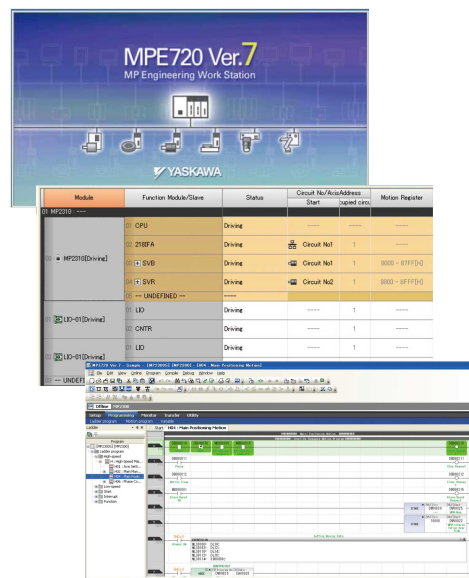


System Integrated Engineering Tool

MPE720 Ver. 7

User's Manual

Model: CPMC-MPE780



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i.1 About this Manual

This manual describes how to operate MPE720 Ver. 7 engineering tool.

The contents of this manual are organized into the following chapters.

Chapter	Title	Contents
1	Basic Information on the MPE720	Describes an outline of the MPE720, the tasks that must be performed to use the MPE720, and the window configuration.
2	Project Management	Describes basic operations and management methods for project files.
3	Designing the System	Describes the operations required to design the system in the MPE720.
4	Settings Related to the Multiple Scans Function	Describes the operations and settings required to use the multiple scans function.
5	Programming	Provides an overview of programming and describes basic operations related to programming.
6	Debugging	Describes the functions for debugging ladder programs and motion programs.
7	Monitor	Describes the methods to monitor the status of the connected controller and the status of registers.
8	Security	Describes the security functions available in the MPE720 for users, controllers, projects, and programs.
9	Settings Related to YRM Controllers	Describes the settings related to YRM controllers.
10	Convenient Functions	Describes convenient functions in the MPE720, such as the environment settings, printing, and importing and exporting data.
11	Appendices	Describes error messages and the corrective action to perform when an error is displayed.

Read this manual carefully to ensure the correct usage of the controller system and apply the controller to control your manufacturing system.

Keep this manual in a safe place so that it can be referred to whenever necessary.

i.2 Related Manuals

The following table lists the manuals that are related to the controllers. Refer to these manuals as required.

i.2.1 YRM1000 Series / MPX1000 Series

Category	Manual Name	Manual Number	Contents
Basic Unit: YRM1000 Series	YRM1000 Series YRM1010 Product Manual	SIEP C890101 26	Describes the basic operations and functions of the YRM1010, as well as specifications, external dimensions, wiring, installation, and operating methods.
	YRM1000 Series YRM1010 Troubleshooting Manual	SIEP C890101 28	Describes troubleshooting procedures related to the YRM1010 controller power supply unit, CPU unit, and IoT unit.
Basic Unit: MPX1000 Series	MPX1000 Series MPX1310 Product Manual	SIEP C880726 00	Describes the basic operations and functions of the MPX1310, as well as specifications, external dimensions, wiring, installation, and operating methods.
	MPX1000 Series MPX1310 Troubleshooting Manual	SIEP C880726 01	Describes troubleshooting procedures related to the MPX1310 supply and CPU.
Program	YRM1000/MPX1000 Series Ladder Program Programming Manual	SIEP C890101 10	Provides detailed information on the ladder programming instructions that can be used with the controllers.
	YRM1000/MPX1000 Series Motion Program Programming Manual	SIEP C890101 09	Provides detailed information on the motion programming instructions that can be used with the controllers.
Function Unit	YRM1000 Series CC-Link IE Field Device Unit Product Manual	SIEP C890101 07	Describes product information (e.g., specifications, installation, wiring, functions, and settings in MPE720) related to the CC-Link IE Field device unit.
	YRM1000/MPX1000 Series Counter Unit Product Manual	SIEP C890101 19	Describes product information (e.g., specifications, installation, wiring, functions, and settings in MPE720) related to the counter unit.
	YRM1000/MPX1000 Series Serial Communications Unit Product Manual	SIEP C890101 20	Describes product information (e.g., specifications, installation, wiring, functions, and settings in MPE720) related to the serial communications unit.
	YRM1000/MPX1000 Series FL-net Communications Unit Product Manual	SIEP C890101 22	Describes product information (e.g., specifications, installation, wiring, functions, and settings in MPE720) related to the FL-net communications unit.
	YRM1000/MPX1000 Series DeviceNet® Communications Unit Product Manual	SIEP C890101 24	Describes product information (e.g., specifications, installation, wiring, functions, and settings in MPE720) related to the DeviceNet communications unit.
	YRM1000/MPX1000 Series EtherNet/IP™ Communications Unit Product Manual	SIEP C890101 21	Describes product information (e.g., specifications, installation, wiring, functions, and settings in MPE720) related to the EtherNet/IP communications unit.
SLIO I/O Series Module	System SLIO manuals Product Manual	—	These manuals describe the product information of the SLIO I/O series modules. Visit the URL below for more information on the product line-up and documentation. https://www.yaskawa.eu.com/products/plc-control-systems/seriesdetail/serie/slio_1447

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Category	Manual Name	Manual Number	Contents
Ethernet	YRM1000/MPX1000 Series Ethernet Communications User's Manual	SIEP C890101 14	Describes functions, settings, and operating procedures for sending and receiving data between peripheral devices and the controller using Ethernet communications.
	YRM1000/MPX1000 Series YERCPProfile Function User's Manual	SIEP C890101 08	Describes functions, settings, and operating procedures for controlling robot controllers using Ethernet communications.
EtherNet/IP	YRM1000/MPX1000 Series EtherNet/IP™Communications User's Manual	SIEP C890101 13	Describes functions, settings, and operating procedures for sending and receiving data between peripheral devices and the controller using EtherNet/IP communications.
MECHATROLINK	YRM1000/MPX1000 Series Motion Control User's Manual	SIEP C890101 11	Describes the specifications, features, functions, and parameters of the motion control function used to control servos and I/O devices using MECHATROLINK-4/III communications.
Engineering Tool	System Integrated Engineering Tool MPE720 Ver. 7 User's Manual	SIJP C880761 03 (This manual)	Describes the operating procedures for MPE720 Ver. 7, which is used as the engineering tool for YRM controllers, MPX controllers, and machine controllers.
	AC Servo Drive Engineering Tool SigmaWin+ Operation Manual	SIET S800001 34	Provides detailed operating procedures for the SigmaWin+ engineering tool for a servo system.
Edge Computing	YASKAWA Cockpit 2 INSTRUCTIONS	HW2480128	Gives an overview of applications that can be used in YCP2 and describes operating procedures.

i.2.2 MP2000-Series Controllers / M3000-Series Controllers

Category	Manual Name	Manual Number	Contents
Basic Functionality: MP2000 Series	Machine Controller MP2000 Series Machine Controller System Setup Manual	SIEP C880732 14	Describes the functions of the MP2000-series machine controllers and the procedures that are required to use the machine controller, from installation and connections to settings, programming, trial operation, and debugging.
	Machine Controller MP210□/MP210□M User's Manual Design and Maintenance	SIEP C880700 01	Describes the functions, specifications, setup procedures, and operating methods of the MP2100/MP2100M.
	Machine Controller MP2200 User's Manual	SIEP C880700 14	Describes the functions, specifications, and operating methods of the MP2200.
	Machine Controller MP2101T/MP2101TM User's Manual Design and Maintenance	SIEP C880712 00	Describes the functions, specifications, and operating methods of the MP2101.
	Machine Controller MP2300 Basic Module User's Manual	SIEP C880700 03	Describes the functions, specifications, setup procedures, and operating methods of the MP2300.
	Machine Controller MP2300S Basic Module User's Manual	SIEP C880732 00	Describes the functions, specifications, setup procedures, and operating methods of the MP2300S.
	Machine Controller MP2310 Basic Module User's Manual	SIEP C880732 01	Describes the functions, specifications, setup procedures, and operating methods of the MP2310.
	Machine Controller MP2400 User's Manual	SIEP C880742 00	Describes the functions, specifications, setup procedures, and operating methods of the MP2400.
	Machine Controller MP2500/MP2500M/MP2500D/MP2500MD User's Manual	SIEP C880752 00	Describes how to use the MP2500, MP2500M, MP2500D, and MP2500MD machine controllers.
	Machine Controller MP2000 Series MPU-01 Multi-CPU Module User's Manual	SIEP C880781 05	Describes the functions, specifications, and operating methods of the MPU-01.
Basic Functionality: MP3000 Series	Machine Controller MP3000 Series Machine Controller System Setup Manual	SIEP C880725 00	Describes the functions of the MP3000-series machine controllers and the procedures that are required to use the machine controller, from installation and connections to settings, programming, trial operation, and debugging.
	Machine Controller MP3000 Series Machine Controller System Troubleshooting Manual	SIEP C880725 01	Describes troubleshooting an MP3000-series machine controller.
	Machine Controller MP3000 Series MP3100 Product Manual	SIEP C880725 24	Describes the specifications and system configuration of an MP3000-series MP3100 machine controller and the functions of the CPU.
	Machine Controller MP3000 Series MP3200 Product Manual	SIEP C880725 10	Describes the specifications and system configuration of an MP3000-series MP3200 machine controller and the functions of the CPU unit.
	Machine Controller MP3000 Series MP3300 Product Manual	SIEP C880725 21	Describes the specifications and system configuration of an MP3000-series MP3300 machine controller and the functions of the CPU unit.

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Category	Manual Name	Manual Number	Contents
Communications	Machine Controller MP3000 Series Communications User's Manual	SIEP C880725 12	Describes the specifications, system configuration, and communications connection methods for the Ethernet communications that are used with an MP3000-series machine controller.
	Machine Controller MP2000 Series Communication Module User's Manual	SIEP C880700 04	Provides information on the communications modules that can be connected to an MP2000-series machine controller and describes the communications methods.
	Machine Controller MP2300S/MP2310/ MP2400 Basic Module Supplement for Ethernet Communications	SIEP C880700 37	Describes a specific method of communications between the MP2300S, MP2310, or MP2400 machine controllers and Ethernet-connected remote equipment, such as PLCs and Windows computers.
	Machine Controller MP2000 Series 262IF-01 FL-net Communication Module User's Manual	SIEP C880700 36	Describes the specifications and communications methods for the FL-net communications module that can be connected to an MP2000-series machine controller.
	Machine Controller MP2000 Series 263IF-01 EtherNet/IP Communication Module User's Manual	SIEP C880700 39	Describes the specifications and communications methods for the EtherNet/IP communications module that can be connected to an MP2000-series machine controller.
Motion Control	Machine Controller MP3000 Series Motion Control User's Manual	SIEP C880725 11	Describes the specifications, system configuration, and operating methods for the SVC32/SVR32 motion function modules that are used in an MP3000-series machine controller.
	Machine Controller MP3000 Series SVF-01 Motion Module User's Manual	SIEP C880725 43	Describes the functions, specifications, and operating methods of the MP3000-series SVF-01 motion module.
	Machine Controller MP2000 Series SVA-01 Motion Module User's Manual	SIEP C880700 32	Describes the functions, specifications, and operating methods of the MP2000-series SVA-01 motion module.
	Machine Controller MP2000 Series Built-in SVB/SVB-01 Motion Module User's Manual	SIEP C880700 33	Describes the functions, specifications, and operating methods of the MP2000-series motion module (built-in function modules: SVB, SVB-01, and SVR).
	Machine Controller MP2000 Series SVC-01 Motion Module User's Manual	SIEP C880700 41	Describes the functions, specifications, and operating methods of the MP2000-series SVC-01 motion module.
	Machine Controller MP2000 Series Pulse Output Motion Module PO-01 User's Manual	SIEP C880700 28	Describes the functions, specifications, and operating methods of the MP2000-series PO-01 motion module.

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Category	Manual Name	Manual Number	Contents
Program	Machine Controller MP3000 Series Ladder Program Programming Manual	SIEP C880725 13	Provides detailed information on the ladder programming instructions that can be used with the MP3000-series controllers.
	Machine Controller MP3000 Series Motion Program Programming Manual	SIEP C880725 14	Provides detailed information on the motion programming instructions that can be used with the MP3000-series controllers.
	Machine Controller MP2000 Series User's Manual Ladder Programming	SIE-C887-1.2	Describes the instructions used in MP2000 ladder programming.
	Machine Controller MP2000 Series User's Manual Motion Programming	SIEP C880700 38	Describes the instructions used in MP2000 motion programming.
	Machine Controller MP900/MP2000 Series New Ladder Editor Programming Manual	SIEZ-C887-13.1	Describes the programming instructions of the New Ladder Editor, which assists MP900/MP2000-series design and maintenance.
	Machine Controller MP900/MP2000 Series New Ladder Editor User's Manual	SIEZ-C887-13.2	Describes the operating methods of the New Ladder Editor, which assists MP900/MP2000-series design and maintenance.
Engineering Tool	System Integrated Engineering Tool MPE720 Ver. 7 User's Manual	SIEP C880761 03 (This manual)	Describes the operating procedures for MPE720 Ver. 7, which is used as the engineering tool for YRM controllers, MPX controllers, and machine controllers.
	Machine Controller MP2000 Series MPE720 Version 6 User's Manual	SIEP C880700 30	Describes the operating procedures for MPE720 Ver.6, which is used as the engineering tool for MP2000-series and machine controllers.
	Machine Controller MP2000/MP3000 Series MPLoader Ver.4 User's Manual	SIEP C880761 01	Describes how to install and operate the MPLoader.
	Machine Controller MP2000/MP3000 Series MPLoad Maker Ver.4 User's Manual	SIEP C880761 02	Describes how to install and operate the MPLoad Maker.
	AC Servo Drive Engineering Tool SigmaWin+ Operation Manual	SIET S800001 34	Provides detailed operating procedures for the SigmaWin+ engineering tool for a servo system.
I/O	Machine Controller MP2000 Series I/O Module User's Manual	SIEP C880700 34	Describes the functions, specifications, and operating methods of the LIO-01, LIO-02, LIO-04, LIO-05, LIO-06, and DO-01 I/O modules for MP2000-series machine controllers.
	Machine Controller MP2000 Series Analog Input/Analog Output Module AI-01/AO-01 User's Manual	SIEP C880700 26	Describes the functions, specifications, and operating methods of the AI-01 and AO-01 I/O modules for MP2000-series machine controllers.
	Machine Controller MP2000 Series Counter Module CNTR-01 User's Manual	SIEP C880700 27	Describes the functions, specifications, and operating methods of the CNTR-01 counter module for MP2000-series machine controllers.

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Category	Manual Name	Manual Number	Contents
MECHATRO- LINK I/O	Machine Controller MP3000 Series MECHATROLINK-4 Compatible I/O Module Product Manual	SIEP C880782 01	Describes the specifications and operating methods for MP3000-series I/O module for MECHATROLINK-4.
	MECHATROLINK-III Compatible I/O Module User's Manual	SIEP C880781 04	Describes the functions, specifications, operating methods, and MECHATROLINK-III communications for the remote I/O modules for MP2000/MP3000-series machine controllers.
	Machine Controller MP900/MP2000 Series Distributed I/O Module User's Manual MECHATROLINK System	SIE-C887-5.1	Describes MECHATROLINK distributed I/O for MP900/MP2000-series machine controllers.

i.3 Using this Manual

i.3.1 Basic Terms Used in this Manual

The following basic terms are used in this manual.

Basic Terms	Meaning
MPE720	The MPE720 Ver. 7 engineering tool, or a personal computer running the engineering tool
controller	A general term for a YRM controller, MPX controller, or machine controller
YRM controller	A general term for a YRM-7-series controller or YRM1000-series controller
MPX controller	A general term for an MPX1000-series controller
machine controller	A general term for an MP2000-series or MP3000-series controller
PLC	A programmable logic controller
engineering	Setting up, adjusting, and programming devices to create a system and maintaining and managing that system

i.3.2 Screenshots Used in This Manual

A portion of the screenshots used in this manual may vary from the windows in the actual software because the screenshots show previous versions of the software or versions of the software currently in development.

i.3.3 Trademarks

- MECHATROLINK is a trademark of the MECHATROLINK Members Association.
- Ethernet is a registered trademark of the Xerox Corporation.
- Microsoft, Windows, Windows NT, and Internet Explorer are trademarks and/or registered trademarks of Microsoft Corporation in the United States.
- Adobe Reader is a trademark or registered trademark of Adobe Systems Incorporated.
- Other product names and company names are the trademarks or registered trademarks of their respective companies. "TM" and the ® mark do not appear with product or company names in this manual.
- This product includes file archive software UNLHA(32).dll. The copyright of UNLHA(32).dll is owned by Micco.

i.3.4 Visual Aids

The following aids are used to indicate certain types of information for easier reference.



Important

Indicates precautions or restrictions that must be observed.

Indicates alarm displays and other precautions that will not result in machine damage.



Term

Indicates definitions of difficult terms or terms that have not been previously explained in this manual.

Information

Indicates supplemental information to deepen understanding or useful information.

i.4 Operating Precautions

- It is strictly prohibited to copy or use MPE720 Ver. 7 for any purpose other than to design and maintain applications for controllers.
- Store the DVD containing MPE720 Ver. 7 in a safe place.
- It is strictly prohibited to decompile, disassemble, or reverse engineer MPE720 Ver. 7.
- You may not give, exchange, lend, or otherwise provide the MPE720 Ver. 7, in part or whole, to any third party without the prior permission of the Yaskawa Electric Corporation.

i.5 Safety Precautions

i.5.1 Safety Information

To prevent personal injury and equipment damage in advance, the following signal words are used to indicate safety precautions in this document. The signal words are used to classify the hazards and the degree of damage or injury that may occur if a product is used incorrectly. Information marked as shown below is important for safety. Always read this information and heed the precautions that are provided.



DANGER

Indicates precautions that, if not heeded, are likely to result in loss of life, serious injury, or fire.



WARNING

Indicates precautions that, if not heeded, could result in loss of life, serious injury, or fire.



CAUTION

Indicates precautions that, if not heeded, could result in relatively serious or minor injury, or in fire.

NOTICE

Indicates precautions that, if not heeded, could result in property damage.

i.5.2 Safety Precautions That Must Always Be Observed

(1) General Precautions



WARNING

The installation must be suitable and it must be performed only by an experienced technician.

There is a risk of electrical shock or injury.

Before connecting the machine and starting operation, make sure that an emergency stop procedure has been provided and is working correctly.

There is a risk of injury.

Do not approach the machine after a momentary interruption to the power supply. When power is restored, the product and the device connected to it may start operation suddenly. Provide safety measures in advance to ensure human safety when operation restarts.

There is a risk of injury.

Do not touch anything inside the product.

There is a risk of electrical shock.

Do not attempt to modify the product in any way.

There is a risk of injury or device damage.

**CAUTION**

Do not remove the front cover, cables, connector, or options while power is being supplied.

There is a risk of electrical shock, malfunction, or damage.

Do not damage, pull on, apply excessive force to, place heavy objects on, or pinch the cables.

There is a risk of electrical shock, operational failure of the product, or burning.

(2) Storage and Transportation Precautions**CAUTION**

Hold onto the main body of the product when transporting it.

Holding the cables or connectors may damage them or result in injury.

Do not overload the product during transportation. (Follow all instructions.)

There is a risk of injury or malfunction.

NOTICE

Never subject the product to an atmosphere containing halogen (fluorine, chlorine, bromine, or iodine) during transportation.

There is a risk of malfunction or damage.

If disinfectants or insecticides must be used to treat packing materials such as wooden frames, plywood, or pallets, use a method other than fumigation.

For example, use heat sterilization (core temperature of 56°C or higher for 30 minutes or longer).

Treat the packing materials before the product is packaged instead of using a method that treats the entire packaged product.

If the electronic products, which include stand-alone products and products installed in machines, are packed with fumigated wooden materials, the electrical components may be greatly damaged by the gases or fumes resulting from the fumigation process. In particular, disinfectants containing halogen, which includes chlorine, fluorine, bromine, or iodine can contribute to the erosion of the capacitors.

Do not store the product in any of the following locations.

- **Locations that are subject to direct sunlight**
- **Locations that are subject to ambient storage temperatures that exceed product specifications**
- **Locations that are subject to relative humidities that exceed product specifications**
- **Locations that are subject to condensation as the result of extreme changes in temperature**
- **Locations that are subject to corrosive or flammable gases**
- **Locations that are near flammable objects**
- **Locations that are subject to dust, salts, or metal powder**
- **Locations that are subject to water, oil, or chemicals**
- **Locations that are subject to vibration or shock that exceeds product specifications**

If you store the product in any of the above locations, the product may fail or be damaged.

(3) Installation Precautions



CAUTION

Do not step on the product or place heavy objects on the product.

There is a risk of injury or malfunction.

Do not block the air ports on the product. Do not allow foreign objects to enter the product.

There is a risk of internal element deterioration, malfunction, or fire.

Leave the specified amount of space between the product, and the interior surface of the control panel and other devices.

There is a risk of fire or malfunction.

Suitable battery installation must be performed and it must be performed only by an experienced technician.

There is a risk of electrical shock, injury, or device damage.

NOTICE

Never install the product in an atmosphere containing halogen (fluorine, chlorine, bromine, or iodine).

There is a risk of malfunction or damage.

Always mount the product in the specified orientation.

There is a risk of malfunction.

Do not subject the product to strong shock.

There is a risk of malfunction.

Do not touch the electrodes when installing the battery.

Static electricity may damage the internal electronic component.

Do not install the product in any of the following locations.

- Locations that are subject to direct sunlight
- Locations that are subject to ambient operating temperatures that exceed product specifications
- Locations that are subject to relative humidities that exceed product specifications
- Locations that are subject to condensation as the result of extreme changes in temperature
- Locations that are subject to corrosive or flammable gases
- Locations that are near flammable objects
- Locations that are subject to dust, salts, or metal powder
- Locations that are subject to water, oil, or chemicals
- Locations that are subject to vibration or shock that exceeds product specifications
- Locations near devices that generate strong magnetic fields
- Locations that are subject to radioactivity

If you install the product in any of the above locations, the product may fail or be damaged.

(4) Wiring Precautions



WARNING

Check the wiring to be sure it has been performed correctly.

There is a risk of motor run-away, injury, or malfunction.



CAUTION

Do not change any wiring while power is being supplied.

There is a risk of electrical shock or injury.

Always use a power supply of the specified voltage.

There is a risk of fire or malfunction.

Install breakers and other safety measures to provide protection against shorts in external wiring.

There is a risk of fire.

Configure the circuits so that the 24-V I/O power supply is turned ON at least 1 second after the CPU unit is turned ON.

If the power to the CPU unit is turned ON after the external power supply, e.g., the 24-V I/O power supply, the outputs from the CPU unit may momentarily turn ON when the power to the CPU unit turns ON. This can result in unexpected operation that may cause injury or device damage.

Provide emergency stop circuits, interlock circuits, limit circuits, and any other required safety measures in control circuits outside of the product.

There is a risk of injury or device damage.

Connect the battery with the correct polarity.

There is a risk of battery damage or explosion.

NOTICE

In places with poor power supply conditions, ensure that the input power is supplied within the specified voltage range.

There is a risk of device damage.

Provide sufficient shielding when using the product in the following locations.

- Locations that are subject to noise, such as from static electricity
- Locations that are subject to strong electric or magnetic fields
- Locations that are subject to radioactivity
- Locations that are near power lines

There is a risk of device damage.

If you use MECHATROLINK I/O units, use the establishment of MECHATROLINK communications as an interlock output condition.

There is a risk of device damage.

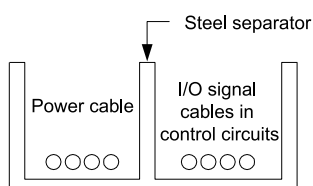
Select the I/O signal wires for external wiring to connect the product to external devices based on the following criteria:

- Mechanical strength
- Noise interference
- Wiring distance
- Signal voltage

Separate the I/O signal cables for control circuits from the power cables both inside and outside the control panel to reduce the influence of noise from the power cables.

If the I/O signal lines and power lines are not separated properly, malfunction may occur.

Example of Separated Cables



(5) Operation Precautions



WARNING

Follow the procedures and instructions in the manuals for the relevant products to perform normal operation and trial operation.

Operating mistakes while the servomotor and machine are connected may damage the machine or even cause accidents resulting in injury or death.



CAUTION

Implement interlock signals and other safety circuits external to the product to ensure safety in the overall system even if the following conditions occur.

- Product failure or errors caused by external factors
- Shutdown of operation due to product detection of an error in self-diagnosis and the subsequent turning OFF or holding of output signals
- Holding of the ON or OFF status of outputs from the product due to fusing or burning of output relays or damage to output transistors
- Voltage drops from overloads or short-circuits in the 24-V output from the product and the subsequent inability to output signals
- Unexpected outputs due to errors in the power supply, I/O, or memory that cannot be detected by the product through self-diagnosis.

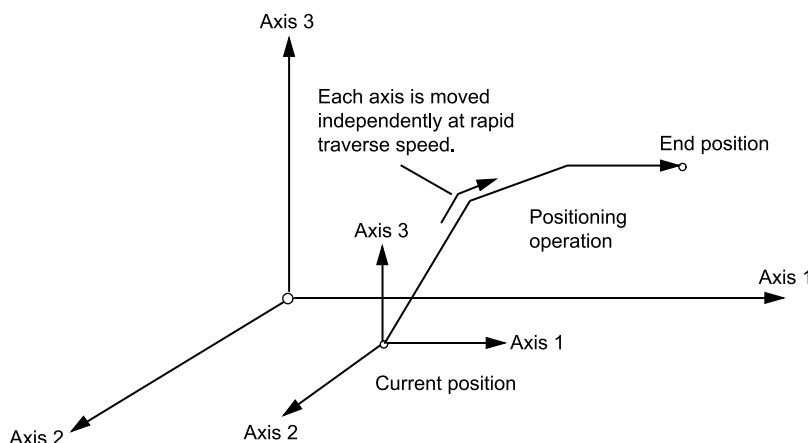
There is a risk of injury, device damage, or burning.

OL□□□48 (Zero Point Position Offset in Machine Coordinate System) is always valid when the axis type is set to a finite-length axis. Do not change the setting of OL□□□48 while the product is operating.

There is a risk of machine damage or an accident.

Always check to confirm the paths of axes when any of the following axis movement instructions are used in programs to ensure that the system operates safely.

- Positioning (MOV)
- Linear Interpolation (MVS)
- Circular Interpolation (MCC or MCW)
- Helical Interpolation (MCC or MCW)
- Set-time Positioning (MVT)
- Linear Interpolation with Skip Function (SKP)
- Zero Point Return (ZRN)
- External Positioning (EXM)



There is a risk of injury or device damage.

The same coordinate word will create a completely different travel operation in Absolute Mode and in Incremental Mode. Make sure that the ABS and INC instructions are used correctly before you start operation.

There is a risk of injury or device damage.



CAUTION

The travel path for the Positioning (MOV) instructions will not necessarily be a straight line. Check to confirm the paths of the axis when this instruction is used in programs to ensure that the system operates safely.

There is a risk of injury or device damage.

The Linear Interpolation (MVS) instruction can be used on both linear axes and rotary axes. However, if a rotary axis is included, the path will not necessarily be a straight line like the one that occurs for linear interpolation. Check to confirm the paths of the axis when this instruction is used in programs to ensure that the system operates safely.

There is a risk of injury or device damage.

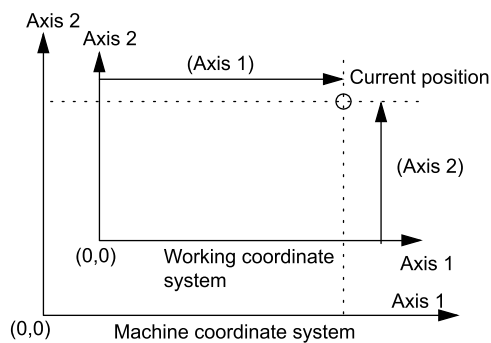
The linear interpolation for the Helical Interpolation (MCW and MCC) instructions can be used for both linear axes and rotary axes.

However, depending on how the linear axis is handled, the path of helical interpolation will not be a helix. Check to confirm the paths of the axis when this instruction is used in programs to ensure that the system operates safely.

There is a risk of injury or device damage.

Unexpected operation may occur if the following coordinate instructions are specified incorrectly: Always confirm that the following instructions are specified correctly before you begin operation.

- Absolute Mode (ABS)
- Incremental Mode (INC)
- Current Position Set (POS)



There is a risk of injury or device damage.

The Set Current Position (POS) instruction creates a new working coordinate system. Therefore, unexpected operation may occur if the POS instruction is specified incorrectly. When you use the POS instruction, always confirm that the working coordinate system is in the correct position before you begin operation.

There is a risk of injury or device damage.

The Move on Machine Coordinates (MVM) instruction temporarily performs positioning to a coordinate position in the machine coordinate system. Therefore, unexpected operation may occur if the instruction is executed without confirming the zero point position in the machine coordinate system first. When you use the MVM instruction, always confirm that the machine zero point is in the correct position before you begin operation.

There is a risk of injury or device damage.

NOTICE

Observe the setting methods that are given in the manual of the motion control function to be used for the following parameters.

- Parameters for absolute position detection when the axis type is set to a finite-length axis
- Parameters for simple absolute infinite-length position control when the axis type is set to an infinite-length axis

If any other methods are used, offset in the current position when the power supply is turned OFF and ON again may result in device damage.

(6) Maintenance and Inspection Precautions



CAUTION

Do not attempt to disassemble or repair the product.

There is a risk of electrical shock, injury, or device damage.

Suitable battery replacement must be performed and it must be performed only by an experienced technician.

There is a risk of electrical shock, injury, or device damage.

Do not forget to perform the following tasks when you replace the CPU unit:

- Back up all programs and parameters from the CPU unit that is being replaced.
- Transfer all saved programs and parameters to the new CPU unit.

If you operate the CPU unit without transferring this data, unexpected operation may occur. There is a risk of injury or device damage.

Do not change any wiring while power is being supplied.

There is a risk of electrical shock or injury.

NOTICE

Replace the battery only while power is supplied to the product.

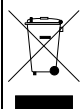
Replacing the battery while the power to the product is turned OFF may result in loss of the data stored in memory in the product.

Do not touch the electrodes when replacing the battery.

Static electricity may damage the internal electronic component.

(7) Disposal Precautions

Correctly discard the product and used batteries as stipulated by regional, local, and municipal laws and regulations. Be sure to include these contents in all labelling and warning notifications on the final product as necessary.



(8) Other General Precautions

- The products shown in the illustrations in this manual are sometimes shown without covers or protective guards. Always replace the cover or protective guard as specified first, and then operate the products in accordance with the manual.
- The illustrations that are presented in this manual are typical examples and may not match the product you received.
- If the manual must be ordered due to loss or damage, inform your nearest Yaskawa representative or one of the offices listed on the back of this manual.

i.6 Warranty

i.6.1 Details of Warranty

(1) Warranty Period

The warranty period for a product that was purchased (hereinafter called the “delivered product”) is one year from the time of delivery to the location specified by the customer or 18 months from the time of shipment from the Yaskawa factory, whichever is sooner.

(2) Warranty Scope

Yaskawa shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the above warranty period. This warranty does not cover defects caused by the delivered product reaching the end of its service life and replacement of parts that require replacement or that have a limited service life.

This warranty does not cover failures that result from any of the following causes.

- Improper handling, abuse, or use in unsuitable conditions or in environments not described in product catalogs or manuals, or in any separately agreed-upon specifications
- Causes not attributable to the delivered product itself
- Modifications or repairs not performed by Yaskawa
- Use of the delivered product in a manner in which it was not originally intended
- Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from Yaskawa
- Events for which Yaskawa is not responsible, such as natural or human-made disasters

i.6.2 Limitations of Liability

- Yaskawa shall in no event be responsible for any damage or loss of opportunity to the customer that arises due to failure of the delivered product.
- Yaskawa shall not be responsible for any programs (including parameter settings) or the results of program execution of the programs provided by the user or by a third party for use with programmable Yaskawa products.
- The information described in product catalogs or manuals is provided for the purpose of the customer purchasing the appropriate product for the intended application. The use thereof does not guarantee that there are no infringements of intellectual property rights or other proprietary rights of Yaskawa or third parties, nor does it construe a license.
- Yaskawa shall not be responsible for any damage arising from infringements of intellectual property rights or other proprietary rights of third parties as a result of using the information described in catalogs or manuals.

i.6.3 Suitability for Use

- It is the customer’s responsibility to confirm conformity with any standards, codes, or regulations that apply if the Yaskawa product is used in combination with any other products.
- The customer must confirm that the Yaskawa product is suitable for the systems, machines, and equipment used by the customer.
- Consult with Yaskawa to determine whether use in the following applications is acceptable. If use in the application is acceptable, use the product with extra allowance in ratings and specifications, and provide safety measures to minimize hazards in the event of failure.
 - Outdoor use, use involving potential chemical contamination or electrical interference, or use in conditions or environments not described in product catalogs or manuals

- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, vehicle systems, medical equipment, amusement machines, and installations subject to separate industry or government regulations
- Systems, machines, and equipment that may present a risk to life or property
- Systems that require a high degree of reliability, such as systems that supply gas, water, or electricity, or systems that operate continuously 24 hours a day
- Other systems that require a similar high degree of safety
- Never use the product for an application involving serious risk to life or property without first ensuring that the system is designed to secure the required level of safety with risk warnings and redundancy, and that the Yaskawa product is properly rated and installed.
- The circuit examples and other application examples described in product catalogs and manuals are for reference. Check the functionality and safety of the actual devices and equipment to be used before using the product.
- Read and understand all use prohibitions and precautions, and operate the Yaskawa product correctly to prevent accidental harm to third parties.

i.6.4 Specifications Change

The names, specifications, appearance, and accessories of products in product catalogs and manuals may be changed at any time based on improvements and other reasons. The next editions of the revised catalogs or manuals will be published with updated code numbers. Consult with your Yaskawa representative to confirm the actual specifications before purchasing a product.

Basic Information on the MPE720

This chapter describes an outline of the MPE720, the tasks that must be performed to use the MPE720, and the window configuration.

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1.1 Before Using the MPE720

This section describes an outline of the MPE720 and the tasks that must be performed to use the MPE720.

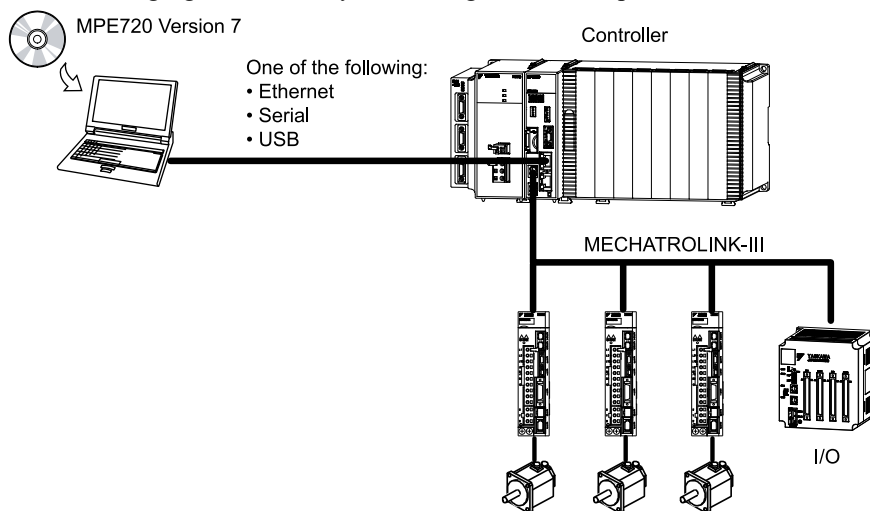
1.1.1 What Is the MPE720?

The MPE720 is an engineering tool equipped with optimum functionality for the entire development process of devices required in machine designs (e.g., controllers, servo drives, AC drives, and distributed I/O devices).

The MPE720 is installed in a PC and the PC can be connected to a controller to operate the controller from the PC interface.

1.1.2 System Configuration Example

The following figure shows a system configuration example where the MPE720 is connected to the controller.



1.1.3 Target Controller Type

The MPE720 supports the following controllers.

- MP2000 series
- MP3000 Series
- Σ -7C model (two-axis SERVOPACK with built-in controller)
- Σ -X-series SERVOPACK FT55 and FT56 (customized sensing data function option)
- YRM controller
- MPX controller

Information You can also check this information in the [Environment Setting] window in the MPE720. Refer to the following section for details.

 [10.1.3 \[System\] - \[Controller Type\] on page 574](#)

1.1.4 Operating Environment

The operating environment of the MPE720 is given below.

CPU Clock	1 GHz or more (recommended) ^{*1}
Memory Capacity	1 GB or more (recommended) ^{*2}
Available Hard Disk Space	1.2 GB or more ^{*3}
Monitor	1280 × 800 resolution or higher (recommended)
CD Drive	One (Used only for software installation)
Communications Port	Ethernet, PCI Express ^{*4} , PCI ^{*4} , USB, RS-232C
Supported Languages	English, Japanese, Simplified Chinese
Supported Operating Systems	- MPE720 Ver. 7.97 or later Supports 32-bit OS and 64-bit OS. Windows 11, Windows 10 (version 20H1 or later) - MPE720 Ver. 7.83 or later Supports 32-bit OS and 64-bit OS. Windows 11, Windows 10, Windows 8, Windows 8.1, Windows 7 SP1 - MPE720 Ver. 7.37 or later Supports 32-bit OS and 64-bit OS. Windows 10, Windows 8, Windows 8.1, Windows 7 SP1 - MPE720 Ver. 7.36 Supports 32-bit OS and 64-bit OS. Windows 10, Windows 8, Windows 8.1, Windows 7 SP1 Supports 32-bit OS only. Windows XP SP3, Windows Vista
Windows Update	For MPE720 Ver. 7.45 or later versions, the following upgraded program must be installed. (No upgraded programs are required for Windows 10 or later) - Windows 7 KB2999226 - Windows 8 KB2919442, KB2919355, KB2999226 - Windows 8.1 KB2999226
Software Environment	- MPE720 Ver. 7.37 or later Microsoft .NET Framework 4.5, 4.6 - MPE720 Ver. 7.36 Microsoft .Net Framework 2.0 to 3.5 SP1
Browser (to Display Help)	Internet Explorer 9 or later
Other	Adobe Reader Ver. 6.00 or later

^{*1} This software can also run on compatible CPUs manufactured by companies other than Intel.

^{*2} Installing more memory than the minimum requirements is recommend because the memory will be insufficient and performance will decrease when multiple applications are run at the same time.

^{*3} This value includes the standard workspace after installation.

^{*4} To use an MP2100/MP3100 controller, connect the controller to a PC running Windows 10 or earlier.

You cannot connect an MP2100/MP3100 controller to a PC running Windows 11 because the PCI Express/PCI interface used by these controllers is not supported in Windows 11.

1.1.5 Installing the MPE720 on a PC

Use the following procedure to install the MPE720 on a PC.

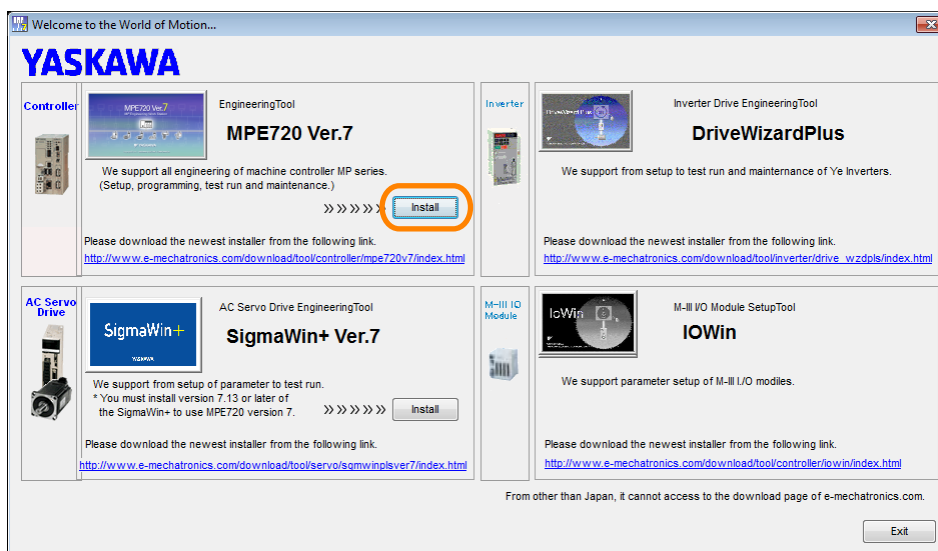
- 1. Insert the MPE720 installation DVD into the PC.**

The Installer will start automatically.

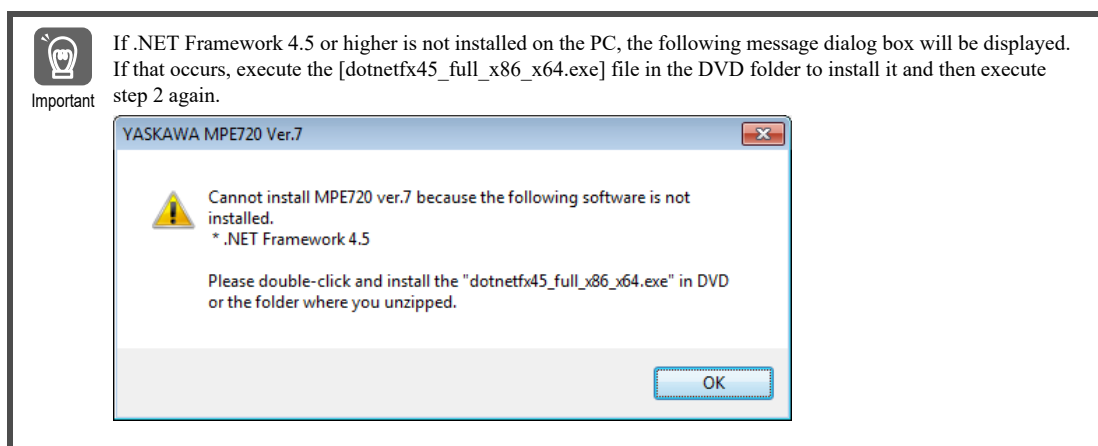
- 2. Execute the [Setup.exe] file in the folder.**

When execution of [Setup.exe] starts, the [Welcome to the World of Motion...] window will be displayed.

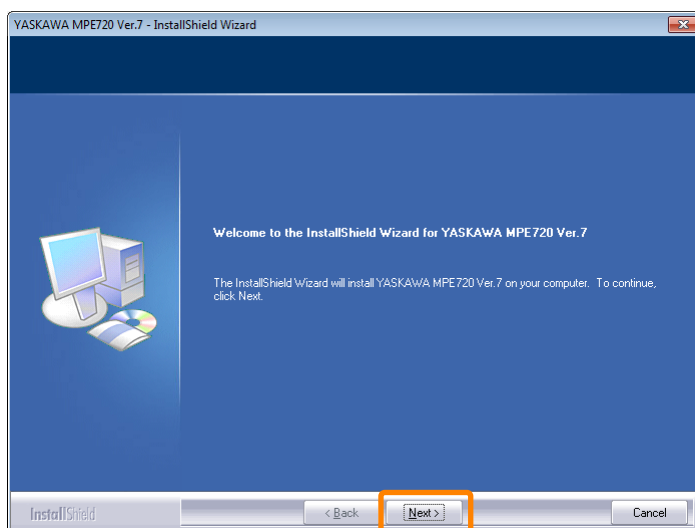
3. Click the [Install] button for MPE720 Ver. 7.



When the application is ready to be installed, the [YASKAWA MPE720 Ver. 7 - InstallShield Wizard] window will be displayed.

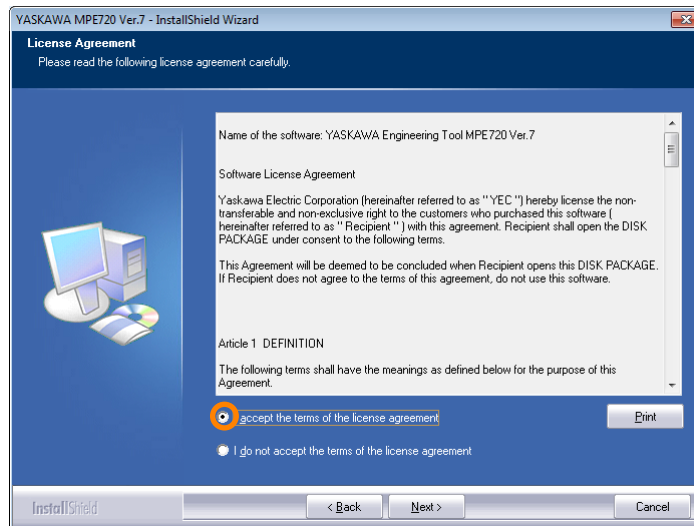


4. Click the [Next] button.

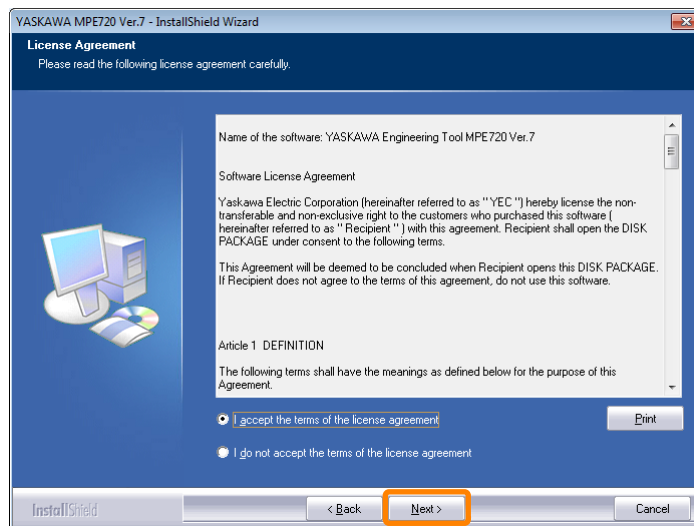


The License Agreement will be displayed.

5. Read the agreement, and then click [I accept the terms of the license agreement].

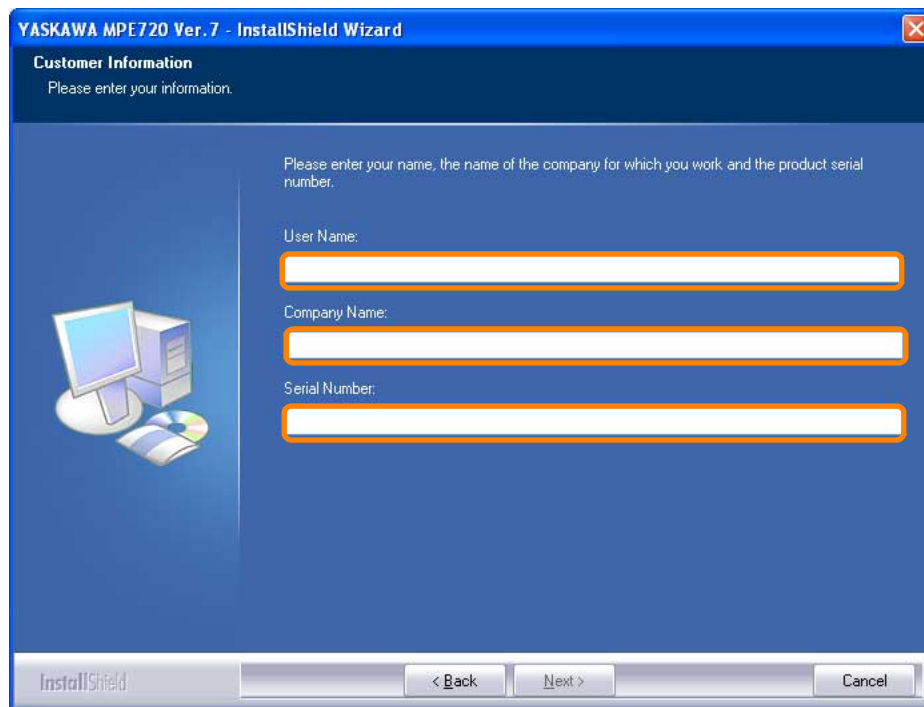


6. Click the [Next] button.



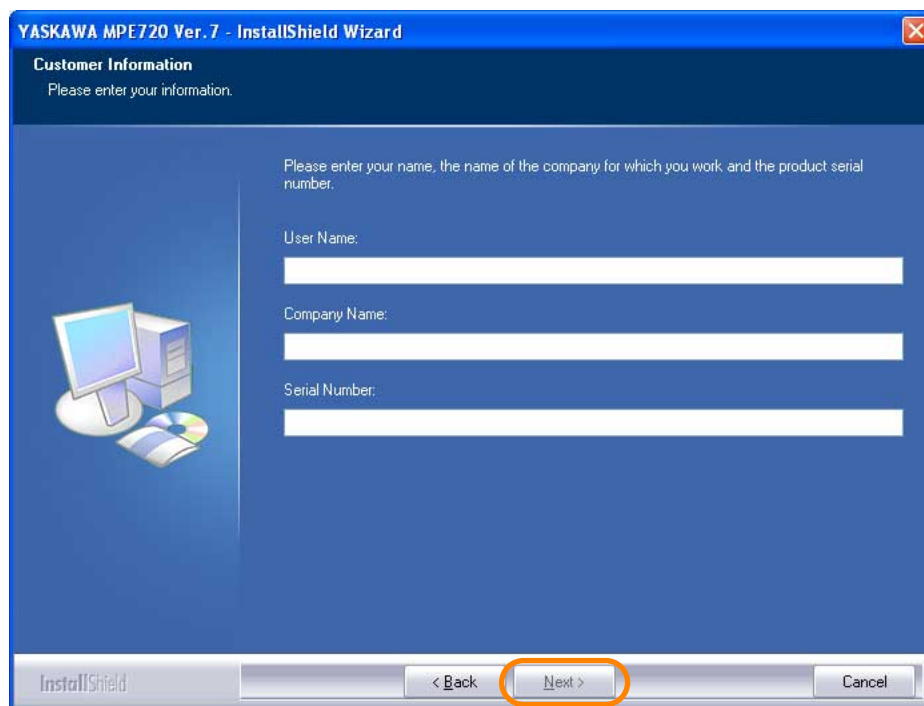
7. Enter the following information.

- User name
- Company name
- Serial number: Enter the number that is printed on the DVD package.



The screenshot shows the 'YASKAWA MPE720 Ver. 7 - InstallShield Wizard' window. The title bar is blue with a close button. Below the title bar, the text 'Customer Information' and 'Please enter your information.' is displayed. On the left, there is an illustration of a computer monitor, tower, and CD. On the right, there are three text input fields labeled 'User Name:', 'Company Name:', and 'Serial Number:'. Each field has a blue border. At the bottom, there is a grey bar with the 'InstallShield' logo, a '< Back' button, a 'Next >' button, and a 'Cancel' button.

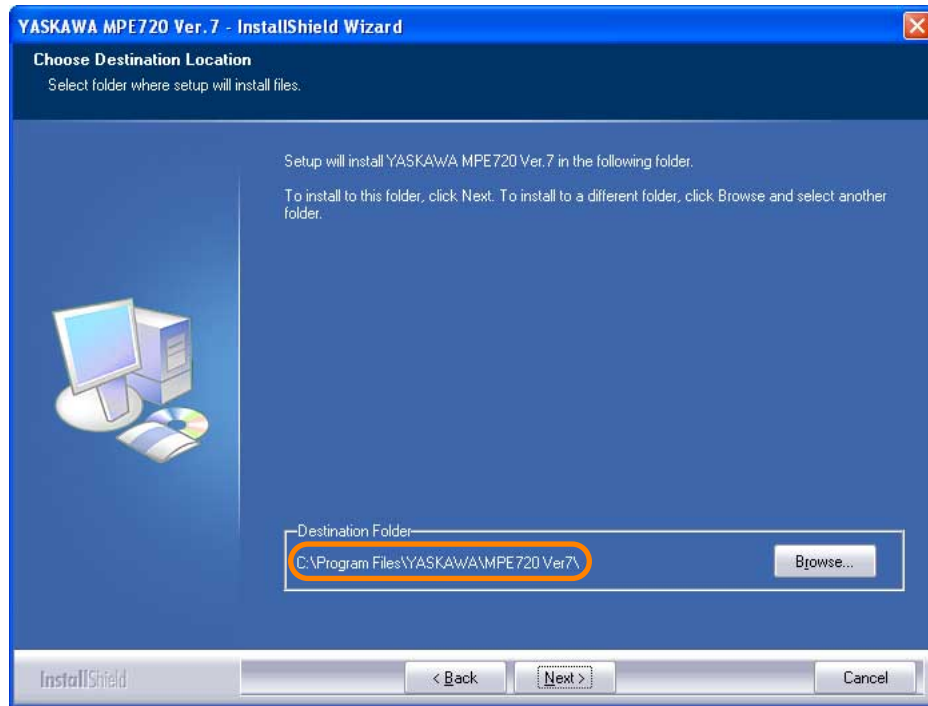
8. Click the [Next] button.



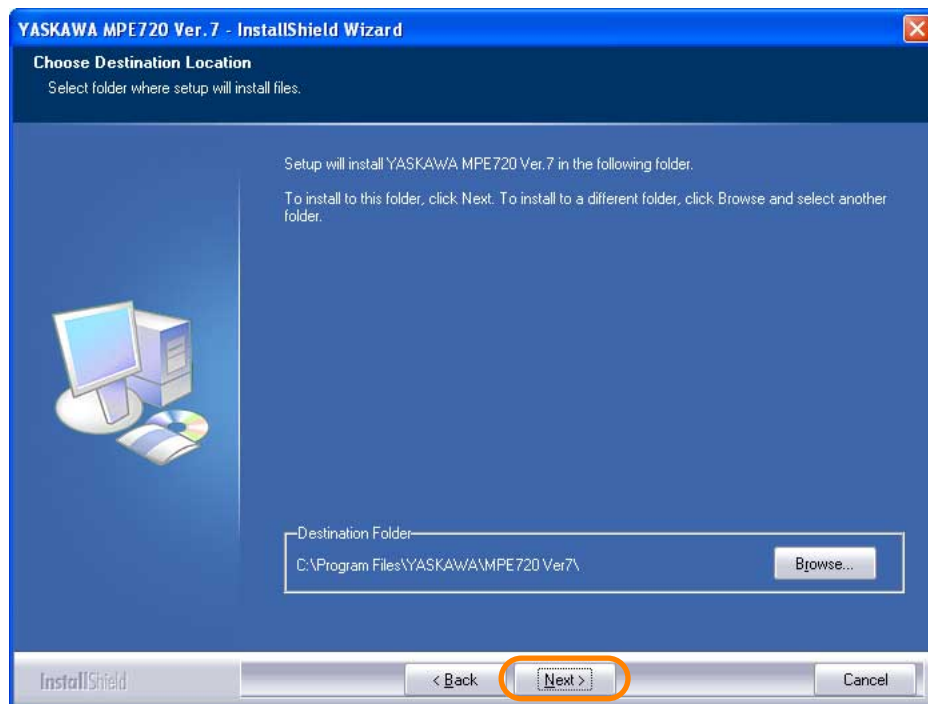
This screenshot is identical to the previous one, but the 'Next >' button at the bottom is highlighted with a red oval, indicating it should be clicked.

9. Select the destination folder.

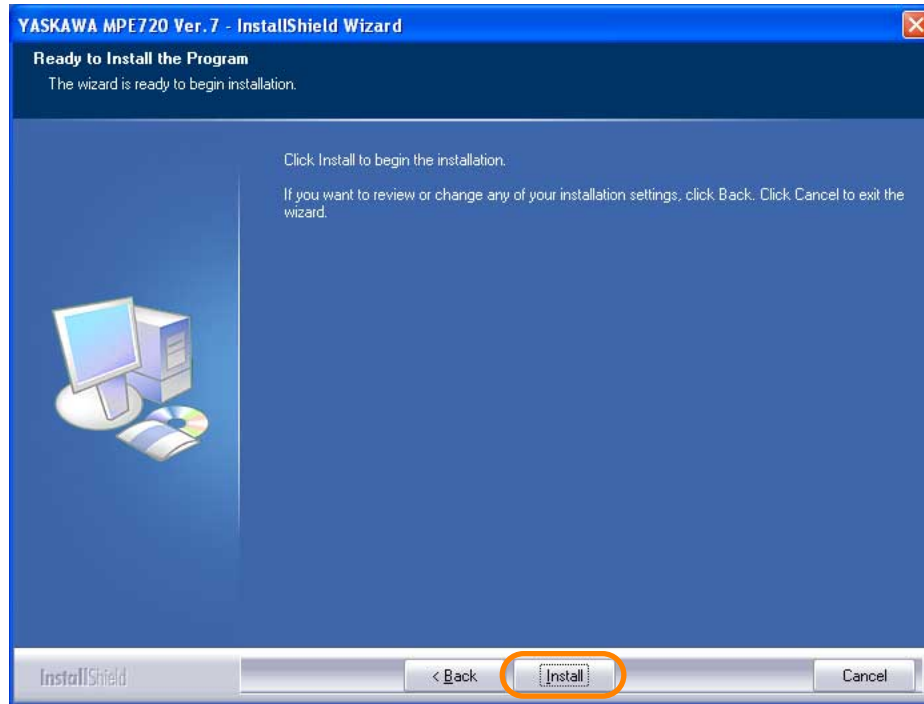
- To install to the folder shown under [Destination Folder]: Proceed to step 10.
- To change the destination folder: Click the [Browse] button and select the desired destination by following the guidance displayed in the window.



10. Click the [Next] button.

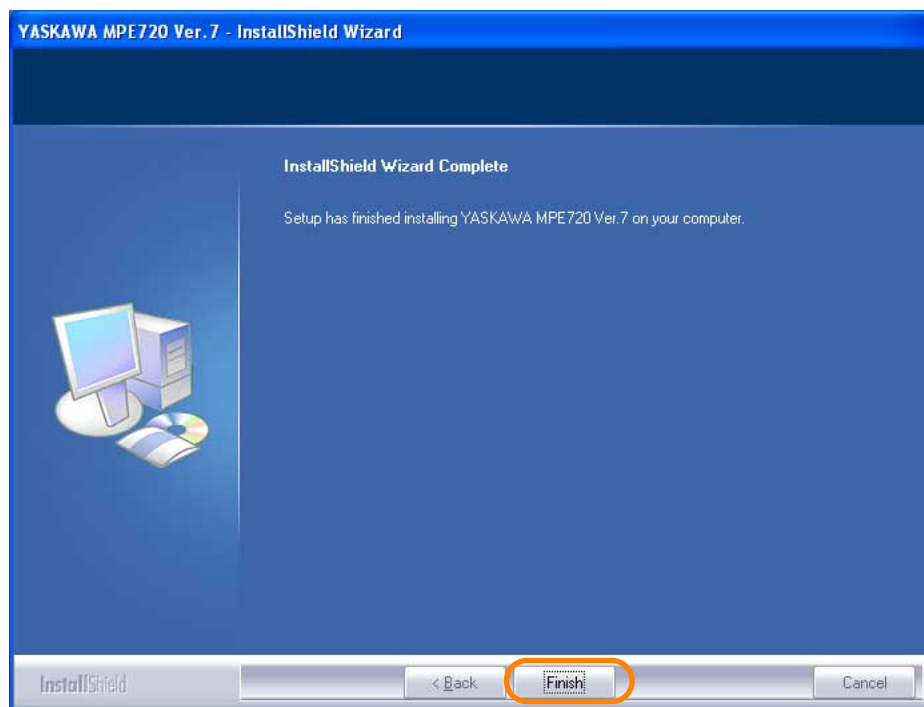


11. Click the [Install] button.



The installation will begin.

12. Click the [Finish] button.

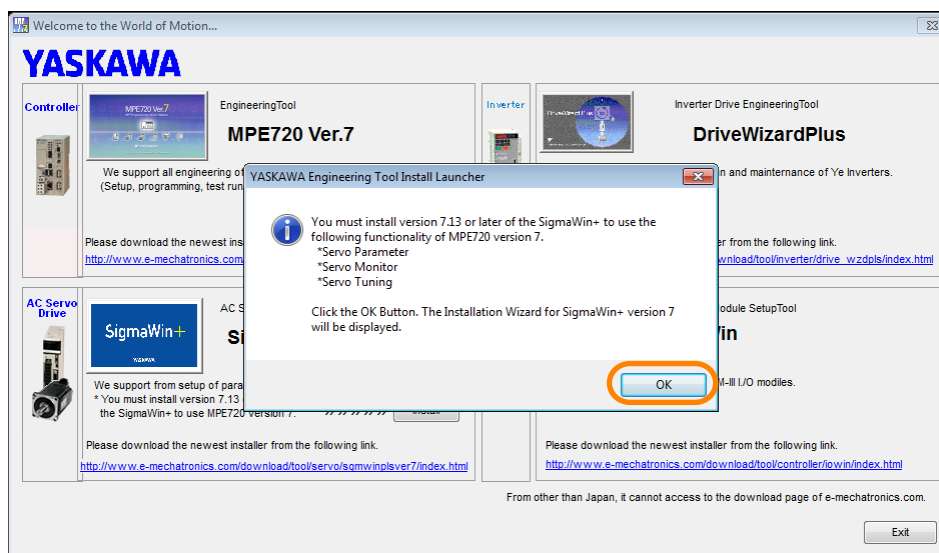


This concludes the installation of the MPE720 on the PC.

Installation of SigmaWin+ Ver.7 will start next in the following cases. Proceed to step 13.

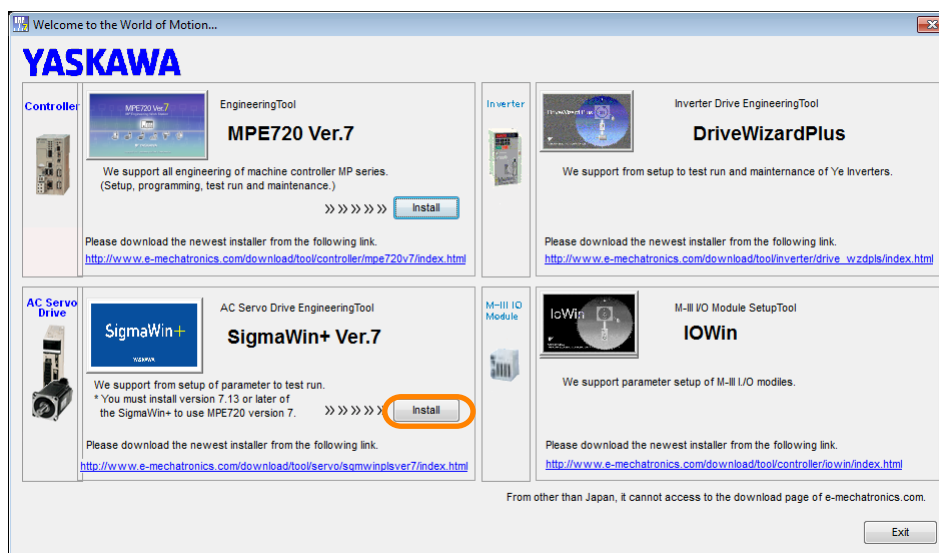
- SigmaWin+ Ver.7 is not installed in the PC.
- The version of SigmaWin+ Ver.7 installed in the PC is lower than version 7.13.
- The version of SigmaWin+ Ver.7 installed in the PC is higher than version 7.13, but the version on the DVD is higher than the installed version.

13. The following message dialog box will be displayed. Click the [OK] button.



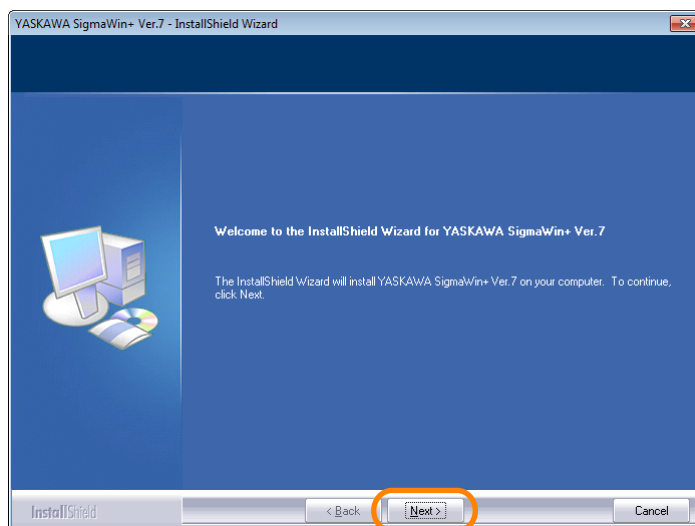
The installer will start automatically.

14. Click the [Install] button for SigmaWin+ Ver.7.



When the application is ready to be installed, the [YASKAWA SigmaWin+ Ver.7 - InstallShield Wizard] window will be displayed.

15. Click the [Next] button.

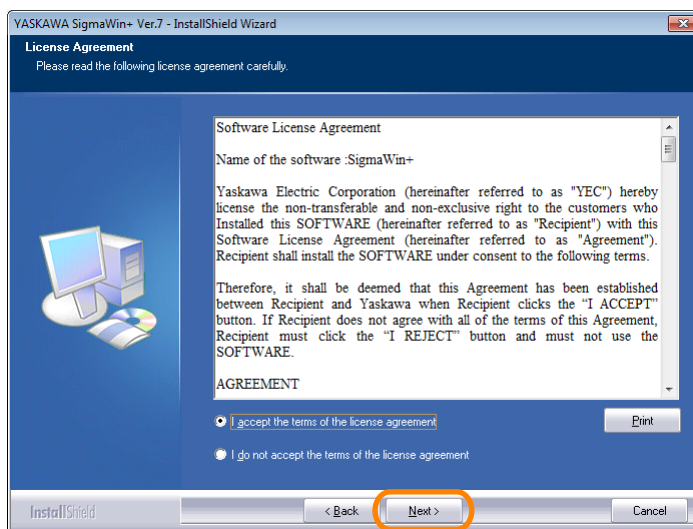


The License Agreement will be displayed.

16. Read the agreement, and then click [I accept the terms of the license agreement].

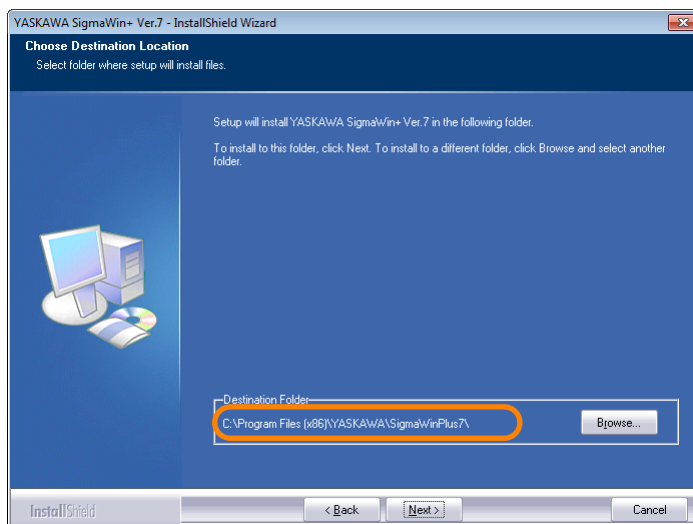


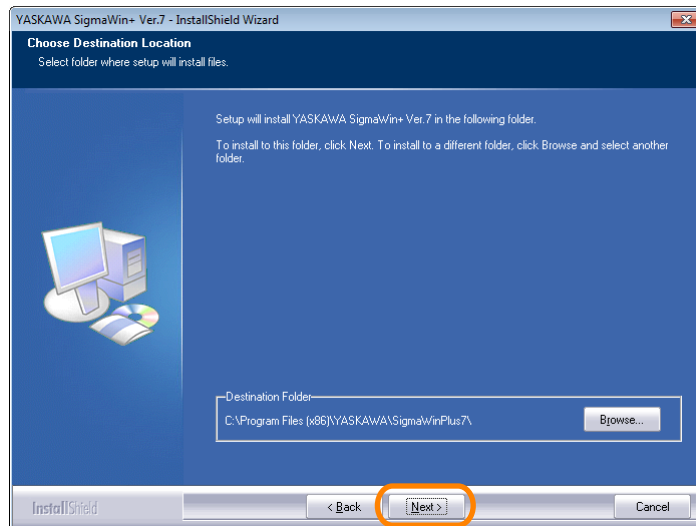
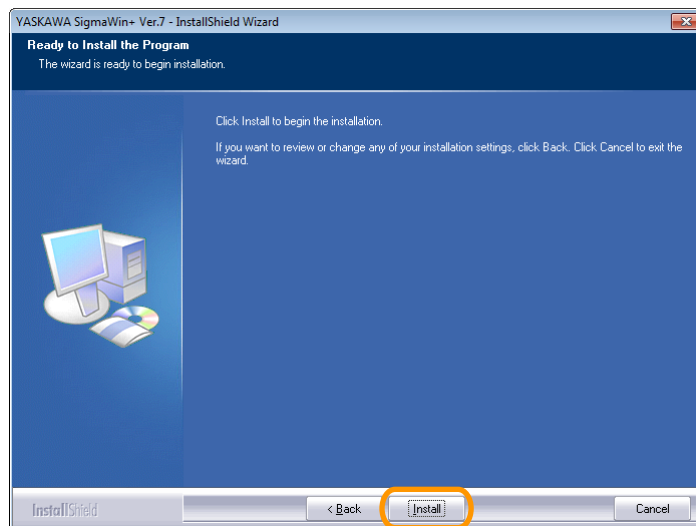
17. Click the [Next] button.



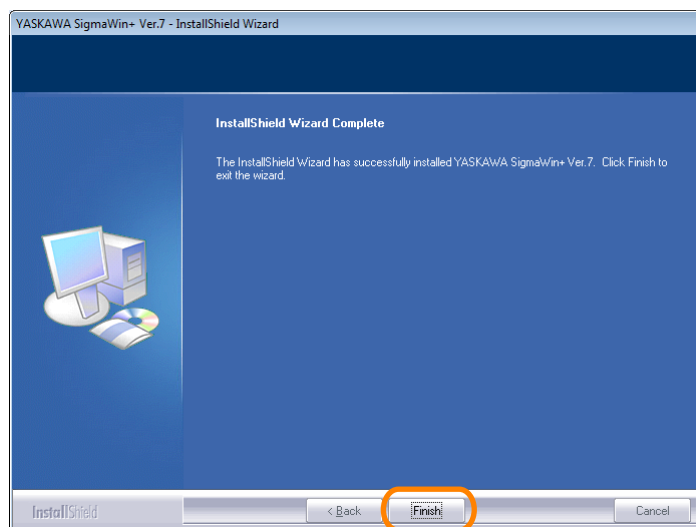
18. Select the destination folder.

- To install to the folder shown under [Destination Folder]: Proceed to step 19.
- To change the destination folder: Click the [Browse] button and select the desired destination by following the guidance displayed in the window.



19. Click the [Next] button.**20. Click the [Install] button.**

The installation will begin.

21. Click the [Finish] button.

This concludes the installation of SigmaWin+ Ver.7 on the PC.

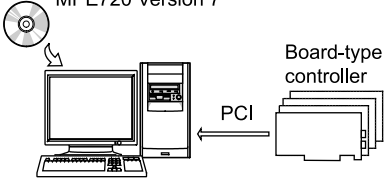
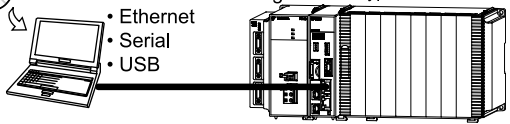
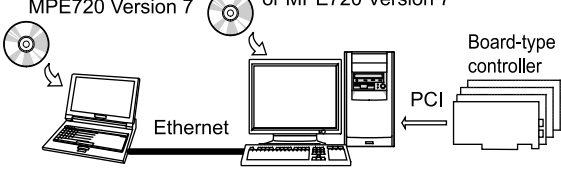
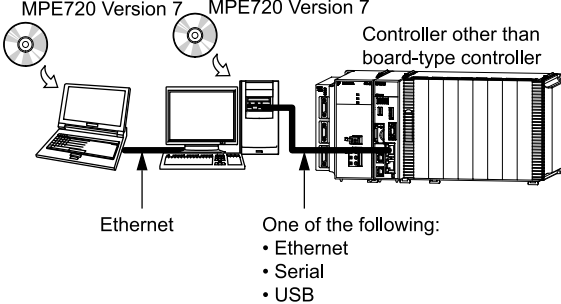
1.1.6 Connecting the MPE720 to a Controller

This section describes how to connect the PC on which the MPE720 is installed to a controller.

(1) Connecting Cables

The connection method depends on the type of connection and the type of controller.

Information Refer to the setup manual for your controller for information on connecting the power supply and other devices (such as servo drives) to the controller and for information on connecting controllers to each other to use them together.

Connection Type	Controller Type	Conceptual Illustration of Connection	Cable Specifications
Normal Connection	Board	A cable is not required for the connection. MPE720 Version 7 	—
	Other than Board	MPE720 Version 7 One of the following: • Ethernet • Serial • USB Controller other than board-type controller 	
Remote Connection	Board	MPE720 Version 7 MPE720 Version 6 or MPE720 Version 7 Board-type controller Ethernet PCI 	Ethernet Use a commercially available cable that meets the following conditions: • Ethernet specification: 100Base-TX • Category 5 or higher • Twisted-pair cable with RJ-45 connectors Serial
	Other than Board	Two cables are required. MPE720 Version 7 MPE720 Version 7 Controller other than board-type controller Ethernet One of the following: • Ethernet • Serial • USB 	Use one of the following cables. • Model: JEPMC-W5311-03 (length: 2.5 m) • Model: JEPMC-W5311-15 (length: 15 m) USB Use a commercially available USB cable.



Term

Remote connection :

The server PC that was connected to the controller is installed at the site of the controller, and a client PC is connected to the server PC.

You can transfer projects that were created on the client PC to the controller via the server PC.

(2) Connection Status

The connection status between the MPE720 and controller can be classified as shown below.

Information Refer to the following section for details on the project file.

 [2.1 What Is a Project File? on page 100](#)

Connection Status		Description
Online	Direct Connection	The status where a connection is made to the controller in the MPE720 without opening a project file. You can monitor and edit information in the controller using the MPE720. However, you cannot copy a drawing when using a direct connection. To copy a drawing, establish a project link connection.
	Project Link Connection	The status where a project file is opened in the MPE720 and then a connection is made to the controller. A project link connection is made to the controller in the following cases: • To set up the actual machine using a project file that was previously created because the previous and current machine configurations are the same. • To connect to the actual machine and continue setup using a project that was previously created when the setup process was not completed.
Offline		The status where the MPE720 is not connected to the controller. You can open a project file and configure the settings for that data. You can manipulate the data in the project file without the actual machine (e.g., controller), but the functions available to you are limited.

The data that is displayed in the MPE720 window and the storage location for edited data depend on the connection status and the project file status. The following table provides illustrations of this. This table describes saving only, but deletion is the same.

Connection Status	Project File Status	Data Displayed in the MPE720 Window	Storage Location of Edited Data	Illustration
Online: Direct Connection	Not open	Controller RAM	Controller RAM	Data displayed in the MPE720 window Storage location of edited data
Online: Project Link Connection	Open	Controller RAM	In the open project file and the controller RAM	Data displayed in the MPE720 window Storage location of edited data Note: Only changes are stored in the project file. When using a project link connection, make sure the contents of the project file and the controller RAM are the same before you start. Refer to the following section for details. 2.4.1 Compare with Controller on page 118
Offline	Open	Open project file	Open project file	Data displayed in the MPE720 window Storage location of edited data

Information

Differences between the Controller RAM and Flash Memory

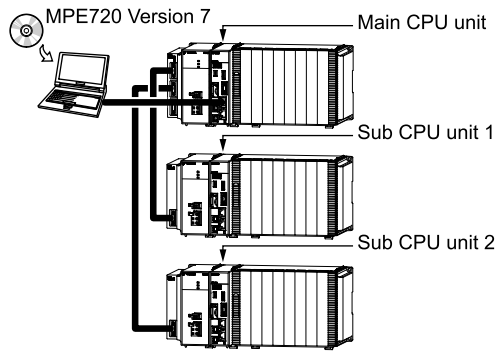
- RAM: Data is lost when the power to the controller is turned OFF.
- Flash memory: Data is retained even when the power to the controller is turned OFF.

We recommend saving the data to the flash memory.

(3) Engineering Range

If you are using multiple CPU units, the CPU units for which you can perform engineering depend on the CPU unit that is connected to the MPE720.

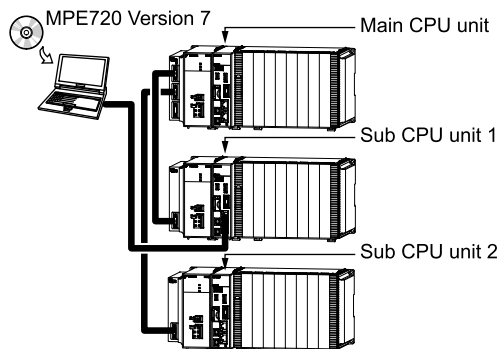
The following figures show the CPU units for which engineering is possible.

(a) MPE720 Connected to Main CPU Unit

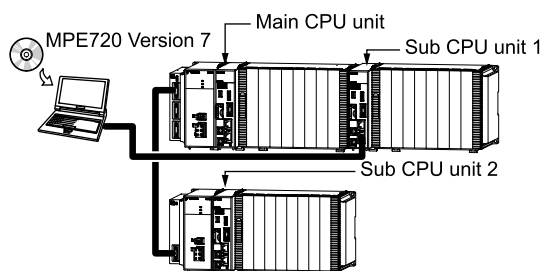
Engineering is possible for all of the CPU units (the main CPU unit, sub CPU unit 1, and sub CPU unit 2).

(b) MPE720 Connected to a Sub CPU Unit

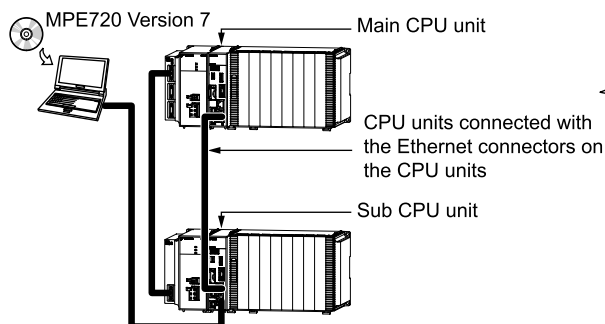
The CPU units for which engineering is possible depends on the method used to connect the CPU units.

◆ CPU Units with a Bus Connection

Engineering is possible only for sub CPU unit 1. To perform engineering for the main CPU unit and sub CPU unit 2, the MPE720 must be reconnected to these CPU units.



Engineering is possible only for sub CPU unit 1. To perform engineering for the main CPU unit and sub CPU unit 2, the MPE720 must be reconnected to these CPU units.

◆ CPU Units with an Ethernet Connection

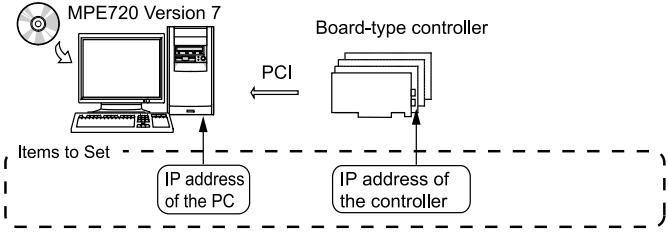
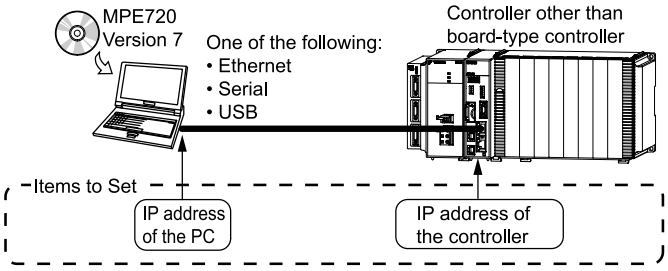
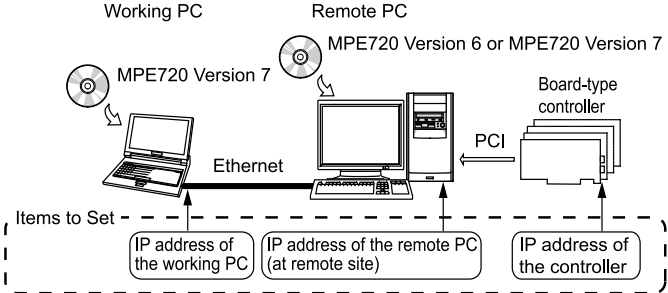
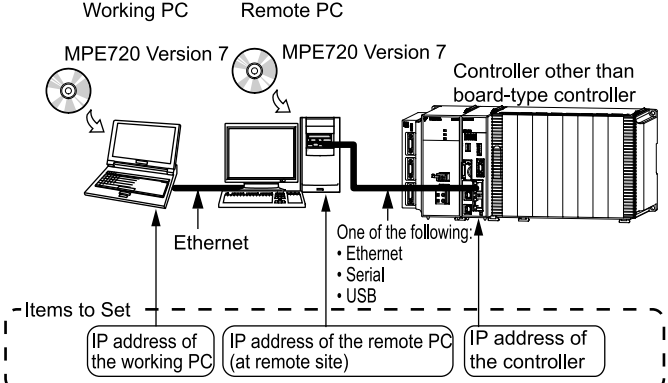
Engineering is possible for all of the CPU units (the main CPU unit and sub CPU unit).

1.1.7 Setting Up Communications

This section describes the communications settings for the PC on which the MPE720 is installed and the controller.

The procedure to set up communications depends on the connection status, the type of controller, and the communications methods.

The following table gives visual examples of the communications settings and page references.

Connection Status	Controller Type	Illustration	Reference
Normal Connection	Board *1		 (1) <i>Board-type Controller on page 48</i>
	Other than Board		 (a) <i>Ethernet Communications (Assigning IP Addresses Automatically) on page 50</i>  (b) <i>Ethernet Communications (Assigning IP Addresses Manually) on page 52</i>  (d) <i>Serial Communications on page 57</i>  (e) <i>USB Communications on page 58</i>
Remote Connection	Board *1		 (3) <i>Using a Remote Connection with MPE720 Ver. 6 Installed on the Remote PC on page 59</i>  (4) <i>Using a Remote Connection with MPE720 Ver. 7 Installed on the Remote PC on page 63</i>
	Other than Board		 (4) <i>Using a Remote Connection with MPE720 Ver. 7 Installed on the Remote PC on page 63</i>

*1 To use an MP2100/MP3100 controller, connect the controller to a PC running Windows 10 or earlier. To make a remote connection, connect the controller to a PC running Windows 10 or earlier for the remote PC only. There are no restrictions on the operating system of the working PC.
You cannot connect an MP2100/MP3100 controller to a PC running Windows 11 because the PCI Express/PCI interface used by these controllers is not supported in Windows 11.

The procedures are given below.

(1) Board-type Controller

Use the following procedure to establish a normal connection from the PC on which the MPE720 is installed to a board-type controller.

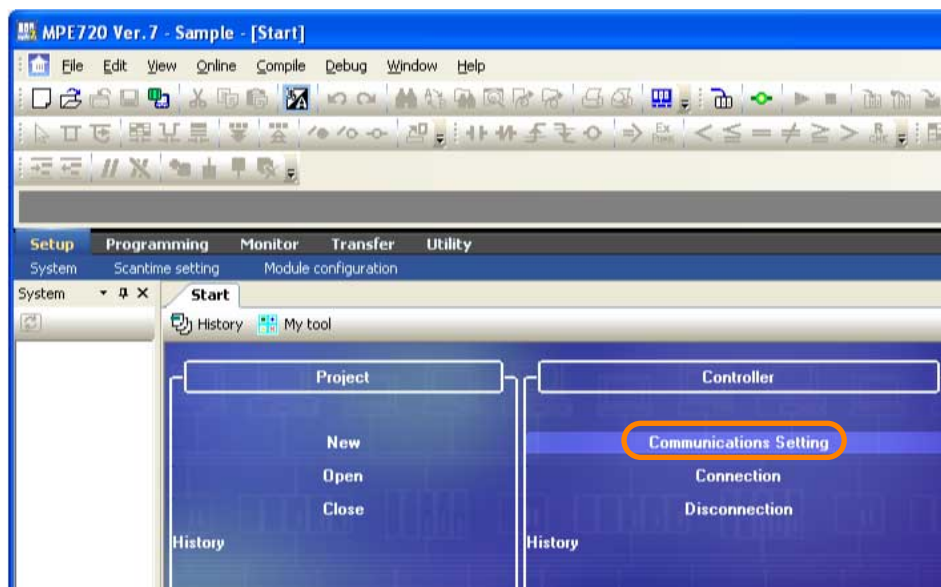


Important

To use an MP2100/MP3100 controller, connect the controller to a PC running Windows 10 or earlier.

You cannot connect an MP2100/MP3100 controller to a PC running Windows 11 because the PCI Express/PCI interface used by these controllers is not supported in Windows 11.

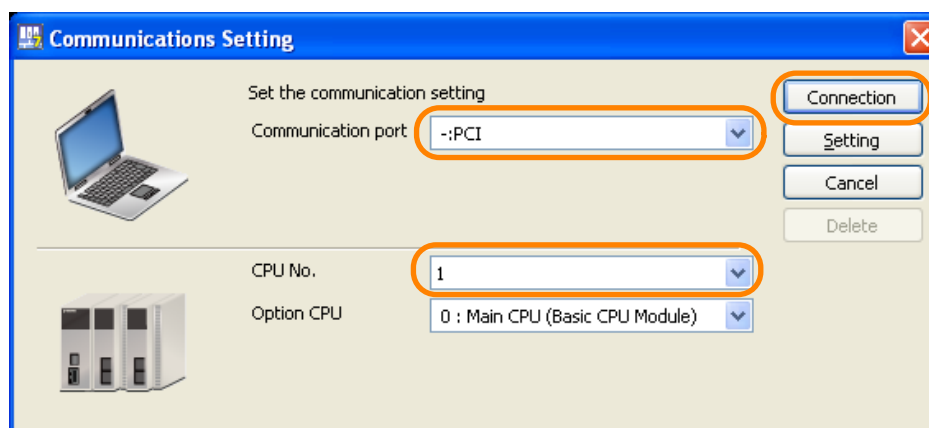
1. Start up MPE720, and click [Communications Setting].



The [Communications Setting] window will be displayed.

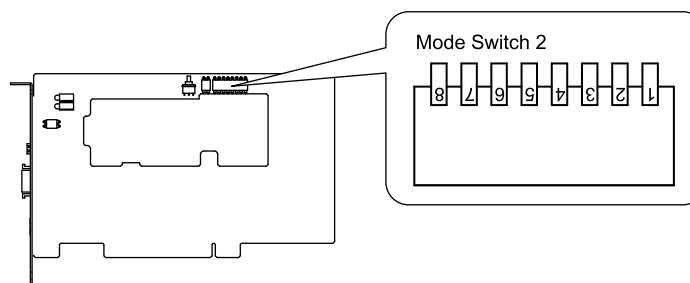
2. Set the following items, and then click the [Connection] button.

- Communications Port
 - For MP2100: PCI
 - For MP3100: PCI Express
- CPU No.: CP number of the destination controller



Information

Check the CP number that is defined by pins 7 and 8 in mode switch 2 on the board-type controller and enter the same number here.



State of Pin 8	State of Pin 7	CP Number
OFF	OFF	1
OFF	ON	2
ON	OFF	3
ON	ON	4

3. Confirm that [Online] appears to the upper left of the launcher.



This concludes the procedure.

(2) Controller Other Than a Board-type Controller

There are three methods to establish a normal connection from the PC on which the MPE720 is installed to a controller other than a board-type controller.

- Ethernet communications
- Serial communications
- USB communications

IP addresses can also be assigned automatically for Ethernet communications.

(a) Ethernet Communications (Assigning IP Addresses Automatically)

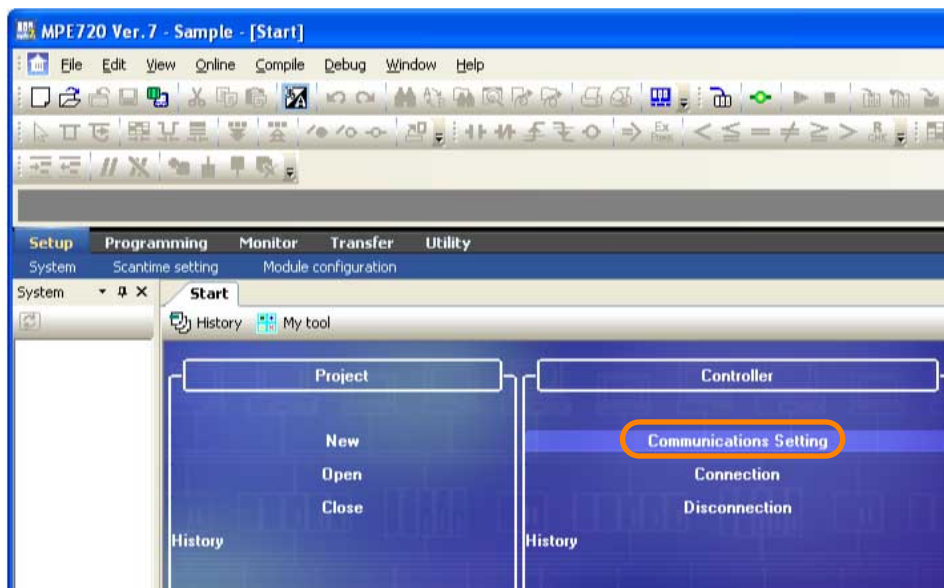
Use the following procedure to establish a normal connection from the PC on which the MPE720 is installed to a controller other than a board-type controller by Ethernet communications (assigning IP addresses automatically).



Important

- Use this procedure only when the PC and controller are connected using the Ethernet connector on the controller.
- The IP addresses cannot be assigned automatically if you are using Windows 7. Set the IP addresses manually. Refer to the following section for details.
 (b) [Ethernet Communications \(Assigning IP Addresses Manually\) on page 52](#)

1. Start up MPE720, and click [Communications Setting].

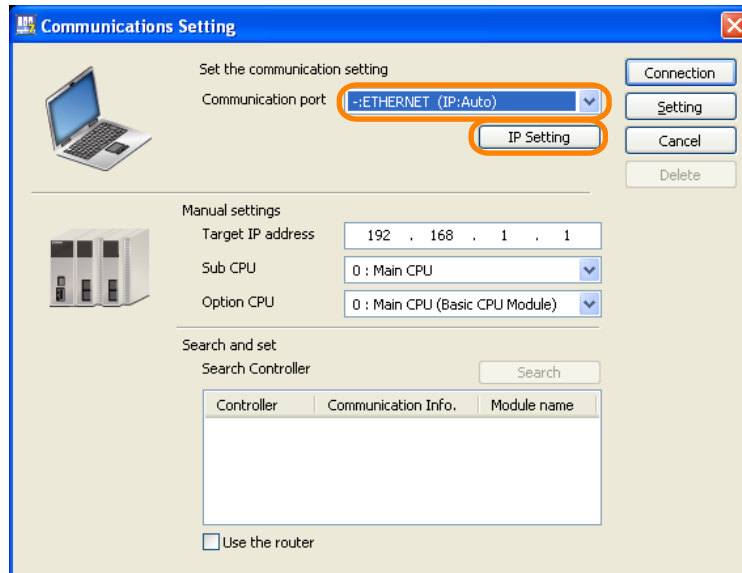


The [Communications Setting] window will be displayed.

2. Select [-:ETHERNET (IP: Auto)] in the [Communication port] box, and click the [IP Setting] button.

Information

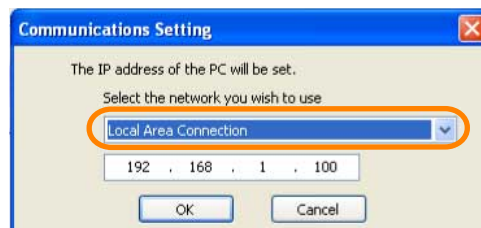
If the list already contains the target Ethernet communications port, (i.e., IP: 192.168.1.□□□), select that entry and proceed to step 5.



A different [Communications Setting] window will be displayed.

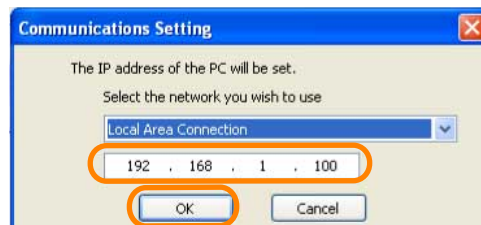
3. **Select [Local Area Connection] or [Ethernet] in the [Select the network you wish to use] box.**

Information The text displayed for the options will depend on your personal computer.



4. **Enter the IP address, and click the [OK] button.**

Information Do not set the MPE720 to the same IP address that is set for the controller (default: 192.168.1.1).



The [Communications Setting] window will close and the entered IP address will appear in [Communication port].

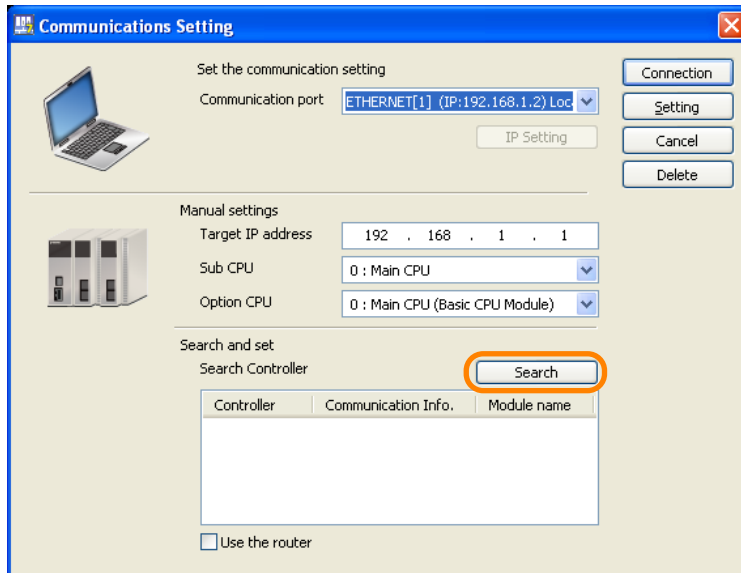
5. **Click the [Search] button.**

Note:

- The [Search] button is enabled only when the PC and controller are connected using the Ethernet connector on the controller.
- If the connection is made using a 218IF-01 communications module, an option module, nothing will be displayed if you click the [Search] button.

Information This section describes the typical procedure. You can also make the connection with other operations. Refer to the following section for details.

 (c) [Details on the \[Communications Setting\] Dialog Box on page 56](#)



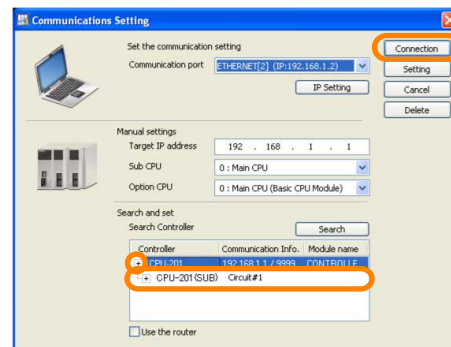
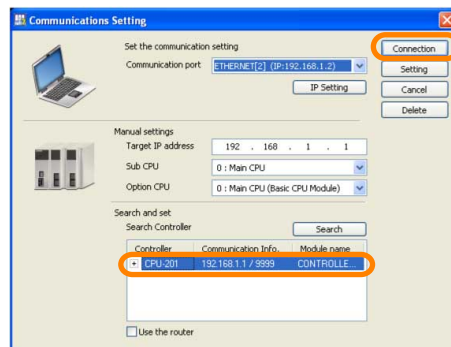
The search results will be displayed in the [Search Controller] area.

Information If the MPE720 is connected to a sub CPU unit, the model name of the sub CPU unit will be displayed in the [Controller] column.

6. **Select the controller that is directly connected to the the MPE720 from the [Search Controller] area, and click the [Connection] button.**



If you are using more than one CPU unit together, Click [+] in the [Controller] column and then double-click the controller that is directly connected to the MPE720 to select it.



7. **Confirm that [Online] appears to the upper left of the launcher.**



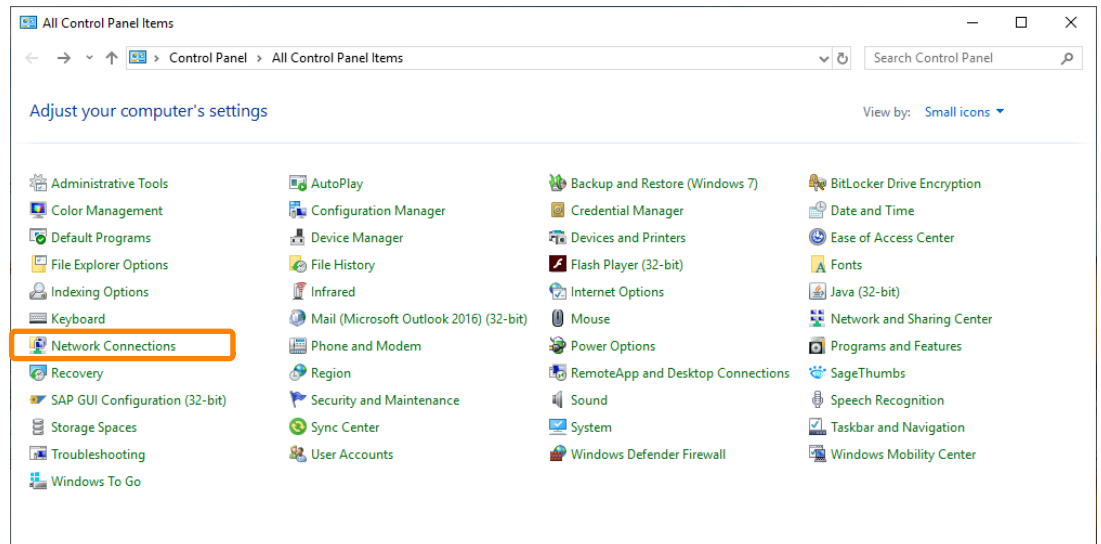
This concludes the procedure.

(b) Ethernet Communications (Assigning IP Addresses Manually)

Use the following procedure to establish a normal connection from the PC on which the MPE720 is installed to a controller other than a board-type controller by Ethernet communications (assigning IP addresses manually).

1. **Open Control Panel from the Windows Start Menu.**

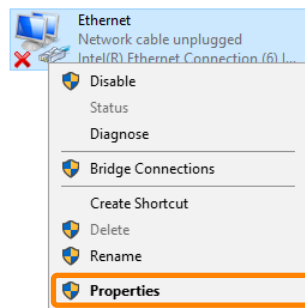
2. Click **[Network Connections]**.



The Network Connections window will be displayed.

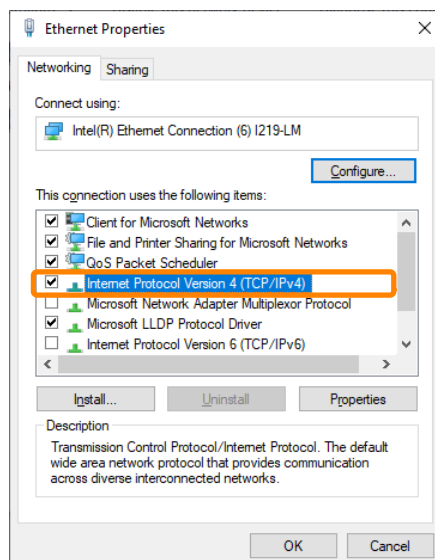
3. Right-click **[Local Area Connection]** or **[Ethernet]** and select **[Properties]**.

Information The text displayed for the options will depend on your personal computer.



The Ethernet Properties window will be displayed.

4. Double-click **[Internet Protocol Version 4 (TCP/IPv4)]**.



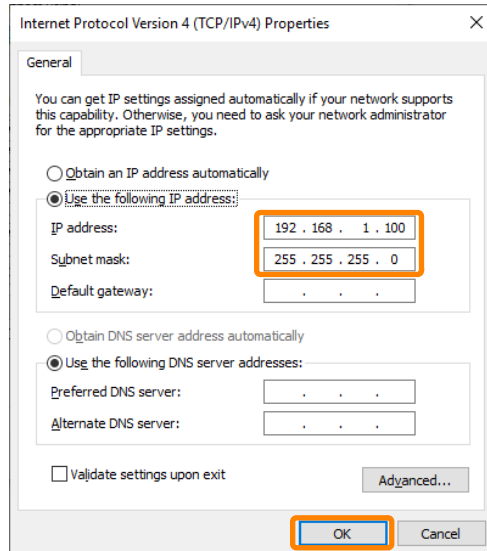
The Internet Protocol Version 4 (TCP/IPv4) Properties window will be displayed.

5. In the **[Use the following IP address]** area, set the following items, and then click the **[OK]** button.

- IP address = 192.168.1.□□□
- Subnet mask = 255.255.255.0

Information

- Do not use the same IP address as the IP address of the controller or any other device.
- It is not necessary to change or specify the default gateway.

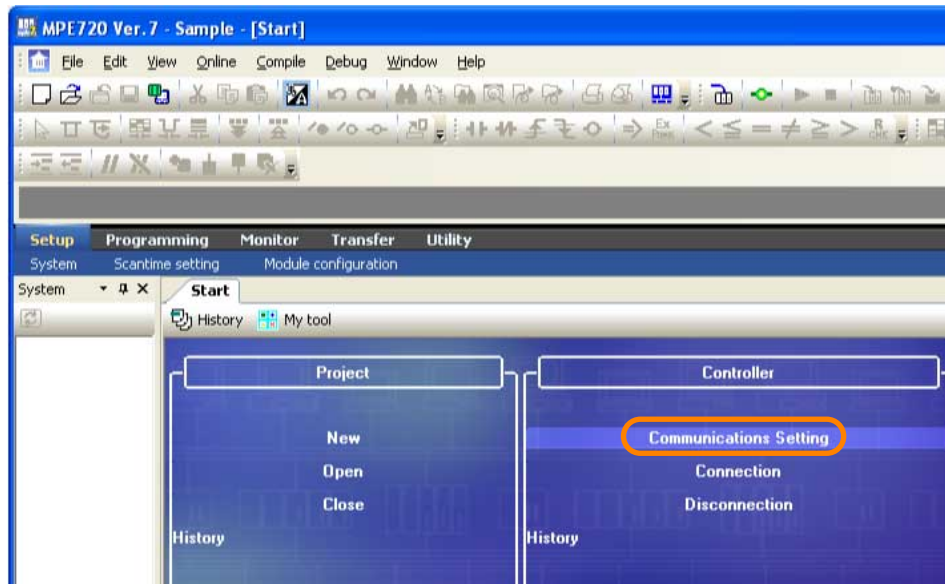


This completes the IP address settings and closes the Internet Protocol Version 4 (TCP/IPv4) Properties window.

6. Start up MPE720.



7. Click [Communications Setting].



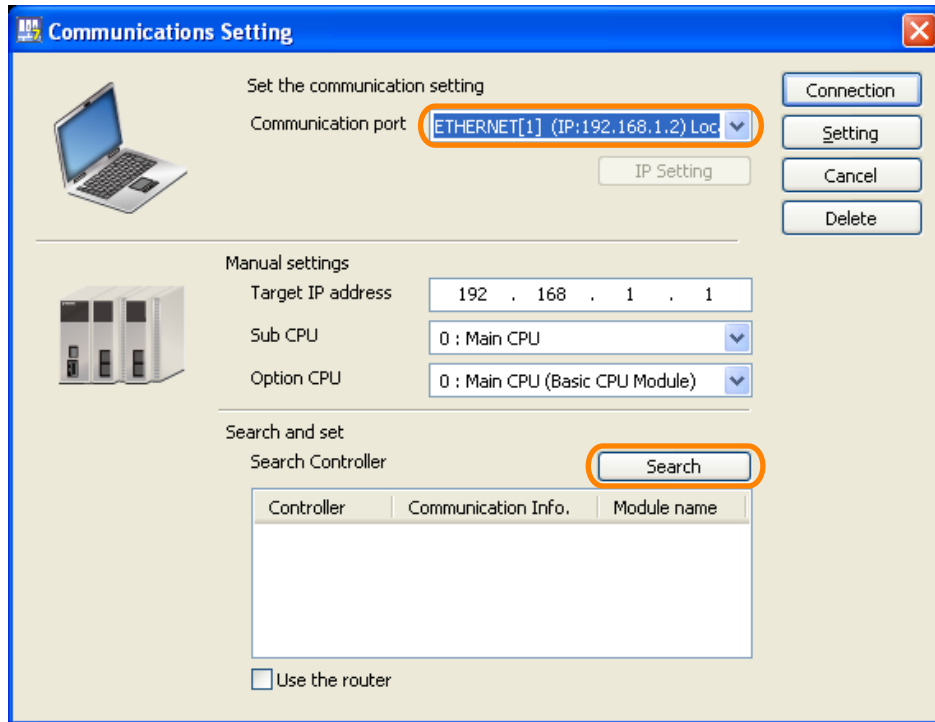
The Communications Setting window will be displayed.

8. Select the IP address that was set in step 5 from the [Communication port] box, and then click the [Search] button.

Information

This section describes the typical procedure. You can also make the connection with other operations. Refer to the following section for details.

 (c) [Details on the \[Communications Setting\] Dialog Box on page 56](#)



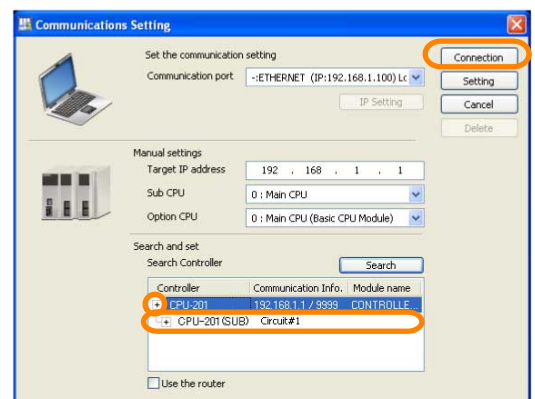
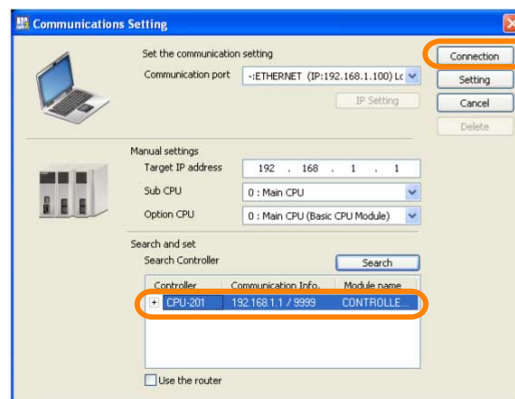
The search results will be displayed in the [Search Controller] area.

Information If the MPE720 is connected to a sub CPU unit, the model name of the sub CPU unit will be displayed in the [Controller] column.

9. **Select the controller that is directly connected to the the MPE720 from the [Search Controller] area, and click the [Connection] button.**



If you are using more than one CPU unit together, Click [+] in the [Controller] column and then double-click the controller that is directly connected to the MPE720 to select it.



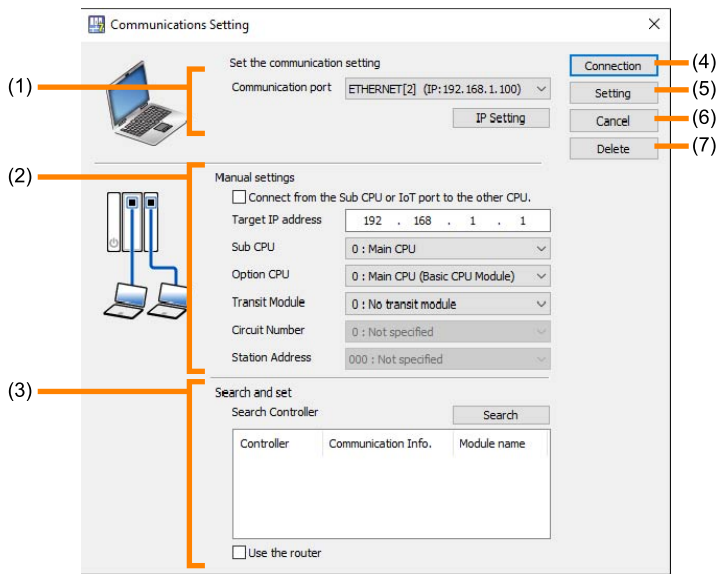
10. **Confirm that [Online] appears to the upper left of the launcher.**



This concludes the settings.

(c) Details on the [Communications Setting] Dialog Box

This section describes the details on the [Communications Setting] dialog box that is displayed when the personal computer on which the MPE720 was installed (referred to here as "the MPE720") is connected to the controller over Ethernet communications.



No.	Item	Description
(1)	[Communications port]	Set or select the IP address of the Ethernet connector for the MPE720.
	[IP Setting] Button	Click [Communication port] and you can select an option from the displayed list. If you click the [IP Setting] button, the separate [Communications Setting] dialog box will be displayed on which you can set the IP address. Note: There are usage restrictions for the [IP Setting] button. Refer to the following section for details. (a) Ethernet Communications (Assigning IP Addresses Automatically) on page 50
(2)	[Manual settings]	Set the information on the destination controller in either [Manual settings] or [Search and set].
	[Connect from the Sub CPU or IoT port to the other CPU.]	When using a sub CPU or the IoT communications unit, you can perform engineering on a unit other than the unit that you are directly connected to, depending on the topology. To perform this kind of engineering, first check the topology, and then select this check box. Refer to the following section for details. (b) MPE720 Connected to a Sub CPU Unit on page 47
	[Target IP address]	Set the IP address of the controller connected to the MPE720 (or the Ethernet connector of the controller). Refer to the manual for your controller for the default setting of the IP address.
	[Sub CPU]	Specify the CPU on which to perform engineering. When the MPE720 is directly connected to the controller on which to perform engineering, select [0: Main CPU].
	[Option CPU]	If the controller on which to perform engineering has a configuration with multiple CPUs, select the circuit number of the CPU.
	[Transit Module]	Set this item when the MPE720 is connected to the FT5□.
	[Circuit Number]	• [Transit Module]: Select the unit or module that is connected to the FT5□.
	[Station Address]	• [Circuit Number]: Set the circuit number of the unit or module that is connected to the FT5□. • [Station Address]: Set the station address of the FT5□.
(3)	[Search and set]	Set the information on the destination controller in either [Manual settings] or [Search and set].
	[Search] Button	Click this button to display the controllers connected to the connector with the IP address set in (1) [Communication port] on this window. When there are multiple controllers, units, and modules that can be connected, select the model to connect to.
	[Use the router]	This item is not normally used.

