

Sysmac Studio for machine creators

The Sysmac Studio provides an integrated development environment to set up, program, debug, and maintain NJ-series Controllers and other Machine Automation Controllers, as well as EtherCAT slaves.



Features

- One software for motion, drives and vision
- Fully compliant with open standard IEC 61131-3
- Supports Ladder, Structured Text and Function Block programming with a rich instruction set
- CAM editor for easy programming of complex motion profiles
- One simulation tool for sequence and motion in a 3D environment
- Advanced security function with 32 digit security password

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Ordering Information

Automation Software

Please purchase a DVD and licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. The license does not include the DVD.

Product	Specifications		Model	Standards		
	Number of licenses	Media				
Sysmac Studio Standard Edition Ver.1.□□		– (Media only)	DVD *1	SYSMAC-SE200D	–	
	The Sysmac Studio provides an integrated development environment to set up, program, debug, and maintain NJ-series Controllers and other Machine Automation Controllers, as well as EtherCAT slaves. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher, 32-bit version) / Vista (32-bit version) / 7 (32-bit/64-bit version)	1 license	–	–	SYSMAC-SE201L	–
		3 licenses	–	–	SYSMAC-SE203L	–
		10 licenses	–	–	SYSMAC-SE210L	–
		30 licenses	–	–	SYSMAC-SE230L	–
		50 licenses	–	–	SYSMAC-SE250L	–
Sysmac Studio Vision Edition Ver.1.□□ *2 *4		Sysmac Studio Vision Edition is a limited license that provides selected functions required for FQ-M-series Vision Sensor settings.	1 license	–	SYSMAC-VE001L	–
Sysmac Studio Measurement Sensor Edition Ver.1.□□ *3 *4	Sysmac Studio Measurement Sensor Edition is a limited license that provides selected functions required for ZW-series Displacement Sensor settings.	1 license	–	SYSMAC-ME001L	–	
		3 licenses	–	SYSMAC-ME003L	–	

Note: Site licenses are available for users who will run Sysmac Studio on multiple computers. Ask your OMRON sales representative for details.

*1. The same media is used for both the Standard Edition and the Vision Edition.

*2. With the Vision Edition, you can use only the setup functions for FQ-M-series Vision Sensors.

*3. With the Measurement Sensor Edition, you can use only the setup functions for ZW-series Displacement Sensors.

*4. This product is a license only. You need the Sysmac Studio Standard Edition DVD media to install it.

Components

DVD (SYSMAC-SE200D)

Components	Details
Introduction	An introduction about components, installation/uninstallation, user registration and auto update of the Sysmac Studio is provided.
Setup disk (DVD-ROM)	1

License (SYSMAC-SE2□□L/VE0□□L/ME0□□L)

Components	Details
License agreement	The license agreement gives the usage conditions and warranty for the Sysmac Studio.
License card	A model number, version, license number, and number of licenses are described.
User registration card	Two cards are contained. One is for users in Japan and the other is for users in other countries.

Included Support Software

DVD media of Sysmac Studio includes the following support software.

Included Support Software	Outline
CX-Designer Ver.3.□	The CX-Designer is used to create screens for NS-series PTs.
CX-Integrator Ver.2.□	The CX-Integrator is used to set up FA networks.
CX-Protocol Ver.1.□	The CX-Protocol is used for protocol macros for Serial Communications Units.
Network Configurator Ver.3.□	The Network Configurator is used for tag data links on the built-in EtherNet/IP port.

System Requirements

Item	Requirement
Operating system (OS) *1 *2	Windows XP (Service Pack 3 or higher, 32-bit version)/Vista(32-bit version)/7(32-bit/64-bit version)
CPU	Windows computers with Celeron 540 (1.8 GHz) or faster CPU. Core i5 M520 (2.4 GHz) or equivalent or faster recommended
Main memory *3	2 GB min.
Recommended video memory / video card for using 3D motion trace	Video memory: 512 MB min. Video card: Either of the following video cards: <ul style="list-style-type: none"> • NVIDIA® GeForce® 200 Series or higher • ATI RadeonHD5000 Series or higher
Hard disk	At least 1.6 GB of available space
Display	XGA 1024 × 768, 16 million colors. WXGA 1280 × 800 min. recommended
Disk drive	DVD-ROM drive
Communications ports	USB port corresponded to USB 2.0, or Ethernet port *4
Supported languages *5	Japanese, English, German, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean

*1. Sysmac Studio Operating System Precaution: System requirements and hard disk space may vary with the system environment.

*2. The following restrictions apply when Sysmac Studio is used with Microsoft Windows Vista or Windows 7.

