

Programmable Terminals NA-series

# Practices Guide

## NJ/NX/NA-series


### Backup and Restore IAG

NA5-15□101□

NA5-12□101□

NA5-9□001□

NA5-7□001□




Practices  
Guide

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# Introduction

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Thank you for purchasing an NA-series Programmable Terminal.

This guide contains information that is necessary to use the NJ/NX/NA-series Backup and Restore Intelligent Application Gadgets (hereinafter, referred to as "IAG"). Please read this guide and make sure you understand the functionality and performance of the NA-series Programmable Terminal before you attempt to use it in a control system.

This guide provides specifications of the IAGs. It does not include restrictions on the Programmable Terminal, connected Controllers, other Units, related components, or combination of those.

Make sure to read the user's manual for each product before use.

Keep this guide in a safe place where it will be available for reference during operation.

## Library Features

The NJ/NX/NA-series Backup and Restore IAGs are provided as a library to support the following functions.

- To save user programs and configuration data from NJ/NX-series CPU Units and the NA-series Programmable Terminal. (This is referred to as a backup.)
- To restore the saved data to NJ/NX-series CPU Units and the NA-series Programmable Terminal. (This is referred to as a restore.)

Using these functions allows you to restore the original state of your system in case it becomes unstable after some changes are made.

## Intended Audience

This guide is intended for the following personnel.

They must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of introducing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of installing and maintaining FA systems.
- Personnel in charge of managing FA systems and facilities.

## Applicable Products

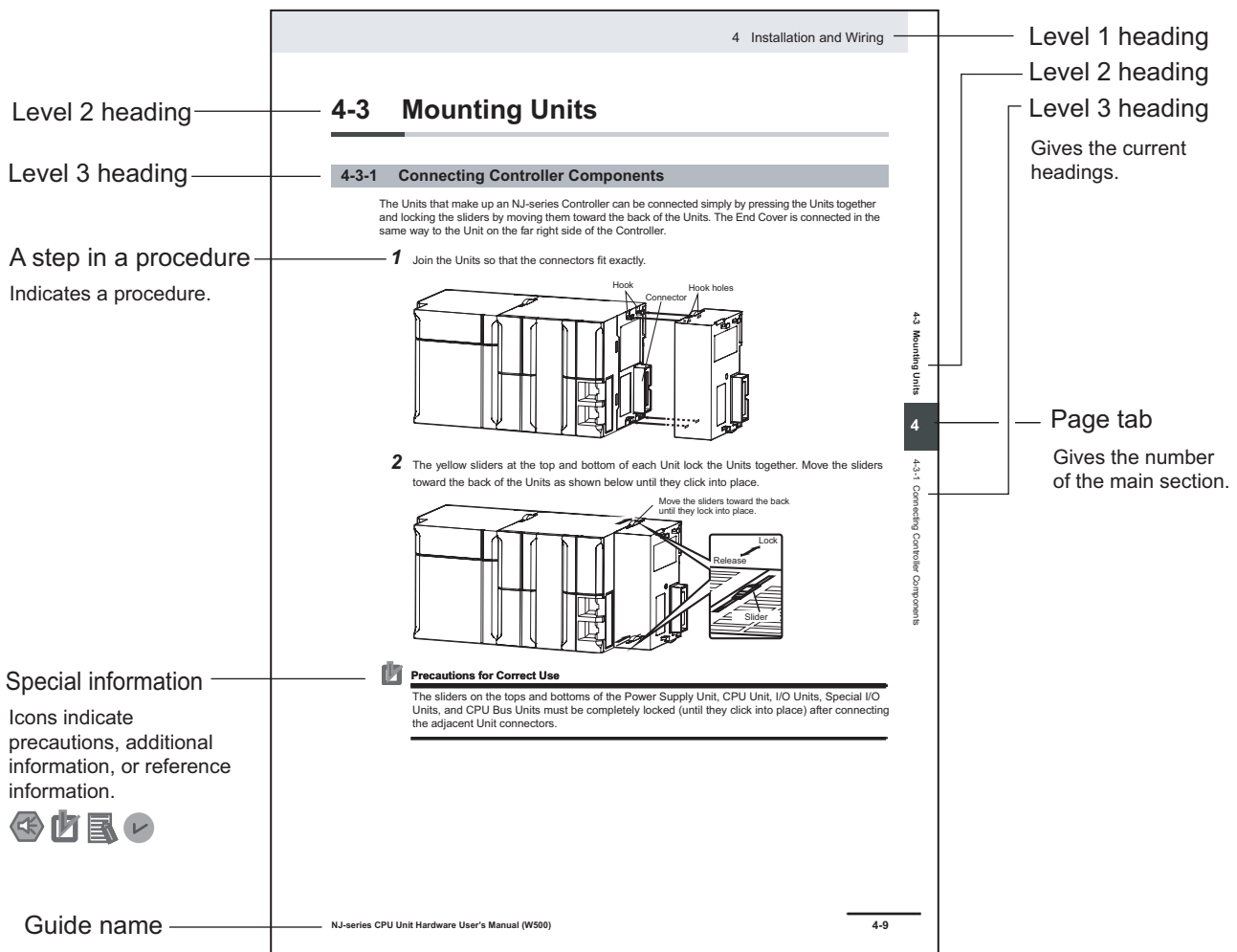
For details on this library and models and versions of relevant NJ/NX-series CPU Units, NX-series Safety Control Units, NA-series Programmable Terminals, and the Sysmac Studio, refer to *2-2 Target Devices and Configuration* on page 2-14.

Part of the specifications of and restrictions on those products are given in other manuals. Refer to *Related Manuals* on page 16.

# Guide Structure

## Page Structure

The following page structure is used in this guide.



**Note** This illustration is provided only as a sample. It may not literally appear in this guide.

## Special Information

Special information in this guide is classified as follows:



### Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.



### Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.



### **Additional Information**

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Additional information to read as required.

This information is provided to increase understanding and make operation easier.



### **Version Information**

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Information on differences in specifications and functionality with different versions is given.



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## Warranty, Limitations of Liability

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# Safety Precautions

## Definition of Precautionary Information





The following notation is used in this guide to provide precautions required to ensure safe usage of this library on the NA-series Programmable Terminals.

The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.

The following notation is used.

 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.
 <b>Caution</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

## Symbols

	The circle and slash symbol indicates operations that you must not do. The specific operation is shown in the circle and explained in text. This example indicates prohibiting disassembly.
	The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a precaution for electric shock.
	The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a general precaution.
	The filled circle symbol indicates operations that you must do. The specific operation is shown in the circle and explained in text. This example shows a general precaution for something that you must do.

## Cautions

### **Caution**

Read all related manuals carefully before you use this library.



Start actual system application only after sufficiently checking project, subroutine and the operation of the program at the connected device side.



---

You must confirm that the user program and parameter values are appropriate for the specifications and operation of the devices.



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This library and its relevant guides are assumed to be used by personnel that is given in *Intended Audience* on page 1 in this guide. If you are not *Intended Audience* on page 1 or did not receive training from such personnel, do not use them.



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You cannot back up, restore, or compare some or all of the settings for certain slaves and Units. Also, you cannot back up, restore, or compare data for disabled slaves or Units. After you restore data, sufficiently confirm that operation is correct before you start actual operation.



---

If any of the following conditions is met, clear the absolute encoder home offsets from the list of data items to restore, and then restore the data. Then, define the absolute encoder home again. If you do not define home, unintended operation of the controlled system may occur.



- a. The Servomotor or Servo Drive was changed after the data was backed up.
  - b. The absolute encoder was set up after the data was backed up.
  - c. The absolute data for the absolute encoder was lost.
-

# Precautions for Safe Use

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## Operation

- In the user program, make sure to restrict access to IAGs so that only users who understand the configurations of the target devices can execute the backup and restore operation.
- Before you restore data, make sure that the data is appropriate for the target device configuration and operation.
- Do not power OFF or turn off communications for the Controllers, EtherCAT slaves, Programmable Terminal, or any other devices while IAGs are executing a backup, restore or data comparison for them.
- You need to prepare peripheral devices that are necessary for the IAG operation in advance. Do not remove the peripheral devices until the IAG operation completes.



# Precautions for Correct Use

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## Using the Library

- Do not use the same IAG in one project more than twice.
- Do not delete or hide objects contained in the IAGs.

# Related Manuals

Manual name	Man. No.	Model numbers	Application	Description
NX-series CPU Unit Hardware User's Manual	W535	NX701-□□□□	Learning the basic specifications of the NX701 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NX701 system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>
NX-series NX102 CPU Unit Hardware User's Manual	W593	NX102-□□□□	Learning the basic specifications of the NX102 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NX102 system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>
NX-series NX1P2 CPU Unit Hardware User's Manual	W578	NX1P2-□□□□	Learning the basic specifications of the NX1P2 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NX1P2 system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>

Manual name	Man. No.	Model numbers	Application	Description
NJ-series CPU Unit Hardware User's Manual	W500	NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Learning the basic specifications of the NJ-series CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NJ-series system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>
NJ/NX-series CPU Unit Software User's Manual	W501	NX701-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Learning how to program and set up an NJ/NX-series CPU Unit. Mainly software information is provided.	The following information is provided on a Controller built with an NJ/NX-series CPU Unit. <ul style="list-style-type: none"> <li>• CPU Unit operation</li> <li>• CPU Unit features</li> <li>• Initial settings</li> <li>• Programming based on IEC 61131-3 language specifications</li> </ul>
NX-series Safety Control Unit User's Manual	Z930	NX-SL□□□□ NX-SI□□□□ NX-SO□□□□	Learning how to use NX-series Safety Control Units.	Describes the hardware, setup methods, and functions of the NX-series Safety Control Units.
Sysmac Studio Version 1 Operation Manual	W504	SYSMAC -SE2□□□□	Learning about the operating procedures and functions of the Sysmac Studio.	Describes the operating procedures of the Sysmac Studio.
NA-series Programmable Terminal User's Manual User's Manual	V117	NA5-□W□□□□	Learning the specifications and settings required to install an NA-series Programmable Terminals and connect peripheral devices.	Information is provided on NA-series Programmable Terminal specifications, part names, installation procedures, and procedures to connect an NA Unit to peripheral devices. Information is also provided on maintenance after operation and troubleshooting.
NA-series Programmable Terminal Software User's Manual	V118	NA5-□W□□□□	Learning about NA-series PT pages and object functions.	Describes the pages and object functions of the NA-series Programmable Terminals.

Manual name	Man. No.	Model numbers	Application	Description
NA-series Programmable Terminal User's Manual Device Connection	V119	NA5-□W□□□□	Learning about the specifications required to connect devices to an NA-series PT.	Describes how to connect an NA-series Programmable Terminal to Controllers and make necessary settings.

# Catalog Revision History

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A catalog revision code appears as a suffix to the catalog number on the front and back covers of the guide.

<b>Cat. No.</b>	<b>V127-E1-01</b>
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↑ Revision code

Revision code	Date	Revised content
01	April 2020	Original production





# 1

## Using IAGs

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This section describes how to register IAGs in a project and how to use them in the project.

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<b>1-1</b>	<b>Registering IAGs and Using IAGs for Projects .....</b>	<b>1-2</b>
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# 1-1 Registering IAGs and Using IAGs for Projects

Unzip the provided file on your computer and save the IAG collection (with the .iag extension).

To use the IAGs, you need to register the IAGs in the Toolbox of your Sysmac Studio. After the registration, you can drag and drop them to a page for use, just like other objects.

For details on the basic functions of the IAGs, refer to the section related to the IAGs in the *NA-series Programmable Terminal Software User's Manual (V118)*.



## Version Information

You need the Sysmac Studio version 1.31 or higher to use the NJ/NX/NA-series Backup and Restore IAGs.

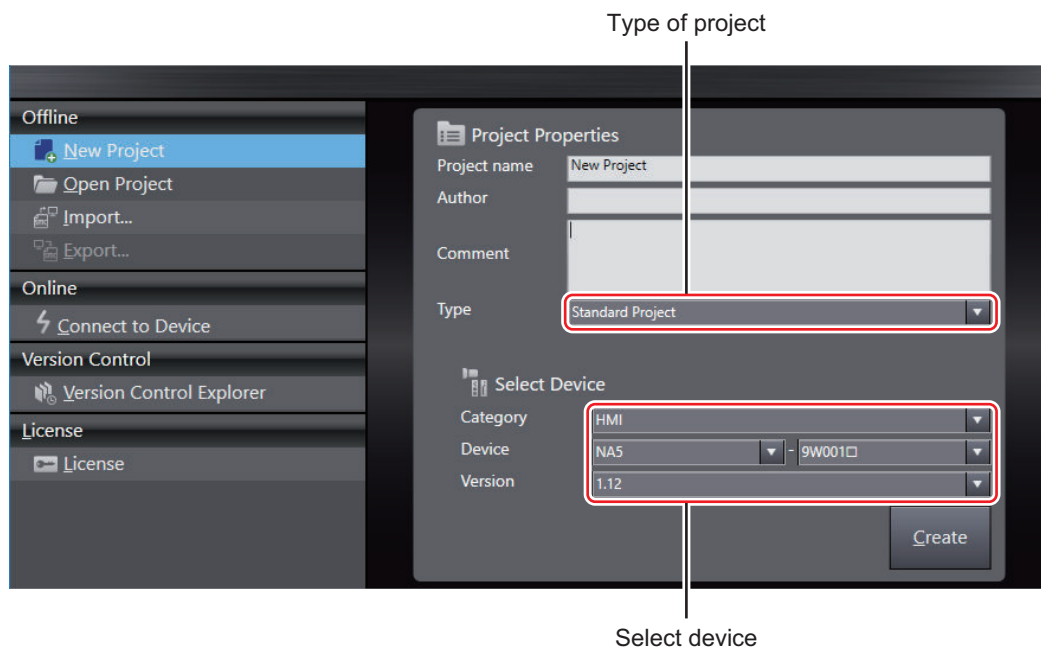


## Additional Information

IAGs serve as a software library, with which you can distribute functions created by combining objects and subroutines provided by the NA-series Programmable Terminal. IAGs are distributed as an IAG collection (with the .iag extension). One IAG collection contains one or more IAGs related to a specific function.

### 1-1-1 Registering IAGs

- 1 Start the Sysmac Studio. Open a project that uses IAGs or create a new project.





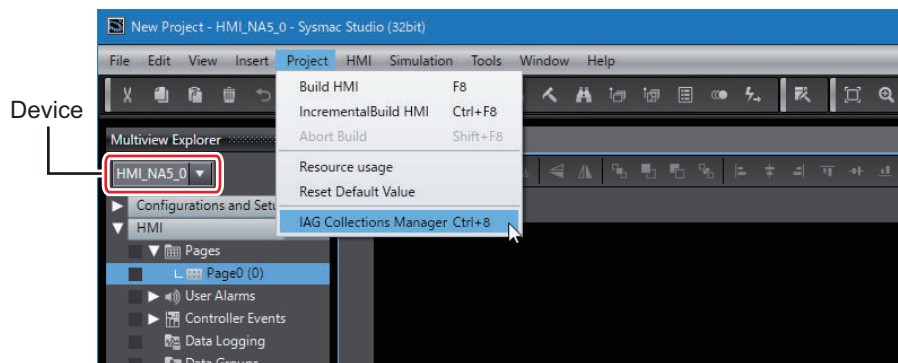


### Precautions for Correct Use

If you create a new project, be sure to configure the following settings for using the IAG.

- Type of project: Select **Standard Project**
- Device category: Select **HMI**
- Device version: Select **1.12 or higher**

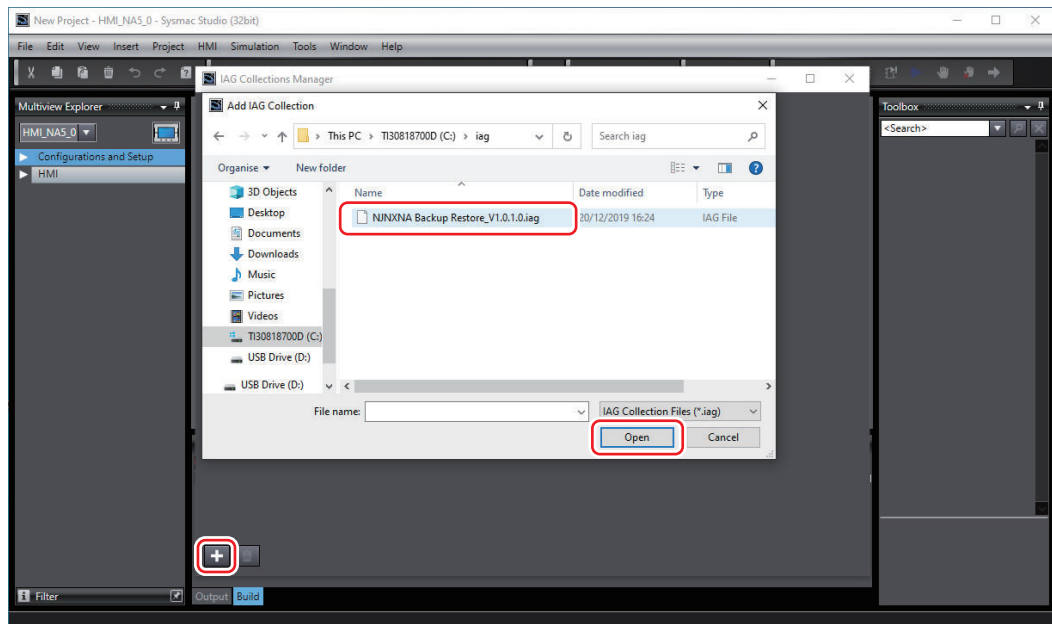
2 From the menu, select **Project - IAG Collections Manager**.



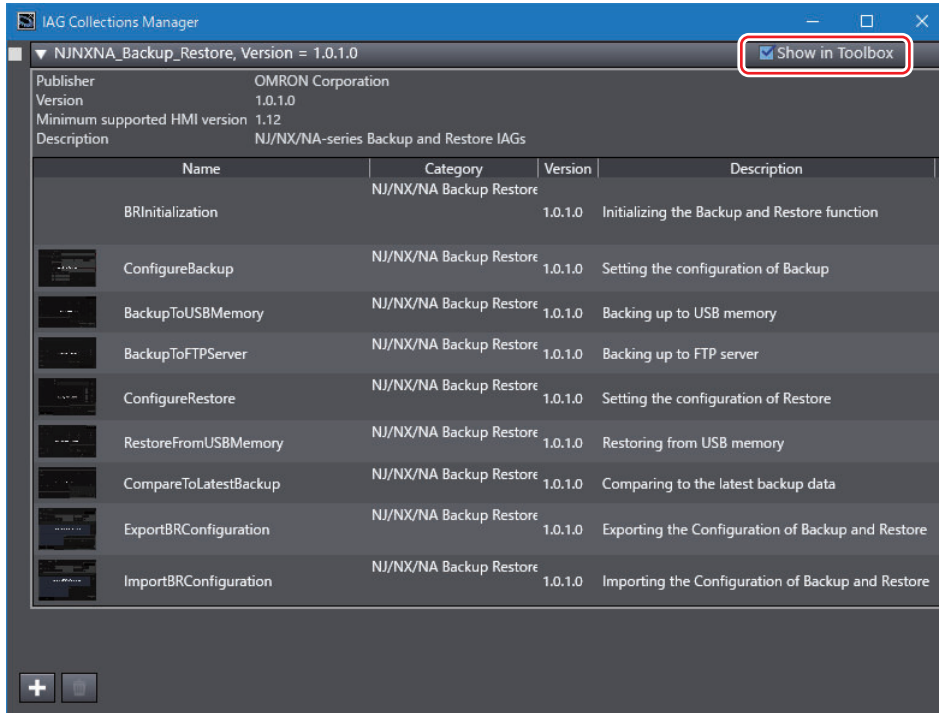
### Precautions for Correct Use

If you have multiple devices registered in the project, make sure that the selected device is the NA-series Programmable Terminal. If no NA-series Programmable Terminal is selected, the menu for the **IAG Collections Manager** does not appear.

