to the [Replacement "2.2.3 Replacing a Fan Module" \(REP 02-0520\)](#).

From TRBL 11-1500



From TRBL 11-1451



\*1 : For the replacement of the Fan Module, refer to the [Replacement "2.2.3 Replacing a Fan Module" \(REP 02-0520\)](#).

### 11.1.32 Recovery Method at the Time of Management Module Blockade

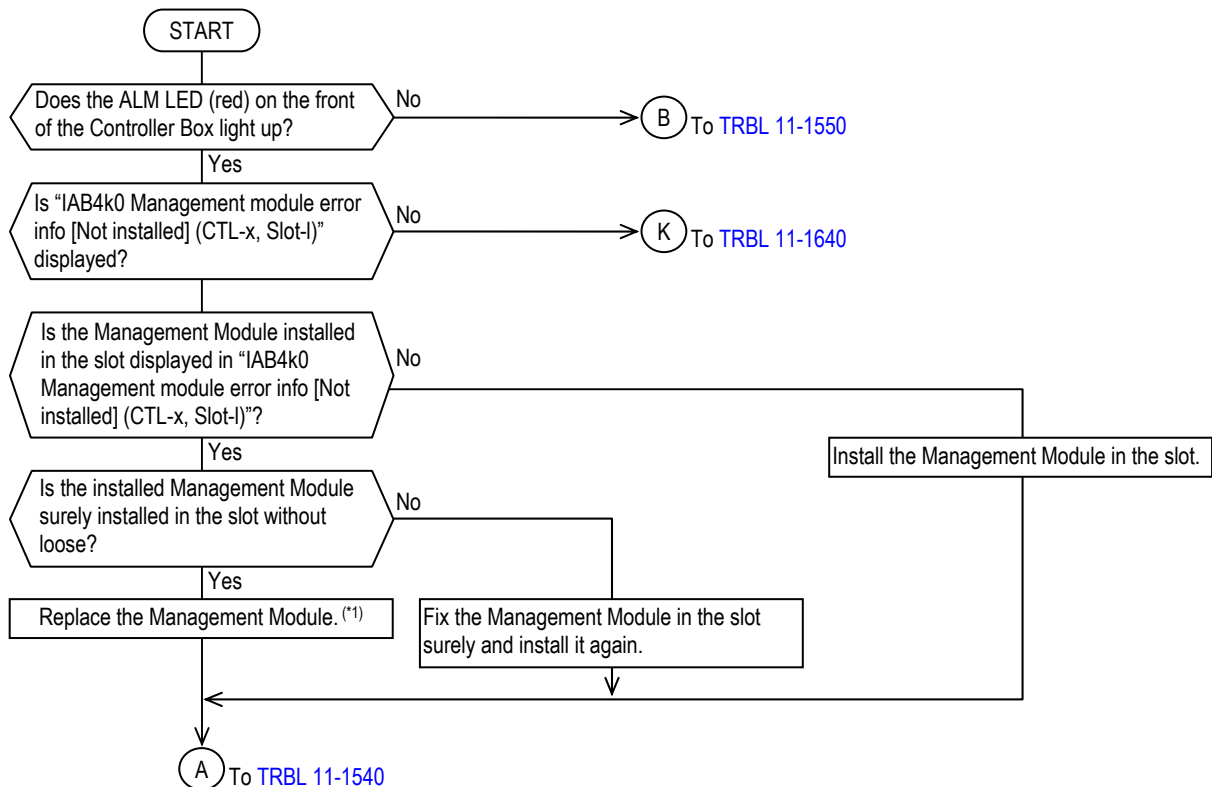
#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy WA2zk0 Management module alarm (CTL-w, Slot-l)			:IFBD/STRC
Date	Time	x : Detect Controller # y : Detect Core #	

In the same Controller, the module blockade (Drive I/O Module blockade, Host I/O Module blockade, Management Module blockade) or the total of two or more Fan Module blockades may occur in multiple slots and the Controller may have the pseudo blockade<sup>(†1)</sup>. In that case, by removing all the factors of the Controller pseudo blockade<sup>(†1)</sup>, the Controller reboots automatically and recovers from the pseudo blockade<sup>(†1)</sup>.

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)
- Controller pseudo blockade<sup>(†1)</sup> : W70z00 Recoverable CTL alarm by the maintenance procedures of the blocked component (CTL-x)

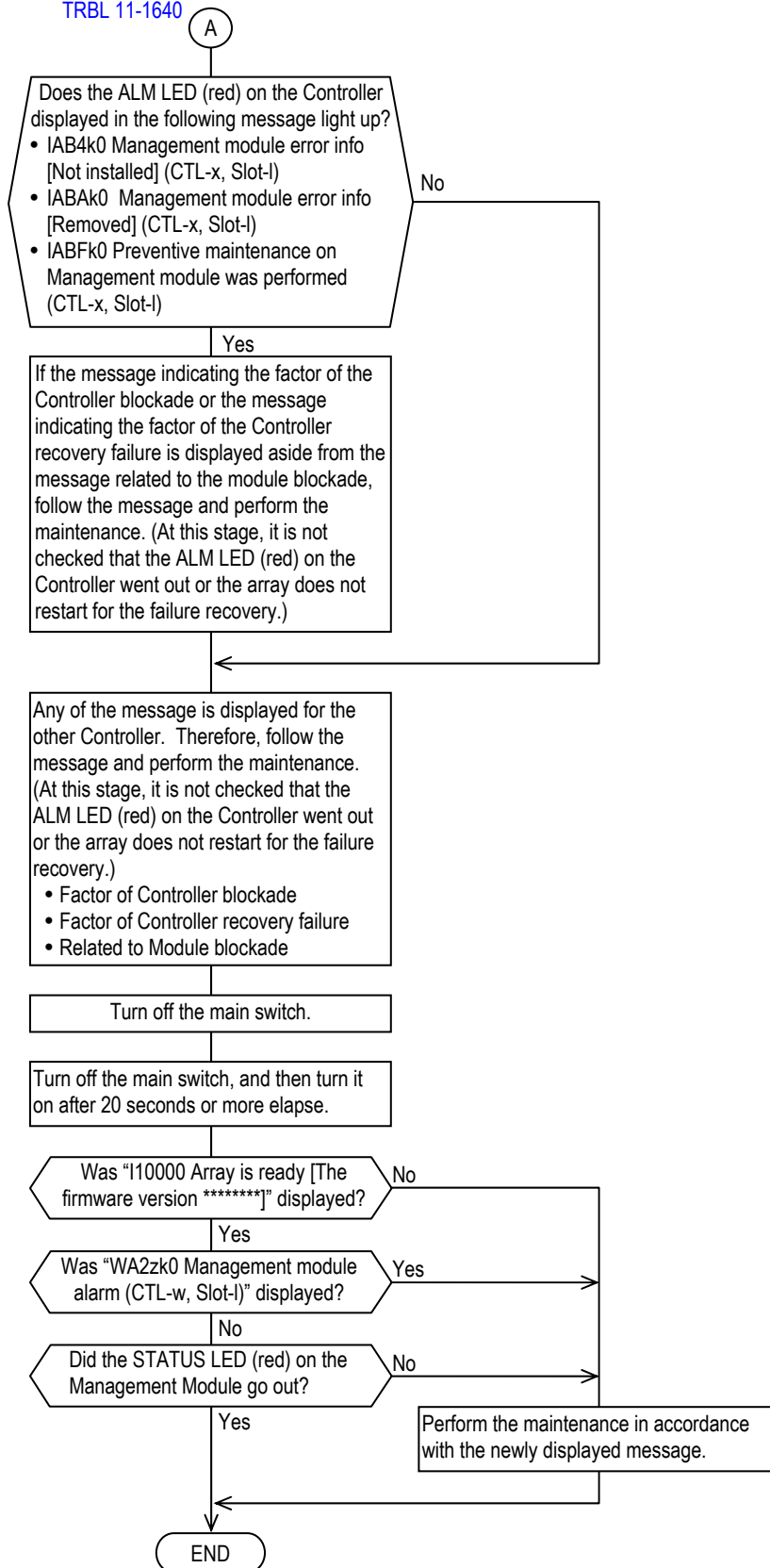
#### [Recovery method]



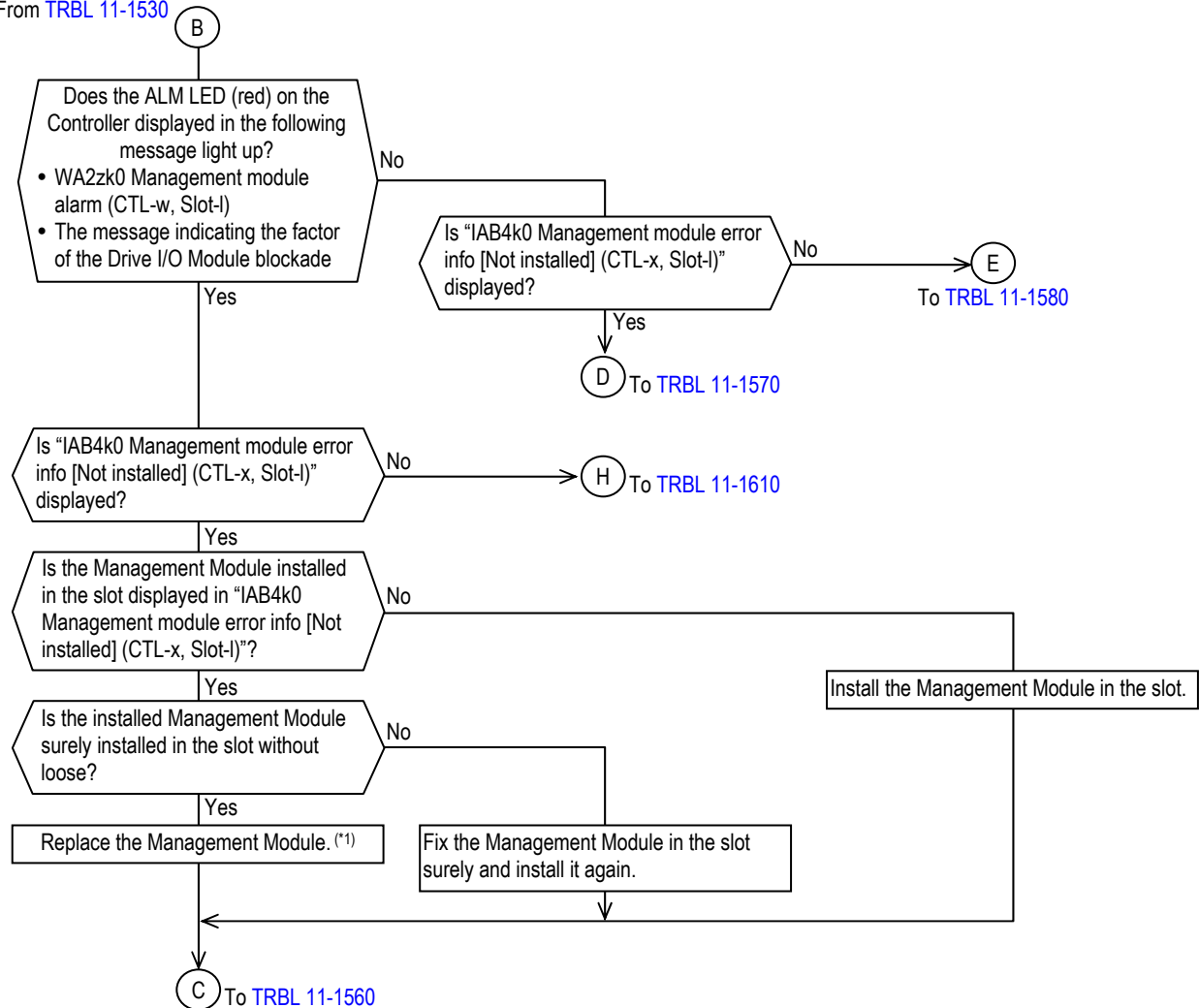
\*1 : For the replacement of the Management Module, refer to the Replacement "2.2.10 Replacing a Management Module" (REP 02-1410).

†1 : The controller concerned becomes inaccessible from the host and the management program because the controller operation stops.

From TRBL 11-1530,  
TRBL 11-1640



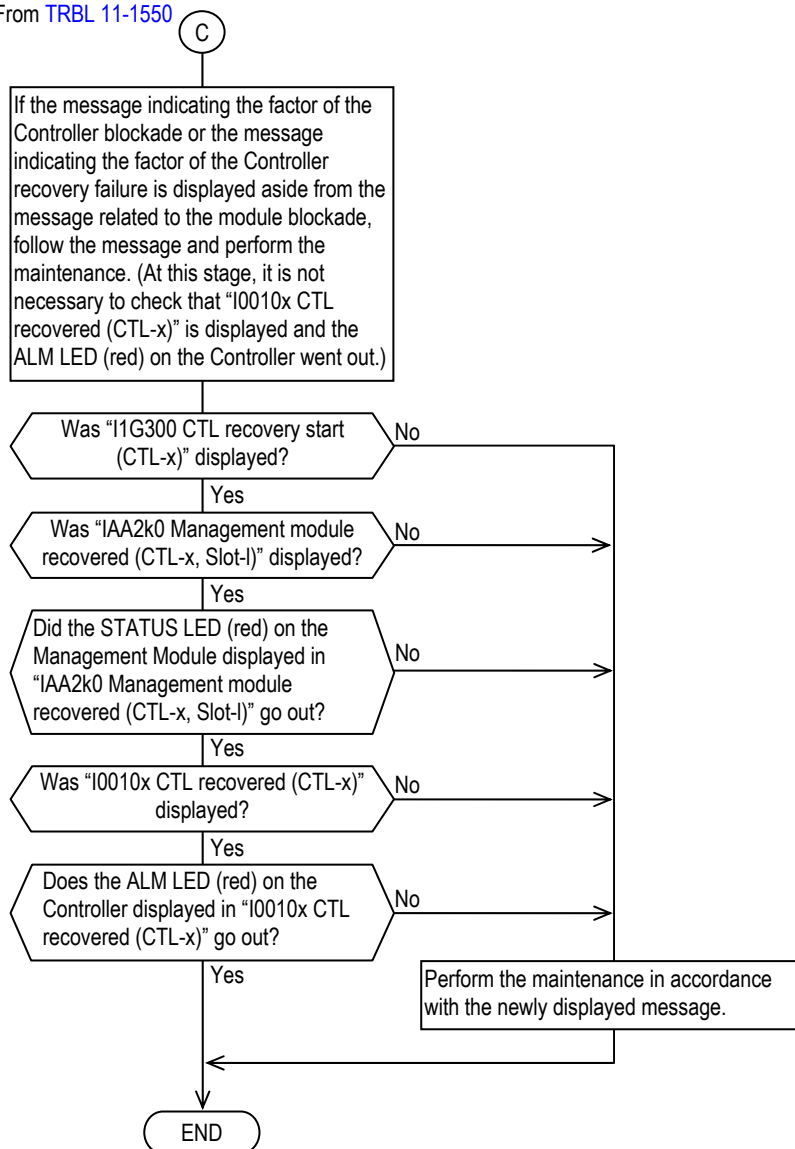
From TRBL 11-1530



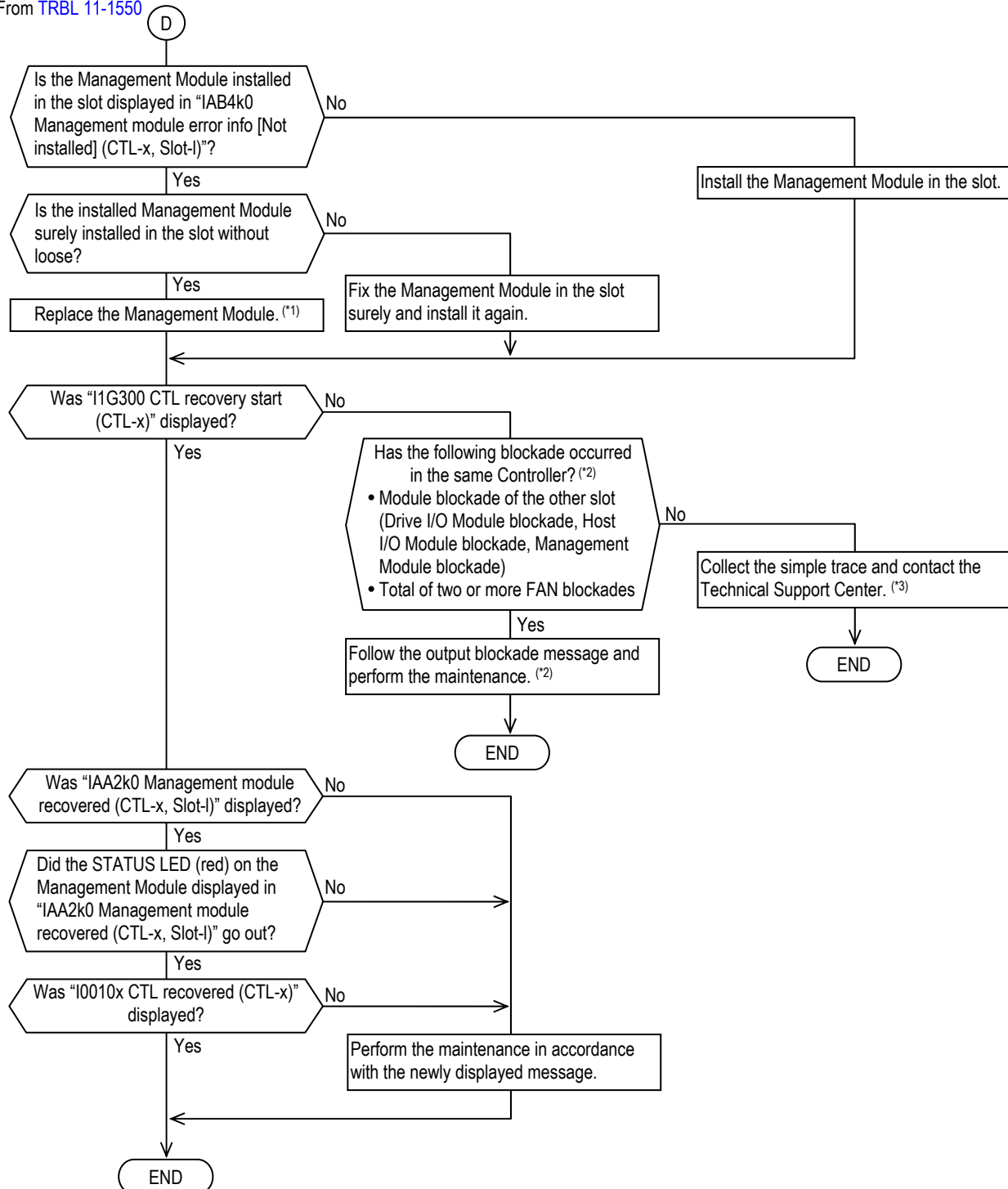
\*1 : For the replacement of the Management Module, refer to the Replacement "2.2.10 Replacing a Management Module" (REP 02-1410).



From TRBL 11-1550



From TRBL 11-1550



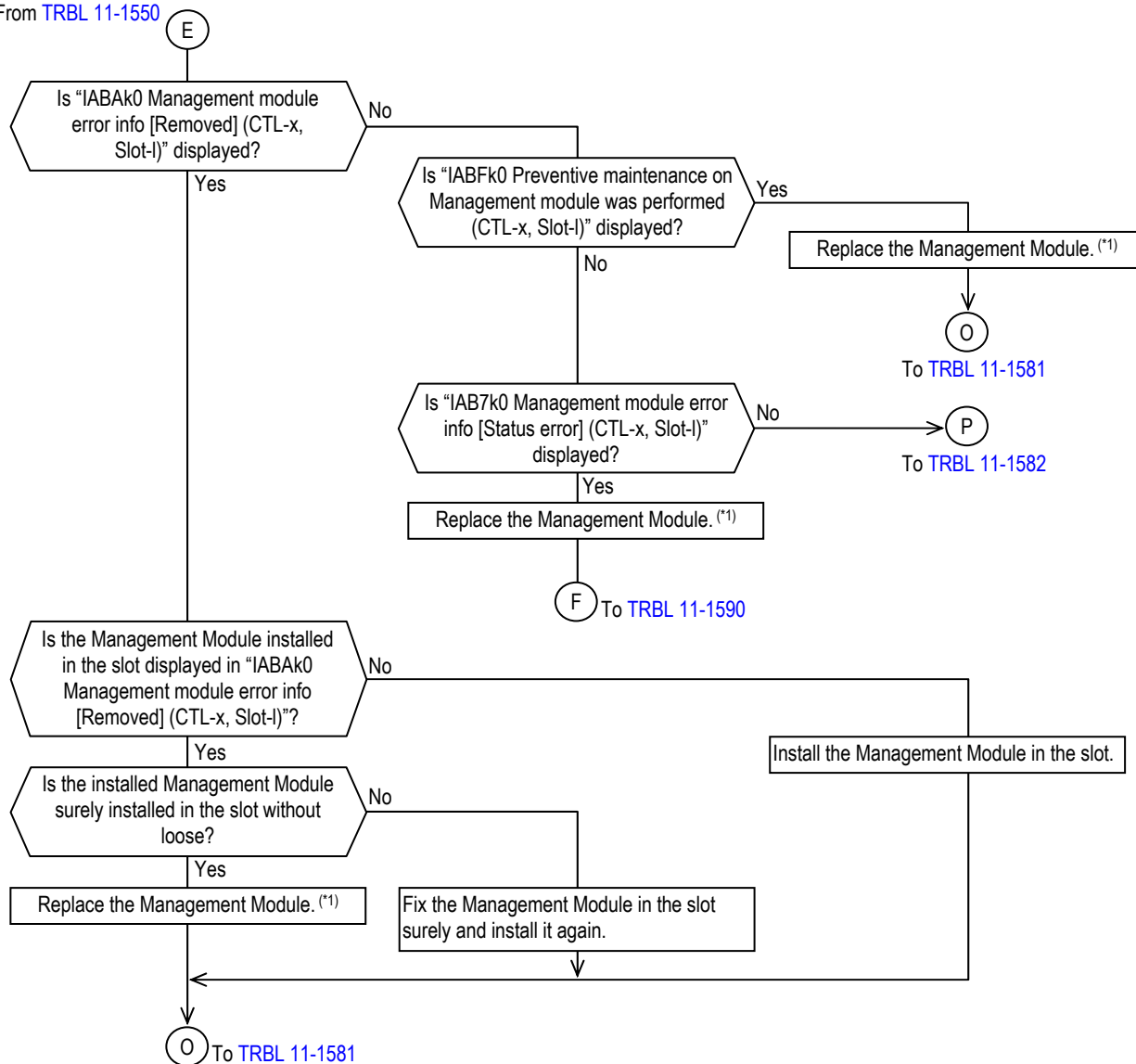
\*1 : For the replacement of the Management Module, refer to the [Replacement "2.2.10 Replacing a Management Module" \(REP 02-1410\)](#).

\*2 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

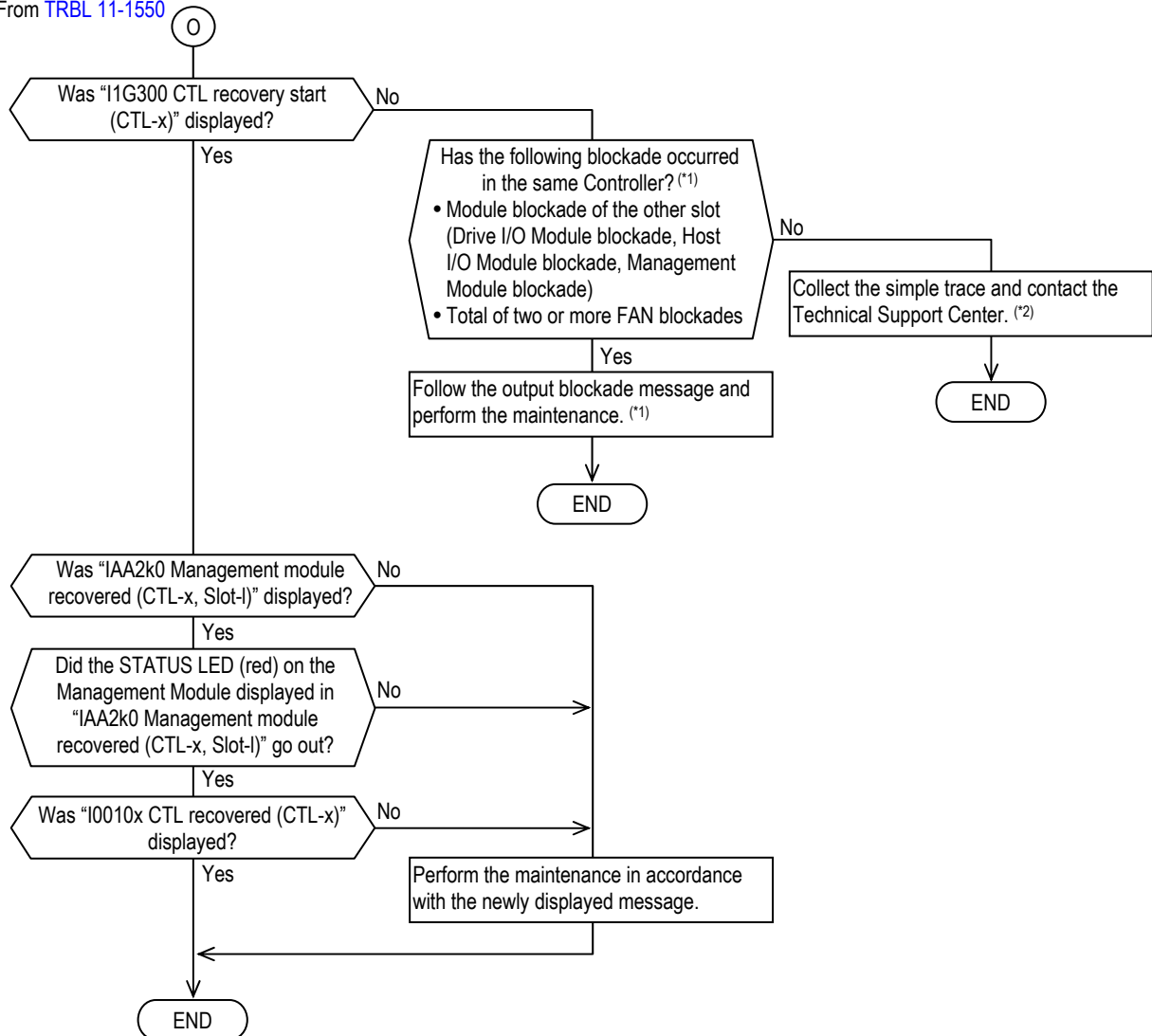
\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-1550



\*1 : For the replacement of the Management Module, refer to the Replacement "2.2.10 Replacing a Management Module" (REP 02-1410).

From TRBL 11-1550

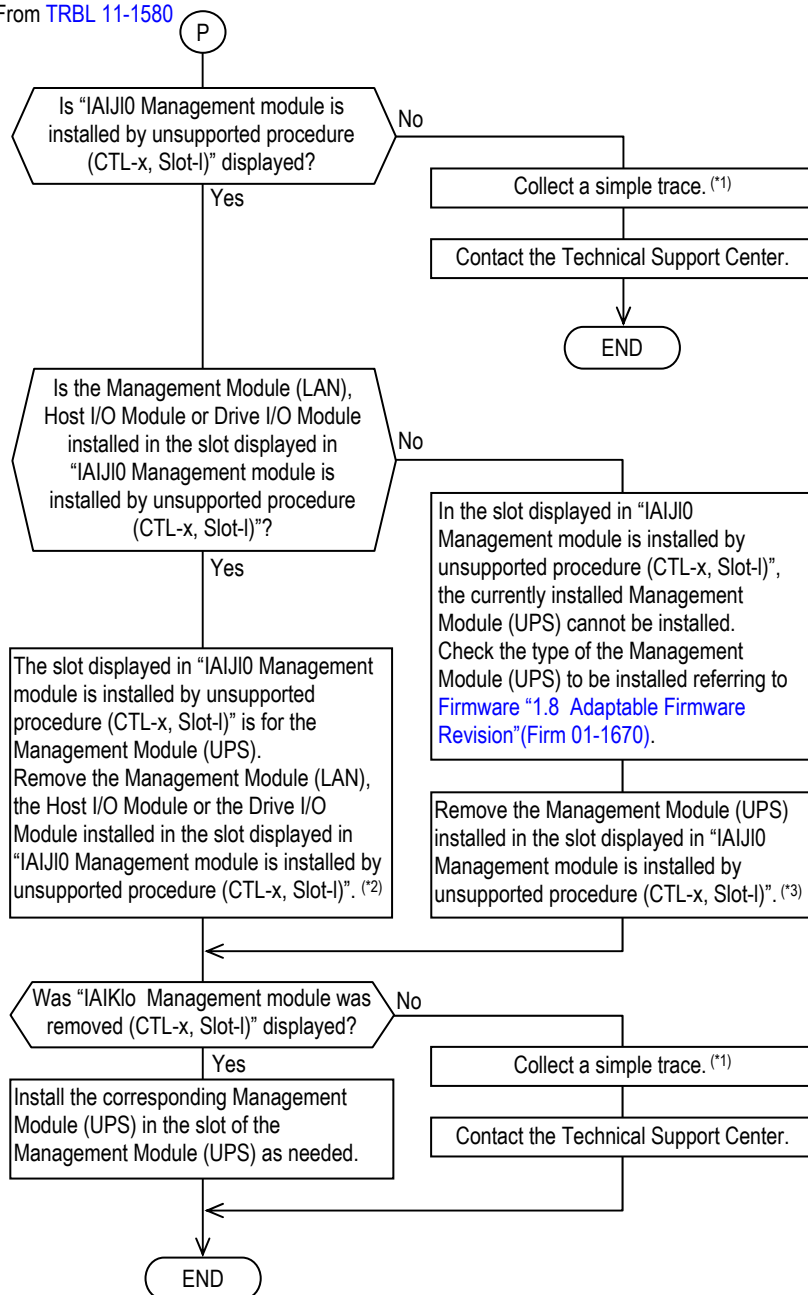


\*1 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*2 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

From TRBL 11-1580

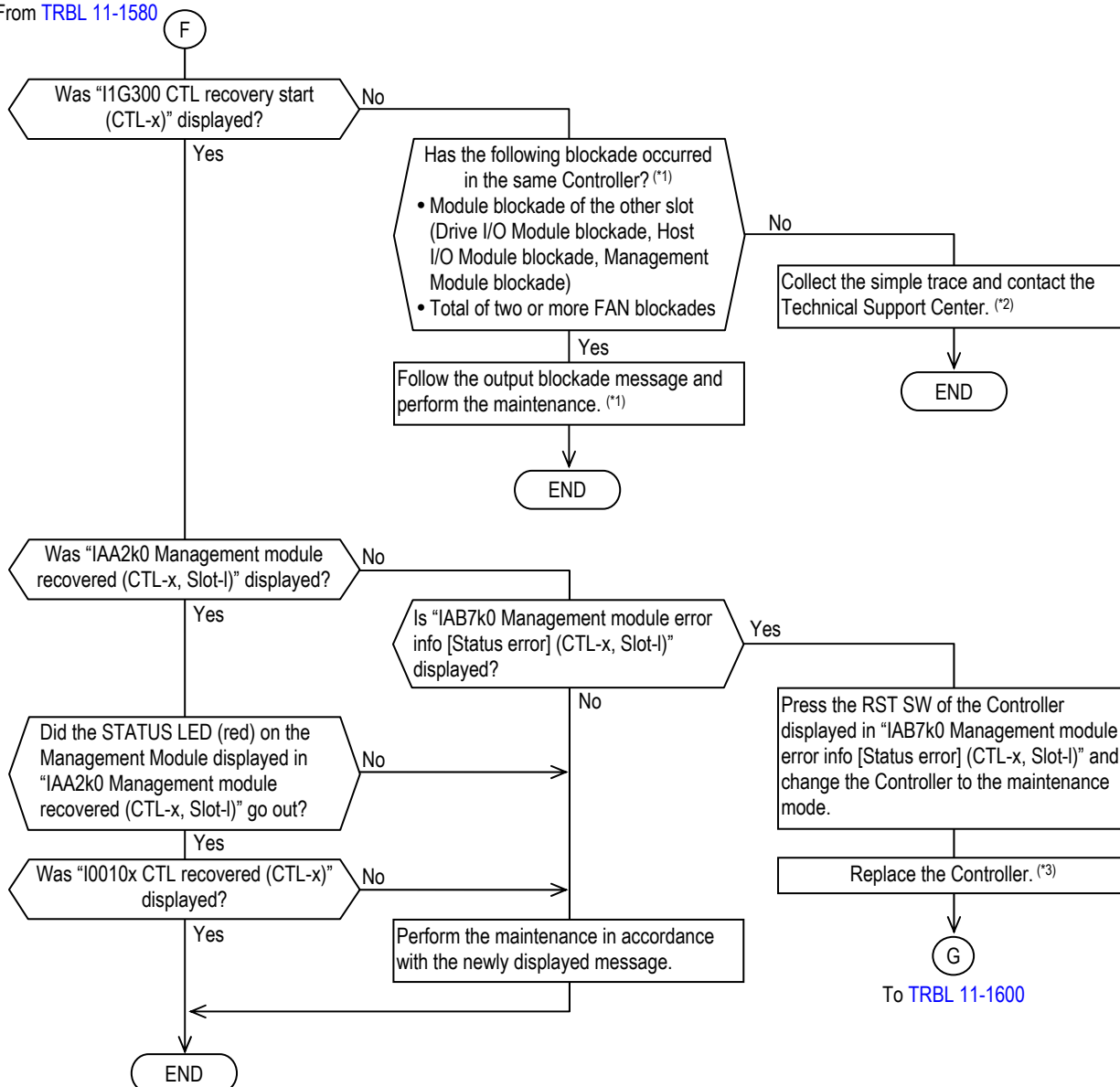


\*1 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

\*2 : For the part replacement, refer to Replacement "Chapter 2. Parts Replacement" (REP 02-0000).

\*3 : For the replacement of the Management Module, refer to the Replacement "2.2.10 Replacing a Management Module" (REP 02-1410).

From TRBL 11-1580



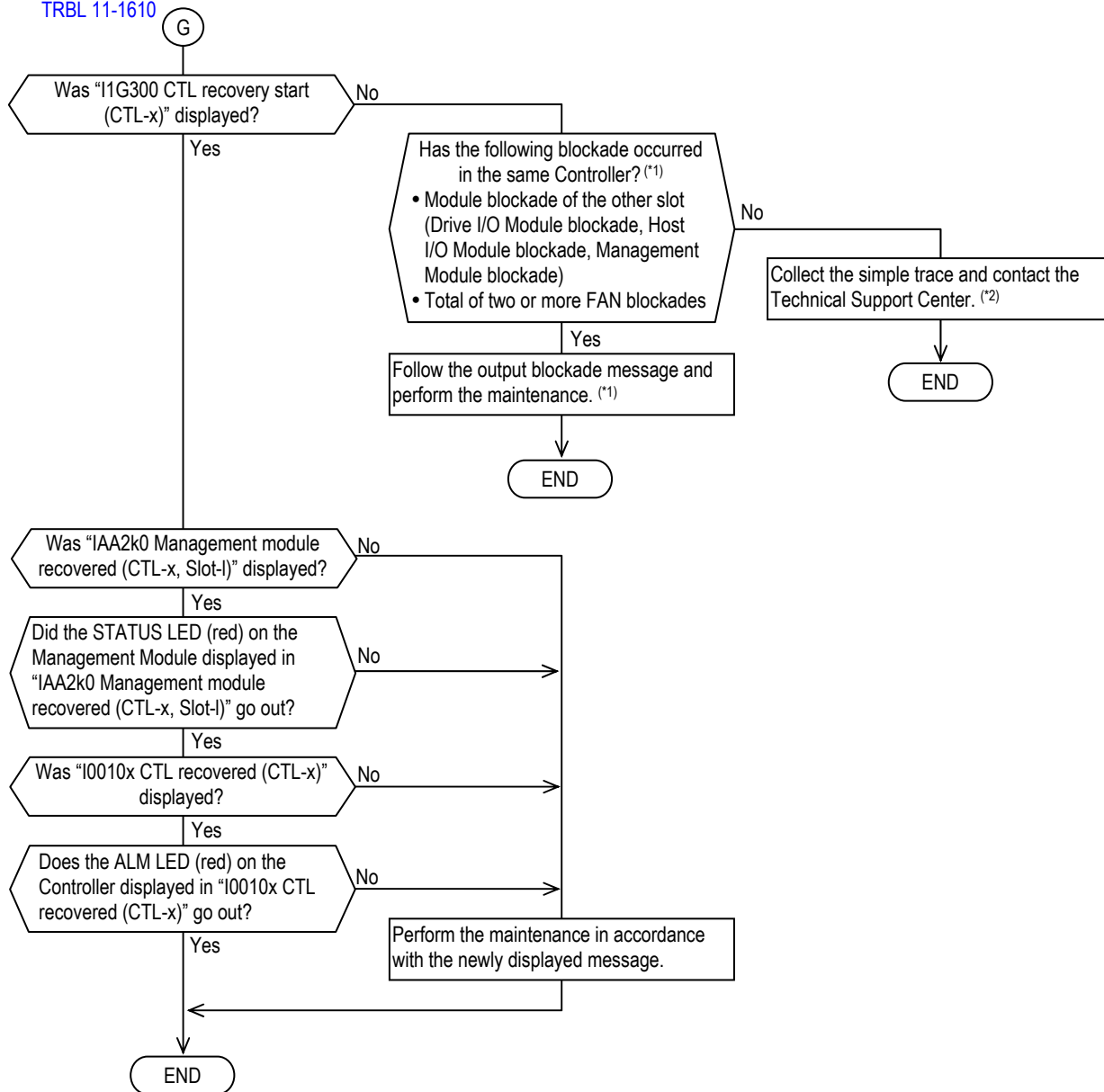
\*1 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-I)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-I)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-I)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*2 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

\*3 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

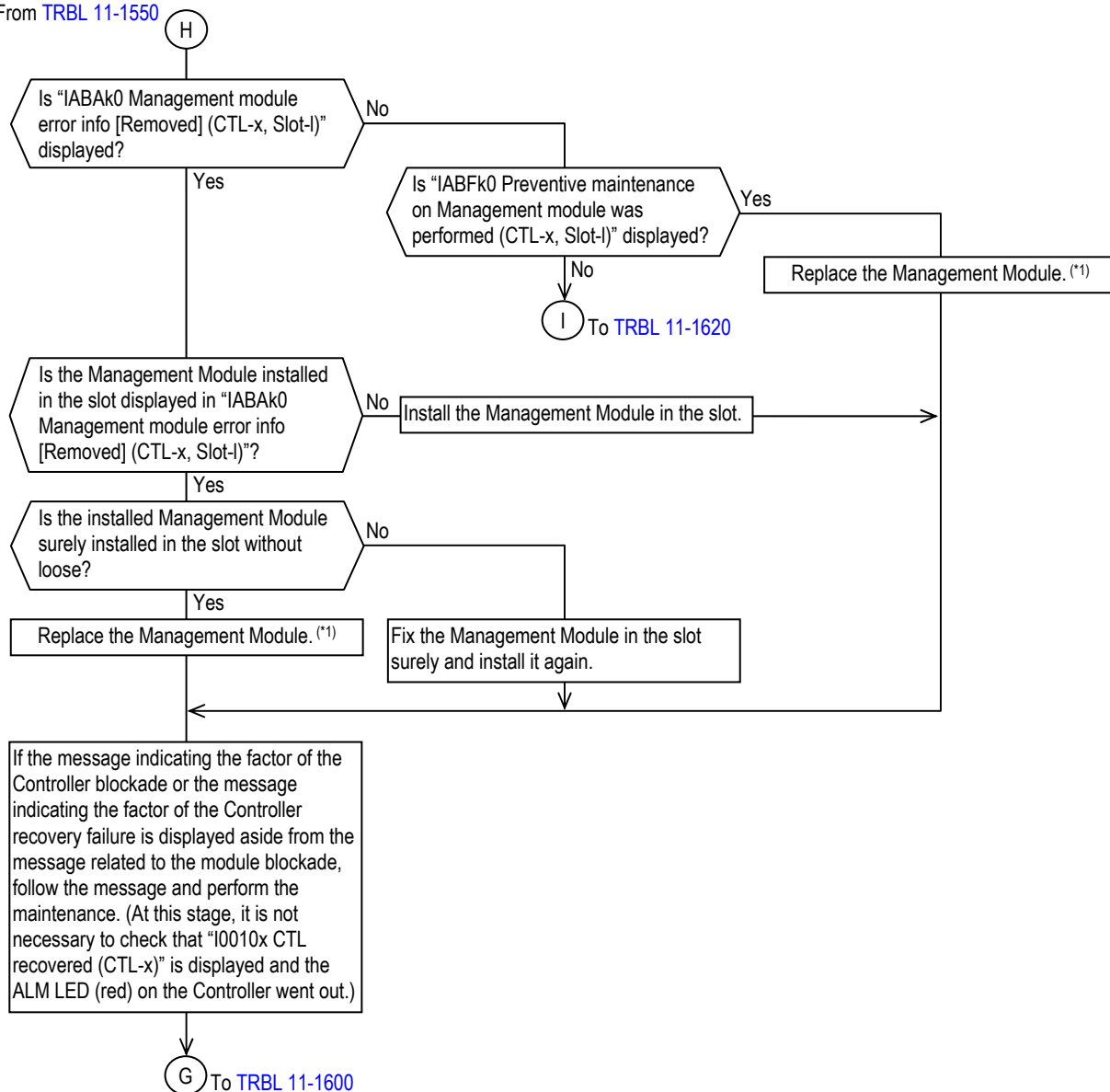
From [TRBL 11-1590](#),  
[TRBL 11-1610](#)



\*1 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-I)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-I)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-I)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

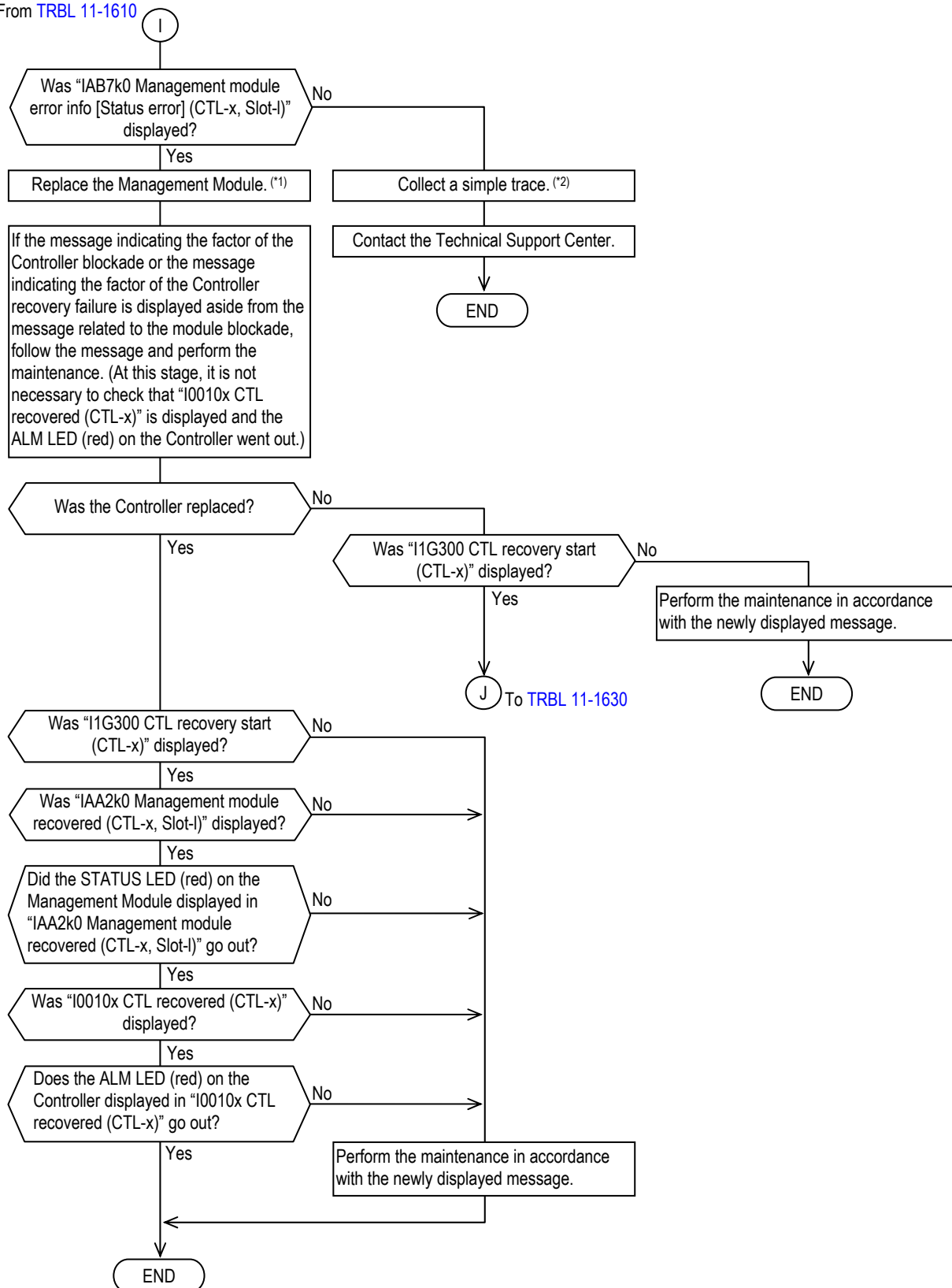
\*2 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From [TRBL 11-1550](#)

\*1 : For the replacement of the Management Module, refer to the [Replacement "2.2.10 Replacing a Management Module" \(REP 02-1410\)](#).



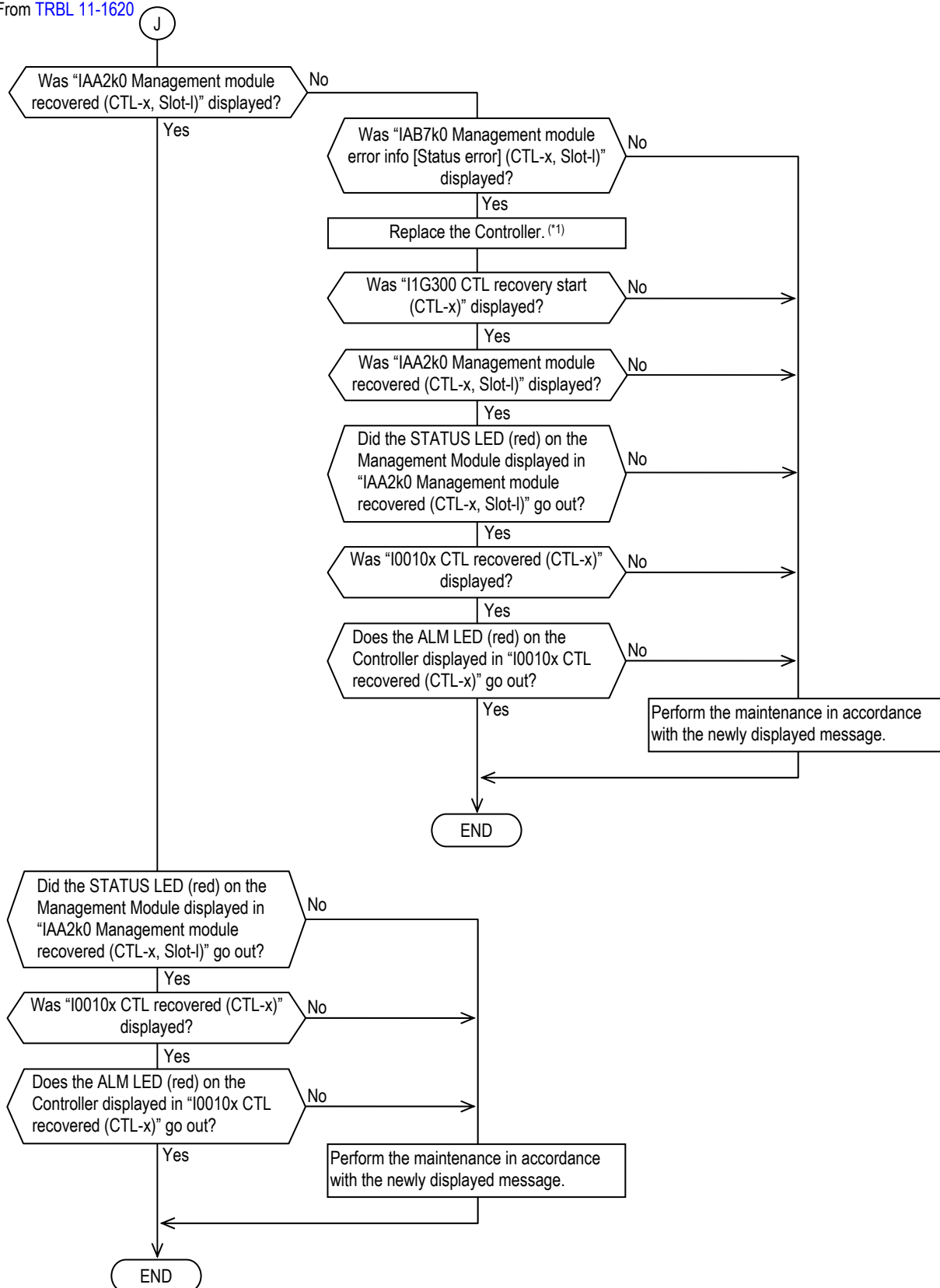
From TRBL 11-1610



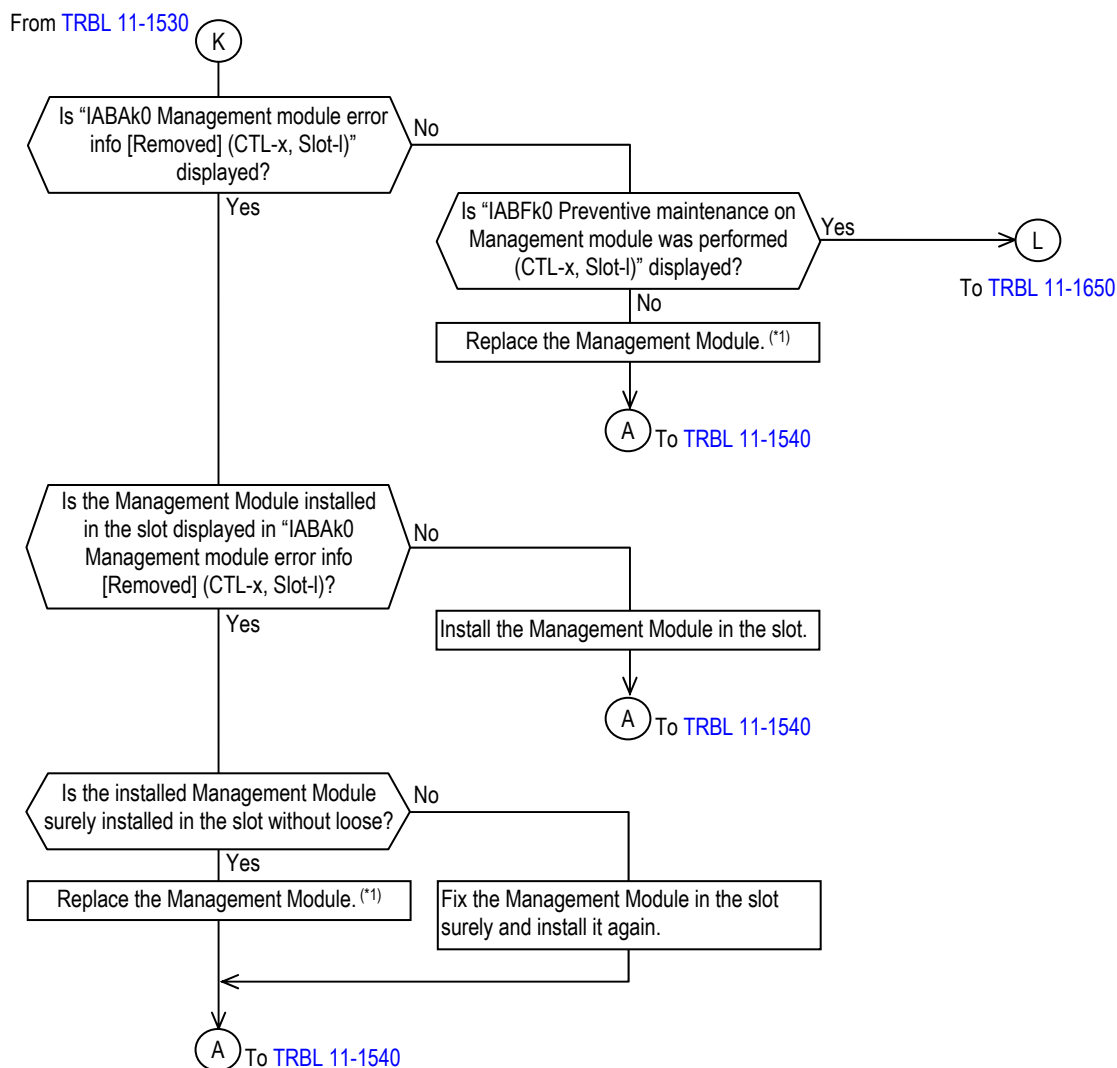
\*1 : For the replacement of the Management Module, refer to the [Replacement "2.2.10 Replacing a Management Module" \(REP 02-1410\)](#).

\*2 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From [TRBL 11-1620](#)

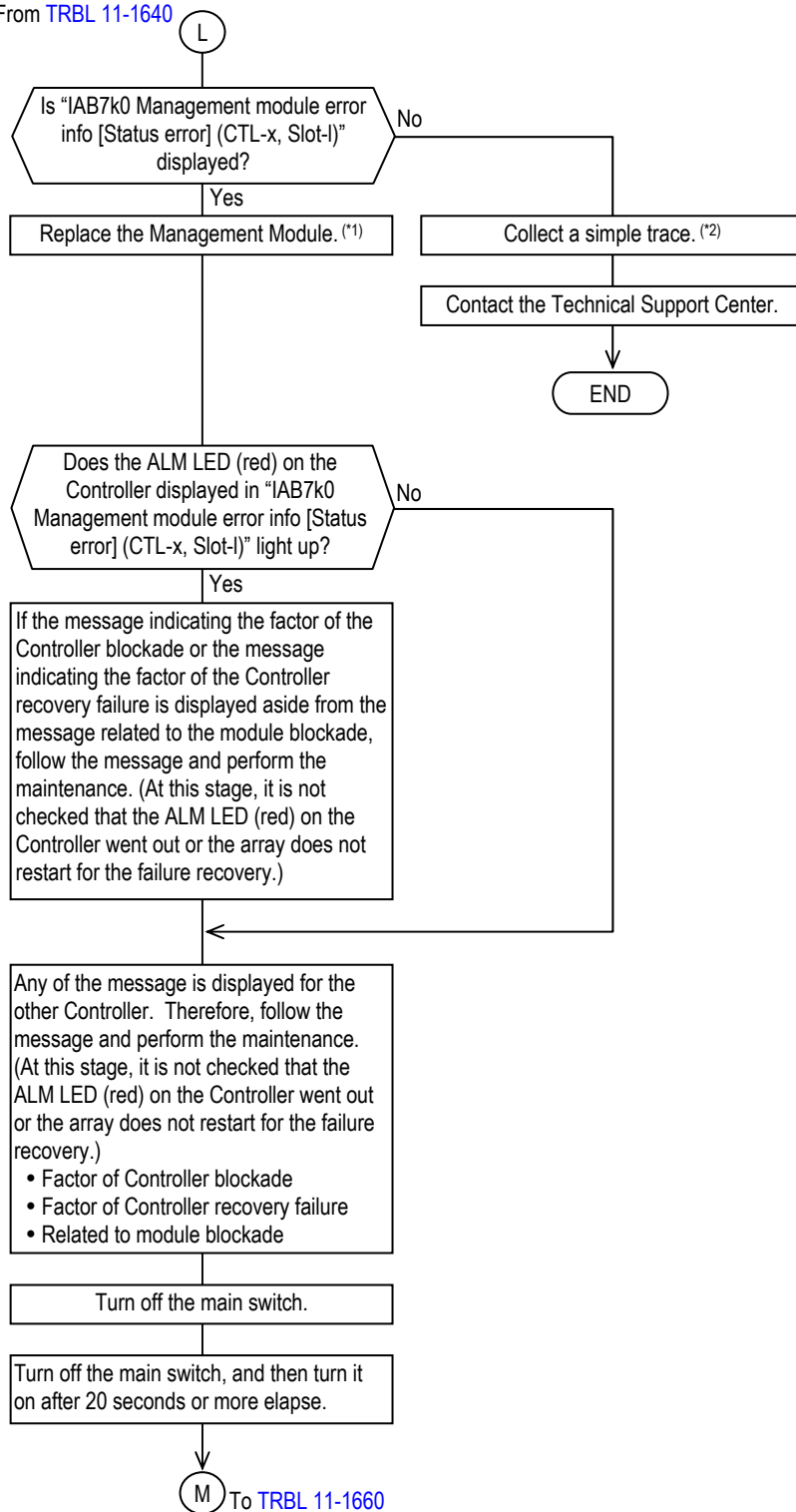


\*1 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).



\*1 : For the replacement of the Management Module, refer to the Replacement "2.2.10 Replacing a Management Module" (REP 02-1410).

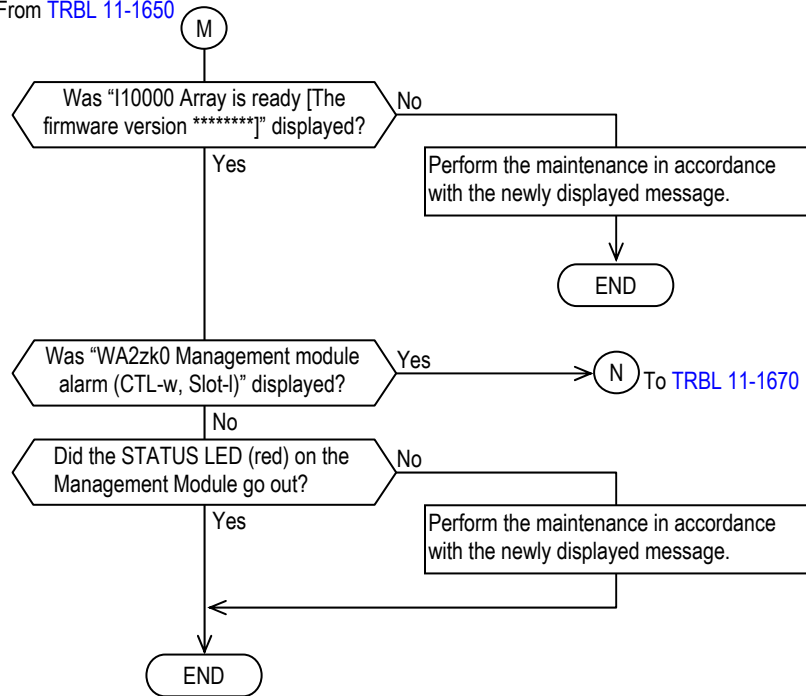
From TRBL 11-1640

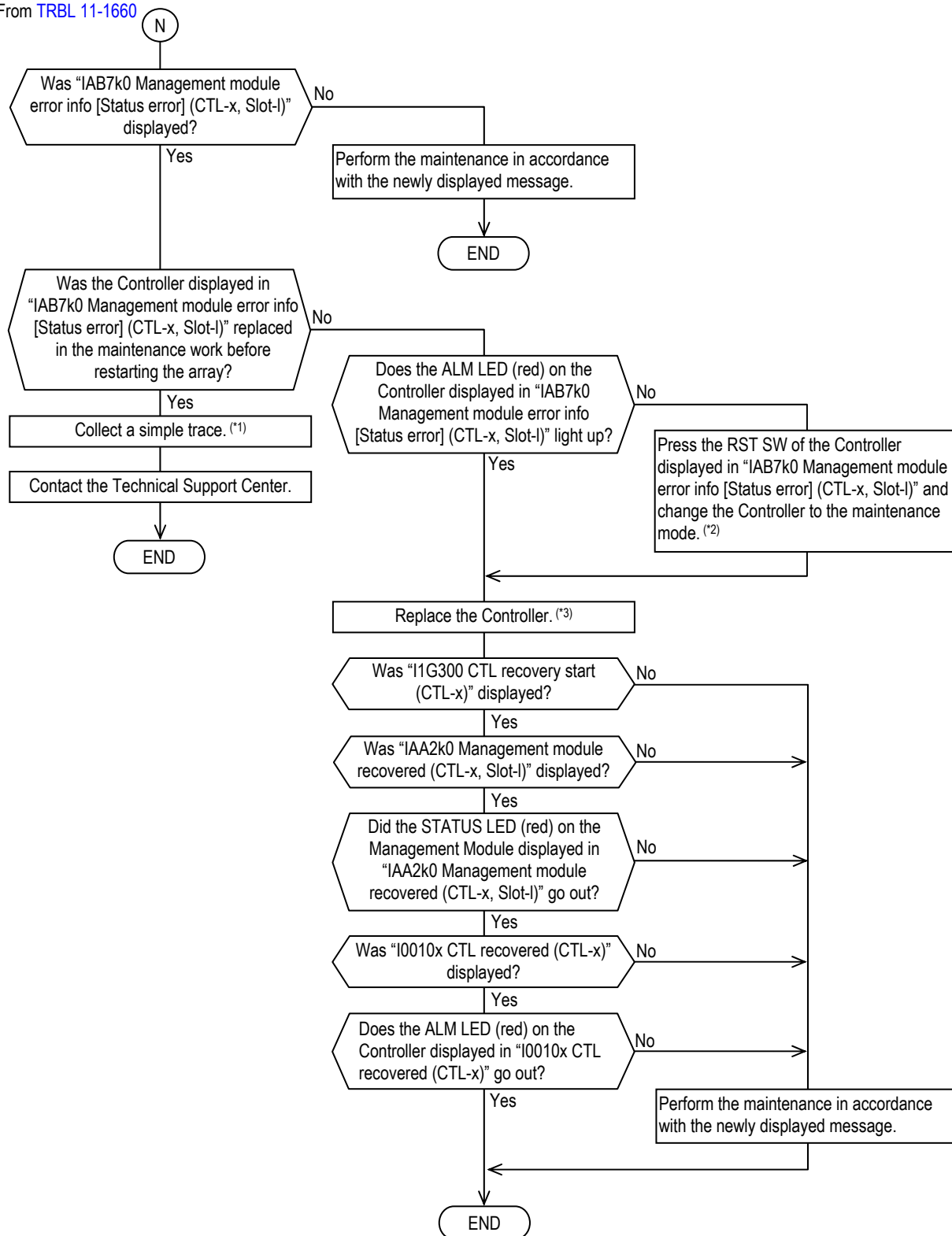


\*1 : For the replacement of the Management Module, refer to the Replacement "2.2.10 Replacing a Management Module" (REP 02-1410).

\*2 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

From [TRBL 11-1650](#)



From [TRBL 11-1660](#)\*1 : For Simple Trace Collection, refer to [“5.3 Collecting Simple Trace” \(TRBL 05-0040\)](#).\*2 : For proceeding to the maintenance mode, refer to [WEB “Chapter 3. The Maintenance Mode Operation Procedure” \(WEB 03-0000\)](#).\*3 : For the replacement of the Controller, refer to the [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\)](#).

### 11.1.33 Recovery Method at the Time of Drive I/O Module Blockade

[WEB Information Message display]

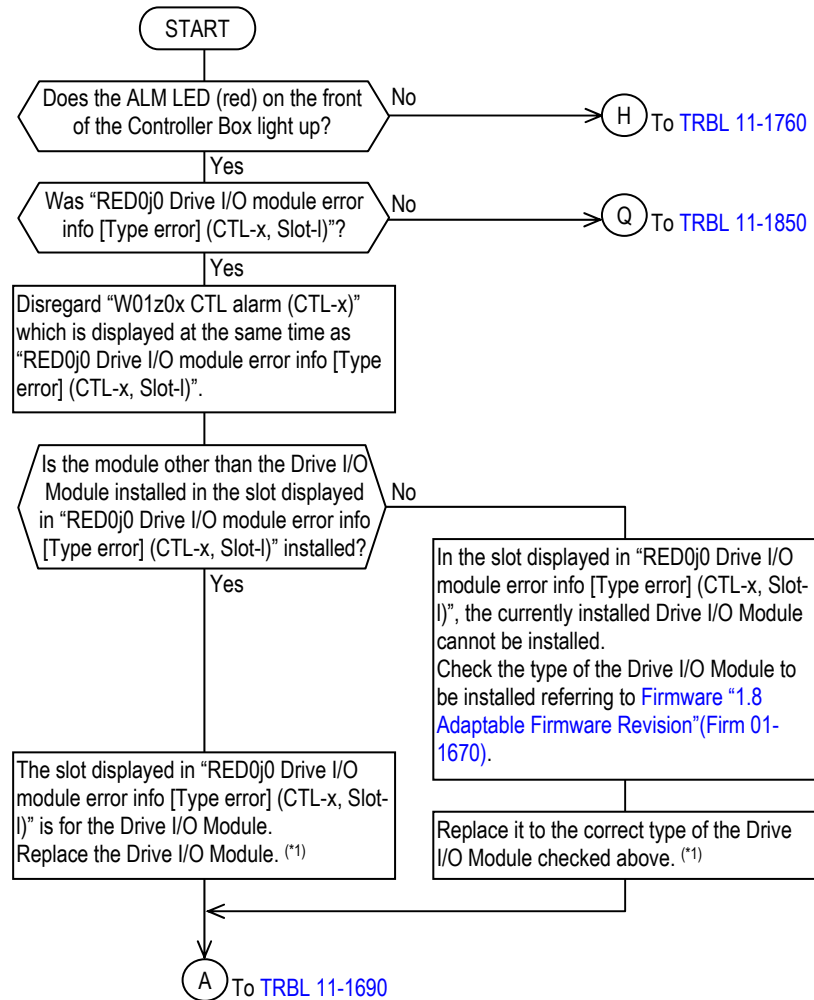
MM/DD/YYYY hh:mm:ss xy WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)			:IFBD/STRC
Date	Time	x : Detect Controller # y : Detect Core #	

In the same Controller, the module blockade (Drive I/O Module blockade, Host I/O Module blockade, Management Module blockade) or the total of two or more Fan Module blockades may occur in multiple slots and the Controller may have the pseudo blockade<sup>(†1)</sup>. In that case, by removing all the factors of the Controller pseudo blockade<sup>(†1)</sup>, the Controller reboots automatically and recovers from the pseudo blockade<sup>(†1)</sup>.

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)
- Controller pseudo blockade<sup>(†1)</sup> : W70z00 Recoverable CTL alarm by the maintenance procedures of the blocked component (CTL-x)

†1 : The controller concerned becomes inaccessible from the host and the management program because the controller operation stops.

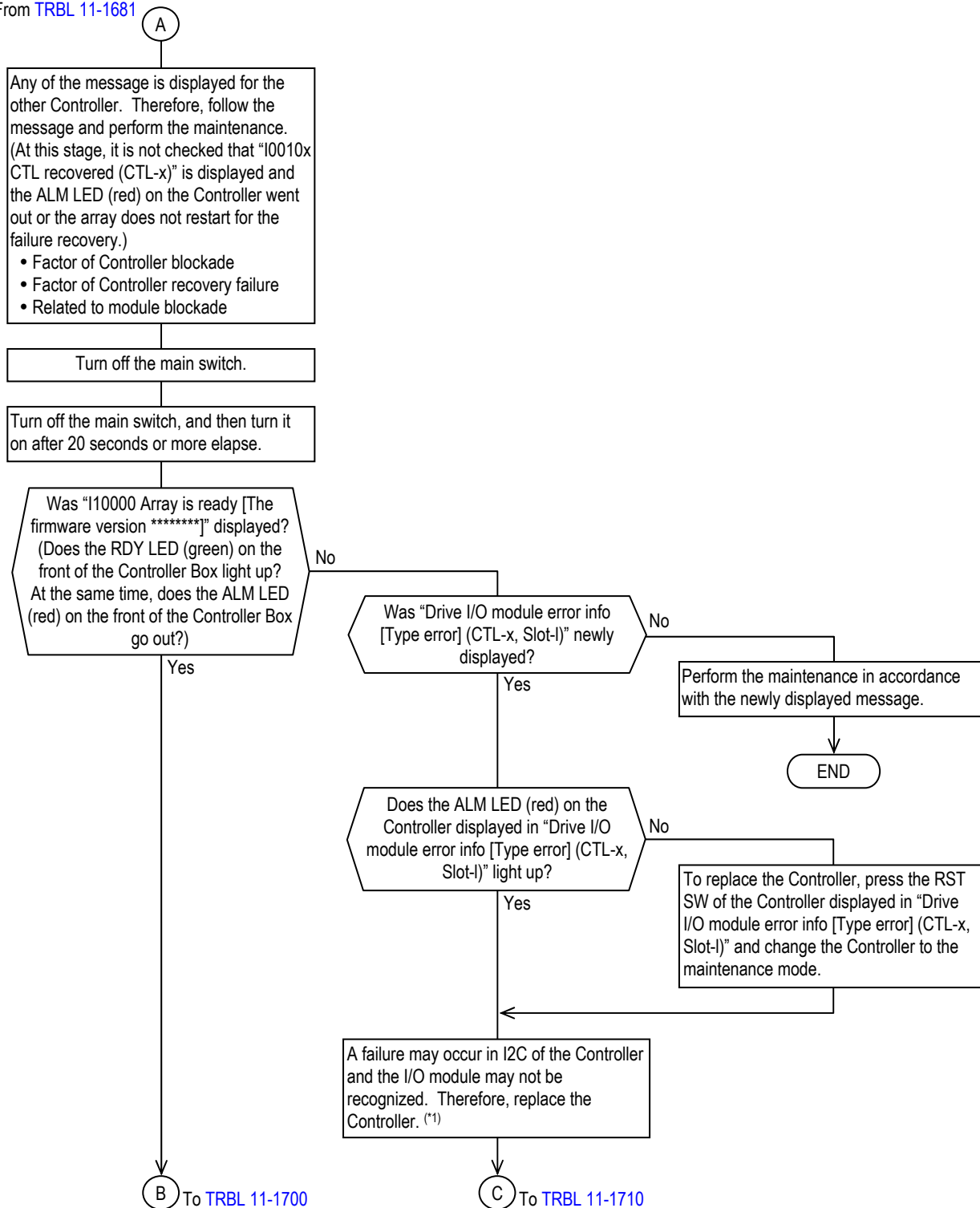
## [Recovery method]



\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).

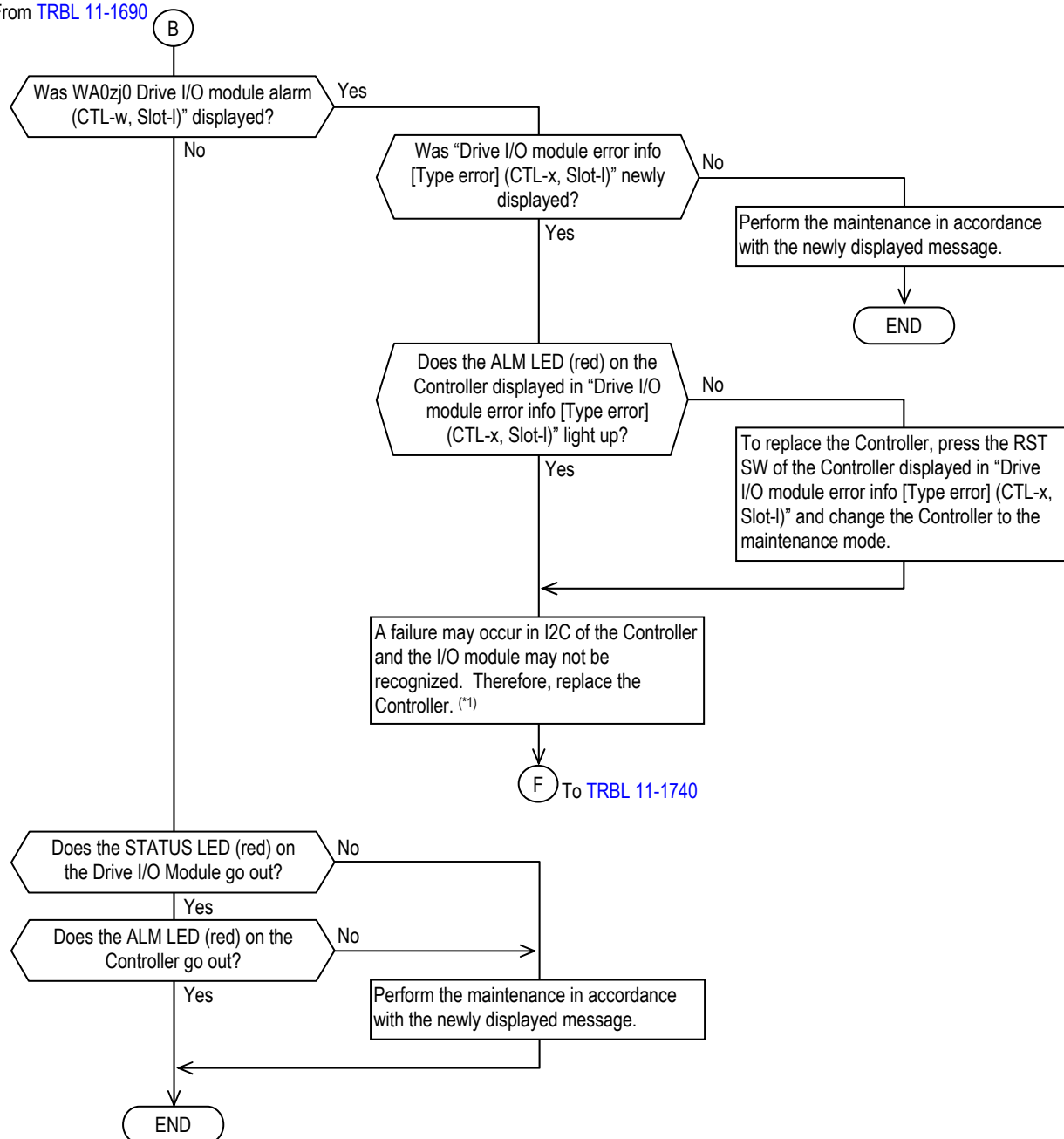


From TRBL 11-1681



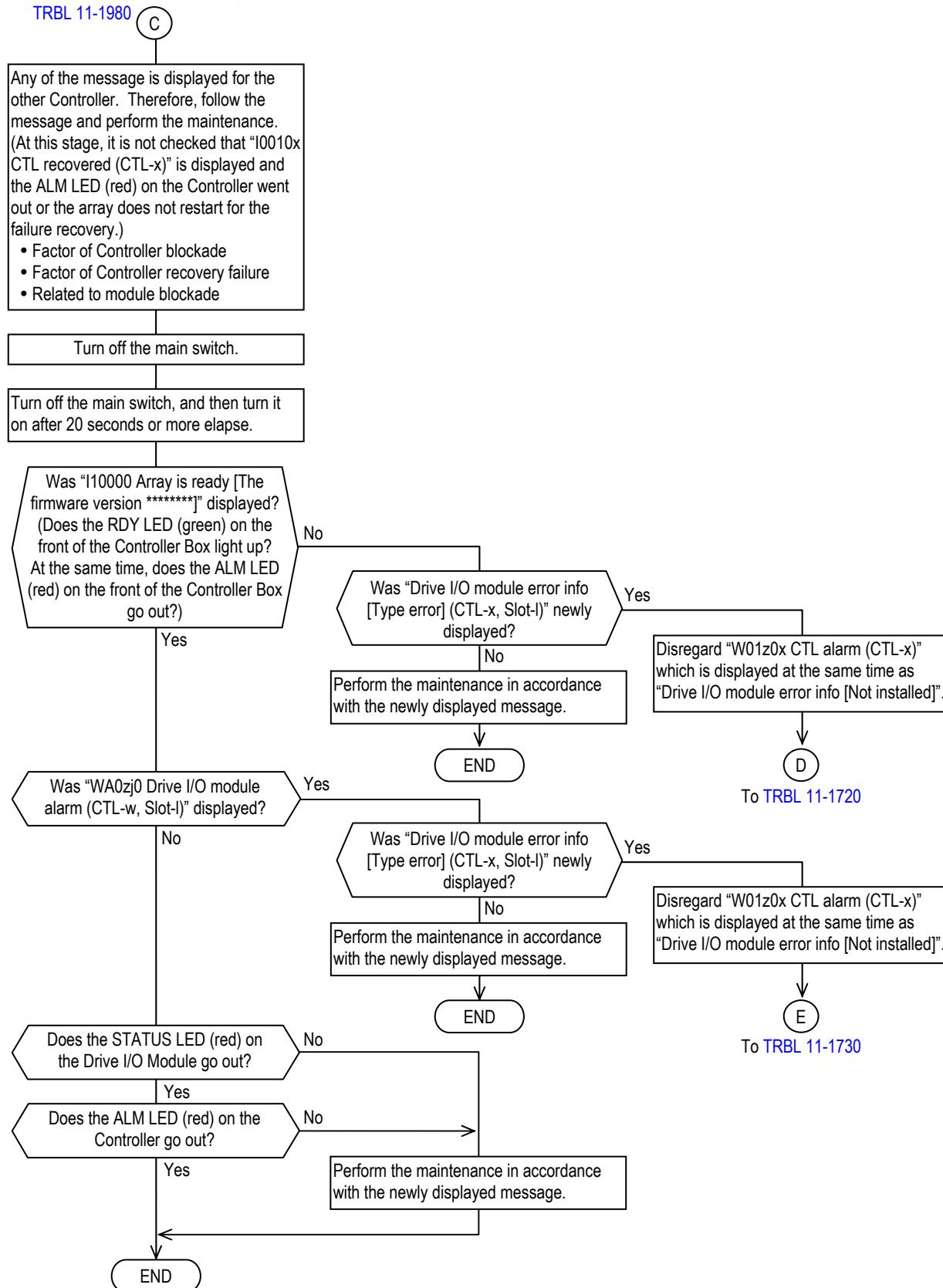
\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

From TRBL 11-1690

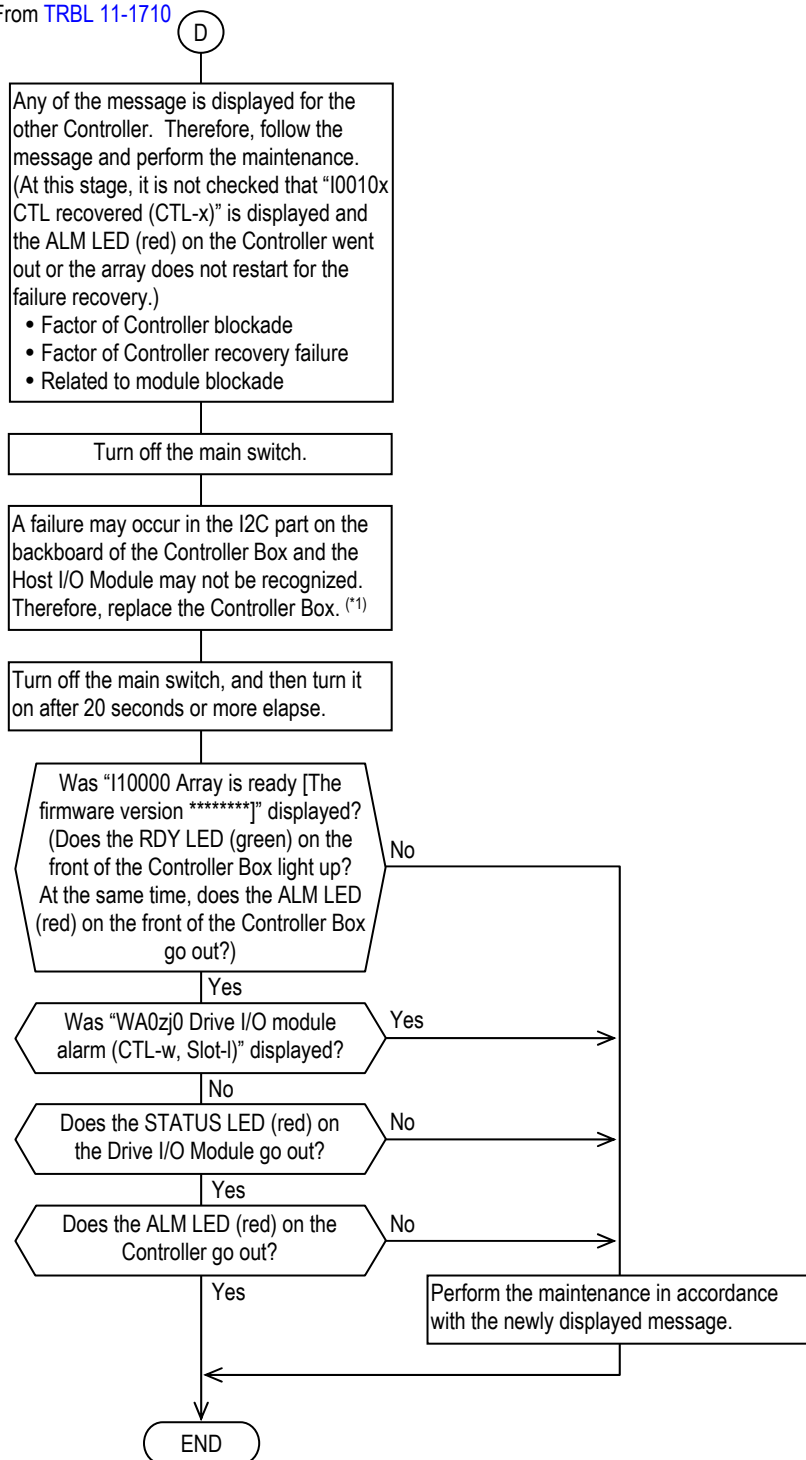


\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

From [TRBL 11-1690](#), [TRBL 11-1940](#),  
[TRBL 11-1980](#)

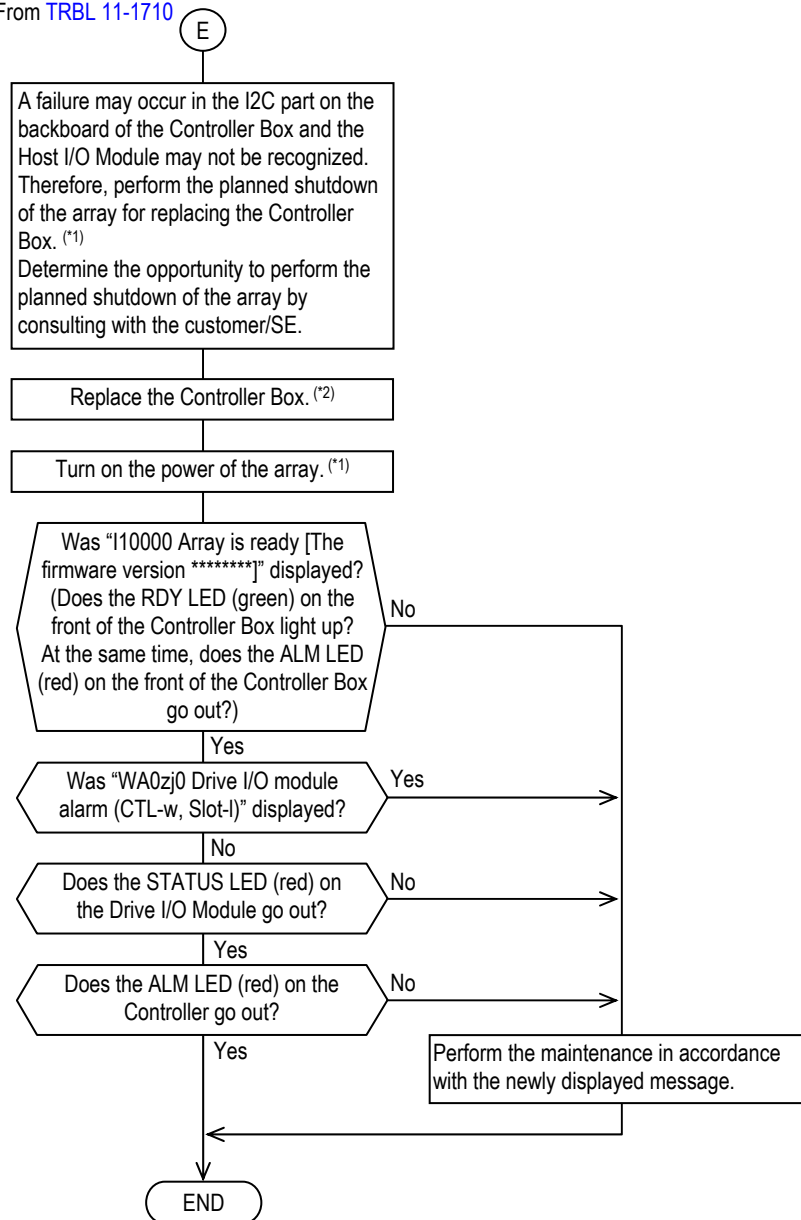


From TRBL 11-1710



\*1 : For the replacement of the Controller Box, refer to the Replacement "2.2.13 Replacing a Controller Box" (REP 02-1840).

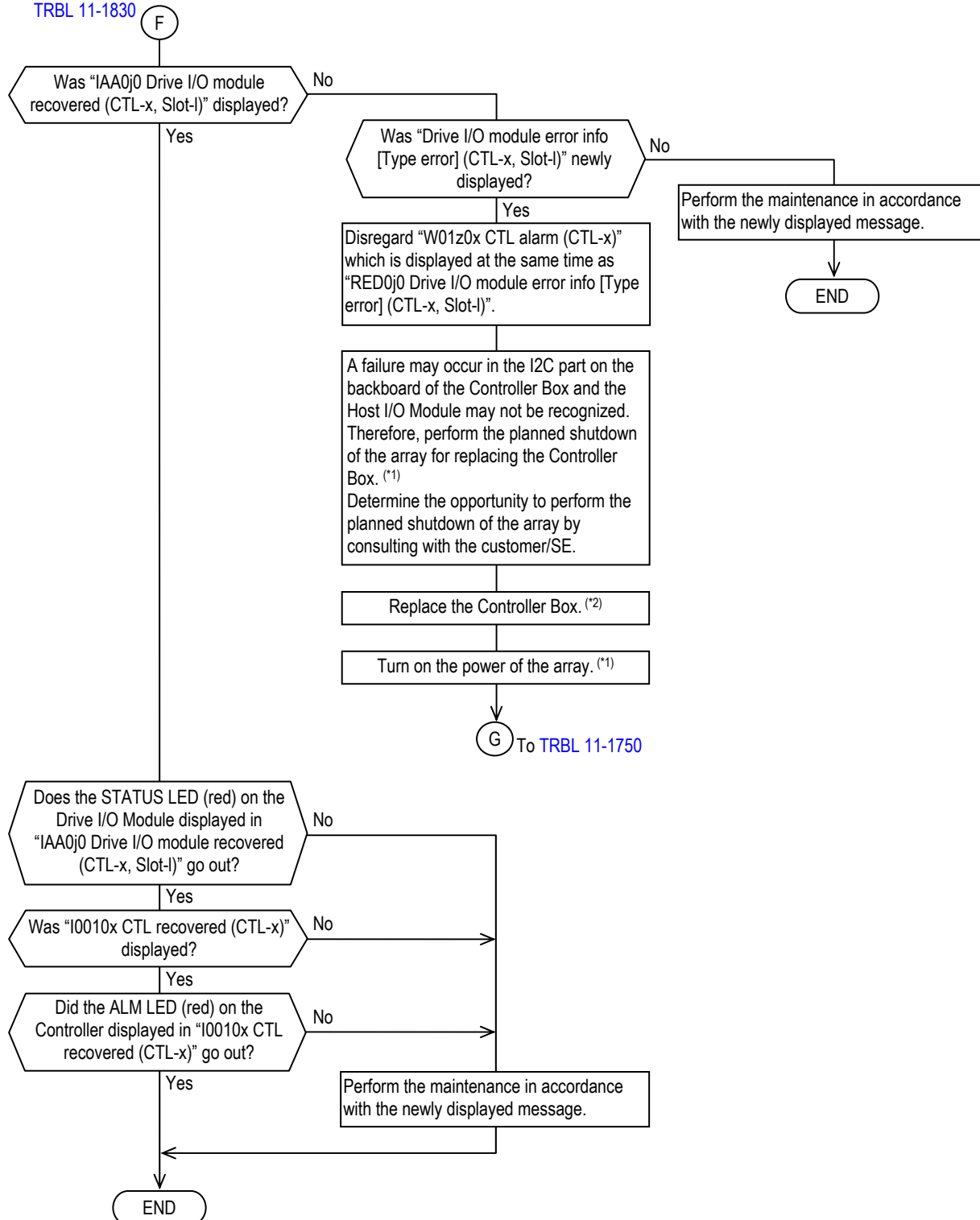
From TRBL 11-1710



\*1 : For how to turn on/off the power, refer to [Installation "1.5 Power On/Off Procedure" \(INST 01-0220\)](#).

\*2 : For the replacement of the Controller Box, refer to the [Replacement "2.2.13 Replacing a Controller Box" \(REP 02-1840\)](#).

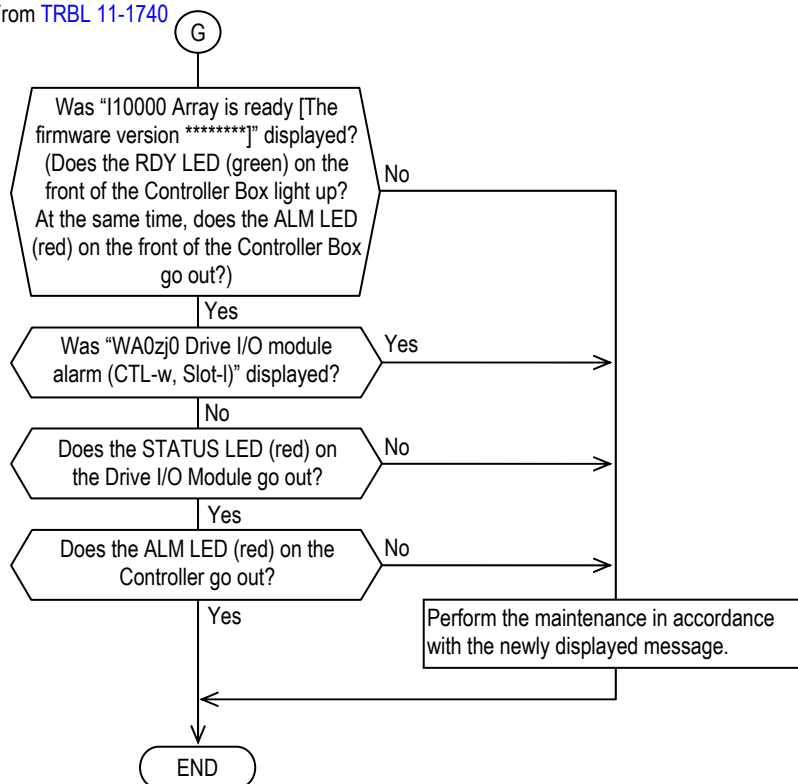
From [TRBL 11-1700](#), [TRBL 11-1770](#),  
[TRBL 11-1830](#)



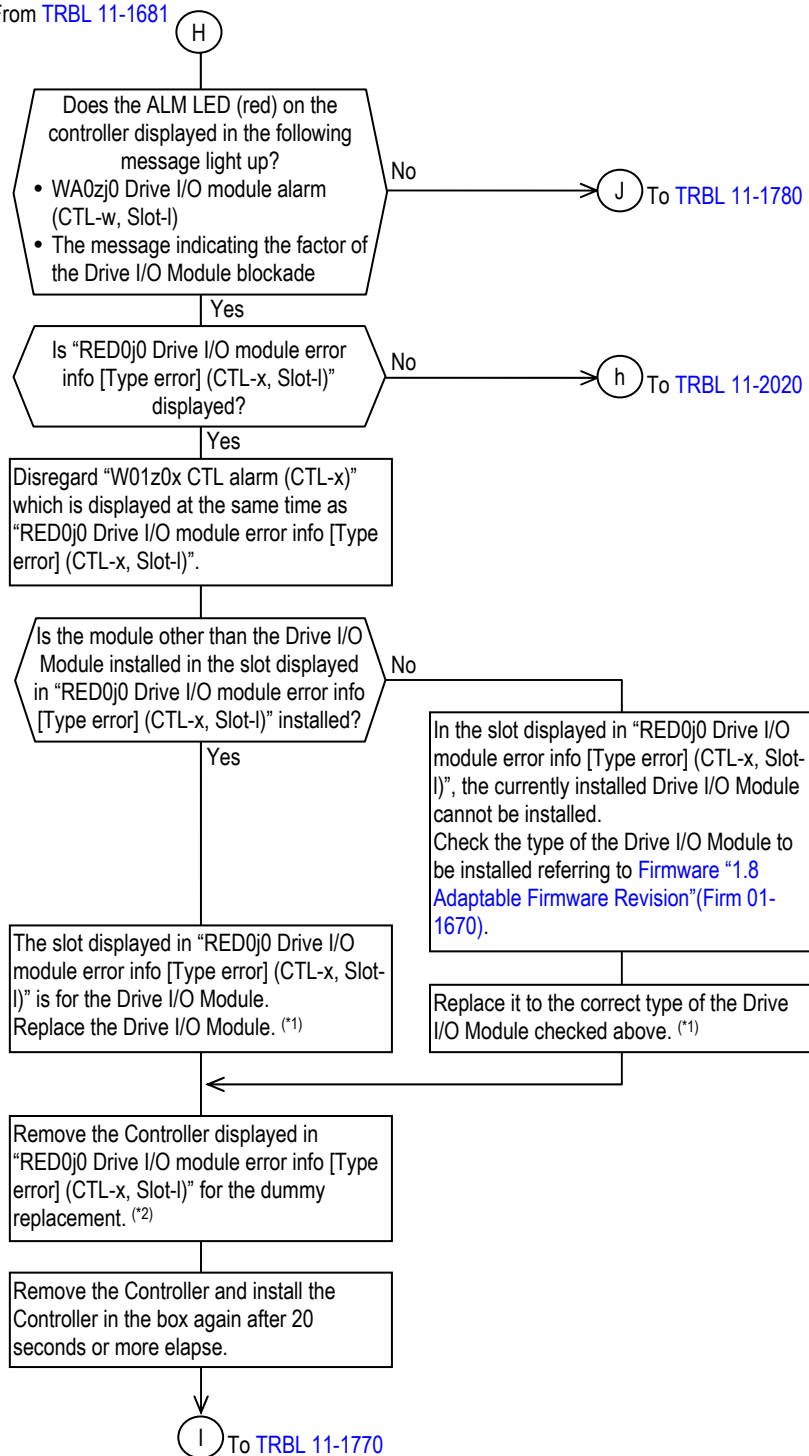
\*1 : For how to turn on/off the power, refer to [Installation "1.5 Power On/Off Procedure" \(INST 01-0220\)](#).

\*2 : For the replacement of the Controller Box, refer to the [Replacement "2.2.13 Replacing a Controller Box" \(REP 02-1840\)](#).

From TRBL 11-1740



From TRBL 11-1681

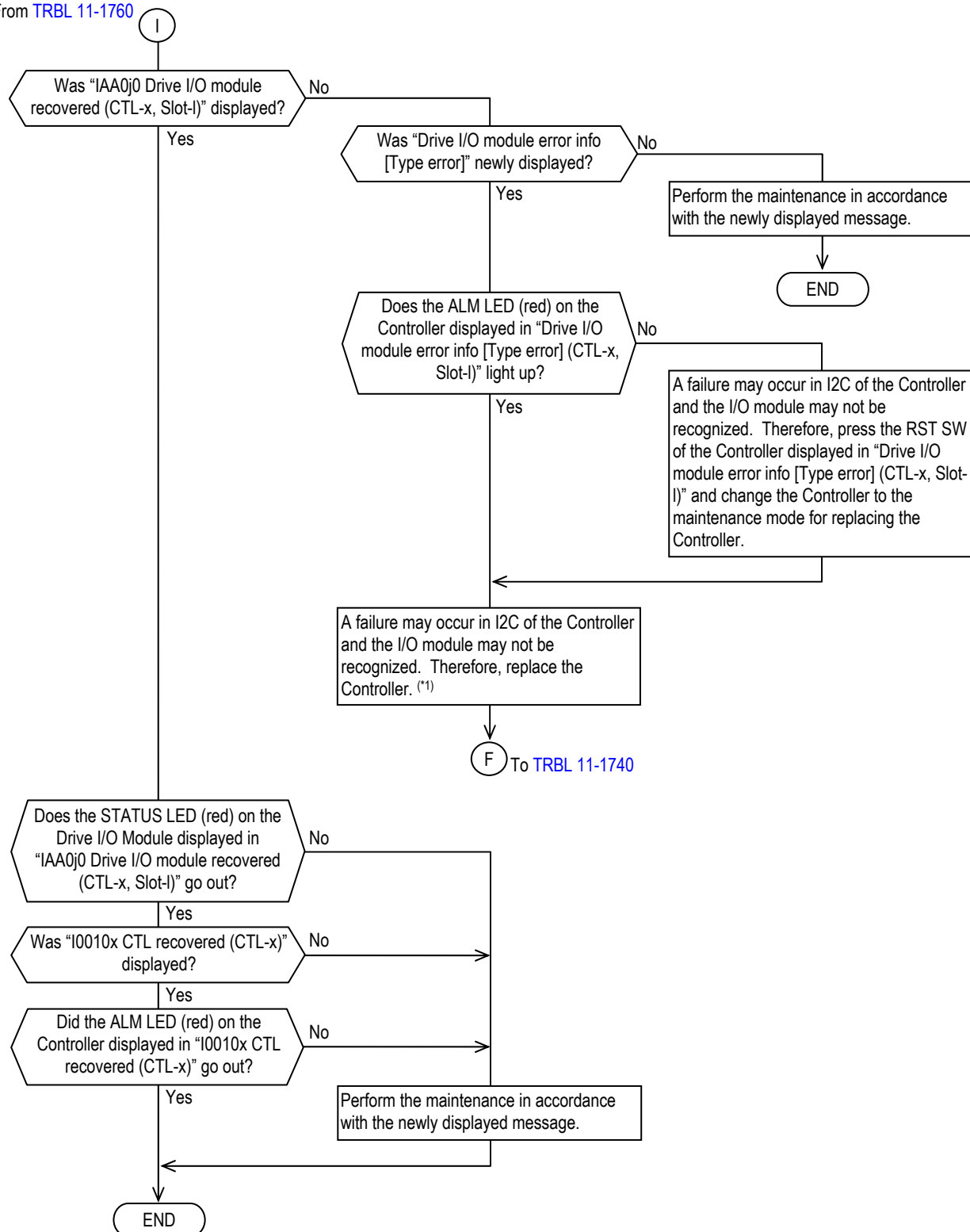


\*1 : For the replacement of the Drive I/O Module, refer to the Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320).

\*2 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

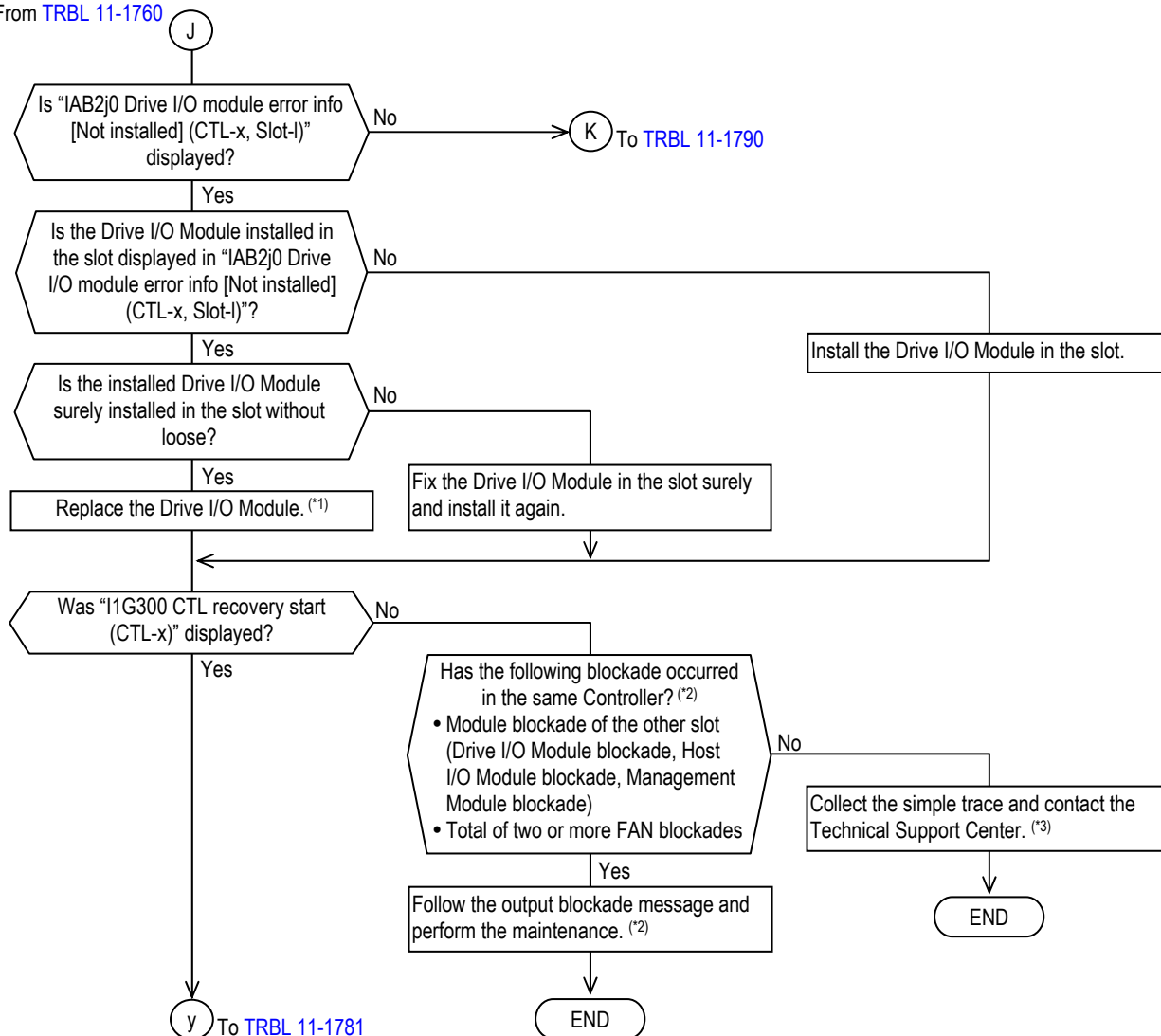


From TRBL 11-1760



\*1 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

From TRBL 11-1760



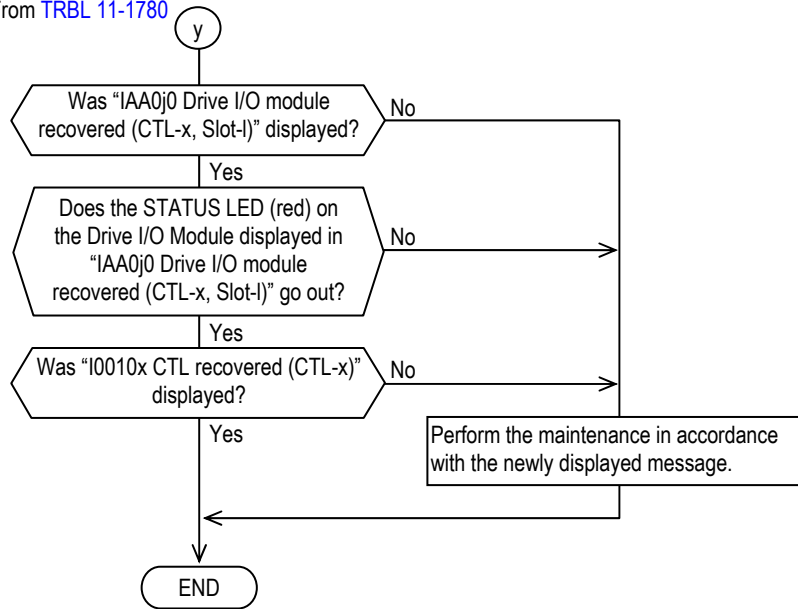
\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).