1) Some Help files cannot be accessed.

The Help files can be accessed if the Help program distributed by Microsoft for Windows (WinHlp32.exe) is installed. Refer to the Microsoft homepage listed below or contact Microsoft for details on installing the file. (The download page is automatically displayed if the Help files are opened while the user is connected to the Internet.)

<http://support.microsoft.com/kb/917607/en-us>

2) The following restrictions apply to some application operations.

Application	Restriction
CX-Designer	If a new Windows Vista or Windows 7 font (e.g., Meiryo) is used in a project, the font size on labels may be bigger and protrude from the components if the project is transferred from CX-Designer running on a Windows XP or earlier OS to the NS/NSJ.
CX-Integrator/Network Configurator	Although you can install CPS files, EDS files, Expansion Modules, and Interface Modules, the virtual store function of Windows Vista or Windows 7 imposes the following restrictions on the use of the software after installation. <ul style="list-style-type: none"> • If another user logs in, the applications data will need to be installed again. • The CPS files will not be automatically updated. These restrictions will not exist if application data is installed using Run as Administrator.

*3. The amount of memory required varies with the Support Software used in Sysmac Studio for the following Support Software. Refer to user documentation for individual Support Software for details.

CX-Designer, CX-Protocol, and Network Configurator

*4. Refer to the hardware manual for your CPU unit for hardware connection methods and cables to connect the computer and CPU unit.

*5. Supported only by the Sysmac Studio version 1.01 or higher about German, French, Italian and Spanish.

Supported only by the Sysmac Studio version 1.02 or higher about simplified Chinese, traditional Chinese and Korean.

Common Function Specifications

	Item	Function	Applicable versions
Setting Parameters	EtherCAT Configuration and Setup		All versions
	Registering slaves	You can set up devices by dragging slaves from the device list displayed in the Toolbox Pane to the locations where you want to connect them.	
	Setting master parameters	You set the common parameters of the EtherCAT network (e.g., the fail-soft operation and wait time for slave startup settings).	
	Setting slave parameters	You set the standard slave parameters and assign PDOs (process data objects).	
	Comparing and merging network configuration information	The EtherCAT network configuration information in the NJ-series CPU Unit and in the Sysmac Studio are compared and the differences are displayed.	
	Transferring the network configuration information	The EtherCAT network configuration information is transferred to the NJ-series CPU Unit. Or, the EtherCAT network configuration information in the NJ-series CPU Unit is transferred to the Sysmac Studio and displayed in the EtherCAT Editor.	
	Installing ESI files	ESI (EtherCAT slave information) files are installed.	
	CPU/Expansion Rack Configuration and Setup		All versions
	Registering Units	A Rack is built by dragging Units from the device list displayed in the Toolbox Pane to the locations where you want to mount them.	
	Creating Racks	An Expansion Rack (Power Supply Unit, I/O Interface Unit, and End Cover) is added.	
	Switching Unit displays	The model number, unit number, and slot number are displayed.	
	Setting Special Units	The input time constants are set for Input Units and parameters are set for Special Units.	
	Displaying Rack widths, current consumption, and power consumption	The Rack widths, current consumption, and power consumption are displayed based on the Unit configuration information.	
	Comparing the CPU/Expansion Rack configuration information with the physical configuration	When online, you can compare the configuration information in the project with the physical configuration. You can also select the missing Units and add them.	
	Transferring the CPU/Expansion Rack configuration information	The Unit configuration information is transferred to the CPU Unit. The synchronize function is used.	
	Printing the Unit configuration information	The Unit configuration information is printed.	
	Controller Setup		All versions
	Operation Settings	The Startup Mode, SD Memory Card diagnosis at Startup, Write Protection at Startup, Controller Error Level Changes #1, and other settings are made.	
	Transferring Operation Settings	Use the synchronize operation to transfer the operation settings to the NJ-series CPU unit.	
	Built-in EtherNet/IP Port Settings	These settings are made to perform communications using the built-in EtherNet/IP port of the NJ-series CPU unit.	
	Transferring Built-in EtherNet/IP Port Settings	Use the synchronize operation to transfer the Built-in EtherNet/IP Port Settings to the NJ-series CPU unit.	
	Motion Control Setup		All versions
	Axis Settings	Axes are added to the project.	
	Axis Setting Table	The Axis Setting Table is a table of all registered axis parameters. You can edit any axis parameters here just as you can on the Axis Settings Tab Page.	
	Axes Group Settings		All versions
	Axis Group Basic Settings	Set the axes group number, whether to use the axes group, the composition, and the composition axes.	
	Operation Settings	Set the interpolated velocity, the maximum interpolated acceleration and deceleration, and the interpolated operation settings.	
	Cam Data Settings		All versions
	Registering cam data settings	Cam data settings is added to the project.	
	Editing cam data settings	You can set properties and node points for cam data settings.	
Transferring cam data settings	You can select to transfer all or part of the cam data.		
Importing cam data settings	You can import cam data settings from a CSV file.		
Exporting cam data settings	You can export cam data to a CSV file.		
Exporting cam tables	You can export a cam table to a CSV file.		
Transferring cam tables from the Controller to files	You can save a cam table in the NJ-series CPU unit to a CSV file.		