3 Click the **+** button. Select the IAG collection (with the extension .iag) and click **Open**.

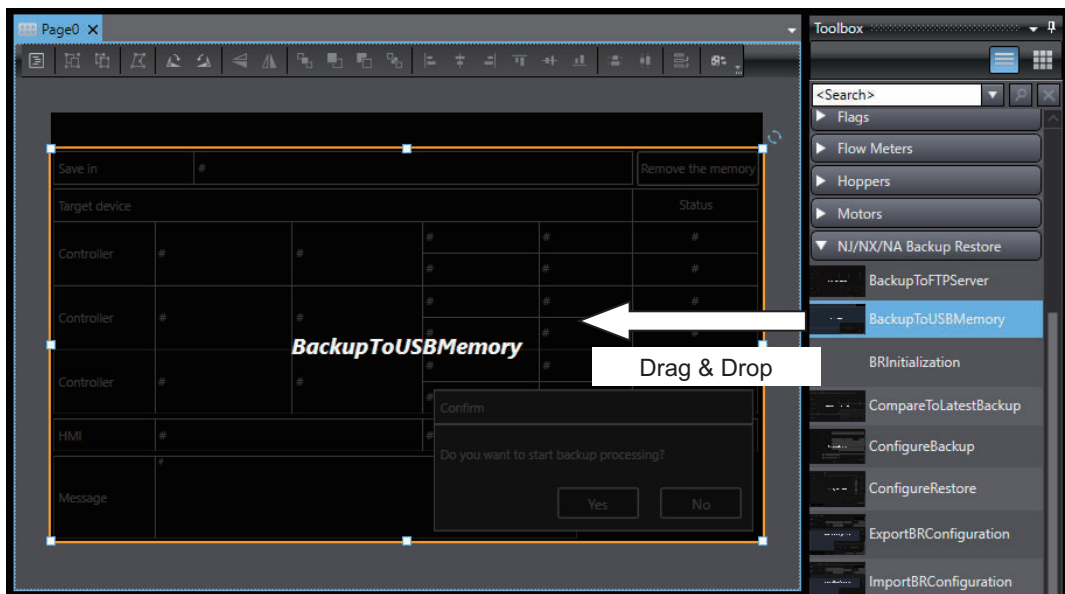


4 Check the **Show in Toolbox** checkbox of the IAG collection you want to display in the Toolbox.



The Toolbox displays the IAGs.

- 5 Select an IAG from the Toolbox and drag & drop it onto the page editor.





### Precautions for Correct Use

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- Each IAG supports a specific version of NA-series Programmable Terminal. If you specify an older version of the Programmable Terminal for a standard project than that supported by an IAG, you cannot use the IAG for the project. Refer to *A-2 IAG Versions* on page A-4 for the relationship between the IAG and device versions.
  - You can use the IAGs only on user-created pages of a standard project. You cannot use them on the IAG project pages.
  - Depending on the individual specifications of the IAG objects, the location and the number of IAG objects you can use may be limited. Refer to *Section 3 Individual Specifications of Each IAG* on page 3-1.
-



# 2

## Common Specifications of IAG

This section describes the common specifications of the NJ/NX/NA-series Backup and Restore IAGs.

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## 2-1 Function

NJ/NX/NA-series Backup and Restore IAGs (hereinafter, "IAGs" unless otherwise noted) function on a NA-series Programmable Terminal as software components to back up, restore and compare data of Controllers and the NA-series Programmable Terminal.



### Additional Information

- To back up, restore or compare the data of a NJ/NX-series CPU Unit, IAGs use the SD Memory Card backup function of the CPU Unit. And therefore, the scope of those operations with IAGs depends on the SD Memory Card backup function capability. For details on the SD Memory Card backup function, refer to the *NJ/NX-series CPU Unit Software User's Manual (Cat. No. W501)*.
- For a backup of an NX-series Safety Control Unit, IAGs back up the Safety Unit restore file in the SD Memory Card in the connected NX-series CPU Unit. Therefore, you need to store the Safety Unit restore file in the SD Memory Card in advance. Refer to the *NX-series Safety Control Unit User's Manual (Cat. No. Z930)* for details.

### 2-1-1 Backup

You can use IAGs to back up programs and settings of NJ/NX-series CPU Units, as well as those of the NA-series Programmable Terminal. You can also back up the Safety Unit restore file in the SD Memory Card in the NX-series CPU Unit or NX-series Communication Control Unit, either of which is connected to an NX-series Safety Control Unit.

In addition, you can specify a save-in location of the backup data and how to start a backup using the IAG.

### Selecting a Backup Start Method

You can select a backup start method from any of the following:

- Manually execute a backup by using the BackupToUSBMemory or BackupToFTPServer button
- Use ConfigureBackup to perform scheduled backup on a regular basis



### Additional Information

The scheduled backup can be executed when the storage location for the backup result is set to an FTP server.

### Selecting Storage Location for Backup Result

You can select a storage location for the backup result from the following two locations:

- USB flash drive inserted to the NA-series Programmable Terminal
- FTP server accessible by the NA-series Programmable Terminal



### Additional Information

If you select an FTP server as the storage location, you can configure the backup settings to save only device data that has been changed since the last backup.

## Behavior of Each Device and Data Flow

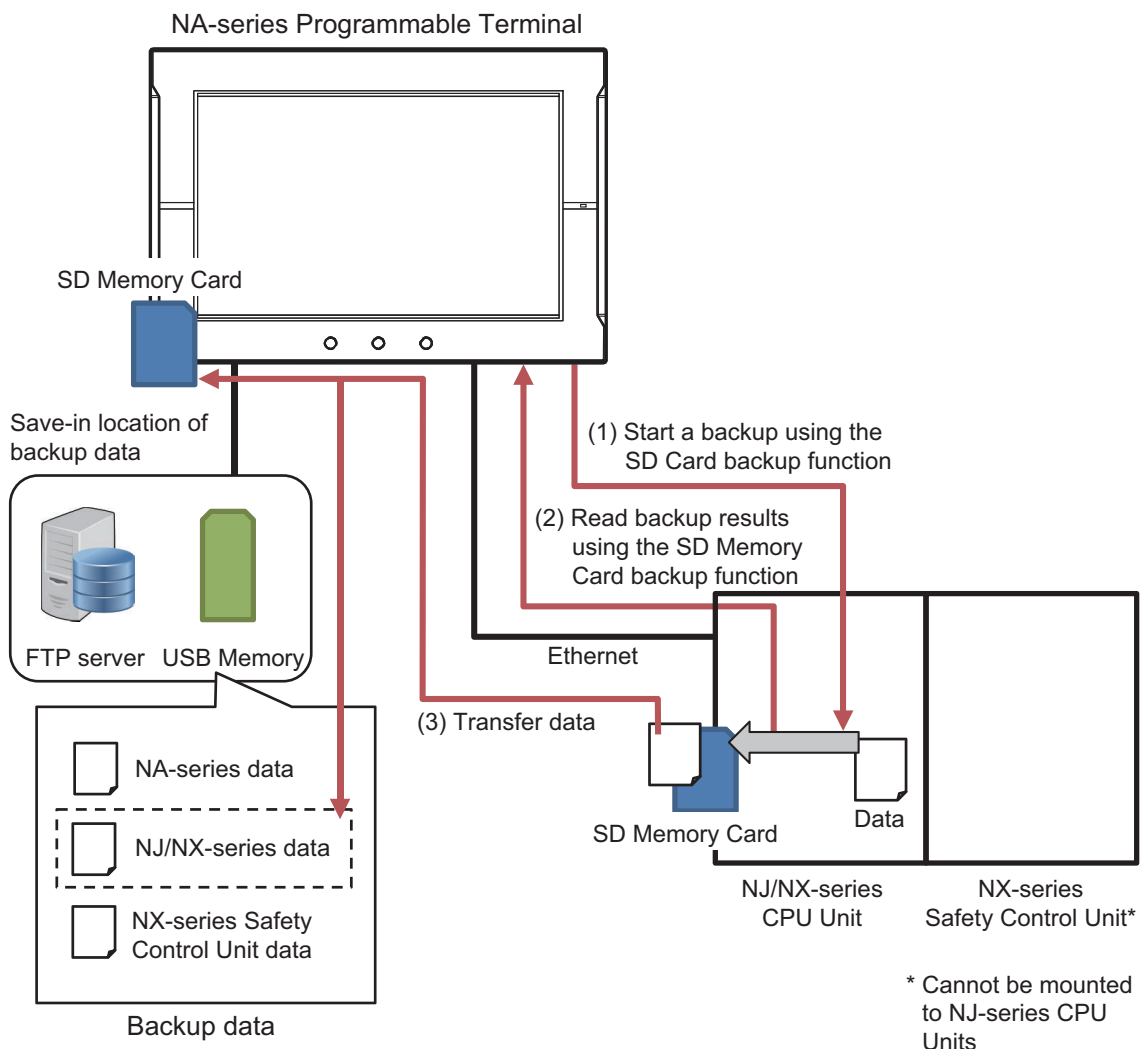
As shown in the figure below, IAGs execute a backup by using each device's function, and each device collects the backup data.

If you configure the backup settings to save only device data that has been changed from the last backup, the IAGs execute a back up only after performing a comparison for each device. For details on the comparison, refer to *2-1-3 Comparison* on page 2-10.

### ● Executing Backup of NJ/NX-series CPU Units

IAGs execute a backup by using the SD Memory Card backup function of the NJ/NX-series CPU Unit.

The IAGs read out data from the SD Memory Card in the NJ/NX-series CPU Unit and write it to the specified save-in location. Simultaneously, they also write the data to the SD Memory Card in the NA-series Programmable Terminal and save as the latest backup data.

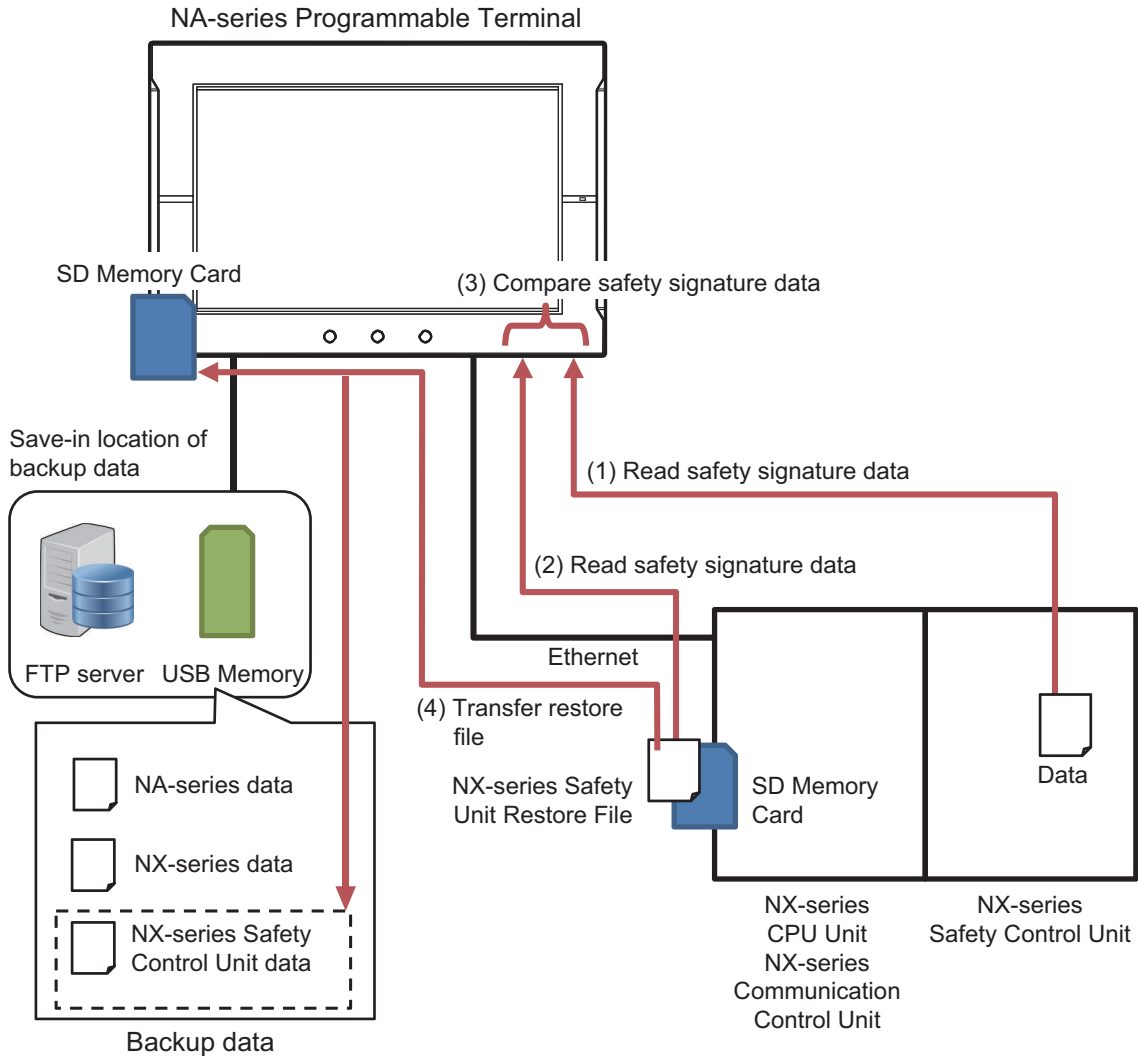


● **Executing Backup of NX-series Safety Control Units**

IAGs read out the Safety Unit restore file in the SD Memory Card inserted to the NJ/NX-series CPU Unit and verify the safety signature information.

The IAGs also read out the safety signature of the validated program in the NX-series Safety Control Unit.

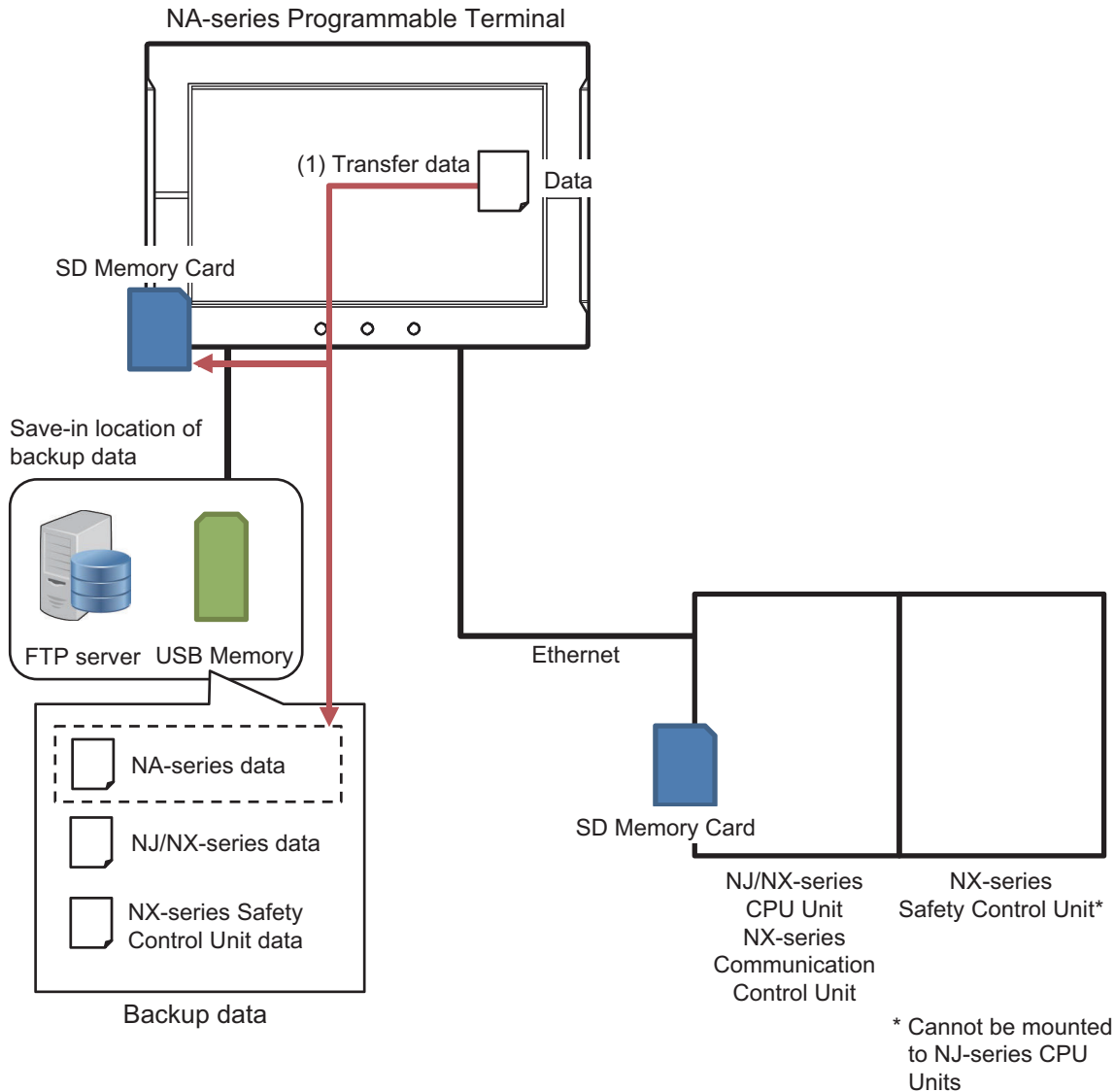
After comparing the two safety signatures, the IAGs aborts the backup if they find the two signatures are different. If the comparison shows they match, the IAGs read out the Safety Unit restore file and write the data into the specified save-in location. Simultaneously, they also write the data to the SD Memory Card in the NA-series Programmable Terminal and save as the latest backup data.





## ● Executing Backup of NA-series Programmable Terminal

IAGs write the HMI project downloaded to the NA-series Programmable Terminal to the specified save-in location. Simultaneously, they also write the data to the SD Memory Card in the NA-series Programmable Terminal and save as the latest backup data.