Continued on next page.

Continued from previous page.

No.	Item	Description
(4)	[Connection] Button	Click this button to start the connection between the MPE720 and the controller according to the settings in (1) [Communication port] and (2) [Manual settings] or (7) [Search and set] on this window.
(5)	[Setting] Button	Click this button to save the set values.
(6)	[Cancel] Button	Click this button to discard the set values and close the [Communications Setting] dialog box.
(7)	[Delete] Button	Click this button to discard the set values.

(d) Serial Communications

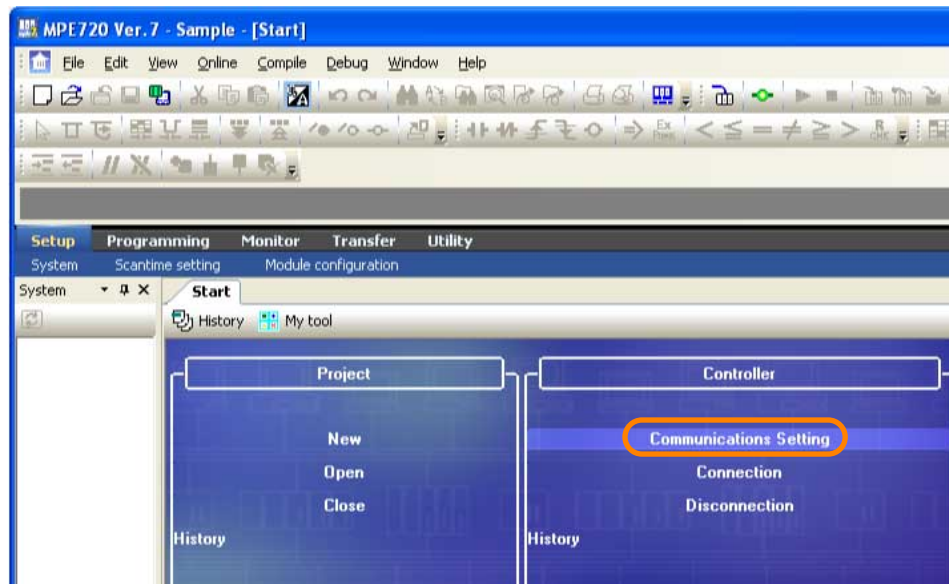
Use the following procedure to establish a normal connection from the PC on which the MPE720 is installed to a controller other than a board-type controller by serial communications.



Important

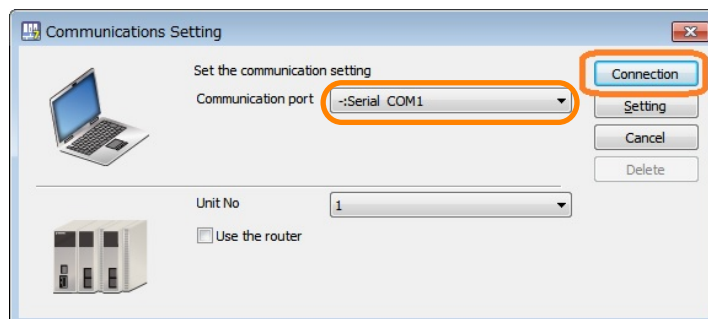
Use this procedure only when the PC and controller are connected using the serial connector on the controller.

1. Start up MPE720, and click [Communications Setting].

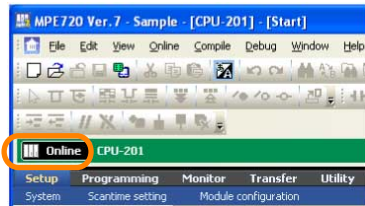


The [Communications Setting] window will be displayed.

2. Select a communications port to connect to the controller in the [Communication port] box, and click the [Connection] button.



3. Confirm that [Online] appears to the upper left of the launcher.



This concludes the settings.

(e) USB Communications

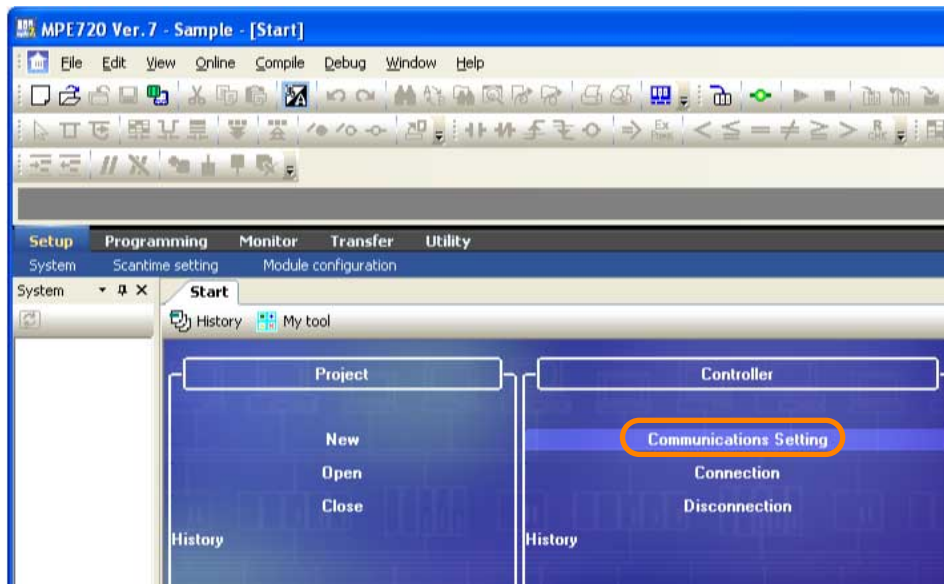
Use the following procedure to establish a normal connection from the PC on which the MPE720 is installed to a controller other than a board-type controller by USB communications.



Important

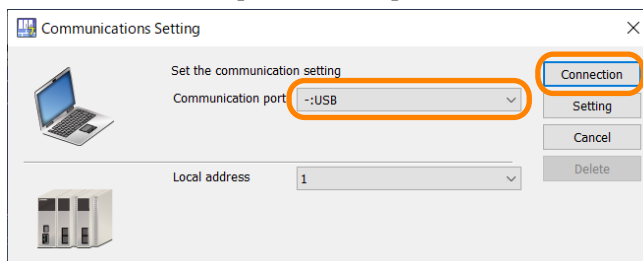
Use this procedure only when the PC and controller are connected using the USB connector on the controller.

1. Start up MPE720, and click [Communications Setting].

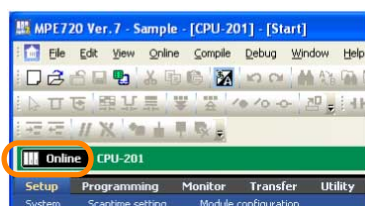


The [Communications Setting] window will be displayed.

2. Select a communications port to connect to the controller in the [Communication port] box, and click the [Connection] button.



3. Confirm that [Online] appears to the upper left of the launcher.



This concludes the settings.

(3) Using a Remote Connection with MPE720 Ver. 6 Installed on the Remote PC

Use the following procedure to establish a remote connection from a PC on which MPE720 Ver. 7 is installed to a PC on which MPE720 Ver. 6 is installed and a board-type controller.

Refer to the following section for a conceptual illustration of this connection.

 [1.1.7 Setting Up Communications on page 47](#)



Important

To use an MP2100/MP3100 controller, connect the controller to a PC running Windows 10 or earlier and use this PC as the remote PC.

You cannot connect an MP2100/MP3100 controller to a PC running Windows 11 because the PCI Express/PCI interface used by these controllers is not supported in Windows 11.

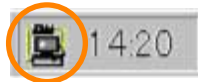
There are no restrictions on the operating system of the working PC.

Begin by setting the remote PC.

1. **Select [Programs] - [YE_Applications] - [Communication Manager] from the Windows Start Menu.**

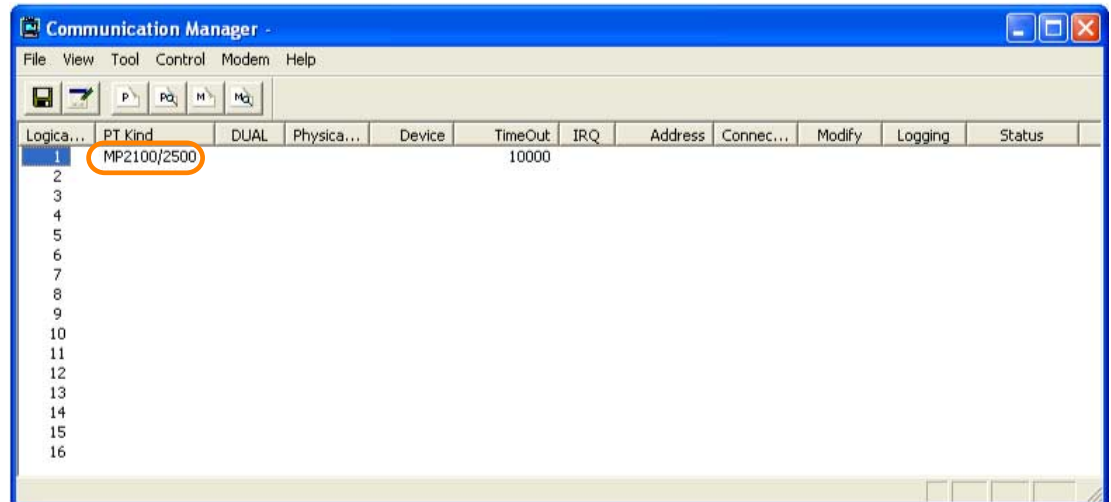
The [Communication Manager] button will be displayed at the bottom right of the PC screen.

2. **Double-click the [Communication Manager] button.**

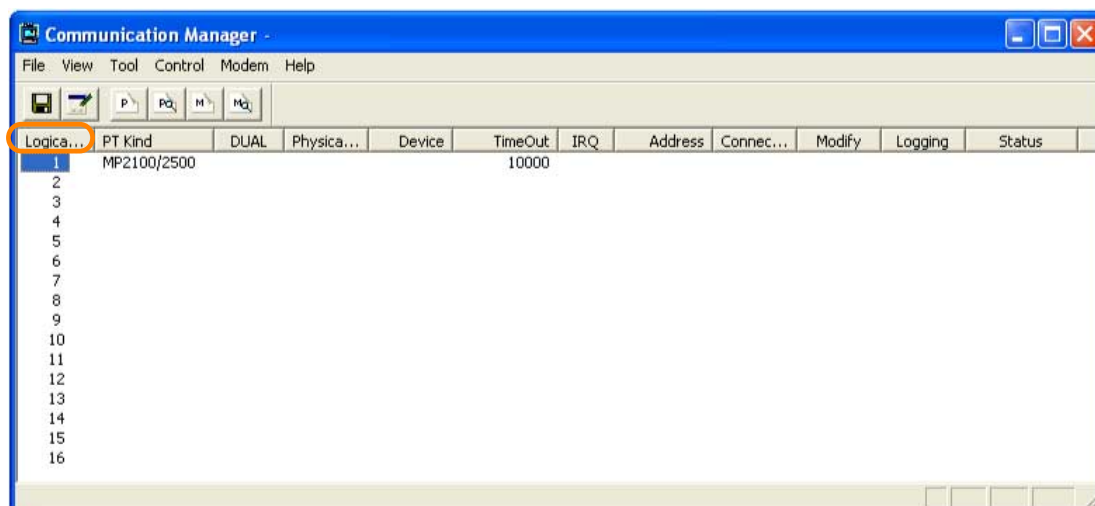


The [Communication Manager] window will be displayed.

3. **Set the [PT Kind] for Logical PT 1 to MP2100/2500.**



4. Double-click [Logical PT].



The [Assignment] window will be displayed.

5. Click the [Details] button.

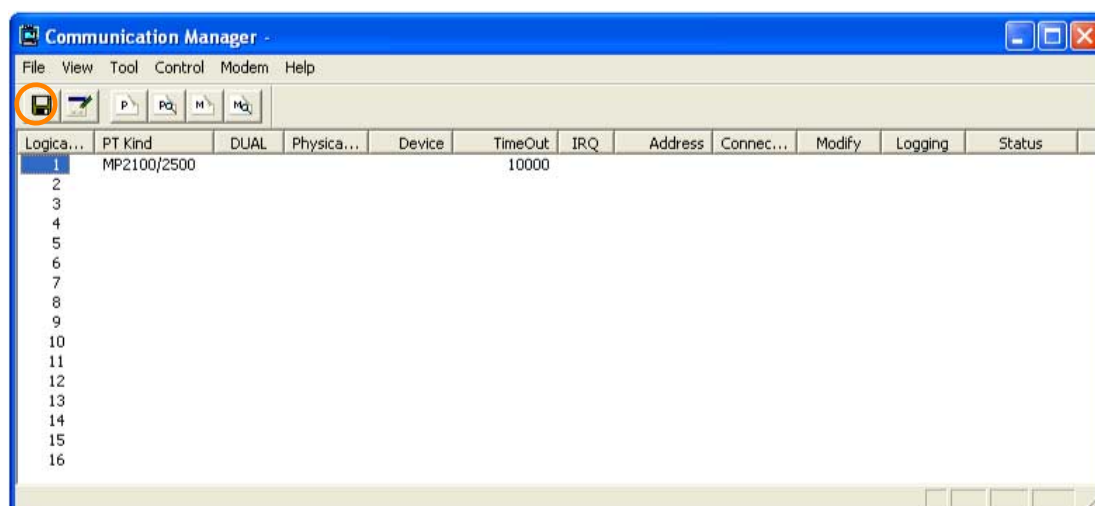
The [MP2100/2500] window will be displayed.

6. Assign the settings based on the CP number that was specified for the board-type controller, and click the [OK] button.



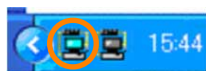
The [MP2100/2500] window will close.

7. Click the [Save] button in the [Communication Manager] window.



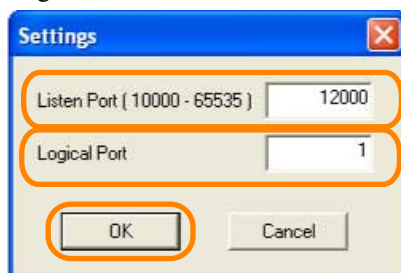
The allocations will be enabled.

8. Under [My Computer], select [Local Disk] - [YeTools] - [CpComSys] - [CpUtility.exe].
The CpUtility will start and the [CpUtility] button will appear at the lower right of the PC screen.
9. Click the [CpUtility] button.



The [Settings] window will be displayed.

10. Correct the settings as required, and click the [OK] button.
 - Listen Port: Change this value only if it conflicts with another application.
 - Logical Port: Set the number of the logical port that was set in step 3.

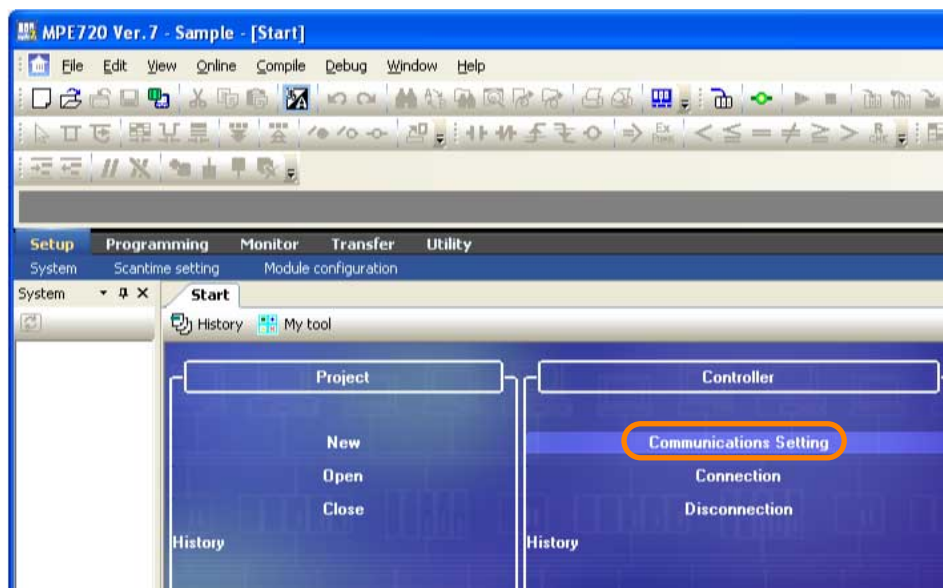


The [Settings] window will close and the settings will be enabled.

This concludes the setup of the remote PC.

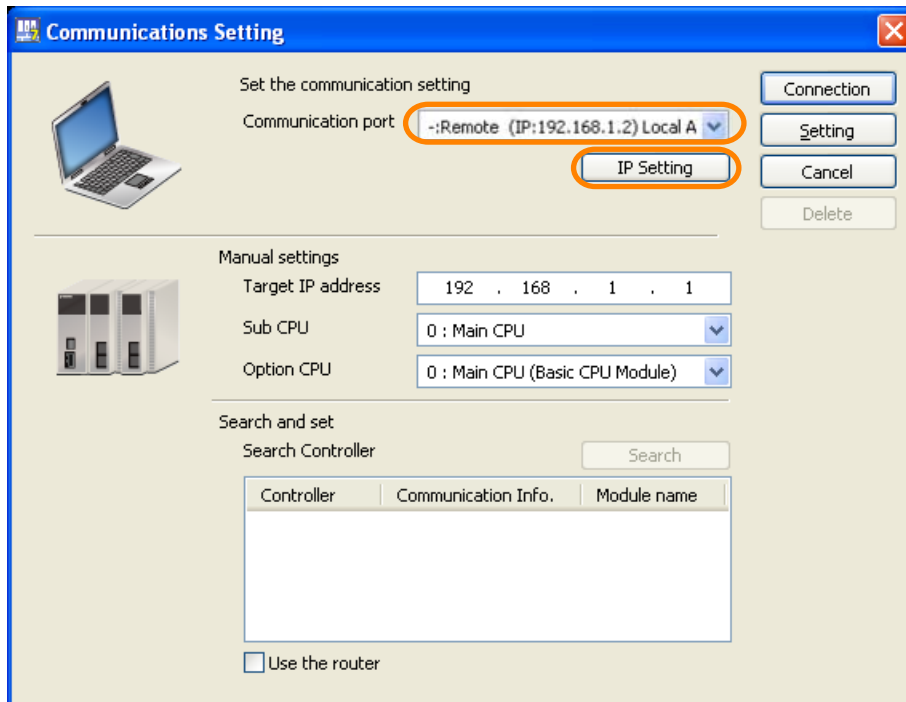
Next, set up the working PC.

11. Start up MPE720, and click [Communications Setting].



The [Communications Setting] window will be displayed.

12. Set [Remote (IP: 192.168.1.□□□) Local Area Connection] or [Remote (IP:Auto)] in [Communication port], and click [IP Setting].



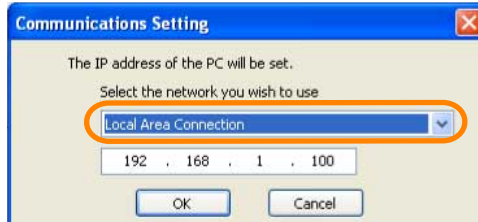
Note:

You cannot set [Remote (IP:Auto)] if you are using Windows 7.

If you selected [Remote (IP: 192.168.1.□□□) Local Area Connection], proceed to step 15.

If you selected [Remote (IP:Auto)], proceed to step 13.

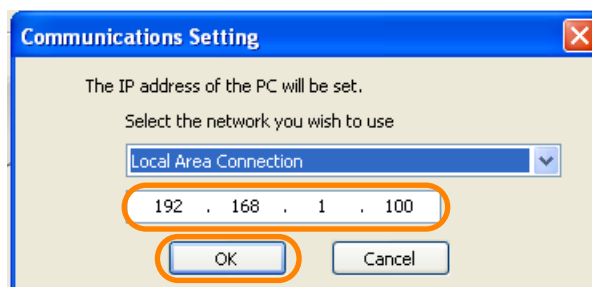
13. Select [Local Area Connection] in the [Select the network you wish to use] box.



14. Enter the IP address, and click the [OK] button.

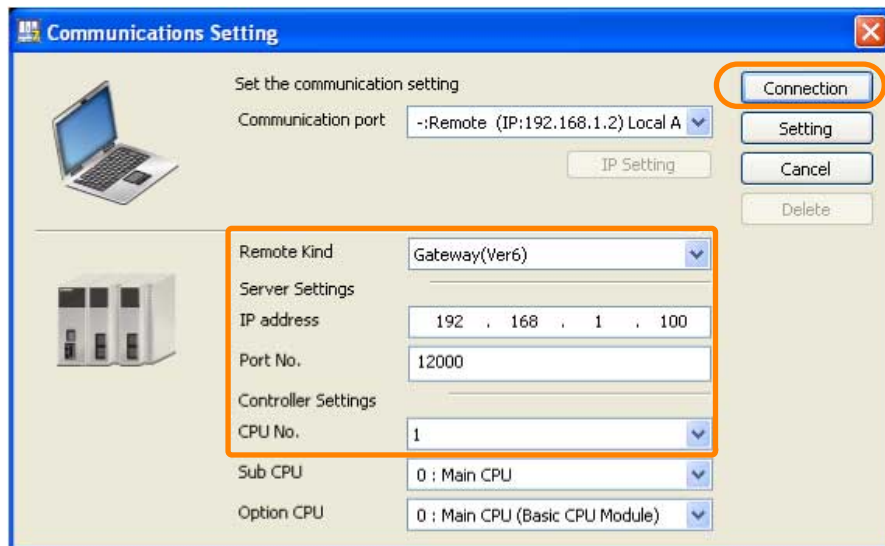
Information

Do not set the MPE720 to the same IP address that is set for the controller (default: 192.168.1.1).



The [Communications Setting] window will close and the entered IP address will appear in [Communication port].

15. Set the following items, and then click the [Connection] button.



Item	Description
Remote Kind	Select [Gateway(Ver6)].
IP address	IP address: Enter the IP address for the destination PC (at the remote site).
Port No.	Enter the port number (the same number that was specified in [Listen Port] in step 10) that was set for the CpUtility on the destination PC (at the remote site).
CPU Number	Set the port number of the board-type controller. Refer to the following section for details on CP numbers. (1) Board-type Controller on page 48

16. Confirm that [Online] appears to the upper left of the launcher.



This concludes the procedure.

(4) Using a Remote Connection with MPE720 Ver. 7 Installed on the Remote PC

Use the following procedure to establish a remote connection between two PCs on which MPE720 Ver. 7 is installed to a controller (either a board-type or other than a board-type controller).

Refer to the following section for a conceptual illustration of this connection.

1.1.7 [Setting Up Communications on page 47](#)



Important

To use an MP2100/MP3100 controller, connect the controller to a PC running Windows 10 or earlier and use this PC as the remote PC.

You cannot connect an MP2100/MP3100 controller to a PC running Windows 11 because the PCI Express/PCI interface used by these controllers is not supported in Windows 11.

There are no restrictions on the operating system of the working PC.

Begin by setting the remote PC.

1. Select [Programs] - [YE_Applications] - [Communication Platform] from the Windows Start Menu.

The [Communication Platform] button will be displayed at the bottom right of the PC screen.

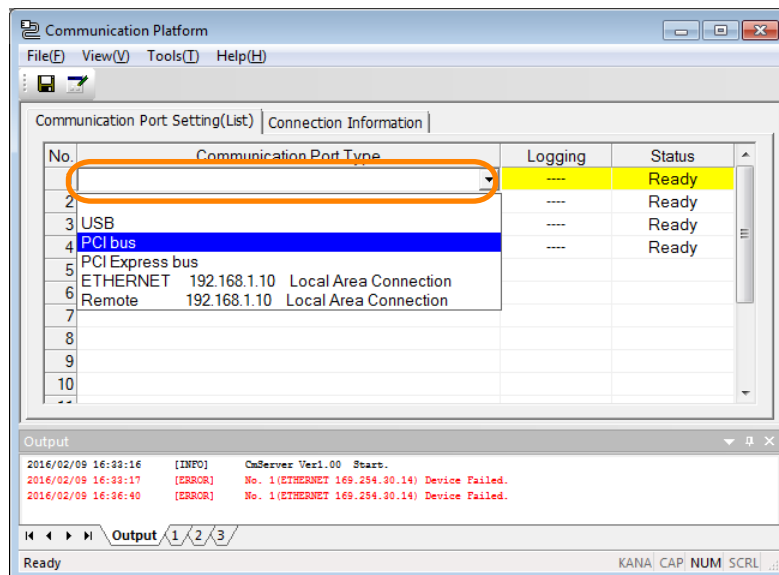
2. Double-click the [Communication Platform] button.



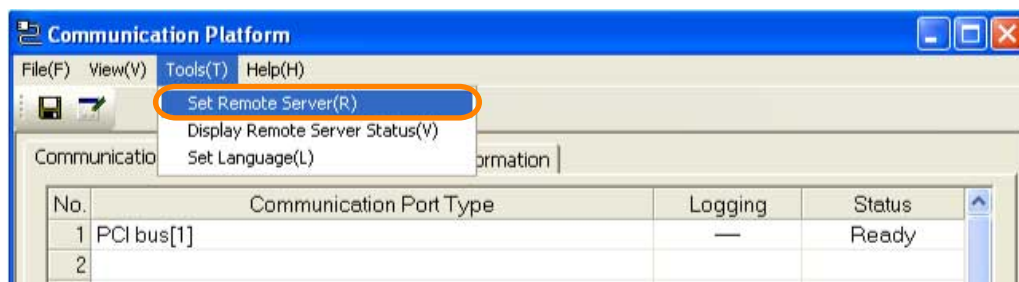
The [Communication Platform] window will be displayed.

3. Assign communications interfaces to the logical ports.

- Board-type Controller: Select “PCI”.
- Other Controllers: Select “Serial”, “USB”, or “ETHERNET”.

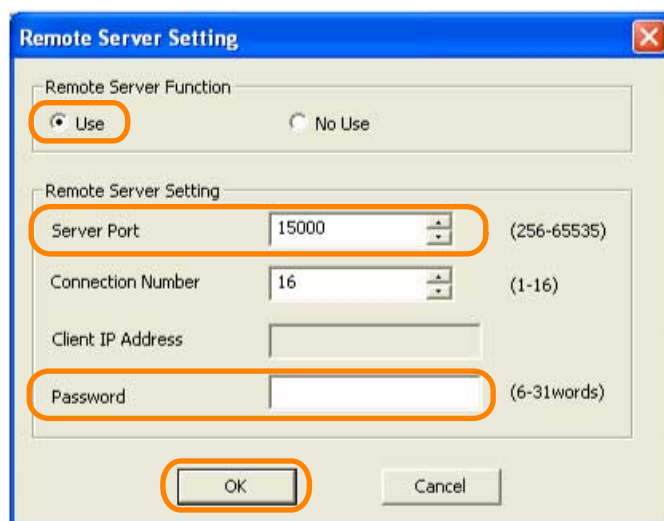


4. Select [Set Remote Server] from the [Tools] menu.



The [Remote Server Setting] window will be displayed.

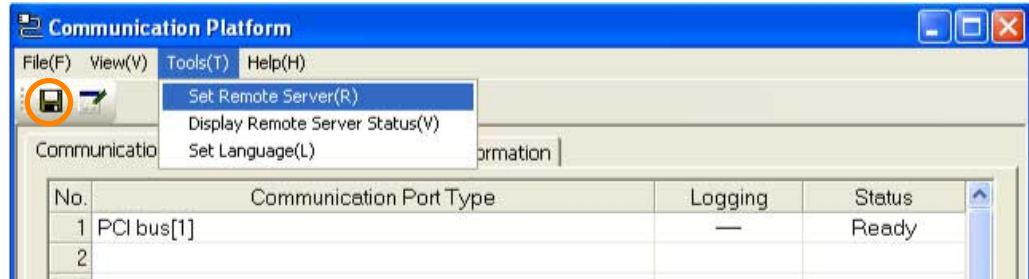
5. Set the following items, and then click the [OK] button.



Item	Description
Remote Server Function	Select [Use].
Server Port	Change this value only if it conflicts with another application.
Password	If you wish to set a password for when the connection is established, enter it here.

The [Remote Server Setting] window will close.

6. Click the [Save] button in the [Communications Platform] window.

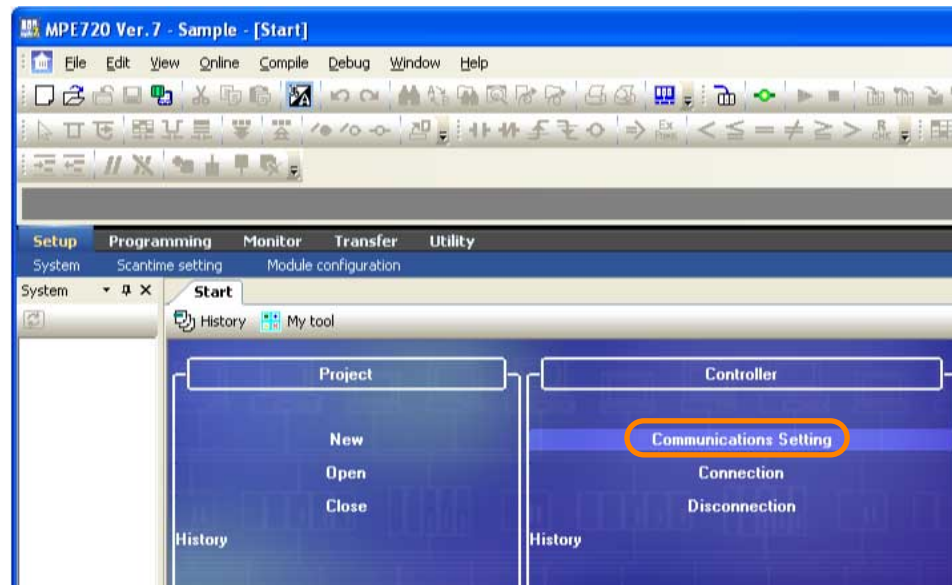


The allocations will be enabled.

This concludes the setup of the remote PC.

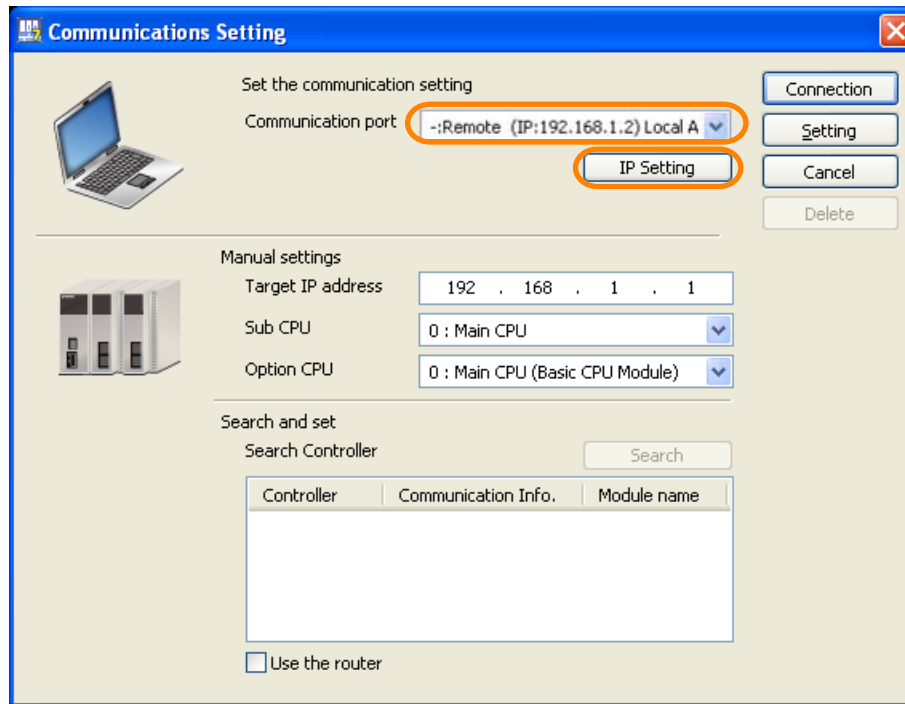
Next, set up the working PC.

7. Start up MPE720, and click [Communications Setting].



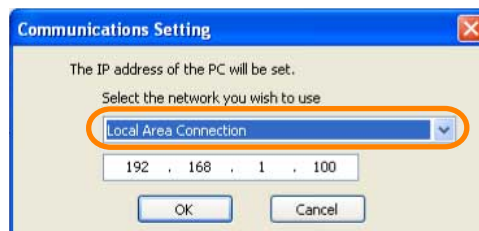
The [Communications Setting] window will be displayed.

8. Set [::Remote (IP:Auto)] in [Communication port], and click [IP Setting].

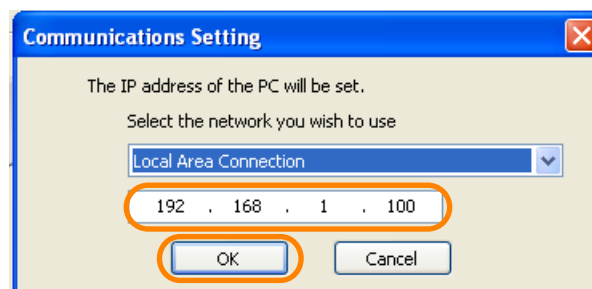


The [Communications Setting] window will be displayed.

9. Select [Local Area Connection] in the [Select the network you wish to use] box.



10. Enter the IP address to use, and click the [OK] button.



The [Communications Setting] window will close.

11. Set the following items.

Communications Setting

Set the communication setting

Communication port: --Remote (IP:192.168.1.100) Loca

Buttons: Connection, Setting, Cancel, Delete, IP Setting

Remote Kind: Gateway(Ver7)

Server Settings:

IP address: 192 . 168 . 1 . 200

Port No.: 15000

Password:

Controller Settings:

Communication port: ETHERNET[1]

Target IP address: 192 . 168 . 1 . 1

Sub CPU: 0 : Main CPU

Option CPU: 0 : Main CPU (Basic CPU Module)

Item	Description
Remote Kind	Select [Gateway(Ver7)].
IP address	IP address: Enter the IP address for the destination PC (at the remote site).
Port No.	Enter the port number (the same number that was specified in [Server Port] in step 5) that was set for the CpUtility on the destination PC (at the remote site).

12. Set the communications interface in [Communication port].

- Board-type Controller: Set "PCI".
- Other Controllers: Set "Serial", "USB", or "ETHERNET".

Communications Setting

Set the communication setting

Communication port: --Remote (IP:192.168.1.100) Loca

Buttons: Connection, Setting, Cancel, Delete, IP Setting

Remote Kind: Gateway(Ver7)

Server Settings:

IP address: 192 . 168 . 1 . 200

Port No.: 15000

Password:

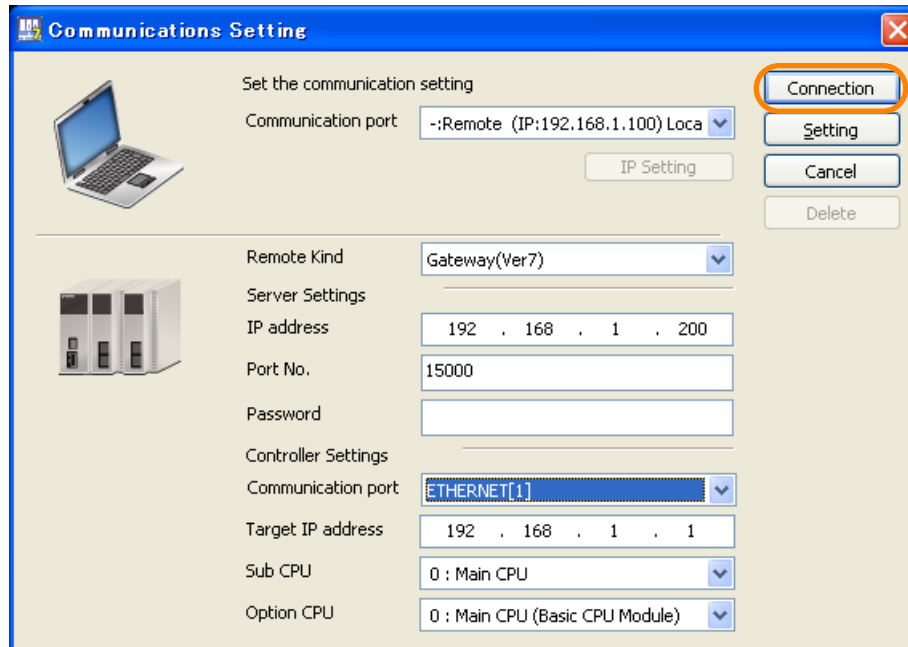
Controller Settings:

Communication port: Serial[1]

Unit No: ETHERNET[1], ETHERNET[2], ETHERNET[3], ETHERNET[4], Serial[1], Serial[2], Serial[3], Serial[4], PCI[1], USB[1]

13. Set one of the following, and then click the [Connection] button.

- If you selected “PCI” in step 12: Set the CP number of the board-type controller in [CPU No.]. Refer to the following section for details on CP numbers.
 (1) [Board-type Controller on page 48](#)
- If you selected “Serial” in step 12: Set a value in [Unit No.].
- If you selected “USB” or “ETHERNET” in step 12: Enter the IP address of the destination controller in [Target IP address].



14. Confirm that [Online] appears to the upper left of the launcher.

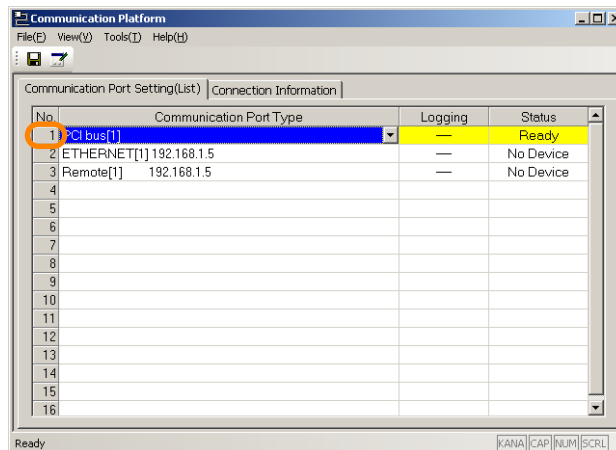


This concludes the procedure.

(5) Setting an Upper Limit to the Communications Size

You can set an upper limit to the communications size when you use a serial, USB, or Ethernet communications port. Use the following procedure.

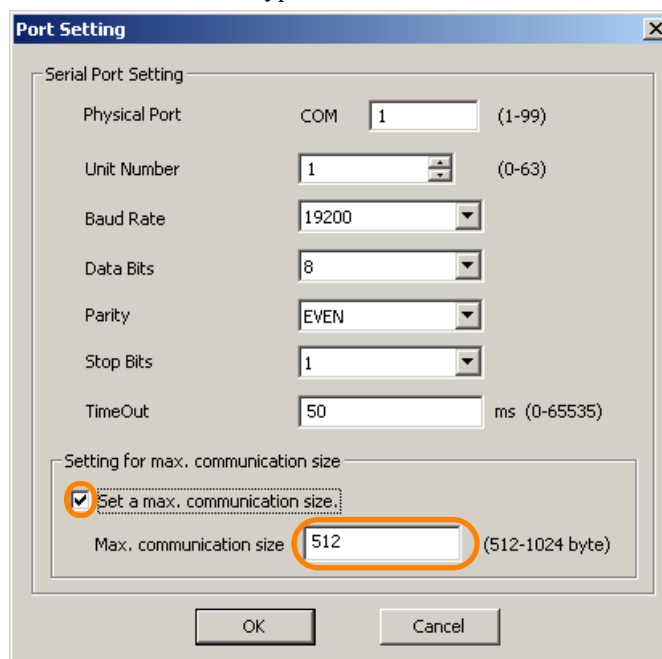
1. Double-click the number of the communications port for which to set an upper limit to the communications size.



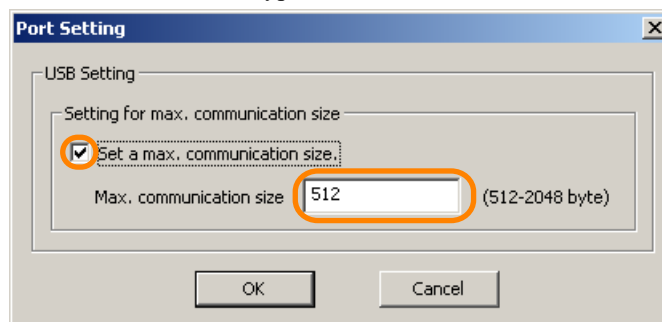
The [Port Setting] window will be displayed.

2. Select the [Set a max. communication size] and enter the upper limit.

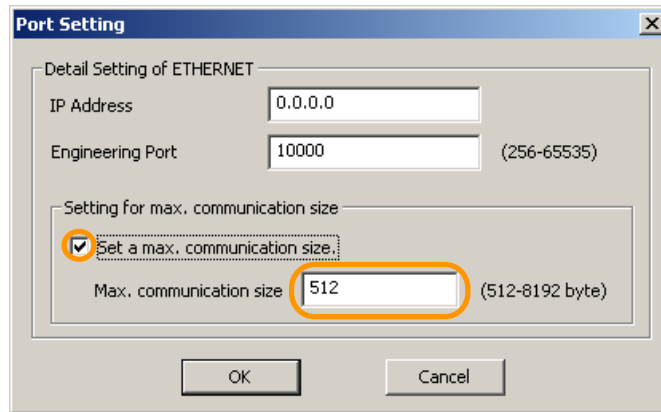
- Communications Port Type: Serial



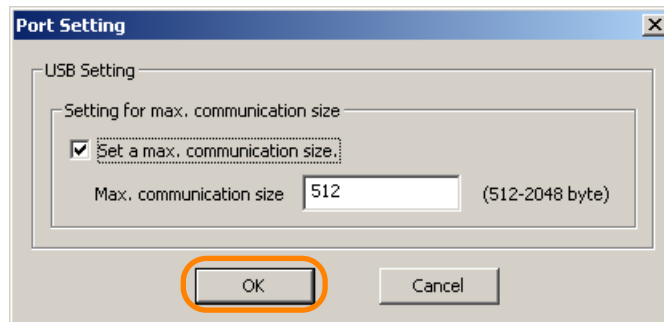
- Communications Port Type: USB



- Communications Port Type: Ethernet



3. Click the [OK] button.

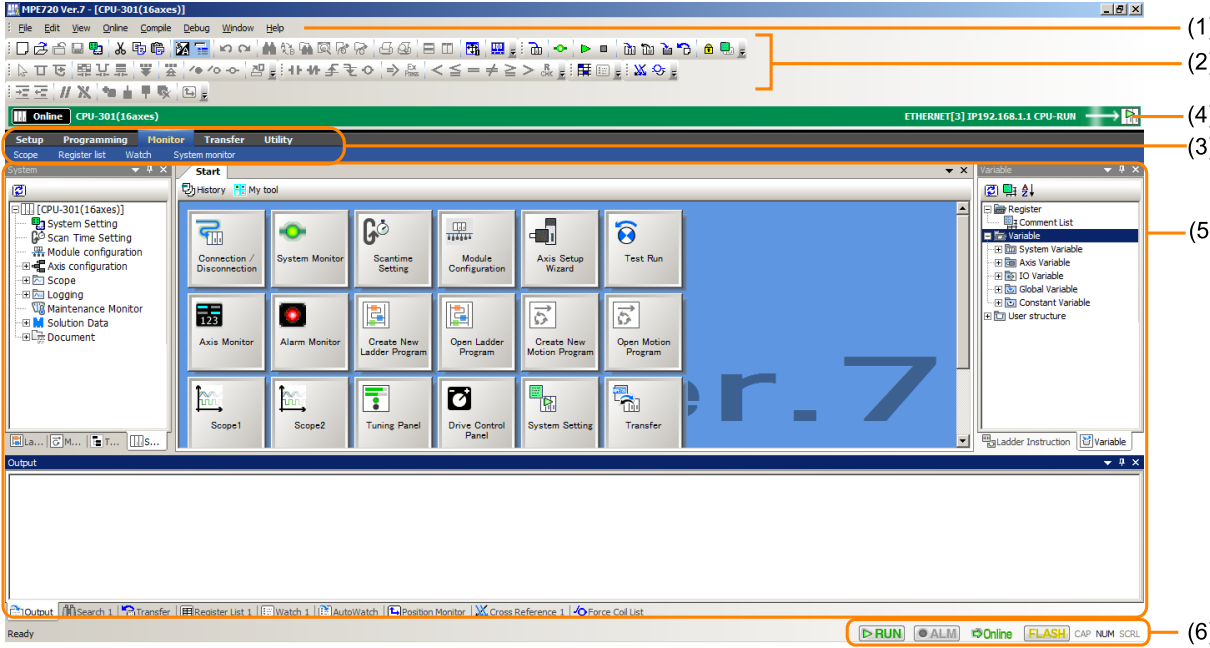


The maximum communications size setting will be enabled.
This concludes the procedure.

1.2 Main Window Configuration

This section describes the names, functions, and view settings for the parts of the Main window in the MPE720.

Information The menu items and other elements will depend on the model of the controller and the connection status.



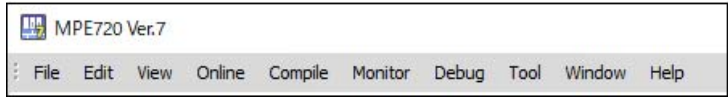
No.	Name	Reference
(1)	Menu bar	1.2.1 Menu Bar on page 71
(2)	Toolbar	1.2.2 Toolbar on page 75
(3)	Launcher	1.2.3 Launcher on page 81
(4)	Caption bar	1.2.4 Caption Bar on page 82
(5)	Window	1.2.5 Window on page 83
(6)	Status bar	1.2.6 Status Bar on page 97

Basic Information on the MPE720

1.2.1 Menu Bar

The menu bar displays the functions necessary for controlling the MPE720 as a menu.

This section gives details on the menu bar.



(1) [File] Menu

Item	Description
New Project	Creates a project file.
Open Project	Selects and opens a project file.
Close Project	Closes the currently open project file.
Save Project	Saves by overwriting the currently open project file.
Save as a New Project	Saves the currently open project file as a separate file.

Continued on next page.

Continued from previous page.

Item	Description
Convert Project	Converts a created project file to another series and another model.
Update Project	Updates module configuration definition information and ladder instruction information in the project file.
Close	Closes the currently open program.
Environment Setting	Displays the [Environment Setting] window.
Import	Imports files.
Export	Exports files.
Print Preview	Displays a printing preview.
Print	Displays the [Print] window.
Page Setup	Displays the [Page Setup] window.
□□.YMW7	Displays the names of the last five project files that were opened. Click a file name to open that project file.
Exit	Exits the MPE720.

(2) [Edit] Menu

Item	Description
Undo	Reverses the effect of the last operation.
Redo	Performs the last operation that was reversed using [Undo].
Cut	Cuts the contents in the selected range.
Copy	Copies the contents in the selected range.
Paste	Inserts the contents that has been cut or copied.
Delete	Deletes the contents in the selected range.
Automatic Switch to IME	When this menu is selected, the input from the keyboard is automatically switched between Japanese and English according to the input box.
Display the Autocomplete list for variables and registers	Toggles between enabling and disabling the Autocomplete.
Select All	Selects the entire range in the currently displayed view.
Find	Displays the [Search] window, which allows you to search for registers and other items.
Replace	Displays the [Replace] window, which allows you to replace registers and other items.
Search in Project	Displays the [Search in project] window, which allows you to search for registers and other items in a specified project.
Replace in Project	Displays the [Replace in the project] window, which allows you to replace registers and other items in a specified project.

(3) [View] Menu

Item	Description
Navigation	Toggle between displaying and hiding the selected windows.
System	
Ladder	
Ladder Instruction	
Motion	
Task List	
C Language	
Variable	
Cross Reference	
Check for Multiple Coils	
Register List	
Watch	
Position Monitor	
Other Windows	
AutoWatch	
Search for Programs Used in Each Axis	
Equipment Configurations	
Toolbars	Toggles between displaying and hiding the selected toolbars.
Launcher	Toggles between displaying and hiding the launcher.
Status Bar	Toggles between displaying and hiding the status bar.
Zoom	Changes the display magnification.
Refresh	Updates the [Ladder] window, [Motion] window, [Navigation] window, and [Variable] window with the latest information.

(4) [Online] Menu

Item	Description
Connection	Establishes a logical connection between the PC on which the MPE720 is installed and a controller. This is displayed only in offline mode.
Disconnection	Disconnects the PC on which the MPE720 is installed and a controller. This is displayed only in online mode.
I □□	Displays up to five connection names (logical port number + port type) that have been used for connections. Click this item to establish the connection with those settings.
Communications Setting	Sets up communications between the PC on which the MPE720 is installed and a controller.
CPU Switching	Fixed to "CPU0".
CPU RUN	Starts the CPU of the connected controller.
CPU STOP	Stops the CPU of the connected controller.
Reset CPU Memory	Clears CPU memory.
Write to Controller	Writes the contents of the project file into the controller.
Read from Controller	Writes the data from the controller into the project file.
Save to Flash	Saves the controller RAM contents to the flash memory of the controller.
Transfer	Transfers data, such as programs and registers.

Continued on next page.

Continued from previous page.

Item	Description
Test Run	Checks operation of the SERVOPACK axis with controller references.
Online Security Setting	Sets the online security settings.
Controller Information	Displays information about the connected controller (e.g., model and firmware version).

(5) [Compile] Menu

Item	Description
Compile	Compiles the currently displayed program.
Compiles All Programs	Compiles all programs.
Compile Program Being Edited	Compiles the program being edited or that has not been compiled.

(6) [Monitor] Menu

Item	Description
Axis Monitor	Monitors the operation status of the axes.
Alarm Monitor	Monitors the alarm status of the axes.
System Monitor	Displays the System Monitor.
Maintenance Monitor	Allocates system registers for maintenance information.
Tuning Panel	Used to monitor, edit, and adjust the current value of variables from the panel.
Drive Control Panel	Controls the operation of motion programs from the panel.
Trace	Analyzes tracing data in the form of a trend graph or XY graph.
Logging	Logs register data.

(7) [Debug] Menu

Item	Description
Cross Reference	Performs a search on variables or registers currently used in the program.
Check for Multiple Coils	Searches all ladder programs for different coils that use the same register.
Force Coil List	Searches ladder programs for coils that are forced ON or OFF.
Display Register Map	Displays the values of registers (register map) at consecutive addresses.
Add to Watch	Adds the selected register to the [Watch] window.
Add to Scope	Adds the selected register to the trace window.
Start Simulation	You can check the operation of a project even in an offline environment by using the simulation.
End Simulation	

(8) [Tool] Menu

Item	Description
Axis Setup Wizard	Used to set up the axes.
Engineering builder	Displays the engineering builder.
Electronic cam tool	Starts the Electronic Cam Tool to create cam tool data.
Library Catalog	Makes settings for the library function.
Print builder	Displays the print builder.

(9) [Window] Menu

Item	Description
Close All	Closes all tab pages except the [Start] tab page when more than one tab page is open in the center window.
Window layout	Saves and restores the window layout.
Horizontal view	Splits the tab page displayed in the center window vertically.
Vertical view	Splits the tab page displayed in the center window horizontally.
Move to the previous tab	Moves the selected tab page to the other window when the center window is split vertically or horizontally.
Move to the next tab	
1 Start	Displays the name of the tab page that is currently displayed in the center window.
2 □□	
Windows	Brings the specified tab page to the front or closes it when more than one tab page is open.

(10) [Help] Menu

Item	Description
Contents	Displays the table of contents for the help file.
About App	Displays the version, user name, company name, and serial number of the MPE720.

1.2.2 Toolbar

The toolbar displays functions related to project files and programming as buttons.

This section gives details on the tool and tells how to toggle whether the toolbar is displayed or hidden.

(1) [Standard] Toolbar



Button	Description
	Creates a project file.
	Selects and opens a project file.
	Closes the currently open project file.
	Saves by overwriting the currently open project file.
	Displays the [Environment Setting] window.
	Cuts the contents in the selected range.
	Copies the contents in the selected range.
	Inserts the contents that has been cut or copied.

Continued on next page.

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Button	Description
	When this menu is selected, the input from the keyboard is automatically switched between Japanese and English according to the input box.
	Toggles between enabling and disabling the Autocomplete.
	Reverses the effect of the last operation.
	Performs the last operation that was reversed using [Undo].
	Displays the [Search] window, which allows you to search for registers and other items.
	Displays the [Replace] window, which allows you to replace registers and other items.
	Displays the [Search in project] window, which allows you to search for registers and other items in a specified project.
	Changes the display magnification.
	Compiles the currently displayed program.
	Compiles all programs.
	Displays the [Print] window.
	Displays a printing preview.
	Splits the tab page displayed in the center window vertically.
	Splits the tab page displayed in the center window horizontally.
	Restores the window layout to the layout that was saved as layout 1.
	Displays the version, user name, company name, and serial number of the MPE720.

(2) [Online] Toolbar



Button	Description
	Establishes and disconnects a logical connection between the PC on which the MPE720 is installed and a controller.
	Sets up communications between the PC on which the MPE720 is installed and a controller.
	Starts the CPU of the connected controller.
	Stops the CPU of the connected controller.
	Writes the contents of the project file into the controller.

Continued on next page.

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Button	Description
	Writes the data from the controller into the project file.
	Saves the controller RAM contents to the flash memory of the controller.
	Transfers data, such as programs and registers.
	Checks operation of the SERVOPACK axis with controller references.
	Sets the online security settings.
	Displays information about the controller.

(3) [Ladder Editor] Toolbar

This tool bar is used when working in the Edit Ladder Program Window.



Button	Description
	Normal Edit Mode
	Branch Creation Mode
	Branch Edition Mode
	Toggles between displaying and hiding register addresses.
	Toggles between displaying and hiding register variables.
	Toggles between displaying and hiding register comments.
	Turns ON batch scoping.
	Turns OFF batch scoping.
	Forces ON the coils in the selected register.
	Forces OFF the coils in the selected register.
	Clears a selected register that has been forced ON or forced OFF.
	Lists program locations that have called the current position.

(4) [Ladder Instruction] Toolbar

This tool bar is used when working in the Edit Ladder Program Window.



Button	Description
	Inputs an NO contact.
	Inputs an NC contact.
	Inputs a rising-edge pulse.
	Inputs a falling-edge pulse.
	Inputs a coil.
	Inputs a Store (=>) instruction.
	Inputs an Expression instruction.
	Inputs a Less Than (<) instruction.
	Inputs a Less Than or Equal (<=) instruction.
	Inputs an Equal (==) instruction.
	Inputs a Not Equal (!=) instruction.
	Inputs a Greater Than or Equal (>=) instruction.
	Inputs a Greater Than (>) instruction.
	Checks that the input data is within the upper and lower limits.

(5) [Monitor] Toolbar



Button	Description
	Displays the values of registers (register map) at consecutive addresses.
	Adds the selected register to the [Watch] window.
	Monitors the operation status of the axes.
	Monitors the alarm status of the axes.
	Displays the System Monitor.
	Allocates system registers for maintenance information.
	Used to monitor, edit, and adjust the current value of variables from the panel.

Continued on next page.

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Button	Description
	Controls the operation of motion programs from the panel.
	Analyzes the data obtained by Trace 1 to 4 in the form of a trend graph or XY graph.
	Performs logging of the register data set as logging condition 1 to 4.

(6) [Debug] Toolbar

Button	Description
	Performs a search on variables or registers currently used in the program.
	Searches all ladder programs for different coils that use the same register.

(7) [Tool] Toolbar

Button	Description
	Used to set up the axes.
	The [Engineering Builder] window will be displayed
	Displays the [Electronic Cam Tool] window.
	Makes settings for the library function.
	Starts the cell program.
	Displays the Print Manager.

(8) [Motion Editor] Toolbar

This tool bar is used when working in the Edit Motion Program Window.



Button	Description
	Indents the line by one level.
	Reverses the line indentation by one level.
	Puts the editor in Line Comment Entry Mode.

Continued on next page.

Button	Description
	Cancels Line Comment Entry Mode.
	Sets or cancels a bookmark.
	Jumps to the next bookmark.
	Jumps to the previous bookmark.
	Clears all bookmarks.
	Starts the Position Monitor.

(9) Toggling between Display and Hide

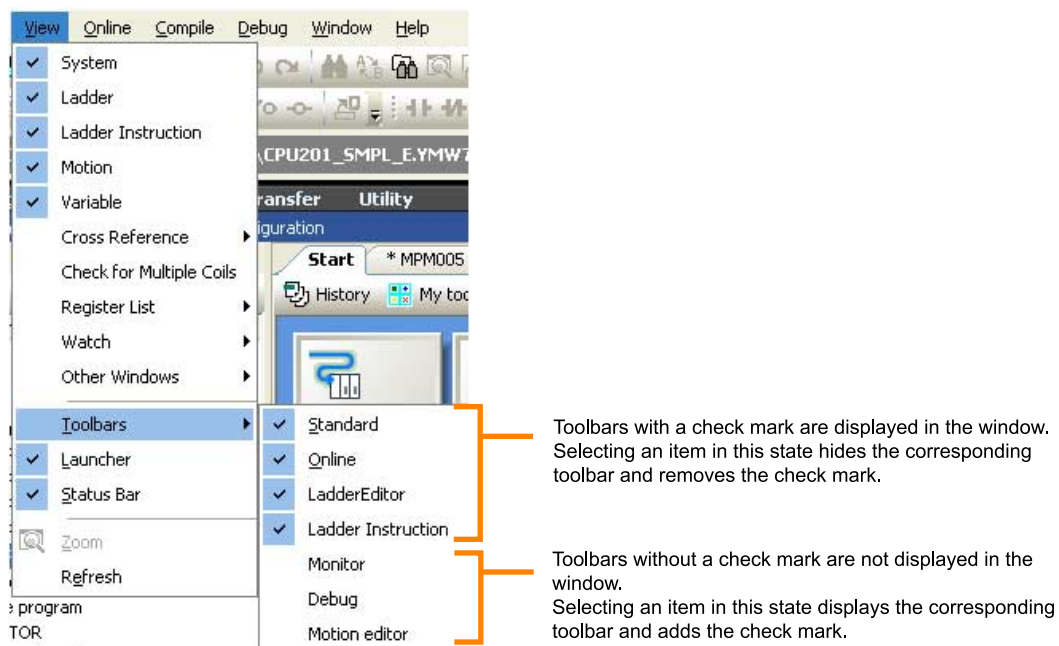
You can display or hide in the following two ways for toolbars:

- Displaying and hiding entire toolbars
- Displaying and hiding individual buttons on each toolbar

The procedures are given below.

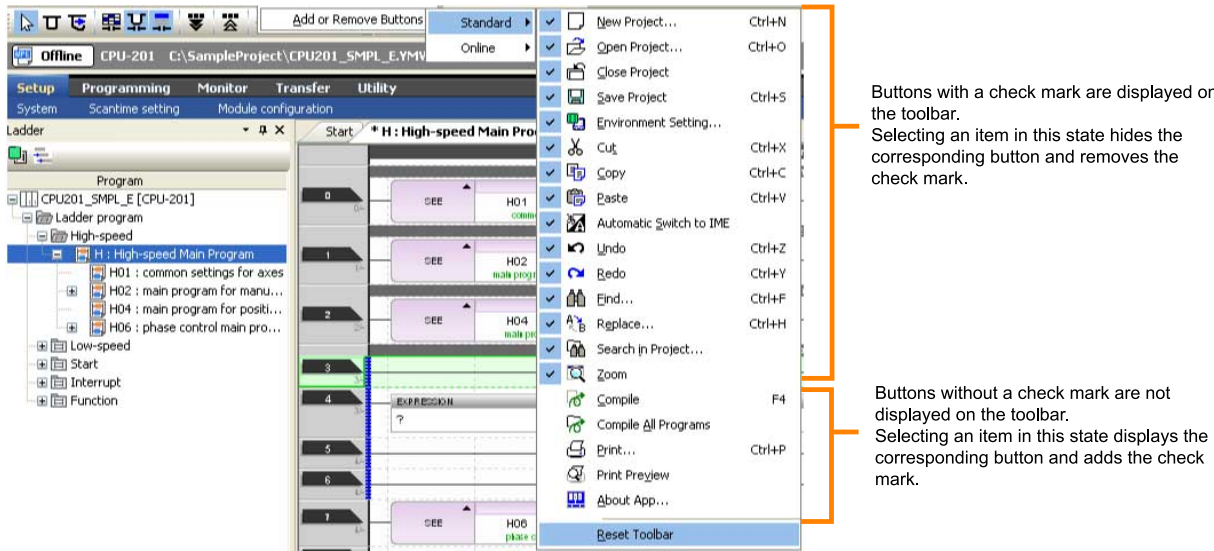
(a) Displaying and Hiding Entire Toolbars

Toggle between displaying and hiding the toolbars with [Toolbars] on the [View] menu.



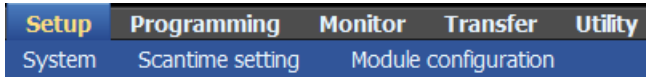
(b) Displaying and Hiding Individual Buttons on Each Toolbar

Toggle between displaying and hiding the buttons on the toolbar with  - [Add or Remove Buttons] - [(Name of the button)].



1.2.3 Launcher

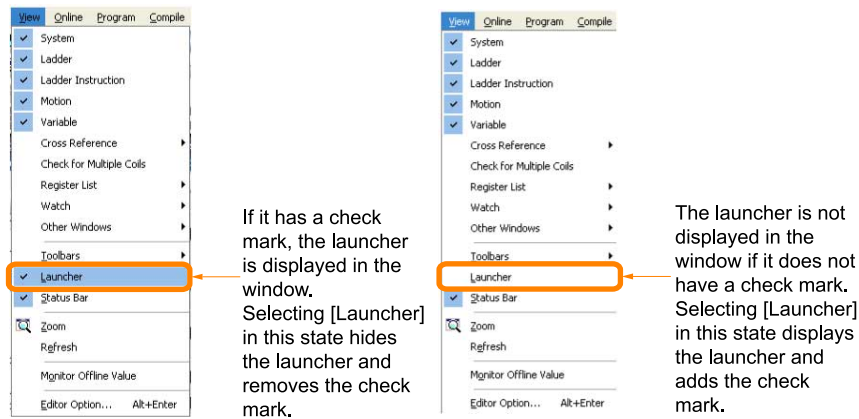
The launcher displays frequently used functions in the MPE720. This section gives details on the launcher and tells how to toggle whether the launcher is displayed or hidden.



Item		Description
Setup	System	Displays the [System] window.
	Scantime setting	Displays the [Environment Setting] window and navigates to [Setup] - [Scan Time Setting].
	Module configuration	Displays the [Module Configuration] window.
Programming	Ladder program	Displays the [Ladder] window or [Navigation] window.
	Motion Program	Displays the [Motion] window or [Navigation] window.
	Variable	Displays the [Variable] window.
Monitor	Scope	Displays the [Trace Type] window.
	Register list	Displays the [Register List] window.
	Watch	Displays the [Watch] window.
	System monitor	Displays the [System Monitor] window.
Transfer	Write into controller	Displays the [Transfer Program - Write to Controller] window.
	Read from controller	Displays the [Transfer Program - Read from Controller] window.
	Save to Flash	The [Transfer Program - Save to Flash] window will be displayed.
	Transfer	Displays the [Transfer] window.
Utility	Engineering builder	The [Engineering Builder] window will be displayed
	Print builder	Displays the Print Manager.
	Electronic cam tool	Displays the [Electronic Cam Tool] window.
	Start page	Displays the [Start] tab page.

(1) Toggling between Display and Hide

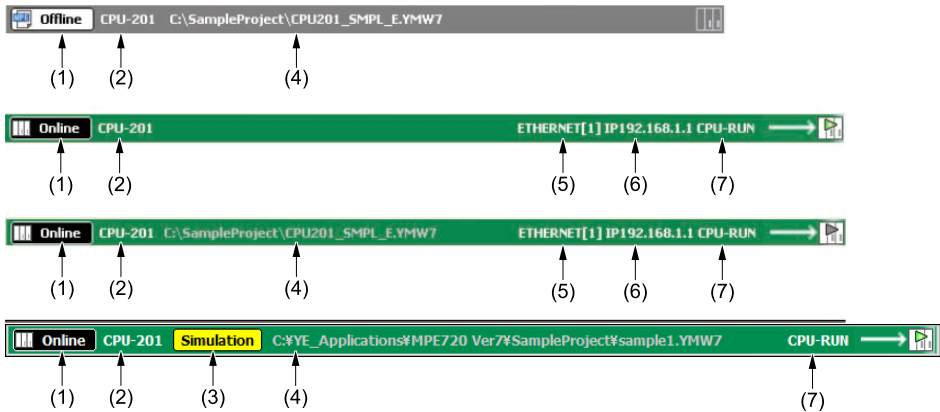
Toggle between displaying and hiding the launcher with [Launcher] on the [View] menu.



1.2.4 Caption Bar

The caption bar displays information that includes the status of the controller, its type, and the name of the project file.

This section gives details on the caption bar.



No.	Display	Description
(1)	Online	The MPE720 is correctly connected to the controller.
	Offline	The MPE720 is not connected to the controller.
(2)	Controller model	When offline: Displays the model of the controller that was set when the current project file was created. When online: Displays the model of the connected controller.
(3)	Simulation	This information is displayed only when a simulation is running.
(4)	Storage location and name of project file	Displays the storage location and file name of the currently open project file. This information is displayed only when a project file is open (i.e., only when offline or when a project link connection is active).
	Ethernet	Displays the communications methods between the MPE720 and the controller.
	Serial	This is displayed only in online mode.
(6)	IP address of controller	Displays the IP address of the controller that is connected to the MPE720. This is displayed only in online mode.
	CPU Status	The operating status of the CPU is displayed. This information is displayed only when in online mode and when a simulation is running.

1.2.5 Window

MPE720 has the types of windows described below.

This section describes the details of the [History] window and [My Tool] window, as well as how to display or hide each window.

Check the references in the following table for details on the other windows.

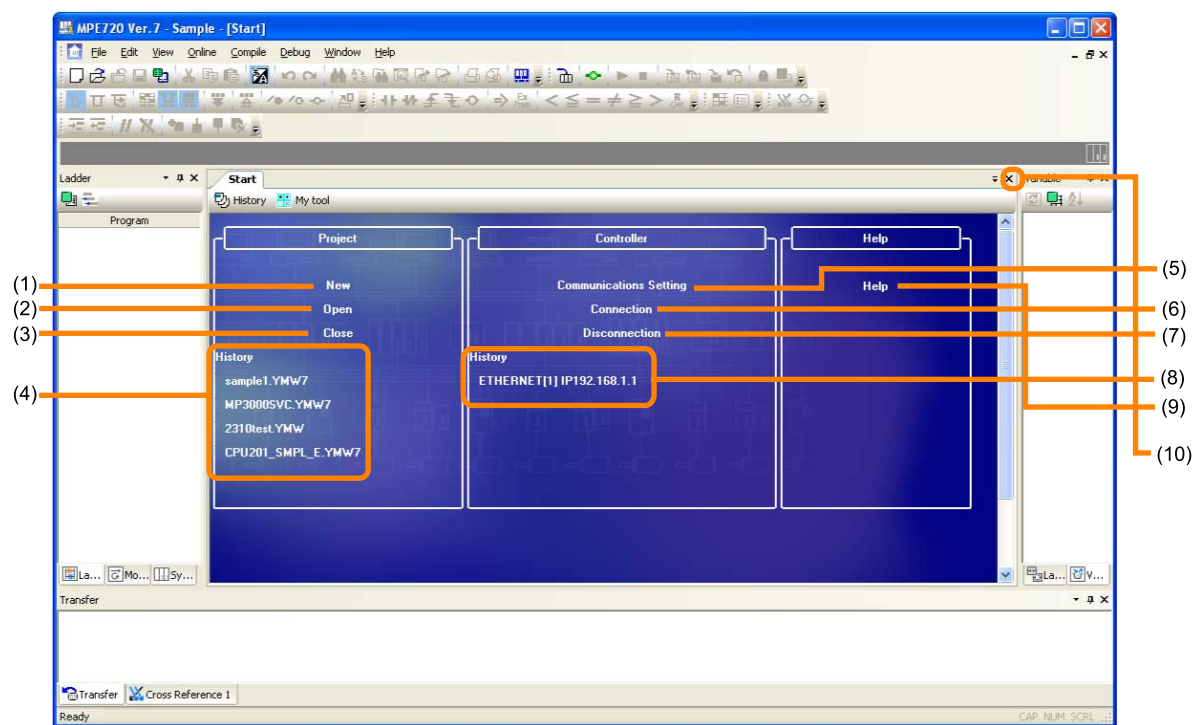
Window	Reference
History	 (1) [History] Window on page 83
My Tool	 (2) [My Tool] Window on page 85
Ladder Program	 (2) Edit Ladder Program Window on page 235
Motion Program	 (2) Edit Motion Program Window on page 264
Trace	 7.5.3 [Real-Time Trace] Tab Page on page 445  7.5.5 [Trace Manager] Tab Page on page 458  7.5.7 [XY Trace] Tab Page on page 475
Comment List	 (2) [Comment List] Tab Page on page 320
Tuning Panel	 6.4.1 [Tuning Panel] Tab Page on page 384
System	–
Navigation	 4.2 [Navigation] Window on page 195
Ladder	 (1) [Ladder] Window / [Navigation] Window on page 233
Ladder Instruction	 (4) [Ladder Instruction] Window on page 236
Motion	 (1) [Motion] Window / [Navigation] Window on page 263
Task List	–
Variable	 (3) [Variable] Window on page 235
Cross Reference	 6.10 Cross Reference on page 408
Check for Multiple Coils	 6.11 Check for Multiple Coils on page 412
Register List	 6.1.1 [Register List] Window on page 375
Watch	 6.2 Watch on page 378
Position Monitor	 7.3.1 [Position Monitor] Window on page 437
Outputs	–
Search	–
Transfer	–
Force Coil List	 6.7.1 Operations on the [Force Coil List] Window on page 398
AutoWatch	 (2) Displaying Data with the [AutoWatch] Window on page 379
Search for Programs Used in Each Axis	 4.6 Checking the Distribution of Axes Using [Search for Programs Used in Each Axis] on page 226
Equipment Configurations	 9.1 Equipment Definitions on page 560

(1) [History] Window

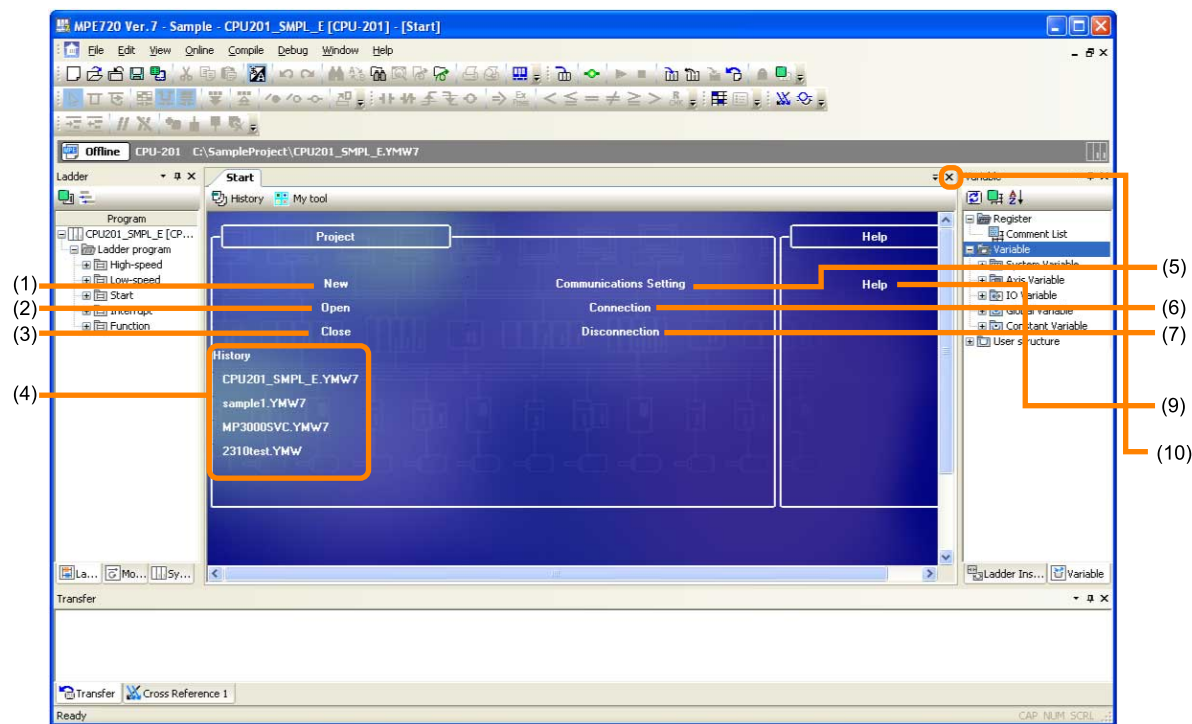
Start the MPE720 or click [History] on the [Start] tab to display the [History] window.

The appearance of the [History] window depends on whether a project file is open.

- When a Project File Is Not Opened



- When a Project File Is Open



No.	Item	Description
(1)	New <i>*I</i>	Displays the [Create New Project] window, which allows you to create a project file. Refer to the following section for details. 2.2.1 Creating a Project File on page 101
(2)	Open <i>*I</i>	Displays the [Open Project] window, which allows you to select and open a created project file.
(3)	Close <i>*I</i>	Automatically saves and closes the project file. [Close] is displayed only when there is an active project link connection. Refer to the following section for details on using a project link connection. (2) Connection Status on page 44

Continued on next page.

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No.	Item	Description
(4)	History (file name) ^{*1}	Displays the names of the five project files that were most recently created or edited using the MPE720 in order beginning with the most recent. If you click a file name, the project file will be opened. Move the cursor over a file name to display a balloon that allows you to confirm the location of the file, the date the file was created, and the date it was changed.
(5)	Communications Setting	Displays the [Communications Setting] window, which allows you to set the communications port and connect with the controller. Refer to the following section for details.  1.1.7 Setting Up Communications on page 47
(6)	Connection	Enables a connection to the controller using the communications port that is currently set.
(7)	Disconnection	Closes the connection with the controller.
(8)	History (connection name)	Displays up to five connection names (logical port number + port type) that have been used for connections. Click a connection name to change the controller to which the connection is to be made.
(9)	Help	Starts Acrobat Reader and displays the [Help Selection] window. Select a PDF file and click the [OK] button to display help for the MPE720.
(10)	Close button	Moves the [History] window to the back. This button does not exit the MPE720. To exit the MPE720, either click the close button in the Main Window, or select [Exit] from the [File] menu.

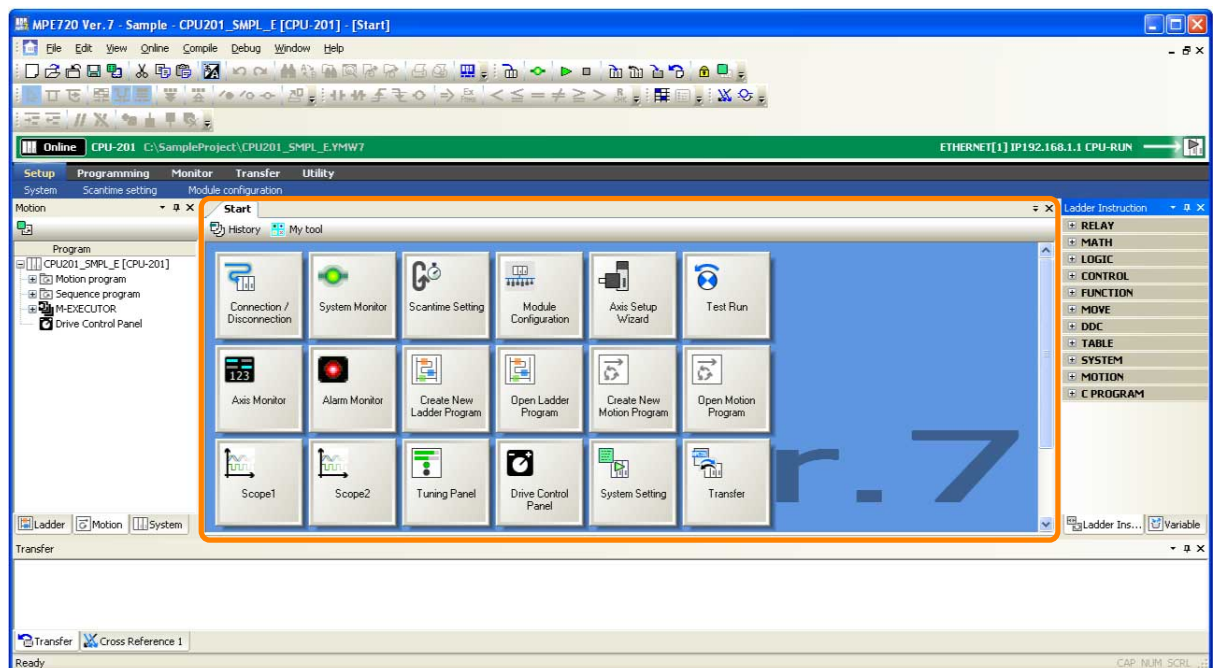
*1 This command closes the current connection, if one exists, with the controller.

(2) [My Tool] Window

Open a project file or click [My tool] on the [Start] tab to display the [My Tool] window.

The [My Tool] window is also displayed automatically when a connection is made to a controller.

You can easily start any of the various functions by clicking on a button in the [My tool] window. You can customize the buttons and register frequently used functions to enable engineering to be started quickly.



This section describes the names and functions of the buttons that are displayed on the [My tool] window.

Button Name	Function
Connection/Disconnection	Connects or disconnects the controller.
System Monitor	Displays the System Monitor.
Scantime Setting	Sets the high-speed and low-speed scan time.
Module Configuration	Opens the [Module Configuration] window.

Continued on next page.

Button Name	Function
Axis Setup Wizard	Used to set up the axes.
Test Run	Checks operation of the SERVOPACK axis with controller references.
Axis Monitor	Monitors the operation status of the axes.
Alarm Monitor	Monitors the alarm status of the axes.
Create New Ladder Program	Creates a ladder program. Allows you to create H, L, A, and I drawings and functions.
Open Ladder Program	Displays a ladder program that was selected from a list.
Create New Motion Program	Creates the main program and subprograms of a motion program and the main program and subprograms of a sequence program. Note: The controller must be compatible with sequence programs.
Open Motion Program	Displays a motion program that was selected from a list.
Scope 1	Analyzes the data obtained by Scope 1 in the form of a trend graph or XY graph.
Scope 2	Analyzes the data obtained by Scope 2 in the form of a trend graph or XY graph.
Tuning Panel	Used to monitor, edit, and adjust the current value of variables from the panel.
Drive Control Panel	Controls the operation of motion programs from the panel.
System Setting	Displays the system settings.
Transfer	Displays the [Transfer] window and executes transfer operations such as writing, reading, and comparing.
Electronic Cam Tool	Starts the Electronic Cam Tool to create cam tool data.
Logging 1	Performs logging of the register data set as logging condition 1.
Logging 2	Performs logging of the register data set as logging condition 2.
FTP Client Settings	Makes settings for an FTP client.
Maintenance Monitor	Allocates system registers for maintenance information.
New Equipment Configuration Definition	Creates a new equipment configuration definition.
Data Sharing Settings	Displays the data sharing settings.
Cell Program	Starts the cell program.
Library Catalog	Makes settings for the library function.
Communications Setting ^{*1}	Used to set up the communications to connect to the controller.
Scope 3 ^{*1}	Analyzes the data obtained by Scope 3 in the form of a trend graph or XY graph.
Scope 4 ^{*1}	Analyzes the data obtained by Scope 4 in the form of a trend graph or XY graph.
Write to Controller ^{*1}	Writes the data from the project file to the controller.
Read from Controller ^{*1}	Reads the data from the controller to a project file.
Save to Flash ^{*1}	Writes the data in the controller RAM to the flash memory.
SigmaWin+ ^{*1}	Starts SigmaWin+ so that the SERVOPACKs can be adjusted.
Module Configuration (EngineeringMgr) ^{*1}	Displays the Module Configuration (EngineeringMgr) window.
Logging 3 ^{*1}	Performs logging of the register data set as logging condition 3.
Logging 4 ^{*1}	Performs logging of the register data set as logging condition 4.
Engineering Builder ^{*1}	Displays the Engineering Builder.

*1 These buttons are not displayed by default.

(a) Editing Buttons on the [My Tool] Window

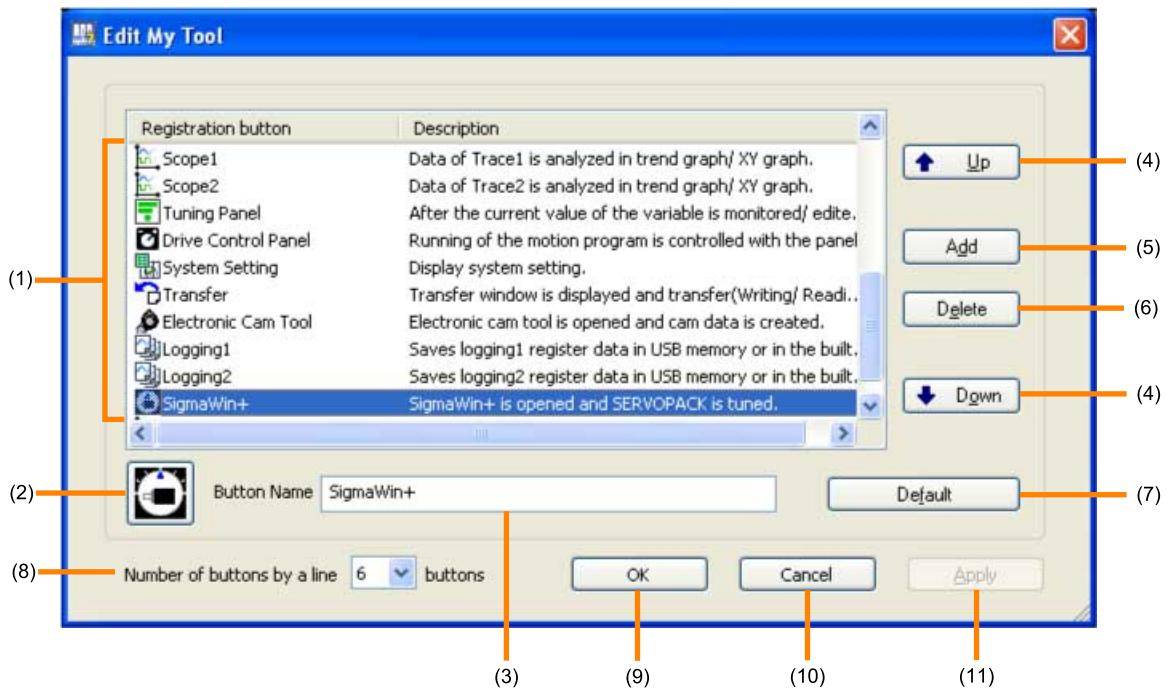
In the [My Tool] window, frequently used functions can be registered as buttons, and the names and the arrangement of the buttons can be customized for easier comprehension.

One customized setting is allowed for one installation of the MPE720.

◆ [Edit My Tool] Window

Right-click on the [My Tool] window and select [Edit My Tool] to display the [Edit My Tool] window.

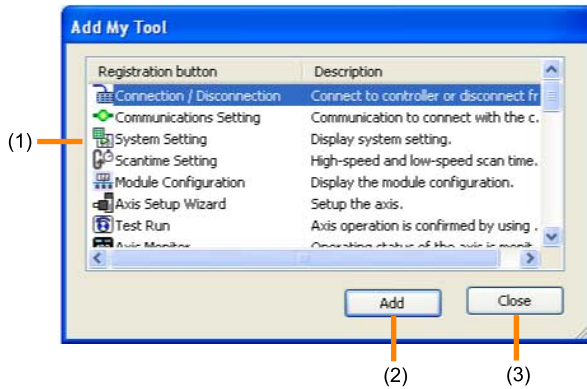
This window allows you to add, delete, sort, and perform other editing operations on the buttons.



No.	Item	Description
(1)	Registration button/Description	Displays the registered buttons and their descriptions. The selected button is highlighted.
(2)	Icon	Click the button and select an image to change the icon.
(3)	Button Name	Renames the button.
(4)	Up/Down	Moves the button selected in (1) up or down.
(5)	Add	Displays the [Add My Tool] window. Refer to the following section for details on the [Add My Tool] window. ◆ [Add My Tool] Window on page 87
(6)	Delete	Deletes the button selected in (1) from the [My Tool] window.
(7)	Default	Restores the default name and icon of the edited button.
(8)	Number of buttons by a line	Sets the number of buttons to display in a single row on the [My Tool] window. Setting range: 3 to 10 buttons
(9)	OK	Confirms the edited settings of the button and returns you to the [My Tool] window.
(10)	Cancel	Cancels the edited settings of the button and returns you to the [My Tool] window.
(11)	Apply	Confirms the edited settings of the button.

◆ [Add My Tool] Window

Click the [Add] button in the [Edit My Tool] window to display the [Add My Tool] window, which allows you to add a button.



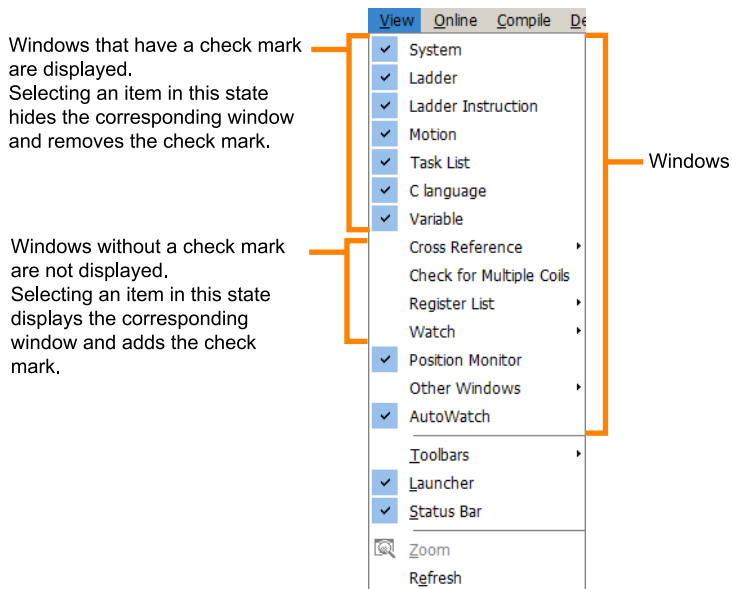
No.	Item	Description
(1)	Registration button/Description	Displays the registered buttons and their descriptions. The selected button is highlighted.
(2)	Add	Adds the button selected in (1).
(3)	Close	Closes the [Add My Tool] window and returns you to the [Edit My Tool] window.

(3) Changing the Window Layout

This section describes how to change the window layout.

(a) Toggling between Display and Hide

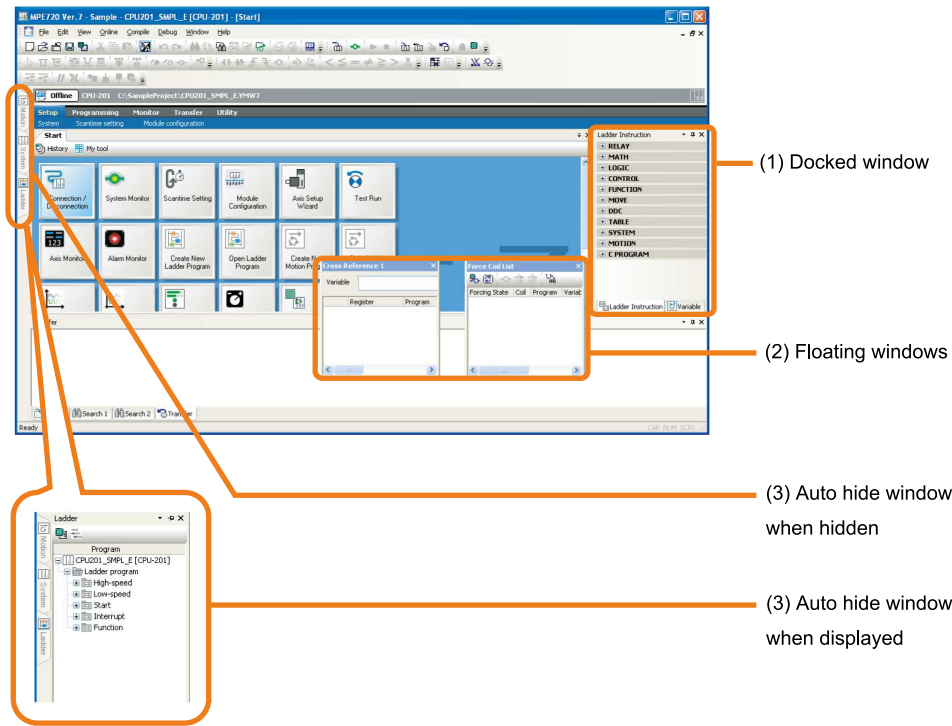
Toggle between displaying and hiding the selected windows on the [View] menu.



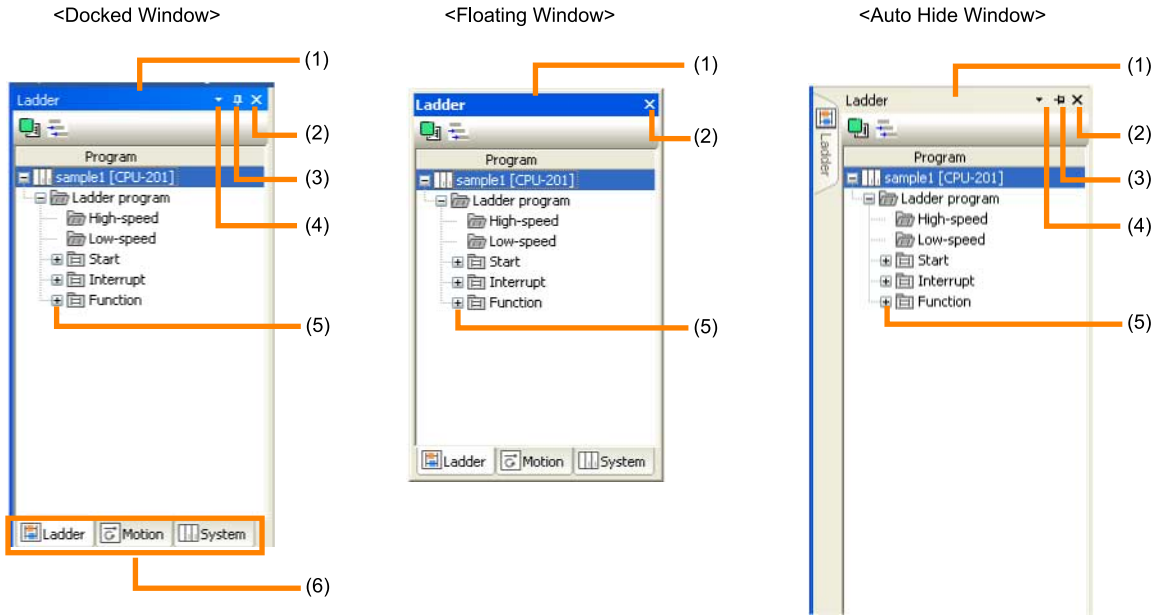
(b) Changing the Window Display Type

There are three display types for windows, as described below.

No.	Display Type	Description
(1)	Docked Window	This is the default display type. Multiple windows are displayed on top of each other as tab pages. The top tab page can be changed by clicking a tab.
(2)	Floating Window	Floating windows are displayed separate from the Main window. A floating window can be freely moved by dragging the title bar. Information Normally, the Main window cannot be changed to a floating window. Only the [Comment List] tab page displayed in the Main window can be changed to a floating window. Drag the tab part to move the floating window.
(3)	Auto Hide Window	The window slides out from the side when the relevant tab is clicked, and closes when any location outside of the window is clicked.



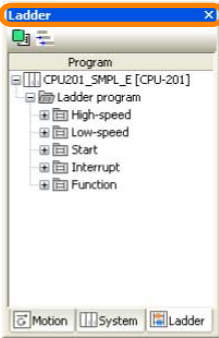
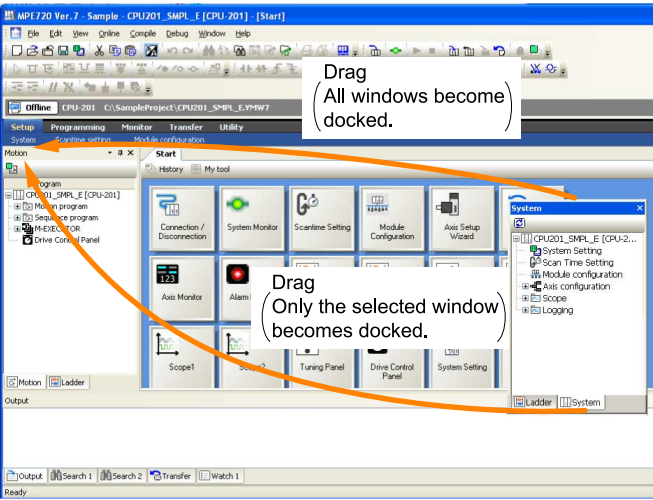
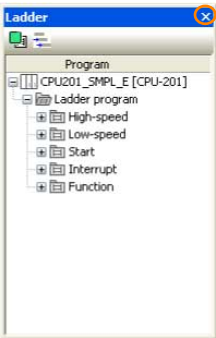
This section provides the names and descriptions of the components of a window.



No.	Name	Description
(1)	Title bar	Displays the title of the currently selected (activated) window.
(2)	Close button	Hides the currently selected window. To display the window again, select the window name from the [View] menu.
(3)	 button	Toggles the display type of the window between Auto Hide and Docked.
(4)	[▼] button	Displays a menu for selecting the display type of the window.
(5)	[+] button	Appears when the window contains a tree hierarchy or categorized list. Expands the display to show the lower levels of the hierarchy or a list of items included in the category. Click the collapse button ([–]) to return the expanded list to its original state.
(6)	Tab	Changes the window that is displayed. The order of the tabs can be changed by dragging one tab over another tab. The window display type can be changed from docked to floating by dragging the tab for that window to a position outside of the currently displayed window.

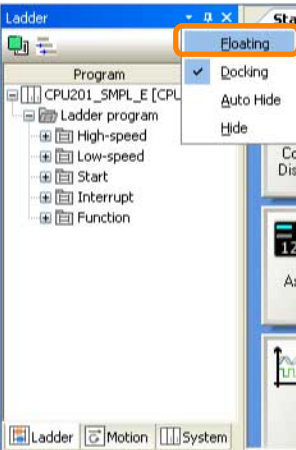
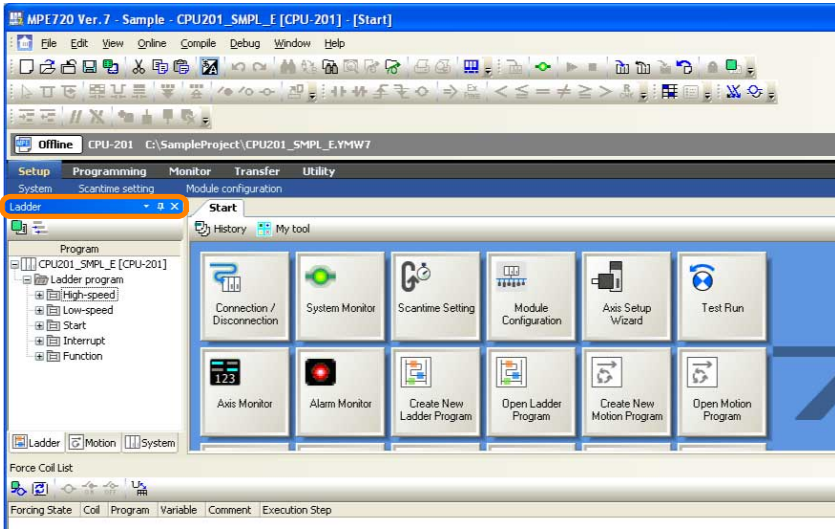
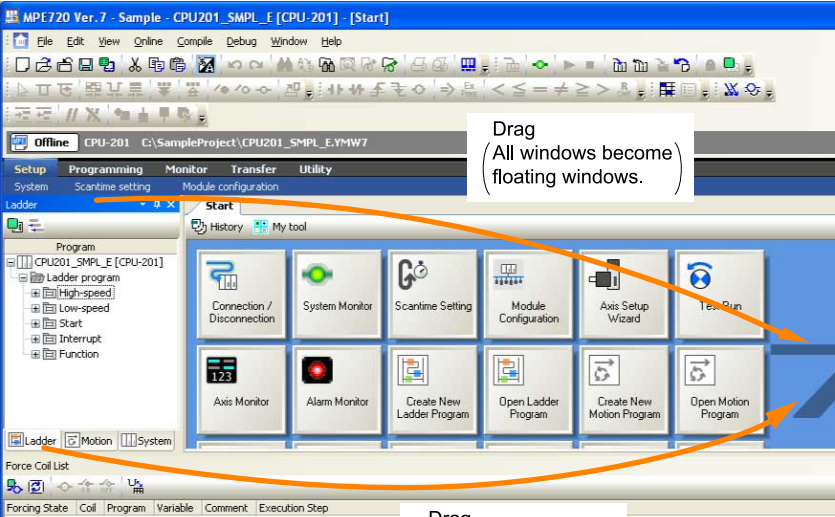
1.2 Main Window Configuration

Use the following methods to change the window display type.

Before Change	After Change	Operating Procedure
Floating Window	Docked Window	Double-click the title bar. 
		Drag the tab or title bar to the desired docking position in the Main window. 
Auto Hide Window		Change the window to a docked window first. A floating window cannot be directly changed to an auto hide window.
Hide		Click the close button. 

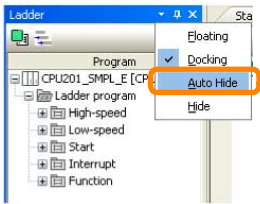
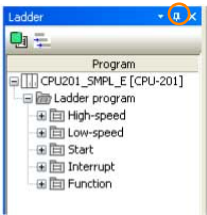
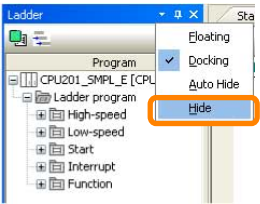
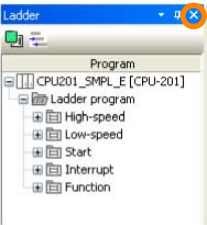
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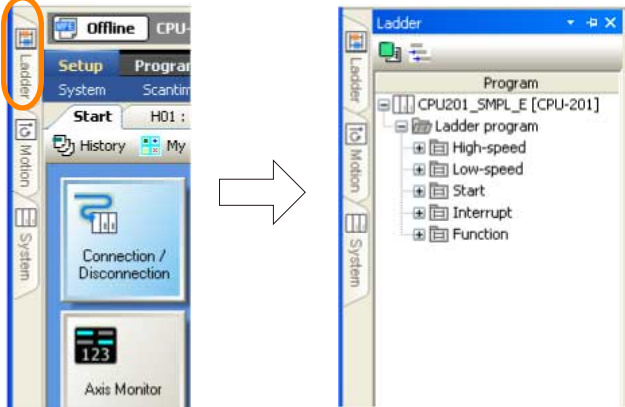
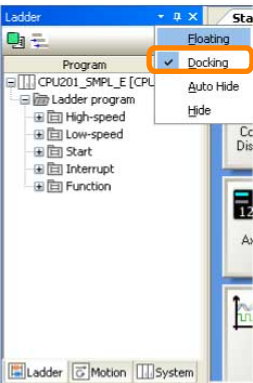
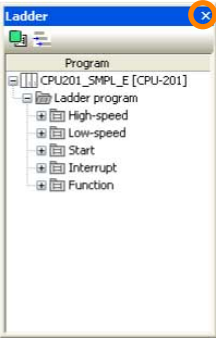
Before Change	After Change	Operating Procedure
Docked Window	Floating Window	Click the menu button [▼] on the title bar and select [Floating]. 
		Double-click the title bar. 
		Drag the tab or title bar to the desired position. 

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Before Change	After Change	Operating Procedure
Docked Window	Auto Hide Window	Click the menu button [▼] on the title bar and select [Auto Hide]. 
		If multiple windows are displayed on top of each other, all of the windows become auto hide windows.
	Hide	Click []. 
		If multiple windows are displayed on top of each other, all of the windows become auto hide windows.
	Hide	Click the menu button [▼] on the title bar and select [Hide]. 
		Click the close button. 

Continued on next page.

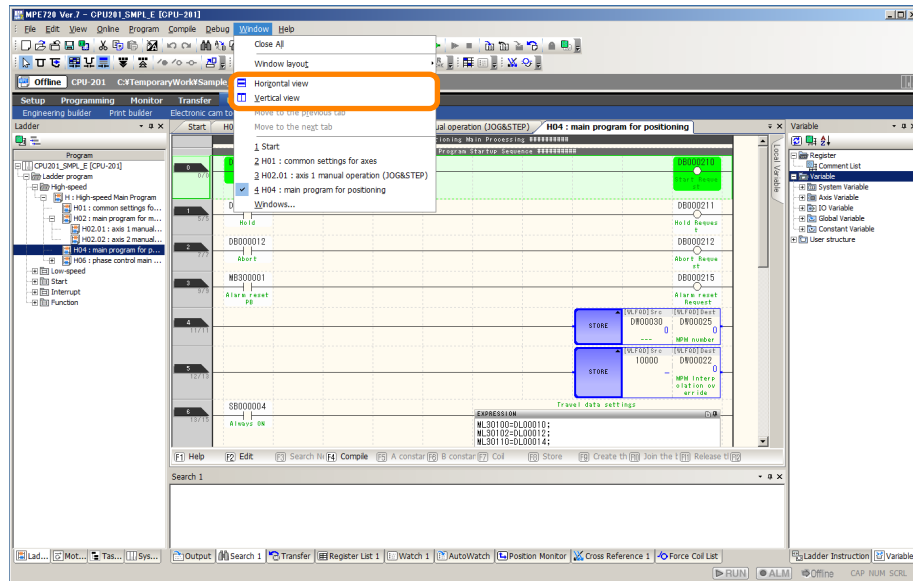
Before Change	After Change	Operating Procedure
Auto Hide Window	Before performing the following procedure, display the window by clicking on its tab. 	
Floating Window	Change the window to a docked window first. An auto hide window cannot be directly changed to floating window.	
Docked Window	Click the menu button [▼] on the title bar and select [Docking].  If multiple windows are displayed on top of each other, all of the windows become docked windows. Click [📏].  If multiple windows are displayed on top of each other, all of the windows become docked windows.	
Hide	Click the close button. 	

(c) Splitting the Window

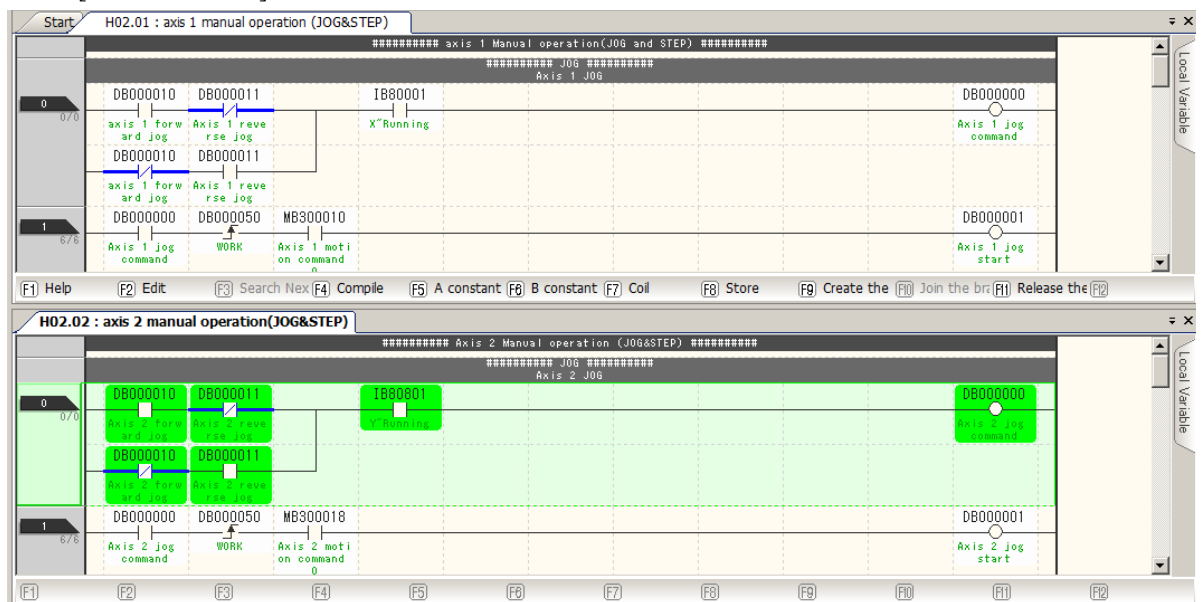
When two or more tab pages are open in the center window, select [Horizontal view] or [Vertical view] on the [Window] menu to display the tab pages in the corresponding manner.

This is convenient for displaying and editing more than one program.

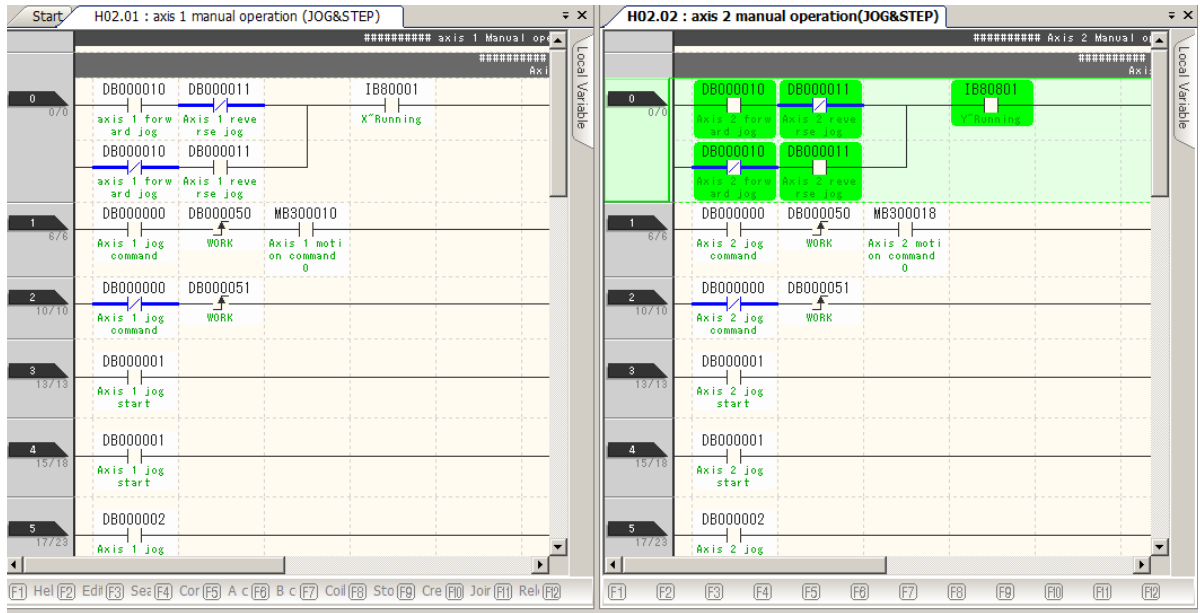
Information Or, click the corresponding button on the toolbar.



- When [Horizontal view] Is Selected



- When [Vertical view] Is Selected



(d) Registering Window Layouts

You can register up to five of the following window layouts.

- Display position and size of each window
- Customized toolbars and menus
- Customized shortcut keys

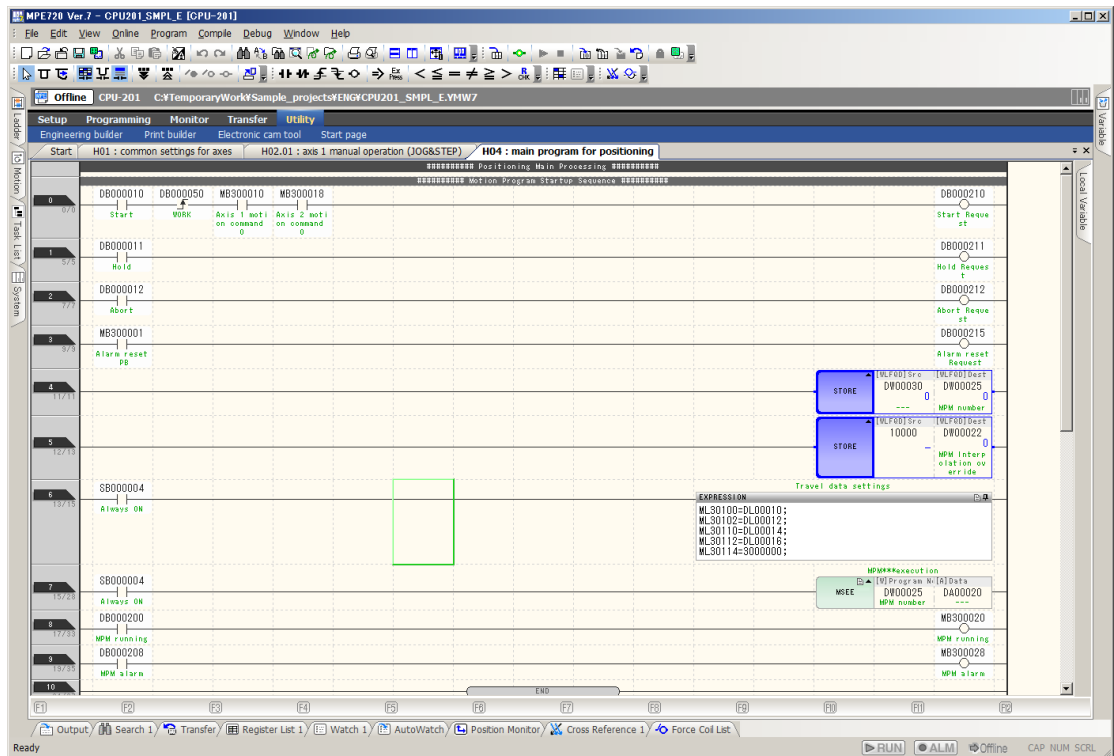
You can select from the previously registered layouts when programming, debugging, or performing maintenance to switch to the easiest window layout to use.

