

NO: PC-338 **PRODUCT:** NJ/NX Controller CPU Firmware
DATE: January 2017 **TYPE:** Modification Notice

NJ/NX series CPU Firmware Version 1.13 Release

Effective date: October 2016

Reason for modification: Improve downloading functionality and add support for NX1P series controllers.

Starting October 3, 2016, some NJ/NX series machine automation controllers will ship with upgraded Version 1.13 firmware installed. The remaining controllers are being released at a later date TBD. This upgrade is intended to improve the performance and usability of the controllers.

Note: The NX1P2 CPU line launched in November, 2016.

Firmware Release Date by Series

Series	Type	Model	Release date
NX701	Standard	NX701-1600/1700	October 2016
NX501	Standard	NJ501-1300/1400/1500	March 2017 TBD
	Database	NJ501-1320/1420/1520	March 2017 TBD
	SECS-GEM	NJ501-1340	March 2017 TBD
	Robot	NJ501-4300/4400/4500/4310	March 2017 TBD
	Robot and Database	NJ501-4320	March 2017 TBD
NJ301	Standard	NJ301-1100/1200	October 2016
NJ101	Standard	NJ101-1000/9000	October 2016
	Database	NJ101-1020/9020	October 2016
NX1P	Standard	NX1P2-□□□□□□/ NX1P2-□□□□□□1	October 2016

See the following pages for details about the performance improvements.

Detail of Differences

Functions supported by Firmware Version 1.13 (Using Sysmac Studio Version 1.17 or higher):

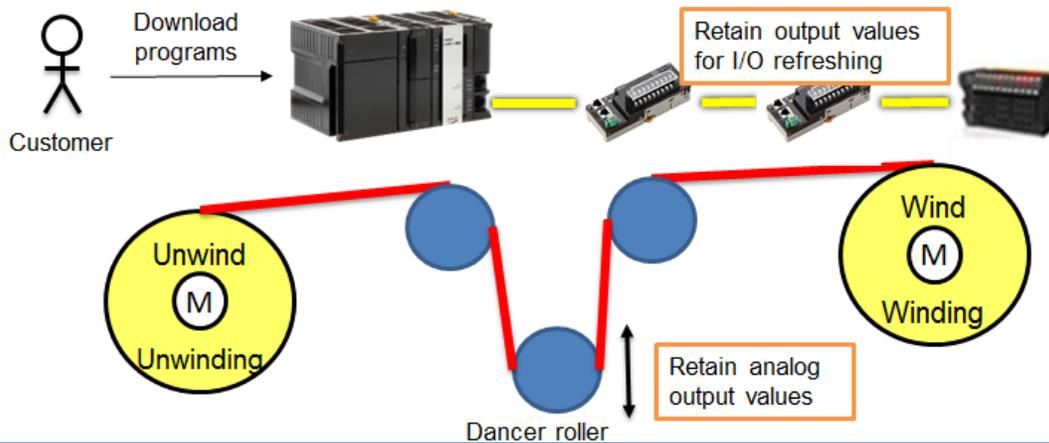
1. Retain the output values of the device when downloading programs:

From

When you download the user program from Sysmac Studio, the CPU stops I/O refreshing and variables are initialized after downloading.

To Enhancing the function!

When you download the user program from Sysmac Studio, the transfer processing can be executed while retaining the output values of the device. Accordingly, the recovery time of equipment can be reduced by keeping the equipment status when you update programs in the equipment.



Overview of the function

- You can set operations when the operating mode changes or when downloading according to the `_DeviceOutHoldCfg` (Device Output Hold Configuration) system-defined variable. Device outputs are retained even when the operating mode changes or when downloading if the device output hold configuration is set to enable (16#A5A5).

Status	Device output hold configuration	
	Disable (other than 16#A5A5)	Enable (16#A5A5)
When the operating mode is changed	Variables are initialized.	Values of variables are retained.
When downloaded	I/O refreshing is stopped and variables are initialized after downloading.	I/O refreshing is executed and values of variables are retained after downloading.

- This function only supports download from Sysmac Studio. This function does not support download with other methods, such as restore operation, automatic transfer, and program updates without Sysmac Studio.
- You can use this function in combination with Sysmac Studio version 1.17 or higher.

Behaviors when changing the operating modes

If the device output hold configuration is set to enable, the operations are given in the following table when changing the operating modes (RUN mode to PROGRAM mode or PROGRAM mode to RUN mode).