*1. Changing event levels for Controller errors is supported by version 1.04 or higher.

Item		Function	Applicable versions	
Setting Parameters	Cam Data Settings	Transferring cam tables from files to the Controller	You can transfer a cam table that is saved in a CSV file to update the contents of a cam table that is already in the NJ-series CPU unit.	All versions
		Superimposing Cam Table	You can superimpose the cam table from a CSV file on the cam profile curve position graph that is currently displayed.	
	Task Setup	Programs are executed in tasks in an NJ-series CPU Unit. The Task Settings define the execution period, the execution timing, the programs executed by the task, the I/O refreshing performed by the task, and which variables to share between tasks.		All versions
		Registering tasks	The tasks, which are used to execute programs, are registered.	
		Setting task I/O	The task I/O settings define what Units the task should perform I/O refreshing for.	
		Assigning programs	Program assignments define what programs a task will execute.	
	I/O Map Settings	The I/O ports that correspond to the registered EtherCAT slaves and to the registered Units on the CPU Rack and Expansion Racks are displayed. The I/O Map is edited to assign variables to I/O ports. The variables are used in the user program.		All versions
		Displaying I/O ports	I/O ports are displayed based on the configuration information of the devices (slaves and Units).	
		Assigning variables	Variables are assigned to I/O ports.	
		Creating device variables	Device variables are created in the I/O Map. You can either automatically create a device variable or manually enter the device variable to create.	
		Checking I/O assignments	The assignments of external I/O devices and variables are checked.	
Vision Sensor Settings		You can set and calibrate Vision Sensors. Refer to " Function Specifications of Vision Sensor Functions ".	Ver.1.01 or higher	
Displacement Sensor Settings		You can set and calibrate Displacement Sensors. Refer to " Function Specifications of Displacement Sensor Functions ".	Ver.1.05 or higher	
Programming	Instruction list (Toolbox)		A hierarchy of the instructions that you can use is displayed in the Toolbox. You can drag the required instruction to a program in the Ladder Editor to insert the instruction.	All versions
	Programming ladder diagrams	Ladder diagram programming involves connecting rung components with connecting lines to build algorithms. Rung components and connecting lines are entered in the Ladder Editor.		All versions
		Starting the Ladder Editor	The Ladder Editor for the program is started.	
		Adding and deleting sections	You can divide your ladder diagrams into smaller units for easier management. These units of division are called sections.	
		Inserting rung components	You insert rung components in the Ladder Editor to create an algorithm.	
		Inserting and deleting function blocks	You can insert a function block instruction or user-defined function block into the Ladder Editor.	
		Inserting and deleting functions	You can insert a function instruction or user-defined function into the Ladder Editor.	
		Inserting and deleting inline ST	You can insert a rung component in a ladder diagram to enable programming in ST. This allows you to include ST in a ladder diagram.	
		Editing rung components	You can copy and past rung components.	
		Inserting and deleting jump labels and jumps	You can insert a jump label in the rung to jump to and then specify that jump label when you insert a jump.	
		Inserting and deleting bookmarks	You can add bookmarks to the beginning of rungs and move between them.	
		Rung comments	You can add comments to rungs.	
		Displaying rung errors	When you enter a rung component, the format is always checked and any mistakes are displayed as errors. If there are any errors, a red line is displayed between the rung number and the left bus bar.	
		Entry assistance	When you enter instructions or parameters, each character that you enter from the keyboard narrows the list of candidates that is displayed for selection.	
Displaying variable comments *2	A specified variable comment can be displayed with each variable of rung components on the ladder diagrams. You can change the length of the displayed variable comments to make them easier to read. *3	Ver.1.01 or higher		

*2. Displaying comments for members of arrays, structures, and unions and displaying long comments for variables (up to five lines) are supported by version 1.04 or higher.

*3. Changing the length of the displayed variable comments is supported by version 1.05 or higher.