## 2-1-2 Restore

You can restore devices with their backup data you saved using IAGs. To restore a device, you need its backup data saved in the USB flash drive on the NA-series Programmable Terminal, or its latest backup data saved in the SD Memory Card.

You cannot read the data directly from the FTP server to use it for the restore. You can start a restore only by pressing the IAG button.



### Precautions for Correct Use

---

- After IAGs execute a restore, some changes may be made in the settings of related devices, causing a communications failure between the NA-series Programmable Terminal and the NJ/NX-series CPU Units. In this case, the restore completion result from the IAGs cannot be acknowledged, and therefore the restore result is indicated as a failure. However, even though this occurs, the target NJ/NX-series CPU Units are successfully restored with the backup data.
  - You cannot use IAGs to restore NX-series Safety Control Units. You need to use the Safety Unit restore function for such restore. For details, refer to relevant sections in the *NX-series Safety Control Unit User's Manual (Cat. No. Z930)*.
-

## Behavior of Each Device and Data Flow

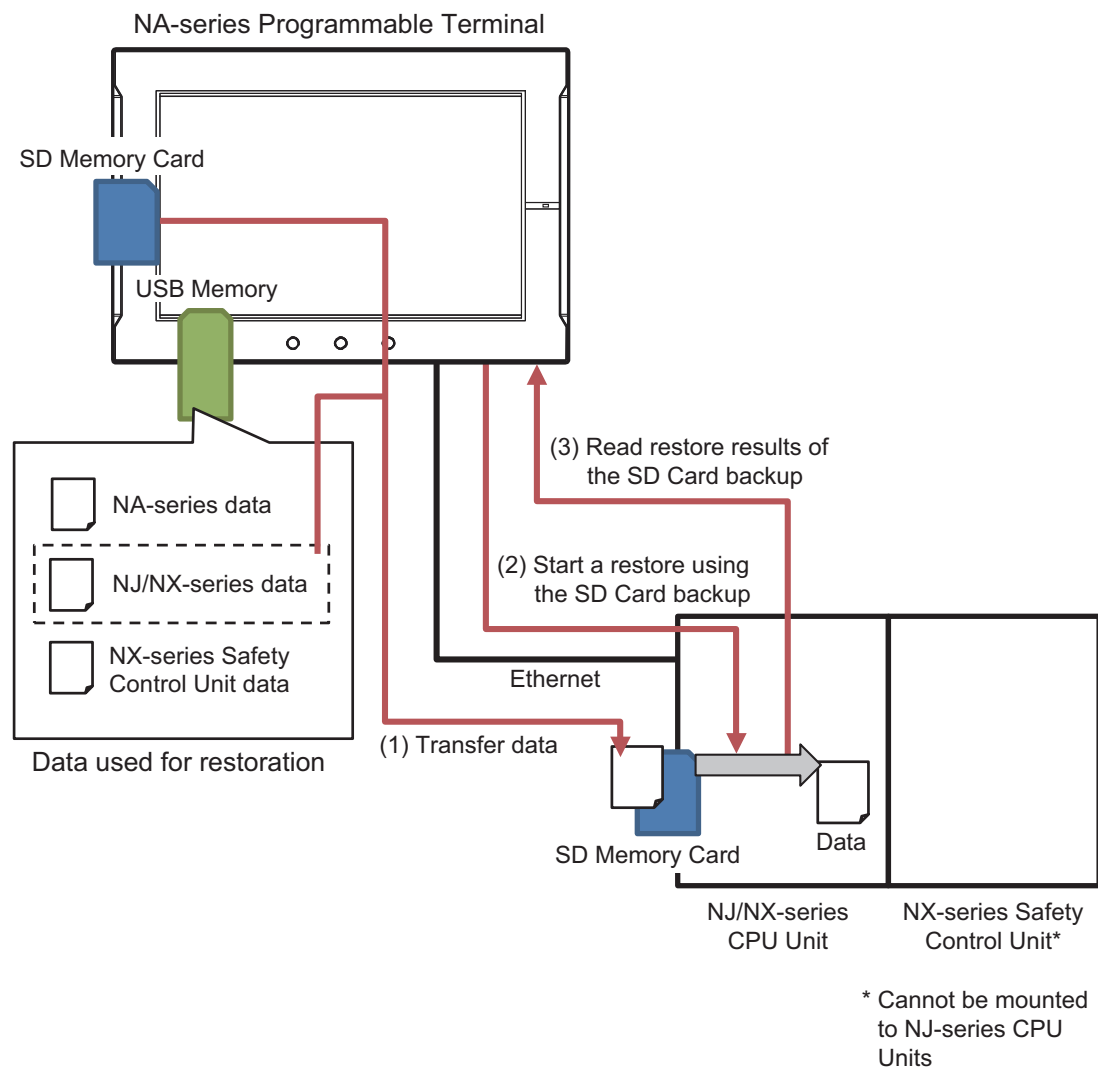
IAGs write data to each device and execute a restore by using each device's function as shown in the figure below.

### ● Executing Restore of NJ/NX-series CPU Units

The IAGs read out data of the NJ/NX-series CPU Unit from the USB flash drive or the latest backup in the SD Memory Card on the NA-series Programmable Terminal, and then write it to the SD Memory Card in the NJ/NX-series CPU Unit.

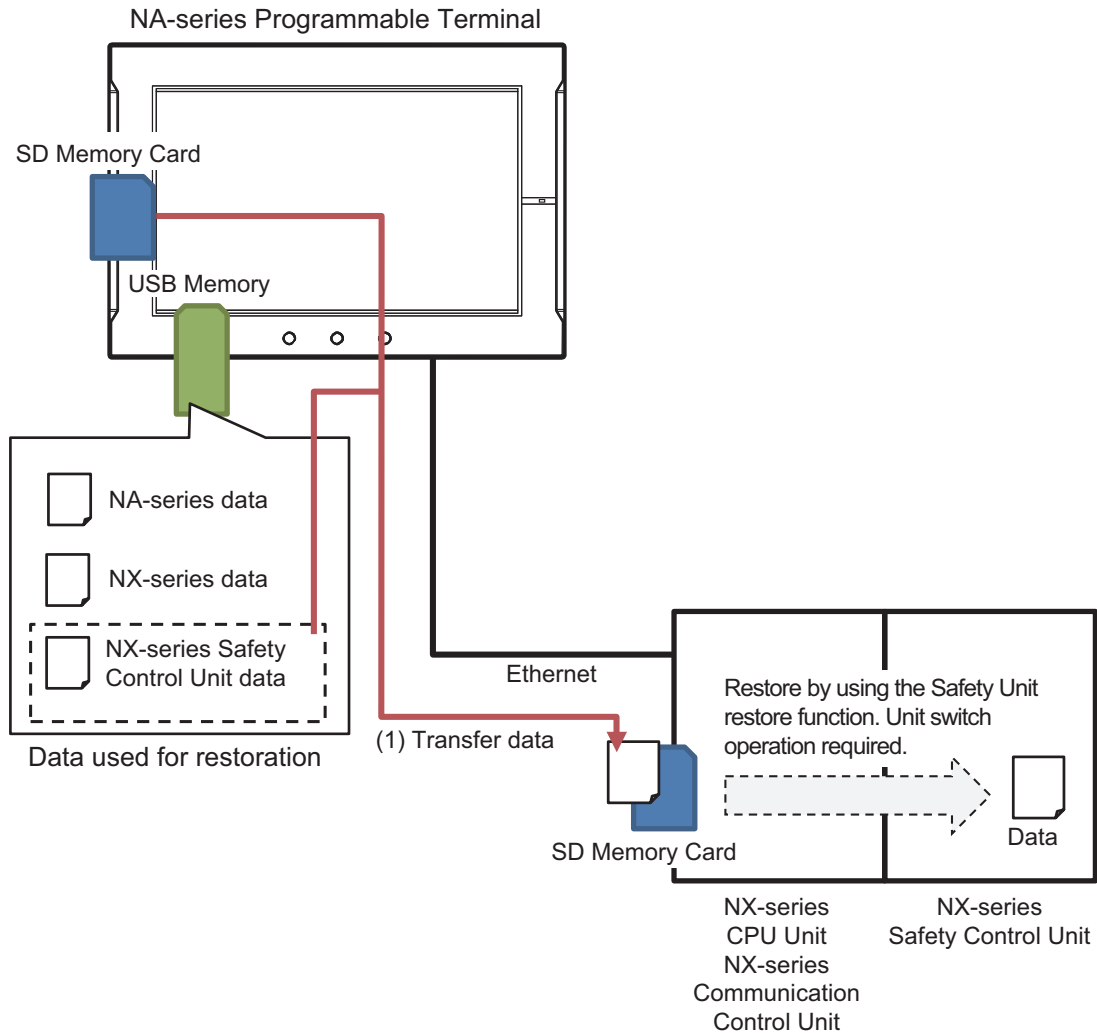
They execute a restore by using the SD Memory Card backup function of the NJ/NX-series CPU Unit.

After restoring the NJ/NX-series CPU Unit successfully by using the IAG, cycle the power supply to the Controller and all of the EtherCAT slaves. For details, refer to the restore section of the SD Memory Card backup function in the *NJ/NX-series CPU Unit Software User's Manual (Cat. No. W501)*.



● **Executing Restore of NX-series Safety Control Units**

IAGs read out the Safety Unit restore file of the NX-series Safety Control Unit from the USB flash drive or the latest backup in the SD Memory Card on the NA-series Programmable Terminal, and then write it to the SD Memory Card in the NJ/NX-series CPU Unit.

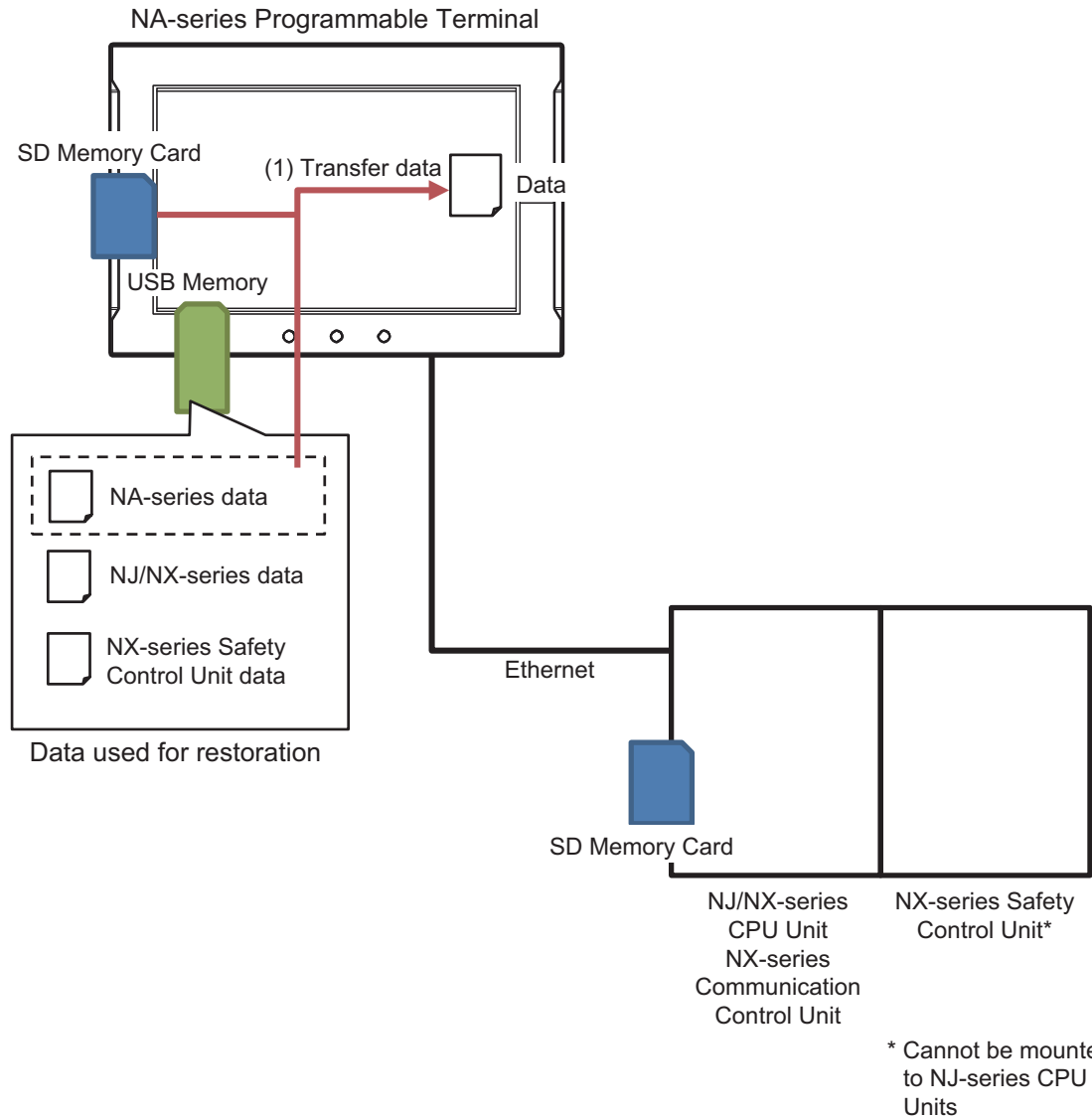


**Precautions for Correct Use**

You cannot use IAGs to restore NX-series Safety Control Units. You need to use the Safety Unit restore function for such restore.

● **Executing Restore of NA-series Programmable Terminal**

To restore an NA-series Programmable Terminal, IAGs use the data in the USB flash drive or the latest backup data in the SD Memory Card on the NA-series Programmable Terminal. Once the restore is successfully completed, the NA-series Programmable Terminal restarts automatically.



### 2-1-3 Comparison

You can use IAGs to compare the latest backup data and the current status of actual devices for verification. For this comparison, use the latest backup data you saved in the SD Memory Card in the NA series Programmable Terminal. Users cannot specify which data to be used for such comparison.

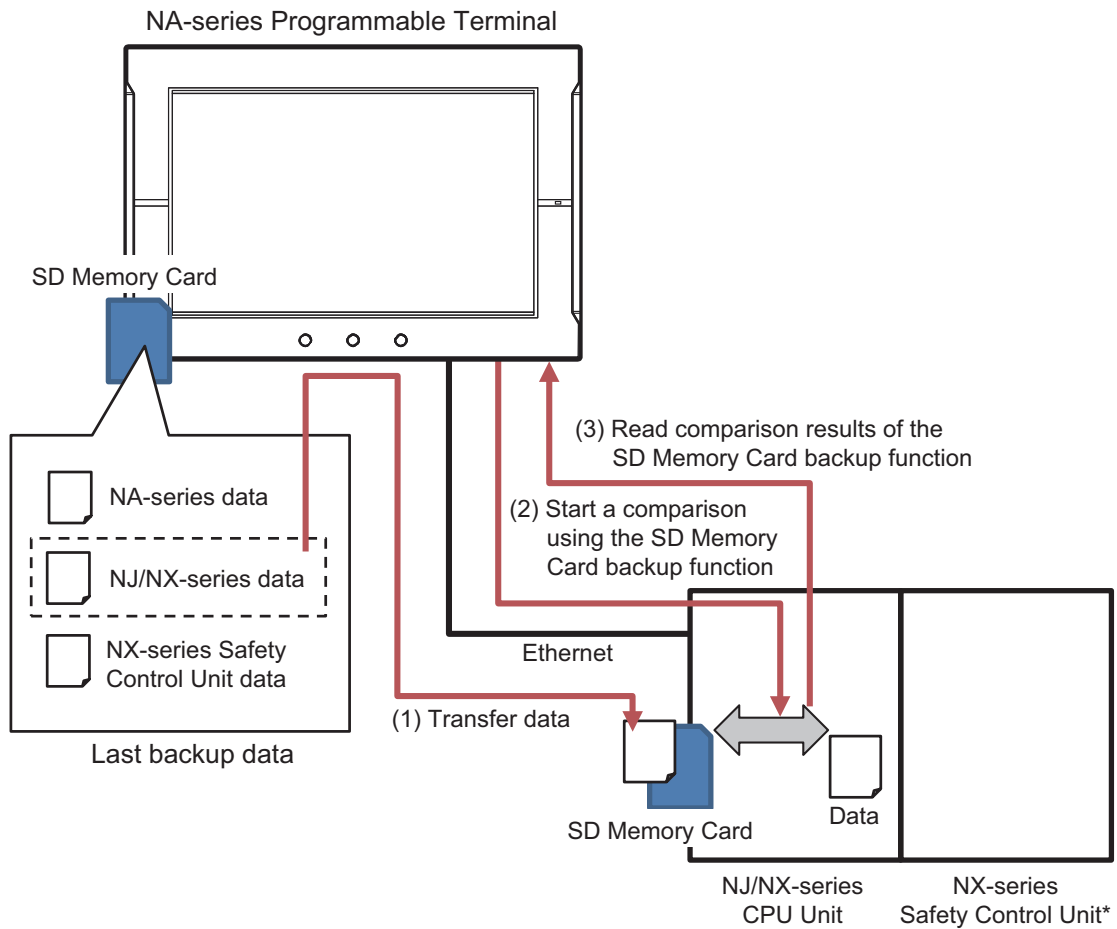
#### Behavior of Each Device and Data Flow

IAGs write data to each device and execute a comparison by using each device's function as shown in the figure below. The comparison is executed on all the devices configured as the backup target. Even when you configure the settings to back up only device data that has been changed since the latest backup, the comparison is executed on all the devices configured as the backup target.

#### ● Executing Comparison of NJ/NX-series CPU Units

The IAGs access the latest backup data to read out data of the NJ/NX-series CPU Unit, and then write it to the SD Memory Card in the NJ/NX-series CPU Unit.

They execute a comparison by using the SD Memory Card backup function of the NJ/NX-series CPU Unit.