◆ Registering Window Layouts in Advance

1. Arrange the windows into layout to register.

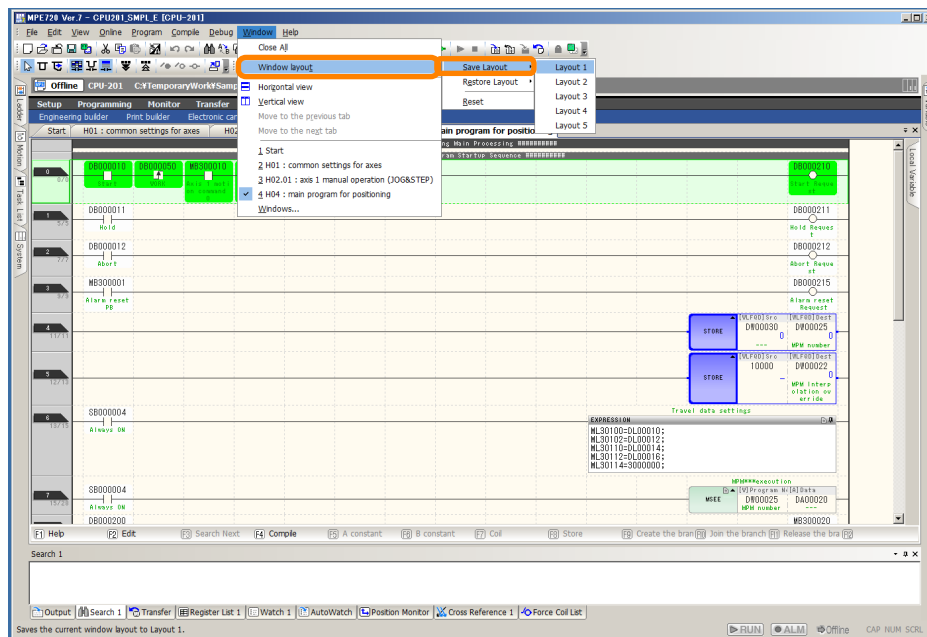
<Example>

Window Layout for Programming with All Other Windows Hidden



2. Select [Window layout] - [Save Layout] from the [Window] menu and select the desired layout number.

Information To register other window layouts, select a different layout number.



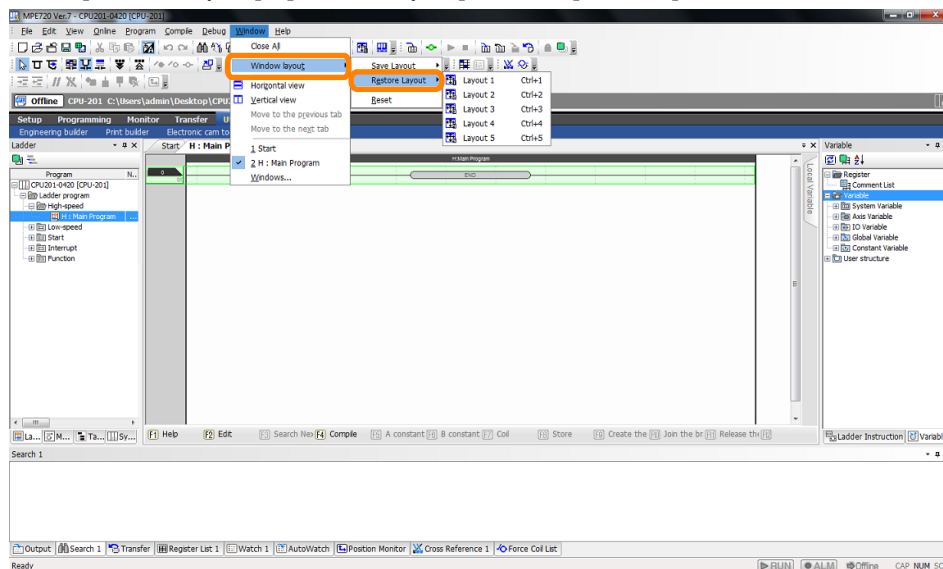
A message dialog box will be displayed, and the window layout will be registered.

This concludes the procedure.

◆ Changing to a Registered Window Layout

Use one of the following methods to change to one of the registered window layouts.

- Select [Window layout] - [Restore Layout] from the [Window] menu and select the desired layout number.

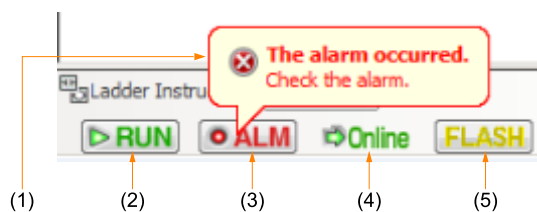


- Hold down the **Ctrl** key and press the number key (**1** to **5** keys) for the layout number to use.

1.2.6 Status Bar

The status bar displays the status of the controller.

This section gives details on the status bar.



No.	Display	Description	Remarks
(1)	Balloon help	When an alarm occurs, an alarm balloon will be displayed.	–
(2)	RUN	Lits while the CPU of the controller is running. The button is grayed out while the CPU is stopped.	Clicking the [RUN] button starts the System Monitor.
(3)	ALM	Lits while there is an alarm in the controller. The button is grayed out when there is no alarm.	Clicking the [ALM] button starts the System Monitor.
(4)	Online	Displayed while the MPE720 is correctly connected to the controller.	–
	Offline	Displayed while the MPE720 is not connected to the controller.	
(5)	FLASH	Lits when the controller RAM and flash memory do not match. The button is grayed out when they match.	Clicking the [FLASH] button displays the [Save to Flash] window.

Project Management

This chapter describes basic operations and management methods for project files.

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2.1 What Is a Project File?

With the MPE720, you can save and manage the application data necessary for the controller as a single file. This file is called the project file.

The project file includes the following application data.

System Configuration	• System definitions • Scan time definitions • FTP client definitions • Module configuration definitions • Equipment configuration definitions • Data sharing definitions • Register Map • Data tracing information • Data logging • Maintenance monitor settings
Programming	• Ladder programs (high-speed, low-speed, start, interrupt, and function programs) • Motion programs (main programs, subprograms, and group definitions) • Sequence programs (main programs, subprograms) • C Language • Table data • Variables (axis, I/O, global, constant, and user-defined structure variables) • Comments (I/O, global, and constant comments)
Register	• M (data registers) • D (internal registers) • C (constant registers) • S (system registers) • I (input registers) • O (output registers) • G (data registers) ^{*1}

*1 Cannot be used with MP2000-series controllers.

Use the project file in the follow types of applications.

- To configure the system configuration settings and write programs in a project file on the PC, and then write that data to a controller.
- To write controller data to a project file.

Refer to the following section for details on reading and writing data.

 [2.3 Transfer on page 107](#)



Important

To prevent data loss in case of a CPU unit failure, always store a backup copy of the project file. We recommend that you save a copy of the project file before you make any modifications to it (changing the module configuration definitions, the ladder programs, the motion programs, etc.).

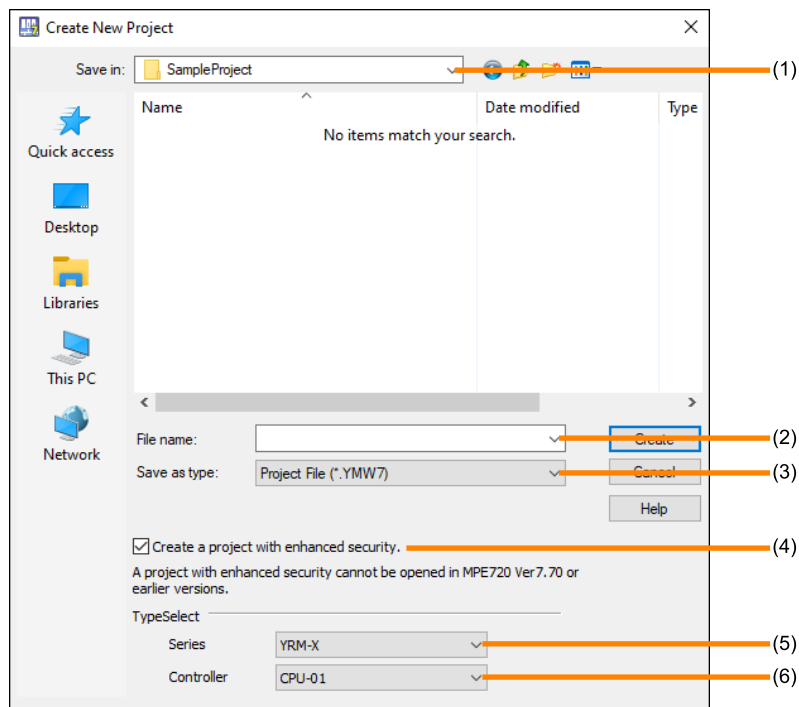
2.2 Project File Operations

This section describes basic operations for project files.

2.2.1 Creating a Project File

Select [New Project] from the [File] menu to create the project file.

Information You can create a project file only when the MPE720 is offline. If the MPE720 is online, click the [Connection/Disconnection] button on the [My Tool] window to set the MPE720 to offline.



No.	Item	Description
(1)	Save in	Select the folder in which to save the project file.
(2)	File Name	Enter the name of the project file. Note: The file name cannot contain any of the following characters: / \ : * ? " < >
(3)	Save as type	Select the file extension for the project file. The extensions that can be selected for the project file are given below. • YMW: This extension is supported by MP2000-series controllers only. Select this extension if you need to also use the project file in MPE720 Ver. 6. • YMW7: This extension is supported by all models.
(4)	Create a project with enhanced security.	This check box is selected by default. Clear this check box as required.
(5)	Series	Select the series of the controller to use.
(6)	Controller	Select the model of the CPU unit.

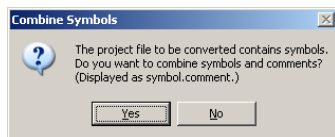
2.2.2 Opening an Existing Project File

Select [Open Project] from the [File] menu to open a project file.

2.2 Project File Operations

Information

- Only one project file can be opened in a single window with MPE720. The same project file cannot be opened in more than one window with MPE720. If you try to open a project file that is already open, the window that contains the open project file will move to the front.
- You can also open a MAL file (a PLC folder compressed into a file) that was used with MPE720 Ver.5 with this operation. The file will be opened by converting the extension from "*.MAL" to "*.YMW7". If the file to convert contains symbols, a message dialog box will be displayed.



If you click the [Yes] button, the text entered for the symbol and the text entered for the comment will be separated with a period and added to the comment data in the converted file.

2.2.3 Overwriting Project Files

Select [Save Project] from the [File] menu to overwrite a project file.

2.2.4 Saving a New Project File

Select [Save as a New Project] from the [File] menu to save a project with a new name.

2.2.5 Converting a Project File

You can create a project file by reusing an existing project file and changing its series or model.

(1) Combinations of Models That Can Be Converted

The following table shows restrictions on the combinations of models for which a project file can be converted.

○: Can be converted, ×: Cannot be converted

Source Model for Project File Conversion	Destination Model for Project File Conversion					
	CPU-01	CPU-12	MPX1312-1	MPX1312-2	MPX1012J	YRM-7
CPU-01	—	○	○	○	○	×
CPU-12	×	—	×	×	×	×
MPX1312-1	×	○	—	○	×	×
MPX1312-2	×	○	○	—	×	×
MPX1012J	×	×	×	×	—	×
YRM-7	○	×	×	×	×	—
MP3000	○	○	○	○	○	○
Sigma-7	○	○	○	○	○	○
CPU-203/CPU-203F	○	○	×	○	○	×
MP-31J	○	○	○	○	○	×
FT5□	×	×	×	×	×	×
MP2000	×	×	×	×	×	○

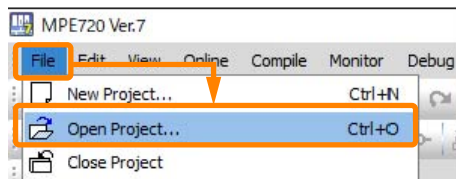
○: Can be converted, ×: Cannot be converted

Source Model for Project File Conversion	Destination Model for Project File Conversion					
	MP3000	Sigma-7	CPU-203/CPU-203F	MP-31J	FT5□	MP2000
CPU-01	×	×	×	×	×	×
CPU-12	×	×	×	×	×	×
MPX1312-1	×	×	×	×	×	×
MPX1312-2	×	×	×	×	×	×
MPX1012J	×	×	×	×	×	×
YRM-7	×	×	×	×	×	×
MP3000	—	○	○	○	×	×
Sigma-7	○	—	○	○	×	×
CPU-203/CPU-203F	○	○	—	×	×	×
MP-31J	○	○	×	—	×	×
FT5□	×	×	×	×	—	×
MP2000	○	○	○	×	×	—

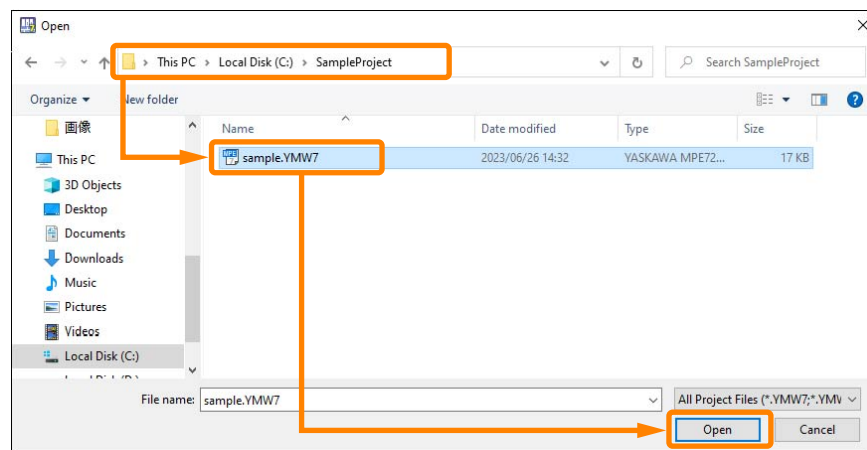
(2) Project File Conversion Procedure

Use the following procedure to convert a project file.

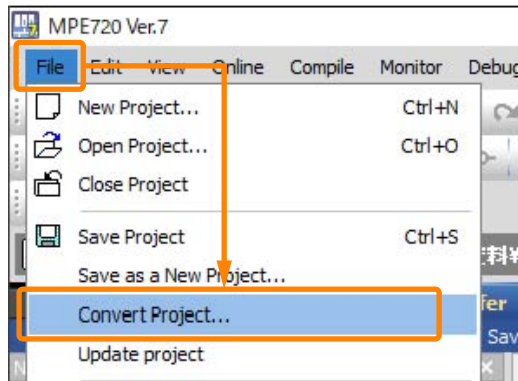
1. Click [File] - [Open Project] from the menu.



2. Select an existing project file and click the [Open] button.

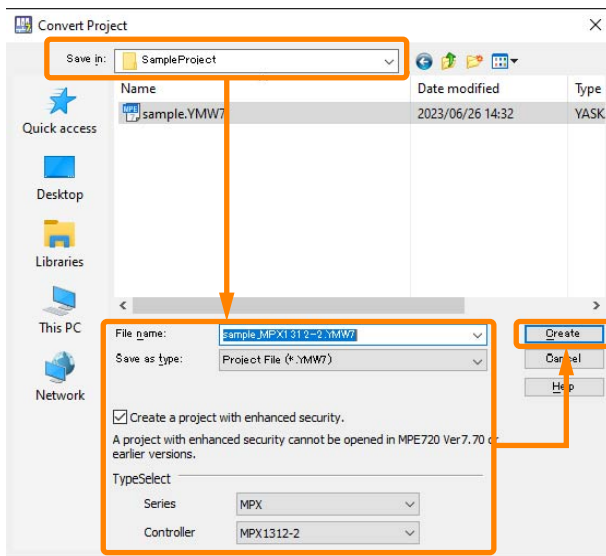


3. Click [File] - [Convert Project] from the menu.



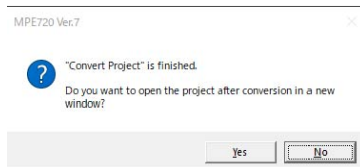
4. Set the following items related to the file to create, and then click the [Create] button.

- Save in
- File name
- Save as type
- Security settings
- TypeSelect: [Series] and [Controller]



A message dialog box will be displayed.

5. Click the [Yes] button or the [No] button.



If you clicked the [Yes] button, the project file will be displayed in a new MPE720 window.

6. Check the log file stored in the save location specified in step 4 and confirm that there were no problems during the conversion process.

Important

If you executed a conversion between different series, certain settings may be automatically changed according to differences in functionality.

This concludes the procedure.

2.2.6 Closing a Project File

Select [Close Project] from the [File] menu to close the project file.

2.2.7 Opening a Backed Up Project File



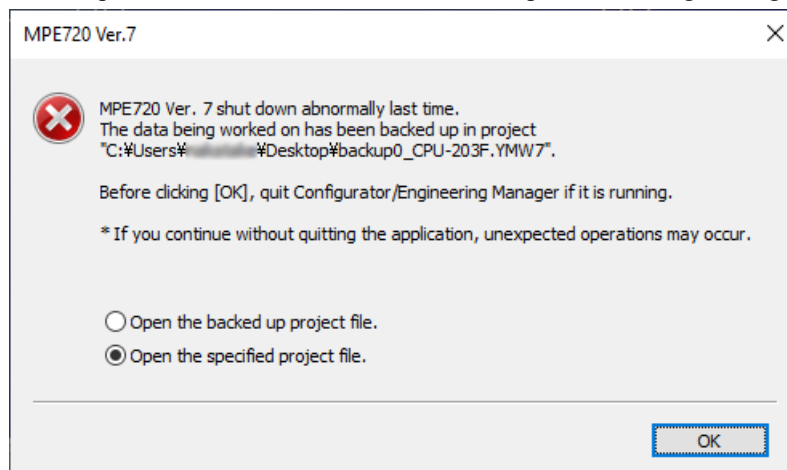
This function provides no guarantees that the content you were editing can be successfully restored.

If you open and edit a project file while offline and the MPE720 shuts down abnormally, a backup file will be created on the desktop of the PC. You can restore the contents of the project file you were editing by opening this backup file.

When the MPE720 shuts down abnormally, use the following procedure to open the backed up project file.

1. **After the MPE720 shuts down abnormally, restart the MPE720 and open the project file you were editing.**

A backup file will have been saved to the desktop, and a message dialog box will be displayed.

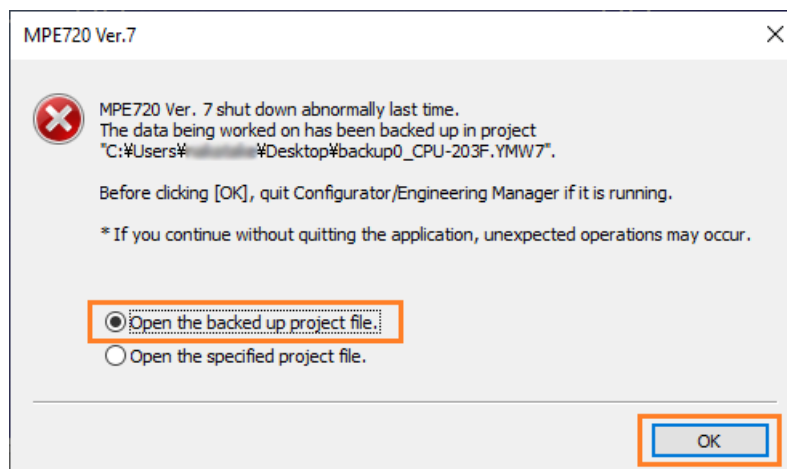


Information

The name of the backup file that is created on the desktop begins with "backup0_".

If you open the backup file and the MPE720 shuts down abnormally again, the number in the backup file name will be incremented.

2. **Quit Configurator/EngineeringManager if it is running.**
3. **Select "Open the backed up project file", and then click the [OK] button.**



The backup file that was saved to the desktop will be opened.

We recommend you save the opened backup file again as the real project file.

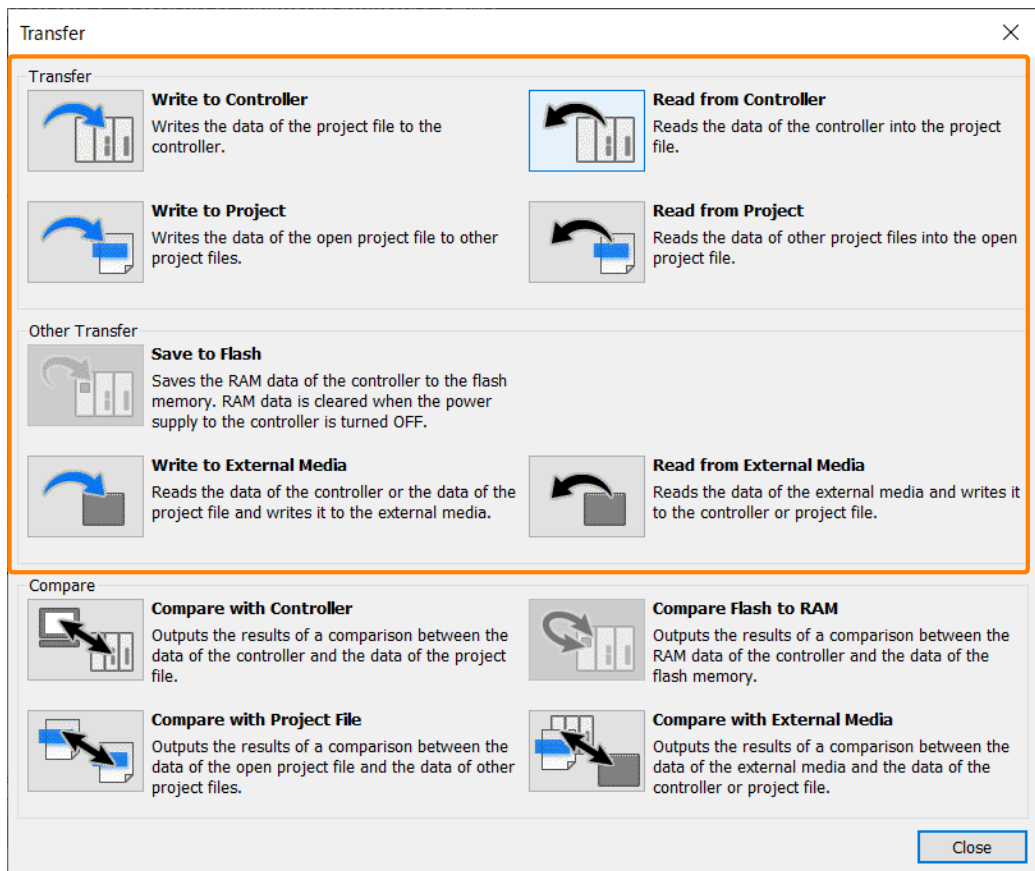
This concludes the procedure.

2.3 Transfer

A transfer refers to reading and writing data between project files, controllers, and external media, and it also refers to saving the controller's RAM data to flash memory.

Click the [Transfer] button in the [My Tool] window to display the [Transfer] window.

The following table lists the types of transfers.



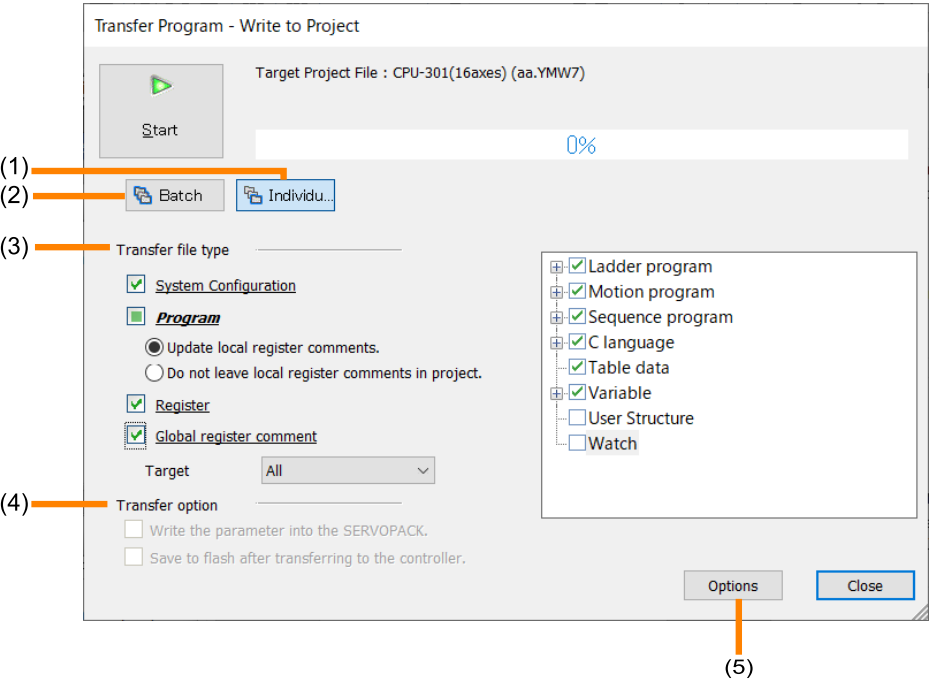
Important

- You cannot transfer data between controllers from different series (for example, you cannot transfer data between the MP2000 series and the MP3000 series, and you cannot transfer data between the MP3000 series and the YRM1000 series).
- For the YRM1000 series, you cannot transfer data between different models (for example, you cannot transfer data between the CPU-01 and the CPU-12).

Type of Transfer	Transfer Source and Transfer Destination	Project File Status	MPE720 Connection Status
Write to Controller	Project file → Controller	—	Online
Read from Controller	Controller → Project file		
Write to Project	Open project file → Other project file	Open	Offline
Read from Project	Other project file → Open project file		
Save to Flash	Controller RAM → Flash memory	—	Online
Write to External Media	Project file → External media	Open	—
	Controller RAM → External media	Closed	Online
Read from External Media	External media → Project file	Open	—
	External media → Controller RAM	Closed	Online

2.3.1 [Transfer Program] Window

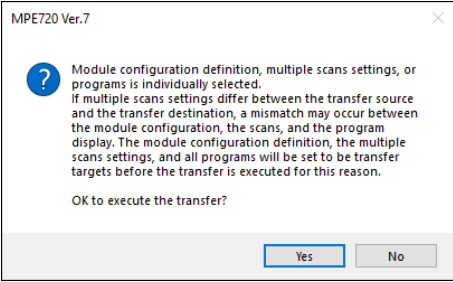
Click a button related to reading or writing in the [Transfer] window to display the [Transfer Program] window. You can select the files to transfer and set the options. The settings that are displayed will depend on the type of transfer.



No.	Item	Description
(1)	[Individual] Button	Displays the details on the data selected in [Transfer file type] in the area to the right. The data selected in this area will be transfered. The [Individual] button has been selected in the above screenshot.
(2)	[Batch] Button	Transfers all data selected in [Transfer file type].

Continued on next page.

Continued from previous page.

No.	Item	Description
(3)	Transfer file type	Select the data to transfer. <When Transferring a Program> Select one of the following radio buttons: • Update local register comments: The program and local register comments will be transferred. • Do not leave local register comments in project/Do not leave local register comments in controller: Only the program will be transferred. As local register comments will not be transferred, local register comments will not be displayed in the program at the transfer destination. <When Transferring Global Register Comments> Select the target comments from [All], [Standard Comment], [Extended Comment 1], [Extended Comment 2], or [Extended Comment 3]. <When Transferring a Program for a Model that Supports Multiple Scans and (1) [Individual] Listed Above Is Selected> If the [Multiple Scan Settings] check box displayed on the right side of the window is selected or if there is a difference in the [Multiple Scan Settings] content of the transfer source and destination, the following message dialog box will be displayed when the [Start] button is clicked. Note that all of the following items will be transferred when the [Yes] button is clicked, regardless of whether the check boxes are selected.  The items listed below are automatically set as the transfer target when the [Yes] button is clicked. • Module configuration • Ladder program • Function • Motion program • Sequence program • Table data • Cam tool data Information "Multiple scans settings" means the following settings. • Scan definitions (addition, modification, and deletion of scans and modification of scan properties) • [Control Device/Group Definition] window settings (addition, modification, and deletion) • [Register Map] window settings (addition, modification, and deletion)
(4)	Transfer option	The following options can be selected. • Write the parameter into the SERVOPACK: Writes the SERVOPACK parameters that were edited in the MPE720 to the SERVOPACK. • Read the parameter from the SERVOPACK: Reads the SERVOPACK parameters that are saved in the SERVOPACK to a project file. • Save to flash after transferring to the controller: Saves the transferred data to the flash memory in the controller.
(5)	[Option] Button	Displays the [Environment Setting] window. You can change the settings related to transfers on this window.

2.3.2 Write to Controller

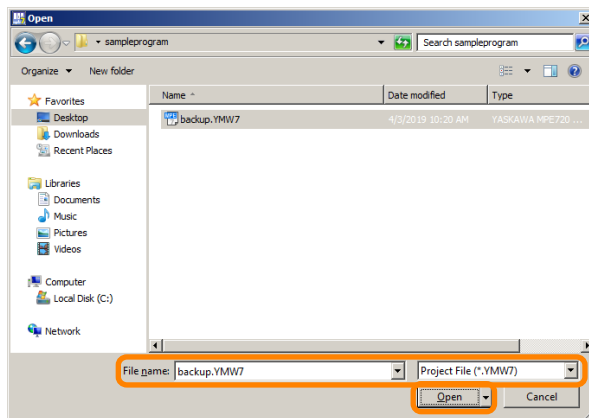
Use the following procedure to write the project file data to the controller.

1. Click the **[Write to Controller]** button in the **[Transfer]** window.
The **[Open]** window will be displayed.

2. Select the project file at the transfer source, then click the [Open] button.

Information

This window will not be displayed if the project file is already open. The project file that is open serves as the transfer source.

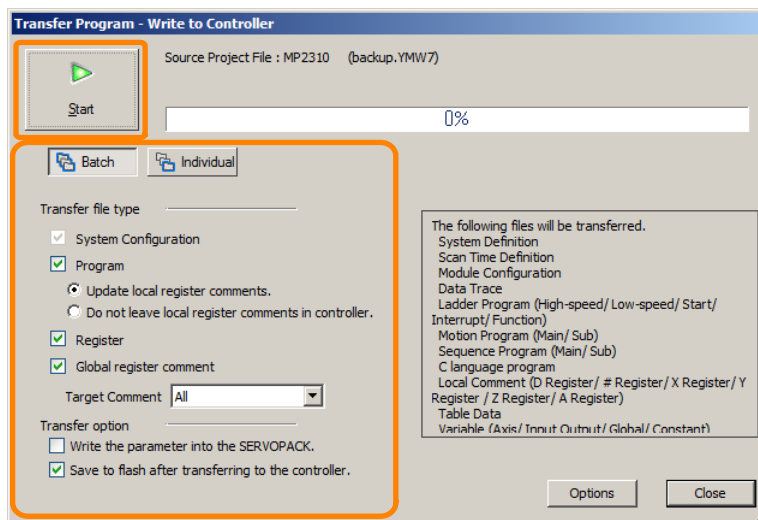


The [Transfer Program] window will be displayed.

3. Specify the transfer settings, and click the [Start] button.

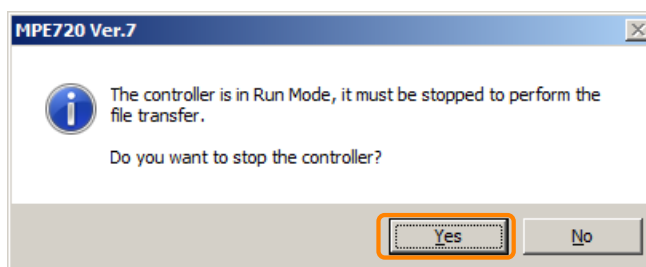
Refer to the following section for details on the settings.

[2.3.1 \[Transfer Program\] Window on page 108](#)



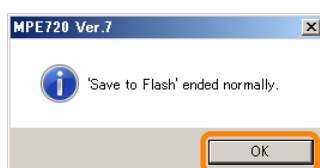
A message dialog box will be displayed.

4. Read the message, and then click the [Yes] button.

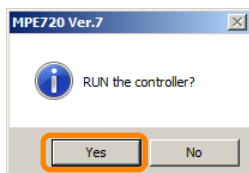


The transfer will start. When data transfer is completed, a message dialog box will be displayed.

5. Click the [OK] button.



6. Click the [Yes] button.



This concludes the procedure.

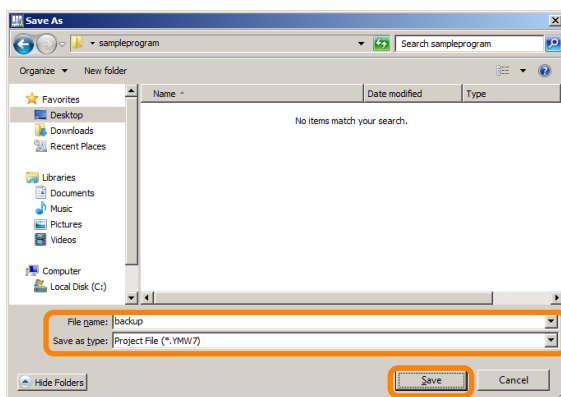
2.3.3 Read from Controller

Use the following procedure to read the data from the controller to a project file.

1. Click the [Read from Controller] button in the [Transfer] window.
The [Save As] window will be displayed.
2. Select the project file at the transfer destination (or create a new project file), then click the [Save] button.

Information

This window will not be displayed if the project file is already open. The project file that is open serves as the transfer destination.

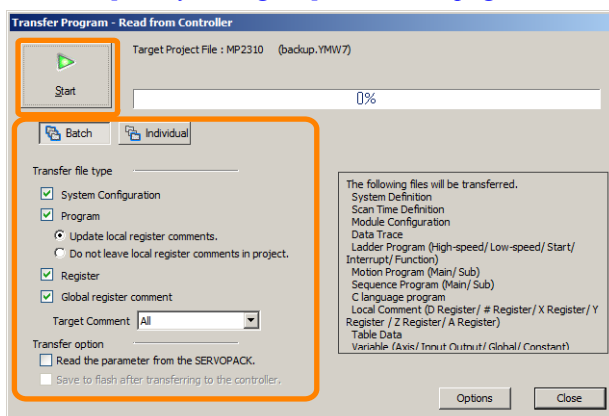


The [Transfer Program] window will be displayed.

3. Specify the transfer settings, and click the [Start] button.

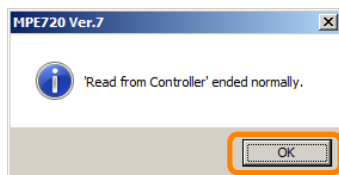
Refer to the following section for details on the settings.

[2.3.1 \[Transfer Program\] Window on page 108](#)



The transfer will start. When data transfer is completed, a message dialog box will be displayed.

- Click the [OK] button.

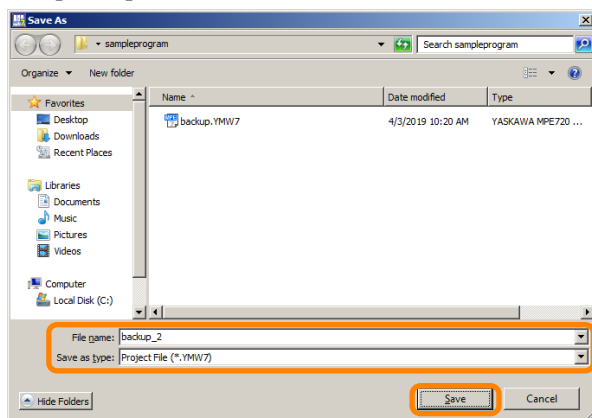


This concludes the procedure.

2.3.4 Write to Project

Use the following procedure to write the data in the open project file to another project file.

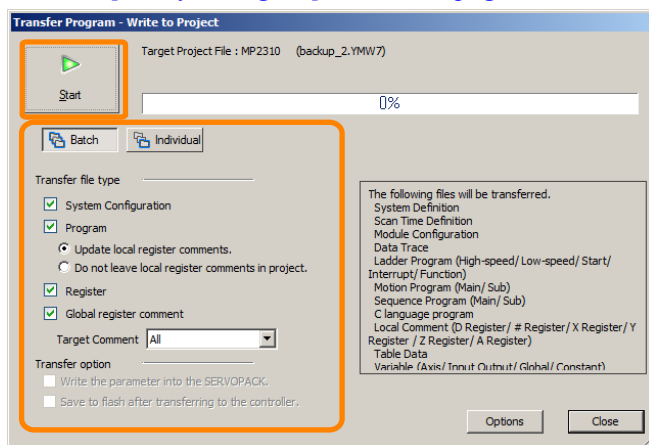
- Open the project file.
- Click the [Write to Project] button in the [Transfer] window.
The [Save As] window will be displayed.
- Select the project file at the transfer destination (or create a new project file), then click the [Save] button.



The [Transfer Program] window will be displayed.

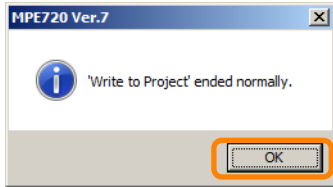
- Specify the transfer settings, and click the [Start] button.
Refer to the following section for details on the settings.

 [2.3.1 \[Transfer Program\] Window on page 108](#)



A message dialog box will be displayed.

- Click the [OK] button.

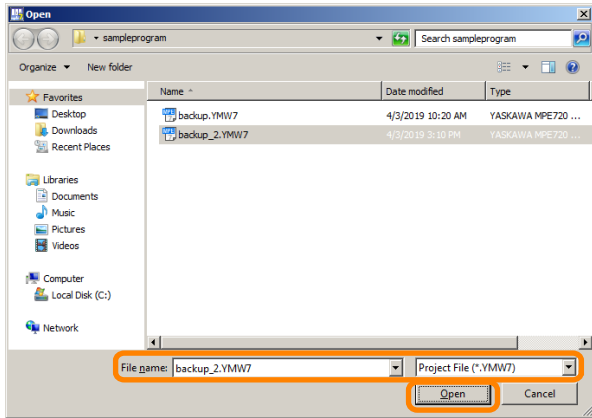


This concludes the procedure.

2.3.5 Read from Project

Use the following procedure to read the data in another project file to the open project file.

- Open the project file.
- Click the [Read from Project] button in the [Transfer] window.
The [Open] window will be displayed.
- Select the project file at the transfer source, then click the [Open] button.

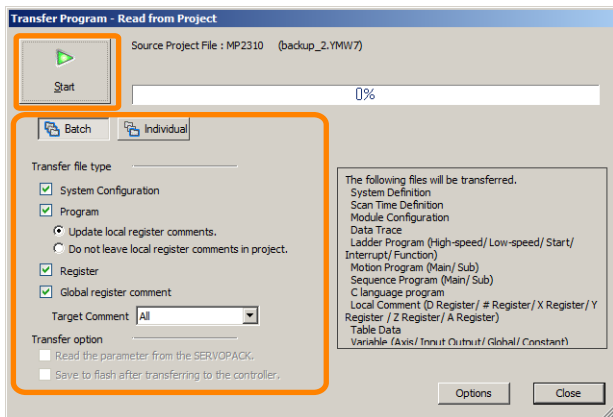


The [Transfer Program] window will be displayed.

- Specify the transfer settings, and click the [Start] button.

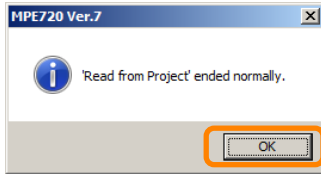
Refer to the following section for details on the settings.

[2.3.1 \[Transfer Program\] Window on page 108](#)



A message dialog box will be displayed.

5. Click the [OK] button.



This concludes the procedure.

2.3.6 Save to Flash

Save to flash refers to saving the data in the controller's RAM to the controller's flash memory.

Use the following procedure to save data to flash memory.



Important

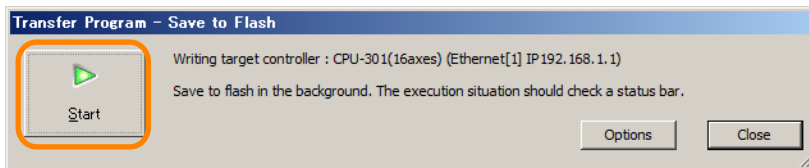
- If you turn the power OFF and ON again without saving data to the flash memory, any changes to the program or definition data will be lost.
- In the [Environment Setting] window, you can also set to automatically save data to flash memory when the connection to the controller is disconnected. Refer to the following section for details.

[10.1.30 \[Transfer\] - \[Transfer\] on page 588](#)

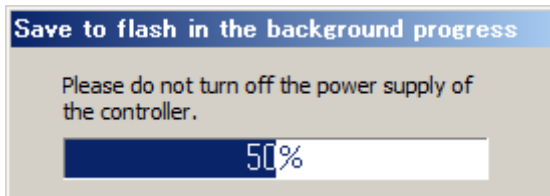
1. Click the [Save to Flash] button in the [Transfer] window.

The [Transfer Program - Save to Flash] window will be displayed.

2. Click the [Start] button.

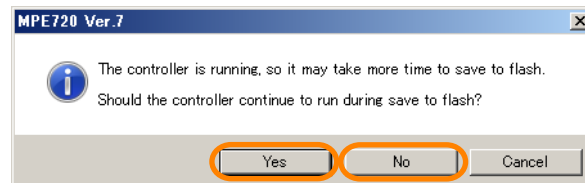


Save to flash will start, and the following window will be displayed.



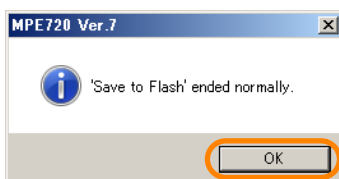
Information

If the CPU unit is in RUN mode, the following message will be displayed. The data transfer to the target controller starts when you click the [Yes] button or the [No] button.



When save to flash is completed, a message dialog box will be displayed.

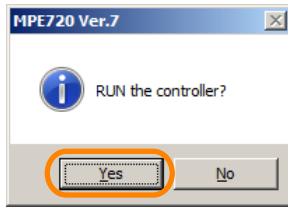
3. Click the [OK] button.



A message dialog box will close.

Information

If you clicked the [No] button in step 2, the following message will be displayed.
Click the [Yes] button to put the CPU unit in the RUN status.



This concludes the procedure.



Important

Do not turn OFF the power to the controller until saving data to flash memory has been completed.
If you turn OFF the power to the controller while data is being saved to flash memory, the data will be lost.
If you then restore power to the controller, the controller will start in the factory default condition.

2.3.7 Write to External Media

You can transfer data to external media (e.g., CF cards and SD cards).

<Example>

When data is transferred to a controller via a display or other device that supports CF cards, use of a CF card frees the operator from the trouble of connecting the MPE720 to the controller.

When a CF Card Is Used	When a CF Card Is Not Used
- Write the data in controller to CF card. - Insert the CF card into the display or other device connected to the controller and transfer the data.	- Write the data in the controller to a project file. - Switch the PC connection to the controller which you want to transfer the project file to. - Write the project file to the controller.

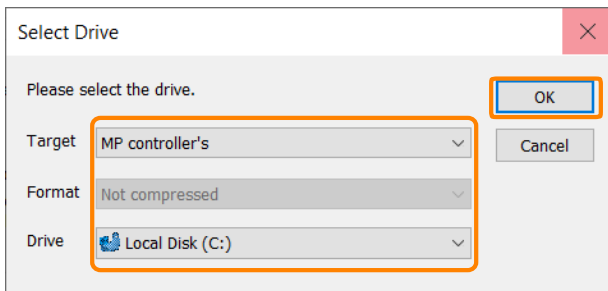


Important

- When the [Apply File Reading Restriction] check box is selected in the security settings on the MPE720, data transfer from RAM in controller to external media is not possible. To transfer data, change the security settings in [Online Security Setting] under the [Online] menu.
- If CARD and SAVE on the DIP switch (SW2) are ON when the MP2200/CPU-02 is in use, data transfer from RAM in controller to external media is not possible. To transfer data, set CARD and SAVE on the DIP switch (SW2) to OFF.

Use the following procedure to write the data in the controller or a project file to external media.

- Click the [Write to External Media] button in the [Transfer] window.
The [Select Drive] window will be displayed.
- Set the following items, and then click the [OK] button.

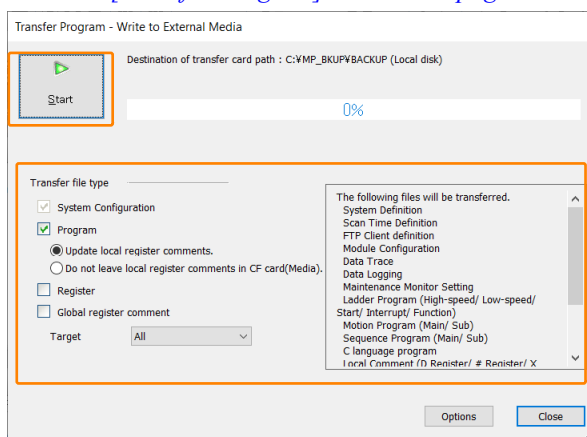


Important

When [User memory (folder specification)] is selected at [Target], and [Compressed □□] is selected at [Format], the transfer file type can be set individually in the [Transfer Program] window that is displayed next.

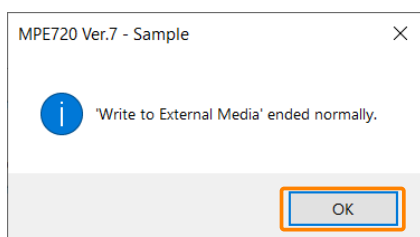
- Specify the transfer settings, and click the [Start] button.
Refer to the following section for details on the transfer file type settings.

2.3.1 [Transfer Program] Window on page 108



The transfer will start. When data transfer is completed, a message dialog box will be displayed.

4. Click the [OK] button.



This concludes the procedure.

2.3.8 Read from External Media

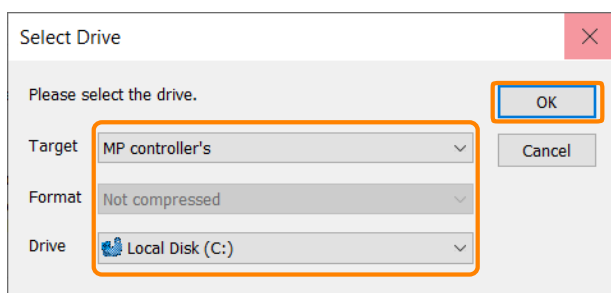
Data is read from external media, for example, to check content written to a CF card or SD card or to write data to the controller during maintenance.

Use the following procedure to read the data on external media to the controller or a project file.

1. Click the [Read from External Media] button in the [Transfer] window.

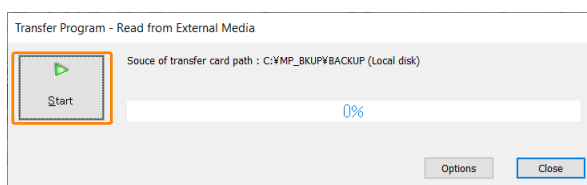
The [Select Drive] window will be displayed.

2. Specify the transfer settings, and click the [OK] button.



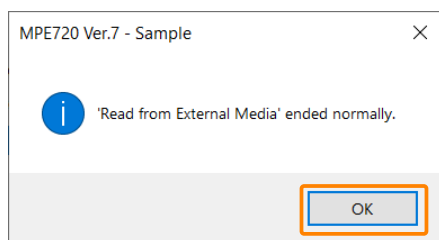
The [Transfer Program] window will be displayed.

3. Click the [Start] button.



The transfer will start. When data transfer is completed, a message dialog box will be displayed.

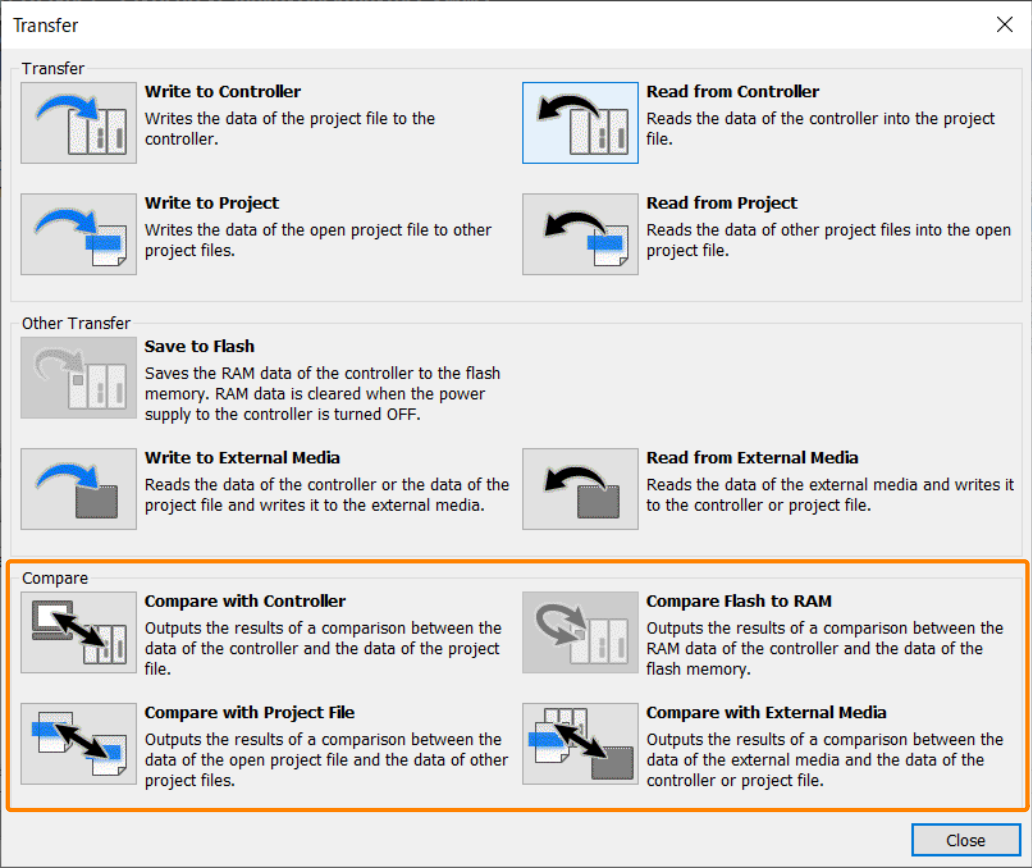
4. Click the [OK] button.



This concludes the procedure.

2.4 Compare

You can compare data between project files, controllers, and external media.
Click the [Transfer] button in the [My Tool] window to display the [Transfer] window.
The following table lists the types of comparisons.



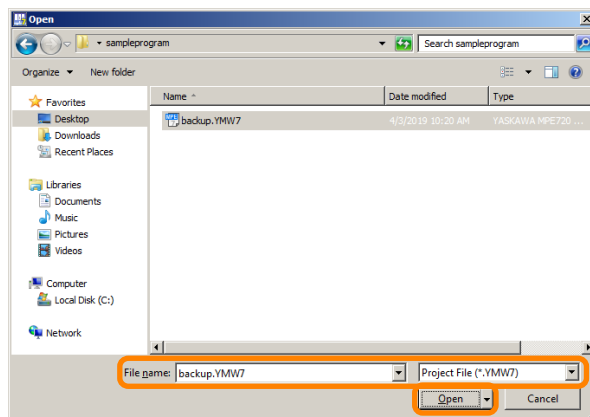
Type of Comparison	Data to Compare	Project File Status	MPE720 Connection Status
Compare with Controller	Controller ⇔ Project file	Open	Online
Compare Flash to RAM	Controller RAM ⇔ Controller flash memory	—	
Compare with Project File	Open project file ⇔ Other project file	Open	Offline
Compare with External Media	External media ⇔ Controller or project file	—	—

2.4.1 Compare with Controller

Use the following procedure to compare the data in the controller and in a project file.

1. Click the [Compare with Controller] button in the [Transfer] window.
The [Open] window will be displayed.
2. Select the project file at the comparison source, then click the [Open] button.

Information This window will not be displayed if the project file is already open. The project file that is open serves as the comparison source.

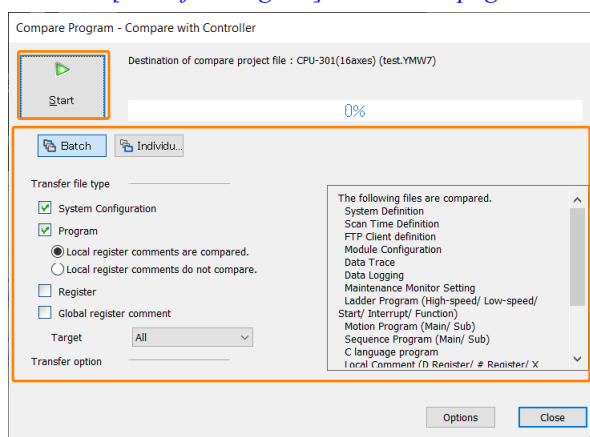


The [Compare Program] window will be displayed.

3. **Select the data to compare, and then click the [Start] button.**

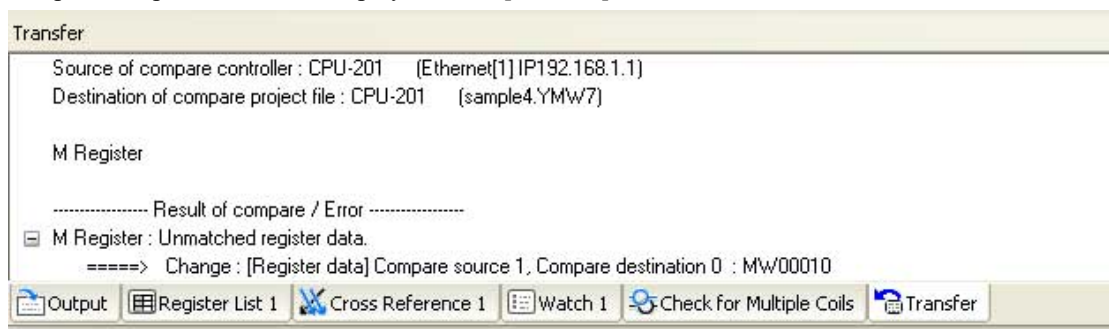
Refer to the following section for details on the settings.

[2.3.1 \[Transfer Program\] Window on page 108](#)



The comparison will start

When the comparison has been completed, a message dialog box will be displayed, and a log of the comparison operation will be displayed in the [Transfer] window.



This concludes the procedure.

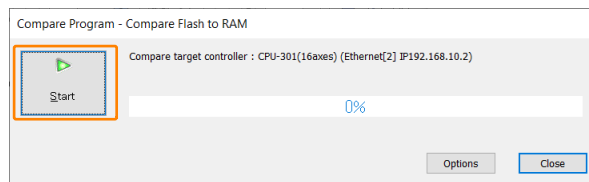
2.4.2 Compare Flash to RAM

Use the following procedure to compare the data in the controller's RAM and flash memory.

1. **Click the [Compare Flash to RAM] button in the [Transfer] window.**

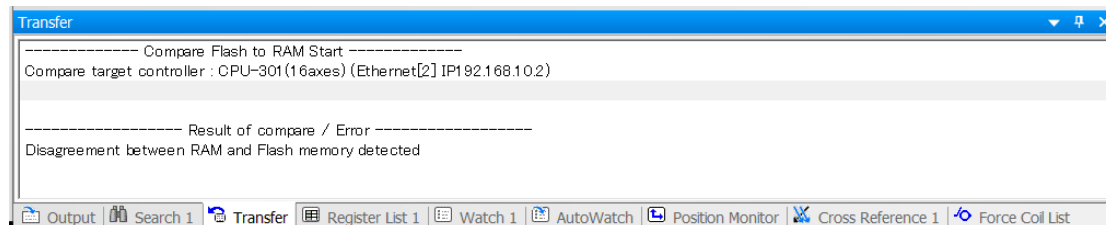
The [Compare Program] window will be displayed.

2. Click the [Start] button.



The comparison will start

When the comparison has been completed, a message dialog box will be displayed, and a log of the comparison operation will be displayed in the [Transfer] window.

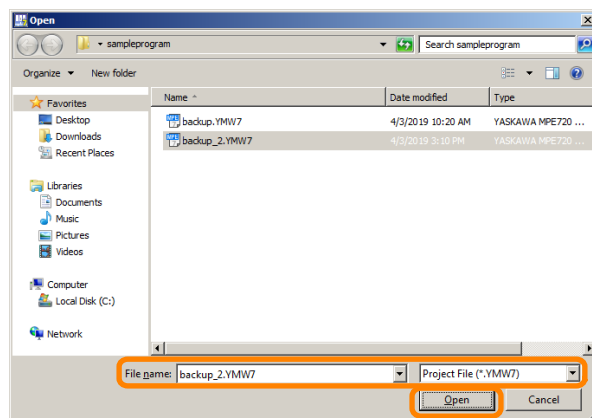


This concludes the procedure.

2.4.3 Compare with Project File

Use the following procedure to compare the data in the open project file and in another project file.

1. **Open the project file.**
2. **Click the [Compare with Project File] button in the [Transfer] window.**
The [Open] window will be displayed.
3. **Select the project file at the comparison source, then click the [Open] button.**

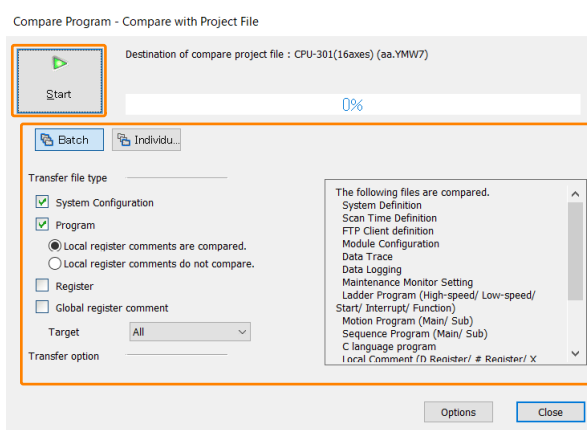


The [Transfer Program] window will be displayed.

4. **Specify the transfer settings, and click the [Start] button.**

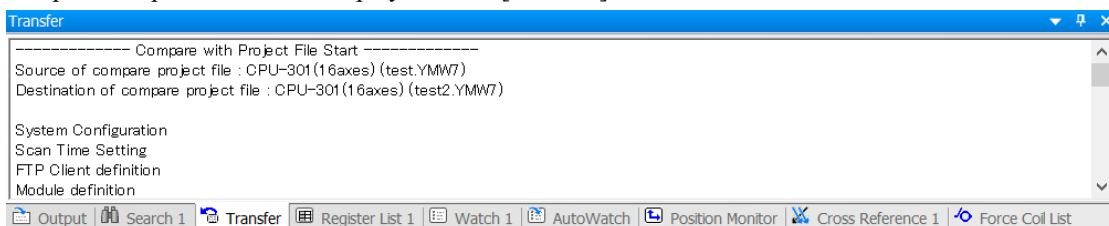
Refer to the following section for details on the settings.

[2.3.1 \[Transfer Program\] Window on page 108](#)



The comparison will start

When the comparison has been completed, a message dialog box will be displayed, and a log of the comparison operation will be displayed in the [Transfer] window.

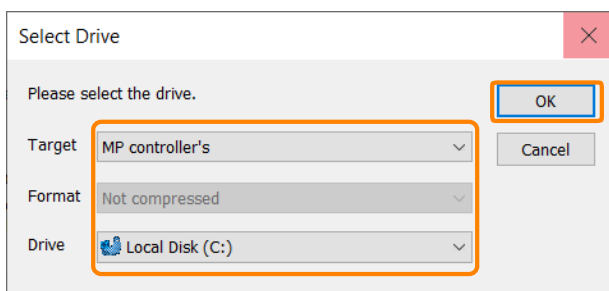


This concludes the procedure.

2.4.4 Compare with External Media

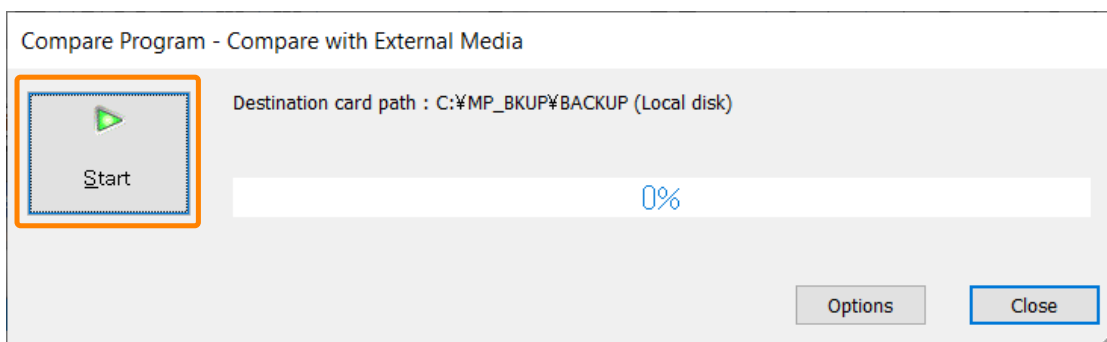
Use the following procedure to compare the data on external media and in the controller or a project file.

1. Click the [Compare with External Media] button in the [Transfer] window.
The [Select Drive] window will be displayed.
2. Set the following items, and then click the [OK] button.



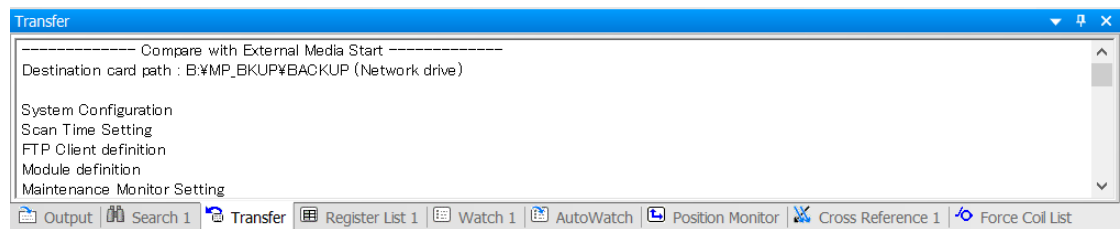
The [Compare Program] window will be displayed.

3. Click the [Start] button.



The comparison will start

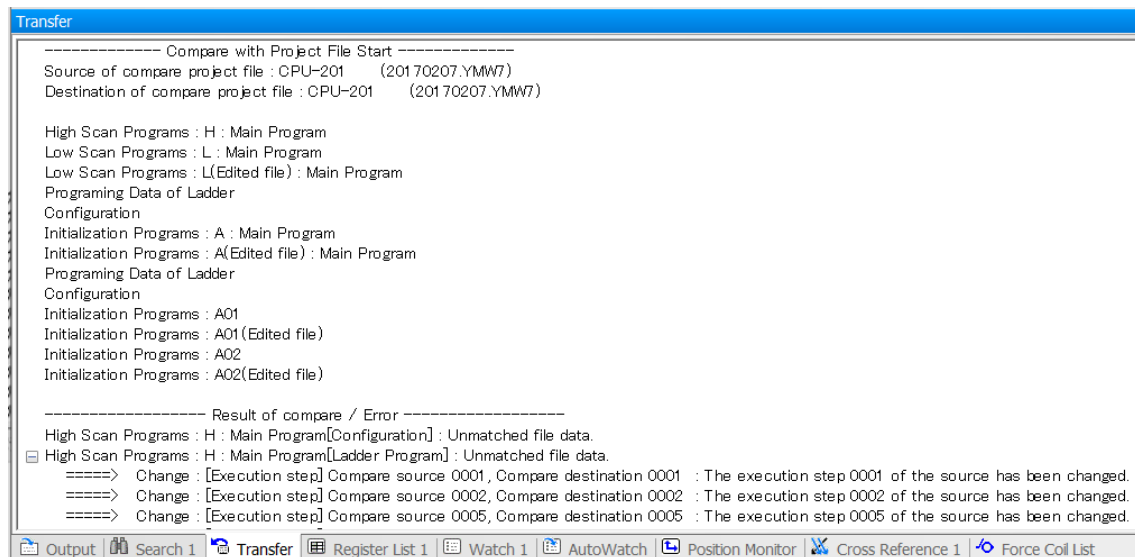
When the comparison has been completed, a message dialog box will be displayed, and a log of the comparison operation will be displayed in the [Transfer] window.



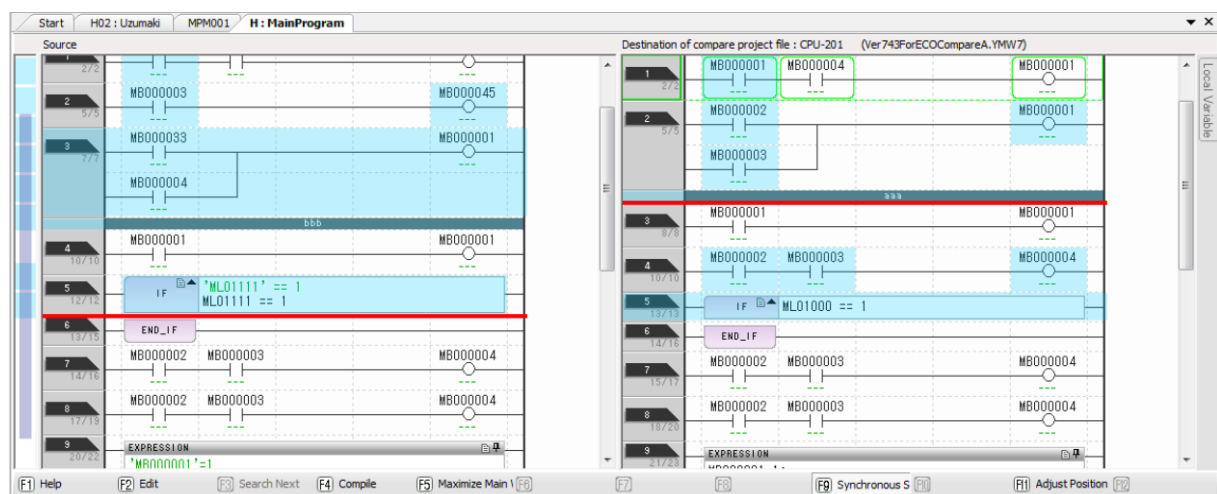
This concludes the procedure.

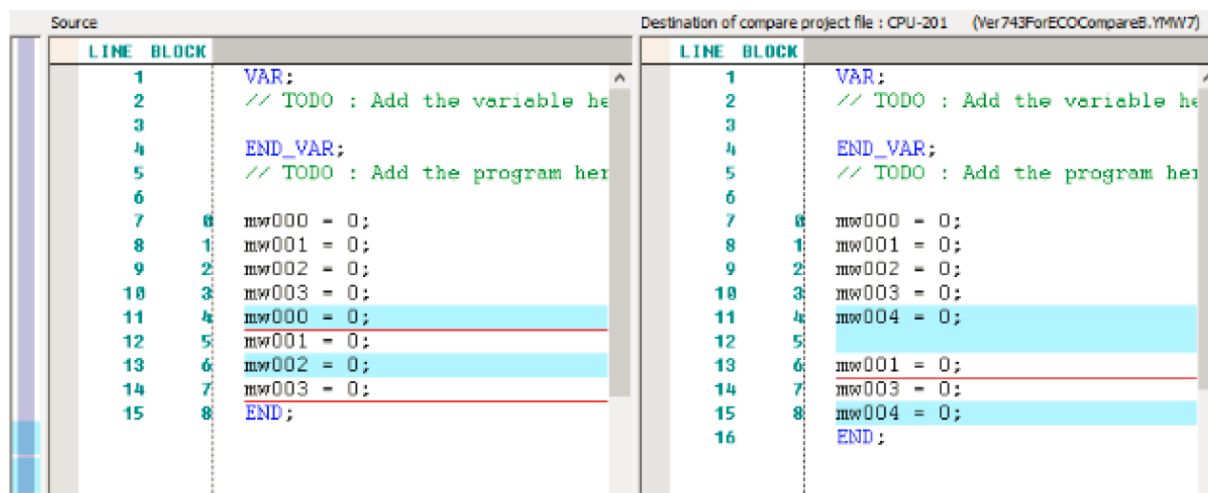
2.4.5 Program Comparison Results

If you double-click the comparison results for a ladder program or motion program in the output log of the [Transfer] window, you can display the comparison source and destination programs side by side.



- Light blue: Added or changed locations
- Red: Deleted locations



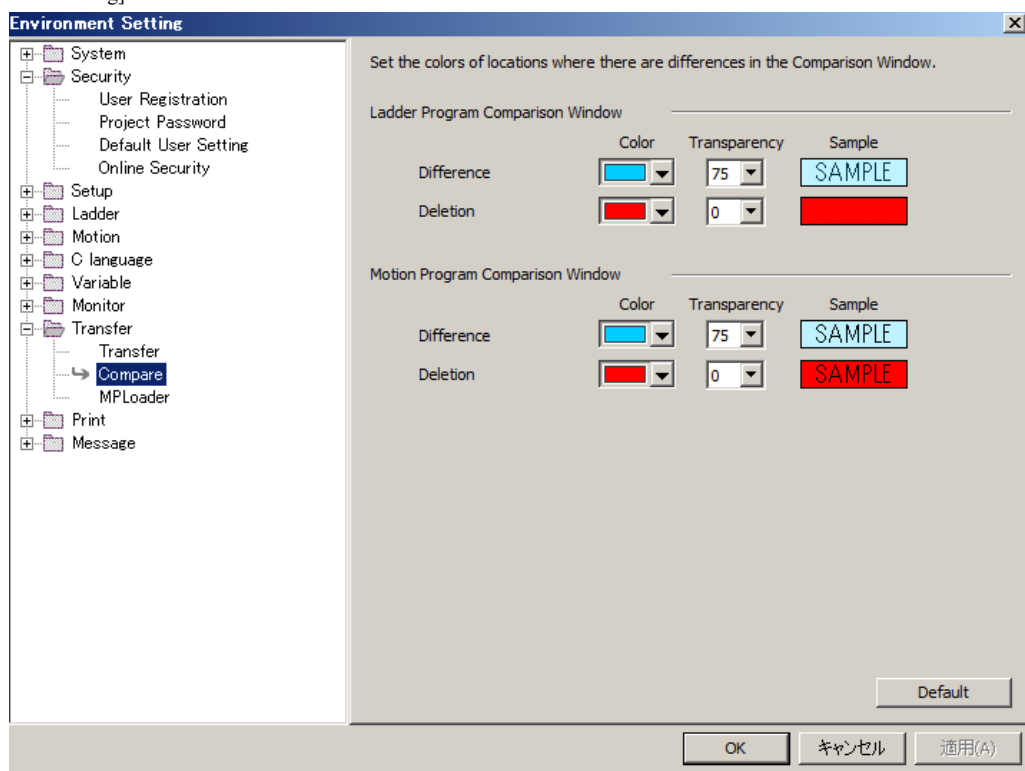


Important

- If there are multiple differences even though the program was changed in only one location:
The ladder programs are compared based on the executable code (the data that can be executed after the program is compiled). Since a specific instruction can be replaced with multiple lines of executable code (instruction numbers), this may be judged as differences in the comparison. This is not a problem in operation.
- If there are differences even though the same program was compared:
A mismatch occurs when programs are compiled with the different compilation methods (when using the normal compilation method and when using the compilation method compatible with version 5). For an exact match, compile the programs using the same compilation method.

Information

- You can toggle between whether or not to simultaneously scroll the comparison source and destination programs by the **F9** key.
- You can toggle between the maximized and original size of the comparison results display by the **F5** key.
- You can align the corresponding lines on the comparison source and destination by the **F11** key. Move the cursor to the desired line in the program at either the comparison source or destination, and press the **F11** key. The corresponding line of the program on the other side will be displayed.
- The comparison source program can be corrected in this pane. The comparison destination program cannot be corrected.
- The display color of differences in the comparison window can be changed by [Transfer] – [Compare] in the [Environment Setting] window.



Designing the System

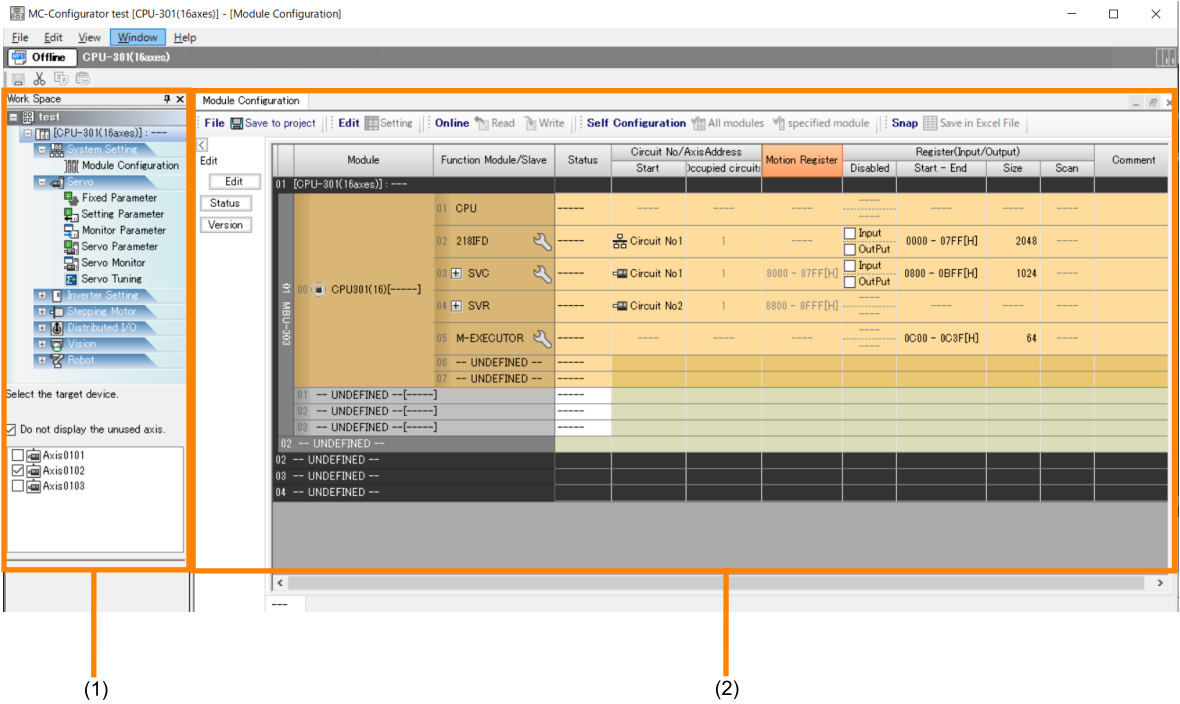
This chapter describes the operations required to design the system in the MPE720.

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3.1 [MC-Configurator] Window

Click the [Module Configuration] button in the [My Tool] window to display the [MC-Configurator] window. You can allocate devices and configure detailed settings and axis parameter settings on the [MC-Configurator] window.



No.	Name	Reference
(1)	[Work Space] Window	3.1.1 [Work Space] Window on page 127
(2)	Edit Area	3.1.2 Edit Area on page 128

3.1.1 [Work Space] Window

This section describes the items displayed in the [Work Space] window.



No.	Item	Description
(1)	Module Configuration	Click this item to display the [Module Configuration] tab page (hereinafter called the "Module Configuration Window").
(2)	Parameter	You can configure the parameter settings for an axis by selecting an axis in (3) and double-clicking these items. If you double-click [Servo Parameter], [Servo Monitor], and [Servo Tuning], the SigmaWin+ will start. Refer to the following section for details. 3.8 Functions Linked to the SigmaWin+ on page 188
(3)	Axis Selection	Select the axes to configure. Select the [Do not display the unused axis] check box to hide axes that are set as unused.

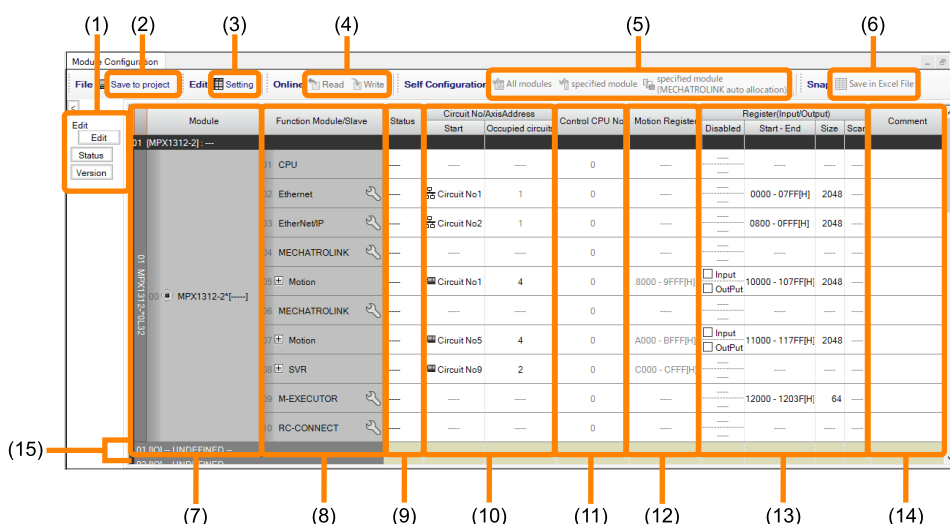
3.1.2 Edit Area

This section describes the items displayed in the edit area.

(1) Module Configuration

When you open the [MC-Configurator] window, the Module Configuration window will be displayed. If the window is not displayed, double-click [Module Configuration] in the [Work Space] window.

Information The displayed items and other elements will depend on the model of the controller and the connection status.



No.	Item		Description
(1)	Page Selection Buttons		Switches between the [Edit] page, [Status] page, and [Version] page. The [Edit] page is displayed in the example given above. The [Status] page shows the operating status of each device. The [Version] page shows the hardware version and software version of each device, as well as the model numbers of SERVOPACKs and servomotors (online mode only).
(2)	Save to project		Saves the edited content to a project file.
(3)	Setting		Configures the selected module, function module, or slave.
(4)	Online	Read	Reads data from the controller.
		Write	Writes data to the controller.

Continued on next page.

Continued from previous page.

No.	Item		Description
(5)	Self Configuration	All modules	Automatically recognizes all modules that are installed in the controller and all the slave devices that are connected via MECHATROLINK. Refer to the following section for details.  3.2.1 All modules on page 136
		Specified module	Automatically recognizes the device configurations in the selected range. Refer to the following section for details.  3.2.2 Specified Module on page 137
		Specified module (MECHATROLINK auto allocation)	Automatically recognizes the MECHATROLINK device configurations in the selected range. Refer to the following section for details.  3.2.3 Specified Module (MECHATROLINK Auto Allocation) on page 138 Information Only controllers in the following series support this function. • YRM1000 Series • MPX1000 Series
(6)	Snap	Save in Excel File	Click this button to output the version information for each module displayed on the [MC-Configurator] window to an Excel file. This button is enabled only when [Version] is selected with the (1) page selection buttons. You can use this button in offline mode, but the version information will not be included in the Excel file because there is no version information in offline mode.
(7)	Module		Unit or module set for each slot is displayed.
(8)	Function Module/Slave		The functions that are built into the unit/module or slaves that are connected to the unit/module are displayed. Click the  button to display the Detail Definition Window. Refer to the following section for details.  (a) Detail Definition Window on page 129
(9)	Status		The status of a function module and transmission status of a MECHATROLINK slave device are displayed.
(10)	Circuit No./Axis Address	Start	The circuit number of a unit or module is displayed.
		Occupied circuits	The number of circuits that can be used by the unit or module is displayed.
(11)	Control CPU No.		The number of the CPU controlling the unit or module is displayed. This is currently fixed to "0".
(12)	Motion Register		The range of registers that can be used as motion parameters is displayed. You cannot change this value because it is automatically set from the circuit number.
(13)	Register (Input/Output)	Disabled	Select the relevant check box to disable inputs or outputs.
		Start - End	The range of registers used as the I/O area is displayed.
		Size	The size of the I/O area is displayed in words.
		Scan	When the I/O signal is processed is displayed.
(14)	Comment		You can set comments. <Setting Conditions> • Function module: 16 characters maximum. • MECHATROLINK slave: 32 characters maximum.
(15)	[FC] area/[IO] area		Configures function units and I/O units.

(a) Detail Definition Window

◆ Displaying the Detail Definition Window

Click the  button for each unit or module to display the Detail Definition window.

The setting items on the Detail Definition window depend on the devices and functions being used. Refer to the manuals of the devices and functions being used for details.

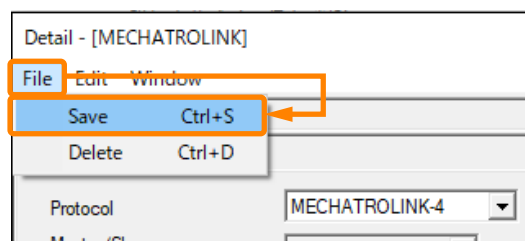
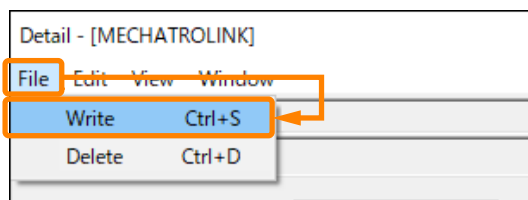
Item	Description	Reference
Ethernet	Ethernet function built into the CPU	YRM1000/ MPX1000 Series Ethernet Communications User's Manual (Manual No.: SIEP C890101 14)
218IFA		MP2200 User's Manual (Manual No.: SIEP C880700 14)
218IFD		MP3000 Series Communications User's Manual (Manual No.: SIEP C880725 12) MP3000 Series Message Communications User's Manual (Manual No.: SIEP C880725 35)
EtherNet/IP	EtherNet/IP function built into the CPU	YRM1000/MPX1000 Series EtherNet/IP Communications User's Manual™(Manual No.: SIEP C890101 13)
MECHATROLINK	Motion control function built into the CPU	YRM1000/MPX1000 Series Motion Control User's Manual (Manual No. SIEP C890101 11)
SVB		MP2310 Basic Module User's Manual (Manual No.: SIEP C880732 01)
SVC		MP3000 Series Motion Control User's Manual (Manual No. SIEP C880725 11)
SVD	Motion control function for two axes in the Σ -7C SERVOPACK	Σ -7 Series Σ -7C SERVOPACK Motion Control User's Manual (Manual No. SIEP C800002 03)
M-EXECUTOR	Software module that executes motion programs or sequence programs	Refer to the relevant product manual.
RC-CONNECT	Interface for communicating with robot controllers (allocation settings)	YRM1000/MPX1000 Series YERCProfile User's Manual (Manual No.: SIEP C890101 08)
Optional Module	—	Refer to the product manual for each option module.

◆ Saving the Detail Definition Data

Use the following procedure to save the detail definition data that was configured or changed.

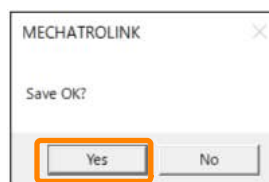
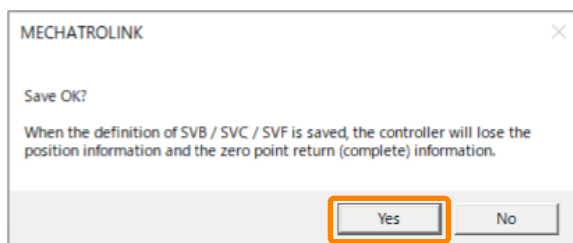
1. Click [File] - [Write] or [Save] from the main menu on the Detail Definition window.

Information [Write] is displayed in online mode and [Save] is displayed in offline mode.



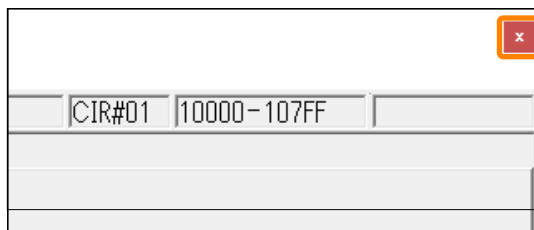
A confirmation message window will be displayed.

2. Read the message, and then click the [Yes] button.

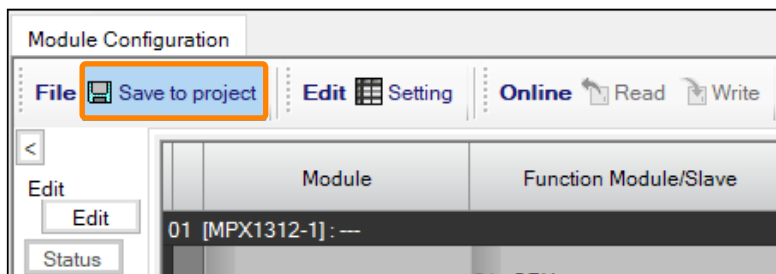


The settings on the Detail Definition window will be saved.

- Click the [×] button at the top-right of the Detail Definition window.



- Click [Save to project] in offline mode only.



- Save the data to flash memory only in online mode.

Refer to the following section for details on the procedure.

☞ [2.3.6 Save to Flash on page 114](#)

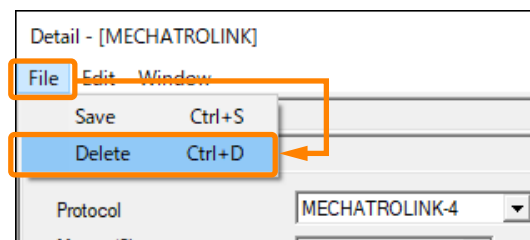
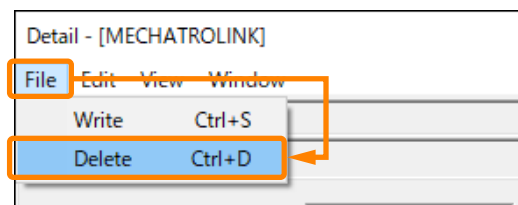
- Turn the controller power OFF and ON again only in online mode.

This concludes the procedure.

◆ Deleting the Detail Definition Data

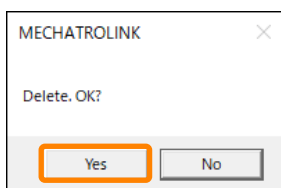
Use the following procedure to delete all detail definition data.

- Click [File] - [Delete] from the main menu on the Detail Definition window.



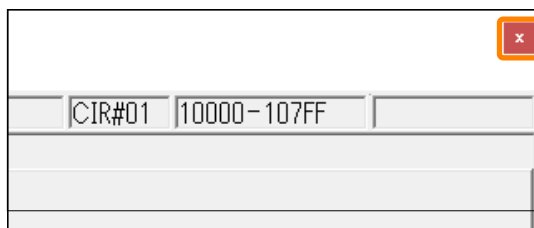
A confirmation message window will be displayed.

- Click the [Yes] button.

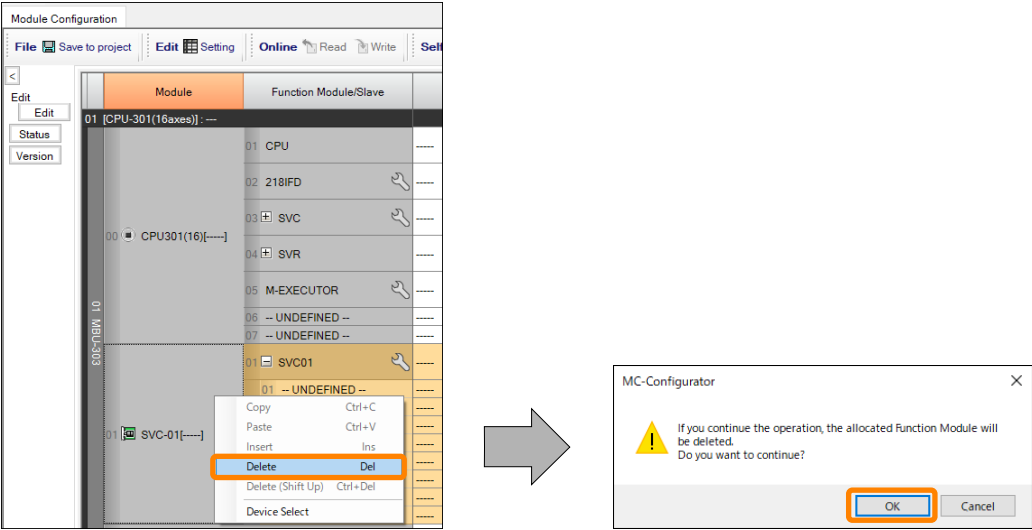


The settings on the Detail Definition window will be deleted.

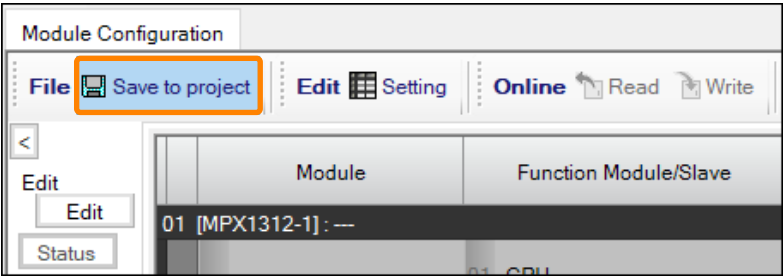
- Click the [×] button at the top-right of the Detail Definition window.



4. To delete the device allocations as well as the detail definition data, right-click the device to delete displayed in the [Module] column and click [Delete]. The message dialog box will be displayed. Click the [OK] button.



5. Click [Save to project] in offline mode only.

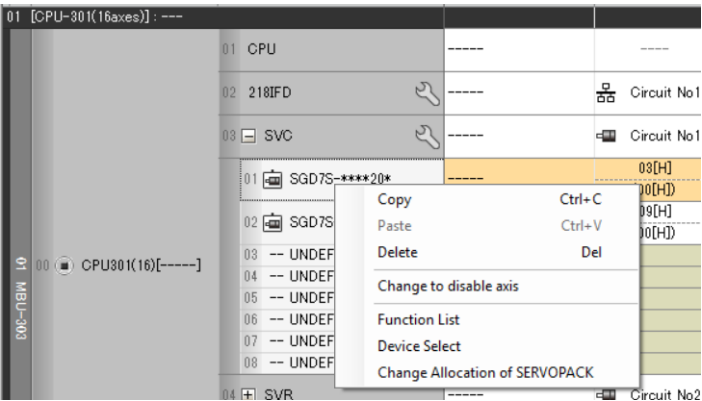


6. Save the data to flash memory only in online mode.
Refer to the following section for details on the procedure.
[2.3.6 Save to Flash on page 114](#)
7. Turn the controller power OFF and ON again only in online mode.

This concludes the procedure.

(b) SERVOPACK Context Menu

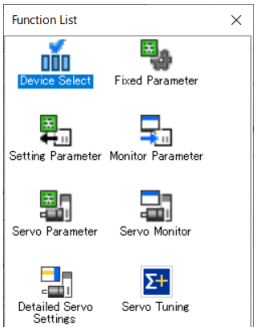
Right-click a SERVOPACK allocated in the Module Configuration Window to display the following menu.



Item	Description
Copy	Copies the selected model.
Paste	Pastes the copied model to another cell.
Delete	Deletes the allocations of the selected model.

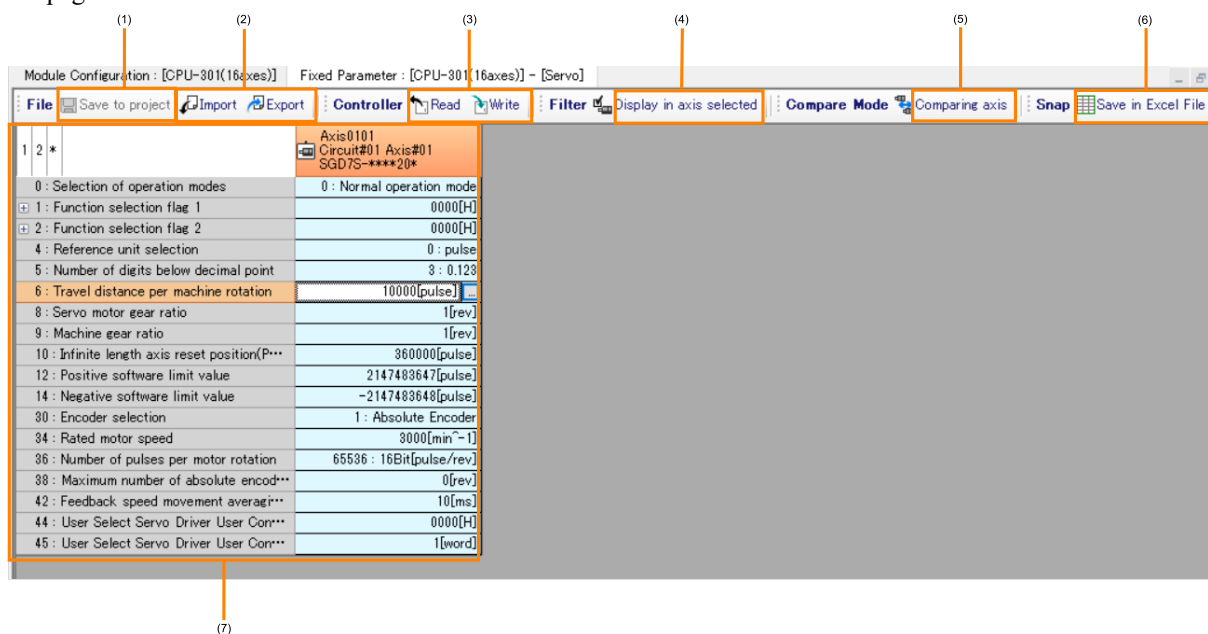
Continued on next page.

Continued from previous page.

Item	Description
Change to disable axis	Sets the selected model as an unused axis.
Function List	Displays the [Function List] window. 
Device Select	Displays the [Slave] window on which you can set and change device allocations.
Change Allocation of SERVOPACK	You can change the device allocations while inheriting the parameters. Refer to the following section for details. 3.4 Inheriting the Parameters and Changing Only the Model on page 145

(2) Fixed Parameters

Select the axis in the [Work Space] window and double-click [Fixed Parameter] to display the [Fixed Parameter] tab page.



No.	Item	Description
(1)	Save to project	Saves the edited content to a project file.
(2)	Export/Import	Exports and imports axis parameters. Refer to the following section for details. 10.3.5 Axis Parameters on page 609
(3)	Read	Reads data from the controller.
	Write	Writes data to the controller.
(4)	Display in axis selected	Displays the [Display in axis selected] window on which you can select the axis to be displayed on the [Fixed Parameter] tab page.

Continued on next page.

Continued from previous page.

No.	Item	Description									
(5)	Comparing axis	Compares the parameters of different axes. If you click the [Comparing axis] button when the column of the source axis selected, the parameters that are different in the destination axis are displayed in red. <table border="1"> <tr> <td>30 : Encoder selection</td><td>1 : Absolute Encoder</td><td>0 : Incremental encoder</td></tr> <tr> <td>34 : Rated motor speed</td><td>3000[min^{-1}]</td><td>3000[min^{-1}]</td></tr> <tr> <td>36 : Number of pulses per motor rotation</td><td>1024 : 10Bit[pulse/rev]</td><td>65536 : 16Bit[pulse/rev]</td></tr> </table>	30 : Encoder selection	1 : Absolute Encoder	0 : Incremental encoder	34 : Rated motor speed	3000[min^{-1}]	3000[min^{-1}]	36 : Number of pulses per motor rotation	1024 : 10Bit[pulse/rev]	65536 : 16Bit[pulse/rev]
30 : Encoder selection	1 : Absolute Encoder	0 : Incremental encoder									
34 : Rated motor speed	3000[min^{-1}]	3000[min^{-1}]									
36 : Number of pulses per motor rotation	1024 : 10Bit[pulse/rev]	65536 : 16Bit[pulse/rev]									
(6)	Save in Excel File	Saves the parameters to an Excel file. This is displayed only in online mode.									
(7)	Parameter List	You can set the fixed parameters for each axis.									

(3) Setting/Monitor Parameter

Select the axis in the [Work Space] window and double-click [Setting Parameter] or [Monitor Parameter] to display the [Setting/Monitor parameter] tab page.

Module Configuration : [CPU-301(16axes)] Setting/ Monitor parameter : [CPU-301(16axes)] - [Servo]

File Save to project Import Export Controller Read Write Display Initial value Current value Auto-updated Parameters Apply to initial values

Axis0101
Circuit#01 Axis#01
SGD7S-****20*
[Initial value]

Axis0101
Circuit#01 Axis#01
SGD7S-****20*

2 *

All

Positioning

External

Zero

Interpolation

Interpolation

JOG

Relative

Speed

Torque/

Phase

Jog

Set Zero

Change

Change

Change

Change

Change

Other

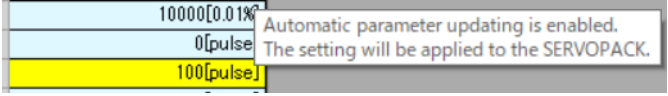
Setting Parameter Monitor Parameter

Address	Initial value	Current value
0: Run command setting	0000[H]	0000[H]
1: Mode setting 1	0000[H]	0000[H]
2: Mode setting 2	0000[H]	0000[H]
3: Function setting 1	0011[H]	0011[H]
4: Function setting 2	0033[H]	0033[H]
5: Function setting 3	0000[H]	0000[H]
6: M-III Vendor Specific Servo Comma...	0000[H]	0000[H]
8: Motion command	0: No Command	0: No Command
9: Motion command control flag	0000[H]	0000[H]
10: Motion subcommand	0: No Command	0: No Command
12: Torque/Thrust reference setting	0[0.01%	0[0.01%
14: Speed limit setting at the torque/th...	15000[0.01%	15000[0.01%
16: Speed reference setting	3000[1000pulse/min]	3000[1000pulse/min]
18: Speed limit value	0[0.01%	0[0.01%
20: Positive side limiting torque/thrust...	30000[0.01%	30000[0.01%
22: Secondly Speed Compensation	0[100pulse/min]	0[100pulse/min]
24: Override	10000[0.01%	10000[0.01%
28: Position reference setting	0[pulse]	0[pulse]
30: Width of positioning completion	100[pulse]	100[pulse]
32: NEAR signal output width	0[pulse]	0[pulse]
34: Error count alarm detection	2147483647[pulse]	2147483647[pulse]
38: Positioning completion check time	0[ms]	0[ms]
40: Phase correction setting	0[pulse]	0[pulse]
42: Latch zone lower limit setting	-2147483648[pulse]	-2147483648[pulse]
44: Latch zone upper limit setting	2147483647[pulse]	2147483647[pulse]

No.	Item	Description
(1)	Page Selection Buttons	Displays parameters filtered into groups.
(2)	Save to project	Saves the edited content to a project file.
(3)	Export/Import	Exports and imports axis parameters. Refer to the following section for details.  10.3.5 Axis Parameters on page 609
(4)	Read	Reads data from the controller.
	Write	Writes data to the controller.
(5)	Initial value	Displays the initial value column only.
	Current value	Displays both the current value and initial value columns.

Continued on next page.

Continued from previous page.

No.	Item	Description
(6)	Apply to Initial Values	The current values of the auto-updated parameters will be applied to the initial values. Refer to the following section for details.  3.5.5 Applying the Current Values of the Auto-Updated Parameters to Initial Values on page 153
(7)	Selection Tabs	Switches the parameters to display between setting parameters and monitor parameters.
(8)	Parameter List	You can set the setting parameters or monitor parameters for each axis. If you select the check box of a parameter and click the [Reflection] button when the initial value and current value are displayed, the current value will be applied to the initial value. Yellow cells are auto-updated parameters. Place the mouse cursor over a cell to view its tooltip. 

3.2 Automatically Recognizing Device Configuration Connected to the Controller

The process of automatically recognizing all option modules that are installed in the controller and all the slave devices that are connected via the MECHATROLINK connector (such as servo drives), and automatically creating the module configuration definition files is called self configuration.

There are three ways to execute self configuration.

Item	Description
All modules	All modules that are installed in the controller and all the slave devices connected via MECHATROLINK will be automatically recognized, and the definition files will be automatically created. Execute this self configuration method when setting up a new system and when changing the overall system. Note that MECHATROLINK devices connected to the YRM controller or the MPX controller will not be automatically recognized. After you complete self configuration for all modules, perform self configuration for specified modules (MECHATROLINK auto allocation).
Specified module	The device configurations in the selected range will be automatically recognized, and definition files for devices with changes (e.g., additions or deletions) will be automatically created. Execute this self configuration method when changing a portion of the system. Note that MECHATROLINK devices connected to the YRM controller or the MPX controller will not be automatically recognized. After you complete self configuration for specified modules, perform self configuration for specified modules (MECHATROLINK auto allocation).
Specified module (MECHATROLINK auto allocation)	The MECHATROLINK device configurations in the selected range will be automatically recognized, and the definition files will be automatically created.

The procedures are given below.



Important

Do not perform the following operations during self configuration. Self configuration may not run correctly.

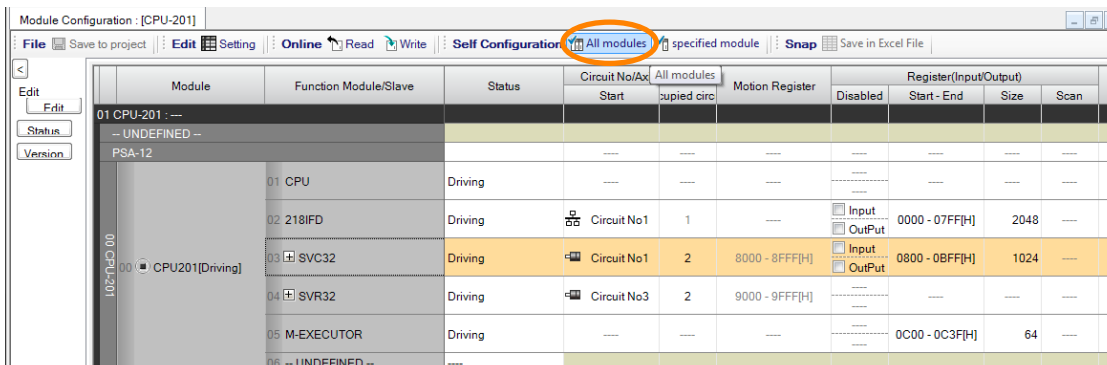
- Operations to create a new drawing, delete a drawing, edit a drawing, and compile a drawing.
- Operations to save and write a system configuration and program.

Information

There is also a method to execute self configuration using the DIP switch on the controller.
Refer to the setup manual for your controller for details.

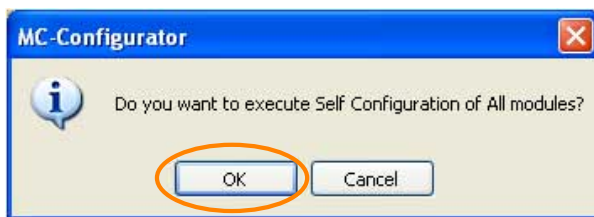
3.2.1 All modules

1. Click the [All modules] button on the Module Configuration window.



A message dialog box will be displayed.

- Click the [OK] button.



Self configuration will be executed for all modules. When completed, the following message dialog box will be displayed.

- Click the [OK] button.



The self configuration results are saved in the MPE720.

- When you are using the YRM controller or the MPX controller and MECHATROLINK devices are connected to the controller, perform the operations in "Specified Module (MECHATROLINK Auto Allocation)" next.

Refer to the following section for details on the operations.

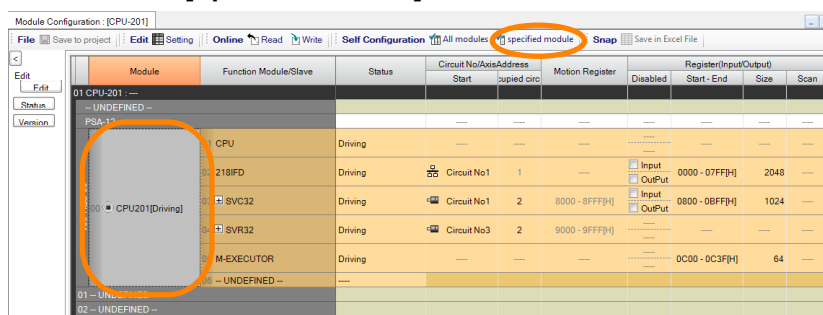
[3.2.3 Specified Module \(MECHATROLINK Auto Allocation\) on page 138](#)

Information For the YRM controller and the MPX controller, MECHATROLINK devices will not be automatically recognized even when self configuration is executed for all modules.

This concludes the procedure.

3.2.2 Specified Module

- Select the module to automatically recognize in the Module Configuration window, and then click the [Specified module] button.



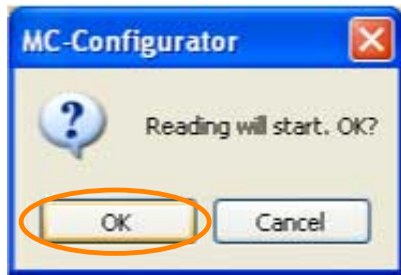
A message dialog box will be displayed.

- Confirm the name of the module, and then click the [OK] button.



Self configuration will be executed for the specified module. When completed, the following message dialog box will be displayed.

3. Click the [OK] button.



The self configuration results are saved in the MPE720.

4. When you are using the YRM controller or the MPX controller and you executed self configuration for specified modules to which MECHATROLINK devices are connected, perform the operations in "Specified Module (MECHATROLINK Auto Allocation)" next. Refer to the following section for details on the operations.

[3.2.3 Specified Module \(MECHATROLINK Auto Allocation\) on page 138](#)

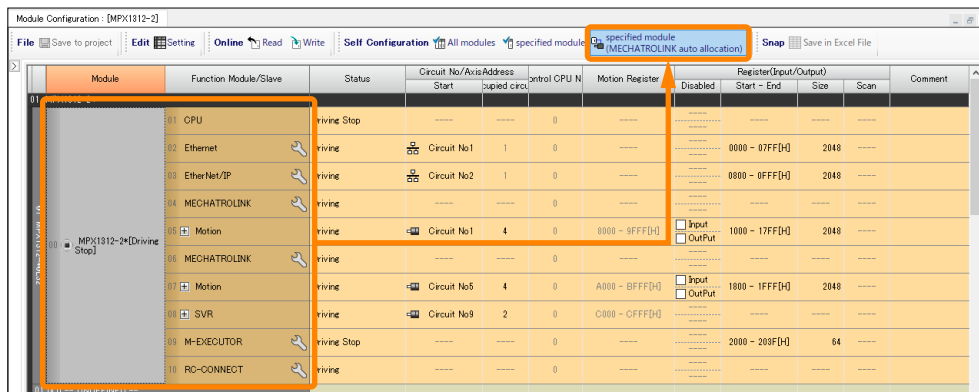
Information For the YRM controller and the MPX controller, MECHATROLINK devices will not be automatically recognized even when self configuration is executed for specified modules.

This concludes the procedure.

3.2.3 Specified Module (MECHATROLINK Auto Allocation)

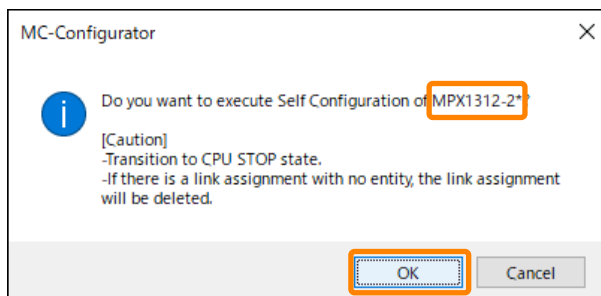
If you are using the YRM controller or the MPX controller and self configuration was executed for all modules or specified modules, MECHATROLINK devices will not be automatically recognized. After you perform the self configuration operation for all modules or specified modules, perform the operation for specified modules (MECHATROLINK auto allocation) described here.

1. Select the module to automatically recognize in the Module Configuration window, and then click the [Specified module (MECHATROLINK auto allocation)] button.



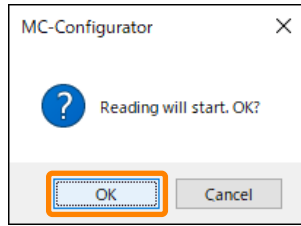
A message dialog box will be displayed.

2. Confirm the name of the module, and then click the [OK] button.



Self configuration will be executed for the MECHATROLINK devices connected to the selected specified module. When completed, the following message dialog box will be displayed.

3. Click the [OK] button.



The self configuration results are saved in the MPE720.

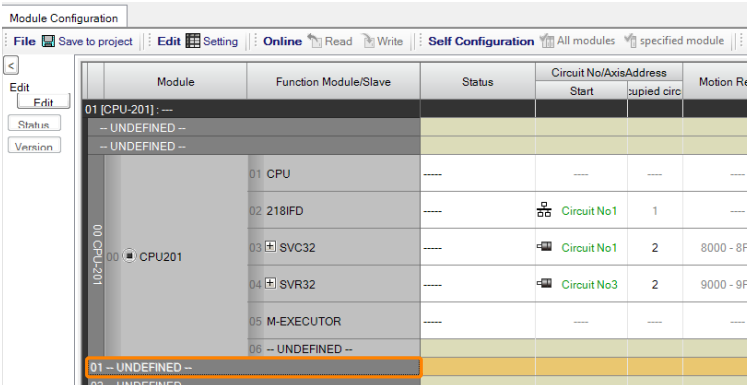
This concludes the procedure.