Item		Function	Applicable versions	
Programming	Programming structured text	You combine different ST statements to build algorithms.	All versions	
	Starting the ST Editor	The ST Editor for programs or for functions/function blocks is started.		
	Editing ST	You combine different ST statements to build algorithms.		
	Entering calls to functions and function blocks	You can enter the first character of the instance name of the function or the function block in the ST Editor to call and enter a function or function block.		
	Entering constants	You can enter constants in the ST Editor.		
	Entering comments	Enter "(" at the beginning and ")" at the end of any text to be treated as a comment in the ST Editor. If you only want to comment out a single line, enter a double forward slash (//) at the beginning of the line.		
	Copying, pasting, and deleting ST elements	You can copy, paste, and delete text strings.		
	Indenting	You can indent nested statements to make them easier to read.		
	Moving to a specified line	You can specify a line number to jump directly to that line.		
	Bookmarks	You can add bookmarks to any lines and move between them.		
	Entry assistance	When you enter instructions or parameters, each character that you enter from the keyboard narrows the list of candidates that is displayed for selection.		
	Variable Manager	A list of the variables in the global and local variable tables is displayed in a separate window. You can display variable usage, sort and filter the variables, edit and delete variables, or move variables while displaying another editing view.	Ver.1.04 or higher	
	Changing variable comments and data type comments	You can globally change variable comments and data type comments to other comments. You can change the comments to different language for users in a different country.	All versions	
	Finding and replacing	You can search for and replace strings in the data of a project.		
Retrace searching	You can search for the program inputs and the input parameters to functions or function blocks that use the selected variable if the selected variable is used as a program output or as the output parameter of a function or function block. Also, you can search for the program outputs and the output parameters to functions or function blocks that use the selected variable if the selected variable is used as a program input or as the input parameter of a function or function block.	Ver.1.01 or higher		
Jumping	You can jump to the specified rung number or line number in the program.	All versions		
Building	Building The programs in the project are converted into a format that is executable in the NJ-series CPU unit.			
Rebuilding Aborting a build operation	A rebuild is used to build project programs that have already been built. You can abort a build operation.			
Reuse Functions	Library	You can create functions, function block definitions, and data types in a library file to use them as objects in other projects.	Ver.1.02 or higher	
	Creating libraries	You can create library files to enable using functions, function block definitions, and data types in other projects.		
	Using libraries	You can access and reuse objects from library files that were created in other projects.		
File Operations	File operations	Creating a project file	A project file is created.	All versions
		Opening a project file	A project file is opened.	
		Saving the project file	The project file is saved.	
		Saving a project file under a different name	A project file is saved under a different name.	Ver.1.03 or higher
		Project update history management	You can assign numbers to projects to manage the project history.	
		Exporting a project file	You can export a project to an .smc or .csm *4 project file.	
		Importing a project file	You can import a project from an .smc or .csm *4 project file.	
	Offline comparison	Compares the data for an open project with the data for a project file and displays the results. Or, you can merge detailed comparison results. *5	Ver.1.02 or higher	
	Cutting, copying, and pasting	You can cut, copy, or paste items that are selected in the Multiview Explorer or any of the editors.	All versions	
	Synchronize	The project file in the computer is compared with the data in the online NJ-series CPU Unit and any differences are displayed. You can specify the transfer direction for any type of data and transfer all of the data.		
Printing	You can print various data. You can select the items to print.			
Clear All Memory	The Clear All Memory Menu command is used to initialize the user program, Controller Configurations and Setup, and variables in the CPU Unit to the defaults from the Sysmac Studio.			

*4. The .csm format is supported by version 1.04 or higher. The size of a csm file is smaller than the size of the smc file.

*5. Merging detailed comparison results is supported by version 1.03 or higher.