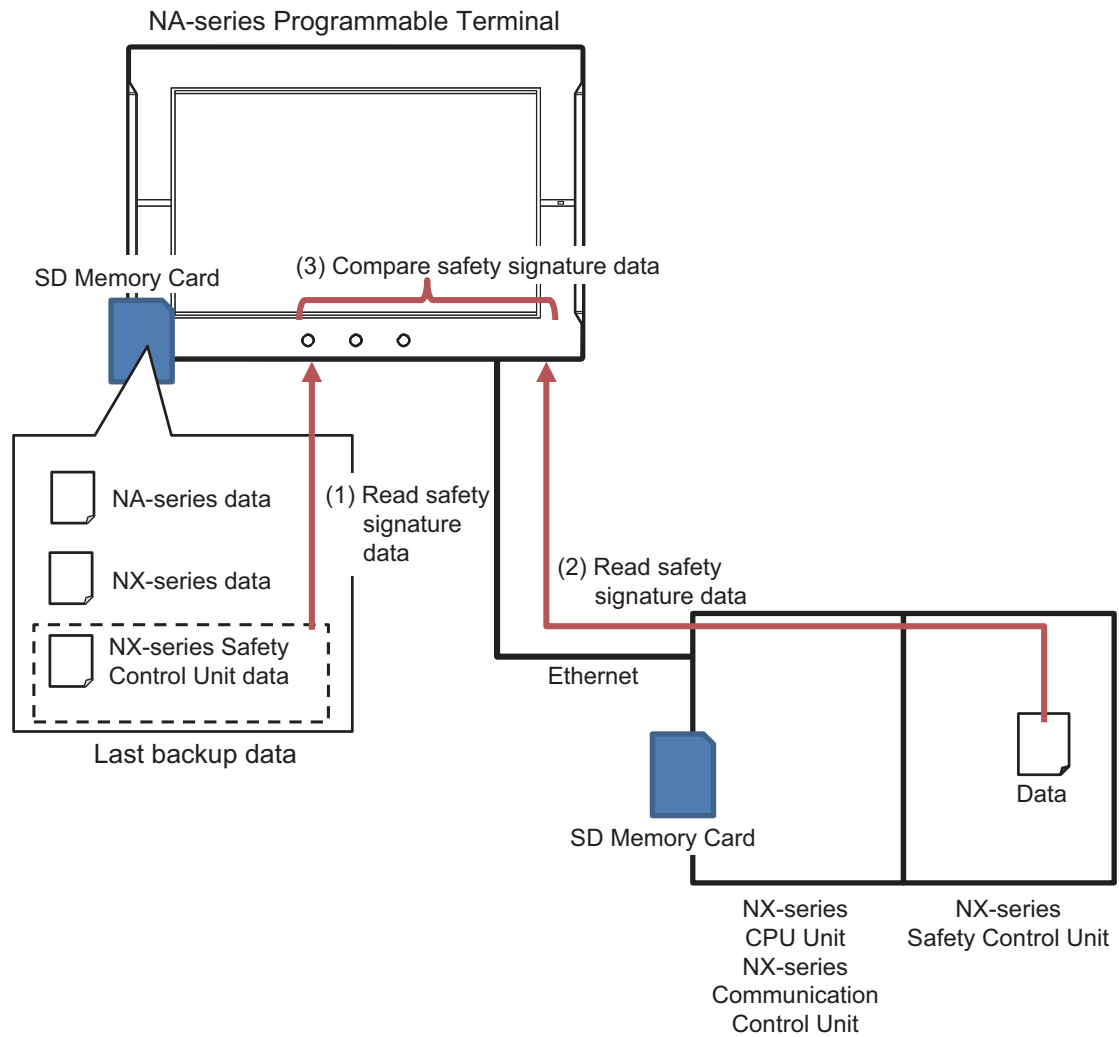
\* Cannot be mounted to NJ-series CPU Units

● **Executing Comparison of NX-series Safety Control Units**

IAGs access the latest backup data to read out the safety signature from the Safety Unit restore file of the NX-series Safety Control Unit.

They also read out the safety signature of the validated program in the NX-series Safety Control Unit.

After comparing the two safety signatures, the IAGs display the verification result.

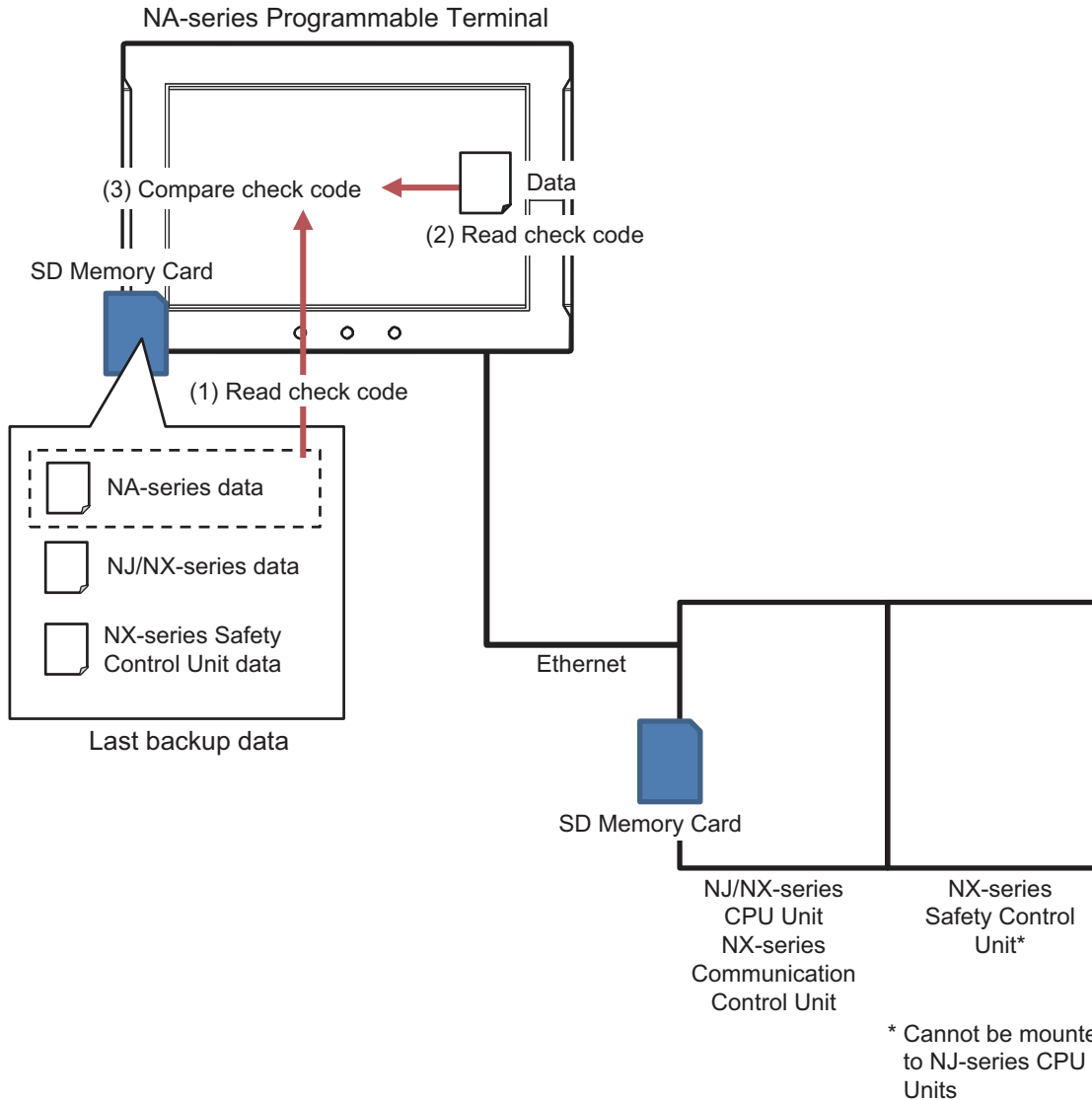


● **Executing Comparison of NA-series Programmable Terminal**

IAGs read out the check code of the NA-series Programmable Terminal data from the latest backup data.

They also read out the check code of the HMI project downloaded to the the NA-series Programmable Terminal.

After comparing the two check codes, the IAGs display the verification result.



**2-1-4 IAG Types**

The NJ/NX/NA-series Backup and Restore IAGs are listed in the table below.

IAG Name	Name	Outline
BRInitialization	Initializing the Backup and Restore function	Performs necessary initialization for using other IAGs. Prepares for starting the backup and restore operations. Starts monitoring of a scheduled backup if any.
BackupToUSB-Memory	Backing up to USB memory	Starts the backup operation and displays the result. Writes the backup result to the USB flash drive on the NA-series Programmable Terminal.



IAG Name	Name	Outline
BackupToFTP-Server	Backing up to FTP server	Starts the backup operation and displays the result. Writes the backup result to the FTP server that is accessible by the NA-series Programmable Terminal.
ConfigureBackup	Setting the configuration of Backup	Allows users to configure necessary settings for executing a backup.
RestoreFromUSBMemory	Restoring from USB memory	Starts the restore operation and displays the result. The data used for restoration is read from the USB flash drive on the NA-series Programmable Terminal or the latest backup data stored in the SD Memory Card.
ConfigureRestore	Setting the configuration of Restore	Allows users to configure necessary settings for a restore.
CompareToLatestBackup	Comparing to the latest backup data	Compares the current status of each device against the last backup data, which was saved by BackupToUSBMemory or BackupToFTPServer.
ExportBRConfiguration	Exporting the Configuration of Backup and Restore	Exports a file containing the backup and restore settings saved by ConfigureBackup and ConfigureRestore to the specified save-in location.
ImportBRConfiguration	Importing the Configuration of Backup and Restore	Imports the backup and restore settings that were exported to a file by using ExportBRConfiguration and reflects the settings of ConfigureBackup and ConfigureRestore.

## 2-2 Target Devices and Configuration

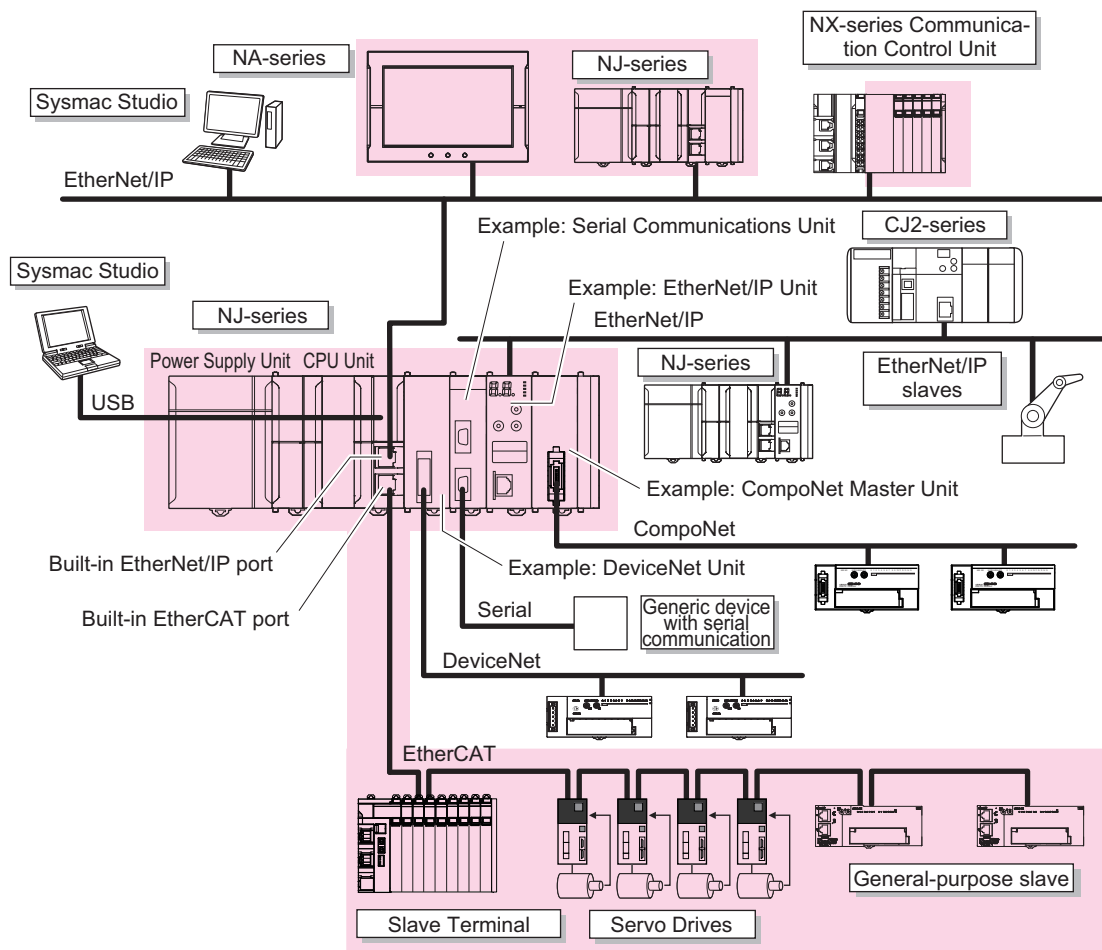
You can specify the NA-series Programmable Terminal where IAGs are running, as a target device. You can also select up to three N/NX-series CPU Units as target devices from the internal and external devices configured in an HMI project on the NA-series Programmable Terminal. NX-series Safety Control Units connected to those selected NX-series CPU Units can be specified as target devices, as well. However, you cannot use IAGs to restore NX-series Safety Control Units.

Devices connected to an NJ/NX-series CPU Unit are covered by the SD Memory Card backup function of the CPU Unit. Refer to the *NJ/NX-series CPU Unit Software User's Manual (Cat. No. W501)* for details.

### 2-2-1 Configuration

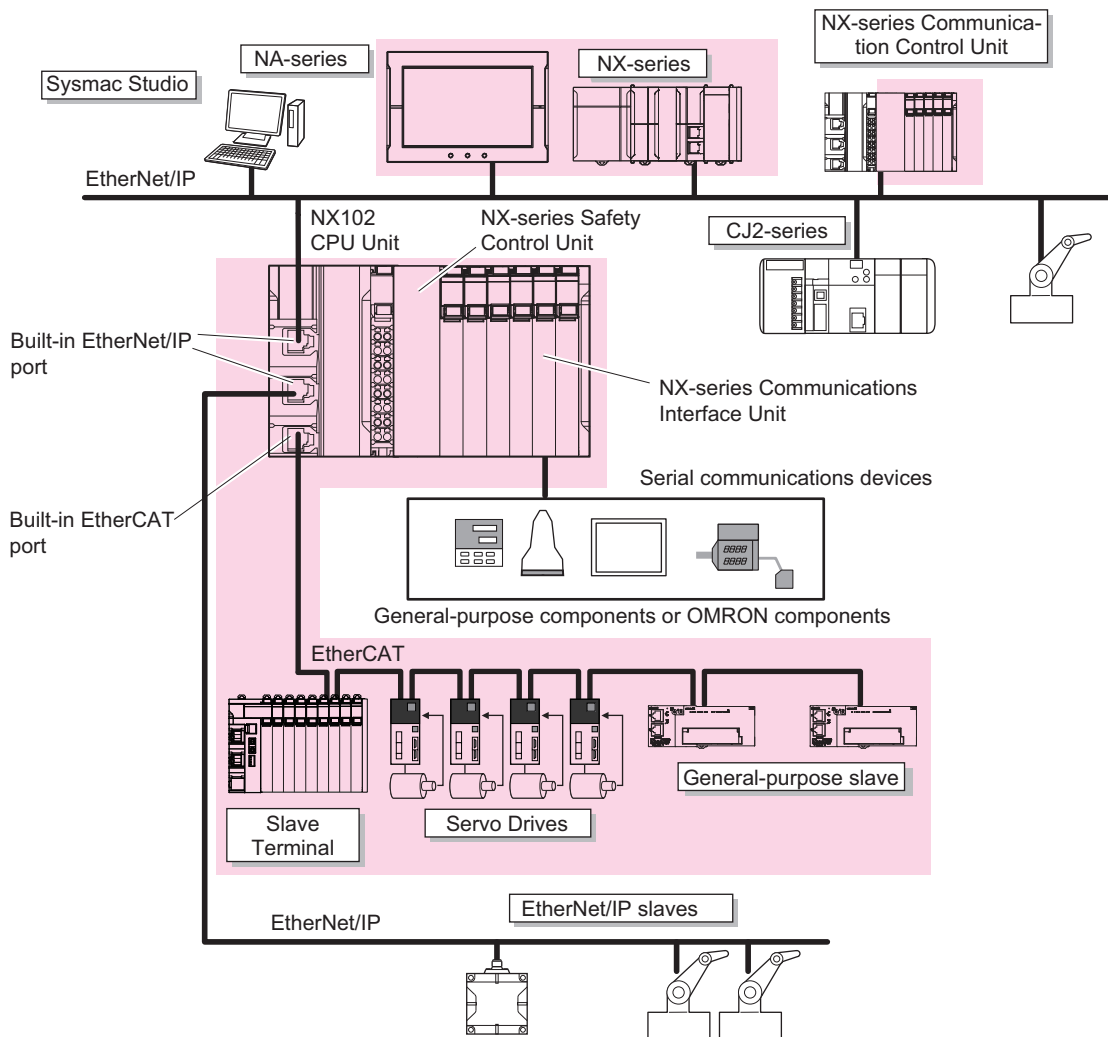
The NJ-series and NX-series CPU Units are listed in separate configuration examples below, but you can use IAGs in a configuration containing both CPU Units.

- Configuration example 1: Configuration Using the NJ-series Units



The shaded area indicates the scope of the NJ/NX/NA-series Backup and Restore IAG

- Configuration example 2: Configuration Using the NX-series Units



The shaded area indicates the scope of the NJ/NX/NA-series Backup and Restore IAG

## 2-2-2 Target Devices

The following devices can be set as target devices.

Name	Model	Version
NJ-series CPU Unit*1	NJ101/ 301/ 501-□□□□	1.14 or higher
NX-series CPU Unit*1	NX102-□□□□ NX701-□□□□	1.30 or higher 1.14 or higher
NX-series Communication Control Unit*2	NX-CSG□□□	1.01 or higher
NX-series Safety Control Unit*3	NX-SL5□□□	1.3 or higher
NA-series Programmable Terminal	NA5-7W/9W/12W/15W(-V1)	1.12 or higher
SD Memory Card	HMC-SD291/491	---
USB flash drive	FZ-MEM2G/8G	---
FTP server	The operation has been tested by the following FTP server: Windows Server 2016 IIS Ver.10.0	---
Sysmac Studio Standard Edition Ver.1.□ □	SYSMAC-SE2□□□	1.31 or higher

\*1. You can specify up to three NJ/NX-series CPU Units in total.

\*2. You cannot perform a backup, restore, or comparison on the NX-series Communication Control Units.

\*3. You can also set an NX-series Safety Control Unit that is connected to an NX-series CPU Unit.