3.3 Manually Setting the Module Configuration

If you do not have the actual field devices, i.e., SERVOPACKs, motors, etc., you can set up the device configuration manually instead of using self configuration. Use the following procedure to manually set up the device configuration in the project file.

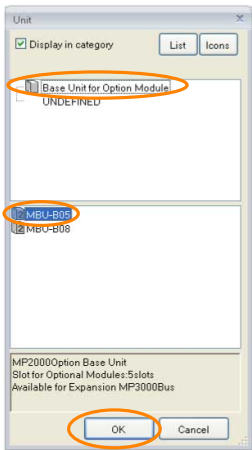
The procedure is based on the following system as an example: an MP3000-series CPU unit is connected to a base unit that has an SVB-01 option module that controls two axes.

- 1. Double-click [01 –UNDEFINED–] on the Module Configuration Window.



The [Unit] window will be displayed.

- 2. Select [Base Unit for Option Module] - [MBU-B05], and then click the [OK] button.



The fields for the MBU-B05 are created on the Module Configuration Window.

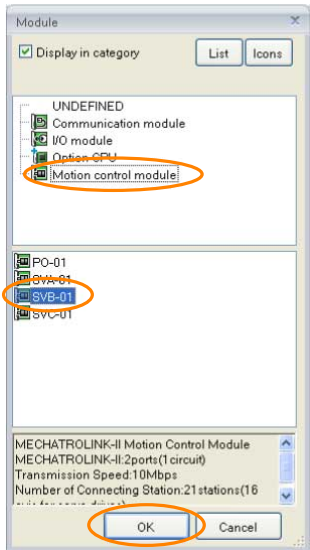
Module	Function Module/Slave	Status	Circuit No/AxisAddress		Motion Register
			Start	cupied circ	
01 [CPU-201] : --					
-- UNDEFINED --					
-- UNDEFINED --					
00 CPU-201	01 CPU	----			
	02 218IFD	----	Circuit No1	1	
	03 SVC32	----	Circuit No1	2	8000 - 8FFF[H]
	04 SVR32	----	Circuit No3	2	9000 - 9FFF[H]
	05 M-EXECUTOR	----			
	06 -- UNDEFINED --				
01 -- UNDEFINED --					
02 -- UNDEFINED --					
03 -- UNDEFINED --					
04 -- UNDEFINED --					
05 -- UNDEFINED --					
02 -- UNDEFINED --					

3. Double-click [–UNDEFINED–] in [01 MBU-B05].

	Module	Function Module/Slave	Status	Circuit No/AxisAddress		Motion Register
				Start	cupied circ	
01 [CPU-201] : --						
-- UNDEFINED --						
-- UNDEFINED --						
00 CPU-201	CPU201	01 CPU	----	----	----	----
		02 218IFD	----	Circuit No1	1	----
		03 SVC32	----	Circuit No1	2	8000 - 8FFF[H]
		04 SVR32	----	Circuit No3	2	9000 - 9FFF[H]
		05 M-EXECUTOR	----	----	----	----
		06 -- UNDEFINED --				
01 MBU-B05		01 -- UNDEFINED --				
		02 -- UNDEFINED --				
		03 -- UNDEFINED --				
		04 -- UNDEFINED --				
		05 -- UNDEFINED --				
		02 -- UNDEFINED --				

The [Module] window will be displayed.

4. Select [Motion control module] - [SVB-01], and then click the [OK] button.



The fields for the SVB-01 are created on the Module Configuration Window.

*Module Configuration

File

Save to project

Edit

Setting

Online

Read

Write

Self Configuration

All modules

specified module

Snap

Edit

Edit

Status

Version

	Module	Function Module/Slave	Status	Circuit No/AxisAddress		Motion Register
				Start	cupied circ	
01 [CPU-201] : ---						
	-- UNDEFINED --					
	-- UNDEFINED --					
00 CPU-201	CPU201	01 CPU	----	----	----	----
		02 218IFD	----	Circuit No1	1	----
		03 SVC32	----	Circuit No1	2	8000 - 8FFF[H]
		04 SVR32	----	Circuit No3	2	9000 - 9FFF[H]
		05 M-EXECUTOR	----	----	----	----
		06 -- UNDEFINED --	----	----	----	----
01 MBU-B05	SVB-01	01 SVB01	----	Circuit No5	1	A000 - A7FF[H]
		02 -- UNDEFINED --	----	----	----	----
		03 -- UNDEFINED --	----	----	----	----
		04 -- UNDEFINED --	----	----	----	----
		05 -- UNDEFINED --	----	----	----	----
		06 -- UNDEFINED --	----	----	----	----

The device will be added to the Module Configuration Window.

*Module Configuration

File Save to project Edit Setting Online Read Write Self Configuration All modules specified module Snap

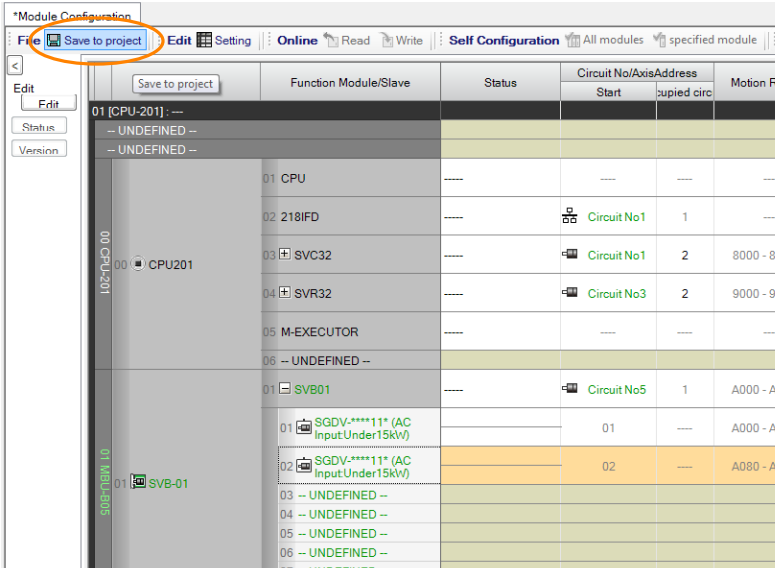
Edit Edit Status Version

Module	Function Module/Slave	Status	Circuit No/AxisAddress		Motion Register
			Start	cupied circ	
01 [CPU-201] : --	-- UNDEFINED --				
-- UNDEFINED --	-- UNDEFINED --				
00 CPU-201	01 CPU	----	----	----	----
	02 218IFD	----	Circuit No 1	1	----
	03 SVC32	----	Circuit No 1	2	8000 - 8FFF[H]
	04 SVR32	----	Circuit No 3	2	9000 - 9FFF[H]
	05 M-EXECUTOR	----	----	----	----
	06 -- UNDEFINED --				
01 MBU-805	01 SVB01	----	Circuit No 5	1	A000 - A7FF[H]
	01 SGDV-****1* (AC Input Under15kw)		01	----	A000 - A07F[H]
	02 -- UNDEFINED --				
	03 -- UNDEFINED --				
	04 -- UNDEFINED --				
	05 -- UNDEFINED --				
	06 -- UNDEFINED --				
	07 -- UNDEFINED --				
	08 -- UNDEFINED --				

8. Add the second axis in the same manner as the first axis.

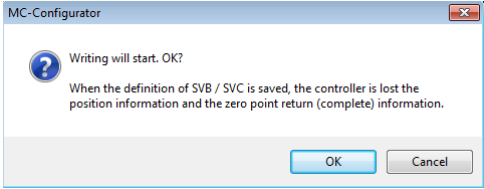
Module	Function Module/Slave	Status	Circuit No/AxisAddress		Motion Register
			Start	cupied circ	
01 [CPU-201] : --	-- UNDEFINED --				
-- UNDEFINED --	-- UNDEFINED --				
00 CPU-201	01 CPU	----	----	----	----
	02 218IFD	----	Circuit No 1	1	----
	03 SVC32	----	Circuit No 1	2	8000 - 8FFF[H]
	04 SVR32	----	Circuit No 3	2	9000 - 9FFF[H]
	05 M-EXECUTOR	----	----	----	----
	06 -- UNDEFINED --				
01 MBU-805	01 SVB01	----	Circuit No 5	1	A000 - A7FF[H]
	01 SGDV-****1* (AC Input Under15kw)		01	----	A000 - A07F[H]
	02 SGDV-****1* (AC Input Under15kw)		02	----	A080 - A0FF[H]
	03 -- UNDEFINED --				
	04 -- UNDEFINED --				
	05 -- UNDEFINED --				
	06 -- UNDEFINED --				
	07 -- UNDEFINED --				
	08 -- UNDEFINED --				

9. Click the [Save to project] button.



This saves the manually specified settings in the project file.

Information If allocations for an SVB or SVC are changed online (e.g., if you add or delete MECHATROLINK devices or change transmission parameters), the following warning dialog box will be displayed when you save the data.



This concludes the procedure.

3.4 Inheriting the Parameters and Changing Only the Model

If the following conditions are satisfied, you can change the SERVOPACK model while inheriting the fixed and setting parameters that were previously set. However, the servo parameters are not inherited.

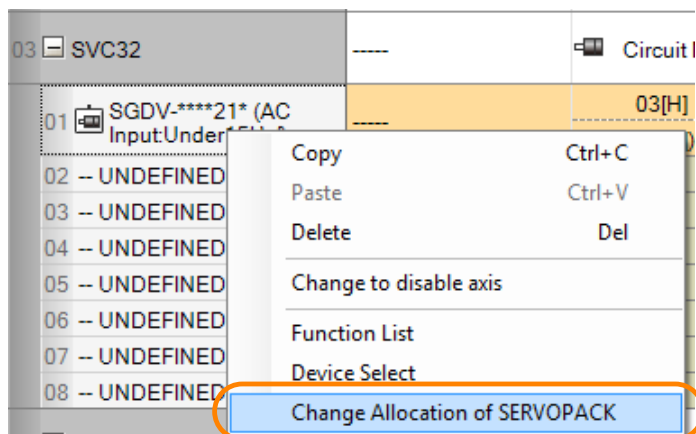
- The change must be made offline.
- The allocations must be saved to a project file.
- The models before and after the change are a combination in the following table.

Before Change	After Change
Σ -7-series SERVOPACK	Servo amplifier from another company (Wild Card Servo)
Σ -V-series SERVOPACK	Σ -7-series SERVOPACK or servo amplifier from another company (Wild Card Servo)
Servo amplifier from another company (Wild Card Servo)	Σ -V-series SERVOPACK or Σ -7-series SERVOPACK

Information This function is not available when using a Σ -X-series SERVOPACK.

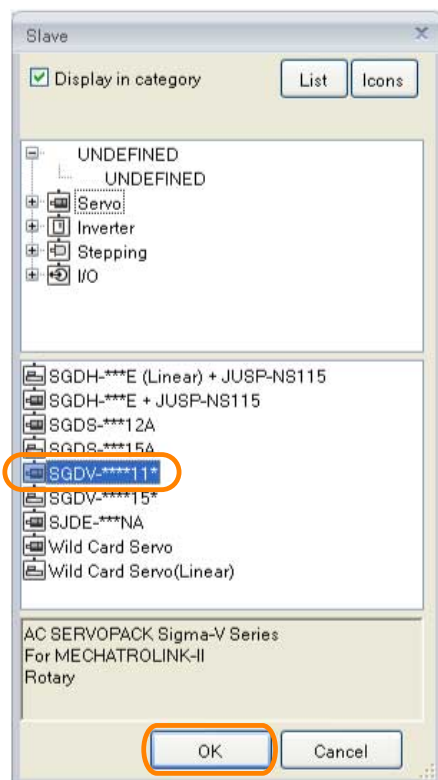
Use the following procedure.

1. **Right-click a SERVOPACK in the Module Configuration window, and then select [Change Allocation of SERVOPACK].**



The [Slave] window will be displayed.

2. **Select the new model, and then click the [OK] button.**



The SERVOPACK model will be changed to the selected model.

This concludes the procedure.

3.5 Checking, Editing, and Saving Parameters

The parameters that are displayed in the window and the save location for those parameters will depend on the type of parameter and the connection type, as shown in the following tables.

This section describes the procedures to check, edit, and save parameters for each type of parameter.

- Fixed and Setting Parameters

Connection Type	Project File Status	Parameter Displayed in the MPE720	Writing Method	Parameter Save Location
Online: Direct Connection	Not open	Controller RAM data	Save to project	—
			Write	Controller RAM
Online: Project Link Connection	Open	Controller RAM data	Save to project	Open project file
			Write	Controller RAM
Offline	Open	Open project file	Save to project	Open project file
			Write	—

- Servo Parameters (Yaskawa Σ -V-series or Later SERVOPACK)

The parameters are displayed in the SigmaWin+ Ver. 7.

Connection Type	Project File Status	Parameter Displayed in the SigmaWin+	Writing Method		Parameter Save Location
			MPE720	SigmaWin+	
Online: Direct Connection	Not open	Data saved in SERVOPACK ^{*1}	—	Write to Servo	SERVOPACK
				Write Servo Values to Controller	Controller RAM
				Write Controller Values to Servo	SERVOPACK
Online: Project Link Connection	Open	Data saved in SERVOPACK ^{*1}	Save to project	—	Open project file
			—	Write to Servo	SERVOPACK
				Write Servo Values to Controller	RAM in controller and open project file ^{*2}
				Write Controller Values to Servo	SERVOPACK and open project file ^{*2}
Offline	Open	Open project file	Save to project	—	Open project file
			—	Save to Project	Open project file ^{*2}

^{*1} This is the default display status. You can also display the RAM data from the controller at the same time. Refer to the following section for details.

 (1) *Yaskawa Σ -V-series or Later SERVOPACK on page 166*

^{*2} The parameters will be saved to a temporary file. To save the data to the project file, click the [Save to project] button in the MPE720 Module Configuration Window.

Information

The servo common parameters that are defined in the standard servo profile for MECHATROLINK-III can be displayed on the SigmaWin+ when it is started from the MPE720. Although you can display the servo common parameters, you cannot write them.

- Servo Parameters (Yaskawa Σ -III-series or Earlier SERVOPACK, Servo Amplifier from Another Company, and Other Devices)

Connection Type	Project File Status	Parameter Displayed in the MPE720	Writing Method	Parameter Save Location
Online: Direct Connection	Not open	Data saved in SERVOPACK	Save to project	—
			Write	SERVOPACK
Online: Project Link Connection	Open	Data saved in SERVOPACK	Save to project	Open project file
			Write	SERVOPACK and open project file

Continued on next page.

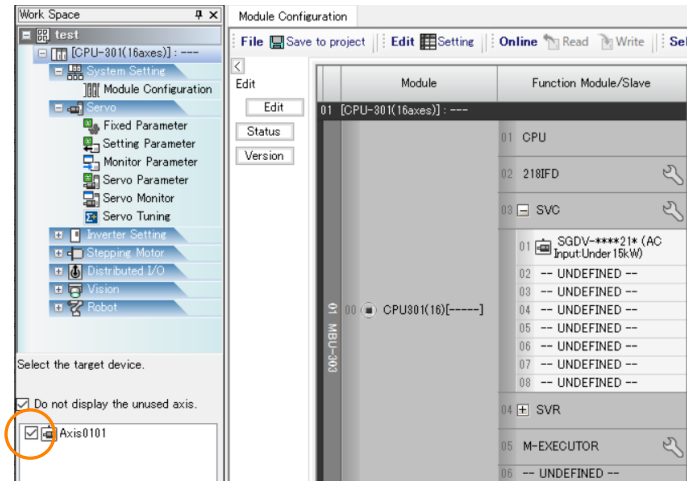
Continued from previous page.

Connection Type	Project File Status	Parameter Displayed in the MPE720	Writing Method	Parameter Save Location
Offline	Open	Open project file	Save to project	Open project file
			Write	—

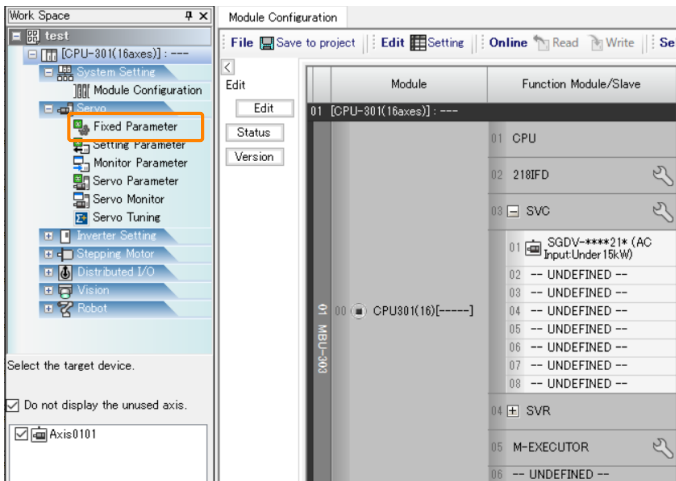
3.5.1 Checking and Editing Fixed Parameters

Use the following procedure to check and edit fixed parameters.

1. In the [Work Space] window, select the check box for the axis with the parameters to display.

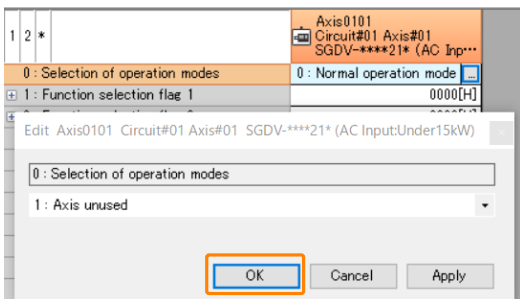


2. Double-click [Fixed Parameter].



The parameters for the selected axes will be displayed.

3. Double-click the parameter cell, edit the value, and then click the [OK] button.



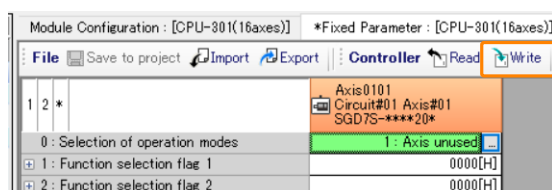
The edited parameter cell will change to green.

1	2	*	Axis0101 Circuit#01 Axis#01 SGDV-****21* (AC Inp...
0	Selection of operation modes		
1	Function selection flag 1		
2	Function selection flag 2		
4	Reference unit selection		
	1	Axis unused	
		0000[H]	
		0000[H]	
		0	pulse

3.5.2 Saving the Fixed Parameters

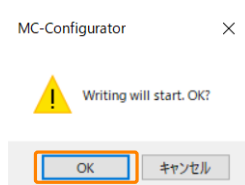
Use the following procedure to save fixed parameters to a controller or project file. When you save the setting parameters to a project file while offline, perform step 4 only.

1. Click the [Write] button.



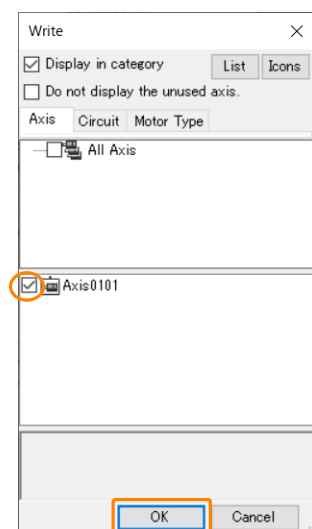
A message dialog box will be displayed.

2. Click the [OK] button.



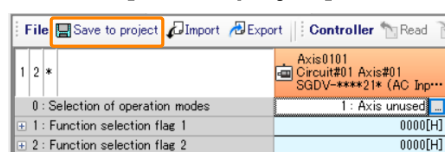
The [Write] window will be displayed.

3. Select the axes to which to write the parameters and click the [OK] button.



The write will be executed. When the write is completed, the green cells change back to white.

4. Click the [Save to project] button.



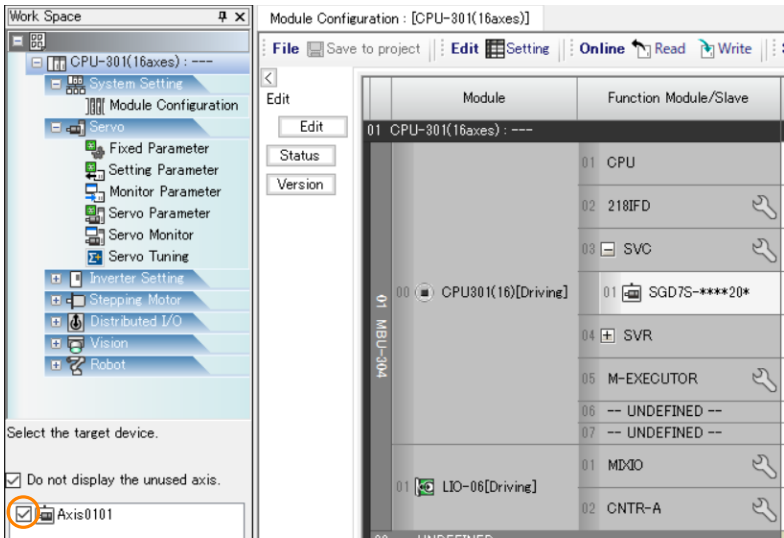
The parameters will be saved to the project file.

This concludes the procedure.

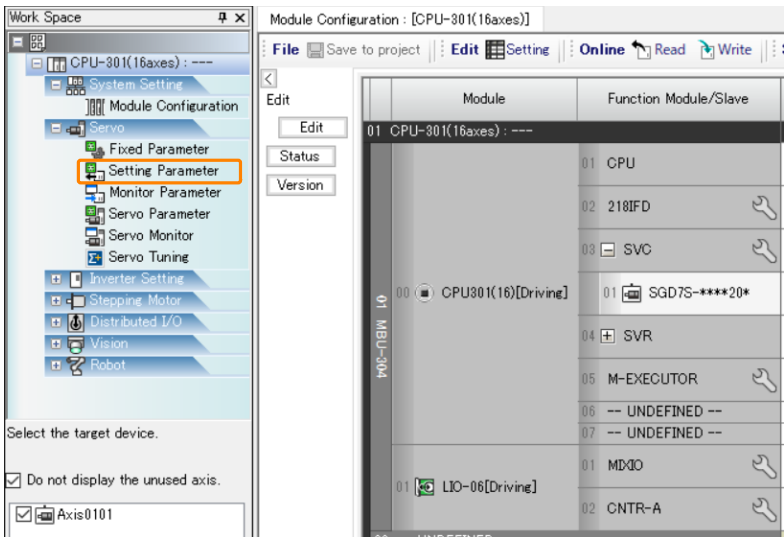
3.5.3 Checking and Editing Setting Parameters

Use the following procedure to check and edit setting parameters.

1. In the [Work Space] window, select the check box for the axis with the parameters to display.



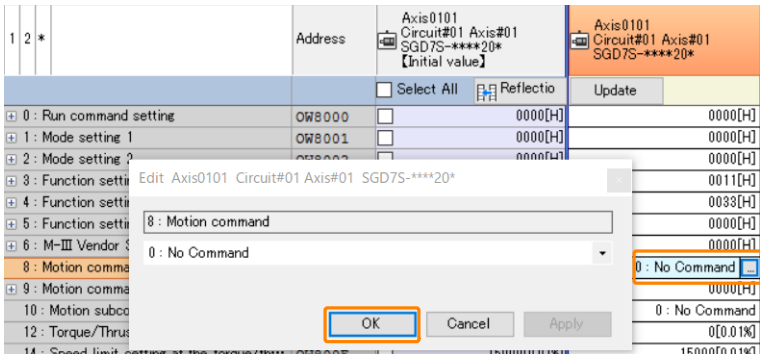
2. Double-click [Setting Parameter].



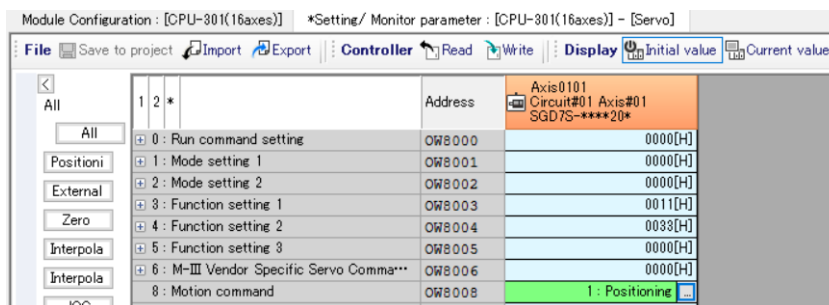
The parameters for the selected axes will be displayed.

3. Double-click the parameter cell, edit the value, and then click the [OK] button.

Information The parameters are displayed in two columns: initial values (left side) and current values (right side). When editing values, double-click the current value cells.



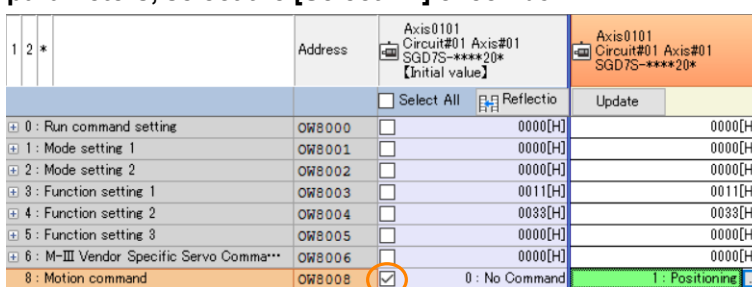
The edited parameter cell will change to green.



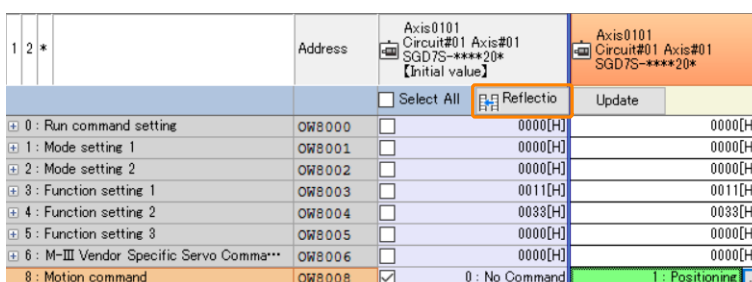
3.5.4 Saving the Setting Parameters

Use the following procedure to save setting parameters to a controller or project file. When you save the setting parameters to a project file while offline, perform step 8 only.

1. In the [Initial value] column, select the check box of the parameters to save. To save all parameters, select the [Select All] check box.

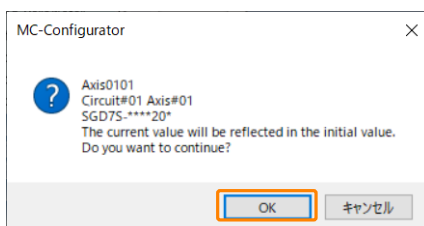


2. Click the [Reflection] button.



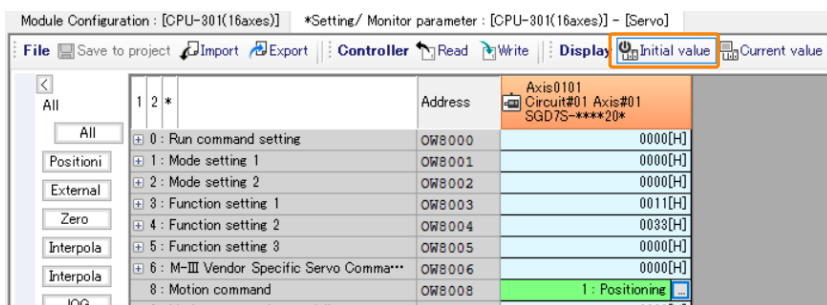
A message dialog box will be displayed.

3. Click the [OK] button.



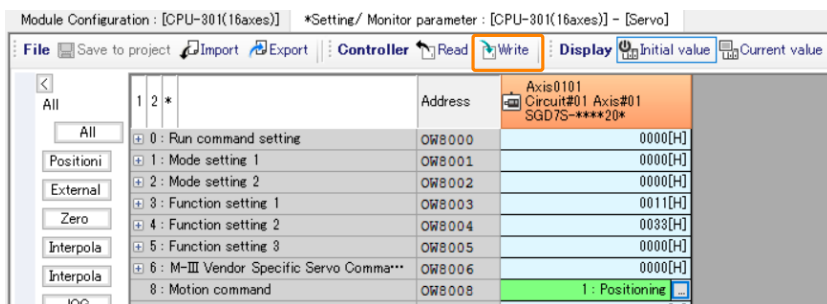
The current values will be applied to the initial values.

4. Click the [Initial value] button.



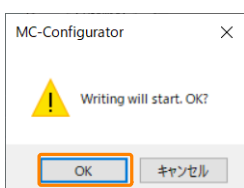
Only the initial value column will be displayed.

5. Click the [Write] button.



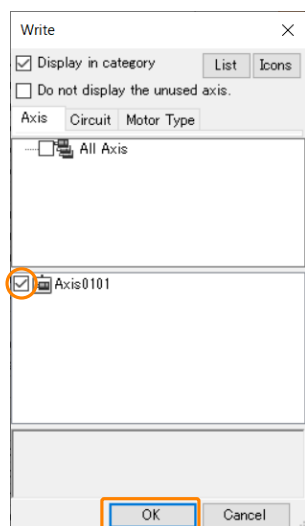
A message dialog box will be displayed.

6. Click the [OK] button.



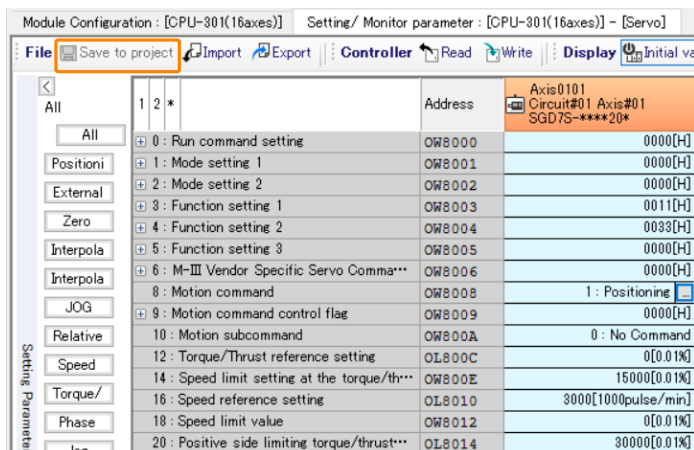
The [Write] window will be displayed.

7. Select the axes to which to write the parameters and click the [OK] button.



The write will be executed. When the write is completed, the green cells change back to white.

8. Click the [Save to project] button.



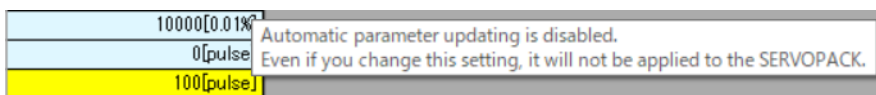
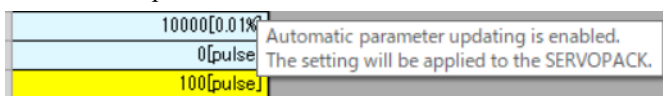
The parameters will be saved to the project file.

This concludes the procedure.

3.5.5 Applying the Current Values of the Auto-Updated Parameters to Initial Values

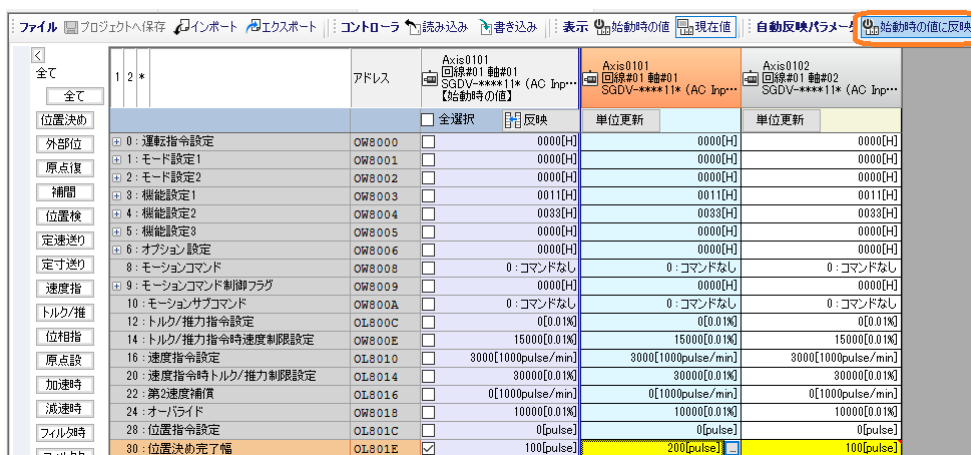
Auto-updated parameters are parameters in which the settings are automatically written to servo common parameters in the SERVOPACK when a MECHATROLINK connection is established. Auto-updated parameters are enabled when fixed parameter No. 1 bit A (User constants self-writing function) is 0.

These parameters will be displayed with yellow cells on the parameter list. Place the mouse cursor over a cell to view its tooltip.



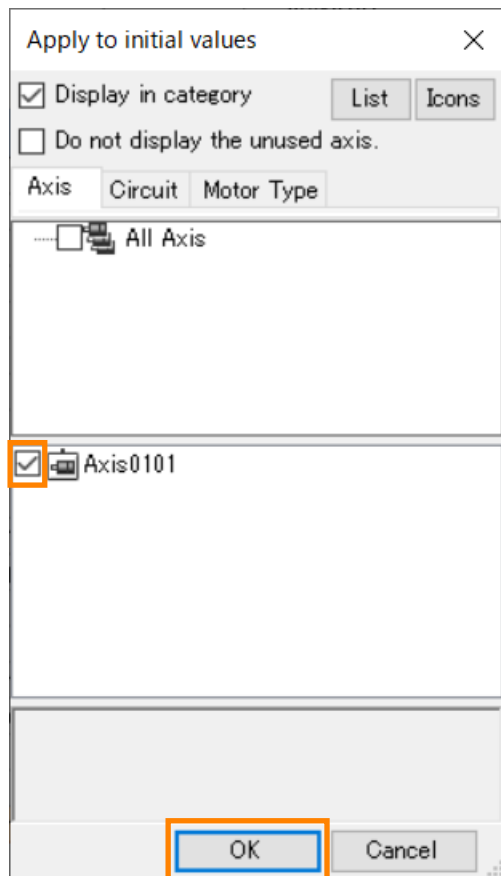
When the current values of the auto-updated parameters are applied to the initial values, those values can be kept when the controller is next started. Use the following procedure.

1. After you edit the parameters, click the [Apply to initial values] button.



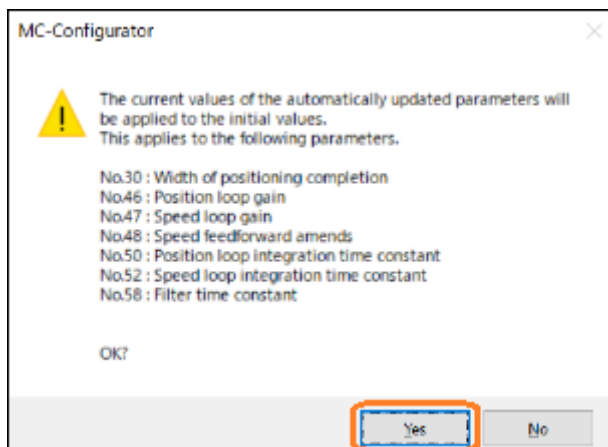
The [Apply to initial values] window will be displayed.

2. **Select the axis, and then click the [OK] button.**



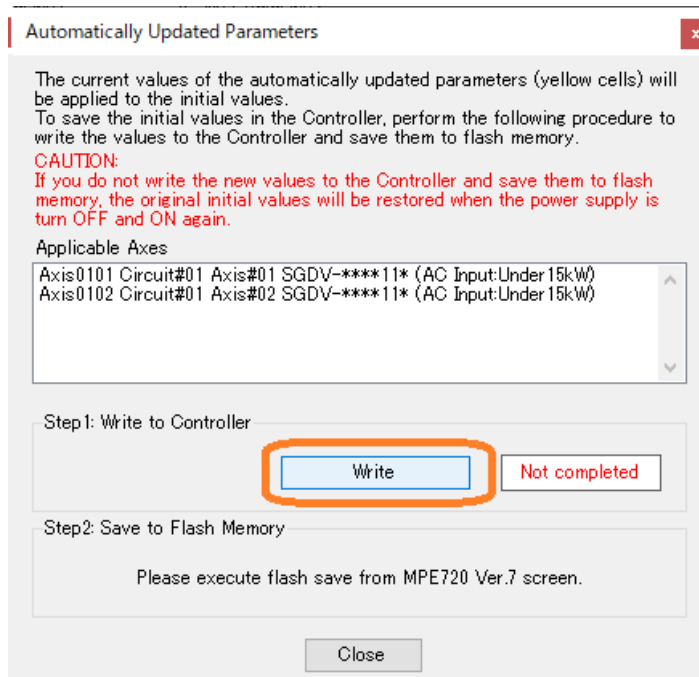
A message dialog box will be displayed.

3. **Click the [Yes] button.**



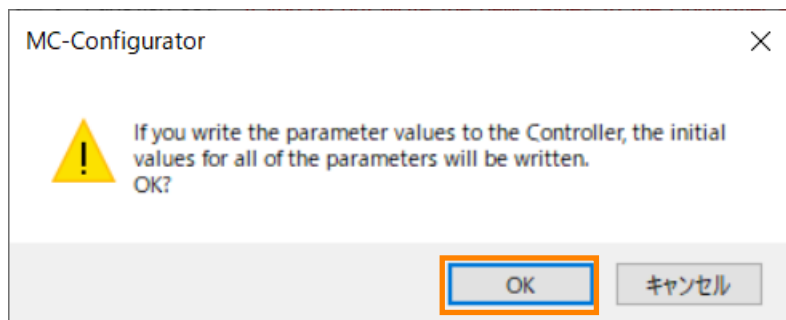
The [Automatically Updated Parameters] window will be displayed.

4. Click the [Write] button.

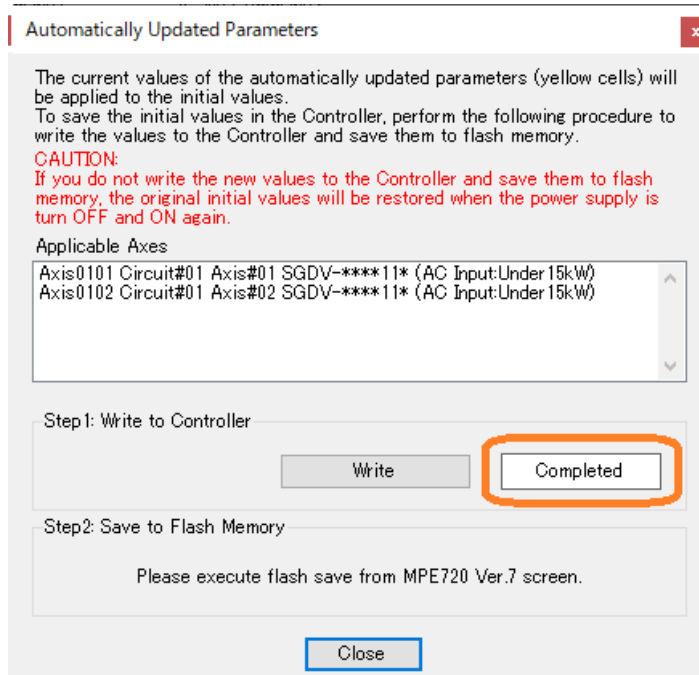


A message dialog box will be displayed.

5. Click the [OK] button.



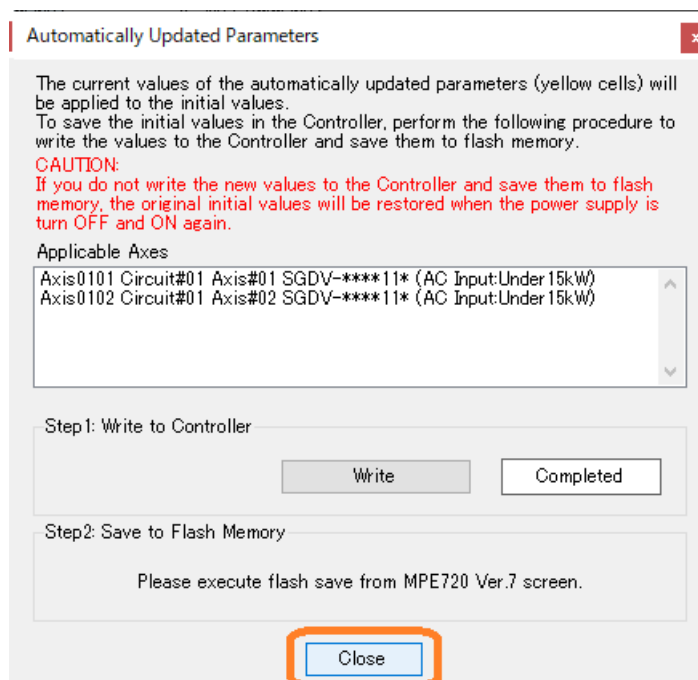
The values will be written to the controller, and the write status will change to [Completed].



6. Click the [Close] button.

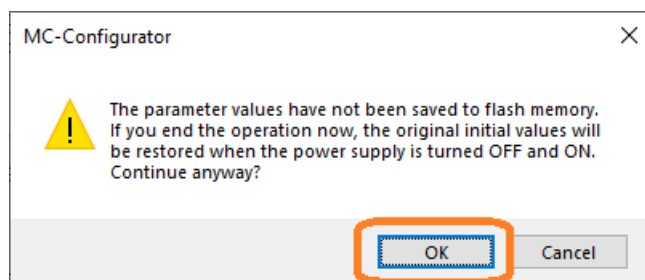
Information

Save to flash memory will be executed after you close the [Automatically Updated Parameters] window.

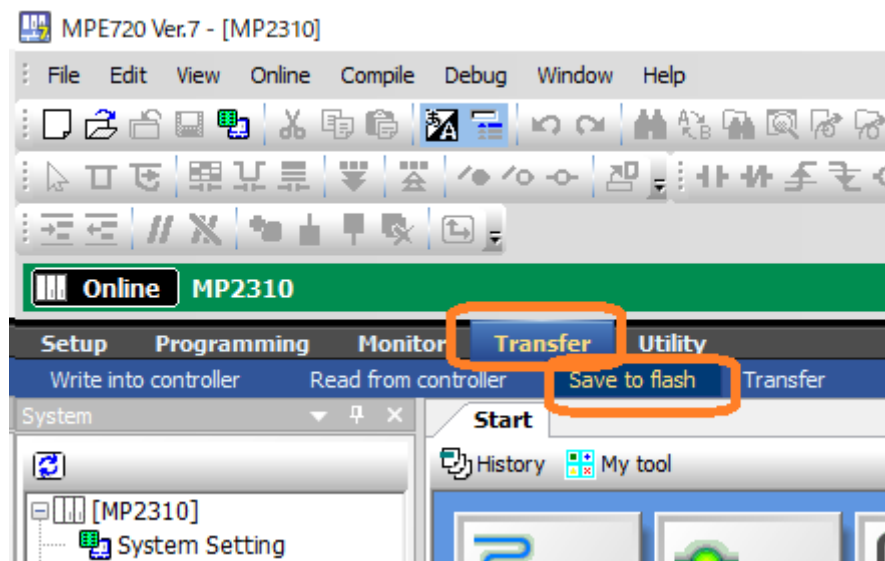


A message dialog box will be displayed.

7. Click the [OK] button.



8. Click the [Save to Flash] button on the [Transfer] tab page in the main window of the MPE720.



The [Transfer Program - Save to Flash] window will be displayed.

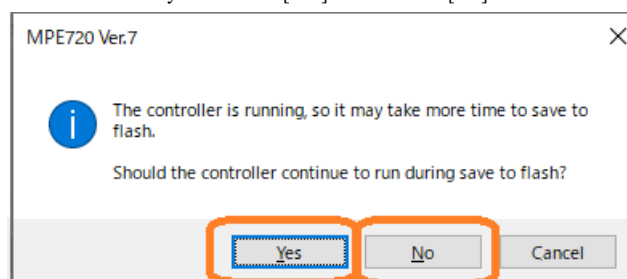
9. Click the [Start] button.



The MPE720 will begin saving the data to flash memory.

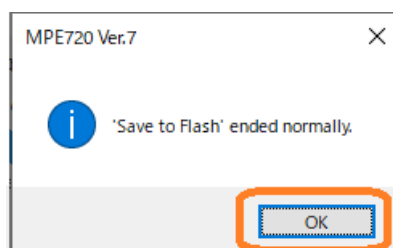
Information

If the CPU unit is in RUN mode, the following message will be displayed. The data transfer to the target controller starts when you click the [Yes] button or the [No] button.



When save to flash is completed, a message dialog box will be displayed.

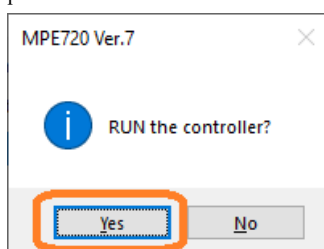
10. Click the [OK] button.



A message dialog box will close.

Information

If you clicked the [No] button in step 9, the following message will be displayed. Click the [Yes] button to put the CPU unit in the RUN status.



This concludes the procedure.

3.5.6 Checking and Editing Servo Parameters

Use the following procedures to check and edit servo parameters.

The procedure will depend on the SERVOPACK model.

(1) Yaskawa Σ -V-series or Later SERVOPACK

For a Yaskawa Σ -V-series or later SERVOPACK, the SigmaWin+ will be started, which you can use to check and edit the parameters. Use the following procedure.

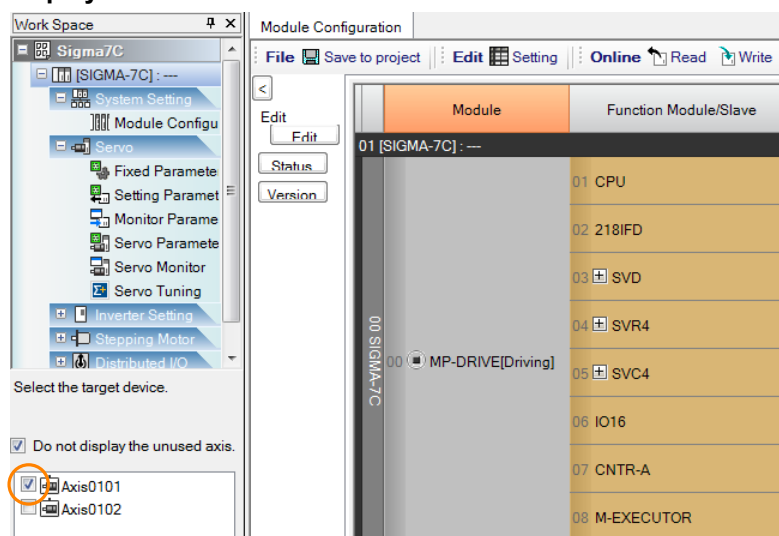
Information In the following cases, you must configure the detailed settings in advance to display the servo parameters.

- When using a Σ -7 SERVOPACK with FT specifications
- When using a direct drive servomotor

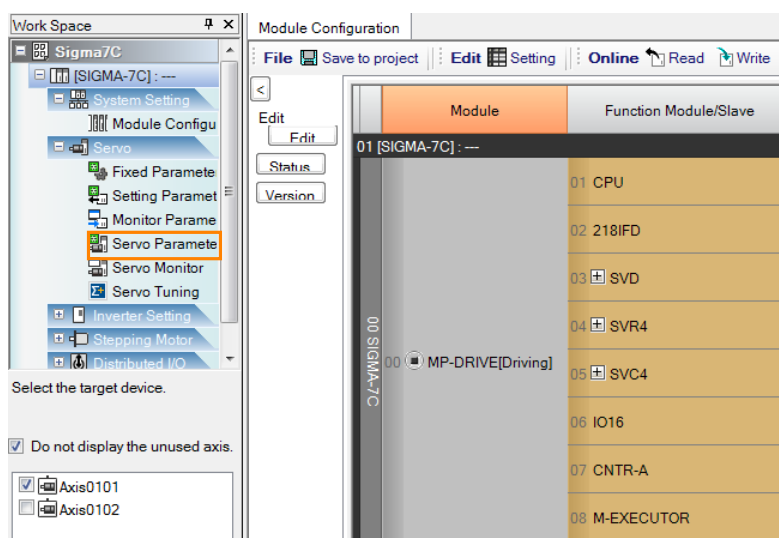
Refer to the following section for details.

 (a) *Detailed SERVOPACK Settings on page 160*

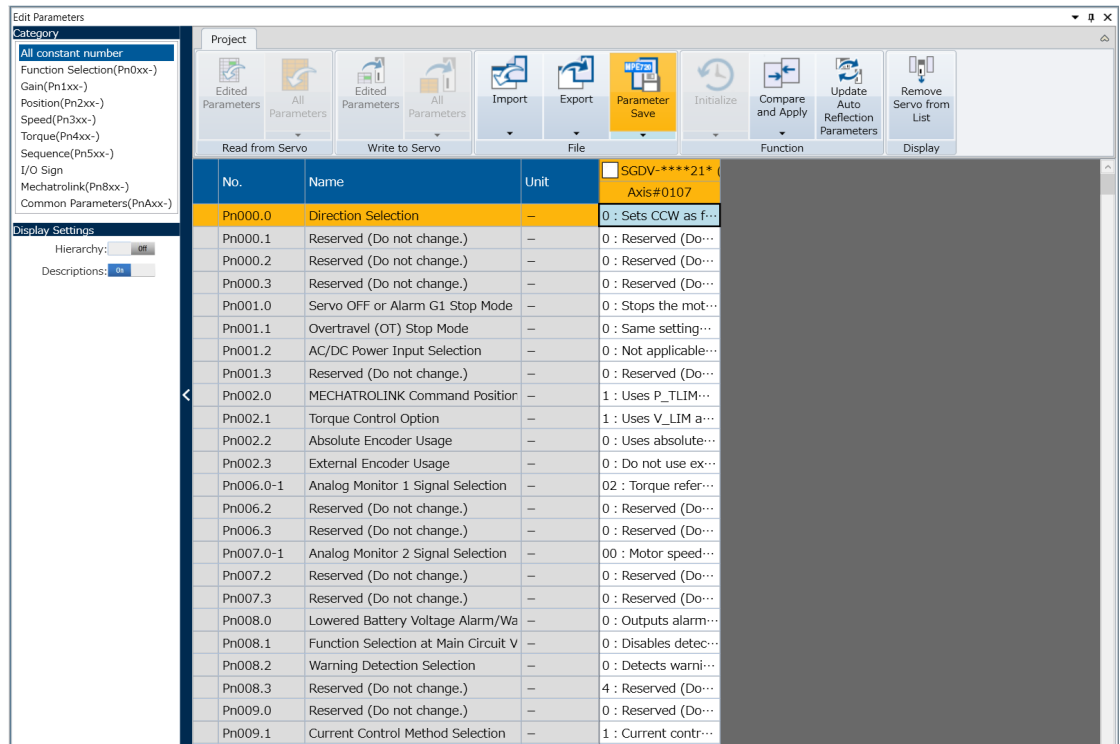
1. In the [Work Space] window, select the check box for the axis with the parameters to display.



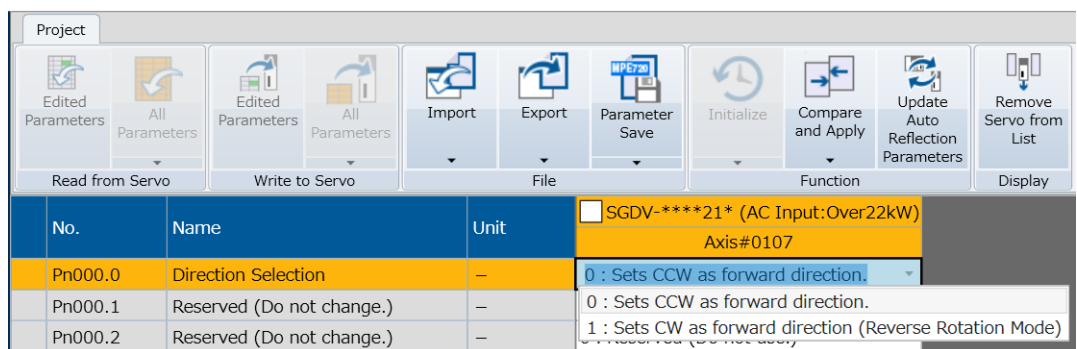
2. Double-click [Servo Parameter].



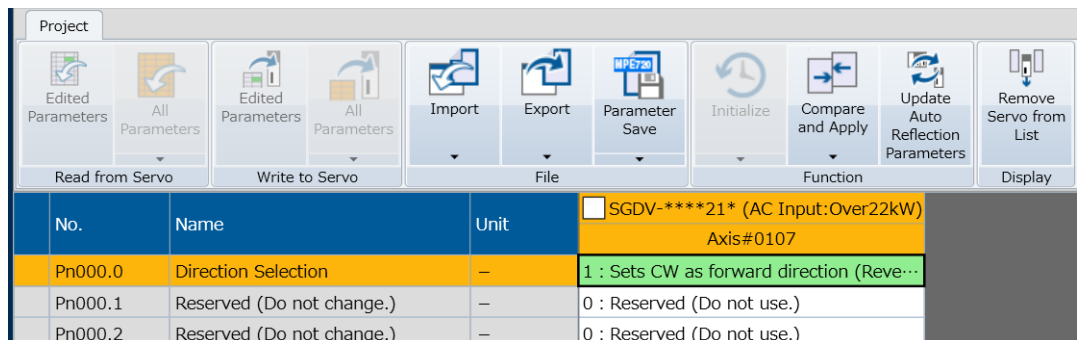
The SigmaWin+ will be started with the selected axis allocated, and the [Edit Parameters] window will be displayed.



3. Double-click the parameter cell and edit the value.



The edited parameter cell will change to green.

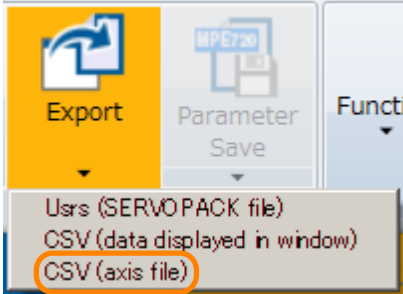




Important

Servo parameters can be imported and exported by axis using CSV files.

However, do not import CSV files that were exported from models that are not compatible with the SigmaWin+, such as Wild Card Servo, because the parameter numbers and other information will be different.



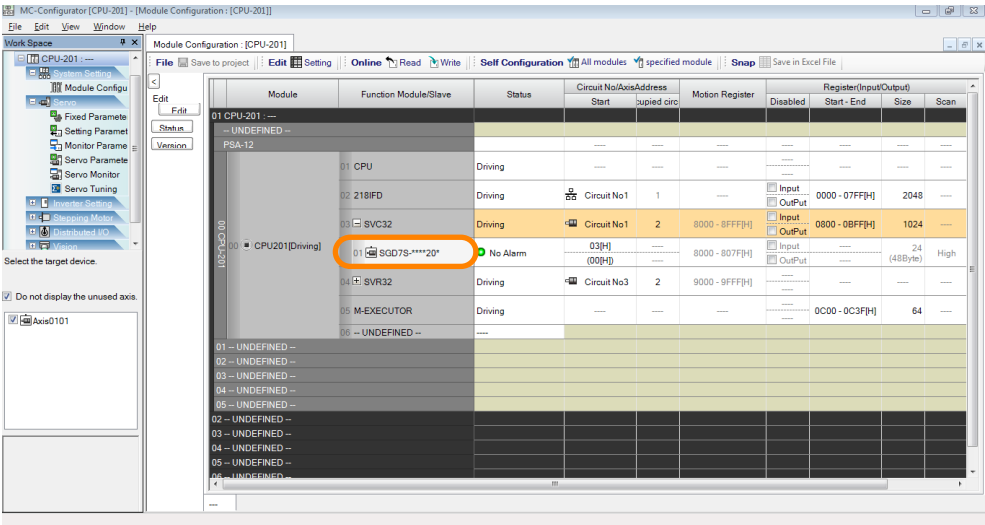
(a) Detailed SERVOPACK Settings

In the following cases, you must configure the detailed settings in advance to display the servo parameters.

- When using a Σ -7 SERVOPACK with FT specifications
- When using a direct drive servomotor

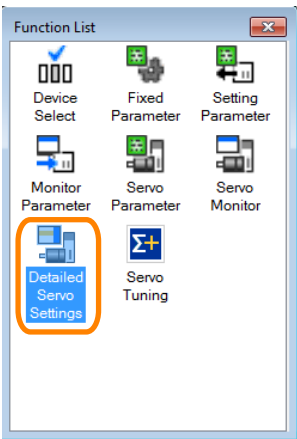
Use the following procedure.

1. **When using a Σ -7 SERVOPACK with FT specifications, add the model information file to the SigmaWin+.**
Refer to the following manual for details on the model information file.
 AC Servo Drive Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)
2. **Double-click the axis with the parameters to display.**



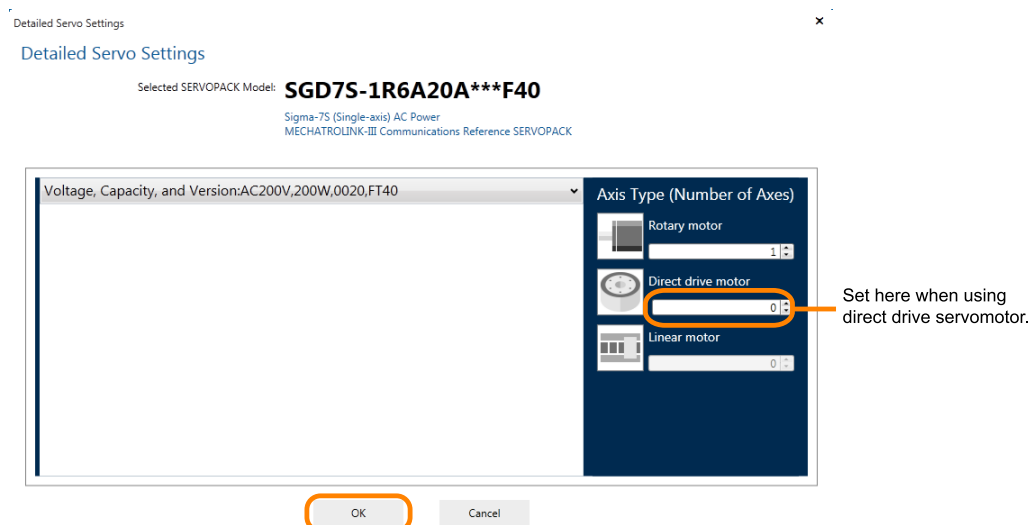
The [Function List] window will be displayed.

3. **Click [Detailed Servo Settings].**

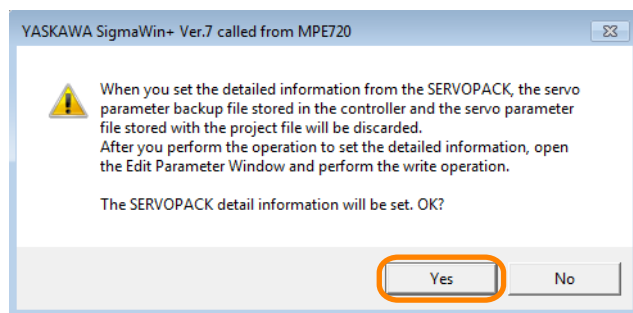


SigmaWin+ will be started and the [Detailed Servo Settings] window for the selected axis will be displayed.

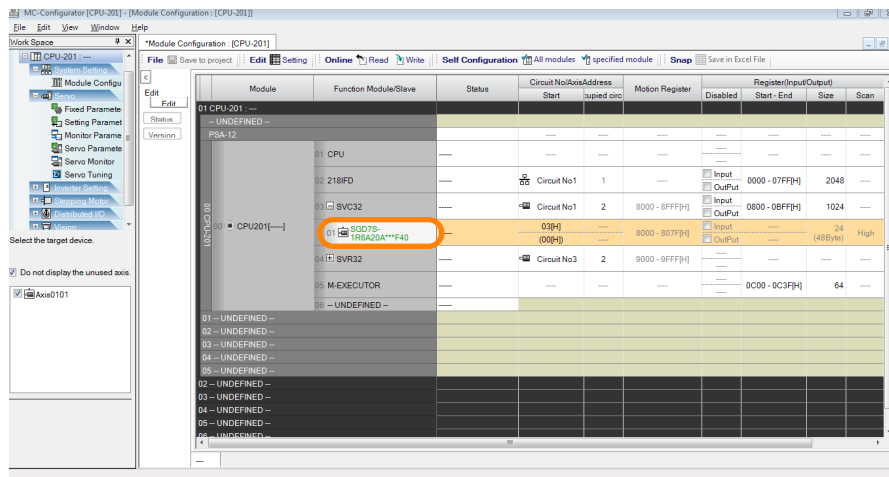
4. Click the [OK] button.



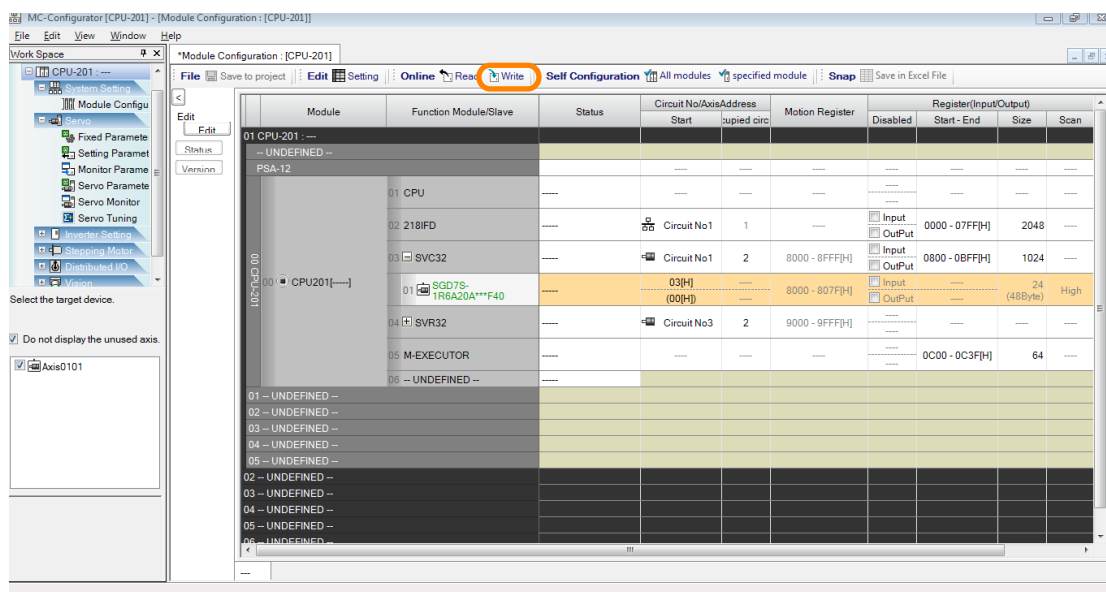
5. Click the [Yes] button.



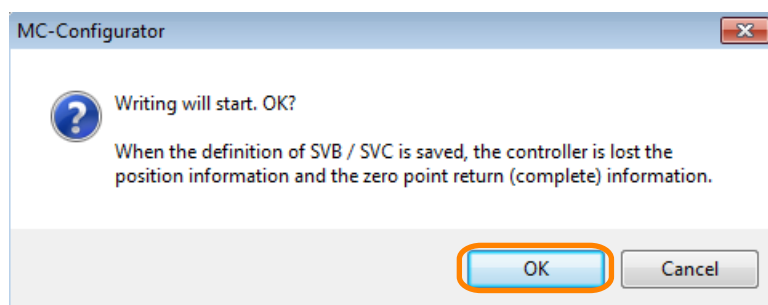
Detailed information on the SERVOPACK will be set on the Module Configuration Window.



6. Click the [Write] button.

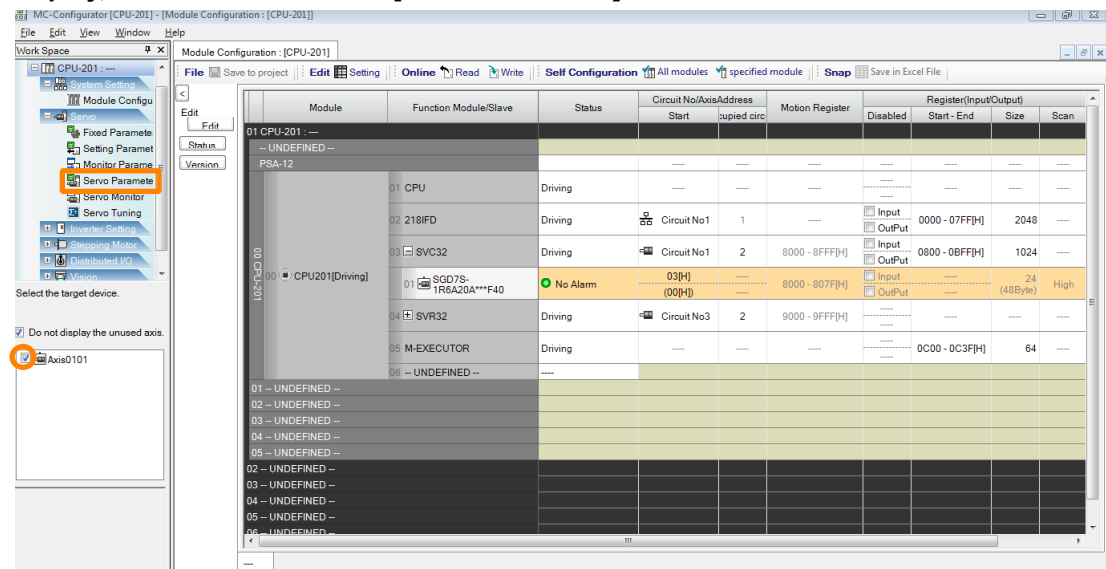


7. Click the [OK] button.

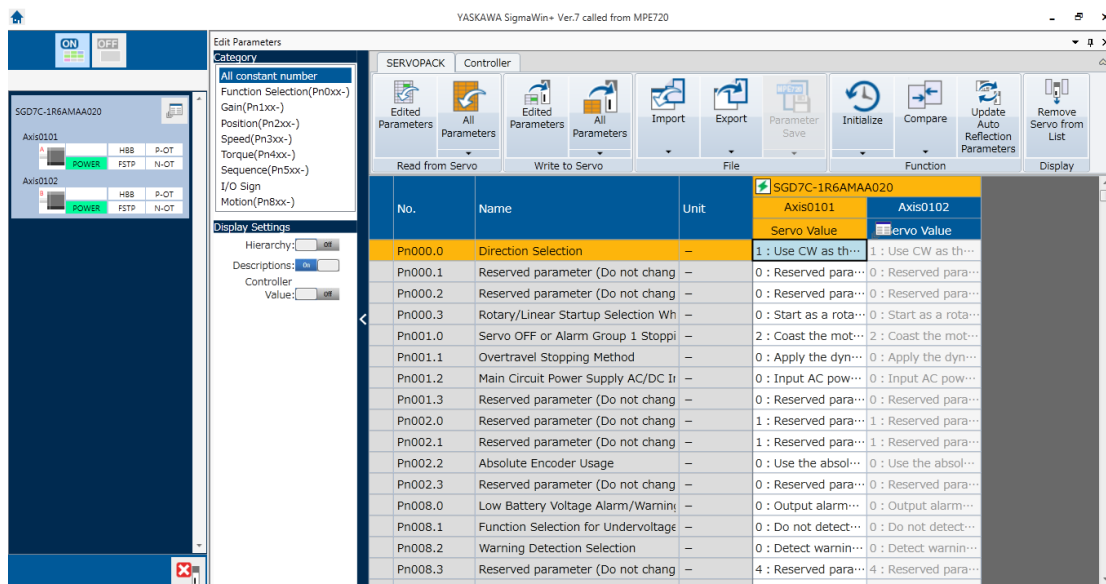


The detailed SERVOPACK settings will be written to the controller.

8. In the [Work Space] window, select the check box for the axis with the parameters to display, and then double-click [Servo Parameter].



The SigmaWin+ will be started with the selected axis allocated, and the [Edit Parameters] window will be displayed.

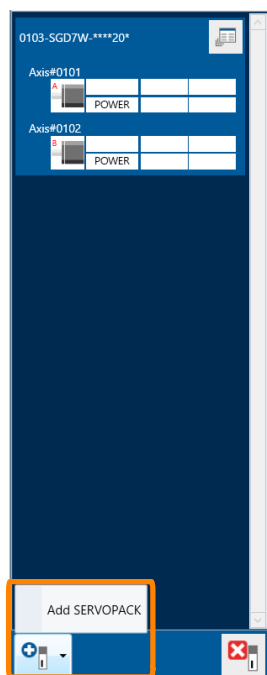


This concludes the procedure.

(b) Adding the SERVOPACK to the SigmaWin+

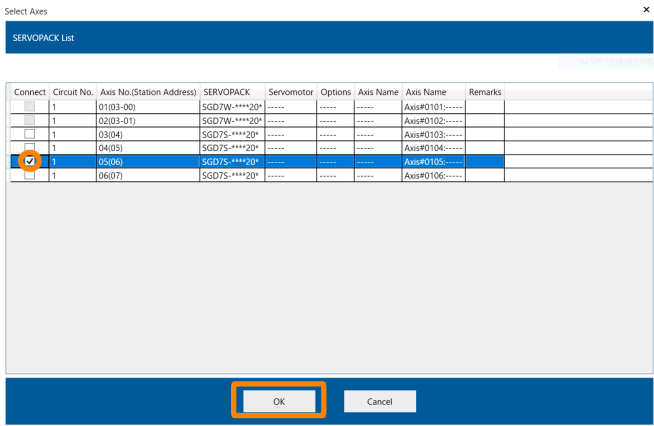
After the SigmaWin+ is started from the MPE720, you can add the SERVOPACK allocated on the Module Configuration Window to the SigmaWin+. This is convenient for adding the displayed SERVOPACK to the SigmaWin+ later. Use the following procedure.

1. In the SigmaWin+ workspace, click the [Add SERVOPACK] button.

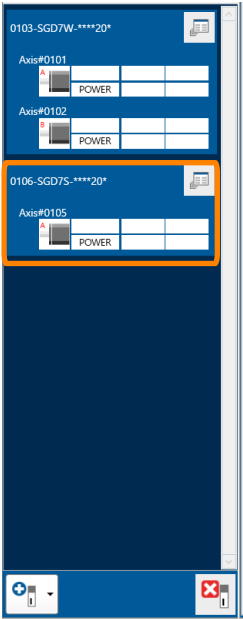


The [Select Axes] window will be displayed. The SERVOPACK axes allocated in the MPE720 Module Configuration Window will be displayed here.

2. Select the axis to add, and then click the [OK] button.



The selected axis will be added to the workspace.

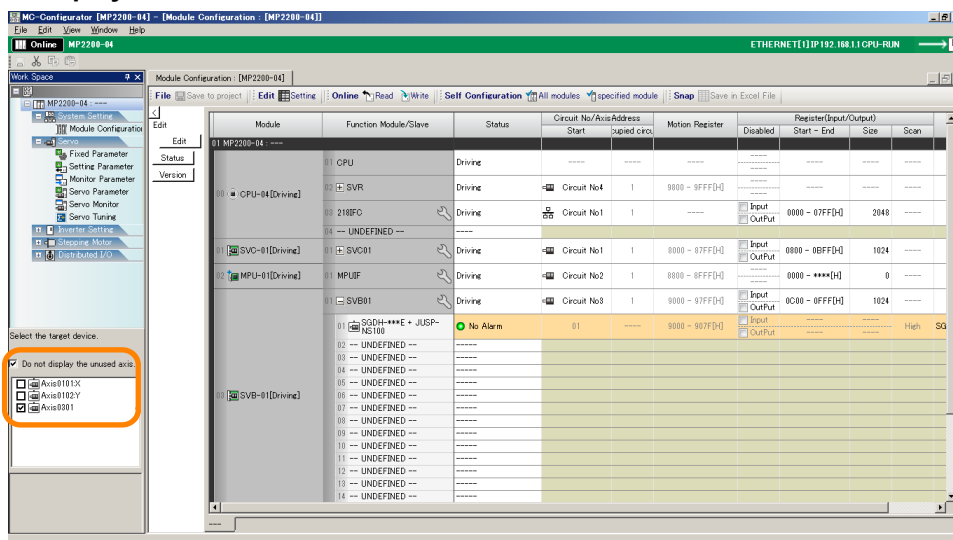


This concludes the procedure.

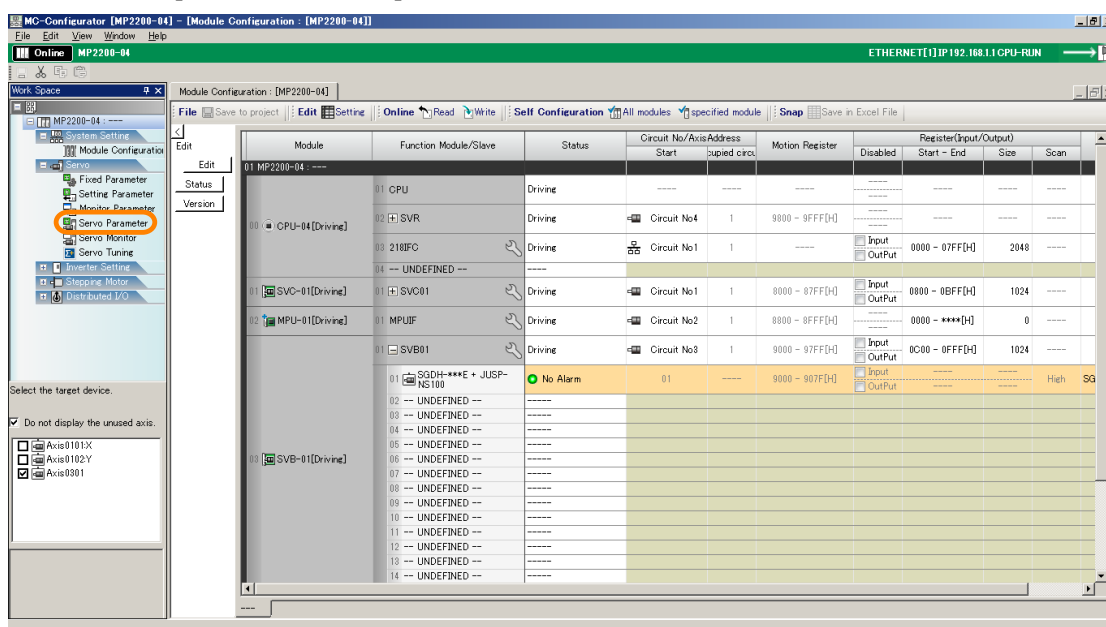
(2) Yaskawa Σ -III-series or Earlier SERVOPACK, Servo Amplifier from Another Company, and Other Devices

For a Yaskawa Σ -III-series or earlier SERVOPACK, servo amplifier from another company, and other devices, check and edit the parameters in MPE720. Use the following procedure.

1. In the [Work Space] window, select the check box for the servo axis with the parameters to display.



2. Double-click [Servo Parameter].



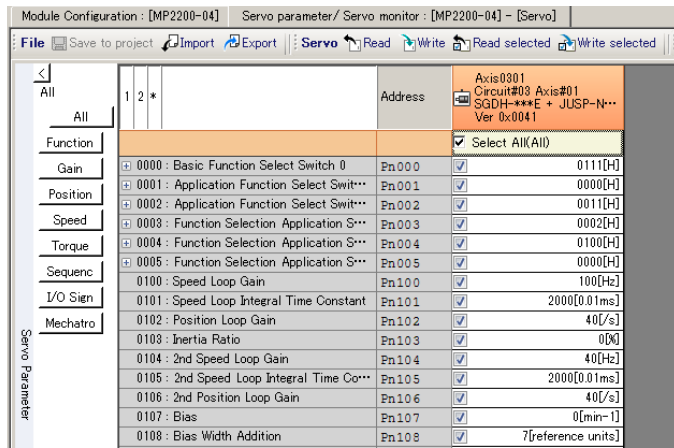
A message dialog box will be displayed.

3. Click the [OK] button.



The parameters for the selected axes will be displayed.

4. Double-click the parameter cell and edit the value.

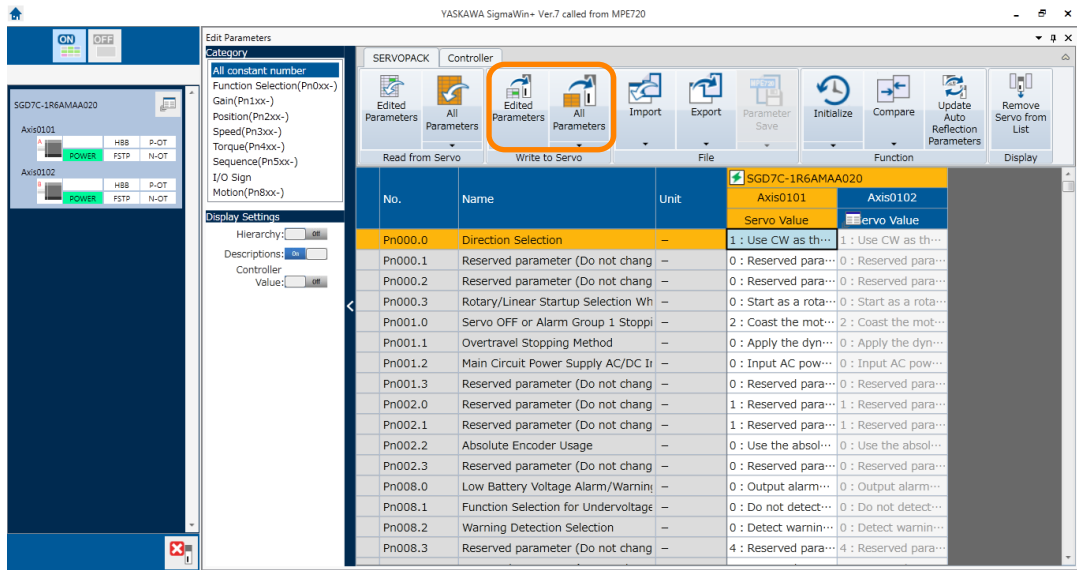


3.5.7 Saving the Servo Parameters

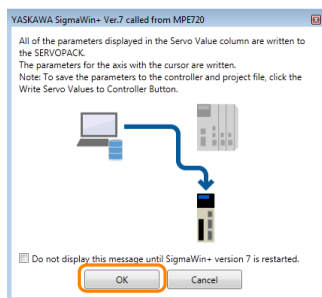
Use the following procedures to save servo parameters to a controller, SERVOPACK, or project file.
The procedure will depend on the SERVOPACK model.

(1) Yaskawa Σ -V-series or Later SERVOPACK

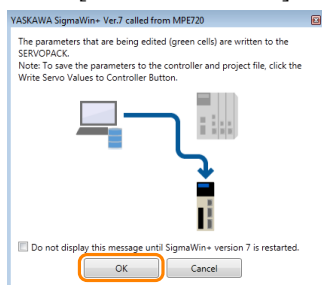
1. Either of the following operations can be used.
 - To write all of the parameters, click [All Parameters] above [Write to Servo].
 - To write only specific parameters, edit the parameters to write and then click [Edited Parameters] above [Write to Servo].



2. The following window will be displayed. Click the [OK] button.
 - When [All Parameters] Is Clicked

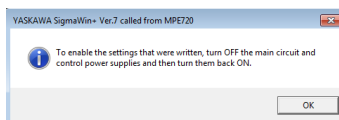


- When [Edited Parameters] Is Clicked



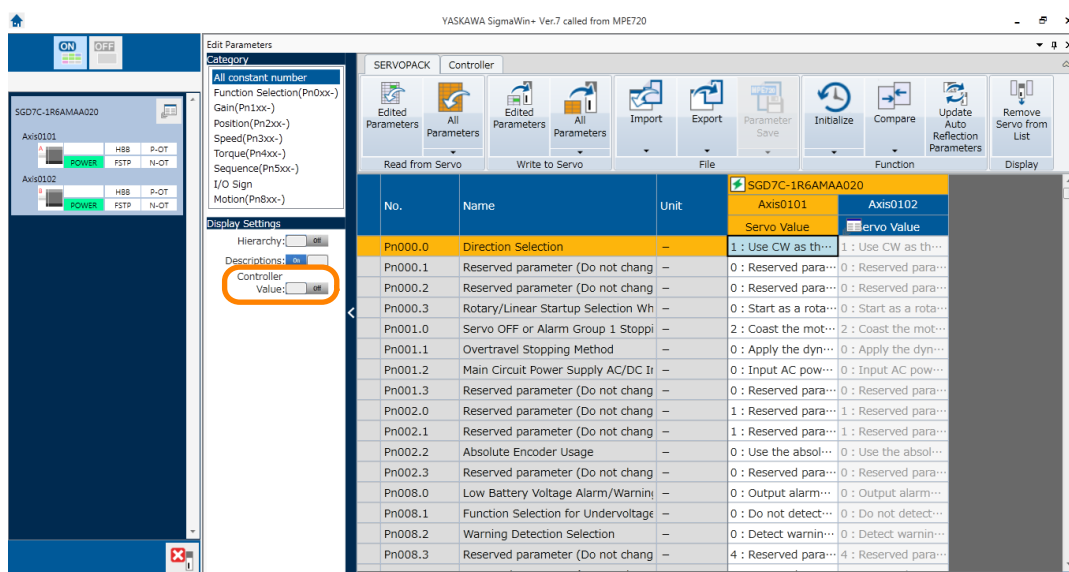
Information

If you write parameters that are enabled only after the power is turned OFF and ON again, the following dialog box will be displayed. To enable the written parameters, click the [OK] button and then turn the power OFF and ON again or perform a software reset.



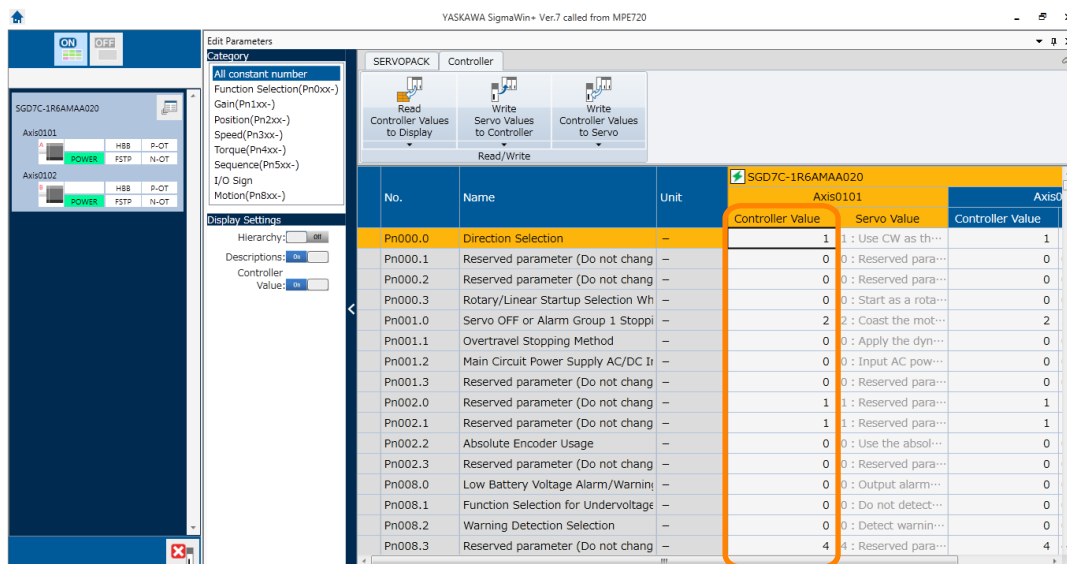
The parameters will be written to the SERVOPACK.

3. Turn ON [Controller Value] in the [Display Settings] area.



The servo parameters saved in the controller will be displayed.

3.5 Checking, Editing, and Saving Parameters



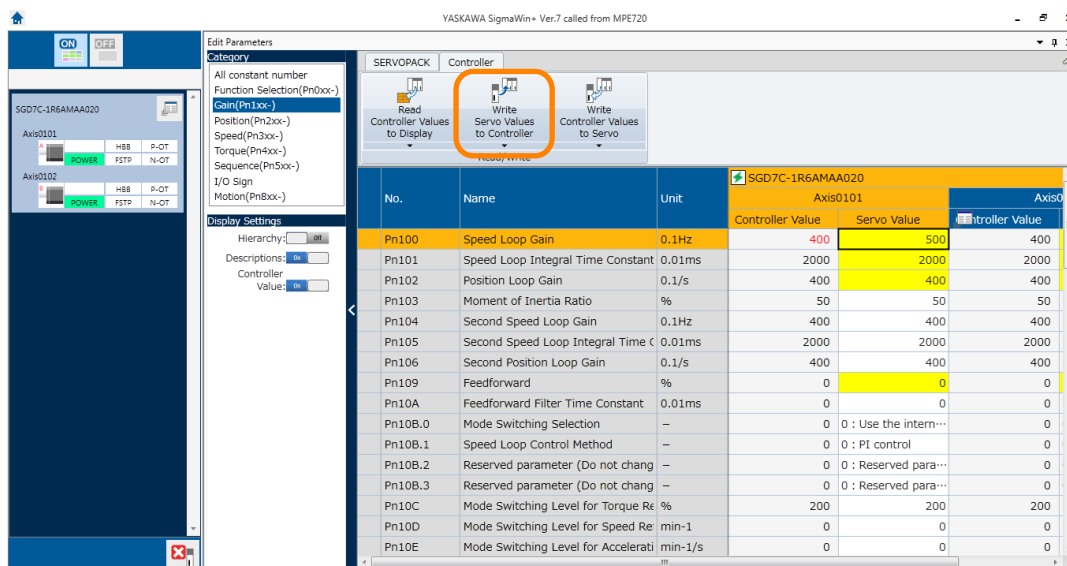
Information If the parameters are not saved in the controller, “-” will be displayed in [Controller Value].

SGD7C-1R6AMAA020			Axis0101	
No.	Name	Unit	Controller Value	Servo Value
Pn000.0	Direction Selection	—	—	1 : Use CW as th...

If the servo values and controller values are different, [Controller Value] will be displayed in red.

SGD7C-1R6AMAA020			Axis0101	
No.	Name	Unit	Controller Value	Servo Value
Pn100	Speed Loop Gain	0.1Hz	400	500

4. Click the [Controller] tab, and then click [Write Servo Values to Controller].

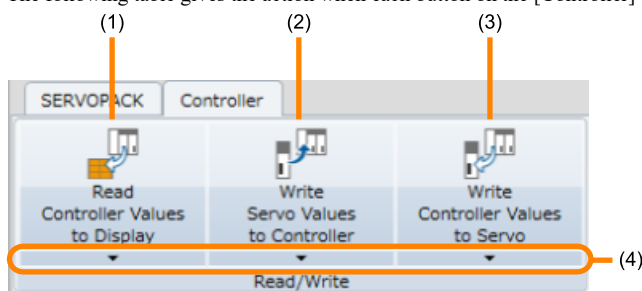


The servo values will be written to the controller.

SGD7C-1R6AMAA020			Axis0101	
No.	Name	Unit	Controller Value	Servo Value
Pn100	Speed Loop Gain	0.1Hz	500	500

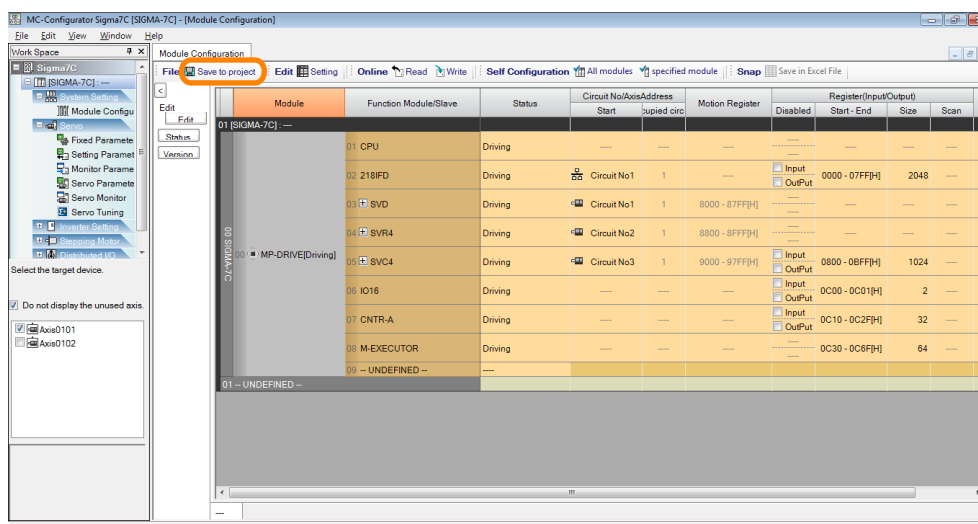
Information

The following table gives the action when each button on the [Controller] tab is clicked.



No.	Description
(1)	Reads the backup servo parameters that are currently saved in the controller, and displays the parameters in the window.
(2)	Writes the values in the window to the controller as backup servo parameters.
(3)	Writes the backup servo parameters that are currently saved in the controller to the SERVOPACK.
(4)	You can select either [Selected Axis] or [All Axes] as the axis to read or write.

5. Change to the Module Configuration Window, and click the [Save to project] button.

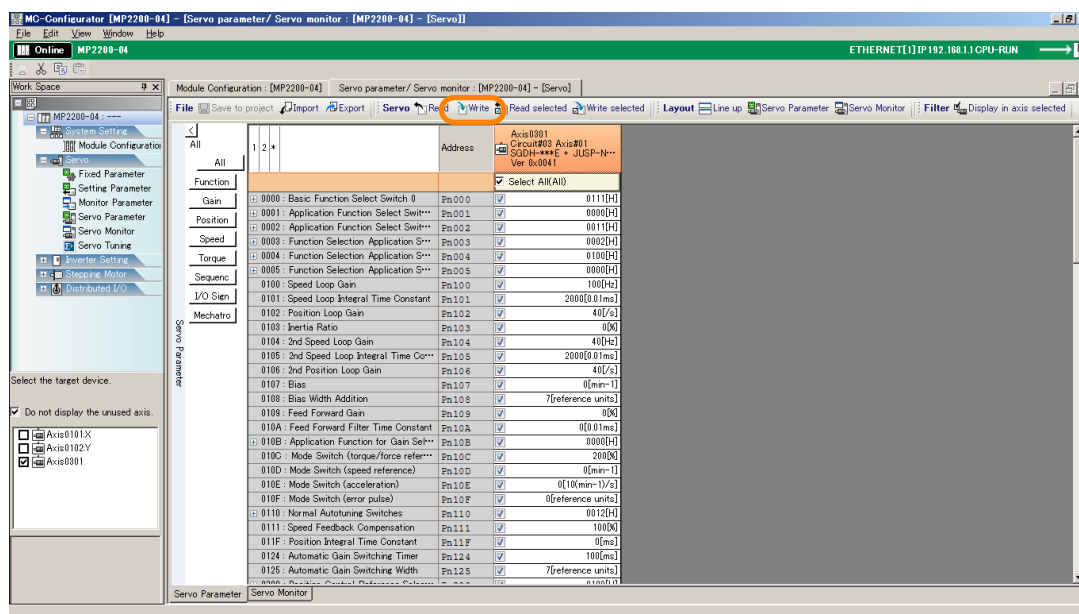


The parameters will be saved to the project file.

This concludes the procedure.

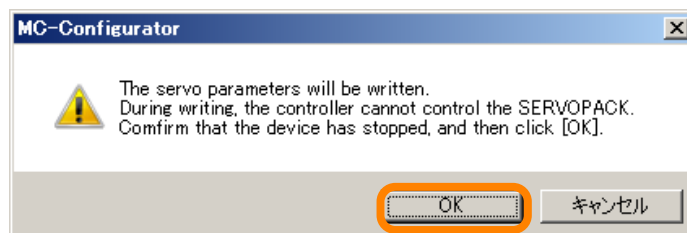
(2) Yaskawa Σ -III-series or Earlier SERVOPACK, Servo Amplifier from Another Company, and Other Devices

1. Click the [Write] button on the [Servo Parameter] tab page.



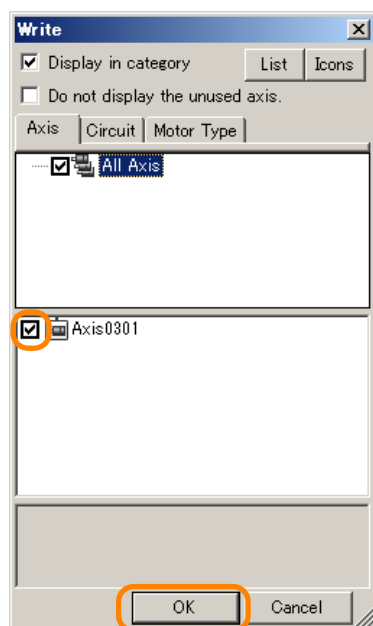
A message dialog box will be displayed.

2. Click the [OK] button.



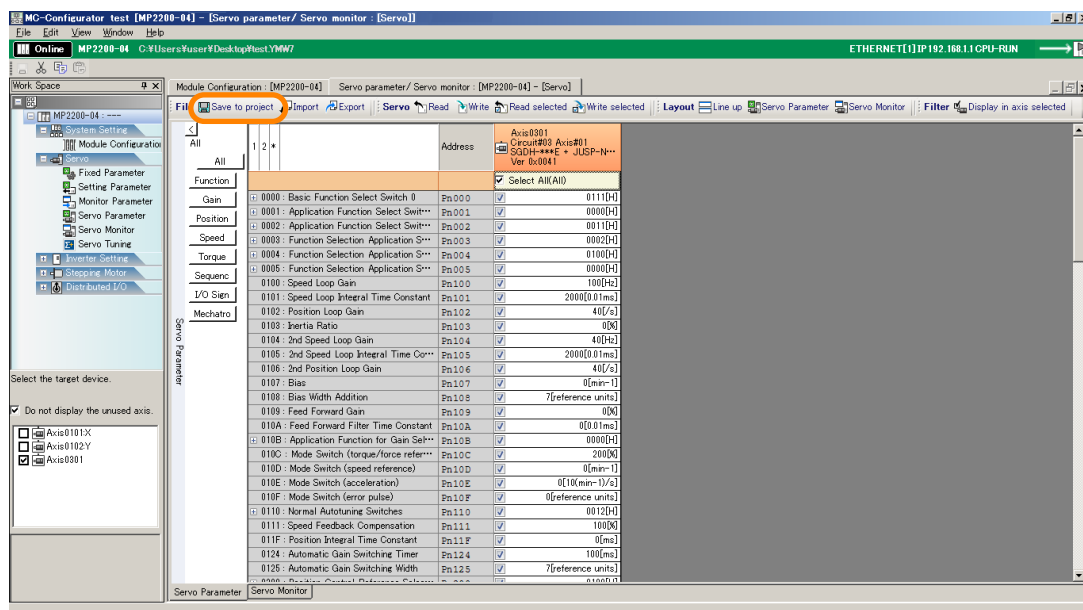
The [Write] window will be displayed.

3. Select the axes to which to write the parameters and click the [OK] button.



The write will be executed.

4. Click the [Save to project] button.



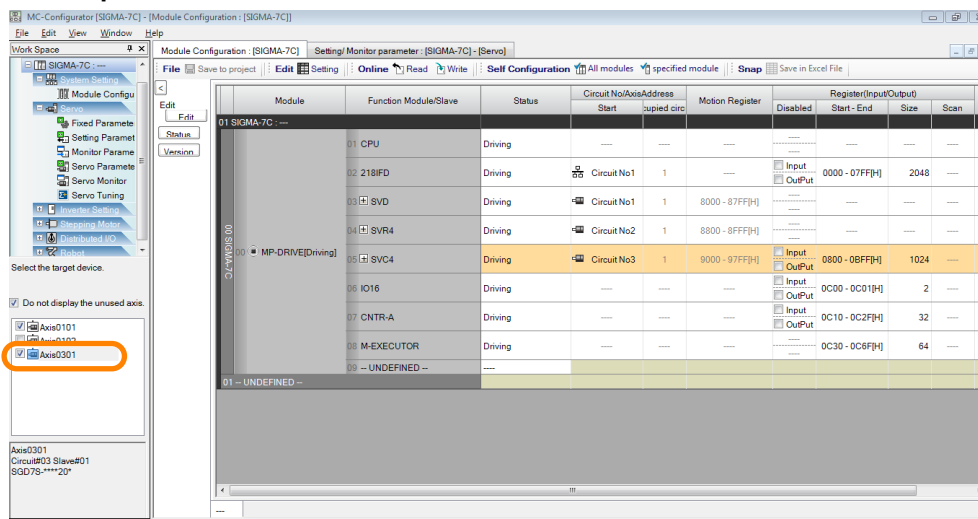
The parameters will be saved to the project file.

This concludes the procedure.

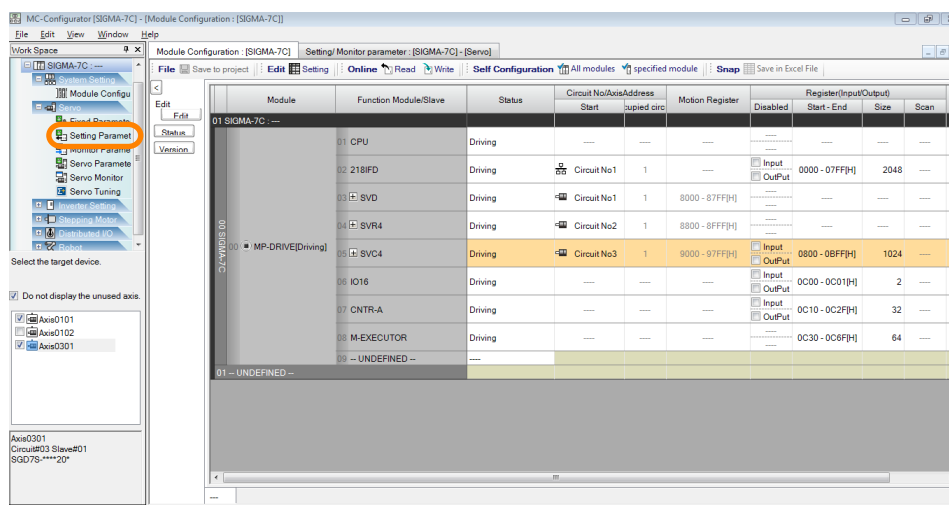
3.6 Checking Operation by Sensing Individual Motion Commands

You may want to check operation for individual motion commands with the current device configuration. However, writing ladder programs or other programs just for this purpose can be time consuming. The MPE720 allows you to send individual motion commands to check operation. Use the following procedure.

1. In the [Work Space] window, select the check boxes for the axes for which you want to check operation.

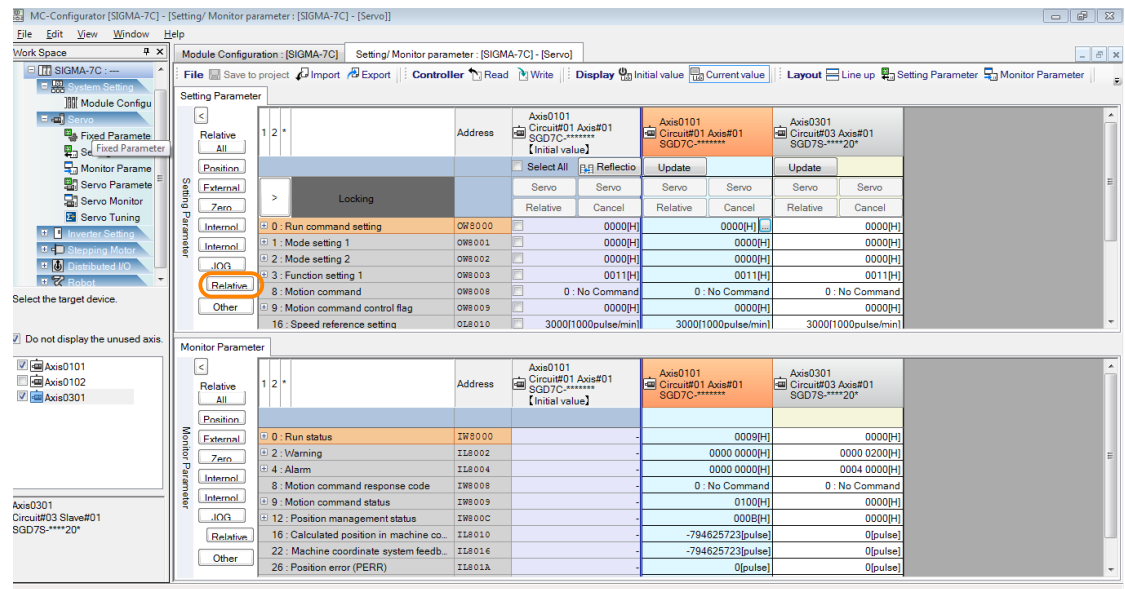


2. Double-click [Setting Parameter].



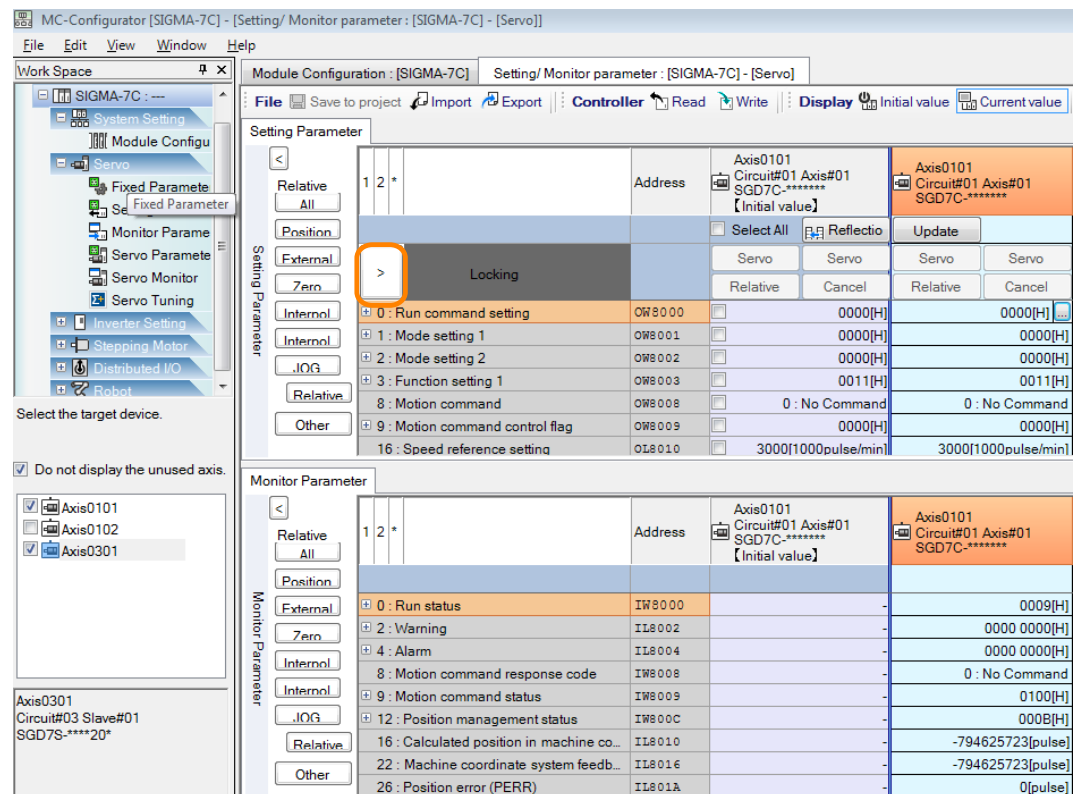
The [Setting/Monitor parameter] tab page will be displayed.

3. Select the motion command for which to check the operation.



The parameters that are related to the selected motion command will be displayed.

4. Click and hold down the [►] button next to the [Locking] cell and slide it to the right.



The controls will be unlocked.

3.6 Checking Operation by Sensing Individual Motion Commands

MC-Configurator [SIGMA-7C] - [Setting/ Monitor parameter : [SIGMA-7C] - [Servo]]

File Edit View Window Help

Work Space

Module Configuration : [SIGMA-7C] Setting/ Monitor parameter : [SIGMA-7C] - [Servo]

File Save to project Import Export Controller Read Write Display Initial value Current value

Setting Parameter

1	2	*	Address	Axis0101 Circuit#01 Axis#01 SGD7C-***** [Initial value]	Axis0101 Circuit#01 Axis#01 SGD7C-*****
				Select All Reflecto	Update
				Servo Servo	Servo Servo
				Relative Cancel	Relative Cancel
0	:	Run command setting	0W8000	0000[H]	0000[H]
1	:	Mode setting 1	0W8001	0000[H]	0000[H]
2	:	Mode setting 2	0W8002	0000[H]	0000[H]
3	:	Function setting 1	0W8003	0011[H]	0011[H]
8	:	Motion command	0W8008	0 : No Command	0 : No Command
9	:	Motion command control flag	0W8009	0000[H]	0000[H]
16	:	Speed reference setting	0L8010	3000[1000pulse/min]	3000[1000pulse/min]

Monitor Parameter

1	2	*	Address	Axis0101 Circuit#01 Axis#01 SGD7C-***** [Initial value]	Axis0101 Circuit#01 Axis#01 SGD7C-*****
0	:	Run status	IW8000	-	0009[H]
2	:	Warning	IL8002	-	0000 0000[H]
4	:	Alarm	IL8004	-	0000 0000[H]
8	:	Motion command response code	IW8008	-	0 : No Command
9	:	Motion command status	IW8009	-	0100[H]
12	:	Position management status	IW800C	-	000B[H]
16	:	Calculated position in machine co...	IL8010	-	-794625724[pulse]
22	:	Machine coordinate system feedb...	IL8016	-	-794625723[pulse]
26	:	Position error (PERR)	IL801A	-	0[pulse]

5. Click the [Servo] button on the left side.

MC-Configurator [SIGMA-7C] - [Setting/ Monitor parameter : [SIGMA-7C] - [Servo]]

File Edit View Window Help

Work Space

Module Configuration : [SIGMA-7C] Setting/ Monitor parameter : [SIGMA-7C] - [Servo]

File Save to project Import Export Controller Read Write Display Initial value Current value

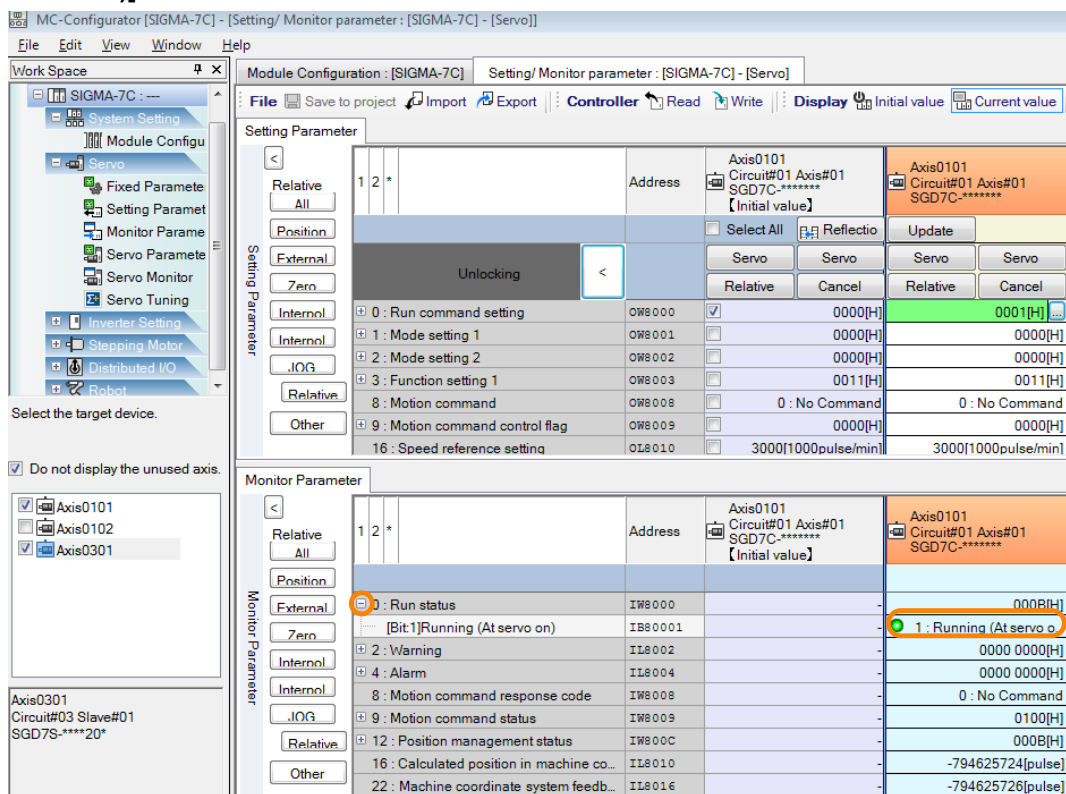
Setting Parameter

1	2	*	Address	Axis0101 Circuit#01 Axis#01 SGD7C-***** [Initial value]	Axis0101 Circuit#01 Axis#01 SGD7C-*****
				Select All Reflecto	Update
				Servo Servo	Servo Servo
				Relative Cancel	Relative Cancel
0	:	Run command setting	0W8000	0000[H]	0000[H]
1	:	Mode setting 1	0W8001	0000[H]	0000[H]
2	:	Mode setting 2	0W8002	0000[H]	0000[H]
3	:	Function setting 1	0W8003	0011[H]	0011[H]
8	:	Motion command	0W8008	0 : No Command	0 : No Command
9	:	Motion command control flag	0W8009	0000[H]	0000[H]
16	:	Speed reference setting	0L8010	3000[1000pulse/min]	3000[1000pulse/min]

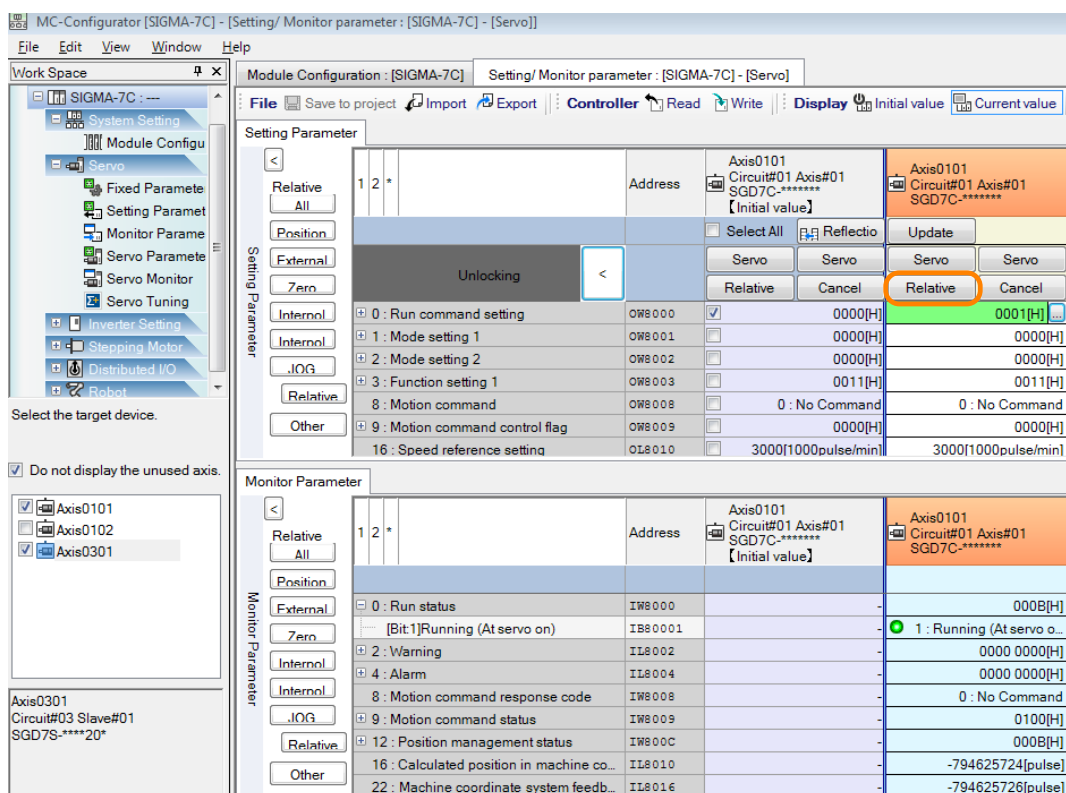
Monitor Parameter

1	2	*	Address	Axis0101 Circuit#01 Axis#01 SGD7C-***** [Initial value]	Axis0101 Circuit#01 Axis#01 SGD7C-*****
0	:	Run status	IW8000	-	0009[H]
2	:	Warning	IL8002	-	0000 0000[H]
4	:	Alarm	IL8004	-	0000 0000[H]
8	:	Motion command response code	IW8008	-	0 : No Command
9	:	Motion command status	IW8009	-	0100[H]
12	:	Position management status	IW800C	-	000B[H]
16	:	Calculated position in machine co...	IL8010	-	-794625724[pulse]
22	:	Machine coordinate system feedb...	IL8016	-	-794625723[pulse]
26	:	Position error (PERR)	IL801A	-	0[pulse]

- Click **[+]** next to **[0: Run status]** on the **[Monitor Parameter]** tab page, and confirm that the cell that corresponds to **[[Bit:1] Running (At servo on)]** is set to **[1: Running (At servo on)]**.