\*2 : Blockade message

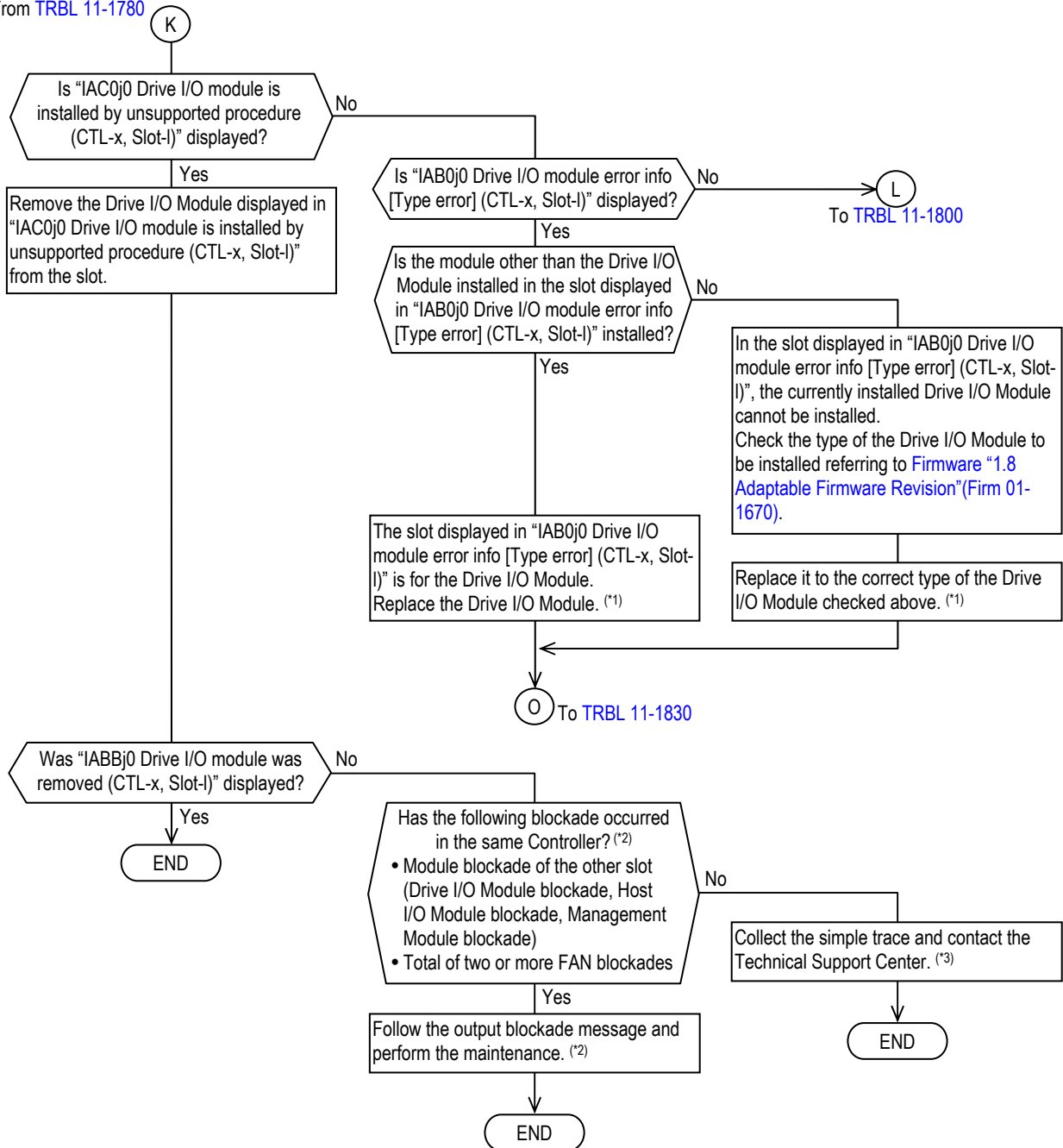
- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-1780



From TRBL 11-1780



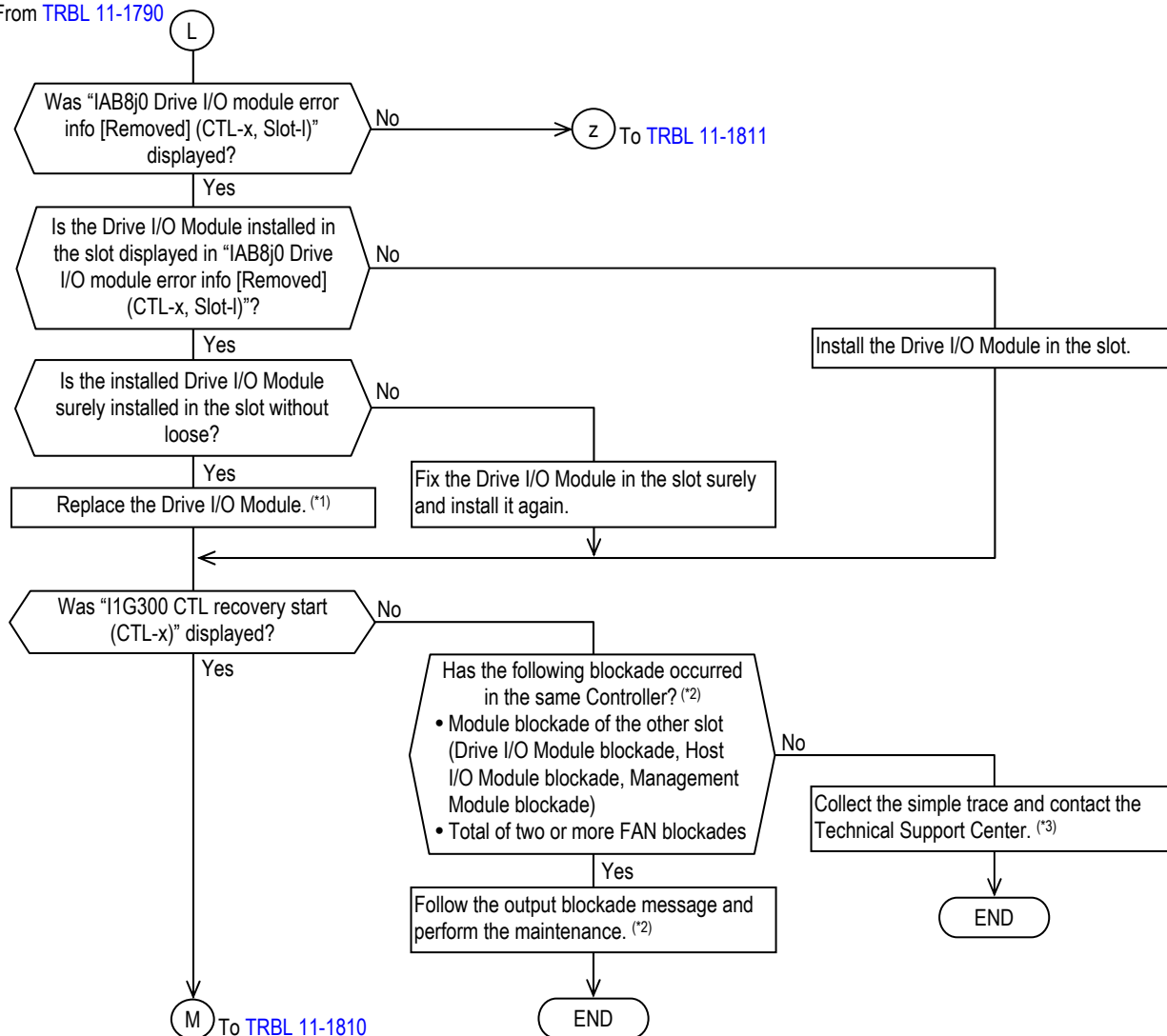
\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).

\*2 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-1790



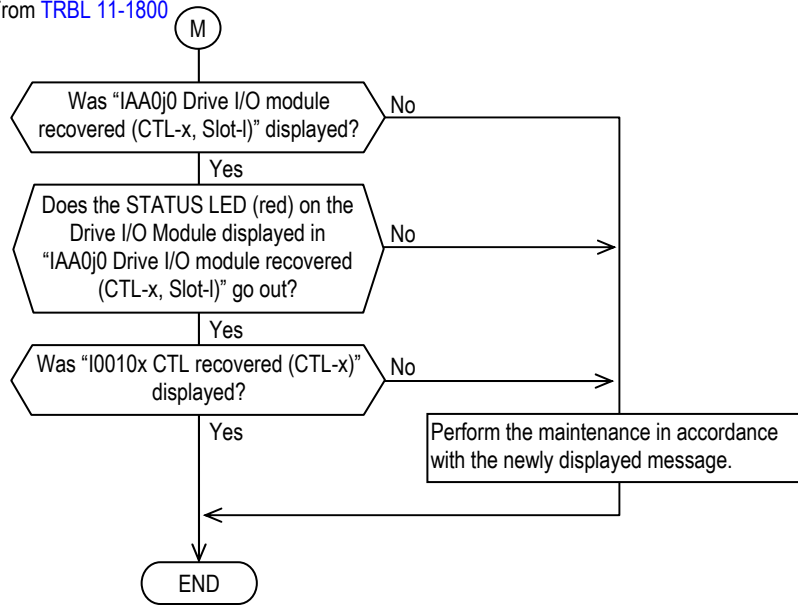
\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).

\*2 : Blockade message

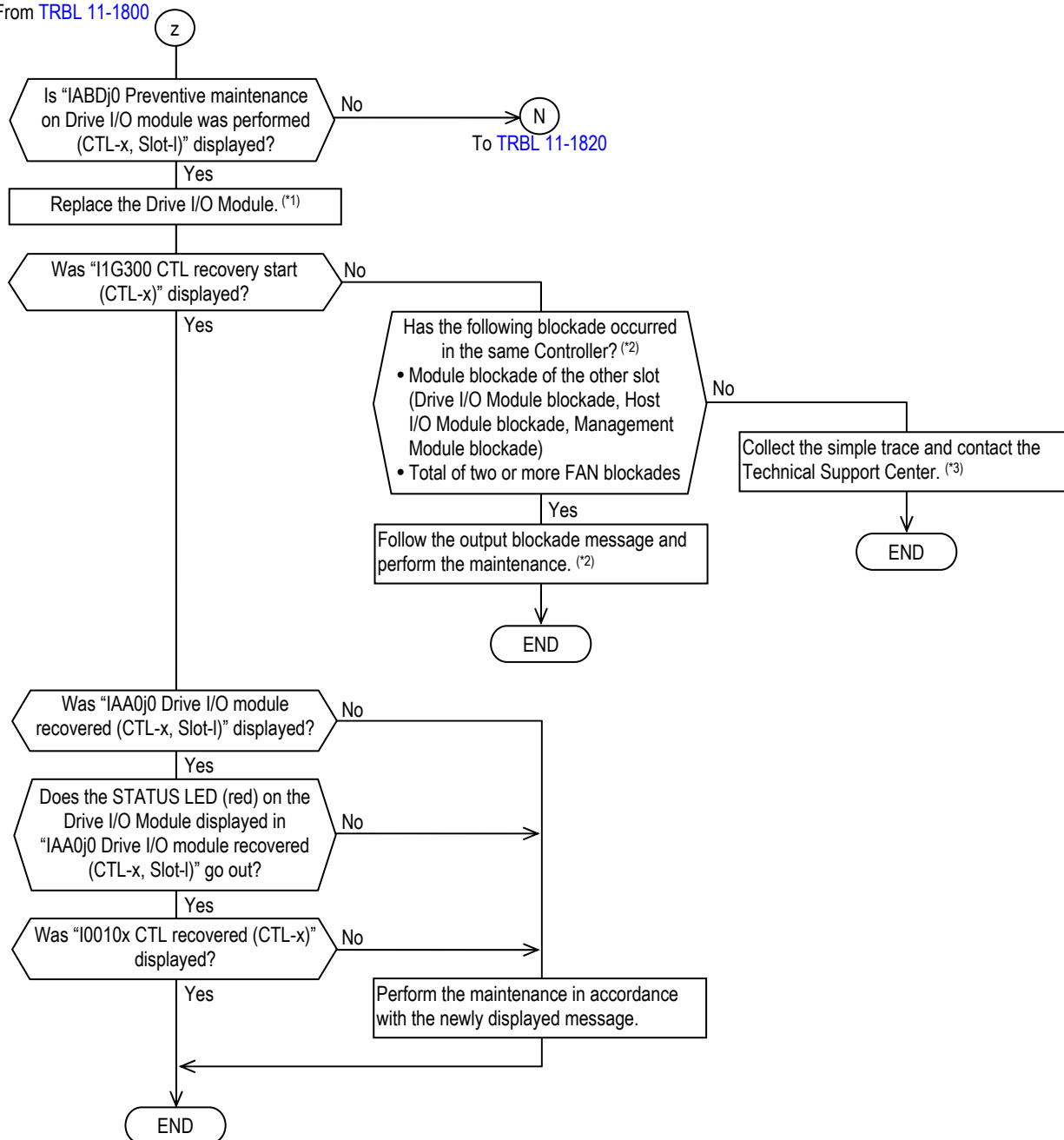
- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-1800



From TRBL 11-1800



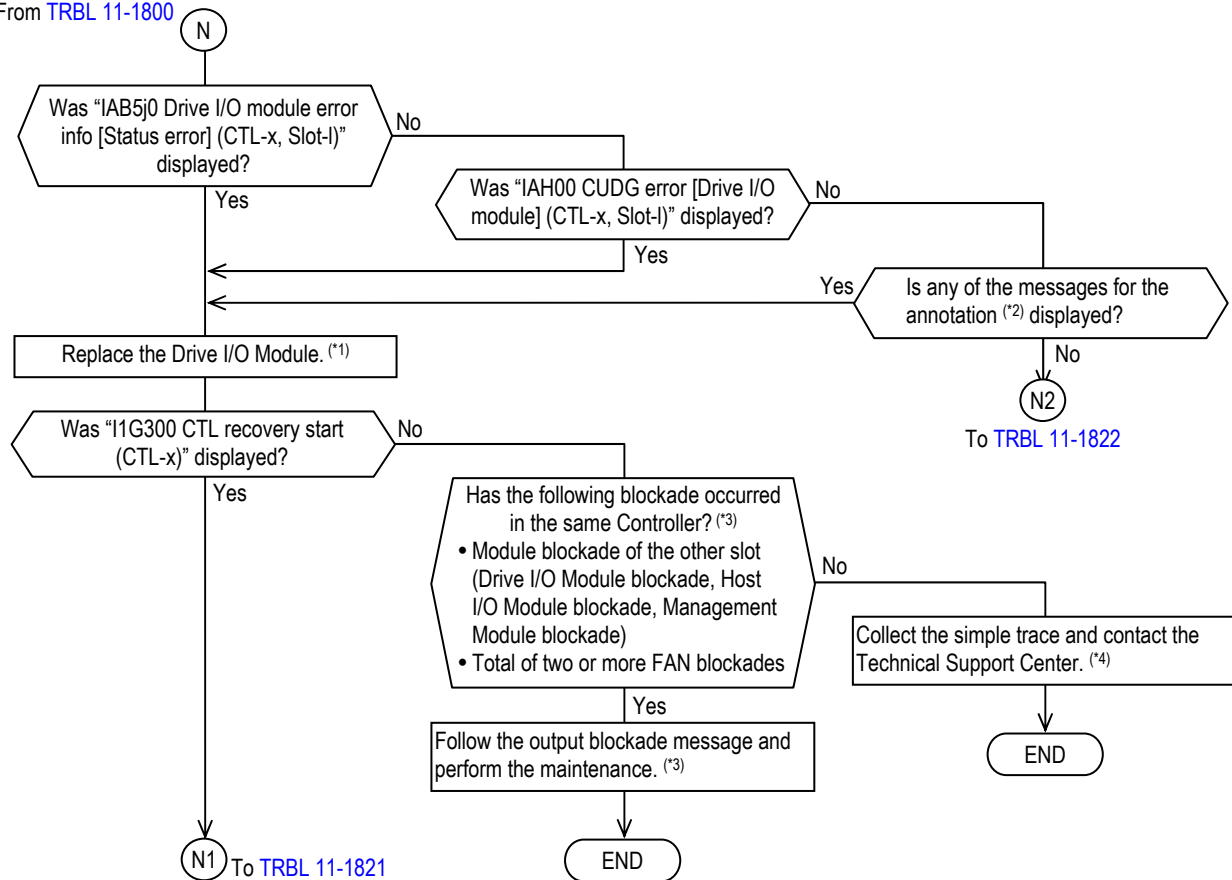
\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module"](#) (REP 02-1320).

\*2 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace"](#) (TRBL 05-0040).

From TRBL 11-1800



\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).

\*2 : List of the messages to be displayed.

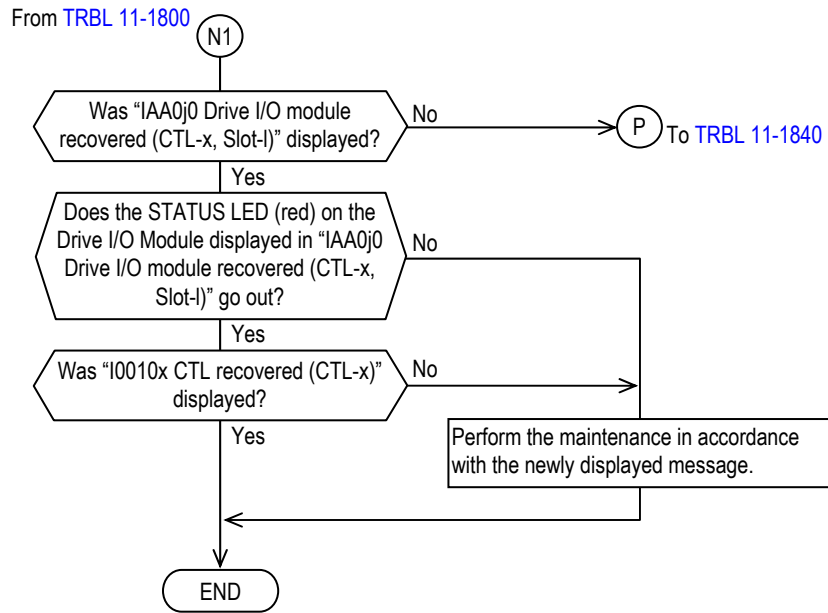
- IAD0lx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- IAD1lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- IAD2lx Backend error count of D-SPC LSI exceeded the threshold [CODE-z] (CTL-x, Slot-l)
- IAD4lx D-SPC firmware error was detected (CTL-x, Slot-l)
- IAD5lx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- IAD6lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- IAD7lx D-SPC firmware download failed (CTL-x, Slot-l)
- IAD8lx The number of correctable D-SPC errors exceeded the threshold (CTL-x, Slot-l)

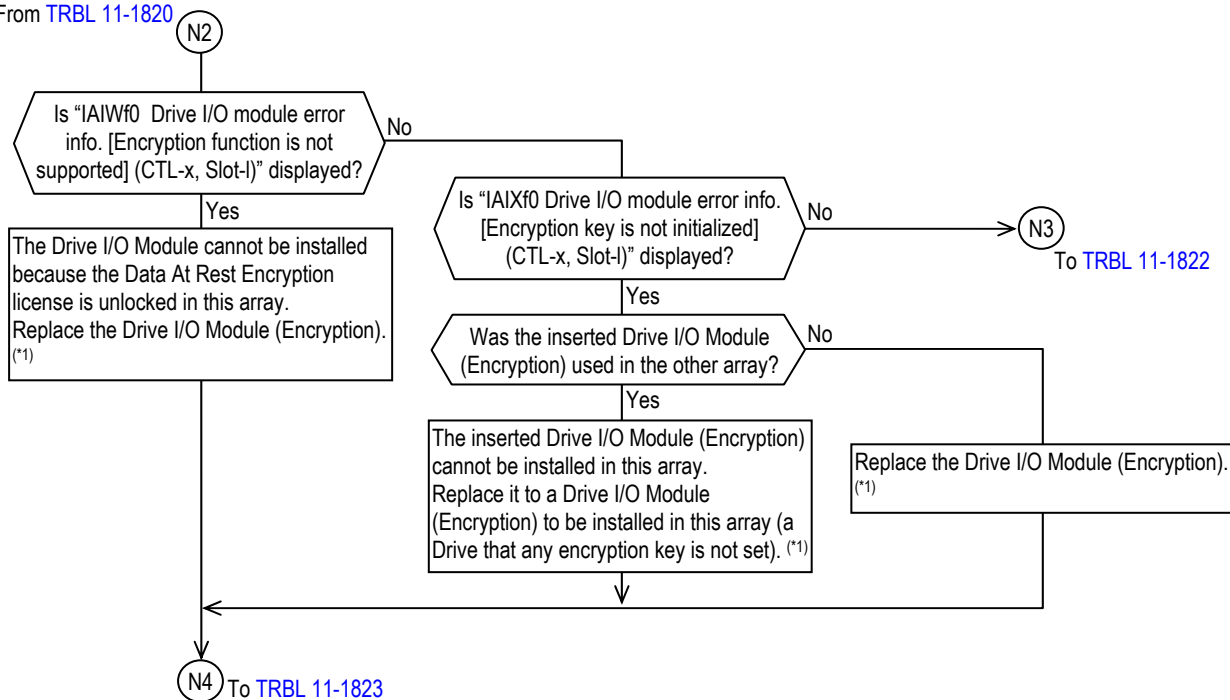
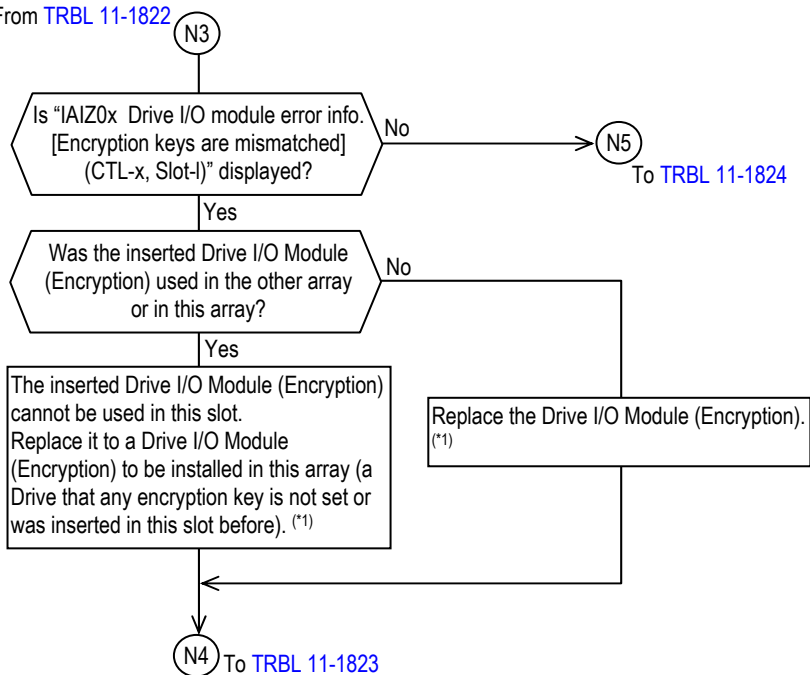
\*3 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*4 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

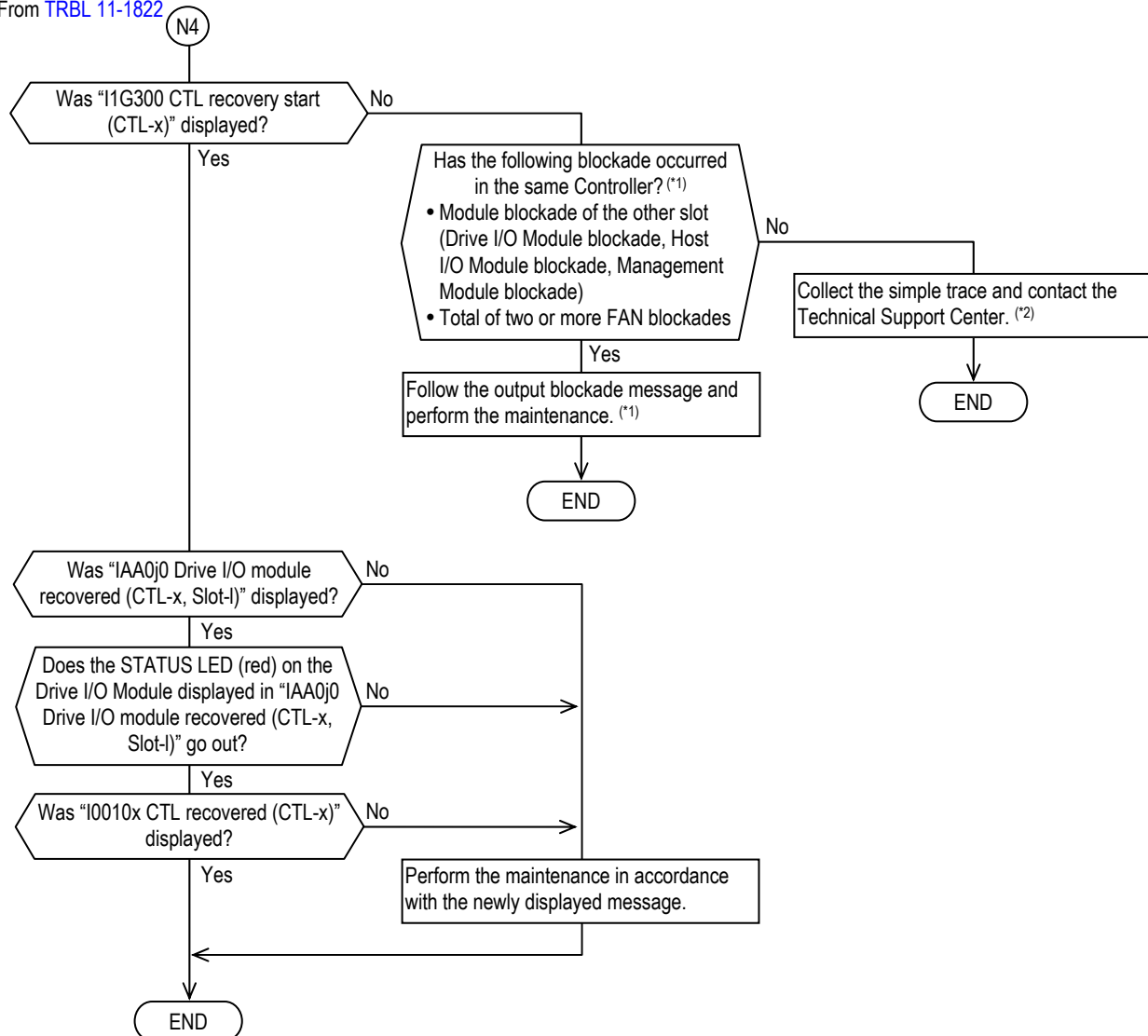




From [TRBL 11-1820](#)From [TRBL 11-1822](#)

\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).

From TRBL 11-1822

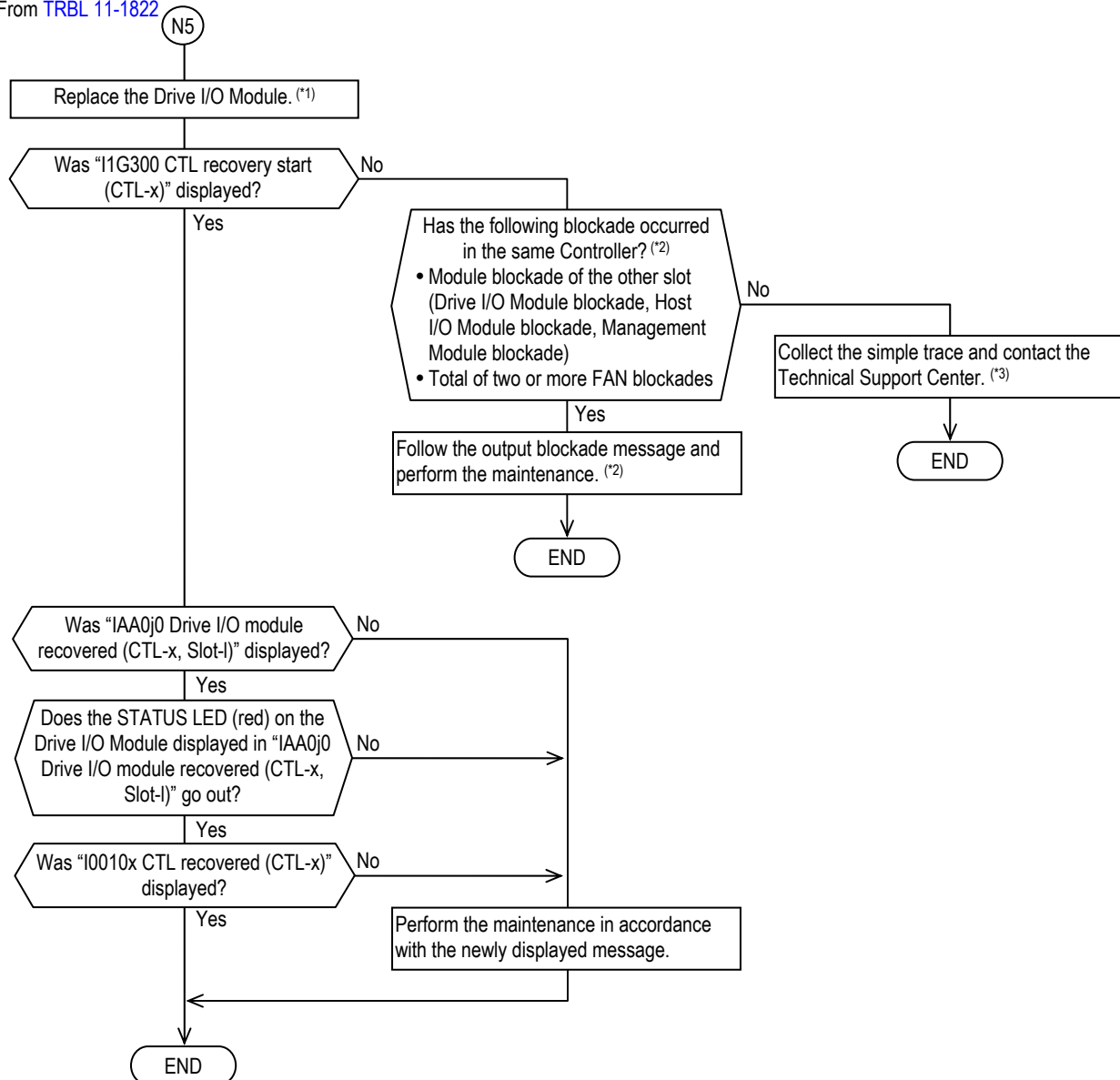


\*1 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*2 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

From TRBL 11-1822



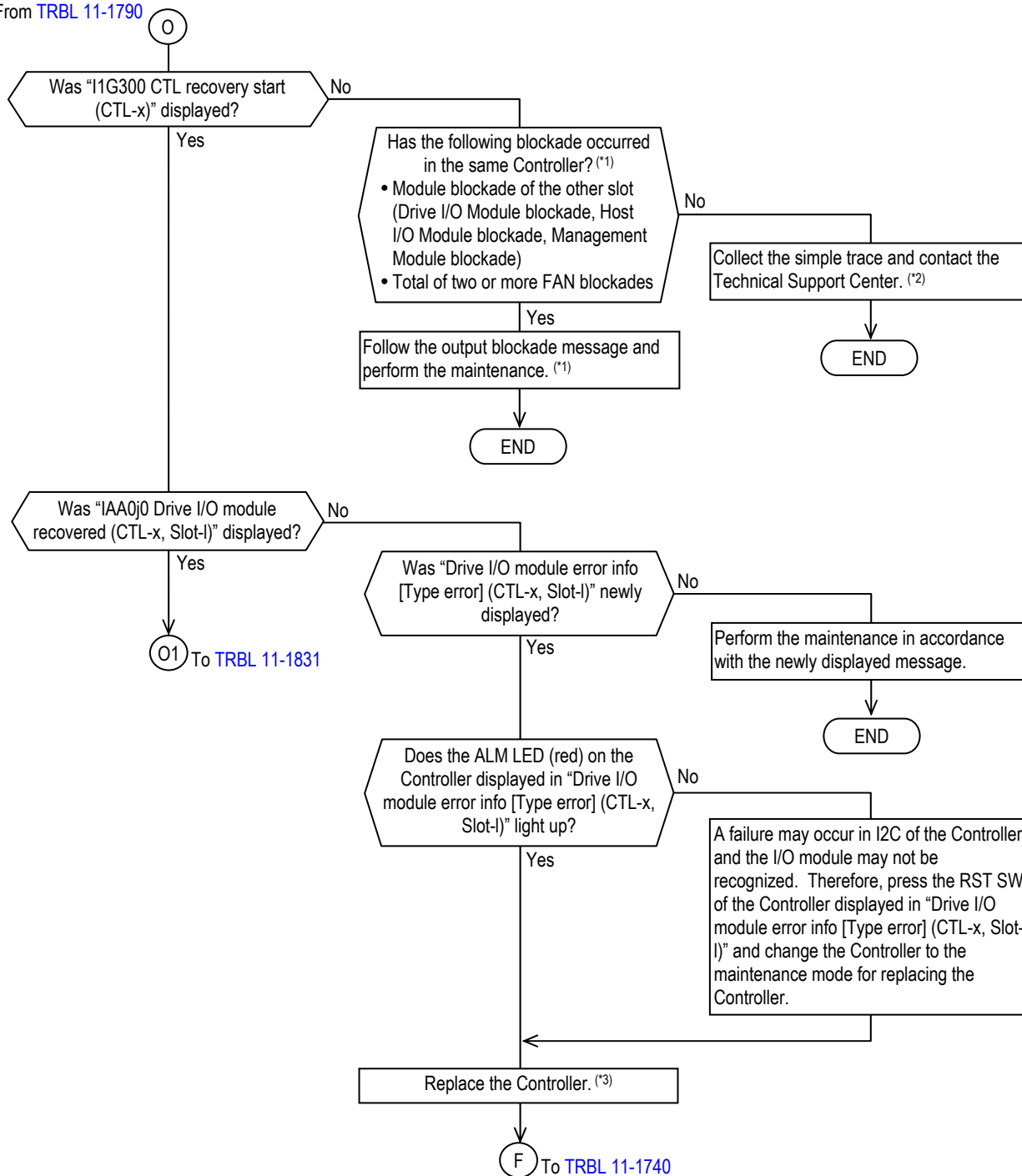
\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).

\*2 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-1790

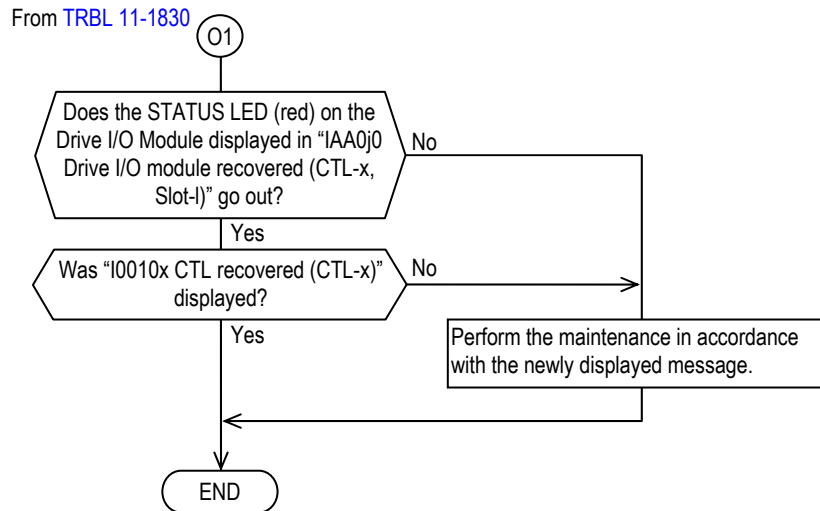


\*1 : Blockade message

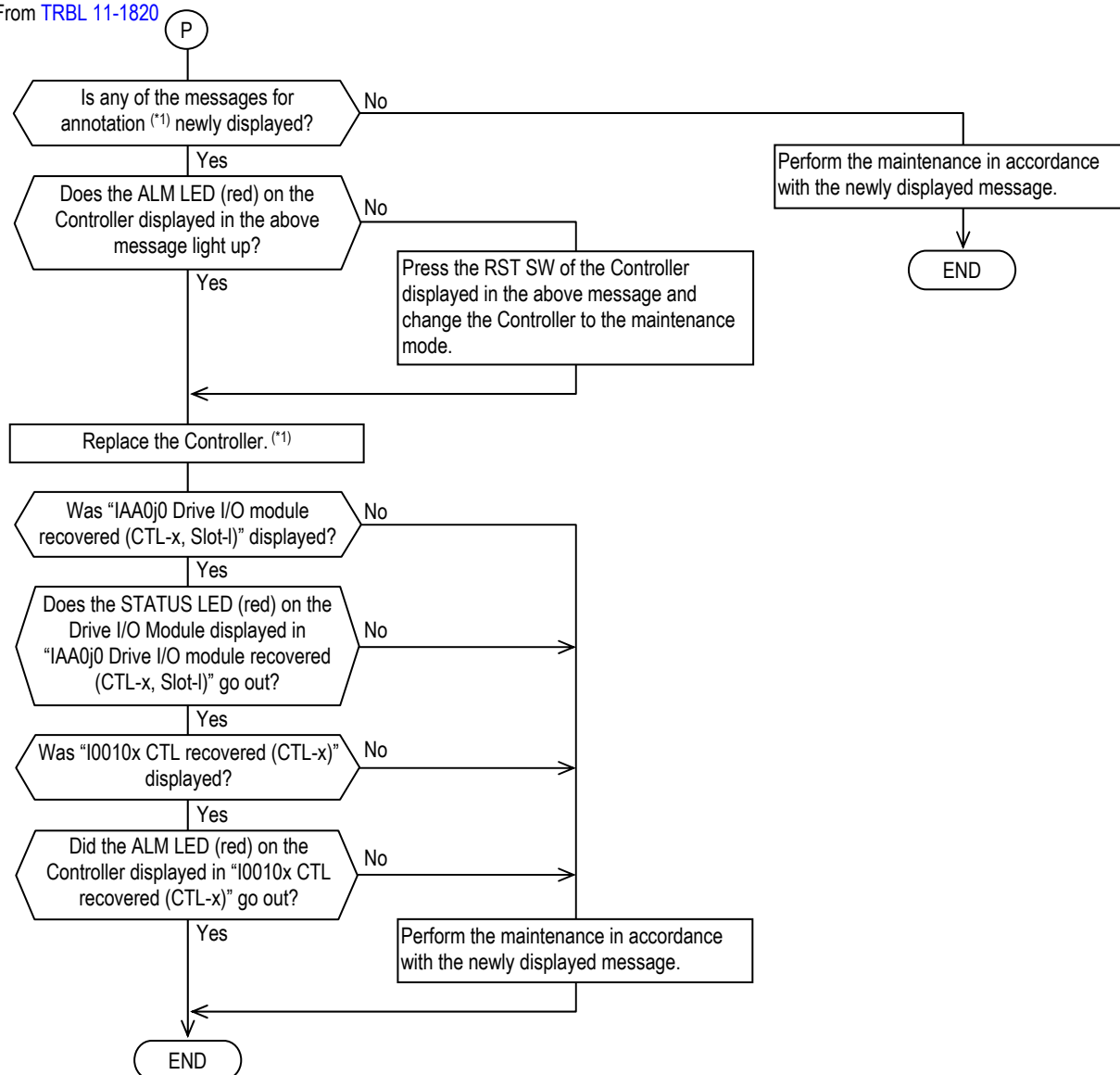
- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-w, Slot-l)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-w, Slot-l)
- Management Module blockade : WA2zk0 Management module alarm (CTL-w, Slot-l)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*2 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

\*3 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).



From TRBL 11-1820

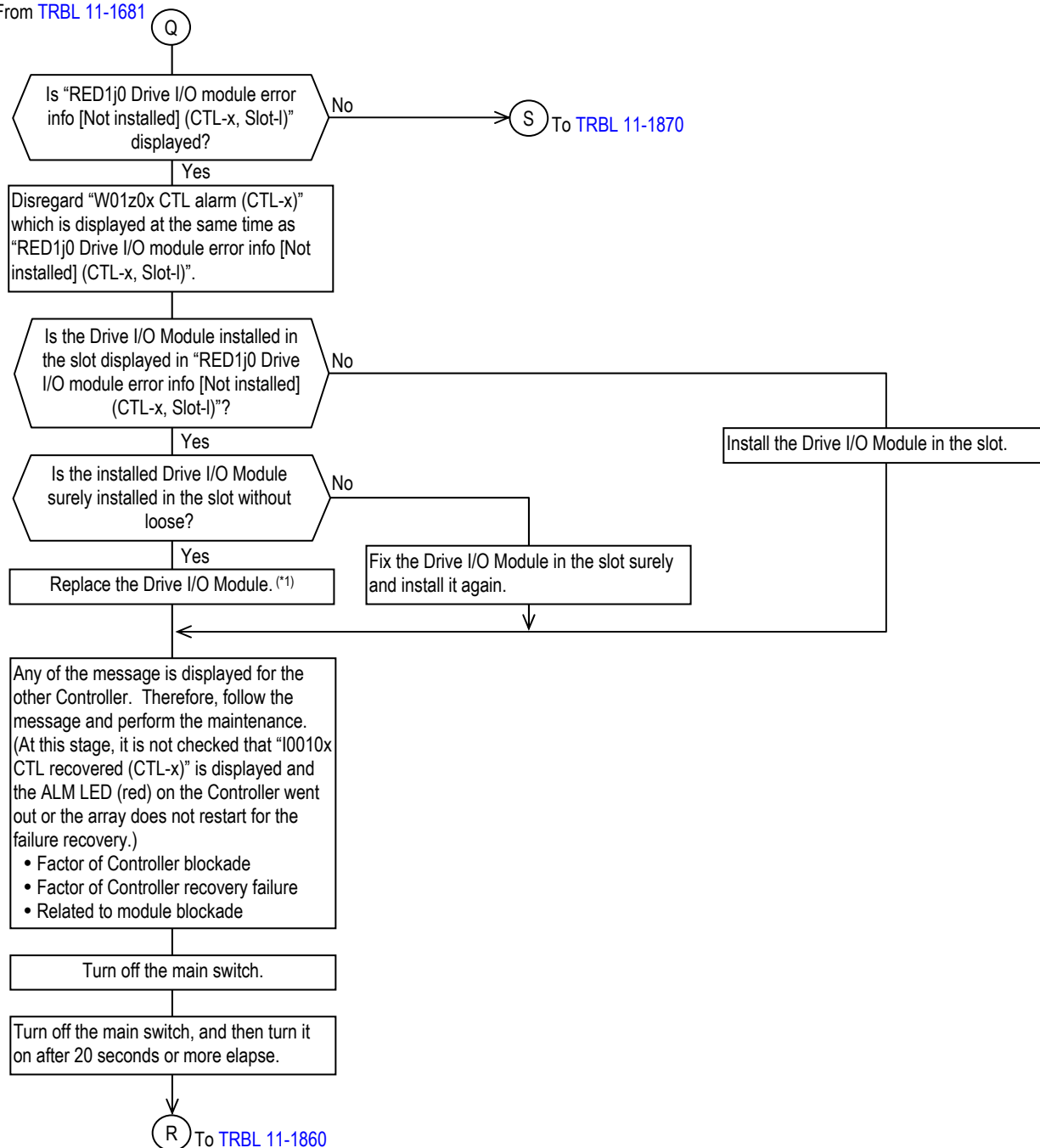


\*1 : List of the messages to be displayed.

- IAB5j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- IAD0lx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- IAD1lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- IAD2lx Backend error count of D-SPC LSI exceeded the threshold [CODE-z] (CTL-x, Slot-l)
- IAD5lx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- IAD6lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- IAD7lx D-SPC firmware download failed (CTL-x, Slot-l)
- IAD8lx The number of correctable D-SPC errors exceeded the threshold (CTL-x, Slot-l)
- IAH00x CUDG error [Drive I/O module] (CTL-x, Slot-l)
- RED2j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- RG00yx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- RG10yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- RG20yx Backend error count of D-SPC LSI exceeded the threshold [CODE-zz] (CTL-x, Slot-l)
- RG30yx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- RG40yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- RG600x D-SPC firmware download failed (CTL-x, Slot-y)

\*2 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

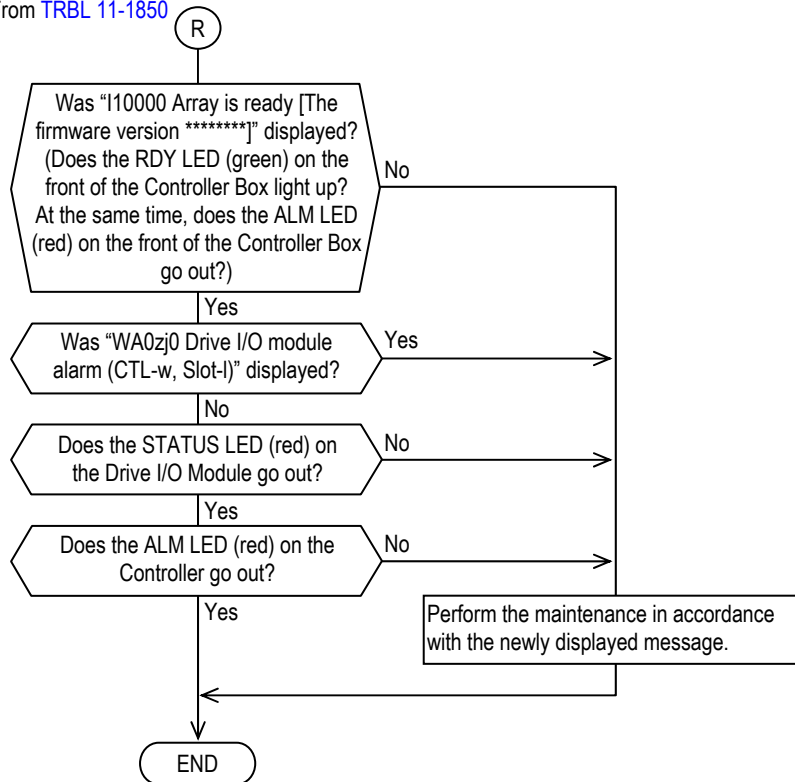
From TRBL 11-1681

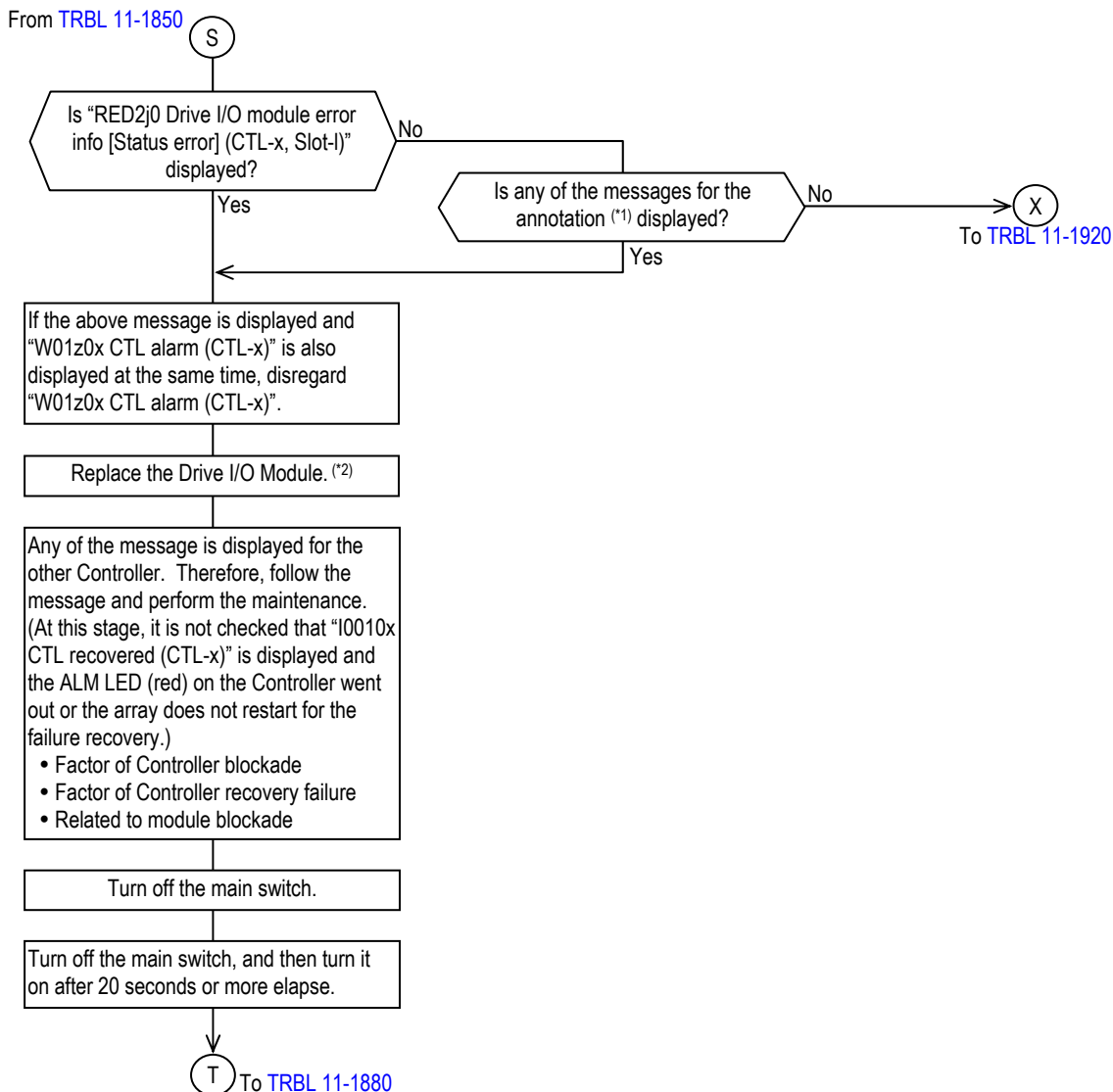


\*1 : For the replacement of the Drive I/O Module, refer to the Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320).



From TRBL 11-1850



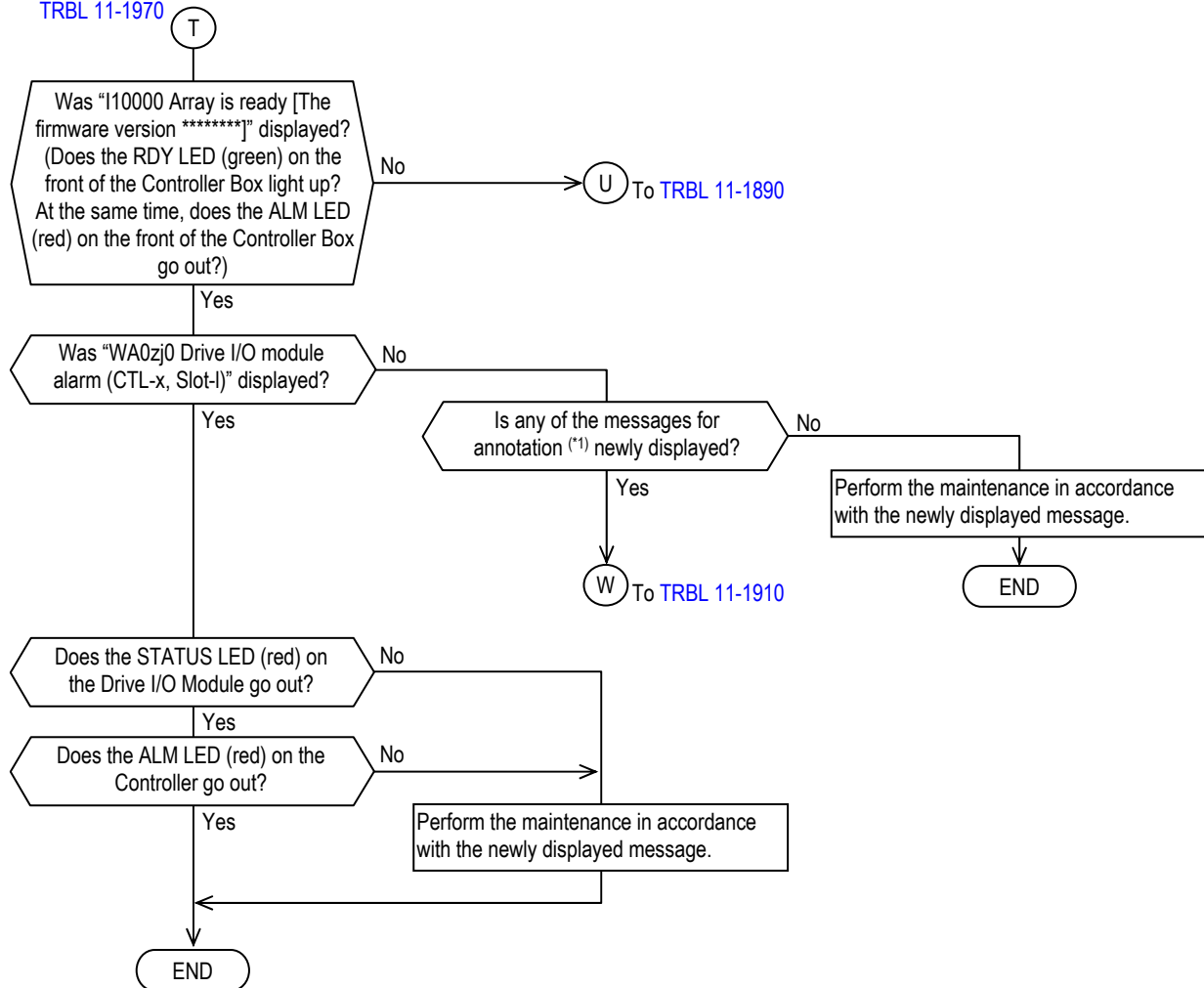


\*1 : List of the messages to be displayed.

- RG00yx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-y)
- RG10yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-y)
- RG20yx Backend error count of D-SPC LSI exceeded the threshold [CODE-zz] (CTL-x, Slot-y)
- RG30yx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-y)
- RG40yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-y)
- RG600x D-SPC firmware download failed (CTL-x, Slot-y)

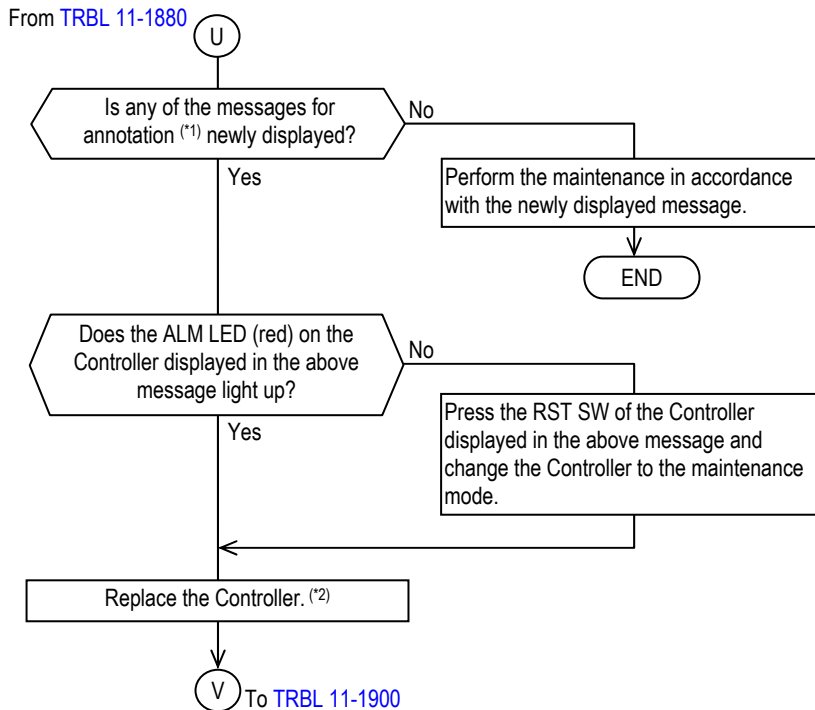
\*2 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).

From TRBL 11-1870,  
TRBL 11-1970



\*1 : List of the messages to be displayed.

- IAB5j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- IAD0lx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- IAD1lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- IAD2lx Backend error count of D-SPC LSI exceeded the threshold [CODE-z] (CTL-x, Slot-l)
- IAD5lx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- IAD6lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- IAD7lx D-SPC firmware download failed (CTL-x, Slot-l)
- IAD8lx The number of correctable D-SPC errors exceeded the threshold (CTL-x, Slot-l)
- IAH00x CUDG error [Drive I/O module] (CTL-x, Slot-l)
- RED2j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- RG00yx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-y)
- RG10yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-y)
- RG20yx Backend error count of D-SPC LSI exceeded the threshold [CODE-zz] (CTL-x, Slot-y)
- RG30yx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-y)
- RG40yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-y)
- RG600x D-SPC firmware download failed (CTL-x, Slot-y)

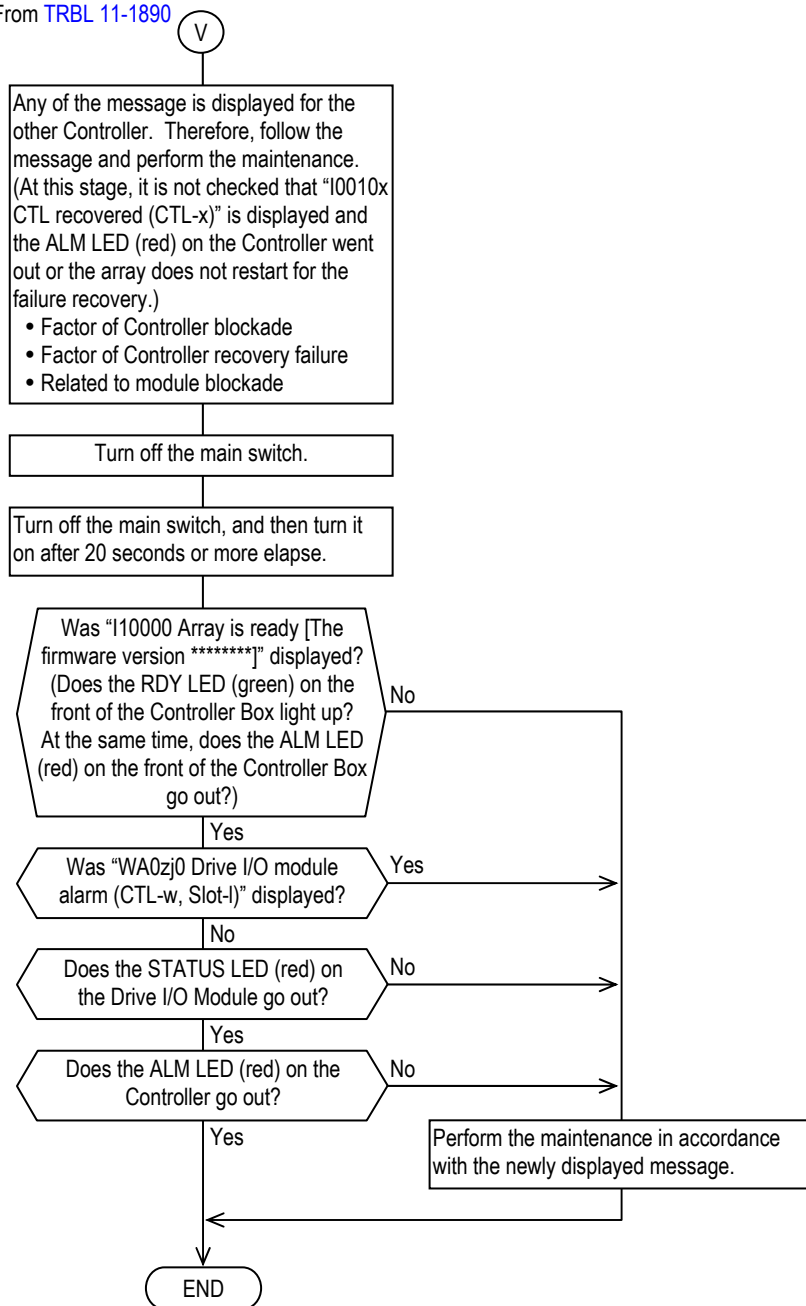


\*1 : List of the messages to be displayed.

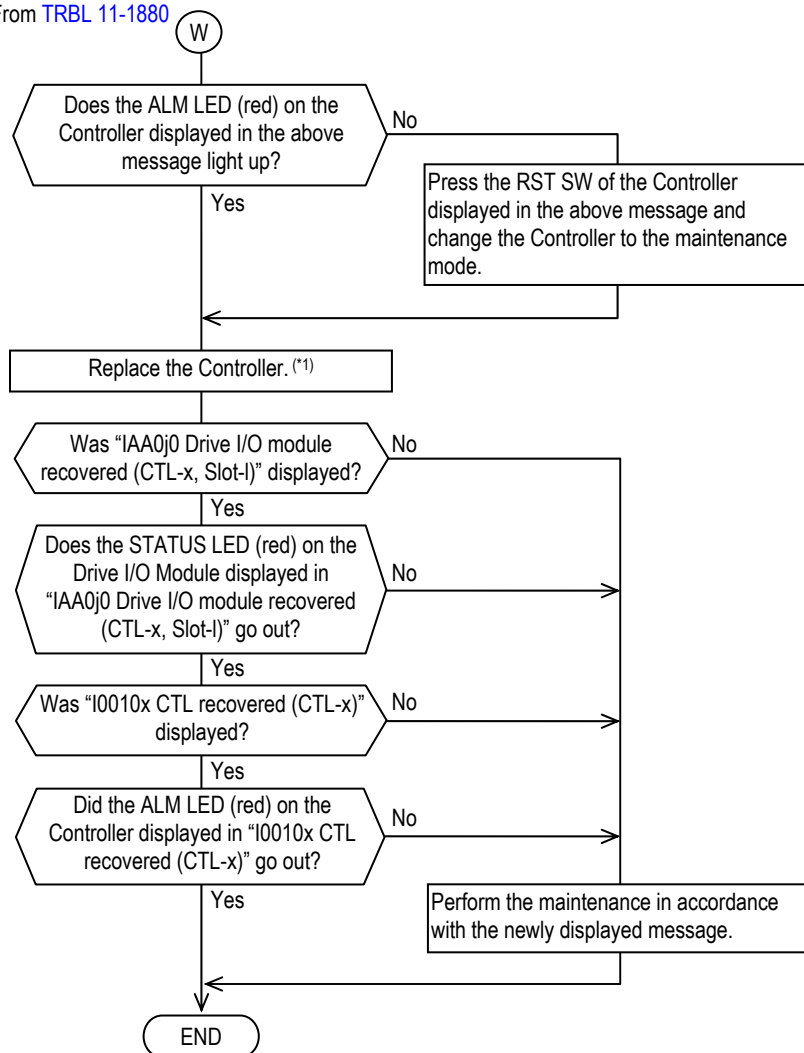
- IAB5j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- IAD0lx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- IAD1lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- IAD2lx Backend error count of D-SPC LSI exceeded the threshold [CODE-z] (CTL-x, Slot-l)
- IAD5lx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- IAD6lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- IAD7lx D-SPC firmware download failed (CTL-x, Slot-l)
- IAD8lx The number of correctable D-SPC errors exceeded the threshold (CTL-x, Slot-l)
- IAH00x CUDG error [Drive I/O module] (CTL-x, Slot-l)
- RED2j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- RG00yx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-y)
- RG10yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-y)
- RG20yx Backend error count of D-SPC LSI exceeded the threshold [CODE-zz] (CTL-x, Slot-y)
- RG30yx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-y)
- RG40yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-y)
- RG600x D-SPC firmware download failed (CTL-x, Slot-y)

\*2 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

From TRBL 11-1890

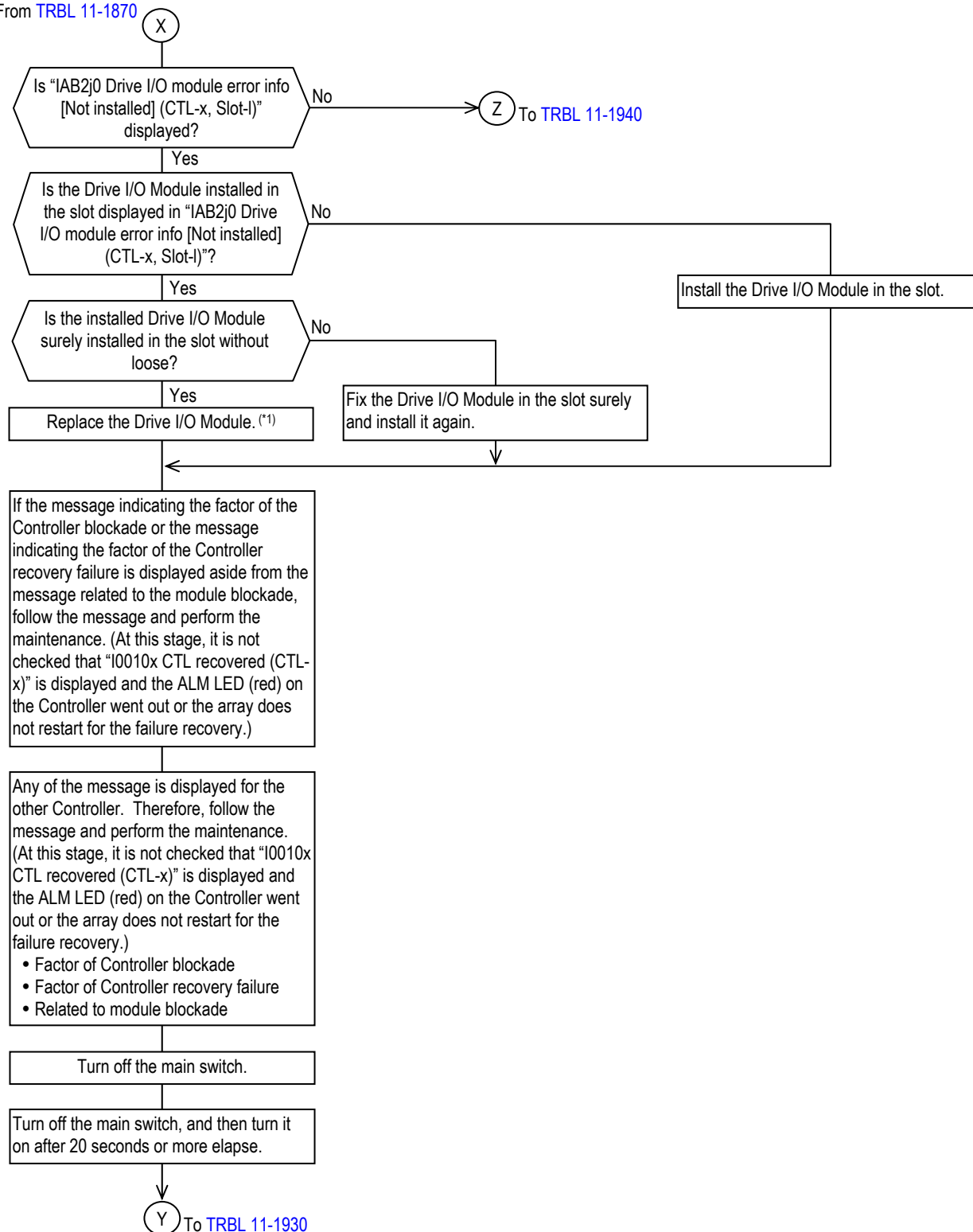


From TRBL 11-1880



\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

From [TRBL 11-1870](#)



Is "IAB2j0 Drive I/O module error info  
[Not installed] (CTL-x, Slot-1)"  
displayed?

No

) To TRBL 11-1940

Yes

Is the Drive I/O Module installed in the slot displayed in "IAB2j0 Drive I/O module error info [Not installed] (CTL-x, Slot-I)"?

No

Yes

Install the Drive I/O Module in the slot.

Is the installed Drive I/O Module surely installed in the slot without loose?

No

Yes

Replace the Drive I/O Module. (\*1)

Fix the Drive I/O Module in the slot surely and install it again.

If the message indicating the factor of the Controller blockade or the message indicating the factor of the Controller recovery failure is displayed aside from the message related to the module blockade, follow the message and perform the maintenance. (At this stage, it is not checked that "I0010x CTL recovered (CTL-x)" is displayed and the ALM LED (red) on the Controller went out or the array does not restart for the failure recovery.)

Any of the message is displayed for the other Controller. Therefore, follow the message and perform the maintenance. (At this stage, it is not checked that "I0010x CTL recovered (CTL-x)" is displayed and the ALM LED (red) on the Controller went out or the array does not restart for the failure recovery.)

- Factor of Controller blockade
- Factor of Controller recovery failure
- Related to module blockade

Turn off the main switch.

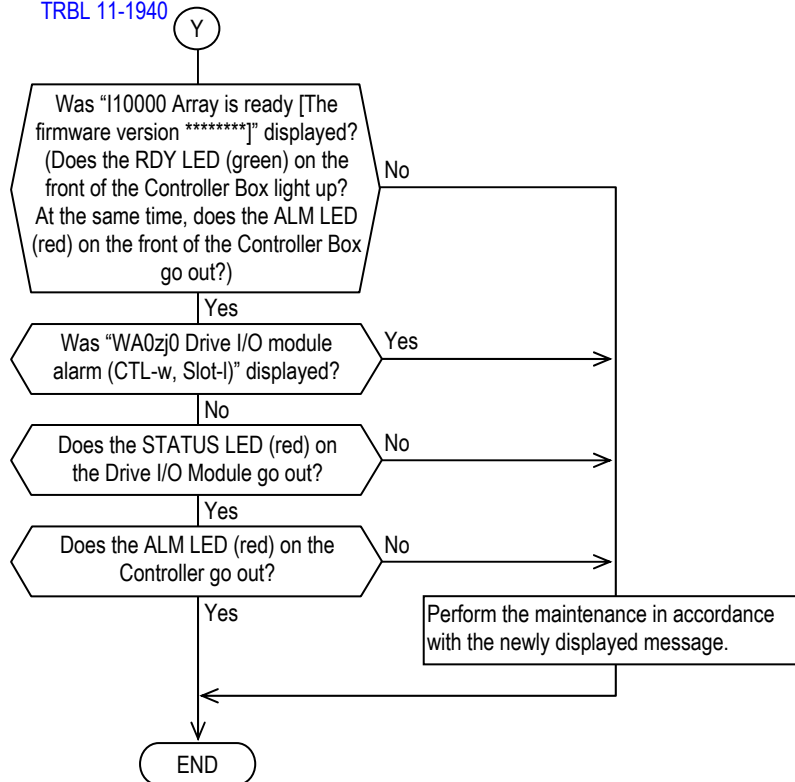
Turn off the main switch, and then turn it on after 20 seconds or more elapse.

Y

)To TRBL 11-1930

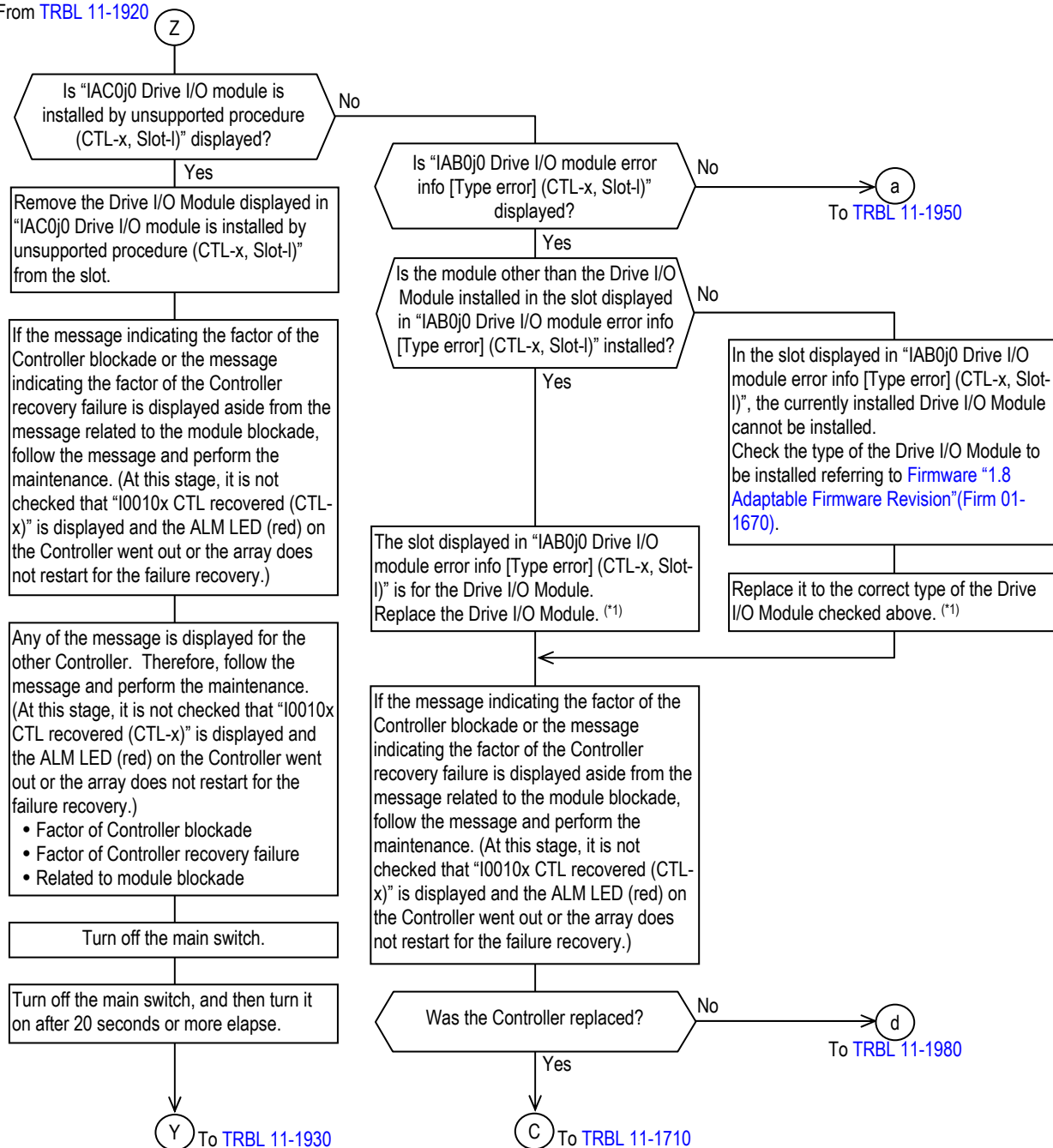
\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement “2.2.9 Replacing a Drive I/O Module” \(REP02-1320\)](#).

From TRBL 11-1920,  
TRBL 11-1940



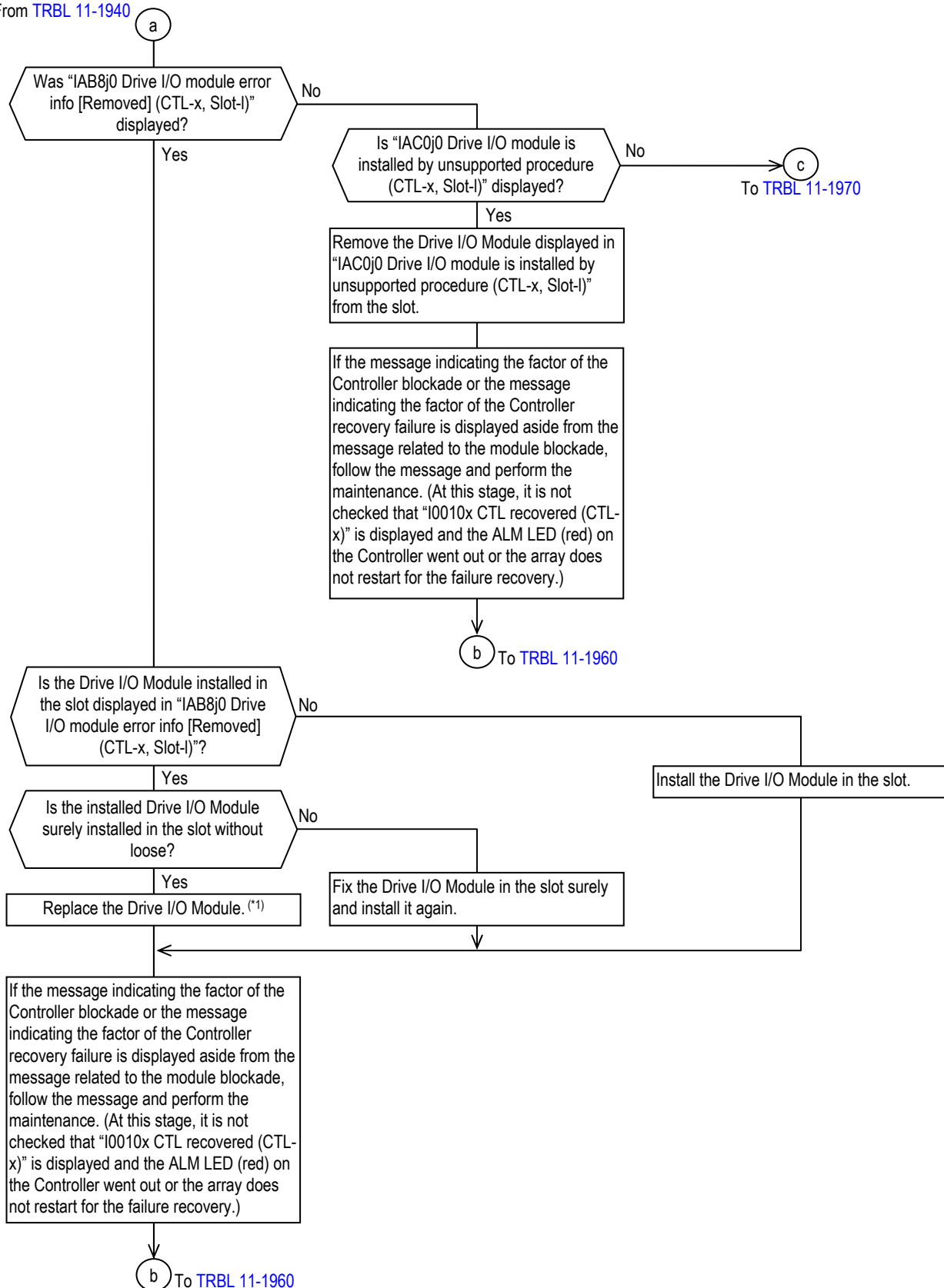


From TRBL 11-1920



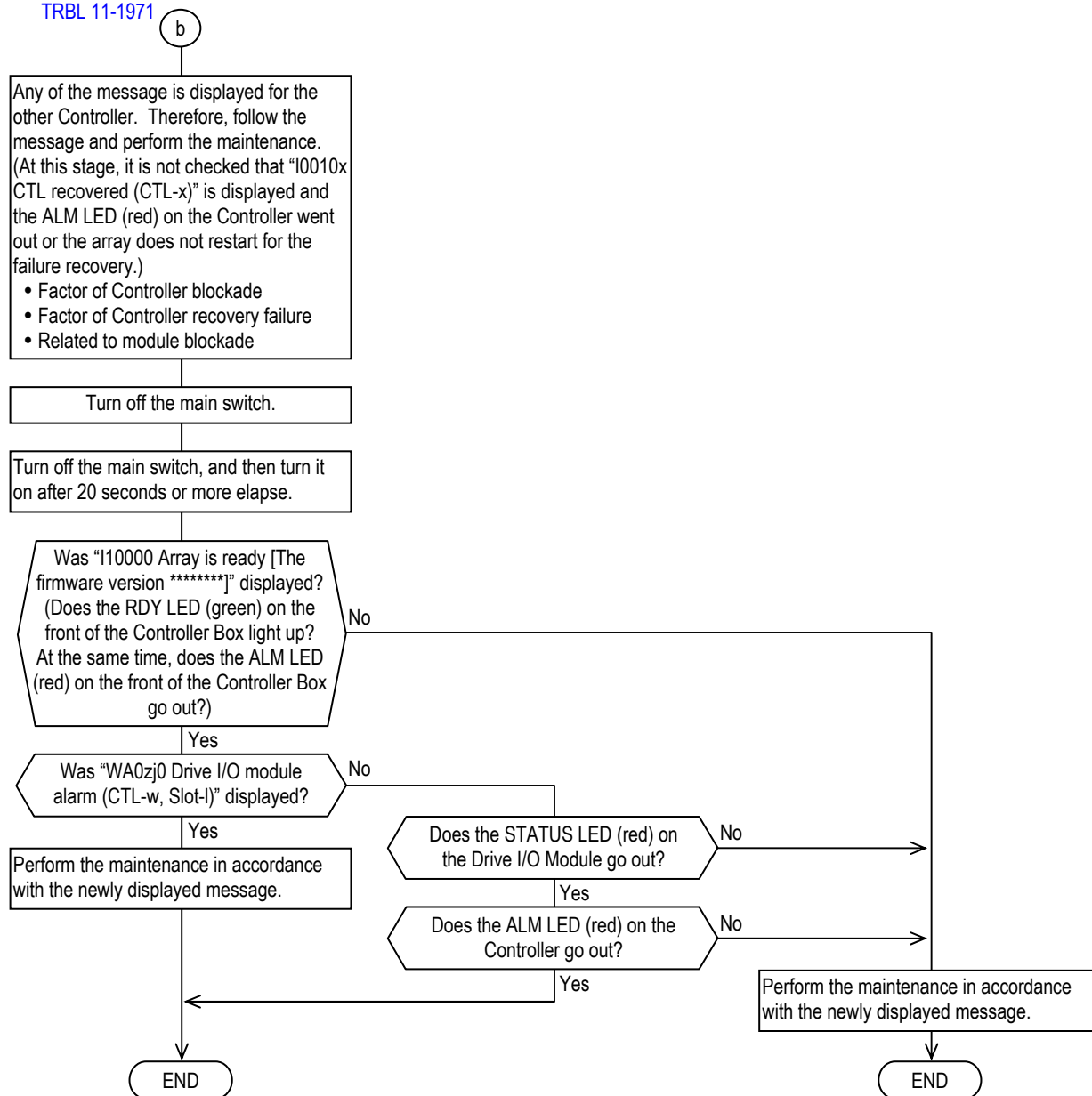
\*1 : For the replacement of the Drive I/O Module, refer to the Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320).

From TRBL 11-1940

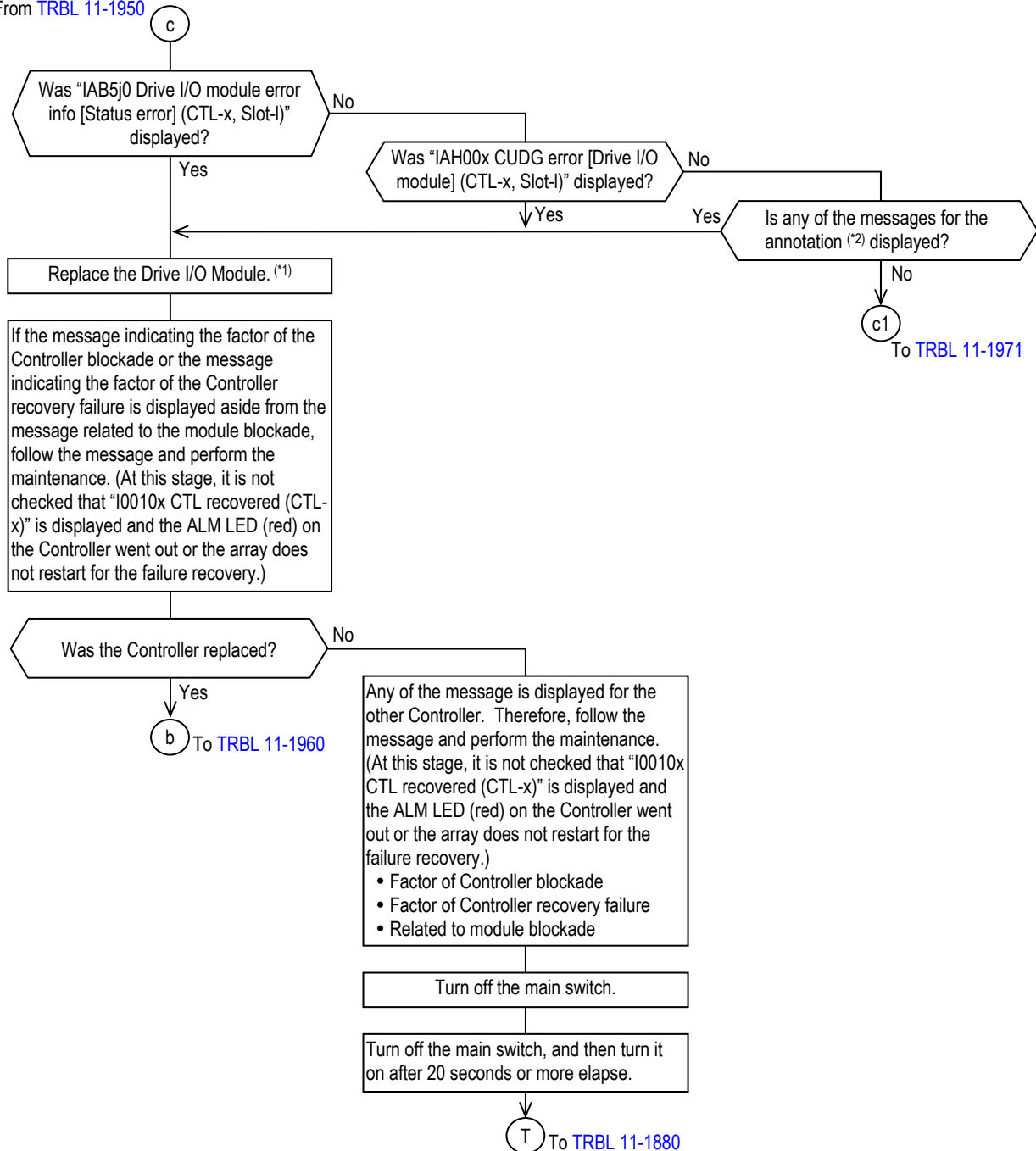


\*1 : For the replacement of the Drive I/O Module, refer to the Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320).

From [TRBL 11-1950](#),  
[TRBL 11-1970](#),  
[TRBL 11-1971](#)



From TRBL 11-1950

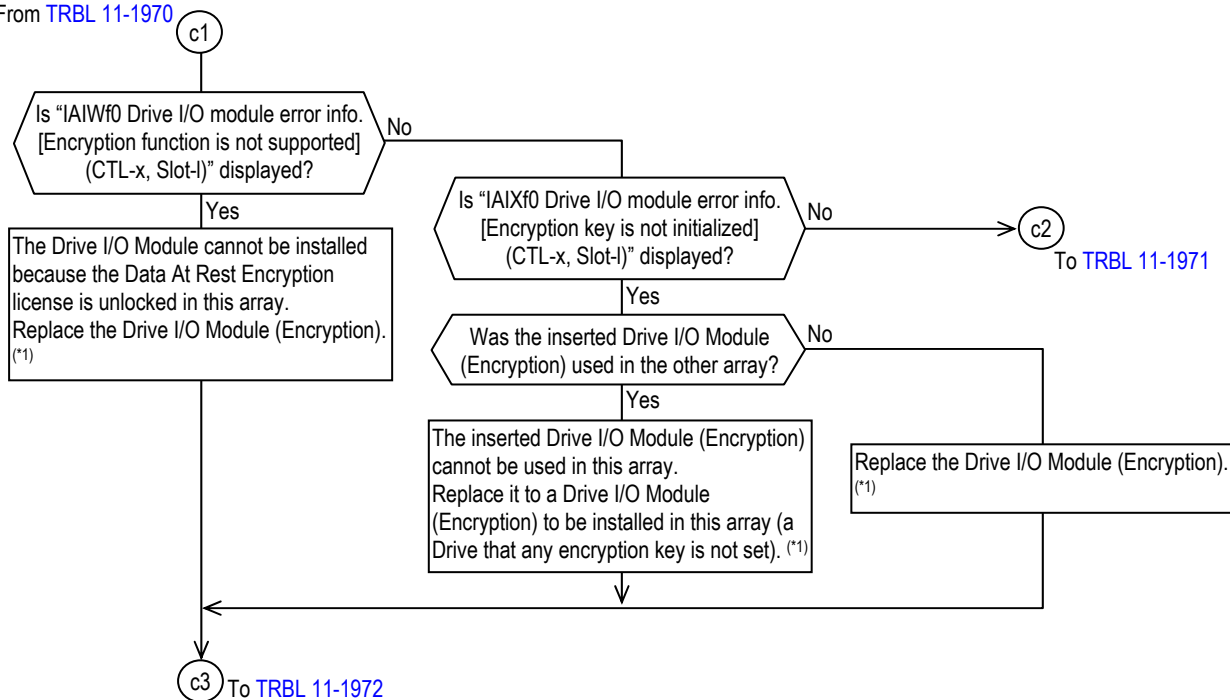


\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module"](#) (REP 02-1320).

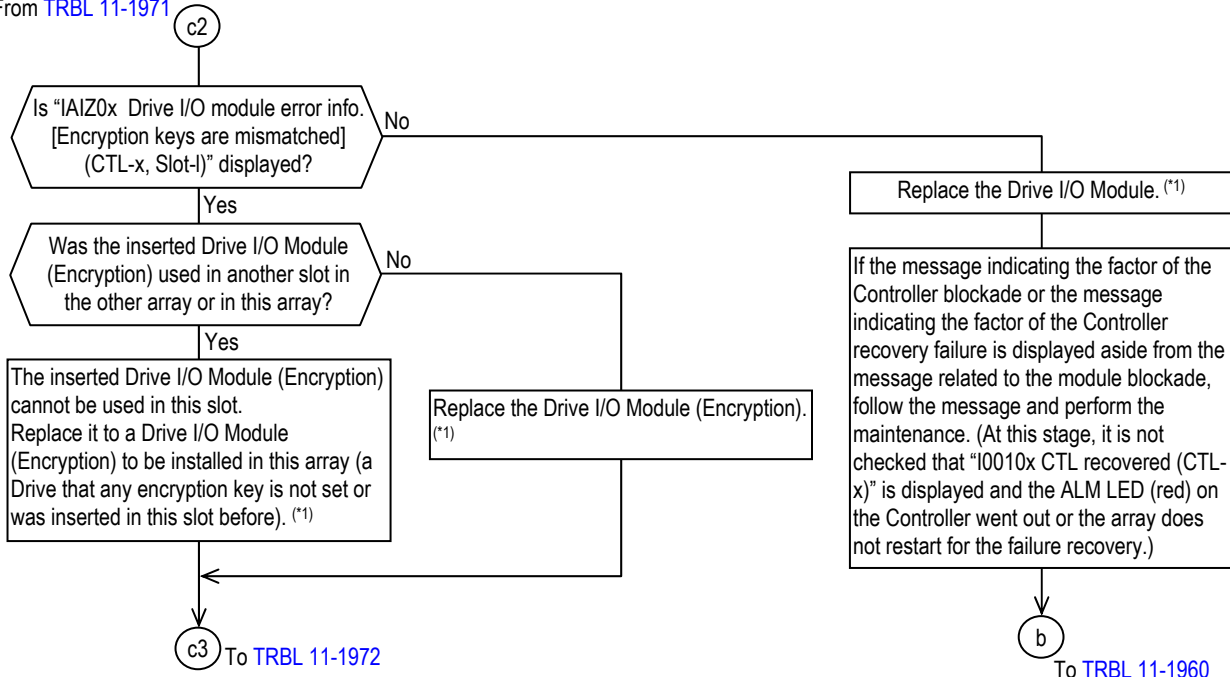
\*2 : List of the messages to be displayed.

- IAD0lx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- IAD1lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- IAD2lx Backend error count of D-SPC LSI exceeded the threshold [CODE-z] (CTL-x, Slot-l)
- IAD4lx D-SPC firmware error was detected (CTL-x, Slot-l)
- IAD5lx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- IAD6lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- IAD7lx D-SPC firmware download failed (CTL-x, Slot-l)
- IAD8lx The number of correctable D-SPC errors exceeded the threshold (CTL-x, Slot-l)

From TRBL 11-1970

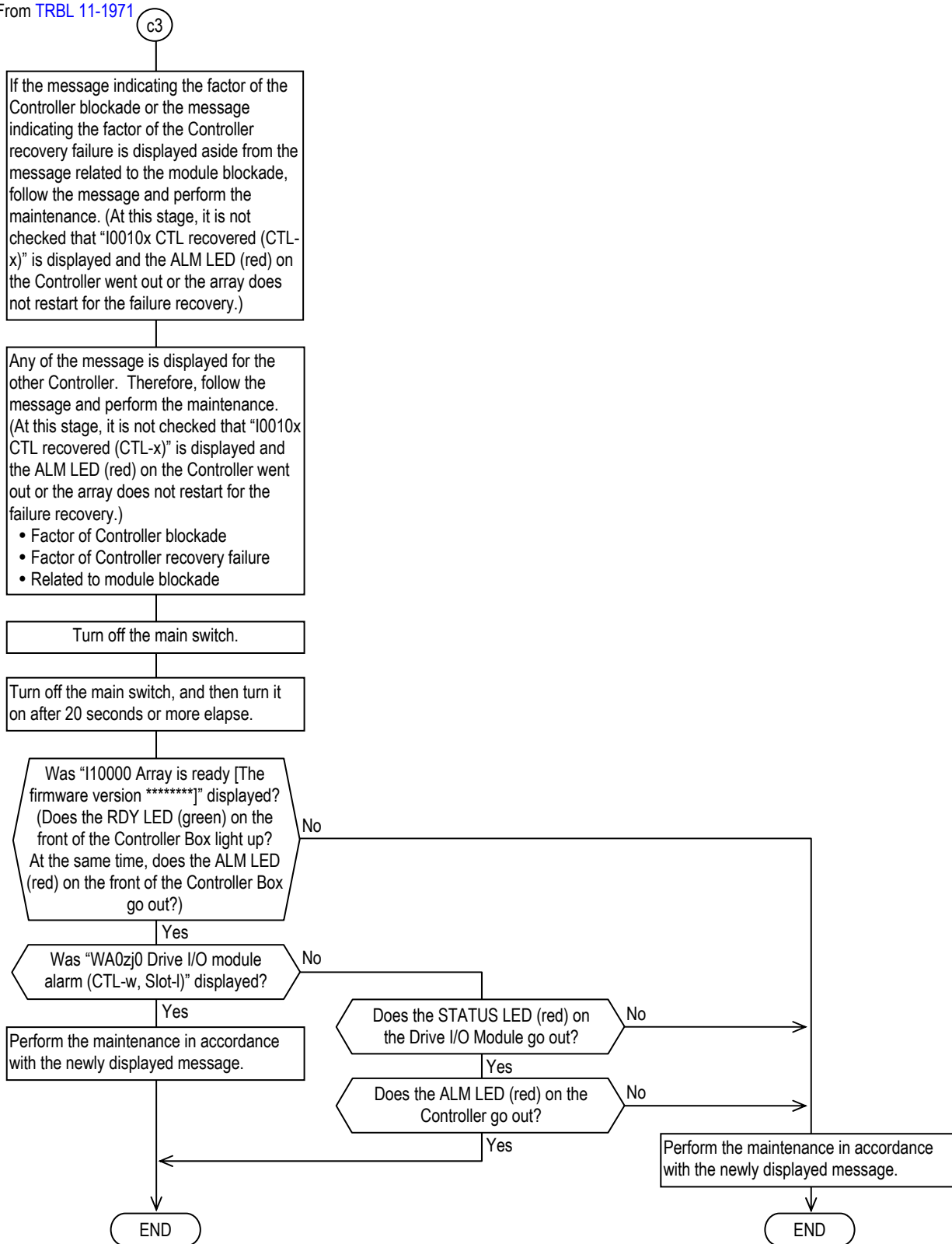


From TRBL 11-1971

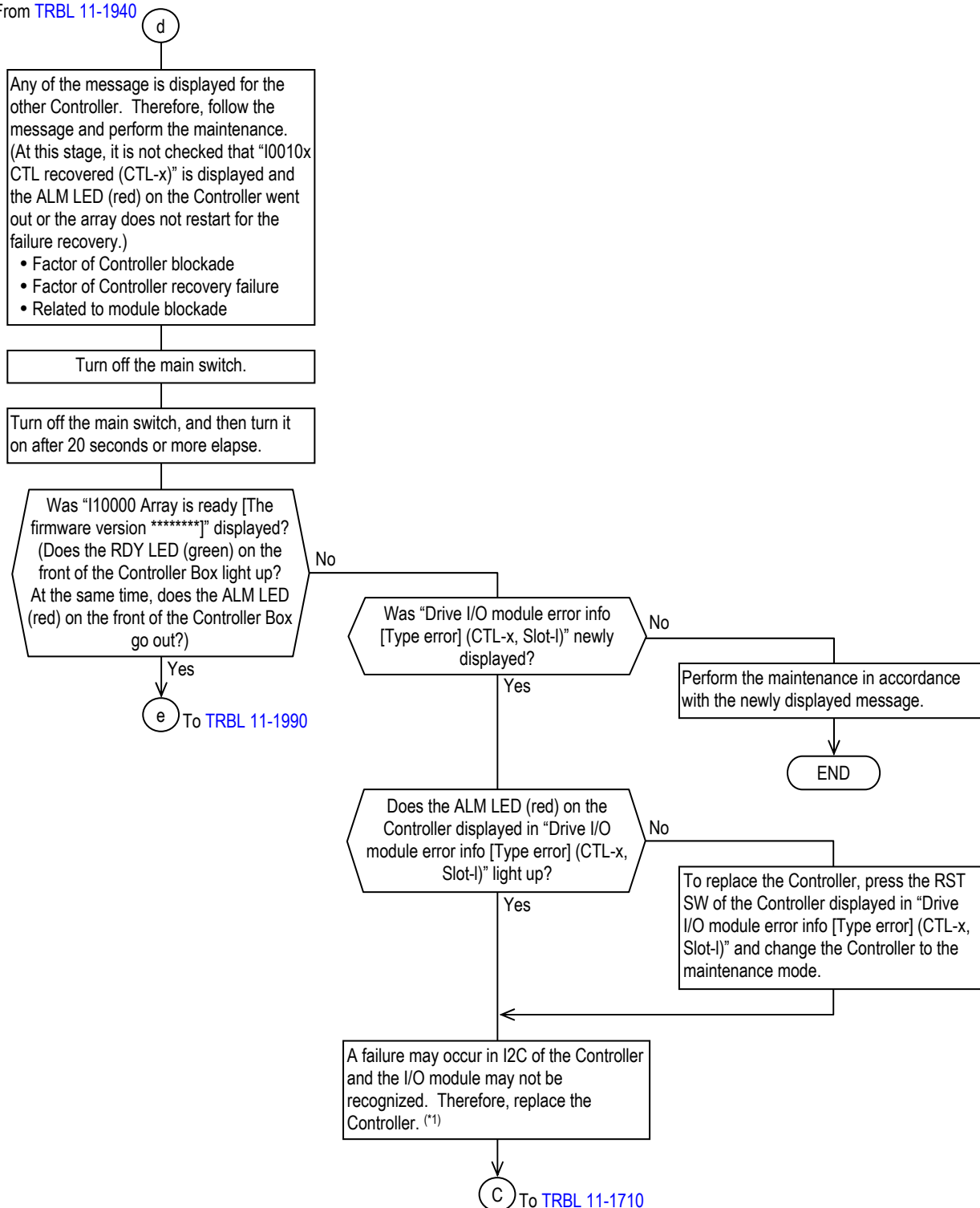


\*1 : For the replacement of the Drive I/O Module, refer to the Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320).

From TRBL 11-1971

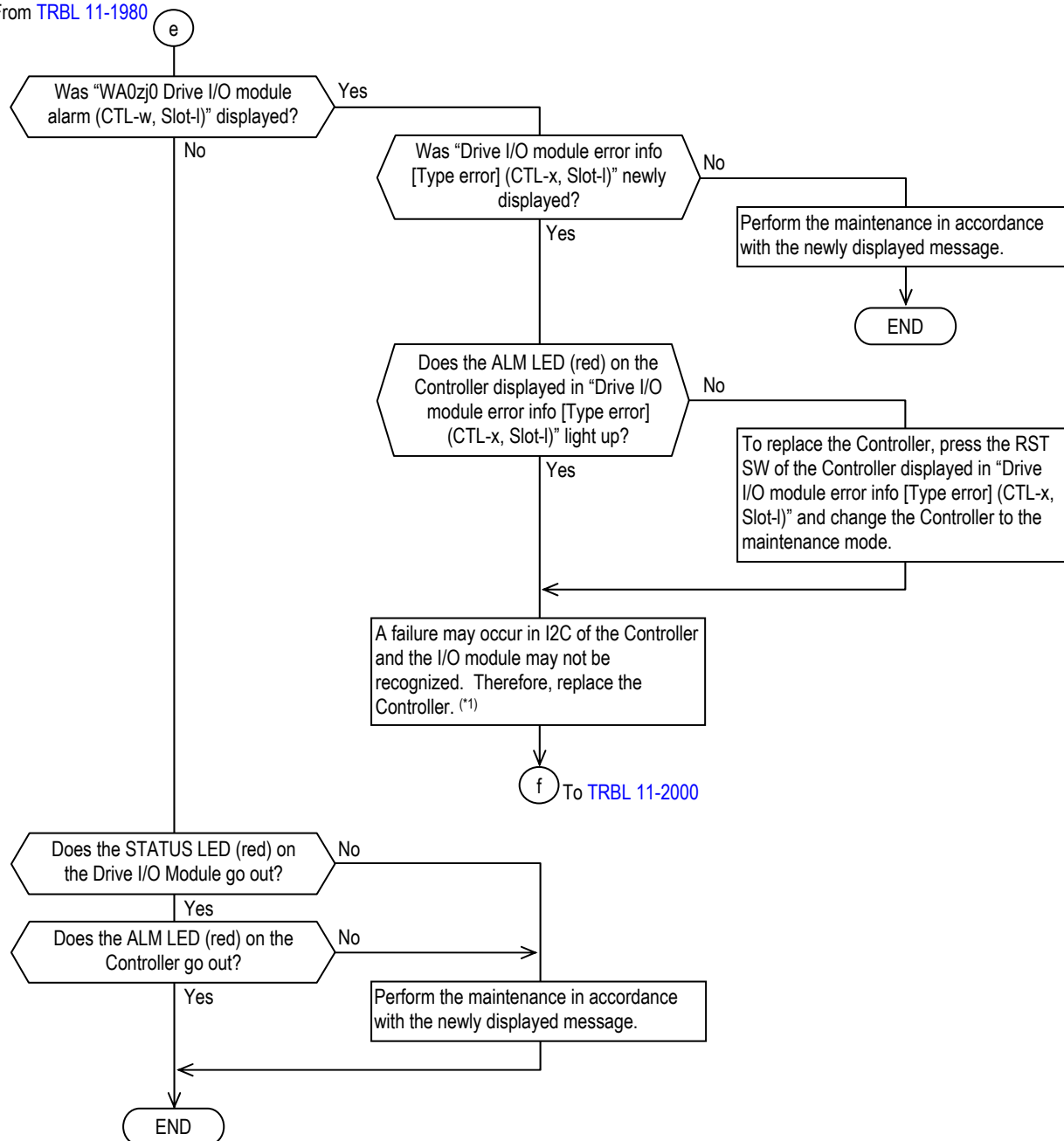


From TRBL 11-1940



\*1 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

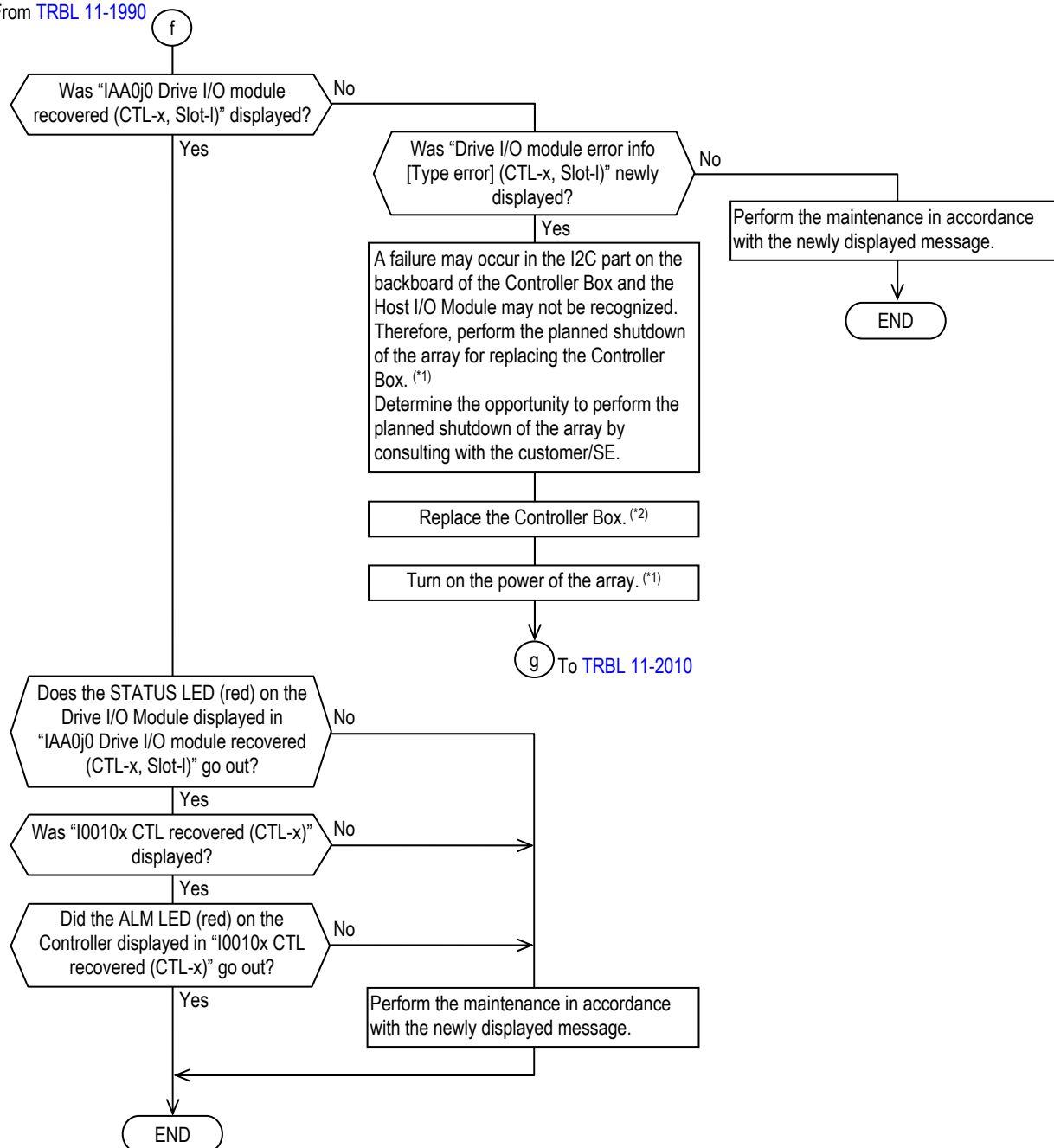
From TRBL 11-1980



\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).



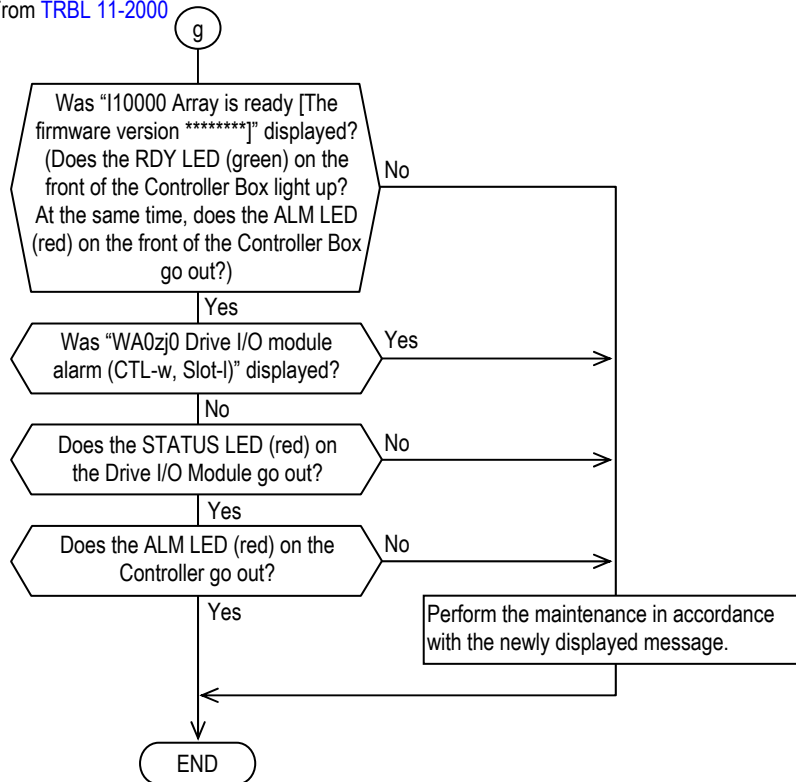
From TRBL 11-1990



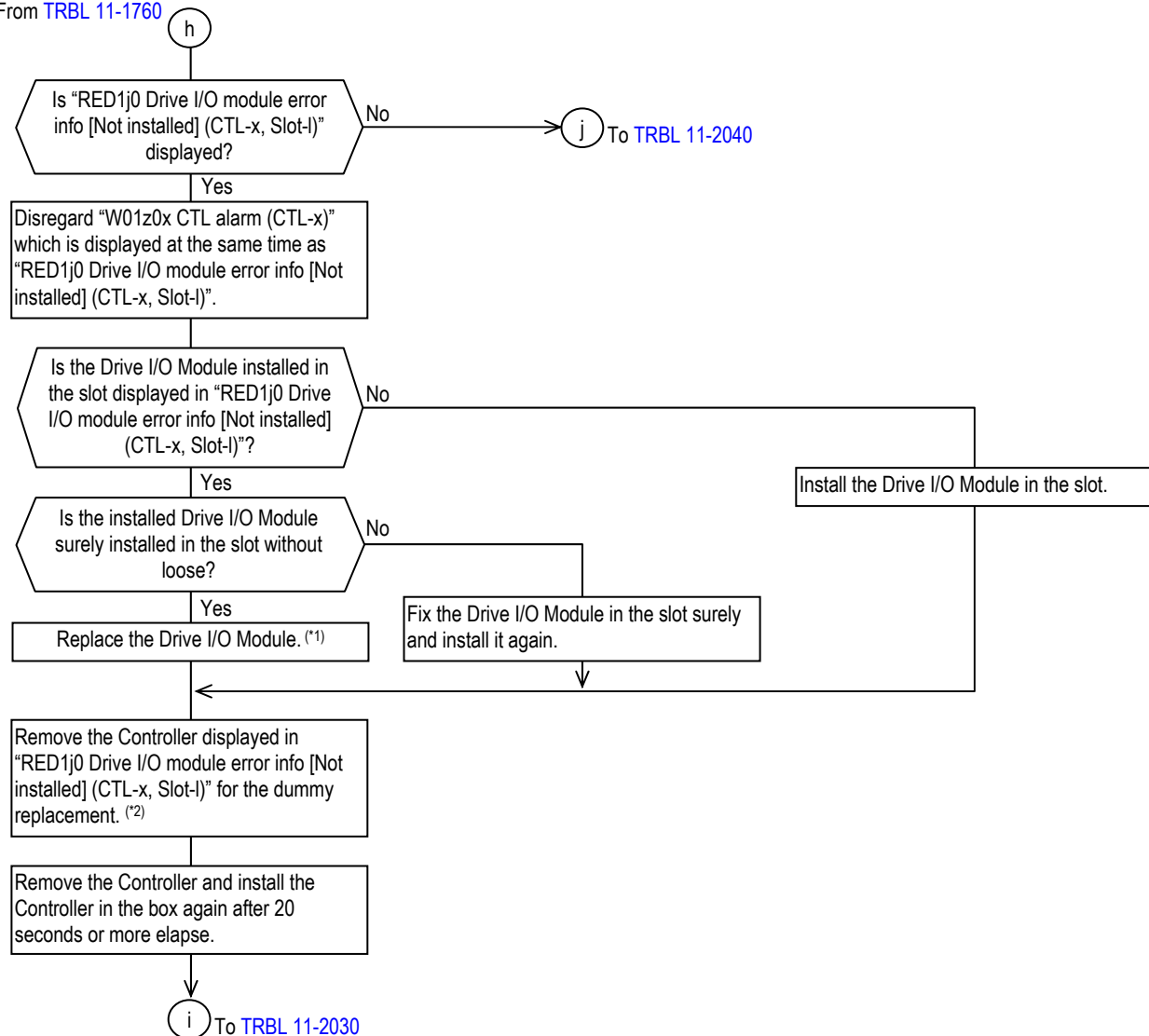
\*1 : For how to turn on/off the power, refer to [Installation "1.5 Power On/Off Procedure" \(INST 01-0220\)](#).