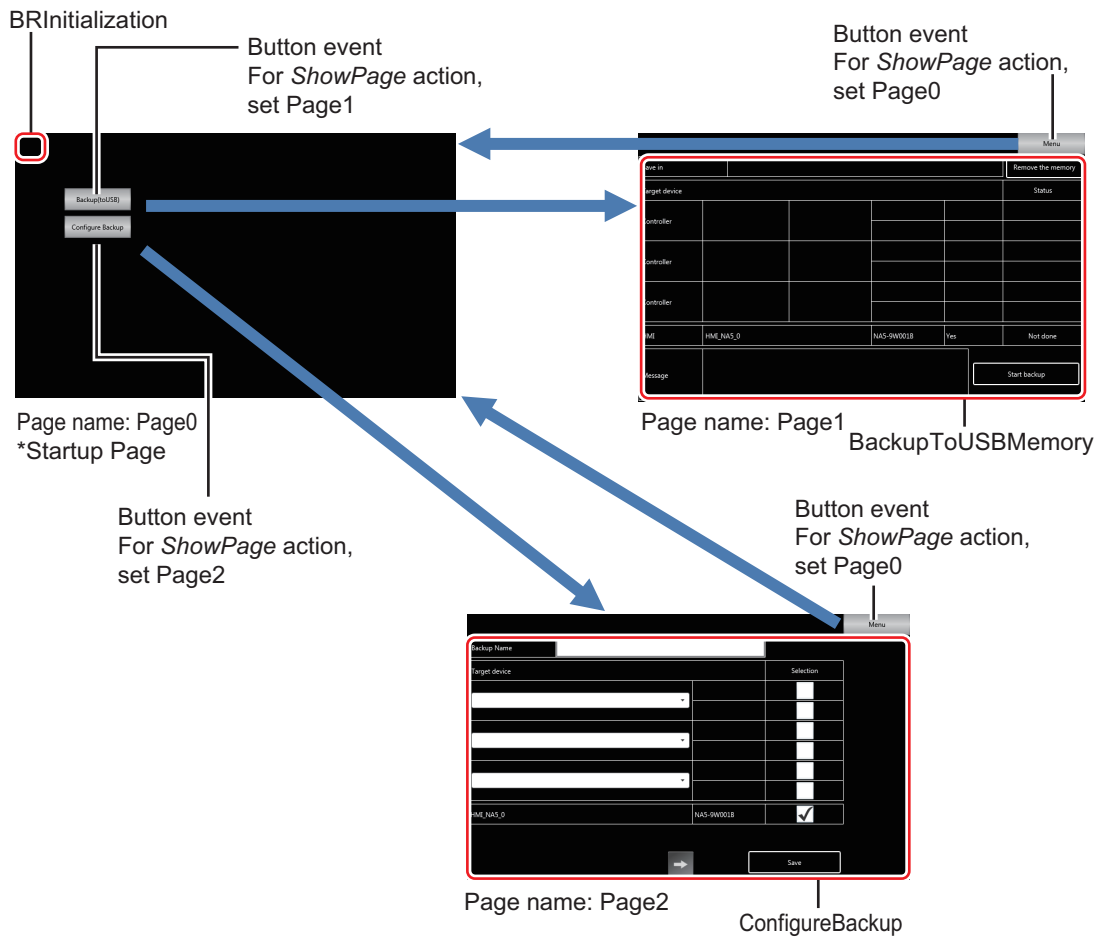
### Precautions for Correct Use

- You need to insert an SD Memory Card to the NA-series Programmable Terminal and the NJ/NX-series CPU Unit that are set as the target devices.
- To execute a backup or comparison for an NX-series Safety Control Unit connected to an NX-series Communication Control Unit, the NX-series Communication Control Unit must have the SD Memory Card inserted.

## 2-3 How to Create a Project

Using a combination of IAGs in an HMI project allows you to use the backup and restore functions. For using the backup function, you need to use BRInitialization, BackupToUSBMemory, and Configure-Backup for your HMI project.

The IAGs do not have a function to move between pages. Users need to design the HMI application on their own.



### Precautions for Correct Use

- To use the IAGs, make sure to use BRInitialization at the startup page.
- You need to design the HMI project not to allow page transition during a restore.

## 2-4 Using the Functions

---

### 2-4-1 Backup

#### Preparation

---

- Correctly install each device that is necessary for equipment control. Correctly download created projects and settings into each of them and make sure the devices run without errors.
- Create IAGs necessary for executing a backup in the HMI project by using the Sysmac Studio and download it to the NA-series Programmable Terminal. The IAGs used for executing a backup are as follows:
  - a) BRInitialization
  - b) ConfigureBackup
  - c) BackupToUSBMemory
  - d) BackupToFTPServer
- Insert an SD Memory Card to all the NJ/NX-series CPU Units, NX-series Communication Control Units and NA-series Programmable Terminal that are specified as target devices for the backup.



#### Precautions for Correct Use

---

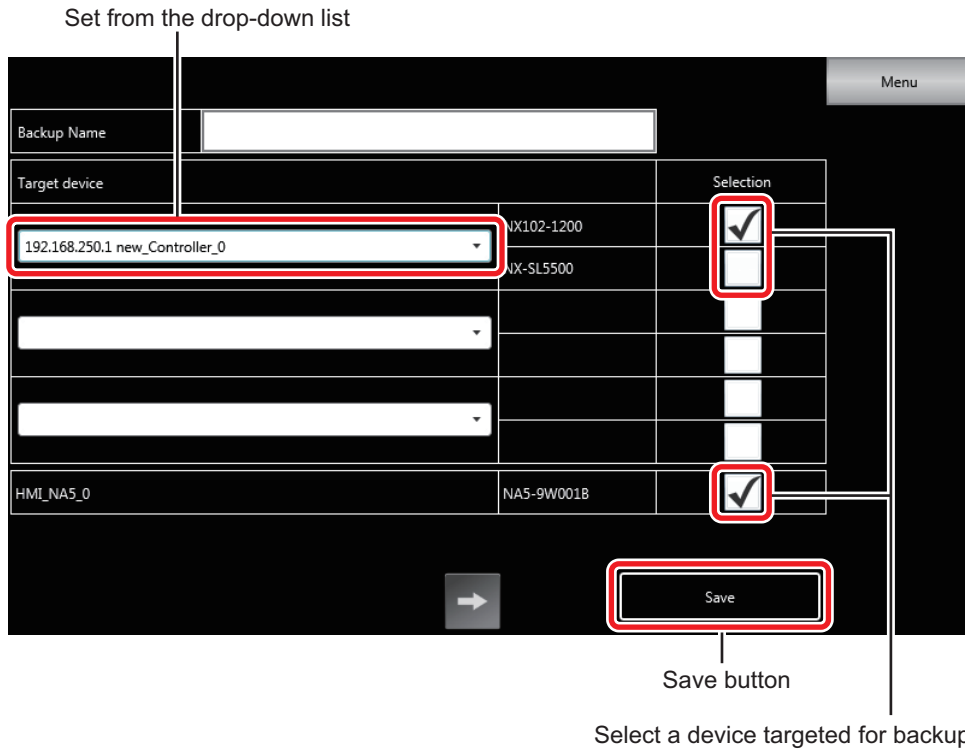
To execute a backup by using the IAGs, you need to correctly install each device that is necessary for equipment control and download created projects and settings into each of them, and make sure the devices run without errors.

---

## Specifying Target Device

Use the screen on the NA-series Programmable Terminal and display ConfigureBackup. Specify a device to back up.

- From the drop-down list of the **Target device** field, select a target device for backup and check the **Selection** box.



- After you finish selecting, touch the **Save** button to save the settings.

## Specifying Data Storage Location

First, connect a storage device for the backup to the NA-series Programmable Terminal.

- Saving to a USB Memory device: Connect a USB Memory device to the USB host port
- Saving to an FTP server: Connect the NA-series Programmable Terminal to the FTP server via Ethernet

Use the screen on the NA-series Programmable Terminal and display ConfigureBackup. Specify the **Save-in** settings to set the backup storage location.

- Saving to a USB Memory device: Specify the full path for the save-in location
- Saving to an FTP server: Specify the FTP server connection settings (host name, mode, port, user name, and password) as well as the full path for the save-in directory

Save-in location of the backup data when BackupToUSBMemory is selected

Save button

Save-in location of the backup data when BackupToFTPServer is selected

Settings to save the difference from the last backup data when BackupToFTPServer is selected

- When an FTP server is specified as the save-in location of the backup data, you can set **Backup difference from the last backup** to **Yes** to compare the actual status against the latest backup data and save only device data that has been changed since the last backup.
- Once the settings are complete, touch the **Save** button to save the settings.



### Additional Information

The backup data is saved in a folder, whose name consists of **Backup name** and the date and time information (year, month, day, hour and minutes), in the directory specified at the **Path** field of **Save-in**. Refer to *2-5 Backup Data Structure* on page 2-30 for details.



## Starting Execution

Start the backup as below.

The backup can be started by pressing the button on BackupToUSBMemory or BackupToFTPServer, or by specifying the schedule on ConfigureBackup. Refer to *Button Operation on BackupToUSBMemory or BackupToFTPServer* on page 2-21 or *Specifying a Schedule with ConfigureBackup* on page 2-22 for details.



### Precautions for Correct Use

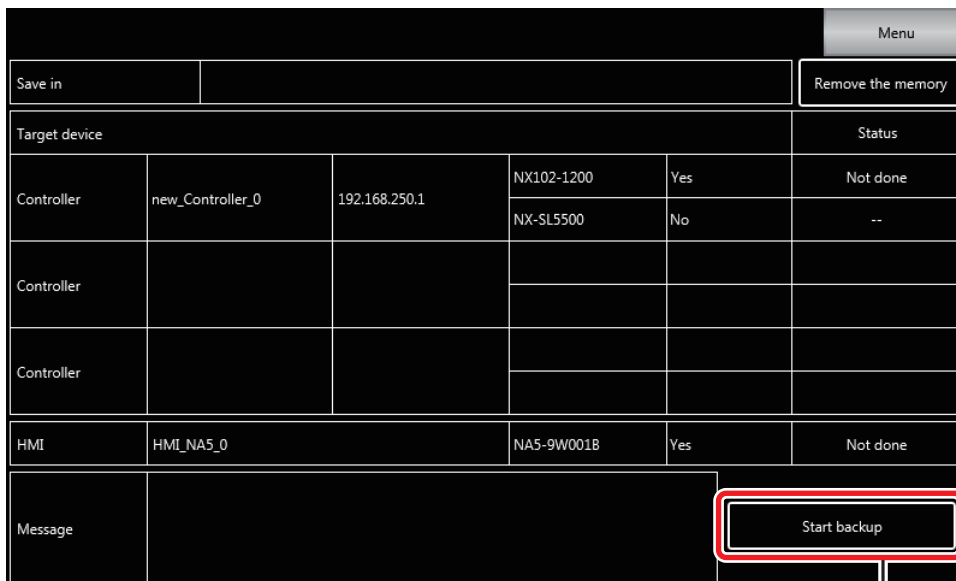
Execution of multiple backups is not allowed.

- To start a scheduled backup, keep a sufficient interval after the precedent backup.
- To start a backup by the button operation, ensure that another backup is not being executed.

### ● Button Operation on BackupToUSBMemory or BackupToFTPServer

Use the NA-series Programmable Terminal and display BackupToUSBMemory or BackupToFTP-Server. Touch the **Start backup** button.

- Saving to a USB Memory device: Display BackupToUSBMemory
- Saving to an FTP server: Display BackupToFTPServer



Start backup button

## ● Specifying a Schedule with ConfigureBackup

You can perform scheduled backup on a regular basis if you specify an FTP server as the save-in location for the backup.

Use the screen of the NA-series Programmable Terminal and display ConfigureBackup. In the **Schedule** field, specify a schedule to start the backup.

The screenshot shows the 'ConfigureBackup' screen with the following settings:

- Backup (To USB memory) Setting**
  - Save in Path: bup
- Backup (To FTP server) Setting**
  - Host: 192.168.250.139
  - Mode: Passive
  - Port: 21
  - User: user
  - Password: [Redacted]
  - Path: bup
- Backup difference from the last backup**: No
- Schedule**
  - Entry 1:  Every week, Sunday, 22:00
  - Entry 2:  [Empty], Sunday, 00:00
- Buttons**: A back arrow button and a 'Save' button are visible at the bottom.

Red boxes highlight the 'Schedule' section and the 'Save' button. Labels 'Schedule' and 'Save button' point to these respective areas.

- Up to two backup schedules can be specified. The checked schedule is enabled.
- Once the settings are complete, touch the **Save** button to save the settings.

## Checking the Result

Use the screen on the NA-series Programmable Terminal and display BackupToUSBmemory or BackupToFTPServer. Check the **Status** field and the **Message** field.

					Menu	
Save in				\USBdisk\bup\201912180643		Remove the memory
Target device					Status	
Controller	new_Controller_0	192.168.250.1	NX102-1200	Yes	Succeeded	
			NX-SL5500	No	--	
Controller						
Controller						
HMI	HMI_NA5_0		NA5-9W001B	Yes	Succeeded	
Message	Path=\USBdisk\bup\201912180643 Trigger=Manual StartTime=18/12/2019 06:43:25 EndTime=18/12/2019 06:43:42 Result=Succeeded Info=				Start backup	

Backup result

- Information of the status, backup completion and error presence of each device is saved as a log file in the location where the backup data is saved. Refer to *2-5 Backup Data Structure* on page 2-30 for details.

## 2-4-2 Restore

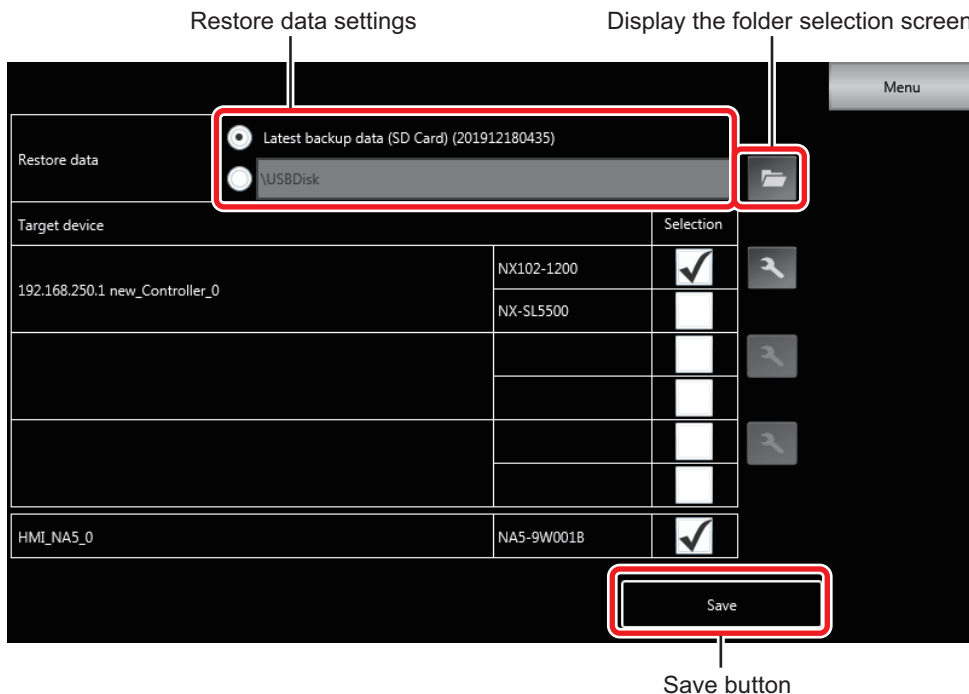
### Preparation

- Correctly install each device that is necessary for equipment control. Correctly download created projects and settings into each of them and make sure the devices run without errors.
- Create IAGs necessary for executing a restore in the HMI project by using the Sysmac Studio and download it to an NA-series Programmable Terminal. The IAGs used for executing a restore are as follows:
  - a) BRInitialization
  - b) ConfigureRestore
  - c) RestoreFromUSBMemory
- Insert an SD Memory Card to all the NJ/NX-series CPU Units, NX-series Communication Control Units and NA-series Programmable Terminal that are specified as target devices for the restore.
- Insert a USB flash drive containing the restore data into the NA-series Programmable Terminal.

### Specifying Data for Restoration

Use the screen on the NA-series Programmable Terminal and display ConfigureRestore. Specify data for restoration.

- In the **Restore data** field, select the backup data folder whose name consists of the name you specified for **Backup name** and the date and time information (year, month, day, hour and minute).



- Once the settings are complete, touch the **Save** button to save the settings.



#### Additional Information

You can select the latest backup data for restore. It is allowed only when the last backup was successfully completed by using IAGs.

## Specifying Target Device

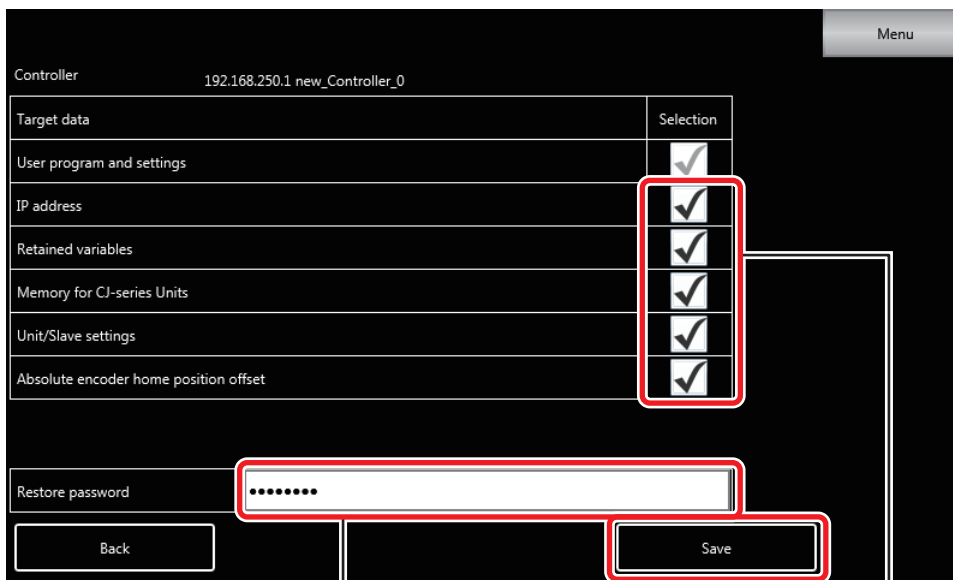
Use the screen on the NA-series Programmable Terminal and display ConfigureRestore. Select devices for the restore. Also, select which data to restore for each selected device.

- Check the **Selection** box of the **Target device** field.



Select a device targeted for restoration

- Touch the button located next to the device checked in the **Selection** field, and enter **Restore password**.



Enter a restoration password

Save button

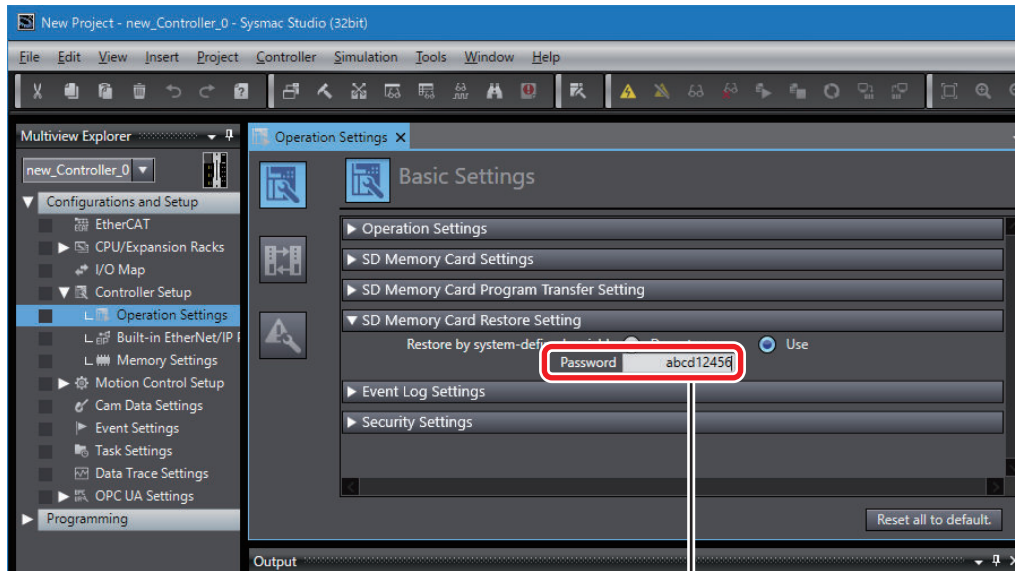
Select a device targeted for restoration

- After you finish selecting, touch the **Save** button to save the settings.