Retain attribute	Types of variables	Device output hold configuration is set to enable	Device output hold configuration is set to disable
Not retained	User-defined variables	A memory initialization is performed.	A memory initialization is performed.
	EtherCAT slave device variables	Values are retained.	A memory initialization is performed.
	NX Unit device variables	Values are retained.	A memory initialization is performed.
	CJ Unit device variables	Values are retained.	A memory initialization is performed.
	Memory used for CJ-series Units (CIO/WR areas)	Values are retained.	A memory initialization is performed.
Retained	User-defined variables	Values are retained.	Values are retained.
	CJ Unit device variables	Values are retained.	Values are retained.
	Memory used for CJ-series Units (HR/DM/EM areas)	Values are retained.	Values are retained.

■ Behaviors when downloading

- The device outputs are retained when downloading from Sysmac Studio. It can be achieved by continuing I/O refreshing in the status that the values of device variables are retained while downloading.
- If you change the EtherCAT configuration or the operation settings, the output status of equipment may change. Therefore, the EtherCAT configuration and operation settings cannot be changed with retaining the device outputs.
- If Configurations and Setup other than the user program are changed, a warning message that the device outputs cannot be retained is displayed to users before downloading from the Sysmac Studio.

The following table shows what can retain the device outputs when downloading if the items of Configurations and Setup, and programs are changed.

Name of settings		Behavior for different settings
EtherCAT settings		Device outputs are not retained. (*1) (*2)
CPU/Expansion Racks		Device outputs are not retained. (*2)
Controller Setup		Device outputs are not retained.
Motion Control Setup	Axis Settings	Device outputs are not retained.
Cam data settings		Device outputs are not retained.
Event settings		Device outputs are retained.
Task settings	Task Settings	Device outputs are not retained.
	I/O Control Task Settings	Device outputs are not retained.
	Program Assignment Settings	Device outputs are retained.
	Settings for Exclusive Control of Variables in Tasks	Device outputs are not retained.
Programming – POU		Device outputs are retained.
Programming – Data		Device outputs are retained.
EtherNet/IP Port Settings, Connection Settings (Network Configuration)		Device outputs are retained.
Host connection settings	DB Connection Settings	Device outputs are retained.

*1: If you want to change the backup parameters of the EtherCAT slaves with retaining the device outputs, change the settings from the Backup Parameter Settings Tab Page of the EtherCAT slaves individually.

*2: If you want to change the Unit operation settings of the NX Units with retaining the device outputs, change the settings from the Edit Unit Operation Settings Tab Page of the NX Units individually.

■ System-defined variables

Newly add a system-defined variable to make the device output hold configuration and a system-defined variable to indicate the device output hold status.

Variable	Meaning	Function	Data type	R/W
_DeviceOutHoldCfg	Device Output Hold Configuration	It is 16#A5A5 if you retain the target device output when the operating mode is changed or when downloaded. In the case other than 16#A5A5, the target device output is initialized when the operating mode is changed or when downloaded.	WORD	RW
_DeviceOutHoldStatus	Device Output Hold Status	It is TRUE if the target device output is retained when the operating mode is changed or when downloaded. When the device output hold configuration is other than 16#A5A5, or when a major fault level Controller error occurs, the target device output is initialized and changes to FALSE.	BOOL	R

■ Event logs

Output the device output hold status when changing the operating mode or downloading to the attached information of an event log.

Event name	Event code	Attached information 1	Attached information 2	Attached information 3	Attached information 4
Operation Started	90130000 hex	Device Output Hold Status 1 : Retained. 2 : Not retained.	None	None	None
Operation Stopped	90140000 hex	Device Output Hold Status 1 : Retained. 2 : Not retained.	None	None	None
User Program/Controller Configuration and Setup Downloaded	90050000 hex	Connection method	Connecting IP address	Device Output Hold Status 1 : Retained. 2 : Not retained.	None

Manual

- ✓ 7-5 Performing Online Debugging in the Sysmac Studio Version 1 Operation Manual
- ✓ 6-3-9 Changes to Variables for Status Changes in the NJ/NX-series CPU Unit Software User's Manual

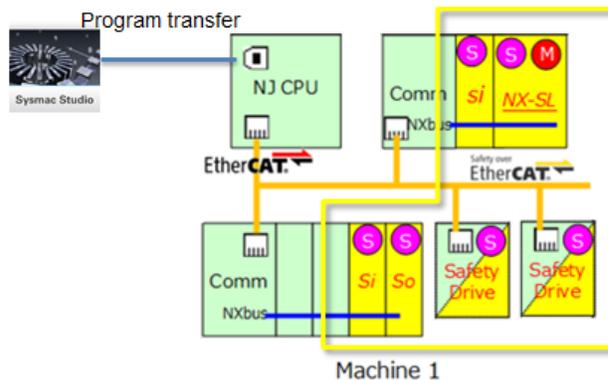
2. Continue safety system communications in the equipment when downloading programs

From

In an integrated safety control system that Safety CPU Units and Safety I/O Units are mounted on the EtherCAT Coupler Unit, the safety system communications in the equipment are stopped before transfer processing is completed when you download user program from Sysmac Studio.