- 7. Click a motion command button.**

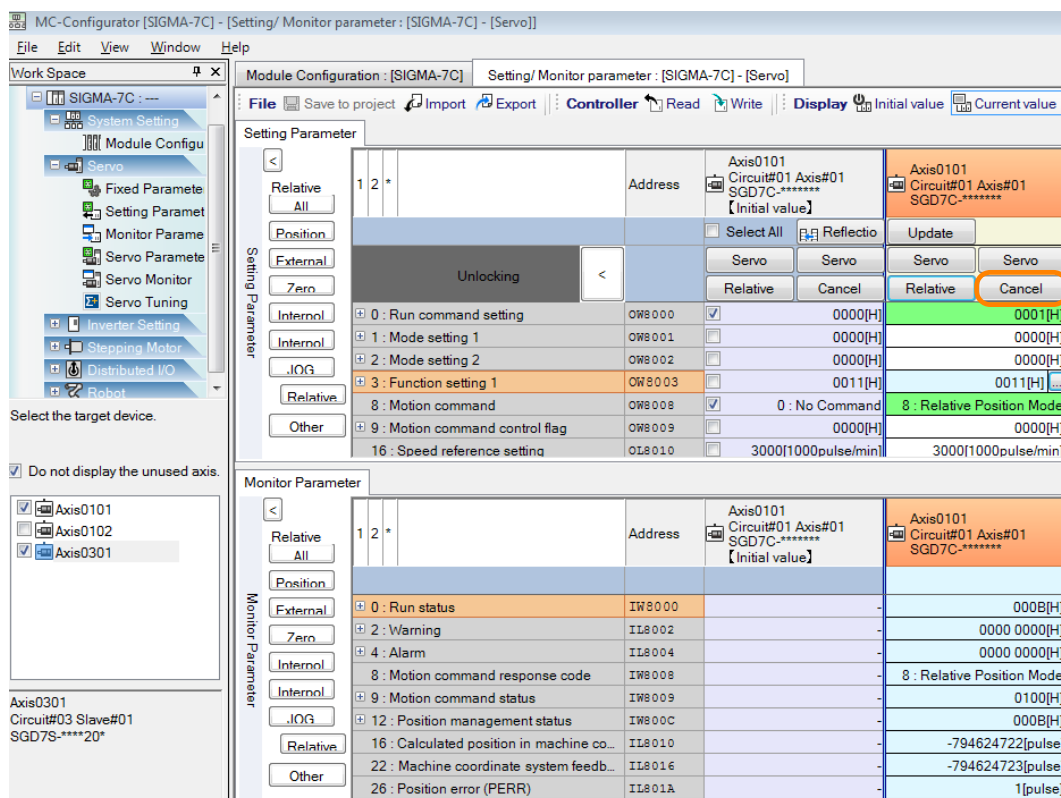


Information The [Relative] button is shown in the example given above.

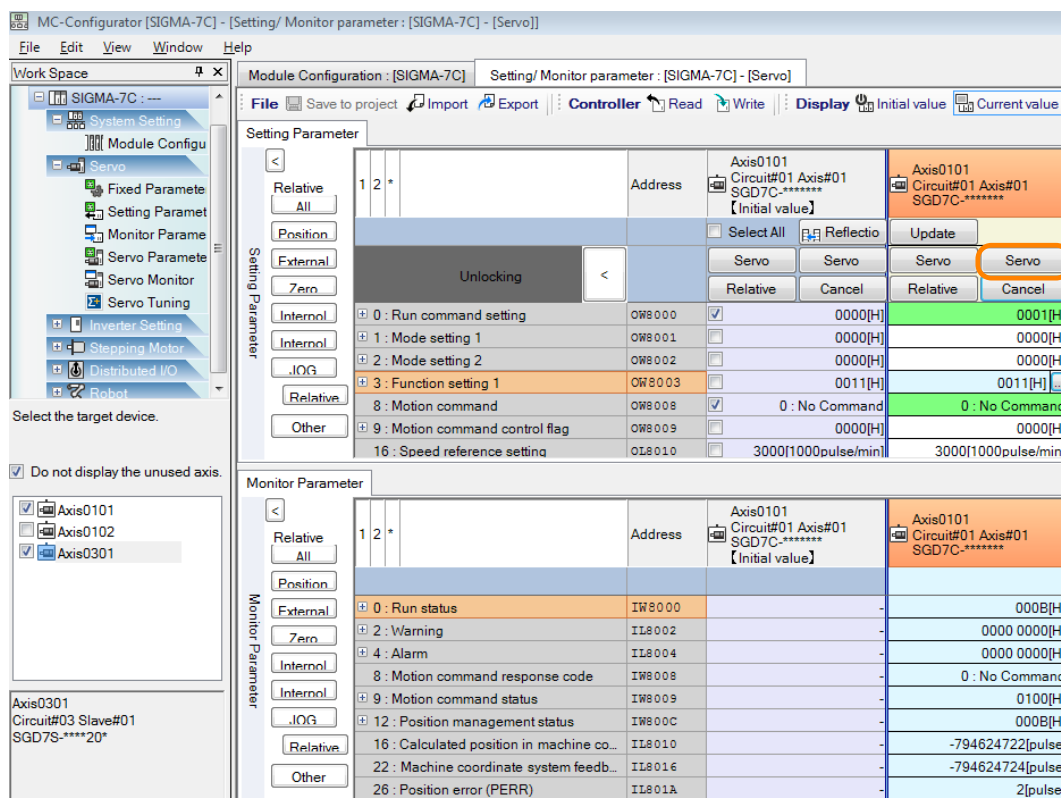
The motion command will be sent to the SERVOPACK.

- 8. Check the operation of the SERVOPACK.**

9. Click the [Cancel] button.



10. Click the [Servo] button on the right side.



This concludes the procedure.

3.7 Using an Absolute Encoder

The flow for setting up an absolute encoder is given below.

1. Preliminary Check Items
2. Initialize the Absolute Encoder

Note:

The procedure to initialize the absolute encoder depends on your option module (your servomotor and the communications references of the SERVOPACK).

3.7.1 Preliminary Check Items

Confirm that all preliminary check items that are listed below are satisfied.

Check Item	Checking Method ^{*1}	Action If the Preliminary Check Item Is Not Satisfied ^{*1}
The servomotor, SERVOPACK, and cables must be compatible with an absolute encoder.	Refer to the manual provided with each device for checking methods.	Replace the servomotor, SERVOPACK, or cables with products that are compatible with an absolute encoder.
The SERVOPACK and servomotor must be ready for synchronized communications.	Bit 0 (Motion controller operation ready) in monitor parameter IW□□□00 must be set to 1 (Operation Ready).	Refer to the manual of the motion control function to be used for details on monitor parameters.
The servomotor must be OFF.	Bit 1 (Running (At Servo ON)) in monitor parameter IW□□□00 must be set to 0 (Servo OFF).	Set bit 0 (Servo ON) in setting parameter OW□□□00 to 0 (OFF).
Motion command execution must be completed.	Monitor parameter IW□□□08 (Motion command response code) must be set to 0 (No command).	Set setting parameter OW□□□08 (Motion command) to 0 (No command).
	Bit 0 (Command execution flag) in monitor parameter IW□□□09 must be set to 0 (Ready).	Wait until command execution is completed, or until command cancellation is completed.
The servo parameters must be set to use the encoder as an absolute encoder.	The second digit (Use of absolute encoder) of servo parameter Pn002 must be set to 0 (Use absolute encoder as an absolute encoder).	Set the second digit (Use of absolute encoder) of servo parameter Pn002 to 0 (Use absolute encoder as an absolute encoder).

*1 Refer to the following section for details.

 [3.5.3 Checking and Editing Setting Parameters on page 150](#)

Information

The □□□ portion of the register address for motion parameters is determined by the circuit number and the axis number. Refer to the manual of the motion control function to be used for details.

3.7.2 Initializing the Absolute Encoder (SVC/SVF Module)

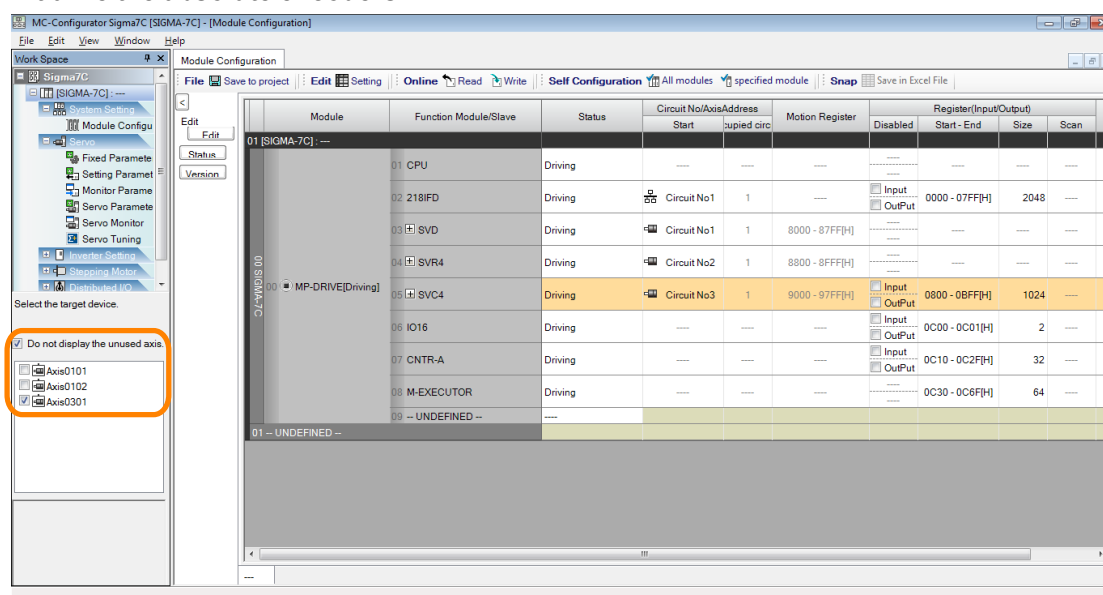
There are two methods that you can use to initialize the absolute encoder if you are using the SVC/SVF module.

Window Used	Description
Edit Ladder Program Window	Create a ladder program to initialize the absolute encoder. It may take time to create a ladder program for this, but once it has been created, it can be used repeatedly whenever it is necessary to initialize the absolute encoder. This is the recommended approach if you have to initialize the absolute encoder often. Refer to the following manual for details. • SVC module  MP3000 Series Motion Control User's Manual (Manual No. SIEP C880725 11) • SVF module  MP3000 Series SVF-01 Motion Module User's Manual (Manual No. SIEP C880725 43)
Module Configuration Window	The absolute encoder is initialized by temporarily changing parameters in the Module Configuration Window. This approach is recommended if you want to initialize the absolute encoder for testing purposes.

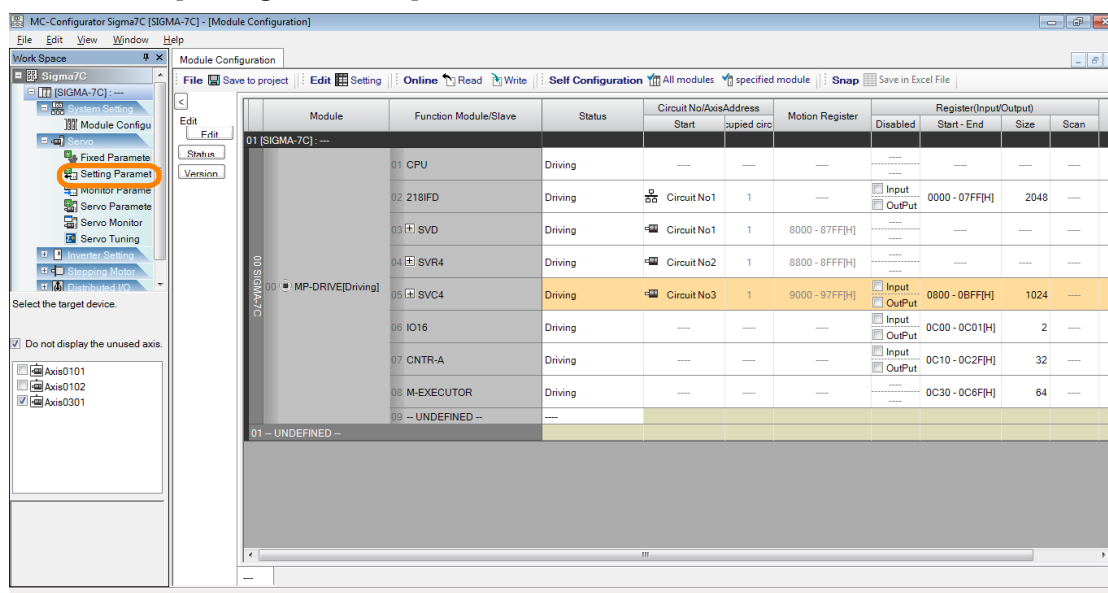
3.7 Using an Absolute Encoder

Use the following procedure to initialize the absolute encoder by using the Module Configuration Window.

1. In the [Work Space] window, select the check boxes for the axes for which you want to initialize the absolute encoders.

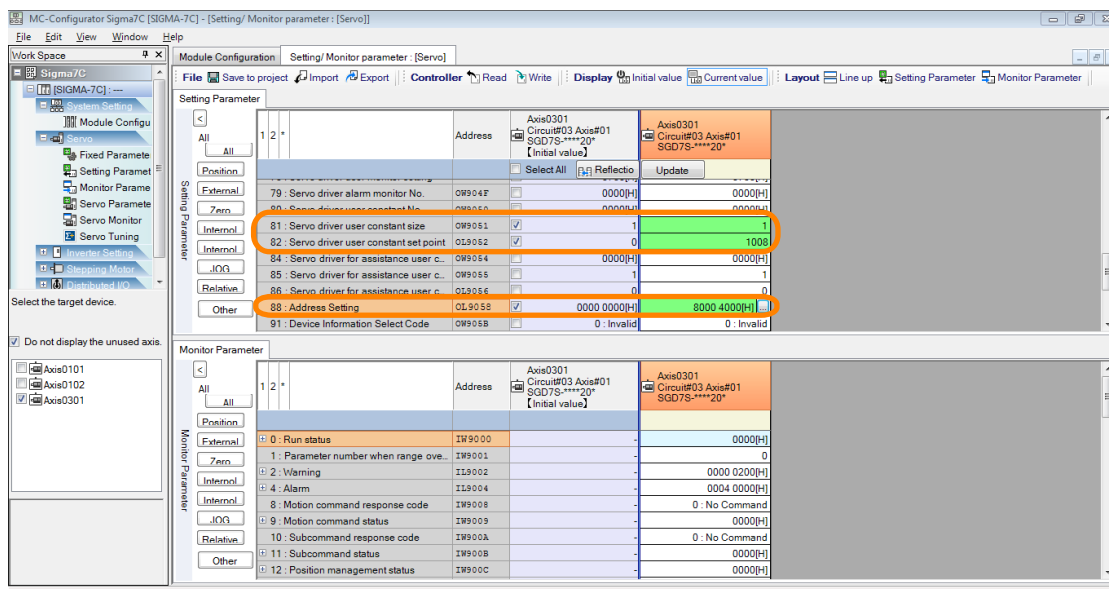


2. Double-click [Setting Parameter].



3. Set the following items.

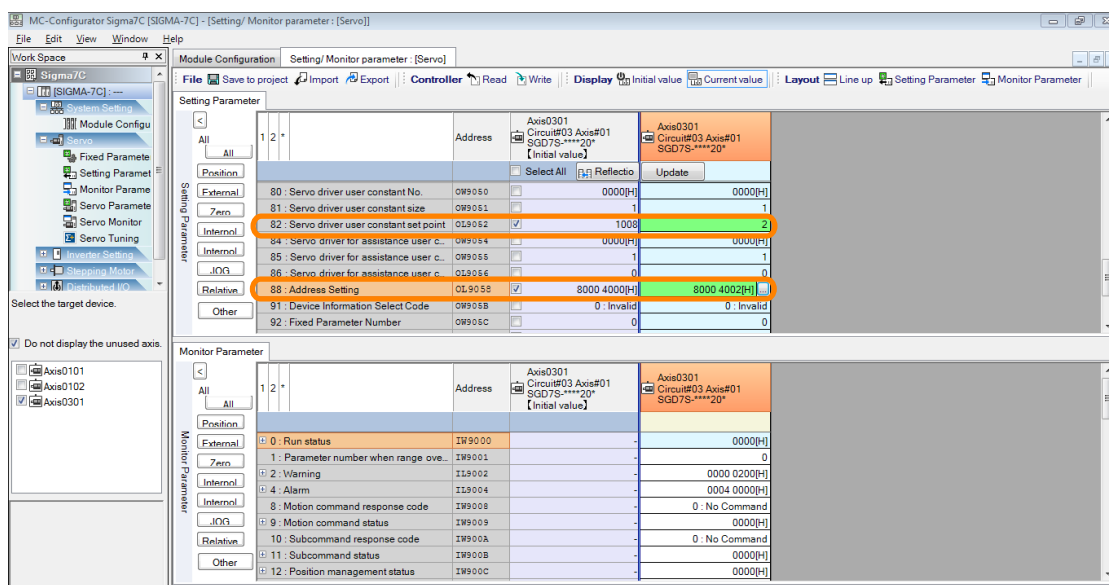
Register Address	Parameter Name	Setting	Description
OW□□□51	Servo driver user constant size	1	Number of words
OL□□□52	Servo driver user constant set point	1008H	Absolute encoder reset request code
OL□□□58	Address Setting	80004000H	Virtual memory address in the SERVOPACK



The absolute encoder initialization request will be sent.

4. Set the following items.

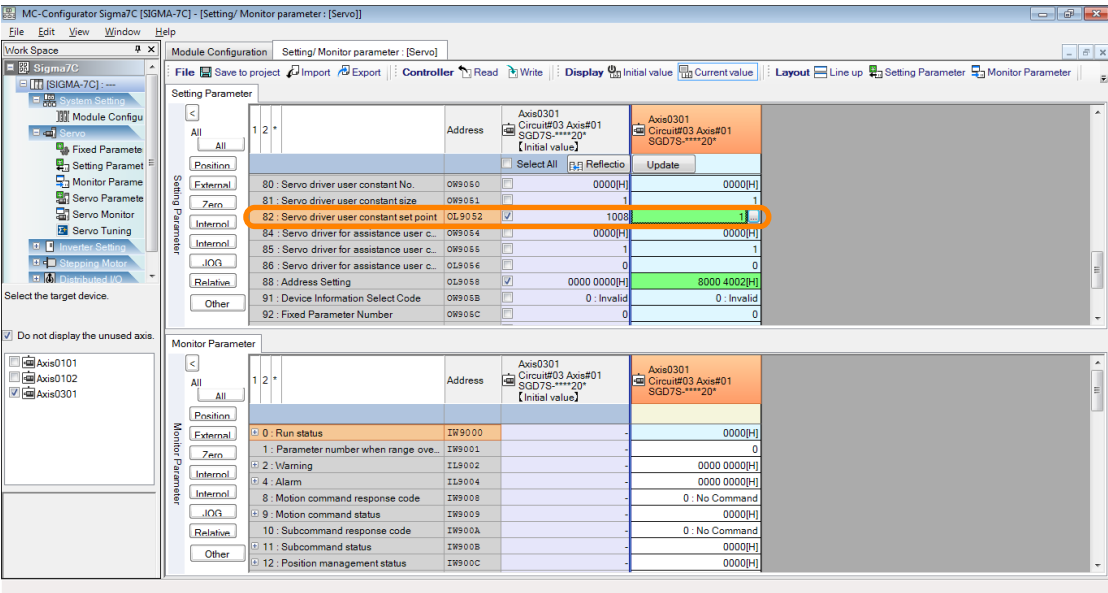
Register Address	Parameter Name	Setting	Description
OL□□□52	Servo driver user constant set point	2	The code required for the preliminary processing
OL□□□58	Address Setting	80004002H	Virtual memory address in the SERVOPACK



Preparations will be made for execution of the absolute encoder initialization.

5. Set the following items.

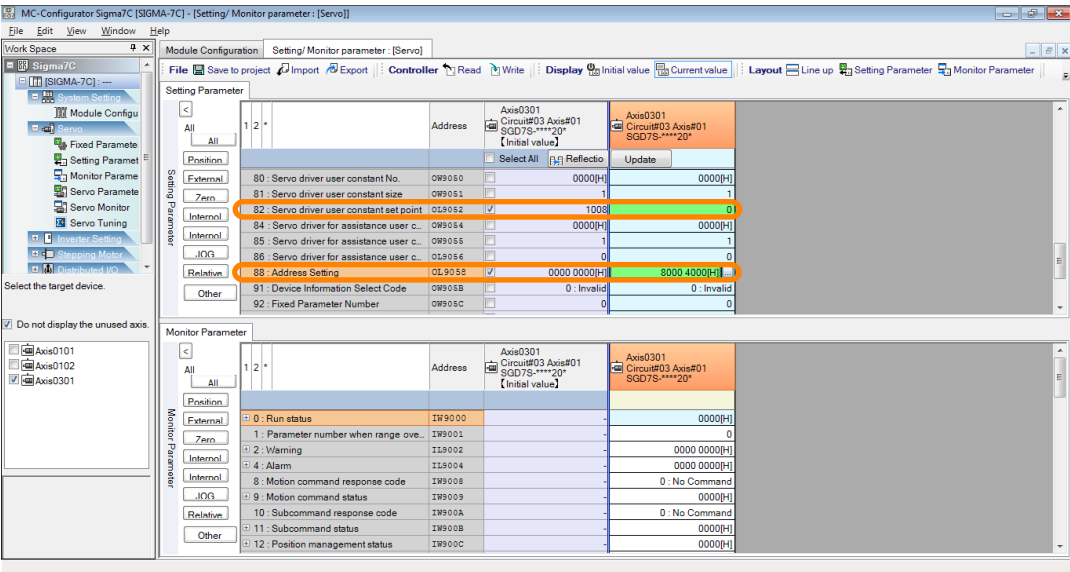
Register Address	Parameter Name	Setting	Description
OL□□□52	Servo driver user constant set point	1	The code required to send the data and perform the calibration operation



The absolute encoder will be initialized.

6. Set the following items.

Register Address	Parameter Name	Setting	Description
0L□□□52	Servo driver user constant set point	0	The code required to send the data and complete the calibration operation
0L□□□58	Address Setting	80004000H	Virtual memory address in the SERVOPACK



This concludes execution of the absolute encoder initialization.

7. Turn the power to the SERVOPACK OFF and ON again.

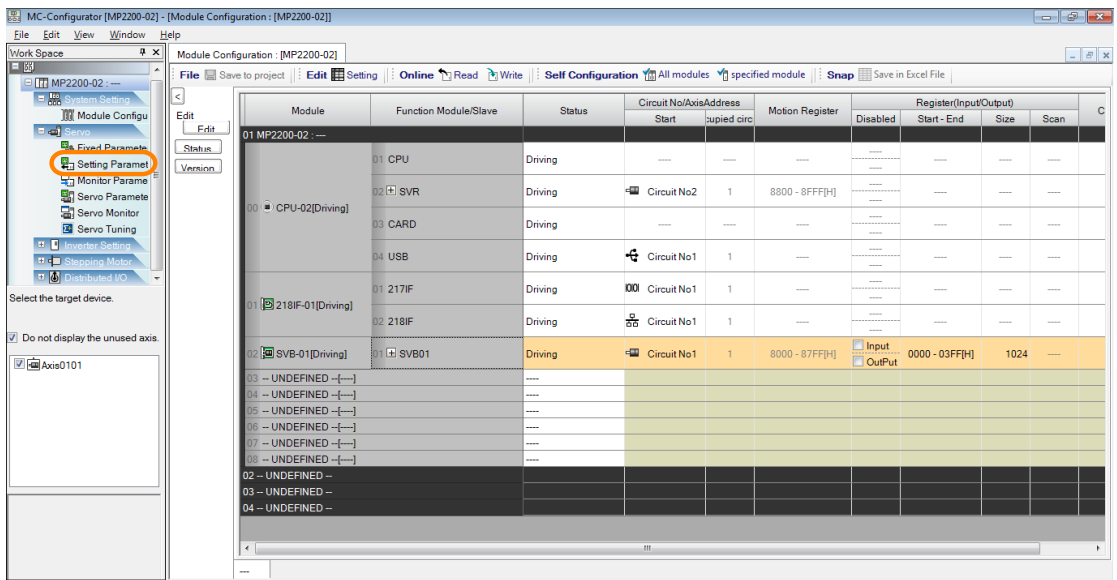
The settings will be enabled.

This concludes the procedure.

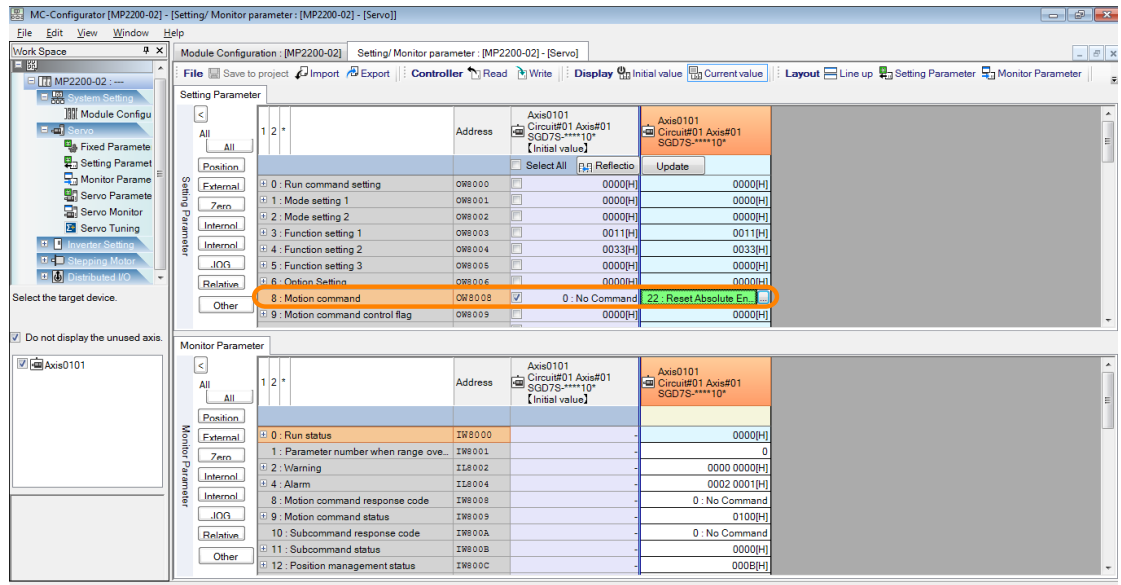
3.7.3 Initializing the Absolute Encoder (SVB Module)

Use the following procedure to initialize the absolute encoder if you are using the SVB module.

- 3



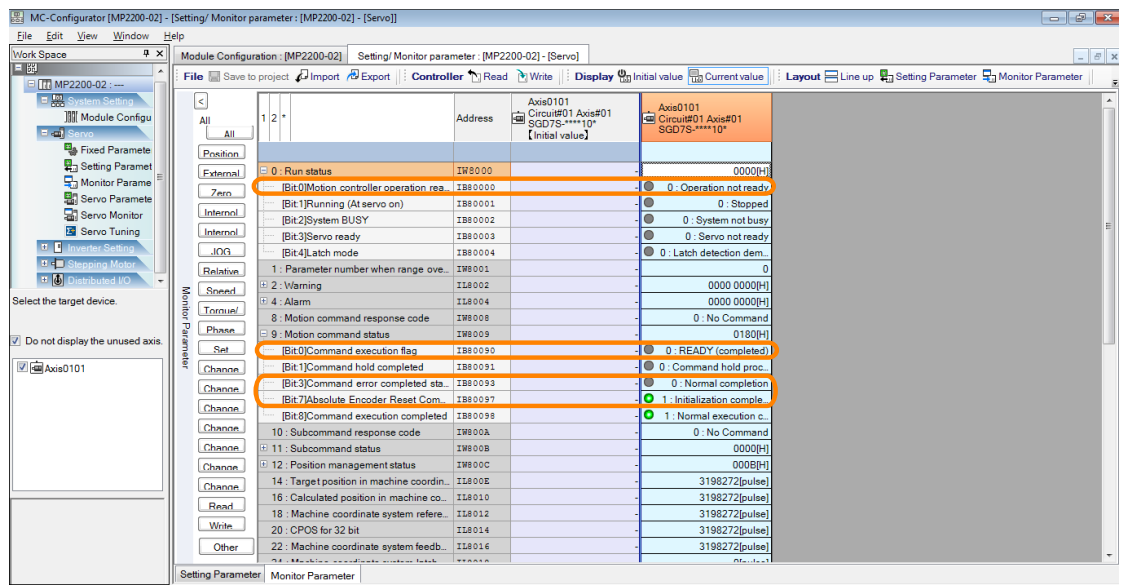
3. Set OW□□08 (Motion command) to 22 (Reset Absolute Encoder).



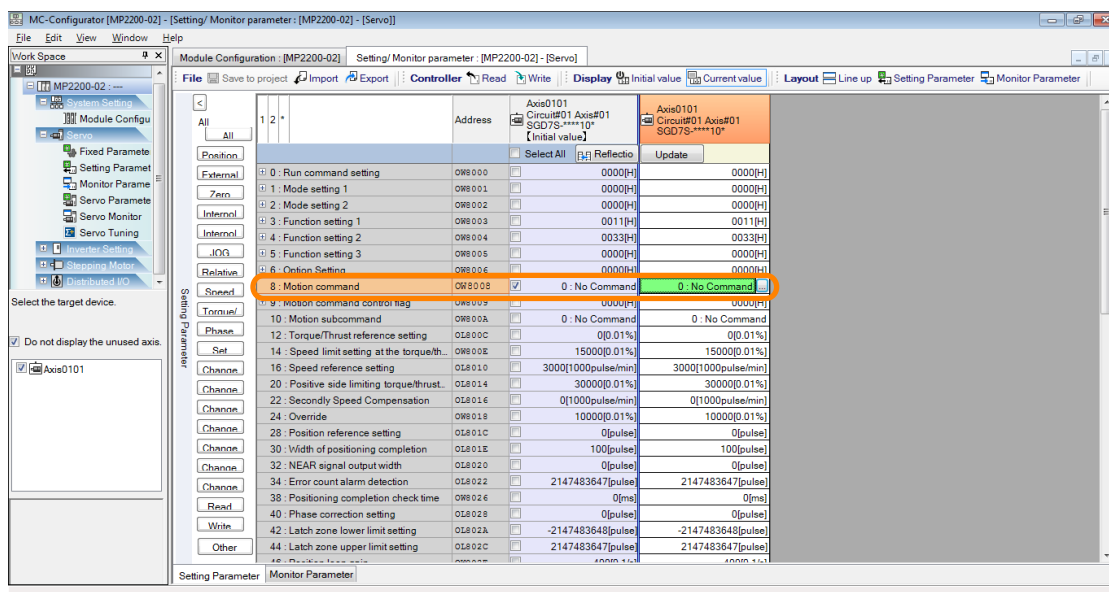
The absolute encoder will be initialized.

4. Check that the following monitor parameter is set as given below.

- IW□□00 bit 0 (Motion controller operation ready) is 0 (Operation not ready).
- IW□□09 bit 0 (Command execution flag) is 0 (READY (completed)).
- IW□□09 bit 3 (Command error completed status) is 0 (Normal completion).
- IW□□09 bit 7 (Absolute Encoder Reset Completed) is 1 (Initialization completed).



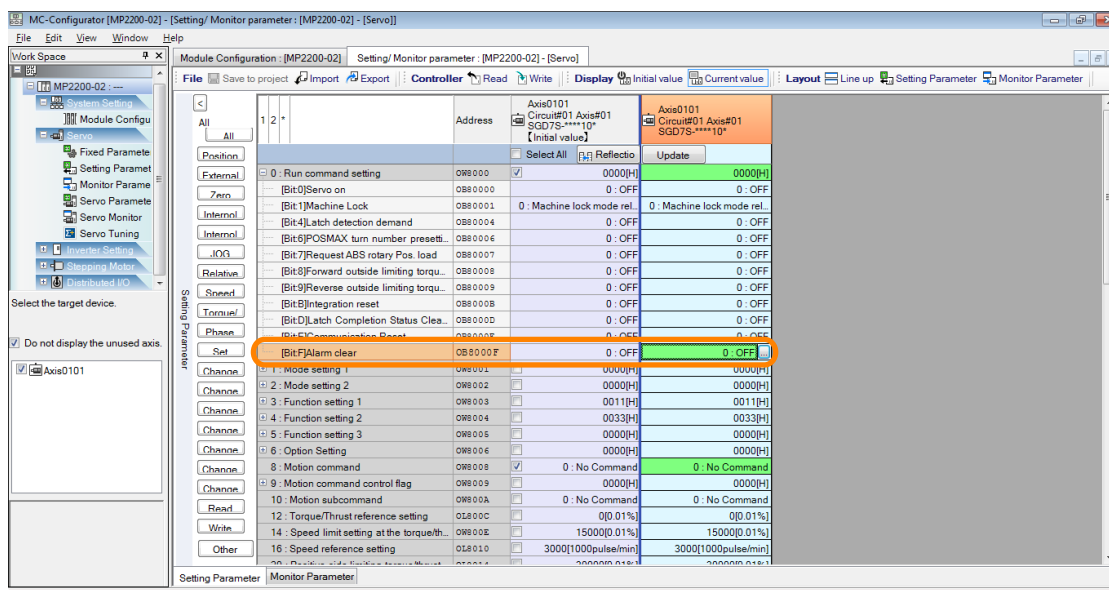
5. Set OW□□08 (Motion command) to 0 (No Command).



This concludes the initialization of the absolute encoder.

6. Turn the power to the SERVOPACK OFF and ON again.

7. Set OW□□00 bit F (Alarm clear) to 1 (ON).

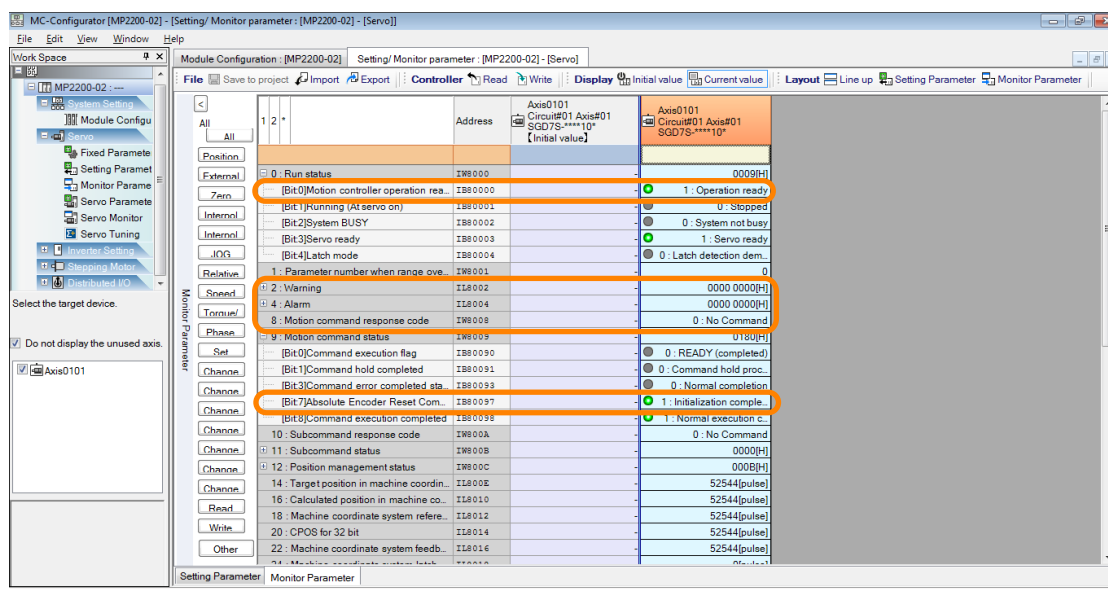


Any alarms that occurred while initializing the absolute encoder will be reset.

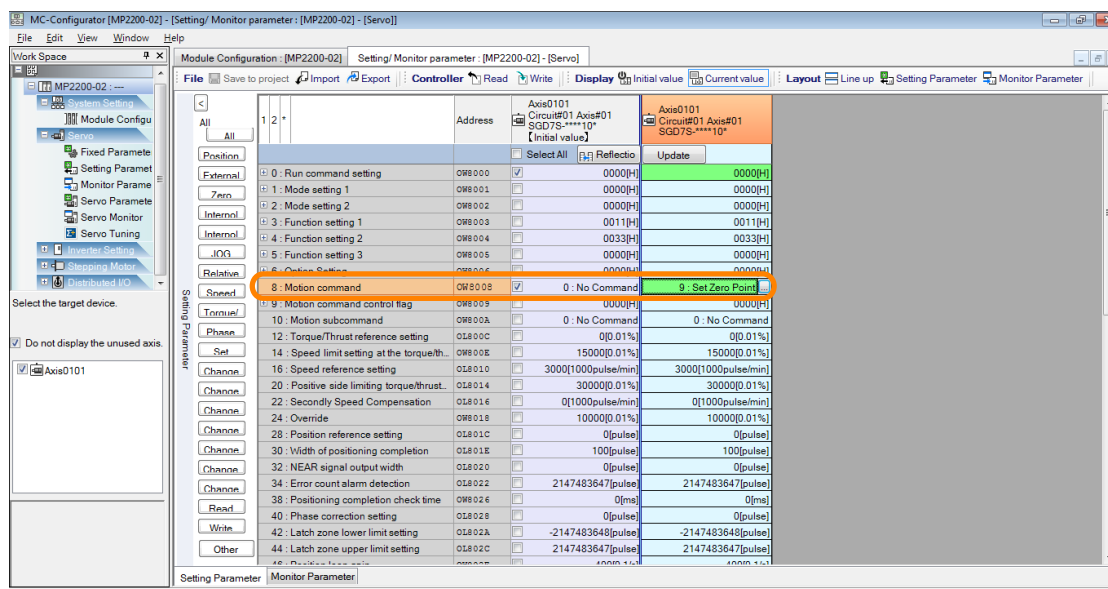
8. Check that the following monitor parameter is set as given below.

- IB□□00 (Motion controller operation ready) is 1 (Operation ready).
- IL□□02 (Warning) is 0.
- IL□□04 (Alarm) is 0.
- IW□□08 (Motion command response code) is 0 (No Command).
- IW□□09 bit 7 (Absolute Encoder Reset Completed) is 1 (Initialization completed).

3.7 Using an Absolute Encoder



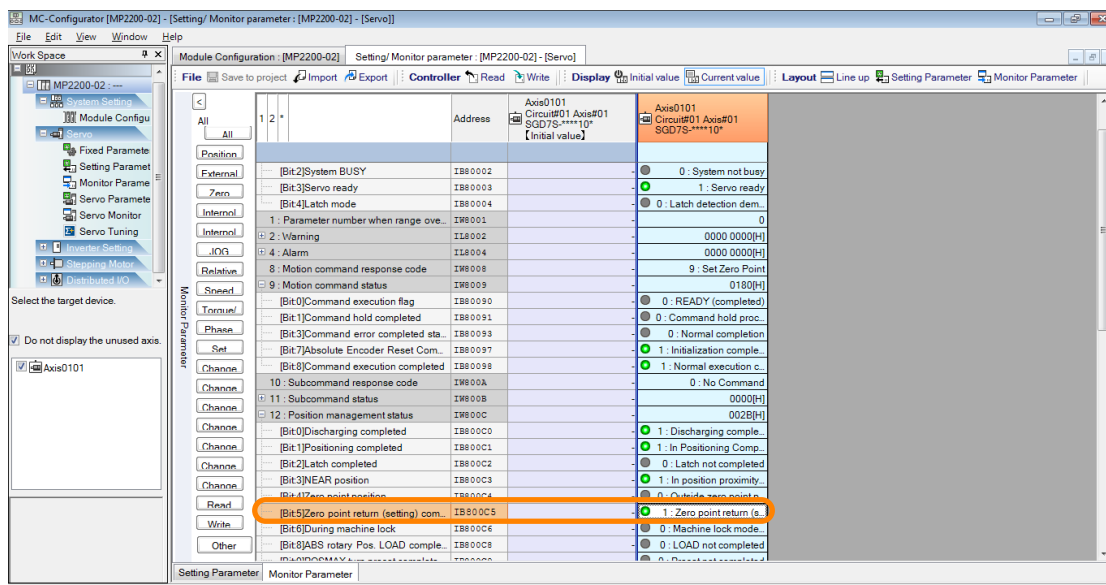
9. Set OW□□08 (Motion command) to 9 (Set Zero Point).



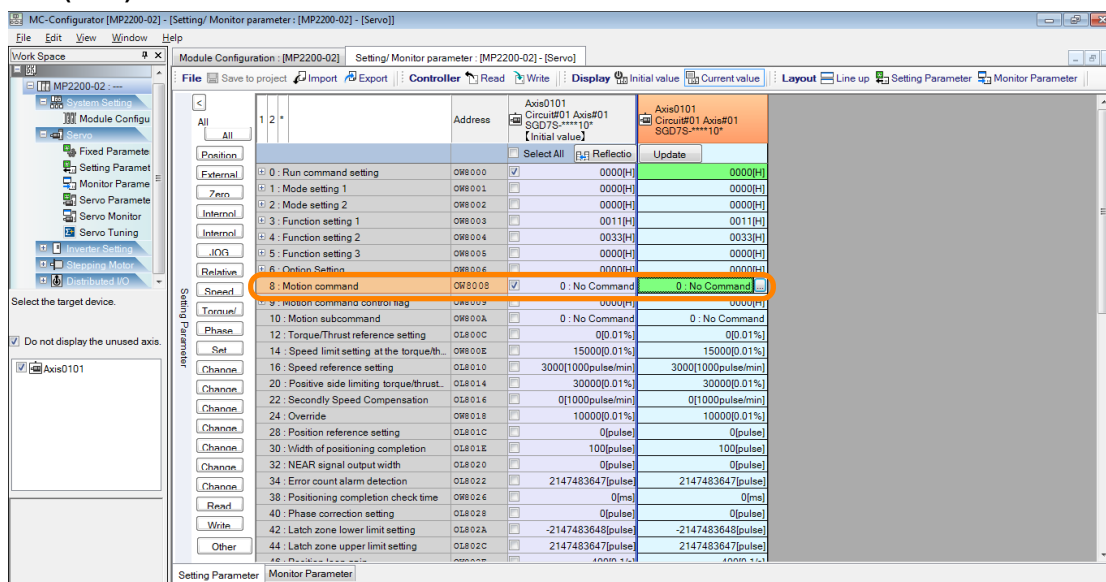
The zero point will be set.

10. Check that the following monitor parameter is set as given below.

- IW□□0C bit 5 (Zero point return (setting) completed) is 1 (Zero point return completed).

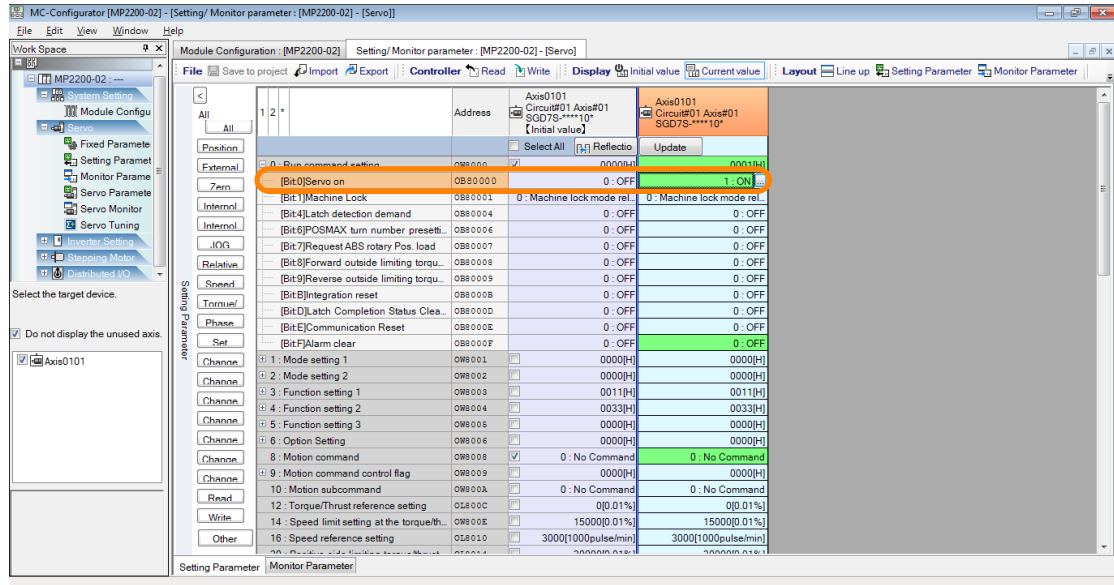


11. Set OW□□08 (Motion command) to 0 (No Command), and set OW□□00 bit F (Alarm clear) to 0 (OFF).



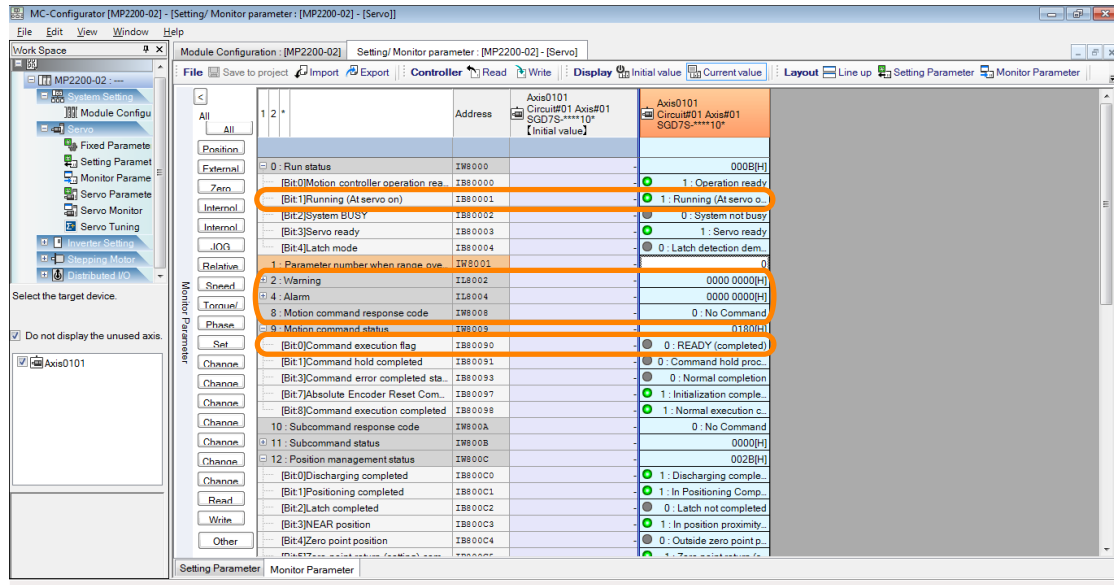
This concludes the zero point setting.

12. Set OW□□00 bit 0 (Servo on) to 1 (ON).

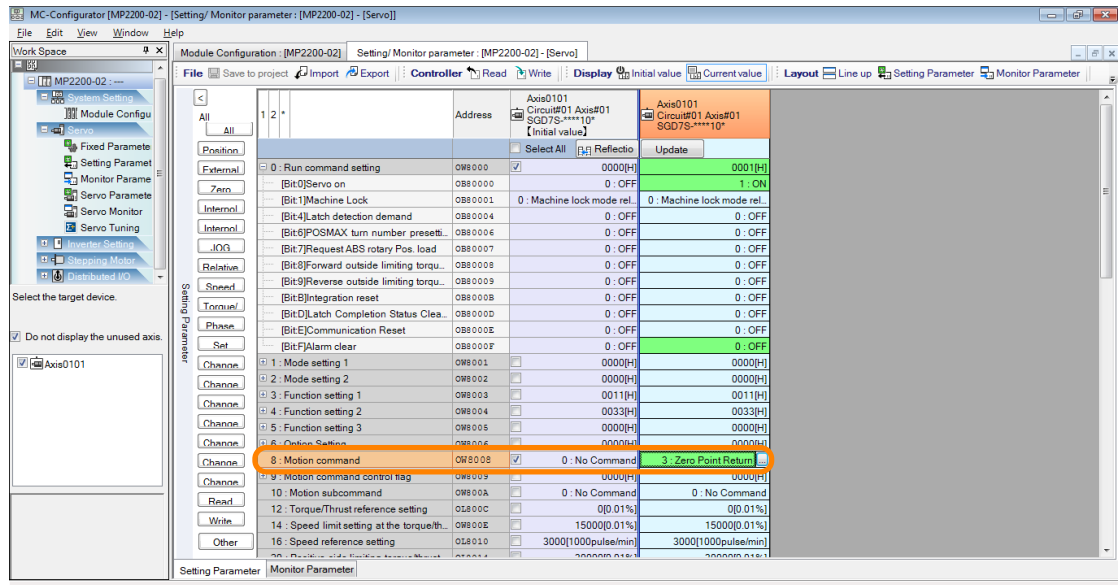


13. Check that the following monitor parameter is set as given below.

- IW□□00 bit 1 (Running (At Servo ON)) is 1 (Running (At Servo ON)).
- IL□□02 (Warning) is 0.
- IL□□04 (Alarm) is 0.
- IW□□08 (Motion command response code) is 0 (No Command).
- IW□□09 bit 0 (Command execution flag) is 0 (READY (completed)).

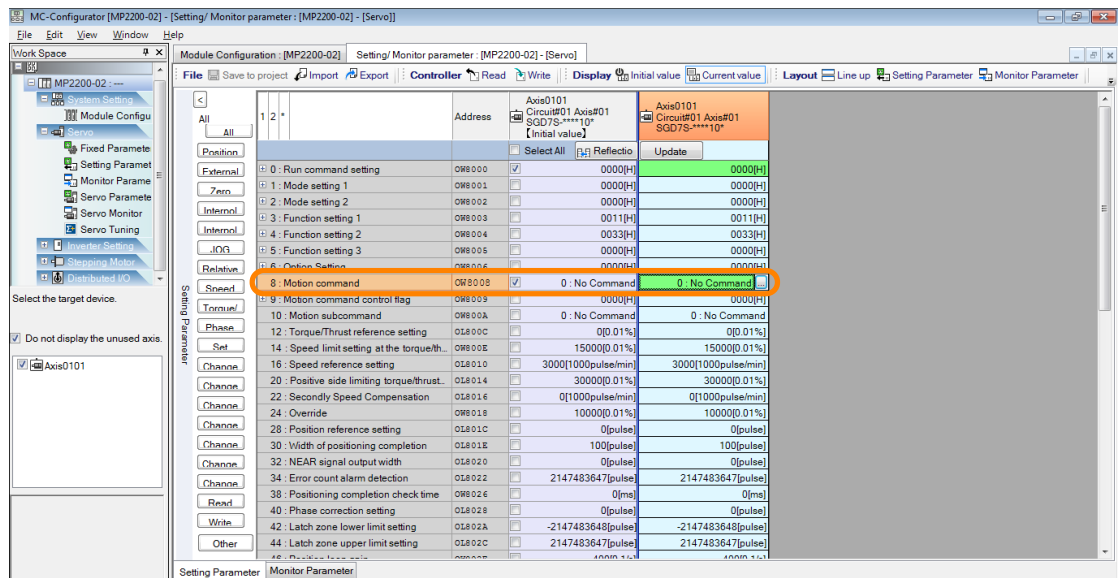


14. Set OW□□08 (Motion command) to 3 (Zero Point Return).



A zero point return will be executed.

15. Set **OW□□08 (Motion command)** to 0 (No Command).



This concludes the zero point return.

This concludes the procedure.

3.8 Functions Linked to the SigmaWin+

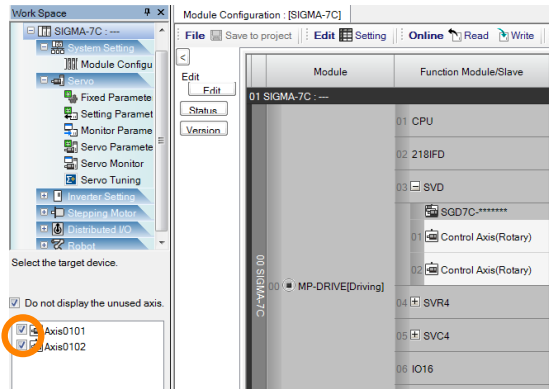
This section describes functions that are available when the SigmaWin+ is started from the MPE720.

- Information
- Refer to the following sections for checking, editing, and saving servo parameters.
-  [3.5.6 Checking and Editing Servo Parameters on page 157](#)
-  [3.5.7 Saving the Servo Parameters on page 166](#)

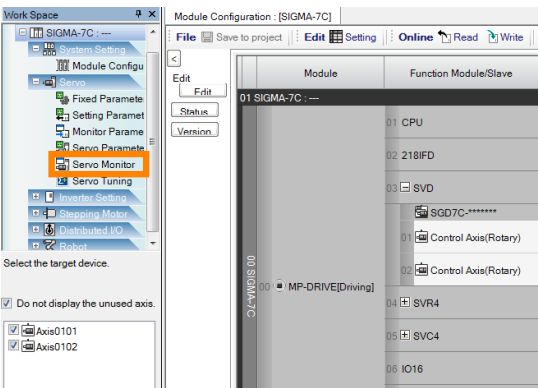
3.8.1 Checking the Servo Status

Use the following procedure to check the servo status.

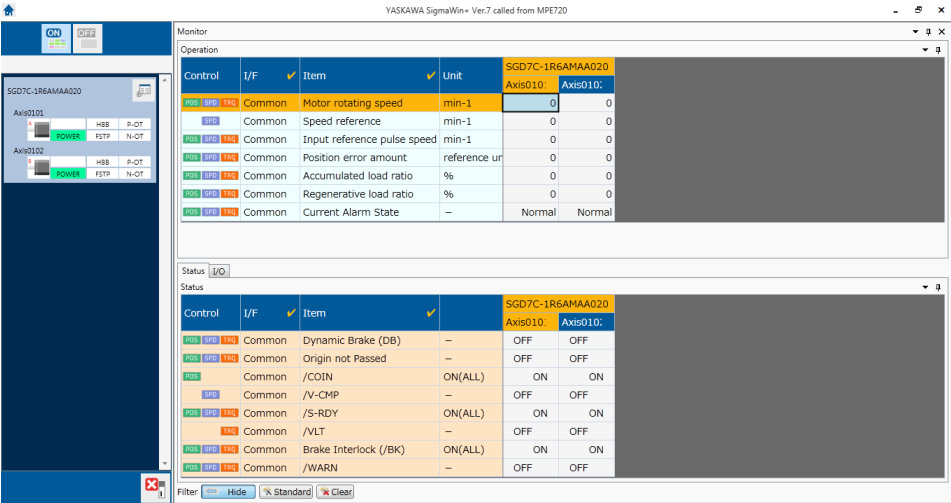
1. In the [Work Space] window, select the check boxes for the axes for which you want to check the status.



2. Double-click [Servo Monitor].



The SigmaWin+ will be started with the selected axis allocated, and the [Monitor] window will be displayed.

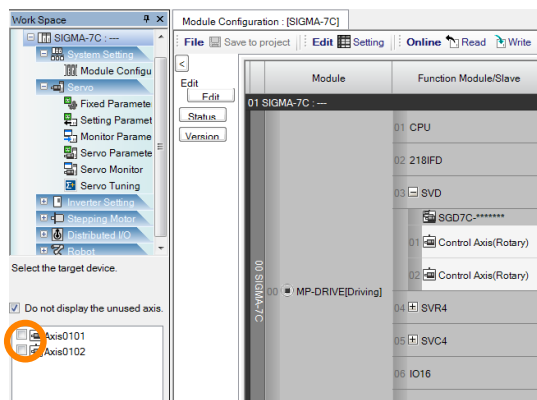


This concludes the procedure.

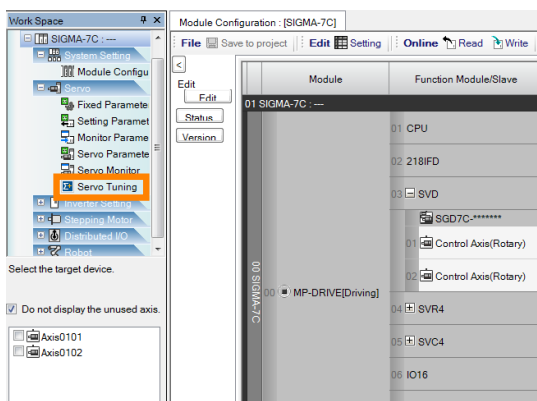
3.8.2 Adjusting the Servo

The servo is adjusted to improve the servo response to the condition of the machine and actual operating conditions. Use the following procedure.

1. In the [Work Space] window, select the check boxes for the axes to adjust.

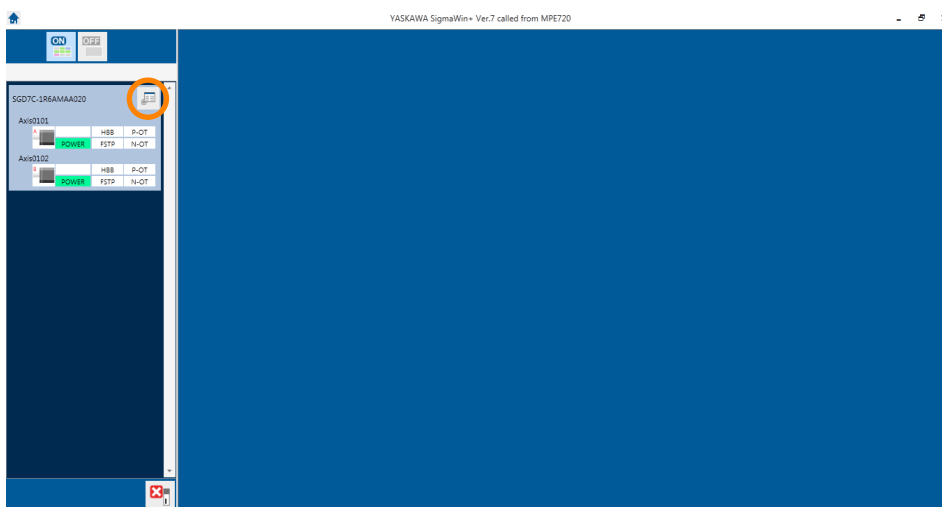


2. Double-click [Servo Tuning].



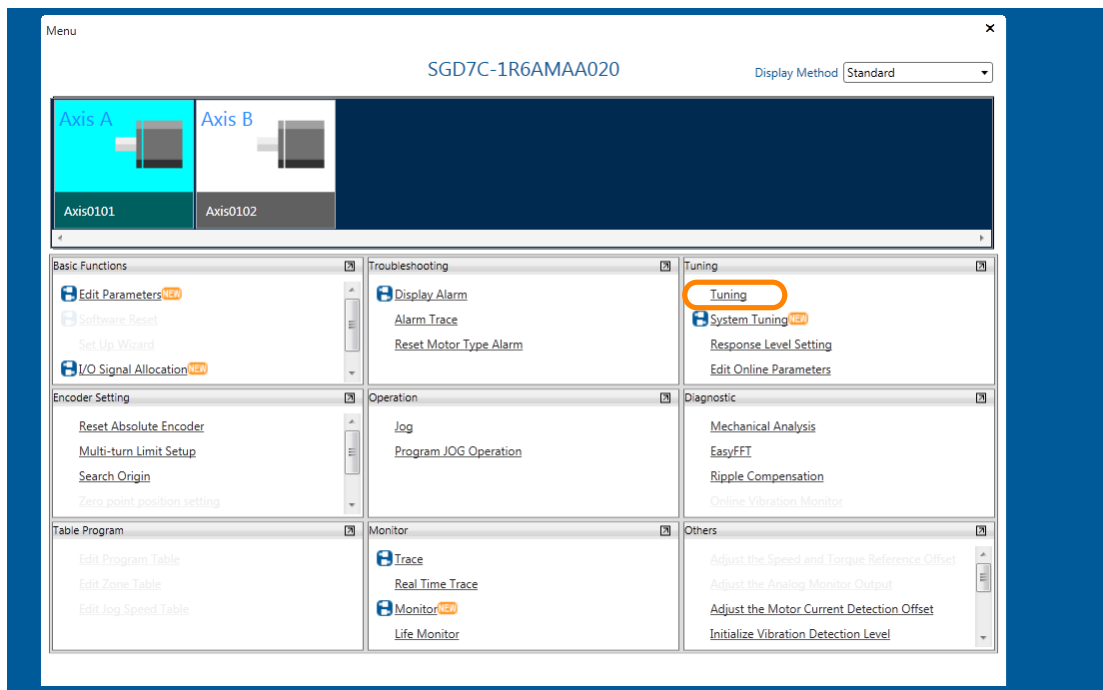
The SigmaWin+ will be started with the selected axes allocated.

3. Click the [Menu] button.



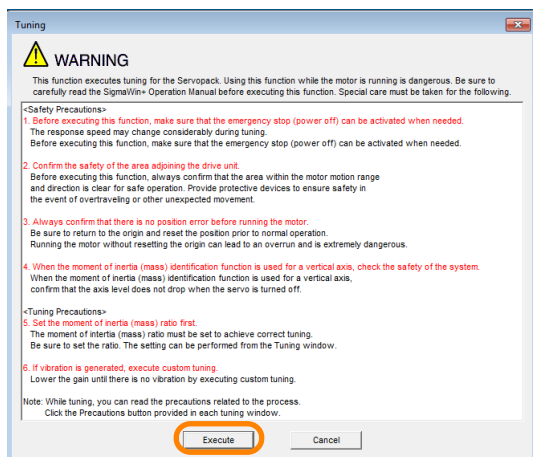
The [Menu] window will be displayed.

4. Click [Tuning].

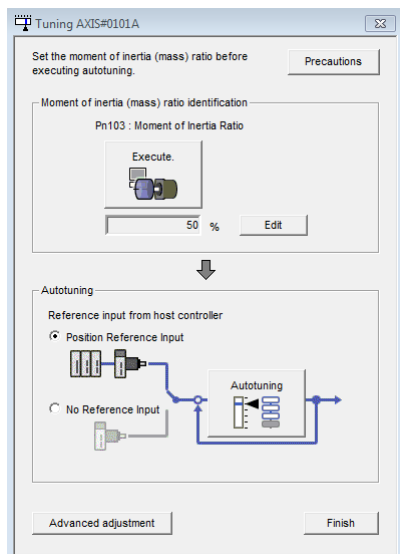


A message dialog box will be displayed.

5. Read the precautions, and then click the [Execute] button.



The [Tuning] window will be displayed.



Refer to the following manual for operating procedures and details on adjusting the servo.

AC Servo Drive Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

This concludes the procedure.

3.8.3 Comparing Parameters in the [Edit Parameters] Window to Parameters in an MPE720 Project File

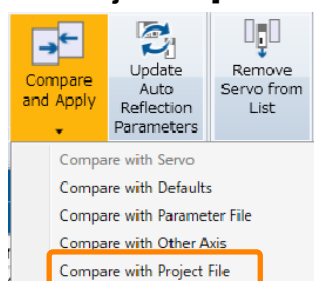
You can compare the parameters in the [Edit Parameters] window to the parameters in an MPE720 project file (extension: .YMW7 or YMW).

The supported versions are:

- MPE720 version 7.51 or later
- SigmaWin+ version 7.31 or later

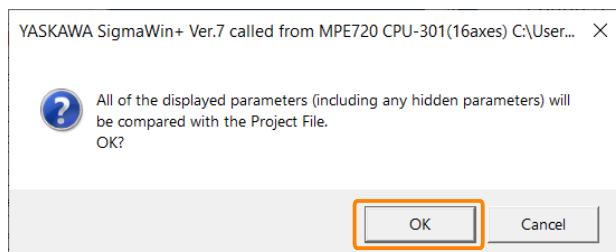
Use the following procedure.

1. In the SigmaWin+ [Edit Parameters] window, click [Compare and Apply] - [Compare with Project File].



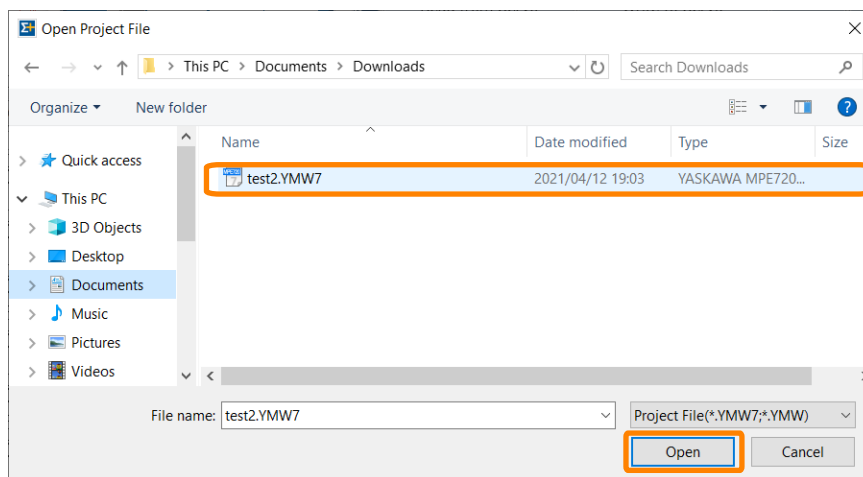
A message dialog box will be displayed.

2. Click the [OK] button.



The [Open Project File] window will be displayed.

3. Select the project file to compare, and then click the [Open] button.



The [Select Axes] window will open and the axes set in the selected project file will be displayed.

4. Select the axis to compare, and then click the [OK] button.

Information You cannot select an axis that does not have parameters set.

Select Axes

SERVOPACK List

Connect	Circuit No.	Axis No.(Station Address)	SERVOPACK	Servomotor	Options	Axis Name	Axis Name	Remarks
☒	1	01(03)	SGD7S-****20*	-----	-----	-----	Axis#0101:-----	
☐	1	02(04)	SGD7S-****20*	-----	-----	-----	Axis#0102:-----	
☐	1	03(05)	SGD7S-****20*	-----	-----	-----	Axis#0103:-----	There are no parameters saved in the project files
☐	1	04(06)	SGD7S-****20*	-----	-----	-----	Axis#0104:-----	There are no parameters saved in the project files

OK

Cancel

If multiple axes are displayed in the [Edit Parameters] window, the [Applicable Axis Selection] window will be displayed.

5. Select the axis to compare, and then click the [OK] button.

Applicable Axis Selection

Axis Selected in Project File

FILE-SGD7S-****20*Axis A

Applicable Axis

When applying the settings, the settings may not be correctly applied if the models, specifications, or other information are different.

☐	SERVOPACK name	Axis Name	Differences with Project File
☐	SGD7S-****20*	Axis#0101	
☒	SGD7S-****20*	Axis#0102	

OK

Cancel

The comparison results for the selected axes will be displayed in the [Edit Parameters] window.

Compare and Apply

Apply Settings with Differences

Export

End Compare and Apply

Apply

File

Close

No.	Name	Unit	FILE-SGD7S-***Axis A	SGD7S-****20*Axis#0102
☐ Pn104	Second Speed Loop Gain	0.1Hz	Base Axis Values400	☒ Applicable Axis Values500
☐ Pn105	Second Speed Loop Integral Time C	0.01ms	2000	2100
☐ Pn50A.3	P-OT (Forward Drive Prohibit) Sign...	—	1 : Enable forward...	0 : Enable forward drive when...
☐ Pn50B.0	N-OT (Reverse Drive Prohibit) Sign...	—	2 : Enable revers...	1 : Enable reverse drive when...
☐ Pn510.0	/NEAR (Near Output) Signal Allocat	—	0 : Disabled (the...	2 : Output the signal from the...

This concludes the procedure.

Settings Related to the Multiple Scans Function

This chapter describes the operations and settings required to use the multiple scans function.

4.1	Introduction to the Multiple Scans Function	194
4.2	[Navigation] Window	195
4.3	Scan Settings	197
4.3.1	Creating a Scan	197
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4.1 Introduction to the Multiple Scans Function

In this manual, a controller with a multi-core CPU is called a model that supports multiple scans as a generic term.

In a model that supports multiple scans, you can distribute the scans to different cores and execute those scans in parallel. The set of MPE720 functions for creating an application that includes parallel execution of scans is called the multiple scan function.

In addition, the CPUs that execute tasks and scans are given numbers (e.g., CPU0 and CPU1) for identification. This number is called the CPU number. This is currently fixed to "CPU0".

The scans are also given names (e.g., high-speed (H) and low-speed (L)) and numbers (e.g., Scan2 and Scan3) for identification. This number is called the scan number.

In the MPE720, the tasks and scans controlled by a CPU are displayed in the hierarchical structure of the [Navigation] window.

Information Refer to the product manual for your controller (a model that supports multiple scans) for details on tasks and scans.

The following items are important for distributing scans to each core and performing parallel execution of the motion of each axis by using the multiple scans function.

- The axis and the registers of the axis must be set to the same scan.
- The scan of the task and the scan of the axis used in the task must be the same.

Set the scan of an axis on the [Control Device/Group Definition] window. Refer to the following section for details.

 [4.4 Control Device/Group Definition Settings on page 202](#)

Set the registers of a scan on the [Register Map] window. Refer to the following section for details.

 [4.5 Configuring the Register Map Settings on page 214](#)

Check the scans of tasks on the [Navigation] window. Refer to the following section for details.

 [4.2 \[Navigation\] Window on page 195](#)

Check if the scans of tasks and the scans of axes used in tasks are the same on the [Search for Programs Used in Each Axis] window. Refer to the following section for details.

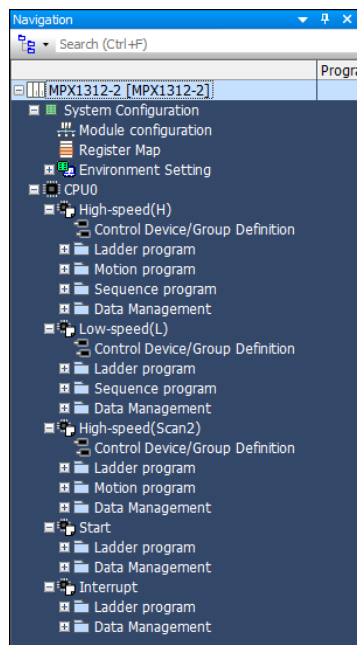
 [4.6 Checking the Distribution of Axes Using \[Search for Programs Used in Each Axis\] on page 226](#)

4.2 [Navigation] Window

The [Navigation] window is displayed only when using a model that supports multiple scans.

The [Navigation] window is automatically displayed at startup and when a project is created.

Items necessary for project management and programming can be found in the [Navigation] window.



The items displayed in the [Navigation] window are described below.

Item	Function	Reference
 Search (Ctrl+F) Collapse Other than this Hierarchy Collapse All Hierarchies Expanded All Hierarchies	Click this item to display the menu. Depending on the item you click, you can close all levels except the item selected in the [Navigation] window or open/close all levels of the tree.	—
Search	You can search for a text string in the [Navigation] window.	 (1) [Ladder] Window / [Navigation] Window on page 233  (1) [Motion] Window / [Navigation] Window on page 263
Project File Name	The name of the project file and the controller model are displayed.	—
System Configuration	Click the [+] and [-] buttons to open and close the following items.	—
Module Configuration	Opens the Module Configuration window.	 (1) Module Configuration on page 128
Equipment configuration definitions	Displays the [New Equipment Configuration] window.	 9.1 Equipment Definitions on page 560
Data Sharing Settings	Displays the [Data Sharing Settings] window.	 9.2 Data Sharing Settings on page 564
Register Map	Displays the [Register Map] window.	 4.5 Configuring the Register Map Settings on page 214
Environment Setting	Click the [+] and [-] buttons to open and close the following items.	—

Continued on next page.

Continued from previous page.

Item			Function	Reference
		System Setting	Displays the [System Setting] window.	 10.1.11 [Setup] - [System Setting] on page 576
		Scan Time Setting	Displays the [Scan Time Setting] window.	 (2) When Using a Model That Supports Multiple Scans on page 580
		FTP Client	Displays the [FTP Client] window.	 10.1.14 [Setup] - [FTP Client] on page 581
	CPU□		Click the [+] and [-] buttons to open and close the following items.	—
		High-speed(H) / Low-speed(L) / Scan□	Displays the scan numbers that belong to the corresponding CPU.	—
		Control Device/Group Definition	Displays the [Control Device/Group Definition] window.	 4.4 Control Device/Group Definition Settings on page 202
		Ladder program	Displays the ladder programs that belong to the corresponding CPU and scan number.	 (1) [Ladder] Window / [Navigation] Window on page 233
		Motion Program	Displays the motion programs that belong to the corresponding CPU and scan number.	 (1) [Motion] Window / [Navigation] Window on page 263
		Sequence program	Displays the sequence programs that belong to the corresponding CPU and scan number.	—
		Data Management	Displays the table data and/or cam tool data that belong to the corresponding CPU and scan number.	 5.6 Data Management on page 355

4.3 Scan Settings

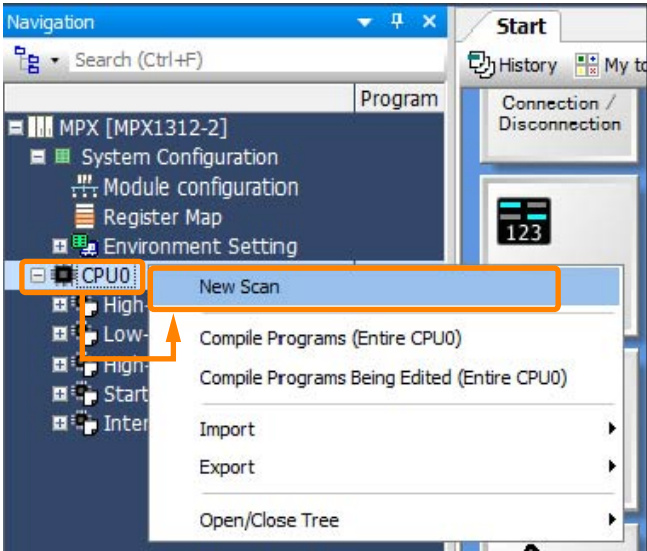
4.3.1 Creating a Scan

The following two scans are set when the project was created:

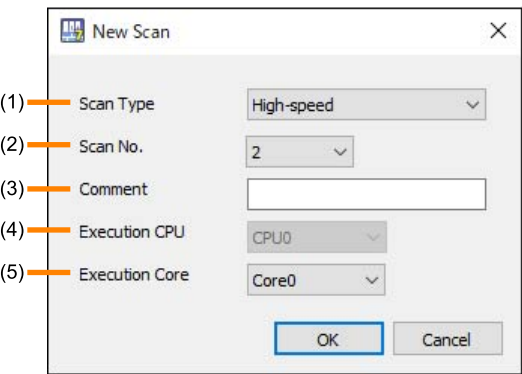
- High-speed(H)
- Low-speed(L)

You can add scans as necessary. Use the following procedure.

1. In the [Navigation] window, right-click on the CPU number, and then click [New Scan].

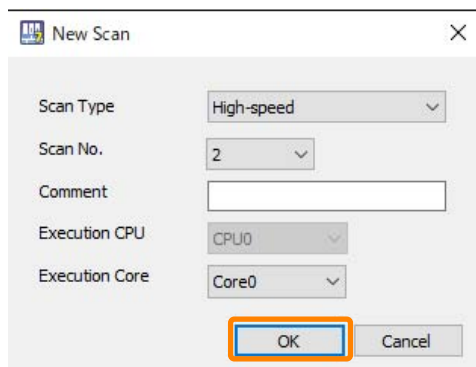


2. Set the items.



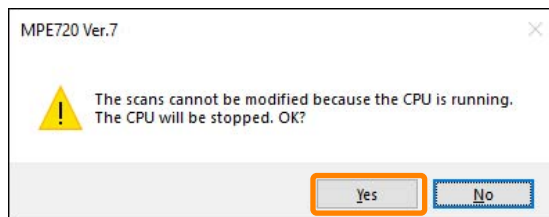
No.	Item	Description	
(1)	Scan Type	Select the scan type. Refer to the following section for details. (1) The Various Execution Timing of Ladder Drawings on page 231	Depending on the CPU, there are upper limits on the scan types and numbers that can be set. If the scan type or number to set is not in the list of options, then the upper limit has been exceeded.
(2)	Scan No.	Select the scan number to add.	The upper limits will change according to the combination of your controller model and device. Refer to the manual for your controller for details.
(3)	Comment	Enter a comment for the scan as necessary.	
(4)	Execution CPU	Select the CPU on which to execute the scan. This is currently fixed to "CPU0".	
(5)	Execution Core	Select the core on which to execute the scan.	

3. Click the [OK] button.



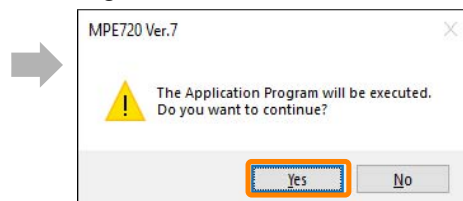
Information

The following message will be displayed in online mode. Read the message, and then click the [Yes] button.

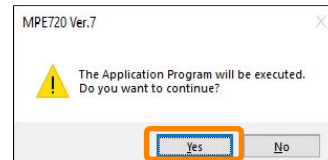
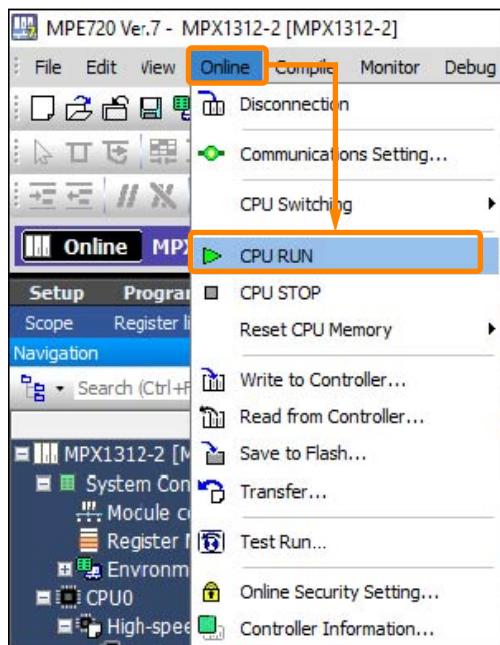


4. Set the CPU to run as necessary with one of the following methods only in online mode.

- Click the [CPU RUN] icon and click the [Yes] button on the message.

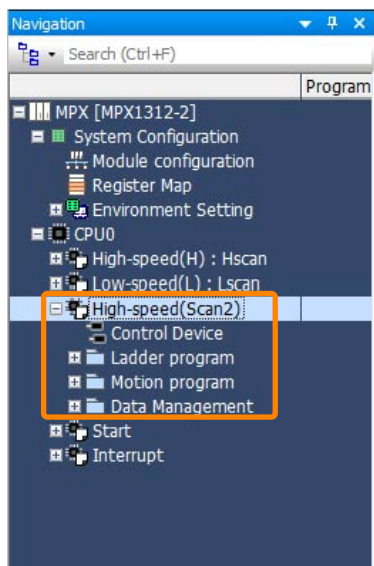


- Click [Online] - [CPU RUN] from the menu bar and click the [Yes] button on the message.



- Use the switch on the controller.
The operating procedure will depend on the controller. Refer to the manual for your controller for details.

5. Confirm that the newly added scan is displayed in the [Navigation] window.

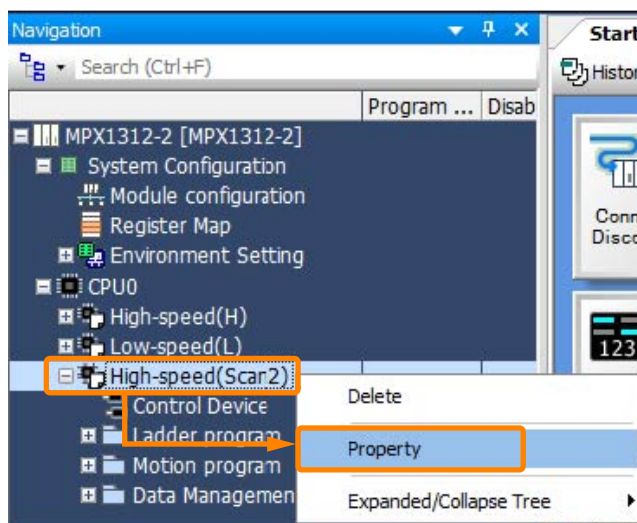


This concludes the procedure.

4.3.2 Checking a Scan

Use the following procedure to check the details of a created scan.

1. In the [Navigation] window, right-click on the scan to check, and then click [Property].

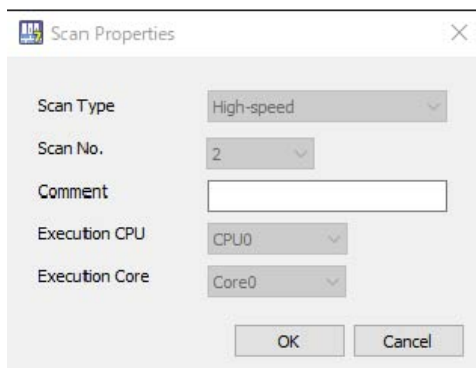


The [Property] window will be displayed.

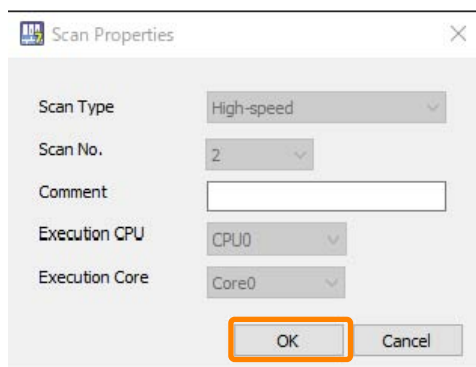
2. Check the scan properties.

Information

- You can edit [Comment] only.
- To edit [Execution Core], do so in [Setup] - [Scan Time Setting] in the environment settings. Refer to the following section for details on the environment settings and scan time settings.
[10.1 Environment Setting on page 573](#)
[\(2\) When Using a Model That Supports Multiple Scans on page 580](#)
- [Scan Type], [Scan No.], and [Execution CPU] cannot be changed.



3. After you add or edit the comment, click the [OK] button.



The setting will be applied and the window will close.

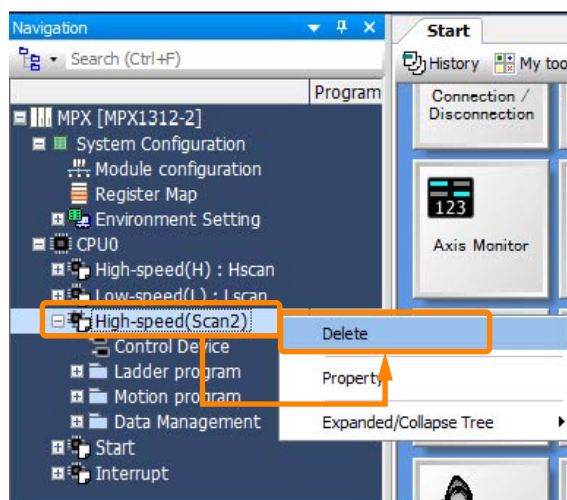
Information If you only checked the settings, click the [OK] or [Cancel] button.

This concludes the procedure.

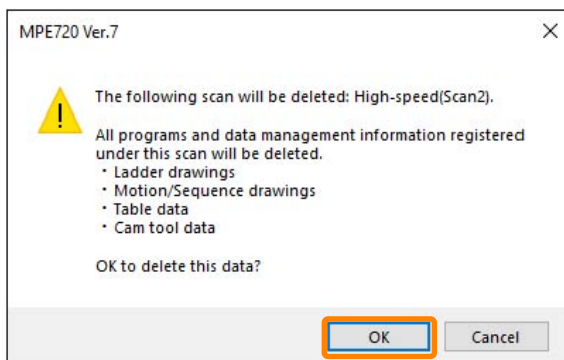
4.3.3 Deleting a Scan

You can delete a created scan. Use the following procedure to delete a scan.

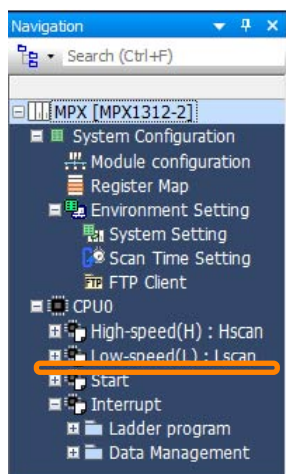
1. In the [Navigation] window, right-click on the scan to delete, and then click [Delete].



- Carefully read the message, and then click the [OK] button.



- Confirm that the selected scan was deleted from the [Navigation] window.



This concludes the procedure.

4.4 Control Device/Group Definition Settings

Set which devices to control in the high-speed and low-speed scans. The controllable devices are the SERVO-PACKs allocated on the Module Configuration window (i.e., the devices set under [Motion]).

Information You do not need to set control devices for the start and interrupt scans.

In addition, to organize axes related to motion into a single group and to program those axes by the group in a motion program, classify the control devices into a group (i.e., group definition).

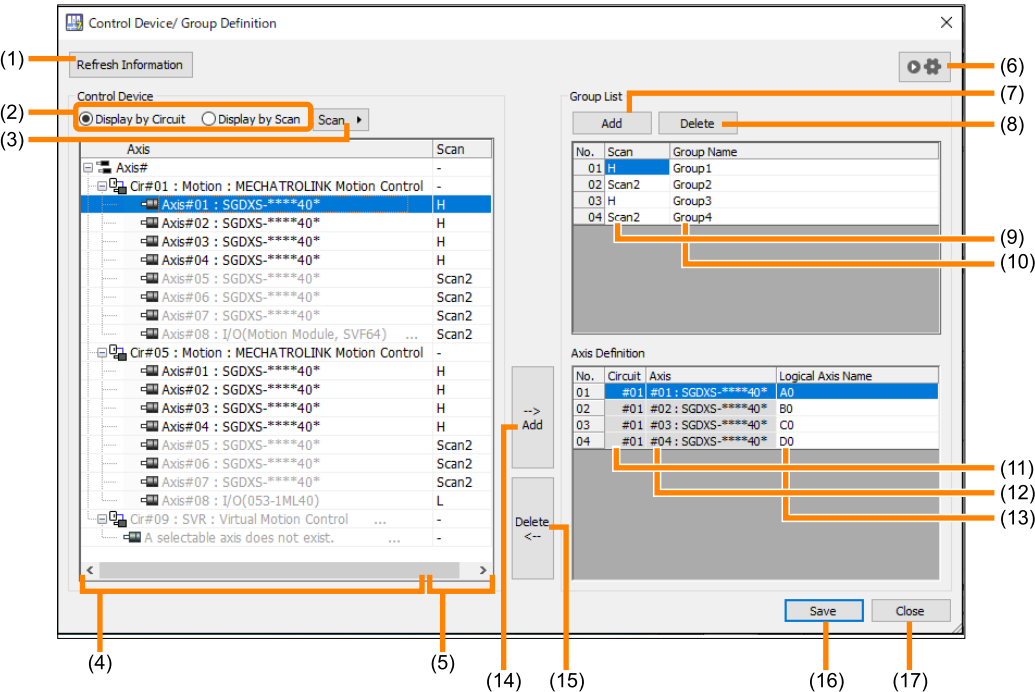
4.4.1 Items Affected by These Settings

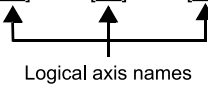
The following items are affected when you configure the control device/group definition settings.

Item	Description	Reference
Compile All Programs	Registers outside the range of motion registers set on the Module Configuration window will result in a warning at compilation when used in programs with different scan numbers. However, the warning at compilation is output only when [Support Access Control between Scans] is set to "Enable" in [Environment Setting] - [Setup] - [System Setting].	5.3.5 Compiling Programs on page 296 10.1.11 [Setup] - [System Setting] on page 576
I/O processing	For the control of each motion module, the communication cycle is determined based on the scan time set value of the scan set in the [Control Device/Group Definition] window.	
Scan Time Setting	When devices with different transmission cycle are set to the same scan number, set an integer multiple of each respective scan time. The value of the least common multiple is displayed for the scan time before the value is set.	10.1.13 [Setup] - [Scan Time Setting] on page 579

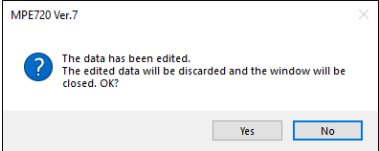
4.4.2 [Control Device/Group Definition] Window Details

This section gives detailed information on the [Control Device/Group Definition] window.



No.	Item	Description
(1)	[Refresh Information] Button	Click this button to update the content displayed in the window to the latest information.
–	[Control Device]	
(2)	[Display by Circuit] [Display by Scan]	These options change the display unit for the (4) control device tree on this window.
(3)	[Scan] Button	Click this button to change the active scan for the control devices. Information The same operation can be performed with [Scan] displayed after right-clicking in the (4) control device tree on this window.
(4)	[Axis] (Control device tree)	The control devices are displayed in a tree format. The SERVOPACKs allocated on the Module Configuration window (i.e., the devices set under [Motion]) are displayed on this window. The [!] icon is displayed for a control device not set to [Group Definition]. (The [!] icon is not displayed for an I/O device.)
(5)	[Scan]	This column displays the scan set to each control device.
(6)	Show/hide group definitions button	Click this button to toggle between showing and hiding the group definitions.
–	Group List	
(7)	[Add] Button	Click this button to add a group (i.e., [No.] row).
(8)	[Delete] Button	Click this button to delete the active group. [Axis Definition] for the deleted group will also be delete at the same time, and the [!] icon will be displayed in the control device tree for the control devices that were included in that group.
(9)	[Scan]	Sets the scan for the group. If the scan of the group and the scans of the control devices included in the axis definition are different, an error message will be displayed when the settings are saved.
(10)	[Group Name]	Change the group name as required. <Setting Conditions> 16 characters maximum. - The group name must be unique.
–	[Axis Definition]	
(11)	[Circuit]	The circuit numbers of the control devices are displayed.
(12)	[Axis]	The axis numbers and models of the control devices are displayed.
(13)	[Logical Axis Name]	Change the logical axis name as required. <Setting Conditions> 8 characters maximum (uppercase letters and numbers only). The name that is defined here is used when writing a motion program. MVS [A1]1000 [B1]2000 [C1]3000 F1000;  Logical axis names
(14)	[Add] Button	Click this button to add the active control devices in the control device tree to the active group in [Group List]. If the [Scan] setting in the control device tree and the [Scan] setting in [Group List] are different, the control devices will not be added even when the [Add] button is clicked.
(15)	[Delete] Button	Click this button to delete the active control device in [Axis Definition]. The [!] icon will be displayed in the control device tree for the control device deleted from [Axis Definition].

Continued on next page.

No.	Item	Description
(16)	[Save] Button	Click this button to save the current settings.
(17)	[Close] Button	Click this button to close the window. If the settings were changed, a message dialog box will be displayed. To save the edited settings, click the [No] button, click the (16) [Save] button on this window, and then click the [Close] button. To discard the edited settings, click the [Yes] button. 

4.4.3 Procedure for Initial Setup

Use the following procedure to initially set up the [Control Device/Group Definition] window.

1. **Confirm that the SERVOPACK allocations (i.e., [MECHATROLINK] and [Motion] settings) are complete on the [MC-Configurator] window.**

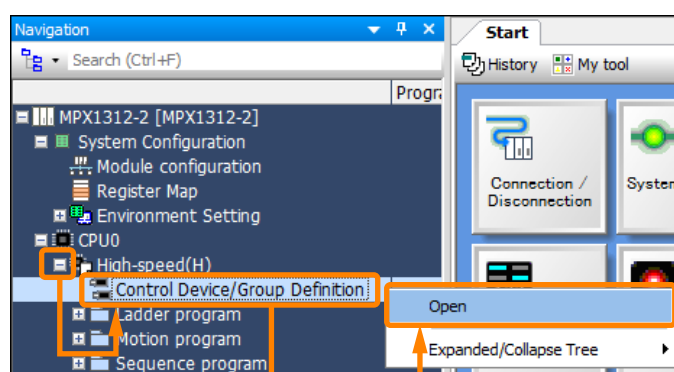
Refer to the following section for the [MC-Configurator] window settings.

 [3.1 \[MC-Configurator\] Window on page 127](#)

2. **In the [Navigation] window, expand the desired scan, and then double-click on [Control Device/Group Definition] or right-click and click [Open].**

Information

The same [Control Device/Group Definition] window will be displayed no matter which scan is clicked on.



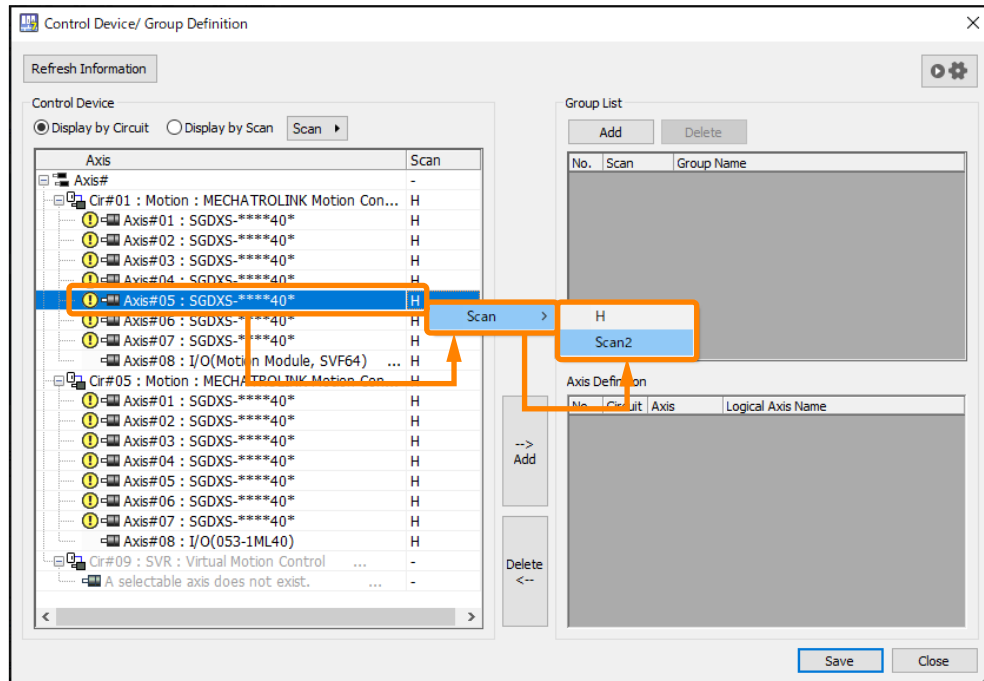
The [Control Device/Group Definition] window will be displayed.

3. **Check the settings for [Scan] under [Control Device]. To change a setting, right-click on the scan and select [Scan] - scan type.**

Information

Refer to the following section for details on the items on the [Control Device/Group Definition] window.

 [4.4.2 \[Control Device/Group Definition\] Window Details on page 202](#)

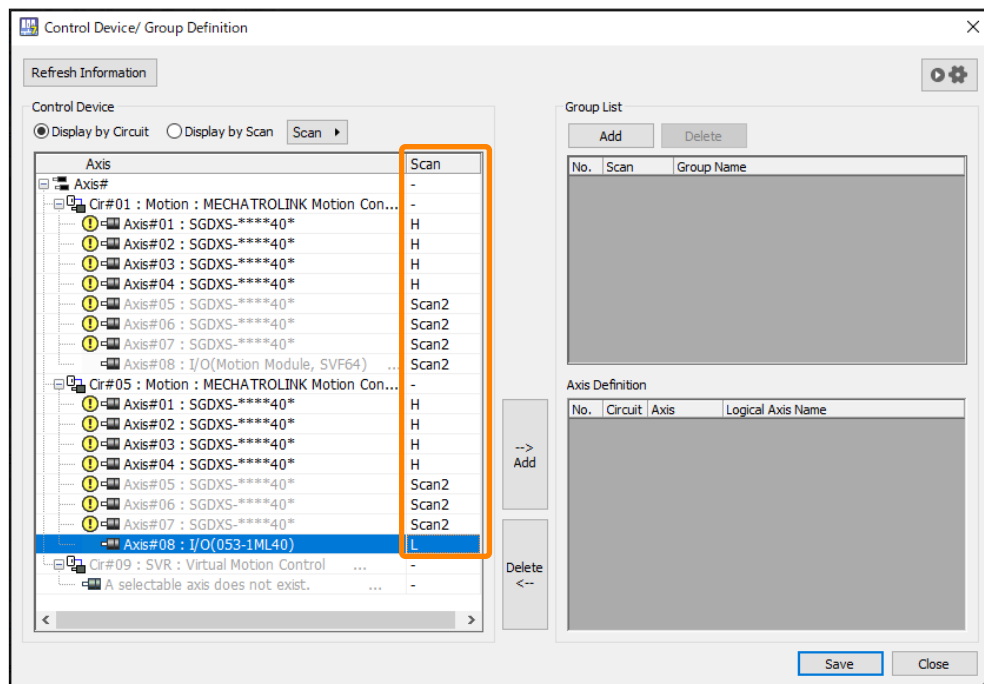
**Information**

The scan types displayed as selections depend on the control devices.

- If the [Device Select] category on the [MC-Configurator] window is [Servo]: Scan type [High-speed]
- If the [Device Select] category on the [MC-Configurator] window is a value other than [Servo]: Scan type [High-speed]/[Low-speed]

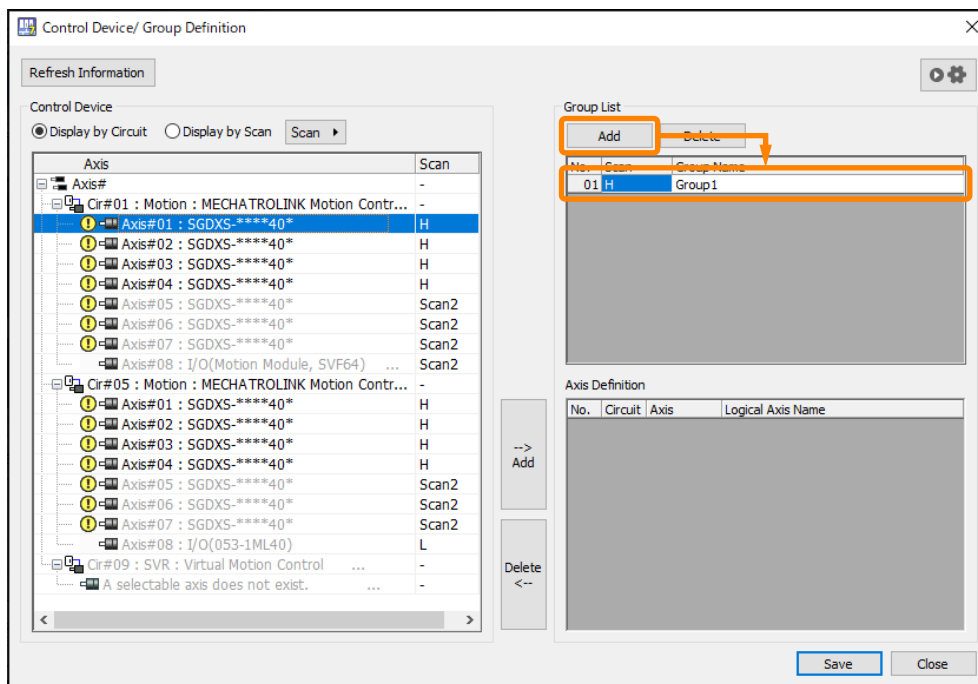
The scan types [Start] and [Interrupt] cannot be selected and will not be displayed.

4. Check if the [Scan] settings for all control devices are correct.

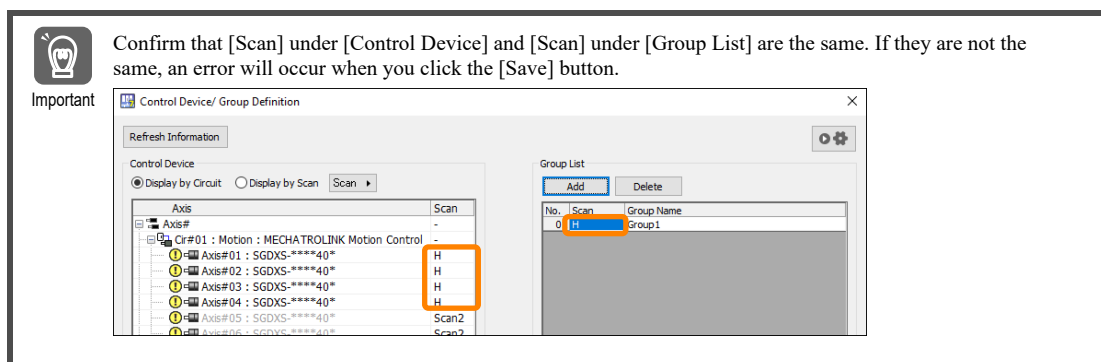
**Information**

If the group definition is not to be used, proceed to step 8.

5. Click the [Add] button under [Group List] to create a new group. Change [Scan] and [Group Name] as necessary.

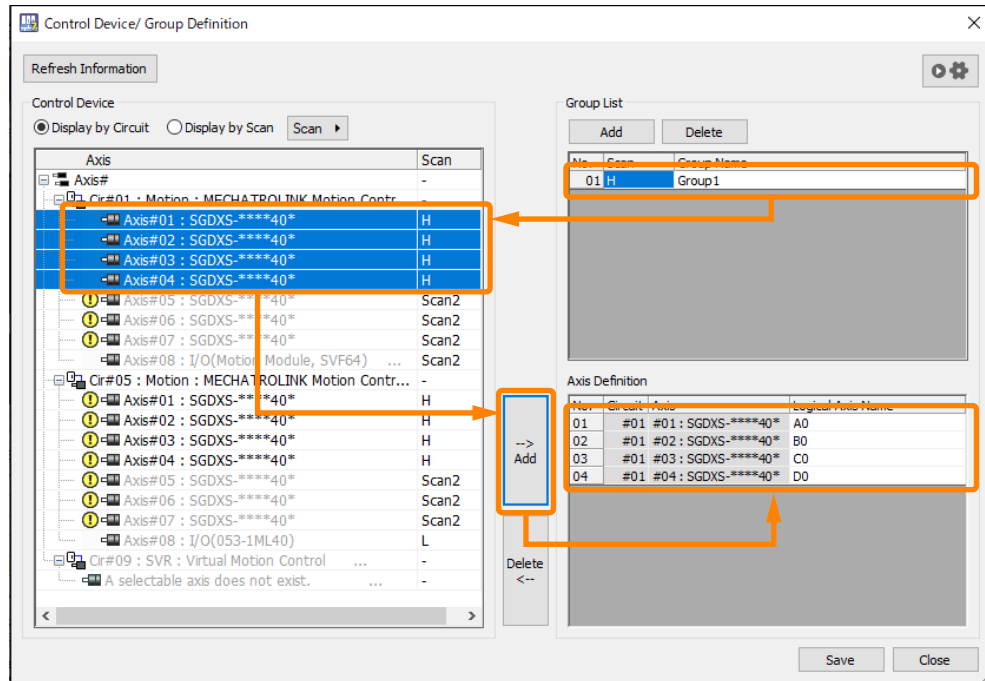


6. Under [Group List], confirm that one of the cells for the group to add to is active, click the control device to add to the group, and then click the [Add] button.



Information

- After you click the control device, if you click another control device while holding the **Ctrl** key, you can select multiple control devices in the amount of clicked control devices.
- After you click the control device, if you click another control device while holding the **Shift** key, you can select all of the control device between the first and second control devices you clicked.

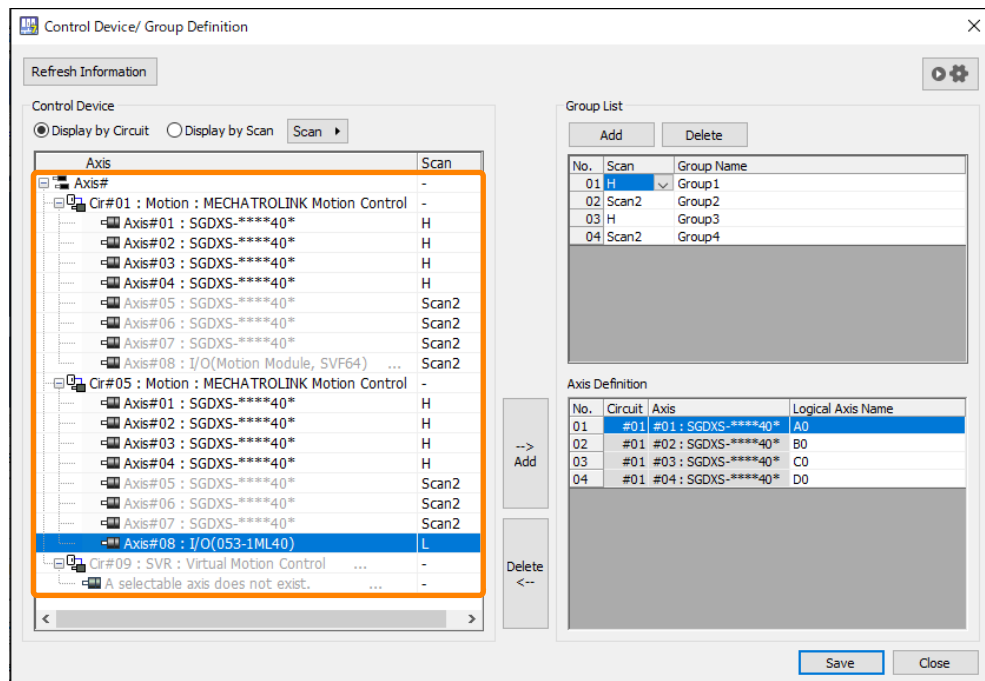


The control device will be added to [Axis Definition].