### Additional Information

The restore password is the one you specified for the NJ/NX-series CPU Unit by using the Sysmac Studio through the following steps: **Controller Setup - Operation Settings - Basic Settings - SD Memory Card Restore Setting - Password**.

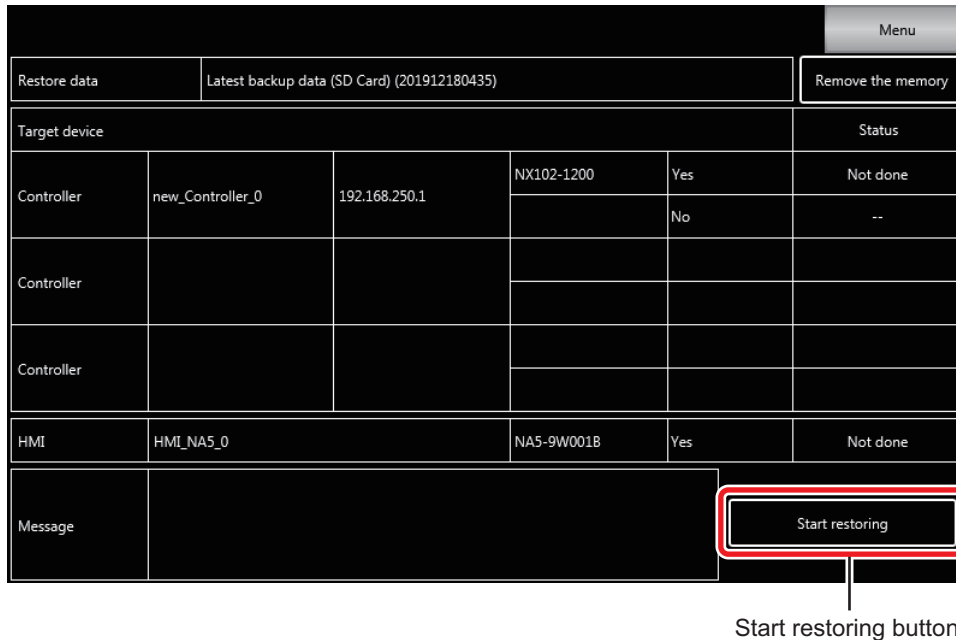


Restoration password

## Starting Execution

Start the restore as below.

Use the screen on the NA-series Programmable Terminal and display RestoreFromUSBMemory. Touch the **Start restoring** button.



### Precautions for Correct Use

- IAGs execute a restore only when they can confirm that the backup data prepared for the restore shows the correct device names and models of the actual NJ/NX-series CPU Units and the NA-series Programmable Terminal. If they do not match, the IAGs will not execute a restore for the devices.
- You cannot use IAGs to restore NX-series Safety Control Units. You need to use the Safety Unit restore function for such restore. Refer to the *NX-series Safety Control Unit User's Manual (Cat. No. Z930)* for details.
- Since the IAGs do not support version upgrades of the system program of the NA-series Programmable Terminal, you cannot execute a restore requiring such version upgrades. Use the Sysmac Studio to update the system program version and download the HMI project.

## Checking the Result

Use the screen on the NA-series Programmable Terminal and display RestoreFromUSBMemory. Check the **Status** field and the **Message** field.

- Information of the status, restore completion and error presence of each device is saved as a log file into the folder which contains the data used for the restore. Refer to *2-5 Backup Data Structure* on page 2-30 for details.

## 2-4-3 Comparison

### Preparation

- Correctly install each device that is necessary for equipment control. Correctly download created projects and settings into each of them and make sure the devices run without errors.
- Create IAGs necessary for executing a comparison in the HMI project by using the Sysmac Studio and download it to an NA-series Programmable Terminal. The IAGs necessary for executing a comparison are as follows:
  - a) BRInitialization
  - b) CompareToLatestBackup
- Insert an SD Memory Card for all the NJ/NX-series CPU Units and NA-series Programmable Terminals that are targeted for comparison.
- Use the IAGs to perform a backup properly.

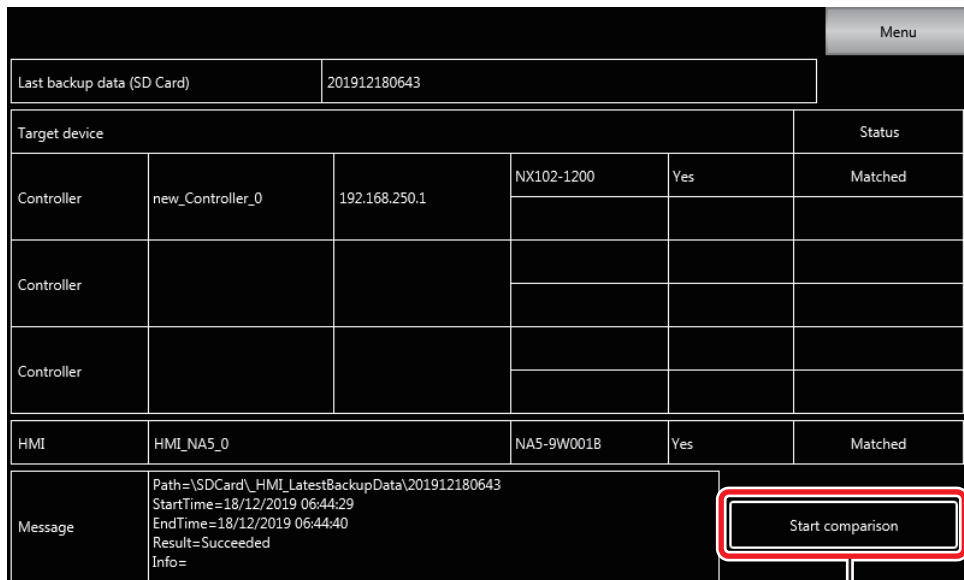


### Additional Information

When you execute a backup by using IAGs, the backup data is saved as a temporary file in the SD Memory Card inserted to the NA-series Programmable Terminal. This latest backup is called "last backup data". Compare this last backup data against each device.

### Starting Execution

Use the screen on the NA-series Programmable Terminal and display CompareToLatestBackup. Touch the **Start comparison** button.



Start comparison button



## Checking the Result

Use the screen on the NA-series Programmable Terminal and display CompareToLatestBackup. Check the **Status** field and the **Message** field.

The screenshot displays a terminal window with the following data:

					Menu	
Last backup data (SD Card)		201912180643				
Target device					Status	
Controller	new_Controller_0	192.168.250.1	NX102-1200	Yes	Matched	
Controller						
Controller						
HMI	HMI_NA5_0		NA5-9W001B	Yes	Matched	
Message	Path=\\SDCard\\_HMI_LatestBackupData\\201912180643 StartTime=18/12/2019 06:44:29 EndTime=18/12/2019 06:44:40 Result=Succeeded Info=				Start comparison	

Execution status and result for each device targeted for comparison

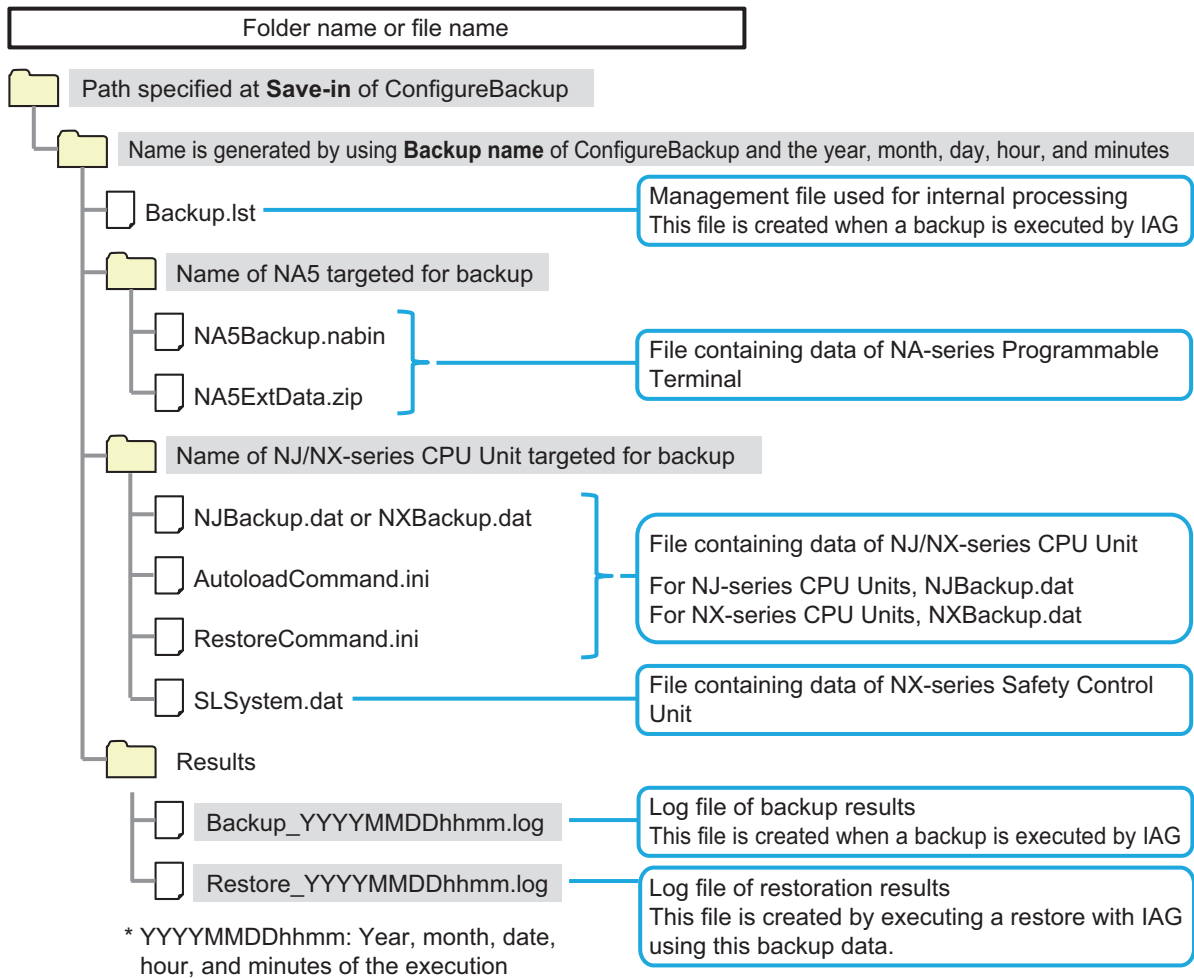
Comparison result

## 2-5 Backup Data Structure

This section describes the folder structure for backup data, as well as log files containing backup or restore result data.

### 2-5-1 Folder Structure of Backup Data

The IAG saves the backup data in the specified storage location. The structure of the save-in location is shown below.



#### Precautions for Correct Use

To save the backup data to the USB flash drive on the NA-series Programmable Terminal, FAT32 is the recommended format. This is because more folders can be created in a folder compared to using FAT16. The number of folders you can create depends on the number of characters used for the folder names and their formats. The details conform to the specifications of FAT16 and FAT32.

## 2-5-2 Log File of Backup Results

When you execute a backup using IAGs, a log file (with the .log extension) is saved in the storage location. The log file contains the same backup result data as displayed in the IAG window.

File contents	Description
[Outline]	Overall execution results
Path=\\USBDisk\\Link1\\Machine1_201909270315	Data storage location
Trigger=Schedule	Backup start trigger
StartTime=2019/09/27 03:15:19	Backup start date and time
EndTime=2019/09/27 03:15:40	Backup end date and time
Result=Fail	Result
Info=An error occurred. Check the logs for details.	Cause of the failure
[Details]	Execution result of each device
Controller1=new_Controller0,NX102,192.168.250.8	Target device 1: Name, model, IP address
Result=Success	Result
Info=	Additional information
Controller2= ,NX-SL5700,192.168.250.8	Target device 1: Name, model, IP address
Result=Fail	Result
Info=Signature mismatch	Additional information
HMI=HMI_NA5_0,NA5-9W,192.168.250.2,0.0.0.0	Target device 1: Name, model, IP address
Result=Success	Result
Info=	Additional information

## 2-5-3 Log File of Restoration Results

When you execute a restore using IAGs, a log file (with the .log extension) is saved in the folder which contains the data used for the restore. The log file contains the same restore result data as displayed in the IAG window.

File contents	Description
[Outline]	Overall execution results
Path=\\USBDisk\\Link1\\Machine1_201909270315	Data used for restoration
StartTime=2019/09/27 03:15:19	Restore start date and time
EndTime=	Restore end date and time
Result=Fail	Result
Info=An error occurred. Check the logs for details.	Cause of the failure
[Details]	Execution result of each device
Controller1=new_Controller0,NX102,192.168.250.8	Target device 1: Name, model, IP address
Result=Success	Result
Info=	Additional information
Controller2= ,NX-SL5700,192.168.250.8	Target device 1: Name, model, IP address
Result=	Result
Info=Manual operation required	Additional information
HMI=HMI_NA5_0,NA5-9W,192.168.250.2,0.0.0.0	Target device 1: Name, model, IP address
Result=Success	Result
Info=	Additional information

## 2-6 Precautions

### 2-6-1 Capacity of Storage Location

If the SD Memory Card, USB flash drive or FTP server runs out of storage space during a backup using IAGs, the backup fails. Be sure to check the following before executing backup:

- Make sure that the USB flash drive or the FTP server specified as the save-in location of the backup data has sufficient storage capacity.
- Make sure that the SD Memory Card inserted to the NA-series Programmable Terminal has sufficient storage capacity.

You need storage space equivalent to the total size of backup data of the specified NJ/NX-series CPU Units, NX-series Safety Control Units and NA-series Programmable Terminal.

- For the NJ/NX-series CPU Units, refer to the section related to the SD Memory Card backup function in the *NJ/NX-series CPU Unit Software User's Manual (Cat. No. W501)*.
- For the NX-series Safety Control Units, refer to the section related to the Safety Unit restore in the *NX-series Safety Control Unit User's Manual (Cat. No. Z930)* and check the file size of the Safety Unit restore file generated by the Sysmac Studio.
- For the NA-series Programmable Terminals, refer to the section on the download using media in the *NA-series Programmable Terminal Software User's Manual (V118)* and check the total size of files (with an extension .nabin) generated by the Sysmac Studio.

### 2-6-2 Device Status and Communication

The IAGs use the SD Memory Card backup function of the NJ/NX-series CPU Unit for the backup, compare and restore operations on the NJ/NX-series CPU Unit. Refer to the *NJ/NX-series CPU Unit Software User's Manual (Cat. No. W501)*, and check the status of each device and communications between devices to ensure normal operation.

When the communications fail between the NA-series Programmable Terminal and the NJ/NX-series CPU Unit, they cannot check the execution status of their functions, or read or write data, and therefore their functions end abnormally. Ensure that normal communications are supported between the devices.

### 2-6-3 Operation during Restore

Controllers suspend control operations during a restore of their data. Similarly, you cannot use the NA-series Programmable Terminal for operations or viewing data during a restore of its data. For this reason, you need to design the HMI project not to allow page transition on the NA-series Programmable Terminal after a restore operation has started.

### 2-6-4 Multiple Executions

While executing a backup, restore, or comparison using IAGs, you cannot perform any of these functions simultaneously using IAGs. For example, you cannot perform a comparison while a backup is running.

If you attempt to perform two of them, the one executed later will fail as an error.

## 2-6-5 IAG Usage Quantity

You can use one for each IAG type in one HMI project. Do not use two or more of the same IAG type in one HMI project. Also, do not use more than one IAG in one page. Using more than one IAG does not result in an error, but the devices may not work as intended because of data inconsistencies among the IAGs.



# 3

## Individual Specifications of Each IAG

This section describes individual IAG specifications of the NJ/NX/NA-series Backup and Restore IAG.

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<b>BRInitialization.....</b>	<b>3-2</b>
<b>BackupToUSBMemory .....</b>	<b>3-3</b>
<b>BackupToFTPServer .....</b>	<b>3-5</b>
<b>ConfigureBackup.....</b>	<b>3-7</b>
<b>RestoreFromUSBMemory.....</b>	<b>3-10</b>
<b>ConfigureRestore .....</b>	<b>3-12</b>
<b>CompareToLatestBackup .....</b>	<b>3-15</b>
<b>ExportBRConfiguration .....</b>	<b>3-17</b>
<b>ImportBRConfiguration.....</b>	<b>3-19</b>

# BRInitialization

Performs necessary initialization for using other IAGs.  
 Prepares for starting the backup and restore operations.  
 Starts monitoring of a scheduled backup if any.

Item	Description
IAG name	BRInitialization
Name	Initializing the Backup and Restore function
Category	NJ/NX/NA Backup Restore
User interface and appearance	None
Part names and functions	---

## IAG Collection Data

Item	Description
IAG Collection Name	NJNXNA_Backup_Restore
Source code published/not published	Not Published

## Input Variables

None

## In-Out Variables

None

## Location and Quantity Allowed

Item	Description
HMI Project Type	Standard Project
Page type	Main Pages*1
Qty	1 in a project

\*1. Use for the startup page.

## Functions

- BRInitialization performs initialization processing necessary for executing and configuring backup, restore and comparison. It prepares for scheduled backups based on the backup setting.
- BRInitialization alone does not serve as a function. Make sure to use it on the startup page. If a scheduled backup is configured, however, it runs the backup according to the settings regardless of other IAGs.



# BackupToUSBMemory

Starts the backup operation and displays the result.

Writes the backup result to the USB flash drive on the NA-series Programmable Terminal.