Item		Function	Applicable versions	
File Operations	SD Memory Cards	The following procedures are used to execute file operations for the SD Memory Card mounted in the NJ-series CPU unit and to copy files between the SD Memory Card and computer.	All versions	
	Formatting the SD Memory Card	The SD Memory Card is formatted.		
	Displaying properties	The properties of the selected file or folder in the SD Memory Card are displayed.		
	Copying files and folders in the SD Memory Card	The selected file or folder in the SD Memory Card is copied to the SD Memory Card.		
	Copying files and folders between the SD Memory Card and the computer	The selected file or folder in the SD Memory Card is copied to the computer. Or, the selected file or folder in the computer is copied to the SD Memory Card.		
Debugging	Monitoring	Variables are monitored during ladder program execution. You can monitor the TRUE/FALSE status of inputs and outputs and the present values of variables in the NJ-series CPU unit. You can monitor operation on the Ladder Editor, ST Editor, Watch Tab Page, or I/O Map.	All versions	
	Differential monitoring	You can detect the number of times the specified BOOL variable or BOOL member changes to TRUE or FALSE and display the count in the Differential Monitor Window. You can check if bits turn ON and OFF and the number of times that they turn ON and OFF.		Ver.1.04 or higher
	Changing present values and TRUE/FALSE	You can change the values of variables that are used in the user program and settings to any desired value, and you can change program inputs and outputs to TRUE or FALSE. This allows you to check the operation of the user program and settings.		All versions
	Changing the present values of variables *6	You can change the present values of user-defined variables, system-defined variables, and device variables as required. You can do this in the Ladder Editor, ST Editor, Watch Tab Page or I/O Map.		
	Forced refreshing	Forced refreshing allows the user to refresh external inputs and outputs with user-specified values from the Sysmac Studio. The specified value is retained even if the value of the variable is overwritten from the user program. You can use forced refreshing to force BOOL variables to TRUE or FALSE in the Ladder Editor, Watch Tab Page, or I/O Map.		All versions
	Online editing	Online editing allows you to edit programs on systems that are currently in operation. Online editing can be used to edit only POU's and global variables. User-defined data types cannot be edited with online editing.		
	Cross Reference Tab Page	Cross references allow you to see the programs and locations where program elements (variables, data types, I/O ports, functions, or function blocks) are used. You can view all locations where an element is used from this list.		
	Data tracing	Data tracing allows you to sample the specified variables and store the values of the variables in trace memory without any programming. You can choose between two continuous trace methods: a triggered trace, where you set a trigger condition and data is saved before and after that condition is met, or a continuous trace, in which continuous sampling is performed without any trigger and the results are stored in a file on your computer. However, you can still display data retrieved on the Sysmac Studio and save those results to a file even if you use a triggered trace. These same functions can be used with the Simulator as well.		
	Setting sampling intervals	The interval to perform sampling on the target data is set. Sampling is performed for the specified task period, at the specified time, or when a trace sampling instruction is executed.		
	Setting triggers	To perform a triggered trace, you set a condition to trigger sampling. A suitable trigger condition is set to record data before and after an event.		
	Setting a continuous trace	The method to save the data traced during a continuous trace is set.		
	Setting variables to sample	The variables to store in trace memory are registered. The sampling intervals can also be set.		
	Starting and stopping tracing	The data trace settings are transferred to the NJ-series CPU unit and the tracing starts. If you selected <i>Trigger (Single)</i> as the trace type, tracing waits for the trigger to begin sampling. If you selected Continuous, sampling begins immediately and all traced data is transferred to the computer as it is gathered and saved to a file.		
	Displaying trace results	You view the results of the traced data in either a chart or in 3D Motion Trace Display Mode. After sampling begins, sample data is immediately transferred and drawn on the graph. The trace target variable table shows the maximum, minimum, and average values for each variable. You can change the line colors on the graph. *7 You can consecutively read and display continuous trace results from more than one file. *8		
	Exporting/ Importing trace results	Trace results are saved within your project automatically when you save the project on the Sysmac Studio. If you want to save this data as a separate file, you can export the data to a CSV file. You can import trace results that you have exported.		
Printing trace results	You can print out data trace settings along with digital and analog charts.			
Debugging Vision Sensors	You can debug the Vision Sensor offline. Refer to " Function Specifications of Vision Sensor Functions ".	Ver.1.01 or higher		
Debugging Displacement Sensors	You can debug Displacement Sensors offline. Refer to " Function Specifications of Displacement Sensor Functions ".	Ver.1.05 or higher		

*6. Changing present values in the Ladder Editor or ST Editor is supported by version 1.03 or higher.

*7. Changing the colors of graph lines is supported by version 1.01 or higher.

*8. Consecutively reading and displaying continuous trace results from more than one file is supported by version 1.05 or higher.