\*2 : For the replacement of the Controller Box, refer to the [Replacement "2.2.13 Replacing a Controller Box" \(REP 02-1840\)](#).

From TRBL 11-2000



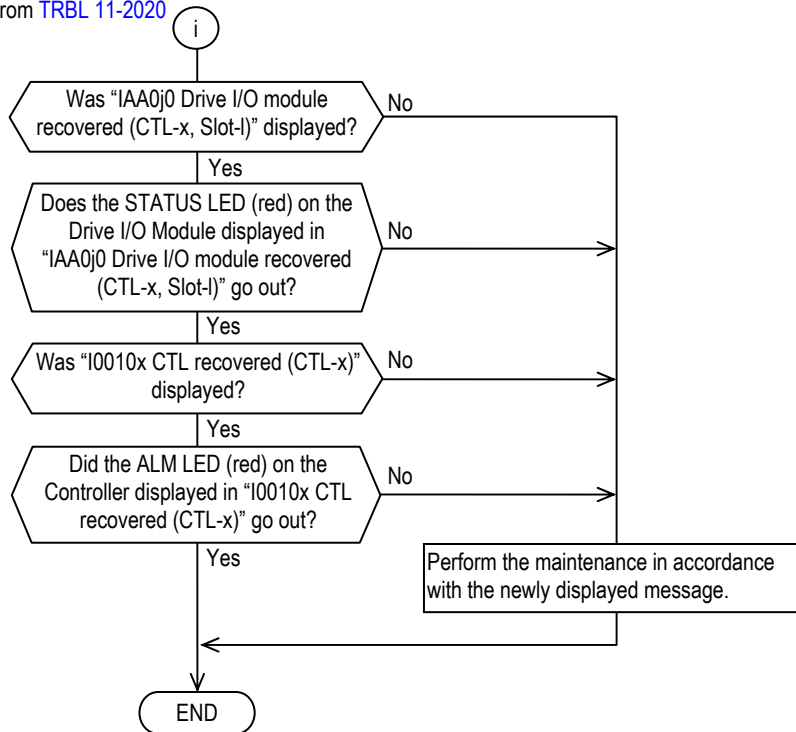
From TRBL 11-1760

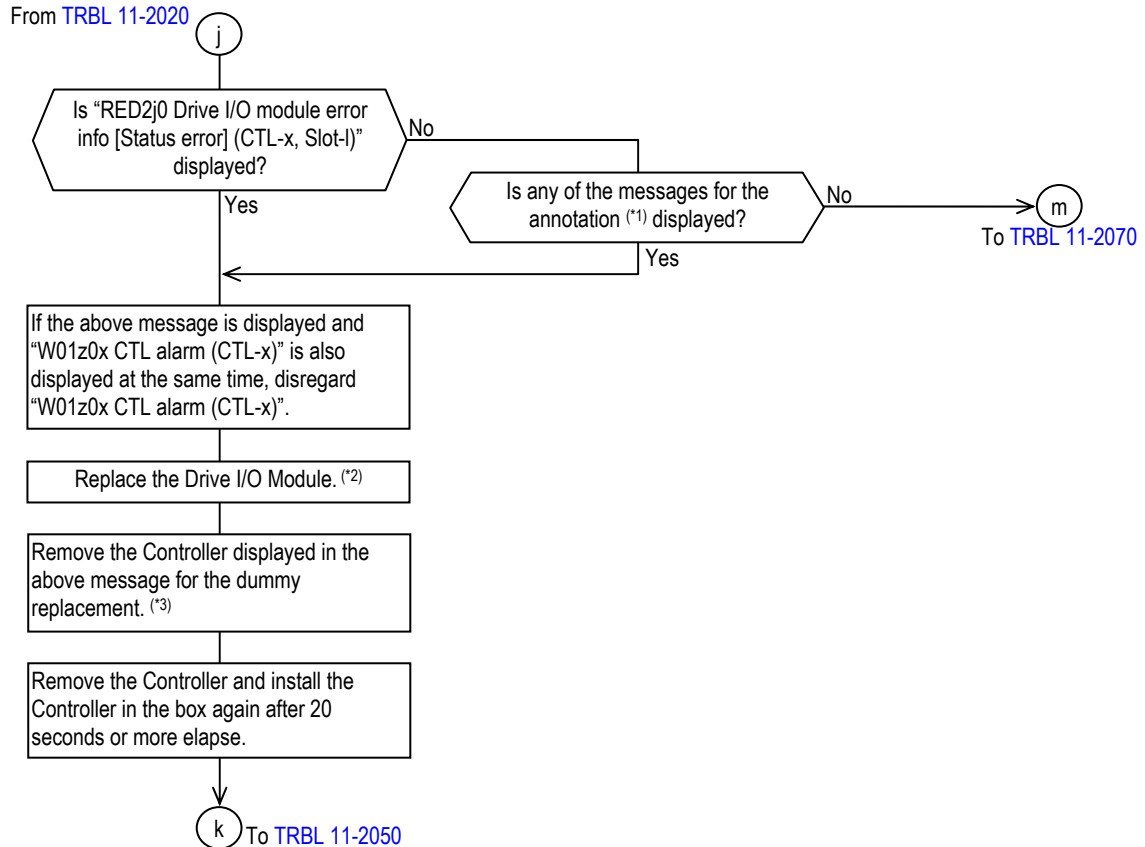


\*1 : For the replacement of the Drive I/O Module, refer to the Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320).

\*2 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

From TRBL 11-2020



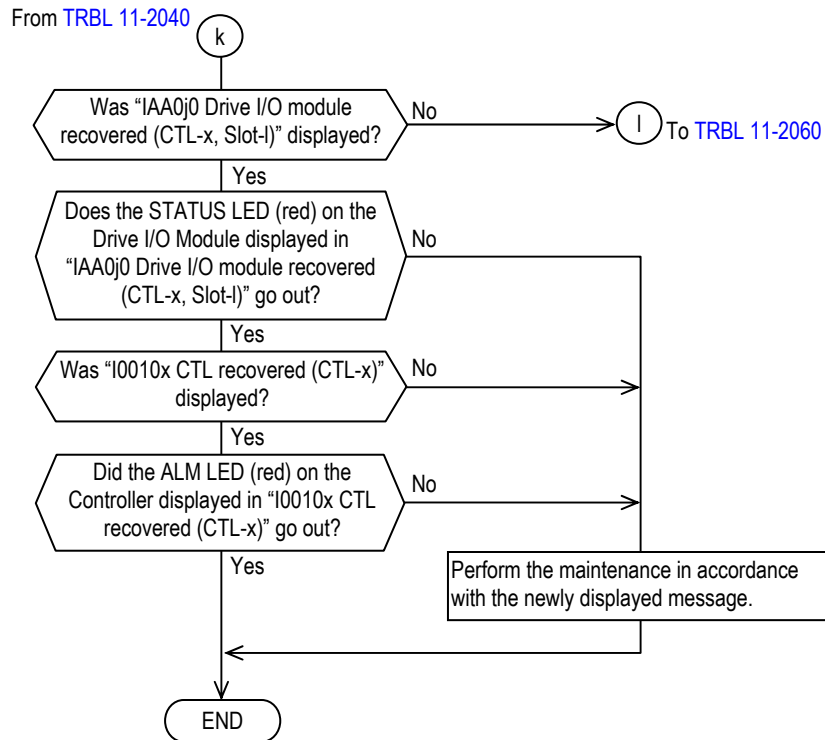


\*1 : List of the messages to be displayed.

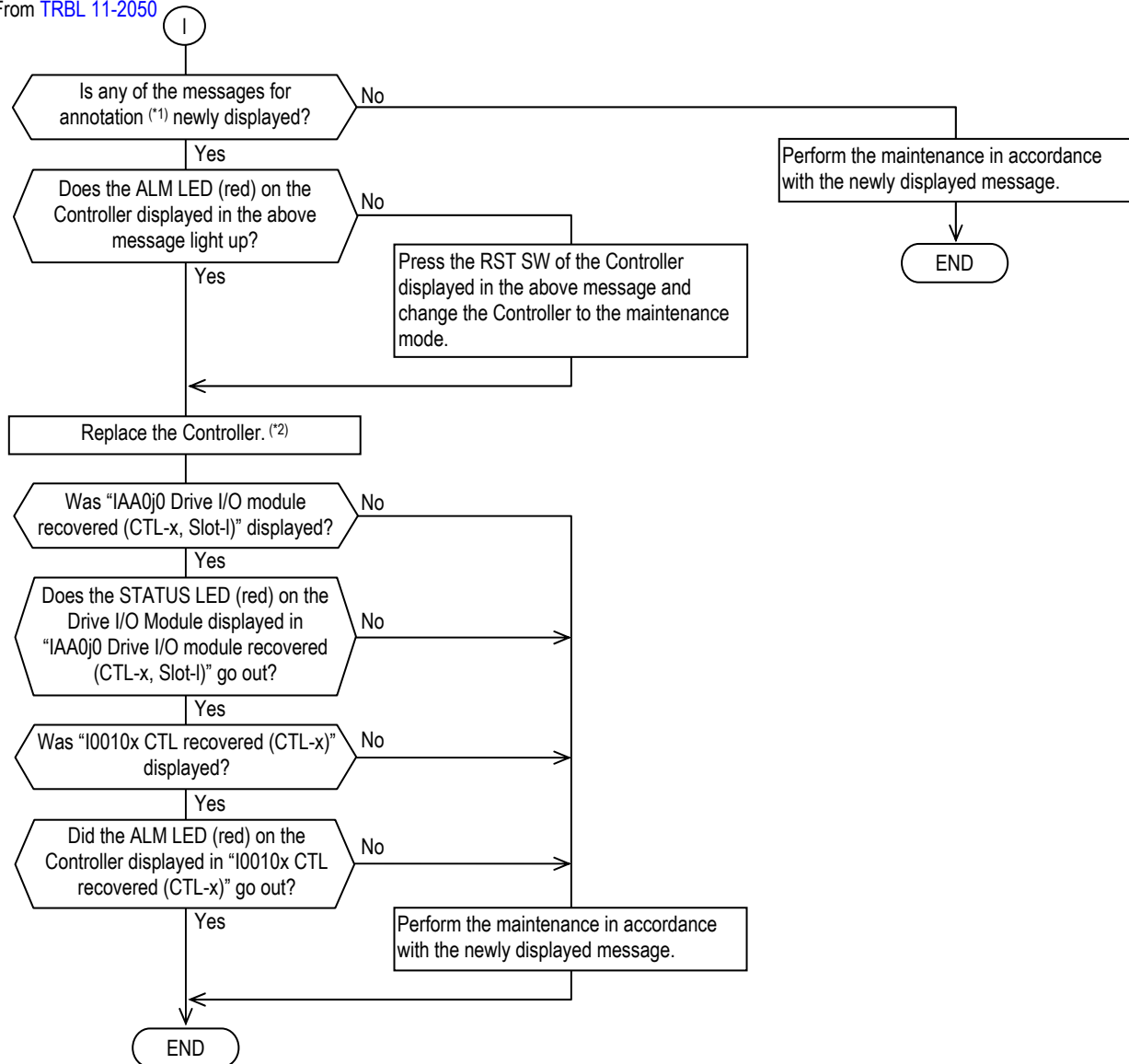
- RG00yx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-y)
- RG10yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-y)
- RG20yx Backend error count of D-SPC LSI exceeded the threshold [CODE-zz] (CTL-x, Slot-y)
- RG30yx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-y)
- RG40yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-y)
- RG600x D-SPC firmware download failed (CTL-x, Slot-y)

\*2 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module"](#) (REP 02-1320).

\*3 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller"](#) (REP 02-0700).



From TRBL 11-2050

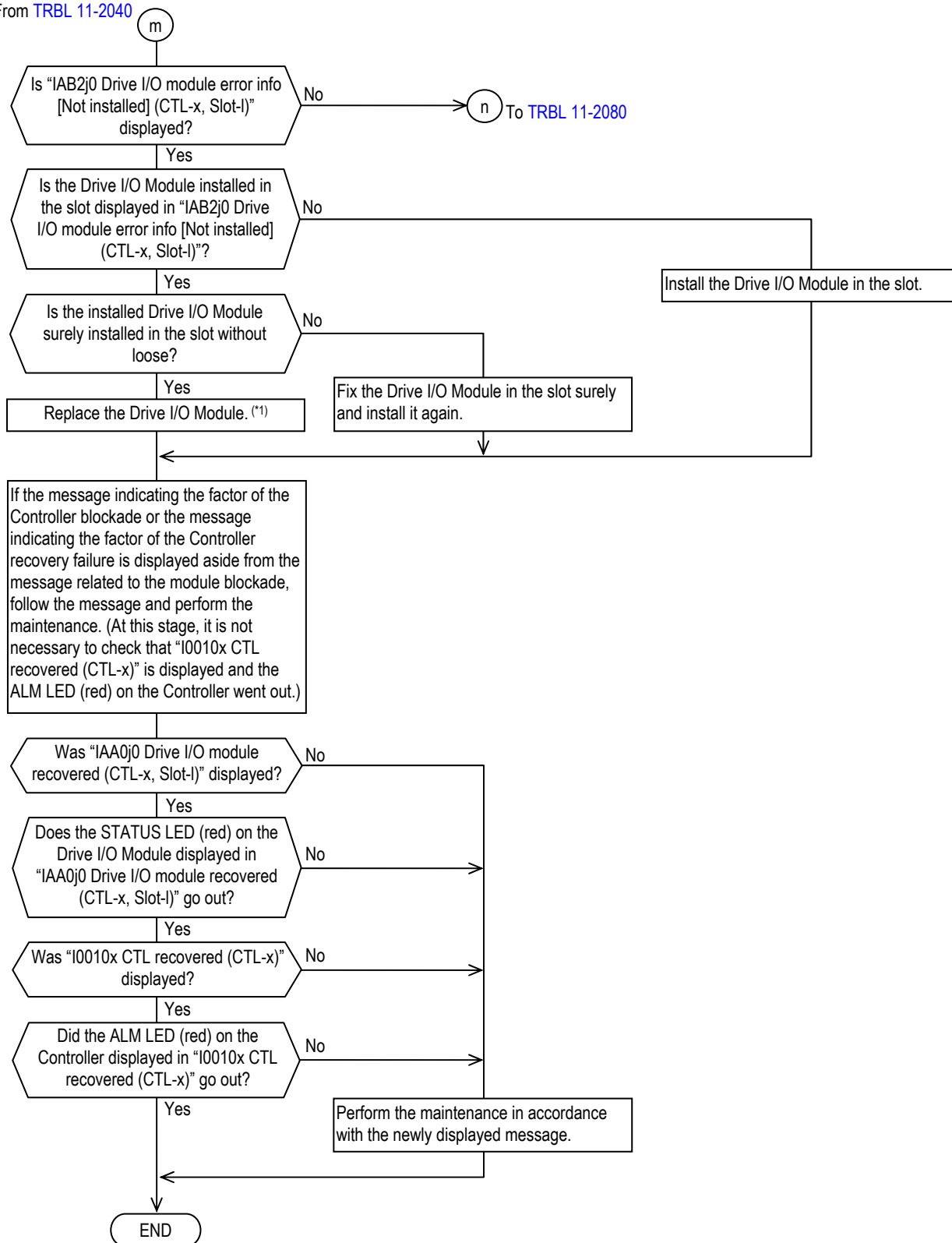


\*1 : List of the messages to be displayed.

- IAB5j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- IAD0lx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- IAD1lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- IAD2lx Backend error count of D-SPC LSI exceeded the threshold [CODE-z] (CTL-x, Slot-l)
- IAD5lx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- IAD6lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- IAD7lx D-SPC firmware download failed (CTL-x, Slot-l)
- IAD8lx The number of correctable D-SPC errors exceeded the threshold (CTL-x, Slot-l)
- IAH00x CUDG error [Drive I/O module] (CTL-x, Slot-l)
- RED2j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- RG00yx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- RG10yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- RG20yx Backend error count of D-SPC LSI exceeded the threshold [CODE-zz] (CTL-x, Slot-l)
- RG30yx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- RG40yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- RG600x D-SPC firmware download failed (CTL-x, Slot-y)

\*2 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

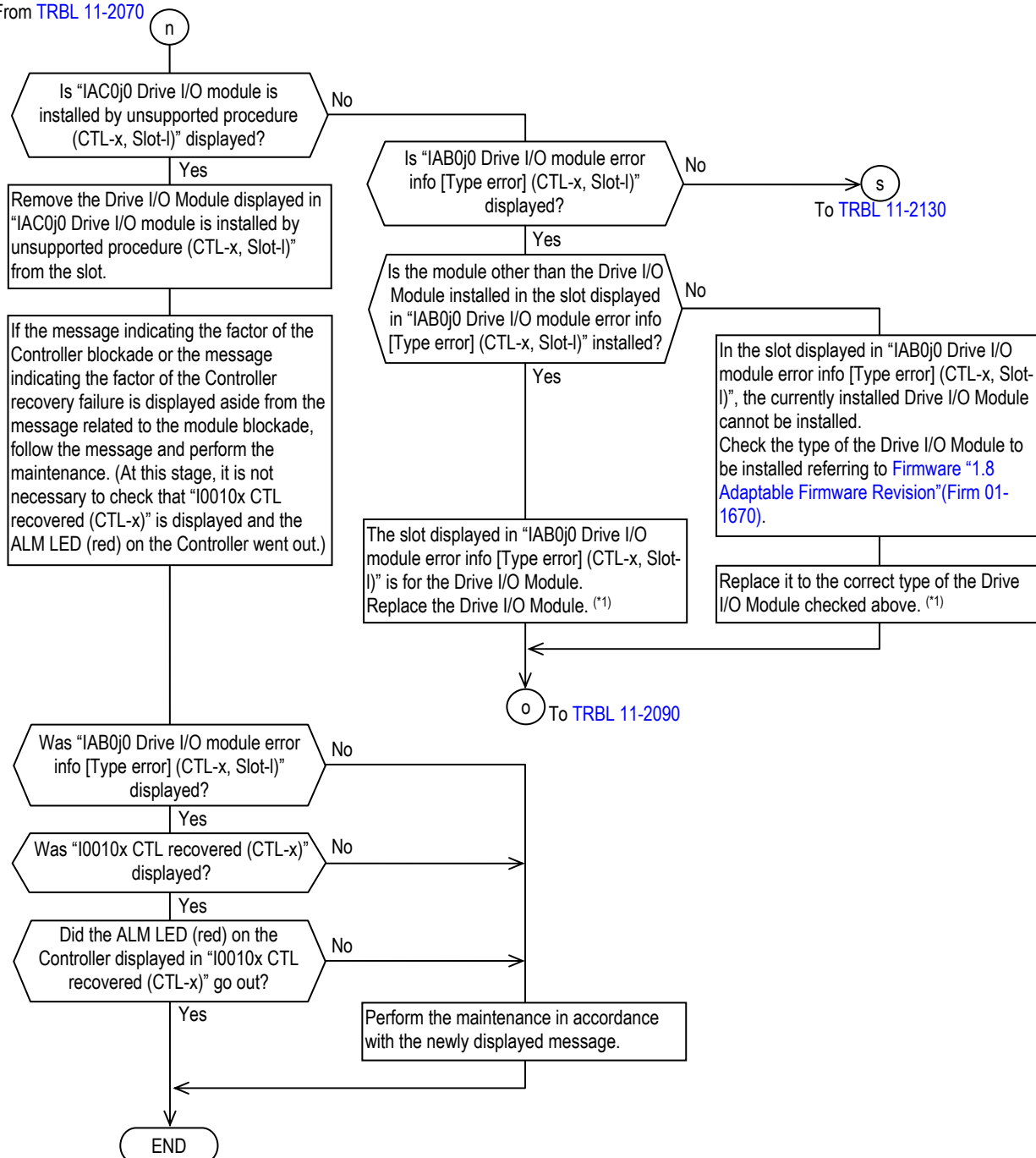
From TRBL 11-2040



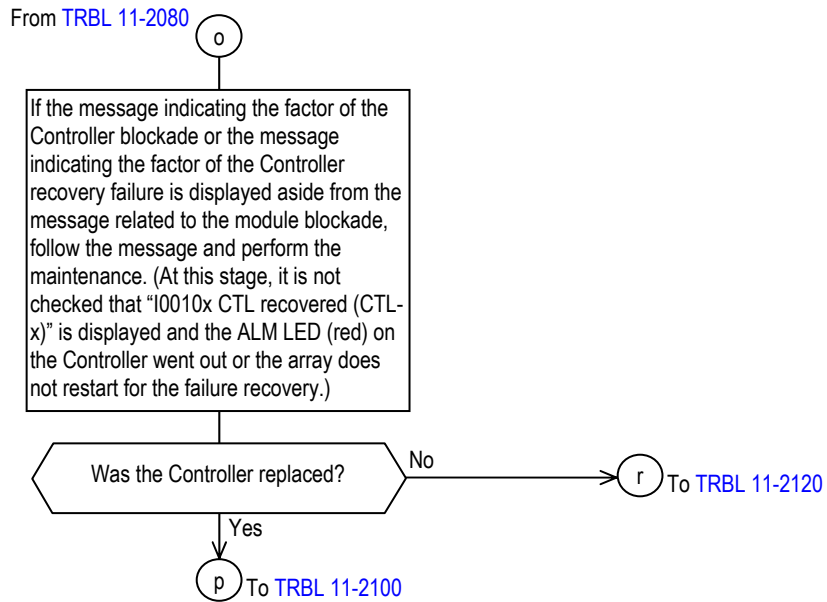
\*1 : For the replacement of the Drive I/O Module, refer to the Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320).



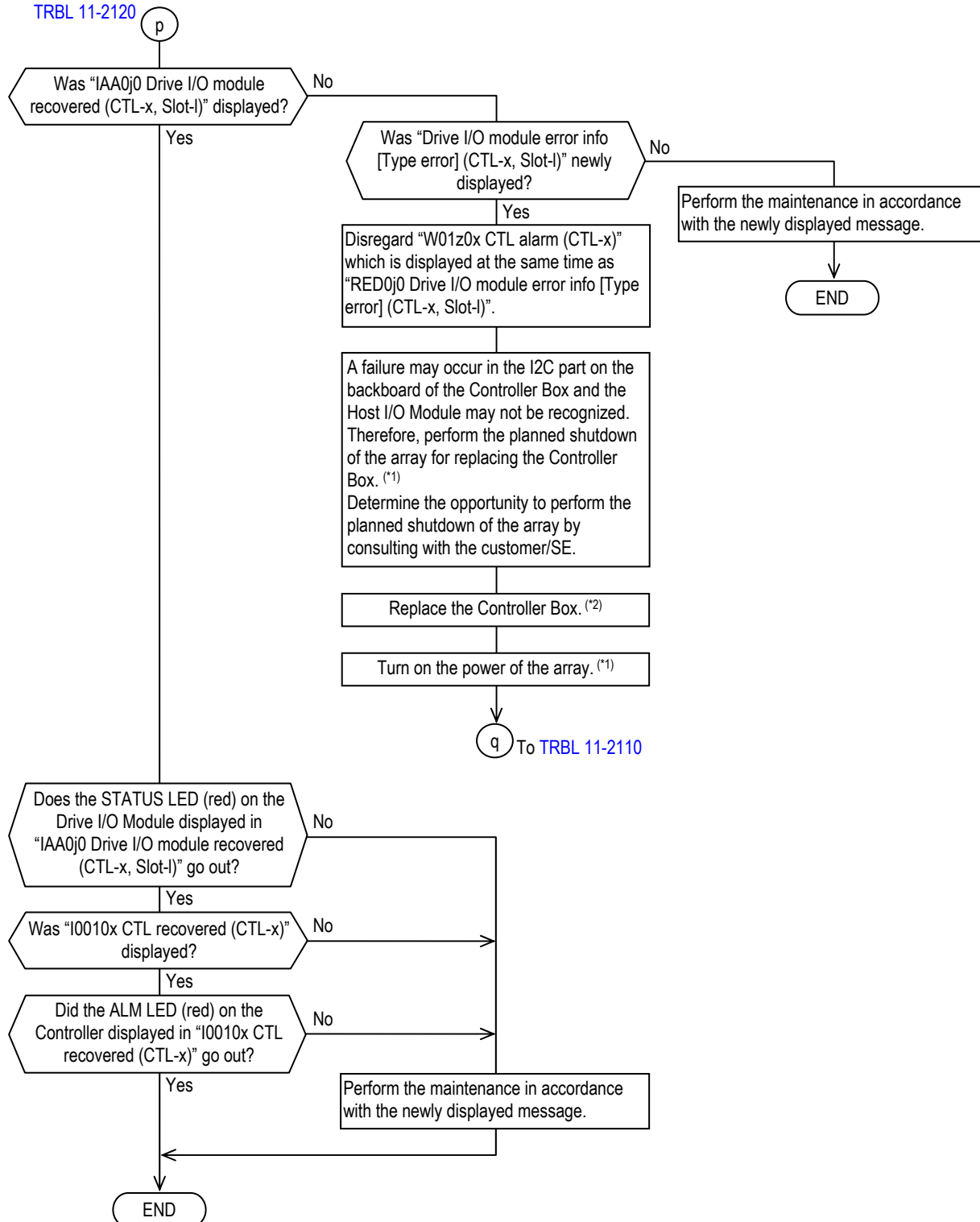
From TRBL 11-2070



\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).



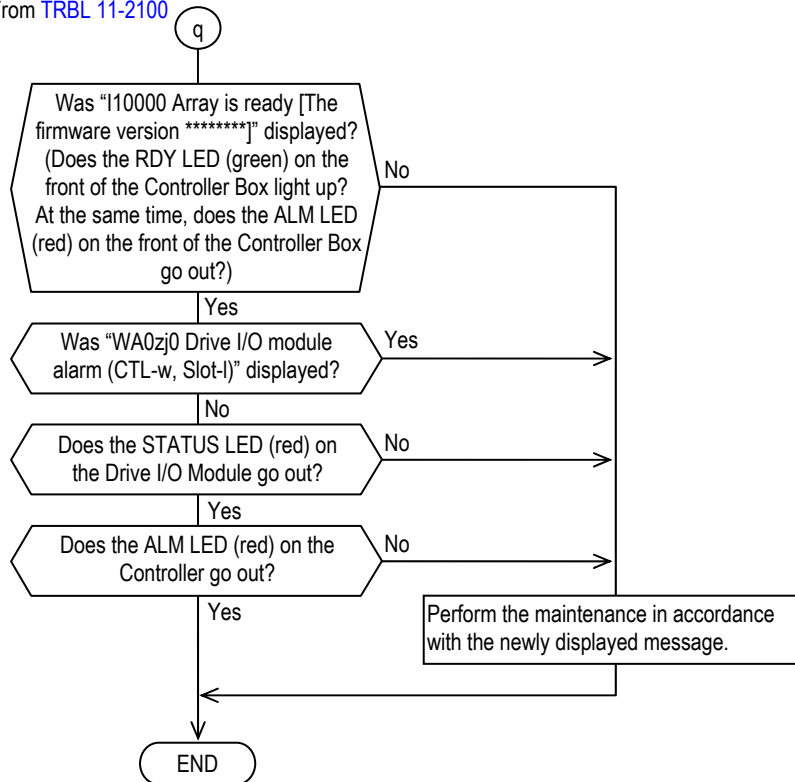
From [TRBL 11-2090](#),  
[TRBL 11-2120](#)



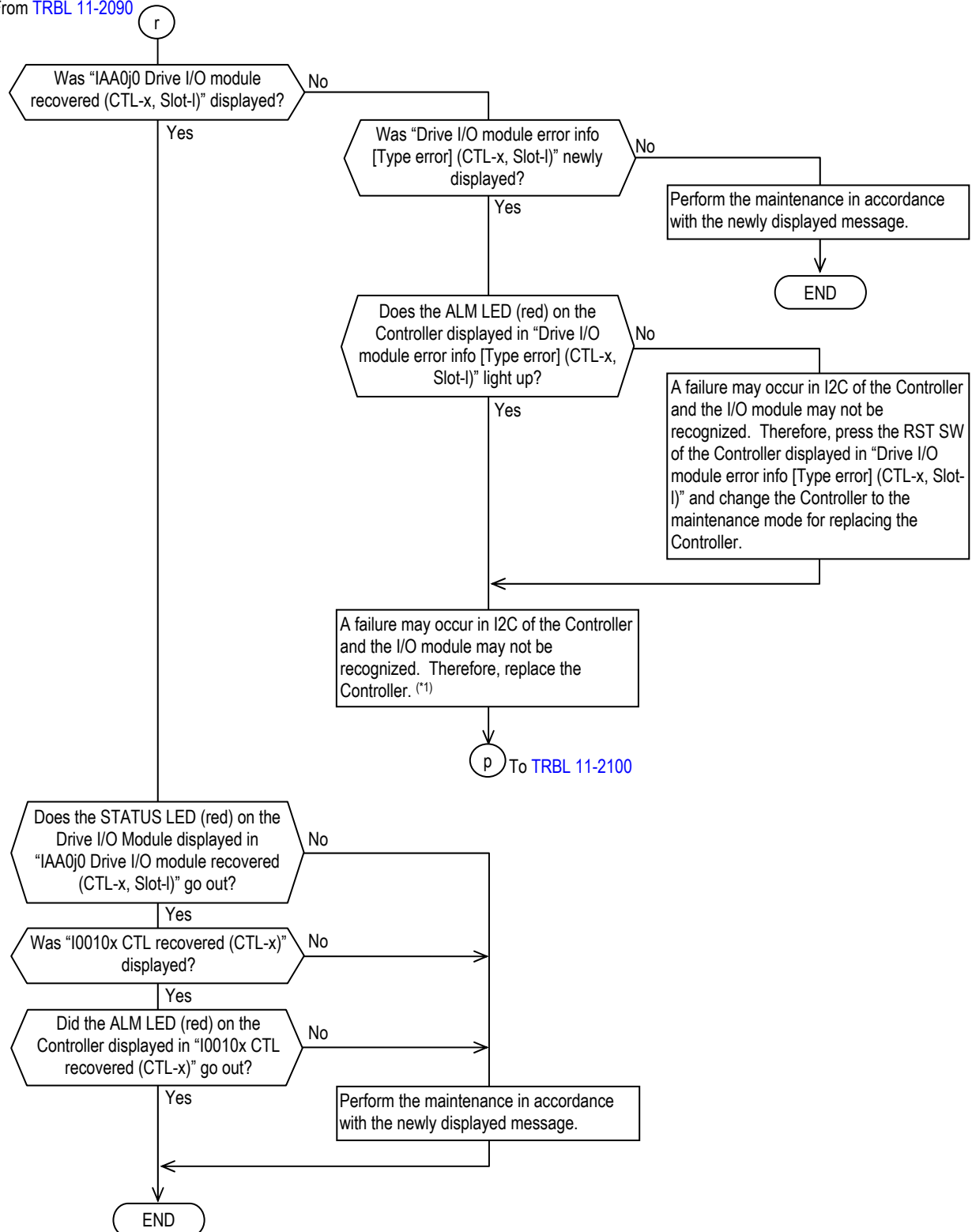
\*1 : For how to turn on/off the power, refer to [Installation "1.5 Power On/Off Procedure" \(INST 01-0220\)](#).

\*2 : For the replacement of the Controller Box, refer to the [Replacement "2.2.13 Replacing a Controller Box" \(REP 02-1840\)](#).

From TRBL 11-2100

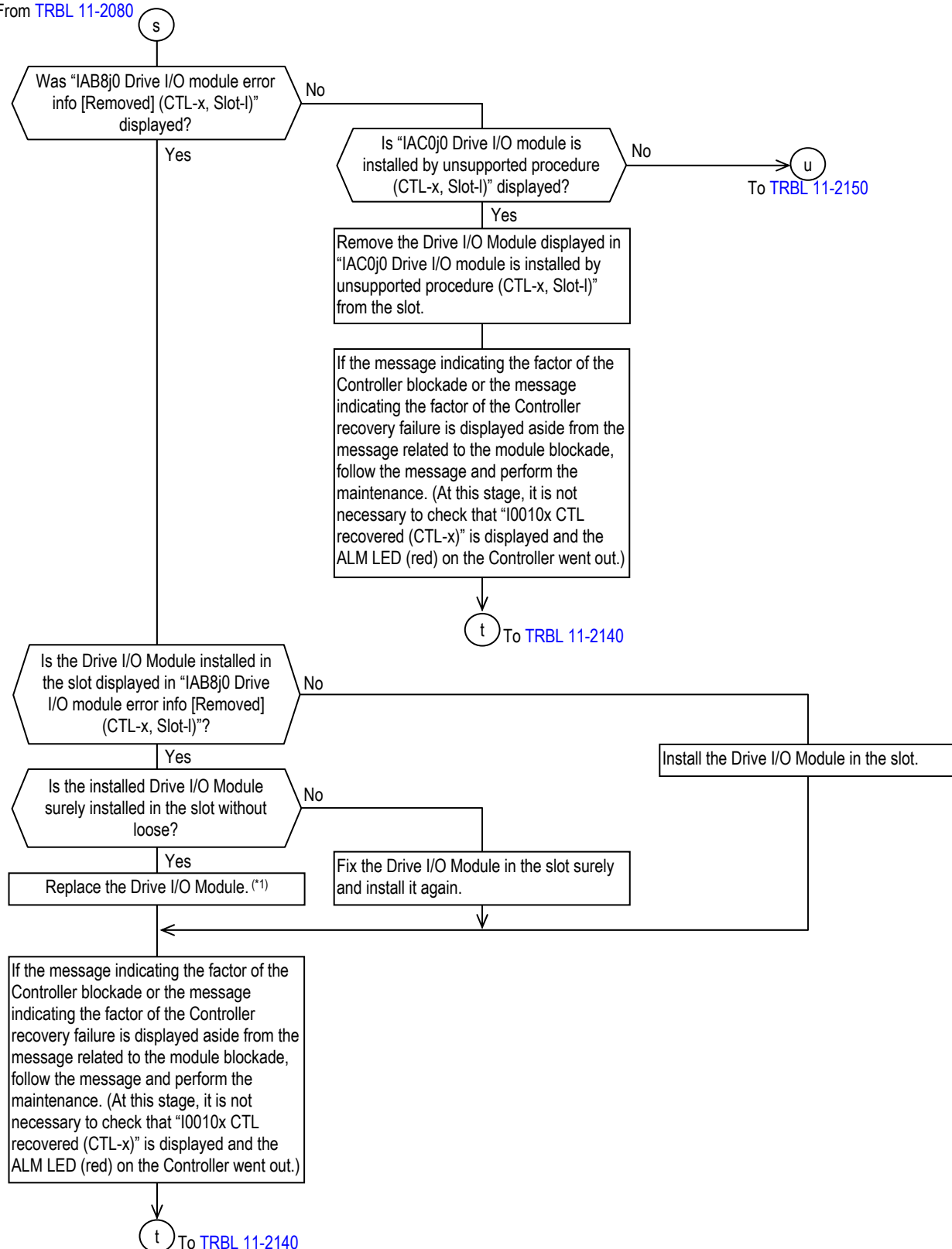


From TRBL 11-2090



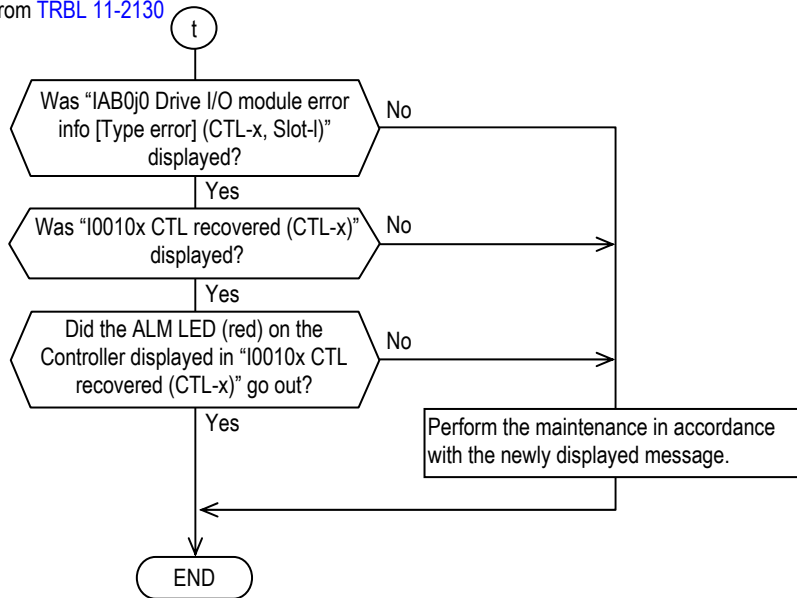
\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

From TRBL 11-2080

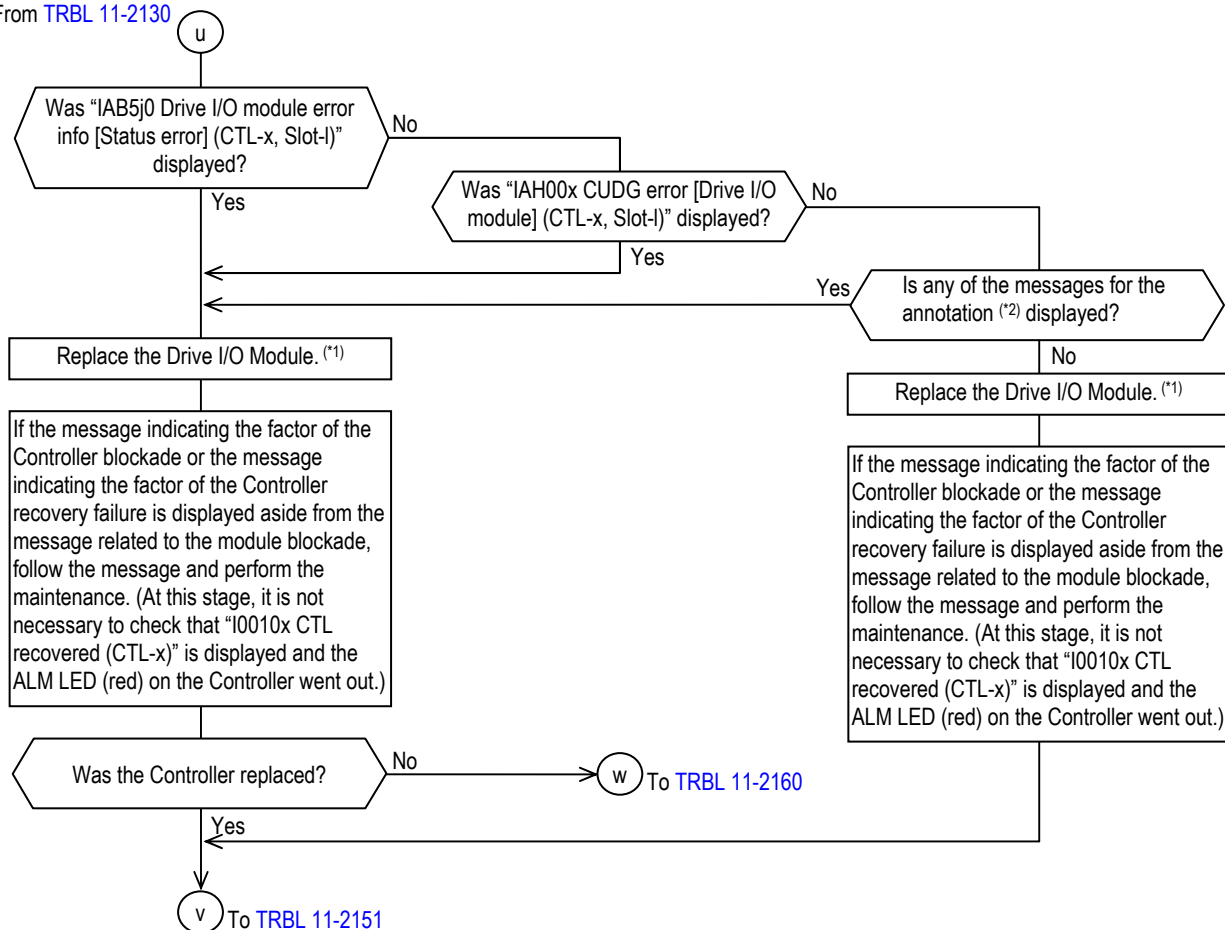


\*1 : For the replacement of the Drive I/O Module, refer to the Replacement "2.2.9 Replacing a Drive I/O Module" (REP 02-1320).

From TRBL 11-2130



From TRBL 11-2130



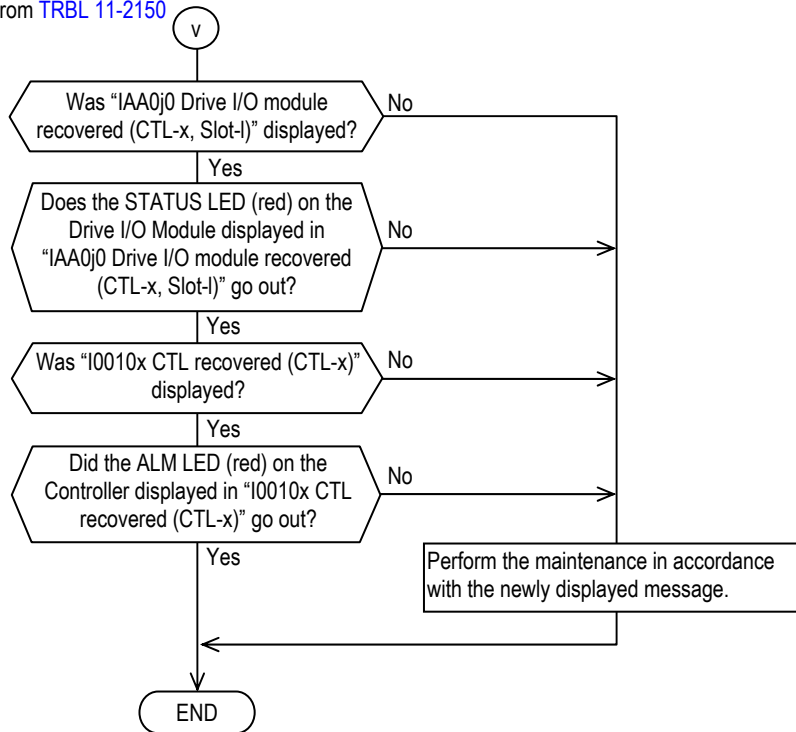
\*1 : For the replacement of the Drive I/O Module, refer to the [Replacement "2.2.9 Replacing a Drive I/O Module" \(REP 02-1320\)](#).

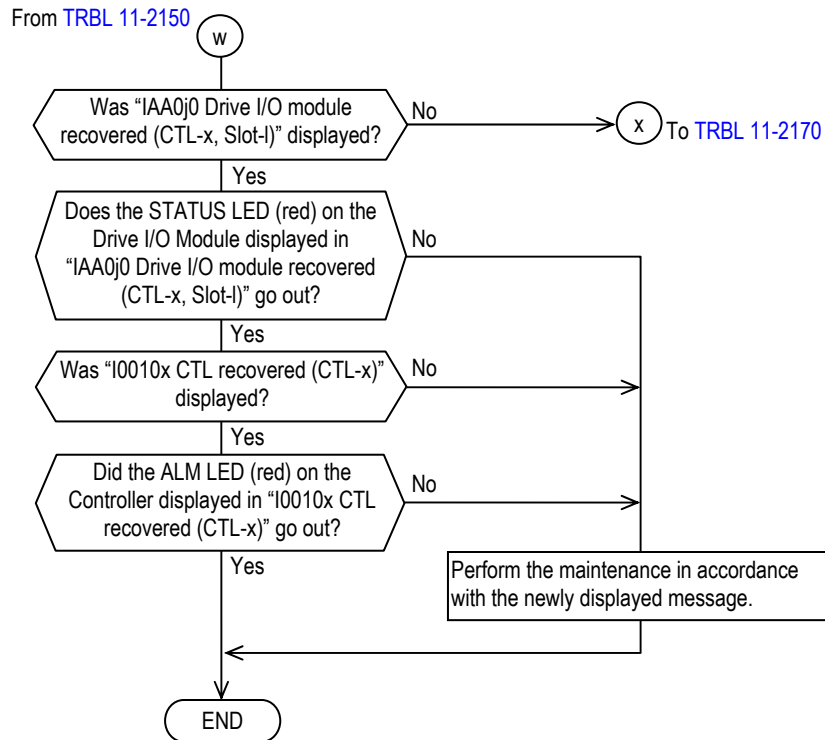
\*2 : List of the messages to be displayed.

- IAD0lx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- IAD1lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- IAD2lx Backend error count of D-SPC LSI exceeded the threshold [CODE-z] (CTL-x, Slot-l)
- IAD4lx D-SPC firmware error was detected (CTL-x, Slot-l)
- IAD5lx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- IAD6lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- IAD7lx D-SPC firmware download failed (CTL-x, Slot-l)
- IAD8lx The number of correctable D-SPC errors exceeded the threshold (CTL-x, Slot-l)

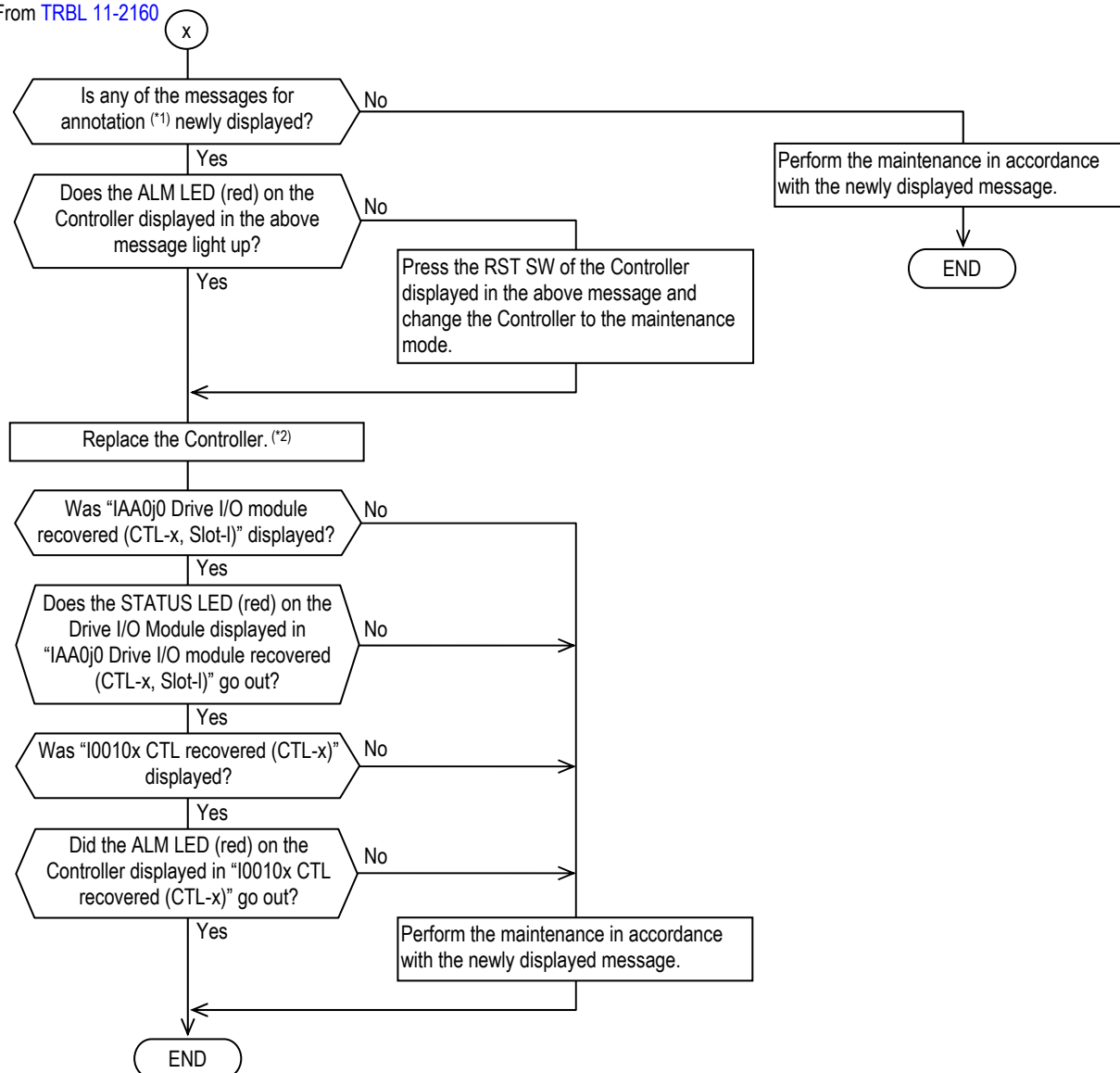


From TRBL 11-2150





From TRBL 11-2160



\*1 : List of the messages to be displayed.

- IAB5j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- IAH00x CUDG error [Drive I/O module] (CTL-x, Slot-l)
- IAD0lx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- IAD1lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- IAD2lx Backend error count of D-SPC LSI exceeded the threshold [CODE-z] (CTL-x, Slot-l)
- IAD5lx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- IAD6lx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- IAD7lx D-SPC firmware download failed (CTL-x, Slot-l)
- IAD8lx The number of correctable D-SPC errors exceeded the threshold (CTL-x, Slot-l)
- RED2j0 Drive I/O module error info [Status error] (CTL-x, Slot-l)
- RG00yx Backend error count of D-SPC exceeded the threshold [D-SPC REBOOT error] (CTL-x, Slot-l)
- RG10yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC FATAL] (CTL-x, Slot-l)
- RG20yx Backend error count of D-SPC LSI exceeded the threshold [CODE-zz] (CTL-x, Slot-l)
- RG30yx An initialization of PCIe failed because of the hardware error [Drv] (CTL-x, Slot-l)
- RG40yx Backend error count of D-SPC LSI exceeded the threshold [D-SPC Error] (CTL-x, Slot-l)
- RG600x D-SPC firmware download failed (CTL-x, Slot-y)

\*2 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

### 11.1.34 Recovery Method at the Time of Host I/O Module Blockade

[WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy WA1zi0 Host I/O module alarm (CTL-x, Slot-y)			:IFBD/STRC
Date	Time	x : Detect Controller # y : Detect Core #	

When the firmware version is less than 0925/A, the module blockade (Drive I/O Module blockade, Host I/O Module blockade, Management Module blockade) or two or more Fan Module blockades in total may occur in multiple slots of the same controller and the Controller may have the pseudo blockade<sup>(†1)</sup>. In that case, by removing all the factors of the Controller pseudo blockade<sup>(†1)</sup>, the Controller reboots automatically and recovers from the pseudo blockade<sup>(†1)</sup>.

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-x, Slot-y)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-x, Slot-y)
- Management Module blockade : WA2zk0 Management module alarm (CTL-x, Slot-y)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)
- Controller pseudo blockade<sup>(†1)</sup> : W70z00 Recoverable CTL alarm by the maintenance procedures of the blocked component (CTL-x)

If the firmware version is 0925/A or later, a Host I/O Module failure causes a Host I/O Module blockage instead of a dummy Controller blockage when READY LED (green) on the front of the Controller Box is on. This enables a Host I/O Module recovery by resolving the only factor related to the Host I/O Module failure.

If a dummy Controller blockage is caused by a Host I/O Module failure, the message “W70z00 Recoverable CTL alarm by the maintenance procedures of the blocked component (CTL-x)” is output. Perform maintenance work according to the message.

**Table 11.1.11 WEB Information Error Message to Be Output Depending on Installation Condition of Host I/O Module Slot between Both Controllers**

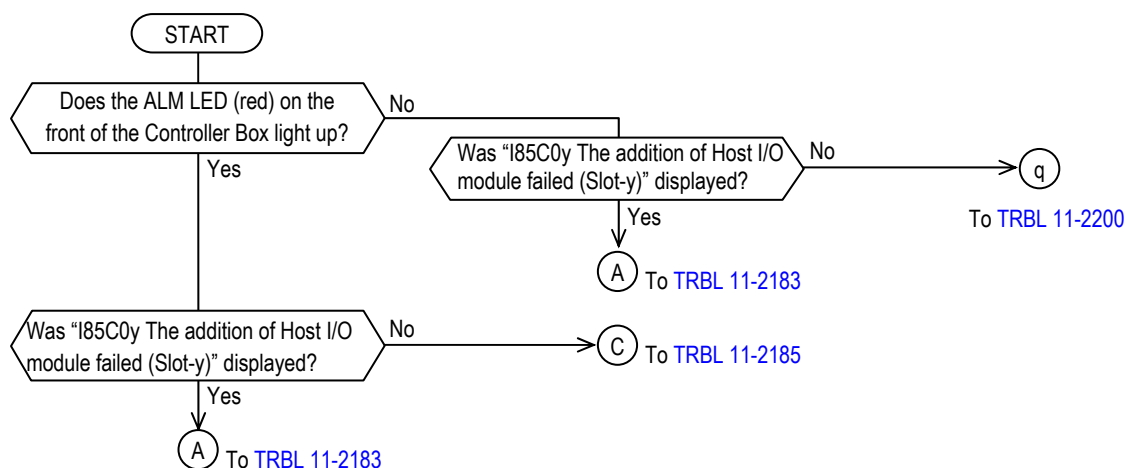
No.	Installation Status of Host I/O Module of Controller #0 and Slot #E (or #F)	Installation Status of Host I/O Module of Same Host I/O Module Slot # as Controller #1 and Controller #0	Slot # Where WEB Information Message Is Output	WEB Information Message to Be Output
1	Unsupported (new-type) version	Unsupported (new-type) version	Slots of both Controllers	IAC1y0 Host I/O module is installed by unsupported procedure (CTL-x, Slot-y)
2			(When I/O Modules are added in slots of both Controllers with array Ready.) Slots of both Controllers	I85lyx Added Host I/O module error info [Unsupported procedure] (CTL-x, Slot-y)

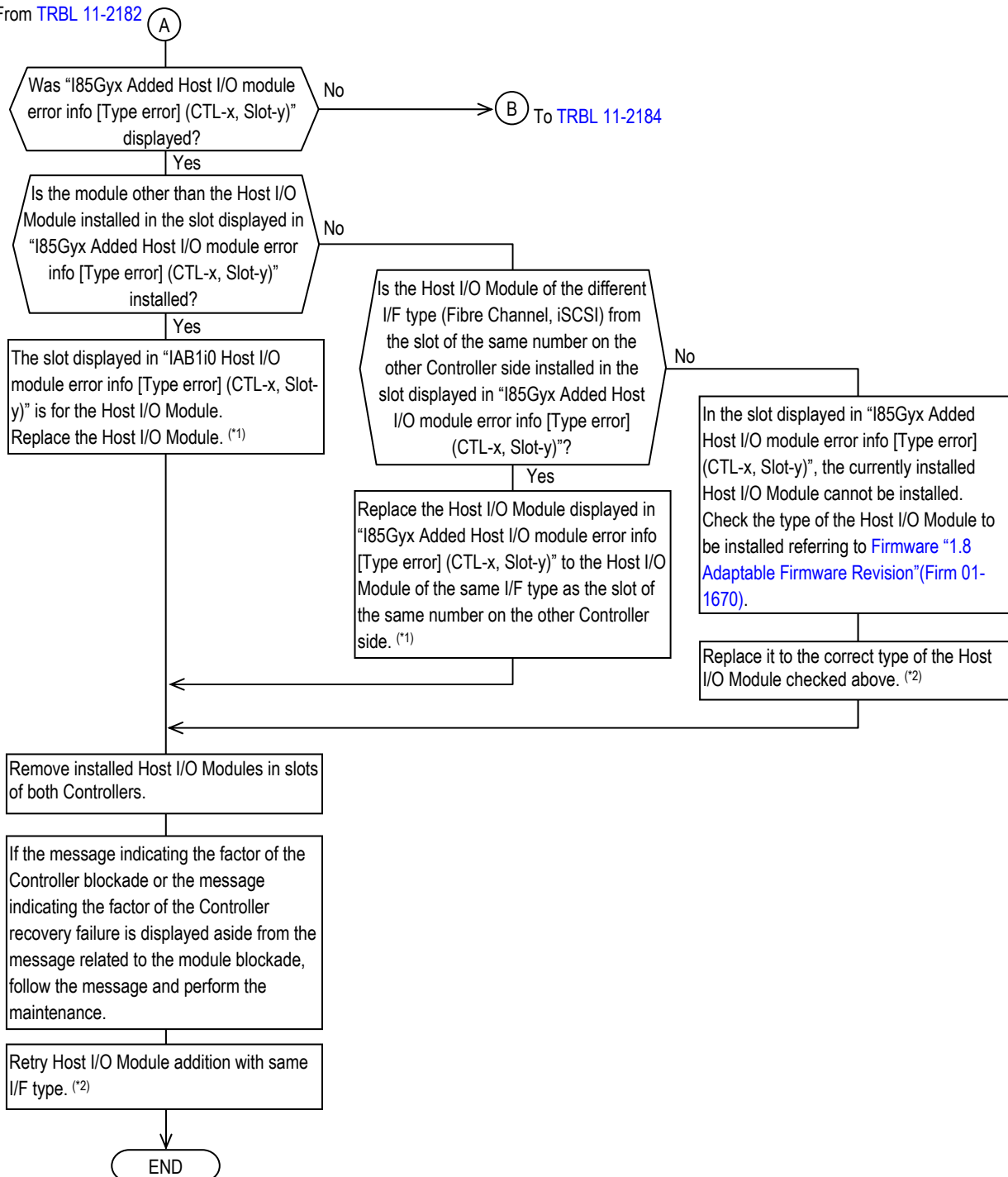
<sup>†1</sup> : The controller concerned becomes inaccessible from the host and the management program because the Controller operation stops.

No.	Installation Status of Host I/O Module of Controller #0 and Slot #E (or #F)	Installation Status of Host I/O Module of Same Host I/O Module Slot # as Controller #1 and Controller #0	Slot # Where WEB Information Message Is Output	WEB Information Message to Be Output
3	Unsupported (new-type) version	Unmount	Slot of Controller #0	IAC1y0 Host I/O module is installed by unsupported procedure (CTL-0, Slot-y)
4			Slot of Controller #0	IAB1y0 Host I/O module error info [Type error] (CTL-0, Slot-y)
5			(When I/O Modules are added in slots of both Controllers with array Ready.) Slot of Controller #0	I85Gy0 Added Host I/O module error info [Type error] (CTL-0, Slot-y)
6	Unsupported (new-type) version	Drive I/O Module	Slots of both Controllers	IAC1y0 Host I/O module is installed by unsupported procedure (CTL-x, Slot-y)
7			(When I/O Modules are added in slots of both Controllers with array Ready.) Slots of both Controllers	I85lyx Added Host I/O module error info [Unsupported procedure] (CTL-x, Slot-y)
8	Unmount	Unsupported (new-type) version	Slot of Controller #1	IAC1y0 Host I/O module is installed by unsupported procedure (CTL-1, Slot-y)
9	Unmount	Unmount	(When slot #E and #F of both Controllers are uninstalled) Slot #E, #F of both Controllers	(When slot #E and #F of both Controllers are uninstalled) IAB3y0 Host I/O module error info [Not installed] (CTL-x, Slot-y)
10	Unmount	Support	Slot of Controller #0	IAB3y0 Host I/O module error info [Not installed] (CTL-0, Slot-y)
11	Unmount	Drive I/O Module	Slot of Controller #1	IAC1y0 Host I/O module is installed by unsupported procedure (CTL-1, Slot-y)
12	Support	Unsupported (new-type) version	Slot of Controller #1	IAB1i0 Host I/O module error info [Type error] (CTL-1, Slot-y)
13			(When I/O Modules are added in slots of both Controllers with array Ready.) Slot of Controller #1	I85Gy1 Added Host I/O module error info [Type error] (CTL-1, Slot-y)
14	Support	Unmount	Slot of Controller #1	IAB3y0 Host I/O module error info [Not installed] (CTL-1, Slot-y)
15	Support (Fibre Channel I/F)	Support (Fibre Channel I/F)	None	None
16	Support (iSCSI I/F)	Support (iSCSI I/F)	None	None
17	Support	Drive I/O Module	Slot of Controller #1	IAB1y0 Host I/O module error info [Type error] (CTL-1, Slot-y)
18			(When I/O Modules are added in slots of both Controllers with array Ready.) Slot of Controller #1	I85Gy1 Added Host I/O module error info [Type error] (CTL-1, Slot-y)
19	Drive I/O Module	Unsupported (new-type) version	Slots of both Controllers	IAC1y0 Host I/O module is installed by unsupported procedure (CTL-x, Slot-y)
20			(When I/O Modules are added in slots of both Controllers with array Ready.) Slots of both Controllers	I85lyx Added Host I/O module error info [Unsupported procedure] (CTL-x, Slot-y)

No.	Installation Status of Host I/O Module of Controller #0 and Slot #E (or #F)	Installation Status of Host I/O Module of Same Host I/O Module Slot # as Controller #1 and Controller #0	Slot # Where WEB Information Message Is Output	WEB Information Message to Be Output
21	Drive I/O Module	Unmount	Slot of Controller #0	IAC1y0 Host I/O module is installed by unsupported procedure (CTL-0, Slot-y)
22	Drive I/O Module	Support	Slot of Controller #0	IAB1y0 Host I/O module error info [Type error] (CTL-0, Slot-y)
23			(When I/O Modules are added in slots of both Controllers with array Ready.) Slot of Controller #0	I85Gy0 Added Host I/O module error info [Type error] (CTL-0, Slot-y)
24	Drive I/O Module	Drive I/O Module	Slots of both Controllers	IAC1y0 Host I/O module is installed by unsupported procedure (CTL-x, Slot-y)
25			(When I/O Modules are added in slots of both Controllers with array Ready.) Slots of both Controllers	I85lyx Added Host I/O module error info [Unsupported procedure] (CTL-x, Slot-y)
26	Fibre Channel I/F	iSCSI I/F	(When starting the array) Slots of both Controllers	IAB1y0 Host I/O module error info [Type error] (CTL-x, Slot-y)
27			(When I/O Modules are added in slots of both Controllers with array Ready.) Slot of Controller #1	I85Gyx Added Host I/O module error info [Type error] (CTL-1, Slot-y)
28			(When replacing the Controller) Slot on the side of the Controller to be replaced	IAB1y0 Host I/O module error info [Type error] (CTL-x, Slot-y)
29	iSCSI I/F	Fibre Channel I/F	(When starting the array) Slots of both Controllers	IAB1y0 Host I/O module error info [Type error] (CTL-x, Slot-y)
30			(When I/O Modules are added in slots of both Controllers with array Ready.) Slot of Controller #1	I85Gyx Added Host I/O module error info [Type error] (CTL-1, Slot-y)
31			(When replacing the Controller) Slot on the side of the Controller to be replaced	IAB1y0 Host I/O module error info [Type error] (CTL-x, Slot-y)

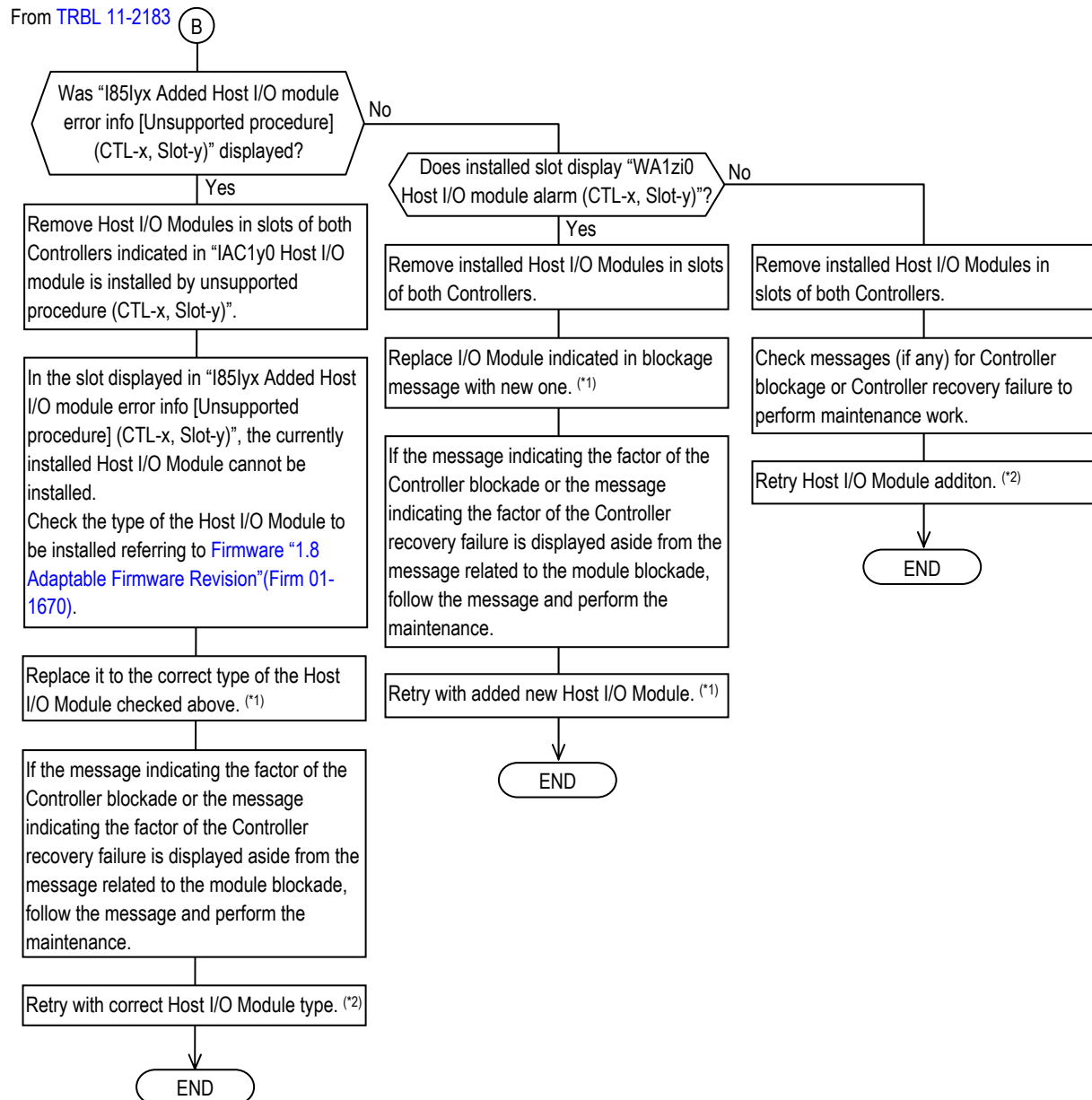
## [Recovery method]



From [TRBL 11-2182](#)

\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : For adding Host I/O Modules, see the online (A host is in operation) adding procedure in [Addition/Removal/Relocation "1.4.4 Adding a FC Host I/O Board/Module \(2\)" \(ADD 01-0561\)](#), [Addition/Removal/Relocation "1.4.5 Adding an iSCSI Host I/O Board/Module \(2\)" \(ADD 01-0632\)](#).

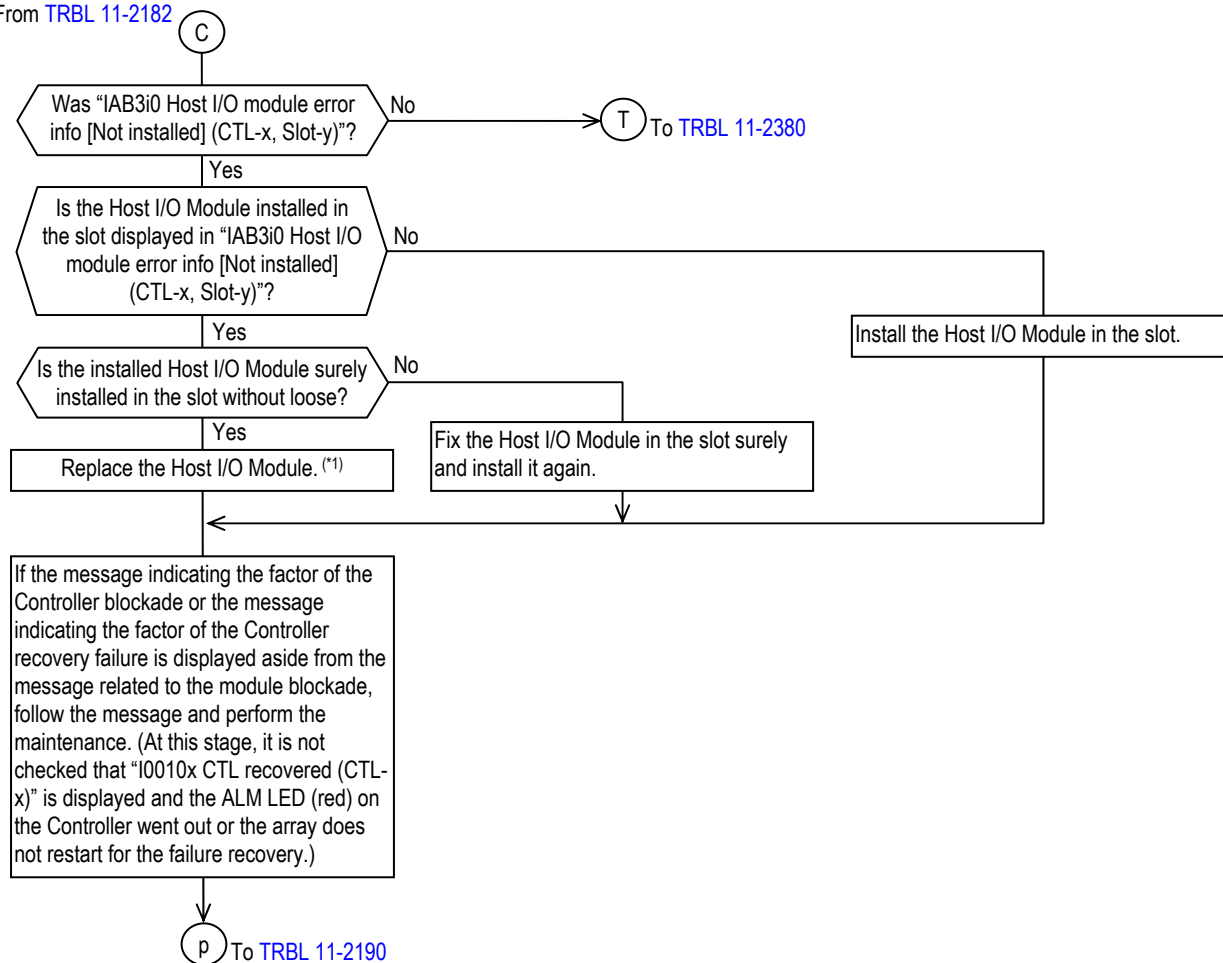
From [TRBL 11-2183](#)

\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : For adding Host I/O Modules, see the online (A host is in operation) adding procedure in [Addition/Removal/Relocation "1.4.4 Adding a FC Host I/O Board/Module \(2\)" \(ADD 01-0561\)](#), [Addition/Removal/Relocation "1.4.5 Adding an iSCSI Host I/O Board/Module \(2\)" \(ADD 01-0632\)](#).

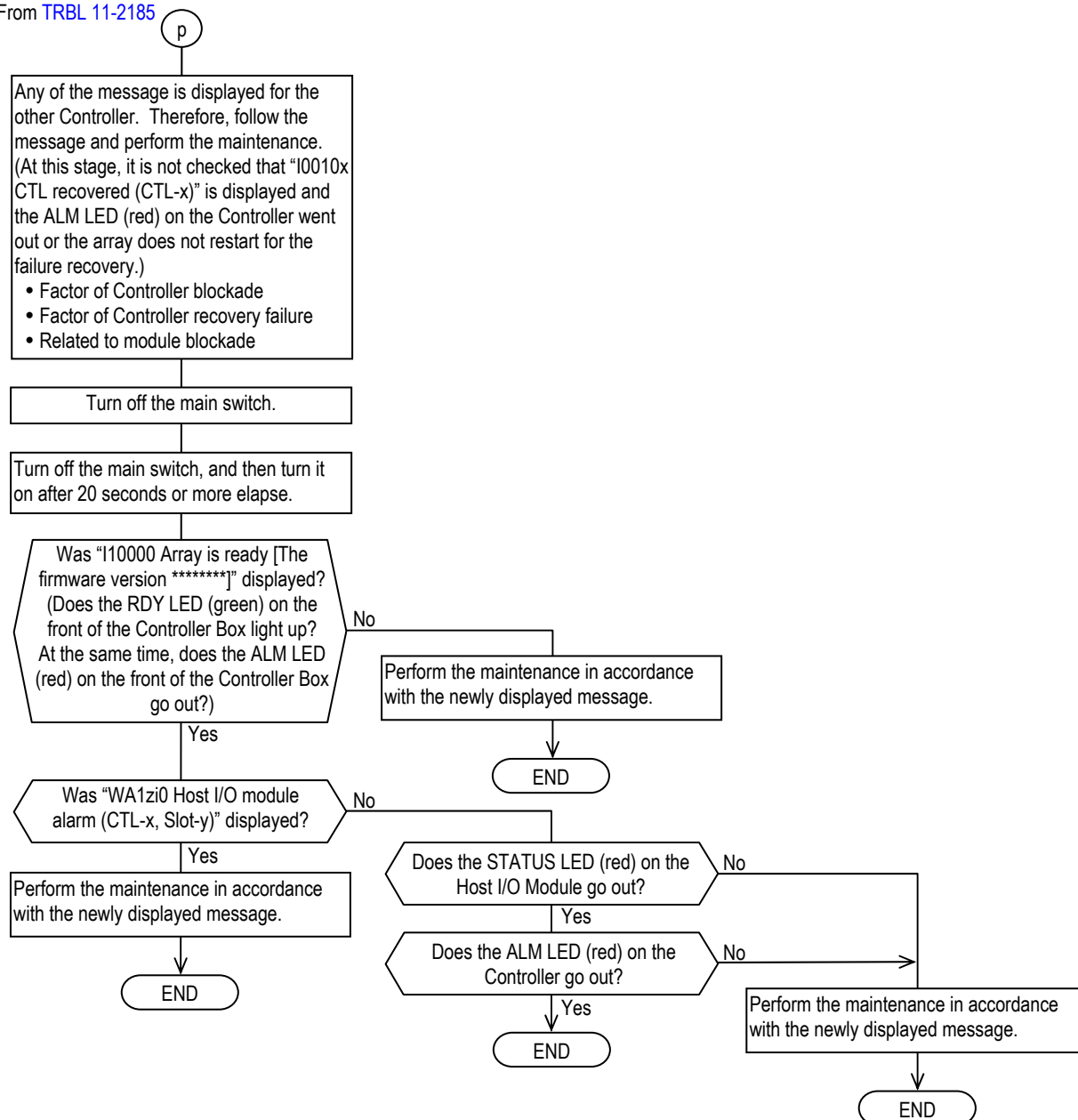


From TRBL 11-2182

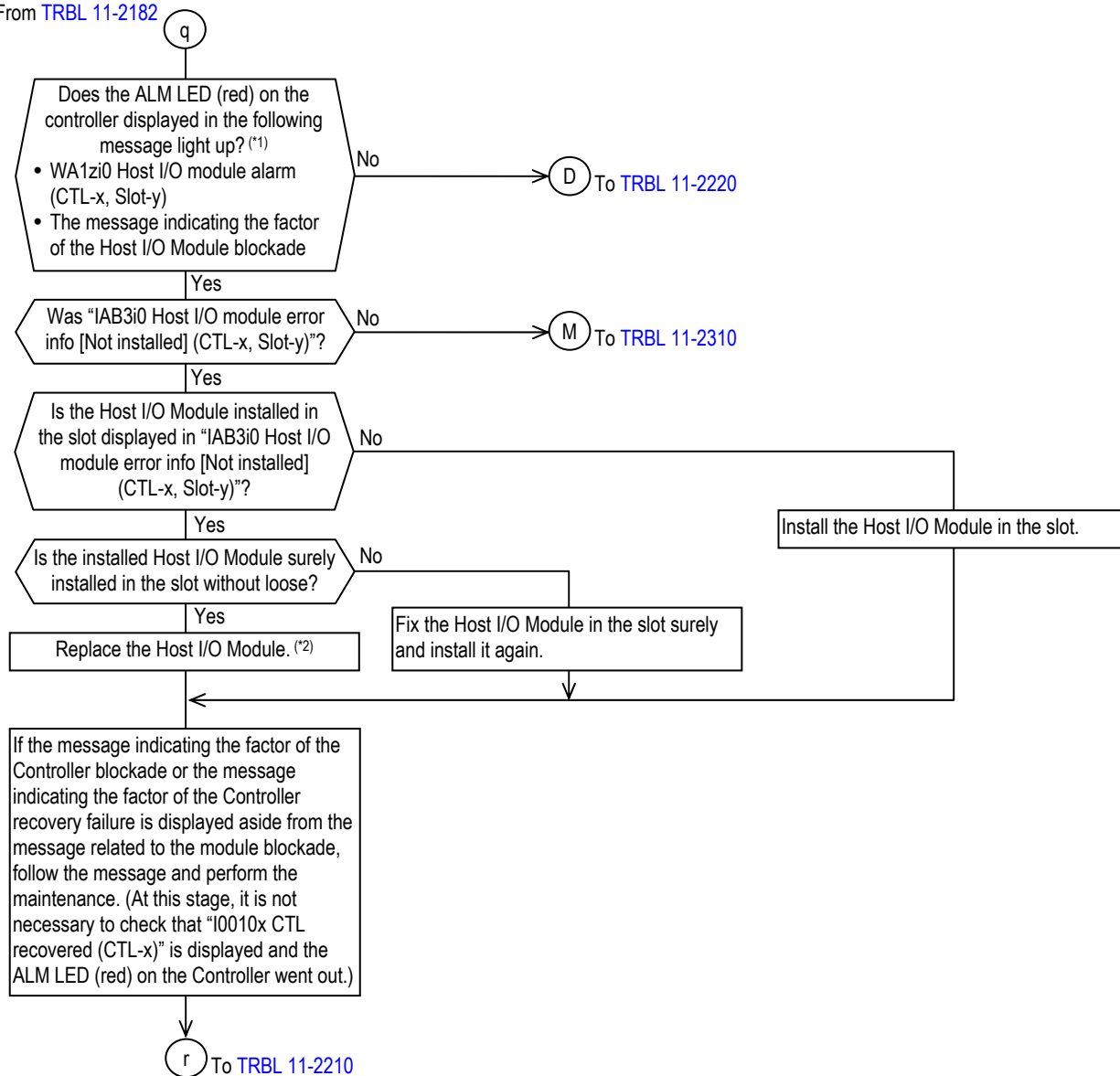


\*1 : For the replacement of the Host I/O Module, refer to the Replacement "2.2.7 Replacing a Host I/O Board/Module" (REP 02-1100).

From TRBL 11-2185



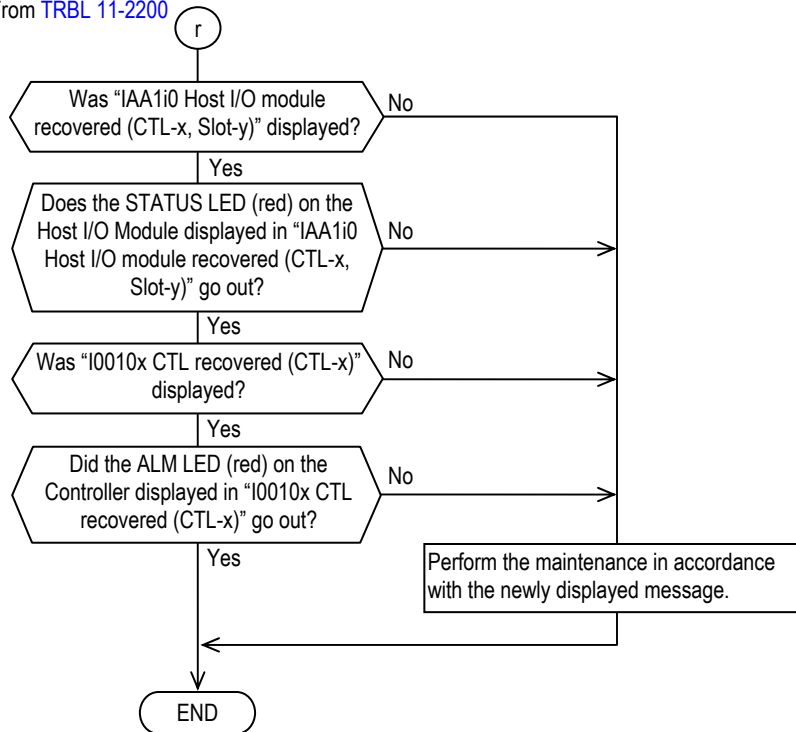
From TRBL 11-2182



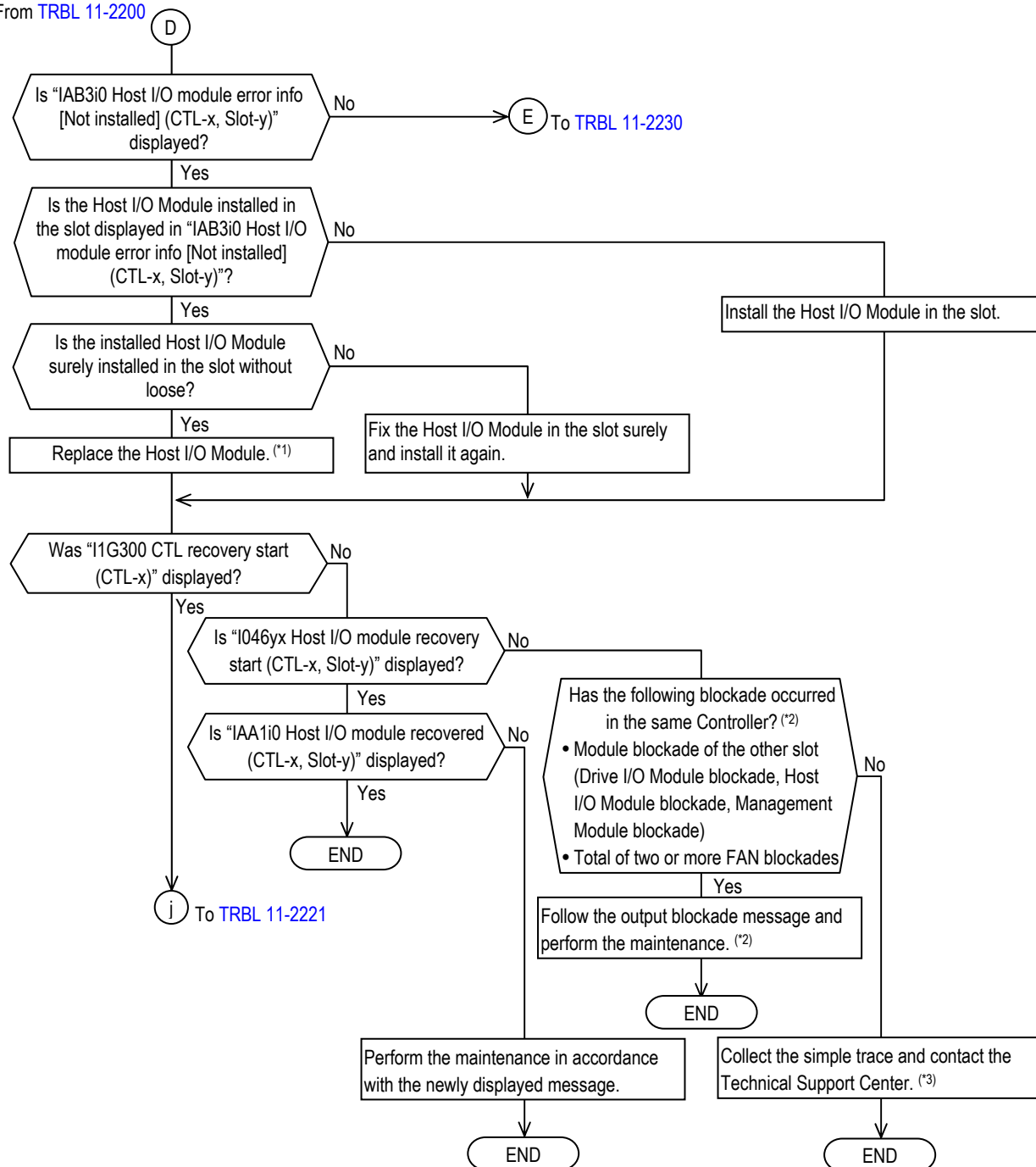
\*1 : If the firmware version is 0925/A or later, a Host I/O Module blockage does not cause a dummy Controller blockage, resulting in ALM LED (red) not being on.

\*2 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

From TRBL 11-2200



From TRBL 11-2200



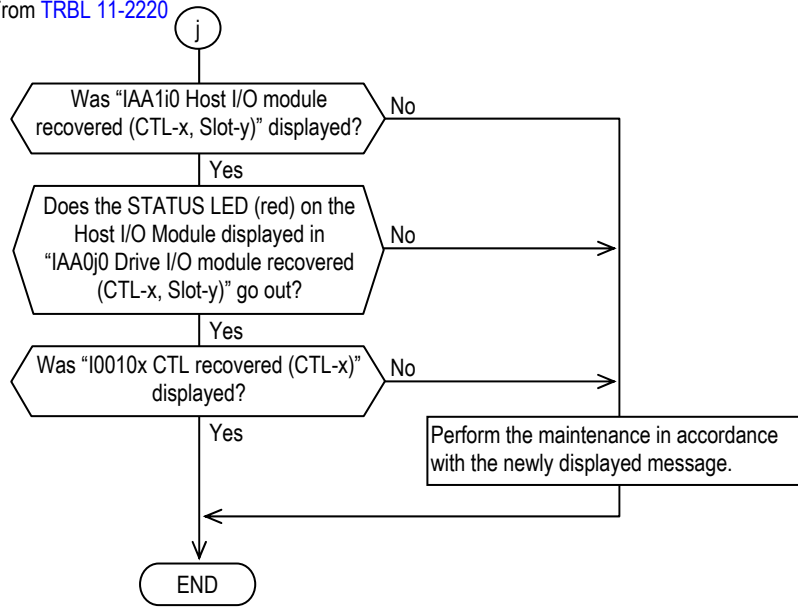
\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : Blockade message

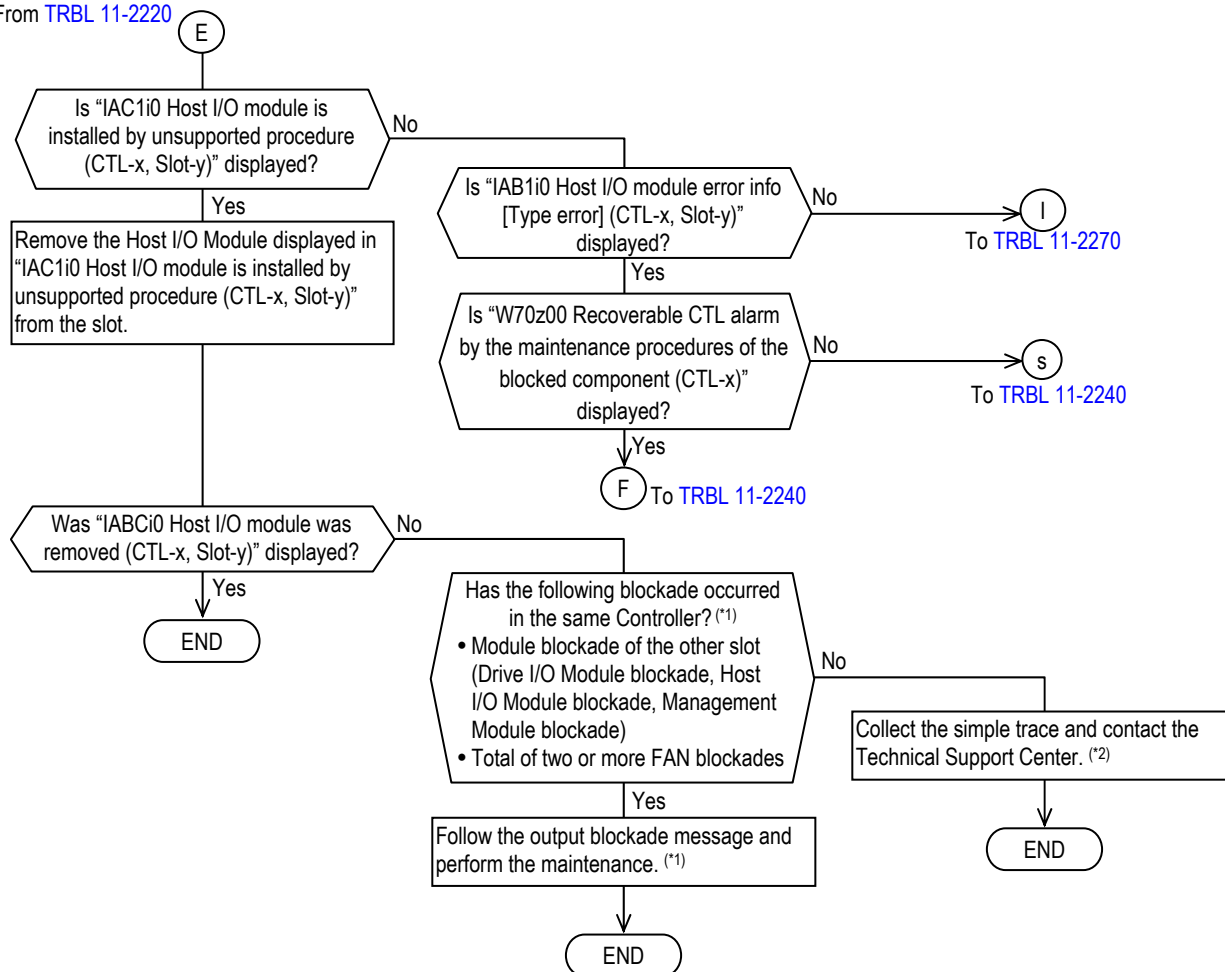
- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-x, Slot-y)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-x, Slot-y)
- Management Module blockade : WA2zk0 Management module alarm (CTL-x, Slot-y)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-2220



From TRBL 11-2220

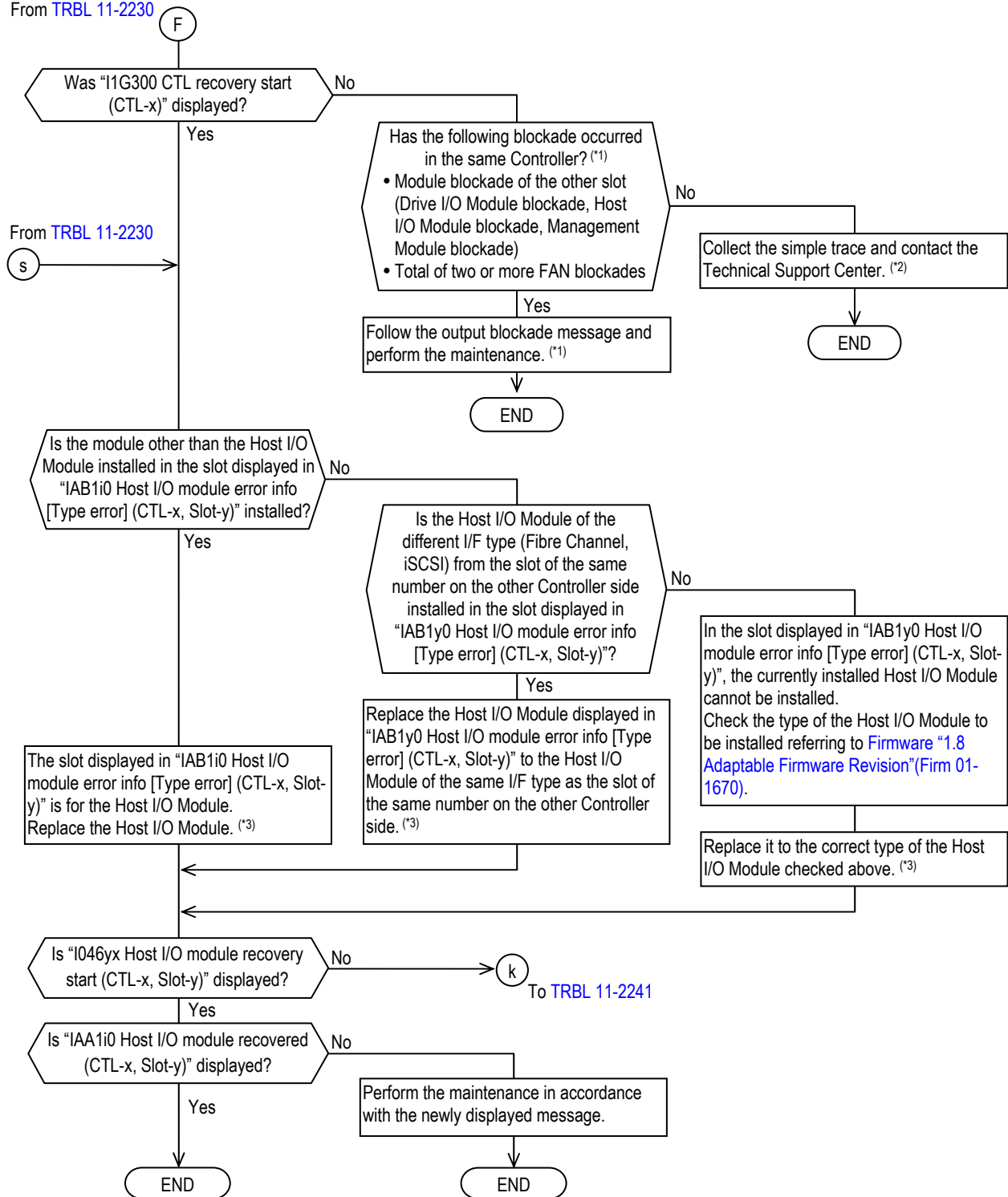


\*1 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-x, Slot-y)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-x, Slot-y)
- Management Module blockade : WA2zk0 Management module alarm (CTL-x, Slot-y)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*2 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

From TRBL 11-2230



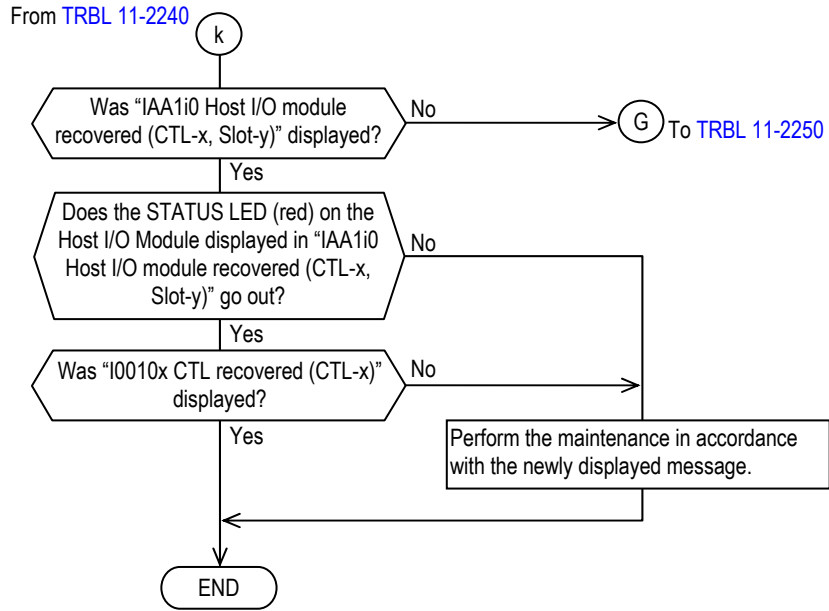
\*1 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-x, Slot-y)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-x, Slot-y)
- Management Module blockade : WA2zk0 Management module alarm (CTL-x, Slot-y)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

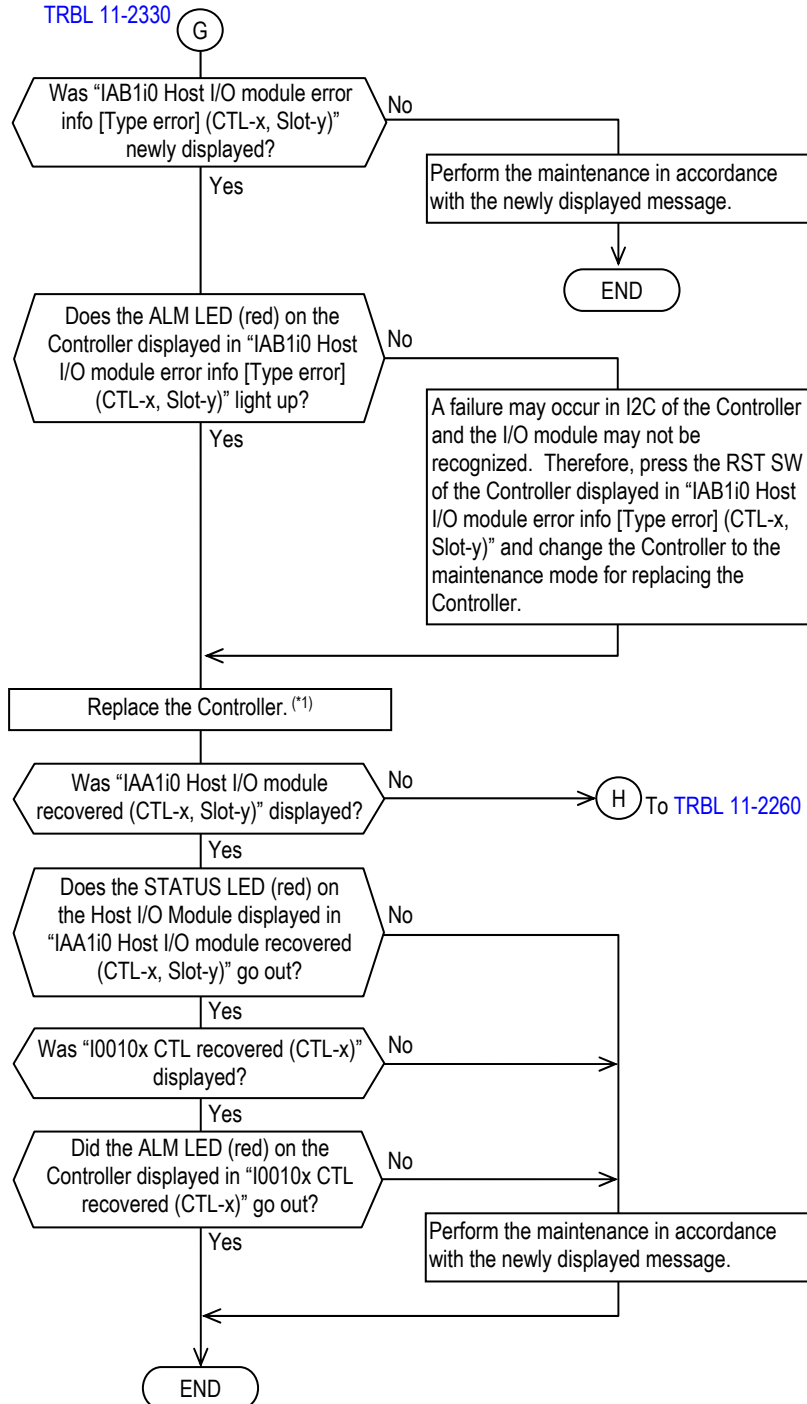
\*2 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

\*3 : For the replacement of the Host I/O Module, refer to the Replacement "2.2.7 Replacing a Host I/O Board/Module" (REP 02-1100).



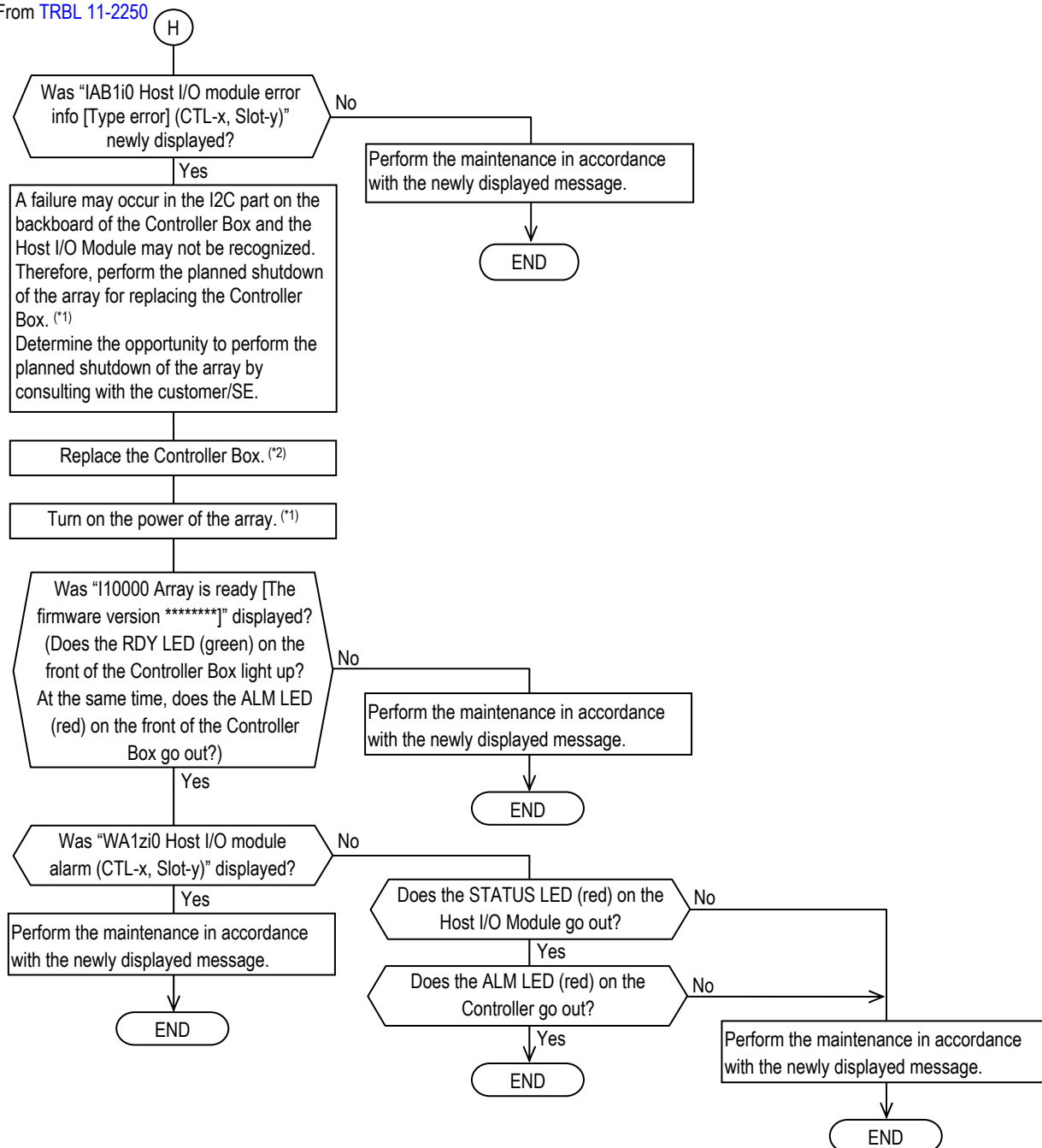


From [TRBL 11-2241](#), [TRBL 11-2320](#),  
[TRBL 11-2330](#)



\*1 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

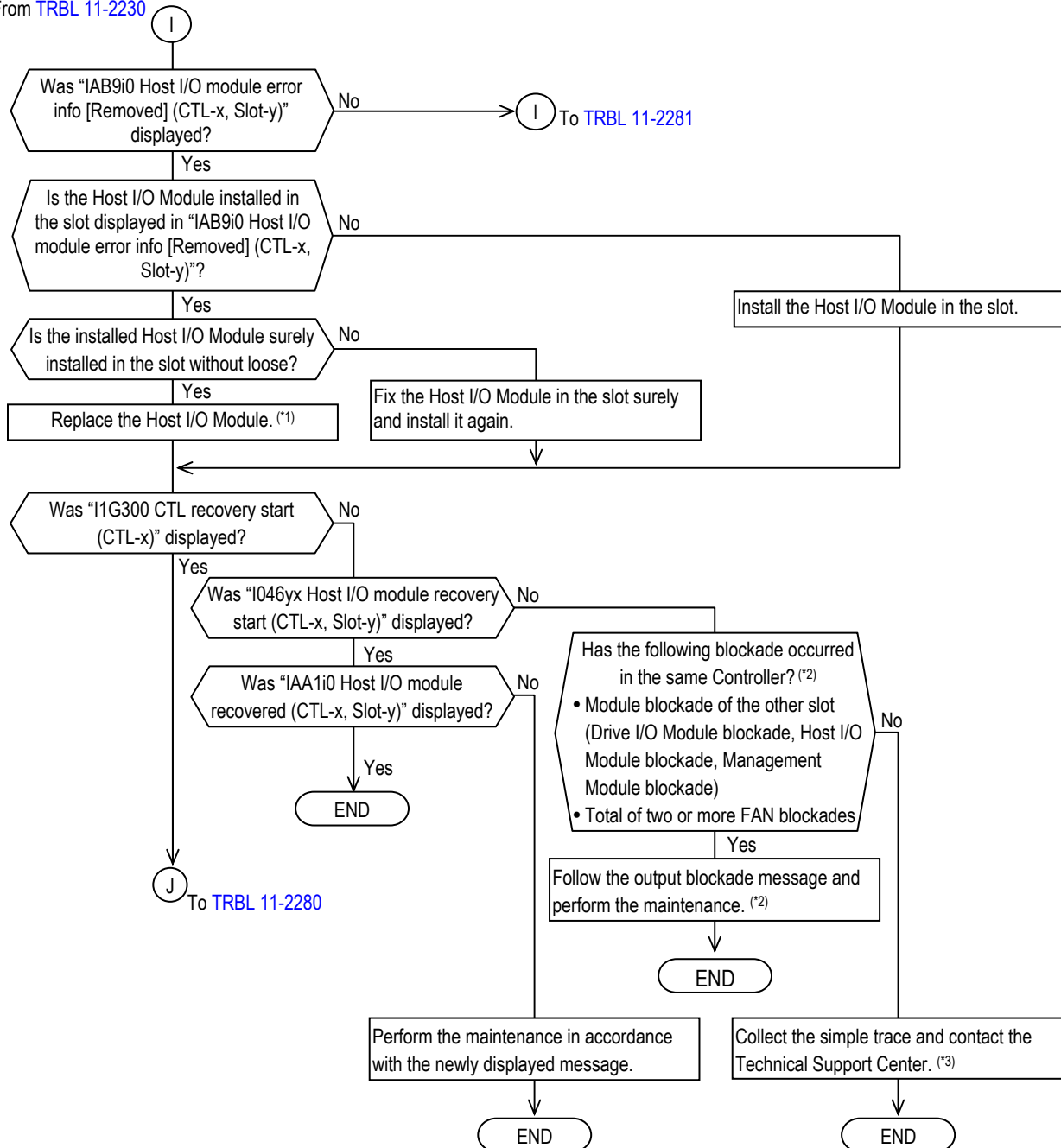
From TRBL 11-2250



\*1 : For how to turn on/off the power, refer to [Installation "1.5 Power On/Off Procedure" \(INST 01-0220\)](#).