Item	Description		
IAG name	BackupToUSBMemory		
Name	Backing up to USB memory		
Category	NJ/NX/NA Backup Restore		
User interface and appearance	<p>(1) Save-in location      (2) Button for removing the memory</p> <p>(3) Target device (Controller) Information</p> <p>(4) Target device (human machine interface) Information</p> <p>(5) Execution status and result for each target device</p> <p>(6) Backup result</p> <p>(7) Start backup button</p>		
Part names and functions	(1)	View	Display the save-in folder path for the backup data specified by ConfigureBackup.
	(2)	Operation	To remove the USB flash drive from the NA-series Programmable Terminal, touch the <b>Remove the memory</b> button first and then remove the USB flash drive.
	(3)	View	Display the following information of Controllers specified by ConfigureBackup. <ul style="list-style-type: none"> <li>• Device name of the NJ/NX-series CPU Unit</li> <li>• IP address of the EtherNet/IP port on the NJ/NX-series CPU Unit</li> <li>• Model of the NJ/NX-series CPU Unit</li> <li>• Model of the Safety Control Unit (if connected)</li> <li>• Whether it is a backup target or not</li> </ul>
	(4)	View	Display the following information of the HMI specified by ConfigureBackup. <ul style="list-style-type: none"> <li>• Device name of the NA-series Programmable Terminal</li> <li>• Model of the NA-series Programmable Terminal</li> <li>• Whether it is a backup target or not</li> </ul>
	(5)	View	Display the backup execution status of each target device.
	(6)	View	Display the execution result of the backup.
	(7)	Operation	The backup operation starts.

## IAG Collection Data

Item	Description
IAG Collection Name	NJNXNA_Backup_Restore
Source code published/not published	Not Published

## Input Variables

None

## In-Out Variables

None

## Location and Quantity Allowed

Item	Description
HMI Project Type	Standard Project
Page Type	Main Pages
Qty	1 in a project

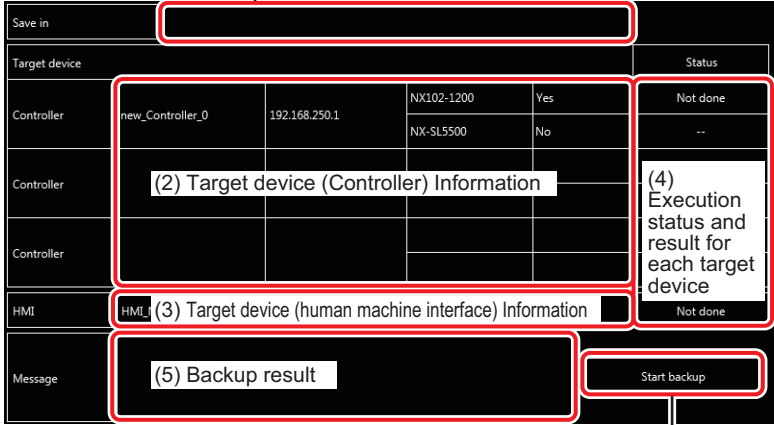
## Functions

- BackupToUSBMemory starts a backup of devices specified by ConfigureBackup, reads out the backup data, and then write it into the specified save-in location.
- It displays the execution result of the backup. It also saves a log file of the backup result in the specified save-in location.

# BackupToFTPServer

Starts the backup operation and displays the result.

Writes the backup result to the FTP server that is accessible by the NA-series Programmable Terminal.

Item	Description		
IAG name	BackupToFTPServer		
Name	Backing up to FTP server		
Category	NJ/NX/NA Backup Restore		
User interface and appearance	<p>(1) Save-in location</p>  <p>(6) Start backup button</p>		
Part names and functions	(1)	View	Display the save-in folder path for the backup data specified by ConfigureBackup.
	(2)	View	Display the following information of Controllers specified by ConfigureBackup. <ul style="list-style-type: none"> <li>• Device name of the NJ/NX-series CPU Unit</li> <li>• IP address of the EtherNet/IP port on the NJ/NX-series CPU Unit</li> <li>• Model of the NJ/NX-series CPU Unit</li> <li>• Model of the Safety Control Unit (if connected)</li> <li>• Whether it is a backup target or not</li> </ul>
	(3)	View	Display the following information of the HMI specified by ConfigureBackup. <ul style="list-style-type: none"> <li>• Device name of the NA-series Programmable Terminal</li> <li>• Model of the NA-series Programmable Terminal</li> <li>• Whether it is a backup target or not</li> </ul>
	(4)	View	Display the backup execution status of each target device.
	(5)	View	Display the execution result of the backup.
	(6)	Operation	The backup operation starts.



## Additional Information

You can execute a backup by using the BackupToFTPServer button, or you can perform regular backup to the FTP server based on the schedule specified by ConfigureBackup. In this case, you do not have to execute BackuptoFTPServer.

## IAG Collection Data

Item	Description
IAG Collection Name	NJNXNA_Backup_Restore
Source code published/not published	Not Published

## Input Variables

None

## In-Out Variables

None

## Location and Quantity Allowed

Item	Description
HMI Project Type	Standard Project
Page Type	Main Pages
Qty	1 in a project

## Functions

- BackupToFTPServer starts a backup of devices specified by ConfigureBackup, reads out the backup data, and then write it into the specified save-in location.
- Whenever a backup is executed by pressing the BackupToFTPServer button or by the scheduled program specified by ConfigureBackup, the BackupToFTPServer window shows the backup execution status and result.
- You can configure the settings to save only device data that has been changed since the last backup.
- This IAG displays the execution result of the backup. It also saves a log file of the backup result in the specified save-in location.

# ConfigureBackup

Allows users to configure necessary settings for executing a backup.

Item	Description
IAG name	ConfigureBackup
Name	Setting the configuration of Backup
Category	NJ/NX/NA Backup Restore

User interface and appearance

(1) Backup name

(2) Target device (Controller) selection

(3) Target device (Human machine interface) selection

(4) Page transition button

(5) Save-in directory path for Backup-ToUSBMemory

(6) BackupToFTPServer Save-in location

(7) Settings to save only the difference from the last backup result

(8) Schedule setting

(9) Save button

Item	Description		
Part names and functions	(1)	View and Operation	Specify a prefix of the folder name to be created for saving back-up data in the save-in location. With a prefix specified, the folder name consists of the prefix + year, month, day, and time (ppppppYYYYMMDDhhmm). The prefix should consist of eight or less single-byte alphanumeric characters. It can be omitted. If this setting is omitted, the folder is named after the year, month, day, and time (12 single-byte numbers: YYYYMMDDhhmm).
	(2)	View and Operation	Specify Controllers as target devices for backup. When you select a Controller from the list, applicable Controller models are listed. Check the <b>Selection</b> box to select the model of the Controller to back up.
	(3)	View and Operation	Specify a device (NA-series Programmable Terminal) for backup. The device name and model of the NA-series Programmable Terminal is displayed. Check the <b>Selection</b> box for the backup.
	(4)	Operation	This button is used to switch pages. Touch this button to switch pages of ConfigureBackup.
	(5)	View and Operation	Specify a path to save the data backed up by BackupToUSBMemory. The save-in location is set to the USB flash drive on the NA-series Programmable Terminal. Specify a full path from the root folder of the USB flash drive.
	(6)	View and Operation	Specify a save-in location for a backup which is executed by BackupToFTPServer or the scheduled program. Host: Set the host name or the IP address of the FTP server. Mode: Select <b>Passive</b> or <b>Active</b> . Port: Set the Port No. to use. User/Password: Set the information of the user who logs into the FTP server. Path: Specify the full path of the default folder as the save-in location on the FTP server.
	(7)	View and Operation	For a backup executed by BckupToFTPServer or a scheduled backup, specify whether to back up device data that has been changed since the last backup.
	(8)	View and Operation	Backup can be executed regularly according to the configured schedule. The schedule can be configured when the backup data is saved in an FTP server. You can specify the following: <ul style="list-style-type: none"> <li>• <i>Every week</i> or <i>Everyday</i> can be selected.</li> <li>• When <i>Every week</i> is selected, <i>Day of the week</i> can be selected.</li> <li>• <i>Time (hour and minute)</i> can be specified.</li> <li>• Checking the check-box enables the setting.</li> </ul>
	(9)	Operation	Save the settings and enable them.

## IAG Collection Data

Item	Description
IAG Collection Name	NJNXNA_Backup_Restore
Source code published/not published	Not Published

## Input Variables

None

## In-Out Variables

None

## Location and Quantity Allowed

Item	Description
HMI Project Type	Standard Project
Page Type	Main Pages
Qty	1 in a project

## Functions

- You can configure necessary settings for executing a backup by using BackupToUSBMemory and BackupToFTPServer.
- The **Backup Name** and **Target device** fields are shared by BackupToUSBMemory and BackupToFTPServer.
- To use BackupToUSBMemory, you need to specify the **Path** field of **Save-in** in the **Backup (To USB Memory) Setting** area.
- To use BackupToFTPServer, you need to specify the **Save-in** information in the **Backup (To FTP server) Setting** area. If you do not use scheduled backup, you do not have to specify the **Schedule** field.
- If you use either BackupToUSBMemory or BackupToFTPServer, you do not have to specify settings for the other. To use both of them, you need to configure both settings.

# RestoreFromUSBMemory

Starts the restore operation and displays the result.

The data used for restoration is read from the USB flash drive on the NA-series Programmable Terminal or the latest backup data stored in the SD Memory Card.

Item	Description
IAG name	RestoreFromUSBMemory
Name	Restoring from USB memory
Category	NJ/NX/NA Backup Restore

User interface and appearance

The screenshot shows a user interface for restoring data. It includes a 'Restore data' section with a dropdown menu showing 'latest backup data (SD Card) (201912180435)' and a 'Remove the memory' button. Below this is a 'Target device' section with a table of controllers and their status. The table has columns for Controller, IP address, Model, and a Yes/No column. A 'Status' column shows 'Not done' and '--'. A 'Message' section at the bottom contains a 'Start restoring' button. Numbered callouts (1-7) identify these elements.

Part names and functions	(1)	View	Description
	(1)	View	Display the folder name of data used for restoration, which is selected by ConfigureRestore.
	(2)	Operation	To remove the USB flash drive from the NA-series Programmable Terminal, touch the <b>Remove the memory</b> button first and then remove the USB flash drive.
	(3)	View	Display the following information of Controllers specified by ConfigureRestore. <ul style="list-style-type: none"> <li>• Device name of the NJ/NX-series CPU Unit</li> <li>• IP address of the EtherNet/IP port on the NJ/NX-series CPU Unit</li> <li>• Model of the NJ/NX-series CPU Unit</li> <li>• Model of the Safety Control Unit (if connected)</li> <li>• Whether it is a restore target or not</li> </ul>
	(4)	View	Display the following information of the HMI specified by ConfigureRestore. <ul style="list-style-type: none"> <li>• Device name of the NA-series Programmable Terminal</li> <li>• Model of the NA-series Programmable Terminal</li> <li>• Whether it is a restore target or not</li> </ul>
	(5)	View	Display the restore execution status of each target device.
	(6)	View	Display the execution result of the restore.
	(7)	Operation	The restore operation starts.



## IAG Collection Data

Item	Description
IAG Collection Name	NJNXNA_Backup_Restore
Source code published/not published	Not Published

## Input Variables

None

## In-Out Variables

None

## Location and Quantity Allowed

Item	Description
HMI Project Type	Standard Project
Page Type	Main Pages
Qty	1 in a project

## Functions

- RestoreFromUSBMemory reads data from the restore data specified by ConfigureRestore and executes a restore of the specified devices.
- For the restore target devices, check the settings and the actual equipment configuration at the start of a restore operation. Check the Controller name, HMI name, and model. When all of them match, the restore will execute.
- The IAG executes a restore of the NA-series Programmable Terminal after completing a restore of the Controllers. Because executing the restore overwrites the HMI project containing the IAG, you cannot verify the restore result on the IAG window. Check the result with the corresponding restore result log file and actual operation of the devices.

# ConfigureRestore

Allows users to configure necessary settings for a restore.

Item	Description
IAG name	ConfigureRestore
Name	Setting the configuration of Restore
Category	NJ/NX/NA Backup Restore

User interface and appearance

(1) Restore data settings

(2) Button for displaying the screen to select a folder containing restore data

(3) Target device (Controller) selection

(4) Target data selection Screen button

(5) Target device (Human machine interface) selection

(6) Save button

(7) Target data selection

(8) Restore password setting

(9) Back to the previous screen button

(6) Save button

Item	Description		
Part names and functions	(1)	View and Operation	Specify data for restoration. Use the radio button to select whether to use the last backup data or specify other data. To specify other data, touch the button (2) and specify a folder in the USB flash drive on the NA-series Programmable Terminal.
	(2)	Operation	Touch this button when you select data for restoration from a folder. This button displays a list of folders in the USB flash drive on the NA-series Programmable Terminal.
	(3)	View and Operation	When you specify data for restoration, it displays the Controller information saved in the data. Check the <b>Selection</b> box to set a restore target.
	(4)	View and Operation	It switches to the page where you select restore target data for the specified Controller.
	(5)	Operation	When you specify data for restoration, it displays the information of the NA-series Programmable Terminal saved in the data. Check the <b>Selection</b> box to set a restore target.
	(6)	Operation	Save the settings and enable them.
	(7)	Operation	Select data items of the Controller for the restore. <b>User program and settings</b> is always selected.
	(8)	Operation	Set the password for restore of the specified Controller. This password is the one you specified for the Controller by using the Sysmac Studio through the following steps: <b>Controller Setup - Operation Settings - Basic Settings - SD Memory Card Restore Setting - Password</b> .
	(9)	Operation	Move back to the previous window.

## IAG Collection Data

Item	Description
IAG Collection Name	NJNXNA_Backup_Restore
Source code published/not published	Not Published

## Input Variables

None

## In-Out Variables

None

## Location and Quantity Allowed

Item	Description
HMI Project Type	Standard Project
Page Type	Main Pages

Item	Description
Qty	1 in a project

## Functions

- ConfigureRestore is used for configuring the necessary settings for executing a restore with RestoreFromUSBMemory.
- For restore, use backup data you saved to the FTP server by executing BackupToUSBMemory or BackupToFTPServer or executing a scheduled backup. Copy the backup data to the USB flash drive, and then copy it to the NA-series Programmable Terminal.
- You can also execute a restore by using the latest backup data. In this case, you do not need to prepare data in the USB flash drive.
- Once you specify which data to use for a restore, the window displays device information contained in the specified data. Select a device to be restored. If the latest backup is updated, only device data containing changes is backed up.
- When you execute a restore, a device selected as the restore target must have the same configuration as the actual device. Otherwise, RestoreFromUSBMemory cannot execute the restore.
- The device configuration is verified by checking the device names and models of the NJ/NX-series CPU Units and the NA-series Programmable Terminal.

# CompareToLatestBackup

Compares the current status of each device against the last backup data, which was saved by BackupToUSBMemory or BackupToFTPServer.

Item	Description		
IAG name	CompareToLatestBackup		
Name	Comparing to the latest backup data		
Category	NJ/NX/NA Backup Restore		
User interface and appearance	<p>(1) Last backup data</p> <p>(2) Target device (Controller) Information</p> <p>(3) Target device (human machine interface) Information</p> <p>(4) Execution status and result for each target device</p> <p>(5) Comparison result</p> <p>(6) Start comparison button</p>		
Part names and functions	(1)	View	Display the name of a folder containing the last backup data. If no backup has been executed, this field is blank.
	(2)	View	Display the information of Controllers included in the last backup data. <ul style="list-style-type: none"> <li>• Device name of the NJ/NX-series CPU Unit</li> <li>• IP address of the EtherNet/IP port on the NJ/NX-series CPU Unit</li> <li>• Model of the NJ/NX-series CPU Unit</li> <li>• Model of the Safety Control Unit (if connected)</li> <li>• Whether it is a comparison target or not</li> </ul>
	(3)	View	Display the information of the HMI included in the last backup data. <ul style="list-style-type: none"> <li>• Device name of the NA-series Programmable Terminal</li> <li>• Model of the NA-series Programmable Terminal</li> <li>• Whether it is a comparison target or not</li> </ul>
	(4)	View	Display the comparison execution status of each target device.
	(5)	View	Display the execution result of the comparison.
	(6)	Operation	The comparison operation starts.

## IAG Collection Data

Item	Description
IAG Collection Name	NJNXNA_Backup_Restore
Source code published/not published	Not Published

### Input Variables

None

### In-Out Variables

None

### Location and Quantity Allowed

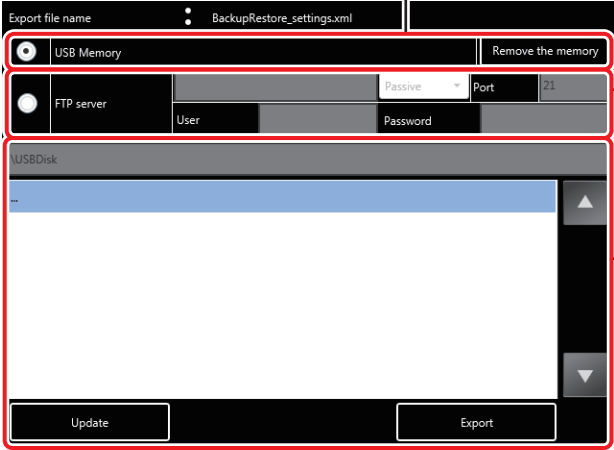
Item	Description
HMI Project Type	Standard Project
Page Type	Main Pages
Qty	1 in a project

### Functions

- Once BackupToUSBMemory or BackupToFTPServer completes a backup successfully, they save the backup data to the specified location, as well as to the SD memory Card in the NA-series Programmable Terminal as the latest backup. CompareToLatestBackup compares actual device status against this latest backup data.
- Even when the settings are configured to back up device data that has been changed since the last backup, the data comparison is executed for all the target devices.
- The comparison is executed for each device, and the result per device is displayed.

# ExportBRConfiguration

Exports a file containing the backup and restore settings saved by ConfigureBackup and ConfigureRestore to the specified save-in location.

Item	Description		
IAG name	ExportBRConfiguration		
Name	Exporting the Configuration of Backup and Restore		
Category	NJ/NX/NA Backup Restore		
User interface and appearance	<p>(1) Set USB Memory as the export destination</p>  <p>(2) Set FTP Server as the export destination</p> <p>(3) Set a directory used as the export destination</p>		
Part names and functions	(1)	View and Operation	Select here to export the settings to the USB flash drive on the NA-series Programmable Terminal. To remove the USB flash drive, touch the <b>Remove the memory</b> button first and then remove the USB flash drive.
	(2)	View and Operation	Select here to export the settings to an FTP server that is accessible by the NA-series Programmable Terminal. Set <i>Host Name or IP Address</i> of the FTP server, <i>Mode</i> , <i>Port No.</i> , <i>User Name</i> , and <i>Password</i> .
	(3)	View and Operation	Select a destination folder for export. <ul style="list-style-type: none"> <li>Select a folder name from the list and touch the <b>Update</b> button to show a list of files and folders in the selected folder.</li> <li>Select ... from the list and touch the <b>Update</b> button to list the contents of the folder immediately above the current folder.</li> <li>From the list, select a destination folder for export. Touch the <b>Update</b> button and then touch the <b>Export</b> button to export the file <i>BackupRestore_Settings.xml</i> to the selected folder.</li> </ul>

## IAG Collection Data

Item	Description
IAG Collection Name	NJNXNA_Backup_Restore
Source code published/not published	Not Published

## Input Variables

None

## In-Out Variables

None

## Location and Quantity Allowed

Item	Description
HMI Project Type	Standard Project
Page Type	Main Pages
Qty	1 in a project

## Functions

- ExportBRConfiguration exports the settings saved by ConfigureBackup and ConfigureRestore and saves them as a file.
- Select a save-in folder and touch the **Export** button to save the file.
- The file is always named *BackupRestore\_settings.xml*. You cannot specify the file name.