Item		Function	Applicable versions		
Simulation	Programs for debugging		You can create programs for debugging that are used only to execute simulations and specify virtual inputs for simulation.		
	Executing a simulation	Selecting what to simulate	You can select the programs to simulate from all of the programs in the Sysmac Studio. Programs can be dragged to select them.	All versions	
		Setting breakpoints	You can set breakpoints to stop the simulation in the Program Editor.		
		Executing and stopping simulations	You can control simulation execution to monitor the user program or to check operation through data tracing. Step execution and pausing are also possible.		
		Changing the simulation speed	You can change the execution speed.		
		Task period simulation	You can display the task periods.		
		Batch transfer of the present values of variables	You can save the values of variables at specific times during simulations in a file, or you can write the values of variables that were saved in a file back to the Simulator. This allows you to write the initial values of variables, e.g., for test applications, before you start a simulation.	Ver.1.02 or higher	
		Integrated NS-series PT simulation *9	You can simulate the linked operation of a sequence program and an NS-series Programmable Terminal to debug the sequence program and screen data offline.		
	Setting the virtual equipment	Creating 3D device models	You can create a 3D device model at the control target to monitor with the 3D motion trace function.	All versions	
		Displaying 3D motion traces	You set the axis variables for each element of the 3D device model, and then set the 3D device into motion according to those axis motions.		
Displaying 2D paths		You can display the 2D paths of the markers for the projections in the 3D display.			
Monitoring Information	Displaying unit production information		You can display the production information of the NJ-series CPU unit and Special Units, including the models of the Units and unit versions.	All versions	
	Monitoring task execution times		You can monitor the execution time of each task when the user program is executed on a NJ-series CPU unit or in the Simulator. When you are connected to the Simulator, you can also monitor the real processing time of tasks. This allows you to perform a Controller performance test.		
	Troubleshooting	Troubleshooting		You can use troubleshooting to check the errors that occurred in the Controller, display corrections for the errors, and clear the errors.	All versions
		Controller errors	Any current Controller errors are displayed. (Observations and information are not displayed.)		
		User-defined errors	Information is displayed on current errors.		
		Controller event log	You can display a log of Controller events (including Controller errors and Controller information). (You cannot display logs from EtherCAT slaves.)		
		User-defined event log	The log of user-defined events that were stored for the Create User-defined Error (SetAlarm) instruction and the Create User-defined Information (SetInfo) instruction is displayed.		
	Event Settings Table	The Event Setting Table is used to register the contents displayed on the Sysmac Studio and on HMIs for User-defined events that occur for execution of the Create User-defined Error (SetAlarm) instruction and the Create User-defined Information (SetInfo) instruction.			
User memory usage monitor		An estimate of the space that is used by the user program that you are editing in the Sysmac Studio is displayed in relation to the size of the Controller's memory.	All versions		
Setting clock information		You can read and set the NJ-series CPU unit's clock. The computer's clock information is also displayed.			
Communications	Going online with a Controller		An online connection is established with the Controller.	All versions	
	Checking for forced refreshing		When you go offline, any forced refreshing is cleared.		
Maintenance	Changing the operating mode of the Controller		There are two operating modes for NJ-series Controllers, depending on if control programs are executed or not. These are RUN mode and PROGRAM mode.	All versions	
	Resetting the Controller		The operations and status when the power supply to the Controller is cycled are emulated. This can be performed only in PROGRAM mode. You cannot reset the Controller in RUN mode.		
	Backup	Backup			You can back up, restore, and compare the user program and other NJ-series Controller data to replace hardware, such as the CPU Unit, or to restore device data.
		Backing up variables and memory	You can back up the contents of retained memory to a file and restore the contents of the backup file. You can individually select the retained variables to back up or restore. *10	Ver.1.04 or higher	
		Controller backup	You can back up data (user program and settings, variable values, memory values, Unit settings, and slave settings) from a Controller to a file and restore the backed up data from the file to the Controller.		
SD Memory Card backup		You can backup the data in the NJ-series CPU unit to an SD Memory Card mounted in the Controller or compare the data in the NJ-series Controller to data in the SD Memory Card.			
Importing/exporting to/from backup files	You can import the data in a backup file created for a Controller backup or SD Memory Card backup to a project. Also, you can export project data to a backup file.				

*9. CX-Designer version 3.41 or higher is required.

*10. Individual selection of the retained variables to back up or restore is supported by version 1.05 or higher.

Item		Function	Applicable versions
Security Measures	Prevention of incorrect connections	Confirming NJ-series CPU unit names and serial IDs If the name or the serial ID is different between the project and the NJ-series CPU unit when an online connection is established, a confirmation dialog box is displayed.	All versions
	Prevention of incorrect operation	Operation authority verification You can set five operation authorities (Administrator, Planning Engineer, Maintainer, Operator, and Observer) to restrict the operations that can be performed according to the operation authority of the user.	
		Write protection of the CPU Unit You can prevent rewriting of data in the CPU Unit from the Sysmac Studio.	
	Prevention of the theft of assets	Authentication of user program execution IDs You can ensure that a user program cannot be operated on another CPU Unit even if copied.	
		User program transfer with no restoration information The program source code is not transferred. If this option is selected, programs are not displayed even if uploaded from another computer. However, variables and settings are transferred even if this option is selected.	
		Password protection for project files You can place a password on the file to protect your assets.	
		Data protection You can set passwords for individual POU's (programs, functions, and function block definitions) to prohibit displaying, changing, and copying them.	
Online Help	Sysmac Studio help system You can access Sysmac Studio operating procedures.	All versions	
	Instructions reference Information is provided on how to use the instructions that are supported by the NJ-series CPU Units.		
	System-defined variable reference You can display a list of descriptions of the system-defined variables that you can use on the Sysmac Studio.		
	Keyboard mapping reference You can display a list of convenient shortcut keys that you can use on the Sysmac Studio.		