\*2 : For the replacement of the Controller Box, refer to the [Replacement "2.2.13 Replacing a Controller Box" \(REP 02-1840\)](#).

From TRBL 11-2230



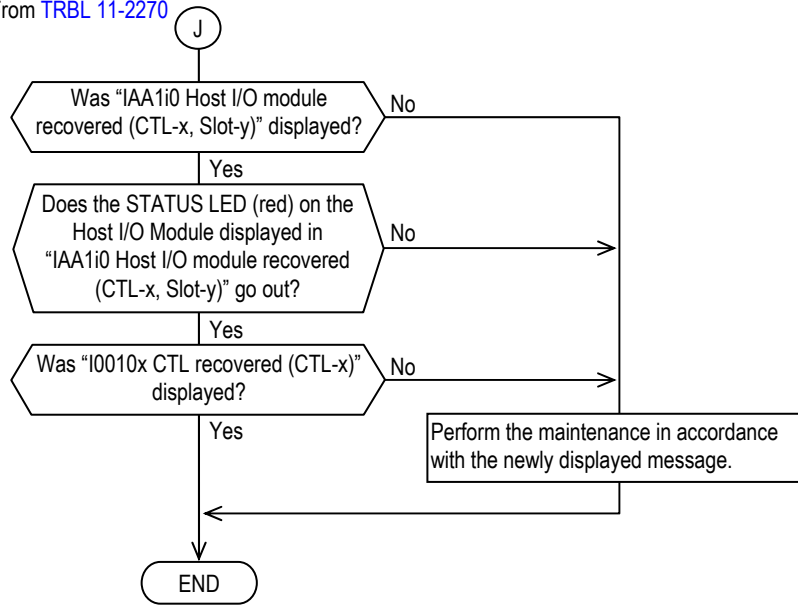
\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : Blockade message

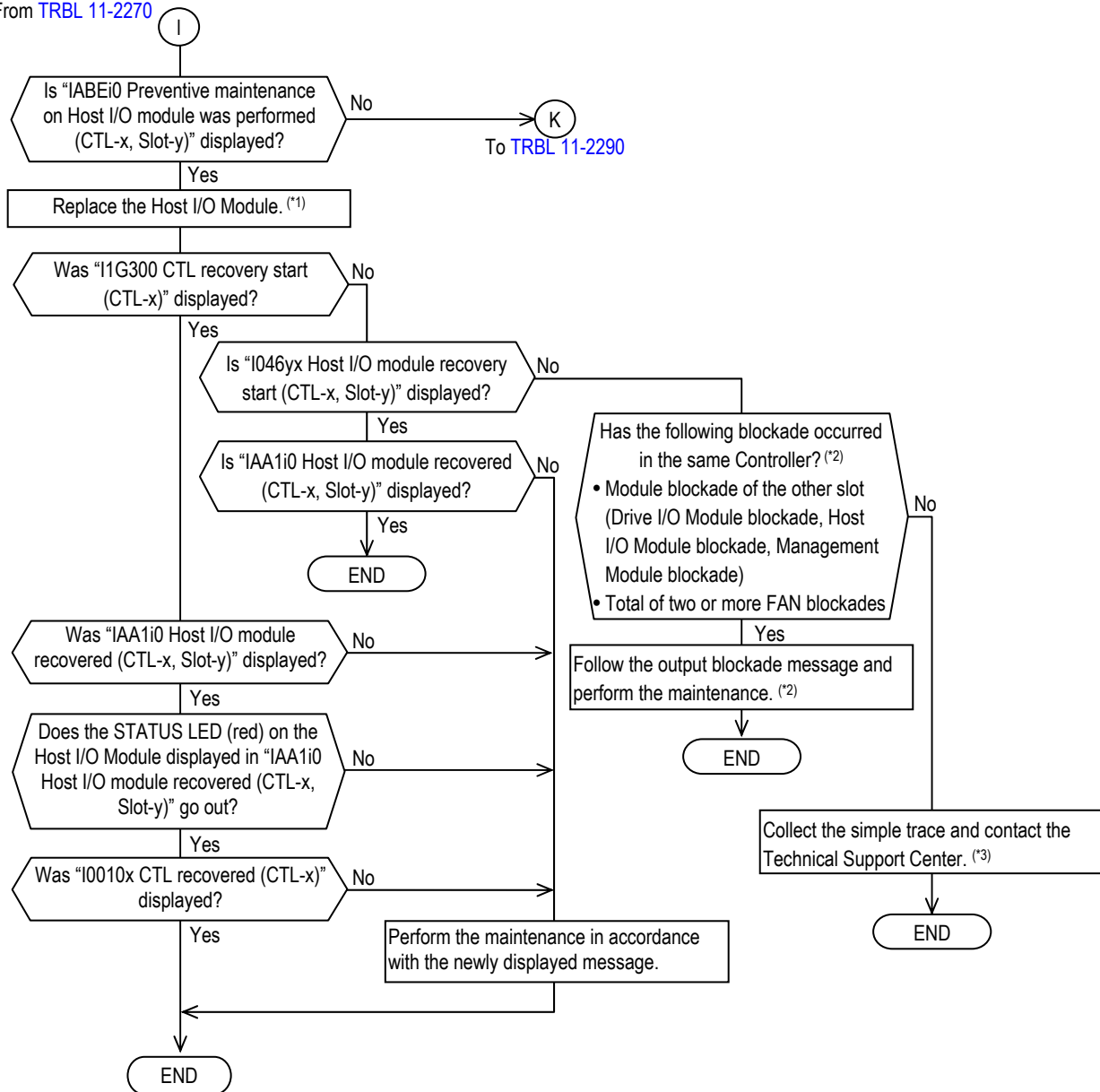
- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-x, Slot-y)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-x, Slot-y)
- Management Module blockade : WA2zk0 Management module alarm (CTL-x, Slot-y)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-2270



From TRBL 11-2270



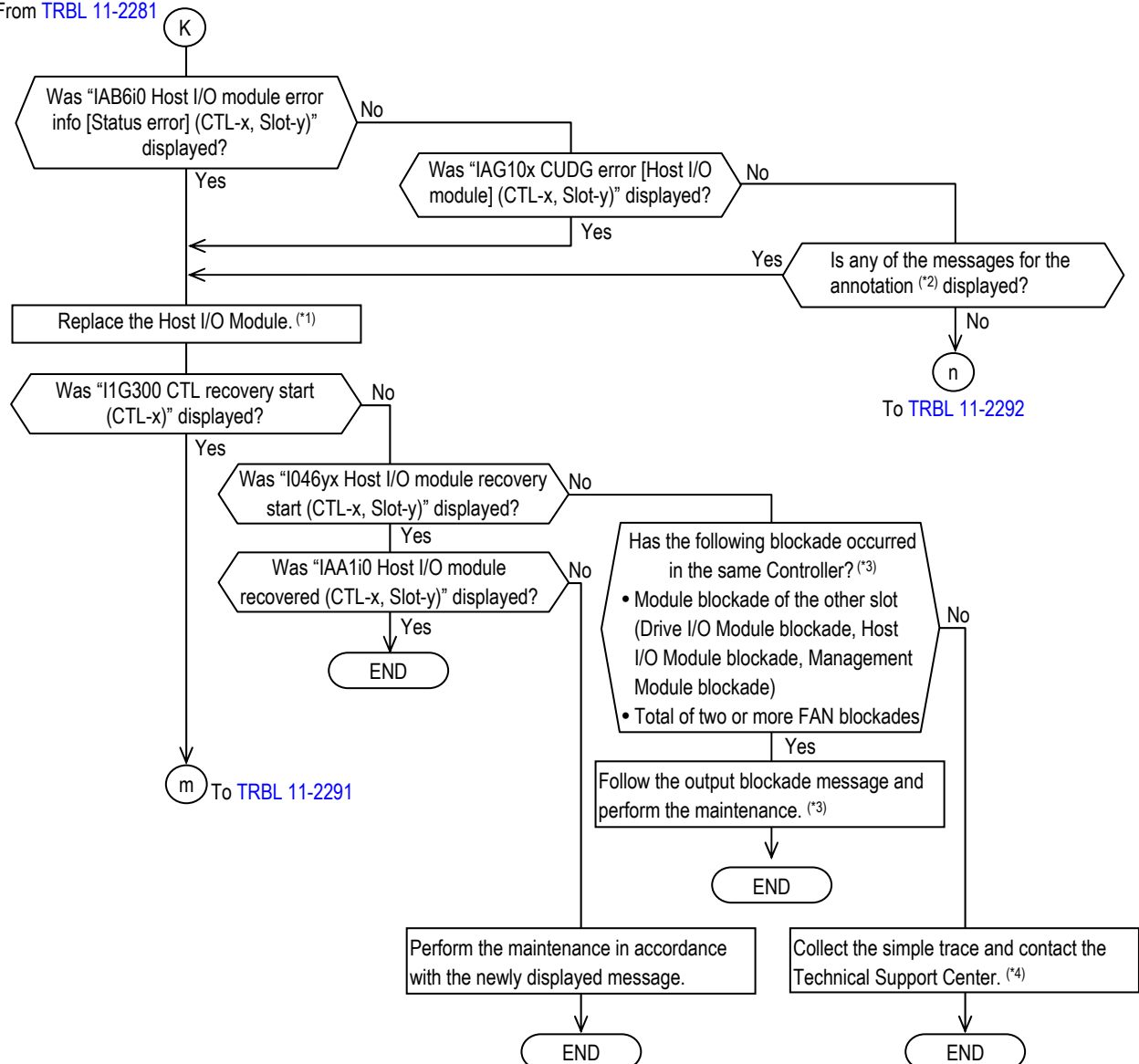
\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-x, Slot-y)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-x, Slot-y)
- Management Module blockade : WA2zk0 Management module alarm (CTL-x, Slot-y)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-2281



\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

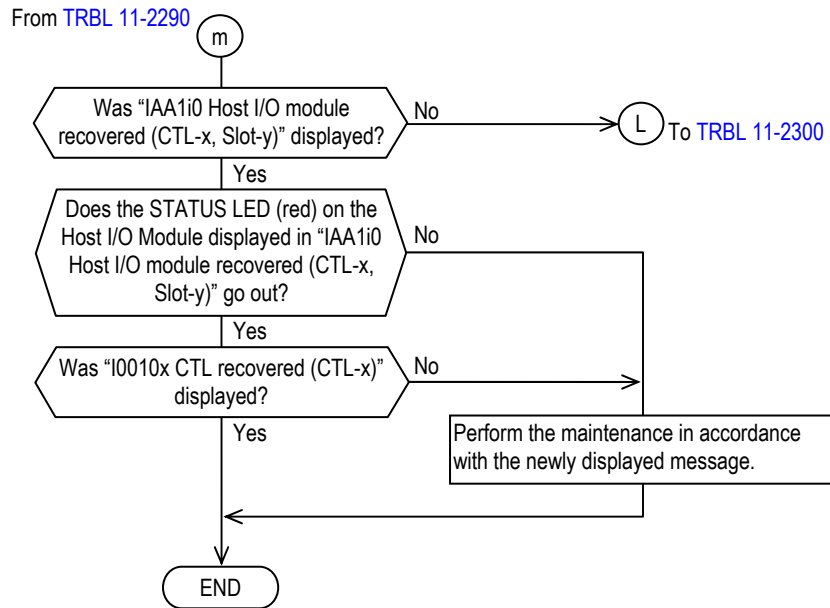
\*2 : List of the messages to be displayed.

- IAH3yx An ECC error was detected in Fibre Channel protocol chip (CTL-x, I/F-y)
- IAH0x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-y)
- IAE0x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-y)
- IAHx PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHx PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHx PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAJ9lx iSCSI protocol chip detected an EDC error (CTL-x, Slot-y)
- IAJAlx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, Slot-y)

\*3 : Blockade message

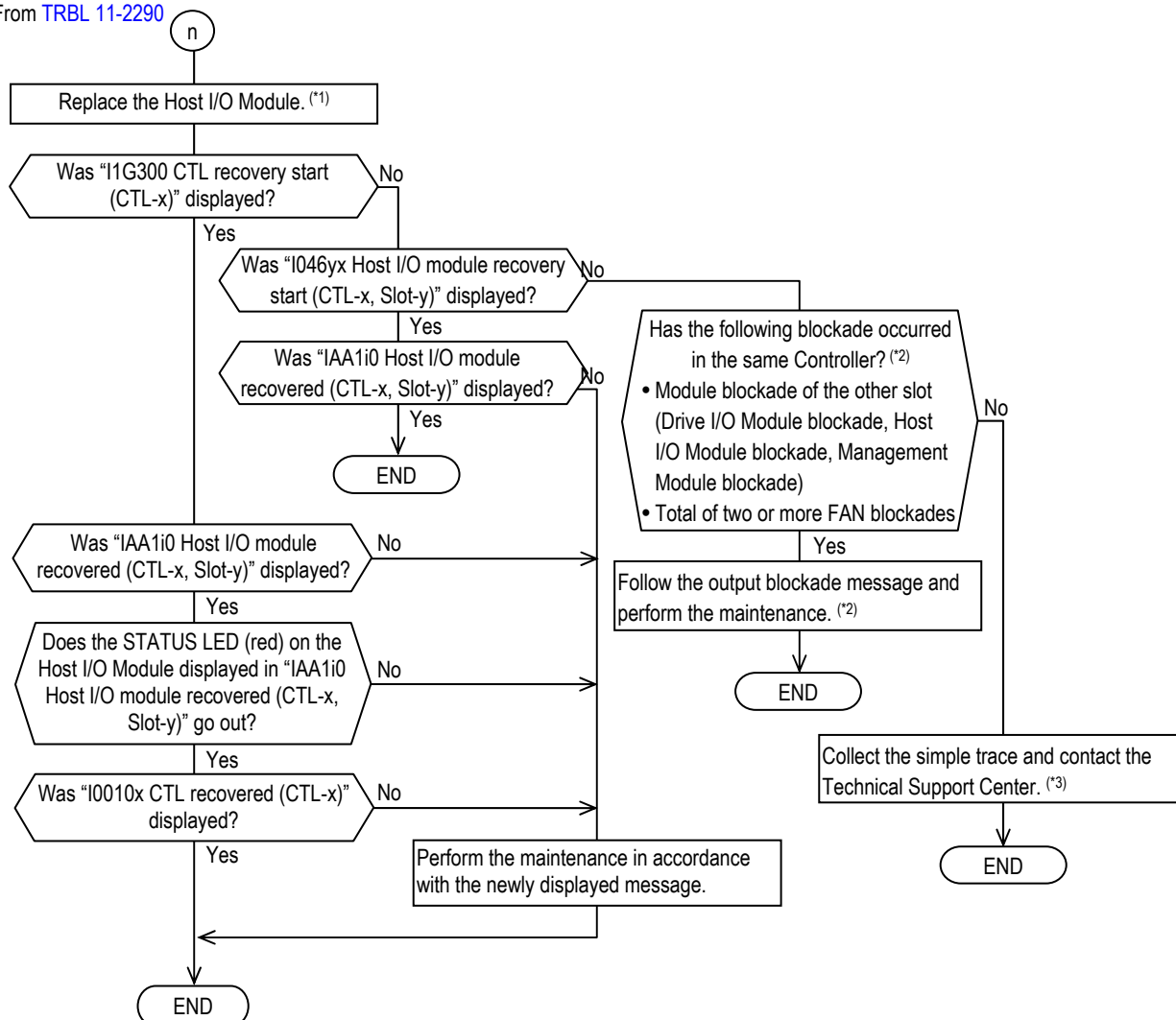
- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-x, Slot-y)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-x, Slot-y)
- Management Module blockade : WA2zk0 Management module alarm (CTL-x, Slot-y)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*4 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).





From TRBL 11-2290



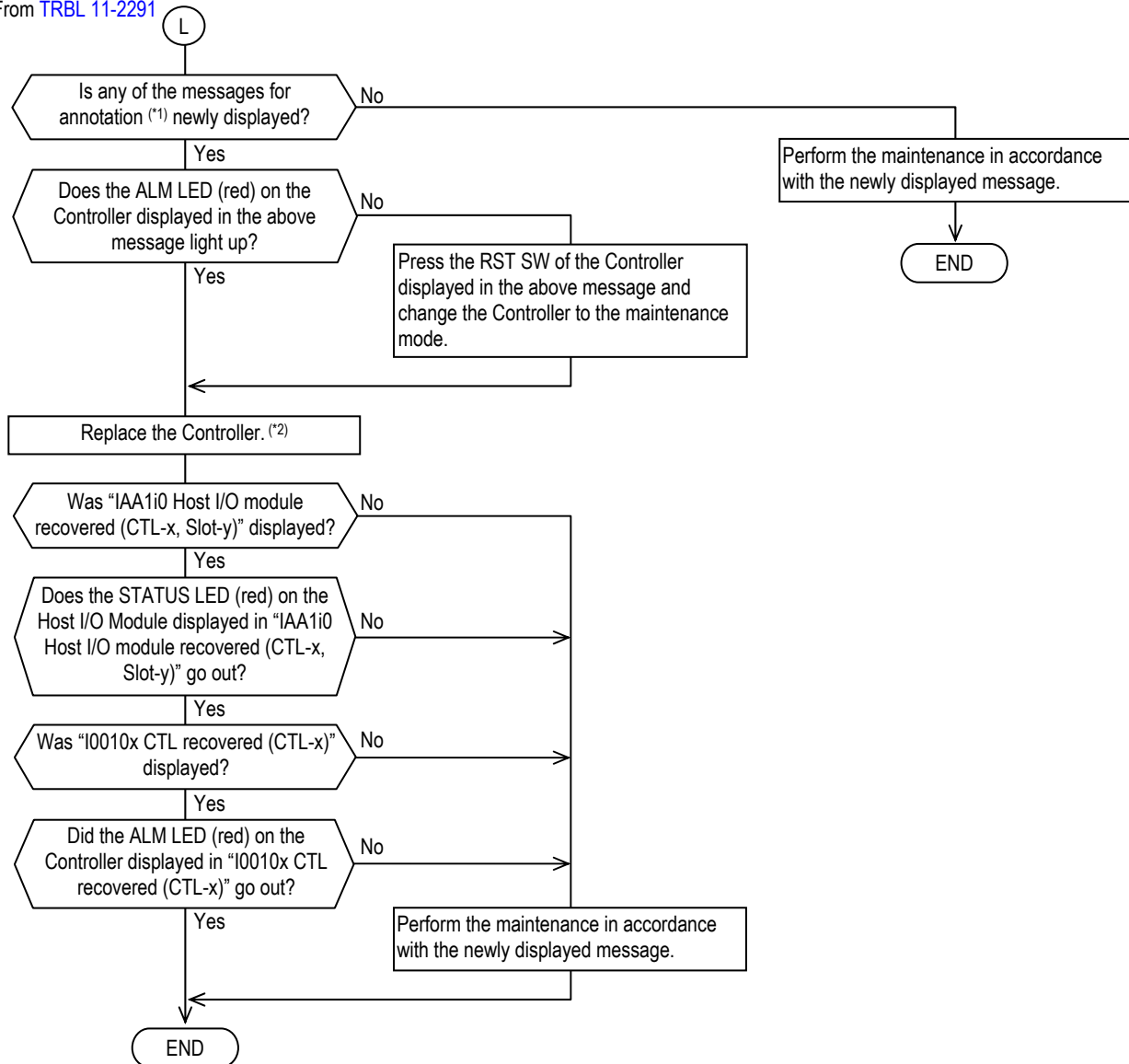
\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : Blockade message

- Drive I/O Module blockade : WA0zj0 Drive I/O module alarm (CTL-x, Slot-y)
- Host I/O Module blockade : WA1zi0 Host I/O module alarm (CTL-x, Slot-y)
- Management Module blockade : WA2zk0 Management module alarm (CTL-x, Slot-y)
- Fan Module blockade : W06z00 FAN alarm (CTL-Unit, FAN-xy)

\*3 : For Simple Trace Collection, refer to ["5.3 Collecting Simple Trace" \(TRBL 05-0040\)](#).

From TRBL 11-2291

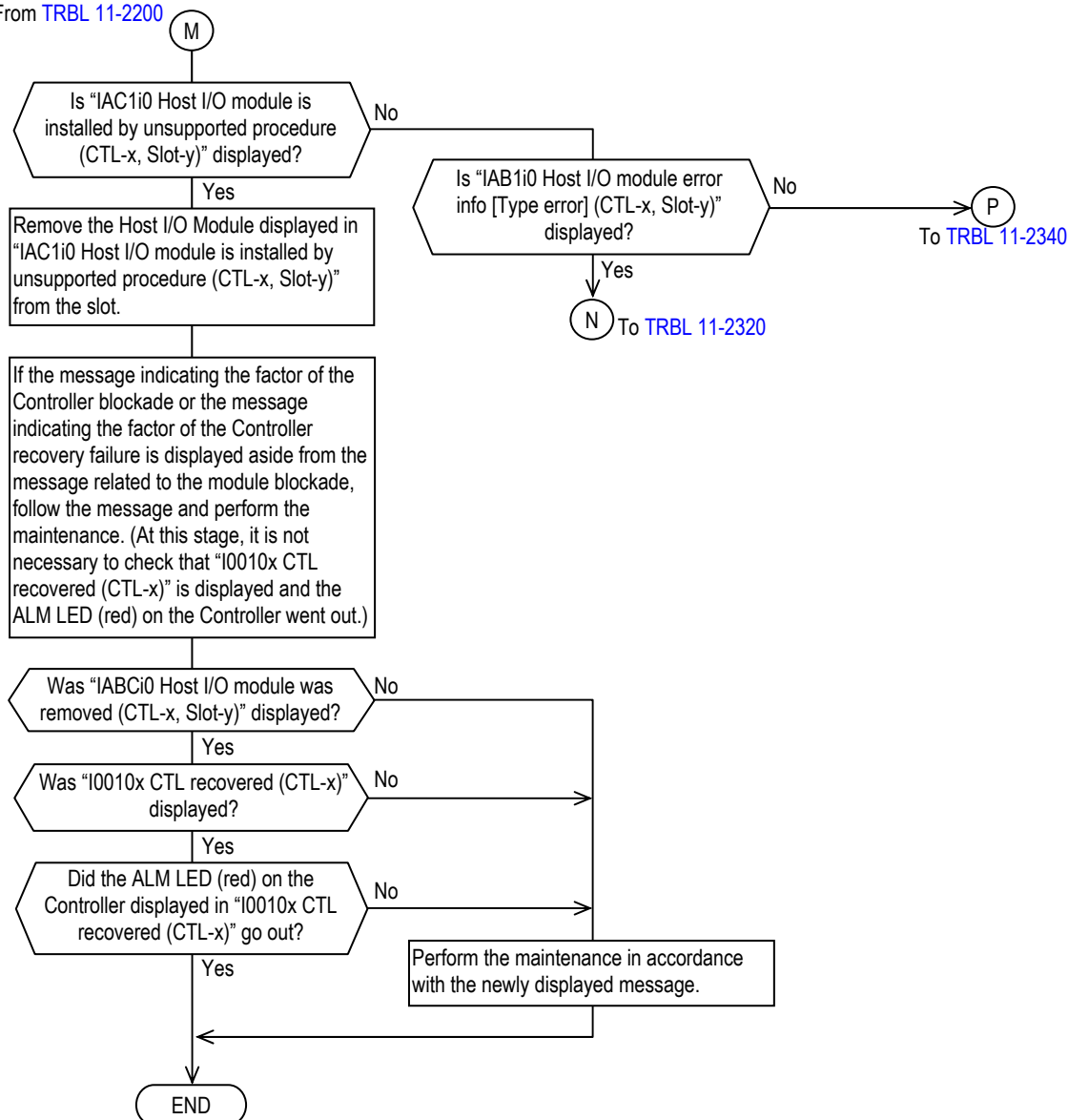


\*1 : List of the messages to be displayed.

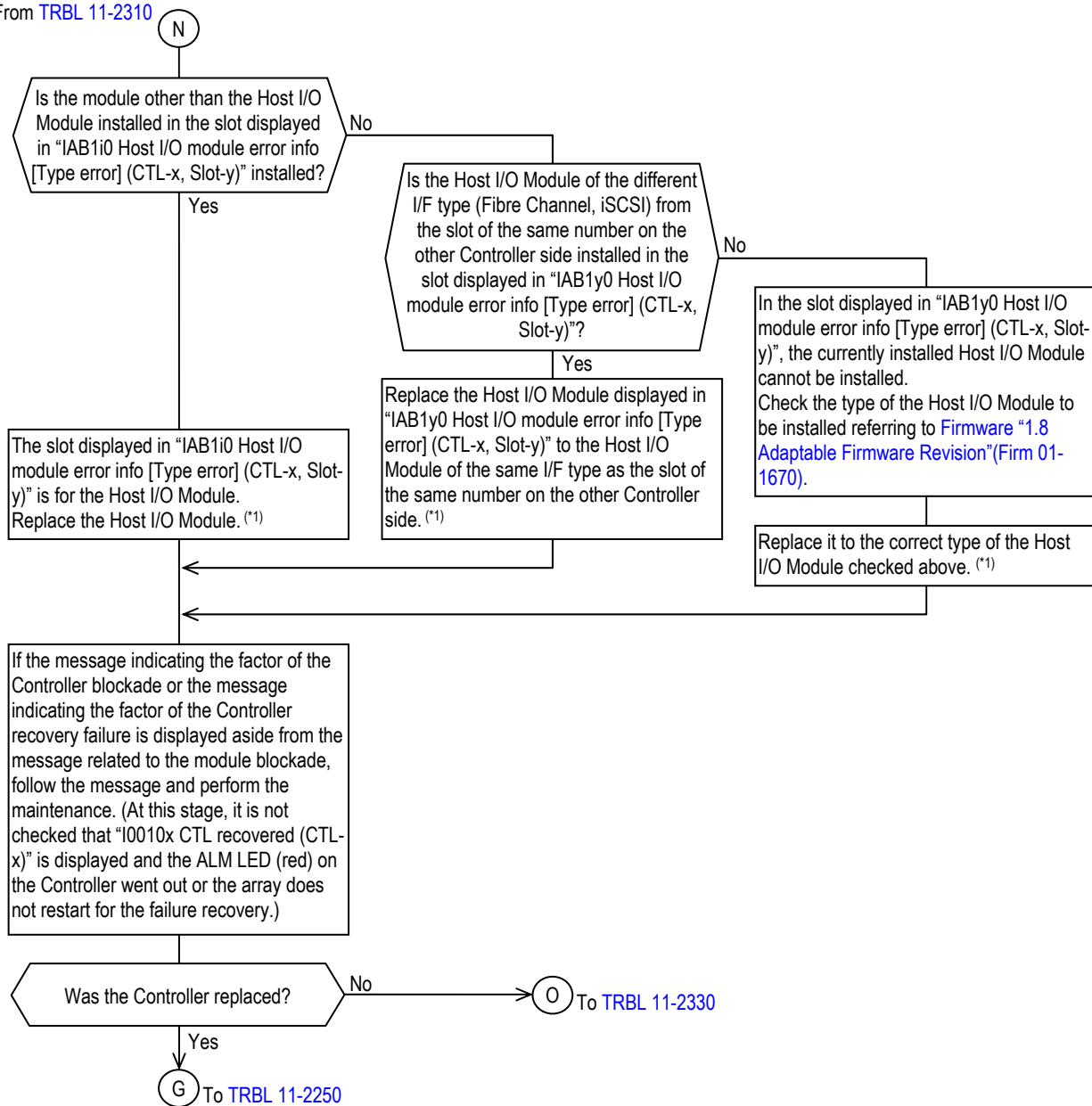
- IAB6i0 Host I/O module error info [Status error] (CTL-x, Slot-y)
- IAG10x CUDG error [Host I/O module] (CTL-x, Slot-y)
- IAH3yx An ECC error was detected in Fibre Channel protocol chip (CTL-x, I/F-y)
- IAH0x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-y)
- IAE0x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-y)
- IAHx PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHx PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHx PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAJ9lx iSCSI protocol chip detected an EDC error (CTL-x, Slot-y)
- IAJAlx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, Slot-y)

\*2 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

From TRBL 11-2200

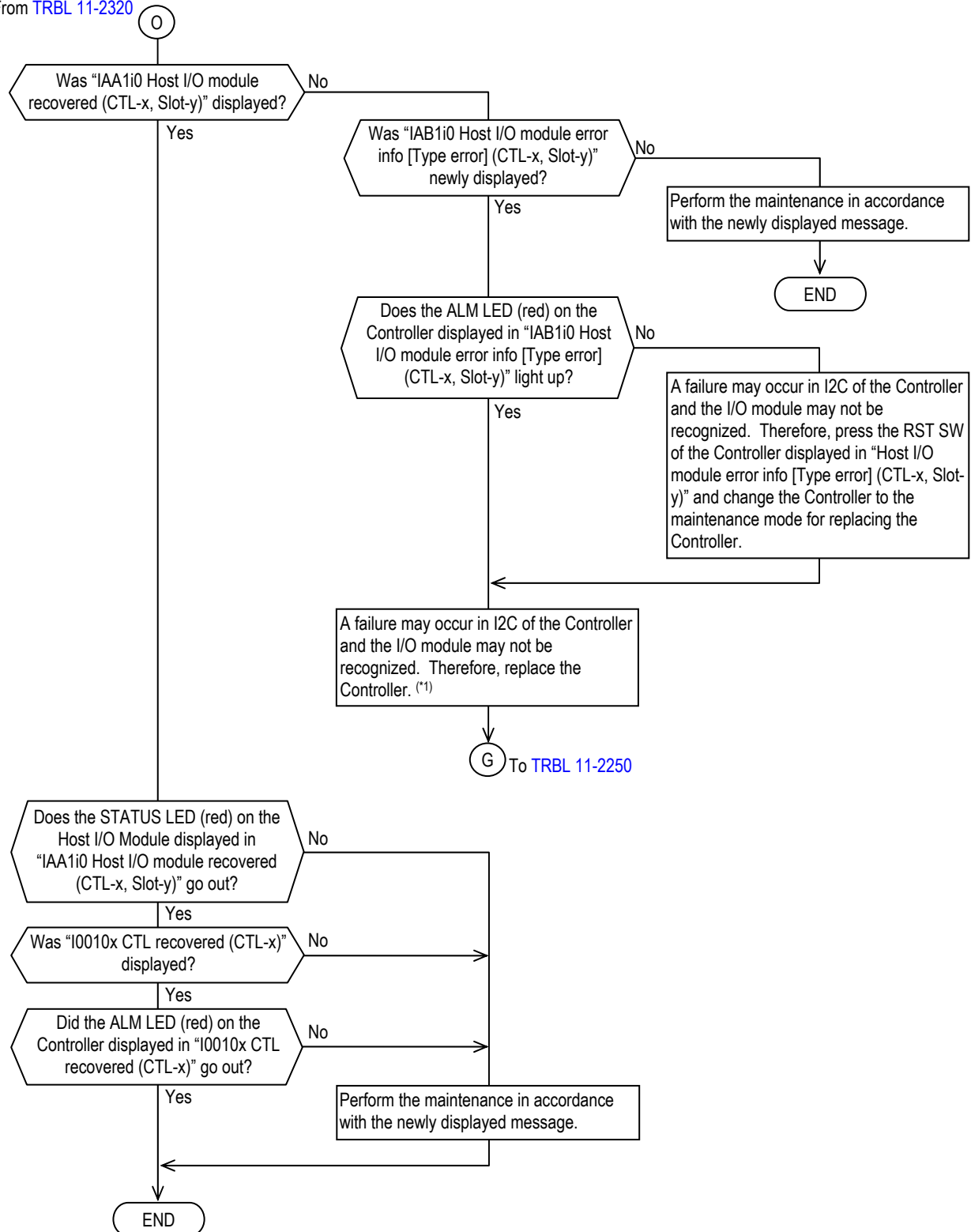


From TRBL 11-2310



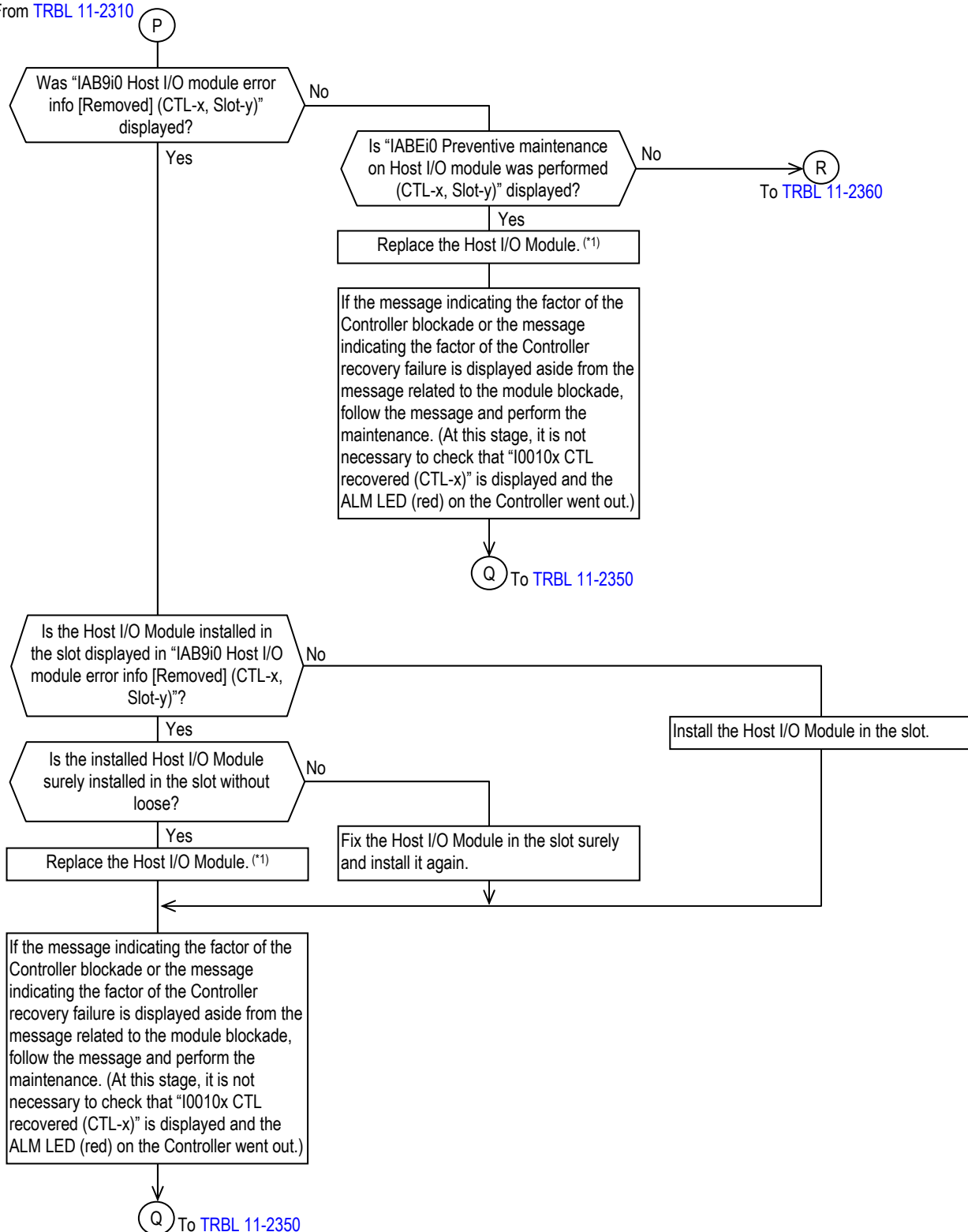
\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module"](#) (REP 02-1100).

From TRBL 11-2320



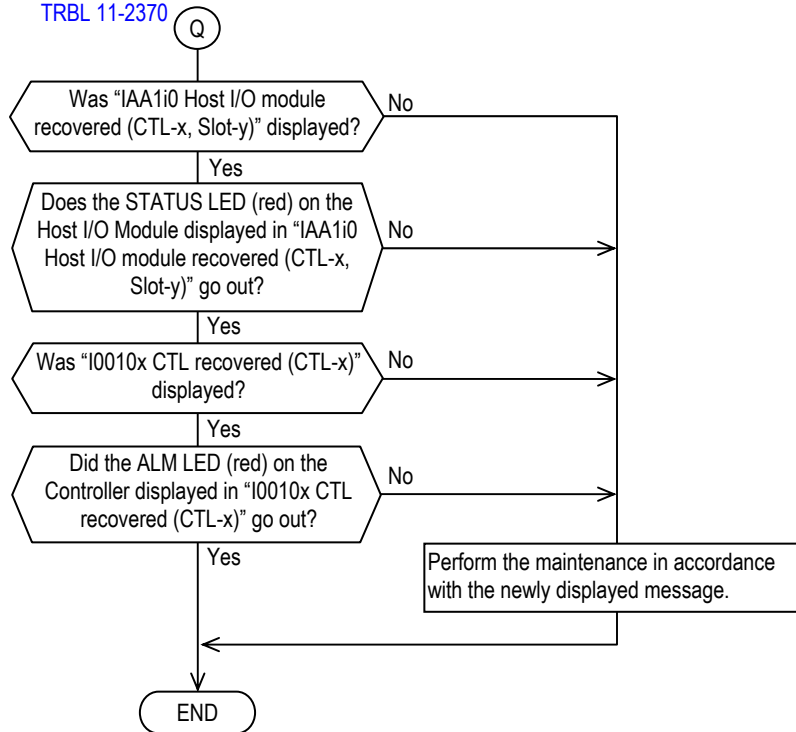
\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

From TRBL 11-2310

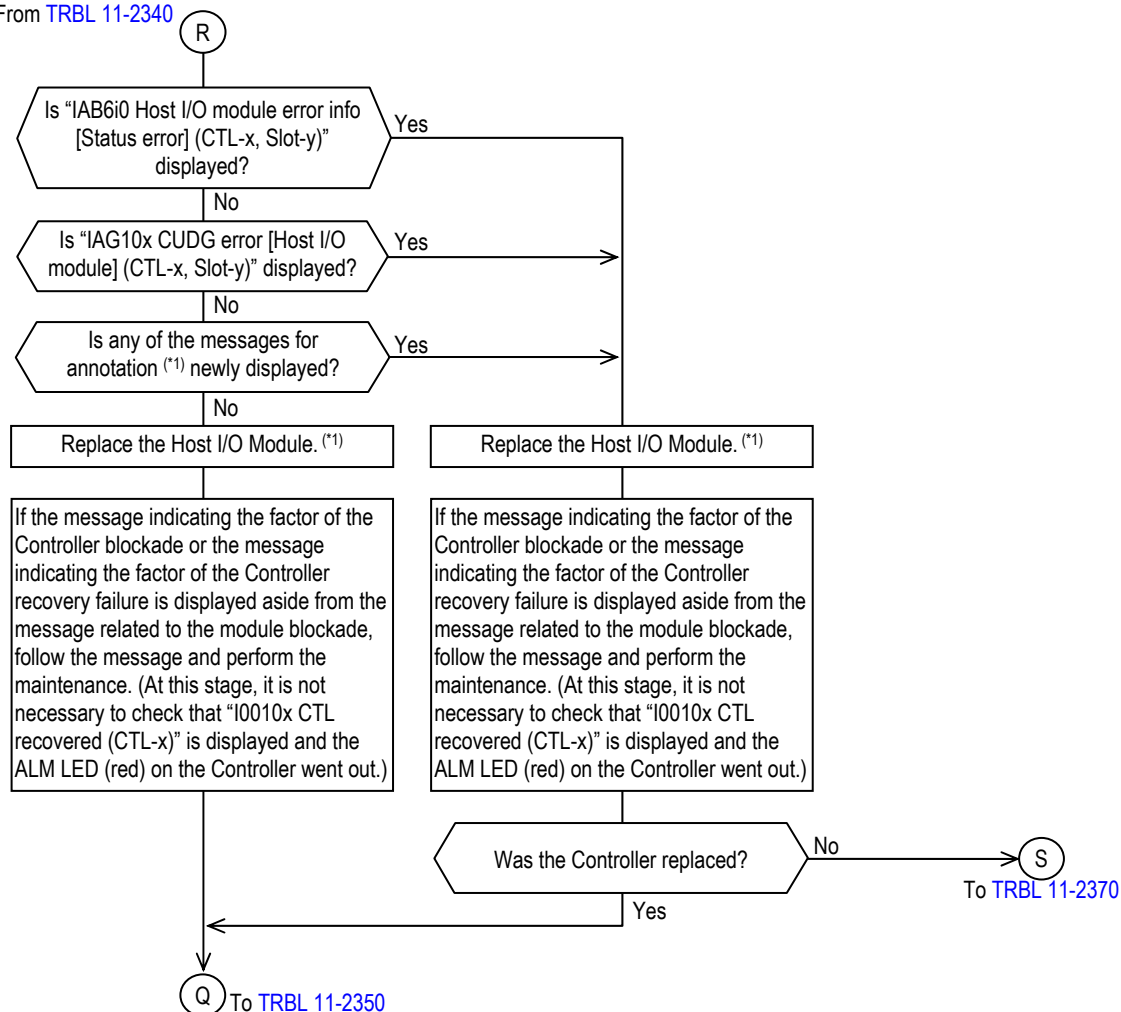


\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

From [TRBL 11-2340](#), [TRBL 11-2360](#),  
[TRBL 11-2370](#)



From TRBL 11-2340

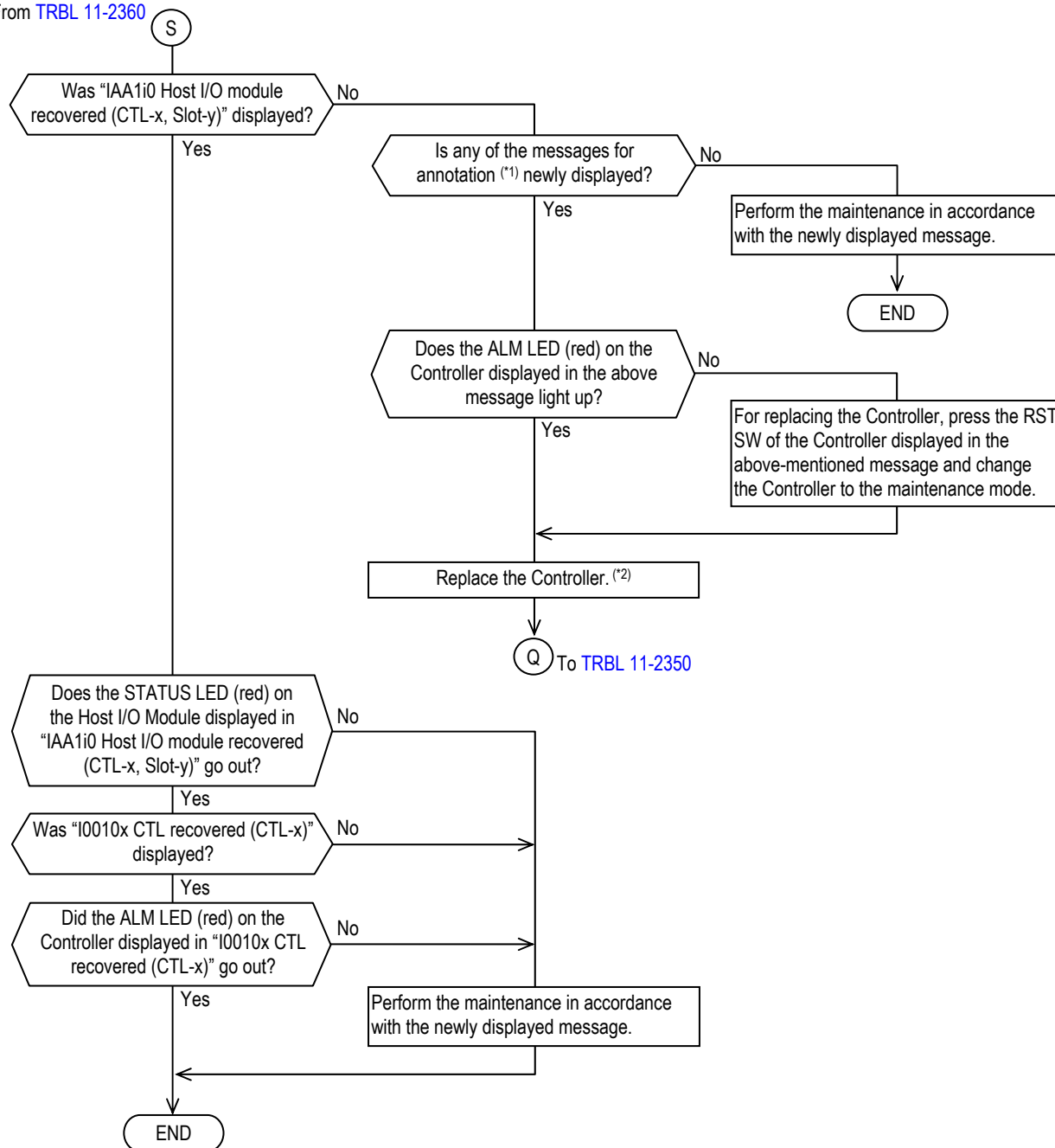


\*1 : List of the messages to be displayed.

- IAH3yx An ECC error was detected in Fibre Channel protocol chip (CTL-x, I/F-y)
- IAHDOx Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-y)
- IAHE0x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-y)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAJ9lx iSCSI protocol chip detected an EDC error (CTL-x, Slot-y)
- IAJAlx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, Slot-y)

\*2 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

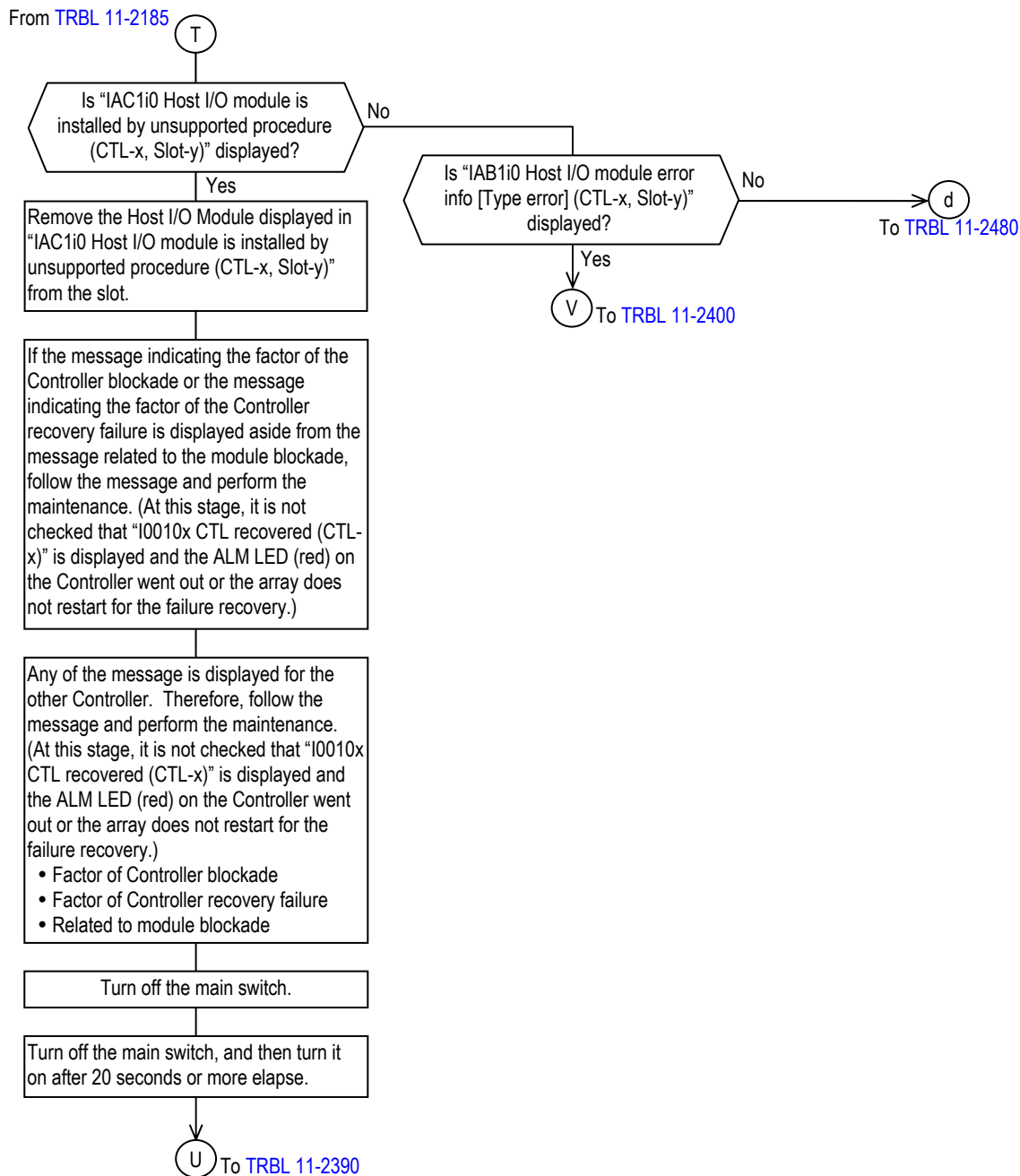


From [TRBL 11-2360](#)

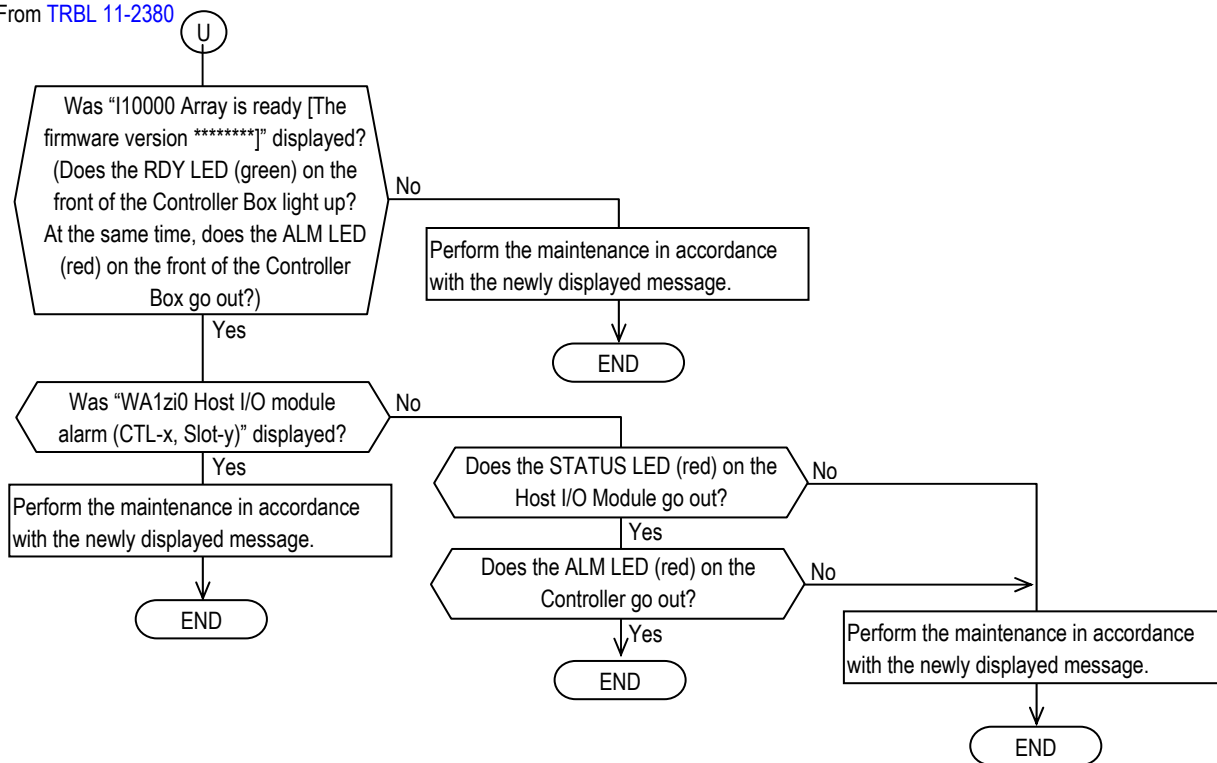
\*1 : List of the messages to be displayed.

- IAB6i0 Host I/O module error info [Status error] (CTL-x, Slot-y)
- IAG10x CUDG error [Host I/O module] (CTL-x, Slot-y)
- IAH3yx An ECC error was detected in Fibre Channel protocol chip (CTL-x, I/F-y)
- IAHDOx Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-y)
- IAHE0x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-y)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAJ9lx iSCSI protocol chip detected an EDC error (CTL-x, Slot-y)
- IAJAlx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, Slot-y)

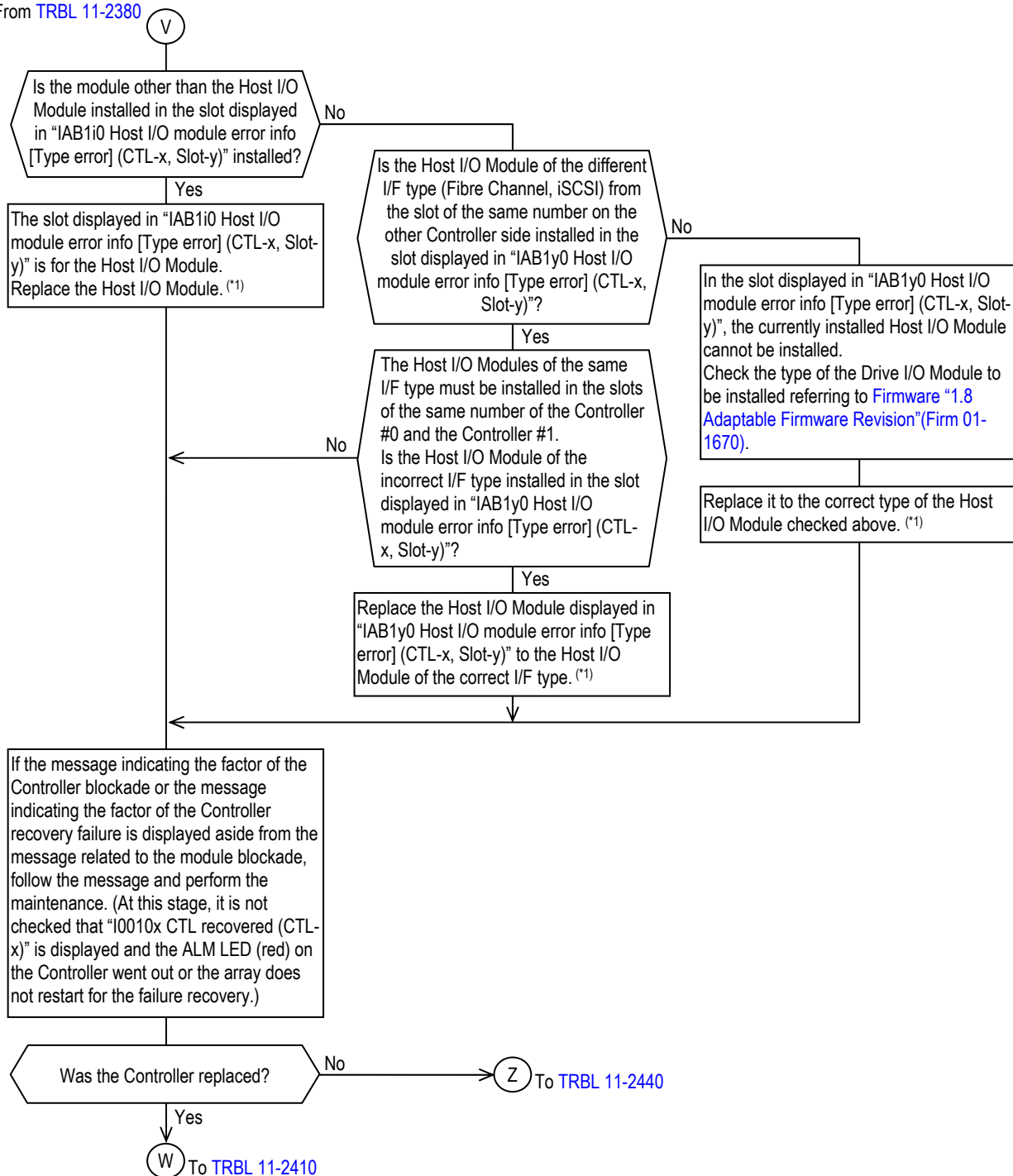
\*2 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).



From TRBL 11-2380

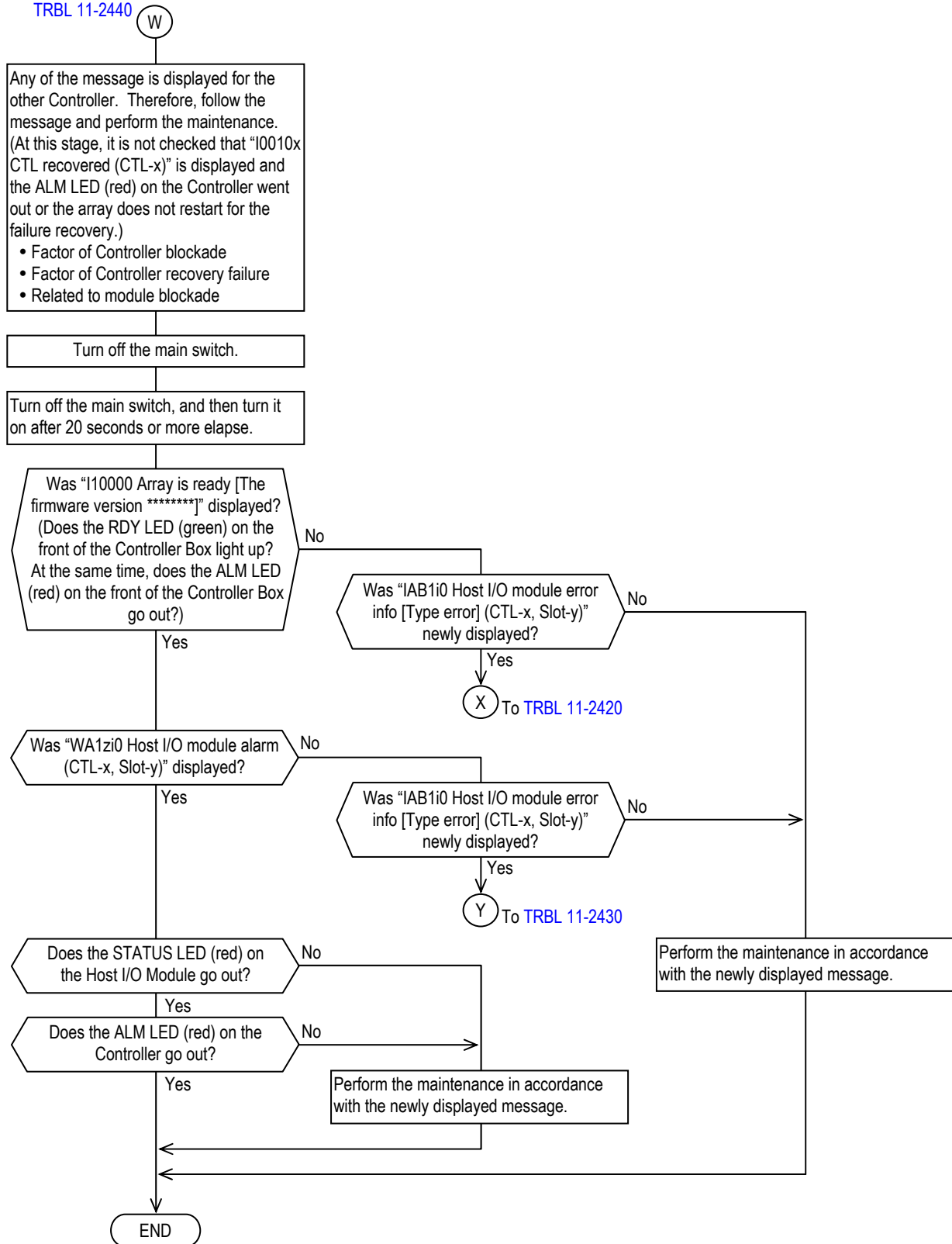


From TRBL 11-2380

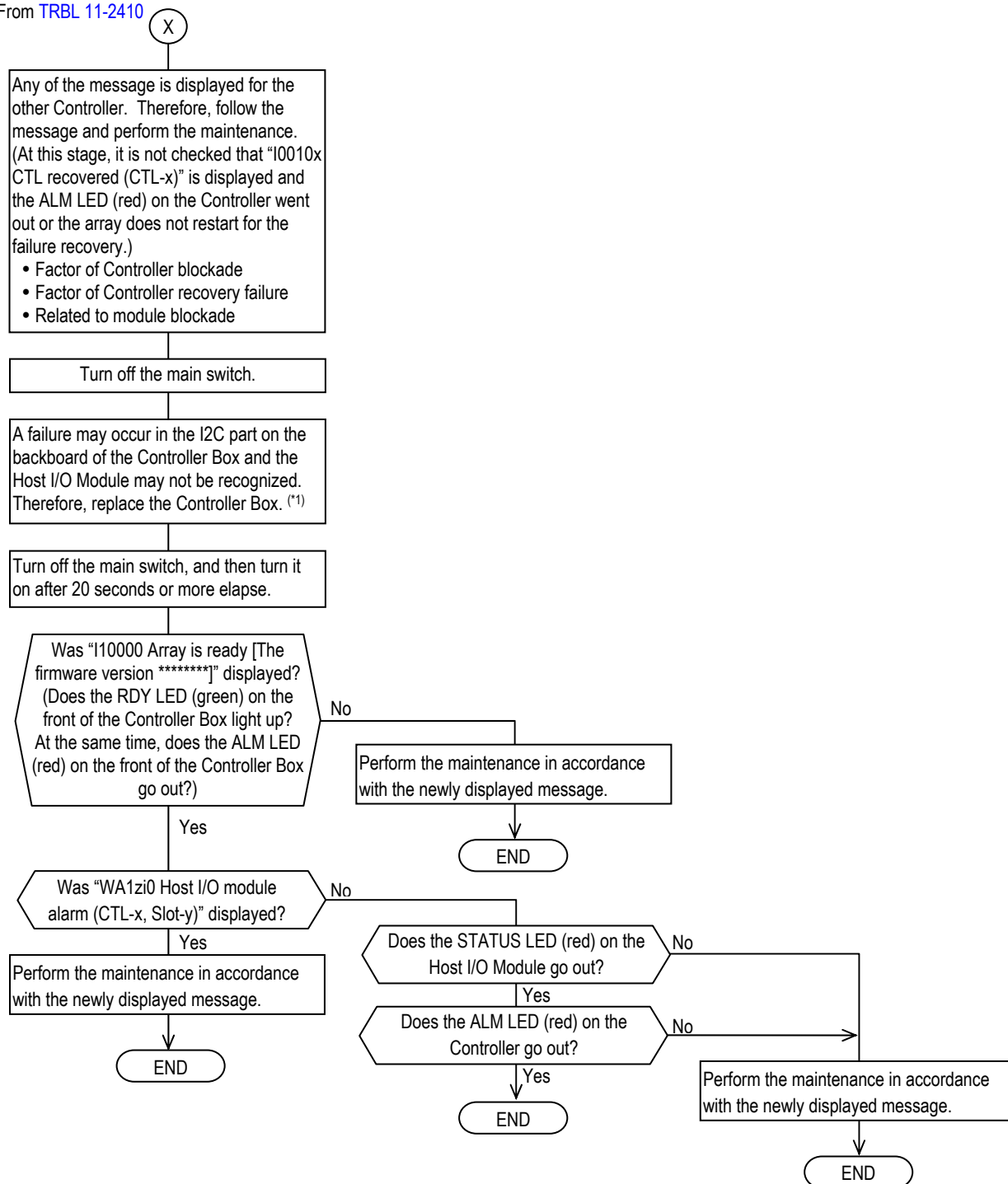


\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module"](#) (REP 02-1100).

From [TRBL 11-2400](#),  
[TRBL 11-2440](#)

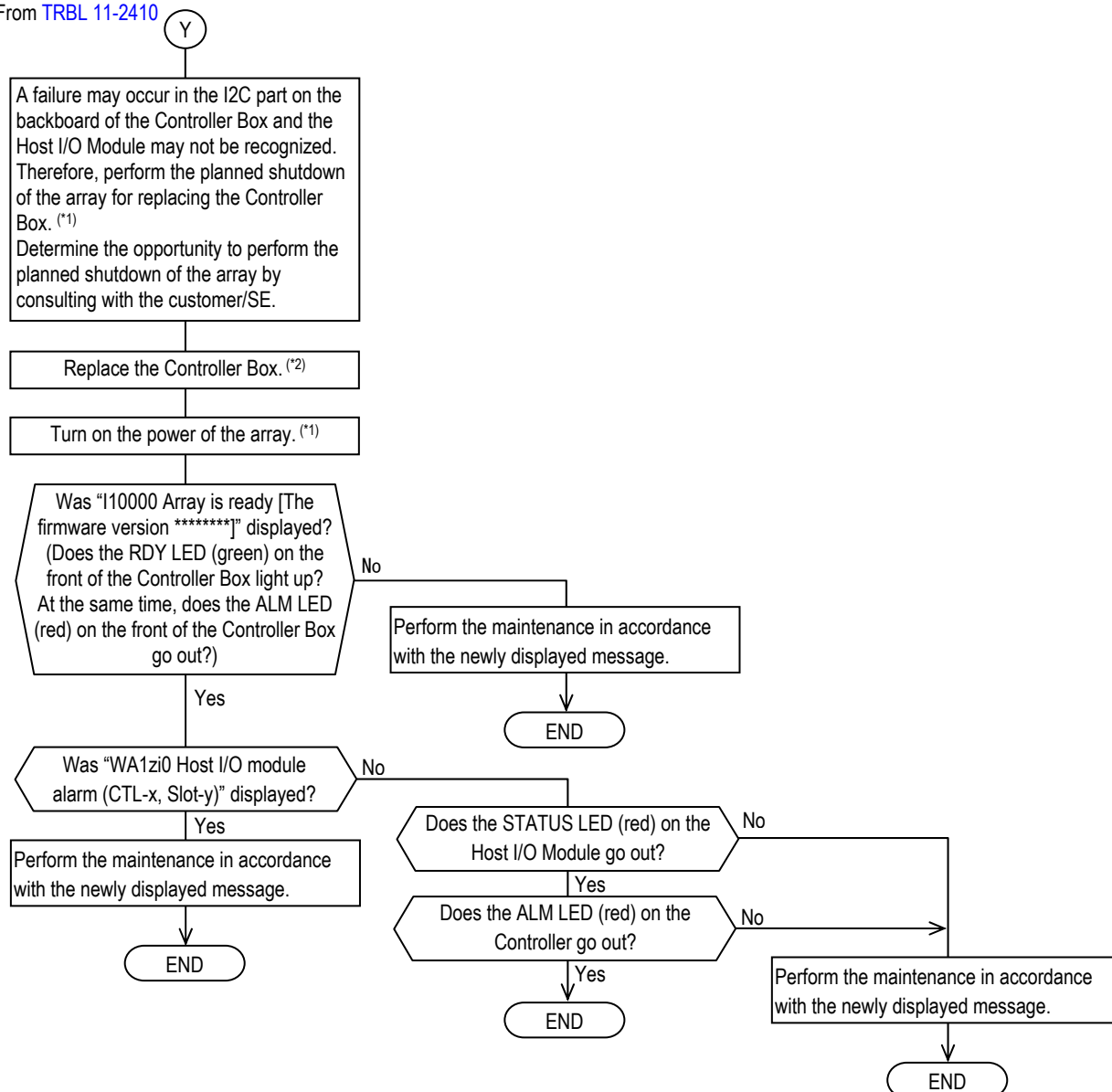


From TRBL 11-2410

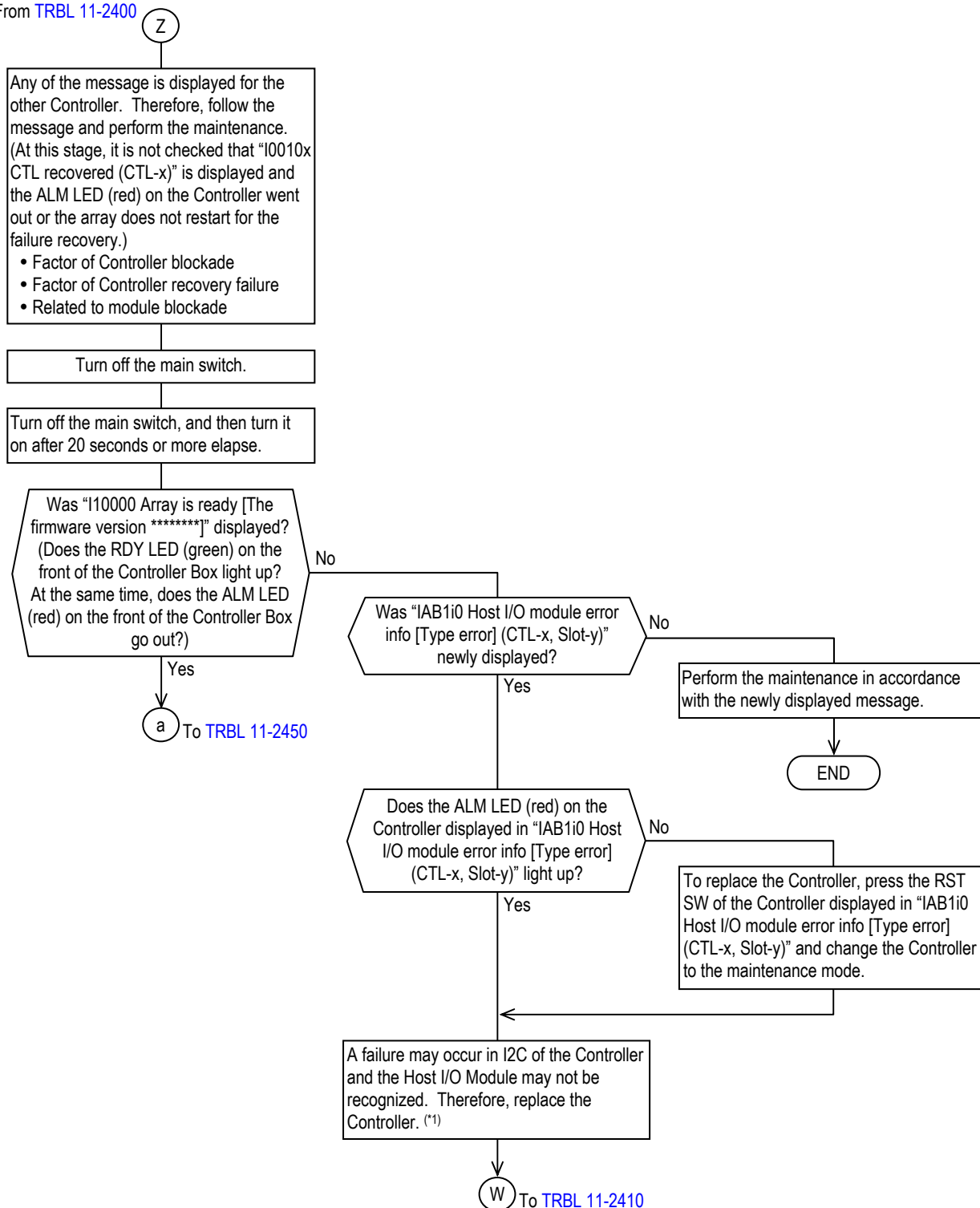


\*1 : For the replacement of the Controller Box, refer to the Replacement "2.2.13 Replacing a Controller Box" (REP 02-1840).

From TRBL 11-2410

\*1 : For how to turn on/off the power, refer to [Installation "1.5 Power On/Off Procedure" \(INST 01-0220\)](#).\*2 : For the replacement of the Controller Box, refer to the [Replacement "2.2.13 Replacing a Controller Box" \(REP 02-1840\)](#).

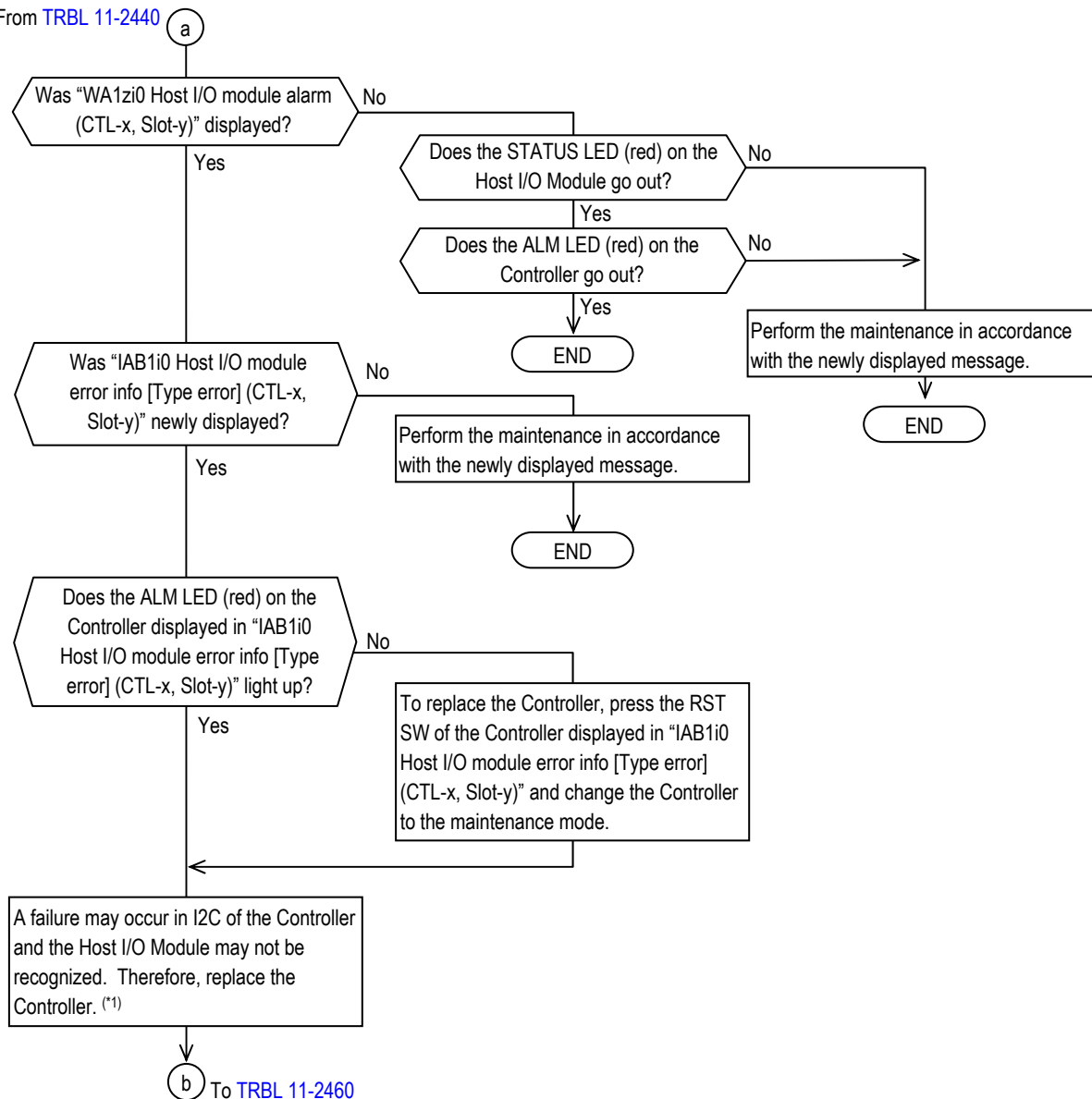
From TRBL 11-2400



\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

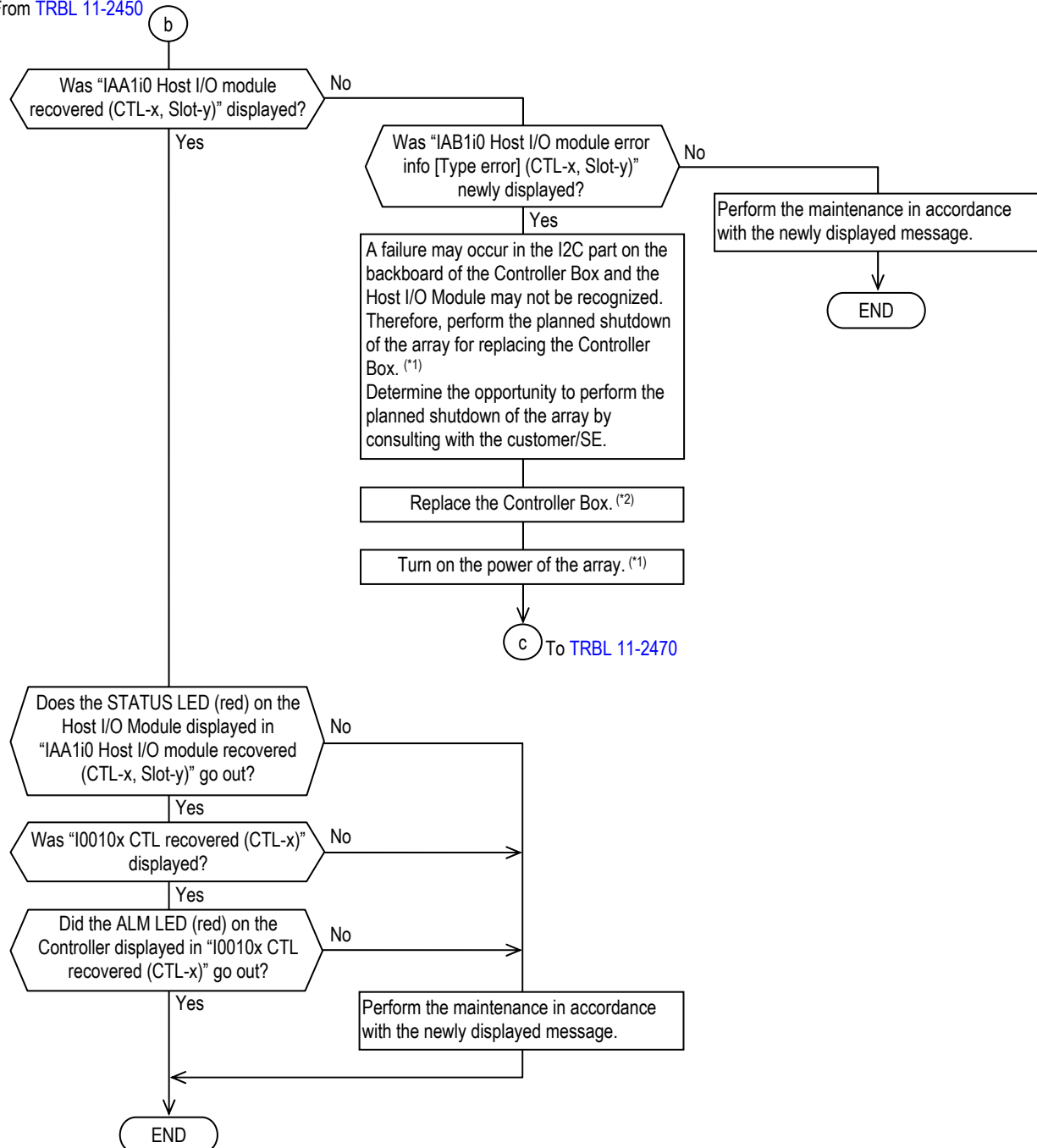


From TRBL 11-2440



\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

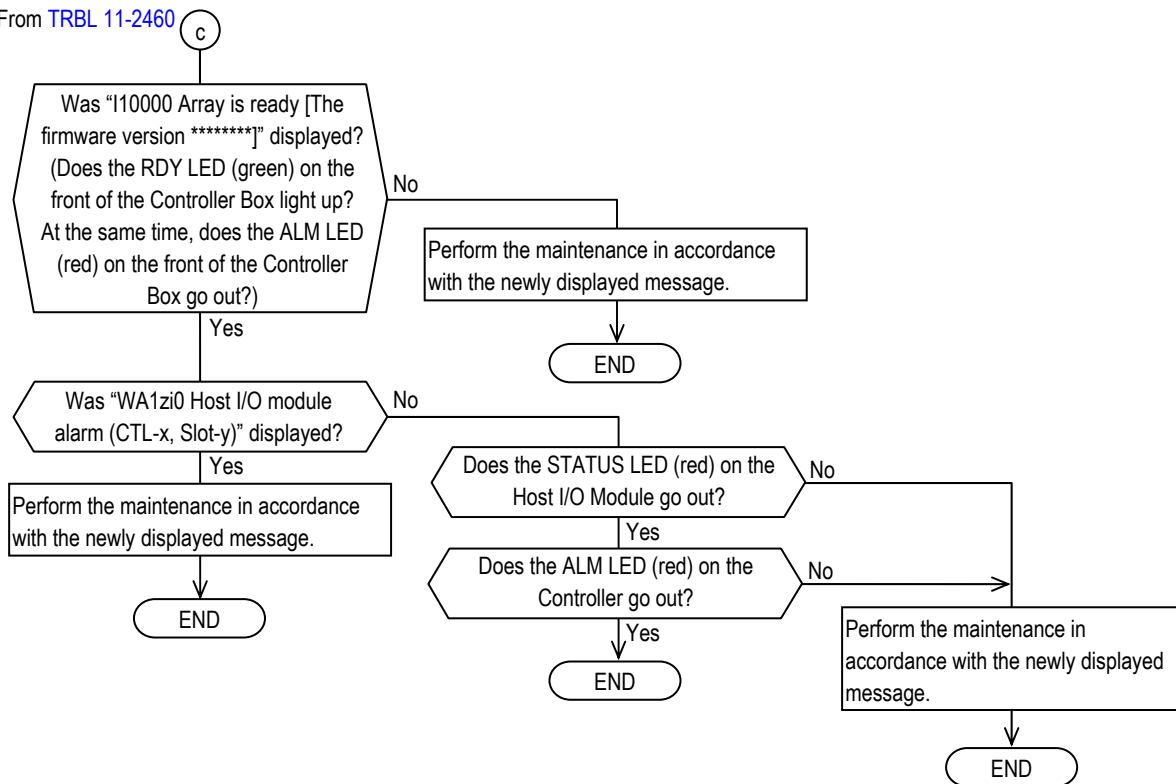
From TRBL 11-2450

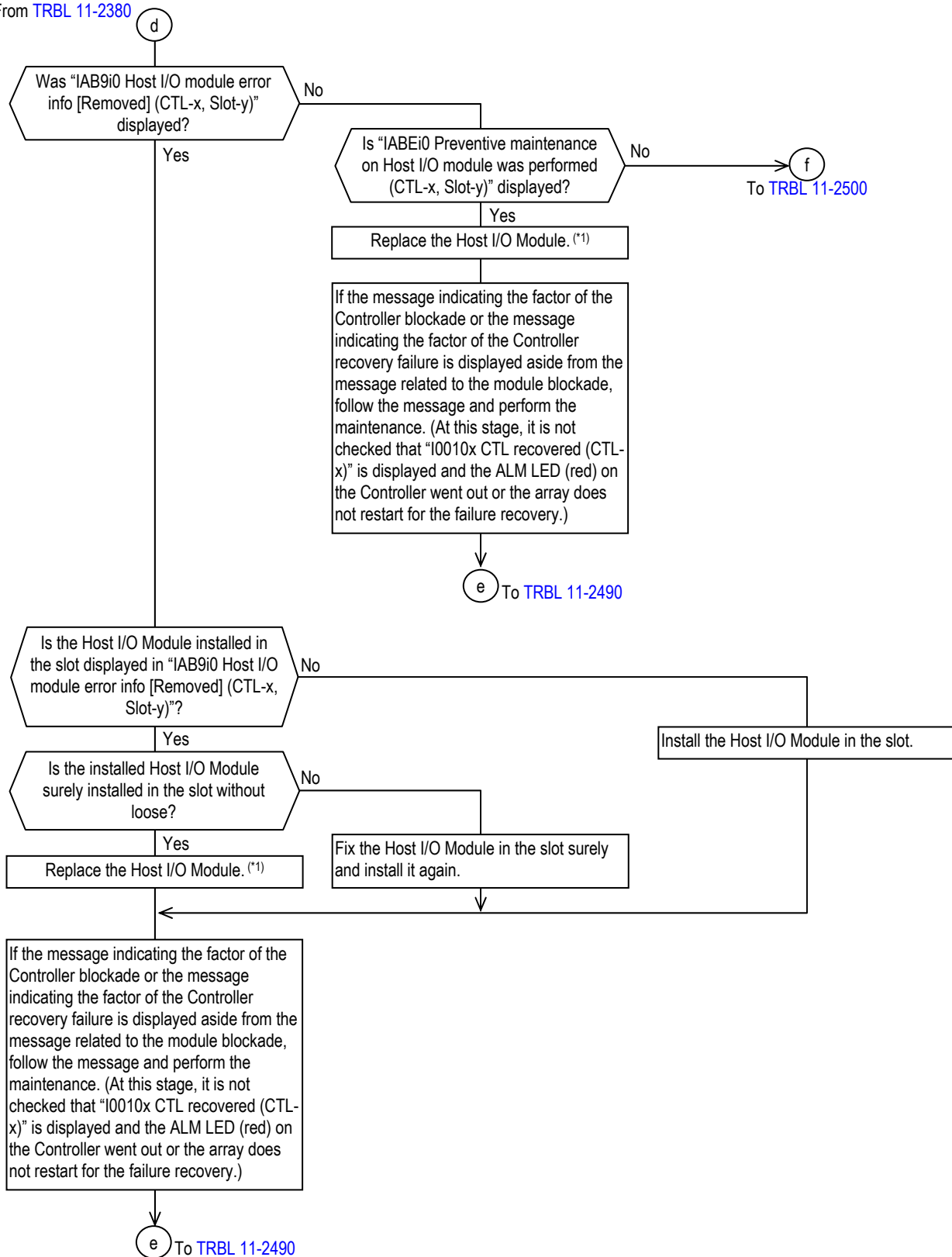


\*1 : For how to turn on/off the power, refer to [Installation "1.5 Power On/Off Procedure" \(INST 01-0220\)](#).

\*2 : For the replacement of the Controller Box, refer to the [Replacement "2.2.13 Replacing a Controller Box" \(REP 02-1840\)](#).

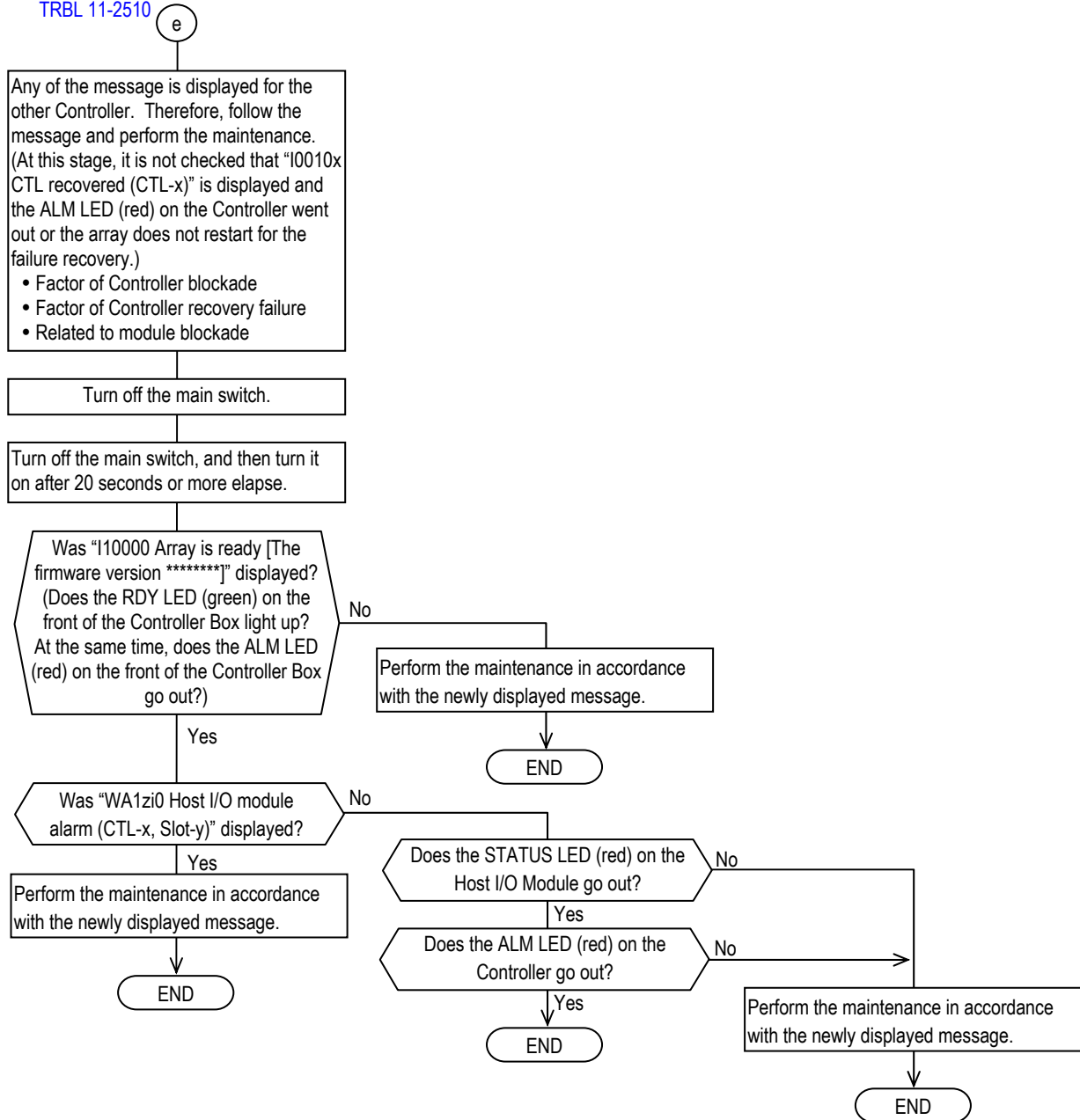
From TRBL 11-2460



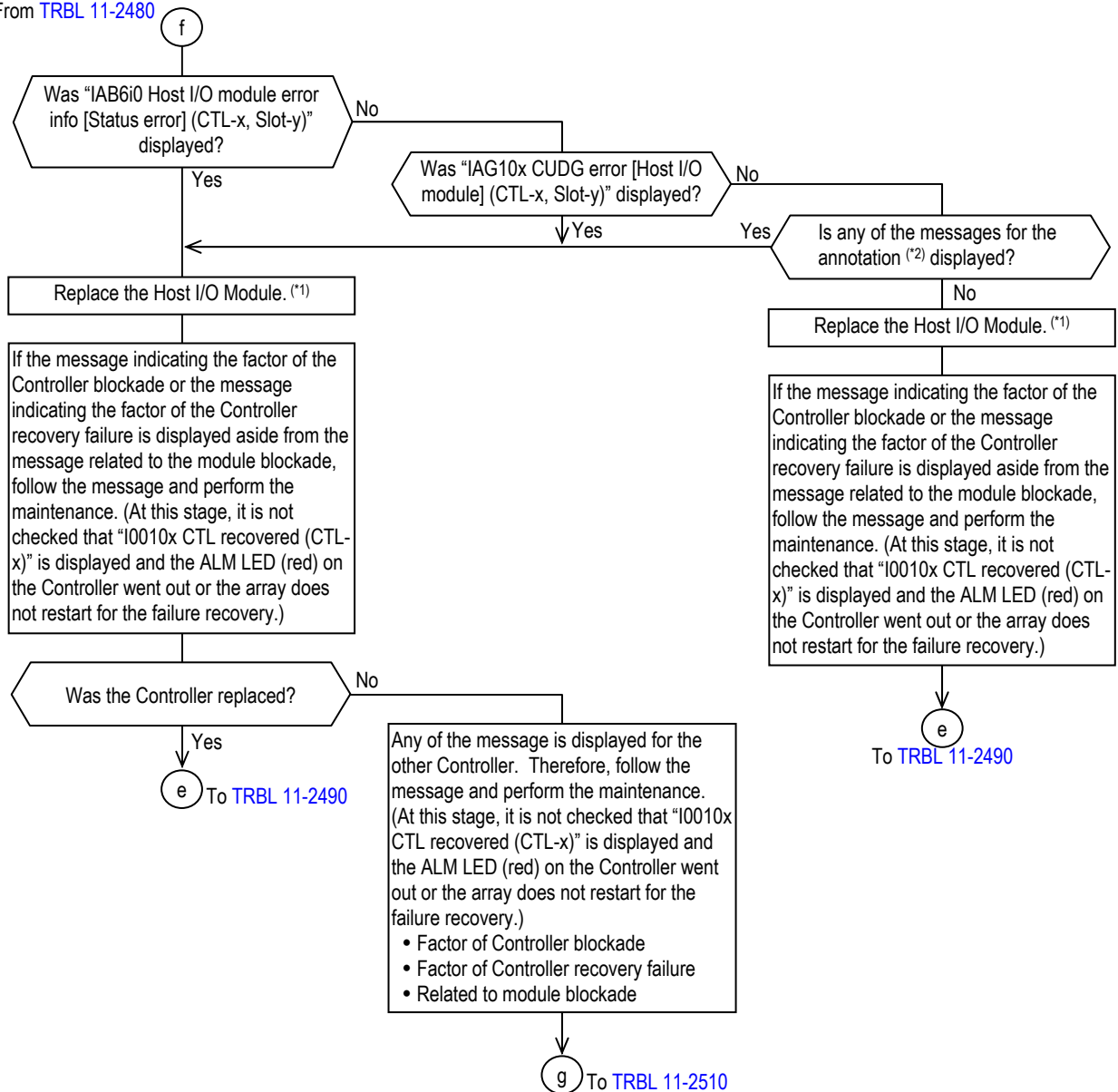
From [TRBL 11-2380](#)

\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

From TRBL 11-2480, TRBL 11-2500,  
TRBL 11-2510



From TRBL 11-2480

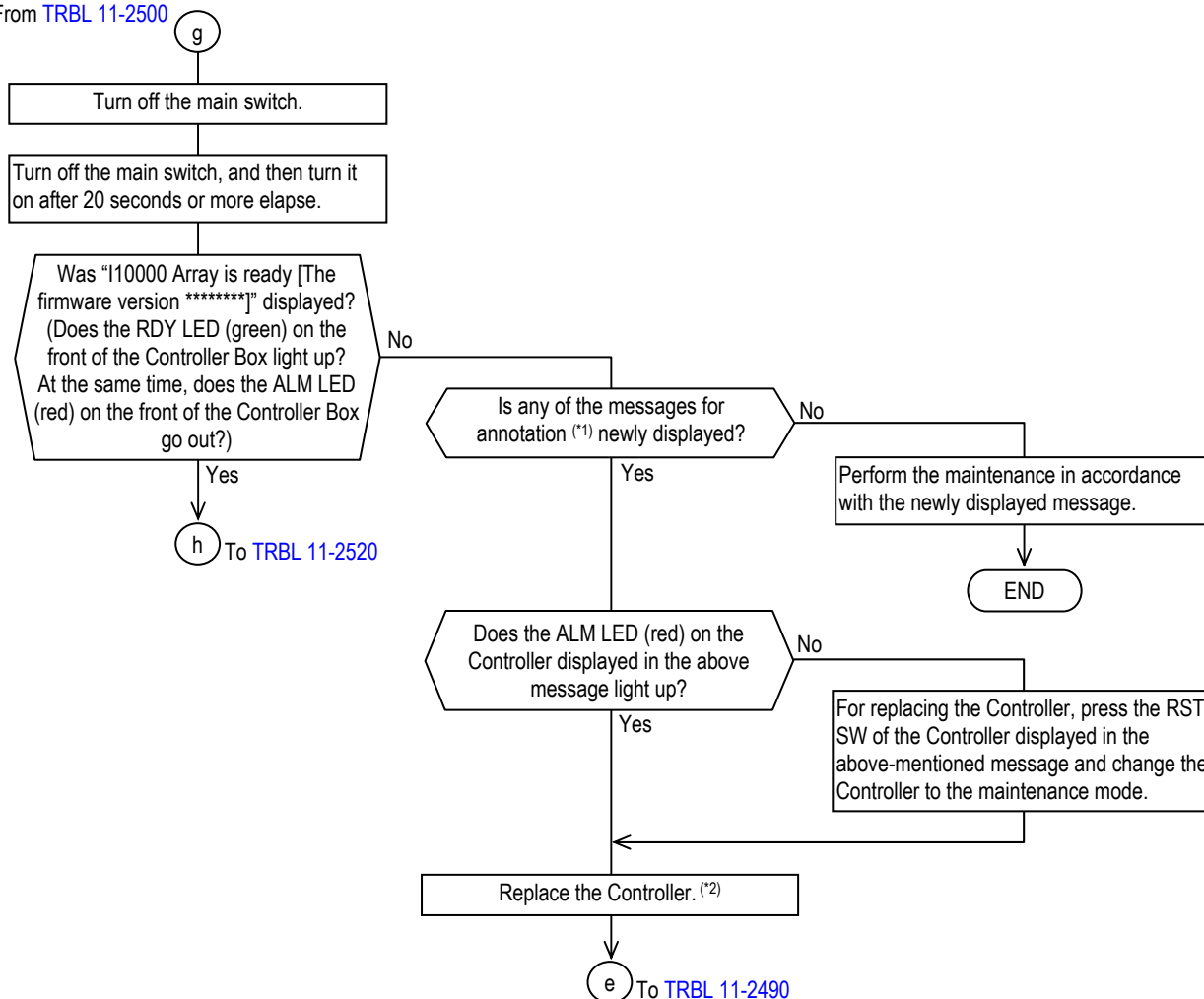


\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : List of the messages to be displayed.

- IAH3yx An ECC error was detected in Fibre Channel protocol chip (CTL-x, I/F-y)
- IAHDOx Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-y)
- IAHE0x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-y)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAJ9lx iSCSI protocol chip detected an EDC error (CTL-x, Slot-y)
- IAJAlx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, Slot-y)

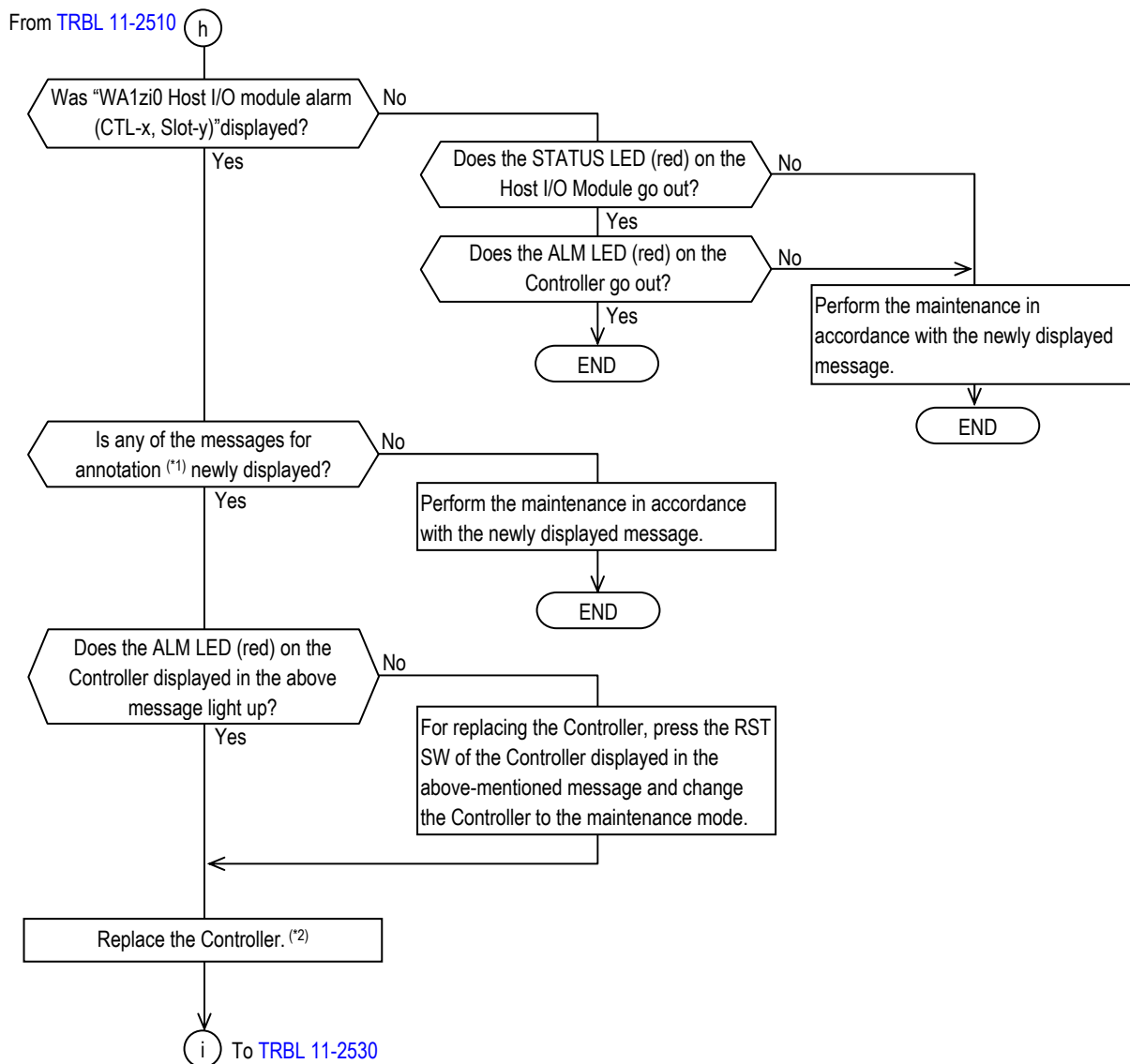
From TRBL 11-2500



\*1 : List of the messages to be displayed.

- IAB6i0 Host I/O module error info [Status error] (CTL-x, Slot-y)
- IAG10x CUDG error [Host I/O module] (CTL-x, Slot-y)
- IAH3yx An ECC error was detected in Fibre Channel protocol chip (CTL-x, I/F-y)
- IAH0x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-y)
- IAE0x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-y)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAJ9lx iSCSI protocol chip detected an EDC error (CTL-x, Slot-y)
- IAJAlx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, Slot-y)

\*2 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).



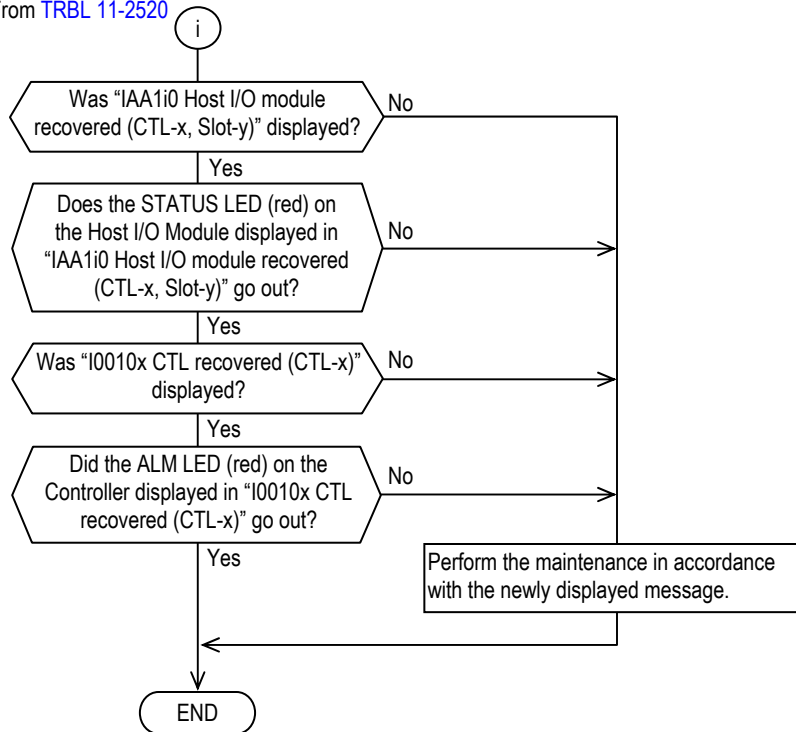
\*1 : List of the messages to be displayed.

- IAB6i0 Host I/O module error info [Status error] (CTL-x, Slot-y)
- IAG10x CUDG error [Host I/O module] (CTL-x, Slot-y)
- IAH3yx An ECC error was detected in Fibre Channel protocol chip (CTL-x, I/F-y)
- IAH0x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-y)
- IAHE0x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-y)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAJ9lx iSCSI protocol chip detected an EDC error (CTL-x, Slot-y)
- IAJAlx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, Slot-y)

\*2 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).



From [TRBL 11-2520](#)



### 11.1.35 Recovery Method at the Time of Host I/O Board Blockade

[WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy W3Rzhx Interface Board alarm (CTL-w, I/F-x)			:IFBD/STRC
Date	Time	x : Detect Controller # y : Detect Core #	

If the firmware version is 0925/A or later, a Host I/O Board failure causes a Host I/O Board blockage instead of a dummy Controller blockage when READY LED (green) on the front of the Controller Box is on. This enables a Host I/O Board recovery by resolving the only factor related to the Host I/O Board failure.

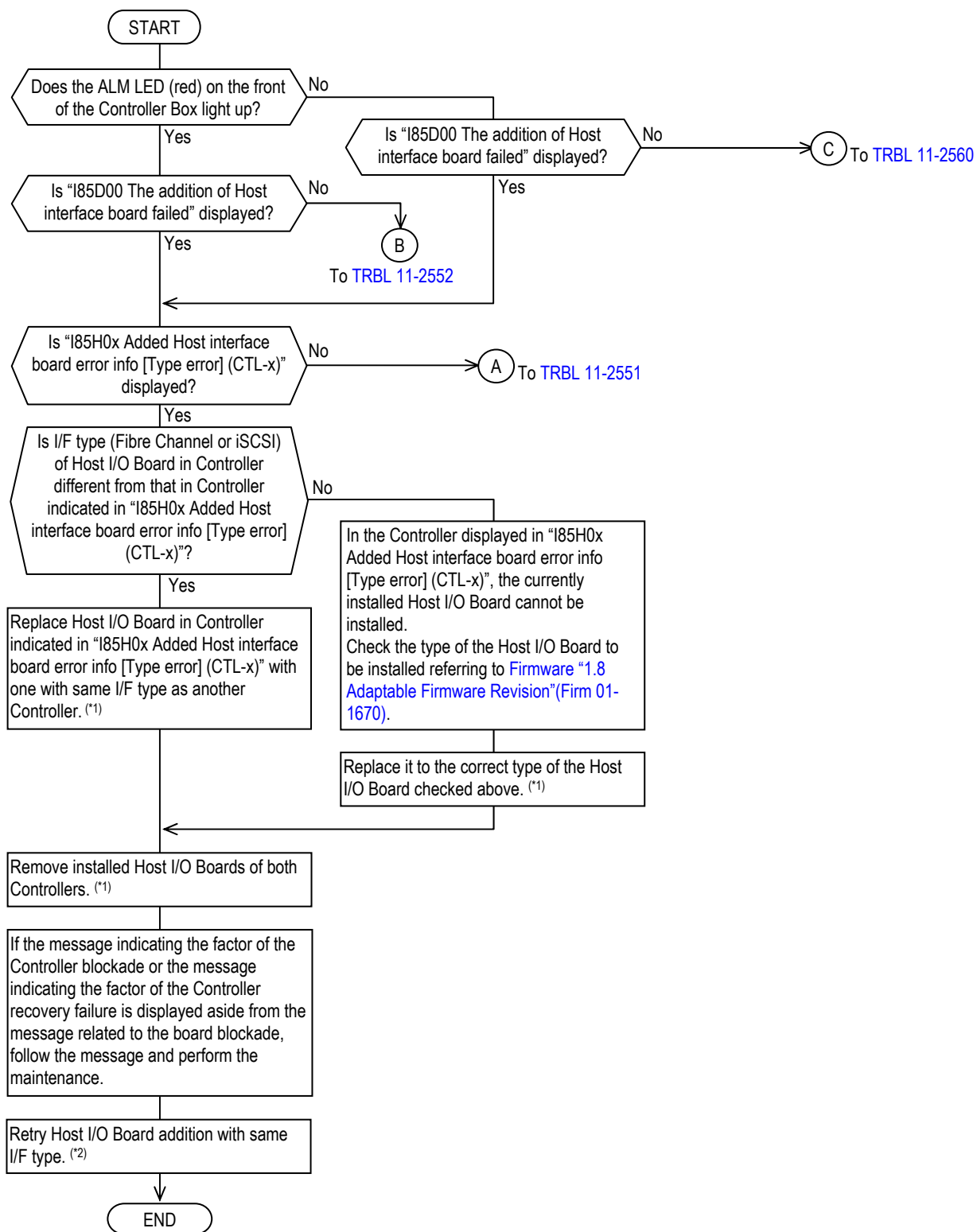
If a dummy Controller blockage is caused by a Host I/O Board failure, the message “W70z00 Recoverable CTL alarm by the maintenance procedures of the blocked component (CTL-x)” is output. Perform maintenance work according to the message.