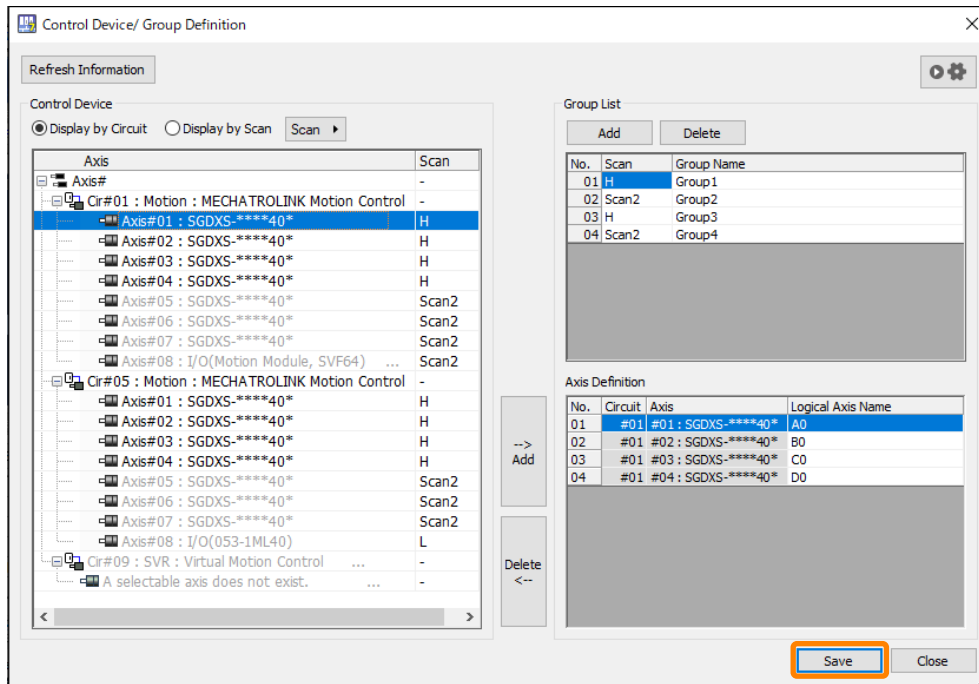
7. Repeat steps 5 and 6 and set the control devices with [Scan] under [Control Device] shown as [H] or [Scan□] to all [Axis Definition] under [Group List].

Information

- It is not a problem for control behavior if a control device with [Scan] under [Control Devices] shown as [H] or [Scan□] is not set to an [Axis Definition] under [Group List].
- The [!] icon disappears for a control device set to an [Axis Definition] under [Group List].

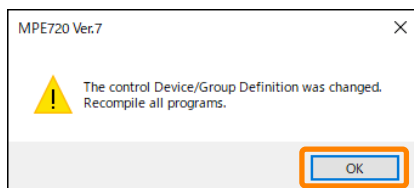


8. Click the [Save] button.



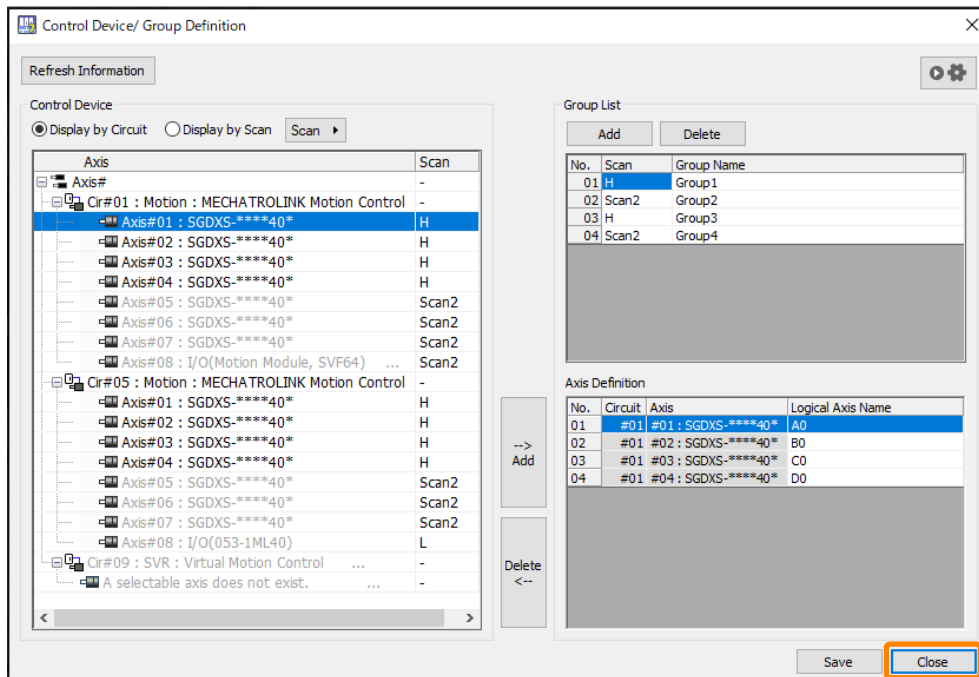
A message dialog box will be displayed.

9. Click the [OK] button.



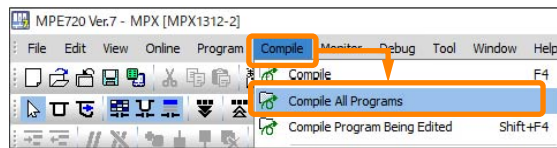
The settings will be saved.

10. Click the [Close] button.



The [Control Device/Group Definition] window will close.

11. Since there was an instruction to compile the programs in the message dialog box displayed in step 9, click [Compile] - [Compile All Programs] from the menu bar to compile the programs.
When the compilation processing is completed, check for compilation errors and warnings in the [Output] window.



Information If there is an error or warning, resolve the issue by referring to the information displayed in the window.

This concludes the procedure.

4.4.4 Procedure for Changing Existing Settings

Use the following procedure to change settings on the [Control Device/Group Definition] window.

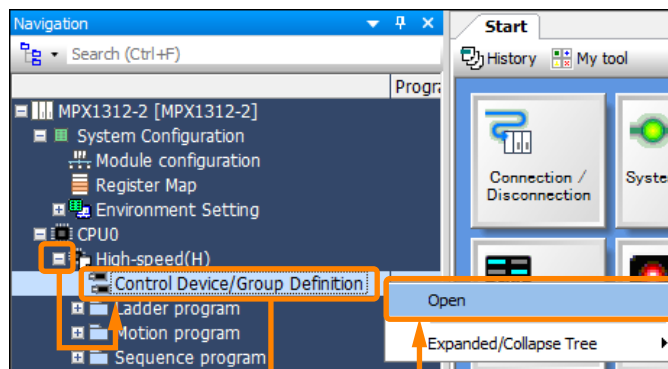
Information This section describes an example of changing the settings in the following manner:

- Changing the scan for axis #05 from "Scan2" to "H"
- Changing axis #05 from "Group No. 02" to "Group No. 01"

To make these changes easier to understand, the group will be changed first, but the scan and group can actually be changed in any order.

1. In the [Navigation] window, expand the desired scan, and then double-click on [Control Device/Group Definition] or right-click and click [Open].

Information The same [Control Device/Group Definition] window will be displayed no matter which scan is clicked on.

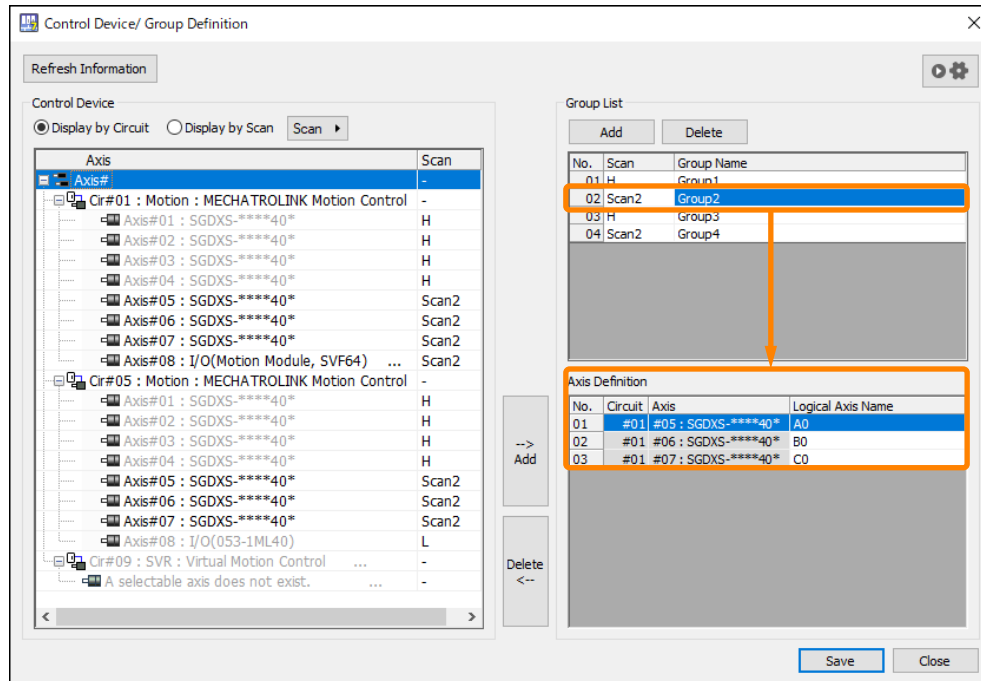


The [Control Device/Group Definition] window will be displayed.

2. Click on any cell for No. 02 under [Group List].

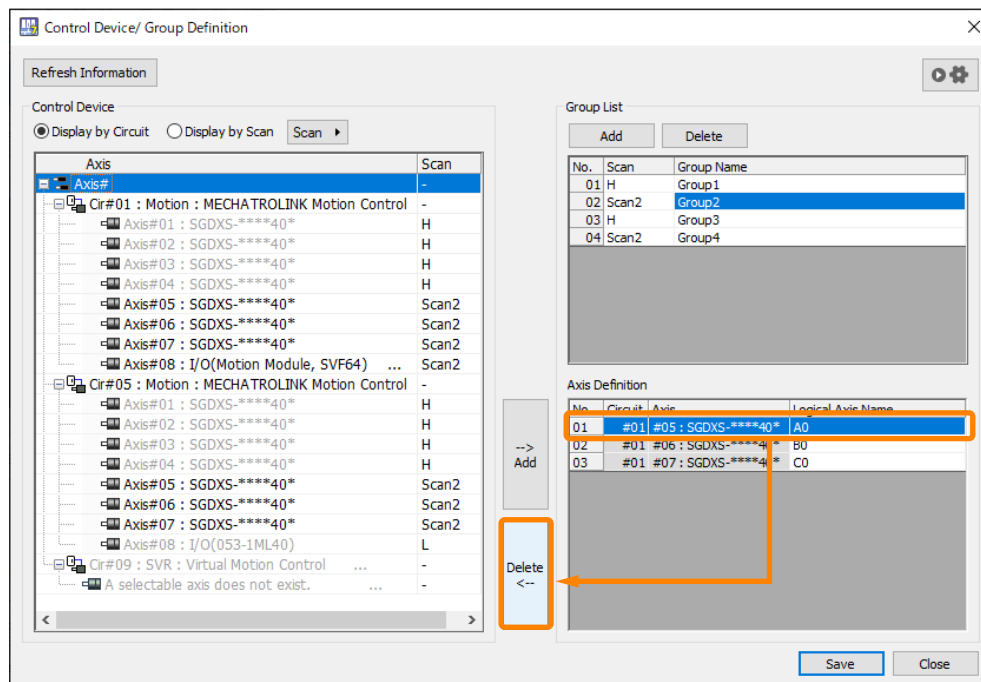
Information Refer to the following section for details on the items on the [Control Device/Group Definition] window.

 [4.4.2 \[Control Device/Group Definition\] Window Details on page 202](#)



[Axis Definition] will change to display group list No. 02 (i.e., the active cell).

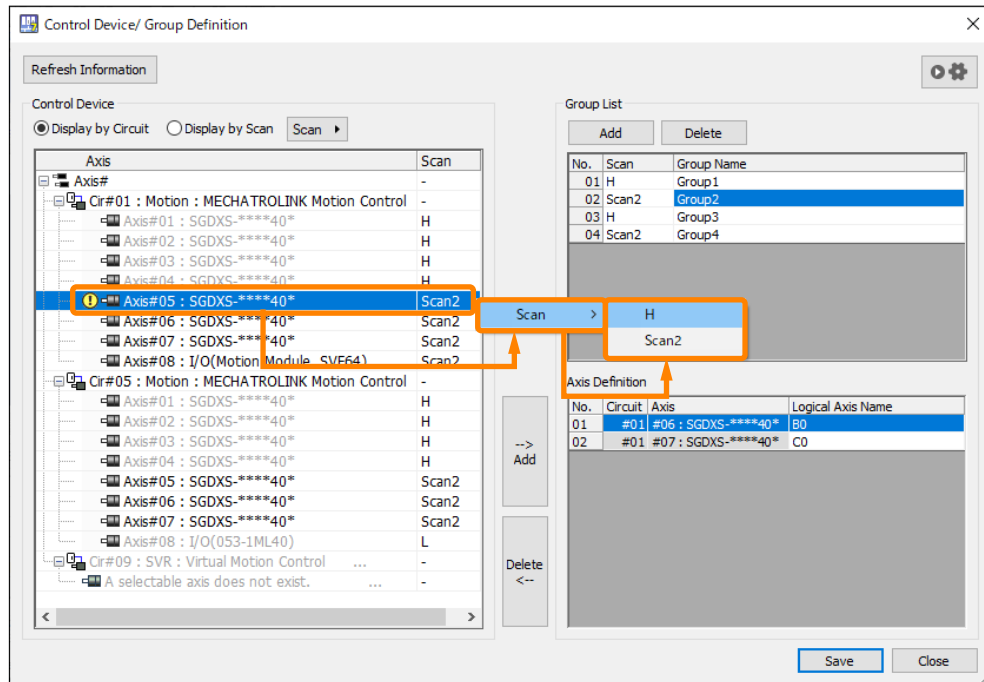
3. Click on any cell for axis #05 under [Axis Definition], and then click the [Delete] button.



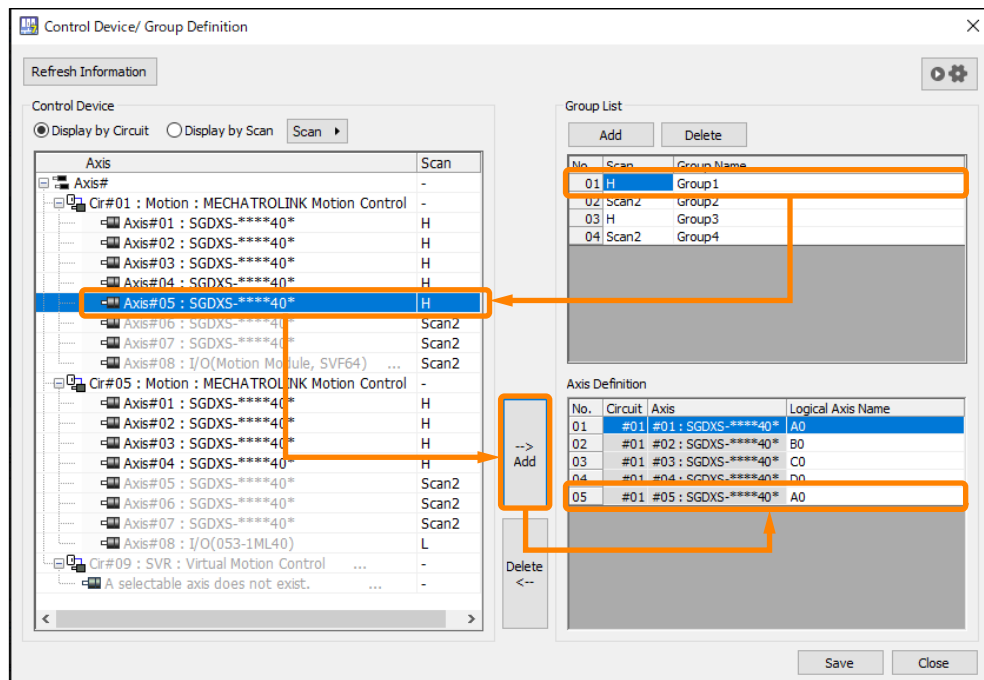
Axis #05 (i.e., the active row) will be deleted from [Axis Definition].

The [!] icon will also be displayed for axis #05 under [Control Device].

4. Right-click on [Axis #05] under [Control Device] and select [Scan] - scan type.



5. Under [Group List], confirm that one of the cells for group list No. 01 (i.e., the group to add to) is active, click [Axis #05] under [Control Device] (i.e., the control device to include in the group), and then click the [Add] button.

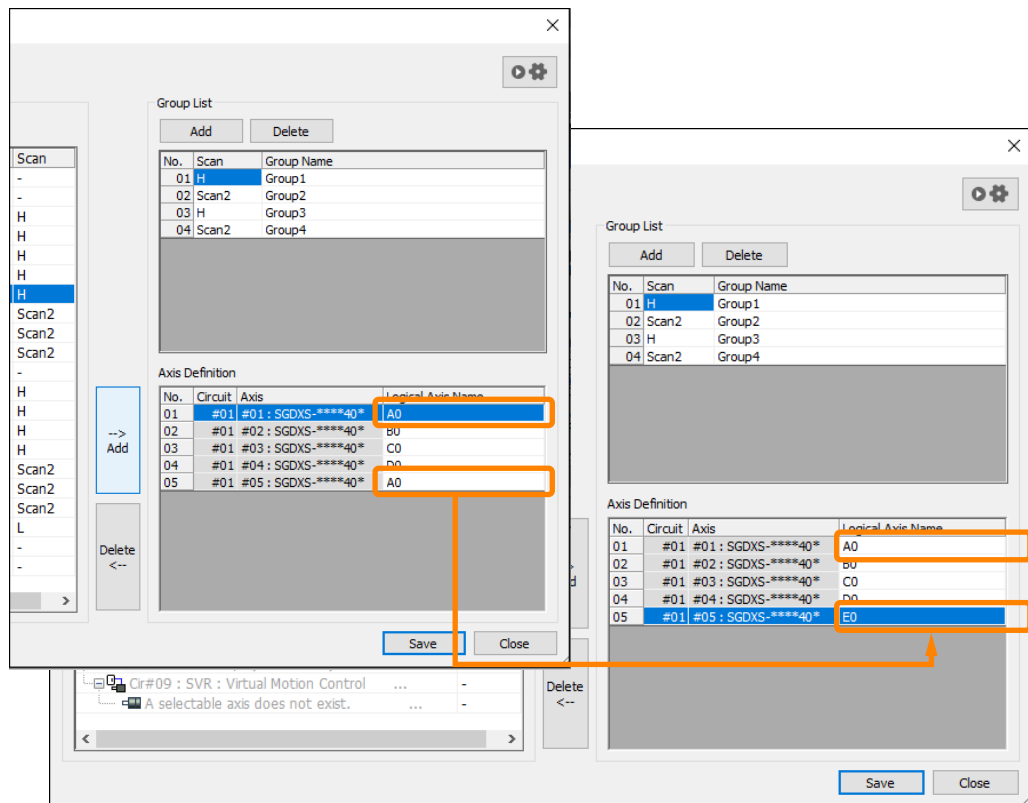


Axis #05 will be added to [Axis Definition].

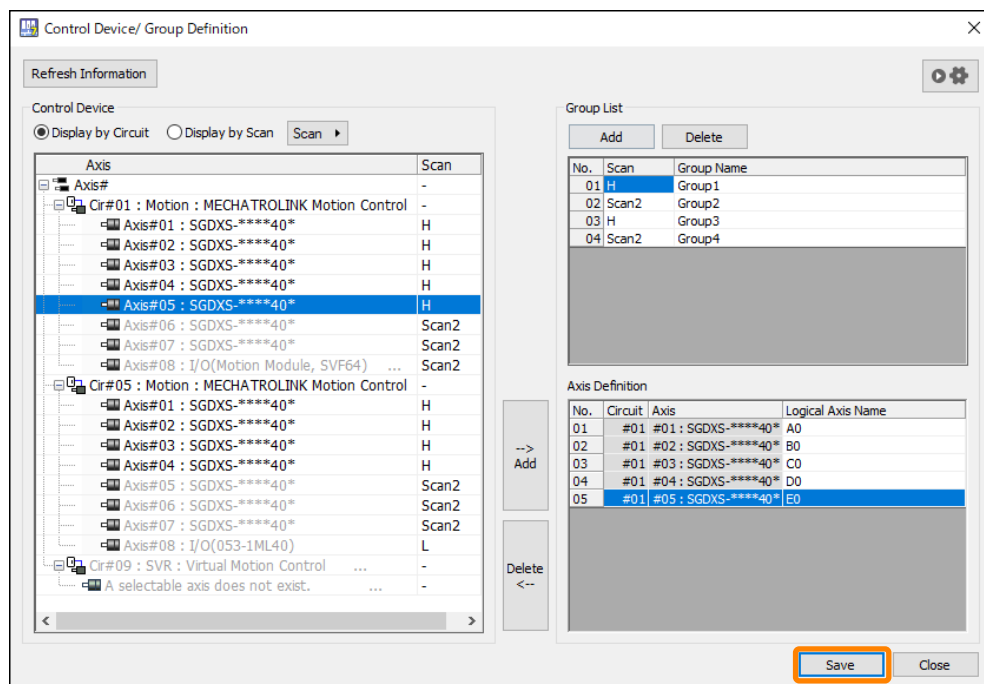
6. Confirm that [Logical Axis Name] is not duplicated inside [Axis Definition] after the group was changed.

If it was duplicated, correct it.

If this example, logical axis name "A0" was duplicated, so change the logical axis name of axis #05.

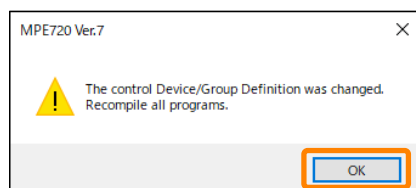


7. Click the [Save] button.



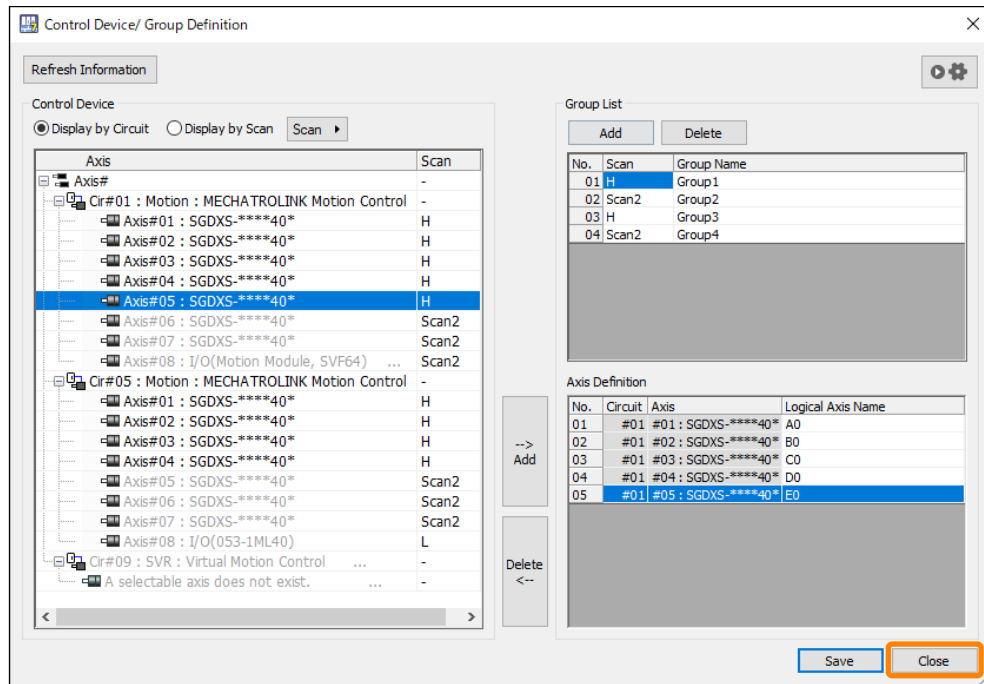
A message dialog box will be displayed.

8. Click the [OK] button.



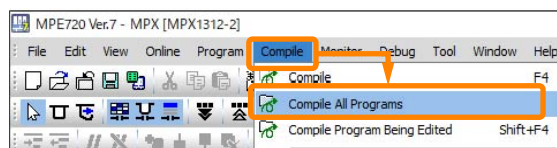
The settings will be saved.

9. Click the [Close] button.



The [Control Device/Group Definition] window will close.

10. Since there was an instruction to compile the programs in the message dialog box displayed in step 8, click [Compile] - [Compile All Programs] from the menu bar to compile the programs.
When the compilation processing is completed, check for compilation errors and warnings in the [Output] window.



Information If there is an error or warning, resolve the issue by referring to the information displayed in the window.

This concludes the procedure.

4.5 Configuring the Register Map Settings

The register map allows you to configure the settings related to the ranges of registers used in each scan and the settings related to copying registers between scans.

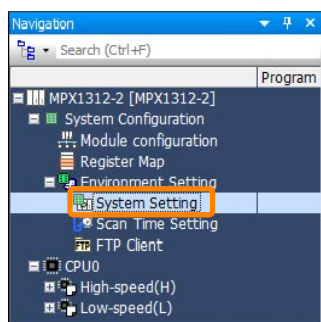
Settings	Description
Range Settings	Defines the ranges of M registers and G registers used in each scan so they do not overlap. When ranges are defined and [Support Access Control between Scans] is set to [Enable], you can check if the overlapping registers are being used between scans by compiling the programs.
Copy Register Settings	Defines the copy source and destination registers when sharing data between different scans. The register values set here are copied at the beginning of the scan. This allows the values of registers used in one scan to be passed to another scan (i.e., to share data between scans).

Information If you will not use either of the above functions, you do not need to configure the settings in the subsequent sections.

4.5.1 Enabling Support Access Control between Scans

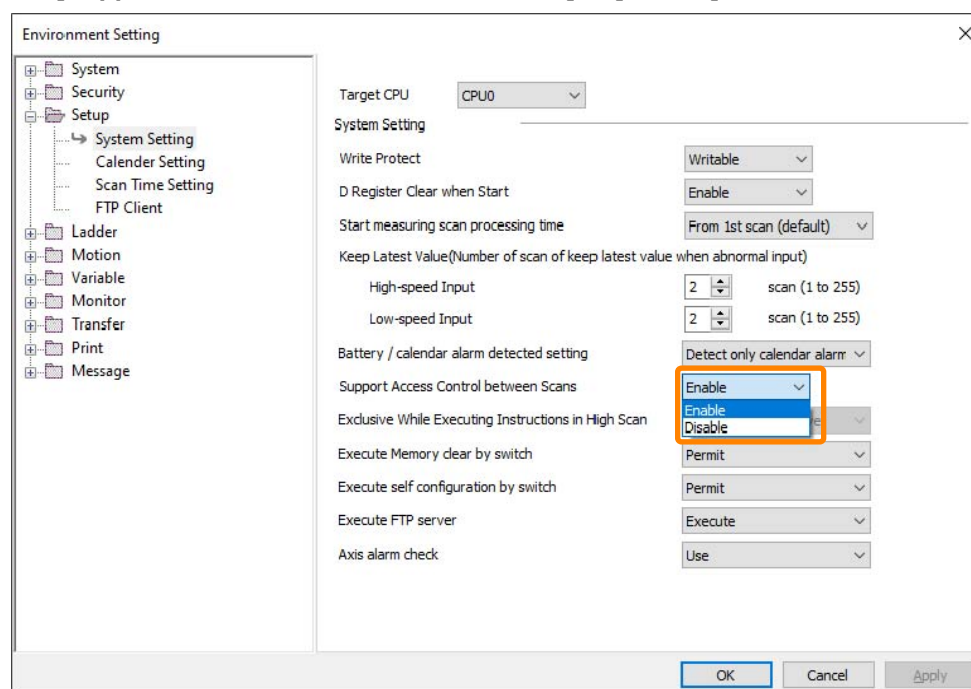
You must first enable support access control between scans to check if the same registers are being used between scans. Use the following procedure.

1. In the [Navigation] window, double-click [System Setting].



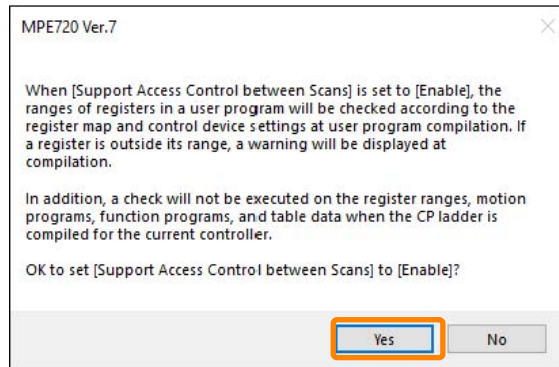
[Setup] - [System Setting] in the [Environment Setting] window will be displayed.

2. Set [Support Access Control between Scans] to [Enable].

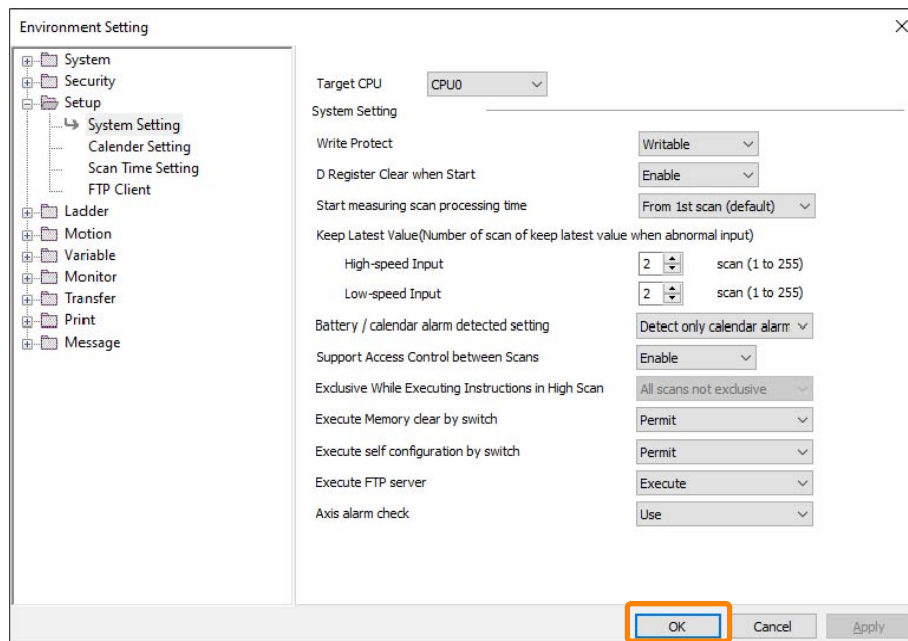


A message dialog box will be displayed.

3. **Carefully read the message, and then click the [Yes] button.**

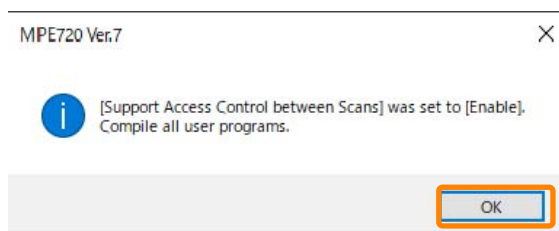


4. **Click the [OK] button.**



A message dialog box will be displayed.

5. **Click the [OK] button.**

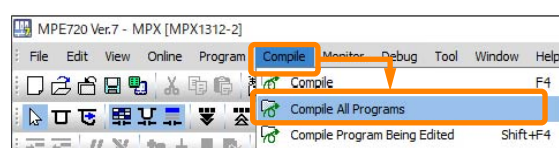


6. **If you completed configuring the settings on the [Range Settings] tab page in [Register Map], click [Compile] - [Compile All Programs] from the menu bar.**

Information

If you did not complete configuring the settings on the [Range Settings] tab page in [Register Map], refer to the following section and compile the programs after you configure the settings.

[4.5.3 Procedure for New Register Map Settings and Changing Settings on page 219](#)



All programs will start being compiled.

7. Check for compilation errors and warnings in the [Output] window.

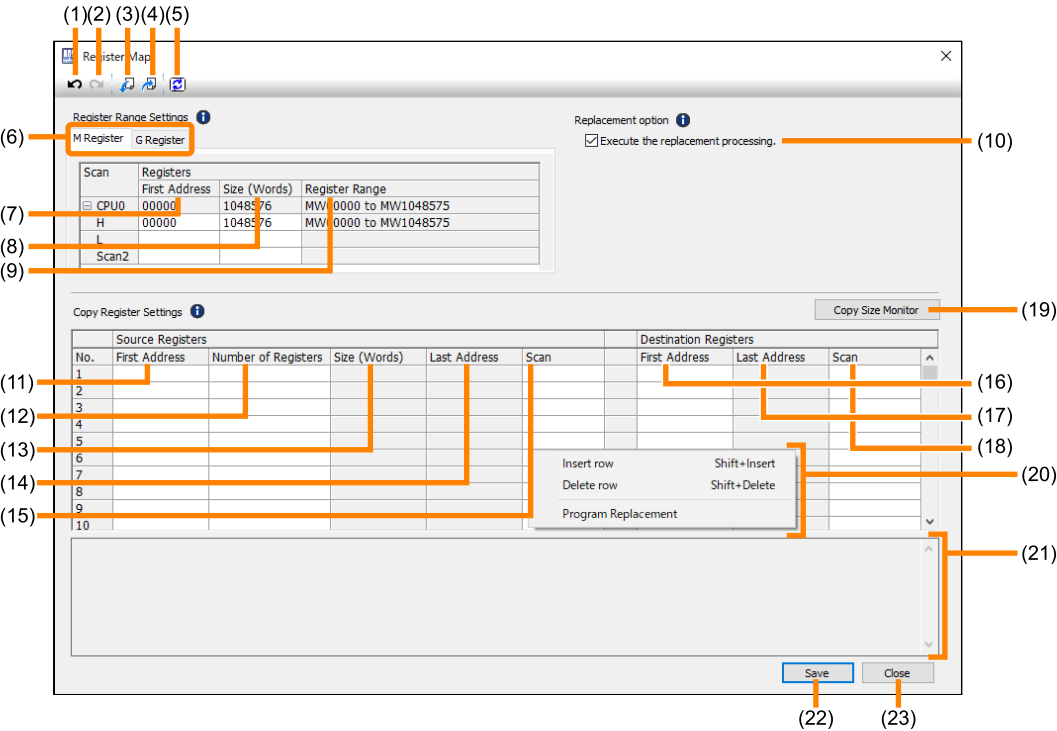
- Information

- If there is an error or warning, resolve the issue by referring to the information displayed in the window.
 - If there is an error or warning, it may be easier to see the location of the error by checking it on the [Search for Programs Used in Each Axis] window. Refer to the following section for details on the [Search for Programs Used in Each Axis] window.
- [4.6 Checking the Distribution of Axes Using \[Search for Programs Used in Each Axis\] on page 226](#)

This concludes the procedure.

4.5.2 [Register Map] Window Details

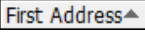
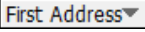
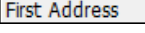
This section describes the details of the [Register Map] window.



No.	Item	Description
(1)	[Undo] Button	Reverses the effect of the last operation.
(2)	[Redo] Button	Performs the last operation that was reversed using [Undo].
(3)	[Import] Button	Imports and exports the settings on the [Register Map] window.
(4)	[Export] Button	Refer to the following sections for details. 4.5.4 Procedure for Exporting Settings on page 222 4.5.5 Procedure for Importing Settings on page 223
(5)	[Refresh] Button	Click this button to update the content displayed in the window to the latest information.
–	[Register Range Settings] Information You can check if the program was programmed as set here only when it is compiled with [Support Access Control between Scans] set to [Enable]. If set to [Disable], this will not be displayed in the compilation results even if [Register Range Settings] are set. Refer to the following section for details. 4.5.1 Enabling Support Access Control between Scans on page 214	
(6)	[M Register] Tab [G Register] Tab	You can change the registers displayed in [Register Range Settings] on this window.

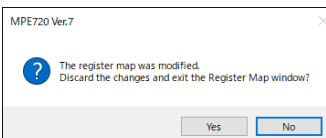
Continued on next page.

Continued from previous page.

No.	Item	Description
(7)	[First Address]	Enter the first address of the registers to use in the relevant scan. - Available range: A value between 0 and less than or equal to the upper limit address of the M registers or G registers - Valid text string: Single-byte numeric value When you finish entering the value, press the Enter key or click a different location. If a value is entered outside the available range, the cell will revert to its previous state when it loses focus.
(8)	[Size (Words)]	Enter the size in words to use in the relevant scan. - Available range: A value between 1 and less than or equal to the upper limit address of the M registers or G registers - Valid text string: Single-byte numeric value When you finish entering the value, press the Enter key or click a different location. If a value is entered outside the available range, the cell will revert to its previous state when it loses focus.
(9)	[Register Range]	Automatically displayed based on the settings for [First Address] and [Size (Words)].
–	[Replacement option]	
(10)	[Execute the replacement processing.]	Selecting this check box automatically applies the settings to the program when the [Save] button is clicked. Follow the on-screen instructions. For example, if you changed the first address from MW00000 to MW10000, the registers used in the program will be replaced as shown below. MW00000 is changed to MW10000, MW00001 is changed to MW10001, MW00002 is changed to MW10002, and so on. Use this function when modifying an existing program.
–	[Copy Register Settings]	
–	[Source Registers]	Click [First Address], [Number of Registers], [Size (Words)], [Last Address], or [Scan] to sort the display in ascending, descending, or normal order. : Ascending order : Descending order : Normal order
(11)	[First Address]	Set the first address of the source registers. - Available register types: M, G, C, S, I, and O Enter M, G, C, and S as a decimal value, and enter I and O as a hexadecimal value. - Available data types: W, L, Q, F, and D - Available range when register types M and G are selected: A value that fits within the range set in [Register Range Settings] when [Number of Registers] is added to the address. - Available range when a register type other than M and G is selected: A value that fits within the range of the address upper limit for the register type ^{*1} when [Number of Registers] is added to the address. However, you may not be able to set the address even if it is a value within the available range in combination with the [Number of Registers] setting. If a value is entered outside the available range, the cell will revert to its previous state when it loses focus or a message will be displayed in (21) "Error display area".
(12)	[Number of Registers]	Set the number of registers to copy. Available range: A value between 1 and less than or equal to "Last address (= [First Address] + [Number of Registers]) ≥ Address upper limit for register type" ^{*2} If a value is entered outside the available range, the cell will revert to its previous state when it loses focus.
(13)	[Size (Words)]	Automatically displayed based on the settings for [First Address] and [Number of Registers].
(14)	[Last Address]	

Continued on next page.

No.	Item	Description
(15)	[Scan]	The source scan is automatically displayed or can be selected. If [First Address] is an M or G register and the register is within the range set in [Register Range Settings], that scan is automatically displayed. If [First Address] is a register other than an M or G register, set the scan from the selections.
–	[Destination Registers]	Click [First Address], [Scan], or [Last Address] to sort the display in ascending, descending, or normal order.
(16)	[First Address]	Set the first address of the destination registers. Double-click the cell to enter the value. - Available register types: M and G Enter the value as a decimal value. - Available data types: W, L, Q, F, and D - Available range: A value that fits within the range set for each scan when [Number of Registers] is added to the address. If a value is entered outside the available range, the cell will revert to its previous state when it loses focus or a message will be displayed in (21) "Error display area".
(17)	[Last Address]	Automatically displayed based on the settings for [Size (Words)] in [Source Registers] and [First Address] in [Destination Registers].
(18)	[Scan]	Automatically displayed.
(19)	[Copy Size Monitor]	Click to display the [Copy Size Monitor] window on which you can check the total sizes of registers to copy for each scan. Click the [+] button to check the size details for each scan. If any size of registers to copy has reached the upper limit, correct the [Copy Register Settings]. Click the [OK] button to close the window.
(20)	Context Menu	- After you click a cell in the [No.] column, if you click another cell in the [No.] column holding the Ctrl key, you can select multiple [No.] rows in the amount clicked. - After you click a cell in the [No.] column, if you click another cell in the [No.] column while holding the Shift key, you can select all of the [No.] rows between the first and second [No.] rows you clicked. - If you hold down the Ctrl key and press the A key, you can select all [No.] rows.
	[Insert row]	Clicking this item adds a new row above the active row in the [Copy Register Settings] table. This cannot be used when the display is in ascending or descending order.
	[Delete row]	Clicking this item deletes the active row of settings in the [Copy Register Settings] table. Use caution when clicking this item because the settings will be immediately deleted without displaying a confirmation dialog box.
	[Program Replacement]	Clicking this item executes program replacement on the settings in the active row of the [Copy Register Settings] table. Use this function when modifying an existing program.
(21)	Error display area	Displays error messages and warning messages related to the settings in [Register Range Settings] and [Copy Register Settings]. Rows with errors are displayed in red at the top of the window. Rows with warnings are displayed in yellow at the top of the window.
(22)	[Save] Button	Click this button to save the current settings.
(23)	[Close] Button	Click this button to close the window. If the settings were changed, a message dialog box will be displayed. To save the edited settings, click the [No] button, click the [Save] button on this window, and then click the [Close] button. To discard the edited settings, click the [Yes] button.



- *1 The address upper limit for the register type depends on the device. Refer to the manual for your product for details.
 *2 For M and G registers, a value within the range set for each scan.

4.5.3 Procedure for New Register Map Settings and Changing Settings

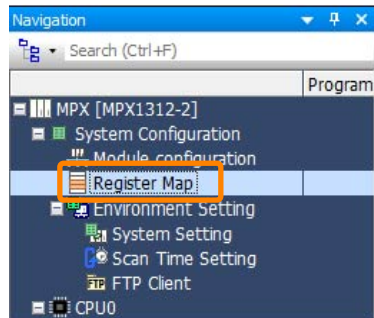
Use the following procedure to configure the register map settings for global registers.

Information You can also import settings that are exported from another project file. Refer to the following sections for details on the procedures to export and import settings.

 [4.5.4 Procedure for Exporting Settings on page 222](#)

 [4.5.5 Procedure for Importing Settings on page 223](#)

1. In the [Navigation] window, double-click [Register Map].



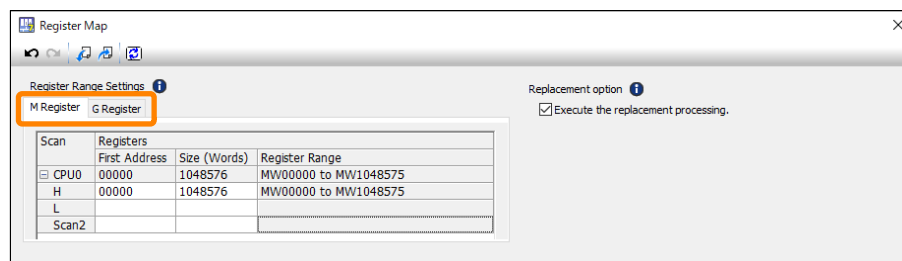
Information Depending on the CPU version of your controller, you may be able to edit the [Register Map] window in off-line mode only. If you cannot edit the contents of the [Register Map] window in online mode, set the MPE720 to offline mode.

The [Register Map] window will be displayed.

2. Select the tab for the registers to set.

Information Refer to the following section for details on the items on the [Register Map] window.

 [4.5.2 \[Register Map\] Window Details on page 216](#)

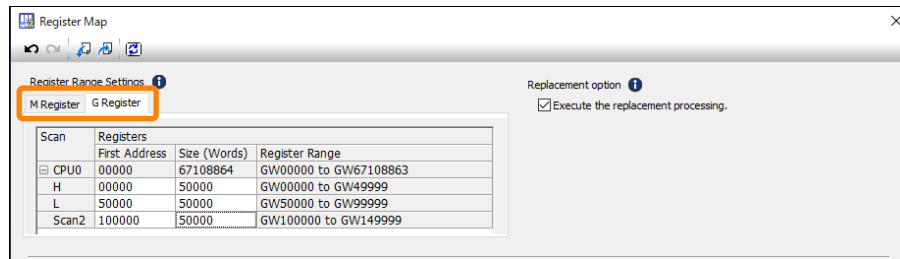


3. To set or change the range, click [First Address] or [Size], enter a numeric value, and then press the Enter key.
Set and change the ranges of registers for all scans so that the numeric values do not overlap in [Register Range].

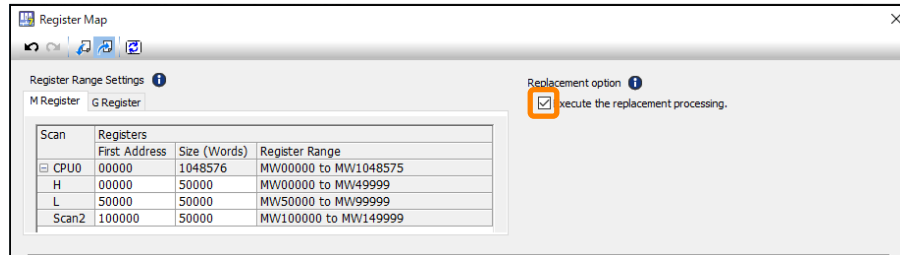


The [Register Range] display will change according to the numeric value you entered.

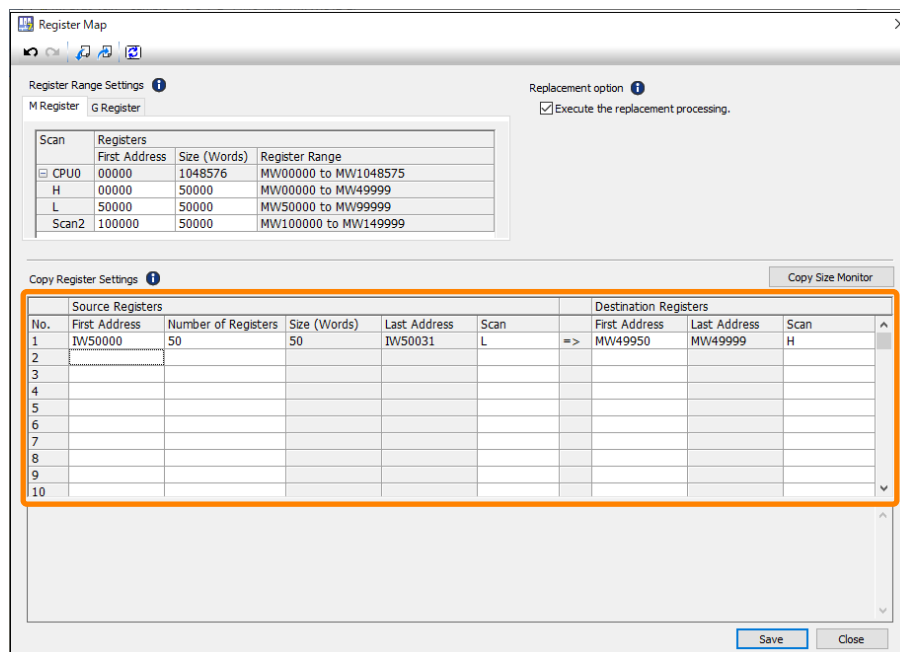
4. Use the same operation as in step 3 and set the ranges of other registers as necessary.



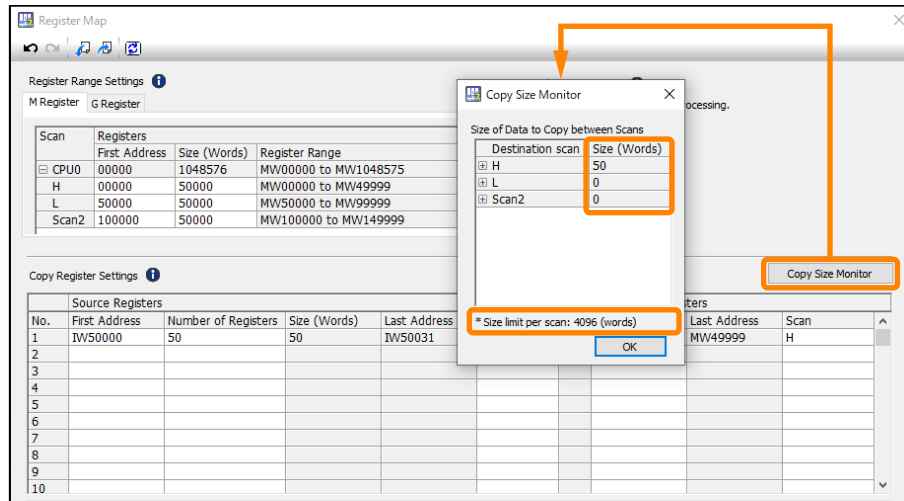
5. Select the check box under [Execute the replacement processing] as necessary.



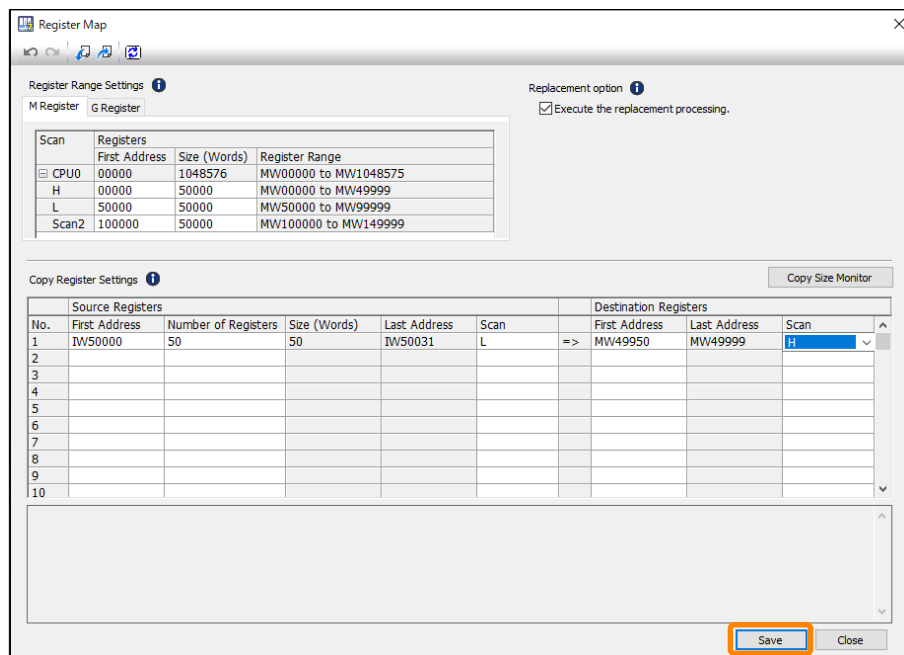
6. Set each item in [Copy Register Settings].



7. Click the [Copy Size Monitor] button and check if the total sizes of registers to copy for each scan has reached the upper limit.
 - After you check the sizes, click the [OK] button to close the [Copy Size Monitor] dialog box.
 - If any size of registers to copy has reached the upper limit, correct the [Copy Register Settings].

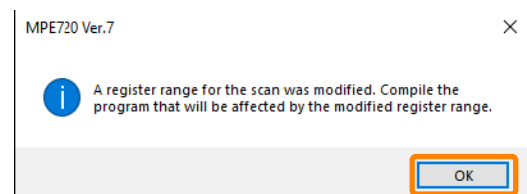
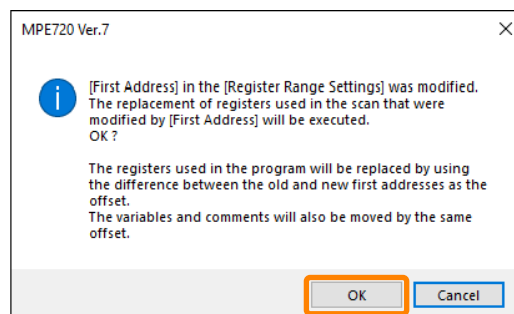


8. Click the [Save] button.



9. Carefully read the message dialog box, and then click the [OK] button or the [Yes] button.

- If the message dialog box below and to the left is displayed, replacement processing and compilation will be executed automatically. When this processing is complete, proceed to step 10.
- If the message dialog box below and to the right is displayed, proceed to step 11.
- If a message dialog box was not displayed, this concludes the procedure.

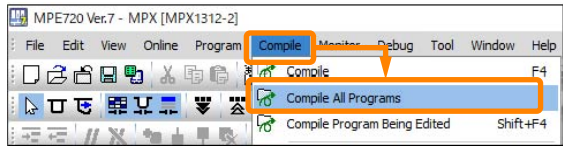


10. When the replacement processing and compilation are completed, check for errors in the [Output] window.

Information If there is an error, resolve the issue by referring to the information displayed in the window.

The procedure is concluded if there are no errors or when you have finished handling the errors.

- 11. Since there was an instruction to compile the programs in the message dialog box displayed in step 9, click [Compile] - [Compile All Programs] from the menu bar to compile the programs.
When the compilation processing is completed, check for compilation errors and warnings in the [Output] window.



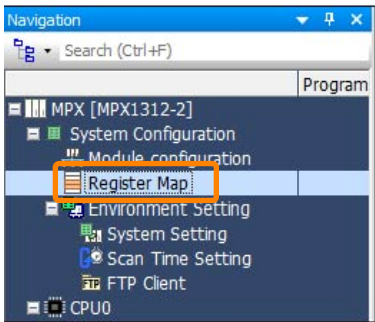
Information If there is an error or warning, resolve the issue by referring to the information displayed in the window.

This concludes the procedure.

4.5.4 Procedure for Exporting Settings

Use the following procedure to export the settings on the [Register Map] window.

- 1. In the [Navigation] window, double-click [Register Map].



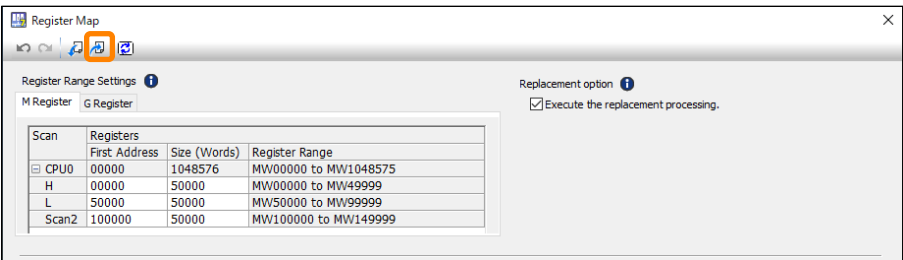
Information Depending on the CPU version of your controller, you may be able to edit the [Register Map] window in off-line mode only. If you cannot edit the contents of the [Register Map] window in online mode, set the MPE720 to offline mode.

The [Register Map] window will be displayed.

- 2. Click the [Export] button.

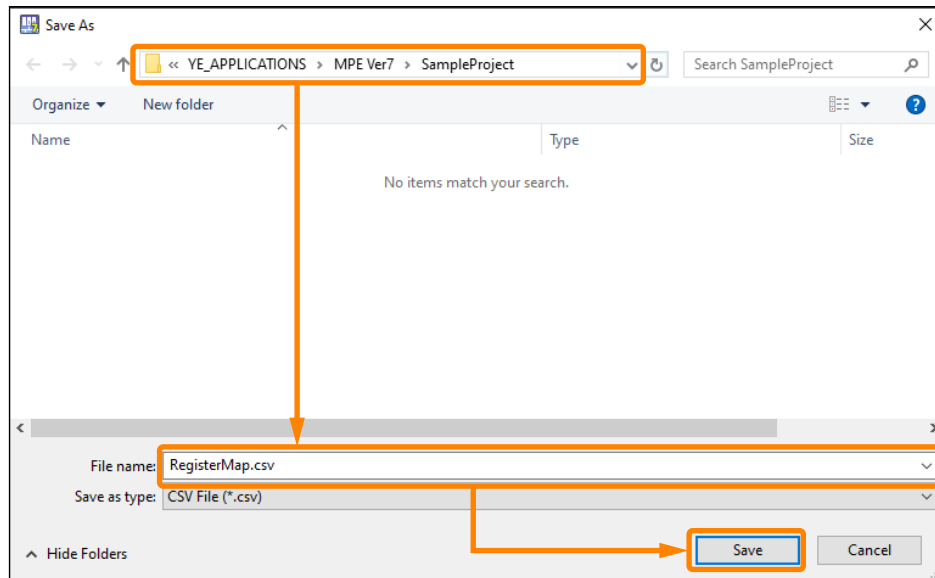
Information Refer to the following section for details on the items on the [Register Map] window.

[4.5.2 \[Register Map\] Window Details on page 216](#)



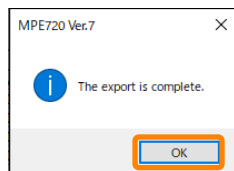
The [Save As] window will be displayed.

3. Specify the destination folder and file name for the export data, and click the [Save] button.



The export will be executed and a message window will be displayed when complete.

4. Click the [OK] button.

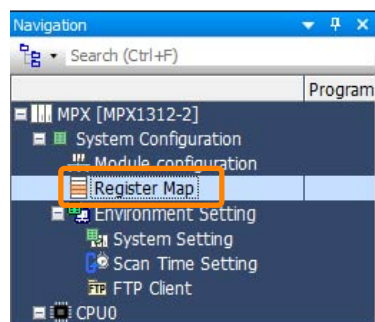


This concludes the procedure.

4.5.5 Procedure for Importing Settings

Use the following procedure to import the settings on the [Register Map] window.

1. In the [Navigation] window, double-click [Register Map].



Information

Depending on the CPU version of your controller, you may be able to edit the [Register Map] window in off-line mode only. If you cannot edit the contents of the [Register Map] window in online mode, set the MPE720 to offline mode.

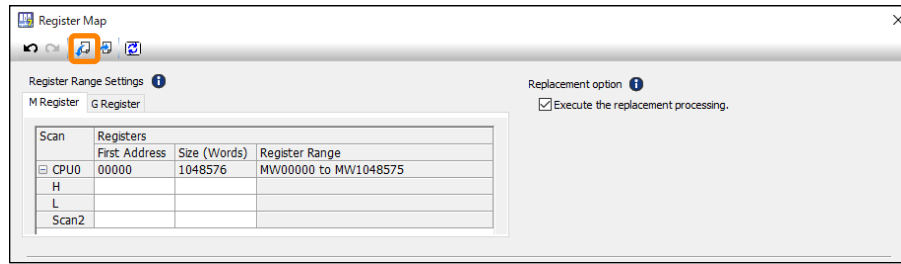
The [Register Map] window will be displayed.

2. Click the [Import] button.

Information

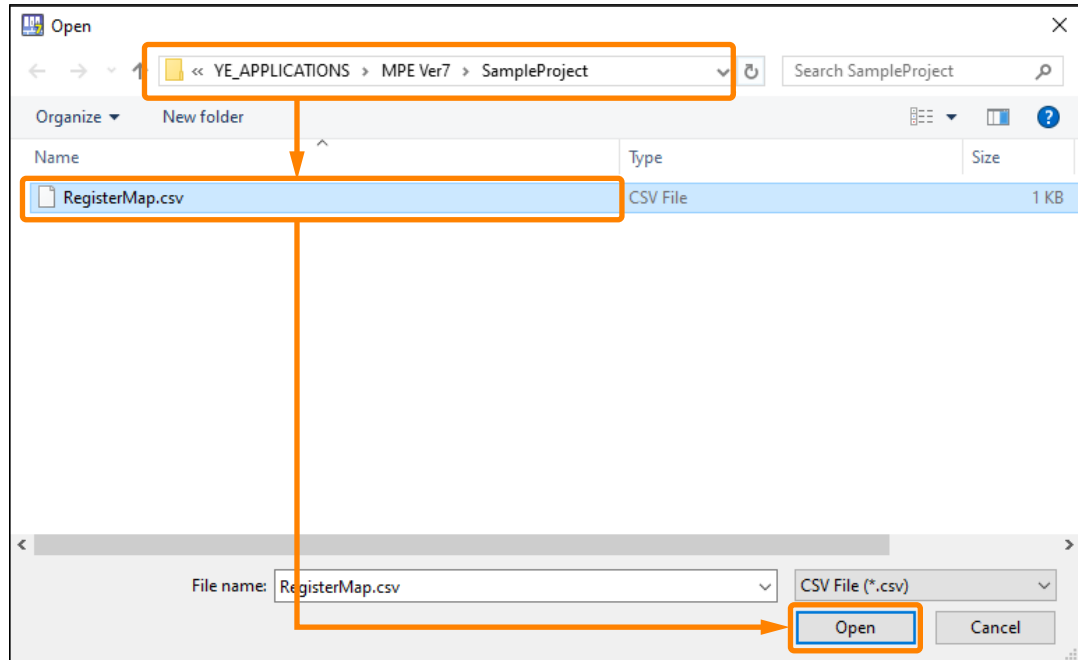
Refer to the following section for details on the items on the [Register Map] window.

[4.5.2 \[Register Map\] Window Details on page 216](#)



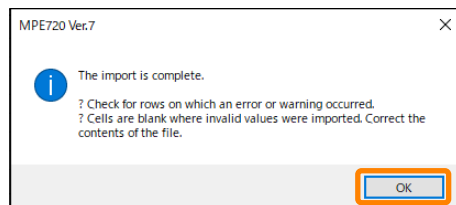
The [Open] window will be displayed.

3. **Specify the file to import, and click the [Open] button.**



The import will be executed and a message window will be displayed when complete.

4. **Click the [OK] button.**

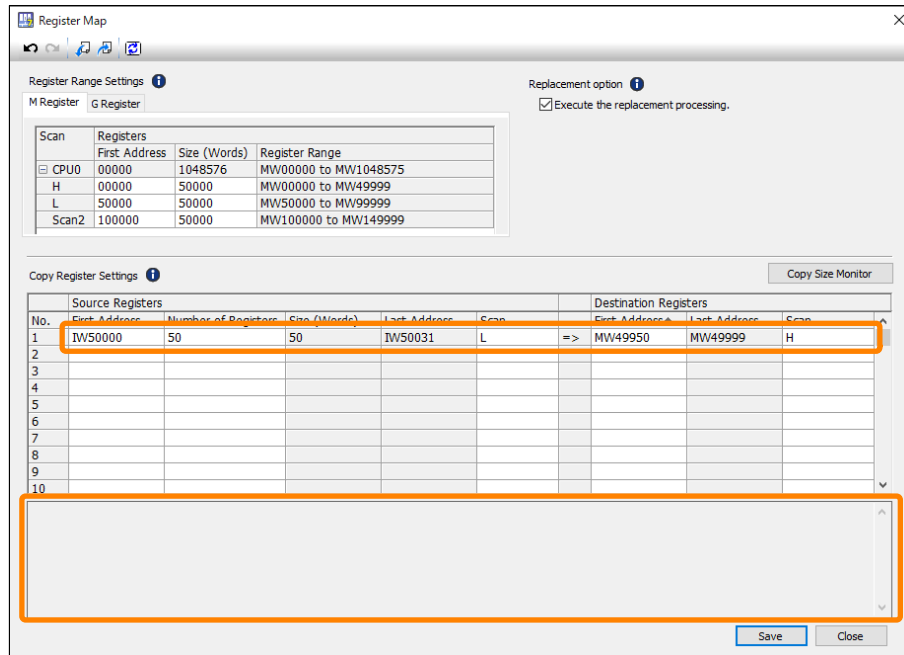


5. **Check the following two items on the [Register Map] window.**

- There are no errors or warnings displayed.
- There are no blank cells in a [No.] row that was configured.

Information

- If there is an error or warning, resolve the issue by referring to the information displayed in the window.
- Cells imported with invalid values may be blank without displaying an error or warning. Blank cells can be checked visually.



This concludes the procedure.

4.6 Checking the Distribution of Axes Using [Search for Programs Used in Each Axis]

Use the [Search for Programs Used in Each Axis] window to check if the scans of tasks and the scans of axes used in tasks are the same. This makes it easier to find the locations of setting defects when using the multiple scans function.

Use the following procedure for the [Search for Programs Used in Each Axis] window.

Information

- The content displayed on the [Search for Programs Used in Each Axis] window can also be checked individually on [Compile], [Search in project], [Cross reference], and other locations.
- This function can also be used on models that do not support the multiple scans function.

1. Confirm that you have finished the following tasks.

- Scan settings
- Control device/group definition settings
- Register map settings
- Task creation

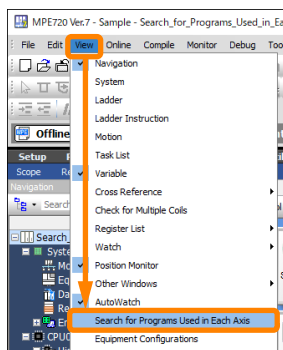
2. Confirm one of the following states.

- A project is open and in offline mode
- Project link connected state

Information

The [Search for Programs Used in Each Axis] window can be executed only in offline mode or in the online project link connected state. When there is a direct online connection, click the [Connection/Disconnection] button on the [My Tool] window to set the MPE720 to offline.

3. Click [View] - [Search for Programs Used in Each Axis] on the menu bar.



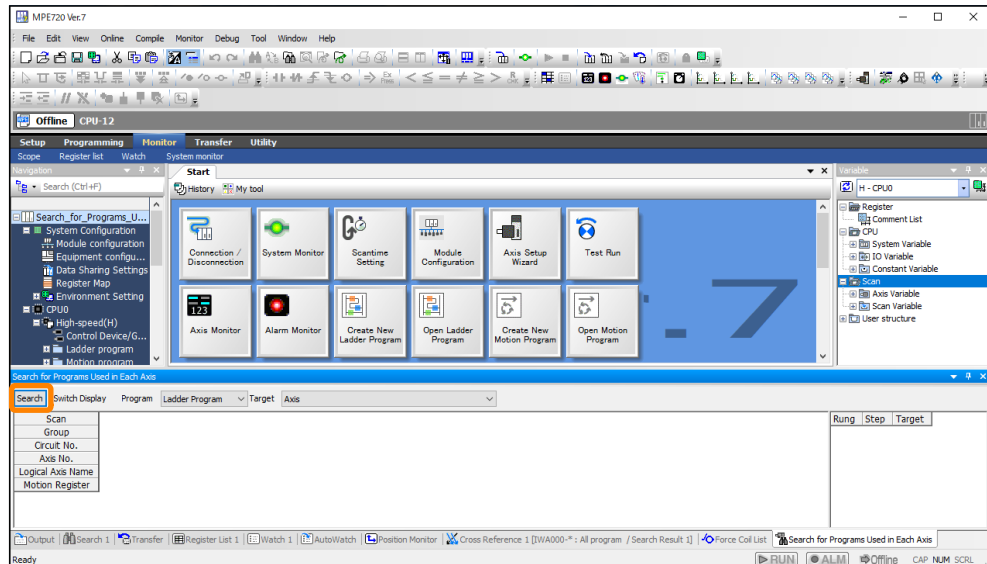
The [Search for Programs Used in Each Axis] window will be displayed.

4. Click the [Search] button.

Information

Refer to the following section for details on the items on the [Search for Programs Used in Each Axis] window.

 [4.6.1 \[Programs Used in Each Axis\] Window Details on page 228](#)



The search will be executed, and the search results will be displayed when complete.

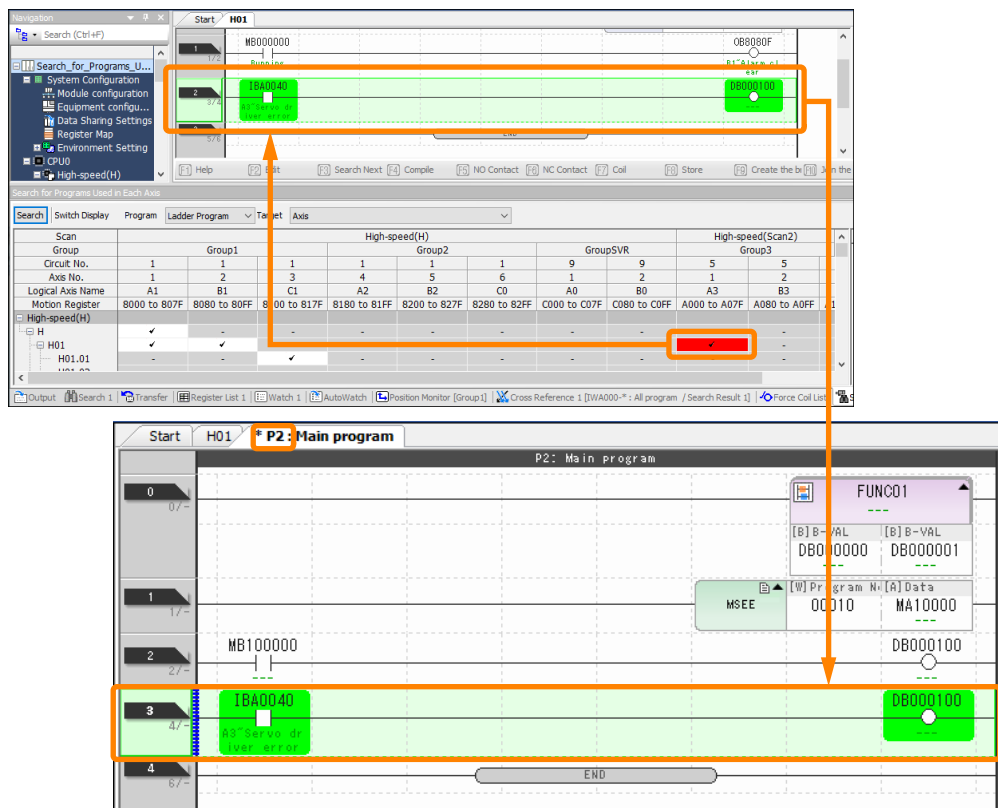
Information This function always displays the same result regardless of the setting of [Setup] - [Support Access Control between Scans].

5. Check and correct the contents shown in red.

Information Double-click a location shown in red to display the program with the relevant axis (registers) selected.

In the following case, for example, the scan: Scan2 axis registers are used in the scan: H task, so the entire rung of the target registers moves to the scan: Scan2 task.

The correction method depends on the circumstances. Make sure you have a proper understanding of the contents of the tasks and correct them.



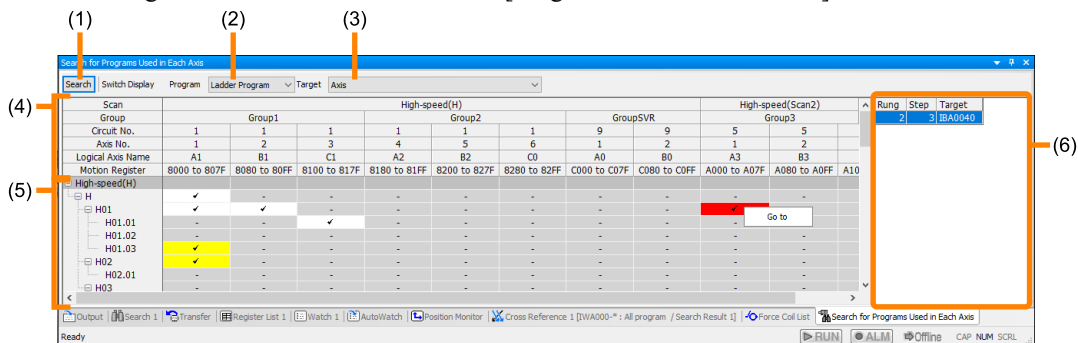
6. Check the contents shown in red and make corrections as necessary.
7. Change the combination of selections for [Program] and [Target], and check the contents according to steps 5 and 6.
8. Repeat steps 5 to 7 for all combinations of [Program] and [Target].

9. Click [Search] again and make sure you check for any missed items in the displayed search results.

This concludes the procedure.

4.6.1 [Programs Used in Each Axis] Window Details

This section gives detailed information on the [Programs Used in Each Axis] window.



No.	Item	Description
(1)	[Search] Button	Clicking this button executes the search.
(2)	[Program]	Select the program to display as the search results from the selections.
(3)	[Target]	Select the target to display as the search results from the selections.
(4)	Displayed header row	The displayed items change depending on (3) [Target]. You can show and hide the header row items with the menu displayed by right-clicking.
(5)	Search results display area	The search results are displayed. If you place the cursor on a cell with a check mark, a description of the search results is displayed. The meanings of the displayed cell colors are given below. - Red location: An axis is being used in a different scan than the program scan./ An axis is being used in a different scan than the program scan in the called program. - Yellow location: An index register or array register of the target axis register is being used./ The target motion program is being called by indirect designation. If you click a cell with a check mark, the details for that location will be displayed in the (6) search results details display area. Double-click or right-click a cell with a check mark and click [Go to] on the displayed menu to display the program in the window and the relevant location.
(6)	Search results details display area	This area displays details about the location clicked in the (5) search results display area. Double-click or right-click and click [Go to] on the displayed menu to display the program in the window and the relevant location.

Programming

This chapter provides an overview of programming and describes operations related to programming.

5.1	Ladder Program	231
5.1.1	What Is a Ladder Program?	231
5.1.2	Window Configuration.....	233
5.1.3	Creating a Drawing	236
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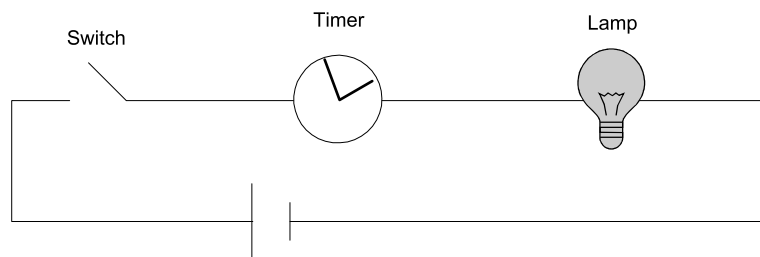
5.1 Ladder Program

This section provides an overview of ladder programming and describes operations that are required when creating a program.

5.1.1 What Is a Ladder Program?

A ladder program uses ladder language instructions and registers to symbolically represent electrical circuits consisting of switches, timers, lamps, and other devices.

<Conceptual Circuit>



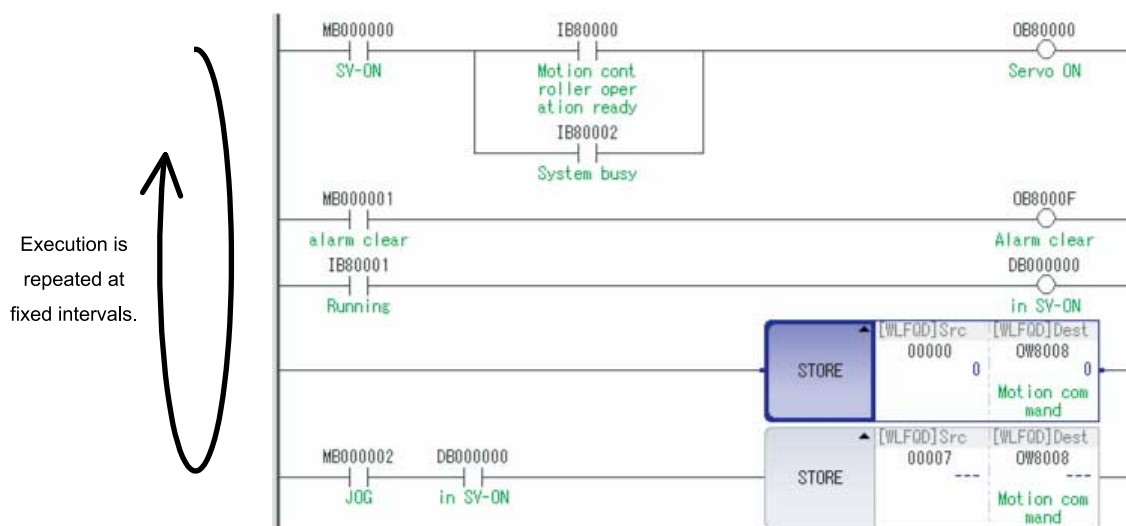
<Ladder Programming>



Ladder programming allows you to easily program large, complex circuits.

Each of the ladder programs that you create is executed in a single scan and then executed repeatedly at fixed intervals.

<Ladder Programming Example>



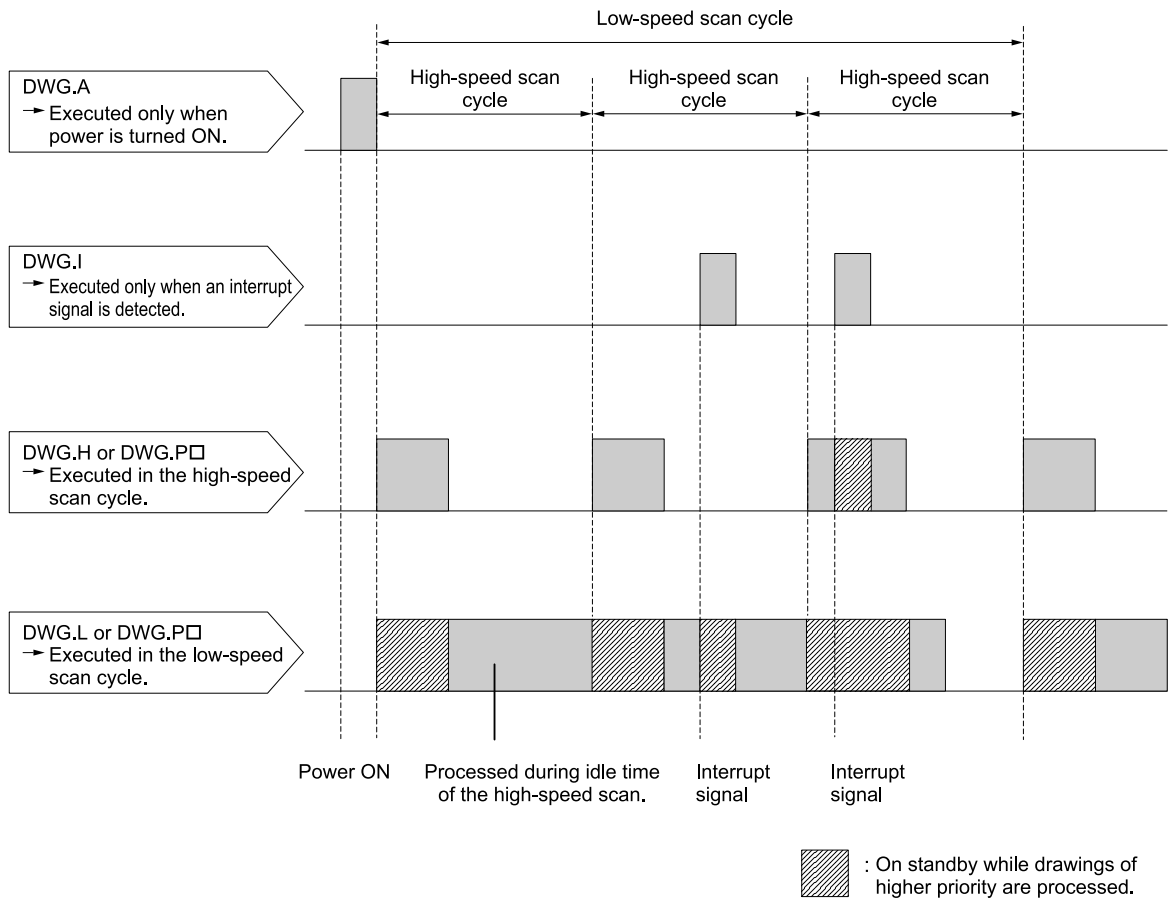
Execution is repeated at fixed intervals.

(1) The Various Execution Timing of Ladder Drawings

Ladder programs are managed in units of drawings (DWG). These are called ladder drawings.

Ladder drawings are executed at various times, as illustrated in the following figure.

Processing can be executed at the appropriate time by programming it in the appropriate ladder drawing.



The following table gives the execution timing for each drawing.

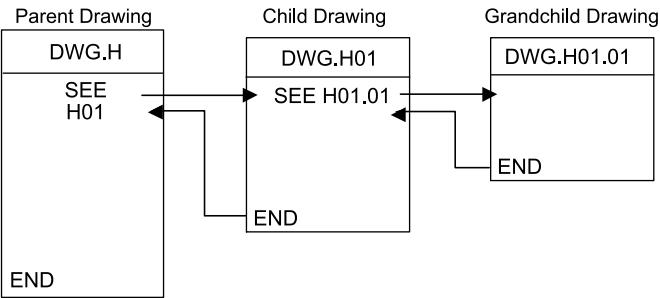
Ladder Drawings	Priority ^{*1}	Execution Timing (Processing Example)
DWG.A	1 (High)	This drawing is executed only once when the power is turned ON (e.g., for data initialization).
DWG.I	2 (↑)	This drawing is executed when an interrupt signal is detected (e.g., for interrupt processing for external signals).
DWG.H or DWG.P□ ^{*2}	3 (↑)	This drawing is executed every high-speed scan cycle (e.g., for motion control).
DWG.L or DWG.P□ ^{*2}	4 (Low)	This drawing is executed every low-speed scan cycle (e.g., for touch panel display processing).

^{*1} The priority will depend on the CPU and execution core settings when using a model that supports multiple scans. Refer to the manual for your controller for details.

^{*2} There are no DWG.P□ drawings when using a model that does not support multiple scans.

(2) Program Modules

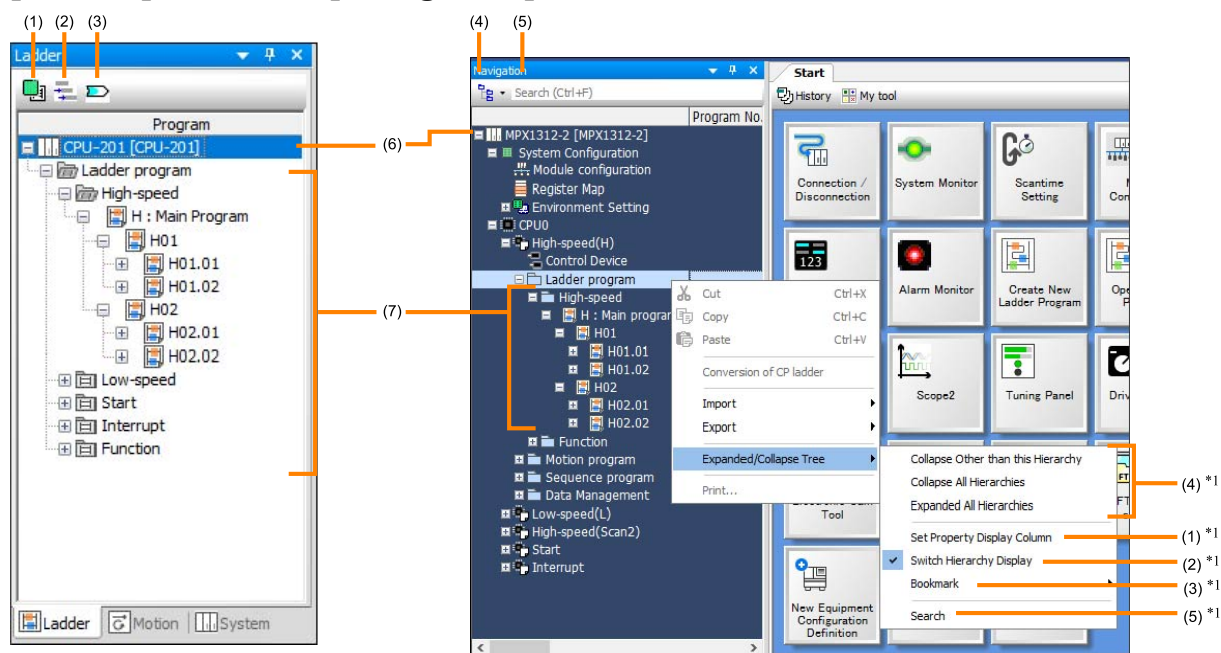
The main program can be separated into modular units to suit different processing requirements, such as child drawings and grandchild drawings, to make the program easier to read.



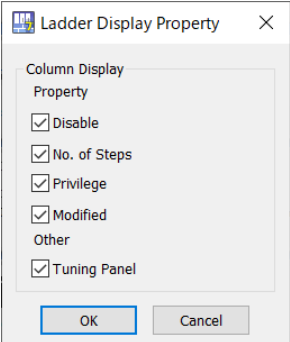
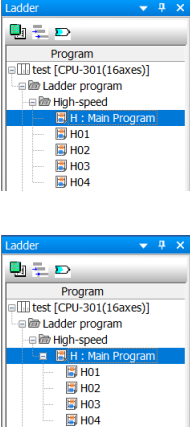
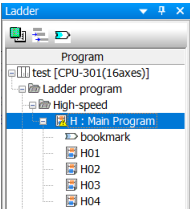
5.1.2 Window Configuration

This section describes the names and views for each window used in creating and editing ladder programs.

(1) [Ladder] Window / [Navigation] Window



*1 Right-click on a level under [Ladder program] and select this item from the [Expanded/Collapse Tree] menu. If you right-click on another location, a different menu will be displayed.

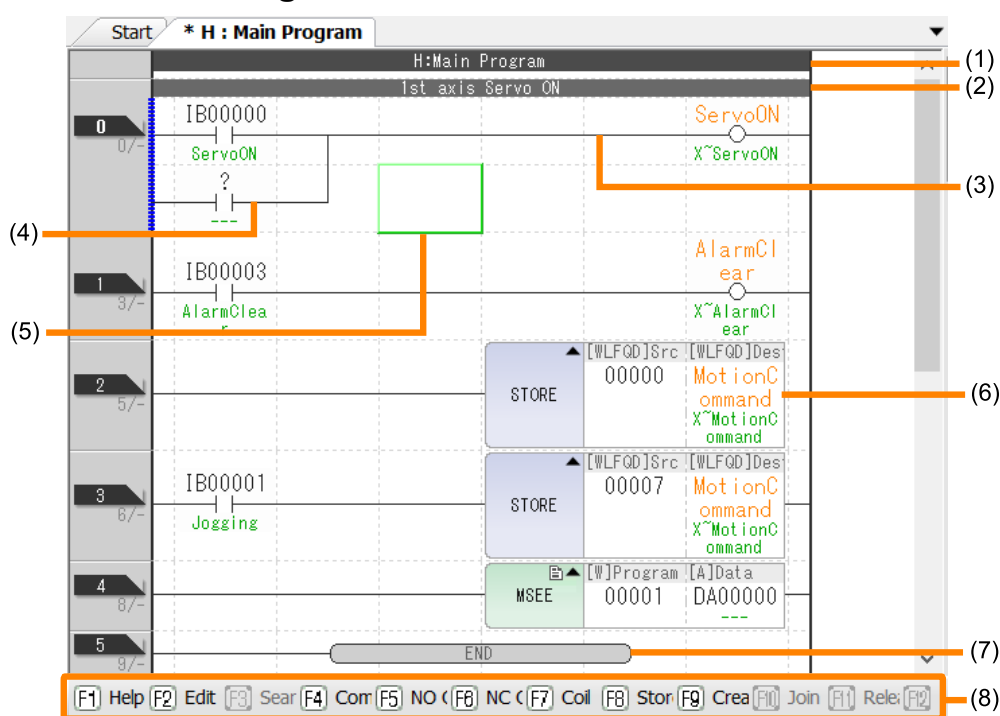
No.	Name	Contents
(1)	Ladder Program Property	Click this button to display the [Ladder Display Property] window. Select the check boxes for the items to display in the [Ladder] window and click [OK]. Columns for those selected items will be displayed in the [Ladder] window. 
(2)	Switch Hierarchy Display	Click this button to change the level of the ladder program drawing. 
(3)	Show/Hide Bookmarks	If bookmarks were added to the ladder program, you can click this button to display or hide the bookmarks in the [Ladder] window. Refer to the following section for how to set bookmarks.  5.1.13 Setting Bookmarks on page 257 <When a Bookmark Is Displayed> 
(4)	Expanded/Collapse Tree	Click this item to display the menu. Depending on the item you click, you can close all levels except the item selected in the [Navigation] window or open/close all levels of the tree.
(5)	Search	You can search for a text string in the items in the [Navigation] window. Enter and confirm the text string to start the search. The search is not case-sensitive. Items that include the search text string will be displayed in green text. If you delete the text string in the search box, the [Navigation] window will be restored to the previous state.

Continued on next page.

Continued from previous page.

No.	Name	Contents
(6)	Project File Name	The name of the project file and the controller model are displayed.
(7)	Ladder Program	The created ladder programs are displayed. The [Navigation] window displays the programs that belong to each CPU and scan separated into those categories. The ladder programs are displayed by drawing. Refer to the following section for details on drawings.  (1) <i>The Various Execution Timing of Ladder Drawings on page 231</i> You can give the ladder programs a three level structure from level 1 to level 3. The level 1 program is called the main program, and only one main program can be created for each A, I, H, L, and P□ program. The level 2 and 3 programs are referenced with the SEE instruction from the program on the level above.

(2) Edit Ladder Program Window



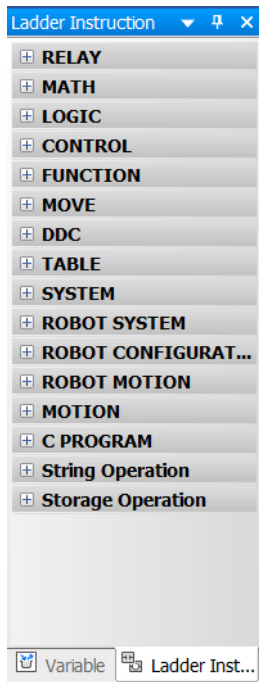
No.	Name	Description
(1)	Program Comment	The program name that was set when the program was created is displayed. You can edit the program comment.
(2)	Rung Comment	This comment is for the following rung. You can set multiple rung comments for a single rung.
(3)	Rung	A reference line on which objects, such as instructions and branches, are placed.
(4)	Branch	A branch line on which to place instructions in parallel. You can create other branches underneath the branch.
(5)	Input Guide	Shows the input position of the object.
(6)	Instruction Object	The instruction name, registers, variable names, comment, and other information are displayed.
(7)	END Instruction	Shows the end of the program. You cannot edit the END instruction.
(8)	Function Keys	Functions to use when creating ladder programs are displayed as buttons. These buttons function the same as the function keys on the keyboard.

(3) [Variable] Window

Refer to the following section for details on the [Variable] window.

 5.4 Variable on page 300

(4) [Ladder Instruction] Window



The instructions to use in Edit Ladder Program Window are displayed on this window organized into categories. Click the [+] button to expand the ladder instructions organized into that category. You can add an instruction to the ladder program by selecting the instruction in the [Ladder Instruction] window and then dragging and dropping it on the Edit Ladder Program Window.

5.1.3 Creating a Drawing

You must create a drawing before creating a ladder program. There are the following two methods that you can use to create a drawing.

- Creating from the [My Tool] window ^{*1}
- Creating from the [Ladder] window or the [Navigation] window

^{*1} Not available for models that support multiple scans.

The procedures are given below.

(1) Creating from the [My Tool] Window

Use the following procedure to create a new drawing from the [My Tool] window.

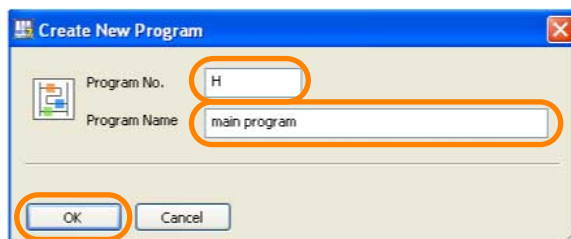
Information This operating procedure cannot be executed when using a model that supports multiple scans. Execute the operating procedure given below.

 (2) [Creating from the \[Ladder\] Window or the \[Navigation\] Window on page 237](#)

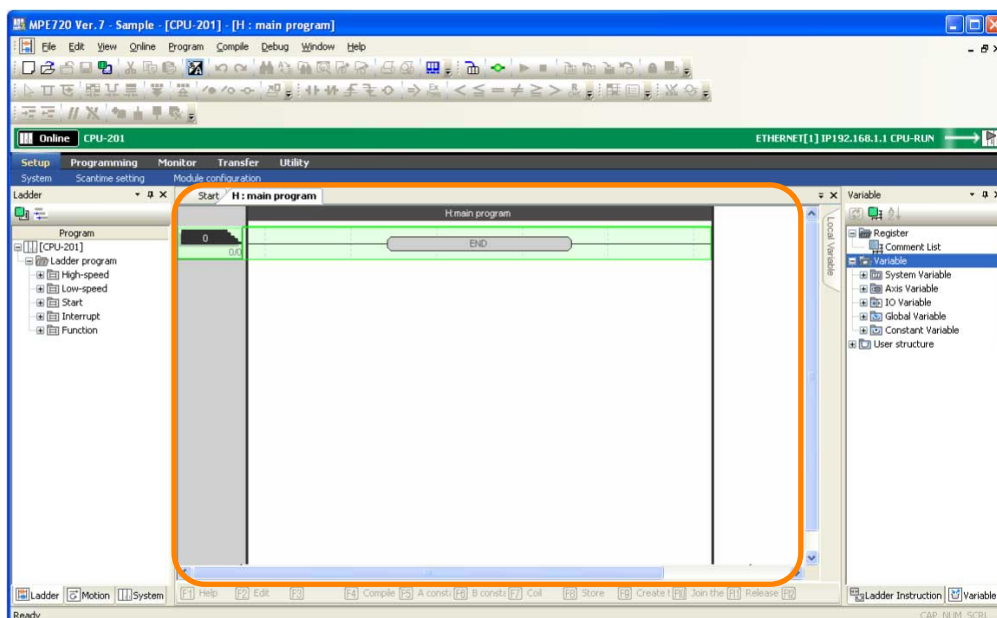
1. **Click the [Create New Ladder Program] button on the [My Tool] window.**
The [Create New Program] window will be displayed.
2. **Enter the program number and program name, and then click the [OK] button.**

Information Refer to the following section for an example for the program number.

 (3) [<Example for the Program Number> on page 238](#)



The new drawing will be displayed.

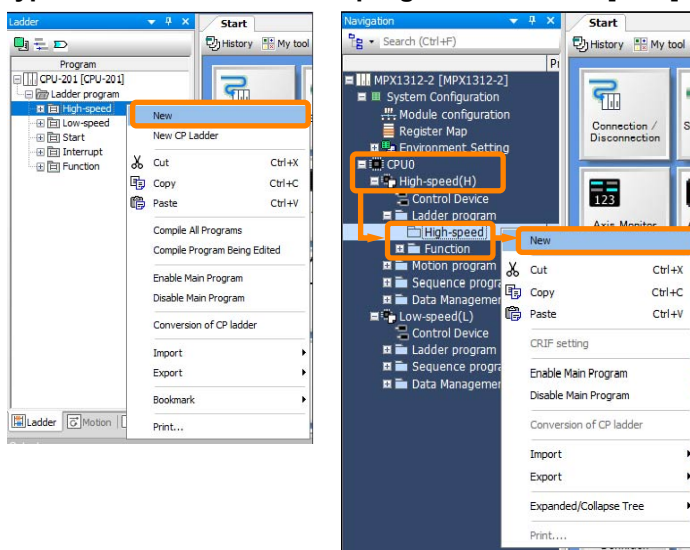


This concludes the procedure.

(2) Creating from the [Ladder] Window or the [Navigation] Window

Use the following procedure to create a new drawing from the [Ladder] window or the [Navigation] window.

1. **When using a model that does not support multiple scans:** Right-click the type of program to create in the [Ladder] window and select [New].
When using a model that supports multiple scans: In the [Navigation] window, expand [Ladder program] under the scan for which to create the program. Right-click the scan type for which to create the program and select [New].



Information

- Creating Child Drawings
Child drawings can be created only if a parent drawing exists.
Right-click the program (parent drawing) for which to create a child drawing.
- Creating Grandchild Drawings
Grandchild drawings can be created only if both parent and child drawings exist.
Right-click the program (child drawing) for which to create a grandchild drawing.

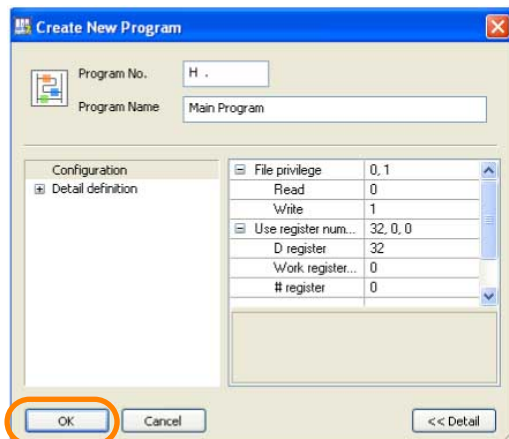
The [Create New Program] window will be displayed.

2. Change the settings as required, and then click the [OK] button.

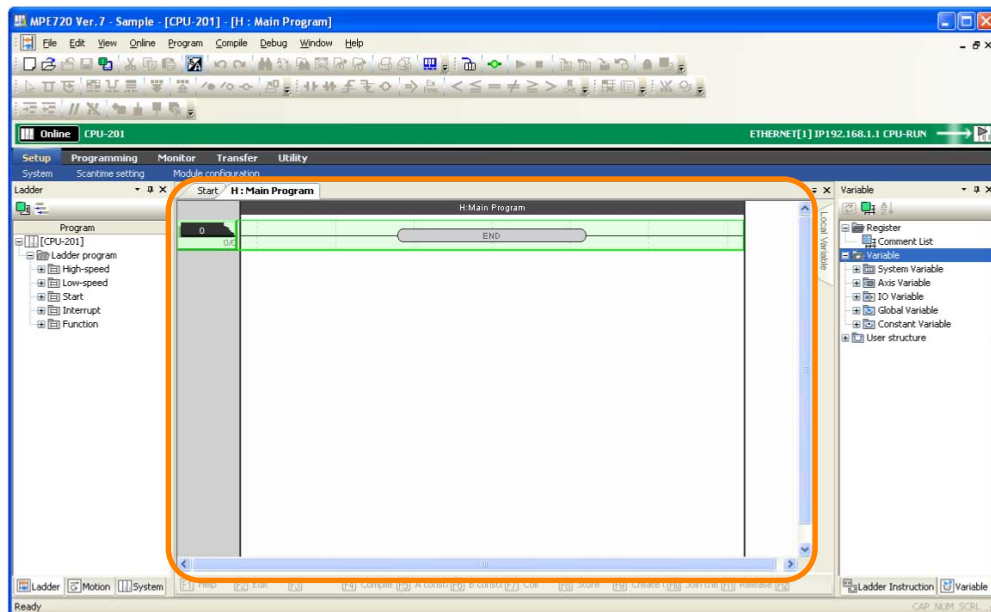
Information

Refer to the following section for an example for the program number.

 (3) <Example for the Program Number> on page 238



The new drawing will be displayed.



This concludes the procedure.

(3) <Example for the Program Number>

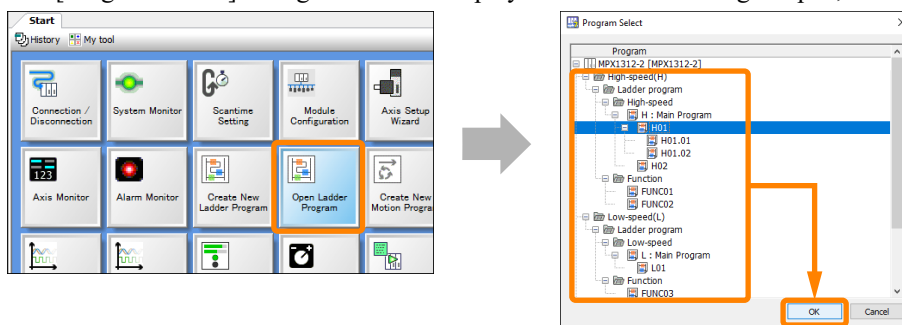
H 01 . 01
↑ ↑ ↑
(1) (2) (3) (4)

No.	Item	Description
(1)	Parent drawing type	- A: Startup drawing - I: Interrupt process drawing - H: High-speed scan process drawing - L: Low-speed scan process drawing - P□: High-speed scan process drawing or low-speed scan process drawing The type is set on the [New Scan] window. Refer to the following section for details. 4.3.1 Creating a Scan on page 197 □ is the same number as the scan number.
(2)	Child drawing	Setting range: 01 to 99
(3)	Period	—
(4)	Grandchild drawing	Setting range: 01 to 99

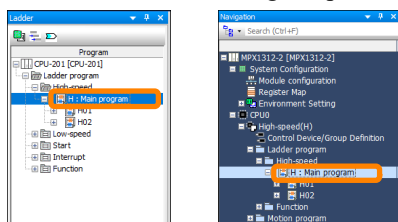
5.1.4 Opening a Drawing

Use one of the following methods to open a created drawing.

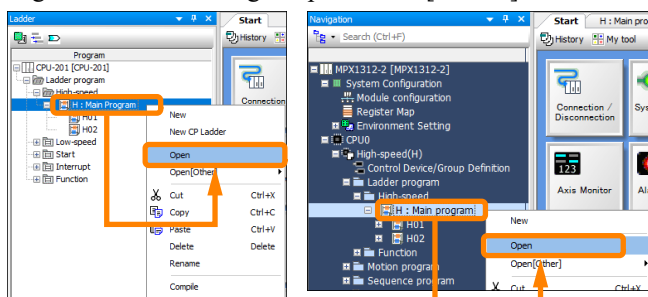
- Click the [Open Ladder Program] button on the [My Tool] window. The [Program Select] dialog box will be displayed. Click the drawing to open, and then click the [OK] button.



- Double-click the drawing to open on the [Ladder] window or the [Navigation] window.



- Right-click the drawing to open on the [Ladder] window or the [Navigation] window and select [Open].



5.1.5 Creating New Ladder Programs

This section describes the following five operations to create ladder programs.

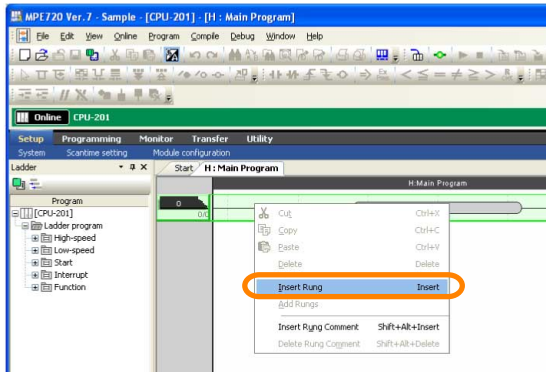
- Inserting a rung
- Inserting an instruction
- Setting the variable, register, and comment

- Inserting a branch
- Editing a rung

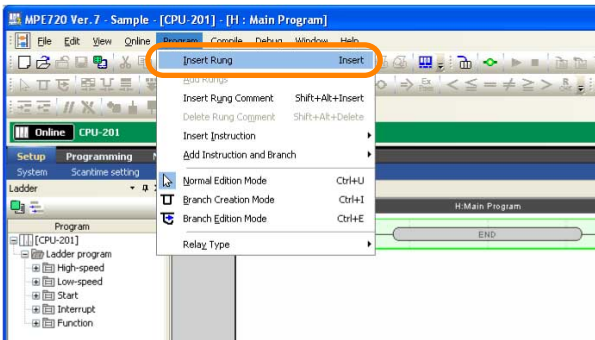
(1) Inserting a Rung

Use one of the following methods to insert a rung.

- Right-click where rung is to be inserted, and select [Insert Rung].



- Place the mouse cursor where the rung is to be inserted, and select [Insert Rung] from the [Program] menu.

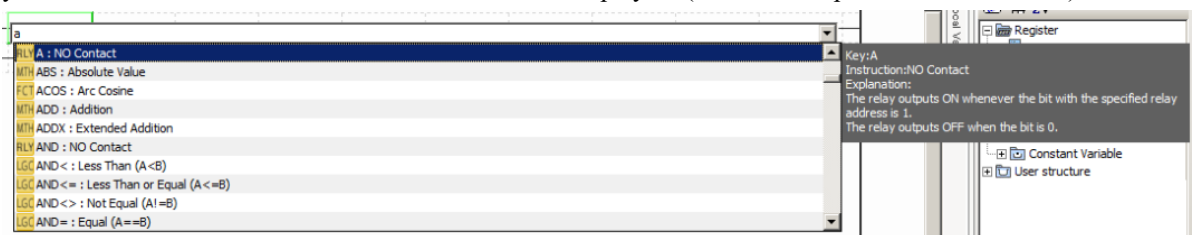


- Place the mouse cursor where the rung is to be inserted, and press the **Insert** key.

(2) Inserting an Instruction

Use one of the following methods to insert an instruction.

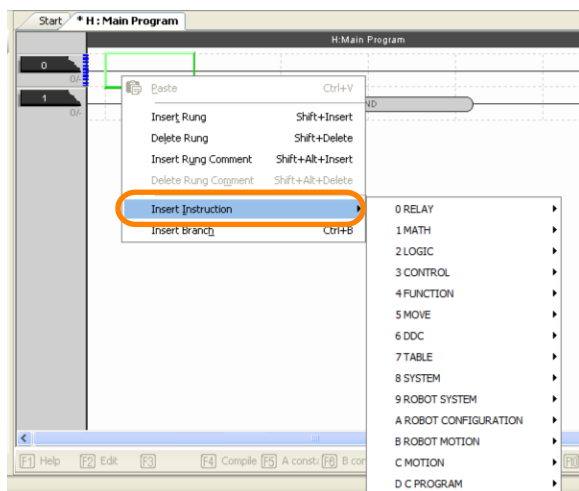
- Enter a text string or double-click the location where the instruction is to be inserted, and select the instruction you want to insert from the list of instructions that is displayed. (The autocomplete function is used.)



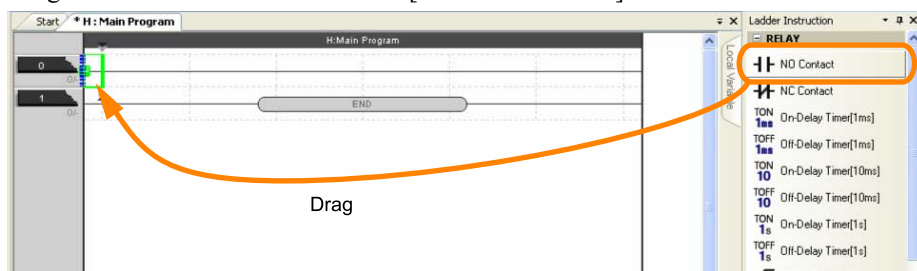
Refer to the following section for details on the autocomplete function.

[5.3.1 Using the Autocomplete Function on page 290](#)

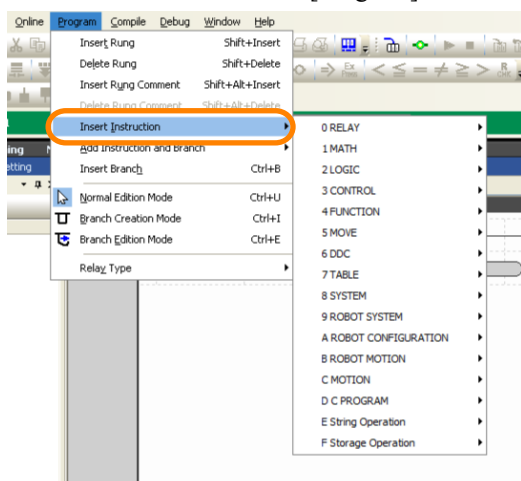
- Right-click where the instruction is to be inserted, and select the desired instruction under [Insert Instruction].



- Drag the desired instruction from the [Ladder Instruction] window to where the instruction is to be inserted.



- Place the mouse cursor where the instruction is to be inserted, and select [Insert Instruction] followed by the desired instruction from the [Program] menu.



Detailed procedures are given only for setting the Expression instruction. Refer to the following section for details.

[5.1.7 Easily Performing Numeric Operations in Ladder Programs on page 247](#)

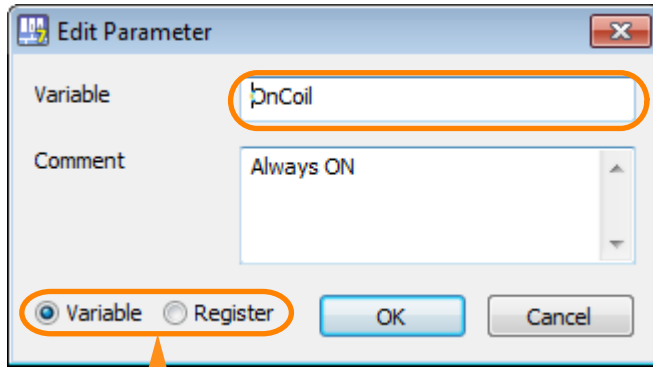
(3) Setting the Variable, Register, and Comment

After you insert the instruction, use one of the following methods to set the variable, register, and comment.

- If you drag a variable from the [Variable] window and drop it on an instruction, the variable will be set for that instruction.



- If you double-click  or , the [Edit Parameter] window will be displayed, on which you can set the variable or register and comment.



Either a variable or register can be input.



Important

If [Register] for the following instructions is set to a value larger than five digits in a project file created with MPE720 Ver. 5 or Ver. 6, the set value will automatically be truncated to five digits when the [Edit Parameter] window is displayed. You must also compile the program when this happens.

- On-Delay Timer (TON (10 ms))
- Off-Delay Timer (TOFF (10 ms))
- On-Delay Timer (TON (1 s))
- Off-Delay Timer (TOFF (1 s))

(4) Insert a Branch

Use one of the following methods to insert a branch.

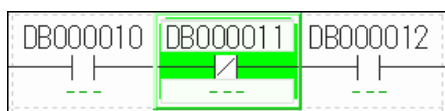
- Placing the same instruction parallel to the selected instruction
- Placing an arbitrary instruction in parallel

Information

A branch can be inserted on the same rung only. You cannot create a branch that spans multiple rungs.

(a) Placing the Same Instruction Parallel to the Selected Instruction

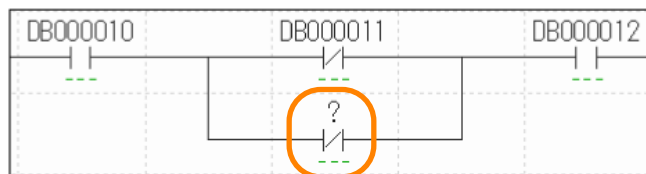
1. Select the instruction object where the branch will be inserted.



2. Use one of the following methods to insert the object.

- Right-click the instruction object, and select [Insert Branch].
- Select [Insert Branch] from the [Program] menu.
- Press **Ctrl + B**.