Function Specifications of Vision Sensor Functions

Item		Description
Setting Parameters		—
Main Edit	General Settings	Displays and sets basic information of the sensor.
	Sensor connection	Changes the connection status of the Sensor, and sets the conditions for communications with the Sensor.
	Sensor control in online	Performs various controls for the sensor mode change, data transfer/save, and monitoring.
	Sensor error history	Displays and clears the error history of an online Sensor.
Scene data Edit	Tool	Restarts and initializes the sensor, updates the firmware of the sensor, reads sensor data from a file, saves sensor data to a file, prints the sensor parameters, and displays help.
	Image condition Settings	Adjusts the image condition.
	Specifies the calibration pattern	Sets a registered calibration pattern.
	Registers inspection item	Registers the inspection item to use in the measurement. You can select from the following inspection items: Edge position, Search, Labeling, Shape search
	Calculation Settings	Makes a setting for basic arithmetic operations and function operations using inspection item judgment results and measurement data.
	Logging Settings	Makes a setting for logging measurement results of inspection items and calculation results.
	Output Settings	Makes a setting for data to output to external devices.
Sensor system data Edit	Run Settings	Switch Sensor modes or monitors measurement results.
	Trigger condition Settings	Sets the trigger type and image timing.
	I/O Settings	Sets the conditions of output signals. You can check the status of I/O signal while online.
	Encoder Settings	Make settings for the encoder such as common encoder settings, ring counter settings, and encoder trigger settings.
	Ethernet communication Settings	Makes Ethernet communication settings. You can select data communication from no-protocol data, PLC link data, and programmable no-protocol data.
	EtherCAT communication Settings	Makes the EtherCAT communication settings according to the communication settings of the EtherCAT master.
	Logging condition Settings	Sets the conditions to log to the internal memory of sensor.
Calibration Scene Data Settings	Sensor Settings	Makes the settings for startup scene control function, password setting function, and adjustment judgment function.
	Calculates, views, and edits the calibration parameters. The Vision Sensor supports general-purpose calibration and calibration for conveyor tracking.	
Debugging	Offline debugging of sensor operation	Simulates measurements offline without connecting to the Vision Sensor. You can use external image files and perform measurements under the conditions set in the offline settings, then display the results of those measurements.
	Offline debugging of the sensor control program and sensor operation	Performs a linked simulation between the sequence control of an NJ-series Controller and the operation of an FQ-M Sensor in EtherCAT configuration systems. This allows you to debug operation offline from when measurements and other processing are performed for control signals such as measurement triggers through the output of processing results.

Note: Supported only by the Sysmac Studio version 1.01 or higher.

Function Specifications of Displacement Sensor Functions

Item		Function
Setting Parameters		–
Main Editing	General Settings	Displays and sets basic information on the Sensor.
	Sensor Connection	Changes the connection status of the Sensor, and sets the conditions for communications with the Sensor.
	Online Sensor Control	Performs various controls for the Sensor (e.g., changing the mode, controlling internal logging, and monitoring).
	Tools	Restarts and initializes the Sensor, updates the firmware in the Sensor, recovers ROM data, prints the Sensor parameters, and displays help.
Editing Bank Data	Setting Sensing Conditions	Adjusts the light reception conditions for each measurement region.
	Setting Task Conditions	Used to select the measurement items to use in measurements. You can select from the height, thickness, or calculations. The following are set for the measurement items: scaling, filters, holding, zero-resetting, and judgement conditions.
	Setting I/O Conditions	Sets parameters for outputting judgements and analog values to external devices.
Editing Bank Data	Sensor Settings	Sets the following: ZW Sensor Controller's key lock, number of displayed digits below the decimal point, the bank mode, the analog output mode, and timing/reset key inputs.
	Ethernet Communications Settings	Sets up Ethernet communications and field bus parameters.
	RS-232C Communications Settings	Sets up RS-232C communications.
	Data Output Settings	Sets serial output parameters for holding values.
Debugging	Offline Debugging of Sensor Control Programs and Sensor Operation	Performs a linked simulation between the sequence control of an NJ-series Controller and the operation of a ZW Sensor in EtherCAT configuration systems. This allows you to simulate the operation of signals when timing signals and other control signals are input to the Sensor to debug the control logic offline.