**Table 11.1.12 WEB Information Error Message to Be Output Depending on Installation Condition of Host I/O Board between Both Controllers**

No.	Controller #0, Installation Status of Host I/O Board #1	Controller #1, Installation Status of Host I/O Board #1	Controller # of Host I/O Board #1 Where WEB Information Message Is Output	WEB Information Message to Be Output
1	Unsupported (new-type) version	Unsupported (new-type) version	Both Controllers	IAIFyx Host interface board is installed by unsupported procedure (CTL-x, I/F-y)
2			(When I/O Boards are added of both Controllers with array Ready.) both Controllers	I85J0x Added Host interface board error info [Unsupported procedure] (CTL-x)
3	Unsupported (new-type) version	Unmount	Controller #0	IAIFy0 Host interface board is installed by unsupported procedure (CTL-x, I/F-y)
4	Unsupported (new-type) version	Support	Controller #0	IAI9y0 Host interface board error info[Type error] (CTL-x, I/F-y)
5			(When I/O Boards are added of both Controllers with array Ready.) Controller #0	I85H00 Added Host interface board error info [Type error] (CTL-0)
6	Unmount	Unsupported (new-type) version	Controller #1	IAIFy1 Host interface board is installed by unsupported procedure (CTL-x, I/F-y)
7	Unmount	Unmount	None	None
8	Unmount	Support	Controller #0	IAIAy0 Host interface board error info[Not installed] (CTL-x, I/F-y)
9	Support	Unsupported (new-type) version	Controller #1	IAI9y1 Host interface board error info[Type error] (CTL-x, I/F-y)
10			(When I/O Boards are added of both Controllers with array Ready.) Controller #1	I85H01 Added Host interface board error info [Type error] (CTL-1)
11	Support	Unmount	Controller #1	IAIAy1 Host interface board error info[Not installed] (CTL-x, I/F-y)
12	Support (Fibre Channel I/F)	Support (Fibre Channel I/F)	None	None
13	Support (iSCSI I/F)	Support (iSCSI I/F)	None	None

No.	Controller #0, Installation Status of Host I/O Board #1	Controller #1, Installation Status of Host I/O Board #1	Controller # of Host I/O Board #1 Where WEB Information Message Is Output	WEB Information Message to Be Output
14	Fibre Channel I/F	iSCSI I/F	(When starting the array) Both Controllers	IAI9yx Host interface board error info[Type error] (CTL-x, I/F-y)
15			(When I/O Boards are added of both Controllers with array Ready.) Controller #1	I85H01 Added Host interface board error info [Type error] (CTL-1)
16			(When replacing the Controller) Replacing the Controller	IAI9yx Host interface board error info[Type error] (CTL-x, I/F-y)
17	iSCSI I/F	Fibre Channel I/F	(When starting the array) Both Controllers	IAI9yx Host interface board error info[Type error] (CTL-x, I/F-y)
18			(When I/O Boards are added of both Controllers with array Ready.) Controller #1	I85H01 Added Host interface board error info [Type error] (CTL-1)
19			(When replacing the Controller) Replacing the Controller	IAI9yx Host interface board error info[Type error] (CTL-x, I/F-y)

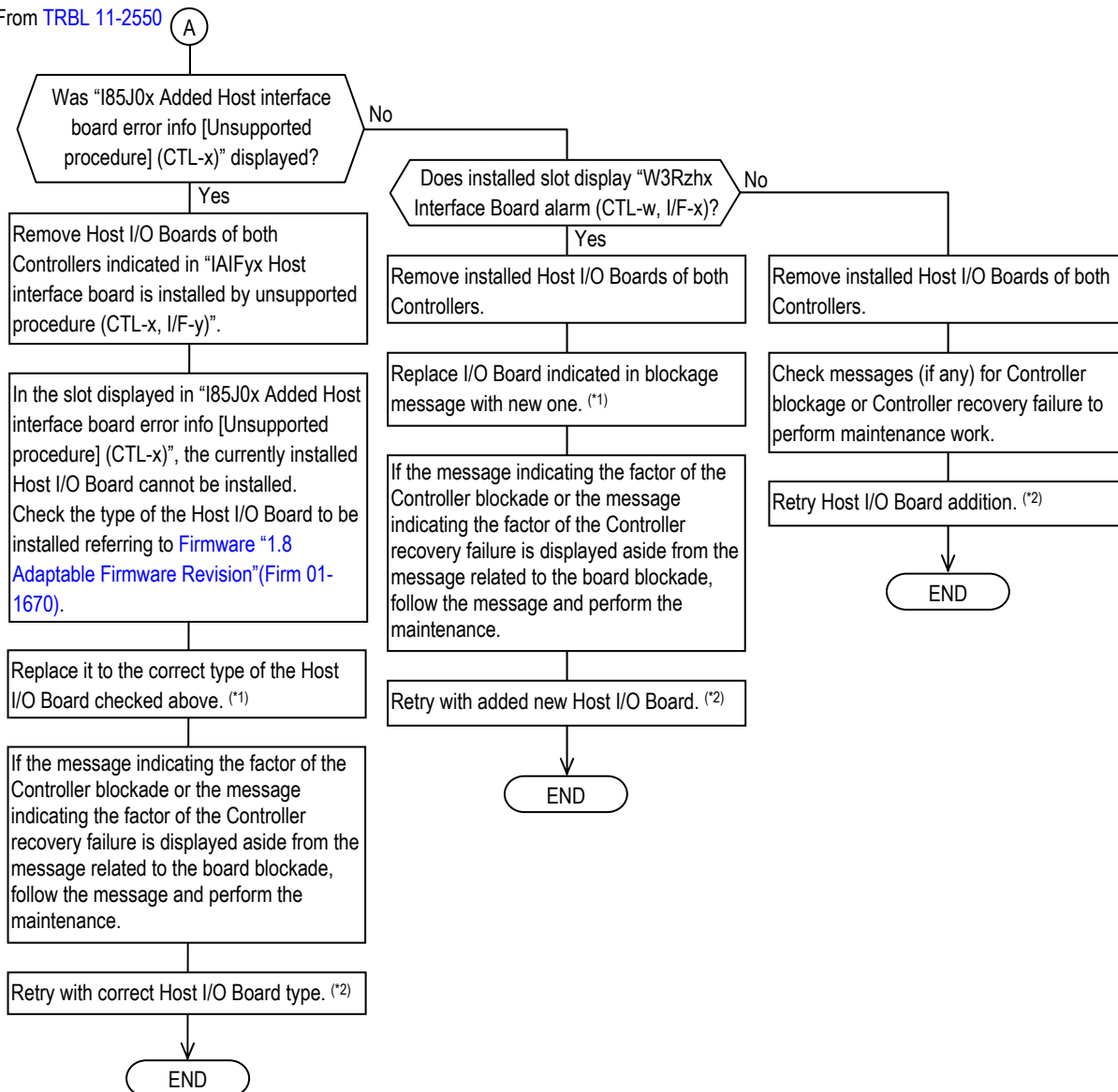
## [Recovery method]



\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : For adding Host I/O Boards, see the online (A host is in operation) adding procedure in [Addition/Removal/Relocation "1.4.4 Adding a FC Host I/O Board/Module \(2\)" \(ADD 01-0561\)](#), [Addition/Removal/Relocation "1.4.5 Adding an iSCSI Host I/O Board/Module \(2\)" \(ADD 01-0632\)](#).

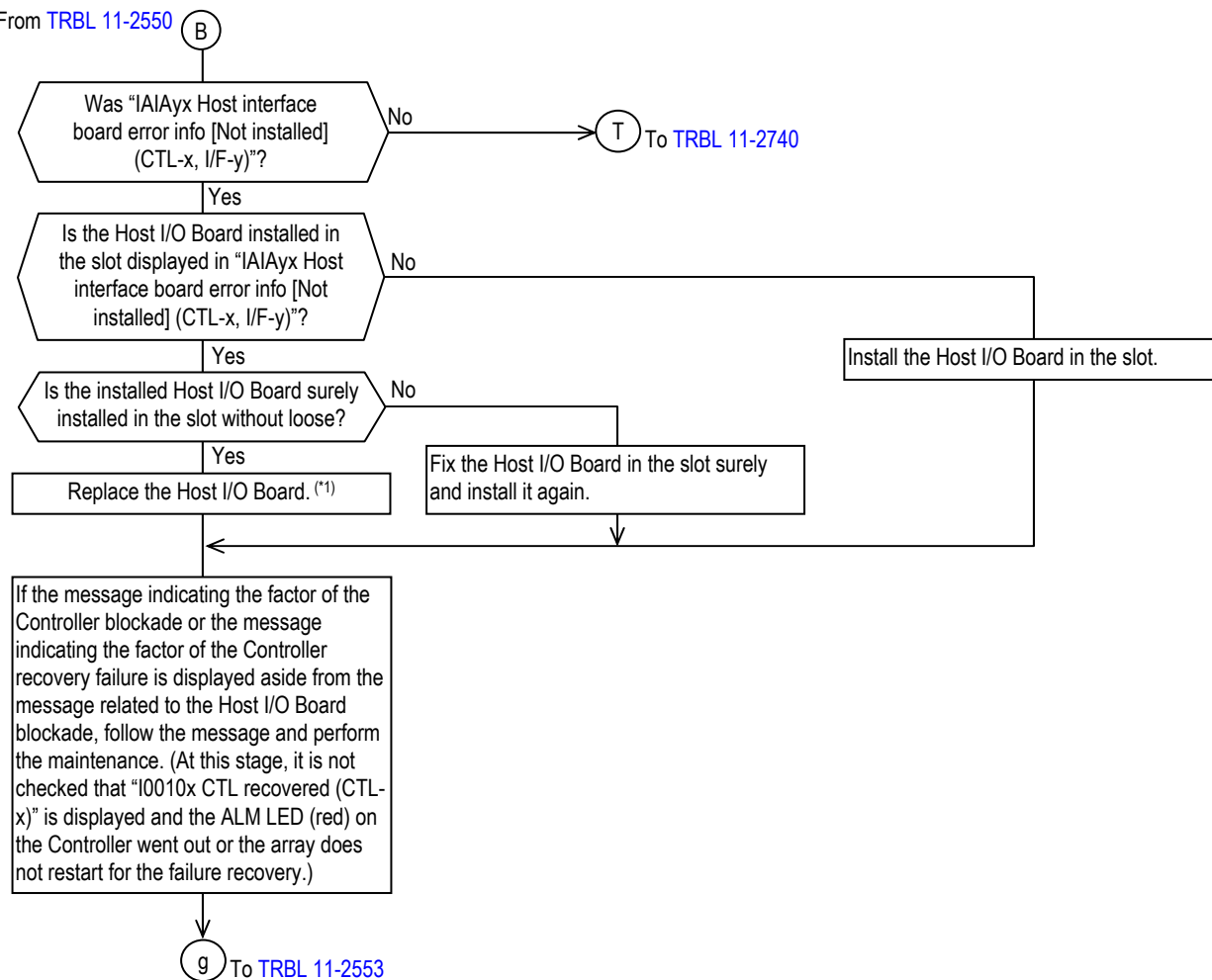
From TRBL 11-2550



\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

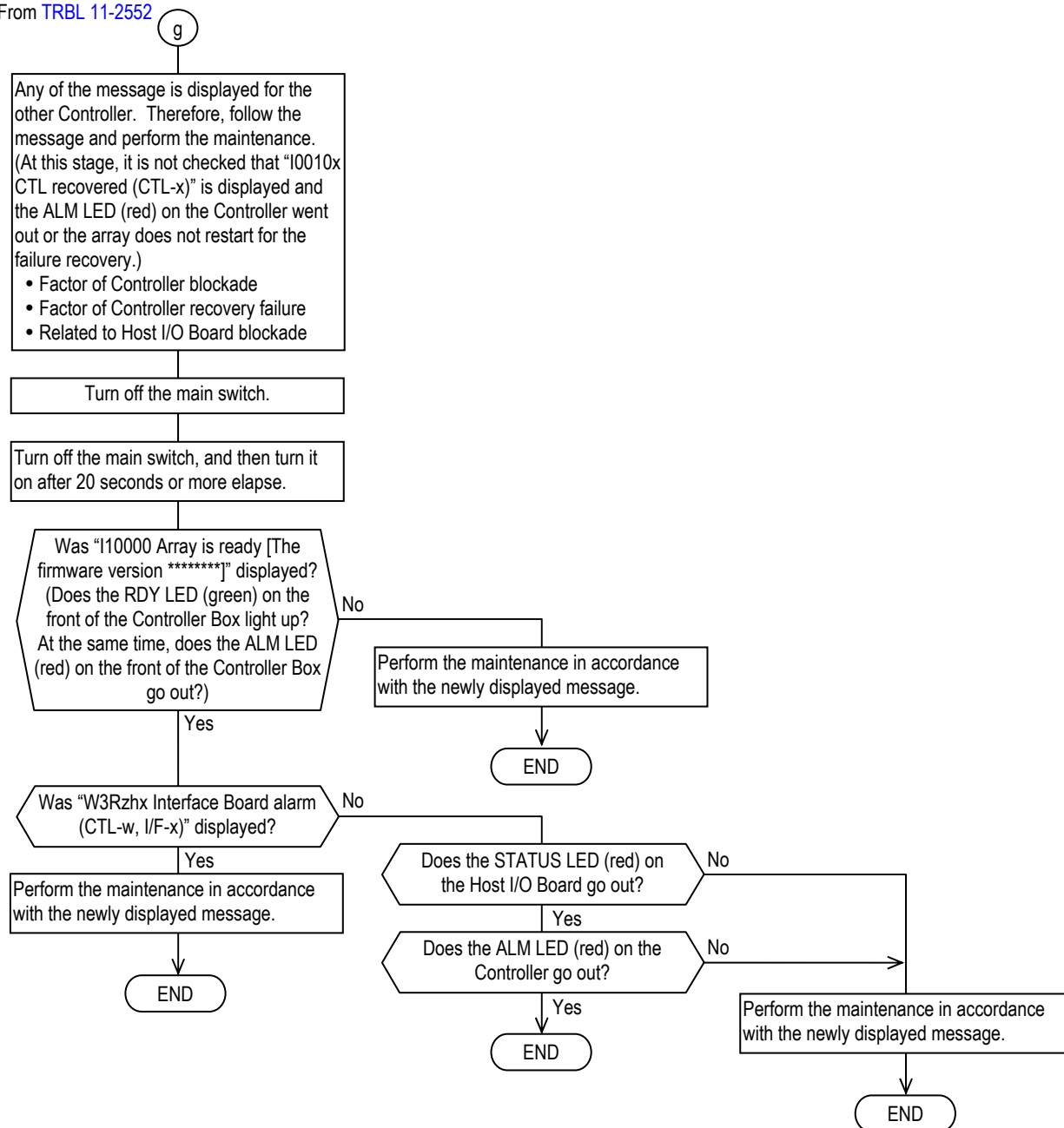
\*2 : For adding Host I/O Boards, see the online (A host is in operation) adding procedure in [Addition/Removal/Relocation "1.4.4 Adding a FC Host I/O Board/Module \(2\)" \(ADD 01-0561\)](#), [Addition/Removal/Relocation "1.4.5 Adding an iSCSI Host I/O Board/Module \(2\)" \(ADD 01-0632\)](#).

From TRBL 11-2550

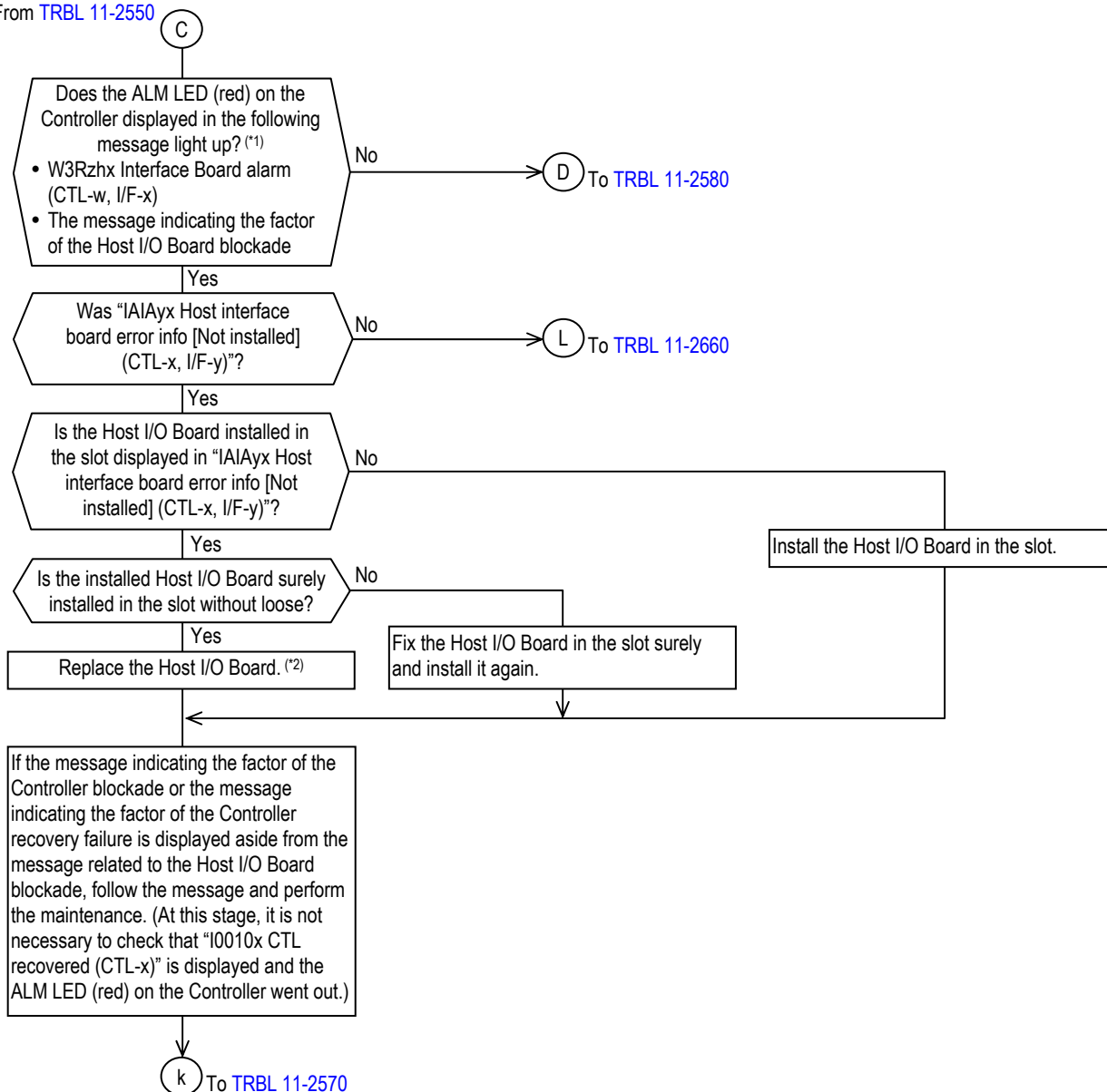


\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module"](#) (REP 02-1100).

From TRBL 11-2552



From TRBL 11-2550

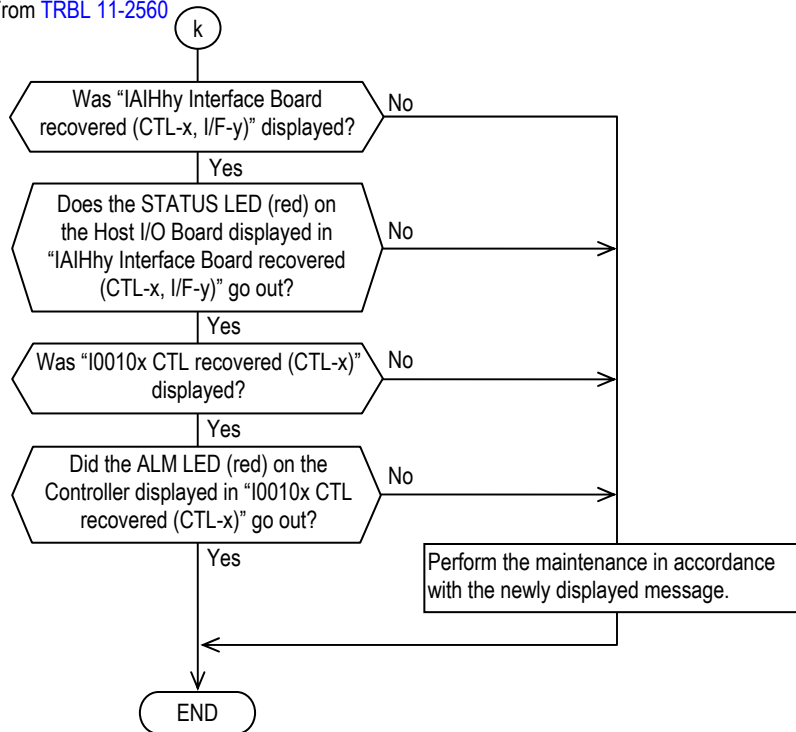


\*1 : If the firmware version is 0925/A or later, a Host I/O Board blockade does not cause a dummy Controller blockade, resulting in ALM LED (red) not being on.

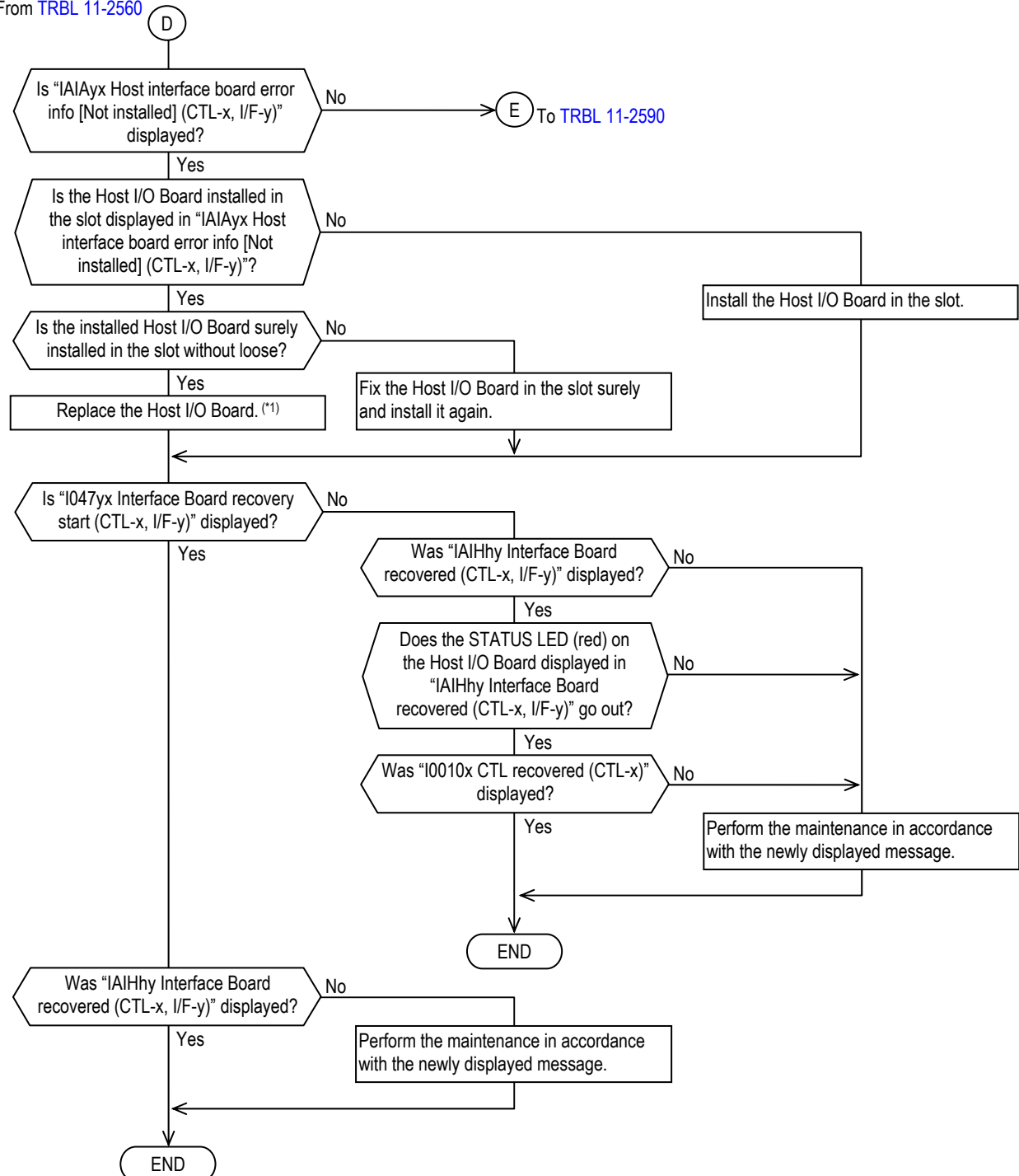
\*2 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).



From TRBL 11-2560

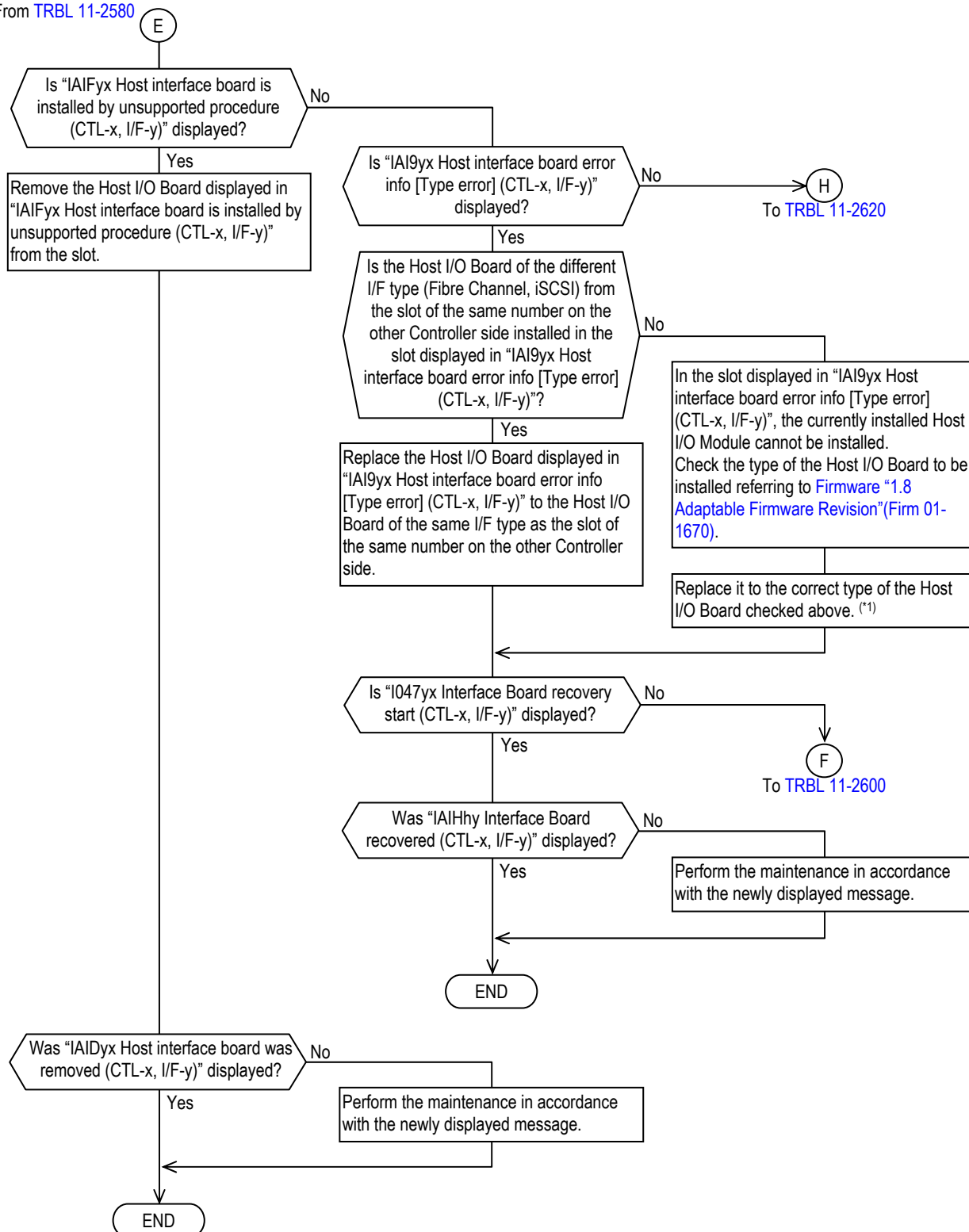


From TRBL 11-2560



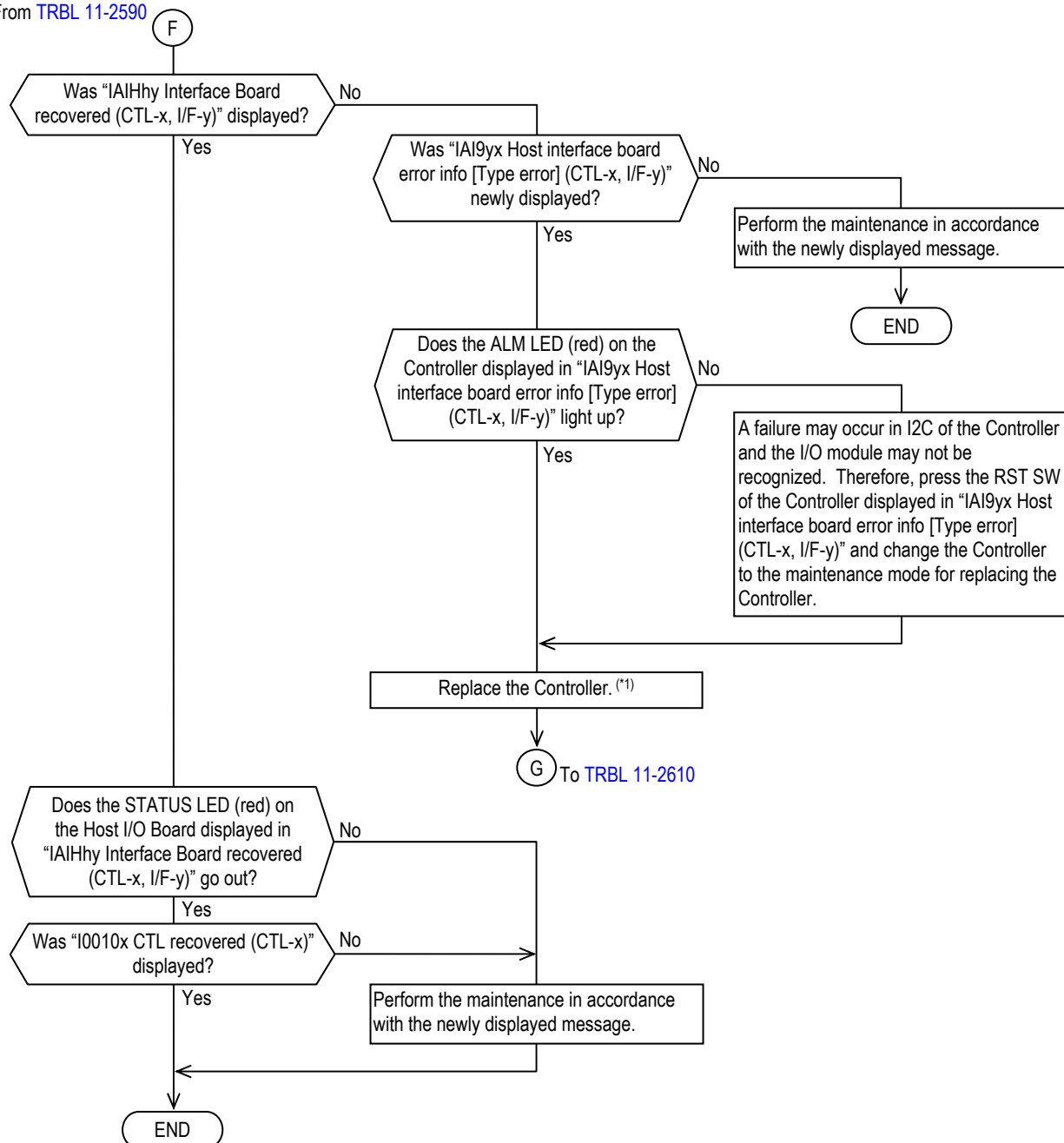
\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

From TRBL 11-2580



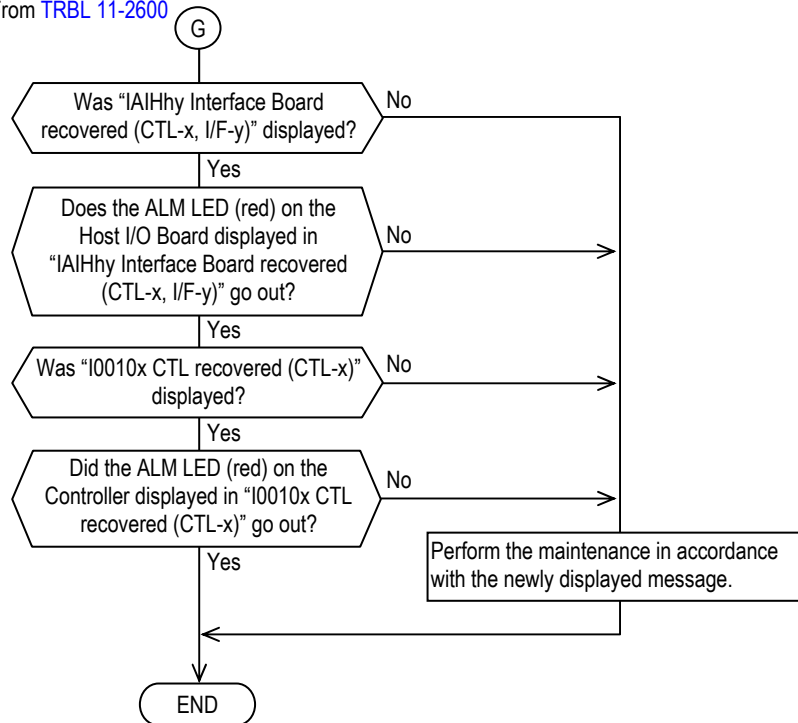
\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

From TRBL 11-2590

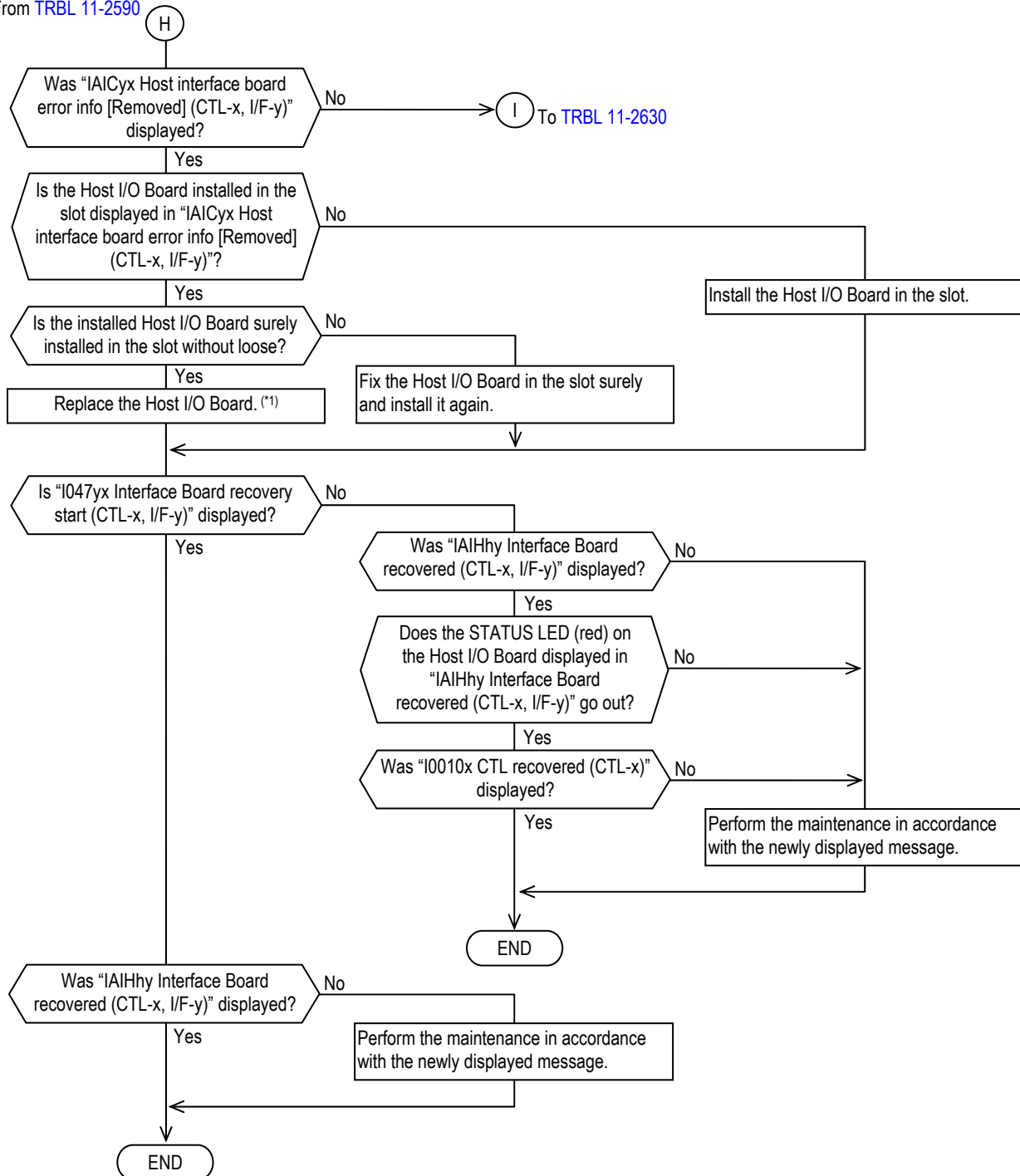


\*1 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

From TRBL 11-2600

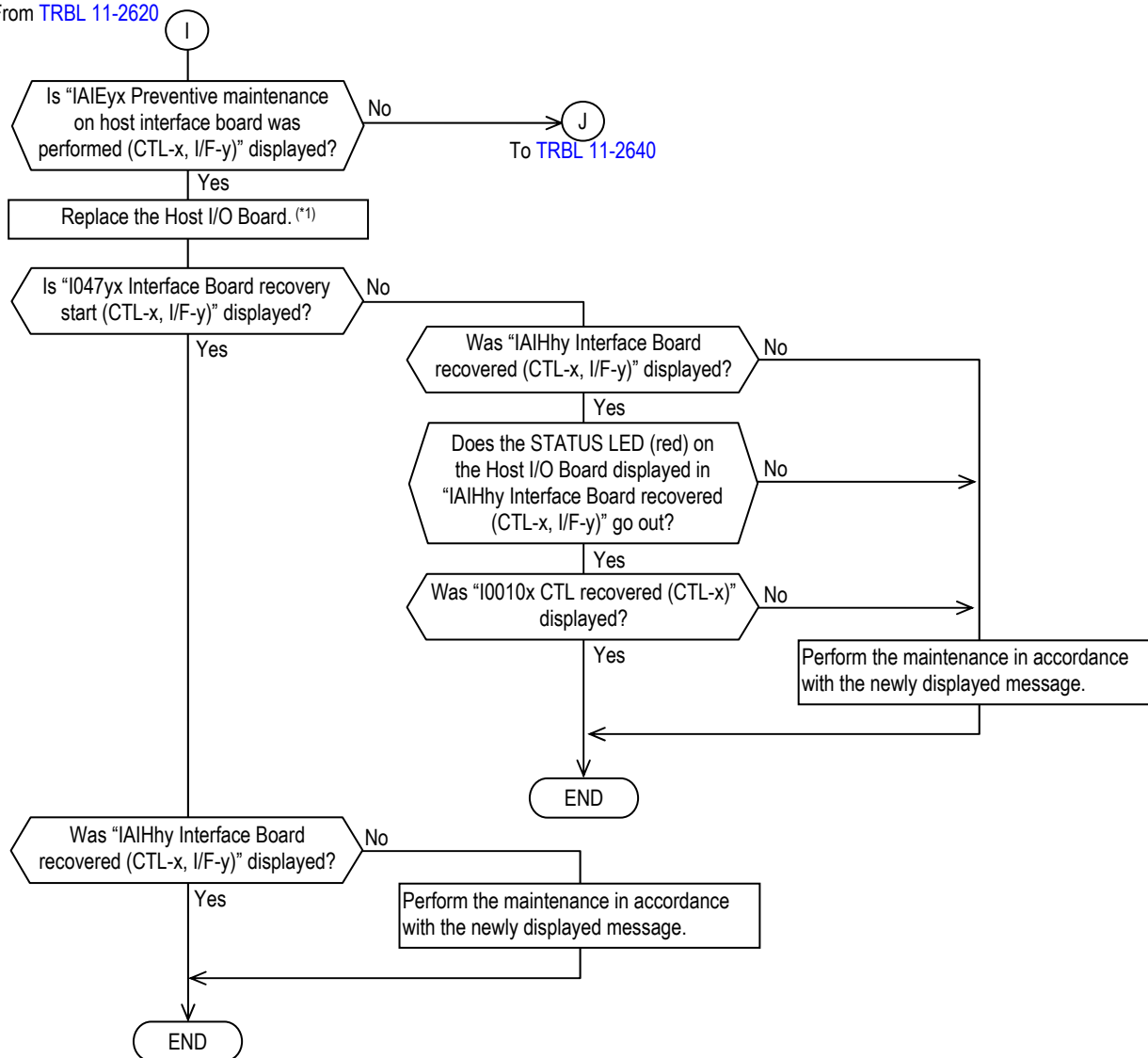


From TRBL 11-2590



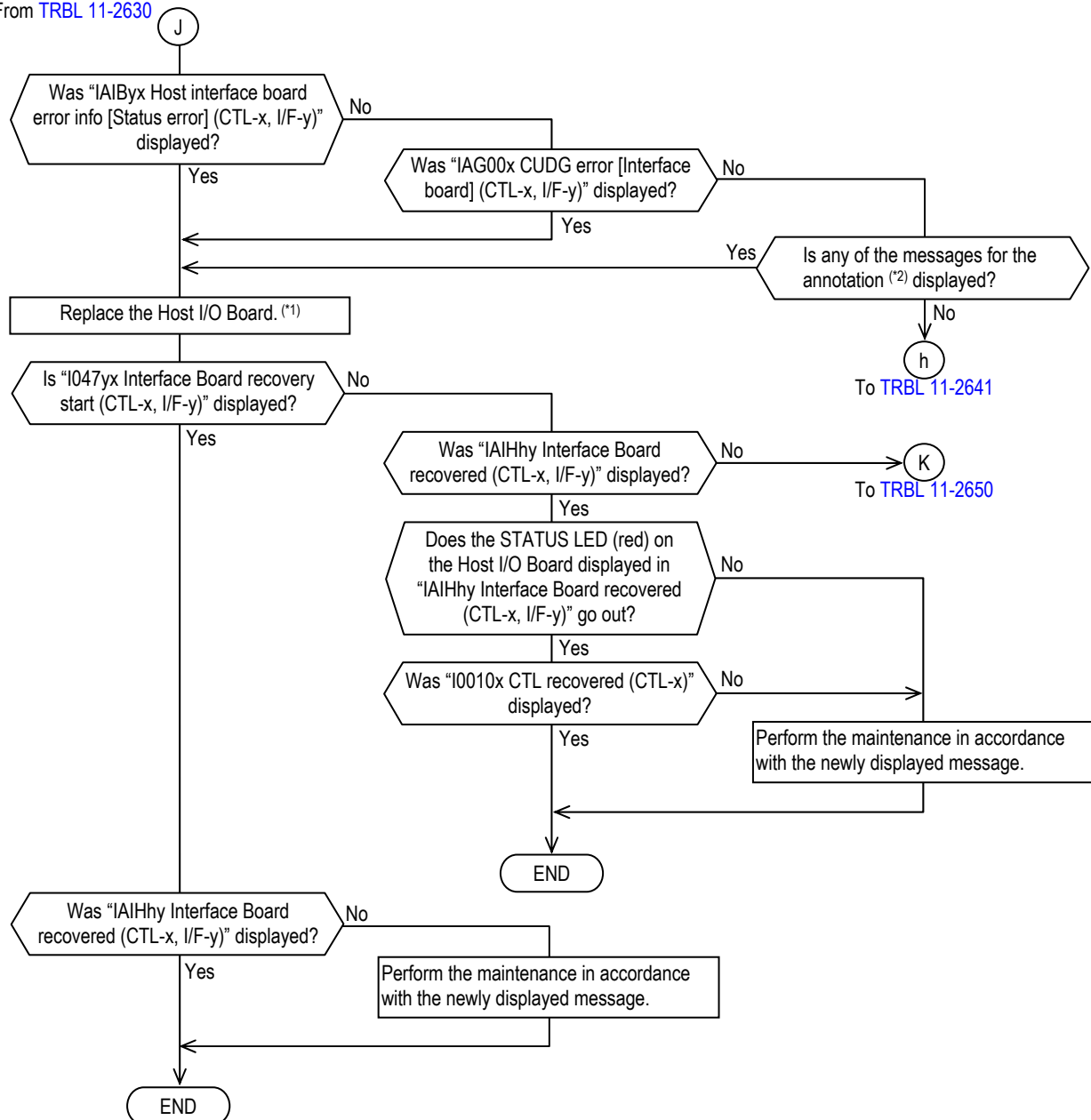
\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

From TRBL 11-2620



\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

From TRBL 11-2630



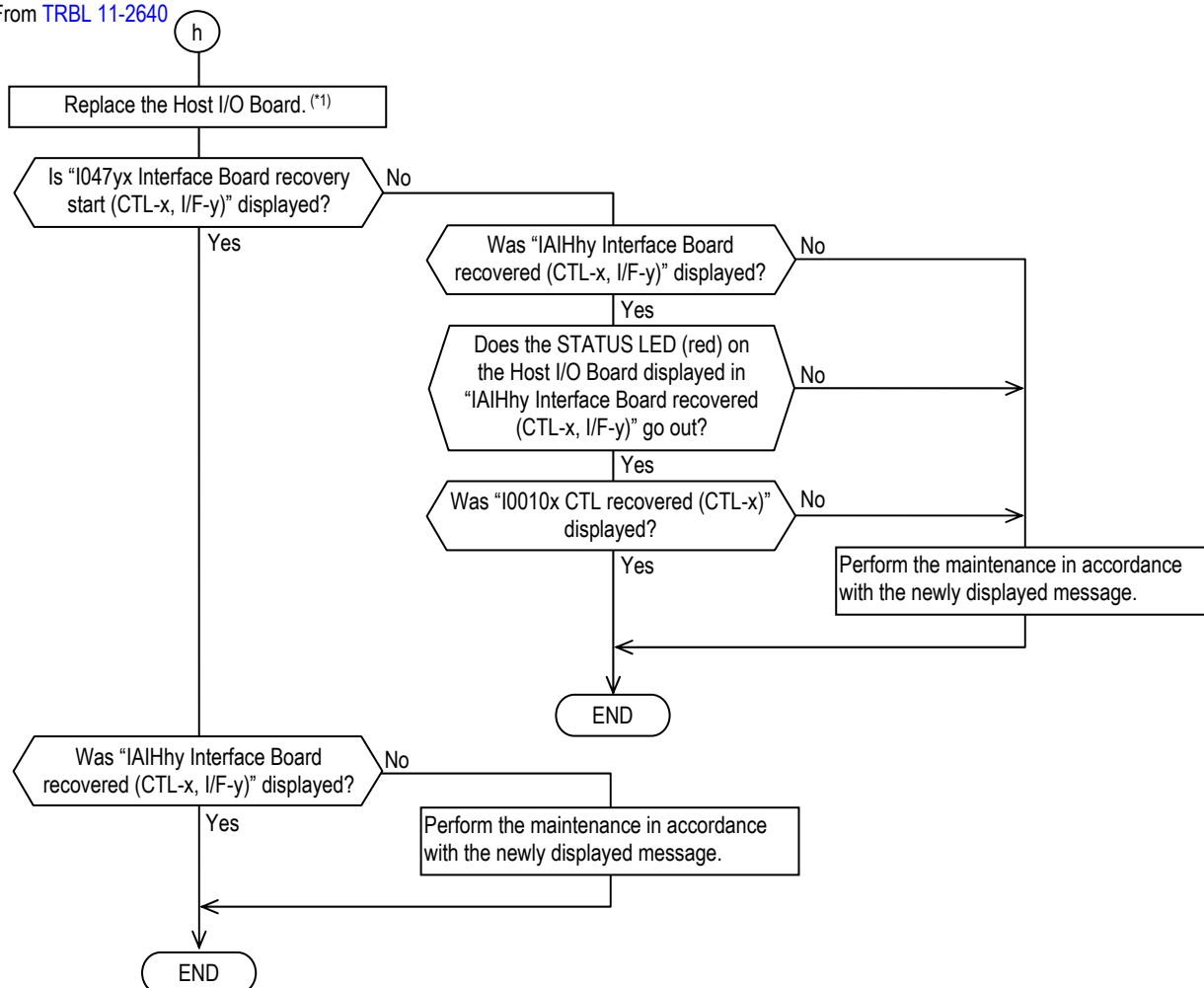
\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : List of the messages to be displayed.

- IAH2yx An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAH00x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-l)
- IAH00x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-l)
- IAHF0x An ECC error was detected in Fibre Channel protocol chip (CTL-x, Slot-l)
- IAHxxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAI1yx EDC error was detected in PCIe between iSCSI protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAI0yx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, I/F-y)

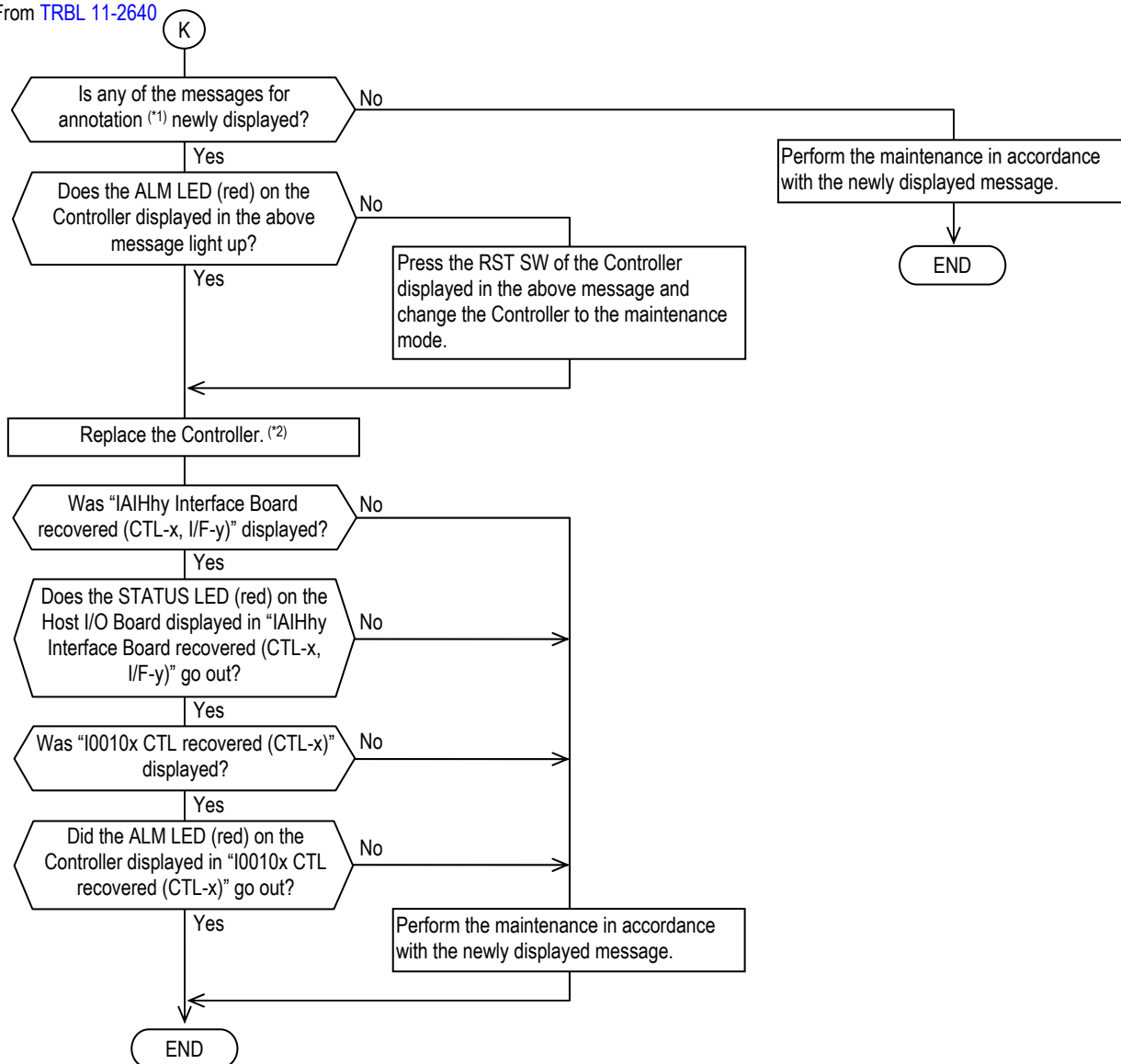


From TRBL 11-2640



\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

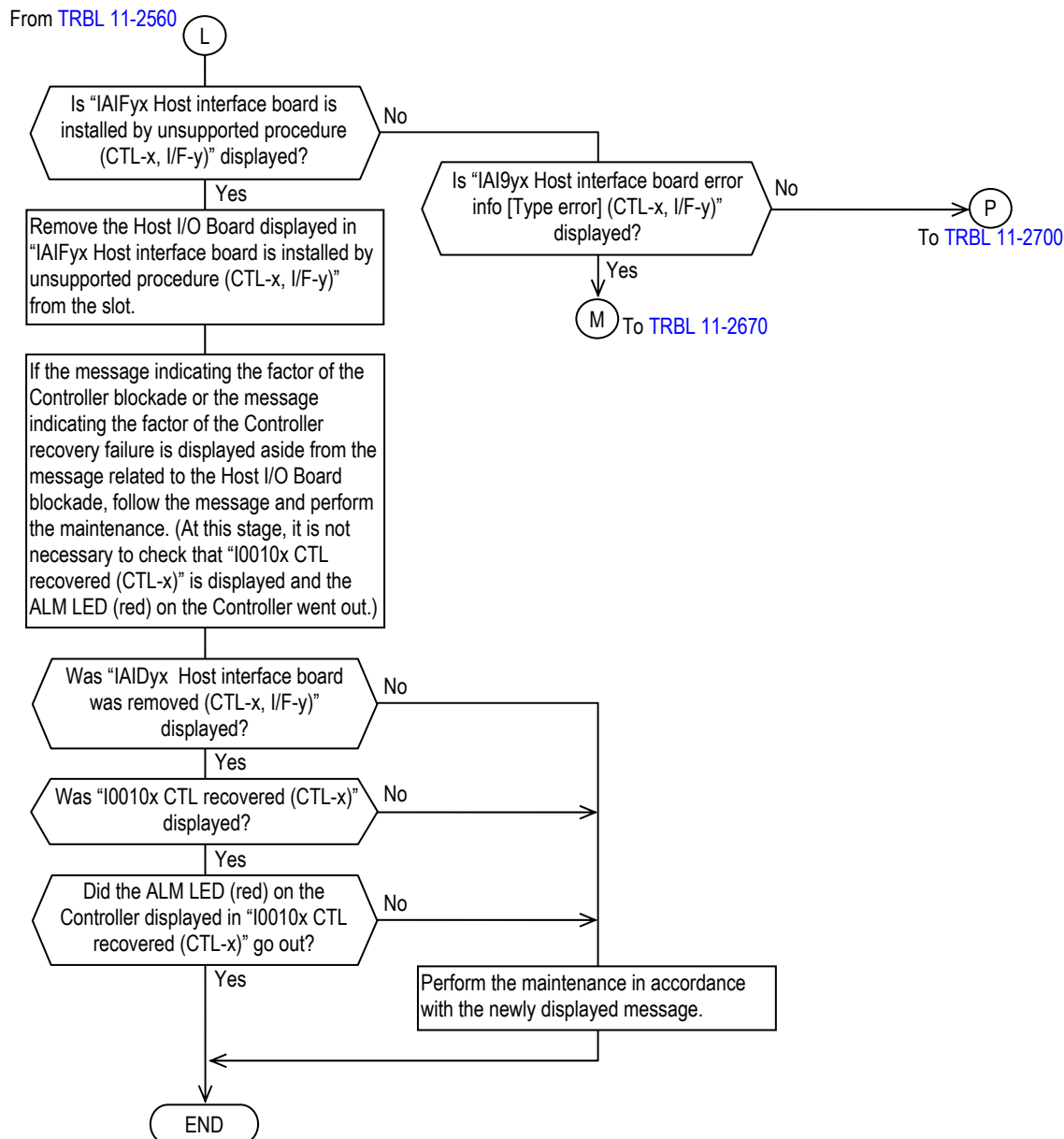
From TRBL 11-2640

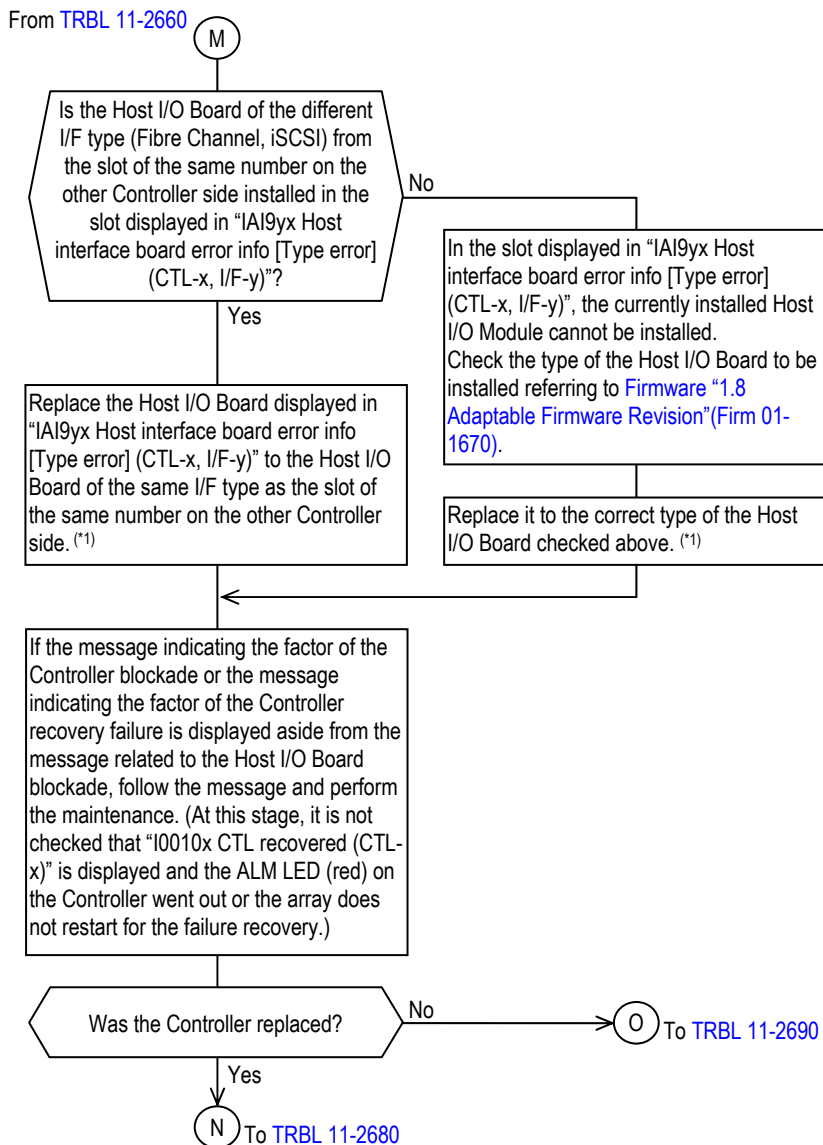


\*1 : List of the messages to be displayed.

- IAG00x CUDG error [Interface board] (CTL-x, I/F-y)
- IAH2yx An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAH00x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-l)
- IAH00x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-l)
- IAHF0x An ECC error was detected in Fibre Channel protocol chip (CTL-x, Slot-l)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IA11yx EDC error was detected in PCIe between iSCSI protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAlByx Host interface board error info [Status error] (CTL-x, I/F-y)
- IAlGyx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, I/F-y)

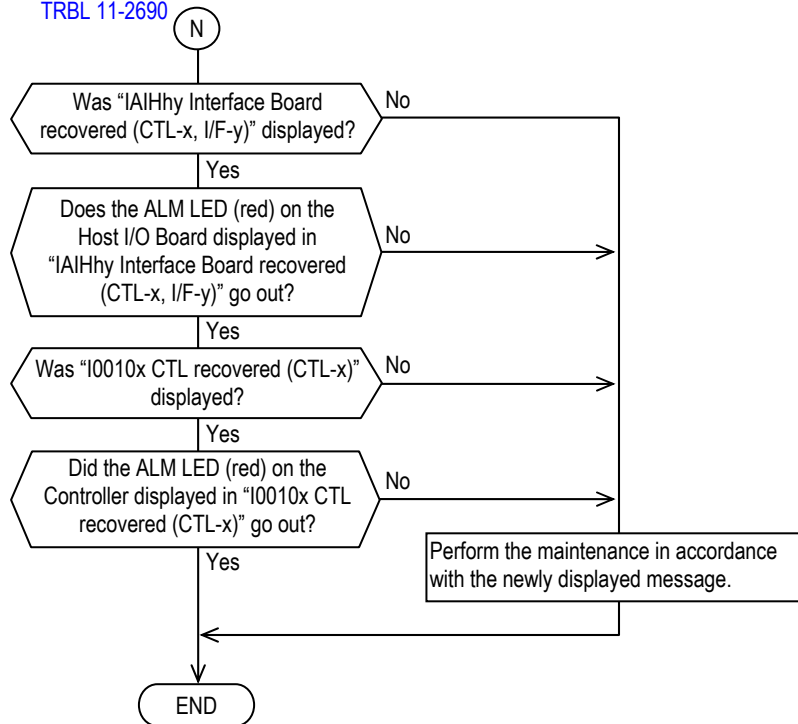
\*2 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).



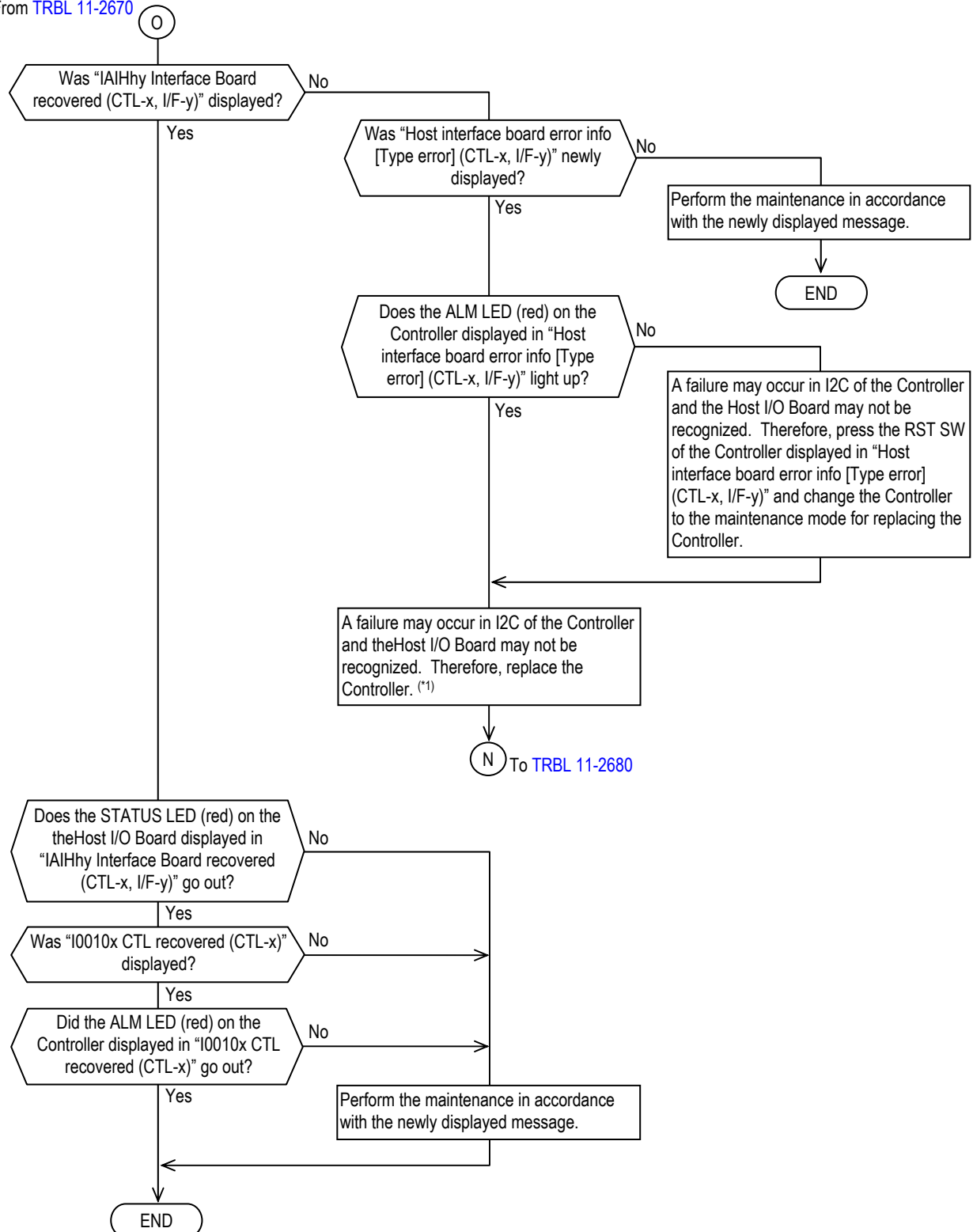


\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module"](#) (REP 02-1100).

From TRBL 11-2670,  
TRBL 11-2690

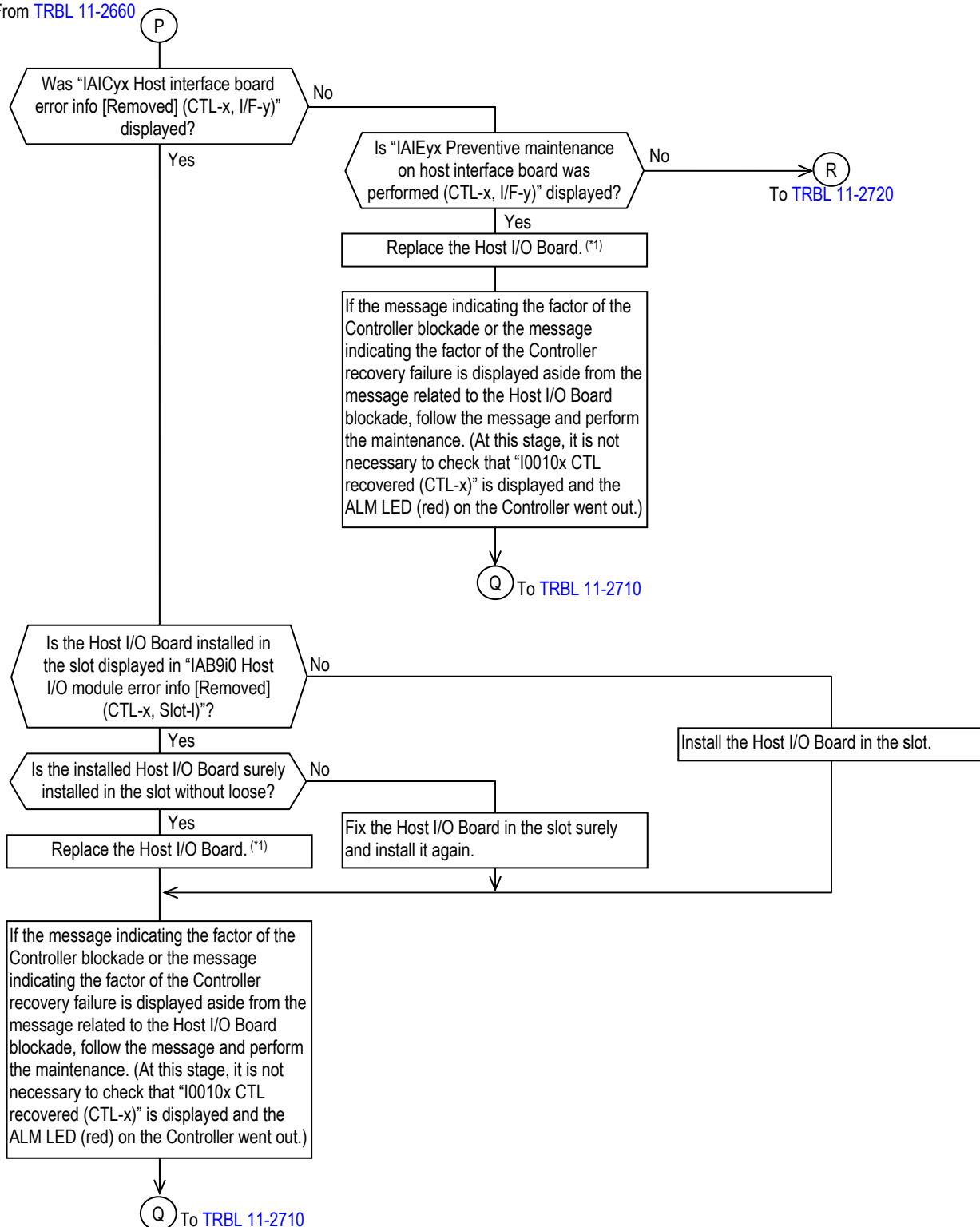


From TRBL 11-2670



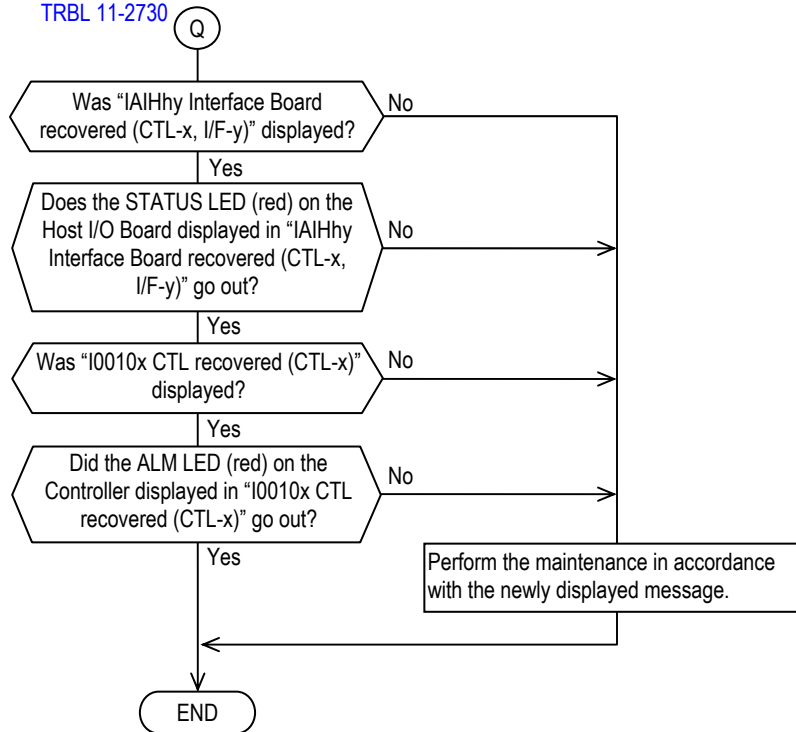
\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).

From TRBL 11-2660



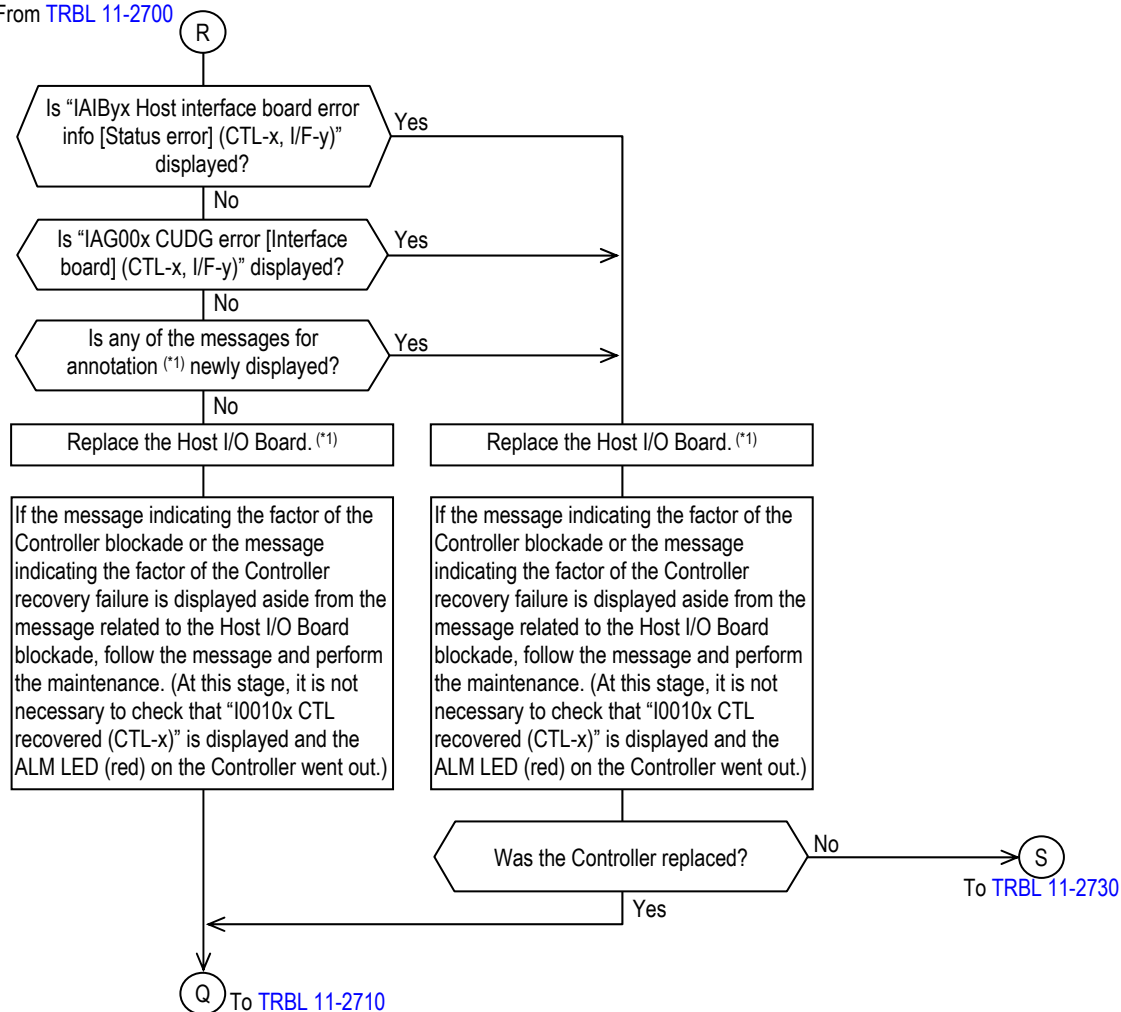
\*1 : For the replacement of the Host I/O Board, refer to the Replacement "2.2.7 Replacing a Host I/O Board/Module" (REP 02-1100).

From [TRBL 11-2700](#), [TRBL 11-2720](#),  
[TRBL 11-2730](#)





From TRBL 11-2700

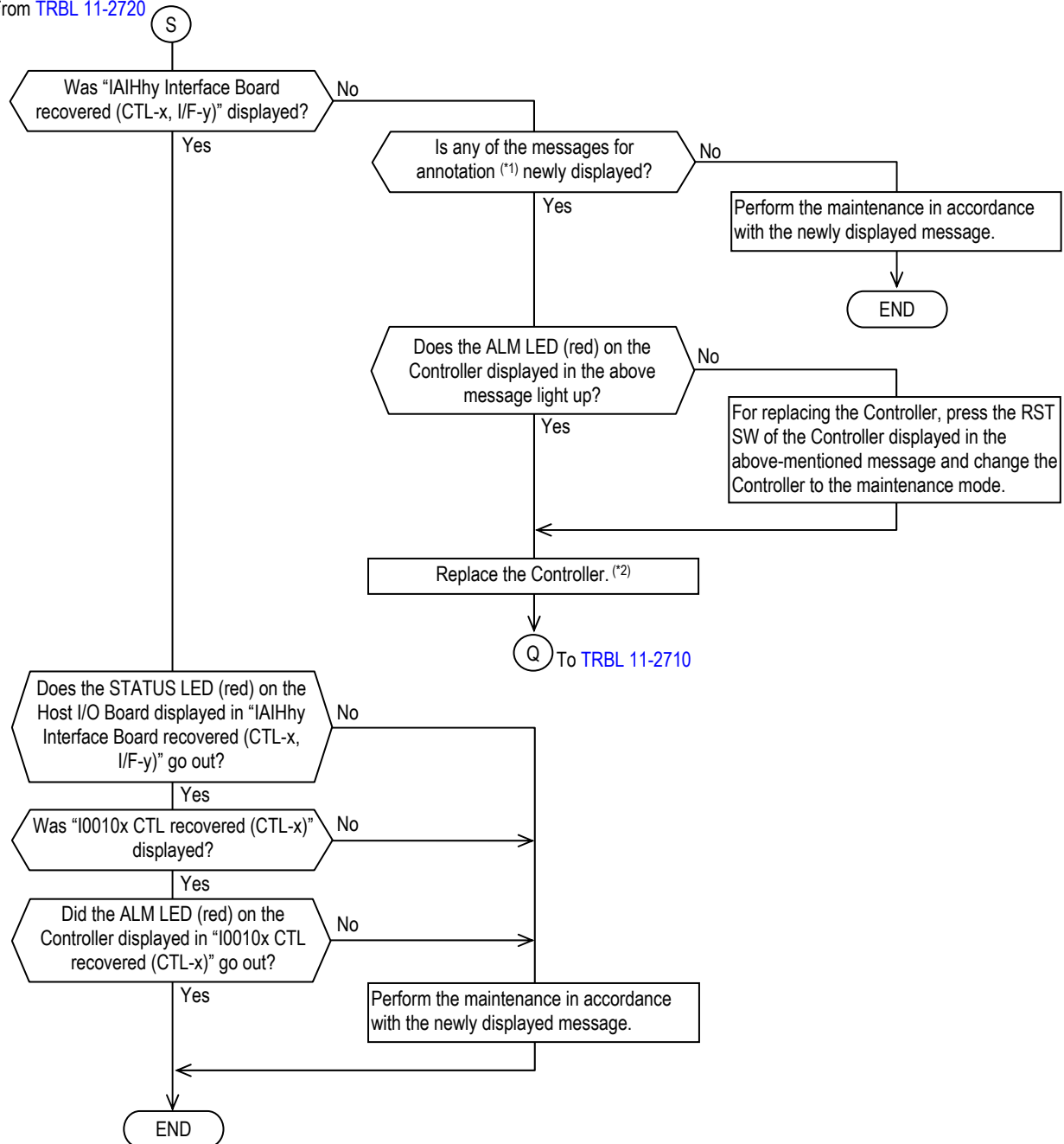


\*1 : List of the messages to be displayed.

- IAH2yx An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAH00x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-l)
- IAH00x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-l)
- IAHF0x An ECC error was detected in Fibre Channel protocol chip (CTL-x, Slot-l)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAH1yx EDC error was detected in PCIe between iSCSI protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAHGyx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, I/F-y)

\*2 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

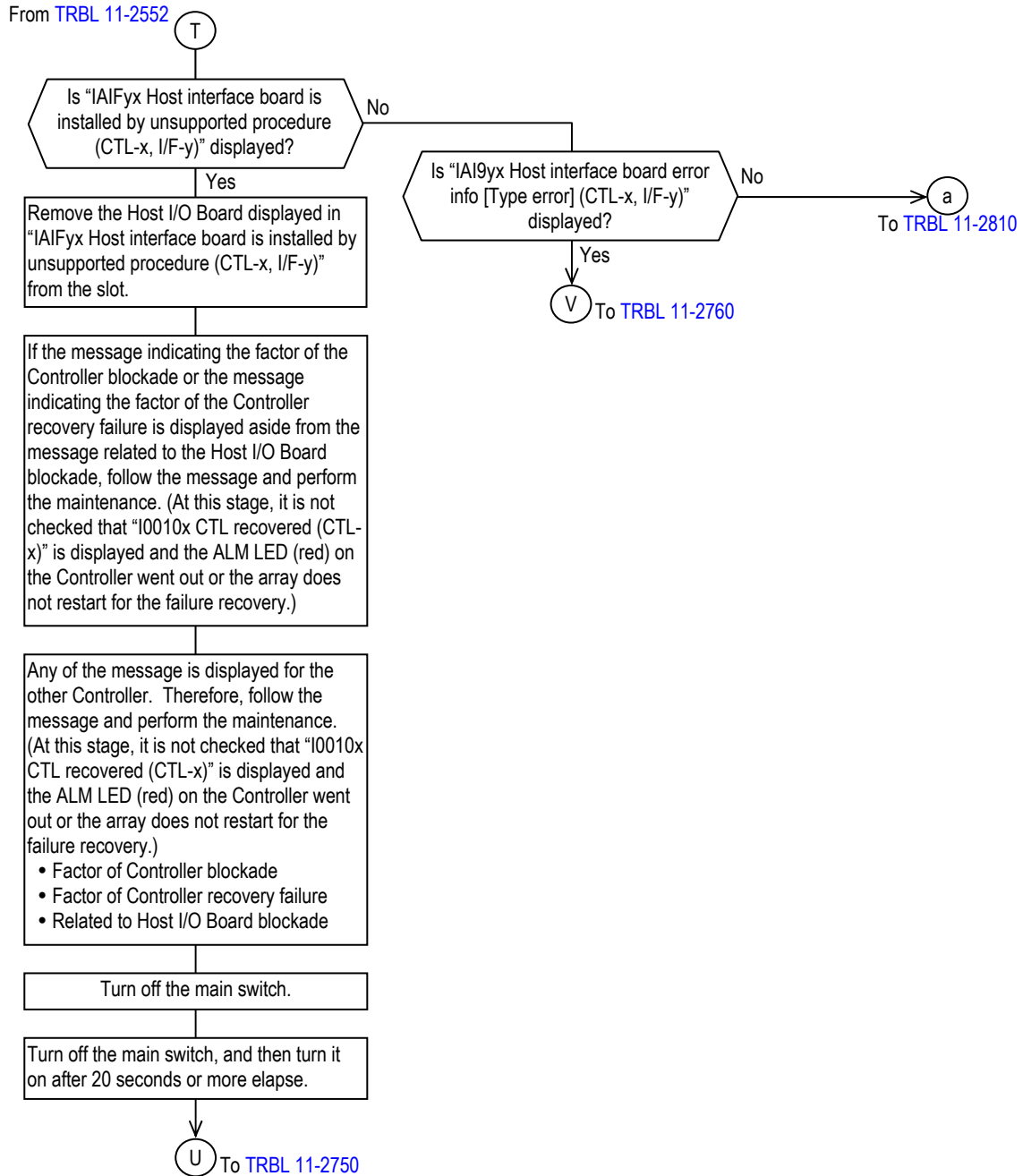
From TRBL 11-2720



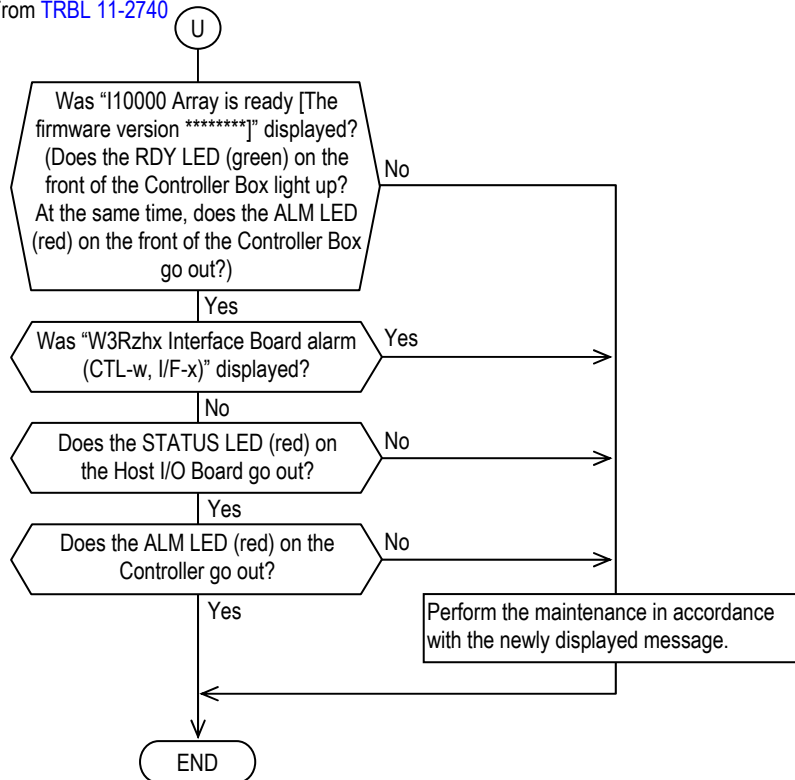
\*1 : List of the messages to be displayed.

- IAG00x CUDG error [Interface board] (CTL-x, I/F-y)
- IAH2yx An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAH00x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-l)
- IAH00x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-l)
- IAHF0x An ECC error was detected in Fibre Channel protocol chip (CTL-x, Slot-l)
- IAHxxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHxxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHxxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IA11yx EDC error was detected in PCIe between iSCSI protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IA1Byx Host interface board error info [Status error] (CTL-x, I/F-y)
- IA1Gyx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, I/F-y)

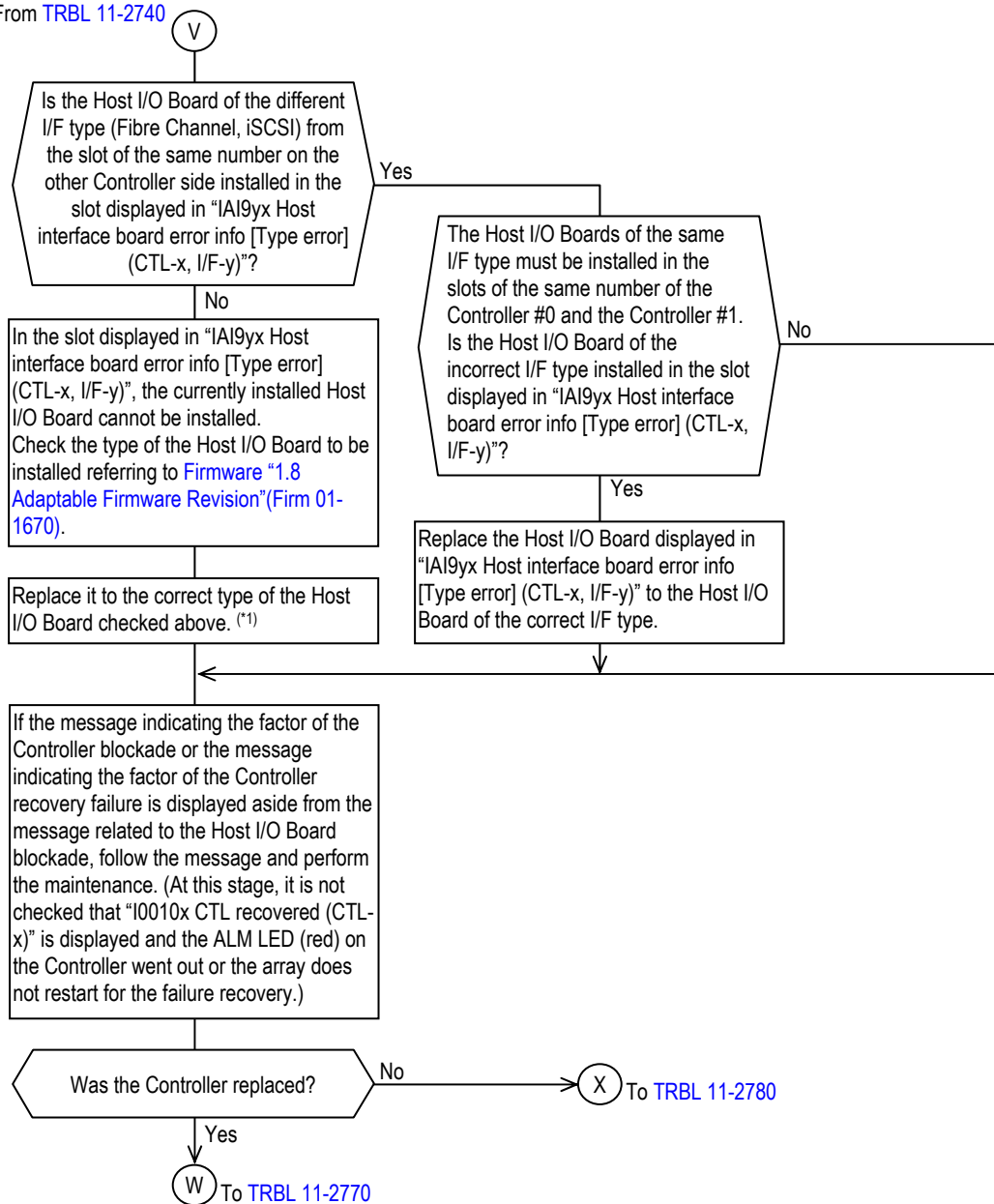
\*2 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).



From TRBL 11-2740

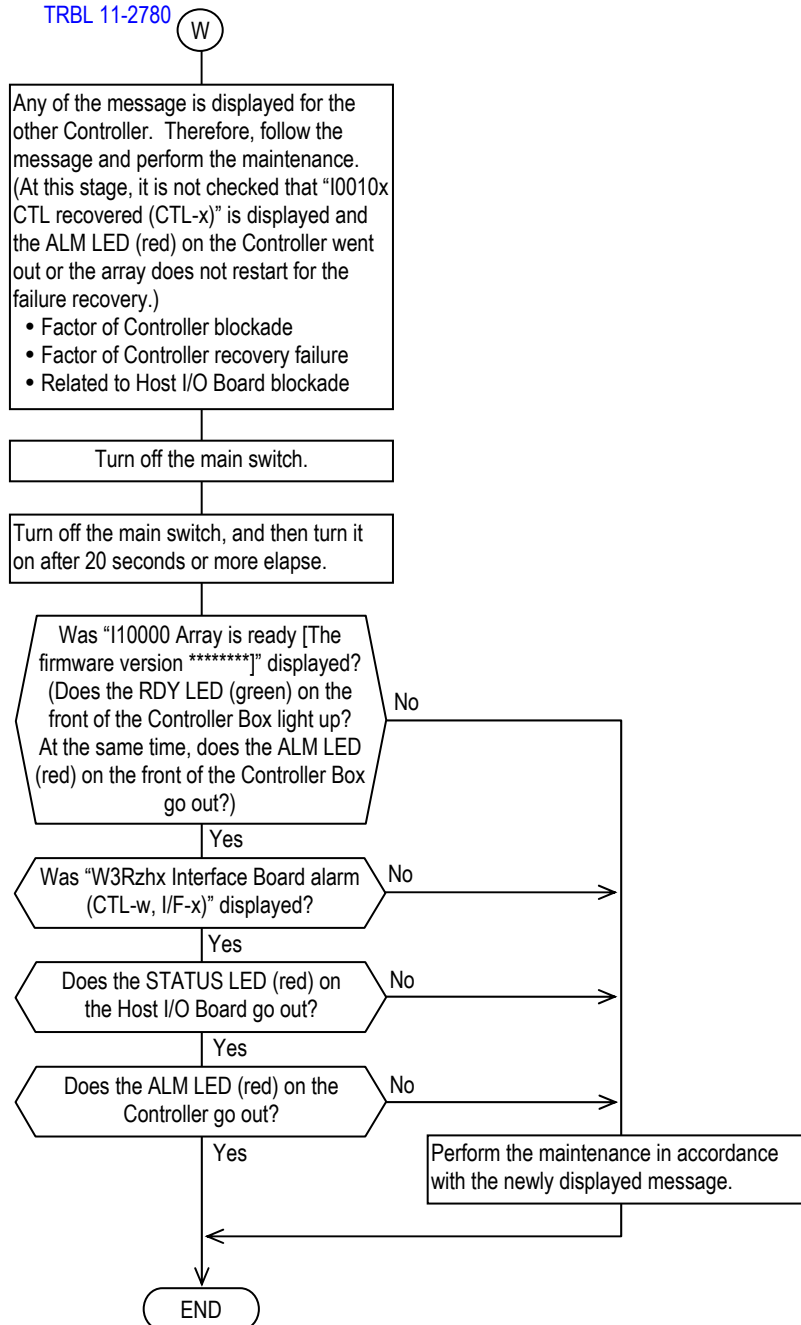


From TRBL 11-2740

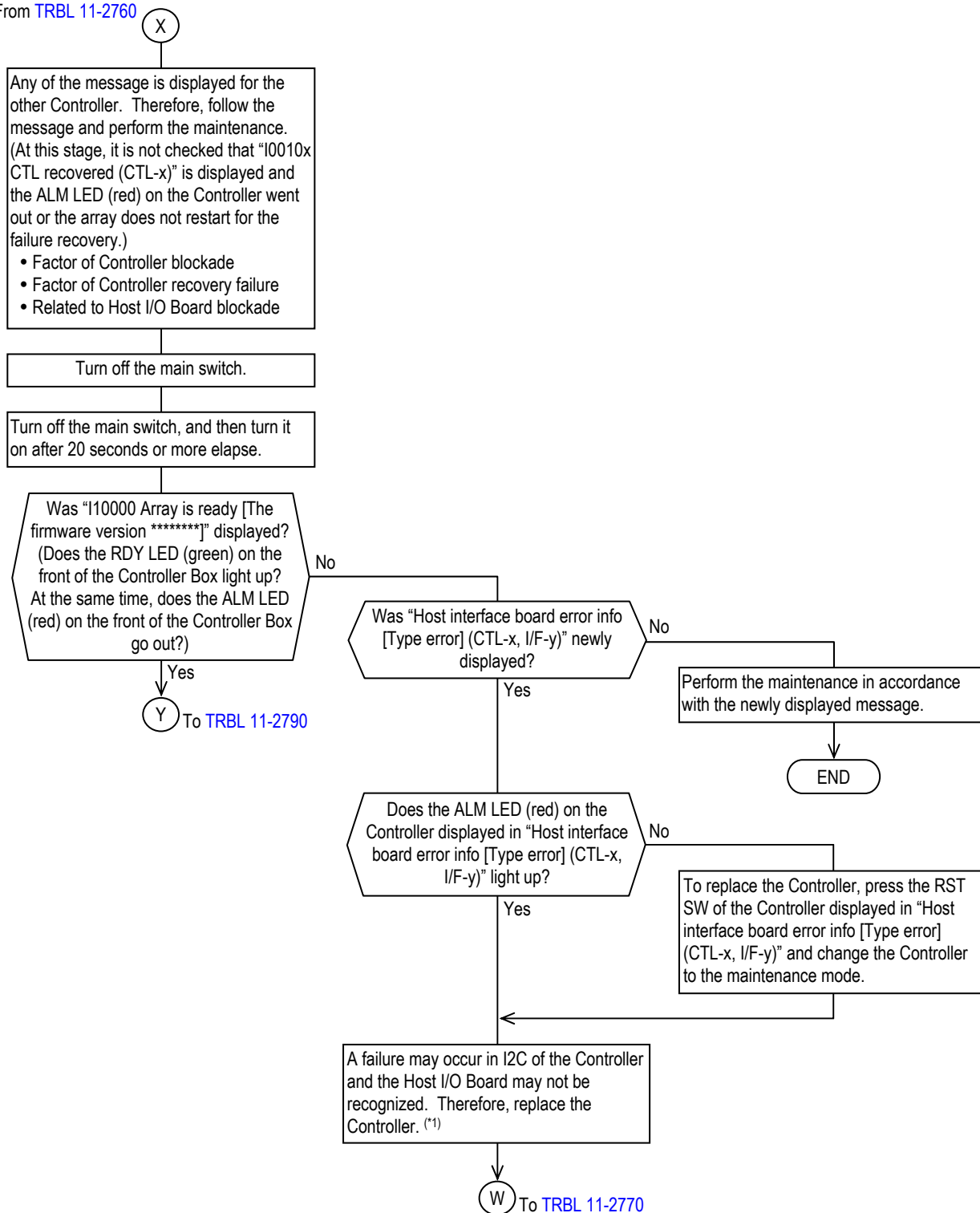


\*1 : For the replacement of the Host I/O Board, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

From TRBL 11-2760,  
TRBL 11-2780

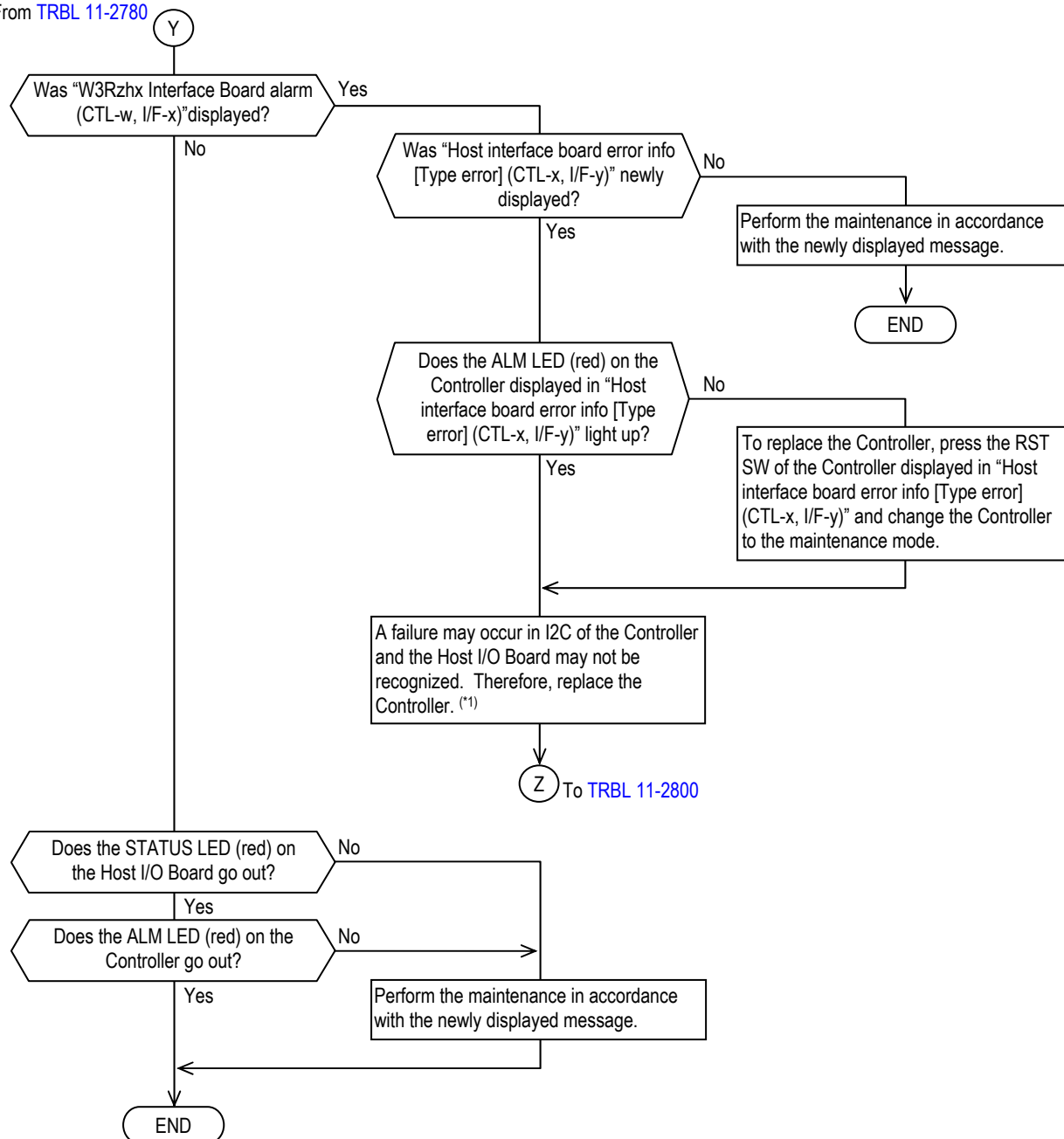


From TRBL 11-2760



\*1 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

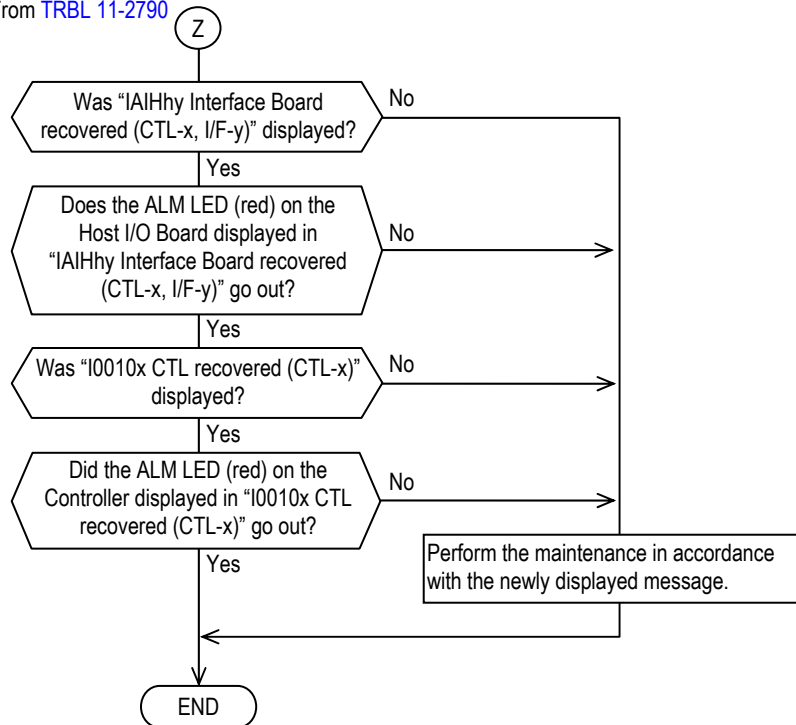
From TRBL 11-2780



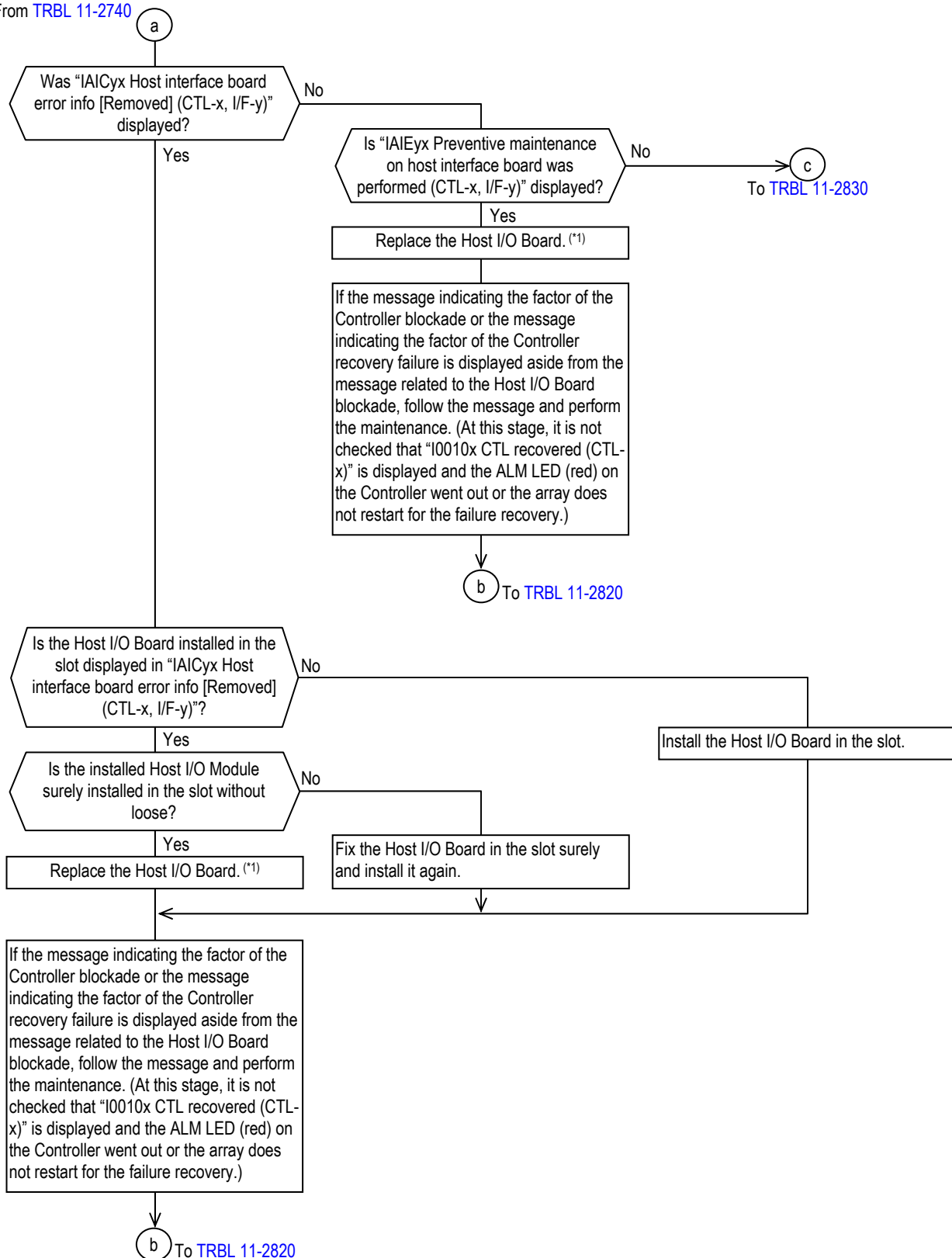
\*1 : For the replacement of the Controller, refer to the Replacement "2.2.5 Replacing a Controller" (REP 02-0700).