A branch will be inserted parallel to the selected instruction object, and the same instruction will be placed on that branch.

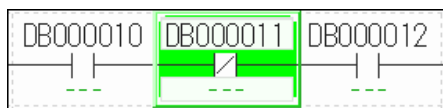


Information

- Only one instruction can be placed on the branch with this operation.
- The data, such as variable names and addresses, is not copied to the instruction placed in parallel.
- Refer to the following section for how to set the comment and register of the inserted instruction.
 (3) [Setting the Variable, Register, and Comment on page 241](#)

(b) Placing an Arbitrary Instruction in Parallel

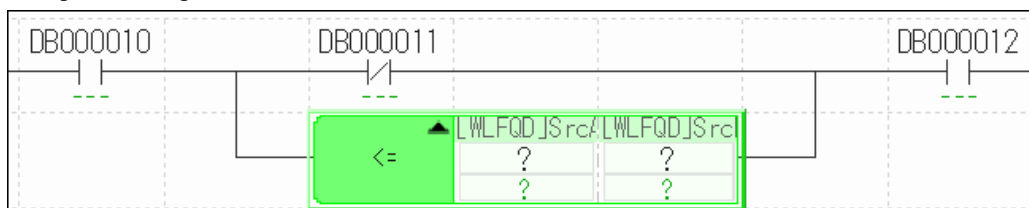
1. Select the instruction object where the branch will be inserted.



2. Use one of the following methods to insert the object.

- Right-click the instruction object, and select [Add Instruction and Branch] - [(Instruction Type)] - [(Instruction)].
- Select [Add Instruction and Branch] - [(Instruction Type)] - [(Instruction)] from the [Program] menu.
- Drag and drop an instruction in the [Ladder Instruction] window to the instruction object in step 1.

A branch will be inserted parallel to the instruction object selected in step 1, and the instruction selected in step 2 will be placed on that branch.



Information Refer to the following section for how to set the comment and register of the inserted instruction.

(3) *Setting the Variable, Register, and Comment on page 241*

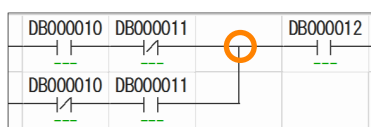
(5) Editing a Branch

There are the following four methods that you can use to edit a branch.

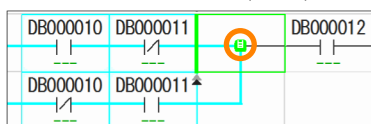
- Pasting a branch
- Moving a branch by dragging
- Changing a branching point
- Deleting a branch

(a) Pasting a Branch

1. Click the branching point of the branch.



The branch edit mark () will be displayed, and the branch to cut or copy will be displayed in blue.



2. Use one of the following methods to cut or copy the branch.

- Right-click the edit mark, and select [Cut] or [Copy].
- Select [Cut] or [Copy] from the [Edit] menu.
- Press **Ctrl + X** (Cut) or **Ctrl + C** (Copy).

3. Select the location to paste the branch.

4. Use one of the following methods to paste the branch.

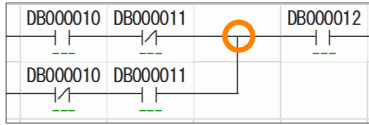
- Right-click the edit mark, and select [Paste].
- Select [Paste] from the [Edit] menu.
- Press **Ctrl + V**.

This will insert the branch that was cut or copied at the location of the input guide.

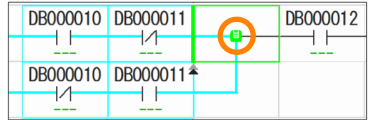
Information The branch can also be pasted on a rung on another ladder drawing.

(b) Moving a Branch by Dragging

1. Click the branching point of the branch.



The branch edit mark () will be displayed, and the branch to move will be displayed in blue.



2. Drag the edit mark, and release the mouse point where the input guide is displayed at the destination.

Information The branch can also be moved to a rung on another ladder drawing.

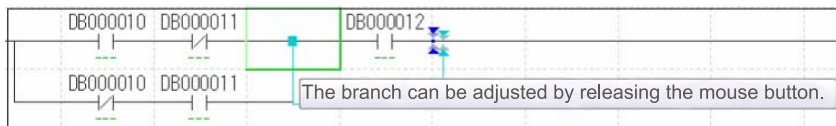
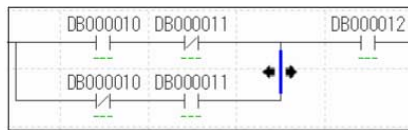
(c) Changing a Branching Point

1. Use one of the following methods to set Branch Edition Mode.

- Click the [Branch Edition Mode ] button on the toolbar.
- Select [Branch Edition Mode] from the [Program] menu.

The cursor will change to the branch edit cursor.

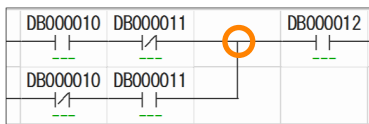
2. Drag the branching line and release the mouse at the new branching location.



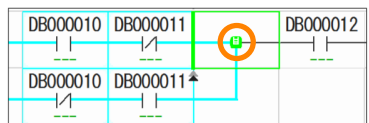
3. Click the [Normal Edition Mode ] button on the toolbar. Branch Edition Mode will end, and the cursor will return to normal.

(d) Deleting a Branch

1. Click the branching point of the branch.



The branch edit mark () will be displayed, and the branch to delete will be displayed in blue.



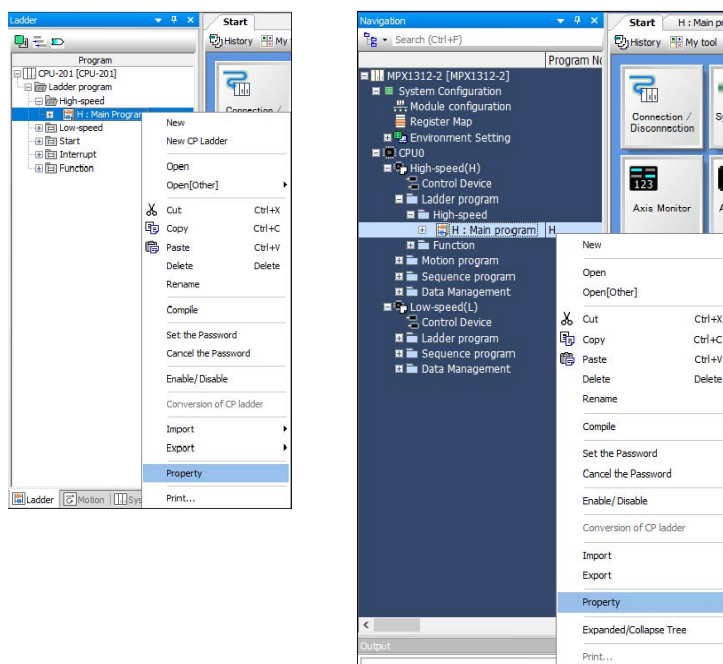
2. Use one of the following methods to delete the branch.

- Right-click the edit mark, and select [Delete].
- Select [Delete] from the [Edit] menu.
- Press the **Delete** key

5.1.6 Checking the Properties of a Ladder Program

You can check the properties (configuration, detail definition, and modification history) of a ladder program. Use the following procedure.

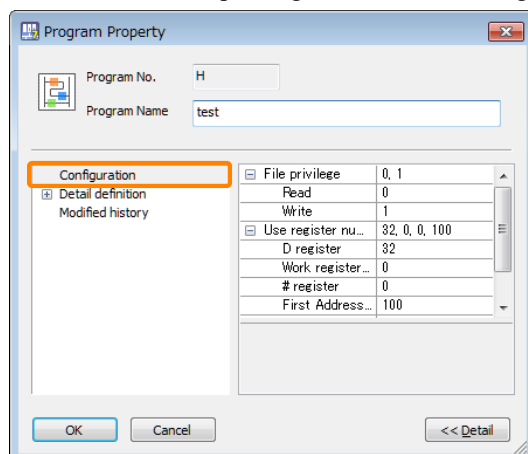
1. In the [Ladder] window or the [Navigation] window, right-click the ladder program file for which to view the properties.
2. Select [Property].



The [Program Property] window will be displayed.

(1) Configuration Definition

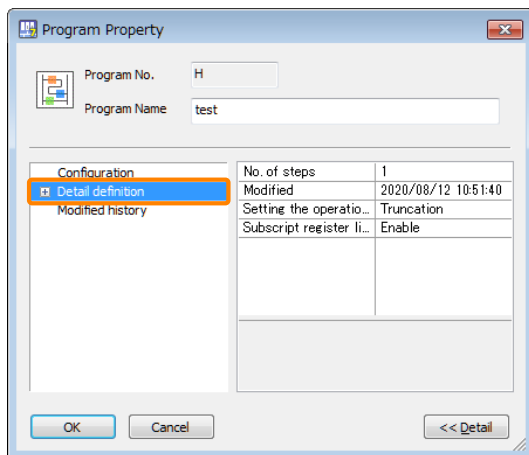
You can set the file privileges and number of registers that are used here.



Item	Description
File privilege	The read privilege level and write privilege level for this program are displayed. The program read privilege and write privilege levels are items created to maintain program security. To open a program, that user must have a user privilege level that is greater than or equal to the read privilege level of that program. In the same manner, to edit and save a program, that user must have a user privilege level that is greater than or equal to the write privilege level of that program. Refer to the following section for information on setting and checking the user privilege level.  8.1 User Management on page 540
Read	Select the read privilege level for this program from 0 to 7. A higher number is a higher privilege level. You cannot enter a numeric value. You cannot set a read privilege level that is higher than your own user privilege level. For example, if your privilege level is 3, you cannot set the privilege level to 4 or higher.
Write	Select the write privilege level for this program from 0 to 7. A higher number is a higher privilege level. You cannot enter a numeric value. You cannot set a write privilege level that is higher than your own user privilege level.
Use register numbers	The number of D registers, work registers, # registers, and first addresses for auto assign that are used by this program are displayed.
D register	Set the maximum number of D registers that are used by this program between 0 and 16384. You can directly set a numeric value or use the spin buttons.
Work register	The number of D registers used by the system as work registers is displayed. You cannot set this value.
# register	Set the maximum number of # registers that are used by this program between 0 and 16384. You can directly set a numeric value or use the spin buttons.
First Address for Auto Assign	Set the first address of the D registers that are automatically assigned to the Param operand when the MLx instruction is inserted into the drawing. The setting range is 0 to 16383.

(2) Detail Definition

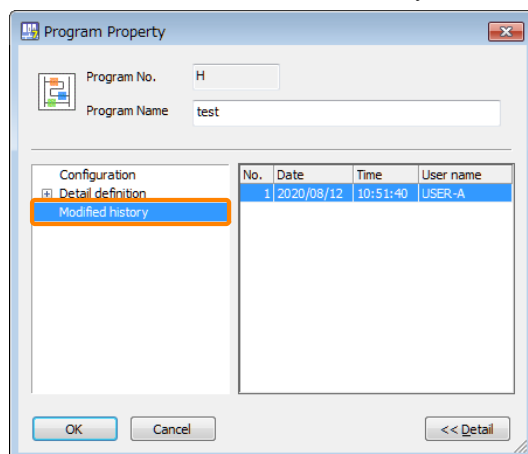
You can check the number of program steps to execute and the date/time the program was last modified, set the operation when performing real number casting, and display/set the subscript register limit check.



Item	Description
No. of steps	The number of steps that are being executed is displayed. This value cannot be changed.
Modified	The date and time the program was last modified is displayed. If you compile the program, the date and time will be updated. This value cannot be changed.
Setting the operation when real number	You can set the operation when converting data from real numbers to integers.
Subscript register limit check	You can set the operation when using index registers. Enable: Detects index errors. (Compatible with MP2000) Disable: Does not detect index errors.

(3) Modified History

You can check the modification history here.

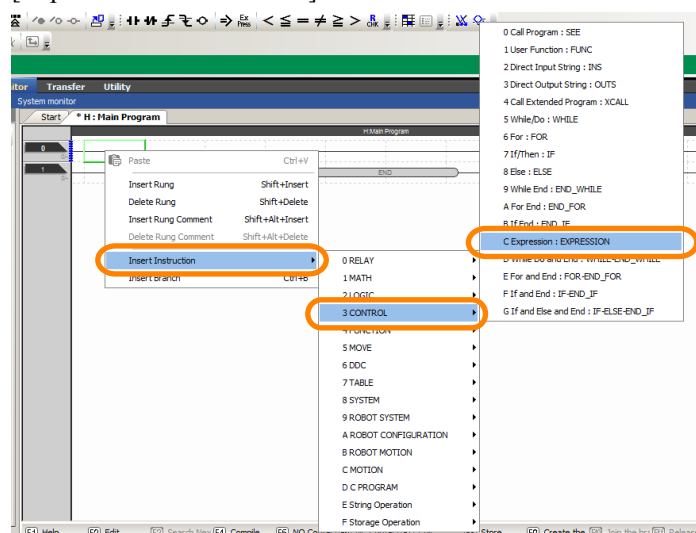


Item	Description
Modified History	The modification history of the program is displayed up to a maximum of 10 entries.

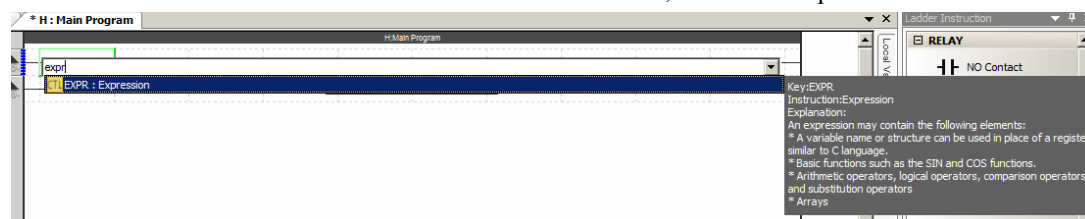
5.1.7 Easily Performing Numeric Operations in Ladder Programs

When performing numerical operations in ladder programming, several extra rungs must be used to store interim calculation results between numeric operations performed with instructions, such as ADD and SUB. With the Expression instruction, you can easily perform complex operations by writing complex formulas inside a single instruction. Use the following procedure.

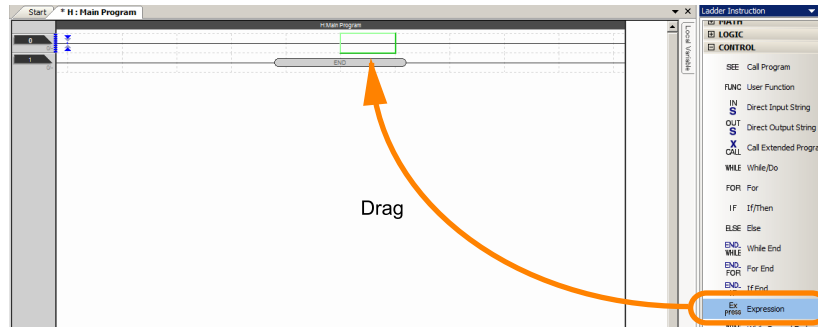
1. Use one of the following methods to insert an Expression instruction.
 - Right-click where the instruction is to be inserted, and select [Insert Instruction] - [CONTROL] - [Expression:EXPRESSION].



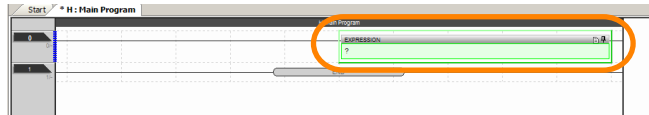
2. Place the mouse cursor where the instruction is to be inserted, and enter "expr".



3. In the [Ladder Instruction] window, click the [+] button next to [CONTROL], and then drag the [Expression] instruction to where the instruction is to be inserted.

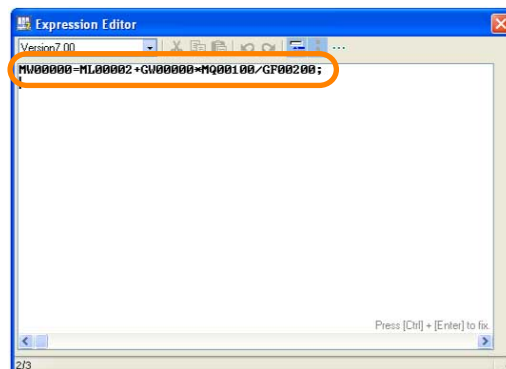


2. Double-click the Expression instruction that was inserted.



The [Expression Editor] window will be displayed.

3. Enter the arithmetic expression.



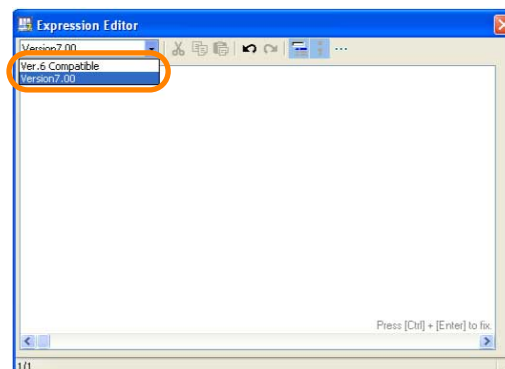
Refer to the ladder programming manual for your controller model for details on limitations on operators, instructions, and functions that can be used inside an Expression instruction.

Information

There are the following two versions of the Expression instruction. The instructions that can be used depend on the version of the Expression instruction.

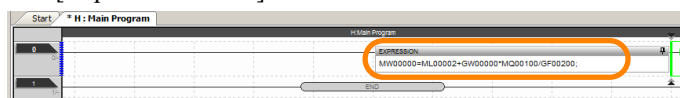
- Expression instruction version 6: Compatible with the Expression instruction from MPE720 Ver.6.
- Expression instruction version 7.00: Not compatible with the Expression instruction from MPE720 Ver.6. New functions and operators that were added for MPE720 Ver.7 are supported.

To change the version, use the list box in the [Expression Editor] window.



4. Hold down the Ctrl key and press the Enter key.

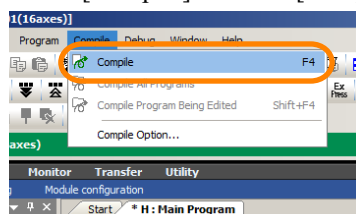
The [Expression Editor] window will close and the entered information will be displayed.



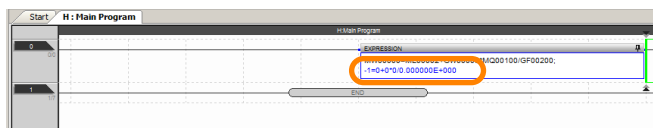
5. Use one of the following methods to compile the program.

- Press the **F4** key.

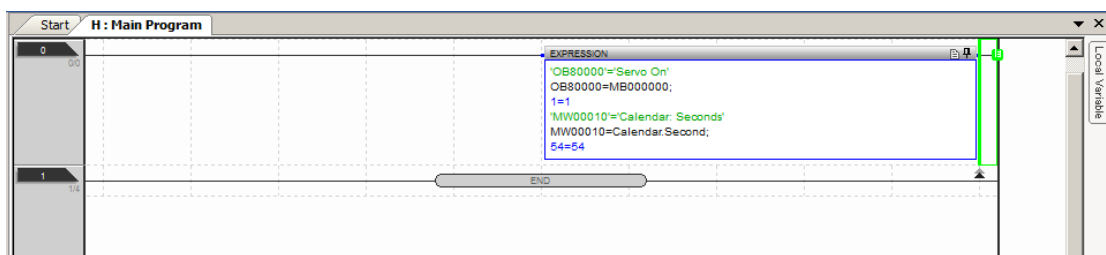
- Select [Compile] from the [Compile] menu.



If the compilation is successful, the controller will execute the Expression instruction and display the current value below the formula.



If there is a comment for a register used in the formula, the register comment will be displayed above the formula.



This concludes the procedure.

5.1.8 Automatically Registering Address Registers as Variables

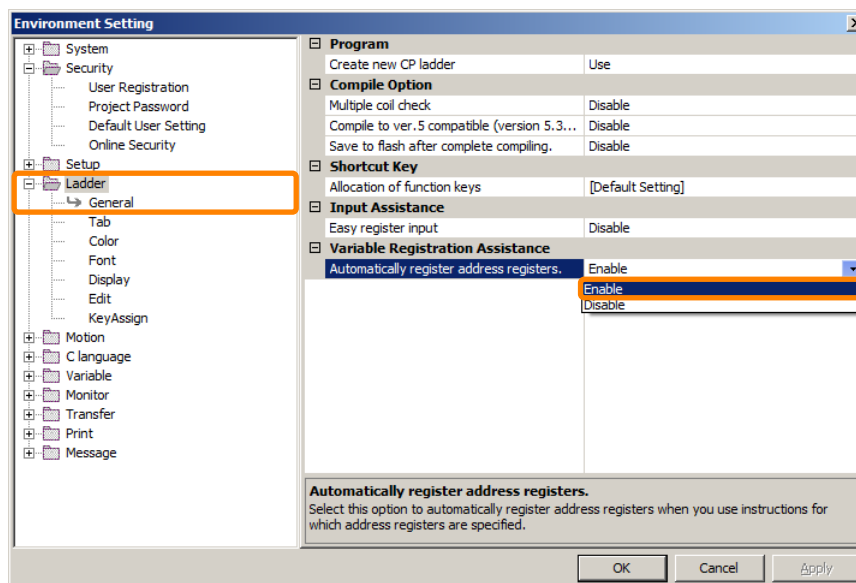
You can automatically register address registers as variables when you use instructions for which address registers are specified. If you register variables, detailed information on the parameters for the address registers will be displayed in window, eliminating the need to look up information in manuals and other resource materials.

Use the following procedure. The MSEE instruction is used as an example.

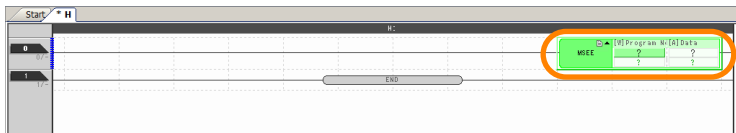
1. On the [Environment Setting] window, select [Ladder] - [General], and then set [Automatically register address registers] to [Enable].

Refer to the following section for details on the [Environment Setting] window.

[10.1 Environment Setting on page 573](#)

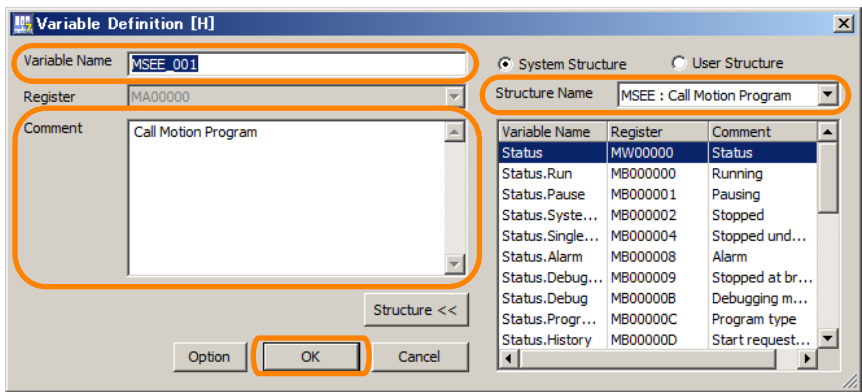


2. On the Edit Ladder Program Window, insert the MSEE instruction and enter the motion program number and the address of the address register.



The [Variable Definition] window will be displayed.

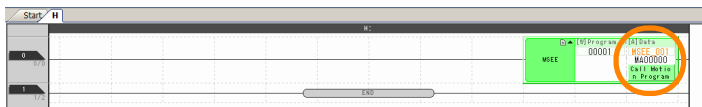
3. Set the following items, and then click the [OK] button.



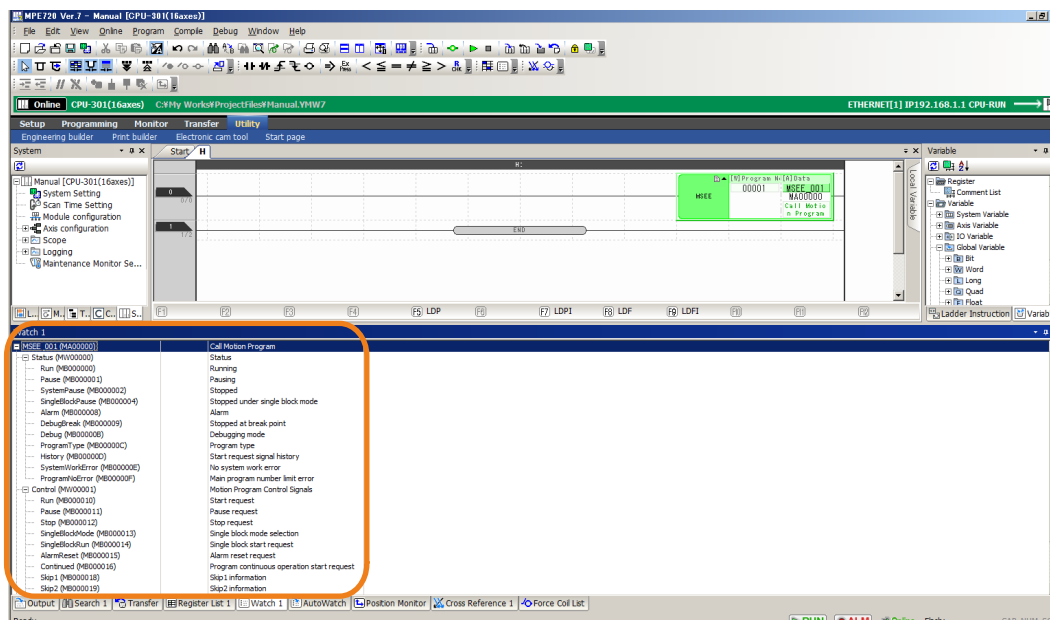
Item	Description
Variable Name	Enter a variable name. The following name is displayed by default: Structure_□□□. The boxes are automatically replaced with a number. <Setting Conditions> • 64 alphanumeric characters maximum. • The first character is an alphabetic character.
Comment	Enter a comment. Carriage returns and line feeds cannot be used. By default, the description of the ladder instruction that was inserted is entered. <Setting Conditions> 255 characters maximum.
Structure Name	Select a structure. Only structures that are related to the instruction that was inserted are displayed as candidates in the list.

The variable name and comment are displayed in the ladder program.

4. Right-click the address register for which you want to check detailed information, and select [Add to Watch].



Detailed information on the selected address register will be displayed in the [Watch] window.



This concludes the procedure.

5.1.9 Toggling the Display of Registers, Variables, and Comments

You can toggle whether to display or hide registers, variables, and comments in the Edit Ladder Program Window.

<When a Register, Variable, and Comment Are Displayed>



<When a Register and Comment Are Displayed>



<When a Variable and Comment Are Displayed>



<When Only a Register Is Displayed>



<When Only a Variable Is Displayed>



Information Variables and registers cannot be hidden at the same time.

There are the following three methods that you can use to display or hide these elements.

- Using the buttons on the toolbar
- Using the shortcut keys
- Using the [Environment Setting] window

The procedures are given below.

(1) Using the Buttons on the Toolbar

- Toggle between displaying and hiding registers.



- Toggle between displaying and hiding variables.



- Toggle between displaying and hiding comments.



(2) Using the Shortcut Keys

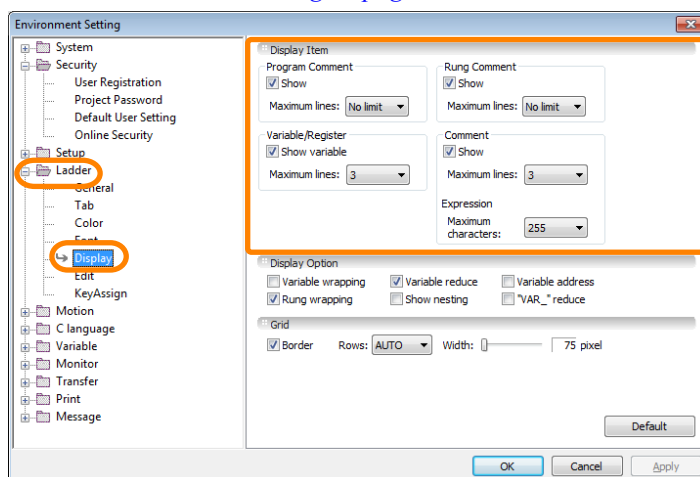
- Displaying or hiding registers: Hold down the **Ctrl** key and press the **F5** key.
- Displaying or hiding variables: Hold down the **Ctrl** key and press the **F7** key.
- Displaying or hiding comments: Hold down the **Ctrl** key and press the **F8** key.

(3) Using the [Environment Setting] Window

You can also toggle between displaying and hiding registers, variables, and comments on the [Environment Setting] window.

Refer to the following section for details on the [Environment Setting] window.

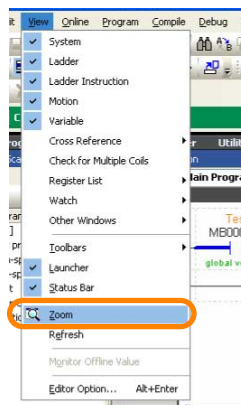
[10.1 Environment Setting on page 573](#)



5.1.10 Zooming the Display

Use the following procedure to zoom the Edit Ladder Program Tab Page.

1. Select [Zoom] from the [View] menu.



The [Ladder Magnification] window will be displayed.

2. Set a value for [Magnification], and click the [OK] button.



The [Ladder Magnification] window will close, and the setting will be applied to the Edit Ladder Program Window.

This concludes the procedure.

5.1.11 Creating a CP Ladder Drawing

There are the following two methods that you can use to create a CP ladder drawing that are compatible with MPE720 Ver.5 or earlier versions of the engineering tool.

- Using the [Ladder] window
- Using the launcher

The procedures are given below.



Important

You can use CP ladder programs for MP2000-series or MP3000-series controllers, but the types and ranges of registers and the data types that can be used will be limited to the range specifications of the MP2000-series controllers.

Refer to the following manual for details.

MP2000 Series Ladder Programming User's Manual (Manual No.: SIE-C887-1.2)

Information

This function is not available when using a model that supports multiple scans.

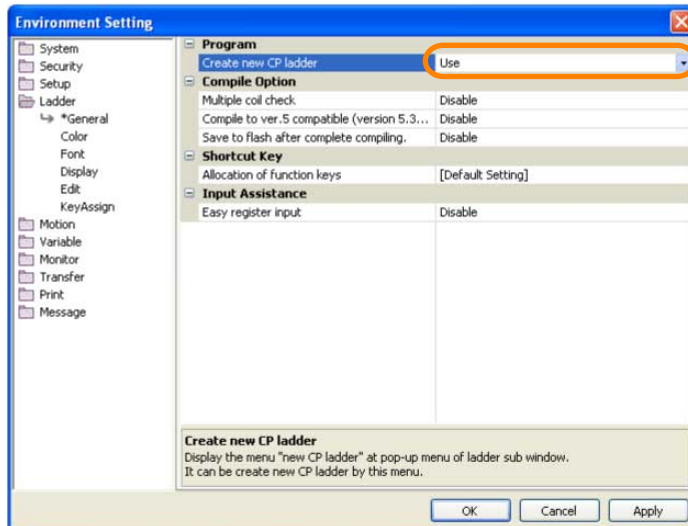
(1) Using the [Ladder] Window

Use the following procedure to create a new CP ladder drawing using the [Ladder] window.

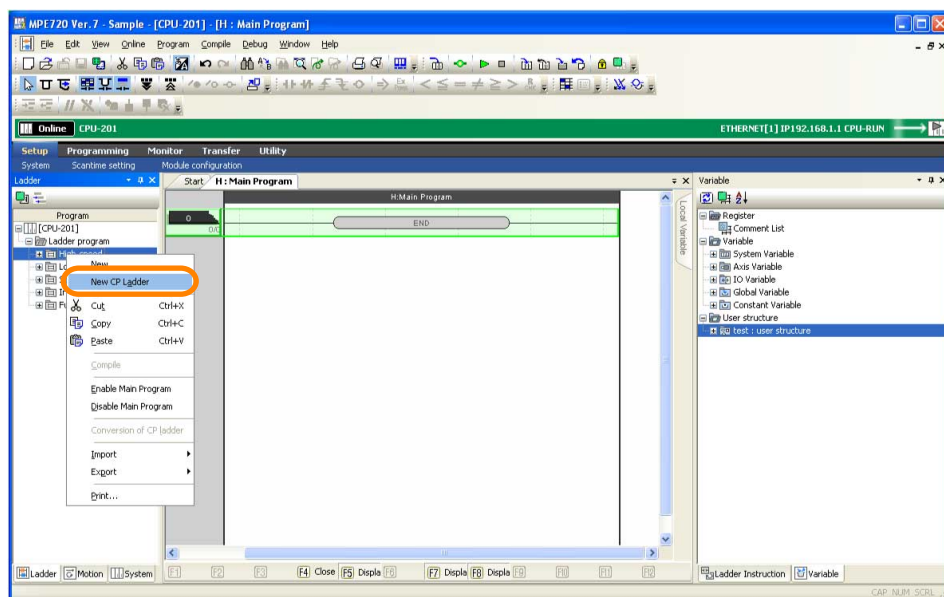
1. On the [Environment Setting] window, set [Create new CP ladder] to [Use].

Refer to the following section for details on the [Environment Setting] window.

[10.1 Environment Setting on page 573](#)

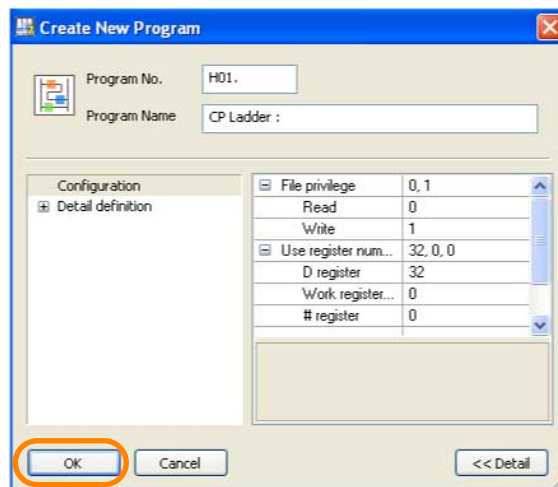


2. Right-click in the [Ladder] window, and select [New CP Ladder].

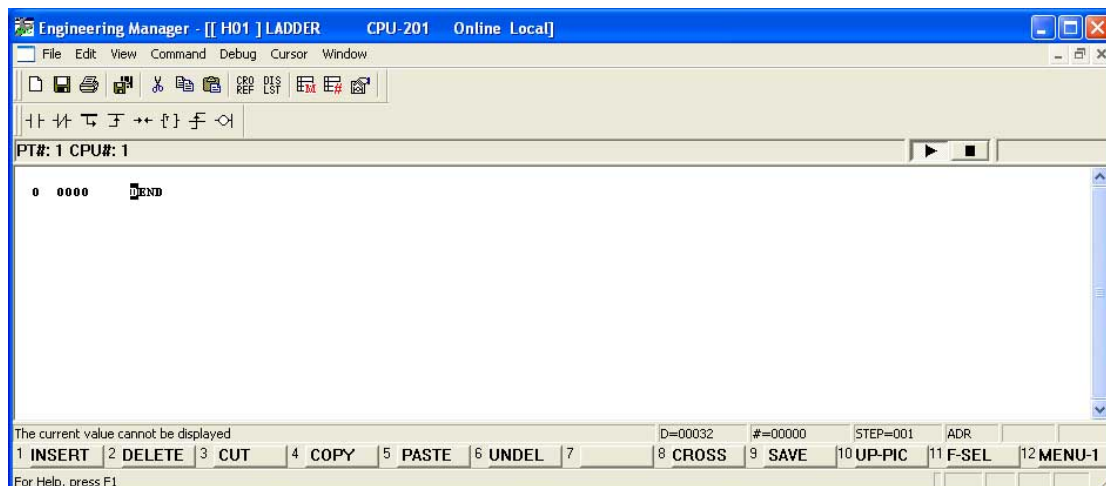


The [Create New Program] window will be displayed.

3. Click the [OK] button.



The Edit CP Ladder Window will be displayed inside the Engineering Manager Window.



Refer to the following manual for details on the features and operating procedures of the Engineering Manager.

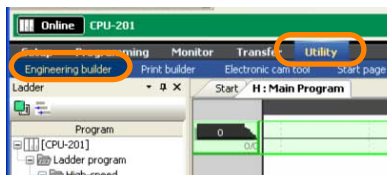
Machine Controller MP900/MP2000 Series MPE720 Software for Programming Device User's Manual (Manual No.: SIEP C880700 05)

This concludes the procedure.

(2) Using the Launcher

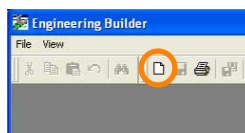
Use the following procedure to create a new CP ladder drawing using the launcher.

1. **Select [Utility] - [Engineering builder] from the launcher.**



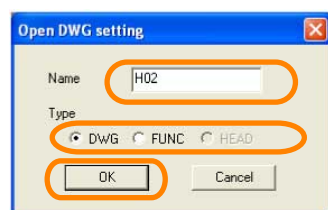
The [Engineering Builder] window will be displayed

2. **Click the [New drawing] button.**

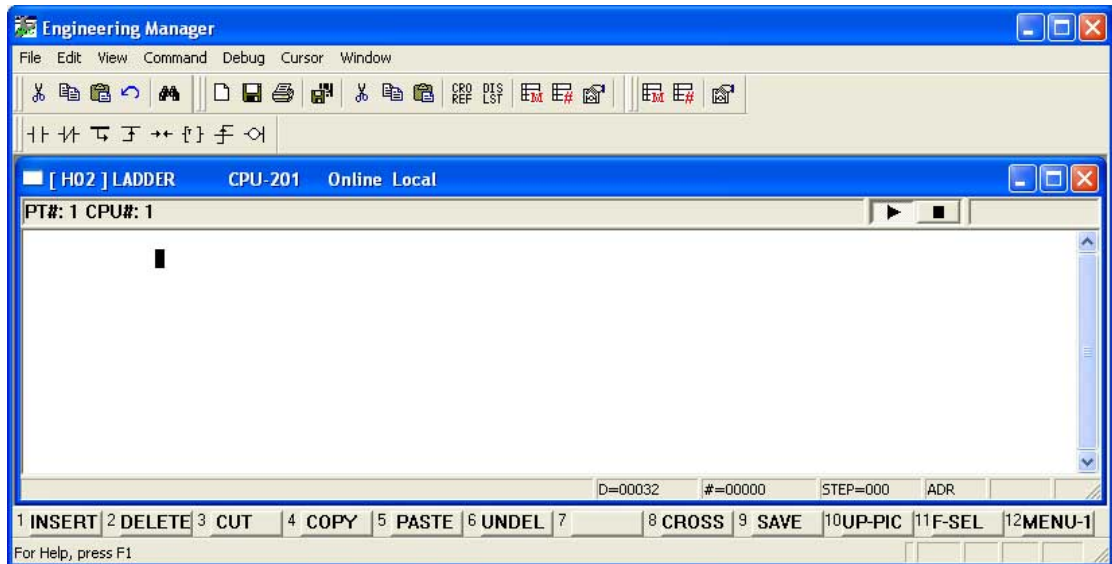


The [Open DWG setting] window will be displayed.

3. **Set [Name] and [Type], and then click the [OK] button.**



The Edit CP Ladder Window will be displayed inside the Engineering Manager Window.



Refer to the following manual for details on the features and operating procedures of the [Engineering Manager].

Machine Controller MP900/MP2000 Series MPE720 Software for Programming Device User's Manual (Manual No.: SIEP C880700 05)

This concludes the procedure.

5.1.12 Specifying the Data Type of the Operation Result of an Expression Instruction

When you use the Expression instruction to perform a numeric operation in a ladder program, the result may not be as intended because of differences in data types.

You can avoid producing unintended operation results by using the cast operator as follows:

- Convert the data type of the operand
- Convert the data type of the operation result
- Specify the data type of the entire arithmetic expression

Each method is described below.

(1) Converting the Data Type of the Operand

You can convert the data type of an operand by placing the cast operator in front of that operand.

<Example>

$DL00010 = 14000 - ((\text{WORD}) DF00012 + 100)$

In this example, floating point data in DF00012 is converted to integer data and then the calculation is performed.

(2) Converting the Data Type of the Operation Result

You can convert the data type of an arithmetic expression by placing the cast operator in front of the arithmetic expression.

<Example>

$DL00010 = 14000 - \text{LONG} (DF00012 + 100)$

In this example, the result of the operation $(DF00012 + 100)$ is converted to a double-length integer.

(3) Specify the Data Type of the Entire Arithmetic Expression

You can specify the data type of the entire arithmetic expression by placing an arithmetic expression data type operator in front of the arithmetic expression.

<Example>

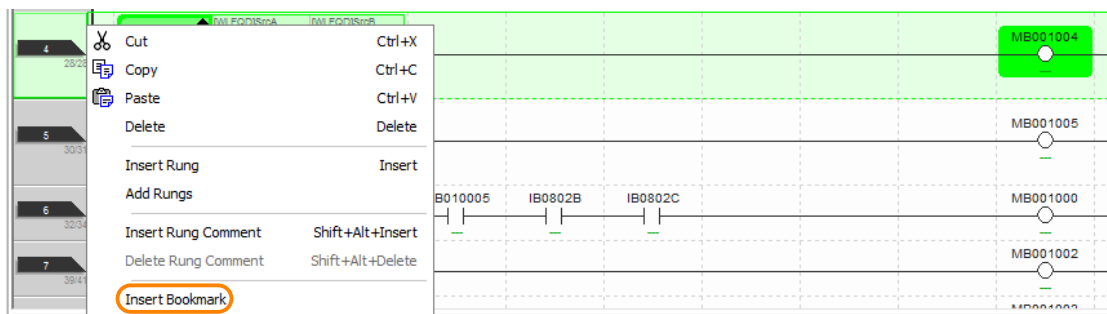
DW00010 = FTYPE (14000 - (DF00012 * 100 / 2))

In this example, the operation on the right side is calculated as if the values were all floating decimal data.

5.1.13 Setting Bookmarks

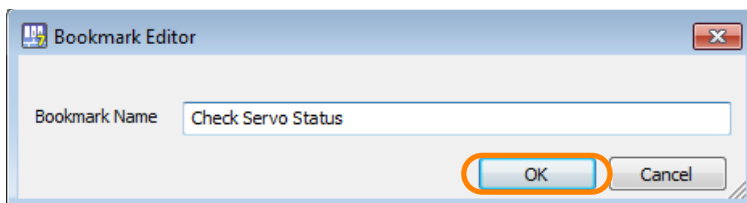
You can set bookmarks at the desired locations in ladder programs. Use the following procedure.

1. **Right-click where the bookmark is to be inserted, and select [Insert Bookmark].**

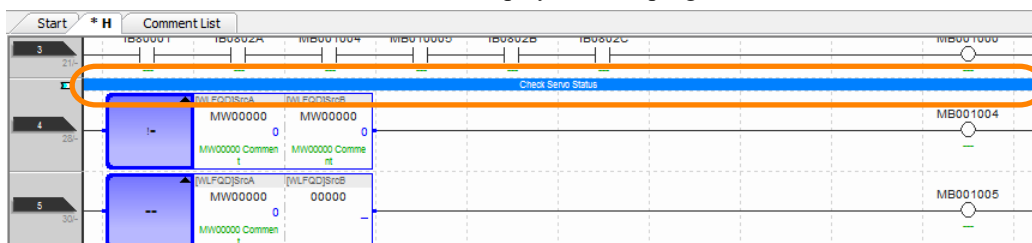


The [Bookmark Editor] window will be displayed.

2. **Enter a name, and click the [OK] button.**



The name of the inserted bookmark will be displayed in the program.

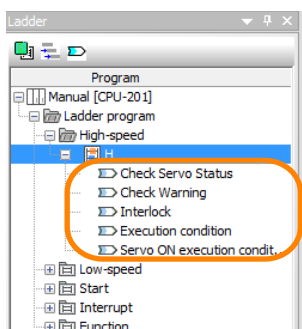


Note:

The above screen capture shows the bookmark while it is being edited. For the bookmark to be recognized, the program must be compiled.

3. **Use one of the following methods to compile the program.**

- Press the F4 key.
- Select [Compile] from the [Compile] menu.



The list of bookmarks will be displayed in the [Ladder] window or the [Navigation] window.

This concludes the procedure.

5.1.14 Enabling and Disabling Ladder Programs by Drawings

You can enable or disable ladder programs by drawings when debugging or in other cases.

Use the following procedure.

1. **Open the project file.**
2. **Right-click the program to enable or disable in the [Ladder] window or the [Navigation] window, and select [Enable/Disable].**

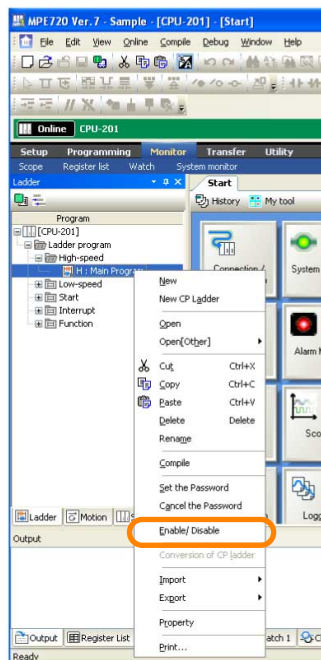
Information

You can select more than one drawing.

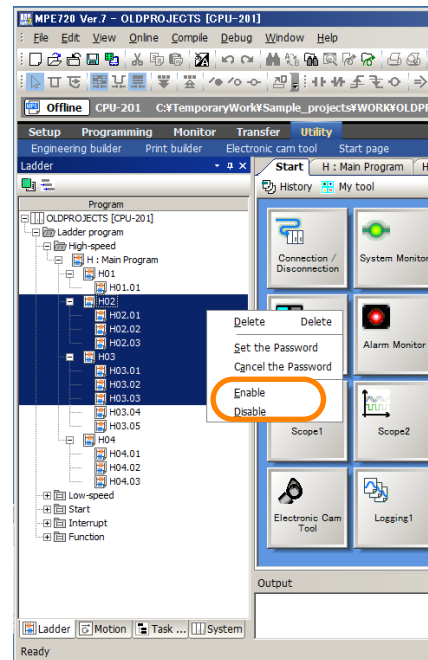
- To open a number of consecutive drawings: Select the first drawing in the group of drawings to open, hold down the Shift key, and then select the last drawing in the group of drawings to open. To open a number of consecutive drawings: Select the first drawing in the group of drawings to open, hold down the **Shift** key, and then select the last drawing in the group of drawings to open.

- To open a number of drawings that are not consecutive: Hold down the Ctrl key and click the drawings to open. To open a number of drawings that are not consecutive: Hold down the **Ctrl** key and click the drawings to open.

<If Only One Drawing Is Selected>



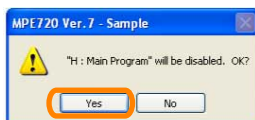
<If More Than One Drawing Is Selected>



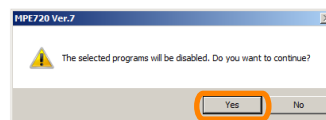
A message dialog box will be displayed.

3. **Click the [Yes] button.**

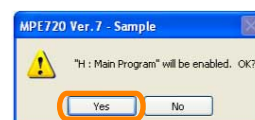
<Disabling with Only One Drawing Selected>



<Disabling with More Than One Drawing Selected>



<Enabling>



The drawing will be enabled or disabled.

4. **Confirm that the icon for the drawing has changed in the [Ladder] window or the [Navigation] window.**

- Drawing is enabled:
- Drawing is disabled:

This concludes the procedure.

5.1.15 Shortcut Keys for Ladder Programming

The following tables list the shortcut keystrokes that are useful when creating ladder programs.

Information If your shortcut keys are assigned to "Ver.6 Compatible" in the [Environment Setting] window, they will not be the same as the assignments that are described in this section.

Refer to the following manual for the shortcut key assignments for MPE720 Ver.6.

📖 Engineering Tool for MP2000 Series Machine Controller MPE720 Version 6 User's Manual (Manual No.: SIEP C880700 30)

(1) Function Keys

Function	Key
Help	F1
Edit	F2
Compile	F4
Input an NO Contact	F5
Input an NC Contact	F6
Input a Coil instruction	F7
Input a Store instruction	F8
Create a branch	F9
Confirm branches	F10
Cancel a branch	F11
Input an NO Contact in parallel	Shift + F5
Input an NC Contact in parallel	Shift + F6
Input a Coil in parallel	Shift + F7
Input an Expression instruction	Shift + F8
Input a Rising Edge NO Contact	Alt + F5
Input a Falling Edge NO Contact	Alt + F7
Input a Rising Edge NC Contact	Alt + F8
Input a Falling Edge NC Contact	Alt + F9
Input a Rising Edge NO Contact in parallel	Alt + Shift + F5
Input a Falling Edge NO Contact in parallel	Alt + Shift + F7
Input a Rising Edge NC Contact in parallel	Alt + Shift + F8
Input a Falling Edge NC Contact in parallel	Alt + Shift + F9
Exit	Alt + F4
Switch windows	Alt + F6
Switch tabs	Ctrl + F6

(2) Edit

Function	Key
Undo	Ctrl + Z
Redo	Ctrl + Y
Cut	Ctrl + X
Copy	Ctrl + C
Paste	Ctrl + V

Continued on next page.

Continued from previous page.

Function	Key
Delete	Delete
Select all	Ctrl + A
Search	Ctrl + F
Replace	Ctrl + H

(3) Programming

Function	Key
Insert a rung	Insert, Shift + Insert
Delete a rung	Shift + Delete
Insert a rung comment	Shift + Alt + Insert
Delete a rung comment	Shift + Alt + Delete
Insert a branch	Ctrl + B
Normal Edit Mode	Ctrl + U
Branch Creation Mode	Ctrl + I
Branch Edition Mode	Ctrl + E
Edit an instruction comment	Ctrl + Alt + Enter
Edit an instruction	F2
Delete an instruction	Ctrl + Delete
Edit parameters	Ctrl + Enter

(4) Debugging

Function	Key
Cross Reference	Ctrl + R
Display register map	Ctrl + W

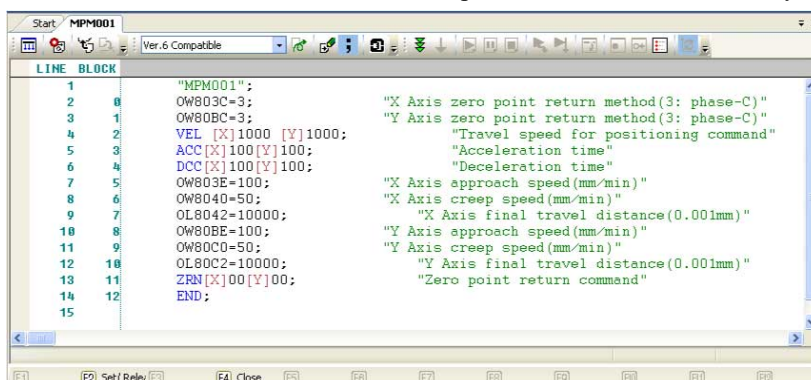
5.2 Motion Program

This section provides an overview of motion programming and describes operations that are required when creating a program.

5.2.1 What Is a Motion Program?

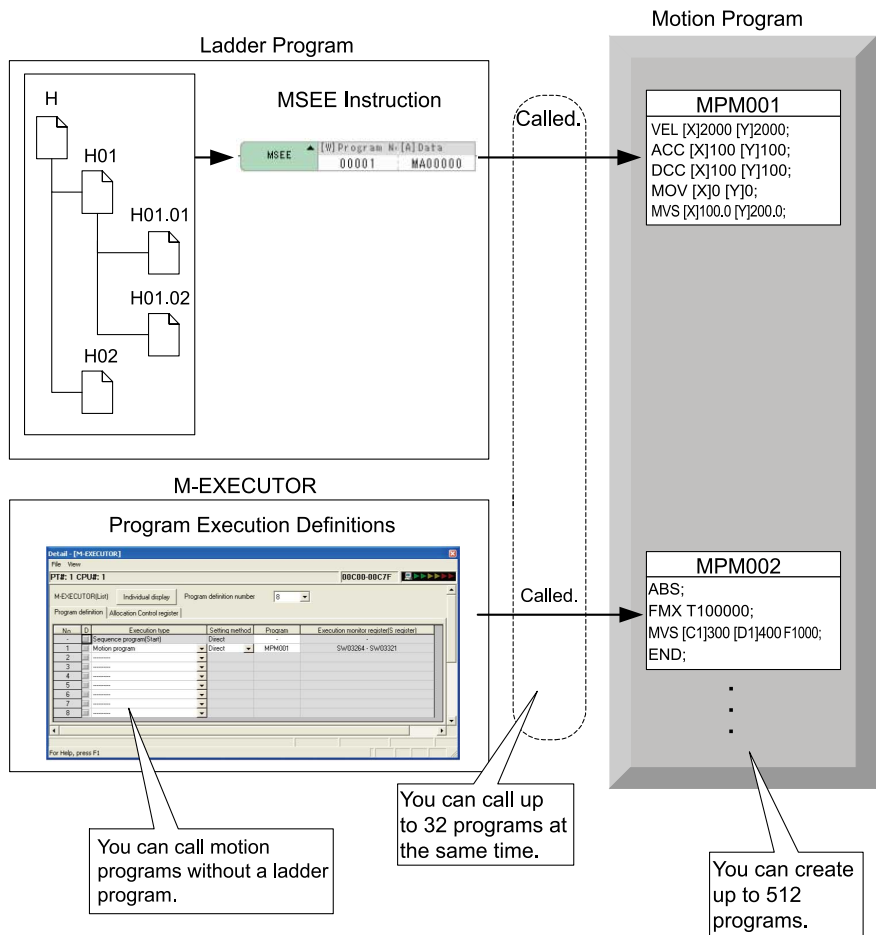
Motion programs are programs that are written in Yaskawa's motion language, which is a textual programming language.

In comparison with ladder programs, motion programs allow you to execute various operations with one line of motion language code. As opposed to ladder programs, motion programs allow you to set the target position, acceleration/deceleration times, or interpolation feed speeds for interpolation instructions to automatically calculate the travel distance each scan based on parameters that are set in the system.



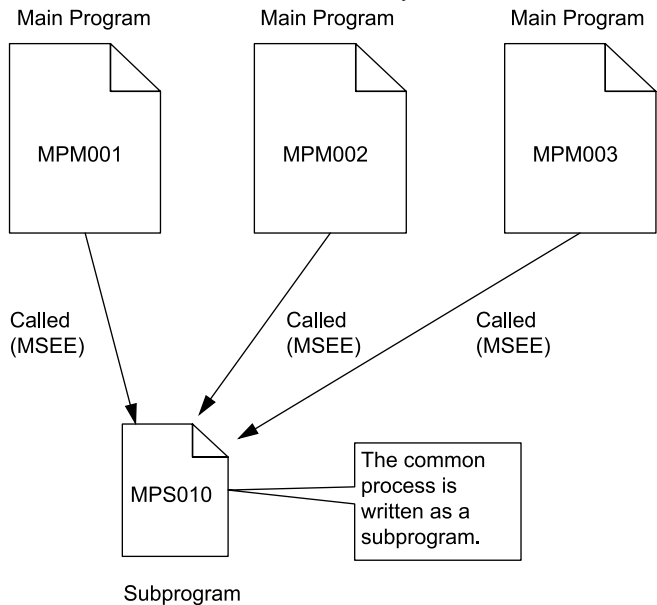
(1) Calling a Motion Program

Motion programs are executed either by calling the motion programs with an MSEE instruction in a ladder program or by registering the motion programs in M-EXECUTOR.



(2) Creating Subprograms for Programs

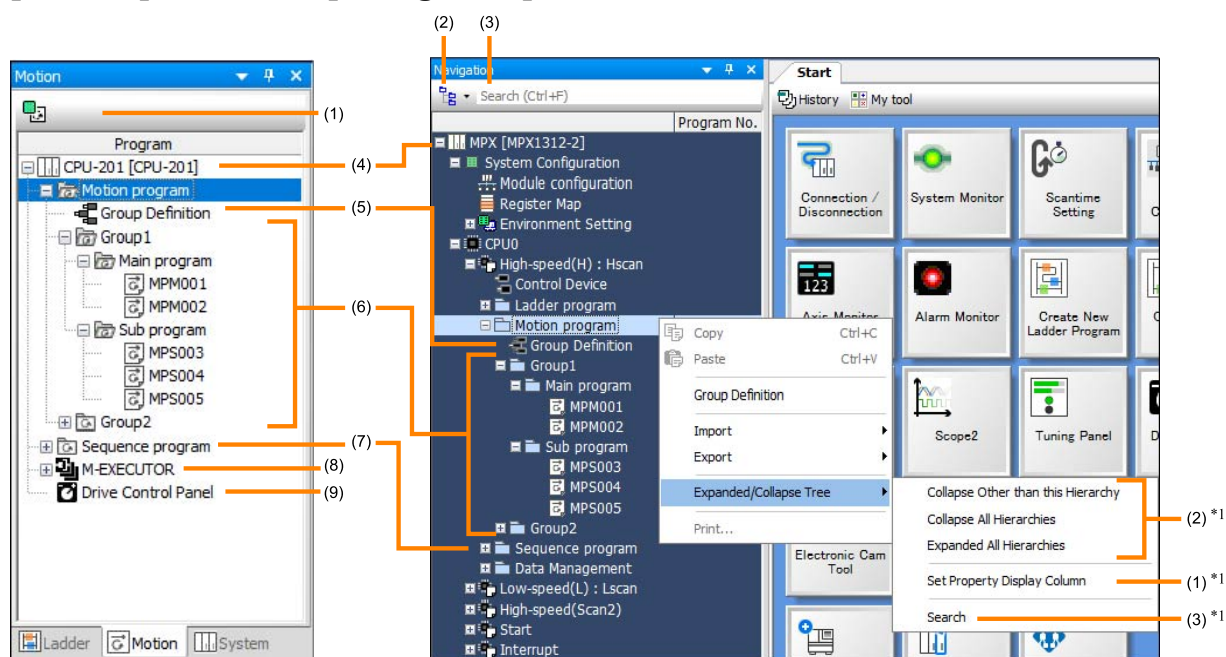
Subprograms can be created for motion programs. Subprograms are created to perform common operations. They help minimizing the number of program steps and allow the efficient use of memory.



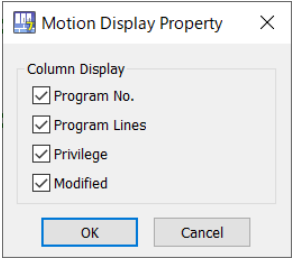
5.2.2 Window Configuration

This section describes the names and views for each window used in creating and editing motion programs.

(1) [Motion] Window / [Navigation] Window



*1 Right-click on a level under [Motion program] and select this item from the [Expanded/Collapse Tree] menu. If you right-click on another location, a different menu will be displayed.

No.	Name	Contents
(1)	Motion Program Property	Click this button to display the [Motion Display Property] window. Select the check boxes for the items to display in the [Motion] window and click [OK]. Columns for those selected items will be displayed in the [Motion] window. 
(2)	Expanded/Collapse Tree	Click this item to display the menu. Depending on the item you click, you can close all levels except the item selected in the [Navigation] window or open/close all levels of the tree.
(3)	Search	You can search for a text string in the items in the [Navigation] window. Enter and confirm the text string to start the search. The search is not case-sensitive. Items that include the search text string will be displayed in green text. If you delete the text string in the search box, the [Navigation] window will be restored to the previous state.
(4)	Project File Name	The name of the project file and the controller model are displayed.
(5)	Group Definition	Set a group definition. Refer to the following section for details. 5.2.3 Setting Group Definitions on page 266
(6)	Motion program	The created motion programs are displayed. Motion programs consist of two types of programs: main programs (MPMxxx) and subprograms (MPSxxx). Main programs are called directly from a ladder program. Subprograms are called from a main program or other subprogram.
(7)	Sequence program	The created sequence programs are displayed.

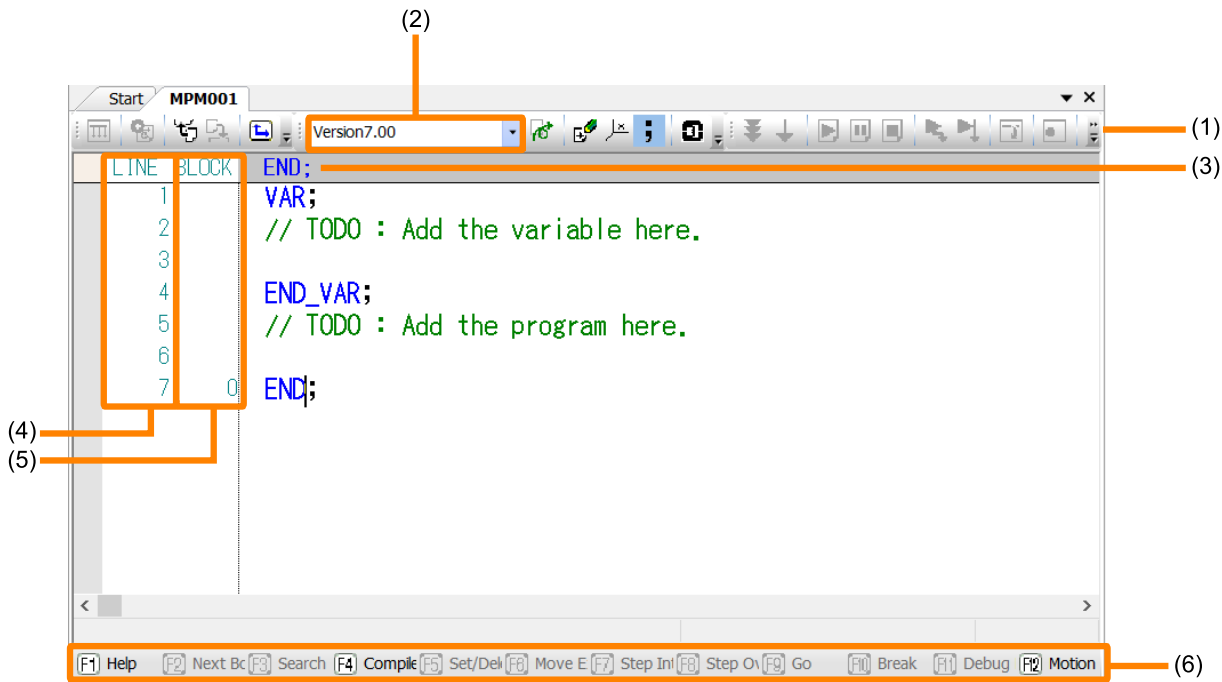
The [Navigation] window displays the programs that belong to each CPU and scan separated into those categories.

Continued on next page.

Continued from previous page.

No.	Name	Contents
(8)	M-EXECUTOR	Registers motion programs to M-EXECUTOR. Refer to the following section for details.  (2) Registering and Calling Motion Programs in M-EXECUTOR on page 278
(9)	Drive Control Panel	The [Drive Control Panel] window will be displayed. Refer to the following section for details.  6.6 Drive Control Panel on page 396

(2) Edit Motion Program Window



No.	Name	Description
(1)	Toolbar	 Causes the display to follow the Block Monitor so that it is always visible on the screen.
		 Displays the [Motion Alarm] window.
		 Calls a motion subprogram.
		 Displays the [Motion Task Settings] window.
		 Displays the [Position Monitor] window.
		 Compiles the currently open program.
		 Displays the [Motion Command Assist] window.
		 Changes the function bar display to Position Teaching Mode.
		 Automatically adds a semicolon.
		 Displays the [Task Allocation] window.
		 Performs operation in Debug Operation Mode.
		 Performs operation in Normal Operation Mode.
		 Executes the program.
		 Stops execution of the program.
		 Forces the program in execution to end.
		 Performs a step-in operation.
		 Performs a step-over operation.
		 Moves the start point for execution.
		 Sets or removes a breakpoint.
		 Enables or disables a breakpoint.
		 Displays a list of all breakpoints.
		 Updates to the most recent state.
(2)	Version	Select the compiling options. - Version 7.00 All MP3000 motion program functions are supported. This setting is used for all programs created in MPE720 version 7. - Version 6 Compatible Only MP2000 motion program functions are supported. This setting is used for programs that were created on MPE720 Ver.6 or Ver.5.
(3)	Input Guidance	Allows you to check the syntax of motion language instructions as you create the motion program. Place the mouse cursor over any motion language instruction (blue text) to display details on how to enter that instruction.

Continued on next page.

No.	Name	Description
(4)	Line Number	The total number of lines is displayed.
(5)	Block Number	Only the number of lines that the program will actually execute is counted and displayed. (This does not include lines such as comments or empty space.)
(6)	Function Keys	Display functions to use when creating motion programs as buttons. These buttons function the same as the function keys on the keyboard.

5.2.3 Setting Group Definitions

To organize axes related to motion into a single group and to program those axes by the group, you must classify control devices into a group (i.e., group definition) before you create a motion program. Use the following procedure.

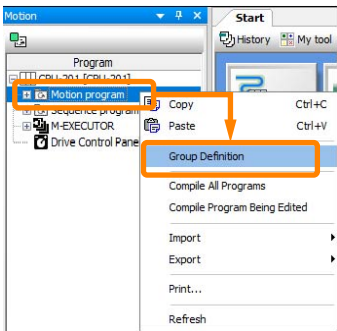


When using a model that supports multiple scans, the settings differ from those in this procedure. Refer to the following section.

Important  [4.4 Control Device/Group Definition Settings on page 202](#)

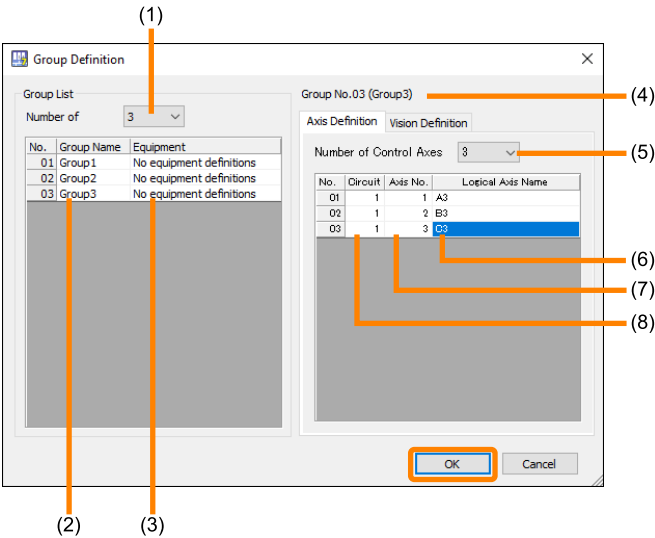
1. Right-click on the [Motion] window and select [Group Definition].

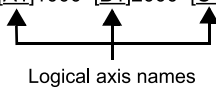
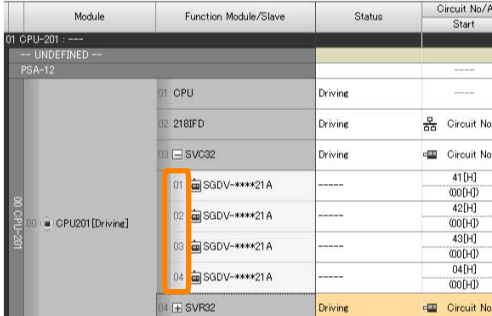
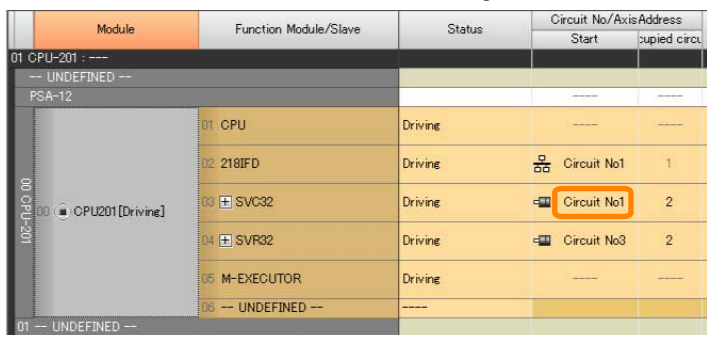
- Information
- The same operation is also possible by using the following methods.
 - Right-click on [Axis Variable] in the [Variable] window, and click [Edit].
 - Double-click on [Axis Variable] in the [Variable] window.
 - Click the [Create New Motion Program] button on the [My Tool] window (the button is enabled only if a group definition has not been set).
 - To open a group definition that has been set, double-click [Group Definition] in the [Motion] window or right-click on it and click [Open].



The [Group Definition] window will be displayed.

2. Set the following items, and then click the [OK] button.



No.	Item	Description
(1)	Number of Groups	Set the number of group to create. When you set the number of groups, that amount of groups will be displayed below in the list.
(2)	Group Name	Set the group names. <Setting Conditions> 16 characters maximum. - The group name must be unique.
(3)	Equipment	If equipment definitions are set, select an item set in the equipment definitions. If no equipment definitions are set, this is fixed to [No equipment definitions]. The [Equipment] column is displayed only for models that support equipment configuration definitions.
(4)	Group No. □ (group name)	Displays the group number and group name currently displayed in [Axis Definition]. The view can be switched by clicking a row in the [Group List] on the left-side of the window.
(5)	Number of Control Axes	Set the number of axes to control in the group selected in the [Group List] area. When you set the number of controlled axes, that amount of axes will be displayed below in the list.
(6)	Logical Axis Name	Set the name of the specified axis number. The name that is defined here is used when writing a motion program. MVS [A1]1000 [B1]2000 [C1]3000 F1000; 
(7)	Axis No.	Set the axis numbers of the axes to use. You can check the axis numbers on the Module Configuration window. 
(8)	Circuit	Set the circuit numbers of the motion control function module to use. You can check the circuit numbers on the Module Configuration window. 

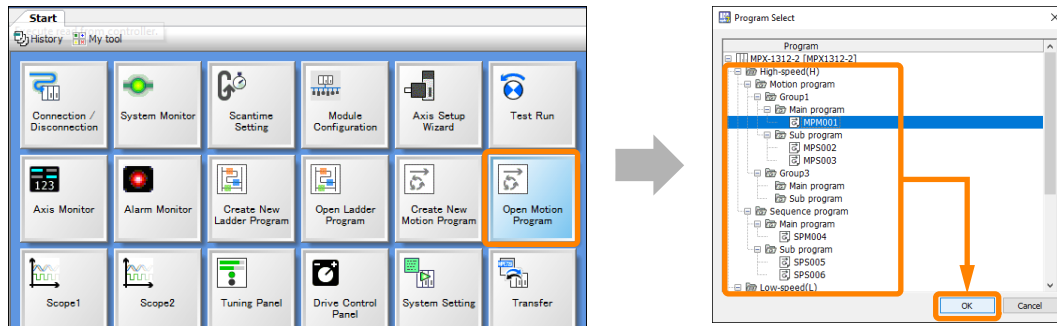
This concludes the procedure.

5.2.4 Opening a Drawing

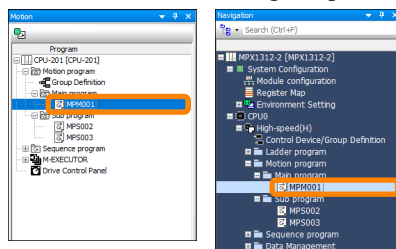
Use one of the following methods to open a created drawing.

- Click the [Open Motion Program] button on the [My Tool] window.

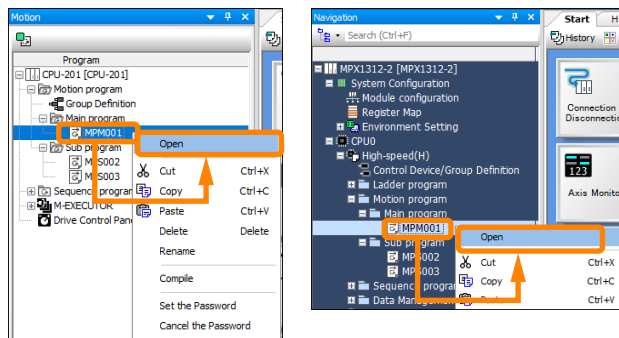
The [Program Select] dialog box will be displayed. Click the drawing to open, and then click the [OK] button.



- Double-click the drawing to open on the [Ladder] window or the [Navigation] window.



- Right-click the drawing to open on the [Ladder] window or the [Navigation] window and select [Open].



5.2.5 Creating a Drawing

You must create a drawing before creating a motion program.

There are the following two methods that you can use to create a drawing.

- Creating from the [My Tool] window ^{*1}
- Creating from the [Motion] window or the [Navigation] window

^{*1} Not available for models that support multiple scans.

The procedures are given below.

(1) Creating from the [My Tool] Window

Use the following procedure to create a new drawing from the [My Tool] window.

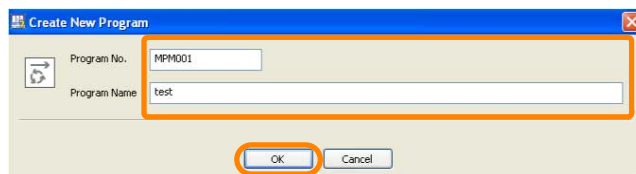
Information This operating procedure cannot be executed when using a model that supports multiple scans. Execute the operating procedure given below.

(2) *Creating from the [Motion] window or the [Navigation] window on page 269*

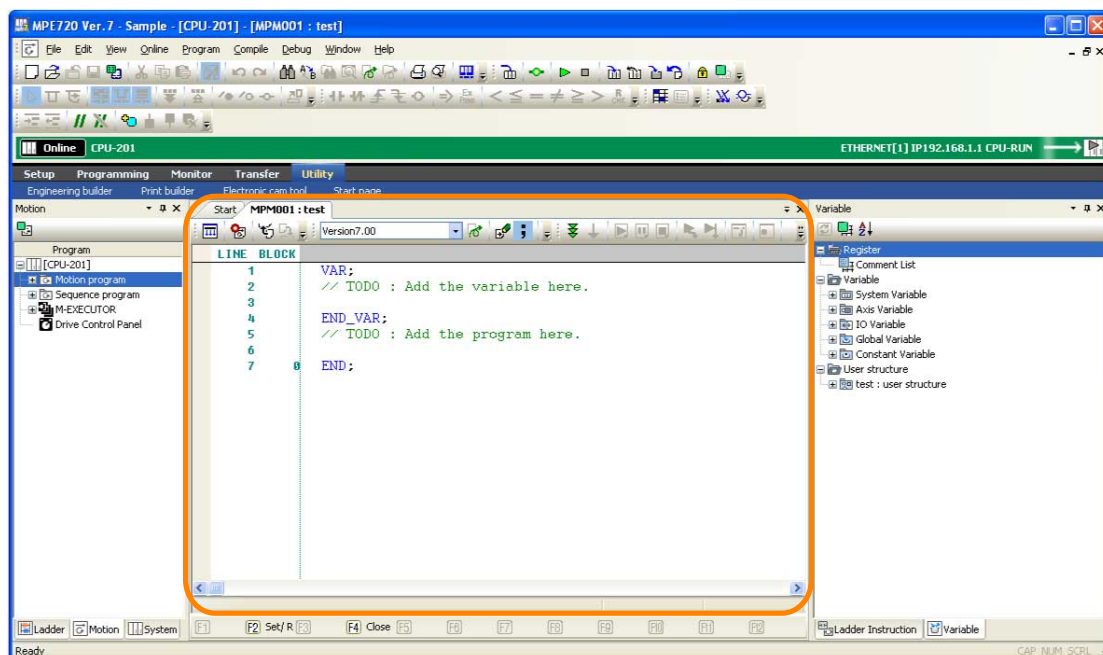
1. **Click the [Create New Motion Program] button on the [My Tool] window.**
The [Create New Program] window will be displayed.
2. **Enter the program number and program name, and then click the [OK] button.**

Information Refer to the following section for an example for the program number.

(3) *Example for the Program Number on page 270*



The new drawing will be displayed.

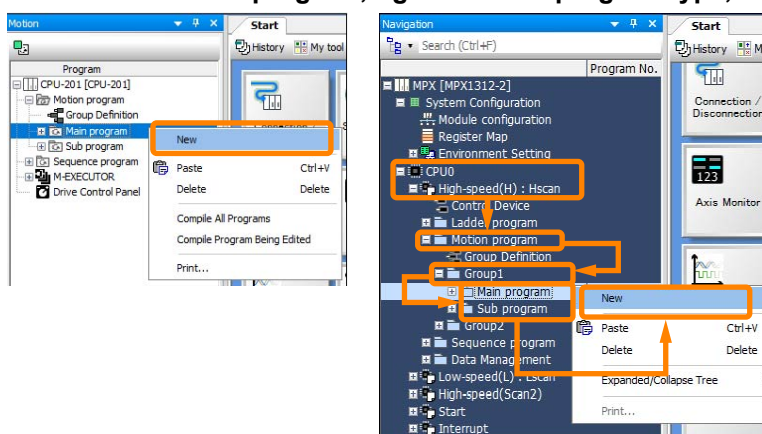


This concludes the procedure.

(2) Creating from the [Motion] window or the [Navigation] window

Use the following procedure to create a new drawing from the [Motion] window or the [Navigation] window.

1. **When using a model that does not support multiple scans: Right-click the type of program to create in the [Motion] window and select [New].**
When using a model that supports multiple scans: In the [Navigation] window, expand [Motion program] under the scan for which to create the program. Expand the group in which to create the program, right-click the program type, and select [New].

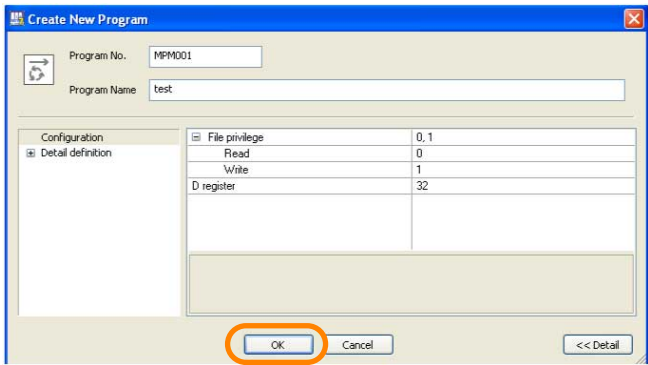


The [Create New Program] window will be displayed.

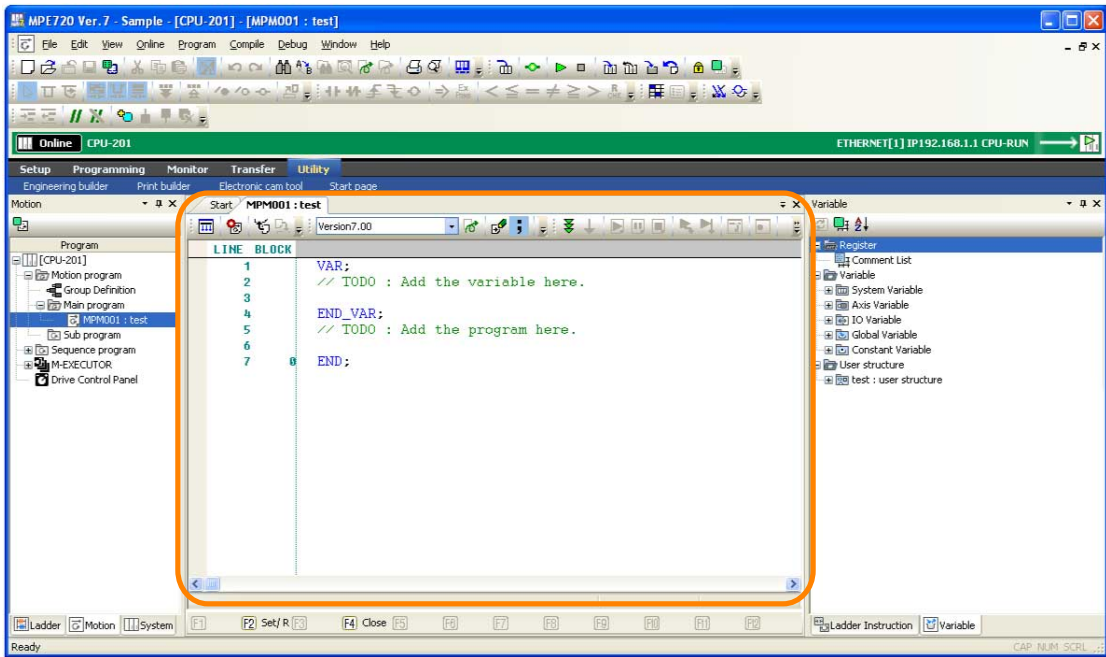
2. **Change the settings as required, and then click the [OK] button.**

Information Refer to the following section for an example for the program number.

 (3) *Example for the Program Number on page 270*

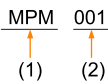


The new drawing will be displayed.



This concludes the procedure.

(3) Example for the Program Number



No.	Item	Description
(1)	Type of program	• MPM: Main program • MPS: Subprogram
(2)	Setting range for program numbers	• MP2000-series controller: 001 to 255 • Controllers other than the MP2000 series: 001 to 512

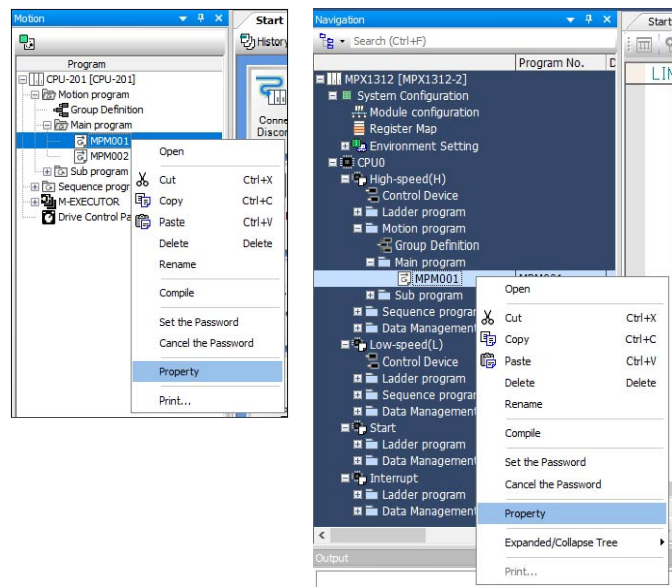
Note:
You cannot set the same program number in a main program and subprogram.

5.2.6 Checking the Properties of a Motion Program

You can check the properties (configuration, detail definition, and modification history) of a motion program. Use the following procedure.

1. In the [Motion] window or the [Navigation] window, right-click the motion program file for which to view the properties.

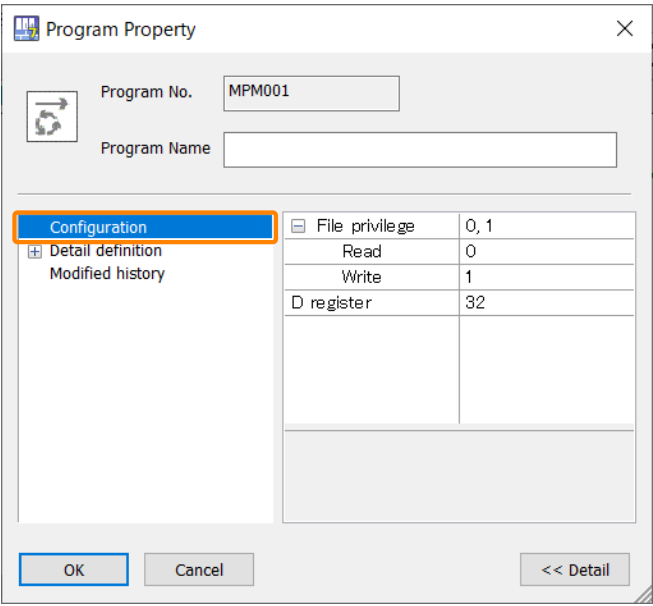
2. Select [Property].



The [Program Property] window will be displayed.

(1) Configuration Definition

You can set the file privileges and number of registers that are used here.



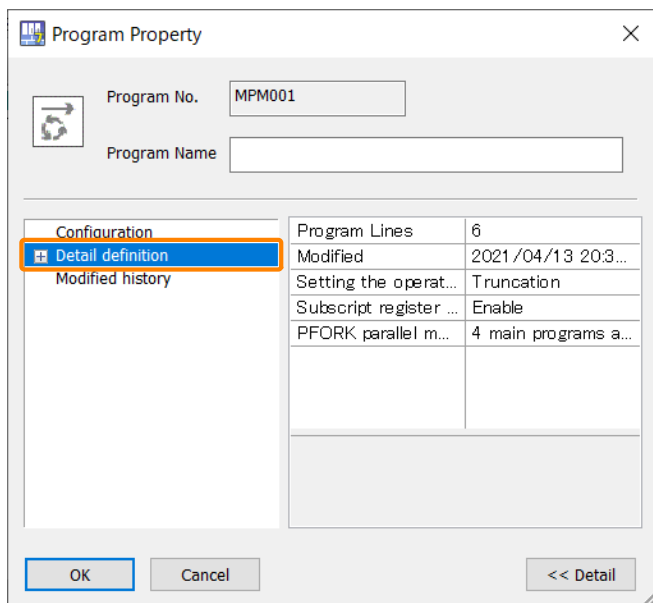
Item	Description
File privilege	The read privilege level and write privilege level for this program are displayed. The program read privilege and write privilege levels are items created to maintain program security. To open a program, that user must have a user privilege level that is greater than or equal to the read privilege level of that program. In the same manner, to edit and save a program, that user must have a user privilege level that is greater than or equal to the write privilege level of that program. Refer to the following section for information on setting and checking the user privilege level.  8.1 User Management on page 540
Read	Select the read privilege level for this program from 0 to 7. A higher number is a higher privilege level. You cannot enter a numeric value. You cannot set a read privilege level that is higher than your own user privilege level. For example, if your privilege level is 3, you cannot set the privilege level to 4 or higher.

Continued on next page.

Item	Description
Write	Select the write privilege level for this program from 0 to 7. A higher number is a higher privilege level. You cannot enter a numeric value. You cannot set a write privilege level that is higher than your own user privilege level.
D register	Set the maximum number of D registers that are used by this program between 0 and 16384. You can directly set a numeric value or use the spin buttons.

(2) Detail Definition

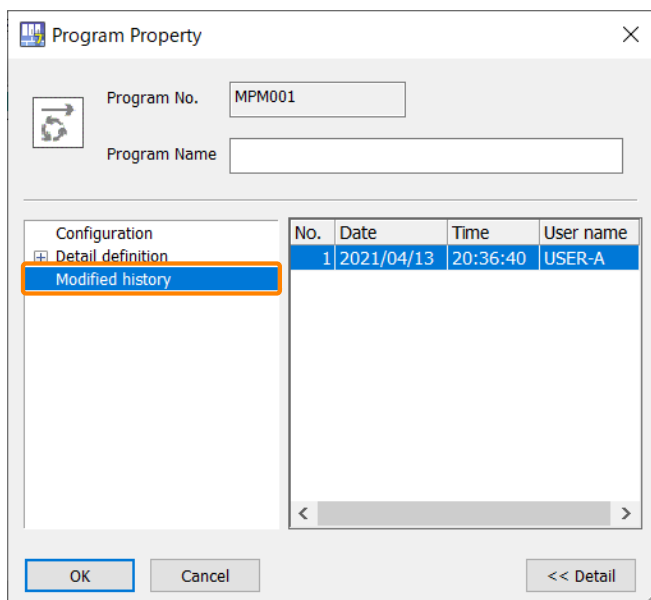
You can check the number of program steps to execute and the date/time the program was last modified, set the operation when performing real number casting, and display/set the subscript register limit check.



Item	Description
Program Lines	The number of lines in the program are displayed. This value cannot be changed.
Modified	The date and time the program was last modified is displayed. If you compile the program, the date and time will be updated. This value cannot be changed.
Setting the operation when real number	You can set the operation when converting data from real numbers to integers.
Subscript register limit check	You can set the operation when using index registers. Enable: Detects index errors. (Compatible with MP2000) Disable: Does not detect index errors.
PFORK parallel mode	You can set the execution mode of the PFORK instruction.

(3) Modified History

You can check the modification history here.



Item	Description
Modified history	The modification history of the program is displayed up to a maximum of 10 entries.

5.2.7 Checking the Operation of Motion Programs

There are the following two methods that you can use to check the operation of motion programs.

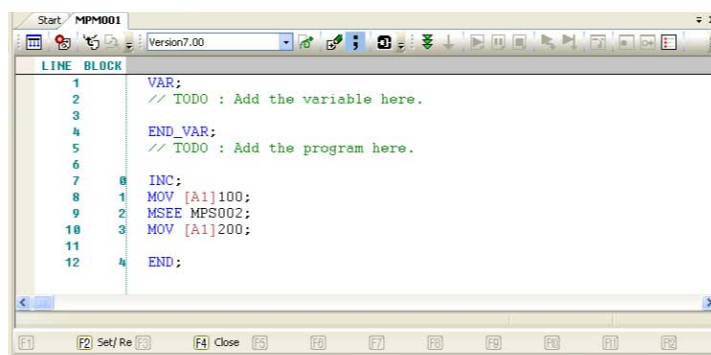
- Performing step execution: Program operation is checked by executing one step at a time.
- Setting breakpoints: The operation of a specified range of the program is checked.

The procedures are given below.

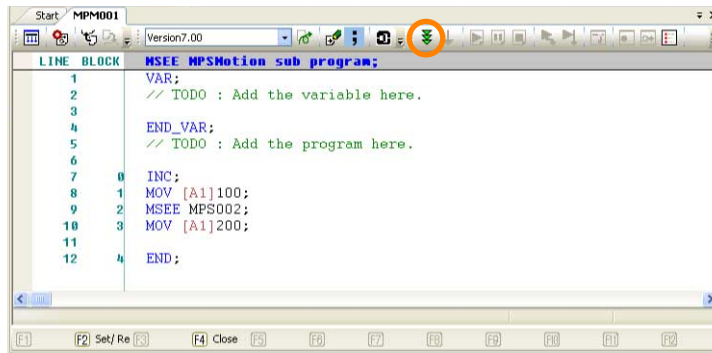
(1) Performing Step Execution

Use the following procedure to perform step execution.

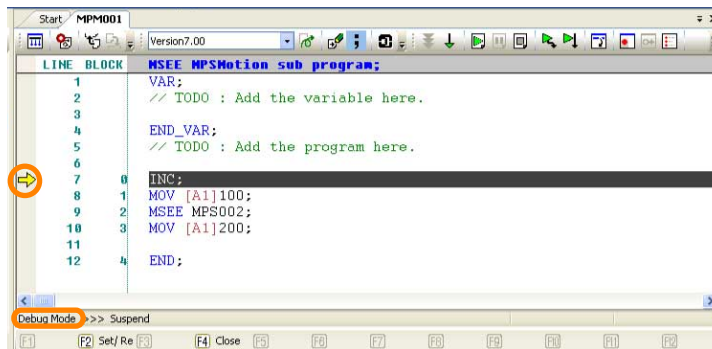
1. Open the motion program.



2. Click the [Debug Mode] button on the toolbar.



The mode will change to Debug Mode and an arrow will appear in front of the line that is about to be executed.

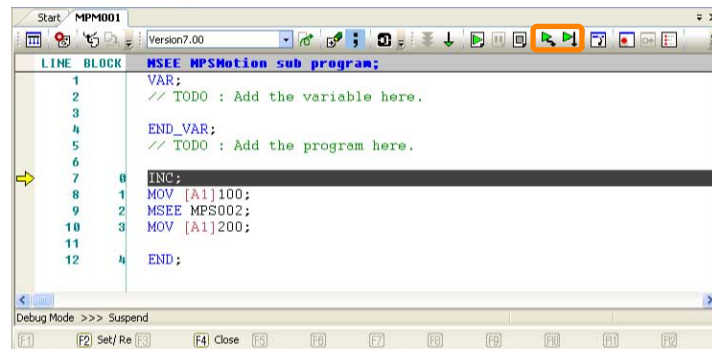


3. Click the [Step into] or [Step over] button.

Information

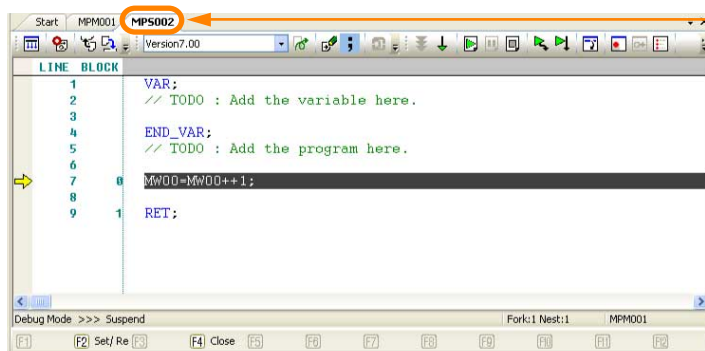
Differences between Step Into and Step Over

- Step Into
If the program has an MSEE or SSEE instruction, the called program is opened and debugging is performed for each line in it.
- Step Over
If the program has an MSEE or SSEE instruction, the called program is not opened and debugging continues.



Each line in the motion program will be executed.

- If You Clicked the [Step into] Button
When an MSEE or SSEE instruction in the main program is executed, the referenced subprogram is displayed and step execution is performed from the beginning of the subprogram.



The subprogram MPS002, which was specified by the MSEE instruction in the main program, is displayed.

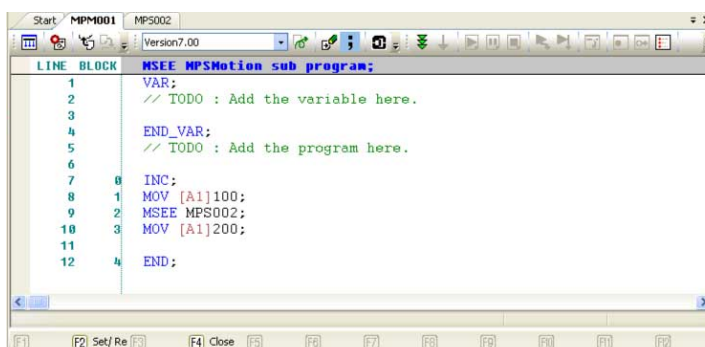
Click the [Step into] button until you have finished debugging the subprogram. When you have finished debugging the subprogram, execution will return to the main program.

This concludes the procedure.

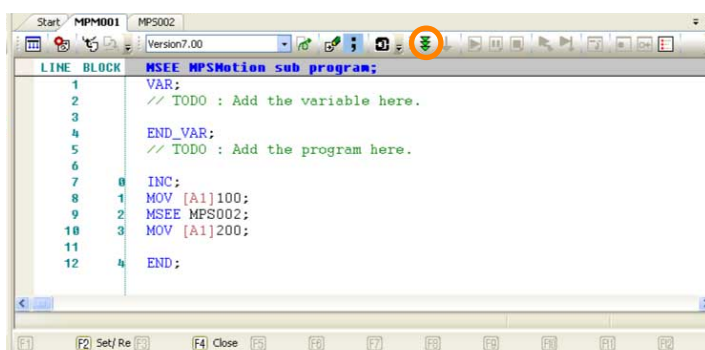
(2) Setting a Breakpoint

Use the following procedure to set breakpoints.

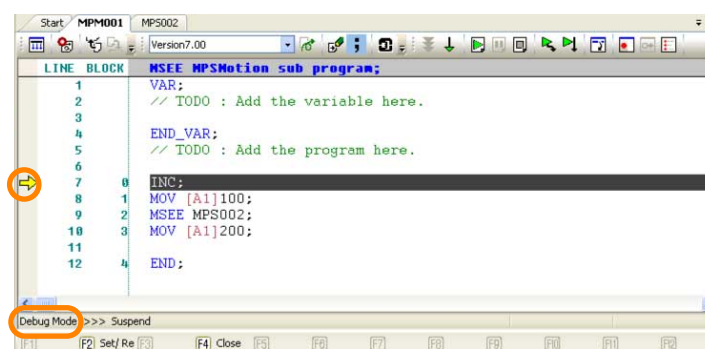
1. Open the motion program.



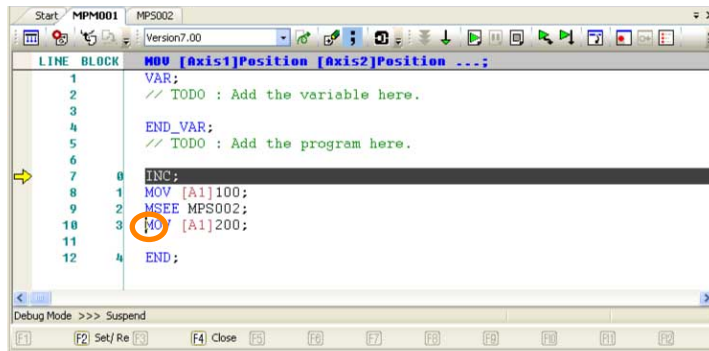
2. Click the [Debug mode] button on the toolbar.



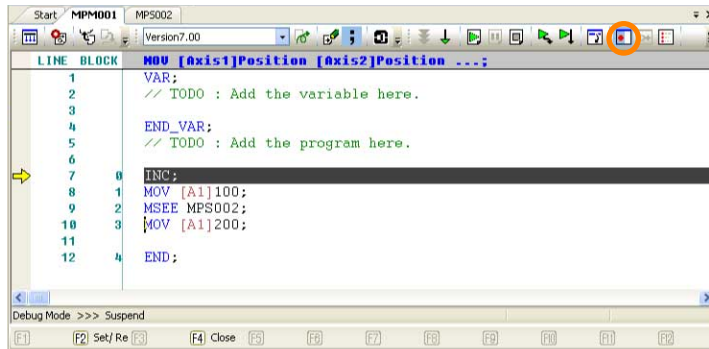
The mode will change to Debug Mode and an arrow will appear in front of the line that is about to be executed.



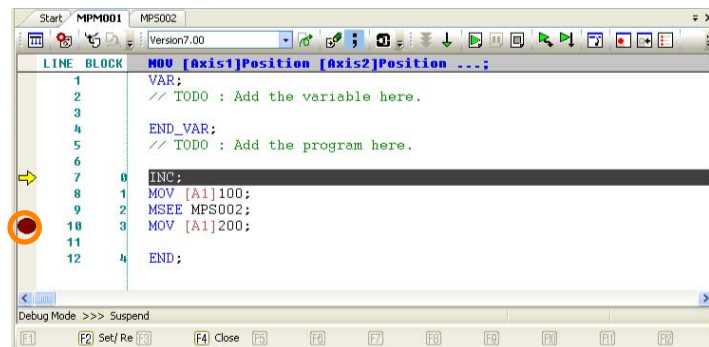
3. Move the cursor to the line at which to set a breakpoint.



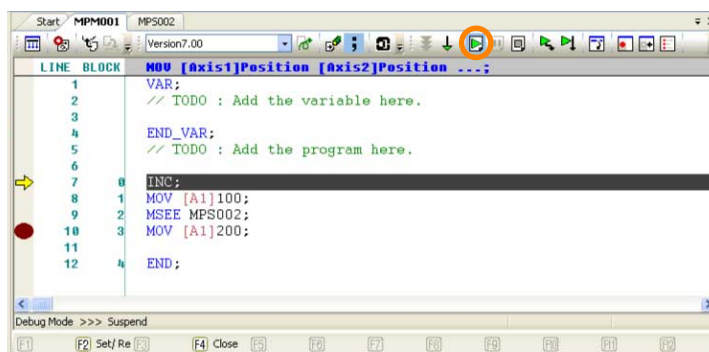
4. Click the [Set/delete breakpoint] button.



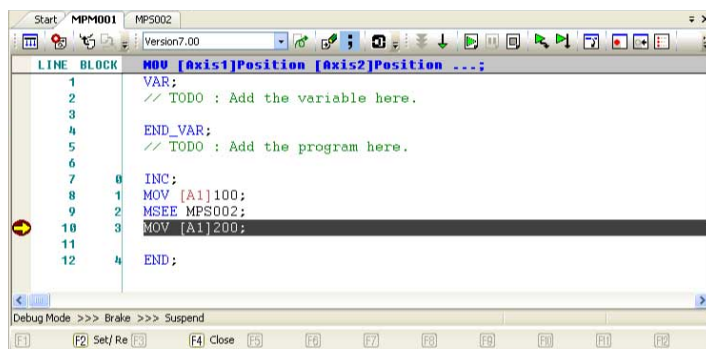
A red dot will be displayed to indicate a breakpoint has been set.



5. Click the [Go] button.



Execution continues to the line with the breakpoint.



This concludes the procedure.

Information To Remove a Breakpoint That Was Set:

Select the line with the breakpoint to remove and click the [Set/delete breakpoint] button on the toolbar.

5.2.8 Executing Motion Programs

There are the following two methods that you can use to execute motion programs.

- Calling the motion program from a ladder program with an MSEE instruction
- Calling the motion program by registering it in M-EXECUTOR

Each method is described below.

(1) Calling the Motion Program from a Ladder Program with an MSEE Instruction

To call a motion program from a ladder program, use the MSEE instruction. Use the following procedure to add an MSEE instruction to a ladder program.

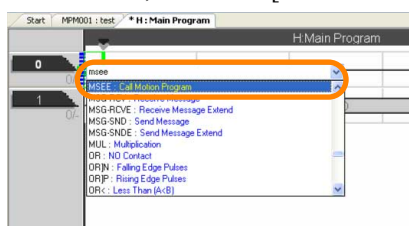
1. **Create a new H drawing or P drawing for a ladder program.**

Refer to the following section for details on creating a drawing.

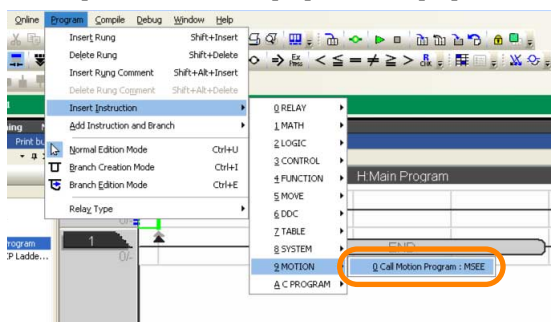
[5.1.3 Creating a Drawing on page 236](#)

2. **Use one of the following methods to insert an MSEE instruction.**

- Enter “msee”, and select [MSEE:Call Motion Program] from the displayed list of instructions.

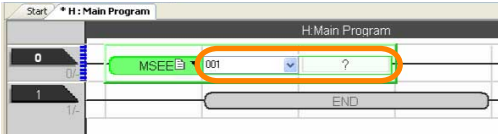


- Select [Insert Instruction] - [MOTION] - [Call Motion Program:MSEE] from the [Program] menu.



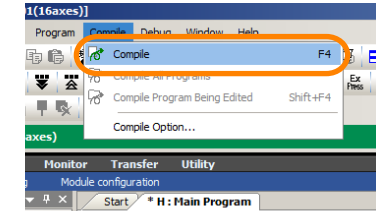
An MSEE instruction will be inserted.

3. Enter the number of the motion program to execute and the work register for execution.



4. Use one of the following methods to compile the program.

- Press the **F4** key.
- Select [Compile] from the [Compile] menu.



This concludes the procedure.

The motion program will be executed at the execution timing of the MSEE instruction in the ladder program.

(2) Registering and Calling Motion Programs in M-EXECUTOR

Use the following procedure to register a motion program in M-EXECUTOR.

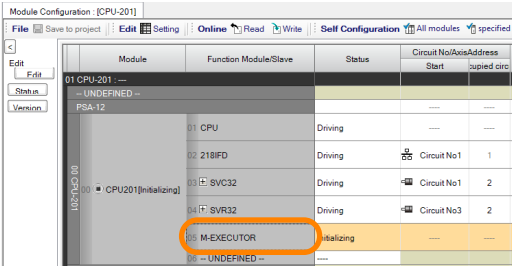
If there is an expand button next to M-EXECUTOR in the [Motion] window, start from step 6.

You must first set the number of tasks to assign to M-EXECUTOR.

1. Click the [Module Configuration] button on the [My Tool] window.

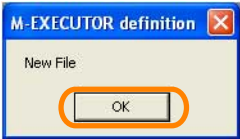
The Module Configuration window will be displayed.

2. Double-click [M-EXECUTOR].



The [M-EXECUTOR definition] window will be displayed.

3. Click the [OK] button.

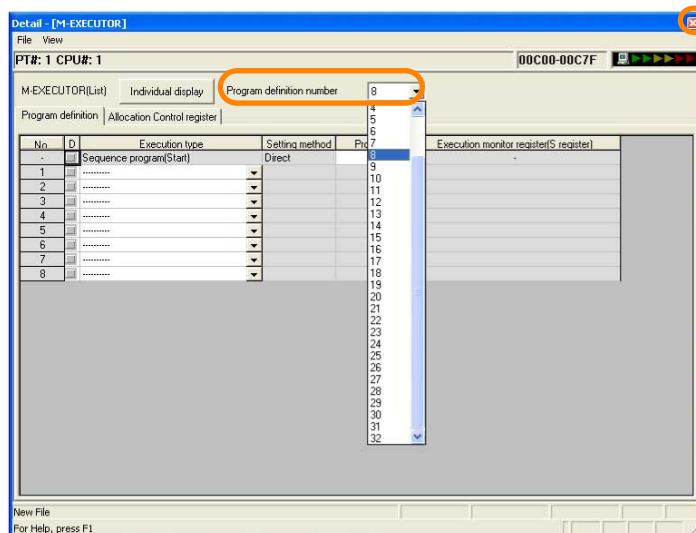


The [Detail - [M-EXECUTOR]] window will be displayed.

4. Set the desired number in [Program definition number], and click the Close button.

Note:

If you need to set the program definition number to 8, first set any other number and then select "8".

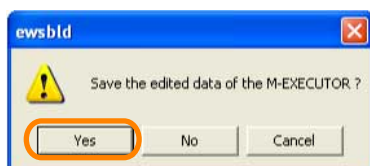


A message dialog box will be displayed.

Note:

If a message dialog box is not displayed, start over from step 2.

5. Click the [Yes] button.



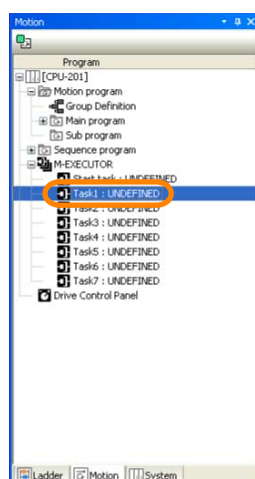
The [Detail - [M-EXECUTOR]] window will close.

This concludes the process for setting the number of tasks to assign to M-EXECUTOR.

Next, register the contents of the motion program to execute in M-EXECUTOR.

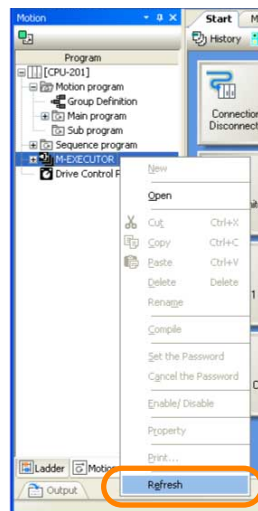
6. Either of the following operations can be used.

- Double-click one of the [Task□:UNDEFINED] entries under [M-EXECUTOR] in the [Motion] window.

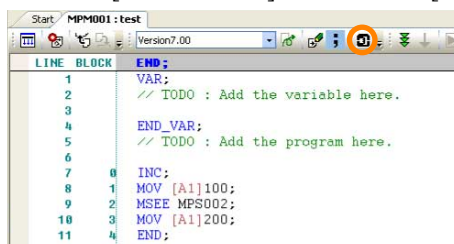


If nothing is displayed below the [M-EXECUTOR], use one of the following methods to refresh the data in the [Motion] window.

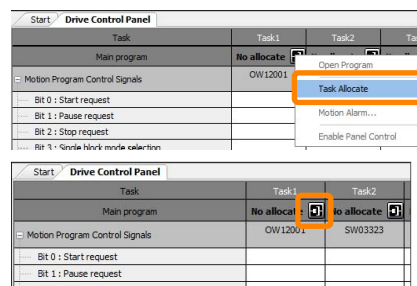
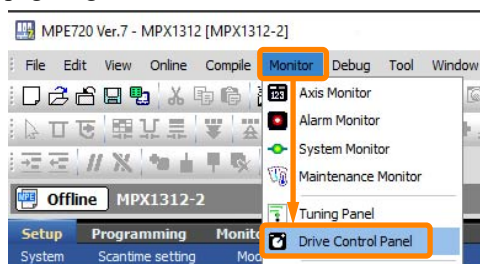
- Click on the [Motion] window to make it the active window, then press the **F4** key.
- Right-click on [M-EXECUTOR] in the [Motion] window and select [Refresh].



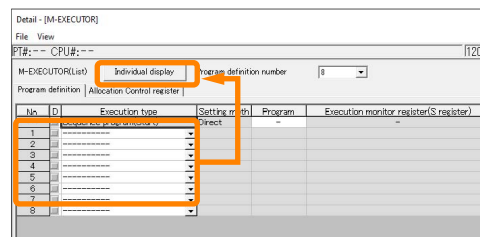
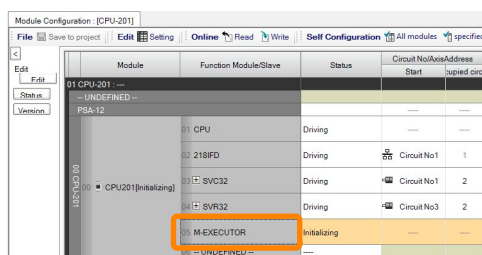
- Click the [Task Allocate] button on the [Edit Motion Program] window.



- Click [Drive Control Panel] from the [Monitor] menu. On the displayed [Drive Control Panel] tab page, right-click on the task to allocate and click [Task Allocate]. Or click the [Task Allocate] button.



- Double-click [M-EXECUTOR] on the Module Configuration window. On the displayed [Detail - [M-EXECUTOR]] window, click a free row and then click [Individual display].



The [Task Allocation] window will be displayed.