Note: Supported only by Sysmac Studio version 1.05 or higher.

Version Information

Please refer to "Change history" in the website at: www.fa.omron.co.jp/ss_rev_e/.

Applicable Models

Series		Unit version	Model
CPU Unit	NJ-series	–	NJ501-□□□□ NJ301-□□□□
Servo Drives	G5-series	Servo Drives with unit version 2.1 or higher recommended	R88D-KN□-ECT R88D-KN□-ECT-L
Inverters	MX2-series	Inverters with version 1.1 or higher *1	3G3MX2-A□□□□
Vision Sensors *2	FQ-M-series	–	FQ-MS12□-ECT FQ-MS12□-M-ECT FQ-MS12□ FQ-MS12□-M
Displacement Sensors *3	ZW-series	–	ZW-CE1□ ZW-CE1□T ZW-C1□ ZW-C1□T
Fiber Sensors, Laser Photoelectric Sensors, Proximity Sensors *4 *5	E3X E3C E2C	–	E3X-HD0/MDA0/DA0-S E3C-LDA0 E2C-EDA0
Remote I/O Terminals	GX-series	Remote I/O Terminals with unit version 1.1 or higher recommended	GX-ID16□2/OD16□2/MD16□2 GX-□D16□1/OC1601 GX-AD0471/DA0271 GX-EC0211/EC0241
HMI's	NS-series	To connect the NJ5 Controller : NS system version 8.5 or higher CX-Designer version 3.3 or higher To connect the NJ3 Controller : NS system version 8.61 or higher CX-Designer version 3.4 or higher	NS5-MQ11(B)-V2/-SQ11(B)-V2/-TQ11(B)-V2 NS8-TV01(B)-V2 NS10-TV01(B)-V2 NS12-TS01(B)-V2 NS15-TX01S-V2/-TX01B-V2

Note: For the Unit that can be connected, refer to "Unit Configuration" of "Machine Automation Controller NJ-Series" of System Design Guide on the Sysmac Catalogue (Cat. No. P072).

*1. A communications unit for connecting to EtherCAT network (3G3AX-MX2-ECT with unit version 1.1 or higher) is additionally required.

*2. Supported only by Sysmac Studio version 1.01 or higher.

*3. Supported only by Sysmac Studio version 1.05 or higher.

*4. A communications unit for connecting to EtherCAT network (E3X-ECT) is additionally required.

*5. Supported only by the Sysmac Studio version 1.02 or higher.

Related Manuals

Cat. No.	Model	Manual name	Application	Description
W504	SYSMAC-SE2□□□	Sysmac Studio version 1 OPERATION MANUAL	Learning general information and the application methods of the Automation Software.	This manual provides an introduction to the Automation Software and describes the installation procedures, basic procedures, connection procedures, and main operating procedures.
V099	–	CX-Designer Ver.3.□ USER'S MANUAL	Installing the CX-Designer. Learning about the basic operating procedures.	This manual describes the installation procedure, basic operating procedures, and user interface of the CX-Designer.
W464	–	CS/CJ/CP/NSJ Series CX-Integrator Ver.2.□ OPERATION MANUAL	Learning how to configure a DeviceNet network (data links, routing tables, Communications Unit settings, etc.).	This manual describes the operating procedures of the CX-Integrator.
W344	–	CX-Protocol OPERATION MANUAL	Learning the operating procedures of the CX-Protocol to create protocol macros (communications sequences) for Serial Communications Units. Learning details on user-created protocol macros.	This manual describes the operating procedures of the CX-Protocol and details on protocol macros. Refer to this manual to use the CX-Protocol to create user protocols for serial communications or to customize standard system protocols.
W506	NJ501-□□□□ NJ301-□□□□	NJ-series CPU Unit Built-in EtherNet/IP Port User's Manual	Learning how to set tag data links for the built-in EtherNet/IP ports on NJ-series CPU Units.	This manual describes the operating procedures of the Network Configurator.
Z314	FQ-MS12□(-M)-ECT FQ-MS12□(-M)	FQ-M-series Specialized Vision Sensor for Positioning User's Manual	Learning the setting procedures for FQ-M-series Vision Sensors.	This manual describes the Sysmac Studio setting procedures for FQ-M-series Vision Sensors.
Z332	ZW-CE1□□	ZW-series Confocal Fiber Type Displacement Sensor User's Manual	Learning the setting procedures for ZW-series Displacement Sensors.	This manual describes the Sysmac Studio setting procedures for ZW-series Displacement Sensors.

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