From TRBL 11-2790

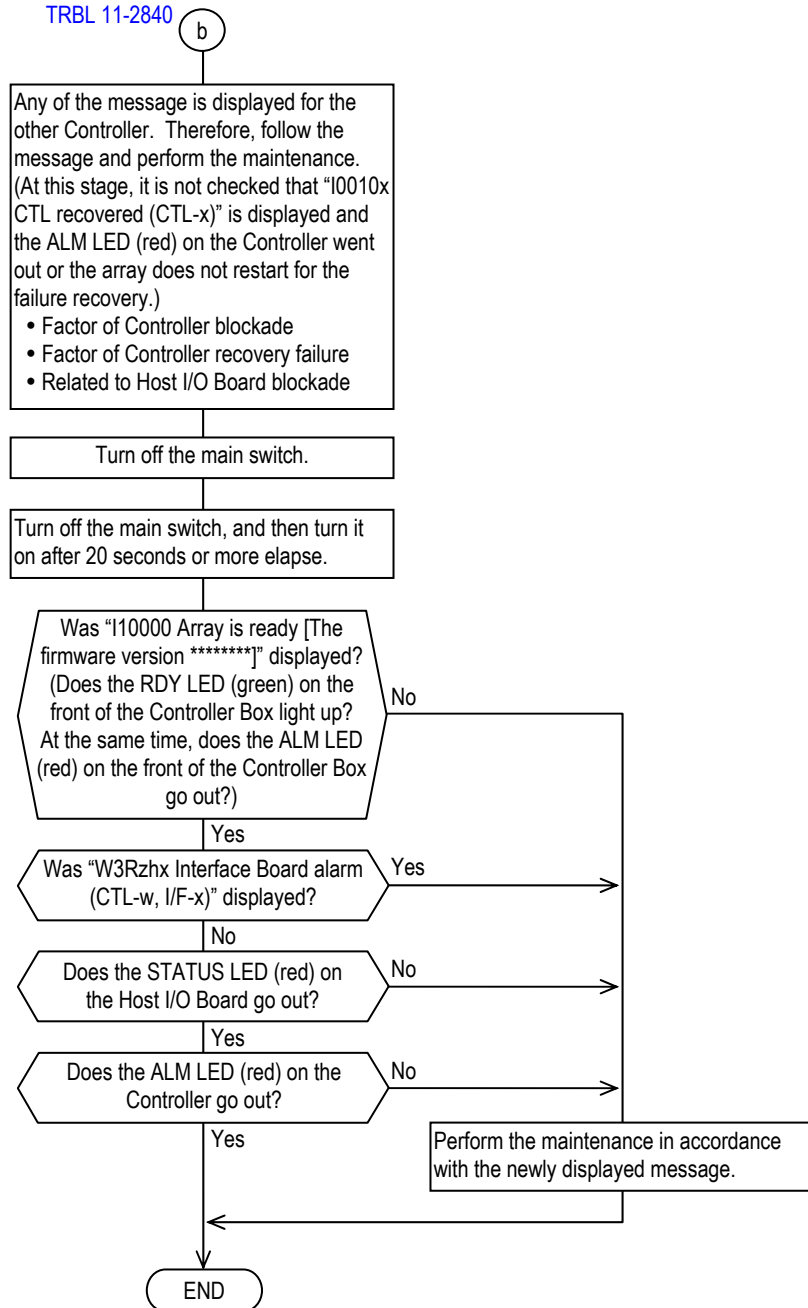


From TRBL 11-2740

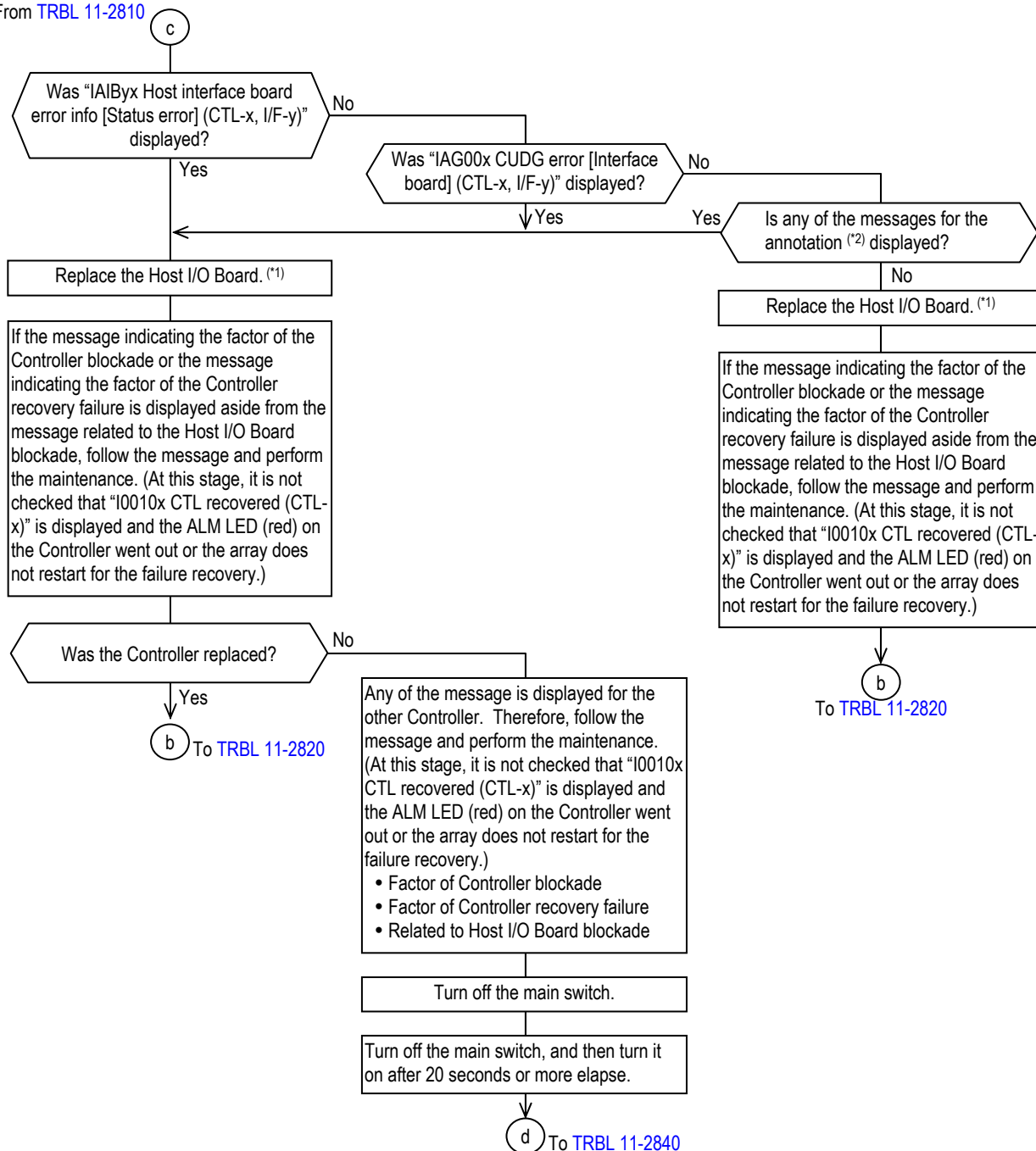


\*1 : For the replacement of the Host I/O Board, refer to the Replacement "2.2.7 Replacing a Host I/O Board/Module" (REP 02-1100).

From TRBL 11-2810, TRBL 11-2830,  
TRBL 11-2840



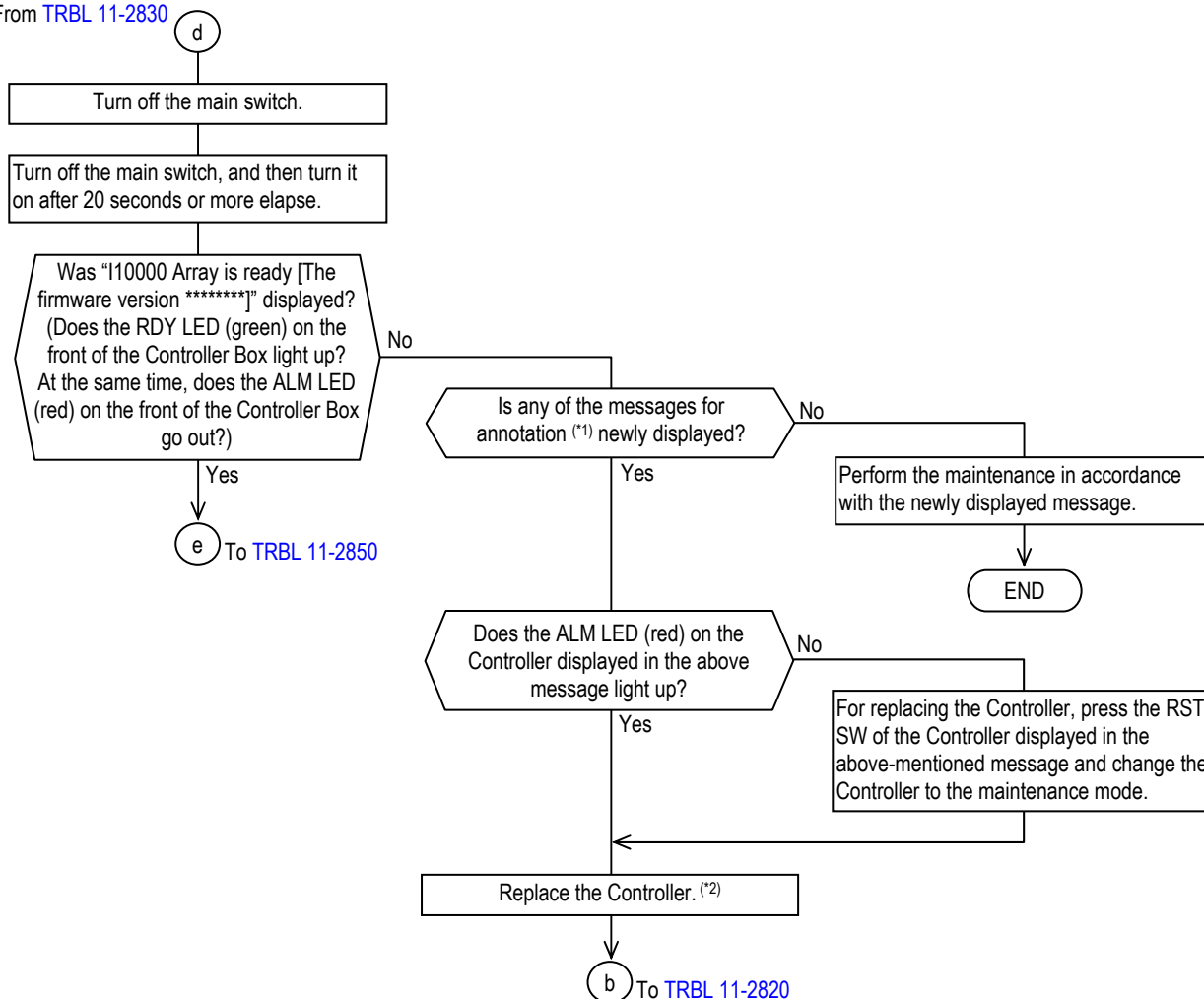
From TRBL 11-2810



\*1 : For the replacement of the Host I/O Module, refer to the [Replacement "2.2.7 Replacing a Host I/O Board/Module" \(REP 02-1100\)](#).

\*2 : List of the messages to be displayed.

- IAH2yx An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAH00x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-l)
- IAH00x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-l)
- IAHF0x An ECC error was detected in Fibre Channel protocol chip (CTL-x, Slot-l)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAI1yx EDC error was detected in PCIe between iSCSI protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAI0yx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, I/F-y)

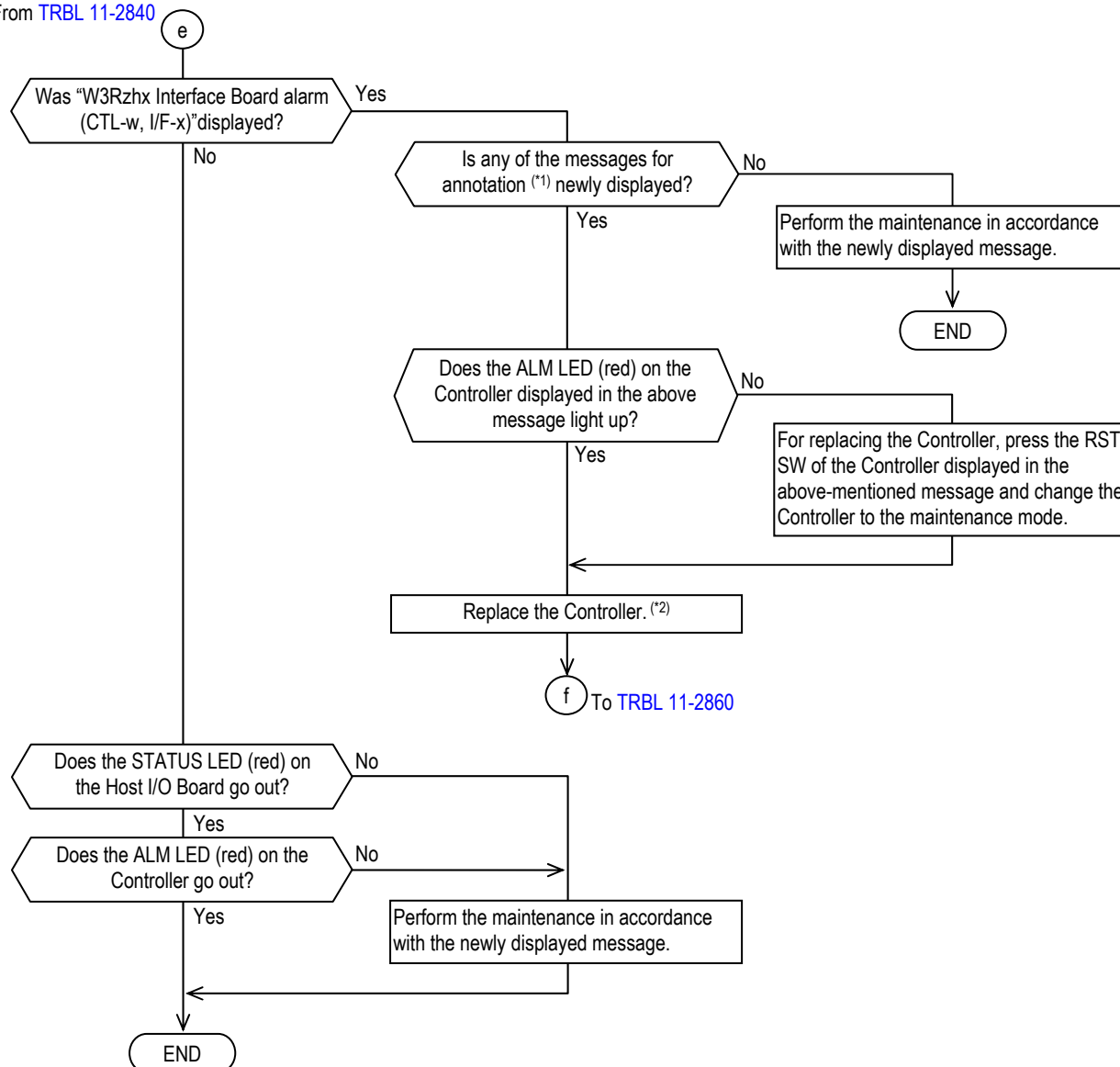
From [TRBL 11-2830](#)

\*1 : List of the messages to be displayed.

- IAG00x CUDG error [Interface board] (CTL-x, I/F-y)
- IAH2yx An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAH00x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-l)
- IAH00x An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-l)
- IAHF0x An ECC error was detected in Fibre Channel protocol chip (CTL-x, Slot-l)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAl1yx EDC error was detected in PCIe between iSCSI protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAlByx Host interface board error info [Status error] (CTL-x, I/F-y)
- IAlGyx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, I/F-y)

\*2 : For the replacement of the Controller, refer to the [Replacement "2.2.5 Replacing a Controller" \(REP 02-0700\)](#).

From [TRBL 11-2840](#)

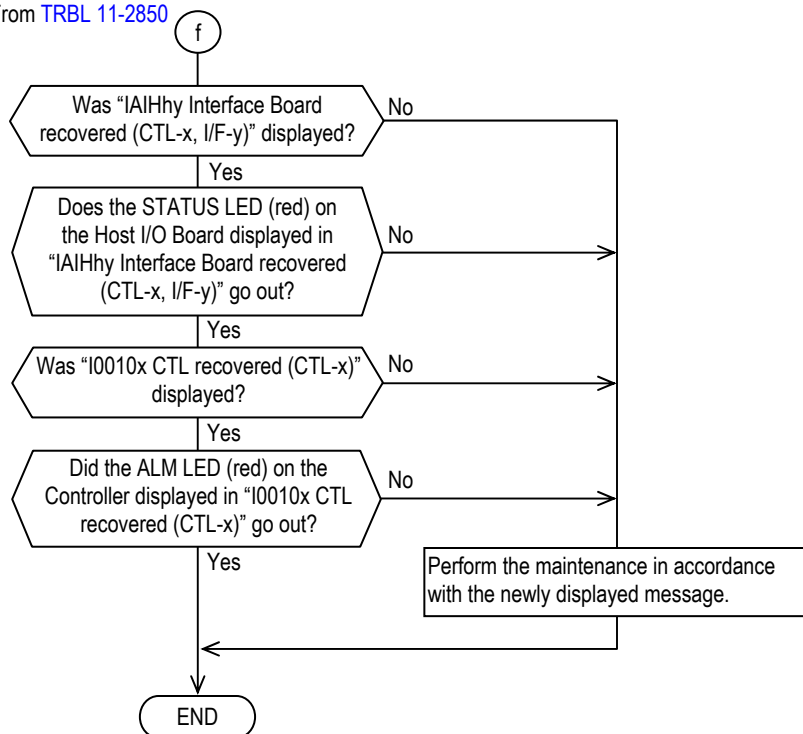


\*1 : List of the messages to be displayed.

- IAG00x CUDG error [Interface board] (CTL-x, I/F-y)
- IAH2yx An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAH00x Fibre Channel protocol chip cannot be recognized (CTL-x, Slot-l)
- IAHExx An EDC error was detected in PCIe between FC protocol chip and D-CTL LSI (CTL-x, Slot-l)
- IAHF0x An ECC error was detected in Fibre Channel protocol chip (CTL-x, Slot-l)
- IAHHxy PCI Interrupt Status register error [DPE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHlxy PCI Interrupt Status register error [UBE] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAHJxy PCI Interrupt Status register error [RMA] in Fibre Channel protocol chip (CTL-x, Port-xy)
- IAl1yx EDC error was detected in PCIe between iSCSI protocol chip and D-CTL LSI (CTL-x, I/F-y)
- IAlBxy Host interface board error info [Status error] (CTL-x, I/F-y)
- IAlGyx An initialization of PCIe failed because of the hardware error [Host] (CTL-x, I/F-y)

\*2 : For the replacement of the Controller, refer to the [Replacement “2.2.5 Replacing a Controller” \(REP 02-0700\)](#).

From TRBL 11-2850

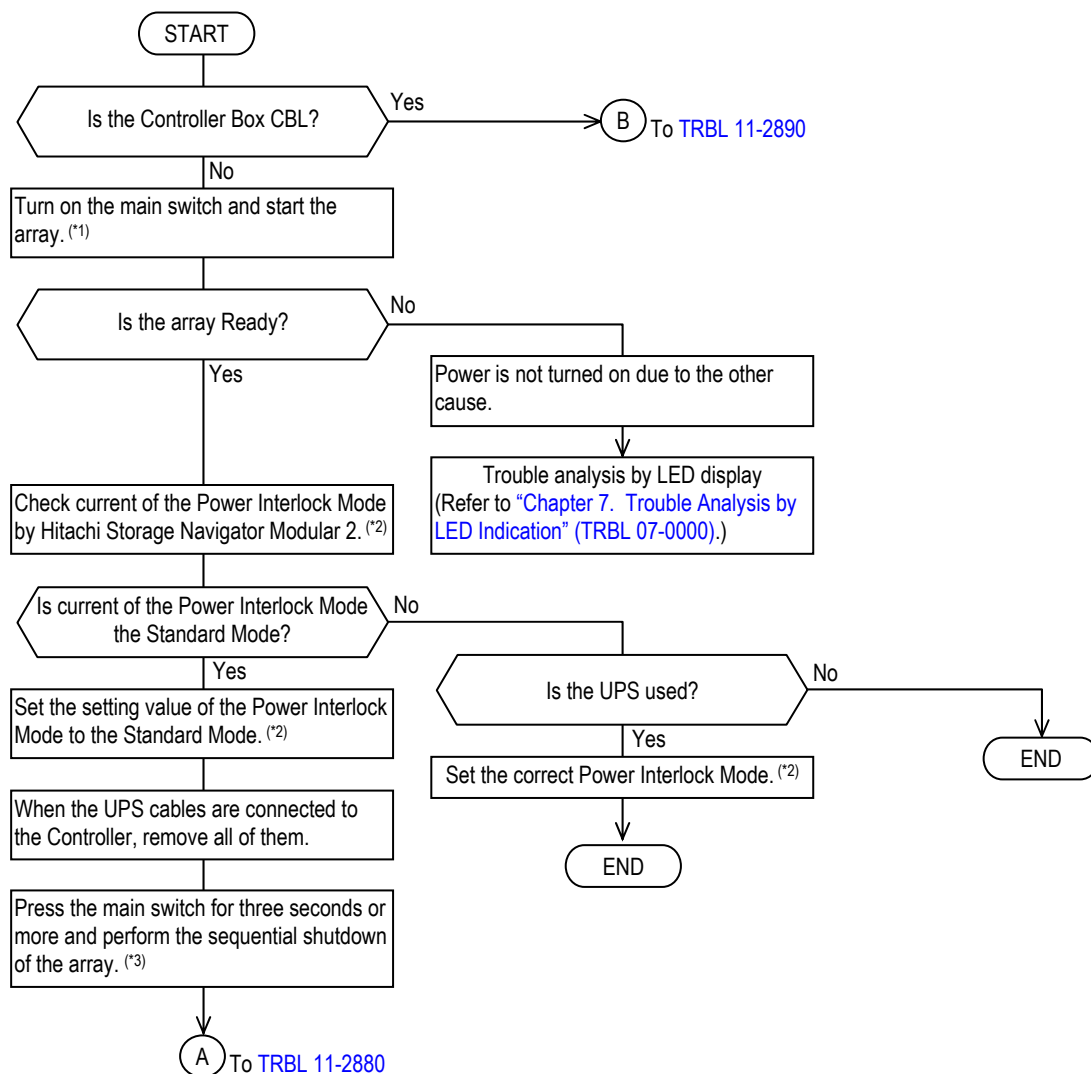


### 11.1.36 The Array does not Start Due to the Incorrect Setting of the Power Interlock Mode

Conditions to start the procedure (the array is in the power-off status)

- The array is not powered on even if instructed by the UPS
- In case of the CBL, the array is not powered on even if pressing the main switch to the on side or it is powered on but immediately powered off automatically

[Recovery method]



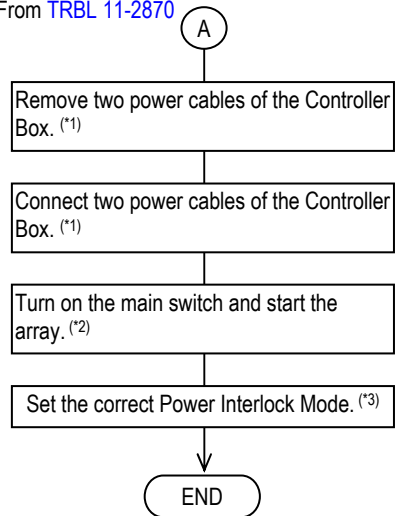
\*1 : Press the main switch of either Controller #0 or Controller #1 with a pen or a key of the bezel for one second or more.

\*2 : Refer to [System Parameter "Chapter 16 Setting Power Interlock" \(SYSPR 16-0000\)](#) for the confirmation of the Power Interlock Mode.

\*3 : Refer to [Installation "1.5.2 Array Power Off \(Sequential Shutdown\)" \(INST 01-0260\)](#) for the powering off procedure.



From [TRBL 11-2870](#)

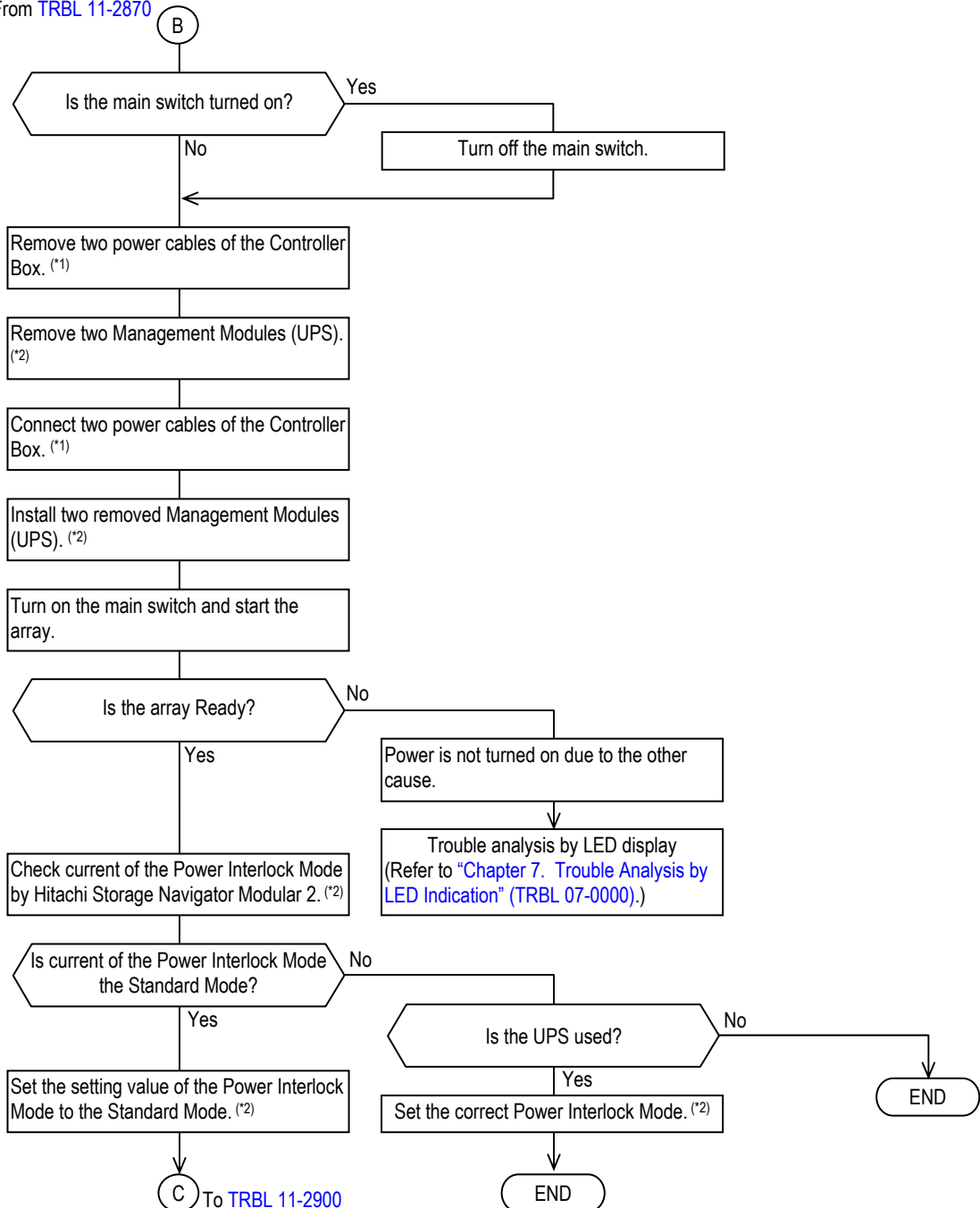


\*1 : Refer to [Installation “2.4.12 Connecting the Power Cables” \(INST 02-1270\)](#) for the connection of the power cables.

\*2 : Refer to [System Parameter “Chapter 16 Setting Power Interlock” \(SYSPR 16-0000\)](#) for the confirmation of the Power Interlock Mode.

\*3 : Press the main switch of either Controller #0 or Controller #1 with a pen or a key of the bezel for one second or more.

From TRBL 11-2870

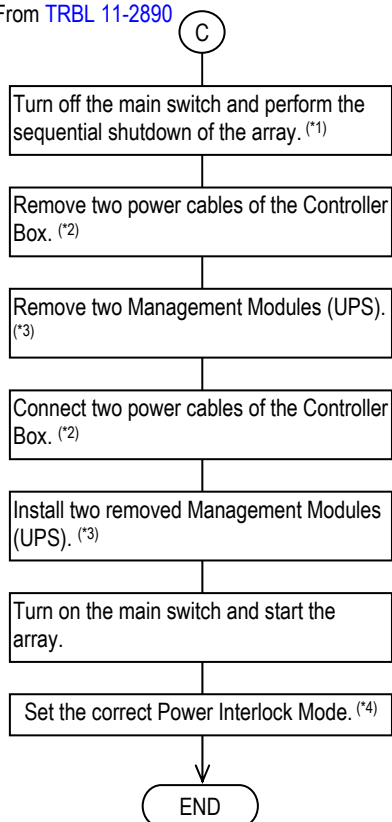


\*1 : Refer to [Installation "2.4.12 Connecting the Power Cables" \(INST 02-1270\)](#) for the connection of the power cables.

\*2 : Refer to [Replacement "2.2.10 Replacing a Management Module" \(REP 02-1410\)](#) for installation and removal of the Management Modules.

\*3 : Refer to [System Parameter "Chapter 16 Setting Power Interlock" \(SYSPR 16-0000\)](#) for the confirmation of the Power Interlock Mode.

From TRBL 11-2890



\*1 : Refer to [Installation “1.5.2 Array Power Off \(Sequential Shutdown\)” \(INST 01-0260\)](#) for the powering off procedure.

\*2 : Refer to [Installation “2.4.12 Connecting the Power Cables” \(INST 02-1270\)](#) for the connection of the power cables.

\*3 : Refer to [Replacement “2.2.10 Replacing a Management Module” \(REP 02-1410\)](#) for installation and removal of the Management Modules.

\*4 : Refer to [System Parameter “Chapter 16 Setting Power Interlock” \(SYSPR 16-0000\)](#) for the confirmation of the Power Interlock Mode.

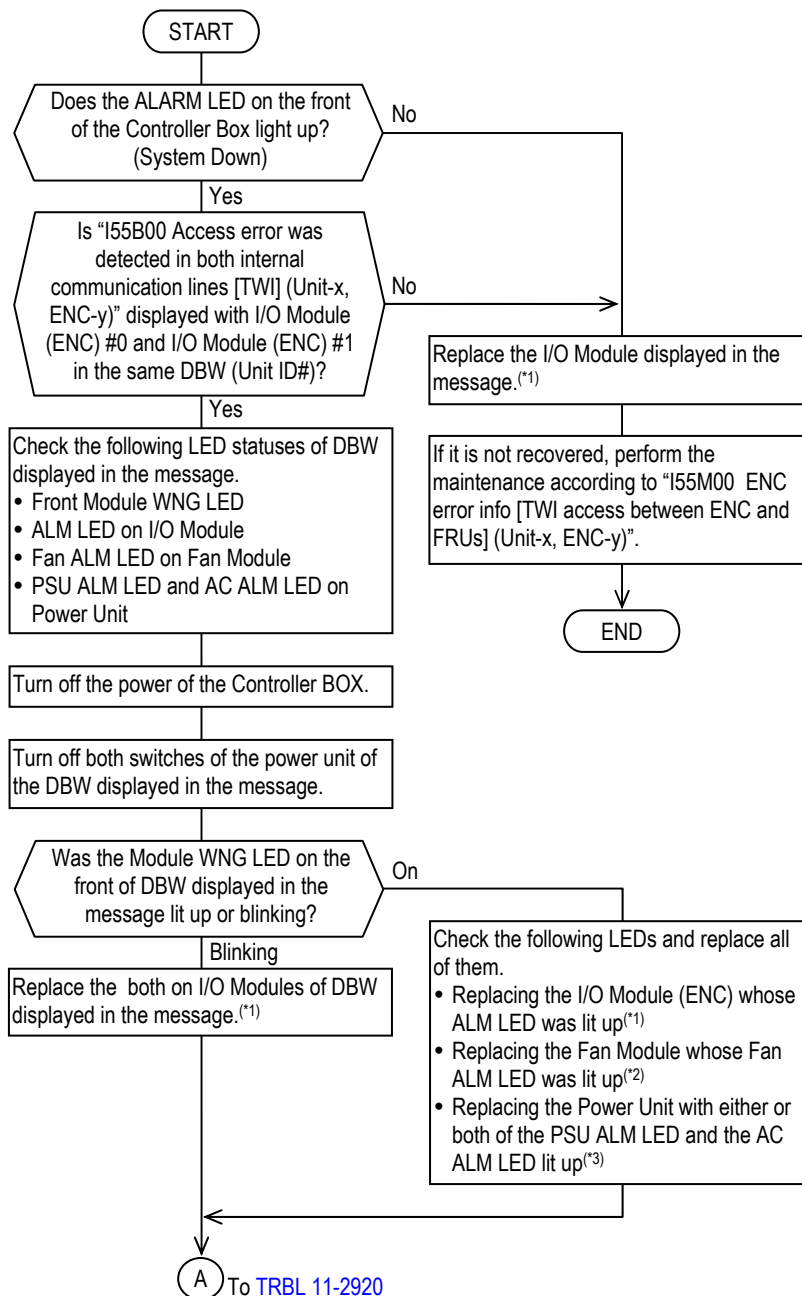
### 11.1.37 Recovery Method of the Failures Occurred in Two Interfaces in DBW

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy I55B00 Access error was detected in both internal communication lines [TWI] (Unit-x, ENC-y):ENC/STRC

Date      Time      x : Detect Controller #  
                                  y : Detect Core #

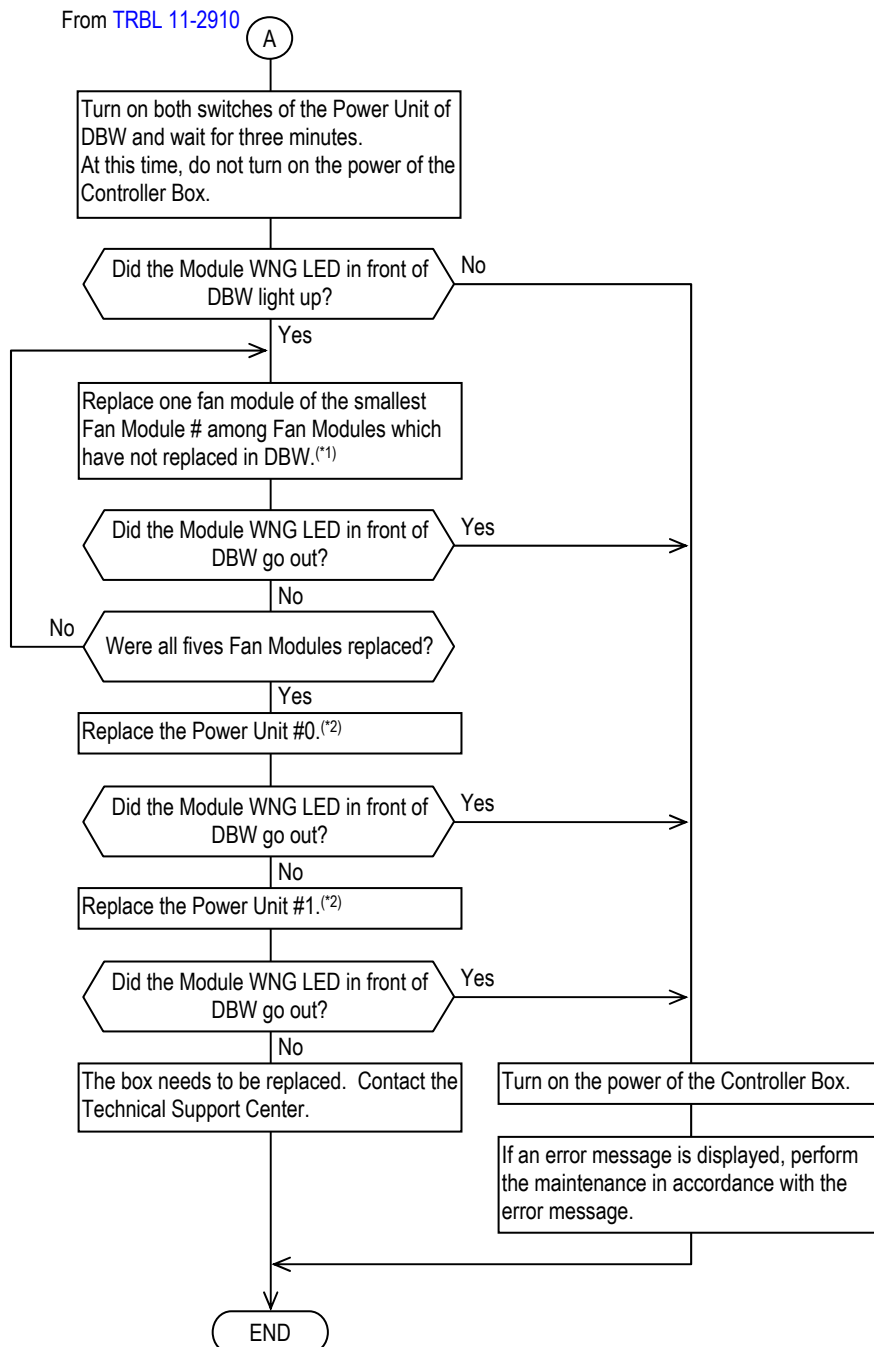
#### [Recovery method]



\*1 : For the replacement of the I/O Module, refer to the [Replacement "2.2.11 Replacing an I/O Module\(ENC\) or I/O Card\(ENC\)" \(REP 02-1500\)](#).

\*2 : For the replacement of the Fan Module, refer to the [Replacement "2.2.3 Replacing a Fan Module" \(REP 02-0520\)](#).

\*3 : For the replacement of the Power Unit, refer to the [Replacement "2.2.4 Replacing a Power Unit" \(REP 02-0560\)](#).



\*1 : For the replacement of the Fan Module, refer to the [Replacement "2.2.3 Replacing a Fan Module" \(REP 02-0520\)](#).

\*2 : For the replacement of the Power Unit, refer to the [Replacement "2.2.4 Replacing a Power Unit" \(REP 02-0560\)](#).

### 11.1.38 The Recovery Method when the Copy-Back Operates Regardless of the Copy-Back-Less Setting if Power Saving/Power Saving Plus is Enabled and Performs the Drive Restoration

This phenomenon has effective Power Saving/Power Saving Plus of array, and when it is in the following states, it may occur.

- When the Spare Drive is set to the system drive<sup>(†1)</sup>
- When the Spare Drives have been set for other than the system drives<sup>(†1)</sup> and the Drive failure restoration operated in the firmware less than 0940/A in the past (the operation is as shown in (1) and the Spare Drives are set for the system drives<sup>(†1)</sup>.)

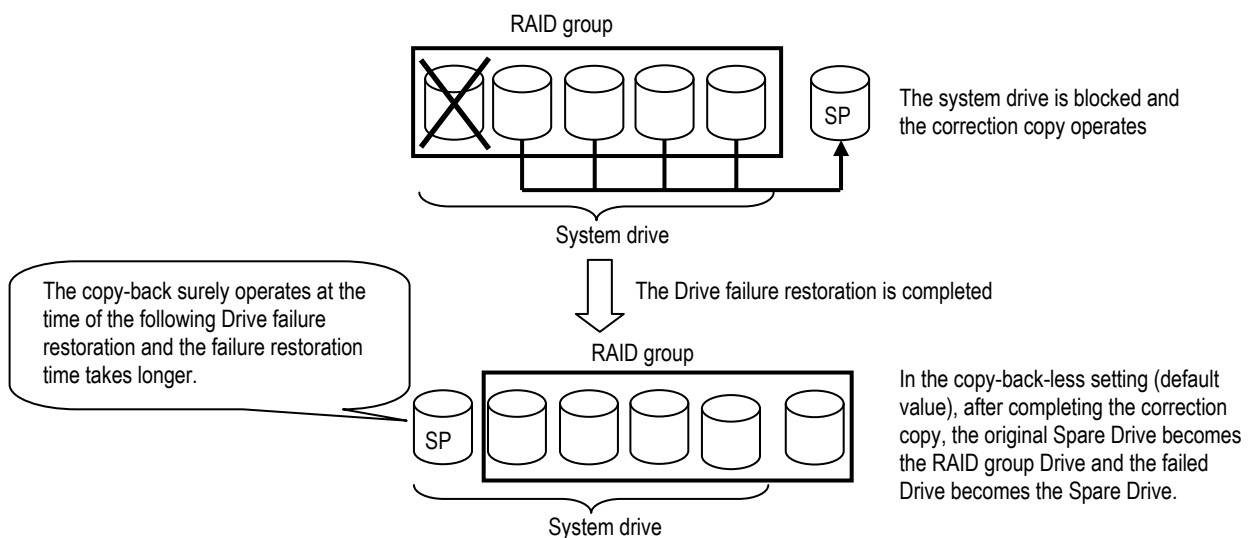
This procedure needs to be executed according to the instruction from the Technical Support Center. Contact the Technical Support Center.

#### (1) The mechanism of phenomenon generating

The power saving function does not operate in the RAID group which includes the system drive<sup>(†1)</sup>. Therefore, when the Power Saving/Power Saving Plus function is enabled, if the Drive restoration operates using the Spare Drive set for the system drive, the copy-back (Spare Drive Operation Mode is “Fixed”) operates even in the copy-back-less setting.

In case of the firmware less than 0940/A, even if the Spare Drive is not set in the system drive<sup>(†1)</sup> but the Spare Drive Operation Mode is in the copy-back-less setting, when a failure occurs in the system drive<sup>(†1)</sup> and the Drive restoration operates using the Spare Drive set in the position other than the system drive<sup>(†1)</sup>, in case of the Spare Drive Operation Mode is in the copy-back-less setting, the Spare Drive migrate to the system drive<sup>(†1)</sup>.

As a result, if using the Spare Drive in the system drive<sup>(†1)</sup> when executing the Drive restoration after this Drive restoration operation, the copy-back is surely operated.



**Figure 11.1.3 Substitution of a Spare Drive**

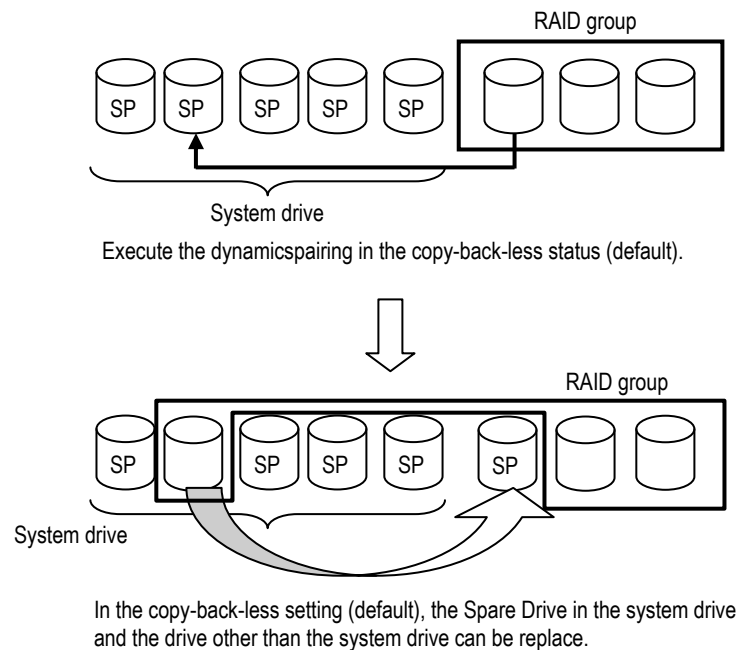
†1 : Drives #0 to #4 of CBSS/CBSL/CBXSS/CBXSL, Drives #0 to #4 of DBL/DBS/DBF/DBW falling under Unit ID#0 connected to CBL, or Drives #A0 to #A4 of DBX, Drives #0 to #4 of DBLD/DBSD falling under Unit ID#0 connected to CBLD.

## (2) The outline of recovery method

For recovering from this phenomenon, it is required to change the spare drives<sup>(†1)</sup> set for the system drives to other than system drives<sup>(†1)</sup>.

This recovery procedure migrates the Spare Drives gathered to the included in the RAID group system drives<sup>(†1)</sup> to the Drives other than the system drives<sup>(†1)</sup> by performing the dynamicsparing of the Spare Drive set for the system drive<sup>(†1)</sup> with the Drive of the RAID group to avoid the copy-back operation regardless of the Spare Drive operation mode by gathering the Spare Drive regardless of the Spare Drive operation mode.

NOTE: This procedure should invalidate the Power Saving/Power Saving Plus functions.



**Figure 11.1.4 The move method of a Spare Drive**

NOTE : This procedure needs to be executed according to the instruction from the Technical Support Center. Contact the Technical Support Center.

†1 : Drives #0 to #4 of CBSS/CBSL/CBXSS/CBXSL, Drives #0 to #4 of DBL/DBS/DBF/DBW falling under Unit ID#0 connected to CBL, or Drives #A0 to #A4 of DBX, Drives #0 to #4 of DBSD/DBLD falling under Unit ID#0 connected to CBLD.

### 11.1.39 Recovery Method when the DIP-Switch Setting of the I/O Module (ENC) is Incorrect

- (1) A case where the Drive Box is added

[WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	I5H800	Added unit failed [ENC type error] (Unit-x, ENC-y)	:ENC
Date	Time	x : Detect Controller # y : Detect Core #			

- (2) A case where an I/O Module (ENC) is inserted in the Drive Box

[WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	I5H900	Unsupported ENC was detected [ENC type error] (Unit-x, ENC-y)	:ENC
Date	Time	x : Detect Controller # y : Detect Core #			

- (3) A case where the power is ON

[WEB Information Message display]

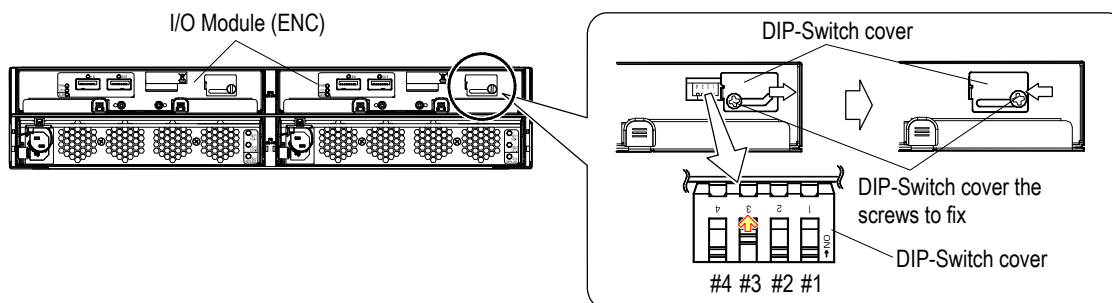
MM/DD/YYYY	hh:mm:ss	xy	HH7600	Backend down [ENC type error] (Unit-x, ENC-y)	:ENC
Date	Time	x : Detect Controller # y : Detect Core #			

- (4) Confirmation method

- Loosen the screws on the DIP-Switch cover of the relevant I/O Module (ENC) displayed in the message and open the cover.
- Check whether DIP-Switch #3 is ON and #1, #2 and #4 are OFF.
- If it is incorrect, perform “(5) Recover method”.  
If it is correct, close the DIP-Switch cover and tighten the screws to fix the cover. Do not perform “(5) Recovery method” and perform the following recovery method in the message.

- (5) Recovery method

- Open the right and left levers fixing the I/O Module (ENC) toward you.  
If you open the lever fully, the I/O Module (ENC) comes out forward.
- Set DIP-Switch #3 to ON and #1, #2 and #4 to OFF using the precision screwdriver.
- Close the DIP-Switch cover and tighten the screws to fix the cover.





- (d) Wait for **20 seconds or more**. Insert the I/O Module (ENC) with the right and left levers open into the specified position until the levers fall down a little.  
At this time, do not inset it to the end. If you do not wait for 20 seconds or more and insert the I/O Module (ENC), it may not recover normally.<sup>(‡1)</sup>
- (e) Push the right and left levers to the I/O Module (ENC) side.

NOTE : The lever operation should be **within one second**. If it takes more time, the I/O Module (ENC) may not recover. In that case, remove and install them again.

---

‡1 : Remove the inserted I/O Module (ENC) from the box. After 20 seconds or more elapse, insert it again.

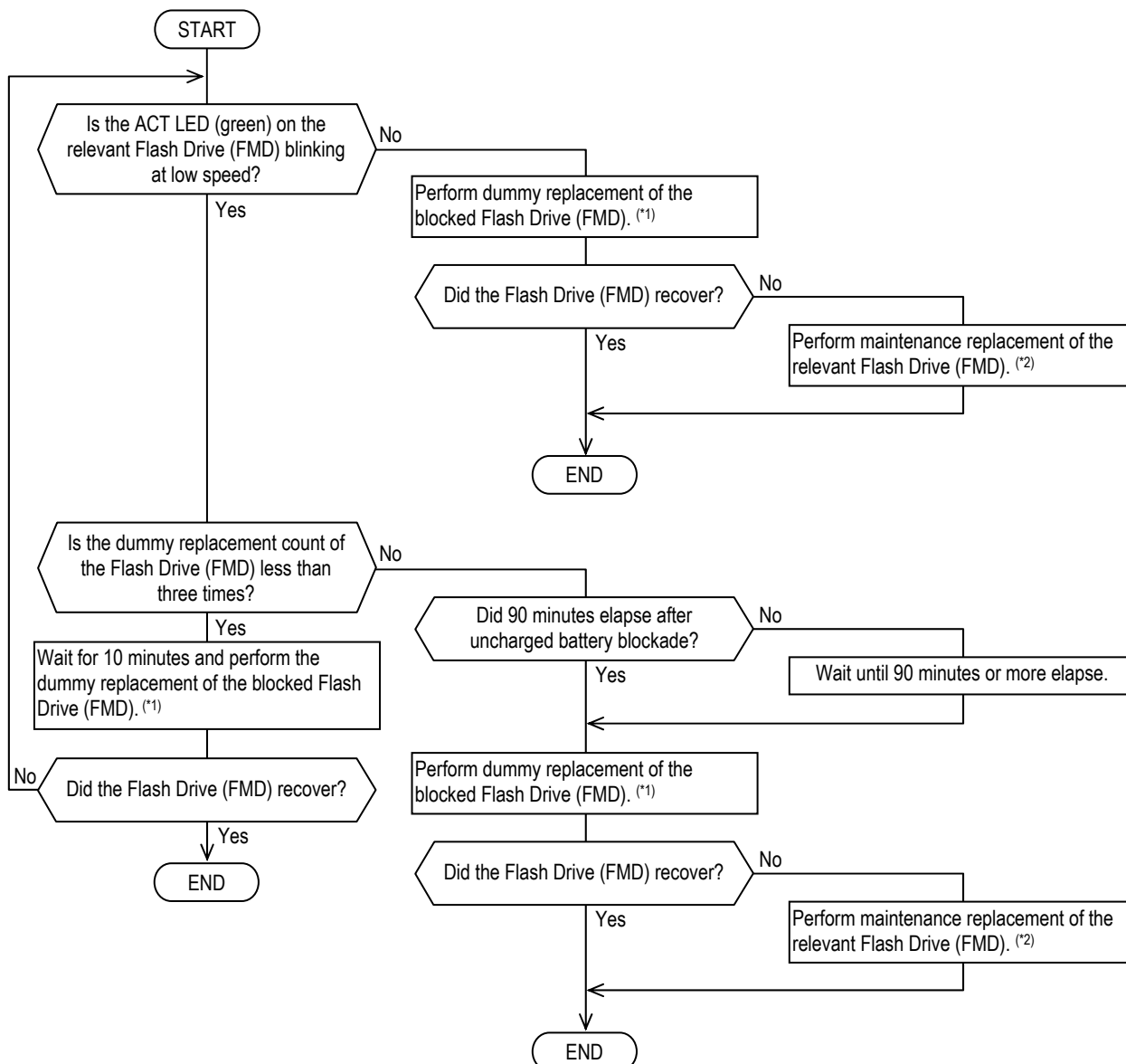
### 11.1.40 Recovery Method when Flash Drives (FMD) are Blocked Due to Uncharged Batteries

#### [WEB Information Message display]

MM/DD/YYYY hh:mm:ss xy IAJB00 FMD battery is not charged (Unit-x, HDU-y)				:MANUAL/STRC
Date		Time	x : Detect Controller # y : Detect Core #	

#### [Recovery method]

Disregard “HDU alarm” and “HDU error” displayed at the same time.



\*1 : This means that the part concerned is removed, and it is reinstalled after 20 seconds or more passed.

\*2 : For the replacement of the Drive, refer to the [Replacement “2.2.1 Replacing a Drive” \(REP 02-0050\)](#).

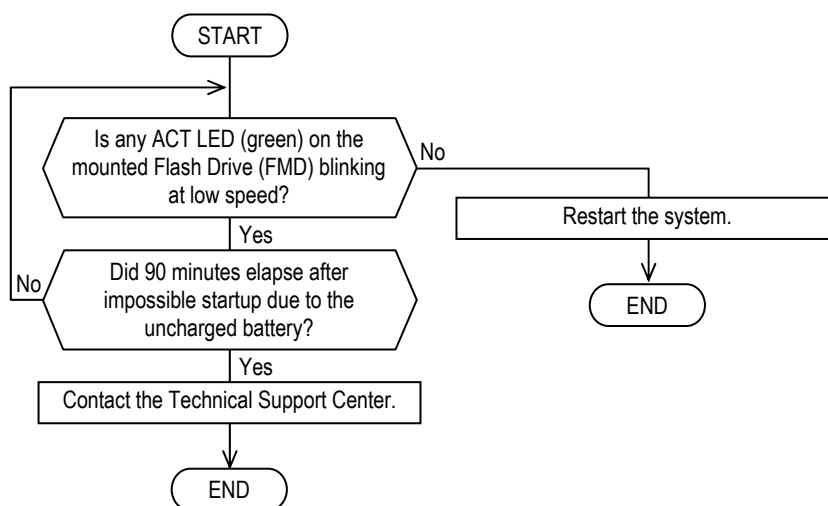
### 11.1.41 Recovery Method when Multiple Flash Drives (FMD) in the Same Array Go Down due to the Uncharged Battery Status

[WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	HH9X00 Multiple FMD batteries are not charged	:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #		

[Recovery method]

Disregard “HDU alarm” and “HDU error” displayed at the same time.



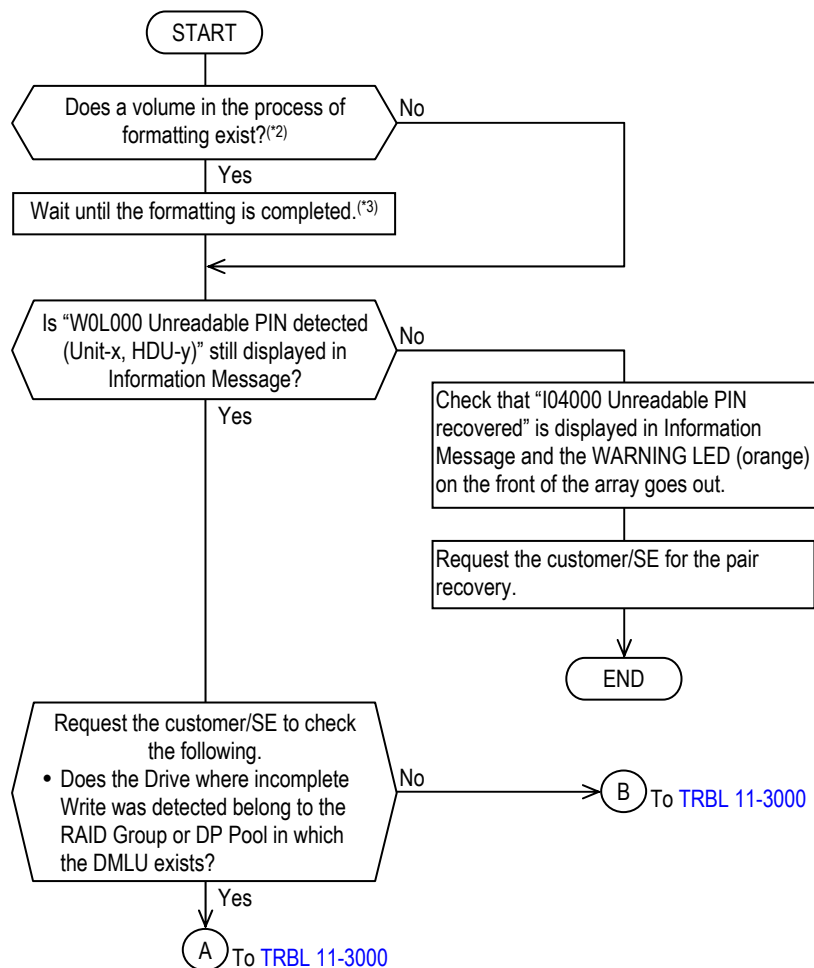
### 11.1.42 Recovery Method when Incomplete Write was Registered in the DMLU, Replication DP Pool or Management Area DP Pool

#### [WEB Information Message display]

MM/DD/YYYY	hh:mm:ss	xy	W0L000 Unreadable PIN detected (Unit-x, HDU-y)	:MANUAL/STRC
Date	Time	x : Detect Controller # y : Detect Core #		

#### [Recovery method]

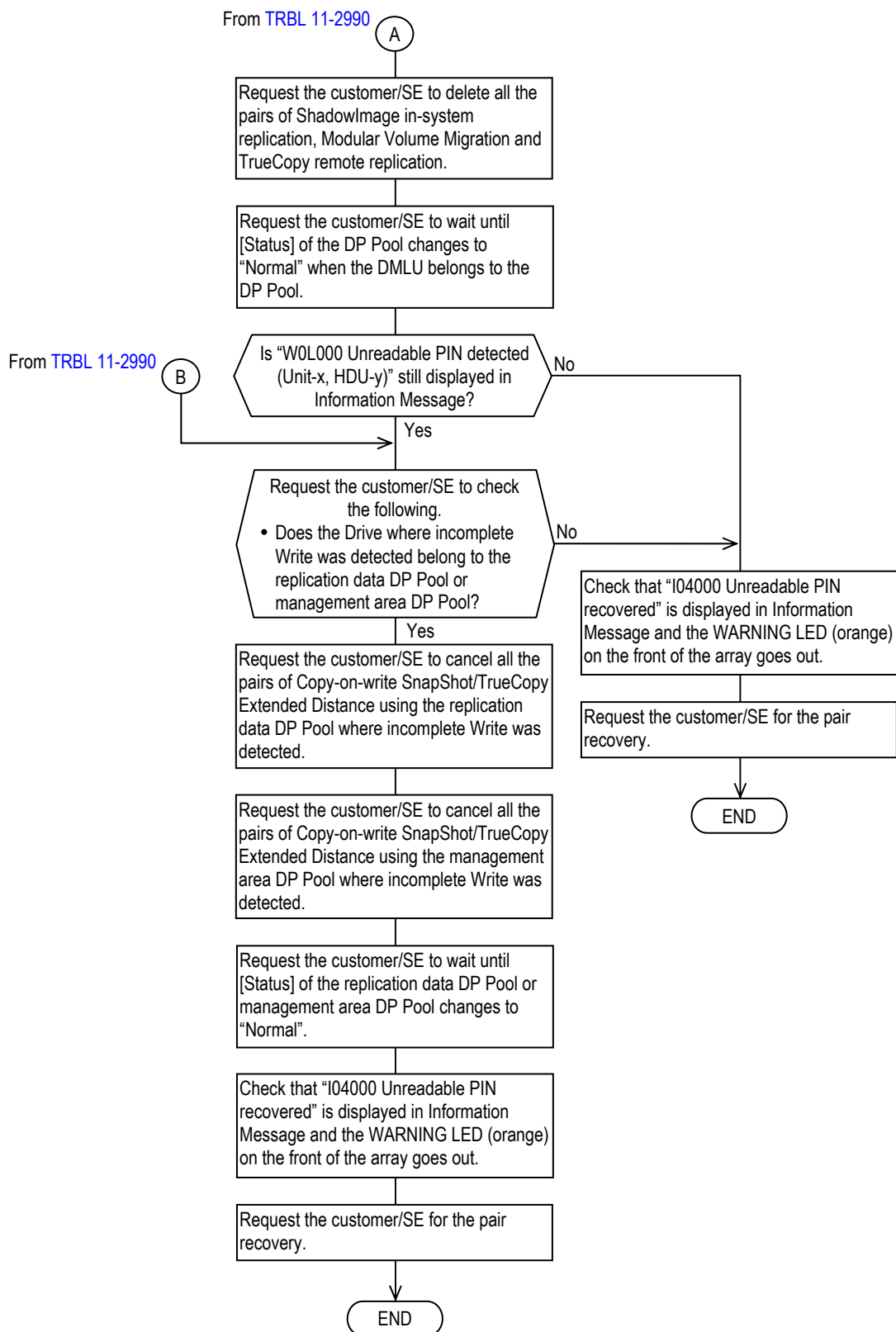
In the following procedure, all the pairs of ShadowImage in-system replication/Modular Volume Migration/TrueCopy remote replication or all the pairs of Copy-on-write SnapShot/TrueCopy Extended Distance are deleted. If the customer/SE desires to specify the pairs actually affected by incomplete Write, collect the simple trace<sup>(\*)</sup> and request the Technical Support Center for the analysis.



\*1 : For Simple Trace Collection, refer to "5.3 Collecting Simple Trace" (TRBL 05-0040).

\*2 : For the volume format status and volume formatting, refer to System Parameter "4.3.6 Formatting Volume" (SYSPR 04-0500).

\*3 : When completing the formatting of all the volumes, the volume in the status of "Unformat (Format Failure)" may exist. In that case, format the relevant volume again. (Refer to System Parameter "4.3.6 Formatting Volume" (SYSPR 04-0500).



## Chapter 12. Procedure for Online ENC Firmware Download

### 12.1 Outline of Online ENC Firmware Download

This describes the method of downloading the ENC firmware from the PC used for maintenance through the firmware without replacing the hard parts when the ENC firmware version-up is required.

For the DBW, the online ENC firmware download can be performed from the firmware version 0935/A or more.

[Possibility of the ENC firmware download depending on whether the host I/O instruction is required or not]

The following table shows possibility of the ENC firmware download depending on whether the host I/O instruction is required or not.

Item	Issue of the host I/O instruction		Note
	Required (online state)	Not required (offline state)	
Offline ENC Firmware Download	Not executable	Executable	
Online ENC Firmware Download	Executable	Executable	

## 12.2 Preconditions for Online ENC Firmware Download

- (1) To perform the Online ENC Firmware Download using Hitachi Storage Navigator Modular 2, a maintenance PC is required.
- (2) State of the array must be normal as shown below. Otherwise, an error message will be output when Hitachi Storage Navigator Modular 2 issues an instruction for the replacement.
  - Both of the Controllers are normal.
  - All the I/O Module(ENC) or I/O Card(ENC) are normal.
- (3) The Online ENC Firmware Download supports the dual controller configuration only. Do not apply the procedure for the case of the single controller configuration to the Online ENC Firmware Download.

## 12.3 Restriction of Online ENC Firmware Download

- (1) Do not remove or insert any parts, for maintenance or any other reason, during Online ENC Firmware Download.

Inserting or removing parts during Online ENC Firmware Download may cause a fault. If parts are inserted or removed during Online ENC Firmware Download and a fault results, action the Online ENC Firmware Download.

- (2) Do not alter the disk array architecture during Online ENC Firmware Download. Altering the disk array architecture during Online ENC Firmware Download may cause download to fail.
- (3) If maintenance personnel download an Online ENC Firmware Download when one of the ENC firmware already installed is defective or there is an I/O Module(ENC) or I/O Card(ENC) hardware error, the ENC firmware exchange may fail. At this time, perform the maintenance according to the message displayed in the Information Message, and then follow this procedure manual to perform the Online ENC Firmware Download again.

- (4) When each automatic diagnosis function operates due to the backend failures, the Online ENC Firmware Download fails.

In such a case, perform the Online ENC Firmware Download again after removing the failed part.

- (5) Do not execute the deliberate shutdown or power turning off when the online ENC download is terminated abnormally because the ENC firmware (part for the boot) may be damaged. When the download is terminated abnormally, issue the download instruction again through Hitachi Storage Navigator Modular 2 after removing a failed part. If the online ENC download is terminated abnormally in spite of the operation above, replace the I/O Module(ENC) or I/O Card(ENC).

If the deliberate shutdown or power turning off is executed after the abnormal termination of the download, the I/O Module(ENC) or I/O Card(ENC) may be detached at the time of the next boot of the array. If it occurs, replace the I/O Module(ENC) or I/O Card(ENC). (Refer to [Replacement “2.2.11 Replacing an I/O Module\(ENC\) or I/O Card\(ENC\)” \(REP 02-1500\).](#))

- (6) Be sure to set the automatic download function to “Disable” before performing the online ENC firmware download.

Be sure to set it to “Enable” again after executing the online ENC firmware download.

- (7) When you executed the planned shutdown during the online ENC firmware download, remove the power cables of all the connected chassis, reconnect them, and then turn on the main switch on the front. If the array is started up without performing the operation above, the I/O Module(ENC) or I/O Card(ENC) is detached. If it is detached, replace the I/O Module(ENC) or I/O Card(ENC). (Refer to [Replacement “2.2.11 Replacing an I/O Module\(ENC\) or I/O Card\(ENC\)” \(REP 02-1500\).](#))

- (8) Do not execute the online ENC firmware download while rewriting the drive firmware (“IZ0000 HDU firmware download start” is displayed in the Information Message on WEB). Execute the online ENC firmware download after checking that “IZ0100 HDU firmware download end” is displayed in the Information Message on WEB.



## 12.4 Time Required for Online ENC Firmware Download

For the Disk Array System, the standard time of working hours required for executing the online ENC firmware download function is shown below. The working hours of [Table 12.4.1](#) show the time from starting the replacement of the ENC firmware for ENC#0 or ENC#1 by the Hitachi Storage Navigator Modular 2 to the end of the replacement.

**Table 12.4.1 Standard of the Time Required for the Download of the ENC for ENC #0 or ENC #1**

Model	Target chassis for ENC firmware download	Working hours	
		Standard	Maximum
HUS110	Only Controller Box	3 minutes	11 minutes
	Only Drive Box	8 minutes	24 minutes
	Controller Box and Drive Box	4 minutes	12 minutes
HUS130	Only Controller Box	3 minutes	11 minutes
	Only Drive Box	9 minutes	26 minutes
	Controller Box and Drive Box	5 minutes	14 minutes
HUS150	Only Controller Box	3 minutes	11 minutes
	Only Drive Box	10 minutes	23 minutes
	Controller Box and Drive Box	10 minutes	23 minutes
HUS150 (DBW connection)	Only Controller Box	3 minutes	11 minutes
	Only Drive Box	64 (16 <sup>(*)</sup> )minutes	144 (36 <sup>(*)</sup> )minutes
	Controller Box and Drive Box	64 (16 <sup>(*)</sup> )minutes	144 (36 <sup>(*)</sup> )minutes

\*1 : This indicates the working hours taken for the latterly downloaded ENC when executing the download function for both of ENC #0 and ENC #1.

## 12.5 Before Starting Online ENC Firmware Download

The PC that is used for maintenance and connected to the LAN must be used to download Online ENC Firmware Download. Before beginning Online ENC Firmware Download, confirm/prepare the following:

- (1) After referring to the web connection procedures in the [WEB “Chapter 1. Before Using Web” \(WEB 01-0000\)](#), prepare 1 PC on which a web browser has been installed and that can be used in a LAN.
- (2) Set the service PC up. (Refer to [Firmware “1.3 Preparation for Installation of Firmware” \(FIRM 01-0020\)](#).)
- (3) Prepare a DVD of the specified revision for firmware installation.
- (4) Execute the installer of the DVD and store the unified version directory<sup>(†1)</sup> under the directory, “C:\diskarray-microprogram\microprogram.”
- (5) If a failure occurs during the ENC firmware download, it is required to see the recovery measures. Prepare the [“Message”](#), and perform the recovery work following the manual.

---

†1 : For the unified version directory, refer to [“12.5.1 Hierarchy of ENC Firmware Storage Directories” \(TRBL 12-0050\)](#).

### 12.5.1 Hierarchy of ENC Firmware Storage Directories

The ENC firmware is stored as the compression format (zip file) in the DVD for firmware installation.

Since the ENC firmware (zip file) is stored under “Firmware\program\microprogram” in the DVD for firmware installation, store the ZIP file from the DVD under the directory “C:\diskarray-microprogram\microprogram”.

When the Hitachi Storage Navigator Modular 2 version is less than 22.00, uncompress the ZIP file.

**Table 12.5.1 DVD Directory Hierarchy**

First stratum	Second stratum	Third stratum
manual	HostInst	Manual file
	UG	
program	Microprogram	Firmware zip file
	DFJavaSetup.exe (Java setup file)	-

The hierarchical structure of firmware storage ZIP file (09xxx.zip) directories is shown in [Table 12.5.2](#).

**Table 12.5.2 ZIP File Directory Hierarchy**

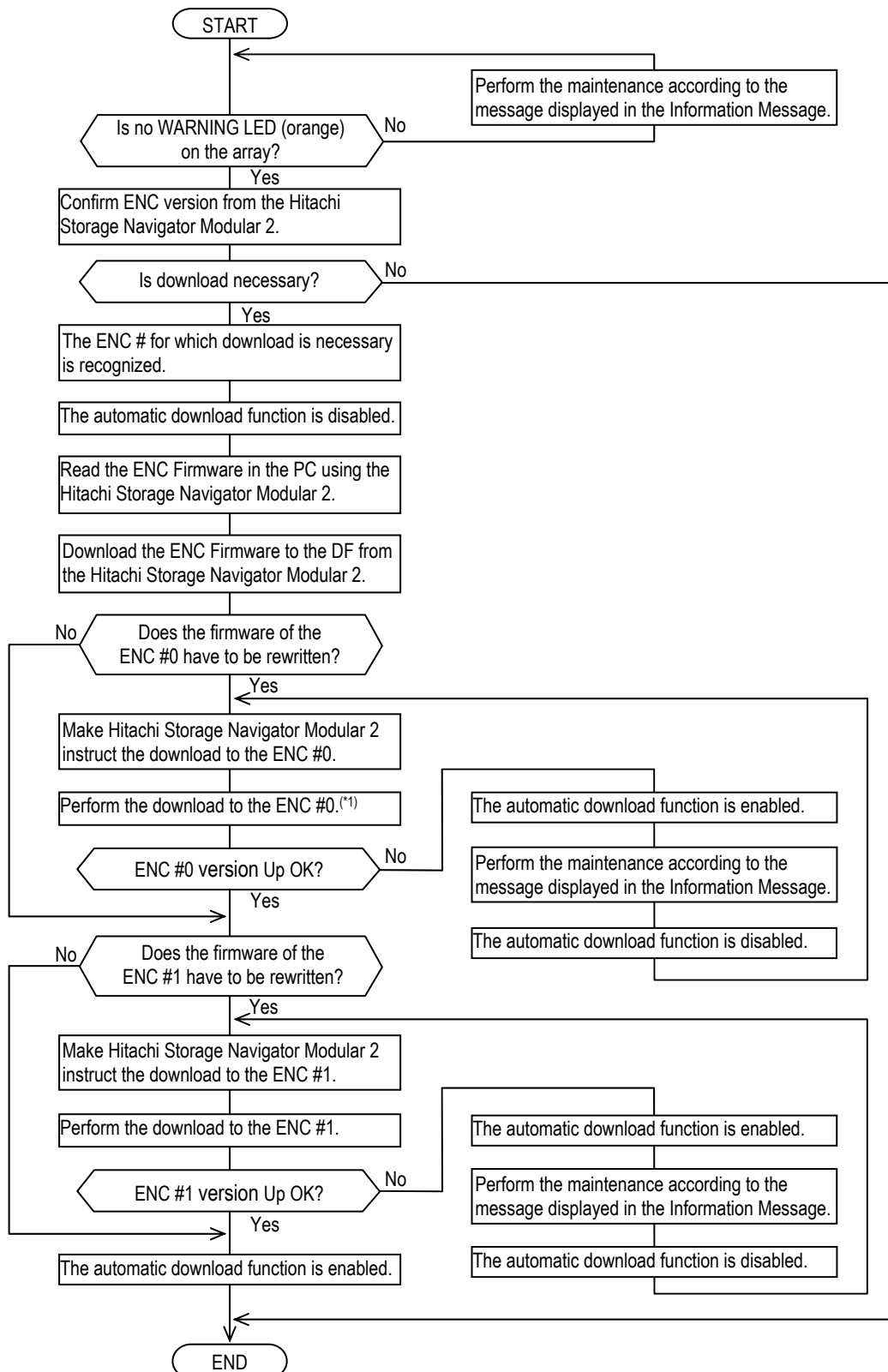
First stratum	Second stratum	Third stratum	Fourth stratum
Unified version (Example: 0915B)	DF850MH	disk 01 - disk X	Firmware file
		fmins	
	DF850MHD	disk 01 - disk X	
		fmins	
	DF850S	disk 01 - disk X	
		fmins	
	DF850XS	disk 01 - disk X	
		fmins	
	drvfirm	DKR2F-VIPERAP	Drive firmware file
		:	
	ENC850	ENC Firmware file	—

## 12.6 Procedure for Online ENC Firmware Download

The procedure that must be followed in order to download Online ENC Firmware Download does not support single controllers.

## 12.6.1 Flowchart

The procedure for the maintenance operation is shown below.



\*1 : The ALM LED(red) on the ENC lights on during the ENC firmware download.

## 12.6.2 Connecting the PC Used for Maintenance

The maintenance LAN connector and the LAN connector of the PC used for maintenance must be connected using a LAN cross cable. Follow the procedure shown below to make the necessary connection.

(1) Confirm the following before connecting the PC used for maintenance:

Check the following LEDs before connecting the PC used for maintenance:

- POWER LED (green) confirmation:

Confirm that the POWER LED (green) located on the top of the front bezel is lit.

If the POWER LED (green) is not lit, refer to the [“Chapter 7. Trouble Analysis by LED Indication” \(TRBL 07-0000\)](#) for details on how to correct the error.

- WARNING LED (orange)/LOCATE LED (orange) confirmation:

Confirm that the WARNING LED (orange)/LOCATE LED (orange) located on the top of the front bezel is not lit.

If the WARNING LED (orange)/LOCATE LED (orange) is lit or blinking, refer to the [“Chapter 7. Trouble Analysis by LED Indication” \(TRBL 07-0000\)](#) for details on how to correct the error.

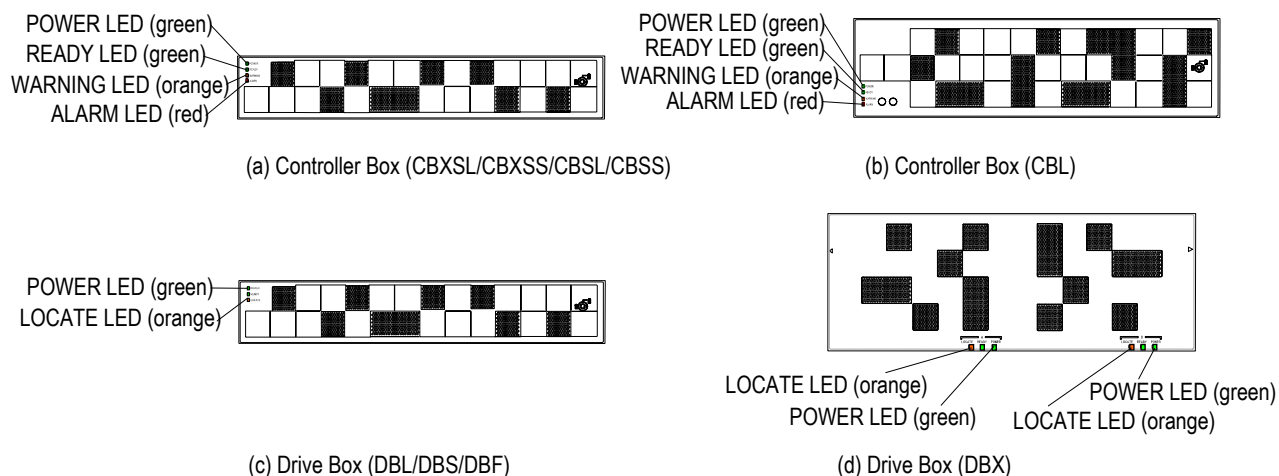


Figure 12.6.1 Locations and Name of LED

## (2) Preparing the maintenance terminal for use

**Table 12.6.1 Preparing the Maintenance Terminal**

Item	Customer Environment	Terminal used for maintenance	Preparation
1	Using LAN connectors for maintenance of the array.	Use the LAN to connect the PC that is being carried and will be used for maintenance.	<ul style="list-style-type: none"> <li>• PC used for maintenance</li> <li>• LAN cross cable</li> </ul>

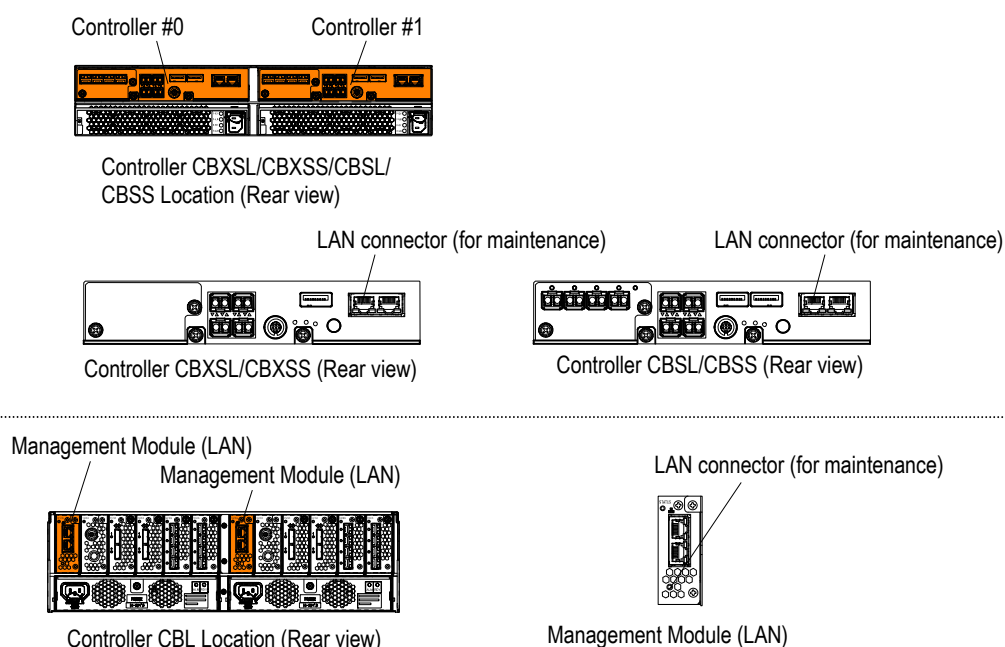
## (3) Controller to be connected (Management Module in case of CBL)

If a system has a dual Controller, connect to either Controller (Management Module in case of CBL) to connect to the WEB. First, connect to Controller#0 (Management Module #0 in case of CBL).

If Controller #0 is blocked, however, information after the blockage of Controller #0 is referenced on only Controller #1 side. Accordingly, if Controller #0 is blocked, connect to Controller #1 (Management Module #1 in case of CBL).

## (4) Connecting the procedures of the PC Used for Maintenance

- (a) Connect the maintenance LAN connector of Controller (Management Module in case of CBL) and the LAN connector of the service PC via the LAN cross cable.

**Figure 12.6.2 LAN Connector Position**

- (b) Start up the Maintenance PC.
- (c) Change the IP Address of the network parameter for the Maintenance Pc.
- (c-1) In case of the IPv4 environment
- (i) Make the setting of the IP Address to be set to the PC as Item 1 in [Table 12.6.2](#).
    - CTL0: 10.0.0.16 (Input example : http://10.0.0.16/)
  - (ii) If it is not connectable, by setting the values of Item 2 to Item 5 in [Table 12.6.2](#), specify the connectable value and perform the WEB connection.
    - According to the setting value of “Maintenance PC” of Items 2 to 5 on [Table 12.6.2](#), set the IP Address and the Subnet Mask of the Maintenance PC.
    - According to the “Array (LAN port for maintenance)” information of Items 2 to 5 on [Table 12.6.2](#), enter into “Address” of the WEB browser and connect with the array.
  - (iii) If not connected yet, refer to [“3.4 Procedure for Specifying Maintenance Port IP Address” \(TRBL 03-0120\)](#).

**Table 12.6.2 Operating Environment (IPv4)**

No.	Array (LAN port for maintenance)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 0.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL 0: 192.168.233.16 CTL 1: 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL 0: 172.23.211.16 CTL 1: 172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL 0: 10.197.181.16 CTL 1: 10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0



(c-2) In case of the IPv6 environment

(i) Make the setting of the IP Address to be set to the PC as Item 1 in [Table 12.6.3](#).

- CTL0: fe80::16 (Input example : http://[fe80::16]/)

When connecting on WEB by the IPv6 address, put the address in brackets ([ ]).

(ii) If it is not connectable, set the value of Item 2 in [Table 12.6.3](#), and perform the WEB connection.

- According to the setting value of “Maintenance PC” of Item 2 on [Table 12.6.3](#), set the IP Address and the Subnet Mask of the Maintenance PC
- According to the “Array (LAN port for maintenance)” information of Item 2 on [Table 12.6.3](#), enter into “Address” of the WEB browser and connect with the array.

(iii) If not connected yet, refer to [“3.4 Procedure for Specifying Maintenance Port IP Address” \(TRBL 03-0120\)](#).

**Table 12.6.3 Operating Environment (IPv6)**

No.	Array (LAN port for maintenance)		Maintenance PC	
	IP Address	Length of Subnet Prefix	IP Address	Length of Subnet Prefix
1	CTL 0: fe80::16 CTL 1: fe80::17 (At the time of shipment)	64 (At the time of shipment)	Automatic	Automatic
2	CTL 0: fe80::f6 CTL 1: fe80::f7	64	Automatic	Automatic

- Manual change of the network parameter of the Maintenance port

When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.

Therefore, in the work other than the installation work of the array at shipment, the maintenance LAN Port for the WEB connection is set to any of Items 1 to 5 in [Table 12.6.2](#) in case of the IPv4 environment and set to either Item 1 or 2 in [Table 12.6.3](#) in case of the IPv6 environment.

**NOTE :** When the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.

Therefore, use a value other than the network address set to the maintenance port for the LAN device connected to the port for the user management via Gateway. Or change the IP address of the maintenance port to a value other than the network address of the LAN device connected via Gateway by Hitachi Storage Navigator Modular 2. (Refer to [System Parameter “7.1 Setting Maintenance LAN” \(SYSPR 07-0000\)](#).)

(d) Make sure that negotiation of Maintenance PC is set to auto negotiation.

To check negotiation of Maintenance PC, refer to [“3.1 \(6\) Procedure for setting negotiation” \(TRBL 03-0060\)](#).

### 12.6.3 Online ENC Firmware Download

The procedure for downloading the ENC firmware using Hitachi Storage Navigator Modular 2 is shown below. According to the procedure, the following operations are performed in due order.

- ① Checking the revision.
- ② The automatic download function is disabled.
- ③ Reading the ENC firmware.
- ④ Instructing for the download to the array (from the Hitachi Storage Navigator Modular 2 to the array main memory).
- ⑤ Instructing for the replacement of the ENC firmware (from the array main memory to the ENC).
- ⑥ The automatic download function is enabled.

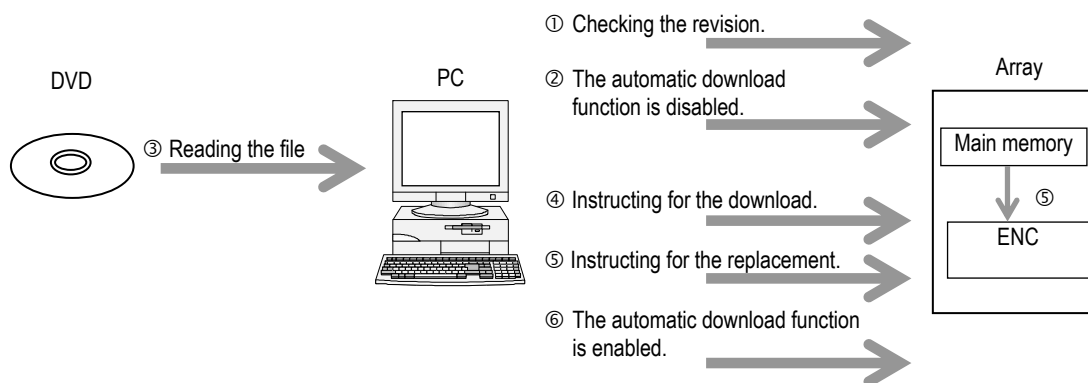


Figure 12.6.3 Procedure for ENC Firmware Download

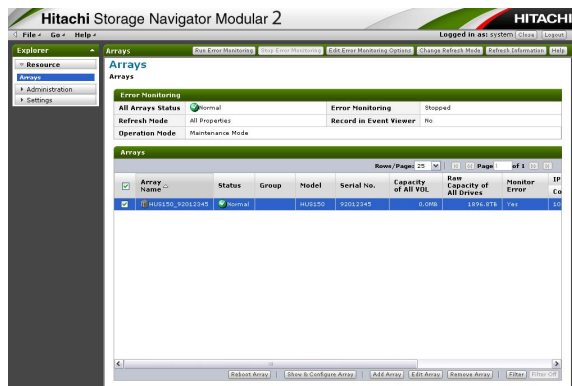
## (1) Checking the revision

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

(i) Start the Hitachi Storage Navigator Modular 2.

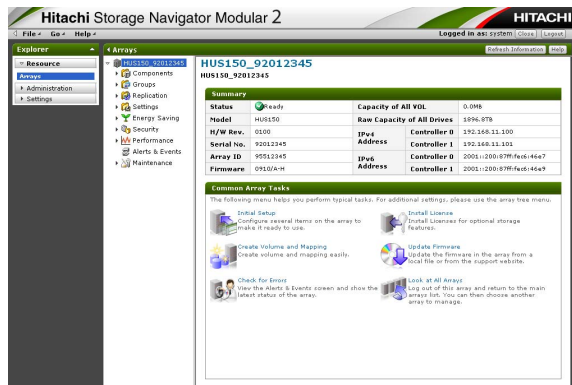
(ii) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



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

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



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

- (iv) Select the [Maintenance] - [ENC Firmware] in the unit window, and then confirm the current version of the ENC firmware.

Check both [ENC0] tab and [ENC1] tab in the window. If the versions of ENC #0 and #1 are both same as the versions to be downloaded or new versions, the download of the ENC firmware is not required. Therefore, terminate the operation.

When either or both of the versions of the ENC #0 and #1 are older than the version to be downloaded, go to the Step (2).

You can refer to the version of the ENC firmware to be downloaded in the text file in the zip file of the firmware distributed by the DVD in advance.

Decompress the zip file to "C:\diskarray-microprogram\maicroprogram".

- In the case of CBL

"C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\85LIST.TXT

Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.

Examples of 85LIST.TXT

09063A(85) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.

85\_REV.DAT

85\_FIRM.WTB

Compare it with the version displayed in ENC(CBx) in the window.

- In the case of CBXSL/CBXSS/CBSL/CBSS

"C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\86LIST.TXT

Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.

Examples of 86LIST.TXT

0A063A(86) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.

86\_REV.DAT

86\_FIRM.WTB

Compare it with the version displayed in ENC(CBx) in the window.

- In the case of DBS/DBL/DBX

"C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\S6LIST.TXT

Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.

Examples of S6LIST.TXT

080F01(S6) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.

S6\_REV.DAT

S6\_FIRM.WTB

Compare it with the version displayed in ENC(xFF) in the window.

- In the case of DBW

"C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\GMLIST.TXT

Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.

Examples of GMLIST.TXT

0B0103(GM) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.

GM\_REV.DAT

G0\_FIRM.WTB

Compare it with the version displayed in ENC(DBW) in the window.

- In the case of DBF

"C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\NFLIST.TXT

Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.

Examples of NFLIST.TXT

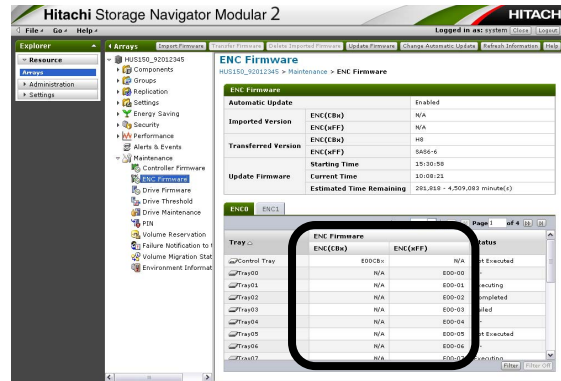
C00111(NF) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.

NF\_REV.DAT

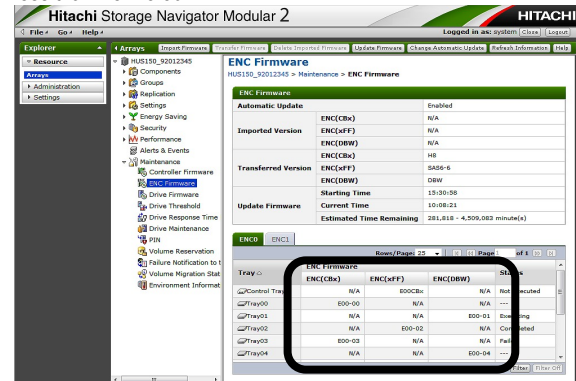
NF\_FIRM.WTB

Compare it with the version displayed in ENC(DBF) in the window.

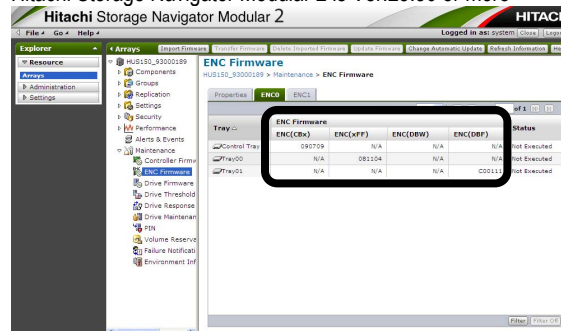
Hitachi Storage Navigator Modular 2 is less than Ver.23.00



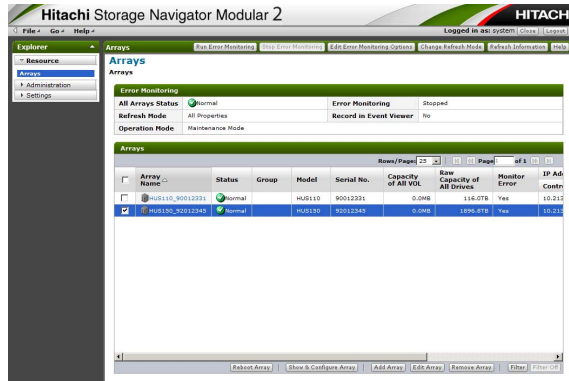
Hitachi Storage Navigator Modular 2 is Ver.23.00 or more, is less than Ver.25.50



Hitachi Storage Navigator Modular 2 is Ver.25.50 or more

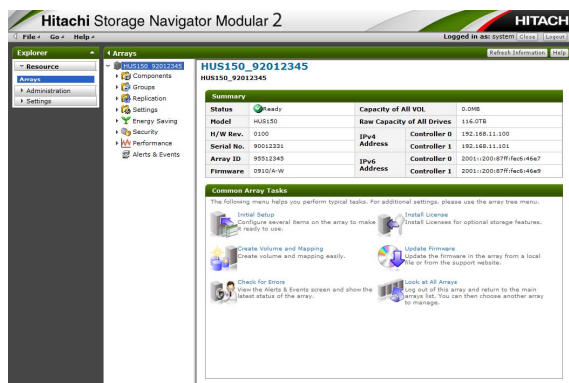


- (b) When the Hitachi Storage Navigator Modular 2 version is less than 22.00
- Start the Hitachi Storage Navigator Modular 2.
  - Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>
- It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



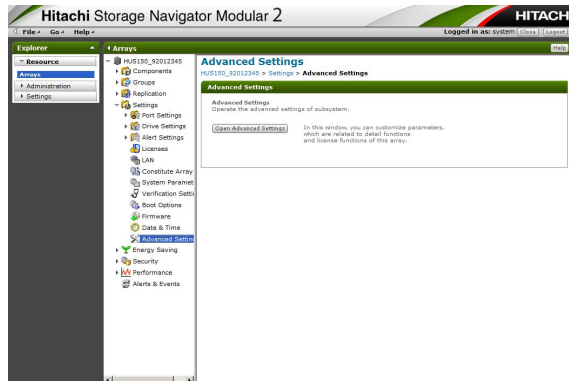
- (iii) Click the array name, and open the unit window.

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

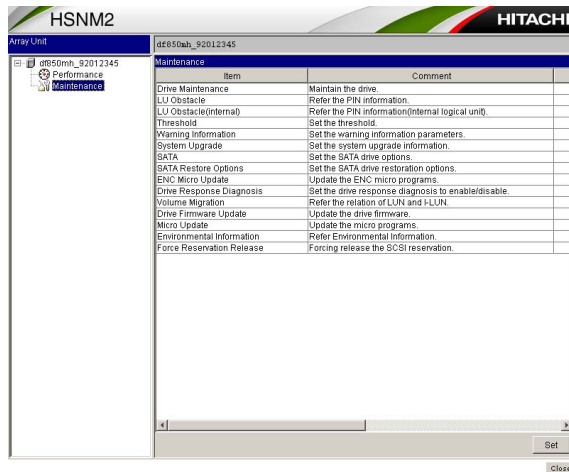


<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

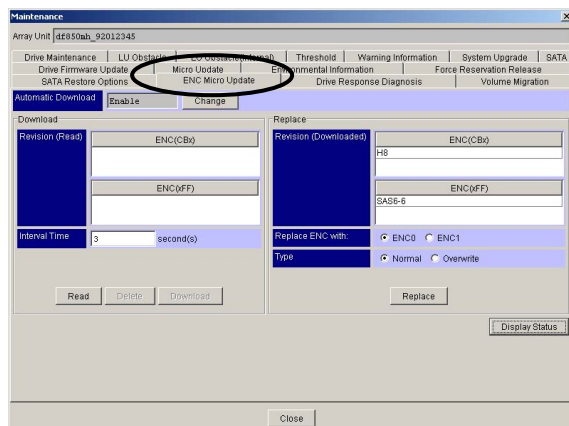
- (iv) Select [Settings] - [Advanced Settings] on the unit window, and click the [Open Advanced Settings] button.



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

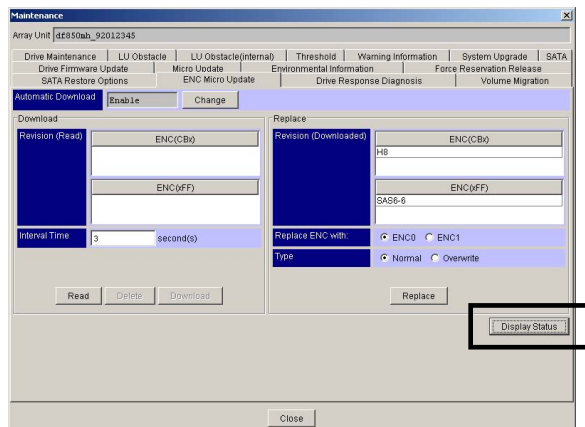


- (vi) Select the [ENC Micro Update] tab in the Hitachi Storage Navigator Modular 2 maintenance window.





(vii) Display the revision of the current ENC firmware by selecting the [Display Status] button.



(viii) Check the version of the current ENC firmware.

Check both [ENC0] tab and [ENC1] tab in the window. If the versions of ENC #0 and #1 are both same as the versions to be downloaded or new versions, the download of the ENC firmware is not required. Therefore, terminate the operation.

When either or both of the versions of the ENC #0 and #1 are older than the version to be downloaded, go to the Step (2).

You can refer to the version of the ENC firmware to be downloaded in the text file in the zip file of the firmware distributed by the DVD in advance.

Decompress the zip file to "C:\diskarray-microprogram\maicroprogram".

- In the case of CBL

"C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\85LIST.TXT

Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.

Examples of 85LIST.TXT

09063A(85) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.

85\_REV.DAT

85\_FIRM.WTB

Compare it with the version displayed in ENC(CBx) in the window.

- In the case of CBXSL/CBXSS/CBSL/CBSS

"C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\86LIST.TXT

Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.

Examples of 86LIST.TXT

0A063A(86) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.

86\_REV.DAT

86\_FIRM.WTB

Compare it with the version displayed in ENC(CBx) in the window.

- In the case of DBS/DBL/DBX

"C:\diskarray-microprogram\microprogram\Folder Name of Decompressed  
Firmware\ENC850\S6LIST.TXT

Open the above-mentioned text file, and the one described in the first row is the ENC  
firmware version.

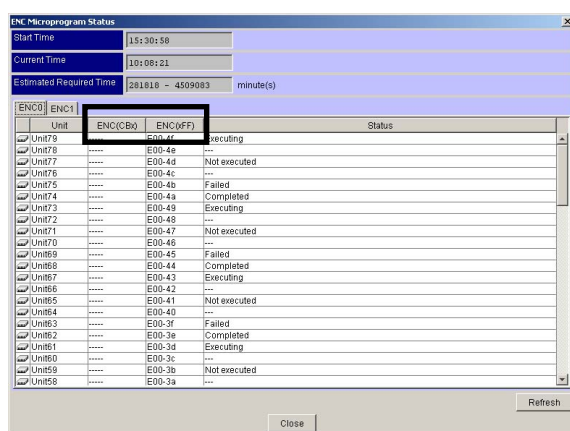
Examples of S6LIST.TXT

080F01(S6) ← The alphanumeric characters of the leading six digits indicate the  
ENC firmware version.

S6\_REV.DAT

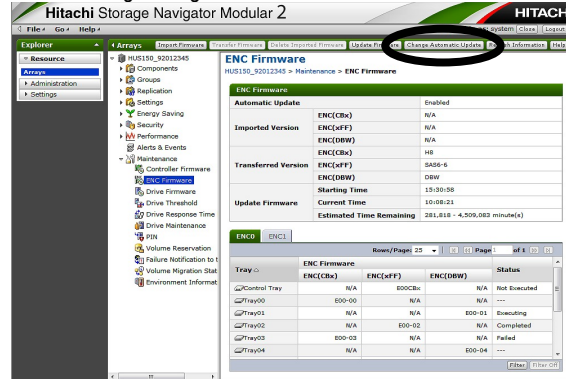
S6\_FIRM.WTB

Compare it with the version displayed in ENC(xFF) in the window.

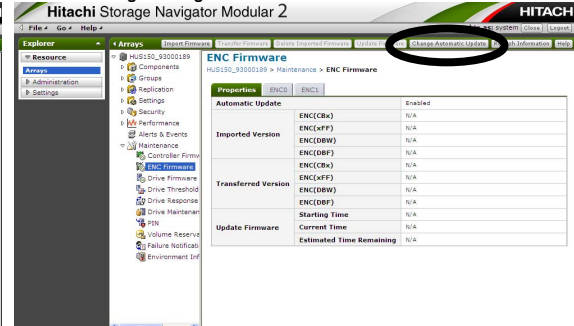


- (2) The automatic download function is disabled.
- (a) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
- (i) Click the [Change Automatic Update] button in the ENC Firmware window.

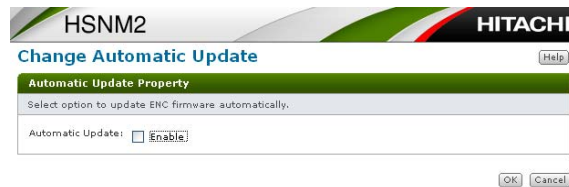
Hitachi Storage Navigator Modular 2 is less than Ver.25.50



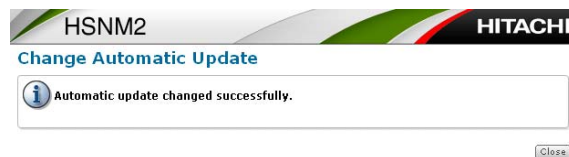
Hitachi Storage Navigator Modular 2 is Ver.25.50 or more



- (ii) Uncheck the Automatic Update check box, and then click the [OK] button.

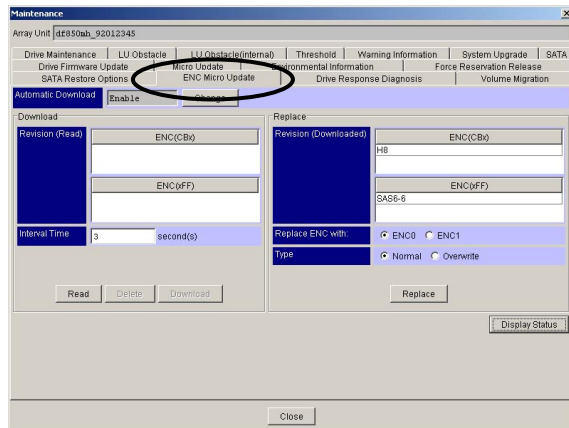


- (iii) The message dialog box appears. Click the [Close] button.

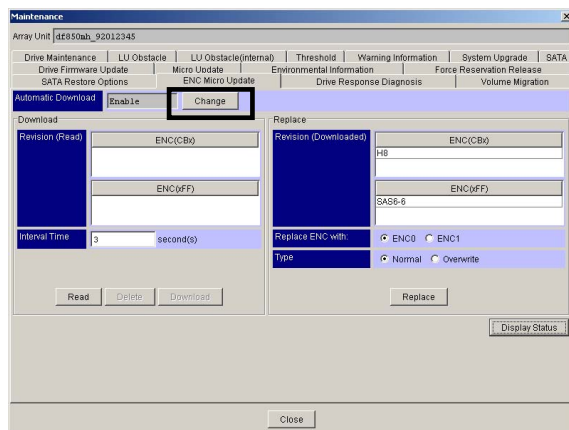


(b) When the Hitachi Storage Navigator Modular 2 version is less than 22.00

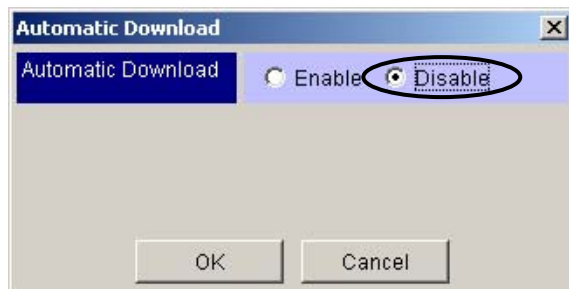
(i) Select the [ENC Micro Update] tab in the Hitachi Storage Navigator Modular 2 maintenance window.



(ii) Click the [Change] button on the “Automatic Download”.

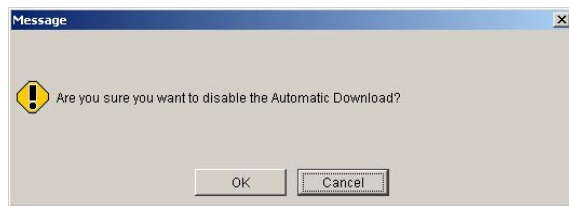


(iii) Select [Disable] in the Automatic Download window.



Click the [OK] button.

(iv) The configuration message dialog box appears. Click the [OK] button.

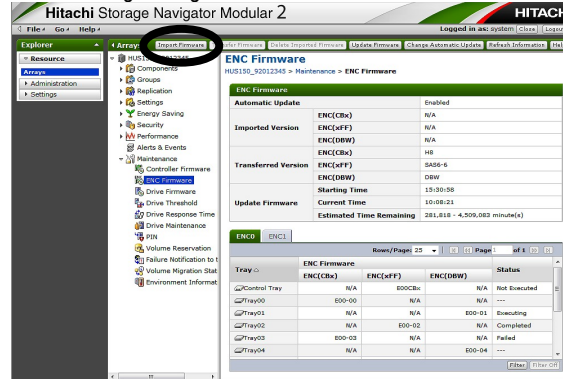


(v) When the set is completed normally, click the [OK] button.

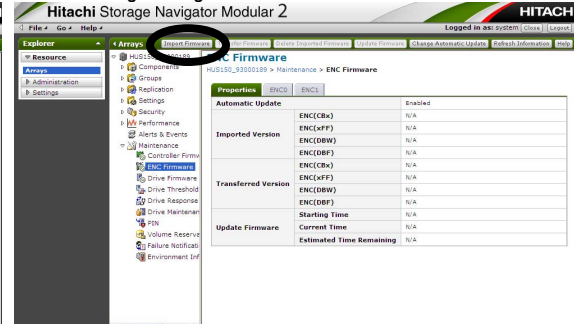


- (3) Importing the ENC firmware (It is described as a procedure to the ENC #0.)
- (a) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
- (i) Click the [Import Firmware] button.

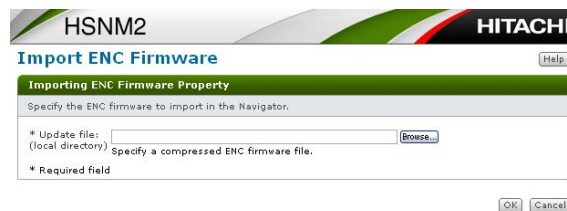
Hitachi Storage Navigator Modular 2 is less than Ver.25.50



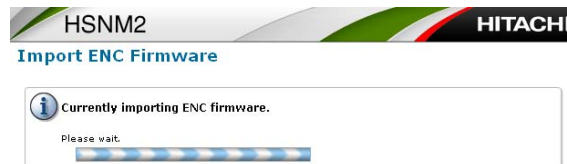
Hitachi Storage Navigator Modular 2 is Ver.25.50 or more



- (ii) Specify the unified version directory<sup>(†1)</sup> for the “Update file”, and then click the [OK] button.



- (iii) The window indicating the file is being importing is displayed.



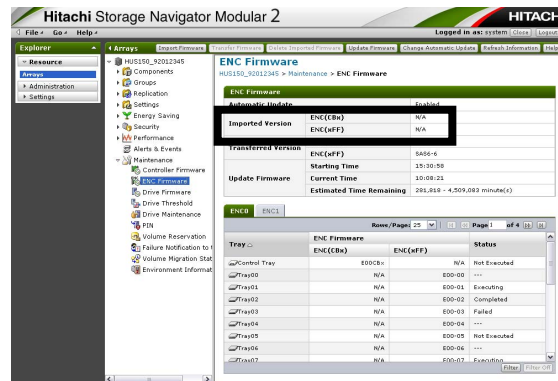
- (iv) When the import of the file is completed, click the [Close] button.



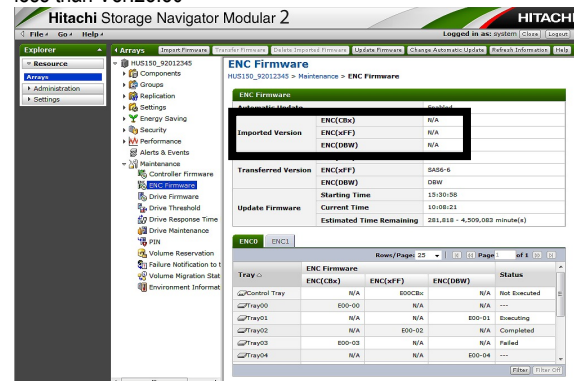
†1 : For the unified version directory, refer to “12.5.1 Hierarchy of ENC Firmware Storage Directories” (TRBL 12-0050).

(v) Confirm the imported version in the ENC Firmware window.