### Precautions for Correct Use

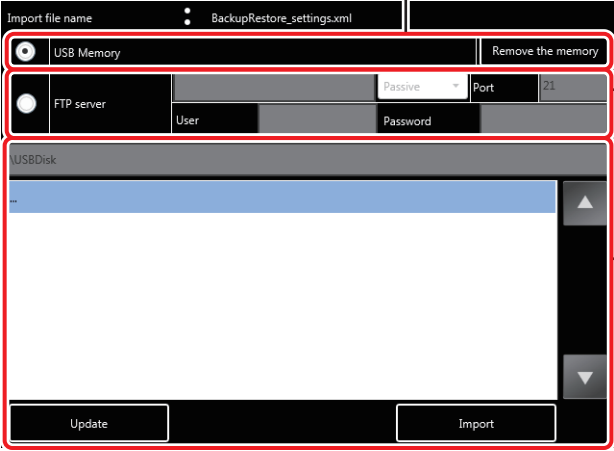
The structure of a file saved with ExportBRConfiguration is not published. If you change the file contents, the import does not work with ImportBRConfiguration, or the function does not work correctly due to an error generated during the IAG execution. Do not change the contents of the file.



# ImportBRConfiguration

Imports the backup and restore settings that were exported to a file by using ExportBRConfiguration and reflects the settings of ConfigureBackup and ConfigureRestore.

Item	Description
IAG name	ImportBRConfiguration
Name	Importing the Configuration of Backup and Restore
Category	NJ/NX/NA Backup Restore

User interface and appearance	<p>(1) Set USB Memory as the import source</p>  <p>(2) Set FTP Server as the import source</p> <p>(3) Set a directory used as the import source</p>		
-------------------------------	--	--	--

Part names and functions	(1)	View and Operation	Select here to import the settings from the USB flash drive on the NA-series Programmable Terminal. To remove the USB flash drive, touch the <b>Remove the memory</b> button first and then remove the USB flash drive.
	(2)	View and Operation	Select here to import the settings from the FTP server that is accessible by the NA-series Programmable Terminal. Set <i>Host Name or IP Address</i> of the FTP server, <i>Mode</i> , <i>Port No.</i> , <i>User Name</i> , and <i>Password</i> .
	(3)	View and Operation	Select a file to import. <ul style="list-style-type: none"> <li>• Select a folder name from the list and touch the <b>Update</b> button to show a list of files and folders in the selected folder.</li> <li>• Select ... from the list and touch the <b>Update</b> button to list the contents of the folder immediately above the current folder.</li> <li>• From the list, select the exported file <i>BackupRestore_Settings.xml</i> and touch the <b>Import</b> button to import the specified file.</li> </ul>

## IAG Collection Data

Item	Description
IAG Collection Name	NJNXNA_Backup_Restore
Source code published/not published	Not Published

## Input Variables

None

## In-Out Variables

None

## Location and Quantity Allowed

Item	Description
HMI Project Type	Standard Project
Page Type	Main Pages
Qty	1 in a project

## Functions

- ImportBRConfiguration reads out the file saved by ExportBRConfiguration and reflects the settings to ConfigureBackup and ConfigureRestore.
- Select *BackupRestore\_settings.xml*, which is the file saved by ExportBRConfiguration. Touch the **Import** button to read out the settings.



### Precautions for Correct Use

The structure of a file saved with ExportBRConfiguration is not published. If you change the file contents, the import does not work with ImportBRConfiguration, or the function does not work correctly due to an error generated during the IAG execution. Do not change the contents of the file.



# Troubleshooting

This section describes errors that may appear when you execute a backup, restore, or comparison by using the IAGs, as well as how to troubleshoot them.

---

4-1	IAG Error Display .....	4-2
4-2	IAG Error Message List .....	4-3

## 4-1 IAG Error Display

---

The IAGs check the data and storage location that are necessary for execution. When the execution fails to start, an error is displayed. If the execution fails due to the status of devices after the execution has started, an error is also displayed.

The NA-series Programmable Terminal window displays the error with the front LED blinking red or the IAG message area displays the error with the LED being lit green.

## 4-2 IAG Error Message List

Error message	Display format	Cause	Correction
<p>You may see one or both of the following messages:</p> <p>E_SYS_999: File save destination info. &lt;Error&gt;: No USB memory is inserted.</p> <p>E_SYS_999: Value does not fall within the expected range.</p>	Dialog	<p>You have performed any of the following actions without inserting a USB Memory device to the NA-series Programmable Terminal:</p> <ul style="list-style-type: none"> <li>• Displayed ConfigureRestoreSettings.</li> <li>• Tried to access the USB Memory device in ExportBRSettings.</li> <li>• Tried to access the USB Memory device in ImportBRSettings.</li> </ul>	<ul style="list-style-type: none"> <li>• Insert the USB Memory device correctly.</li> <li>• Check the free space of the USB Memory device.</li> </ul>
E_SYS_999: TypeLoadException	Dialog	<p>You have performed the following action without inserting an SD Memory Card to the NA-series Programmable Terminal:</p> <ul style="list-style-type: none"> <li>• Tried to select the last backup data in ConfigureRestoreSettings.</li> </ul>	<ul style="list-style-type: none"> <li>• Insert the SD Memory Card correctly.</li> <li>• Check the free space of the SD Memory Card.</li> </ul>
E_SYS_999: Failed to generate a log file. Check the output destination.	Dialog	<p>You have performed the following action while the FTP server is not accessible from the NA-series Programmable Terminal:</p> <ul style="list-style-type: none"> <li>• Executed a backup with BackupToFTP-server.</li> </ul>	<ul style="list-style-type: none"> <li>• Check the FTP server settings, communications, and server behaviors.</li> </ul>
Info=File save destination info. <Error>: The USB memory is not recognized.	Message area	<p>You have performed the following action without inserting a USB Memory device to the NA-series Programmable Terminal:</p> <ul style="list-style-type: none"> <li>• Executed a backup with BackupToUSB-memory.</li> </ul>	<ul style="list-style-type: none"> <li>• Insert the USB Memory device correctly.</li> <li>• Check the free space of the USB Memory device.</li> </ul>
Info=No SD Memory Card is inserted to the HMI.	Message area	<p>You have performed any of the following actions without inserting an SD Memory Card to the NA-series Programmable Terminal:</p> <ul style="list-style-type: none"> <li>• Executed a backup with BackupToUSB-memory.</li> <li>• Executed RestoreFromUSBmemory with the latest backup data specified for the restore.</li> </ul>	<ul style="list-style-type: none"> <li>• Insert the SD Memory Card correctly.</li> <li>• Check the free space of the SD Memory Card.</li> </ul>
Info=File save destination info. <Error>: Could not access the specified FTP server.	Message area	<p>You have performed the following action while the FTP server is not accessible from the NA-series Programmable Terminal:</p> <ul style="list-style-type: none"> <li>• Executed a backup with BackupToFTP-server.</li> </ul>	<ul style="list-style-type: none"> <li>• Check the FTP server settings, communications, and server behaviors.</li> </ul>
Info=Failed to generate a log file. Check the output destination.	Message area	<p>You have performed the following action without inserting an SD Memory Card to the NA-series Programmable Terminal:</p> <ul style="list-style-type: none"> <li>• Executed CompareToLatestBackup.</li> </ul>	<ul style="list-style-type: none"> <li>• Insert the SD Memory Card correctly.</li> </ul>

Error message	Display format	Cause	Correction
Info=Necessary backup data for restoring and comparison is missing.	Message area	<p>You have performed any of the following actions without storing the last backup data to the SD Memory Card inserted to the NA-series Programmable Terminal:</p> <ul style="list-style-type: none"> <li>• Executed CompareToLatestBackup.</li> <li>• Executed RestoreFromUSBmemory with the latest backup data specified for the restore.</li> </ul>	<ul style="list-style-type: none"> <li>• Check to see if the last backup data is correctly stored in the SD Memory Card.</li> </ul>
Info=File save destination info. <Error>: No USB memory is inserted.	Message area	<p>You have performed the following action without inserting a USB Memory device to the NA-series Programmable Terminal:</p> <ul style="list-style-type: none"> <li>• Executed RestoreFromUSBmemory with backup data in the USB Memory device specified for the restore.</li> </ul>	<ul style="list-style-type: none"> <li>• Insert the USB Memory device correctly.</li> <li>• Check to see if the configured backup data is stored in the USB Memory device.</li> </ul>



# Appendices

The appendices provide useful information, including how you can reference IAG information and how IAG versions are related.

---

<b>A-1</b>	<b>Referencing IAG Information .....</b>	<b>A-2</b>
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A-2-3	Oldest Runtime Version Supported by IAG .....	A-4



# A-1 Referencing IAG Information

When you make an IAG-related inquiry to OMRON, you can refer to the IAG information to identify the relevant IAGs.

This information helps you identify the IAGs among others provided by OMRON or defined by the users.

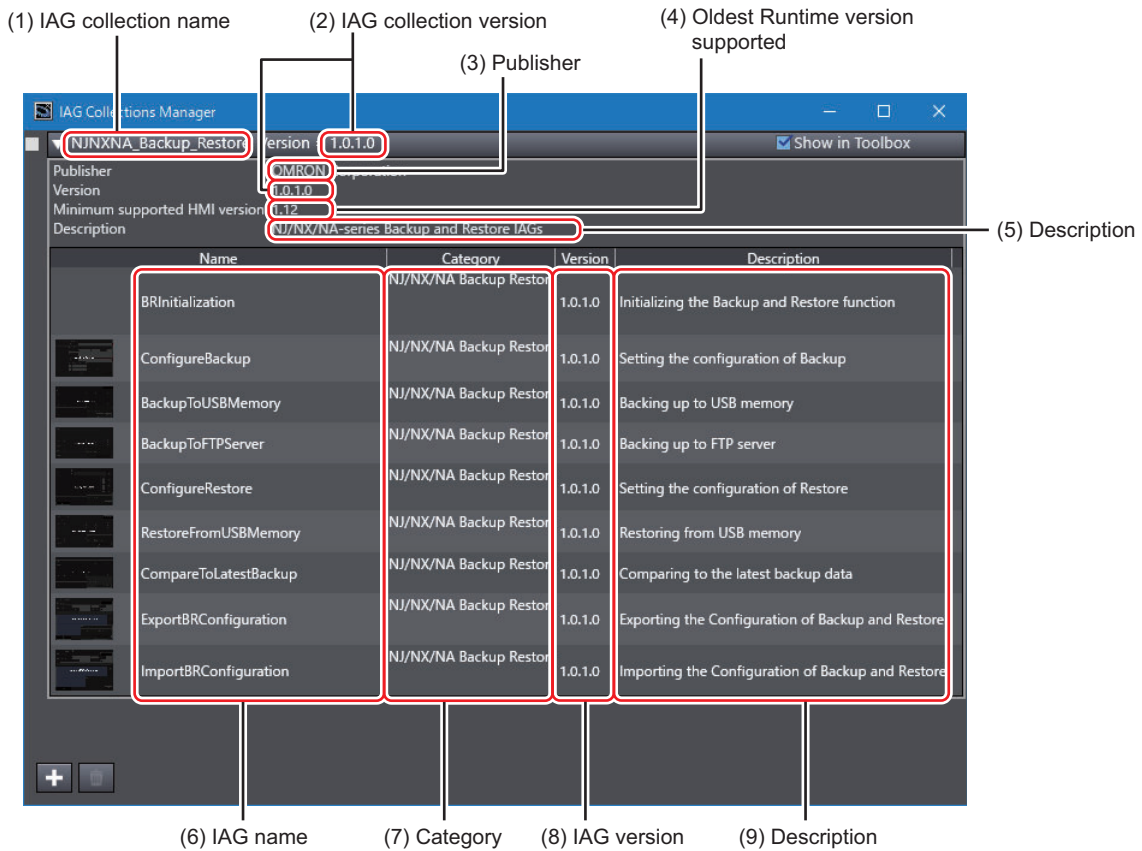
The IAG information contains the following two types of attributes: one is the IAG collection attribute, which represents the attribute of collective IAGs, and the other is the attribute of each IAG used on HMI project pages.

- IAG collection attribute:  
Information used for identifying an IAG collection managed by the IAG Collections Manager
- IAG attribute:  
Information used for identifying an IAG (instance) selected in a project page

Use the Sysmac Studio to access the IAG information.

## A-1-1 IAG Collection Attributes and Reference Method

On the menu, select **Project - IAG Collections Manager** to display the IAG collection list. Expand the relevant IAG collection to reference the attribute.



No.	Attribute	Description
(1)	IAG collection name	Name of the IAG collection
(2)	IAG collection versions	Version of the IAG collection



No.	Attribute	Description
(3)	Publisher	Name of the person who created the IAGs included in the IAG collection
(4)	Oldest Runtime version supported	HMI project version supported for using the IAGs included in the IAG collection
(5)	Description	Description of the IAG collection
(6)	IAG name	Name of the IAG
(7)	Category	Category used for displaying the IAG on the Toolbox
(8)	IAG versions	Version of the IAG
(9)	Description	Description of the IAG

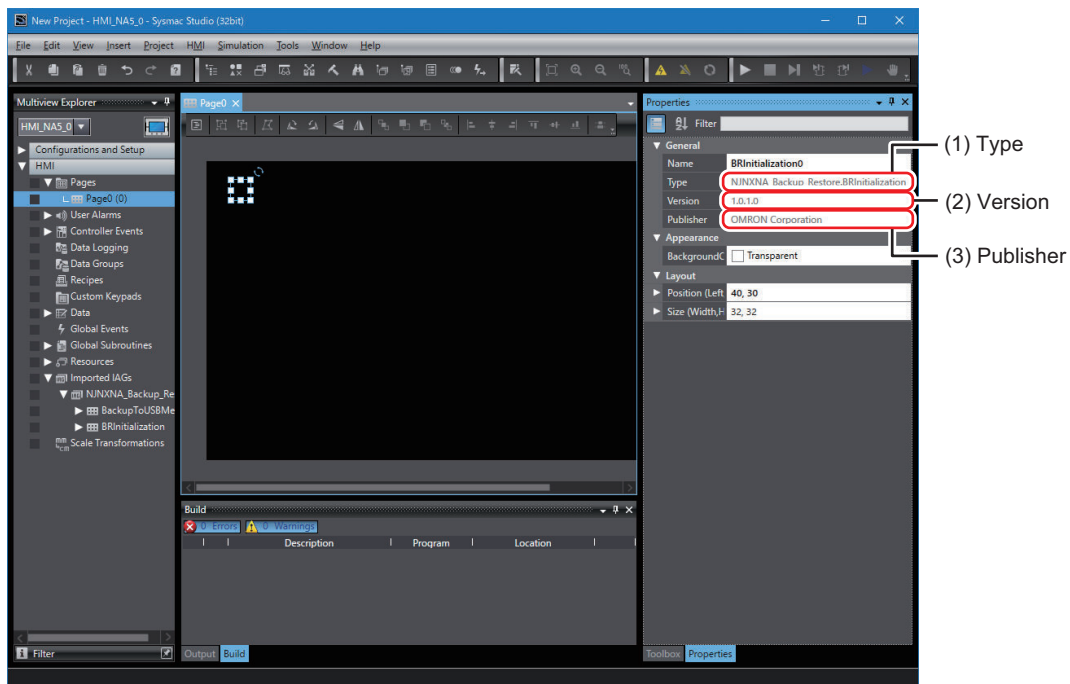


**Additional Information**

IAG collection attribute data is not multilingual. It is displayed only in English.

## A-1-2 IAG Attributes and Reference Method

When you select an IAG on the page editor for an HMI project, the Properties window shows its attribute information.



No.	Attribute	Description
(1)	Type	IAG collection name and IAG name Two names are displayed with a period in between
(2)	Version	IAG version
(3)	Publisher	Name of the person who created the IAG included in the IAG collection



**Additional Information**

IAG attribute data is not multilingual. It is displayed only in English.

## A-2 IAG Versions

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This section describes the IAG versions.

To use IAGs, you need to manage their version information as specified below.

- IAG collection version
- IAG version
- Oldest Runtime version supported by IAG

### A-2-1 IAG Collection Versions

An IAG collection contains one or more IAGs related to a specific function. Each IAG collection is assigned a version number.

Check the version information of your registered IAG collections to confirm if they are the latest versions.

Refer to *A-1 Referencing IAG Information* on page A-2 for the procedure to check the IAG collection version.

### A-2-2 IAG Versions

Each IAG in an IAG collection is assigned a version number. It is called an IAG version.

Check the version information of your IAGs to confirm if they are the latest versions. Even if an IAG collection is upgraded, this does not necessarily mean that all the IAGs contained in the IAG collection are upgraded. To confirm if all the IAGs are properly upgraded, check the IAG version of each IAG.

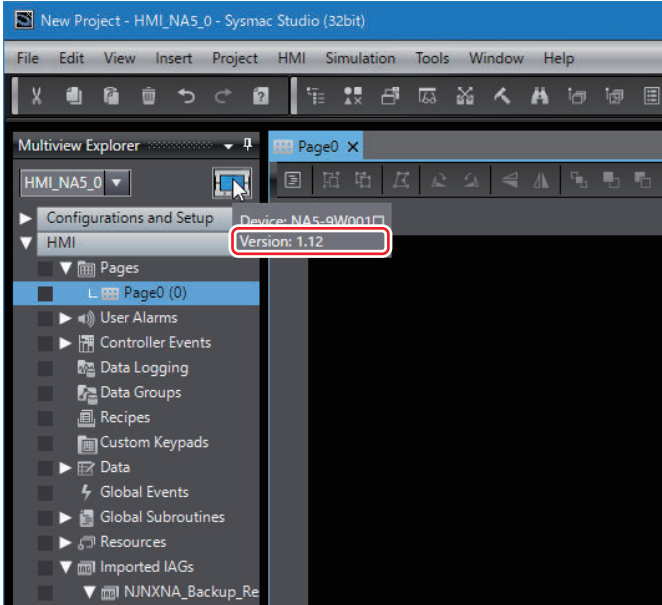
Refer to *A-1 Referencing IAG Information* on page A-2 for the procedure to reference the IAG versions.

### A-2-3 Oldest Runtime Version Supported by IAG

This is the Runtime version that can run the IAG. NA-series Programmable Terminals have middle-ware called Runtime, which executes HMI projects and supports different functions according to the Runtime version. When you select a Runtime version in creating a HMI project on the Sysmac Studio, it should be newer than the oldest Runtime version supported by the IAGs; otherwise, the IAGs cannot be used for the HMI project.

Refer to *A-1 Referencing IAG Information* on page A-2 for the procedure to check the oldest Runtime version supported by the IAG.

The Runtime version of an HMI project is displayed in the Multiview Explorer as shown below.



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**Note: Do not use this document to operate the Unit.**

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