To **Enhancing the function!**

In an integrated safety control system that Safety CPU Units and Safety I/O Units are mounted on the EtherCAT Coupler Unit, transfer processing can be executed while continuing safety system communications in the equipment when you download user program from Sysmac Studio.



Continue safety communications even if the programs are being transferred.

Ensure the safety of operators in the system commissioning and adjustment operation even if the programs are being transferred!

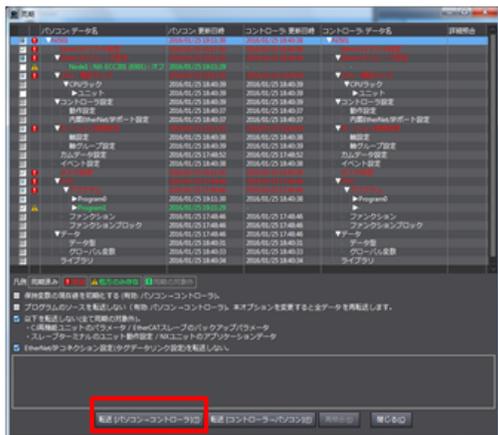
Overview of the function

- Continue safety communications when downloading programs from Sysmac Studio.
- This function only supports download from Sysmac Studio. This function does not support download with other methods, such as restore operation, automatic transfer, and program updates without Sysmac Studio.
- You can use this function in combination with Sysmac Studio version 1.17 or higher.
- Only a part of settings can be changed to continue the safety communications. If the items, which are set to *Communications stop* in the following table, are included in the transfer targets, the safety communications are stopped and the safety system is stopped. (i.e. The safe state is entered.)

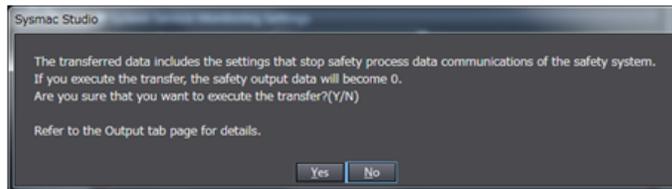
How to transfer	Transfer target	Setting item	Safety system in the equipment (built-in EtherCAT communications and built-in NX bus communications)
Synchronized transfer	EtherCAT		Communications stop
	CPU/Expansion Racks	CJ Unit Configuration	Communications stop
	I/O Map	Device Variable Names	Communications continue
	Controller Setup	Operation Settings	Communications stop
		Built-in EtherNET/IP Port Settings	Communications stop
	Motion Control Setup	Axis Settings	Communications stop
		Axes Group Settings	Communications stop
	Cam data settings		Communications stop
	Event settings		Communications continue
	Task settings	Task Settings	Communications stop
		I/O Control Task Settings	Communications stop
		Program Assignment Settings	Communications continue
Settings for Exclusive Control of Variables in Tasks		Communications stop	
POUs	Programs	Communications continue	
Data	Functions	Communications continue	
Synchronized transfer	Built-in EtherNET/IP port	Connection Settings	Communications continue
Synchronized transfer	EtherCAT	Slave Settings (backup parameters only)	Communications continue
Synchronized transfer	DB connection	DB Connection Service Settings	Communications continue
Individual transfer	SECS communications	SECS Communications Settings	Communications continue

Operation of program transfer

- When data are transferred from the computer to the Controller, a check message is displayed if the settings that stop safety process data communications are included.
- The warning message is displayed only when the Safety CPU Unit is registered on the Sysmac Studio.



Warning message



Manual
 ✓ 7-5 Performing Online Debugging in the Sysmac Studio Version 1 Operation Manual

Specifications and prices in this product news are as of the issue date and are subject to change without notice. Only main changes in specifications are described in this document. Please be sure to read the relevant catalogs, datasheets, product specifications, instructions, and manuals for precautions and necessary information when using products.