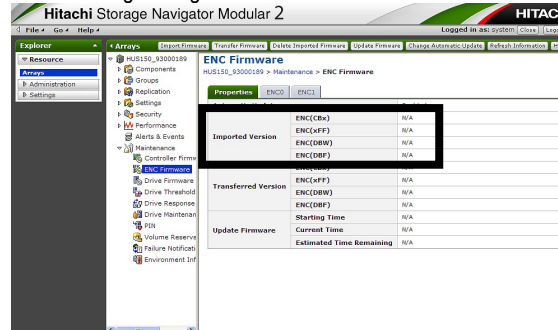
Hitachi Storage Navigator Modular 2 is less than Ver.23.00



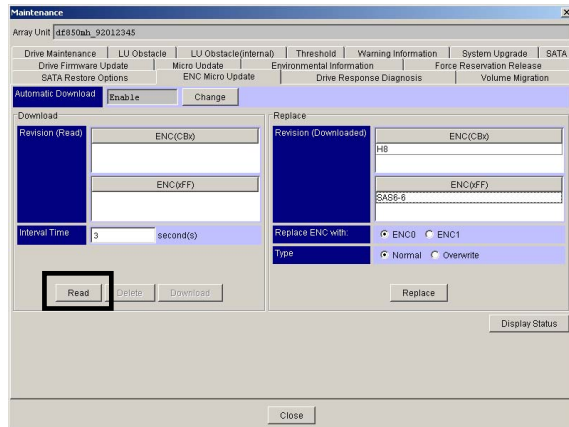
Hitachi Storage Navigator Modular 2 is Ver.23.00 or more, is less than Ver.25.50



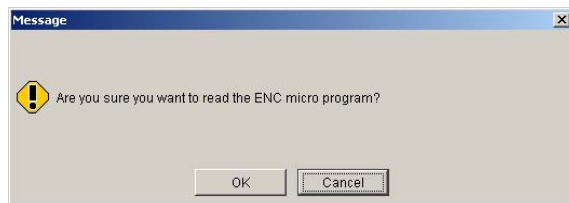
Hitachi Storage Navigator Modular 2 is Ver.25.50 or more



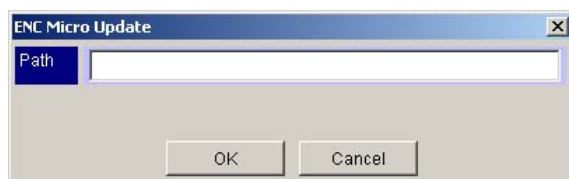
- (b) When the Hitachi Storage Navigator Modular 2 version is less than 22.00
- Check that the [Type] is the Normal version, select the [Read] button on the [ENC Micro Update] tab.  
When [Overwrite] is selected, specify [Normal].  
Select [Overwrite] only when there is the instruction to select it.



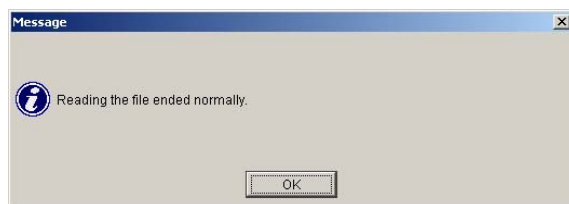
- The “Configuration Message” dialog box appears. Click the [OK] button.



- Specify the unified version directory<sup>(†1)</sup> to the [Path], and click the [OK] button.



- When the download of the file is completed, click the [OK] button.



†1 : For the unified version directory, refer to “12.5.1 Hierarchy of ENC Firmware Storage Directories” (TRBL 12-0050).



- (v) The revision of the ENC firmware that has been read in is displayed in the [ENC Micro Update] tab. Make sure that the revision of the displayed ENC firmware is the same as that to be downloaded. If they are not the same, read in the ENC firmware again.

Maintenance

Array Unit: BD3150\_92012345

Drive Maintenance | LU Obstacle | LU Obstacle(internal) | Threshold | Warning Information | System Upgrade | SATA  
Drive Firmware Update | Enc Update | Environmental Information | Force Reservation Release  
SATA Restore Order | ENC Micro Update | Drive Response Diagnosis | Volume Migration

Automatic Download:

Download

Revision (Read)

ENC(CB0)	ENC(0FF)
090601	080C0B

Interval Time:  seconds(s)

Read Delete Download

Replace

Revision (Downloaded)

ENC(CB0)	ENC(0FF)
H8	SAS6-S

Replace ENC with: ☒ ENC0 ☐ ENC1

Type: ☒ Normal ☐ Overwrite

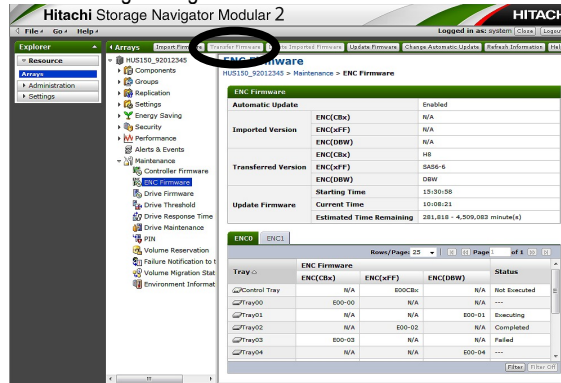
Replace

Display Status

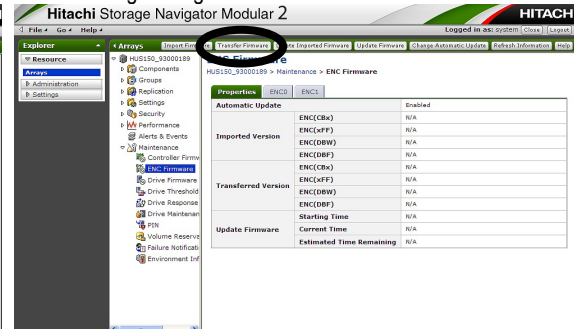
Close

- (4) Instructing for the transfer to the disk array unit
- (a) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
- (i) Transfer the ENC firmware that has been import in the Hitachi Storage Navigator Modular 2 to the disk array unit.
- To transfer the ENC Firmware, click the [Transfer Firmware] button.

Hitachi Storage Navigator Modular 2 is less than Ver.25.50



Hitachi Storage Navigator Modular 2 is Ver.25.50 or more



- (ii) Enter the interval time in the Transfer ENC Firmware window, and then click the [OK] button.

For the [Interval Time], three seconds or more of the default value are recommended to avoid the influence on the host I/O.



- (iii) The Message dialog box appears. Click the [Confirm] button.



- (iv) During the transfer, a message indicating the ENC firmware is being transferring is displayed.

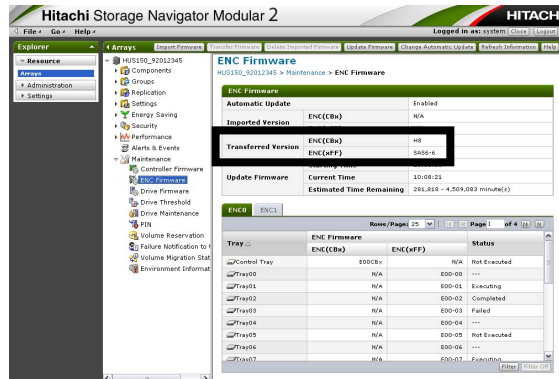


- (v) The message dialog box appears. Click the [Close] button.

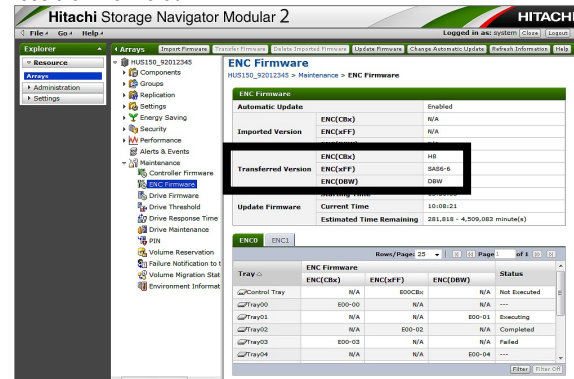


- (vi) Confirm the transferred ENC firmware version in the ENC Firmware window.

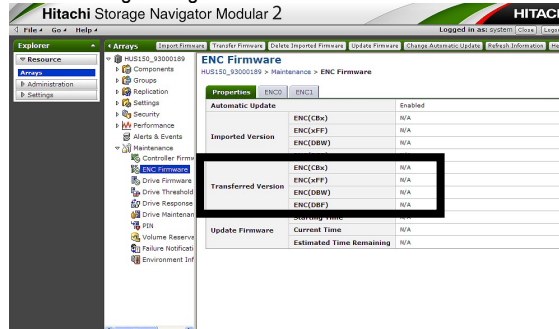
Hitachi Storage Navigator Modular 2 is less than Ver.23.00



Hitachi Storage Navigator Modular 2 is Ver.23.00 or more, is less than Ver.25.50



Hitachi Storage Navigator Modular 2 is Ver.25.50 or more

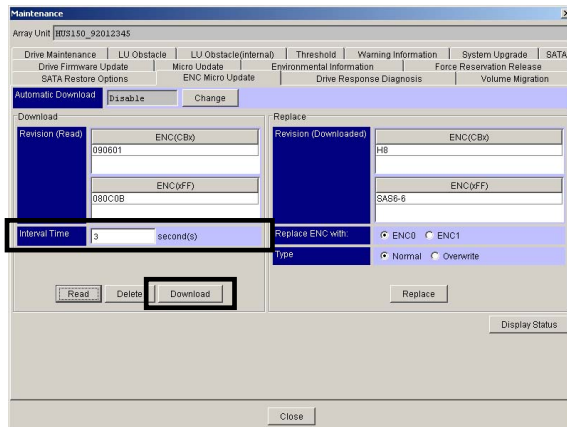


(b) When the Hitachi Storage Navigator Modular 2 version is less than 22.00

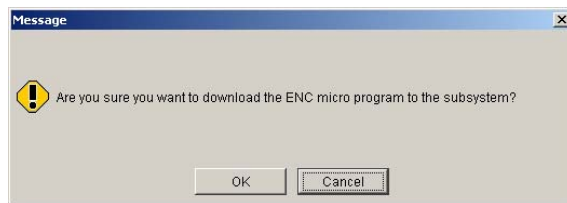
- (i) Download the ENC firmware that has been read in the Hitachi Storage Navigator Modular 2 to the disk array unit.

To perform the download, enter the [Interval Time] and press the [Download] button.

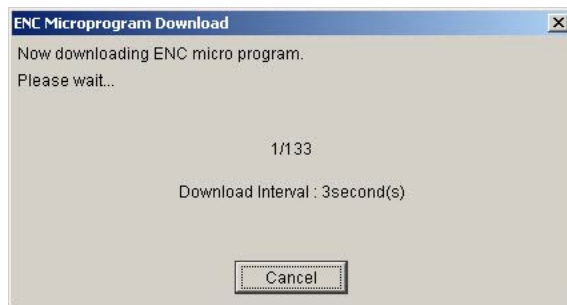
Three seconds or more of the default value are recommended to avoid the influence on the host I/O for the [Interval Time].



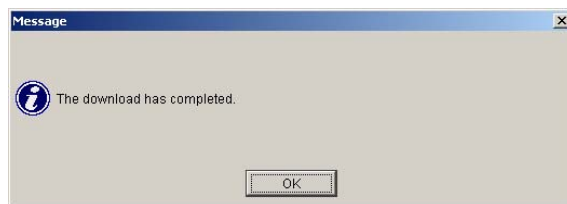
- (ii) The “Configuration Message” dialog box appears. Click the [OK] button.



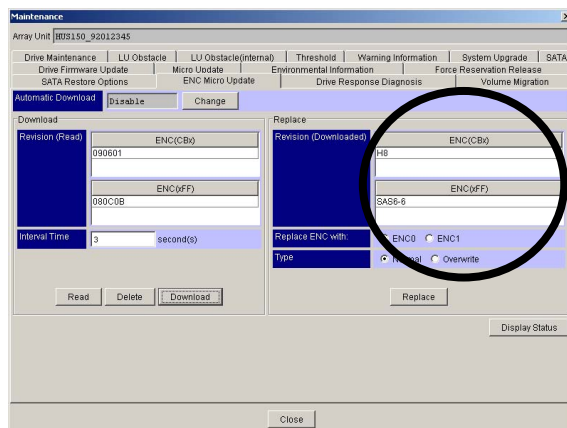
- (iii) During the download, a dialog box showing that the download is in progress is displayed. When the [Cancel] button is clicked, the download is aborted and the window is returned to the [ENC Micro Update] tab.



- (iv) When the download is completed normally, click the [OK] button.

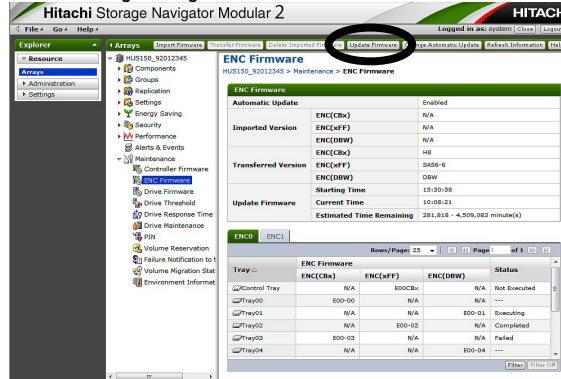


- (v) When the window is returned to the [ENC Micro Update] tab, the revision of the firmware that has been downloaded is displayed.

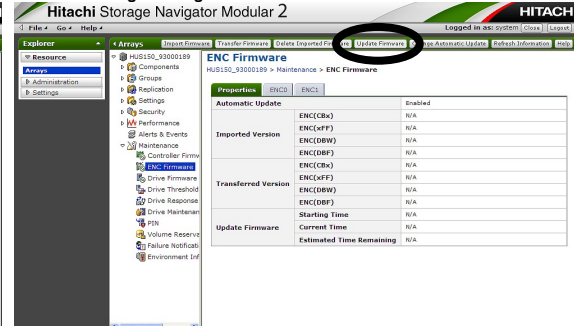


- (5) Instructing for the update of the ENC firmware
- (a) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
- (i) When starting the update of the ENC firmware, click the [Update Firmware] button.

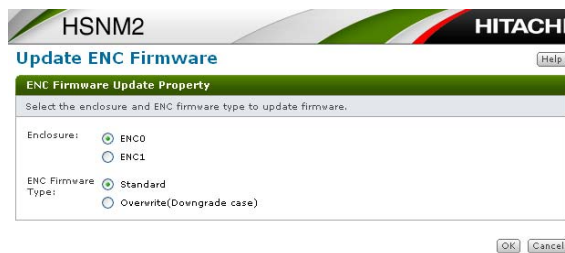
Hitachi Storage Navigator Modular 2 is less than Ver.25.50



Hitachi Storage Navigator Modular 2 is Ver.25.50 or more



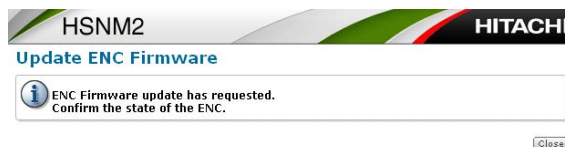
- (ii) Select the ENC number to be updated in the Update ENC Firmware window, and then click the [OK] button.



- (iii) The message dialog box appears. Click the [Confirm] button.

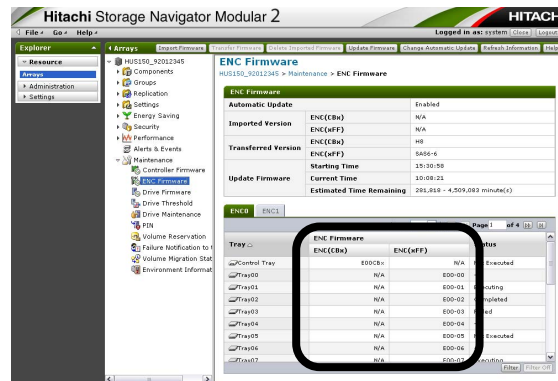


- (iv) The message dialog box appears. Click the [Close] button.

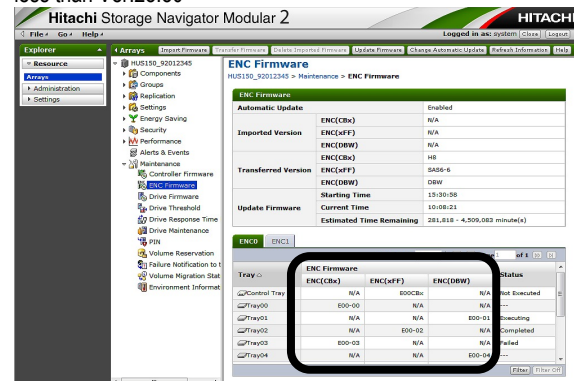


(v) Confirm the update status of the ENC firmware.

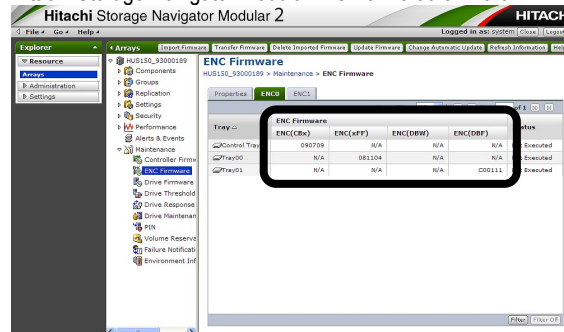
Hitachi Storage Navigator Modular 2 is less than Ver.23.00



Hitachi Storage Navigator Modular 2 is Ver.23.00 or more, is less than Ver.25.50



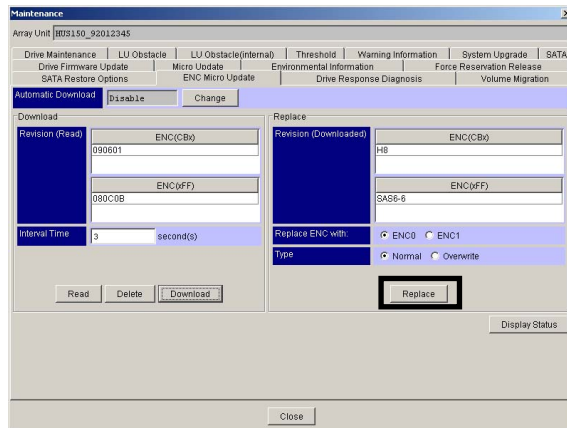
Hitachi Storage Navigator Modular 2 is Ver.25.50 or more



(vi) When the update of the other ENC is necessary, return to the “(3) Importing the ENC firmware” (TRBL 12-0170) and work.

If the update is unnecessary, go to the “(6) The automatic update function is enabled.” (TRBL 12-0220).

- (b) When the Hitachi Storage Navigator Modular 2 version is less than 22.00
- (i) When starting the download of the ENC firmware, specify the number of the ENC whose firmware is to be replaced and click the [Replace] button.



- (ii) The “Configuration Message” dialog box appears. Click the [OK] button.

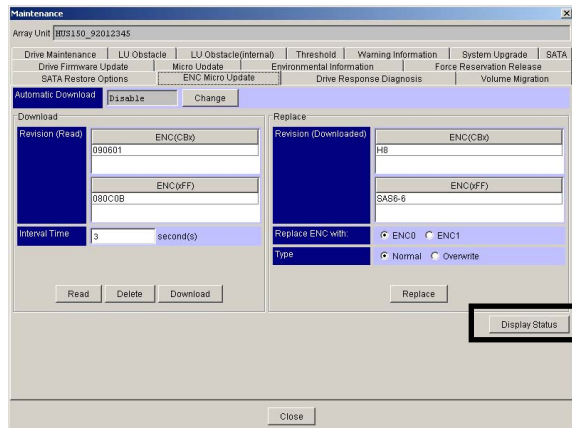


- (iii) When the [OK] button is clicked, the window is returned to the original window of Step (i).

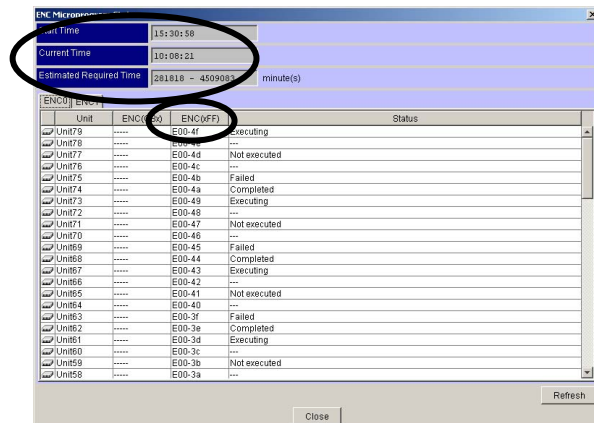




- (iv) Display the current progress state of the ENC firmware downloading by selecting the [Display Status] button.



- (v) Make sure of the current progress state of the ENC firmware downloading.



When the download of the other ENC is necessary, return to the “(3) Importing the ENC firmware” (TRBL 12-0170) and work.

If the download is unnecessary, go to the “(6) The automatic update function is enabled.” (TRBL 12-0220).

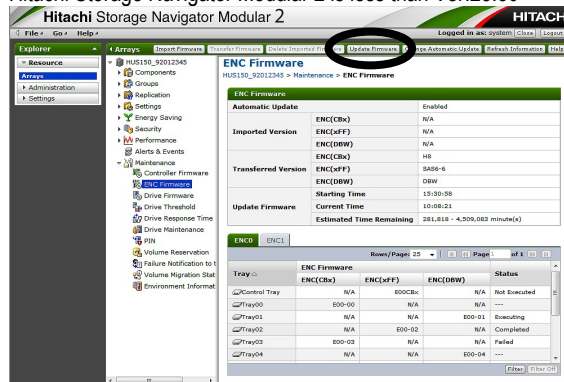
(6) The automatic update function is enabled.

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

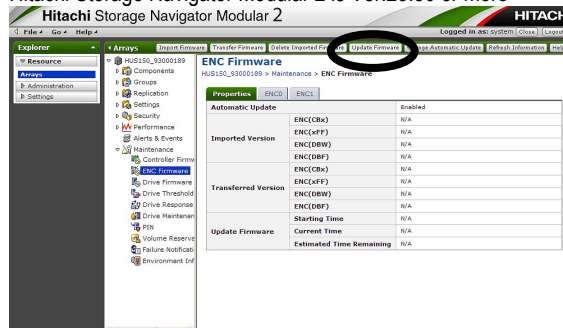
When the function is changed from [Disable] to [Enable], check if the automatic download is required again. Therefore, the start and termination messages of the automatic download are displayed.

(i) Click the [Change Automatic Update] button in the Hitachi Storage Navigator Modular 2 maintenance window.

Hitachi Storage Navigator Modular 2 is less than Ver.25.50



Hitachi Storage Navigator Modular 2 is Ver.25.50 or more



(ii) Check the Enable in the Change Automatic Update window, and then click the [OK] button.

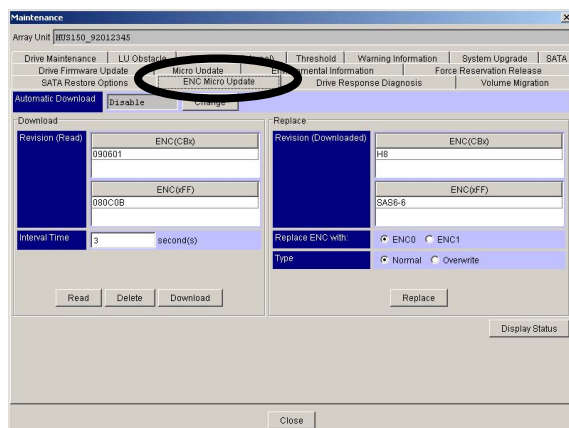


(iii) The message dialog box appears. Click the [Close] button.

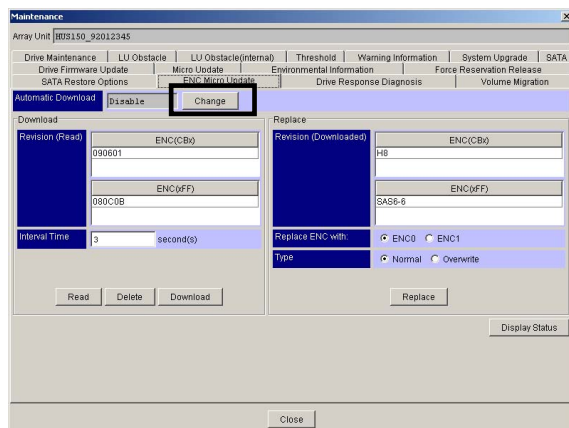


(b) When the Hitachi Storage Navigator Modular 2 version is less than 22.00

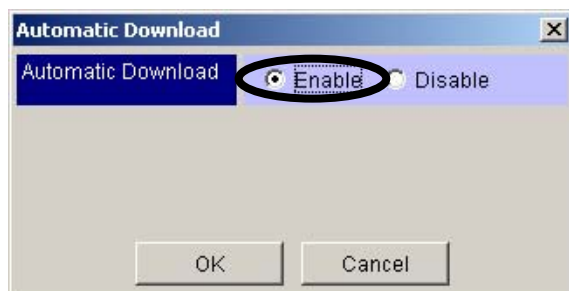
(i) Select the [ENC Micro Update] tab in the Hitachi Storage Navigator Modular 2 maintenance window.



(ii) Press the [Change] button on the “Automatic Download”.

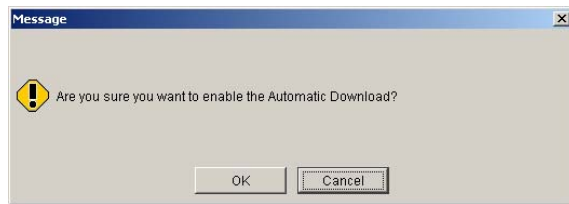


(iii) Select [Enable] in the Automatic Download window.

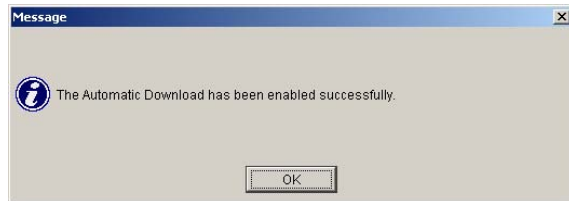


Press the [OK] button.

(iv) The configuration message dialog box appears. Click the [OK] button.



(v) When the set is completed normally, click the [OK] button.

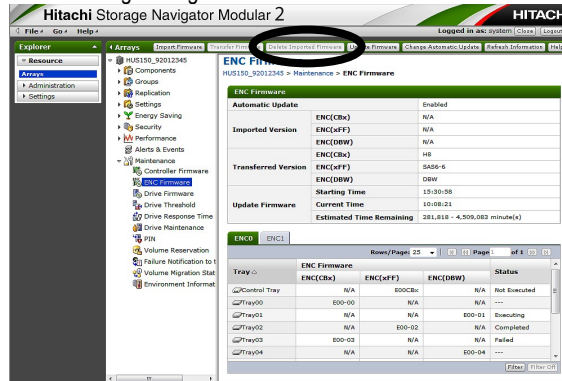


## (7) Deleting the file

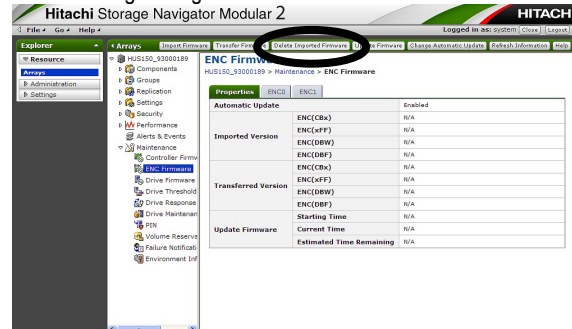
(a) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more

(i) When deleting the ENC firmware that has been imported in the Hitachi Storage Navigator Modular 2, click the [Delete Imported Firmware] button.

Hitachi Storage Navigator Modular 2 is less than Ver.25.50



Hitachi Storage Navigator Modular 2 is Ver.25.50 or more

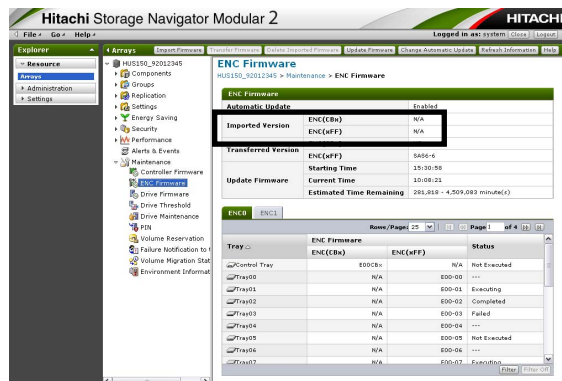


(ii) The message dialog box appears. Click the [Close] button.

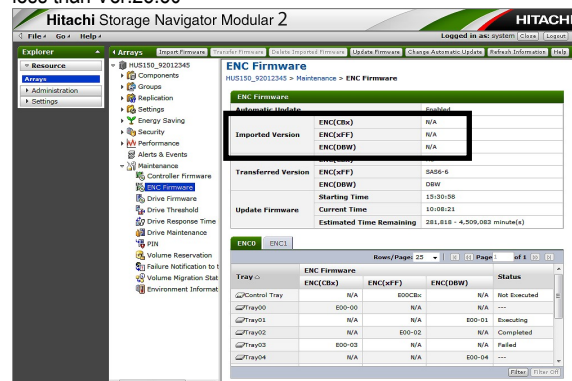


(iii) Check that the “N/A” is displayed in the Imported Version.

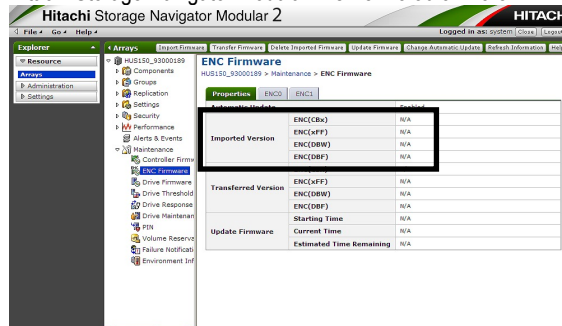
Hitachi Storage Navigator Modular 2 is less than Ver.23.00



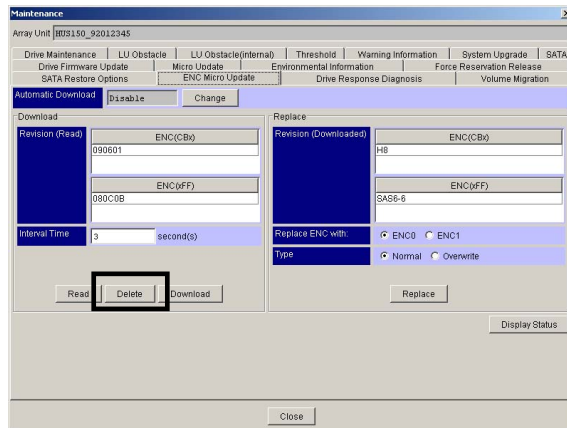
Hitachi Storage Navigator Modular 2 is Ver.23.00 or more, is less than Ver.25.50



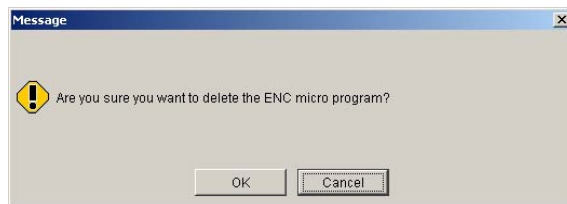
Hitachi Storage Navigator Modular 2 is Ver.25.50 or more



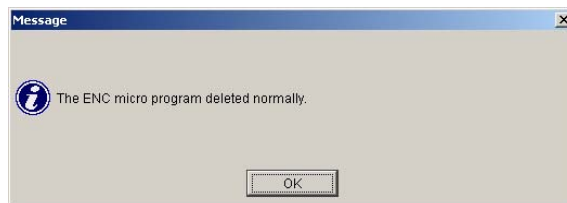
- (b) When the Hitachi Storage Navigator Modular 2 version is less than 22.00
- (i) When deleting the ENC firmware that has been read in the Hitachi Storage Navigator Modular 2, click the [Delete] button.



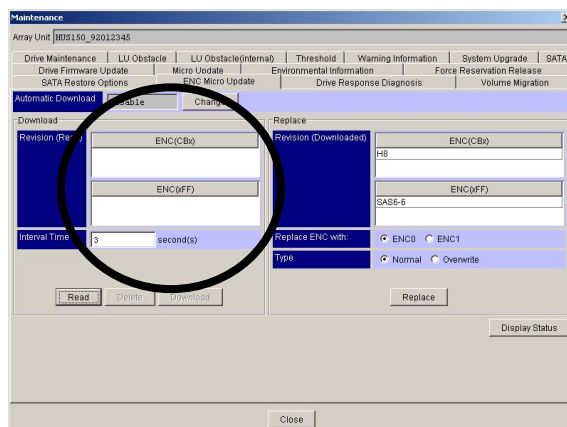
- (ii) The “Configuration Message” dialog box appears. Click the [OK] button.



- (iii) When the deletion of the firmware is completed normally, click the [OK] button.



- (iv) If it returns to the [Enc Micro Update] tab, the revision, which has already been read, displays a blank column.



## 12.7 Procedure for Displaying ENC Firmware/Backup Controller Firmware Version Using Web

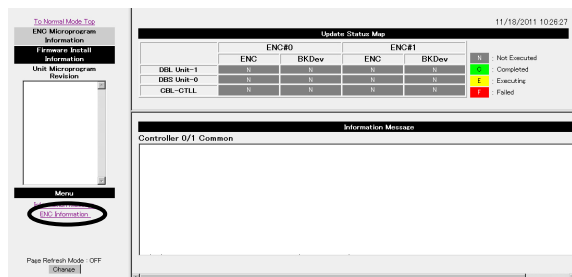
The version of the ENC firmware/backup controller firmware can be looked up using not only Hitachi Storage Navigator Modular 2 but also the Web.

The window for displaying the ENC firmware version is displayed through an entry of the following URL into the Web browser using the PC connected to the disk array system.

[http://\[IP address of a controller\]/encmicro](http://[IP address of a controller]/encmicro)

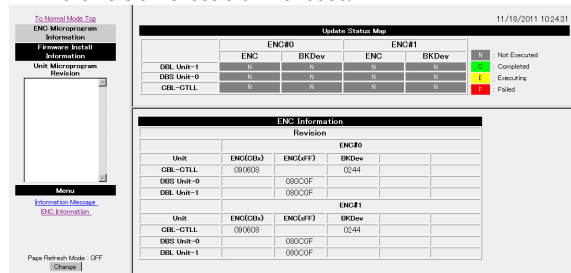
Entries of a [User's Name] and [Password] may be required when connecting or operating the Web. In such a case, enter [maintenance] as a user's name and [hosyu9500] as a password.

- Select [ENC Information] from the [Menu] in the window displaying the ENC firmware version.

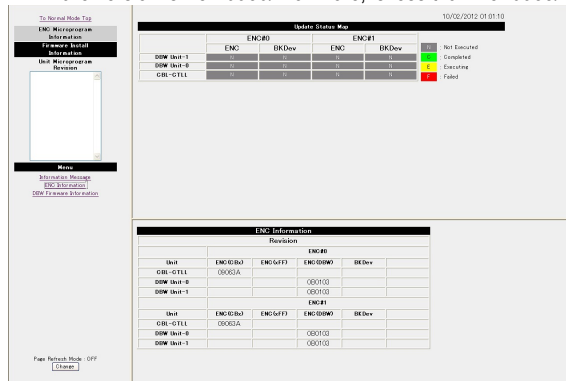


- The ENC firmware version is displayed.

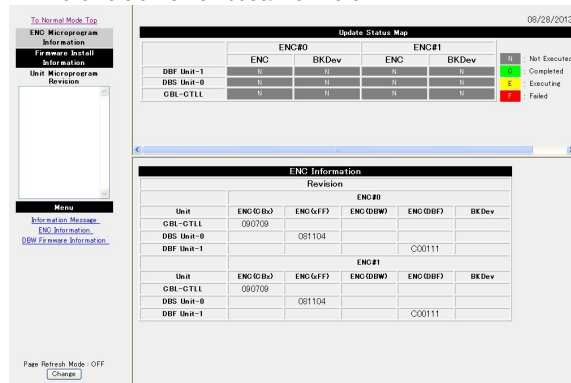
Firmware version is less than Ver.0930/A



Firmware version is Ver. 0930/A or more, is less than Ver.0955/A



Firmware version is Ver. 0955/A or more



## Chapter 13. Procedure for Offline ENC Firmware Download

### 13.1 Offline ENC Firmware Download Overview

This document explains how to use the firmware to download ENC firmware from the PC used for maintenance without replacing any hardware parts in the event of an ENC Firmware malfunction.



## 13.2 Offline ENC Firmware Download Prerequisites

- (1) A maintenance PC is required to connect to the web and download ENC firmware.
- (2) To download the ENC firmware making a connection to the Web, it is required to connect the LAN connector of the Controller 0. If the Controller 1 is connected, the ENC firmware cannot be downloaded.
- (3)
  - If the array is the one other than DBX, either Drive #0 or Drive #2 must be installed at each unit in the array when downloading ENC firmware for I/O Module(ENC) #0. Either Drive #1 or Drive #3 must be installed at each unit in the array when downloading ENC firmware for I/O Module(ENC) #1. In addition, I/O Module(ENC) #0 and I/O Module(ENC) #1 must be installed at each Drive Box. Attempting ENC firmware download when the aforementioned are not installed may cause an array to go down. In the event of an array error, restart the ENC firmware download after confirming that the required Drives and I/O Modules(ENC) have been installed.
  - If the array is DBX, either Drive #A0/#B0 or Drive #A2/#B2 must be installed at each unit in the array when downloading ENC firmware for I/O Card(ENC) #A0/#B0. Either Drive #A1/#B1 or Drive #A3/#B3 must be installed at each unit in the array when downloading ENC firmware for I/O Card(ENC) #A1/#B1. In addition, I/O Card(ENC) #A0/#B0 and I/O Card(ENC) #A1/#B1 must be installed at each Drive Box. Attempting ENC firmware download when the aforementioned are not installed may cause a system to go down. In the event of a system error, restart the ENC firmware download after confirming that the required Drives and I/O Cards(ENC) have been installed.
- (4) Maintenance personnel must only use the ENC firmware download function when the array is offline. The following tasks and situations will occur during Offline ENC Firmware download procedures:
  - Maintenance personnel must perform the planned stop of the array on the measurement screen.
  - Maintenance personnel must start the array in start mode (ENC Micro-Download Mode).
  - The array may reboot automatically.

If the ENC firmware download is performed when the system is online, abnormal termination will result. The host computer may also detect I/O errors and refuse to recognize Volumes, which will cause business applications to stop responding. If any of the aforementioned errors occurs, take the system offline and restart the ENC firmware.

Also, stop the failure monitoring such as the E-mail Alert Function, the PC ASSIST, the SNMP monitoring, the failure monitoring of the Hitachi Storage Navigator Modular 2, the Hi-Track monitoring, etc.

And, restart the failure monitoring after completing the download of the ENC firmware.

Offline is used to explain the situation detailed below.

(Continued to the next page)

- The host computer neither accesses the array nor recognizes the Volume, does not execute a Drive restoration (dynamic sparing, copy back, and/ or correction copy), Volume formatting, pair creation/resynchronization of ShadowImage in-system replication, and restoration of Copy-on-write Snapshot within the array and does not execute the resynchronization of TrueCopy remote replication between the array. If the host computer will not access the array, either all power to the host computer is turned off or the host computer is ready but the array, including direct fiber optic cable connections and switches, is physically disconnected.
- (5) Do not download ENC firmware if the I/O Module(ENC) or I/O Card(ENC) is not installed at the Drive Box. If removing the I/O Module (ENC) or I/O Card (ENC) which is opposite of the I/O Module (ENC) or I/O Card (ENC) number of the ENC firmware download target or executing the ENC firmware download in the uninstalled situation, the array goes down due to a failure of the loop switching on the drive side.
  - (6) Confirm that the array is ready and there is not an error other than an ENC error in the array. If an ENC firmware is downloaded when there is an error other than an ENC error in the array, the download may result in an abnormal shutdown. When an abnormal shutdown occurs, confirm the array's status on the web, and, after addressing the error, restart the ENC firmware download.
  - (7) In order to prevent user data loss and other problems that may occur when the Offline ENC Firmware download function is used, perform the planned stop of the array before attempting to download the ENC firmware. After the array boots up again, download the ENC firmware once the system READY status.

Be aware that the ENC firmware download function can be used without performing the planned stop. The ENC firmware download function cannot be used when the array is in one of the statuses listed below. In such case, recover the error status to normal and then execute the ENC firmware download again.

    - Forced parity recovery is required.
    - User data is stored in the cache.
  - (8) When the READY LED (green) on the Front Bezel of a Controller Box is blinking quickly, the ENC firmware is being downloaded. Therefore, start the downloading after the READY LED (green) becomes kept on.
  - (9) When the WARNING LED (orange) on the front of the Controller Box is blinking at high speed, do not perform the work. The automatic download of the ENC firmware and the backup controller firmware or the update of the flash program is being executed. Perform the work after checking that the WARNING LED (orange) on the front of the Controller Box goes out and the READY LED (green) lights up.

- (10) When the TrueCopy remote replication is enabled, and the array, which the ENC firmware download is to be performed, is a remote, perform the ENC firmware download after changing the pair status (S-VOL) of TrueCopy remote replication to PSUS.
- However, although a path blockade occurs if the ENC firmware download is performed, the pair blockade is automatically recovered by turning on the power supply of the array after performing the ENC firmware download.
- After the offline ENC firmware download is completed, set the pair status (S-VOL) of the TrueCopy remote replication to previous state.
- Also, if the ENC firmware download is performed, the following phenomena occur.
- Both paths of the TrueCopy remote replication are blocked. The notice of E-mail Alert Function and SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the pair status of the TrueCopy remote replication is PAIR or COPY, the pair status changes to PSUE.
- (11) When the TrueCopy Extended Distance is enabled, and the array, which the ENC firmware download is to be performed, is a remote, perform the ENC firmware download after changing the pair status (S-VOL) of TrueCopy Extended Distance to PSUS.
- However, although a path blockade occurs if the ENC firmware download is performed, the pair blockade is automatically recovered by turning on the power supply of the array after performing the ENC firmware download.
- After the offline ENC firmware download is completed, set the pair status (S-VOL) of the TrueCopy Extended Distance to previous state.
- Also, if the ENC firmware download is performed, the following phenomena occur.
- Both paths of the TrueCopy Extended Distance are blocked. The notice of E-mail Alert Function and SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the pair status of the TrueCopy Extended Distance is PAIR or COPY, the pair status changes to PSUE.
- (12) When it sets to the mode that executes the offline ENC firmware replacement and the array starts, the Drives, which were spun down due to the Power Saving/Power Saving Plus of the priced option, spin up.
- When the array normally starts and it becomes the Ready status after completing the offline ENC firmware replacement, the Drives set to the power saving spin down.
- (13) It is required to install JRE 1.6 in the service PC to download the ENC firmware. When the version other than JRE 1.6 is installed in the service PC, the procedure may not be performed normally. When the version other than JRE 1.6 is installed, be sure to uninstall the JRE and then install JRE 1.6. After completing the procedure, return it to the original JRE.

### 13.3 Restriction and Notes of Offline ENC Firmware Download

- (1) Do not remove or insert any parts, for maintenance or any other reason, during Offline ENC firmware download.

Inserting or removing parts during ENC firmware download may cause a fault. If parts are inserted or removed during ENC firmware download and a fault results, retry the ENC firmware download.

Do not download ENC firmware if the I/O Module(ENC) or I/O Card(ENC) is not installed at the Drive Box. If executing the ENC firmware download in the status where the I/O Module (ENC) or I/O Card (ENC) is uninstalled in the Drive Box, the array goes down due to a failure of the loop switching on the drive side.

- (2) Do not alter the disk array architecture during offline ENC firmware download. Altering the disk array architecture during ENC firmware download may cause download to fail.
- (3) If maintenance personnel download an offline ENC firmware when one of the ENC firmware already installed is defective or there is an I/O Module(ENC) or I/O Card(ENC) hardware error, the ENC firmware exchange may fail. If a failure occurs, correct the error by retrying the ENC firmware download in accordance with the procedure manual and/or perform the maintenance according to the message displayed in the Information Message.
- (4) After downloading an ENC firmware, the ALARM LED (red) on the I/O Module(ENC) or I/O Card(ENC) that performed the download will light up. This means that the ENC is automatically rebooting after the ENC firmware was downloaded and does not indicate an error. After the ENC firmware download, remove the power cables, reconnect them, and check that the array restarts normally and the ENC firmware is updated according to the offline ENC firmware download procedure.
- (5) When returning the revision of the ENC firmware to the previous one after downloading the firmware because of its trouble, etc., it is required to invalidate the automatic downloading function before downloading the firmware.  
For the procedure for invalidating the automatic downloading function, [“13.9 Procedure for Invalidating the Automatic ENC Firmware and Backup Controller Firmware Downloading Function” \(TRBL 13-0400\)](#).
- (6) When it sets to the mode that executes the offline ENC firmware replacement and the array starts, the Drives, which were spun down due to the Power Saving/Power Saving Plus of the priced option, spin up.  
When the array normally starts and it becomes the Ready status after completing the offline ENC firmware replacement, the Drives set to the power saving spin down.

### 13.4 Offline ENC Firmware Download Time

The table below shows the amount of time required to download an ENC firmware in the disk array system. These figures do not include the amount of time required for the system (including the host computer) to go online. The working hours of [Table 13.4.1](#) to [Table 13.4.3](#) show the time from instructing the download of the ENC firmware for ENC#0 or ENC#1 by WEB to the end of the download.

**Table 13.4.1 Standard of the Time Required for the Off-line ENC Firmware Download of the HUS110**

No.	Item	Operation time					
	Target chassis for ENC firmware download	Only Controller Box		Only Drive Box		Controller Box and Drive Box	
		Standard	Maximum	Standard	Maximum	Standard	Maximum
	ENC firmware download task						
1	Host I/O stop	Varies with system architecture.					
2	Planned stop	1 minute	3 minutes	1 minute	3 minutes	1 minute	3 minutes
3	Array startup	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
	I/O Module(ENC) or I/O Card(ENC) #0 side firmware download						
4	Disk array system reboot	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
5	I/O Module(ENC) or I/O Card(ENC) #0 side download	2 minutes	10 minutes	2 minutes	10 minutes	2 minutes	10 minutes
6	Array startup	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
	I/O Module(ENC) or I/O Card(ENC) #1 side firmware download						
7	Disk array system reboot	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
8	I/O Module(ENC) or I/O Card(ENC) #1 side download	2 minutes	10 minutes	2 minutes	10 minutes	2 minutes	10 minutes
9	Array startup	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
10	Total	29 minutes	49 minutes	29 minutes	49 minutes	29 minutes	49 minutes

**Table 13.4.2 Standard of the Time Required for the Off-line ENC Firmware Download of the HUS130**

No.	Item	Operation time					
	Target chassis for ENC firmware download	Only Controller Box		Only Drive Box		Controller Box and Drive Box	
		Standard	Maximum	Standard	Maximum	Standard	Maximum
	ENC firmware download task						
1	Host I/O stop	Varies with system architecture.					
2	Planned stop	1 minute	3 minutes	1 minute	3 minutes	1 minute	3 minutes
3	Array startup	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
	I/O Module(ENC) or I/O Card(ENC) #0 side firmware download						
4	Disk array system reboot	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
5	I/O Module(ENC) or I/O Card(ENC) #0 side download	2 minutes	10 minutes	4 minutes	12 minutes	4 minutes	13 minutes
6	Array startup	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
	I/O Module(ENC) or I/O Card(ENC) #1 side firmware download						
7	Disk array system reboot	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
8	I/O Module(ENC) or I/O Card(ENC) #1 side download	2 minutes	10 minutes	4 minutes	12 minutes	4 minutes	13 minutes
9	Array startup	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
10	Total	29 minutes	49 minutes	29 minutes	49 minutes	29 minutes	49 minutes

**Table 13.4.3 Standard of the Time Required for the Off-line ENC Firmware Download of the HUS150**

No.	Item	Operation time					
		Only Controller Box		Only Drive Box		Controller Box and Drive Box	
		Standard	Maximum	Standard	Maximum	Standard	Maximum
	ENC firmware download task						
1	Host I/O stop	Varies with system architecture.					
2	Planned stop			2 minute	6 minutes	2 minute	6 minutes
3	Array startup			5 minutes	8 minutes	5 minutes	8 minutes
	I/O Module(ENC) or I/O Card(ENC) #0 side firmware download						
4	Disk array system reboot			5 minutes	8 minutes	5 minutes	8 minutes
5	I/O Module(ENC) or I/O Card(ENC) #0 side download	2 minutes	10 minutes	9 minutes	22 minutes	9 minutes	22 minutes
6	Array startup			5 minutes	8 minutes	5 minutes	8 minutes
	I/O Module(ENC) or I/O Card(ENC) #1 side firmware download						
7	Disk array system reboot			5 minutes	8 minutes	5 minutes	8 minutes
8	I/O Module(ENC) or I/O Card(ENC) #1 side download	2 minutes	10 minutes	9 minutes	22 minutes	9 minutes	22 minutes
9	Array startup			5 minutes	8 minutes	5 minutes	8 minutes
10	Total			29 minutes	49 minutes	37 minutes	66 minutes

**Table 13.4.4 Standard of the Time Required for the Off-line ENC Firmware Download of the HUS150 (when Connecting DBWs)**

No.	Item	Operation time					
		Only Controller Box		Only Drive Box (DBW)		Controller Box and Drive Box (DBW)	
		Standard	Maximum	Standard	Maximum	Standard	Maximum
	ENC firmware download task						
1	Host I/O stop	Varies with system architecture.					
2	Planned stop			2 minute	6 minutes	2 minute	6 minutes
3	Array startup			5 minutes	10 minutes	5 minutes	10 minutes
	I/O Module(ENC) #0 side firmware download						
4	Disk array system reboot			5 minutes	10 minutes	5 minutes	10 minutes
5	I/O Module(ENC) #0 side download	2 minutes	10 minutes	14 minutes	28 minutes	14 minutes	28 minutes
6	Array startup			5 minutes	10 minutes	5 minutes	10 minutes
	I/O Module(ENC) #1 side firmware download						
7	Disk array system reboot			5 minutes	10 minutes	5 minutes	10 minutes
8	I/O Module(ENC) #1 side download	2 minutes	10 minutes	75 minutes	123 minutes	75 minutes	123 minutes
9	Array startup			5 minutes	10 minutes	5 minutes	10 minutes
10	Total	4 minutes	20 minutes	116 minutes	207 minutes	116 minutes	207 minutes

## 13.5 Before Beginning an Offline ENC Firmware Download

Before beginning ENC firmware download, confirm/prepare the following:

- (1) After referring to the web connection procedures in the [WEB “Chapter 1. Before Using Web” \(WEB 01-0000\)](#), prepare 1 PC on which a web browser has been installed and that can be used in a LAN.  
The PC that is used for maintenance and connected to the LAN must be used to download ENC firmware.
- (2) Set the service PC up. (See [Firmware “1.3 Preparation for Installation of Firmware” \(FIRM 01-0020\)](#).)
- (3) Prepare a DVD of the specified revision for firmware installation.
- (4) ENC firmware can only be downloaded when the system is off (when the host I/O is stopped). (When the Volume formatting, drive restoration (dynamic sparing, copy back, and/or correction copy), pair creation/resynchronization of ShadowImage in-system replication, or restore of Copy-on-write Snapshot, or copying of TrueCopy remote replication is in progress, perform the downloading after the operation above is completed.)
- (5) Execute the installer of the DVD, and save the unified version directory<sup>(†1)</sup>, where the ENC firmware is stored, under the directory “C:\diskarray-microprogram\microprogram”.
- (6) If a failure occurs during the ENC firmware download, it is required to see the recovery measures. Prepare the [“Message”](#), and perform the recovery work following the manual.
- (7) When you return the firmware to the original firmware after downloading it due to ENC firmware trouble, etc., it is required to disable the automatic download function and then perform the offline ENC firmware download. Refer to [“13.9 Procedure for Invalidating the Automatic ENC Firmware and Backup Controller Firmware Downloading Function” \(TRBL 13-0400\)](#) for the method to disable the automatic download function.
- (8) Stop the failure monitoring such as the E-mail Alert Function, the PC ASSIST, the SNMP monitoring, the failure monitoring of the Storage Navigator Modular 2, the Hi-Track monitoring, etc.  
And, restart the failure monitoring after completing the download of the ENC firmware.
- (9) Confirm that the array is ready and there is not an error other than an ENC error in the array.  
If an ENC firmware is downloaded when there is an error other than an ENC error in the array, the download may result in an abnormal shutdown. When an abnormal shutdown occurs, confirm the array’s status on the web, and, after addressing the error, restart the ENC firmware download.

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†1 : For the unified version directory, refer to [“13.5.1 Hierarchy of ENC Firmware Storage Directories” \(TRBL 13-0100\)](#).

- (10) In order to prevent user data loss and other problems that may occur when the Offline ENC Firmware download function is used, perform the planned stop of the array before attempting to download the ENC firmware. After the array boots up again, download the ENC firmware once the system ready status.
- Be aware that the ENC firmware download function can be used without performing the planned stop. The ENC firmware download function cannot be used when the array is in one of the statuses listed below. In such case, recover the error status to normal and then execute the ENC firmware download again.
- Forced parity recovery is required.
  - User data is stored in the cache.
- (11) When the READY LED (green) on the Front Bezel of a Controller Box is blinking quickly, the ENC firmware is being downloaded. Therefore, start the downloading after the READY LED (green) becomes kept on.
- (12) When the WARNING LED (orange) on the front of the Controller Box is blinking at high speed, do not perform the work. The automatic download of the ENC firmware and the backup controller firmware or the update of the flash program is being executed. Perform the work after checking that the WARNING LED (orange) on the front of the Controller Box goes out and the READY LED (green) lights up.
- (13) When using the priced option, Power Saving/Power Saving Plus, and the power saving instruction of the I/O interlock disabled is executed, if the ENC firmware download is performed while the power saving status is "Normal (Command Monitoring)", the status is changed to "Normal (Spindown Failed: PS OFF/ON)".
- After executing the power saving instruction of the I/O interlock disabled, check that there is no RAID group whose power saving status is "Normal (Command Monitoring)" and then restart the array.
- Also, if the ENC firmware download is performed, the following phenomena occur.
- Both paths of the TrueCopy remote replication are blocked. The notice of E-mail Alert Function and SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the pair status of the TrueCopy remote replication is PAIR or COPY, the pair status changes to PSUE.



- (14) When the TrueCopy Extended Distance is enabled, and the array, which the ENC firmware download is to be performed, is a remote, perform the ENC firmware download after changing the pair status (S-VOL) of TrueCopy Extended Distance to PSUS.
- However, although a path blockade occurs if the ENC firmware download is performed, the pair blockade is automatically recovered by turning on the power supply of the array after performing the ENC firmware download.
- Also, if the ENC firmware download is performed, the following phenomena occur.
- Both paths of the TrueCopy Extended Distance are blocked. The notice of E-mail Alert Function and SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the pair status of the TrueCopy Extended Distance is PAIR or COPY, the pair status changes to PSUE.
- (15) When Power Saving/Power Saving Plus of the priced option is used, if you perform the download of the ENC firmware after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host when the array starts. Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then perform the download of the ENC firmware.
- If the spin-down fails, execute the spin-down again.

### 13.5.1 Hierarchy of ENC Firmware Storage Directories

The ENC firmware is stored as the compression format (zip file) in the DVD for firmware installation.

Since the ENC firmware (zip file) is stored under “Firmware\program\microprogram” in the DVD for firmware installation, store the ZIP file from the DVD under the directory “C:\diskarray-microprogram\microprogram”.

**Table 13.5.1 DVD Directory Hierarchy**

First stratum	Second stratum	Third stratum
manual	HostInst	Manual file
	UG	
program	Microprogram	Firmware zip file
	DFJavaSetup.exe (Java setup file)	-

The hierarchical structure of firmware storage ZIP file (09xxx.zip) directories is shown in [Table 13.5.2](#).

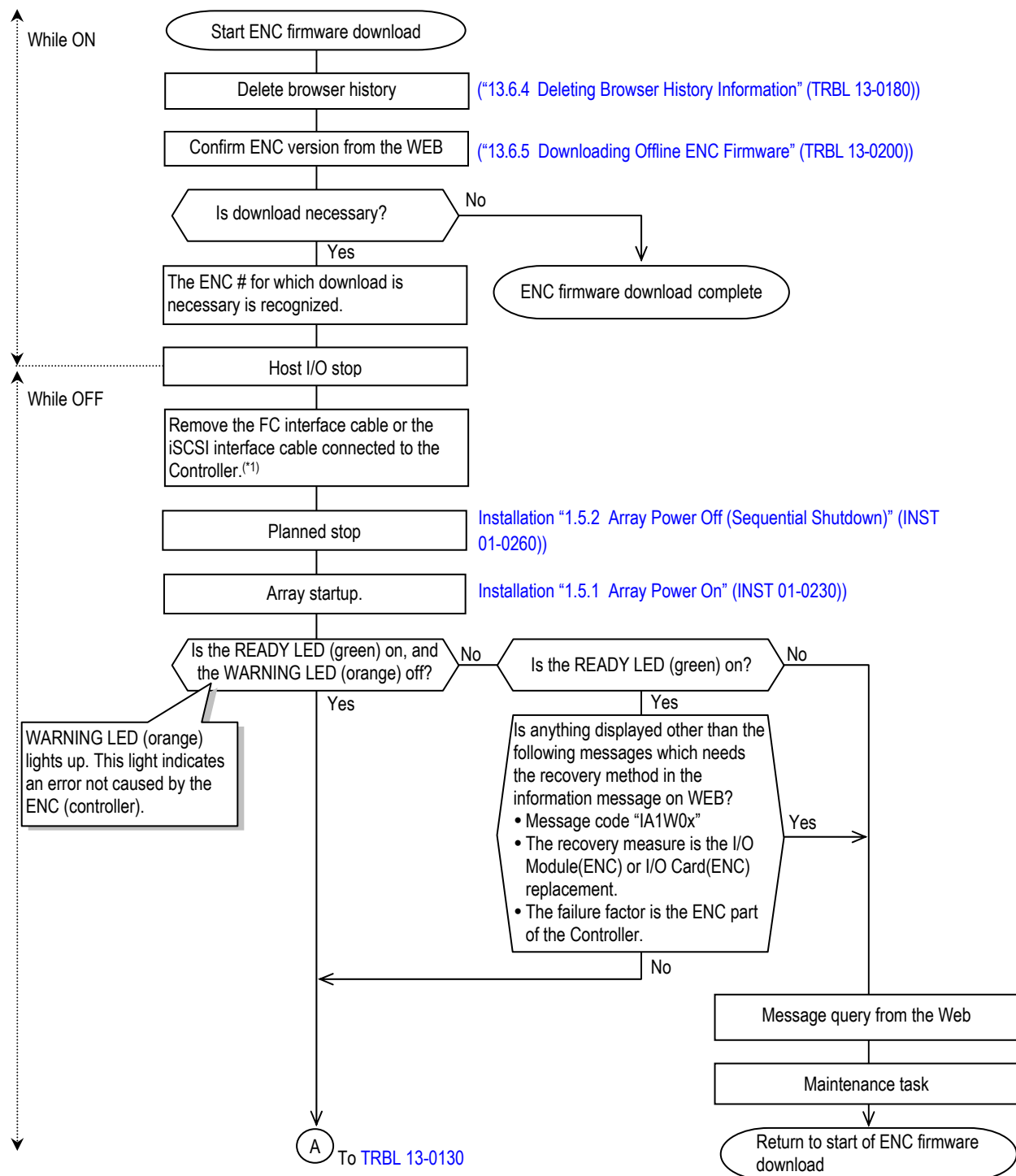
**Table 13.5.2 ZIP File Directory Hierarchy**

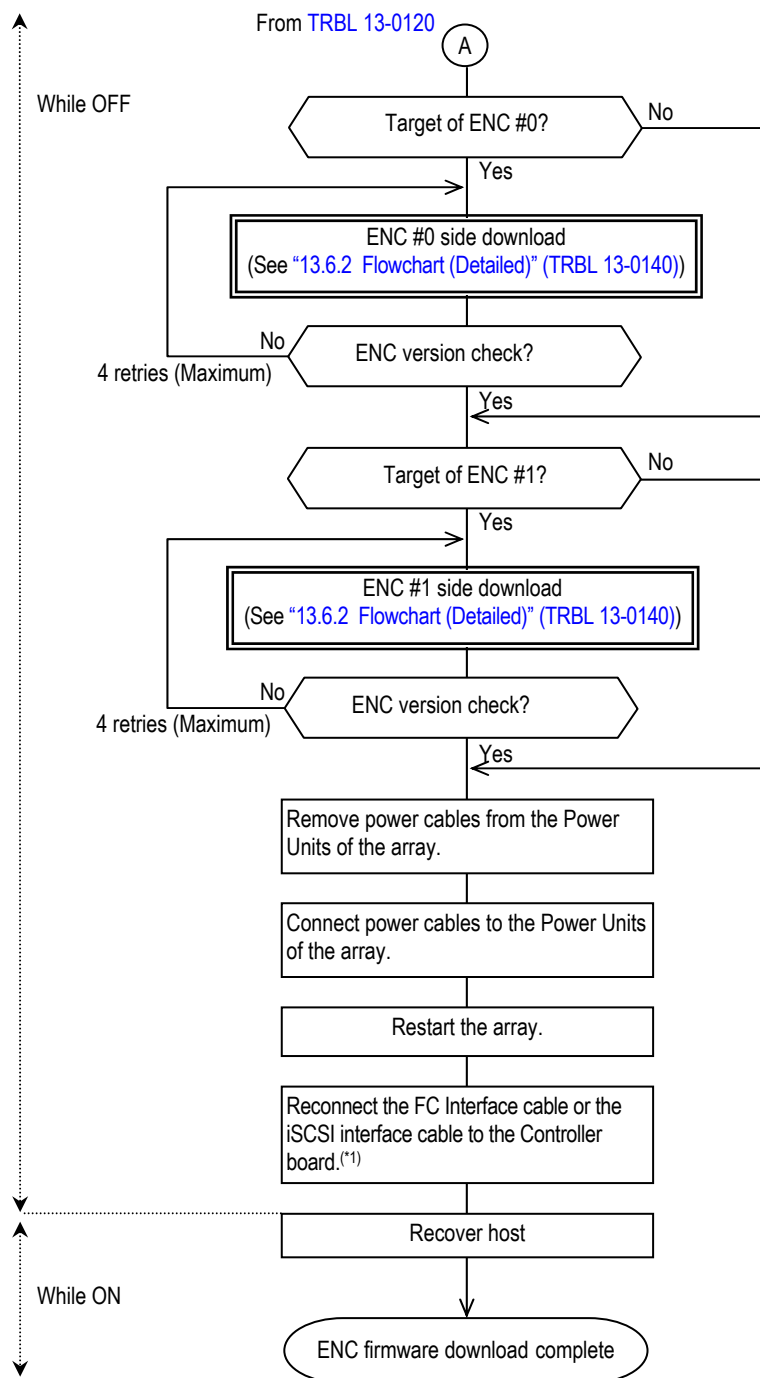
First stratum	Second stratum	Third stratum	Fourth stratum
Unified version (Example: 0915B)	DF850MH	disk 01 - disk X	Firmware file
		fmins	
	DF850MHD	disk 01 - disk X	
		fmins	
	DF850S	disk 01 - disk X	
		fmins	
	DF850XS	disk 01 - disk X	
		fmins	
	drvfirm	DKR2F-VIPERAP	Drive firmware file
		:	
	ENC850	ENC Firmware file	—

## 13.6 Offline ENC Firmware Download Procedure (Dual Controller)

The procedure that must be followed in order to download ENC firmware differs depending on whether CBXSL/CBXSS/CBSL/CBSS use single or dual controller configuration. For details on using dual controller configuration when downloading ENC firmware, refer to [“13.6.1 Flowchart \(General\)” \(TRBL 13-0120\)](#). For details on using single controller configuration when downloading ENC firmware, refer to [“13.7 Offline ENC Firmware Download Procedure \(Single Controller\)” \(TRBL 13-0310\)](#). For details on the ENC firmware download operation for the CBL, refer to [“13.6. Offline ENC Firmware Download Procedure \(Dual Controller\)” \(TRBL 13-0110\)](#).

## 13.6.1 Flowchart (General)

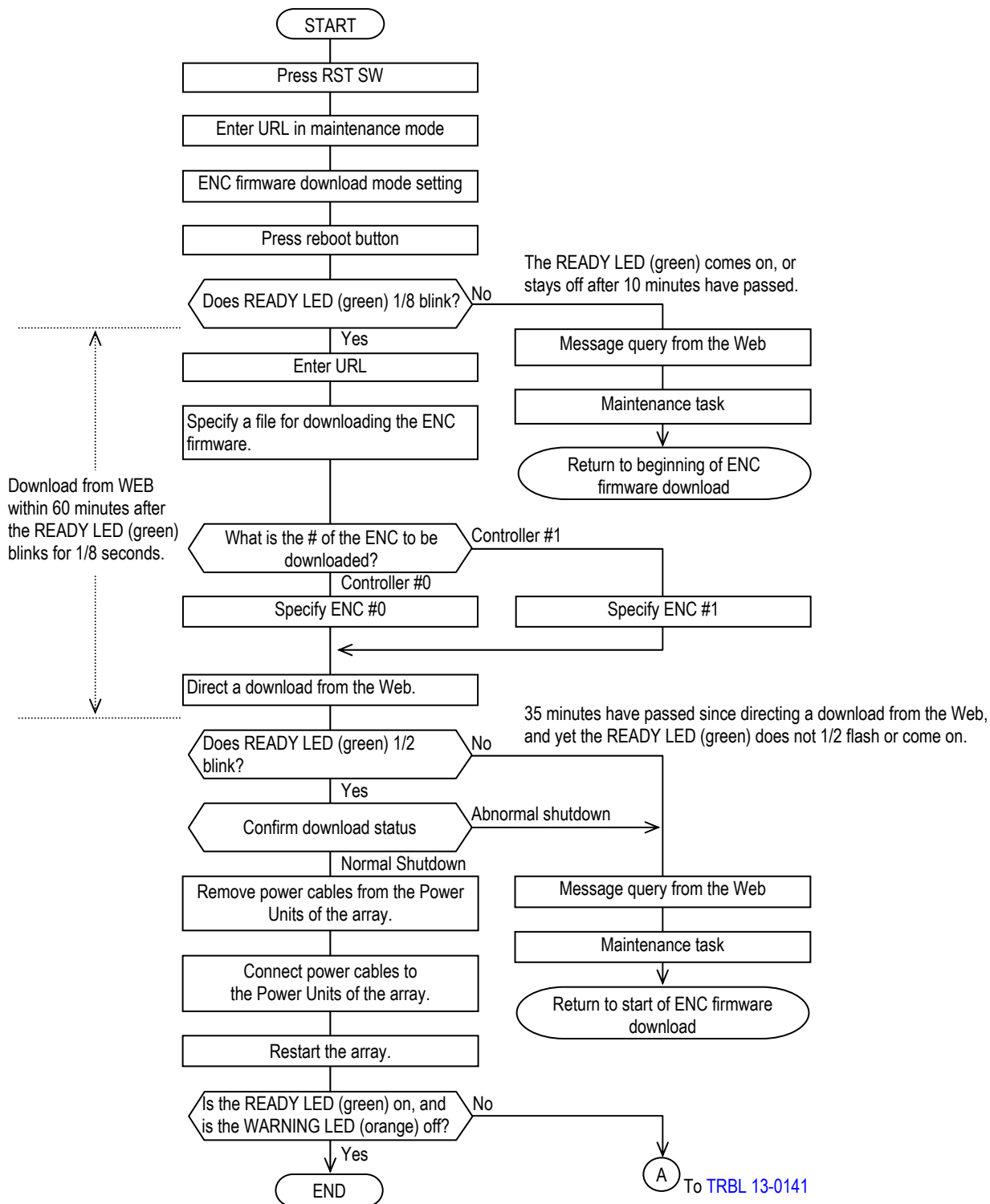




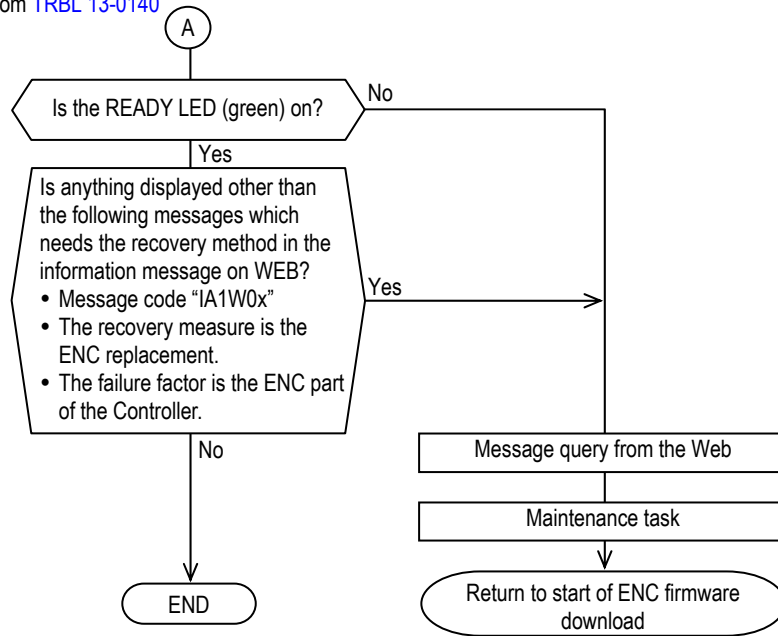
\*1 : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.

If the Fibre Channel Interface cables are inserted half in the host connectors, the Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

## 13.6.2 Flowchart (Detailed)



From TRBL 13-0140



### 13.6.3 Connecting the PC Used for Maintenance

The maintenance LAN connector and the LAN connector of the PC used for maintenance must be connected using a LAN cross cable. Follow the procedure shown below to make the necessary connection.

(1) Confirm the following before connecting the PC used for maintenance:

Check the following LEDs before connecting the PC used for maintenance:

- POWER LED (green) confirmation:

Confirm that the POWER LED (green) located on the top of the front bezel is lit.

If the POWER LED (green) is not lit, refer to the [“Chapter 7. Trouble Analysis by LED Indication” \(TRBL 07-0000\)](#) for details on how to correct the error.

- WARNING LED (orange)/LOCATE LED (orange) confirmation:

Confirm that the WARNING LED (orange)/LOCATE LED (orange) located on the top of the front bezel is not lit.

If the WARNING LED (orange)/LOCATE LED (orange) is lit or blinking, refer to the [“Chapter 7. Trouble Analysis by LED Indication” \(TRBL 07-0000\)](#) for details on how to correct the error.

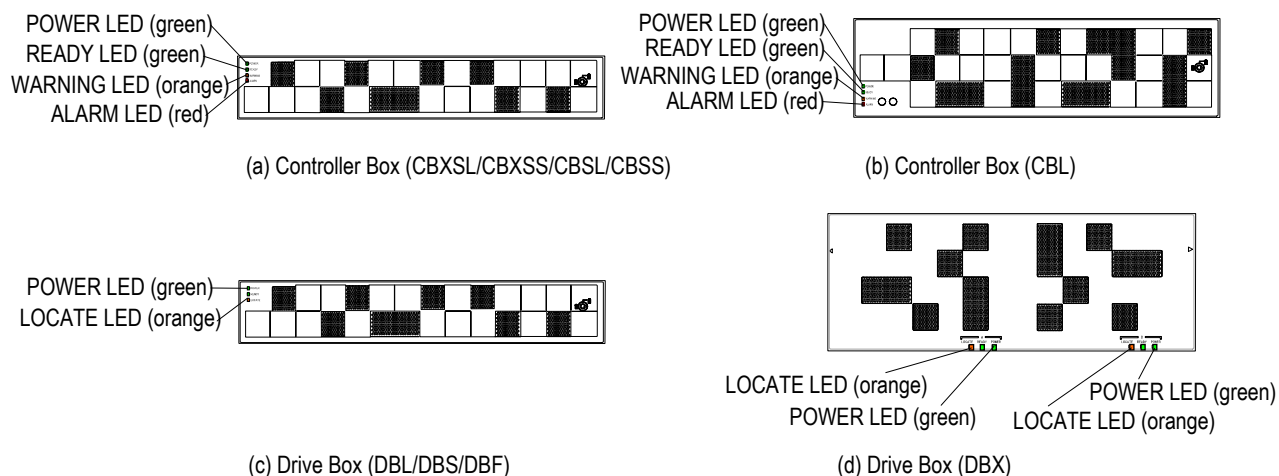


Figure 13.6.1 Locations and Names of LED



## (2) Preparing the maintenance terminal for use

**Table 13.6.1 Preparing the Maintenance Terminal**

Item	Customer Environment	Terminal used for maintenance	Preparation
1	Using LAN connectors for maintenance of the array.	Use the LAN to connect the PC that is being carried and will be used for maintenance.	<ul style="list-style-type: none"> <li>• PC used for maintenance</li> <li>• LAN cross cable</li> </ul>

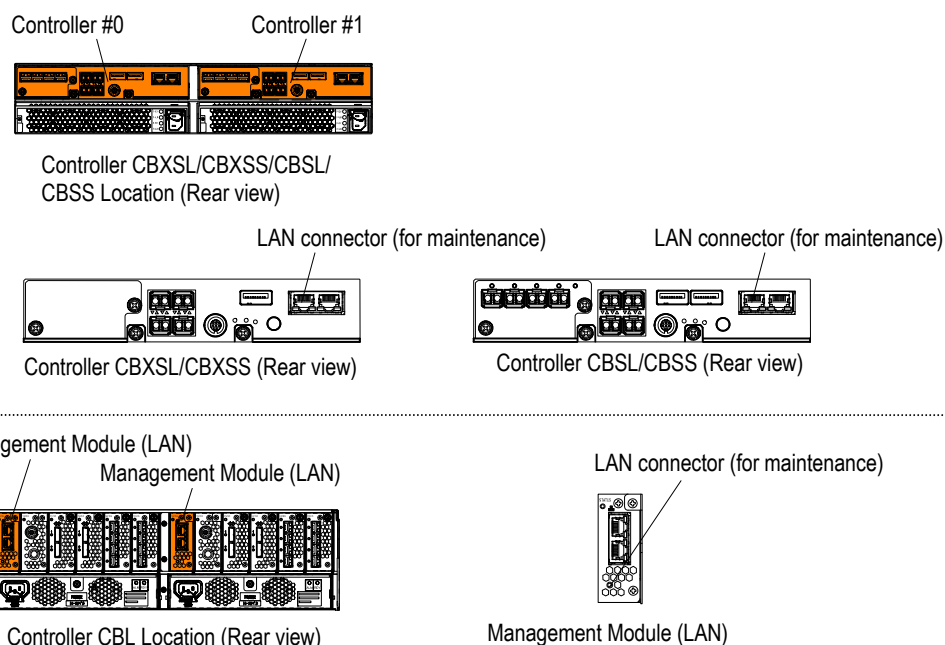
## (3) Controller to be connected (Management Module in case of CBL)

If a system has a dual Controller, connect to either Controller (Management Module in case of CBL) to connect to the WEB. First, connect to Controller#0 (Management Module #0 in case of CBL).

If Controller #0 is blocked, however, information after the blockage of Controller #0 is referenced on only Controller #1 side. Accordingly, if Controller #0 is blocked, connect to Controller #1 (Management Module #1 in case of CBL).

## (4) Connecting the procedures of the PC Used for Maintenance

- (a) Connect the maintenance LAN connector of Controller (Management Module in case of CBL) and the LAN connector of the service PC via the LAN cross cable.

**Figure 13.6.2 LAN Connector Position**

- (b) Start up the Maintenance PC.
- (c) Change the IP Address of the network parameter for the Maintenance PC.
- (c-1) In case of the IPv4 environment
- (i) Make the setting of the IP Address to be set to the PC as Item 1 in [Table 13.6.2](#).
    - CTL0: 10.0.0.16 (Input example : http://10.0.0.16/)
  - (ii) If it is not connectable, by setting the values of Item 2 to Item 5 in [Table 13.6.2](#), specify the connectable value and perform the WEB connection.
    - According to the setting value of “Maintenance PC” of Items 2 to 5 on [Table 13.6.2](#), set the IP Address and the Subnet Mask of the Maintenance PC.
    - According to the “Array (LAN port for maintenance)” information of Items 2 to 5 on [Table 13.6.2](#), enter into “Address” of the WEB browser and connect with the array.
  - (iii) If not connected yet, refer to [“3.4 Procedure for Specifying Maintenance Port IP Address” \(TRBL 03-0120\)](#).

**Table 13.6.2 Operating Environment (IPv4)**

No.	Array (LAN port for maintenance)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 0.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL 0: 192.168.233.16 CTL 1: 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL 0: 172.23.211.16 CTL 1: 172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL 0: 10.197.181.16 CTL 1: 10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

(c-2) In case of the IPv6 environment

(i) Make the setting of the IP Address to be set to the PC as Item 1 in [Table 13.6.3](#).

- CTL0: fe80::16 (Input example : http://[fe80::16]/)

When connecting on WEB by the IPv6 address, put the address in brackets ([ ]).

(ii) If it is not connectable, set the value of Item 2 in [Table 13.6.3](#), and perform the WEB connection.

- According to the setting value of “Maintenance PC” of Item 2 on [Table 13.6.3](#), set the IP Address and the Subnet Mask of the Maintenance PC.
- According to the “Array (LAN port for maintenance)” information of Item 2 on [Table 13.6.3](#), enter into “Address” of the WEB browser and connect with the array.

(iii) If not connected yet, refer to [“3.4 Procedure for Specifying Maintenance Port IP Address” \(TRBL 03-0120\)](#).

**Table 13.6.3 Operating Environment (IPv6)**

No.	Array (LAN port for maintenance)		Maintenance PC	
	IP Address	Length of Subnet Prefix	IP Address	Length of Subnet Prefix
1	CTL 0: fe80::16 CTL 1: fe80::17 (At the time of shipment)	64 (At the time of shipment)	Automatic	Automatic
2	CTL 0: fe80::f6 CTL 1: fe80::f7	64	Automatic	Automatic

- Manual change of the network parameter of the Maintenance port

When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.

Therefore, in the work other than the installation work of the array at shipment, the maintenance LAN Port for the WEB connection is set to any of Items 1 to 5 in [Table 13.6.2](#) in case of the IPv4 environment and set to either Item 1 or 2 in [Table 13.6.3](#) in case of the IPv6 environment.

**NOTE :** When the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.

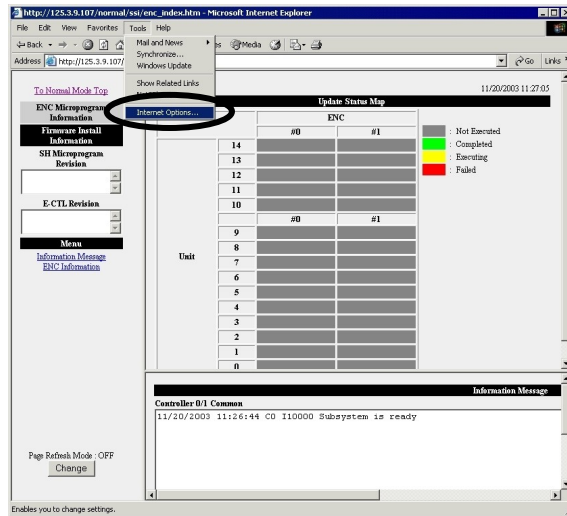
Therefore, use a value other than the network address set to the maintenance port for the LAN device connected to the port for the user management via Gateway. Or change the IP address of the maintenance port to a value other than the network address of the LAN device connected via Gateway by Hitachi Storage Navigator Modular 2. (Refer to [System Parameter “7.1 Setting Maintenance LAN” \(SYSPR 07-0000\)](#).)

(d) Make sure that negotiation of Maintenance PC is set to auto negotiation.

To check negotiation of Maintenance PC, refer to [“3.1 \(6\) Procedure for setting negotiation” \(TRBL 03-0060\)](#).

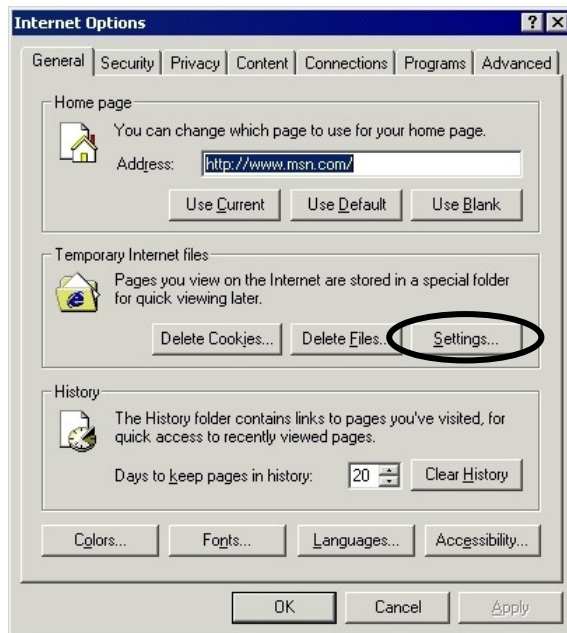
### 13.6.4 Deleting Browser History Information

Boot up the browser on the PC used for maintenance and delete history information.



(1) Internet Explorer

(a) From the menu, select [Tool] - [Internet Options].



(b) Click the [Delete Files] button, which is located on the Temporary Internet File section of the general tag.

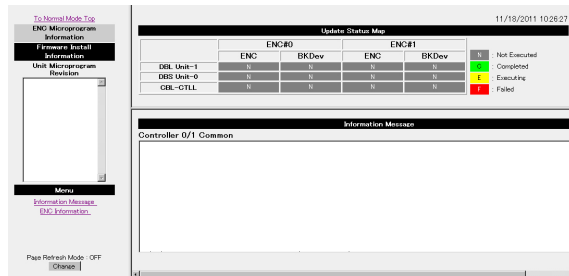
(c) A dialog box will be displayed. Check [Delete all offline content] and click the [OK] button.



### 13.6.5 Downloading Offline ENC Firmware

- (1) While the disk array system is on, enter the following URL in the browser of the PC used for maintenance : “http:// array maintenance LAN port IP address/encmicro”. A screen showing the ENC Firmware version will be displayed.

At the time when the Web is connected or operated, entries of [User Name] and [Password] may be required. In such a case, enter [maintenance] as a user name and [hosyu9500] as a password.



- (2) Click [ENC Information] in the menu section, and check version of the current ENC firmware displayed in [ENC Information].

When the version of the ENC #0 and #1 are both the same as the versions to be downloaded or new versions, it is not necessary to download the ENC firmware, so that terminate the work.

When either or both of the versions of the ENC #0 and #1 are older than the version to be downloaded, go to the Step (3).

You can refer to the version of the ENC firmware to be downloaded in the text file in the zip file of the firmware distributed by the DVD in advance.

Decompress the zip file to “C:\diskarray-microprogram\maicroprogram”.

- In the case of CBL

“C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\85LIST.TXT

Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.

Examples of 85LIST.TXT

09063A(85) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.

85\_REV.DAT

85\_FIRM.WTB

Compare it with the version displayed in ENC(CBx) in the window.

- In the case of CBXSL/CBXSS/CBSL/CBSS  
“C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\86LIST.TXT  
Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.  
Examples of 86LIST.TXT  
0A063A(86) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.  
86\_REV.DAT  
86\_FIRM.WTB  
Compare it with the version displayed in ENC(CBx) in the window.
- In the case of DBS/DBL/DBX  
“C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\S6LIST.TXT  
Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.  
Examples of S6LIST.TXT  
080F01(S6) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.  
S6\_REV.DAT  
S6\_FIRM.WTB  
Compare it with the version displayed in ENC(xFF) in the window.
- In the case of DBW  
“C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\GMLIST.TXT  
Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.  
Examples of GMLIST.TXT  
0B0103(GM) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.  
GM\_REV.DAT  
GO\_FIRM.WTB  
Compare it with the version displayed in ENC(DBW) in the window.
- In the case of DBF  
“C:\diskarray-microprogram\microprogram\Folder Name of Decompressed Firmware\ENC850\NFLIST.TXT  
Open the above-mentioned text file, and the one described in the first row is the ENC firmware version.  
Examples of NFLIST.TXT  
C00111(NF) ← The alphanumeric characters of the leading six digits indicate the ENC firmware version.  
NF\_REV.DAT  
NF\_FIRM.WTB  
Compare it with the version displayed in ENC(DBF) in the window.

## Firmware version is less than Ver.0930/A

11/18/2011 10:24:31

**Update Status Map**

	ENC#0		ENC#1		
	ENC	BKDev	ENC	BKDev	
DBF Unit-1	N	N	N	N	Not Executed
DBF Unit-0	N	N	N	N	Completed
GRB-CTLL	N	N	N	N	Executing
GRB-CTLL	N	N	N	N	Failed

**ENC Information**

Revision

Unit	ENC#0		ENC#1		BKDev
	ENC(Bb)	ENC(GFF)	ENC(Bb)	ENC(GFF)	
GRB-CTLL	090608	09060F	0244		
DBF Unit-0		09060F			
DBF Unit-1		09060F			

Menu

[ENC Information](#)

Page Refresh Mode: OFF

[Change](#)

## Firmware version is Ver.0930/A or more, is less than Ver.0955/A

10/02/2012 09:05:10

**Update Status Map**

	ENC#0		ENC#1		
	ENC	BKDev	ENC	BKDev	
DBF Unit-1	N	N	N	N	Not Executed
DBF Unit-0	N	N	N	N	Completed
GRB-CTLL	N	N	N	N	Executing
GRB-CTLL	N	N	N	N	Failed

**ENC Information**

Revision

Unit	ENC#0		ENC#1		BKDev
	ENC(Bb)	ENC(GFF)	ENC(Bb)	ENC(GFF)	
GRB-CTLL	090608	09060F	0244		
DBF Unit-0		09060F			
DBF Unit-1		09060F			

Menu

[ENC Information](#)

Page Refresh Mode: OFF

[Change](#)

## Firmware version is Ver. 0955/A or more

08/28/2013

**Update Status Map**

	ENC#0		ENC#1		
	ENC	BKDev	ENC	BKDev	
DBF Unit-1	N	N	N	N	Not Executed
DBF Unit-0	N	N	N	N	Completed
GRB-CTLL	N	N	N	N	Executing
GRB-CTLL	N	N	N	N	Failed

**ENC Information**

Revision

Unit	ENC#0		ENC#1		BKDev
	ENC(Bb)	ENC(GFF)	ENC(Bb)	ENC(GFF)	
GRB-CTLL	090708	081104			
DBF Unit-0		081104			
DBF Unit-1		081104			

Menu

[ENC Information](#)

Page Refresh Mode: OFF

[Change](#)



- (3) When the downloading of the ENC firmware is required, make sure that none of the host I/O, Volume formatting, drive restoration (dynamic sparing, copy back, or correction copy), pair creation/resynchronization of ShadowImage in-system replication, resynchronization of Copy-on-write Snapshot, and copying of TrueCopy remote replication is not in progress, and then perform the deliberate shutdown of the disk array system.

When using the priced option, Power Saving/Power Saving Plus, and the power saving instruction of the I/O interlock disabled is executed, if the array restarts while the power saving status is "Normal (Command Monitoring)", the status is changed to "Normal (Spindown Failed: PS OFF/ON)".

After executing the power saving instruction of the I/O interlock disabled, check that there is no RAID group whose power saving status is "Normal (Command Monitoring)" and then restart the array.

If the spin-down fails, execute the spin-down again.

After normal completion of the planned stop, reboot the disk array system and confirm that the READY LED (green) is lit and that the WARNING LED (orange) is blinking.

- (4) Press the RST SW on each controller and proceed to the maintenance mode.

(a) Proceeding to the Maintenance Mode

The method used to proceed to the maintenance mode differs depending on whether the READY LED (green) or the ALARM LED (red), both of which are located on the top of the front bezel (CBSXSL/CBXSS/CBSL/CBSS/CBL) is lit.

- If the READY LED (green) is lit, proceed to Step (ii) of the procedures.
- If the ALARM LED (red) is lit, wait 3 minutes before proceeding to Step (ii).
- If neither the READY LED (green) nor the ALARM LED (red) lights up after the power to the array has been turned on for 10 minutes, follow the procedure listed below.

- (i) Confirm that the WARNING LED (orange) on the front bezel is not blinking at a high rate of speed (in 125 ms intervals).

If the WARNING LED (orange) is blinking at a high rate of speed, wait for up to 80 seconds. The LED will stop blinking.

There is no error if the LED is blinking at a low rate of speed (once per second).

- (ii) Perform the change to the maintenance mode.

- Single controller

Press the RST SW on the single Controller (the RST LED (orange) will light up while the RST SW is pressed).

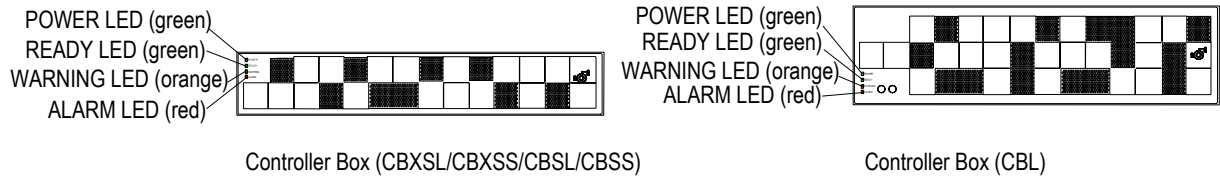
- Dual controller

- ① Press the RST SW on Controller #0 (the RST LED (orange) will light up while the RST SW is pressed).

- ② Press the RST SW on Controller #1 (within 10 seconds of the first time the ALM LED (red) on controller #0 lights up).

If the ALM LED (red) on Controller #0 has not lit up by this point, turn the power to the array off and back on without removing the controller, return to Step (a), and repeat the procedure.

(a) LED positions on Front Bezel



(b) Controller Location

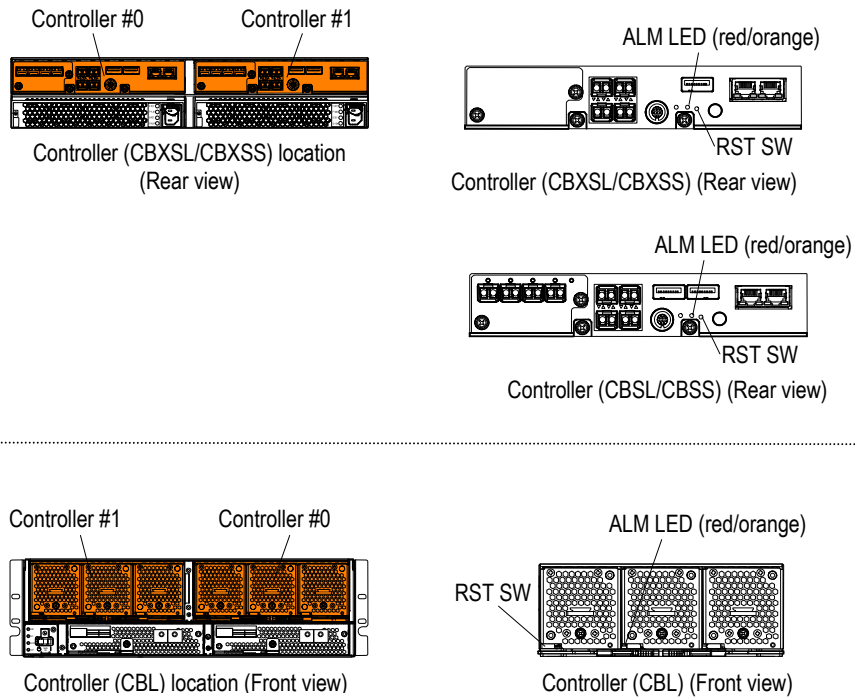


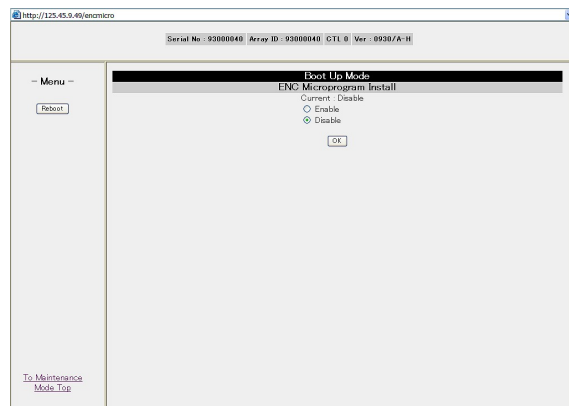
Figure 13.6.3 Indication Position

NOTE : • The Controller will remain closed while the array is in the maintenance mode.  
No commands from the host computer can be performed during this time.  
To recover, you must reboot the Controller.

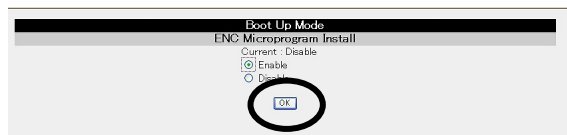
The array will proceed to the maintenance mode once the ALM LED (red) on Controller #0 and the READY LED (orange) on the front bezel are both lit.

- Using DNS at the network TCP/IP settings increases the time it takes to connect to the network. To expedite connections, set “Do not use DNS”. Refer to the instruction manual of the PC in use for details on how to make settings.
- The array cannot connect to the network if the browser is set to use the proxy server. Confirm that the browser is set not to use it. Refer to the instruction manual of the browser in use for details on how to confirm settings.

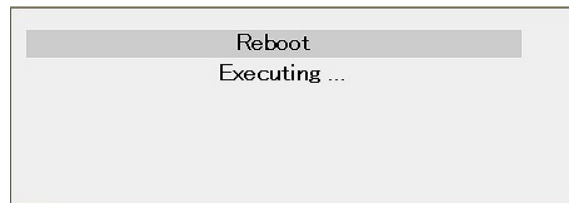
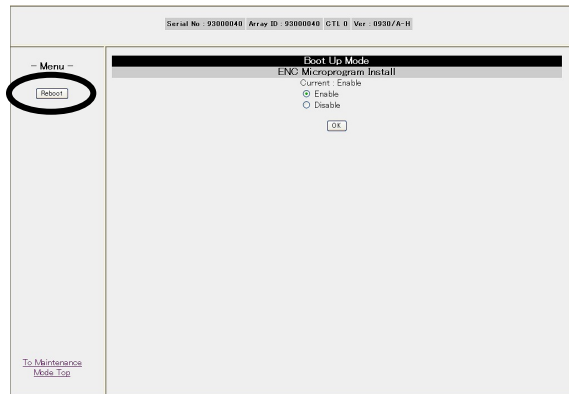
(5) Enter the following URL in the browser of the PC used for maintenance: “http://subsystem maintenance LAN port IP address/encmicro”. The bootup settings screen for firmware download will be displayed.



(6) Change the Boot Up Mode to Enable and click the [OK] button. Confirm that Enable has been selected.



- (7) Click the [Reboot] button on the menu. Reboot the array according to the instructions provided by the dialog box.



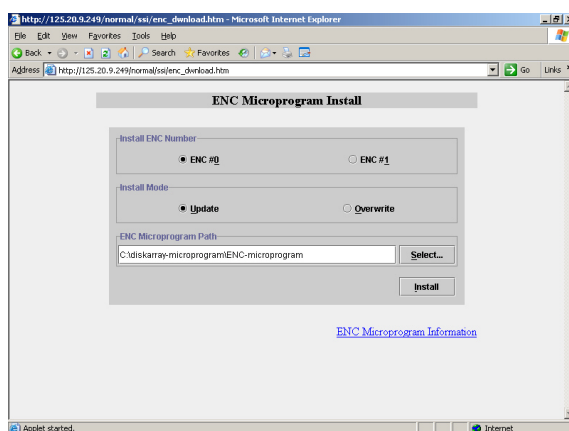
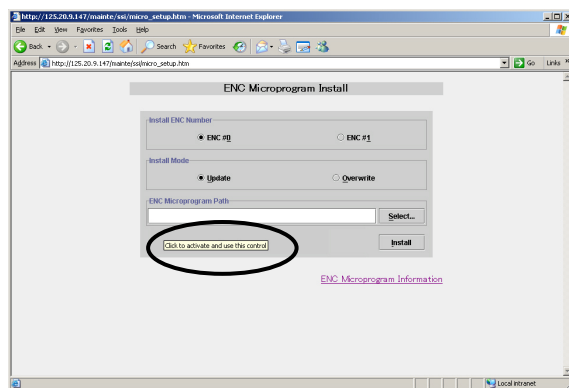
- (8) When the READY LED (green) on the array starts to blink for 1/8 seconds, enter the following URL in order to display the ENC firmware download screen (Java applet): “http:// array maintenance LAN port IP address/encmicro”.<sup>(†1)</sup>

NOTE : Execute Step (8) to (11) within 60 minutes after the READY LED (green) blinks for 1/8 seconds.

When the READY LED (green) on the array does not blink for 1/8 seconds or does not light up, enter the URL “http://array maintenance LAN port IP address” in the browser to check the array status and then recover the failure.

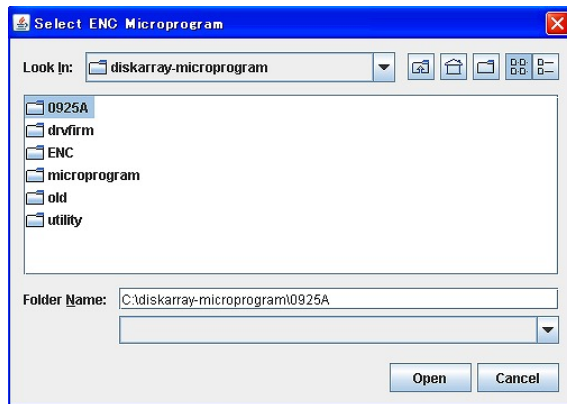
If the READY LED (green) on the array lights up instead of blinking for 1/8 seconds, enter the following URL in the browser of the PC used for maintenance in order to display the information screen for the ENC firmware: “http:// array maintenance LAN port IP address/encmicro”. Then, refer to “Information Message” in the window and recover the failure.

When the following message is displayed, it is necessary to click ActiveX Control with a mouse and to change it into the active status.



<sup>†1</sup> : The Drives, which were spun down due to the Power Saving/Power Saving Plus of the priced option, are also spinning up.

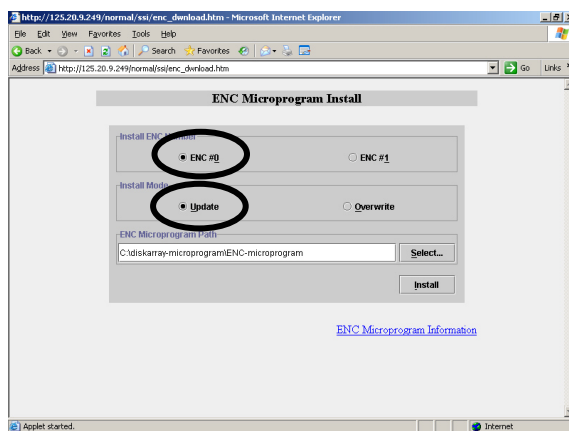
Specify the unified version directory<sup>(†1)</sup> by clicking the [Select...] button on the ENC Firmware Downloading panel.



- (9) The ENC number in which the ENC firmware is downloaded from [Install ENC Number] is checked.

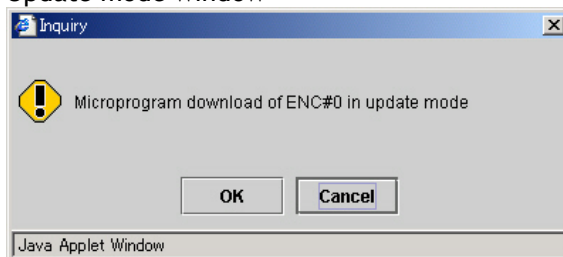
Also, check that [Update] of [Install Mode] is selected. Specify it for [Update] when [Overwrite] is selected. Select [Overwrite] only when there is an instruction.

The download procedure from ENC #0 is shown in this procedure.

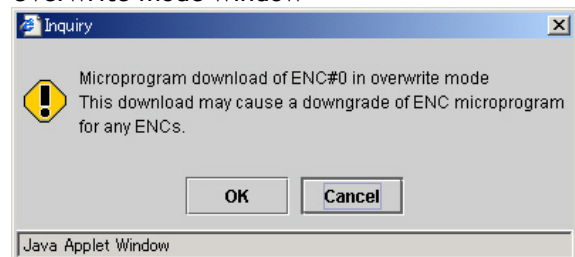


Click the [Install] button to display the dialog box in which the number of the ENC to be downloaded can be confirmed. Check the ENC number to be downloaded and click the [OK] button.

Update mode window

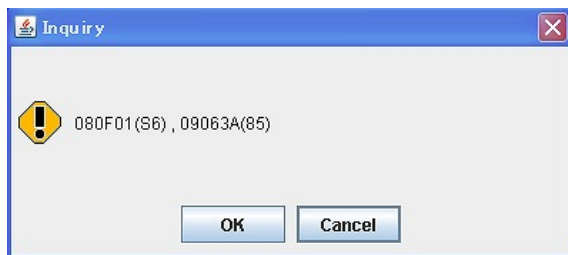


Overwrite mode window

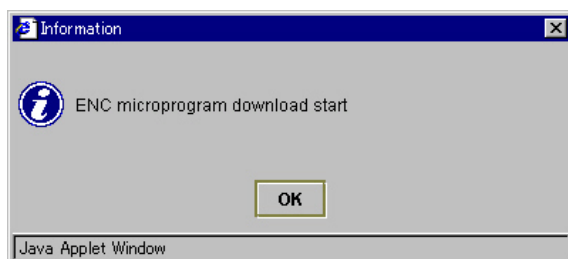


<sup>†1</sup> : For the unified version directory, refer to “13.5.1 Hierarchy of ENC Firmware Storage Directories” (TRBL 13-0100).

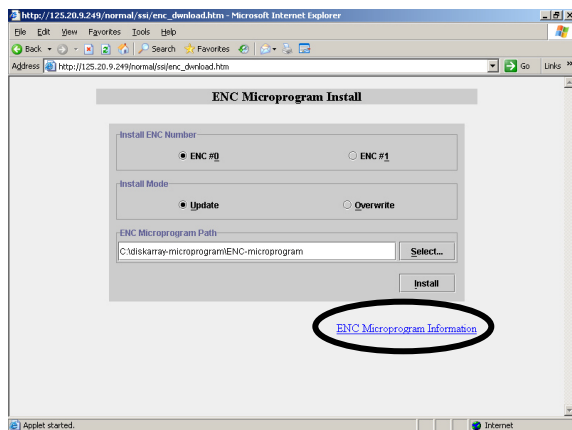
- (10) The configuration message dialog box appears. If there is no error in version to be downloaded, click the [OK] button. The transfer of the ENC firmware file will begin.



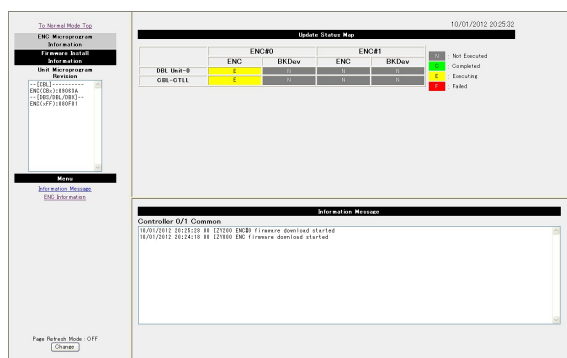
- (11) If all the ENC Firmware file transfers are accepted normally, the “ENC microprogram download start” dialog box will be displayed. Click the [OK] button. The download of the ENC firmware will begin.



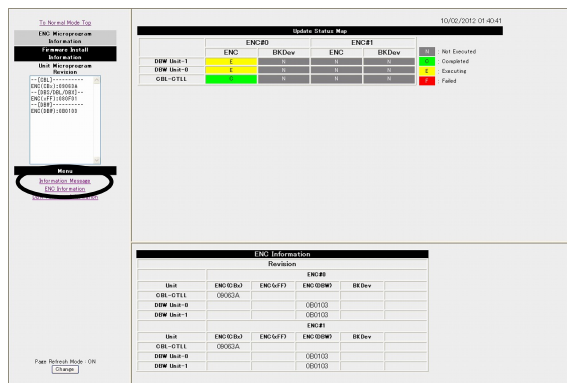
- (12) Click [ENC Microprogram Information] to display the ENC firmware download status view screen. The progress of the ENC firmware download can be confirmed at this screen.



A message indicating the download status can be confirmed by clicking “Information Message” on the menu.







When the download starts, “IZY20x firmware download started” is displayed in the “Information Message” column.





Download status is indicated by different colors on the “Update Status Map” and “ENC Information”. The status indicated by each color is as shown on the table below.

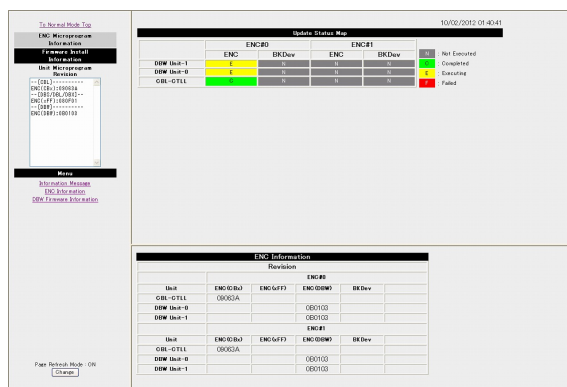
Screen (color)	Status
 Gray	Not targeted for download
 Green	Download complete
 Yellow	Downloading
 Red	The downloading failed (a failure occurred) or it was attempted for firmware outside the range to be downloaded (*1).

\*1 : When it is intended to download only a part of the ENC firmware, a window, which shows the status of the ENC of a disk array unit having firmware outside the range to be downloaded, may be displayed in red. In this case, you can see which of the above is the case in point by checking whether or not a failure has occurred referring to the “Information Message” for a message as shown below.

- (13) After all ENC firmware installation is completed, “IZY40x ENC#x firmware download completed” will be displayed in “Information Message” and the READY LED (green) on the array will blink for 1/2 seconds.

NOTE : After an ENC firmware download has been completed normally, the ENC ALARM of the ENC that downloaded the firmware will light up. This light means that the ENC has rebooted automatically and does not indicate an error.

If the message “IZY40x ENC#X firmware download completed” is not displayed or the READY LED (green) on the array does not blink for 1/2 seconds even 35 minutes elapse after the message “IZY20x ENC#x firmware download started” in Step (12) is displayed, refer to the Information Message (refer to Step (12)) and recover the failure. If an error message is displayed between “IZY20x ENC#x firmware download started” and “IZY40x ENC#x firmware download completed”, correct the error in accordance with the instructions in the error message.



- (14) Remove the power cables of all chassis of the array, reconnect them, turn it on again, and turn on the main switch to restart. When it becomes READY, check that the WARNING LED (orange) is turned off. If the array does not become Ready status or the WARNING LED (orange) lights up or blinks, refer to the Information Message and recover the failure.
- Next, enter the following URL in the browser: “http://IP address/encmicro”, click “ENC Information” on the menu, and confirm that the versions of the ENC firmware that were downloaded are equivalent to or greater than the versions that were overwritten.

Firmware version is less than Ver.0930/A

The screenshot shows the ENC Information page for a system with firmware version less than Ver.0930/A. The page includes a sidebar with navigation links and a main content area with two tables.

**Update Status Map**

Unit	ENC00		ENC01		Status
	ENC	BRDev	ENC	BRDev	
DBL Unit-0	0930A	0930A	0930A	0930A	Completed
DBL Unit-1	0930A	0930A	0930A	0930A	Completed
DBL Unit-2	0930A	0930A	0930A	0930A	Completed

**ENC Information**

Unit	ENC00		ENC01	
	ENC/BR	BRDev	ENC/BR	BRDev
DBL Unit-0	0930A	0930A	0930A	0930A
DBL Unit-1	0930A	0930A	0930A	0930A
DBL Unit-2	0930A	0930A	0930A	0930A

Firmware version is Ver.0930/A or more

The screenshot shows the ENC Information page for a system with firmware version Ver.0930/A or more. The page includes a sidebar with navigation links and a main content area with two tables.

**Update Status Map**

Unit	ENC00		ENC01		Status
	ENC	BRDev	ENC	BRDev	
DBL Unit-0	0930A	0930A	0930A	0930A	Completed
DBL Unit-1	0930A	0930A	0930A	0930A	Completed
DBL Unit-2	0930A	0930A	0930A	0930A	Completed

**ENC Information**

Unit	ENC00		ENC01	
	ENC/BR	BRDev	ENC/BR	BRDev
DBL Unit-0	0930A	0930A	0930A	0930A
DBL Unit-1	0930A	0930A	0930A	0930A
DBL Unit-2	0930A	0930A	0930A	0930A

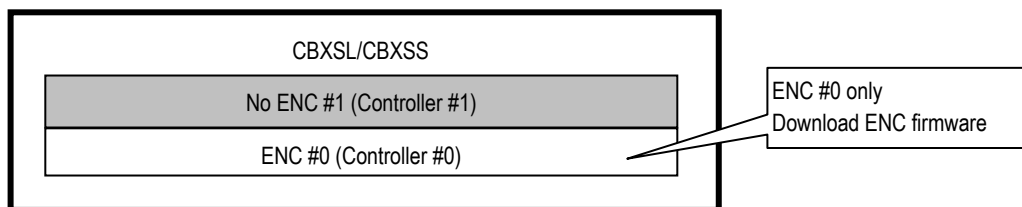
- (15) When the download is necessary for the other ENC, repeat (4) to (14) of “13.6.5 Downloading Offline ENC Firmware” (TRBL 13-0200), and download the ENC firmware.

### 13.7 Offline ENC Firmware Download Procedure (Single Controller)

This procedure is explained below, with the mounted controller as controller #0.

- For CBXSL/CBXSS only

Since the CBXSL/CBXSS ENC forms a single unit with the Controller, download ENC #0 only.

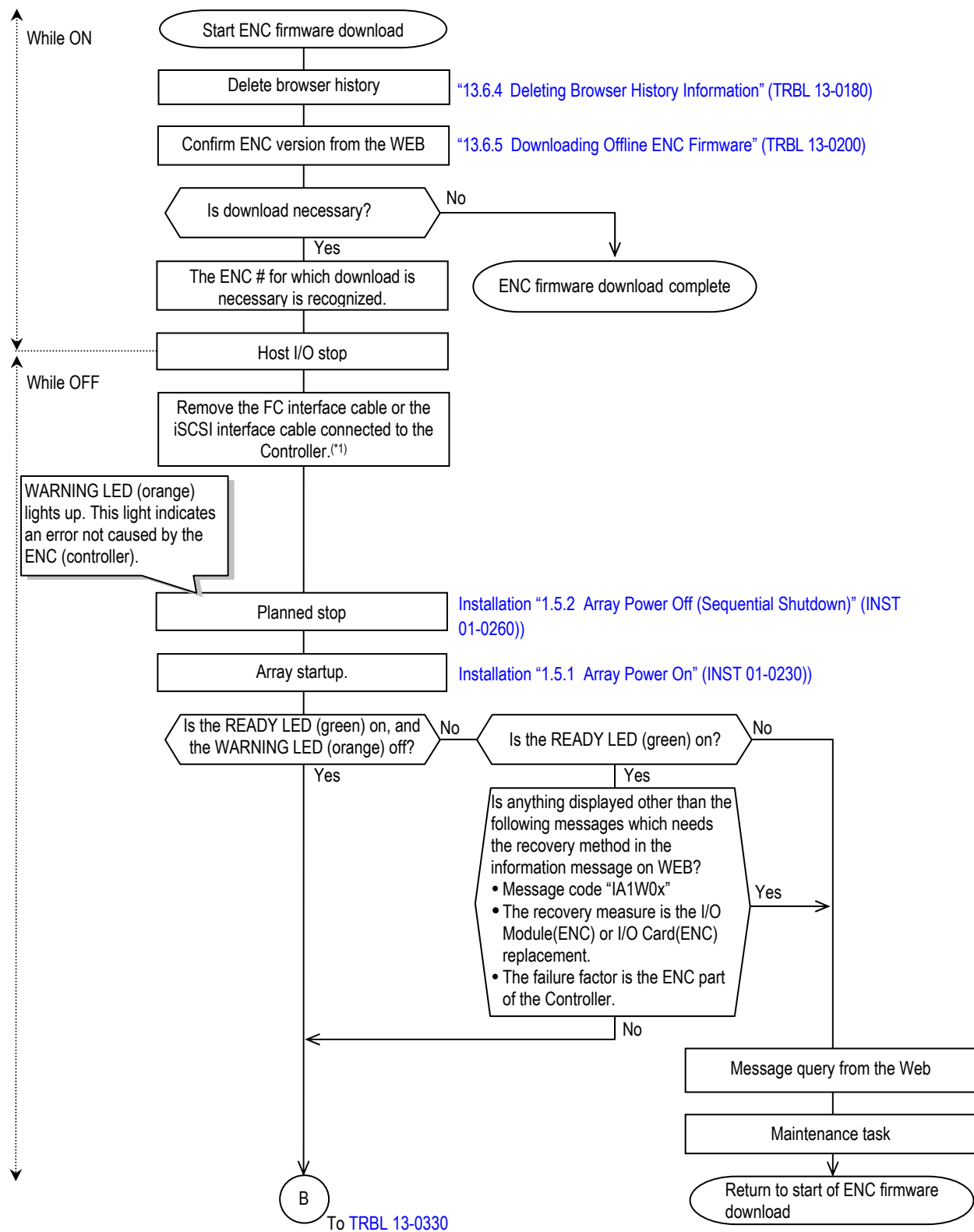


- For CBXSL/CBXSS+DBL/DBS

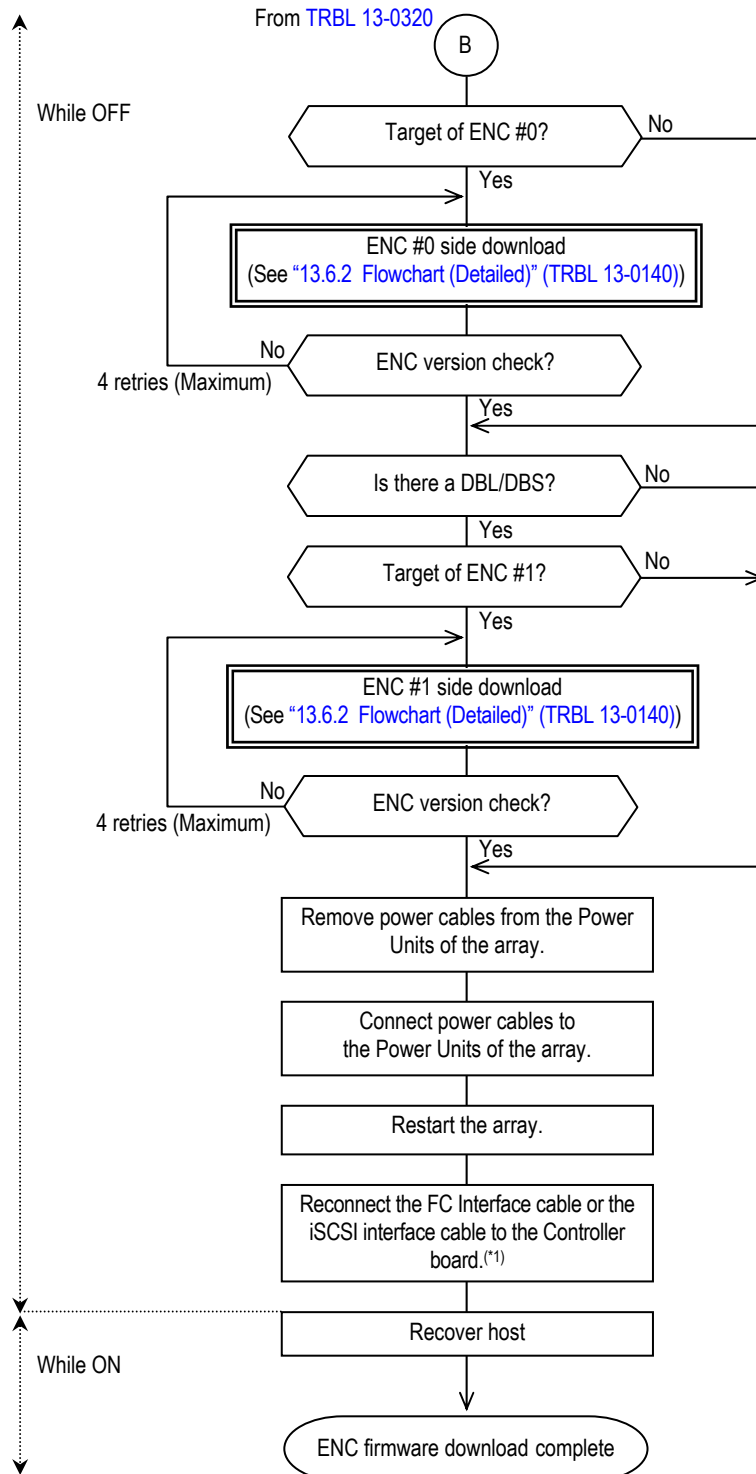
Although CBXSL/CBXSS has only ENC #0, DBL/DBS includes both ENC #0 and ENC #1.

Therefore, it is necessary to download to both ENC #0 and ENC #1.

## 13.7.1 Flowchart (General)

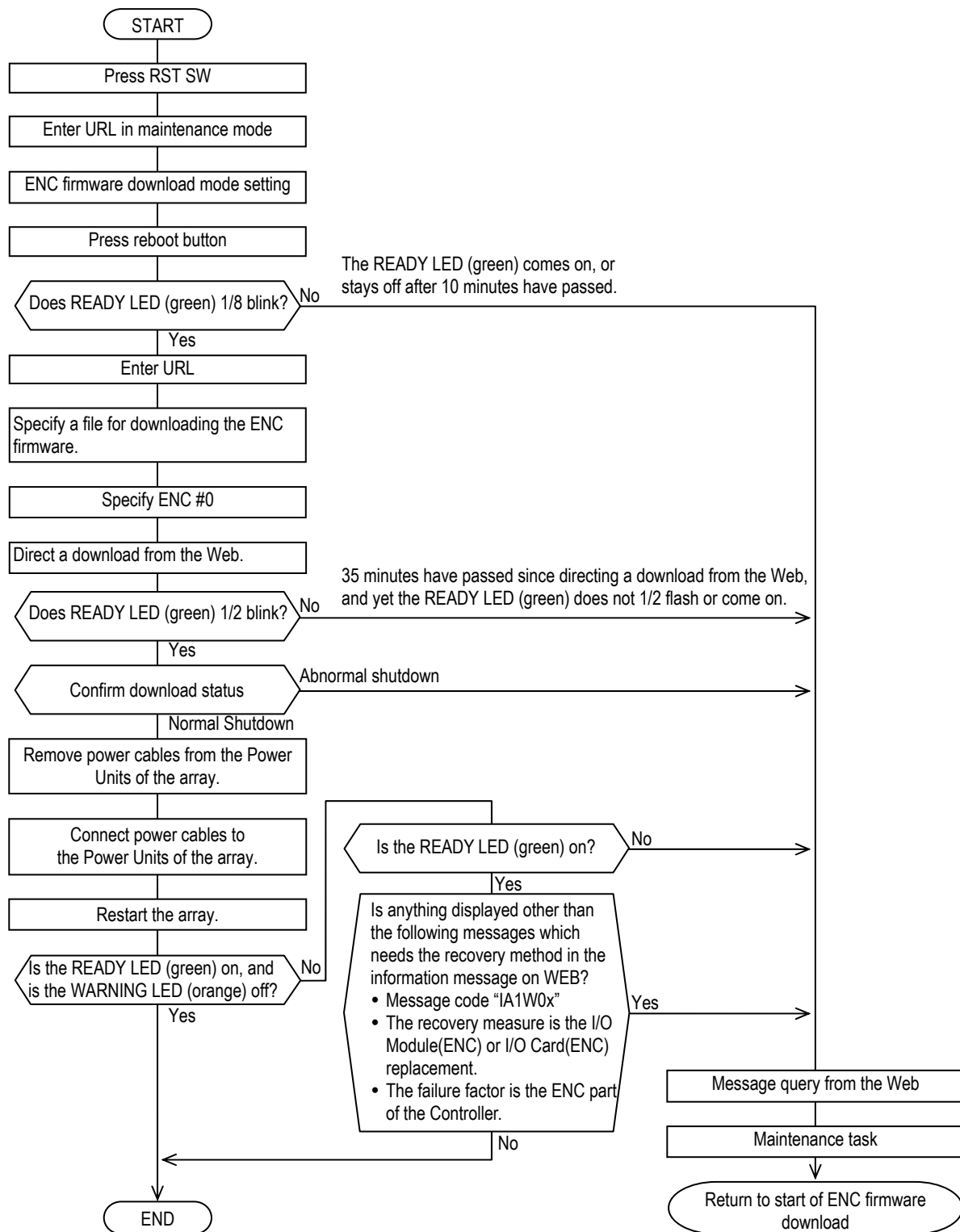


\*1 : When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.



\*1 : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

## 13.7.2 Flowchart (Detailed)



### 13.7.3 Offline ENC Firmware Download Procedure Screen (Single Controller)

The download procedure of the ENC firmware is the same procedure as the dual Controller.

(Refer to [“13.6 Offline ENC Firmware Download Procedure \(Dual Controller\)”](#) (TRBL 13-0110).)

- (1) Use a LAN cross cable to connect the LAN connector used for maintenance to the LAN connector of the PC used for maintenance. (Refer to [“13.6.3 Connecting the PC Used for Maintenance”](#) (TRBL 13-0150).)
- (2) Start the browser on the PC used for maintenance, and delete the history. (Refer to [“13.6.4 Deleting Browser History Information”](#) (TRBL 13-0180).)
- (3) Download the ENC firmware. (Refer to [“13.6.5 Downloading Offline ENC Firmware”](#) (TRBL 13-0200).)

## 13.8 Offline ENC Firmware Download Web Display Screen

### 13.8.1 URLs

The ENC firmware version display screen is displayed by entering the following URL in the Web browser of the PC connected to DF. (ENC firmware download status reference screen during ENC firmware download.)

<http://controller IP address/encmicro>

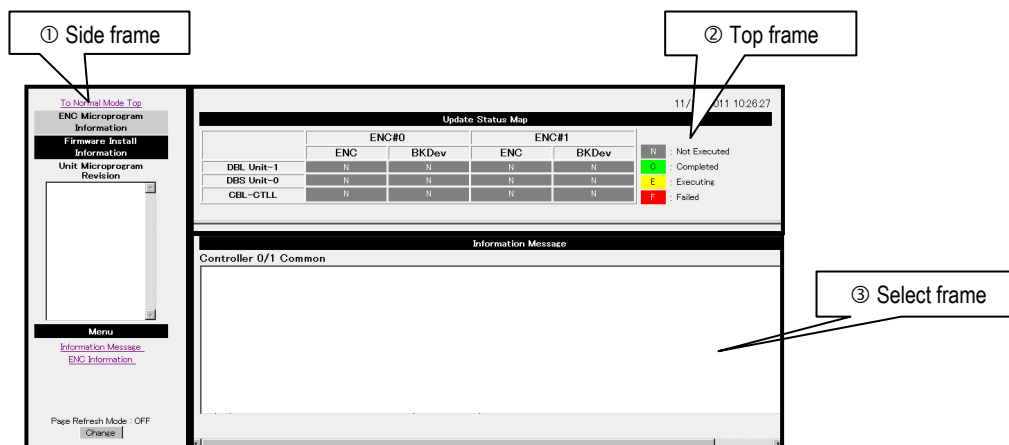
At the time when the Web is connected or operated, entries of [User Name] and [Password] may be required. In such a case, enter [maintenance] as a user name and [hosyu9500] as a password.



### 13.8.2 Web Screen Image

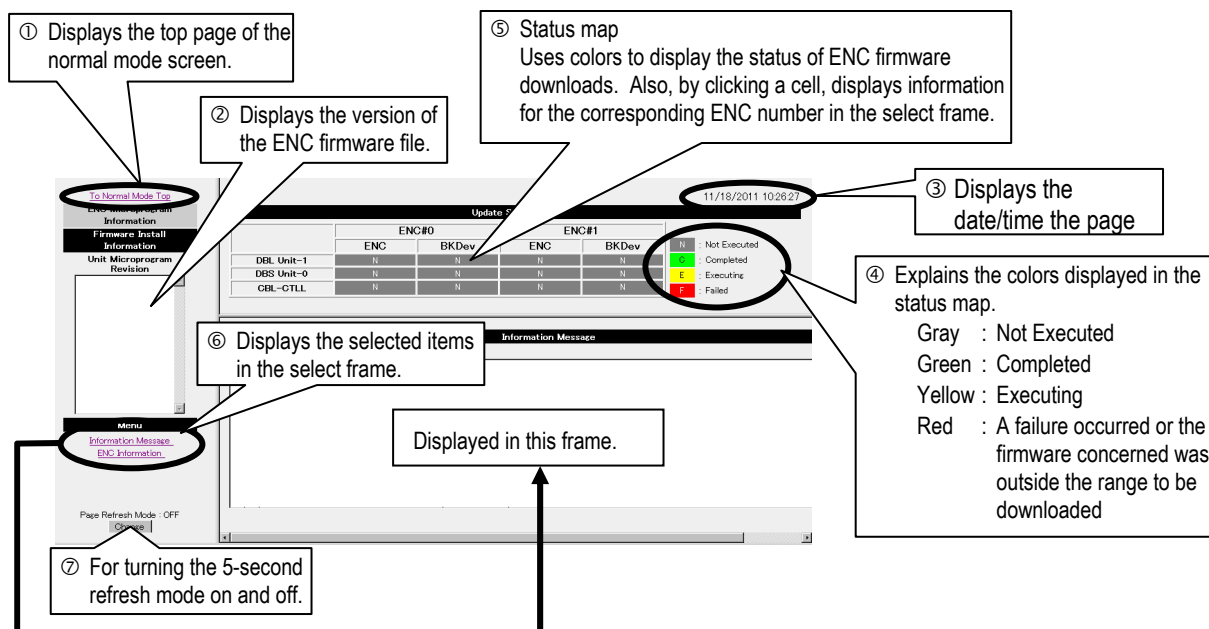
A Web screen image of the ENC firmware version display as it appears in Internet Explorer is shown below.

After the INQUIRY information is fixed, enter the URL to display the following screen. In the figure below, the left side is called the Side frame, the top right half is called the Top frame, and the bottom half is called the Select frame.



### 13.8.3 Side Frame and Top Frame Image Screen Details

The details of the side frame and top frame are shown below.

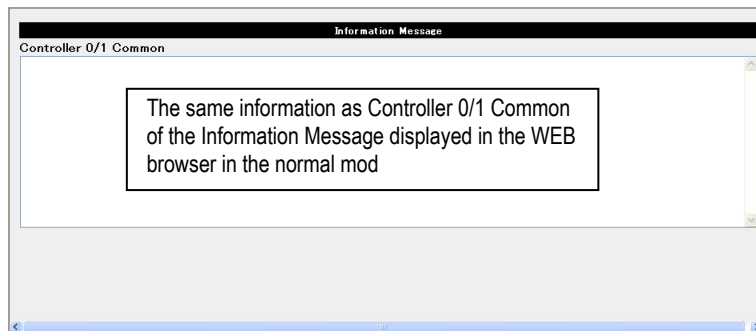


### 13.8.4 Select Frame Image Screen Details

The details of the select frame are shown below.

One of the following two patterns is displayed, depending on settings.

- (1) The select frame screen when an Information Message is selected is shown below.



- (2) The select frame screen when ENC Information is selected is shown below.

① ENC Unit number

② Displays the version of the ENC firmware/backup controller firmware

ENC Information				
Revision				
		ENC#0		
Unit	ENC(GBx)	ENC(xFF)	BKDev	
CBL-CTLL	090608		0244	
DBS Unit-0		080C0F		
DBL Unit-1		080C0F		
		ENC#1		
Unit	ENC(GBx)	ENC(xFF)	BKDev	
CBL-CTLL	090608		0244	
DBS Unit-0		080C0F		
DBL Unit-1		080C0F		

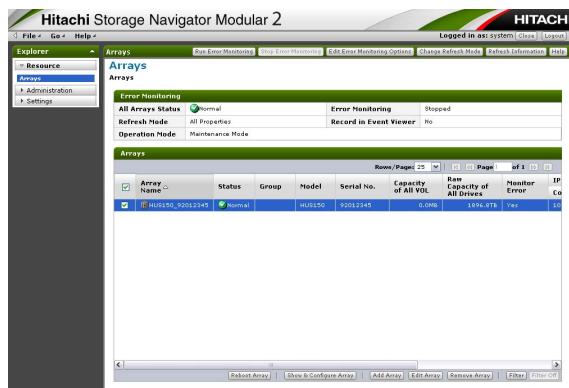
### 13.9 Procedure for Invalidating the Automatic ENC Firmware and Backup Controller Firmware Downloading Function

When returning the revision of the ENC firmware to the previous one after downloading the firmware because of its trouble, etc., it is required to invalidate the automatic downloading function before downloading the firmware.

Execute the following procedure using Storage Navigator Modular 2.

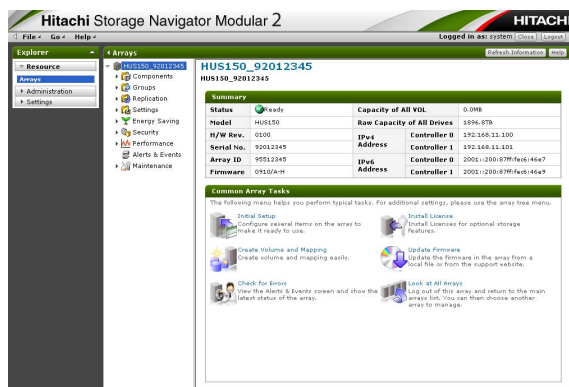
- (1) When the Hitachi Storage Navigator Modular 2 version is 22.00 or more
  - (a) Start the Hitachi Storage Navigator Modular 2.
  - (b) Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

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



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

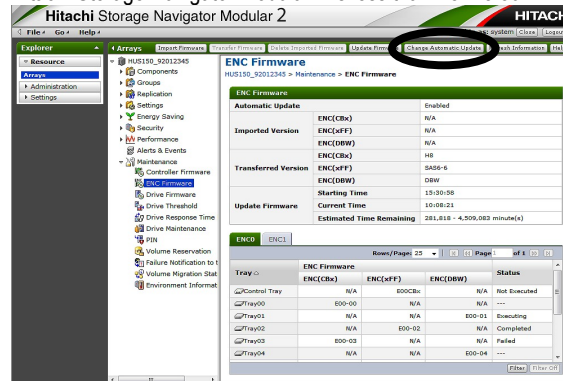
NOTE : When the main window is not displayed even if you select the array, check that the LAN port number is not changed. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\).](#)) Use the changed LAN Port Number, and execute it again.



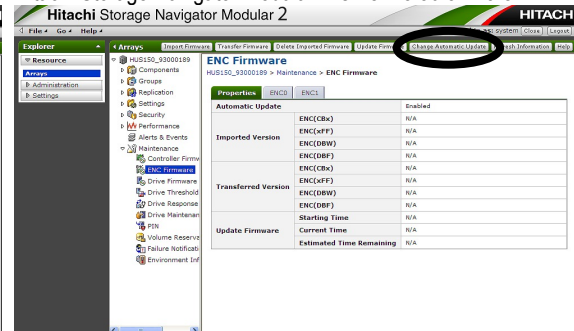
<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

- (d) Select [Maintenance] - [ENC Firmware] in the unit window and click the [Change Automatic Update] button.

Hitachi Storage Navigator Modular 2 is less than Ver.25.50



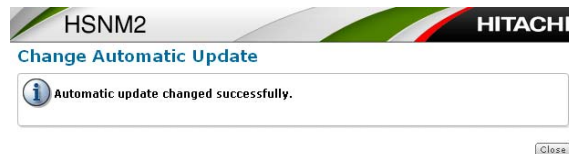
Hitachi Storage Navigator Modular 2 is Ver.25.50 or more



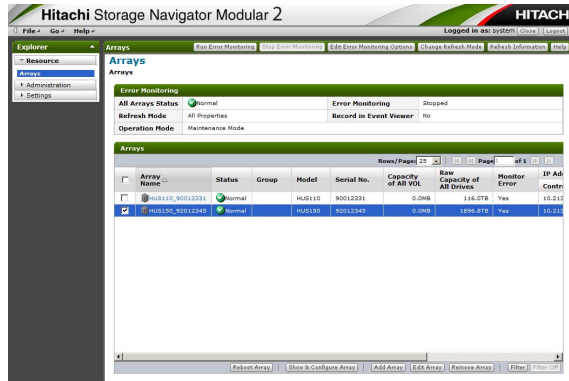
- (e) Uncheck the checkbox and click the [OK] button.



- (f) Click the [Close] button when the message is displayed.

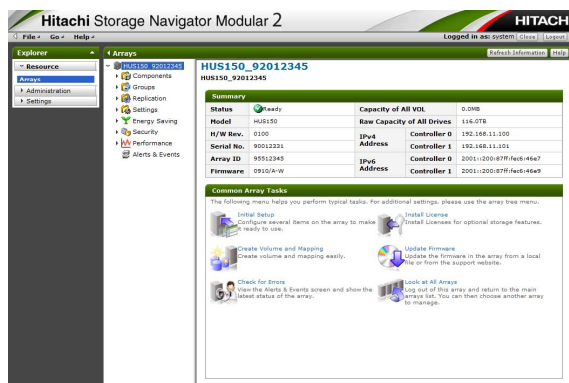


- (2) When the Hitachi Storage Navigator Modular 2 version is less than 22.00
- Start the Hitachi Storage Navigator Modular 2.
  - Put a checkmark to the array to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>
- It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



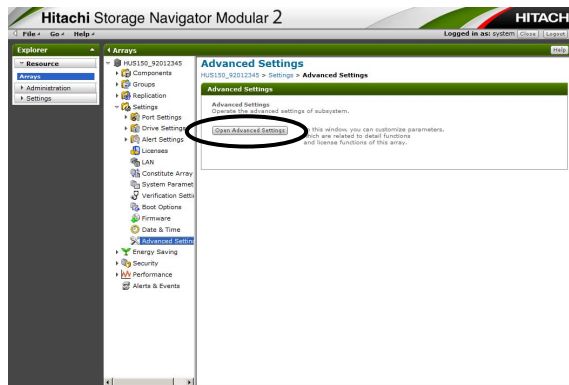
- (c) Click the array name, and open the unit window.

NOTE : When the main window is not displayed even if you select the array, check that the LAN port number is not changed. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\)](#).) Use the changed LAN Port Number, and execute it again.

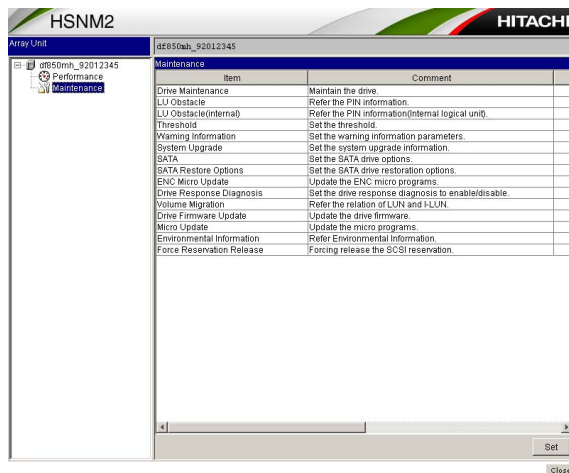


<sup>†1</sup> : When the array to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

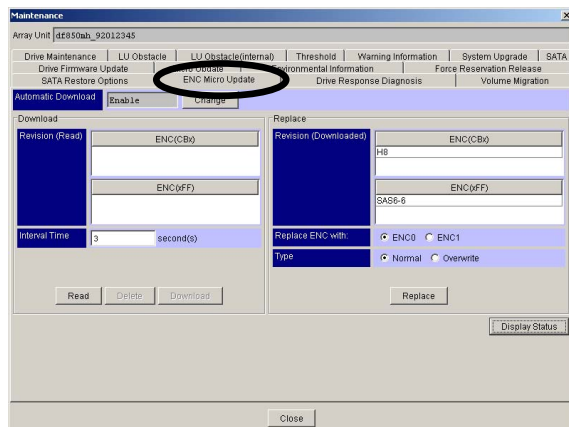
(d) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



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

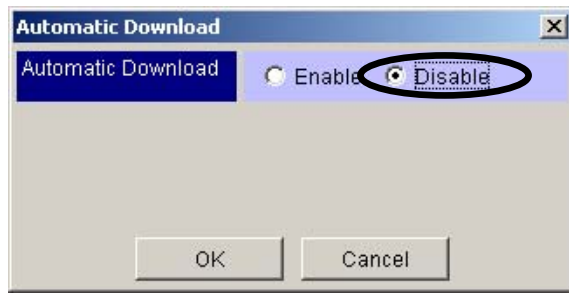


(f) Click the [ENC Micro Update] tab on the Maintenance dialog box.



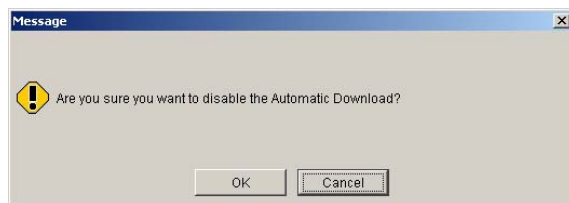
(g) Click the [Change] button on the “Automatic Download”.

(h) Select [Disable] in the Automatic Download window.



(i) Click the [OK] button.

(j) The configuration message dialog box appears. Click the [OK] button.



(k) When the set is completed normally, click the [OK] button.



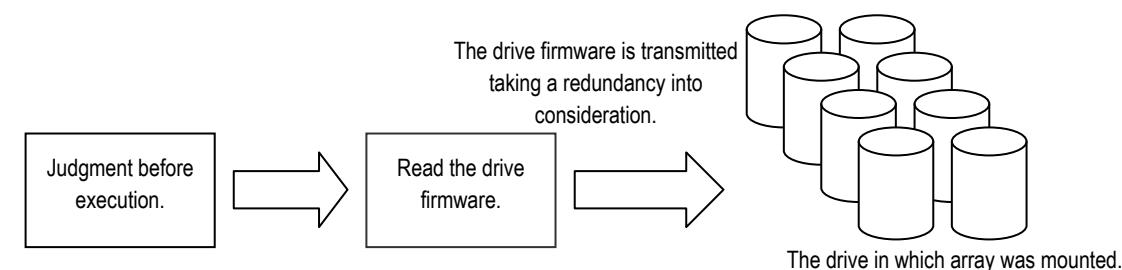


## Chapter 14. Procedure for Replacing the Offline Drive Firmware

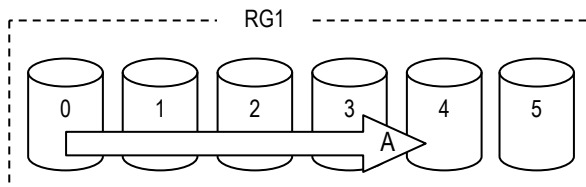
### 14.1 Overview of the Offline Drive Firmware Replacement Function

If the firmware also exists in the Drive itself installed in the chassis and trouble corrections and specification changes occur as well as the main body of the array firmware, the firmware is updated. Replace the firmware by issuing the write buffer command to the Drives.

The firmware update function replaces the firmware of Drives simultaneously by considering the redundancy of the RAID configuration. Moreover, the function can replace the firmware of all drives (made by Hitachi and made by Seagate) currently supported with the disk array system.

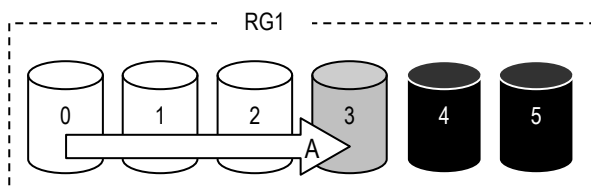


Configuration of 4D+2P



- ☐: A replacement of the drive firmware was completed normally.
- ☒: A replacement of the drive firmware was completed abnormally.
- ☒: The execution of the replacement is stopped because the redundancy cannot be maintained.

2 configuration of 4D+1P (Failure occurred at drive 3.)



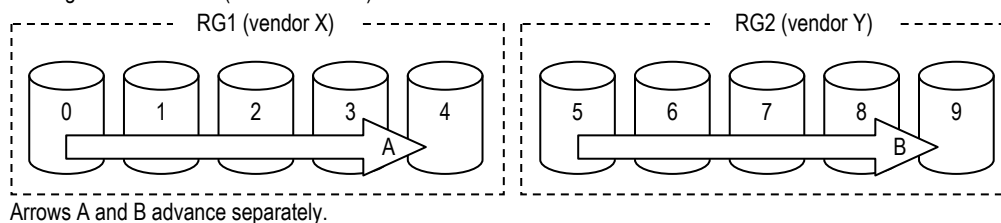
In the RAID group 1, the firmware replacement for the drive 3 in which a failure has occurred terminates abnormally and the replacement for the drive 4 and 5 are stopped before it is replacement because the redundancy of the RAID group 1 cannot be maintained.

When the replacement of one drive firmware among Drives that configure the RAID group because it is the RAID level 6 terminates abnormally, there is redundancy of the data but safety of the data is emphasized, so that the drive firmware replacement cancelled at that time.

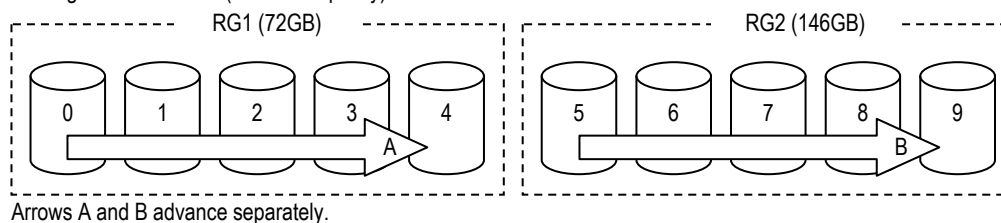
Figure 14.1.1 Outline (1)

The firmware differs for every vendor, capacity, etc. Therefore, in the case of performing firmware update, it may be necessary to perform firmware update several times.

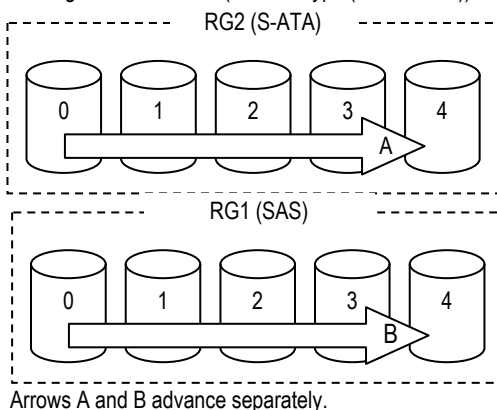
2 configuration of 4D+1P(different vendor)



2 configuration of 4D+1P(different capacity)



2 configuration of 4D+1P(different type (SAS/S-ATA))



**Figure 14.1.2 Outline (2)**

## 14.2 Prerequisites

- (1) It is recommended for the customer to backup the user data in advance.  
It is recommended for the customers to backup the user data before starting the work to prepare in the contingency such as the user data may be lost if the operation is mistaken and the Drive does not operate after replacing the drive firmware.
- (2) The drive firmware replacement is off-line work, and turning on/off the power supply of the array is also repeated several times.  
The drive firmware replacement cannot be executed with the dirty data (the user data which is not written in the Drive) maintained in the Cache memory. Therefore, before performing the drive firmware replacement, ask the customer to stop the operation of the host computer, and remove the interface cable connected to the array. Also, stop the failure monitoring such as E-mail Alert Function, ASSIST-PC monitoring, SNMP monitoring or Hi-Track monitoring.
- (3) The firmware, which can be replaced by one drive firmware replacement, is only one type of the firmware.
- (4) The firmware replacement overwrites the firmware to be replaced in the targeted Drive. The Drive with the same revision of the firmware before and after the replacement does not write the firmware. The Drive which the revision of the firmware before and after the replacement differs overwrites the firmware regardless of the update/version downgrade.
- (5) Perform the drive firmware replacement in the status where the array is not array warning.  
For example, when the array has an I/O Module(ENC) or I/O Card(ENC) blockade, the drive firmware replacement cannot be performed.  
Be sure to perform the drive firmware replacement after recovering the I/O Module(ENC) or I/O Card(ENC) blockade.
- (6) When the TrueCopy remote replication is enabled, and the array, which the drive firmware replacement is to be performed, is a remote, perform the drive firmware replacement after changing the pair status (S-VOL) of TrueCopy remote replication to PSUS.  
However, although a path blockade occurs if the drive firmware replacement is performed, the pair blockade is automatically recovered by turning on the power supply of the array after performing the drive firmware replacement.  
After the drive firmware replacement is completed, set the pair status (S-VOL) of TrueCopy remote replication to previous state.  
Also, if the drive firmware replacement is performed, the following phenomena occur.
  - Both paths of the TrueCopy remote replication are blocked. The notice of E-mail Alert Function and SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the pair status of the TrueCopy remote replication is PAIR or COPY, the pair status changes to PSUE.

- (7) When the TrueCopy Extended Distance is enabled, and the array, which the drive firmware replacement is to be performed, is a remote, perform the drive firmware replacement after changing the pair status (S-VOL) of TrueCopy Extended Distance to PSUS. However, although a path blockade occurs if the drive firmware replacement is performed, the pair blockade is automatically recovered by turning on the power supply of the array after performing the drive firmware replacement. After the drive firmware replacement is completed, set the pair status (S-VOL) of TrueCopy Extended Distance to previous state. Also, if the drive firmware replacement is performed, the following phenomena occur.
- Both paths of the TrueCopy Extended Distance are blocked. The notice of E-mail Alert Function and SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the pair status of the TrueCopy Extended Distance is PAIR or COPY, the pair status changes to PSUE.
- (8) When using the priced option, Power Saving/Power Saving Plus, and the power saving instruction of the I/O interlock disabled is executed, if the array restarts while the power saving status is "Normal (Command Monitoring)", the status is changed to "Normal (Spindown Failed: PS OFF/ON)". After executing the power saving instruction of the I/O interlock disabled, check that there is no RAID group whose power saving status is "Normal (Command Monitoring)" and then restart the array. If the spindown fails, execute it again.
- (9) It is required to install JRE 1.6 in the service PC to replacement the drive firmware. When the version other than JRE 1.6 is installed in the service PC, the procedure may not be performed normally. When the version other than JRE 1.6 is installed, be sure to uninstall the JRE and then install JRE 1.6. After completing the procedure, return it to the original JRE.

### 14.3 Restrictions

- (1) If a failure is detected in the Drive during the drive firmware replacement, the ALARM LED (red) does not light up.  
Check the Drive where the failure occurred in the information message on WEB or at the time of turning on the power supply of the array system after the drive firmware replacement.
- (2) The replacement parts cannot be inserted or removed during the drive firmware replacement. It does not recover even if the replacement parts are inserted during the drive firmware replacement. Also, when the replacement parts are removed during the firmware replacement, the parts may not be blocked or the drive firmware replacement may be terminated abnormally.
- (3) When it sets to the mode that executes the drive firmware replacement and the array starts, the Drives, which were spun down due to the Power Saving/Power Saving Plus of the priced option, spin up.  
When the array normally starts and it becomes the Ready status after completing the drive firmware replacement, the Drives set to the power saving spin down.

## 14.4 Offline Drive Firmware Replacement Time

The working hours taken for executing the drive firmware replacement in the array is shown below. This does not include the time taken for making the whole system (including the host computer) offline. The working hours in [Table 14.4.1](#) to [Table 14.4.3](#) shows the time from instructing the drive firmware replacement on WEB to completing the download.

**Table 14.4.1 Standard of Time Required for Offline Drive Firmware Replacement of HUS110**

No.	Item	Working Hours	
		Standard	Maximum
	Drive firmware replacement work		
1	Hot I/O stop	Differs depending on the system configuration.	
2	Planned shutdown	1 minutes	3 minutes
3	Array start	4 minutes	6 minutes
4	Disk array system reboot	4 minutes	6 minutes
5	Drive firmware replacement	$1.0 \times (\text{Number of Drives}) / (\text{Number of RAID Groups})$ minutes	30 minutes
6	Array start	4 minutes	6 minutes
7	Total	Depends on the number of Drives and RAID Groups.	121 minutes

**Table 14.4.2 Standard of Time Required for Offline Drive Firmware Replacement of HUS130**

No.	Item	Working Hours	
		Standard	Maximum
	Drive firmware replacement work		
1	Hot I/O stop	Differs depending on the system configuration.	
2	Planned shutdown	1 minutes	3 minutes
3	Array start	4 minutes	6 minutes
4	Disk array system reboot	4 minutes	6 minutes
5	Drive firmware replacement	$1.0 \times (\text{Number of Drives}) / (\text{Number of RAID Groups})$ minutes	30 minutes
6	Array start	4 minutes	6 minutes
7	Total	Depends on the number of Drives and RAID Groups.	281 minutes

**Table 14.4.3 Standard of Time Required for Offline Drive Firmware Replacement of HUS150**

No.	Item	Working Hours	
		Standard	Maximum
	Drive firmware replacement work		
1	Hot I/O stop	Differs depending on the system configuration.	
2	Planned shutdown	2 minutes	6 minutes
3	Array start	5 minutes	8 minutes
4	Disk array system reboot	5 minutes	8 minutes
5	Drive firmware replacement	$1.0 \times (\text{Number of Drives}) / (\text{Number of RAID Groups})$ minutes	30 minutes
6	Array start	5 minutes	8 minutes
7	Total	Depends on the number of Drives and RAID Groups.	830 minutes

## 14.5 Before Replacing the Offline Drive Firmware

Do the following preparation before replacing the drive firmware.

- (1) Refer to [WEB “Chapter 1. Before Using Web” \(WEB 01-0000\)](#) and, prepare a PC that supports the LAN environment by means of the Web browser installed in it.  
In the drive firmware replacement work, it is required to check the execution result from the service PC connected by LAN.
- (2) Prepare the drive firmware DVD.
- (3) When the items shown below are performed, the drive firmware cannot be replaced, so that, replace it after the items are completed.
  - Format is in progress.
  - Pair creation or resynchronization of ShadowImage-in-system replication is in progress.
  - Restoration of Copy-on-write SnapShot is in progress.
  - Restoration of the drives (dynamic sparing, copy back or correction copy) is in progress.
  - During the RAIG group expansion
- (4) It is recommended for the customer to backup the user data in advance.  
It is recommended for the customers to backup the user data before starting the work to prepare in the contingency such as the user data may be lost if the operation is mistaken and the Drive does not operate after replacing the drive firmware.
- (5) Perform the drive firmware replacement in the status where the array is not array Warning.  
For example, when the array has an I/O Module(ENC) or I/O Card(ENC)blockade, the drive firmware replacement cannot be performed.  
Be sure to perform the drive firmware replacement after recovering the I/O Module(ENC) or I/O Card(ENC)blockade.
- (6) When the TrueCopy remote replication is enabled, and the array, which the drive firmware replacement is to be performed, is a remote, perform the drive firmware replacement after changing the pair status (S-VOL) of TrueCopy remote replication to PSUS.  
However, although a path blockade occurs if the drive firmware replacement is performed, the pair blockade is automatically recovered by turning on the power supply of the array after performing the drive firmware replacement.  
After the drive firmware replacement is completed, set the pair status (S-VOL) of TrueCopy remote replication to previous state.  
Also, if the drive firmware replacement is performed, the following phenomena occur.
  - Both paths of the TrueCopy remote replication are blocked. The notice of E-mail Alert Function and SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the pair status of the TrueCopy remote replication is PAIR or COPY, the pair status changes to PSUE.

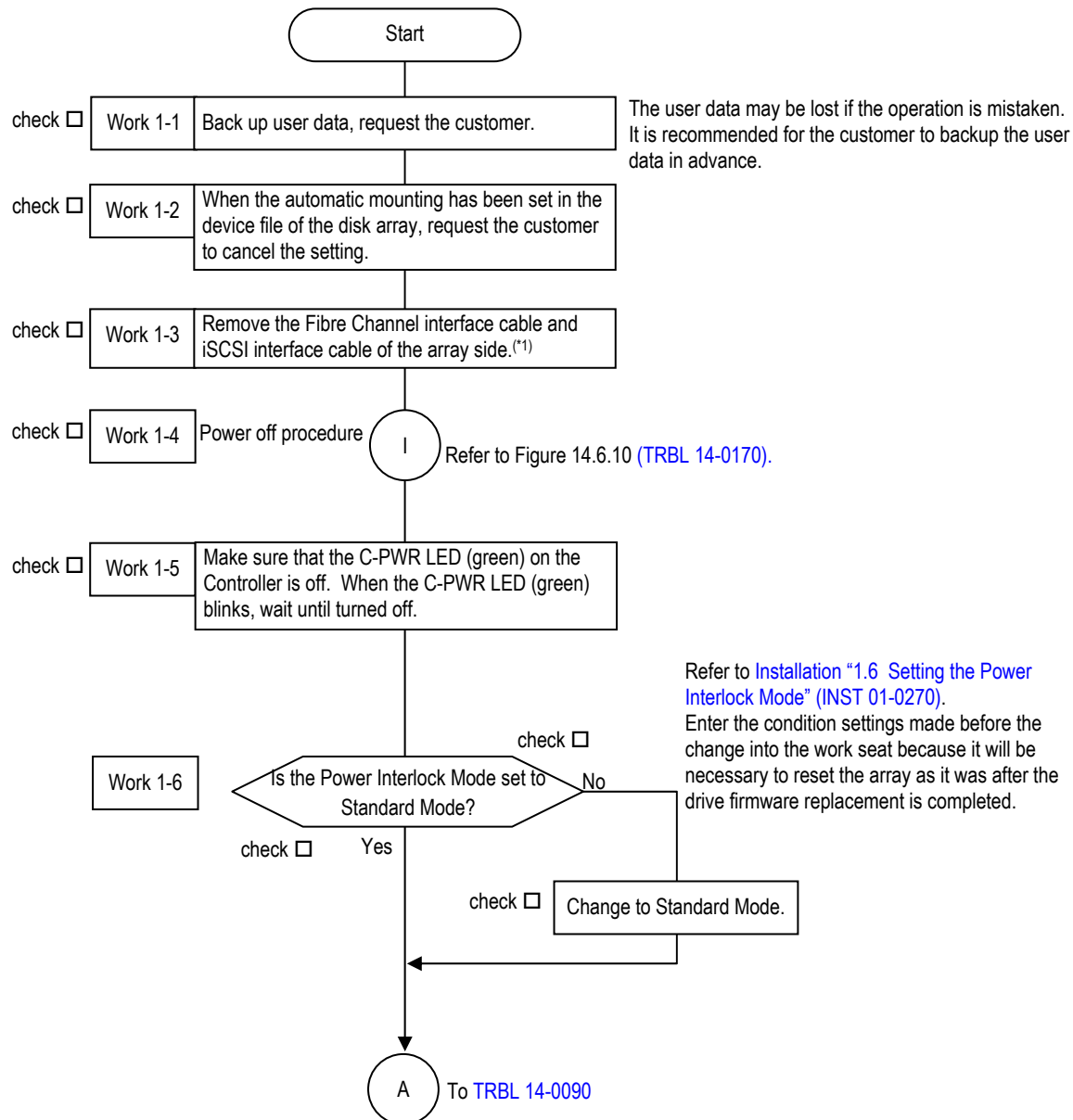
- (7) When the TrueCopy Extended Distance is enabled, and the array, which the drive firmware replacement is to be performed, is a remote, perform the drive firmware replacement after changing the pair status (S-VOL) of TrueCopy Extended Distance to PSUS.
- However, although a path blockade occurs if the drive firmware replacement is performed, the pair blockade is automatically recovered by turning on the power supply of the array after performing the drive firmware replacement.
- After the drive firmware replacement is completed, set the pair status (S-VOL) of TrueCopy Extended Distance to previous state.
- Also, if the drive firmware replacement is performed, the following phenomena occur.
- Both paths of the TrueCopy Extended Distance are blocked. The notice of E-mail Alert Function and SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the pair status of the TrueCopy Extended Distance is PAIR or COPY, the pair status changes to PSUE.
- (8) When Power Saving/Power Saving Plus of the priced option is used, if you perform the drive firmware replacement after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host when the array starts.
- Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then perform the drive firmware replacement.
- If the spin-down fails, execute the spin-down again.



## 14.6 Procedure for Replacing the Offline Drive Firmware

### 14.6.1 Replacing Procedure

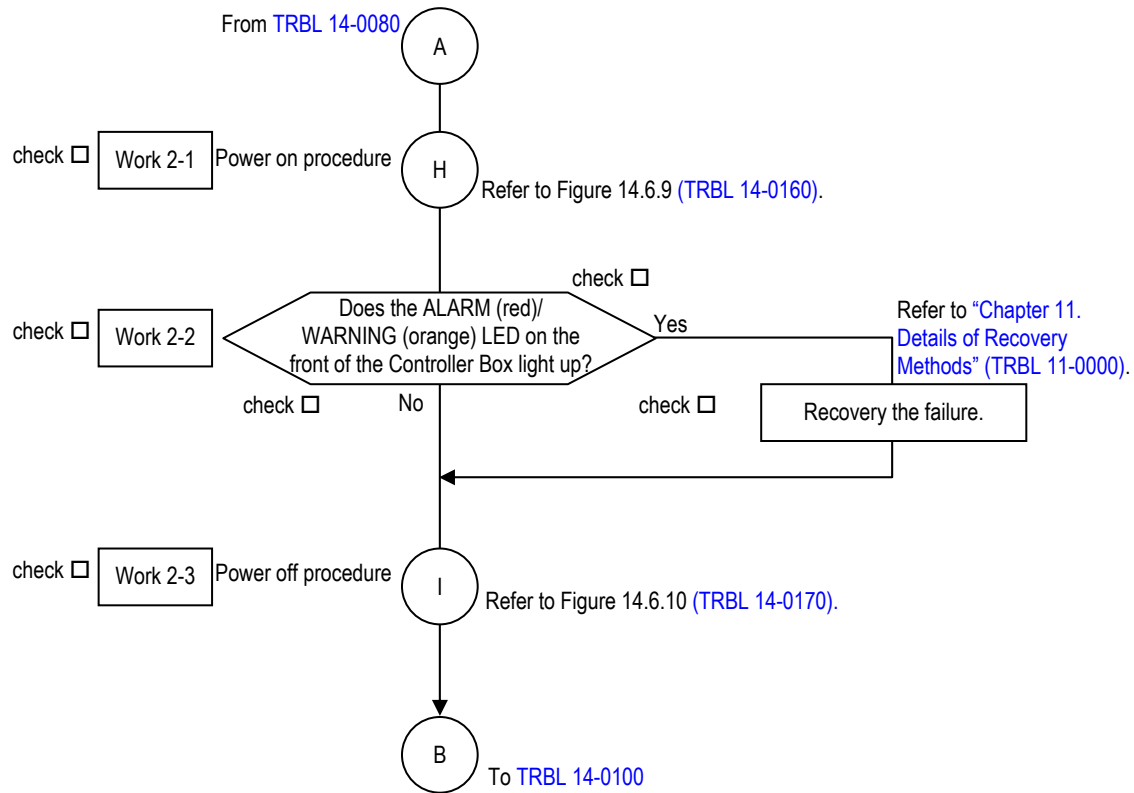
#### (1) Environment setting



\*1 : When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

Figure 14.6.1 Environment Setting

(2) Check of operation (before replacement)



**Figure 14.6.2 Check of Operation (Before Replacement)**

- (3) Replacing the drive firmware (For the detail screens of procedure, refer to the for “14.6.2 Procedure Screen” (TRBL 14-0180).)

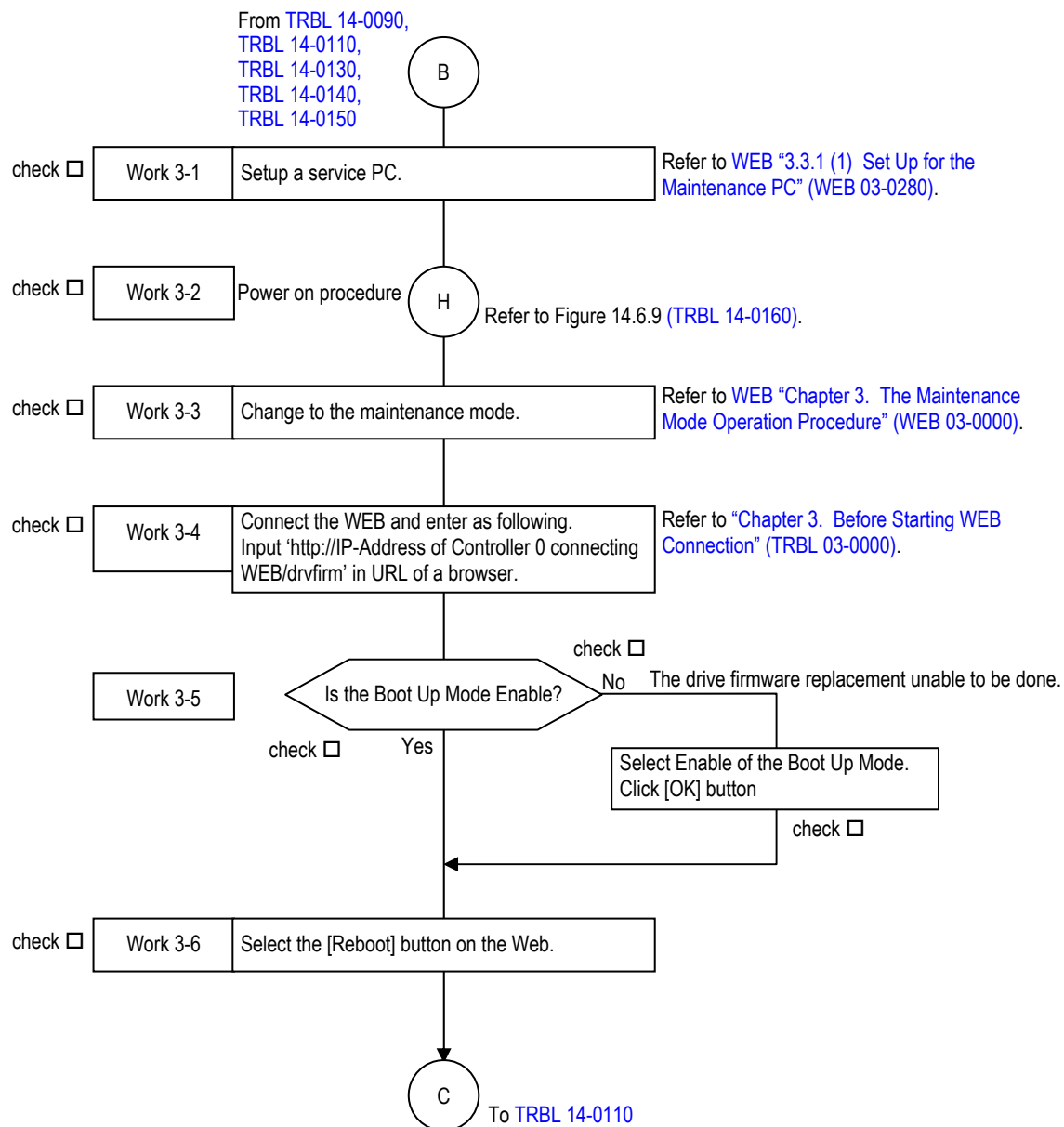


Figure 14.6.3 Replacement the Drive Firmware (1)

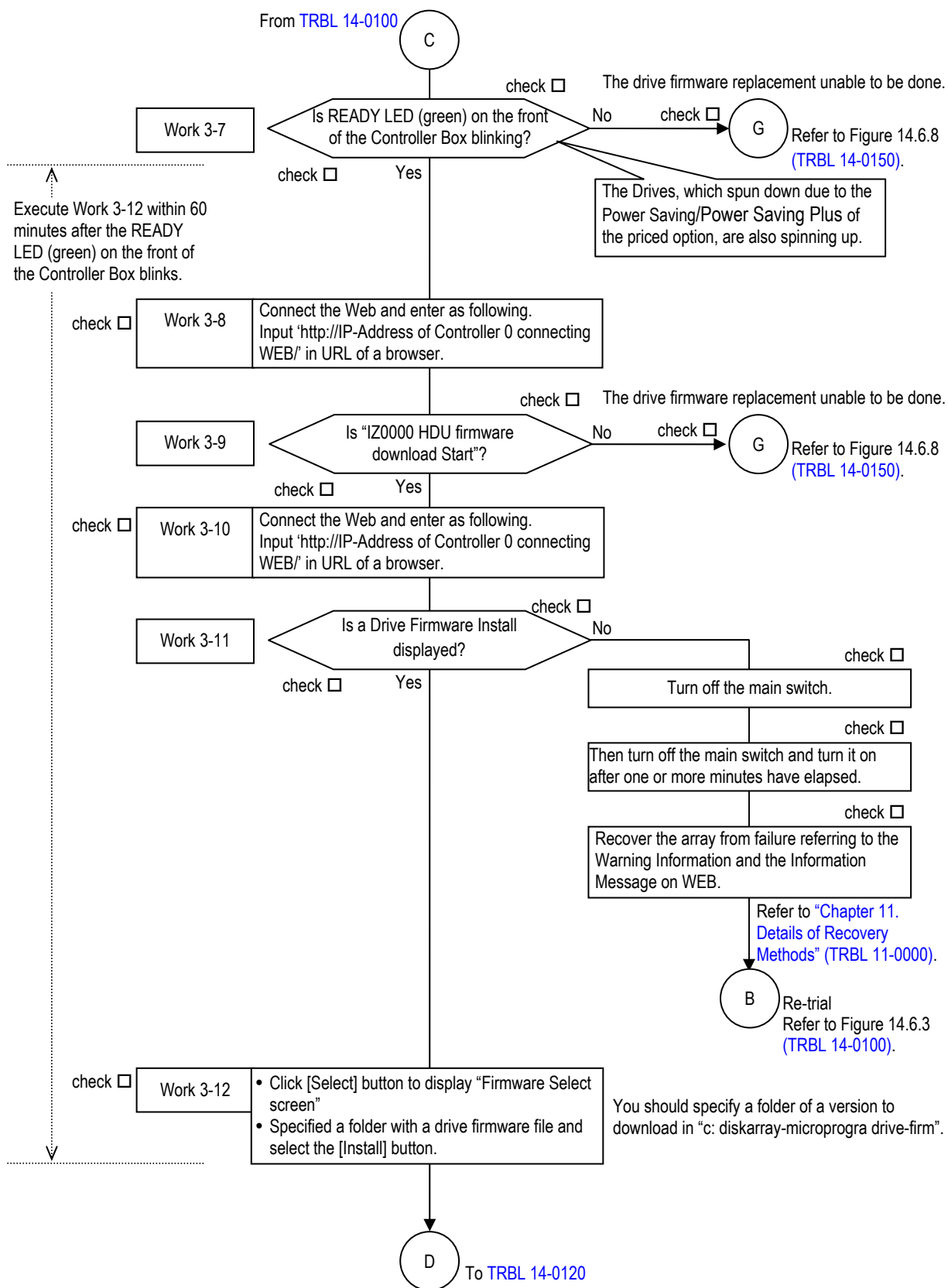


Figure 14.6.4 Replacement the Drive Firmware (2)

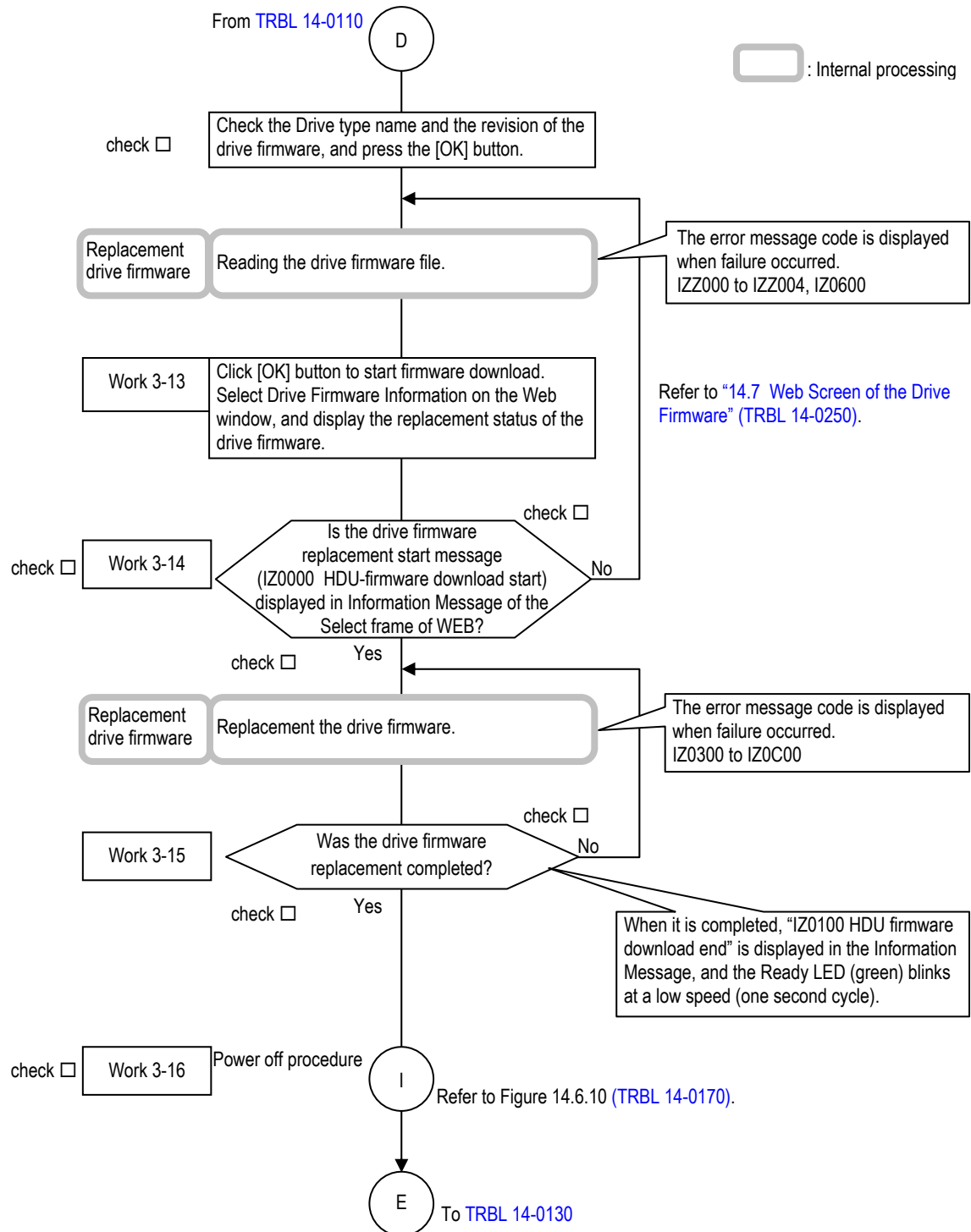


Figure 14.6.5 Replacement the Drive Firmware (3)

## (4) Check of operation (after replacement)

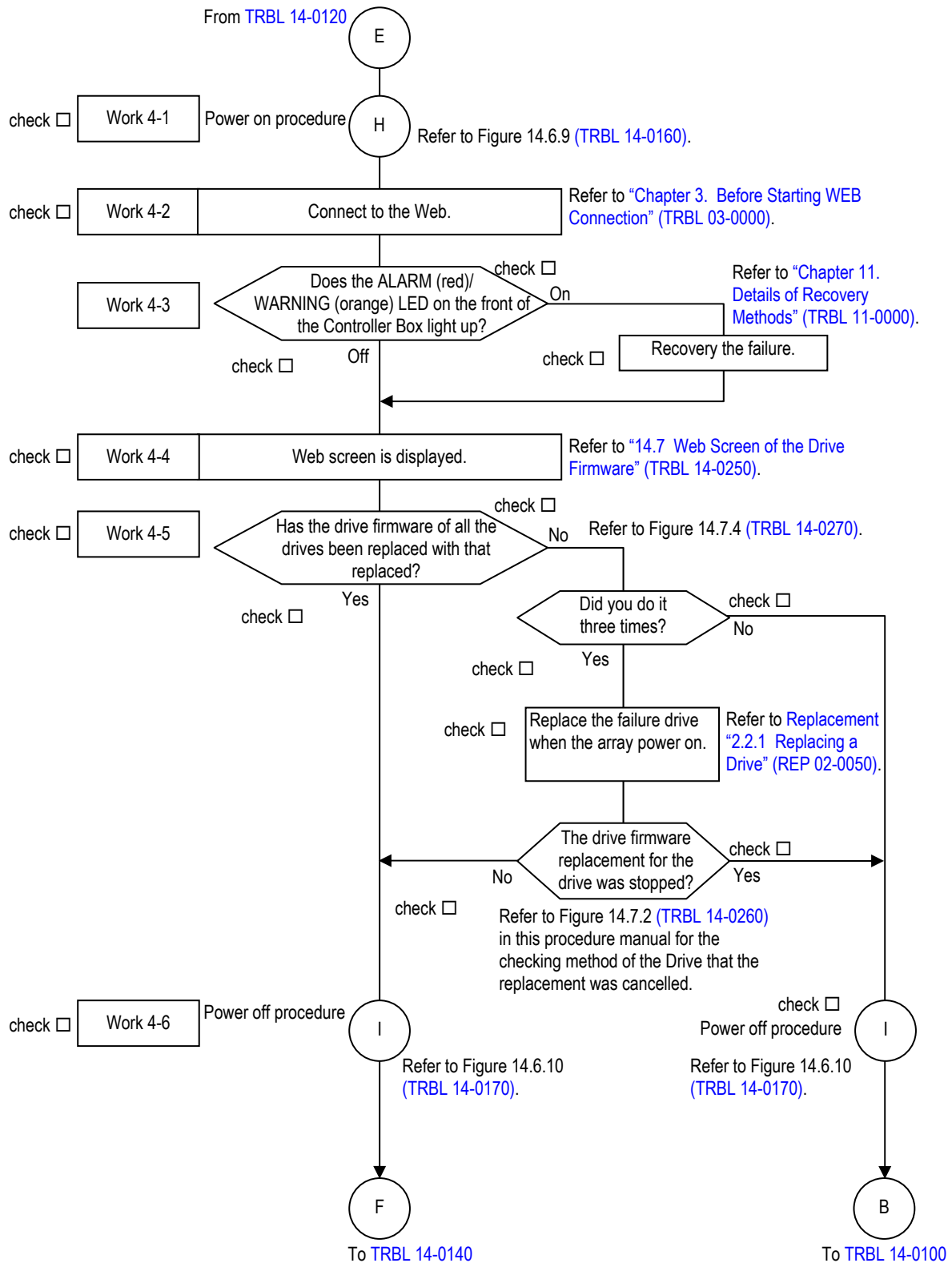
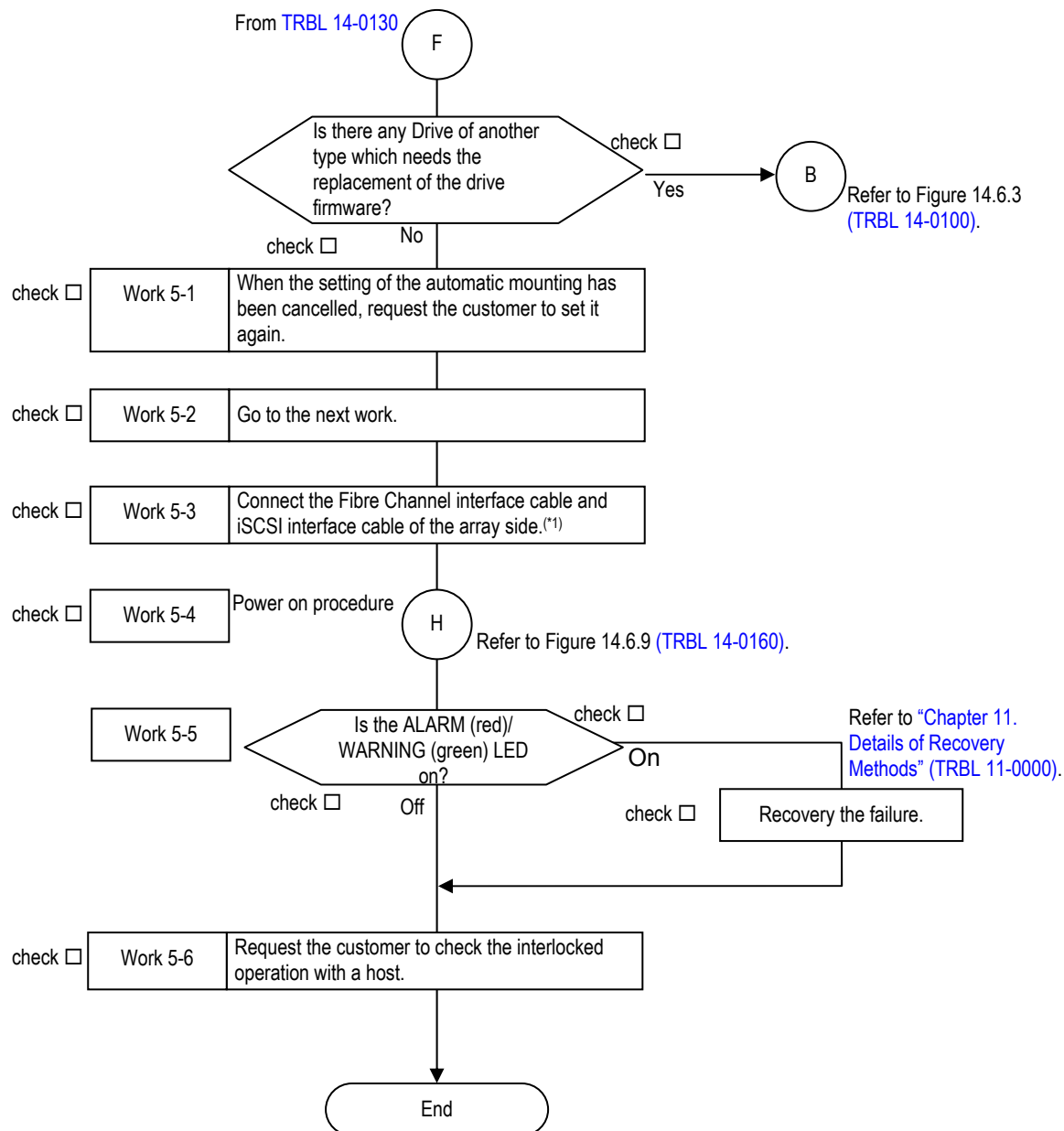


Figure 14.6.6 Check of Operation (After Replacement)

## (5) Recovery environment



\*1 : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.

If the Fibre Channel Interface cables are inserted half in the host connectors, the Controller continues to detect the Fibre Channel failures, and the I/O processing of the Controller may be deteriorated.

**Figure 14.6.7 Recovery Environment**

## (6) Recovery action against an error that makes the drive firmware replacement unable to be done

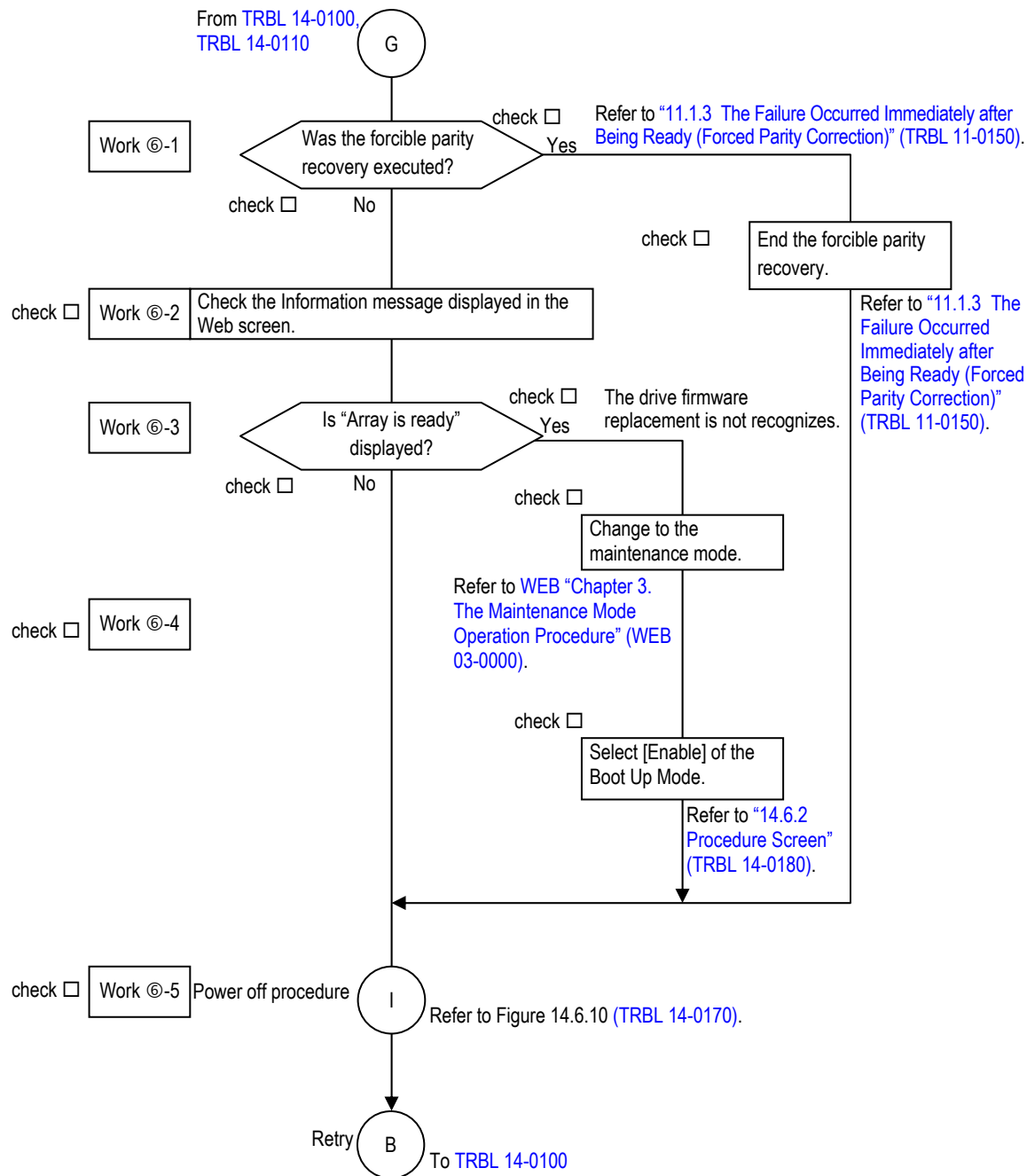
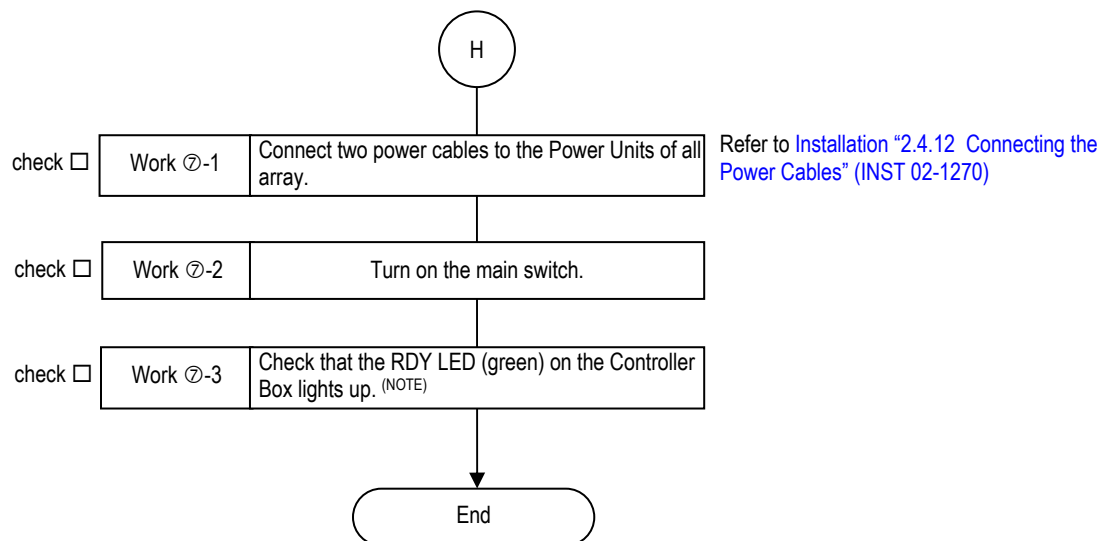


Figure 14.6.8 Recovery Action Against an Error that Makes the Drive Firmware Replacement Unable to be done



(7) Power on procedure



NOTE : When the RDY LED (green) on the front of the Controller Box is blinking at high-speed, the RDY LED (green) on the front of the Controller Box lights up after it blinks for the maximum of 30 to 50 minutes and 40 to 60 minutes for the CBL (80 to 180 minutes when the DBW is connected to the CBL) because the download of the ENC firmware is operating.

Also, when the WARNING LED (orange) on the front of the Controller Box is blinking at high speed, the RDY LED (green) on the front of the Controller Box lights up after the WARNING LED (orange) on the front of the Controller Box blinks at high speed for the maximum of 30 to 85 minutes because the update of the flash program or the automatic download of the ENC firmware and the backup controller firmware at the time of turning the power on is operating in the single controller configuration.

If the ALARM LED (red) on the Controller Box or the WARN LED (orange) on the Controller Box and the Drive Box lights on, refer to Maintenance Manual ["7.1 Trouble Analysis by LED Indication of Front Bezel" \(TRBL 07-0000\)](#).

The Drives, which were spun down due to the Power Saving/Power Saving Plus of the priced option, spin up while the array is starting. When the array becomes the Ready status, the Drives set to the power saving immediately spin down.

Figure 14.6.9 Power On Procedure

## (8) Power off procedure

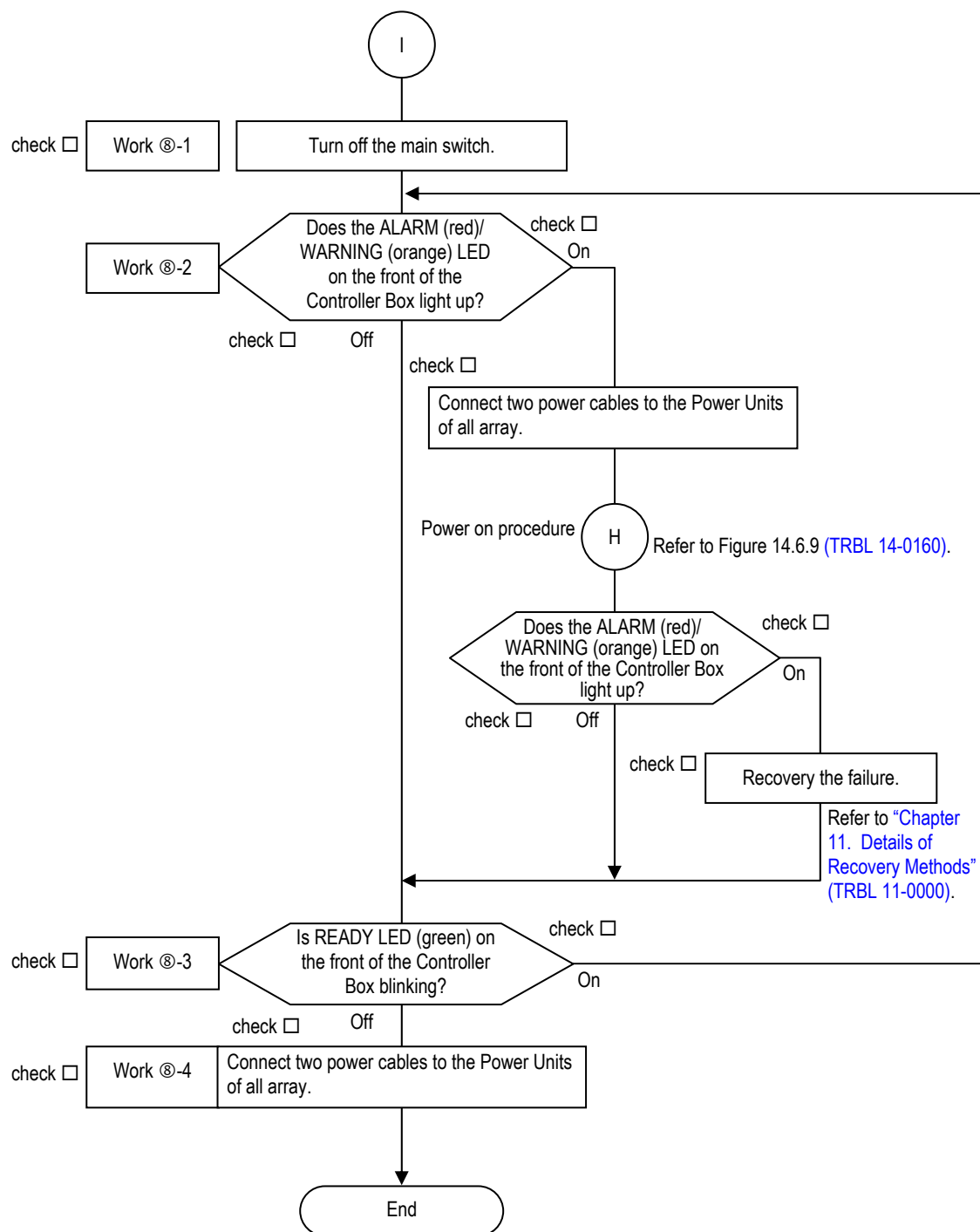


Figure 14.6.10 Power Off Procedure

## 14.6.2 Procedure Screen

- (1) When the drive starts a spin-up, change to the maintenance mode. (Refer to [WEB “Chapter 3. The Maintenance Mode Operation Procedure” \(WEB 03-0000\).](#))
- (2) Input ‘http://IP-Address of Controller 0 connecting WEB/drvfirm’ in URL of a browser. (Refer to [“Chapter 3. Before Starting WEB Connection” \(TRBL 03-0000\).](#))

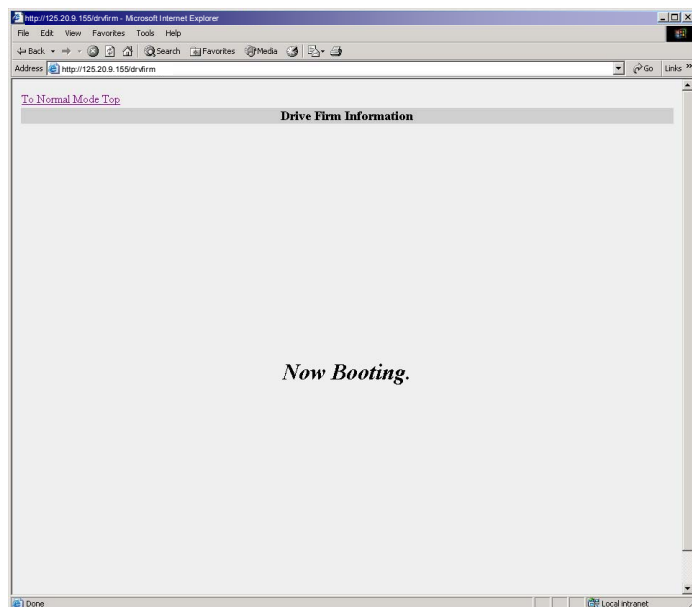


Figure 14.6.11 Booting

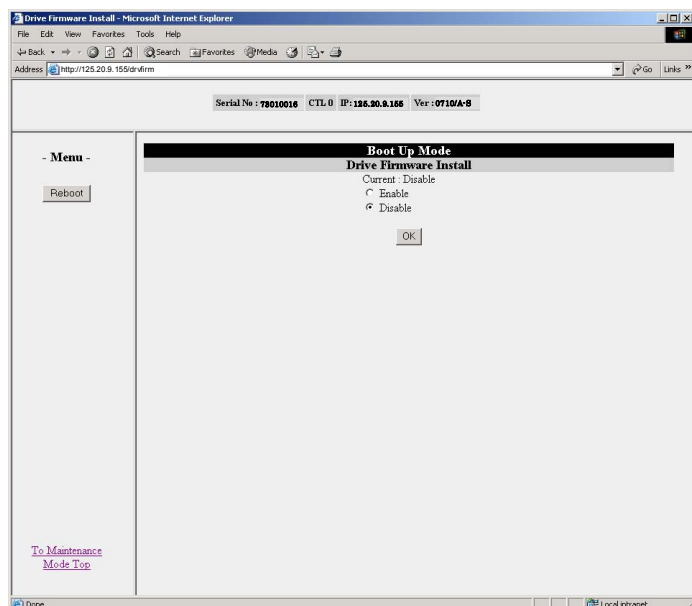


Figure 14.6.12 After Booting (Boot Up Mode)

- (3) When the “Enter Network Password” is displayed, enter [User Name] and [Password] and click the [OK] button.

User Name: maintenance

Password: hosyu9500



Figure 14.6.13 Network Password Screen

- (4) When Figure 14.6.12 is displayed, select [Enable] on the [Boot Up Mode] and click the [OK] button.



Figure 14.6.14 After Booting (Boot Up Mode: Enlargement Figure)

- (5) After select [Enable], click the [Reboot] button.



Figure 14.6.15 Reboot Button (Enlargement Figure of Figure 14.6.12)

- (6) Click the [OK] button on the System Restart screen.

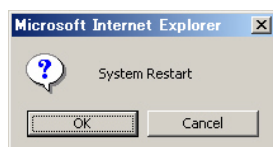


Figure 14.6.16 System Restart Screen



Figure 14.6.17 Rebooting

- (7) If the READY LED <green> on the front of the Controller Box is blinking, input “http://IP-Address of the Controller 0 connecting WEB/” in URL of a browser, and check that the message of “IZ0000 HDU firmware download start” is displayed in Information Message.

NOTE : Execute Work (7) to (11) within 60 minutes after the READY LED (green) blinks.

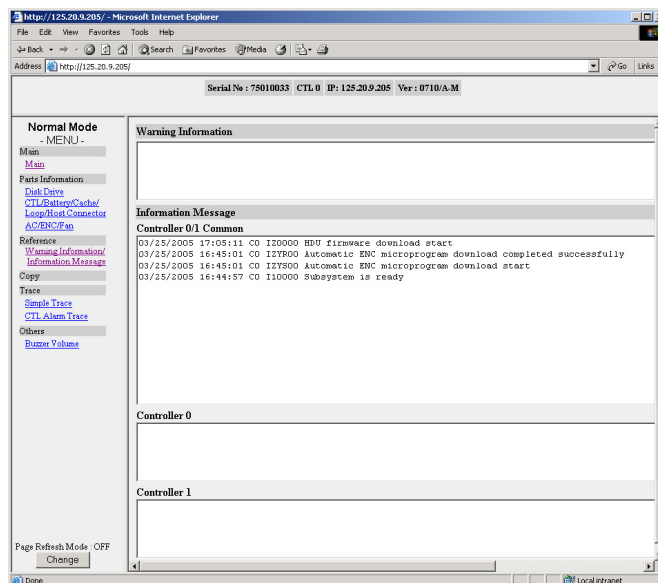


Figure 14.6.18 Web Browser

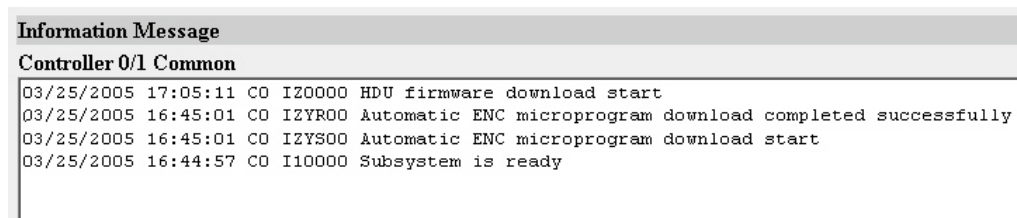


Figure 14.6.19 Web Browser (Information Message)

- (8) Input “http://IP-Address of Controller 0 connecting WEB/drvfirm” in URL of a browser.

When the “Enter Network Password” is displayed, enter [User Name] and [Password] and click the OK button.

The Java applet (Drive Firmware Install) is displayed. Click the [Select] button.

When the following message is displayed, it is necessary to click ActiveX Control with a mouse and to change it into the active status.

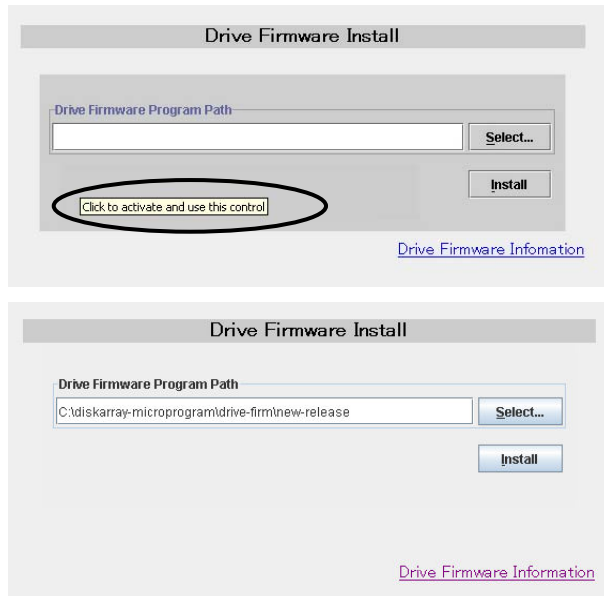


Figure 14.6.20 Java Applet (Drive Firmware Install)

- (9) Specify the folder in which the drive firmware is stored.

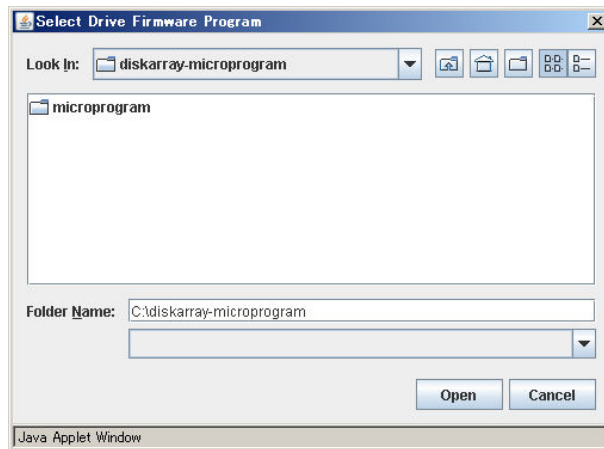


Figure 14.6.21 Firmware Select Screen

- (10) Click the [Install] button on the [Figure 14.6.22](#), a confirmation message is displayed. Click the [OK] button when satisfactory. (Install is started)



Figure 14.6.22 Confirmation Message



Figure 14.6.23 Installing Firmware

- (11) When a file transfer is received normally, since a confirmation screen will be displayed, click the [OK] button.

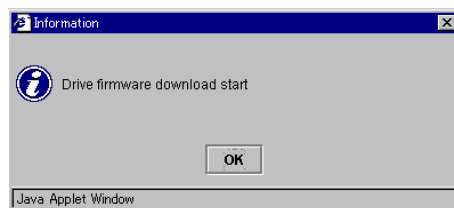
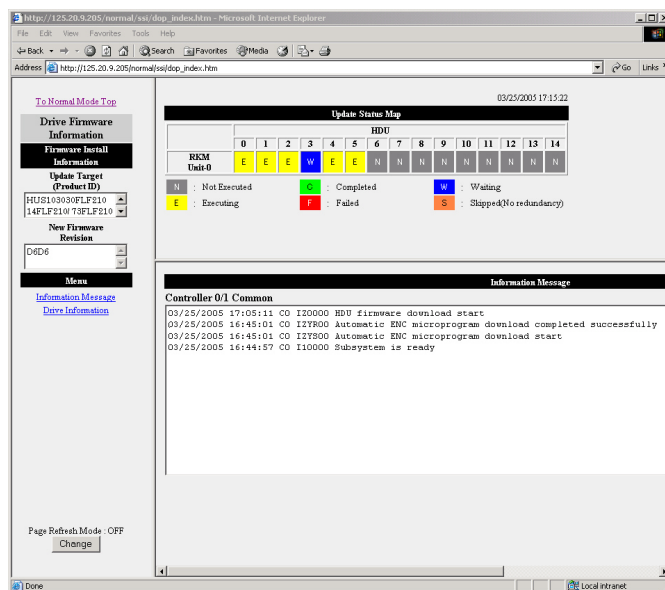


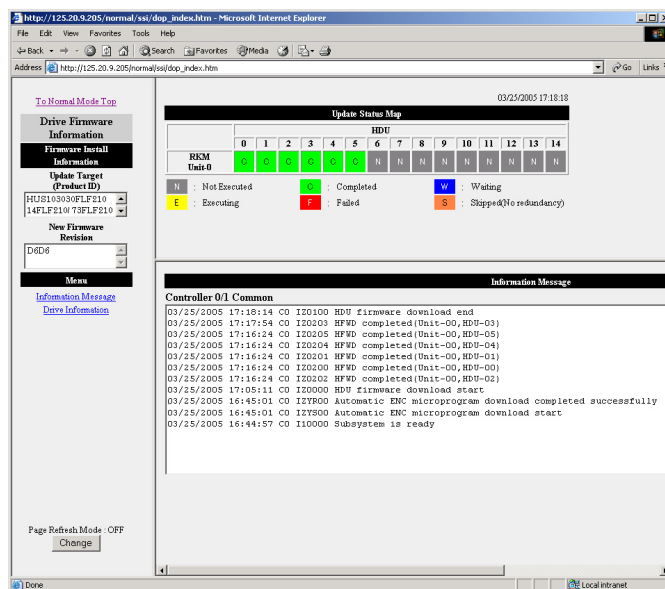
Figure 14.6.24 Confirmation Screen

(12) Click the [Drive Firmware Information]; the replacement state of a drive firmware is displayed.



**Figure 14.6.25 Drive Firm Information (in Progress)**

(13) When the installation in all Drives is completed, after remove the power cables, turn on the power of the array again. (Refer to [Installation “1.5.1 Array Power On” \(INST 01-0230\)](#) for the procedure for turning on the power.)



**Figure 14.6.26 Drive Firm Information (Completed)**



- (14) After the array becomes READY, input 'http://IP-Address of Controller 0 connecting WEB/drvfirm' in URL of a browser.  
Then, select "Drive Information" of the Side frame.  
And, see Revision of Drive Information and check that the drive firmware is replaced.

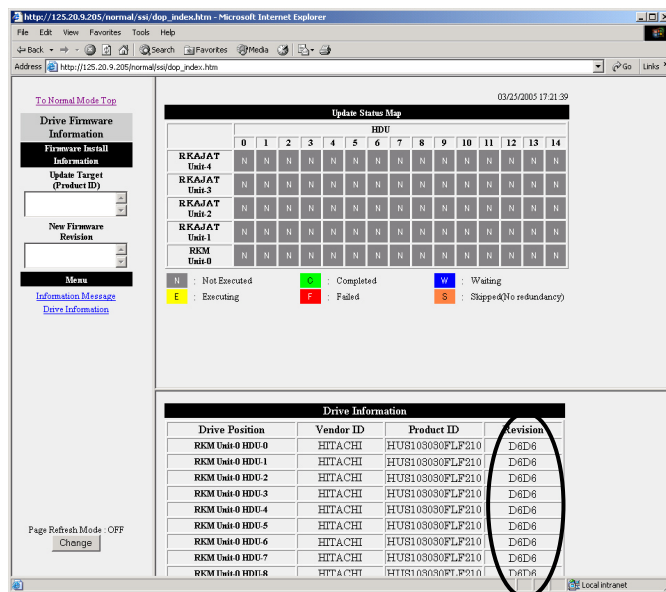


Figure 14.6.27 Completed Drive Firmware Replacement (The Screen of HUS1XX is shown as an example.)

## 14.7 Web Screen of the Drive Firmware

### 14.7.1 URL

Entering the following URL in the Web browser using a PC connected with the array displays the window that shows the drive firmware revision. (It can be displayed even when the drive firmware replacement is not being executed.) (Refer to “Chapter 3. Before Starting WEB Connection” (TRBL 03-0000).)

IP address/drvfirm of the Controller 0 connecting http://WEB

### 14.7.2 Web Screen Image

Image of the Web window, which shows the drive firmware, displayed by means of Internet Explorer is shown below.

When URL is input after the INQUIRY information on the Drive is decided, the window of Figure 14.7.1 is displayed.

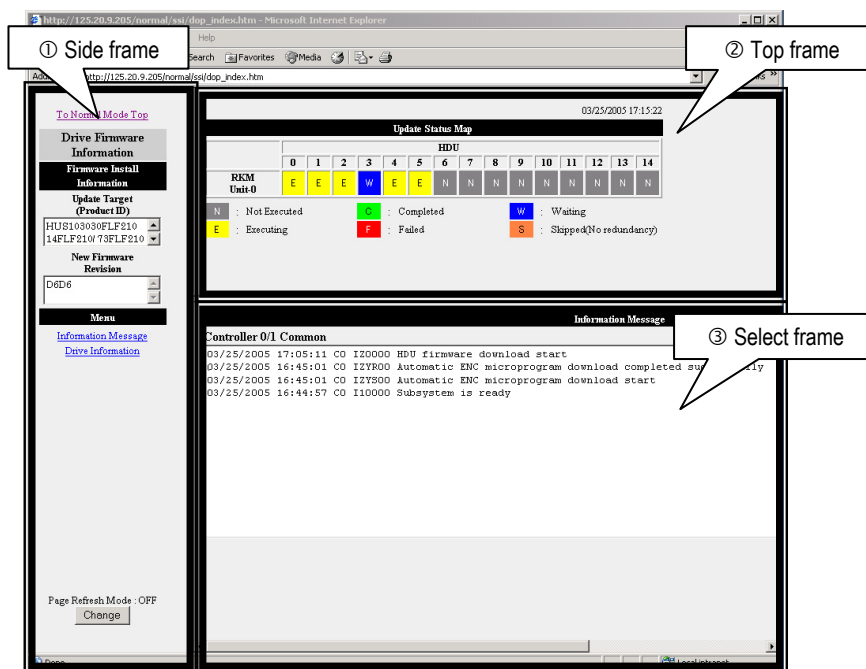


Figure 14.7.1 Status of Drive Firm Revision Screen (1)

## (1) Detail of Side Frame and Top Frame

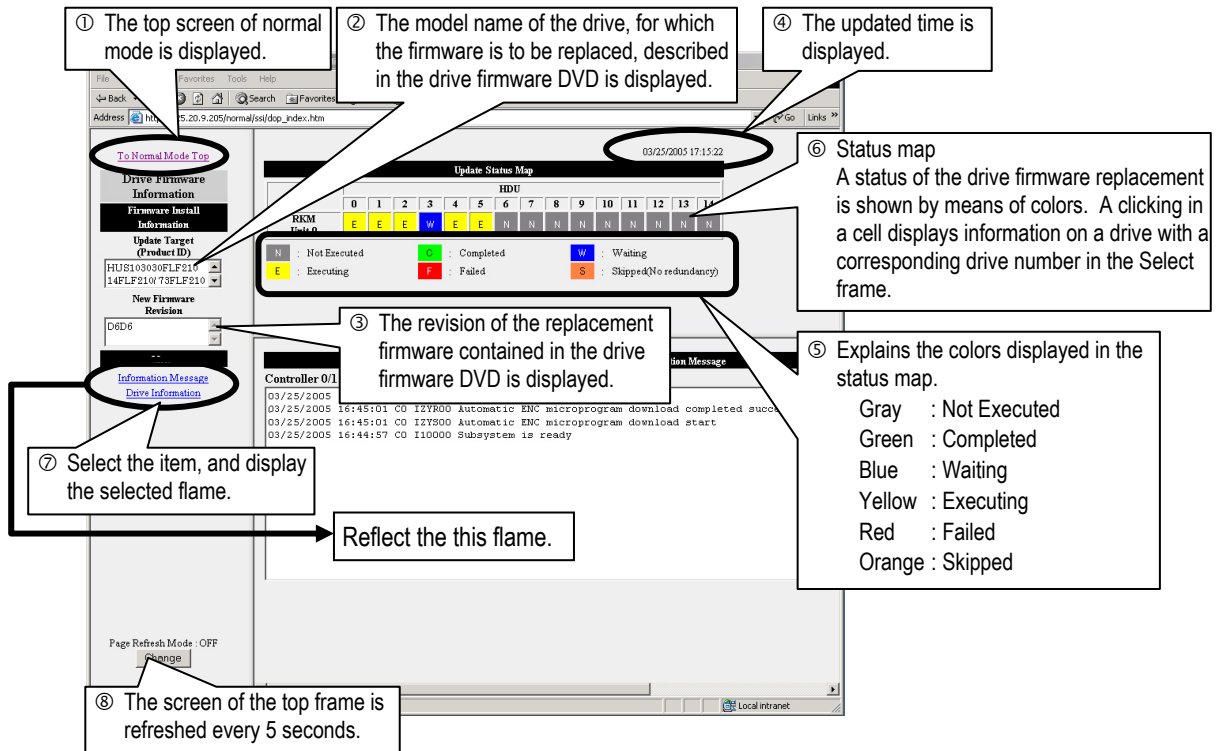


Figure 14.7.2 Status of Drive Firm Revision Screen (2)

## (2) Detail of Select Frame

Details of Side Frame and Top Frame are shown in [Figure 14.7.3](#) and [Figure 14.7.4](#).

You can select the following two patterns.

The Select frame window display when selecting the Information Message item of the Side frame is shown in [Figure 14.7.3](#).

Information Message			
Controller 0/1 Common			
03/18/2005	14:14:18	C0 IZ0000	HDU firmware download start
03/18/2005	14:09:31	C0 IZYR00	Automatic ENC firmware download completed successfully
03/18/2005	14:09:31	C0 IZYS00	Automatic ENC firmware download started :MANUAL
03/18/2005	14:09:26	C0 I10000	I10000 Array is ready [The firmware version *****]

Display the common message of Information Message in normal mode.

Figure 14.7.3 Status of Drive Firm Revision Screen (3)

The Select frame window display when selecting the Drive Information item of the Side frame is shown in [Figure 14.7.4](#).

Drive Information			
Drive Position	Vendor ID	Product ID	Revision
RKM Unit-0 HDU-0	HITACHI	HUS103030FLF210	D6D6
RKM Unit-0 HDU-1	HITACHI	HUS103030FLF210	D6D6
RKM Unit-0 HDU-2	HITACHI	HUS103030FLF210	D6D6
RKM Unit-0 HDU-3	HITACHI	HUS103030FLF210	D6D6
RKM Unit-0 HDU-4	HITACHI	HUS103030FLF210	D6D6
RKM Unit-0 HDU-5	HITACHI	HUS103030FLF210	D6D6
RKM Unit-0 HDU-6	HITACHI	HUS103030FLF210	D6D6
RKM Unit-0 HDU-7	HITACHI	HUS103030FLF210	D6D6
RKM Unit-0 HDU-8	HITACHI	HUS103030FLF210	D6D6

① The drive number is displayed.

② The vender ID is displayed.

③ The product ID is displayed.

④ The drive firmware revision is displayed.

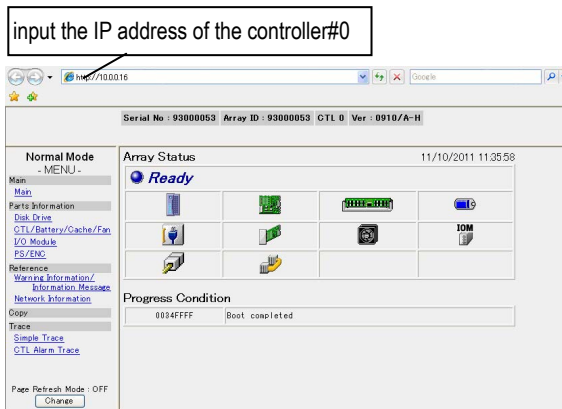
Figure 14.7.4 Status of Drive Firm Revision Screen (4)

## 14.8 Method of Checking the Drive Firmware Revision

There are three kinds of revision check methods of a drive firmware.

### 14.8.1 The Check Method by WEB Connection

- (1) Connect the Controller #0 side to the network and input the IP address of the Controller #0 as “address” of the WEB browser.



- (2) Input “drivefirm” following an IP address. (Drive farm revision state screen is displayed.)  
http://IP Address /drvfirm

Click drive information of Menu

Explains the colors displayed in the status map.

- Gray : Not Executed
- Green : Completed
- Blue : Waiting
- Yellow : Executing
- Red : Failed
- Orange : Skipped

(3) Click “Drive Information” of Menu. (The model name of a mounted drive and firm revision are displayed.)

① The drive number is displayed.

② The vender ID is displayed.

③ The product ID is displayed.

④ The drive firmware revision is displayed.

Drive Information				
Drive Position	Vendor ID	Product ID	Firmware Revision	
			Drive	Interposer Card
DBS Unit-0 HDU-0	SEAGATE	DKS5D-J900SS	6F04	Not available
DBS Unit-0 HDU-1	SEAGATE	DKS5D-J900SS	6F04	Not available
DBS Unit-0 HDU-2	SEAGATE	DKS5D-J900SS	6F04	Not available
DBS Unit-0 HDU-3	SEAGATE	DKS5D-J900SS	6F04	Not available
DBS Unit-0 HDU-4	SEAGATE	DKS5D-J900SS	6F04	Not available
DBS Unit-0 HDU-5	SEAGATE	DKS5D-J900SS	6F04	Not available
DBS Unit-0 HDU-6	SEAGATE	DKS5D-J900SS	6F04	Not available

## 14.8.2 The Check Method by Trace Analysis

Refer to a message worksheet.

① The drive number is displayed.

② The vender ID is displayed.

③ The product ID is displayed.

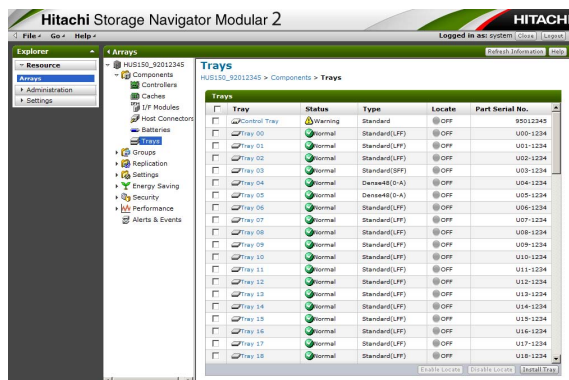
④ The drive firmware revision is displayed.

Message worksheet.

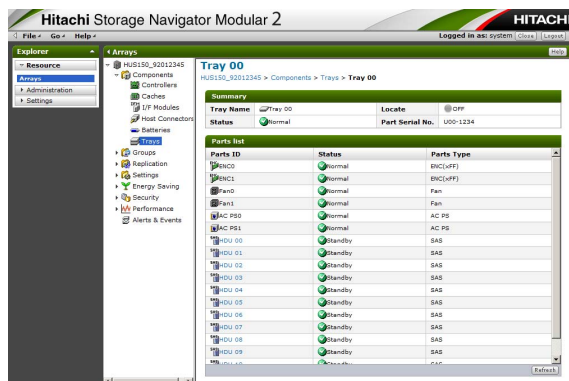
	Drive Type	[HDD] [Unit]	VENDOR	PRODUCT_ID	PR_REV	SERIAL
68	pdevtype.txt	[ 0] [ 0]	HITACHI	HUS151414VLF400	D0B0	JAVH66XK
69	pdevtype.txt	[ 1] [ 0]	HITACHI	HUS151414VLF400	D0B0	JAVL275K
70	pdevtype.txt	[ 2] [ 0]	HITACHI	HUS151414VLF400	D0B0	JAVL26BK
71	pdevtype.txt	[ 3] [ 0]	HITACHI	HUS151414VLF400	D0B0	JAVM04AK
72	pdevtype.txt	[ 4] [ 0]	HITACHI	HUS151414VLF400	D0B0	JAVJ7UMK

### 14.8.3 The Procedure to Check the Drive Firmware Revision Using the Hitachi Storage Navigator Modular 2

(1) Click [Components] - [Trays] on the unit window.



(2) When you click [Tray 00], the tray 00 window is displayed.



(3) When you click [HDU] that you want to check the status, the detailed information of the HDU (Drive) is displayed.