7. Set the following items.

- After Using the [Motion] Window or the [Drive Control Panel] Tab Page in Step 6

Task Allocation dialog box showing initial settings:

- (1) Task Allocation No.: Task1
- (2) Task Type: No allocate
- (3) Program Specification:
- (4) Program:
- (5) Allocation Register:
 - Disabled allocation:
 - Control register allocate:
 - Program No.: ☐
 - Status: ☐
 - Control signal: ☐
 - Override(1=0.01%): ☐
 - Allocate register:

- After Using Edit Motion Program Window in Step 6

Task Allocation dialog box showing settings after editing the motion program:

- (1) Task Allocation No.: Task1
- (2) Task Type: Motion program
- (3) Program Specification: Direct
- (4) Program: MPM001
- (5) Allocation Register:
 - Disabled allocation:
 - Control register allocate:
 - Program No.: ☒
 - Status: ☒
 - Control signal: ☒
 - Override(1=0.01%): ☒
 - Allocate register:

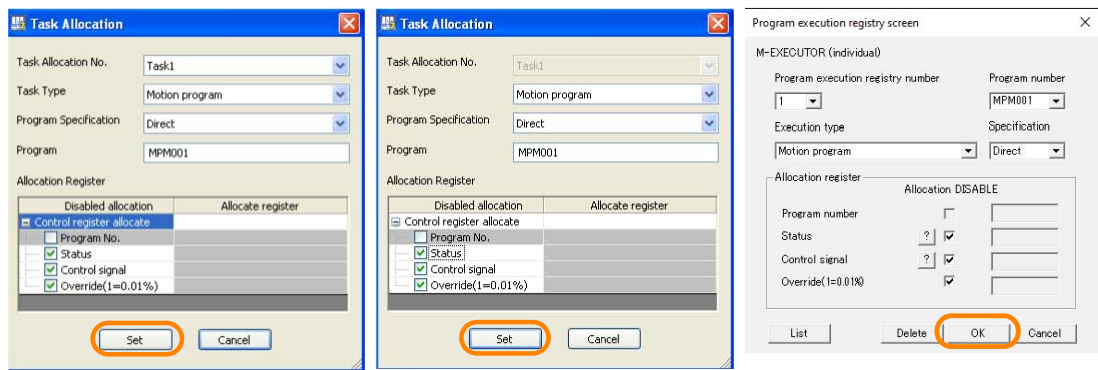
- After Using the [Detail - [M-EXECUTOR]] Window in Step 6

Program execution registry screen showing M-EXECUTOR (individual) settings:

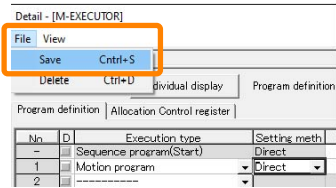
- (1) Program execution registry number: 1
- (2) Execution type:
- (3) Program number:
- (4) Specification:
- (5) Allocation register:
 - Allocation register:
 - Program number: ☒
 - Status: ☒
 - Control signal: ☒
 - Override(1=0.01%): ☒
 - Allocation DISABLE:

No.	Item	Description
(1)	Task allocation number Program execution registry number	Select the task number to assign to the motion program.
(2)	Task type Execution type	Set the execution type of the program. - Sequence program (start): Executed once when the power is turned ON. - Sequence program (L scanning): Executed every low-speed scan. - Sequence program (H scanning): Executed every high-speed scan. - Motion program: Executed when the start request for program is turned ON.
(3)	Program specification Specification	Set the program designation method. - Direct: The program is specified with the program number (e.g., MPM001 and SPM002). - Indirect: The program is specified by specifying a register that contains the program number (e.g., OW0C0C).
(4)	Programming Program Number	Set the number of the motion program to assign.
(5)	Allocation Register	Set the registers to assign. You can set any kind of register: I registers, O registers, or M registers.

8. Click the [Set] button or the [OK] button.



9. After using the [Detail - [M-EXECUTOR]] window in step 6, click [Save] from the [File] menu.



This concludes the procedure.
Refer to the following section for details on how to execute a registered program.
[6.6.2 Operating the Drive Control Panel on page 396](#)

5.2.9 Checking Motion Programs during Execution

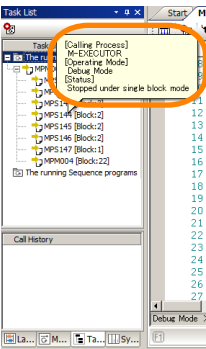
Use the following procedure to check motion programs during execution.

1. Open the [Task List] window.



The program numbers and block numbers of all of the motion programs that are currently being executed will be displayed in the Task List.

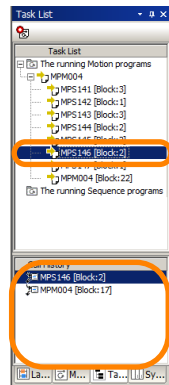
2. Move the mouse cursor over a motion program displayed in the Task List.



The items displayed in the balloon are described in the following table.

Item	Content	Description
Calling Process	Ladder	The motion program was called by the MSEE instruction in a ladder program.
	M-EXECUTOR	The motion program was called by a task assigned to M-EXECUTOR.
Operating Mode	Executing	The motion program is being executed in Normal Operation Mode.
	Debug Mode	The motion program is being executed in Debug Mode.
Status	Paused	Information will be displayed on the status signal.
	Stopped	
	Stopped under single block mode	
	Alarm occurred	
	Break active	
	Start request signal history	
	No System Work Available Error	
	Main Program No. Limit Exceeded Error	

3. Click a motion program displayed in the Task List.



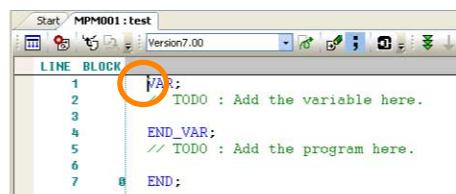
The call history (program numbers and block numbers) of the selected motion program from the main program will be displayed in the [Call History] area.

This concludes the procedure.

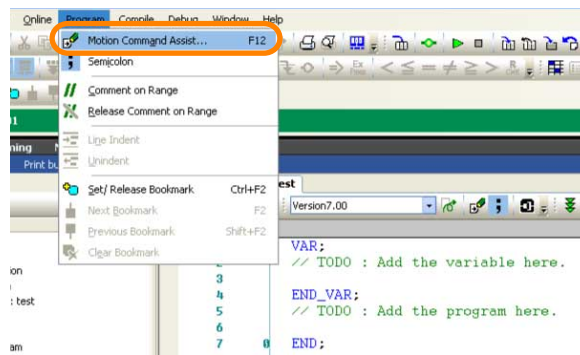
5.2.10 Using Instruction Input Assistance for Motion Programs

Use the following procedure to activate instruction input assistance to help you edit motion programs.

1. Place the mouse cursor where the instruction is to be inserted.



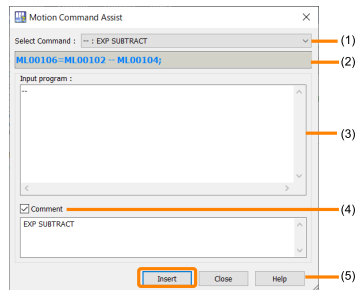
2. Select [Motion Command Assist] from the [Program] menu.



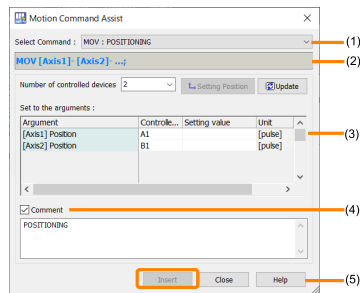
The [Motion Command Assist] window will be displayed.

3. Set the following items, and then click the [Insert] button.

- Instruction That Does Not Require Parameter Settings



- Instruction That Requires Parameter Settings



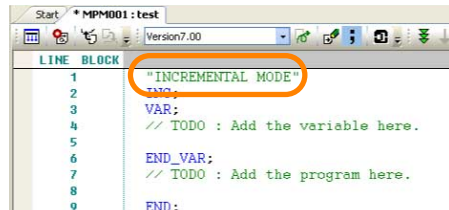
No.	Item	Description
(1)	Select Command	Select the instruction to insert from the list.
(2)	Instruction Format	The format of the currently selected instruction is displayed.
(3)	Edit Area	The content that is displayed depends on the instruction that was selected. <Instruction That Does Not Require Parameter Settings> Enter the program referring to the instruction format. <Instruction That Requires Parameter Settings> Set the following items. • Argument: The parameter names that are set as arguments to the instruction are displayed. Arguments that can be omitted will be designated as optional. • Controlled device: The logical axis name set in the group definition is displayed. Change the logical axis as required. • Setting value: Specify a constant or register for the set value. • Unit: The unit that was set in the motion parameter of each axis is displayed. Note: If a unit has not been set in the motion parameter settings, the corresponding cell is displayed in yellow. Place the mouse cursor over a cell to view its tooltip. Follow the instructions to set the motion parameters. After you change the settings, click the [Update] button to update the display.

Continued on next page.

Continued from previous page.

No.	Item	Description
(4)	Comment	Select the check box to enter a comment on the line above the instruction. The location to insert the comment cannot be changed. When this check box is not selected, the text box is grayed out.
(5)	[Help] Button	Displays the manual related to the relevant instruction.

The settings will be applied to the motion program.

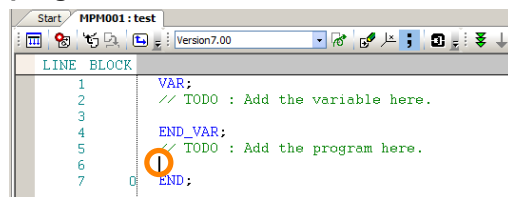


This concludes the procedure.

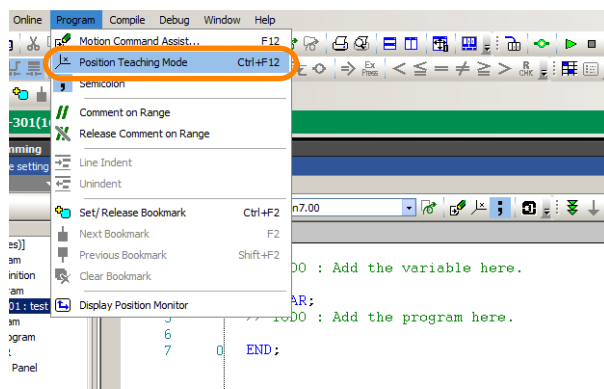
5.2.11 Inserting Axis Feedback Positions into a Motion Program

Use the following procedure to insert axis feedback positions into a motion program.

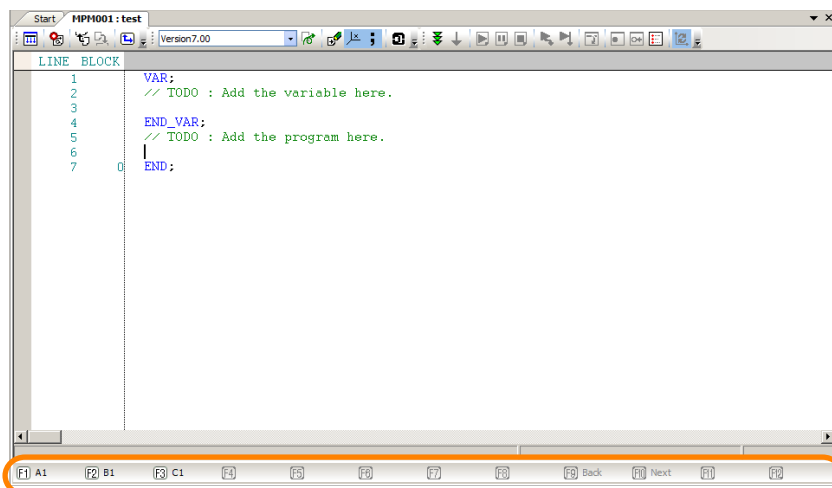
1. Place the cursor where the axis feedback positions are to be inserted into the motion program.



2. Select [Position Teaching Mode] from the [Program] menu.

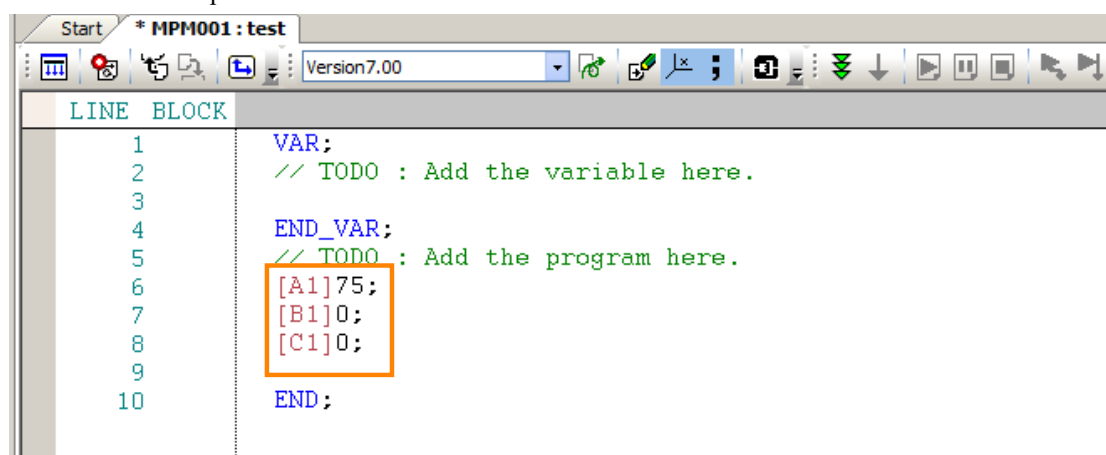


The function bar display will change to Position Teaching Mode.

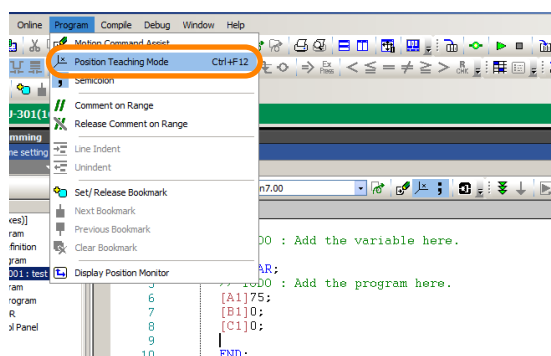


3. Press the function key that corresponds to the axis to insert.

The axis feedback position will be inserted.



4. Select [Position Teaching Mode] from the [Program] menu.



The function bar display will return to Normal Mode.

This concludes the procedure.

5.2.12 Using Variables in Motion Programs

Variable names that are used in ladder programs cannot be used within motion programs. Instead, you can use variables by defining them inside a declaration block that starts with VAR and ends with END_VAR. Declared definitions can be used within the program.



Important

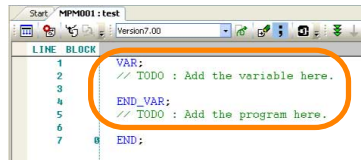
To use variables in motion programs, the compilation version of the MPE720 must be set to "Version 7.00".
Select "Version 7.00" in the Edit Motion Program Window if it is set to a different version.



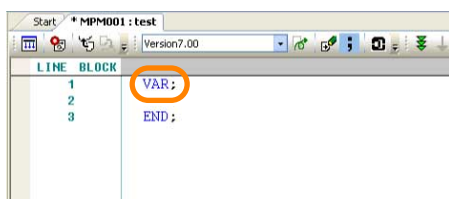
Use the following procedure to use variables in a motion program.

Information

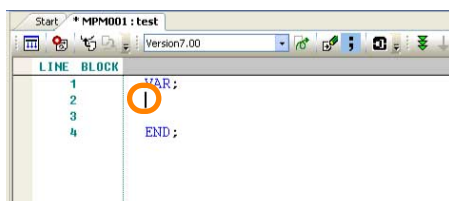
If you created a new motion program with the MPE720 compilation version set to 7.00, the program will be pre-filled with an empty "VAR" and "END_VAR" block.



1. Place the mouse cursor where the motion program variable is to be inserted.

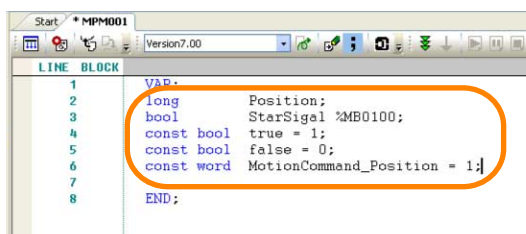


2. Press the Enter key.



The cursor will move to the next line.

3. Enter the definition to declare.



Note:

The following limitations apply to variables.

- Declarations: 1,000 maximum per program
- Variable name length: 255 bytes maximum
- Characters allowed: Alphanumerics and the underline (The variable name must start with a letter of the alphabet.)

Information

The syntax for definitions is shown below.

• Declaring Automatic Variables

LONG Position;

↑↑

Variable name

Type declaration

• Declaring Variables That Specify Registers

BOOL StartSignal %MB100;

↑↑↑

% + register address

Variable name

Type declaration

• Declaring Constant Variables

const WORD MotionCmd_Position = 1

↑↑↑↑

Constant value

=

Variable name

Type declaration

Enter "const" at the beginning of the line to declare a constant variable.

Type Declaration	Data Type	Array Specification
BOOL	Bit	○: Supported.
WORD	One-word signed integer	○: Supported.
SINT		
LONG	Two-word signed integer	○: Supported.
DINT		
QUAD	Four-word signed integer	○: Supported.
LONGLONG		
LINT		
FLOAT	Single-precision floating point number	○: Supported.
REAL		
DOUBLE	Double-precision floating point number	○: Supported.
LREAL		
ADDRESS	Address	×: Not supported.
Names of user-defined structures	Structure	○: Supported.

*1 Array specifications cannot be used with MP2000-series controllers.

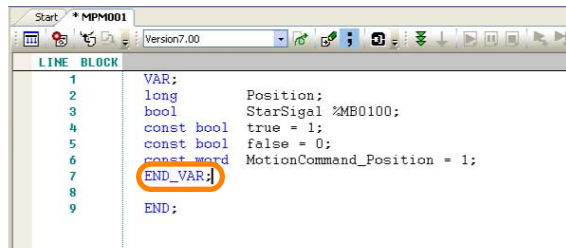
4. Press the Enter key.

A screenshot of a motion programming software interface. The window title is 'Start * MPM001'. Below the title bar is a toolbar with various icons. The main area is a table with two columns: 'LINE' and 'BLOCK'. The 'LINE' column contains numbers 1 through 9. The 'BLOCK' column contains the following text: 'VAR;', 'long Position;', 'bool StarSignal %MB0100;', 'const bool true = 1;', 'const bool false = 0;', 'const word MotionCommand_Position = 1;', and 'END;'. A blue cursor is positioned at the end of line 7, which is the line containing 'const word MotionCommand_Position = 1;'. The cursor is highlighted with a blue circle.

The cursor will move to the next line.

288

5. Enter "END_VAR;"



This concludes the procedure.

5.3 Common Information for Ladder Programs and Motion Programs

This section describes operations that are common to ladder programming and motion programming.

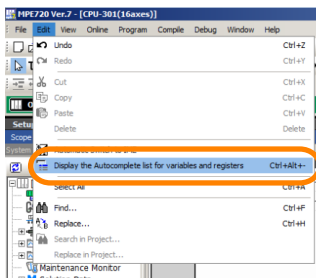
5.3.1 Using the Autocomplete Function

The autocomplete function displays candidates to aid entry when entering variables, registers and instructions. The following shows how the autocomplete function is used.

(1) Enabling the Autocomplete Function

The autocomplete function is enabled by default. When the autocomplete function is disabled, enable the autocomplete function by one of the following methods.

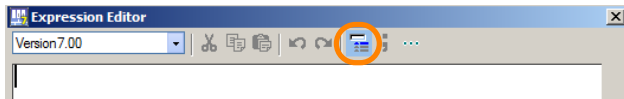
- Select [Display the Autocomplete list for variables and registers] from the [Edit] menu.



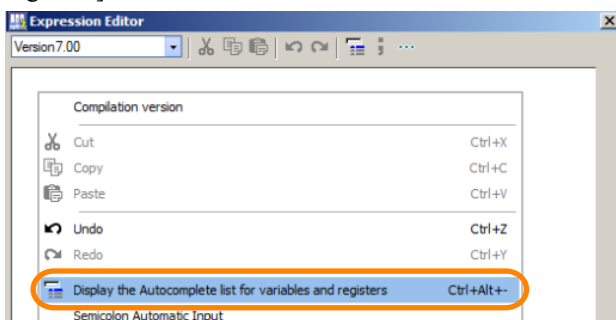
- Hold down the **Ctrl** key + **Alt** key + **–** key simultaneously.
- Click the [Turn Autocomplete for variables and registers ON/OFF] button on the toolbar.



- Click the [Turn Autocomplete for variables and registers ON/OFF] button in the [Expression Editor] window.



- Right-click on the [Expression Editor] window, and select [Display the Autocomplete list for variables and registers].



(2) Autocomplete Operating Procedure

If you enter a text string or double-click the location where the variable, register or instruction is to be inserted, a list of entry candidates will be displayed. Select the desired entry item from the list of entry candidates either by clicking the item or by pressing the **Enter** key with the item displayed in blue.

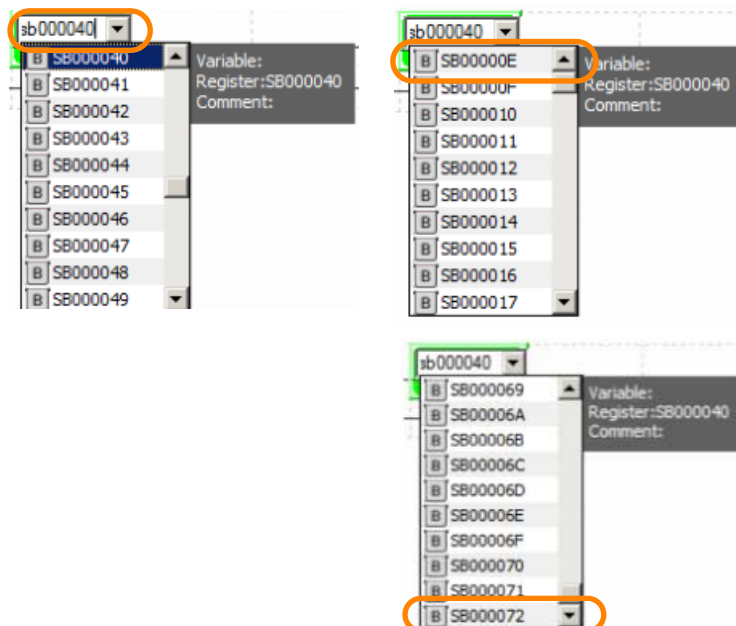
The following gives details on the autocomplete operating procedure.

- When a text string of two characters or longer is entered, candidates that match the start of the item or partially match that text string will be displayed. When only one character is entered as the text string, all candidates will be displayed.
- When a location is double-clicked, all candidates will be displayed.

- When a register address is entered, the 50 addresses preceding and following the entered register address will be displayed as the list of candidates.

<Example>

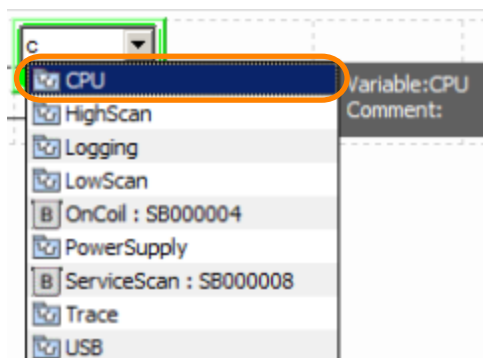
When "SB000040" is entered, the 50 addresses preceding and following the entered register address (i.e., SB00000E to SB000072) will be displayed as the list of candidates.



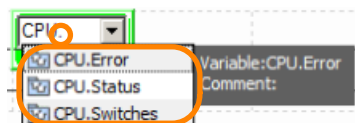
- In the case of a variable, if "." is entered, a list of candidates at the lower level will be displayed.

<Example>

Variable name: Select CPU.

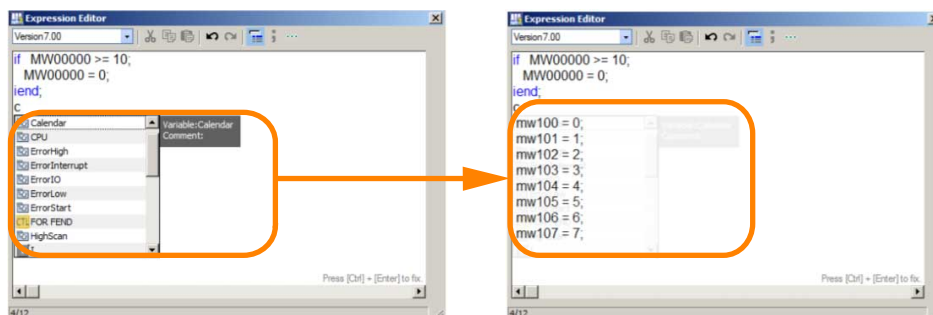


If "." is entered, a list of candidates at the lower level of "Variable: CPU" will be displayed.



- The list can be made transparent by pressing the **Ctrl** key when the list of entry candidates is displayed. This feature is convenient for checking parts that are hidden by the list.

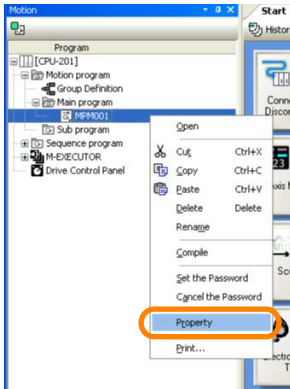
<Example>



5.3.2 Increasing the Number of Usable D Registers

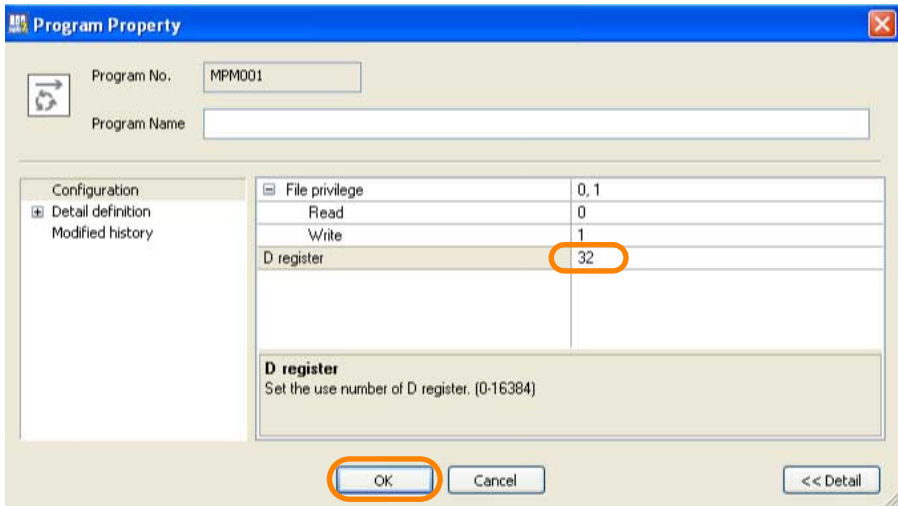
D registers are local registers that are unique within each specific program. By default, there are 32 D registers. The following procedure shows how to increase the number of D registers using motion programming as an example.

1. In the [Ladder] window, the [Motion] window, or the [Navigation] window, right-click the program for which you want to increase the number of D registers, and select [Property].



The [Program Property] window will be displayed.

2. Set a value for [D register] under [Use register number], and then click the [OK] button.
The setting range is 0 to 16384.



This concludes the procedure.

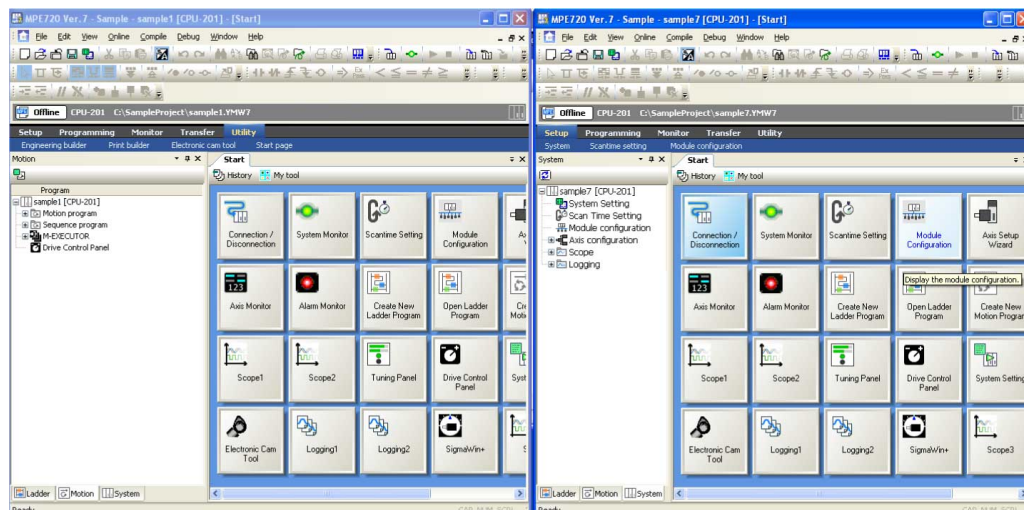
5.3.3 Copying or Moving Drawings

(1) Procedure

Use the following procedure to copy or move drawings.

Information

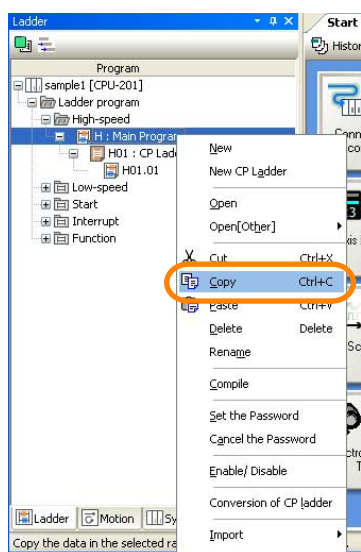
- Drawings cannot be copied if you are using a direct connection. If the MPE720 is online, set it offline.
- If you open two instances of the MPE720 on the same PC, you can also copy or move drawings between different project files.



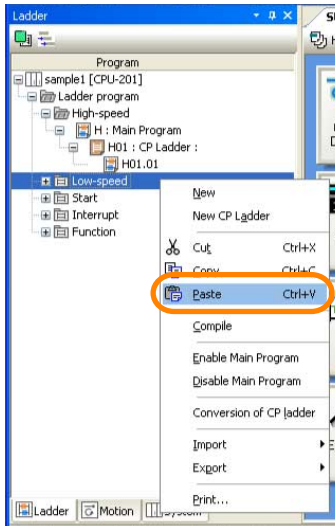
1. Open the project file that contains the drawing to copy or move.
2. Right-click the drawing to copy or move in the [Ladder] window, [Motion] window, or [Navigation] window, and select [Copy] or [Cut].

Information

- You can also copy or move files by folder. Refer to the following section for details.
 (2) [Restrictions on Copying and Moving a Drawing on page 294](#)
- This section shows the screenshots for the procedure to copy a drawing in the [Ladder] window and paste it into the same project file.



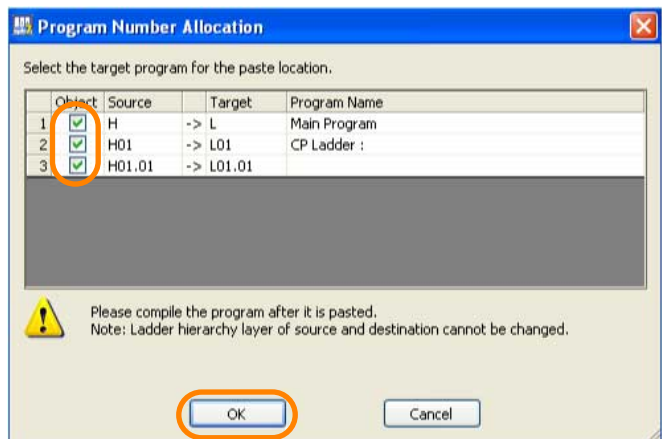
3. Right-click the destination program where the drawing will be pasted in the [Ladder] window, [Motion] window, or [Navigation] window, and select [Paste].



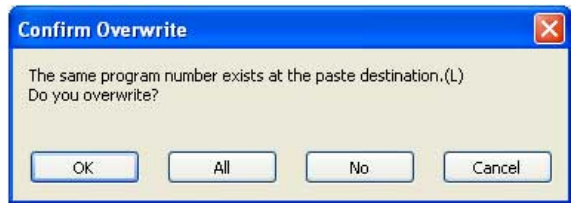
The [Program Number Allocation] window will be displayed.

4. Select the [Object] check boxes for the drawings to copy or move, and click the [OK] button.

- Information
- You can change [Target] and [Program Name] as necessary.
 - If a CP ladder is included in the drawings to copy or move and the destination is a model that supports multiple scans, the CP ladder will not be displayed.
 - The drawing may start being copied or moved without the [Program Number Allocation] window being displayed, depending on the selected drawing.



If the program number is in use at the destination, a message dialog box will be displayed. Click the appropriate button.



The selected drawings will be copied.

This concludes the procedure.

(2) Restrictions on Copying and Moving a Drawing

The restrictions on copying and moving a drawing are given below.

- You can copy and move a drawing only when offline.
- If [User Privilege] is set on the [User Registration] window, you can copy and move a drawing only when logged in with a user that has those privileges or higher.

- You can copy and move a drawing only when "○" appears in the following table.

○: Can copy/move, ×: Cannot copy/move

Drawing	Item	Same Drawing		Different Drawing	
Ladder	Copy single drawing (parent drawing)	×		○	
	Copy single drawing (other than parent drawing)	○		○	
	Copy folder *1	×		○	
	Move single drawing (parent drawing)	×		○	
	Move single drawing (other than parent drawing)	○		○	
	Move folder *1	×		○	
Drawing	Item	Model That Does Not Support Multiple Scans		Model That Supports Multiple Scans	
		Same Group	Different Group	Same Scan/Group	Different Scan/Group
Motion	Copy single drawing	○ *2	○ *2, *4	○ *2	○ *2, *4
	Copy folder *1 (sub/main)	×	○ *2, *3, *4	×	○ *2, *3, *4
	Move single drawing	○	○ *4	○	○ *4
	Move folder *1	×	○ *4	×	○ *4
Sequence Function	Copy single drawing	○ *2	—	○ *2	○ *2
	Copy folder *1 (sub/main)	×	—	×	○ *2, *3
	Move single drawing	○	—	○	○
	Move folder *1	×	—	×	○

*1 A folder is the upper level of the drawings. That means a folder is the named folders listed below.

- Ladder program: High-speed, Low-speed, Start, Interrupt, and Function
- Motion: Main program and Sub program (You cannot copy or move drawings as [Group□] folders.)
- Sequence: Main program and Sub program

*2 You can copy and move a drawing only when the source and destination program types are the same.

Example: If you selected MPM□□□ as the source, you can copy or move it only to the main program folder as the destination.

*3 You can copy and move a drawing only when the source and destination folder types are the same.

Example: If you selected the main folder as the source, you can copy or move it only to the main folder as the destination.

*4 The group number of the source is automatically converted to a group number in the destination.

5.3.4 Deleting Drawings

Use the following procedure to delete drawings.

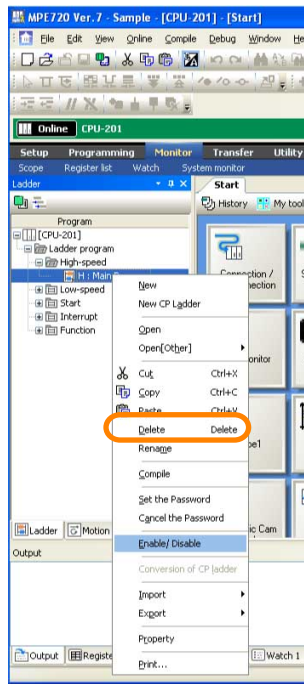
- Open the project file.
- In the [Ladder] window, the [Motion] window, or the [Navigation] window, right-click the drawing to delete, and then select [Delete].

Information

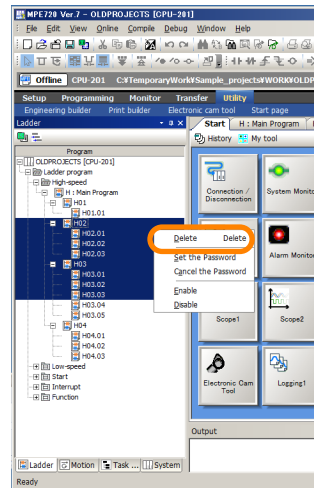
You can also select more than one drawing and delete them all.

- After you click the drawing, if you click another drawing while holding the **Ctrl** key, you can select multiple drawings in the amount of clicked drawings.
- After you click the drawing, if you click another drawing while holding the **Shift** key, you can select all of the drawings between the first and second drawings you clicked.

<If Only One Drawing Is Selected>



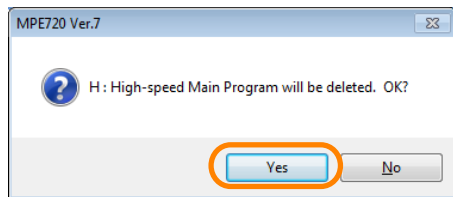
<If More Than One Drawing Is Selected>



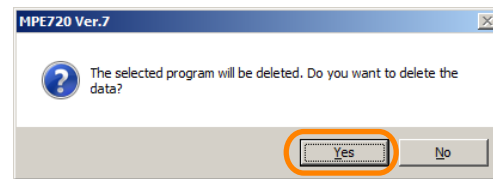
A message dialog box will be displayed.

3. Click the [Yes] button.

<If Only One Drawing Is Selected>



<If More Than One Drawing Is Selected>



The drawing will be deleted.

This concludes the procedure.

5.3.5 Compiling Programs

Compiling programs is the process of verifying that the syntax of the created program is correct and creating the internal data that can be executed by the controller.

Information Compiling a program verifies if its syntax is correct, but it does not verify that the program operates as intended.

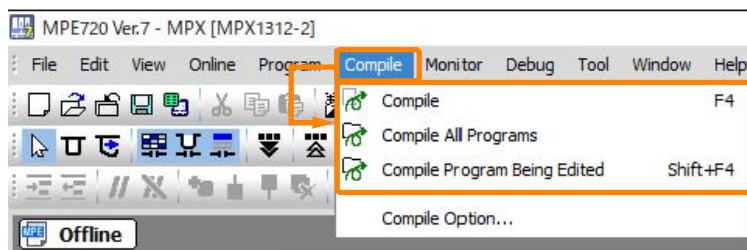
(1) Compiling Programs

Use one of the following methods to compile the program.

- Click the [Compile] button on the toolbar.



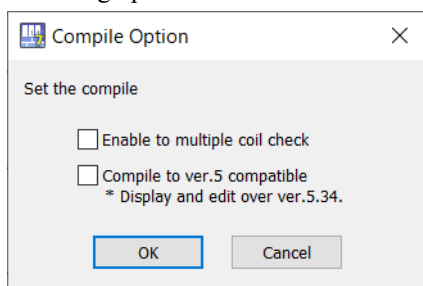
- Select one of the following items on the [Compile] menu.



Type	Description
Compile	Compiles the selected program.
Compile All Programs ^{*1}	Compiles all programs in the project that is currently open offline.
Compile Program Being Edited ^{*1}	Compiles multiple programs that were edited in the project that is currently open offline.

^{*1} Cannot be executed when online.

Select [Compile Option] from the [Compile] menu to display the [Compile Option] window. You can set the following options in this window.



- [Enable to multiple coil check]: This option enables checks for multiple coils when compiling the program.
- [Compile to ver.5 compatible]: This option allows the program to be opened using MPE720 Ver. 5.

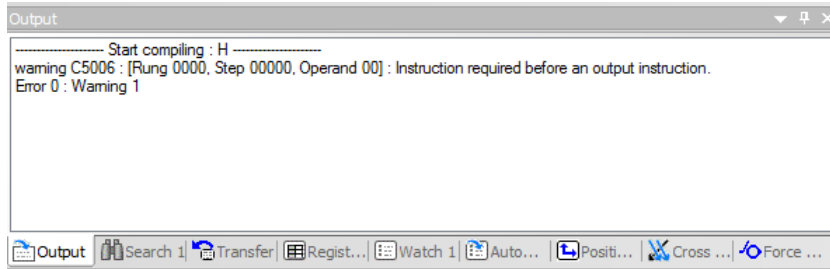
When the program is finished being compiled, the results will be displayed in the [Output] window. If there is an error or warning, resolve the issue by referring to the information displayed in the window.

(2) Precautions for Compiling a Program

The precautions for compiling a program are given below.

- The following restrictions apply when you compile programs while connected to the controller.
 - Program is being executed: You cannot compile programs.
 - Program is being debugged: You can compile a program while single block execution is stopped. However, you cannot compile the program if a subprogram was called with the MSEE (SSEE) instruction.
- A warning message will be displayed if a program is compiled and any of the following instructions does not receive an output from another instruction on the left side of it.
 - On-Delay Timer (TON (1 ms))
 - Off-Delay Timer (TOFF (1 ms))
 - On-Delay Timer (TON (10 ms))
 - Off-Delay Timer (TOFF (10 ms))
 - On-Delay Timer (TON (1 s))
 - Off-Delay Timer (TOFF (1 s))
 - Rising-edge Pulses (ON-PLS)
 - Falling-edge Pulses (OFF-PLS)
 - Coil (COIL)
 - Reverse Coil (REV-COIL)
 - Rising-edge Detection Coil (ON-PLS-COIL)
 - Falling-edge Detection Coil (OFF-PLS-COIL)

- Set Coil (S-COIL)
- Reset Coil (R-COIL)



- To check if the same registers are being used between scans when using a model that supports multiple scans, set [Support Access Control between Scans] to "Enable" in [Environment Setting] - [Setup] - [System Setting]. Refer to the following sections for details.

10.1 Environment Setting on page 573

10.1.11 [Setup] - [System Setting] on page 576

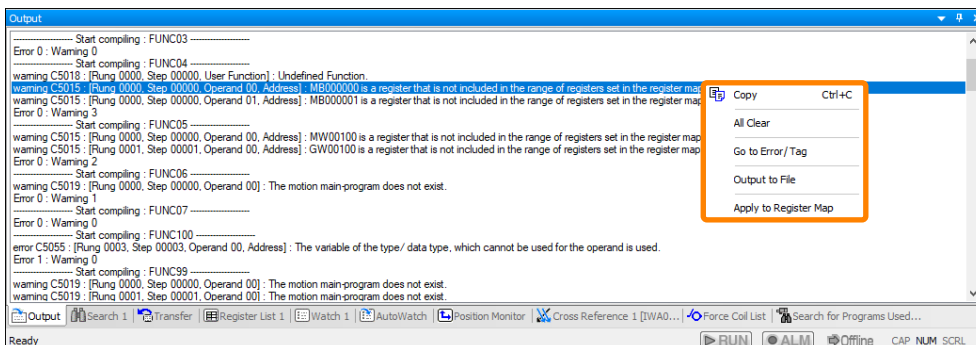
The compilation result corresponding to the above is displayed as a warning. The program will still operate as programmed even when a warning is displayed in the compilation results.

If you created a program that uses the same registers between scans, the consistency of data may be lost, resulting in unintended control of the equipment. Be very careful about registers when creating the program.

- When using a model that supports multiple scans, the check on a register that changes dynamically (e.g., a register to which an offset is added with an index register or array register) is performed at compilation on the register before it is changed (i.e., the register before the offset is added). In other words, the register after it is changed (i.e., the register after the offset is added) is not checked.
For this reason, when using registers that change dynamically, confirm that each register falls within the range of registers for the scan set on the [Register Map] window after it is changed, instead of checking only the compilation results.

(3) Context Menu for the Compilation Results (I.e., [Output] Window)

The context menu displayed by right-clicking on the [Output] window is described below.



Item	Description
[Copy] ^{*1}	Clicking this item copies the selected row of text.
[All Clear]	Clicking this item clears the display in the [Output] window.
[Go to Error/Tag]	Clicking this item displays the target program of the selected row. The program cursor will be displayed at the target location.
[Output to File]	Click this item to display the [Save As] window. Specify the destination folder and file name for the data and click the [Save] button to output the [Output] window contents to a file.
[Apply to Register Map] ^{*1}	Clicking this item adds the content to [Copy Register Settings] on the [Register Map] window as a new row. The row that was automatically added based on the [Output] window results will be highlighted. Check the content, correct if necessary, and then click the [Save] button on the [Register Map] window.

^{*1} You can select more than one row and perform an operation on those rows as a group.

- To select multiple continuous rows: Select the first row to select, hold down the **Shift** key, and then select the last row to select.
- To select multiple rows that are not continuous: Hold down the **Ctrl** key and individually click the rows to select.

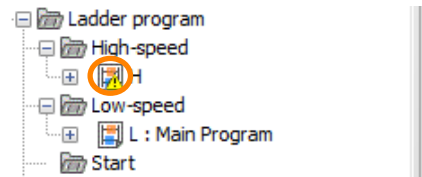
5.3.6 Saving Programs While Editing

Use one of the following methods to save programs that are enabled for editing (while a compilation error exists).

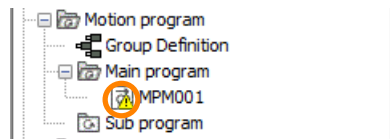
- Select [Save Project] from the [File] menu.
- Hold down the **Ctrl** key and press the **S** key.

The following kinds of icons are displayed for programs that are saved while editing.

<Ladder Program>



<Motion Program>



Information

If the MPE720 is online, a program cannot be saved if it is enabled for editing. Make sure to save the programs after compilation has been completed.

5.4 Variable

This section provides an overview of variables and describes operations related to variables.

5.4.1 What Are Variables?

Variables are registers with labels (variable names) and comments.

The following tables list the types of variables.

- Variables That Are Automatically Assigned by the System
Users cannot add or delete the following variables.

Type	Description
System Variable	These variables are prepared by the system to represent the status of the controller.
Axis Variable	These variables represent the setting parameters and monitor parameters of axes.
I/O Variable	These variables are displayed according to the number of I/O points on I/O units and modules.

- Variables That Can Be Set by Users
Users can add, edit, and delete the following variables.

Type	Description
Global Variable	These variables can be shared between ladder programs, user functions, motion programs, and sequence programs.
Scan Variable	Information These variables can be shared between programs in a scan. If you set [Support Access Control between Scans] to [Enable] in the environment settings, the compilation results will show a warning when the same scan variable is used in different scans.
Constant Variable	These variables are set with a predetermined value by the user. These variables can be referenced in programs only. The values cannot be changed.
Local Variable	These variables are used within drawings. They cannot be used in other drawings.

You use variables in instructions inside programs and in various windows.

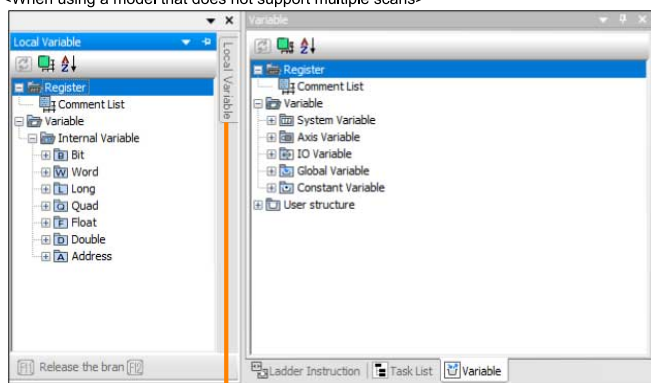
For example, you can use variables for the following types of operations. Refer to the following sections for details.

- Ladder instruction input
 [\(3\) Setting the Variable, Register, and Comment on page 241](#)
- [Search] window input
 [6.8 Search on page 402](#)
- [Replace] window input
 [6.9 Replace on page 405](#)
- [Cross Reference] window input
 [6.10 Cross Reference on page 408](#)
- [Watch] window input
 [6.2 Watch on page 378](#)

5.4.2 Window Configuration

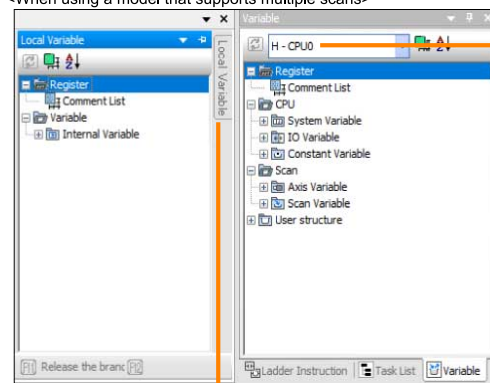
Variables are displayed in the [Variable] window and the [Local Variable] window.

<When using a model that does not support multiple scans>



(2)

<When using a model that supports multiple scans>



(2)

No.	Item	Description
(1)	Scan Combo Box	For the following variables, select the scan to which the variables belong to be displayed in this window. - Axis variable - Scan variable
(2)	[Local Variable] Window	Displayed when the mouse cursor is placed on the [Local Variable] tab that is displayed when a ladder program is opened.

5.4.3 Variables That Are Automatically Assigned by the System

(1) System Variable

System variables are system registers (S registers) that have been registered as variables. System variables are preset in the MPE720.

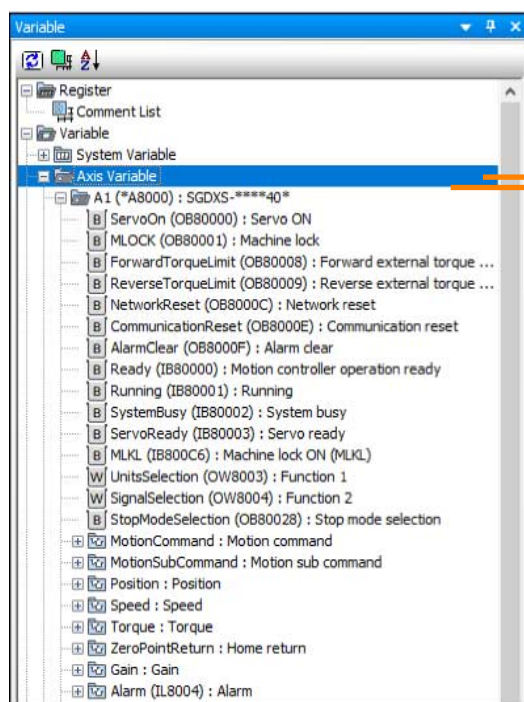
Users cannot change settings related to system variables.

(2) Axis Variable

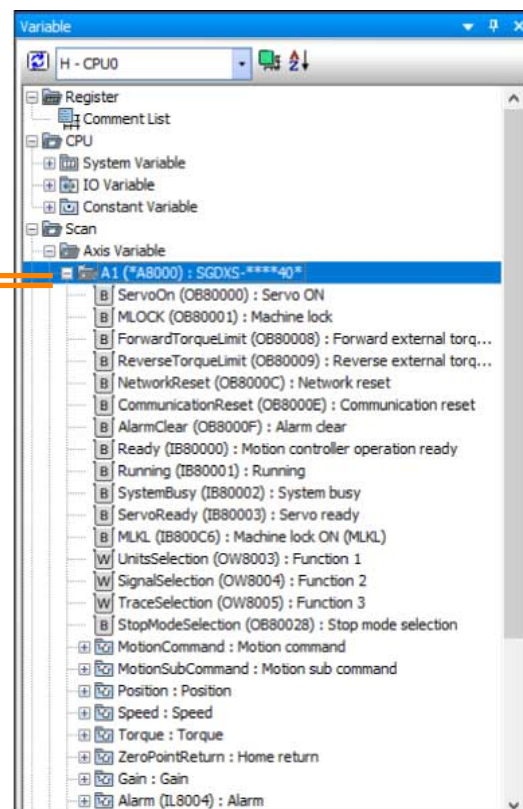
Axis variables are the axis setting parameters and monitor parameters of axes to be used in programs that have been registered as variables.

You can register the axes related to an operation as a group. The variable sets of logical axes for all registered groups are displayed under [Axis Variable] in the [Variable] window.

<When using a model that does not support multiple scans>



<When using a model that supports multiple scans>



No.	Item	Description
(1)	Axis Group	You can register the axes related to an operation as a group. Double-clicking [Axis Variable] displays the [Group Definition] or [Control Device/Group Definition] window on which you can set group name and logical axis names. Refer to the following section for details on the [Group Definition] window. 5.2.3 Setting Group Definitions on page 266 Refer to the following section for details on the [Control Device/Group Definition] window. 4.4.2 [Control Device/Group Definition] Window Details on page 202
(2)	Axis Variables Set	The axis variables set consists of monitor parameters and setting parameters. You cannot add or delete items. You can change comments only.

(3) I/O Variable

I/O variables are variables to which I register and O register addresses have been automatically registered by the system. The number of I/O variables that is displayed is the amount of inputs and outputs on the I/O modules set in the Module Configuration window.

You cannot change the registers, but you can change the variable names and comments.



Important

Use caution as the I/O variables that have been set will be deleted by performing the following operations.

- If you set an LIO module allocated in the Module Configuration window to “UNDEFINED” and save the definition, the I/O variables that were registered will be deleted.
- If you change a range of registers (start register address/end register address) that was allocated to a subslot in the Module Configuration window, the I/O variables outside that range will be deleted.

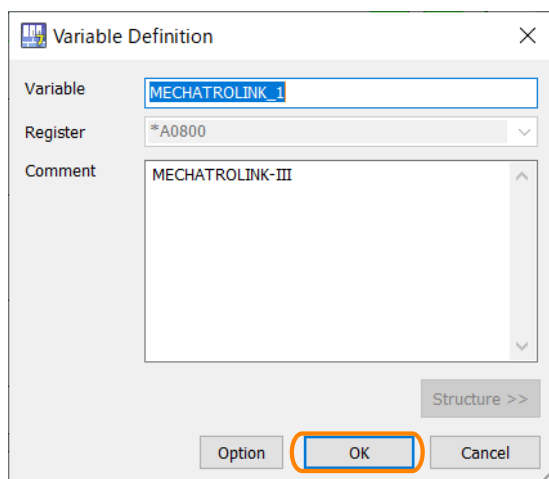
(a) Changing the Variable Name and Comment

Use the following procedure to change the variable name and comment of an I/O variable.

1. **Right-click the variable name to edit, and select [Edit]. Or double-click the variable name.**

The [Variable Definition] window will be displayed.

2. Set the items to change, and then click the [OK] button.



Item	Description
Variable	Set the name of the I/O module. <Setting Conditions> • 16 alphanumeric characters maximum. • The first character is an alphabetic character. • Do not enter a space.
Comment	Set a comment. Carriage returns and line feeds cannot be used.

The content in the [Variable] window will be changed. If the changed variable was entered in a program, the variable name and comment in that program will also be changed.

This concludes the procedure.

5.4.4 Variables That Can Be Set by Users

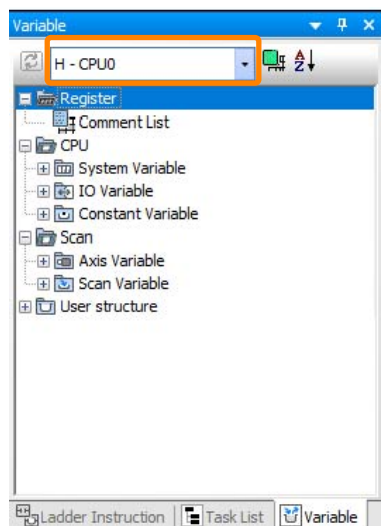
(1) Global Variables and Scan Variables

These variables are displayed in the [Variable] window separated into different levels by data type.

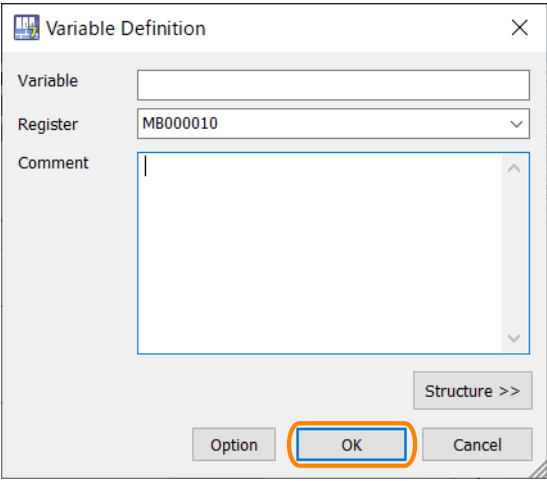
(a) Registering a Global Variable or a Scan Variable

Use the following procedure to register a global variable or a scan variable.

1. Only when using a model that supports multiple scans: Select the scan number/CPU number for the variable to register in the [Variable] window.



2. In the [Variable] window, right-click [Global Variable], [Scan Variable], or a data type folder (Bit, Word, Long, Quad, Float, Double, or Address), and then select [Add].
The [Variable Definition] window will be displayed.
3. Set the following items, and then click the [OK] button.



Item	Description
Variable	Set a variable name. <Setting Conditions> • 64 alphanumeric characters maximum. • The first character is an alphabetic character. • The following values are not valid: – The same value as the register – A variable name that is already registered – Reserved words, such as motion instructions
Register	Set the register. <Setting Conditions> • The register must be within the range of registers. The list box displays the smallest address out of the available registers. <MP3000 Series> MW00000 to MW1048575 GW00000 to GW1048575 <MPX Controller and YRM Controller> MW00000 to MW1048575 GW00000 to GW67108863 • Address if a structure is registered.
Comment	Set a comment. Carriage returns and line feeds cannot be used. <Setting Conditions> 255 characters maximum.
[Structure] Button	Displays the list of structures. System structure: Sets of variables prepared in advance. User structure: Sets of variables that can be registered by the user. Refer to the following section for details.  (3) User-Defined Structure on page 308
[Option] Button	Displays the [Environment Setting] window.

The [Variable Definition] window will close, and the registered variable will be displayed in the [Variable] window.

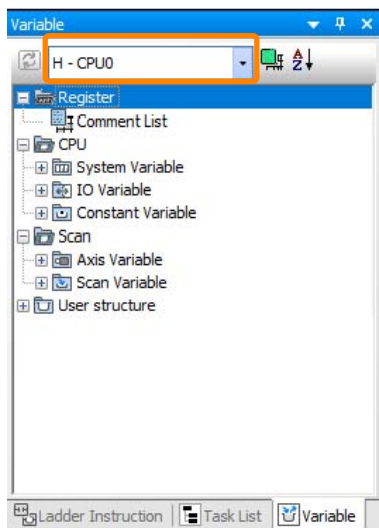
The registered variable name and comment will be displayed in the program that uses the register of the registered variable.

This concludes the procedure.

(b) Editing a Global Variable or a Scan Variable

Use the following procedure to edit a global variable or a scan variable.

1. **Only when using a model that supports multiple scans: Select the scan number/CPU number for the variable to edit in the [Variable] window.**



2. **Right-click the global variable or the scan variable to edit in the [Variable] window, and select [Edit]. Or double-click the global variable or the scan variable to edit.**

The [Variable Definition] window will be displayed.

3. **Set the items to edit, and then click the [OK] button.**

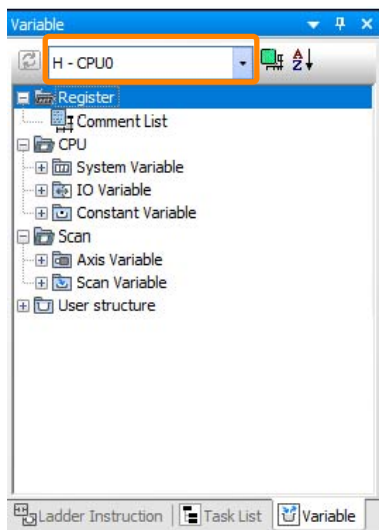
The [Variable Definition] window will close, and the changes will be applied to the variable in the [Variable] window.

This concludes the procedure.

(c) Deleting a Global Variable or a Scan Variable

Use the following procedure to delete a global variable or a scan variable.

1. **Only when using a model that supports multiple scans: In the [Variable] window, select the scan number/CPU number for the variable to delete.**

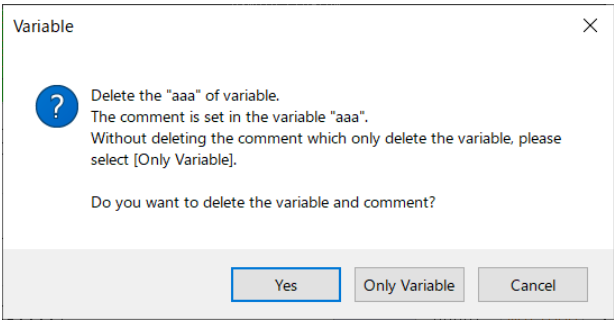


2. **Right-click the global variable or the scan variable to delete in the [Variable] window, and select [Delete]. Or select the global variable or the scan variable to delete, and press the Delete key.**

A message dialog box will be displayed.

3. Click the [Yes] button.

Information When a comment is set for the variable to delete, the following message dialog box will be displayed. Click the [Only Variable] button to delete the variable but leave the comment in the comment list.



The selected variable will be deleted from the [Variable] window.
The deleted variable will be replaced with the register when the program that used the deleted variable is displayed next.

This concludes the procedure.

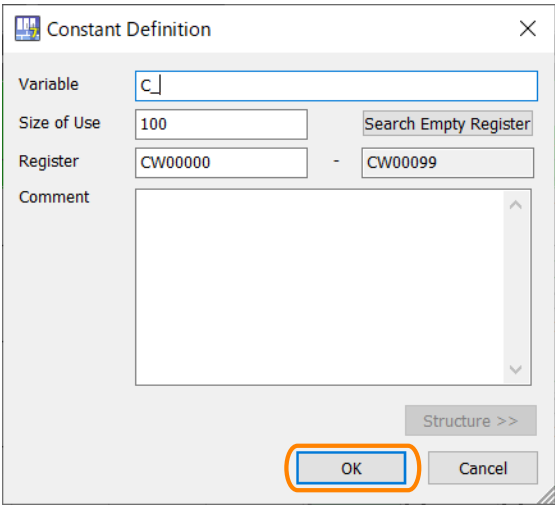
(2) Constant Variable

Constant variables are C registers that have been registered as variables.
After you register a range of C registers as a constant group, you can name that range of C registers and set the constant value, unit (pulse, mm, deg, inch, and μm), and comment.

(a) Registering a Constant Group

Use the following procedure to register a constant group.

- 1. Right-click [Constant Variable] in the [Variable] window, and select [Add].
The [Constant Definition] window will be displayed.
- 2. Set the following items, and then click the [OK] button.



Item	Description
Variable	Set a variable name. The letters "C_" are automatically displayed at the beginning. <Setting Conditions> 8 alphanumeric characters maximum.
Size of Use	Enter the number of word registers to use starting from the first address that is set in the [Register] field. Click the [Search Empty Register] button to search for the number of available registers that is set in the [Size of Use] box. The ending address will be entered automatically.

Continued on next page.

Continued from previous page.

Item	Description
Register	Enter the first word address of the C registers to register as the group.
Comment	Set a comment. Carriage returns and line feeds cannot be used. <Setting Conditions> 255 alphanumeric characters maximum.

The [Constant Definition] window will close, and the registered variable group will be displayed in the [Variable] window.

This concludes the procedure.

(b) Registering a Constant Variable

Use the following procedure to register a constant variable to a constant group.

1. **Right-click the constant group to which the variable will be registered in the [Variable] window, and select [Add].**

The [Constant Variable Definition] window will be displayed.

2. **Set the following items, and then click the [OK] button.**

Constant Variable Definition [C_1 (C*00000-100)]

Variable: [] = 0 [pulse]

Register: CW00000

To specify the range of the variable, push Set button

Range: [] to [] [Set]

Comment: []

Click [OK] to write the value of register C.

[OK] [Cancel]

Item	Description
Variable	Set a variable name. <Setting Conditions> • 64 alphanumeric characters maximum. • The first character is an alphabetic character. • The following values are not valid: – The same value as the register – A variable name that is already registered in the same group – Reserved words, such as motion instructions
Numerical Value	Enter the numerical value to store in the register. <Setting Conditions> The range of the numerical value that can be set depends on the data type of the register as shown below. WORD: -32768 to 32767 LONG: -2147483648 to 2147483647 QUAD: -9223372036854775808 to 9223372036854775807 FLOAT: ±(1.175495 to 3.40283), 0 DOUBLE: ±(2.225E-308 to 1.798E+308), 0
Unit	Directly enter the unit or select the unit from the list.

Continued on next page.

Item	Description
Register	Set the C register to register as the variable. The list box displays the smallest address in the range of registers set in the group for each data type (W, L, Q, F, and D).
Range	Set the upper and lower limits of the constant as required. To set the range, click the [Set] button, enter the upper and lower limits of the constant in the window that is displayed, and click the [OK] button.
Comment	Set a comment. Carriage returns and line feeds cannot be used. <Setting Conditions> 255 alphanumeric characters maximum.

The [Constant Variable Definition] window will close, and the registered variable will be displayed in the [Variable] window.

This concludes the procedure.

(c) Editing a Constant Group or Constant Variable

Use the following procedure to edit a constant group or constant variable.

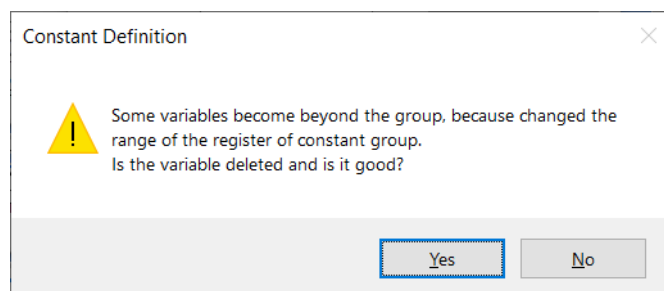
1. **Right-click the constant group or constant variable to edit in the [Variable] window, and select [Edit]. Or double-click the constant group or constant variable to edit.**

The [Constant Definition] window or the [Constant Variable Definition] window will be displayed.

2. **Set the items to edit, and then click the [OK] button.**

Information

If you change the range of registers in the [Constant Definition] window and variables exist outside the range of registers in that group, the following message dialog box will be displayed. Click the [Yes] button to delete the relevant variable.



The window will close, and the changes will be applied to the variable in the [Variable] window.

This concludes the procedure.

(d) Deleting a Constant Group or Constant Variable

Use the following procedure to delete a constant group or constant variable.

Information

If a constant group is deleted, the variables that belong to that group will also be deleted.

1. **Right-click the constant group or constant variable to delete in the [Variable] window, and select [Delete]. Or select the the constant group or constant variable to delete, and press the Delete key.**

A message dialog box will be displayed.

2. **Click the [Yes] button.**

The selected constant group or constant variable will be deleted from the [Variable] window.

If the deleted variable was used in a program, the variable name will be replaced with the register when the program is displayed.

This concludes the procedure.

(3) User-Defined Structure

User-defined structures are multiple variables, registers, and comments that have been registered as a set.

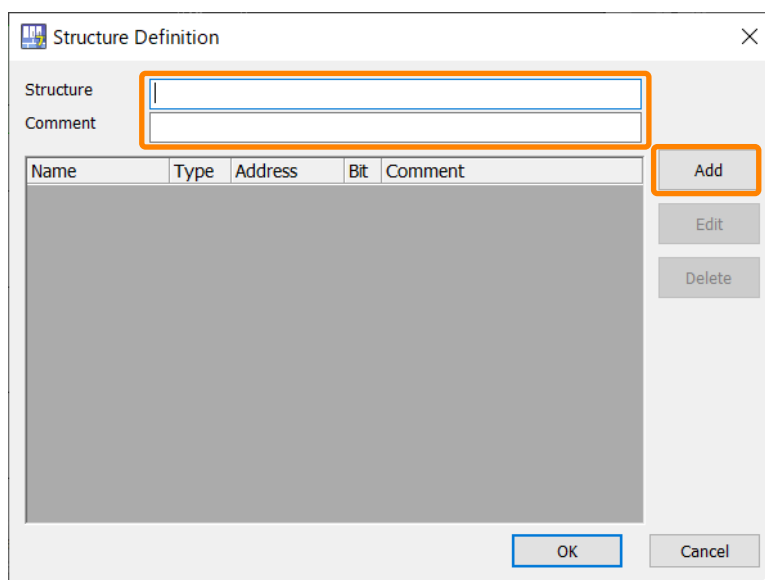
The registers that are registered in a user-defined structure are called "structure members". You can register up to 100 structure members for one user-defined structure.

User-defined structures are used by assigning them to address global variables, scan variables, and local variables.

(a) Registering a User-Defined Structure

Use the following procedure to register a user-defined structure.

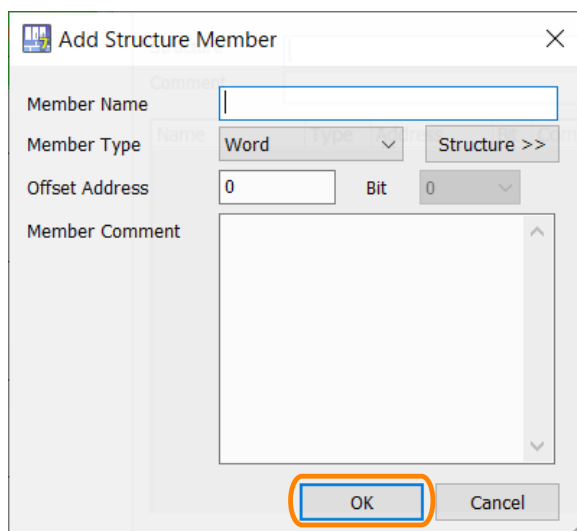
1. **Right-click [User structure] in the [Variable] window, and select [Add].**
The [Structure Definition] window will be displayed.
2. **Enter values for [Structure] and [Comment], and click the [Add] button.**



The 'Structure Definition' dialog box is shown. It has a title bar with a close button. Inside, there are two text input fields: 'Structure' and 'Comment'. The 'Structure' field is highlighted with an orange border. To the right of these fields are three buttons: 'Add' (highlighted with an orange border), 'Edit', and 'Delete'. Below the input fields is a table with the following headers: 'Name', 'Type', 'Address', 'Bit', and 'Comment'. The table body is currently empty. At the bottom of the dialog are 'OK' and 'Cancel' buttons. The 'OK' button is highlighted with an orange border.

The [Add Structure Member] window will be displayed.

3. **Set the following items, and then click the [OK] button.**



The 'Add Structure Member' dialog box is shown. It has a title bar with a close button. Inside, there are several fields: 'Member Name' (text input), 'Member Type' (dropdown menu showing 'Word'), 'Offset Address' (text input showing '0'), and 'Bit' (dropdown menu showing '0'). There is also a 'Structure >>' button. Below these fields is a large text area for 'Member Comment'. At the bottom of the dialog are 'OK' and 'Cancel' buttons. The 'OK' button is highlighted with an orange border.

Item	Description
Member Name	Set the member name. <Setting Conditions> • 64 alphanumeric characters maximum. • The first character is an alphabetic character. • The following values are not valid: – The same value as the register – A variable name that is already registered – Reserved words, such as motion instructions
Member Type	Select the data type (Bit, Word, Long, Quad, Float, Double, or Address) from the list.
Offset Address	Set the offset address.
Member Comment	Set a comment. Carriage returns and line feeds cannot be used. <Setting Conditions> 255 alphanumeric characters maximum.

You will return to the [Structure Definition] window.

4. **Repeat steps 1 to 3 to add structure members.**

The registered structure members will be displayed in the list.

Structure Definition

Structure: User_structure

Comment: structure

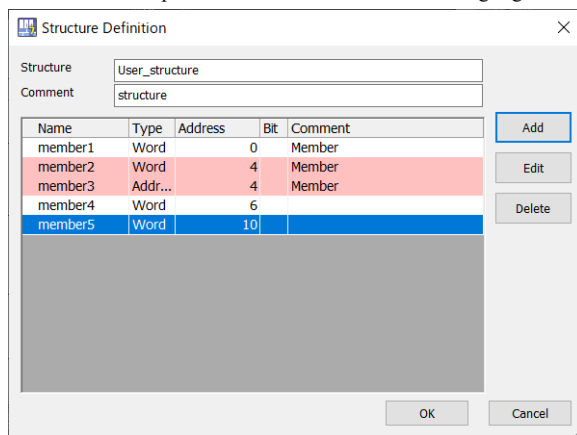
Name	Type	Address	Bit	Comment
member1	Word		0	Member
member2	Bit		3 E	Member
member3	Addr...		4	Member

Buttons: Add, Edit, Delete, OK, Cancel

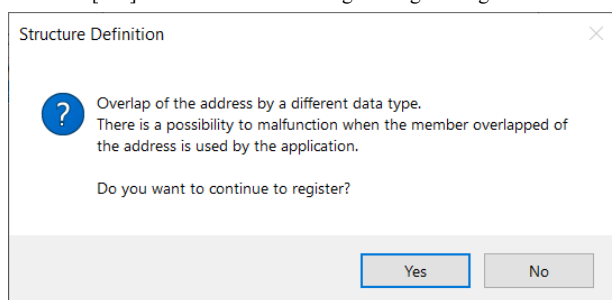
Note:

If register addresses are duplicated:

If an address is a duplicate of the address of another structure member that is already registered in a single user-defined structure, the lines of the duplicated structure members will be highlighted in pink.



Click the [OK] button and the following message dialog box will be displayed.

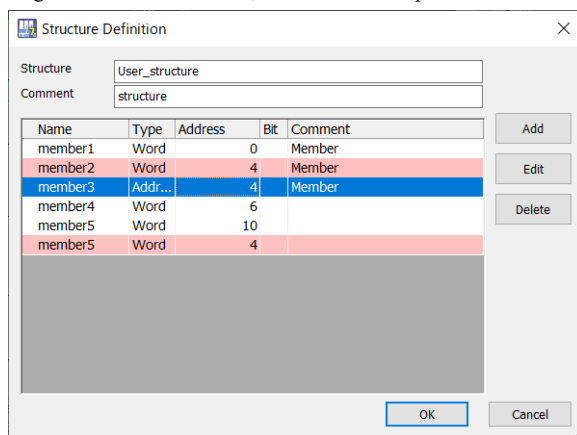


Click the [Yes] button to register the structure to add.

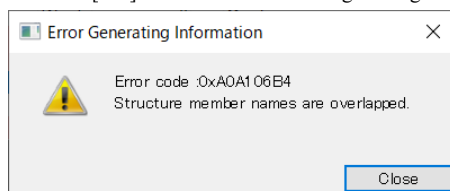
Note:

If the same register exists in the structure:

If a member type (data type), address, and bit are duplicates of those of another structure member that is already registered in a single user-defined structure, the lines of the duplicated structure members will be highlighted in pink.



Click the [OK] button and the following message dialog box will be displayed. Change one of the structure members.



5. Click the [OK] button in the [Structure Definition] window.

The [Structure Definition] window will close, and the registered user-defined structure will be displayed in the [Variable] window.

This concludes the procedure.

(b) Editing a User-Defined Structure

Use the following procedure to edit a user-defined structure.

1. **Right-click the user-defined structure or structure member to edit in the [Variable] window, and select [Edit]. Or double-click the user-defined structure or structure member to edit.**

The [Structure Definition] window will be displayed.

2. **Set the items to edit, and then click the [OK] button.**

The window will close, and the changes will be applied to the user-defined structure in the [Variable] window.

Note:

If the user-defined structure that was edited is already assigned to a global variable, scan variable, or local variable:

- Name of structure member was changed: Change is also applied to the variable.
- Comment of structure member was changed: Change is not applied to the variable. Apply the change manually.
- Structure member was deleted: Structure member is deleted from the variable.

This concludes the procedure.

(c) Deleting a User-Defined Structure

Use the following procedure to delete a user-defined structure.

1. **Right-click the user-defined structure to delete in the [Variable] window, and select [Delete]. Or select the user-defined structure to delete, and press the Delete key.**

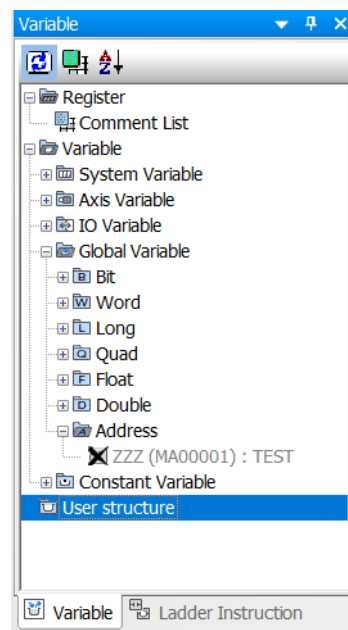
A message dialog box will be displayed.

2. **Click the [Yes] button.**

The selected user-defined structure will be deleted from the [Variable] window.

Information

If the deleted user-defined structure was assigned to a variable, the user-defined structure under that variable will be inactivated and not deleted.



This concludes the procedure.

(4) Local Variable

Local variables are D registers that have been registered as variables.

Local variables are registered in each individual ladder program, and they can be used in that program only.

(a) Registering a Local Variable

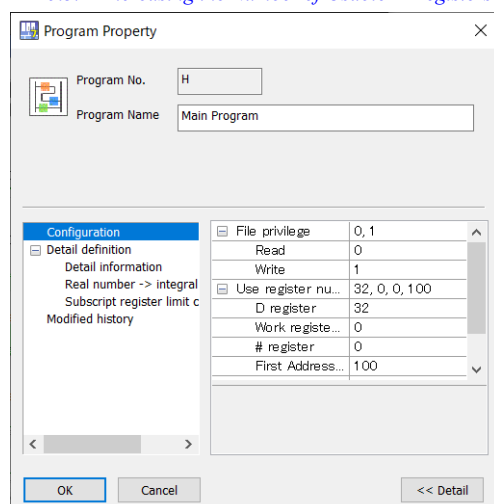
Use the following procedure to register a local variable.

Information

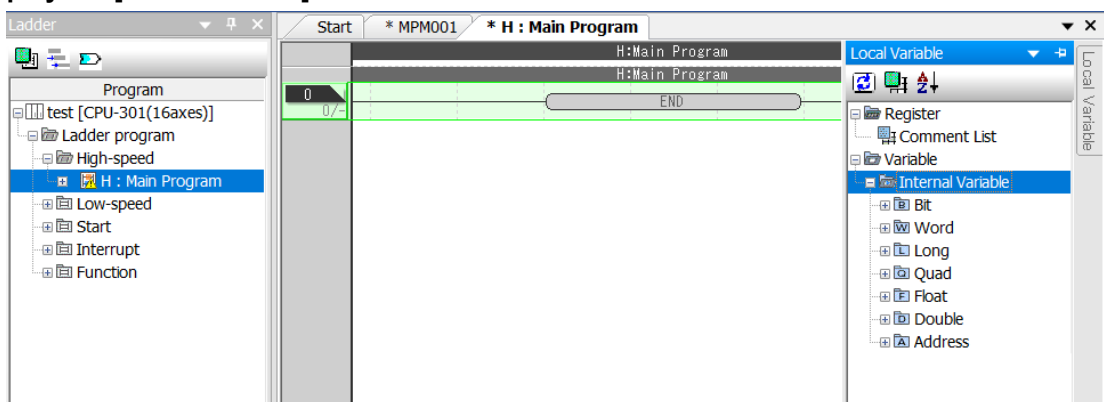
Even if you register D registers as variables, you can use only the number of D registers that was set in the [Program Property] window when the variables are used in a program.

Refer to the following section for how to increase the number of D registers that can be used.

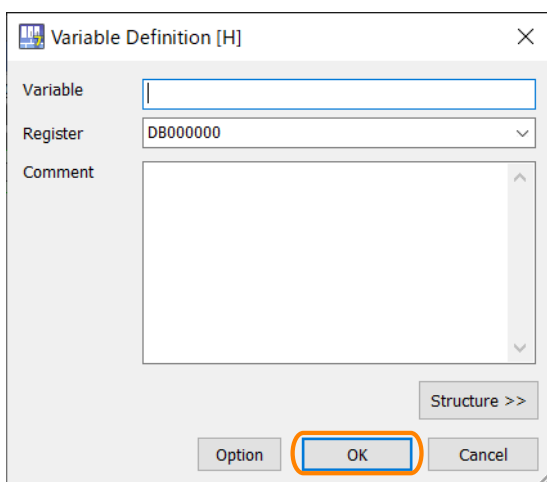
 [5.3.2 Increasing the Number of Usable D Registers on page 292](#)



1. With the ladder program open, place the mouse cursor on the [Local Variable] tab to display the [Local Variable] window.



2. Right-click [Internal Variable], and select [Add].
The [Variable Definition] window will be displayed.
3. Set the following items, and then click the [OK] button.



Item	Description
Variable	Set a variable name. <Setting Conditions> 60 alphanumeric characters maximum (64 characters when "VAR_" is added to the beginning of the variable name). - The following values are not valid: - A variable name that is already registered in the same program - Reserved words, such as motion instructions
Register	Enter the register to register as the variable. The list box displays the smallest address in the range of available D registers for each data type. You can also register the same address if the data type is different (e.g., DB00000 and DW00000). However, when registering the variable, a message will be displayed warning you of the risk of malfunction.
Comment	Set a comment. Carriage returns and line feeds cannot be used when entering comments. <Setting Conditions> 255 alphanumeric characters maximum.
[Structure] Button	Displays the list of structures. System structure: Sets of variables prepared in advance. User structure: Sets of variables that can be registered by the user. Refer to the following section for details.  (3) User-Defined Structure on page 308
[Option] Button	Displays the [Environment Setting] window.

The [Variable Definition] window will close, and the registered variable will be displayed in the [Local Variable] window.

Information "VAR_" will be displayed at the beginning of the variable name to show it is a local variable.

This concludes the procedure.

(b) Editing a Local Variable

Use the following procedure to edit a local variable.

1. **Open the ladder program in which the variable to edit was set.**
2. **Right-click the variable to edit in the [Local Variable] window, and select [Edit]. Or double-click the variable.**

The [Variable Definition] window will be displayed.

3. **Set the items to edit, and then click the [OK] button.**

The window will close, and the changes will be applied to the variable in the [Local Variable] window.

This concludes the procedure.

(c) Deleting a Local Variable

Use the following procedure to delete a local variable.

1. **Open the ladder program in which the variable to delete was set.**
2. **Right-click the variable to delete in the [Local Variable] window, and select [Delete]. Or press the Delete key when the variable is selected.**

A message dialog box will be displayed.

3. **Click the [Yes] button.**

The selected variable will be deleted from the [Local Variable] window.

This concludes the procedure.

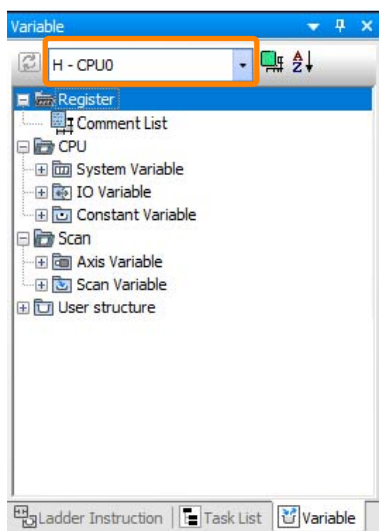
5.4.5 Operations on the [Variable] Window

(1) Manipulating Global Variables, Scan Variables, and Local Variables as Groups

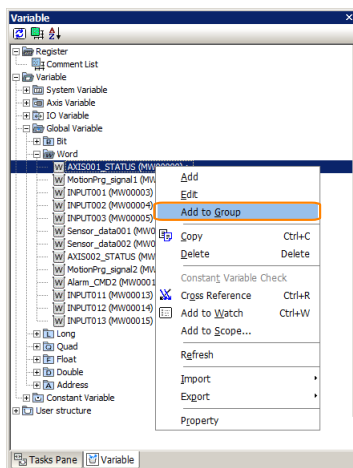
You can group global variables, scan variables, and local variables and name the groups to manipulate them and manage them as groups. Use the following procedure.

(a) Creating a Variable Group

1. Only when using a model that supports multiple scans: Select the scan number/CPU number for the variable group to create in the [Variable] window.

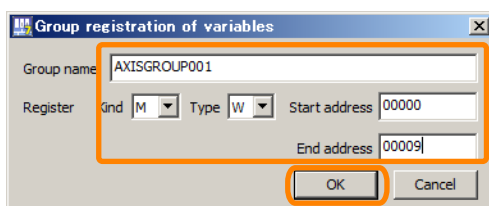


2. Right-click any location under [Global Variable] or [Scan Variable], and select [Add to Group].

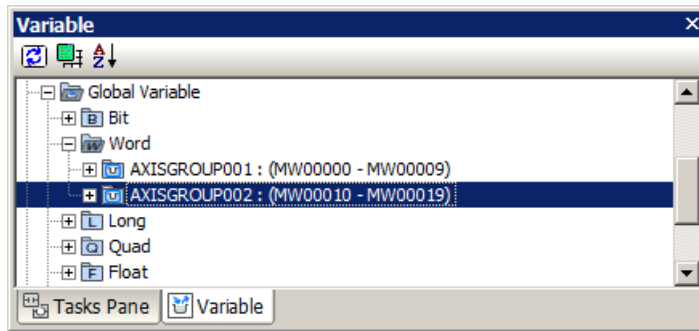


The [Group registration of variables] window will be displayed.

3. Set the group name and range of registers, and then click the [OK] button.



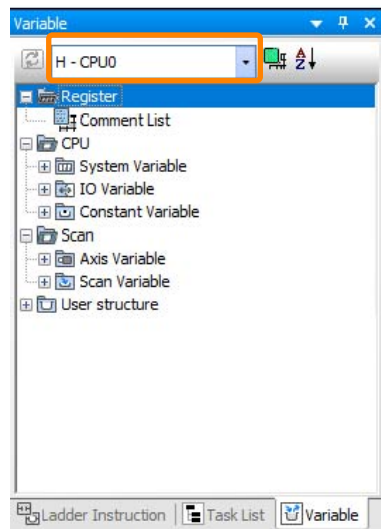
The variables in the specified range of registers will be grouped and the group will be displayed.



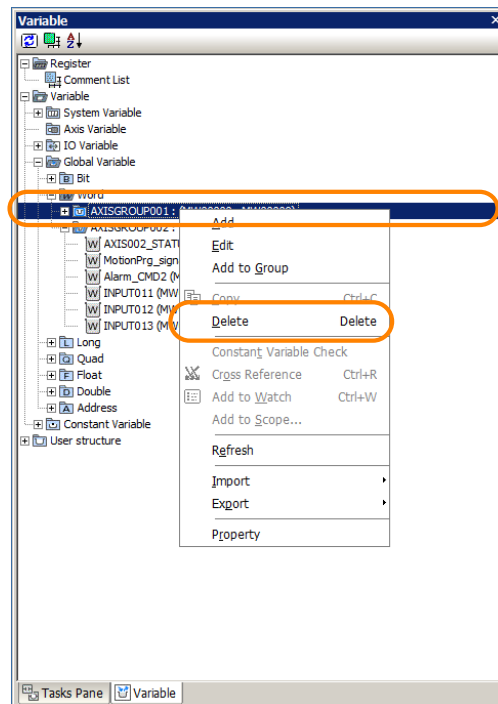
This concludes the procedure.

(b) Deleting a Variable Group

1. Only when using a model that supports multiple scans: Select the scan number/CPU number for the variable group to delete in the [Variable] window.

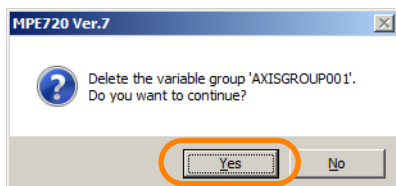


2. Right-click the global variable or the scan variable group to delete, and select [Delete].

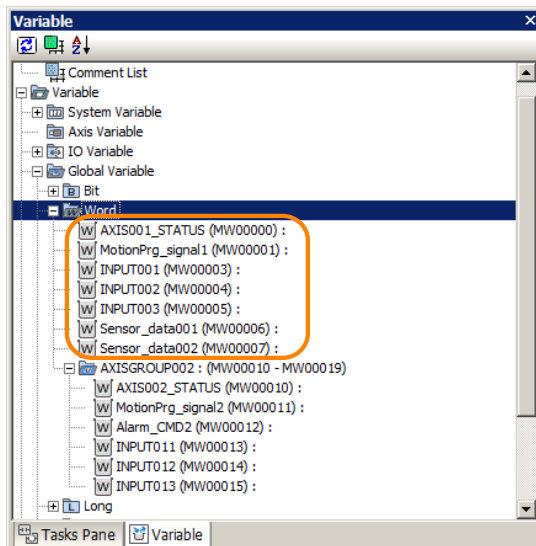


A message dialog box will be displayed.

3. Click the [Yes] button.



The variables will be ungrouped.

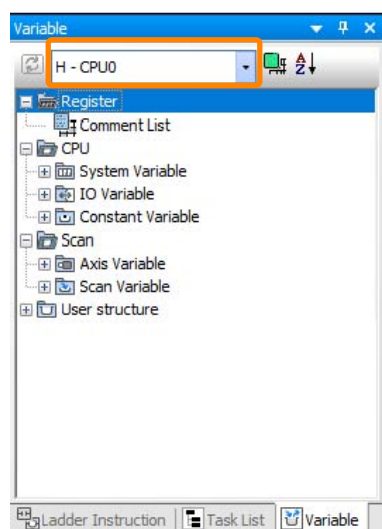


This concludes the procedure.

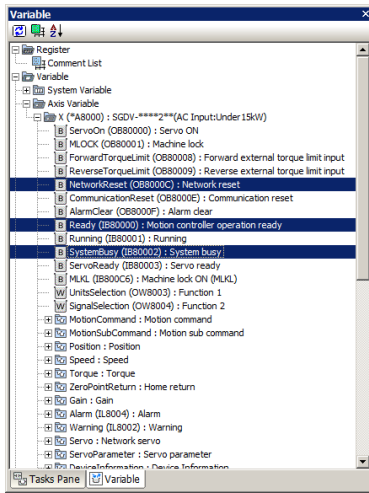
(2) Manipulating Multiple Variables at the Same Time

You can manipulate more than one system variable or user variable at the same time. Use the following procedure.

1. **Only when using a model that supports multiple scans: Select the scan number/CPU number for the variables on which to perform the batch operation in the [Variable] window.**

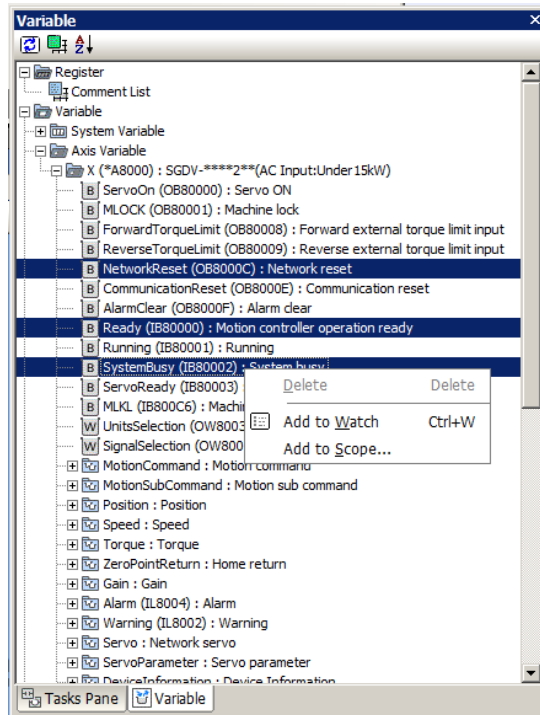


2. Select the variables to manipulate together in the [Variable] window.

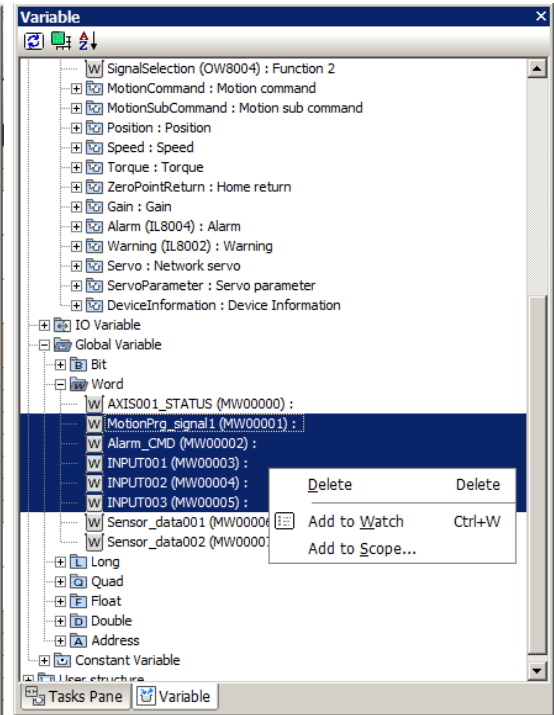


3. Right-click on the [Variable] window, and select the command to use.

<System Variables>



<User Variables>



Item	Description
Delete	Deletes the selected variable. This command is disabled when a system variable is selected.
Add to Watch	Registers the selected variables for a watch.
Add to Scope	Registers the selected variables for a trace.

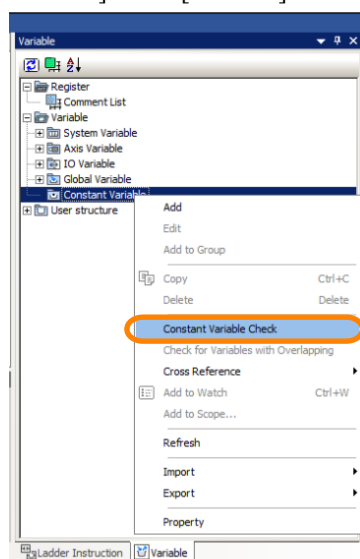
This concludes the procedure.

(3) Comparing Constant Variable Setting Values with Current Values in C Registers

Normally, the setting values registered to constant variables are the same as the current values in C registers. However, these values sometimes differ for some reason. When you use this function, the setting values registered to constant variables are compared with the current values in C registers, and, if the values do not match,

the current values in C registers are automatically corrected to the same values as the setting values registered to constant variables.

To compare the setting values of constant variables with the current values in C registers, right-click on [Constant Variable] in the [Variable] window, and select [Constant Variable Check].

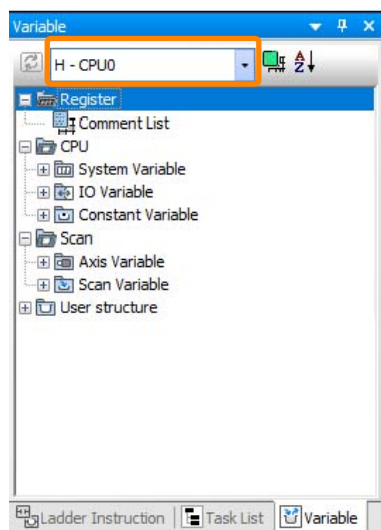


5.4.6 Comment List

(1) Displaying the Comment List

You can browse and edit the comments registered for registers in the comment list. This section describes the procedure to display the comment list.

1. **Only when using a model that supports multiple scans: Select the scan number/CPU number for the comment list to display in the [Variable] window.**

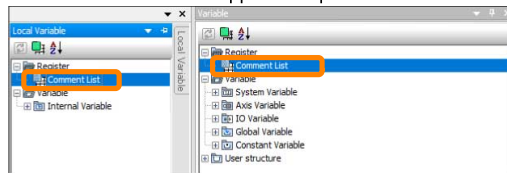


2. **Double-click [Comment List] in the [Variable] window or the [Local Variable] window.**

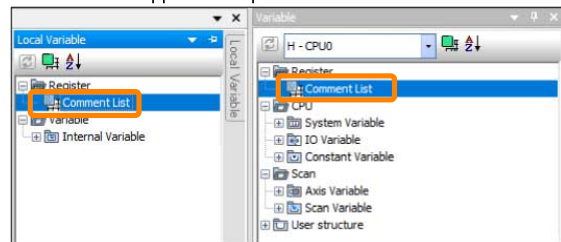
Information

The [Local Variable] window is displayed when the mouse cursor is placed on the [Local Variable] tab that is displayed when a ladder program is opened.

<A model that does not support multiple scans>



<A model that supports multiple scans>

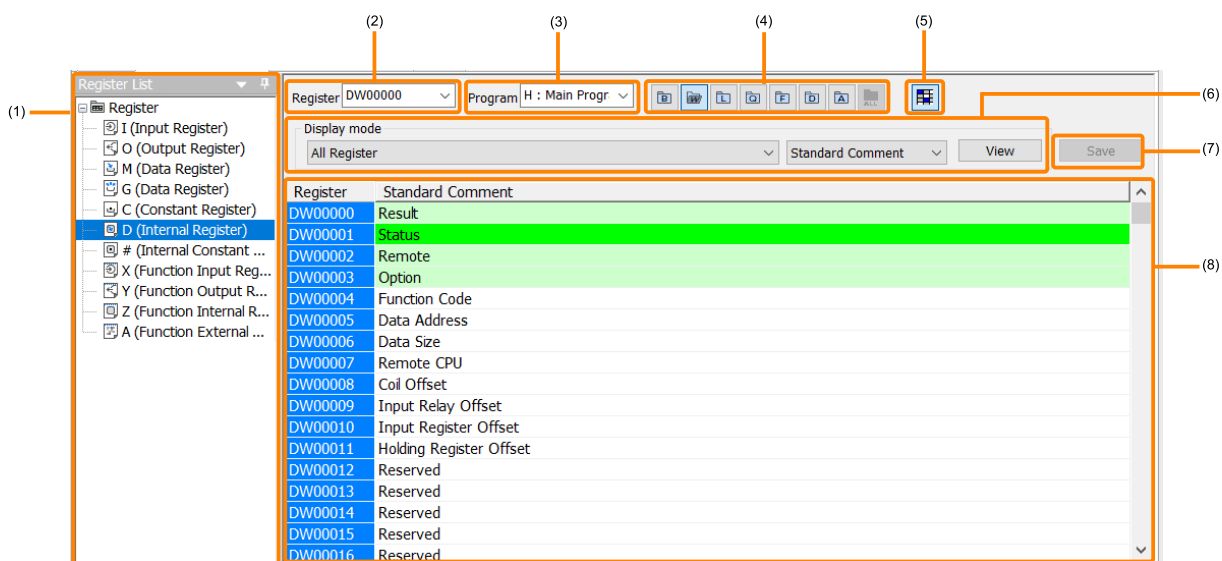


The [Comment List] tab page will be displayed.

This concludes the procedure.

(2) [Comment List] Tab Page

Information The displayed items and other elements will depend on the model of the controller and the connection status.



No.	Item	Description
(1)	Register List	The list of registers is displayed. Double-click a register type to apply that register type to the register address (first character) in [Register].
(2)	Register	Select the first register of the registers to display in the comment list.
(3)	Program	Select the program to reference when the selected register type is a local register (D, #, X, Y, Z or A).
(4)	Data Type	The data type buttons are displayed. Click a button to apply that data type to the register address (second character) in [Register].
(5)	[Display/Hide Register Map] Button	When this button is enabled, the cells in the comment list are given colors. <i>*/</i>
(6)	Display Mode	Select one of the following items and click the [View] button to update the contents of the comment list. - Select the registers to display from "All Register", "Registers used", or "Registers used (Also displays registers other than first register in color)". - Select the comments to display from "Standard Comment", "Extended Comment 1", "Extended Comment 2", "Extended Comment 3", or "All Comments".
(7)	[Save] Button	Saves the content that was set.
(8)	Comment List	You can browse and edit the comments.

*1 The color of the cell indicates the status of the register.

Color	Meaning
Light green	Address registers or registers that specify the number of transfer data with constants for specific instructions (SETW, MOVW, XCHG, and COPYW)
Red	Registers that use the same memory address as other registers
Green	Registers used in ladder or motion programming
Yellow	Registers that are used as the starting addresses for indexing (i or j) or registers that are used for specific instructions (SETW, MOVW, XCHG, and COPYW) for indirect addressing of the number of words to transfer. Note: An unspecified range of registers may be used after these registers.

(3) Editing the Comment List

Double-click a comment in the comment list to edit it.

You can also right-click a comment in the comment list and edit it from the displayed menu.

After you edit the comment, it will be updated in all programs and windows that use the relevant registers.

Register	Standard Comment
DW00000	Result
DW00001	Status
DW00002	Remote
DW00003	Option
DW00004	Function Co
DW00005	Data Address
DW00006	Data Size
DW00007	Remote CP
DW00008	Coil Offset
DW00009	Input Relay
DW00010	Input Regis
DW00011	Holding Reg
DW00012	Reserved
DW00013	Reserved
DW00014	Reserved
DW00015	Reserved
DW00016	Reserved

Item	Description
Cut	Cut, copy, paste, and delete the comments in the selected comment cells.
Copy	
Paste	
Delete	
Comment All Clear	Clears all comments that are currently displayed. Use caution because you cannot restore the comments after they have been cleared.
Search	Searches the comments that are currently displayed.
Replace	Replaces the comments that are currently displayed.
Cross Reference	A cross reference for the register of the selected comment will be executed, and the results will be displayed in the [Cross Reference] window. Refer to the following section for details on the cross reference. 6.10 Cross Reference on page 408
Add to Watch	Add the register of the selected comment to the [Watch] window.
Import	Import and export comments.
Export	Refer to the following section for details. 10.3 Export/Import on page 598

(4) Saving a Comment

You can save a comment changed in the MPE720 by selecting [Save Project] or [Save as a New Project] from the [File] menu. You can also save variable comments in the same manner.

The following table shows the read source and write destination of comment data according to the connection status by register.



Important

If there are differences in the registers between the read source project file and the write destination project file + controller in a project link connection, data may be erased because the read source data will overwrite the write destination data.

Connection Status	Register	Read Source	Write Destination
Offline	S / Motion (I/O)	Fixed by system	Cannot be written.
	M· I· O· G	Project file	Project file
	C	Project file	Project file
	D· #· X· Y· Z· A	Programs in project file	Programs in project file
Project Link Connection	S / Motion (I/O)	Fixed by system	Cannot be written.
	M· I· O· G	Project file	Project file + Controller
	C	Controller	Controller
	D· #· X· Y· Z· A	Programs in controller	Programs in controller
Direct Connection	S / Motion (I/O)	Fixed by system	Cannot be written.
	M· I· O· G	Controller	Controller
	C	Controller	Controller
	D· #· X· Y· Z· A	Programs in controller	Programs in controller

5.5 Library Function

This section provides an overview of the library function and describes related operations.

Information This function is not available when using a model that supports multiple scans.

5.5.1 Overview of Library Function

Information that you want to reuse can be registered as a library in the library catalog.

The registered library can be reused for the following purposes.

- Importing to existing project files
- Creating new project files based on the registered library

The following four types of libraries are available.

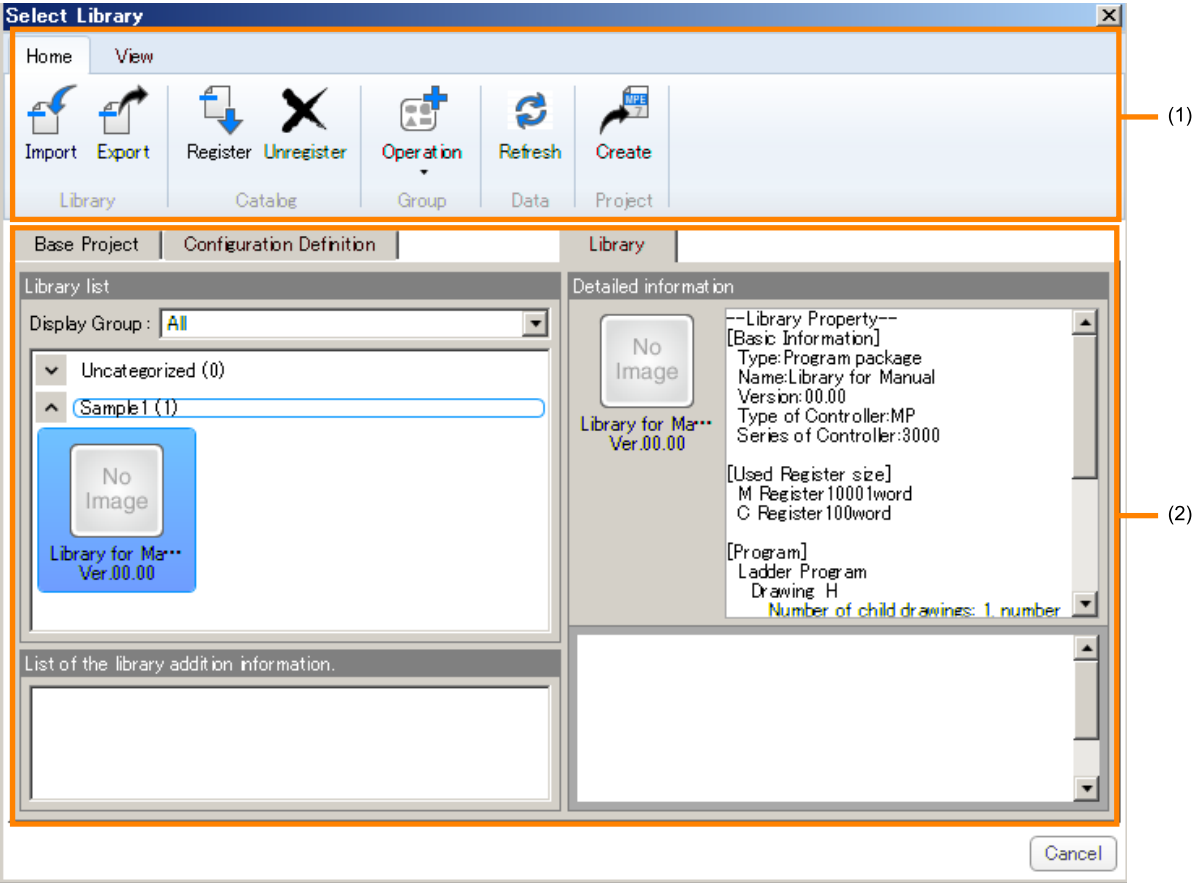
Type	Description
Program package	• This is a package where the ladder program and motion program are converted to a library. Refer to the following section for the procedure to create a program package library.  (2) Creating a Program Package on page 331 • This data can be imported to an existing project file. Refer to the following section for details.  5.5.6 Importing Libraries to a Project File on page 345
Function package	• This is a package where a user function is converted to a library. Refer to the following section for the procedure to create a function package library.  (3) Creating a Function Package on page 335 • This data can be imported to an existing project file. Refer to the following section for details.  5.5.6 Importing Libraries to a Project File on page 345
Base project package	• This is a package where the information serving as the base of the project file is converted to a library. Refer to the following section for the procedure to create a base project package library.  (4) Creating a Base Project Package on page 338 • This data and the configuration definition package can be used to create a new project file. Refer to the following section for details.  5.5.7 Creating a New Project File Using a Library on page 351
Configuration definition package	• This is a package where a module configuration definition is converted to a library. Refer to the following section for the procedure to create a configuration definition package library.  (5) Creating a Configuration Definition Package on page 339 • This data and the base project package can be used to create a new project file. Refer to the following section for details.  5.5.7 Creating a New Project File Using a Library on page 351

5.5.2 Window Configuration

This section describes the names and view settings for the library windows.

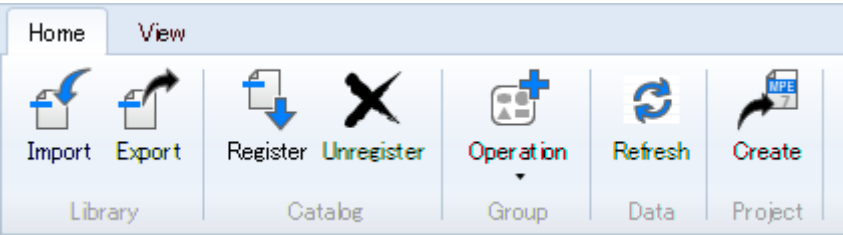
(1) [Select Library] Window

The [Select Library] window is displayed by clicking the [Library Catalog] button on the [My Tool] window.



No.	Item	Description	Reference
(1)	[Home] Tab and [View] Tab	Switches between display of the [Home] tab page and [View] tab page.	(a) [Home] Tab on page 324 (b) [View] Tab on page 325
(2)	[Base Project] tab, [Configuration Definition] tab, and [Library] tab	Switches between display of the [Base Project] tab page, [Configuration Definition] tab page, and [Library] tab page.	(c) [Base Project] Tab Page and [Configuration Definition] Tab Page on page 326 (d) [Library] Tab Page on page 327

(a) [Home] Tab



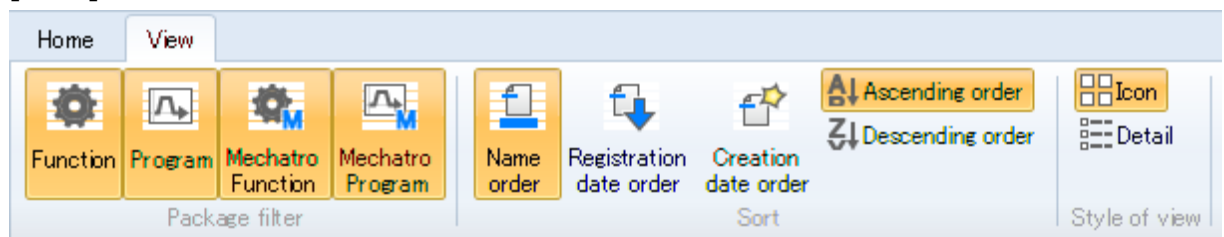
Button	Description
	Imports project package and function package library to a project file. The button is disabled if no library is selected. Refer to the following section for details on the import operation. 5.5.6 Importing Libraries to a Project File on page 345
	Creates a library. Refer to the following section for details on creating a library. 5.5.3 Creating a Library on page 330

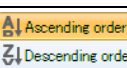
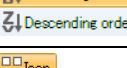
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Button	Description
 Register	Registers the libraries for the base project package, configuration definition package, program package, and function package to the library catalog. The libraries that can be registered vary depending on the displayed tab pages. • When [Base Project] tab page is displayed: Base project package • When [Configuration Definition] tab page is displayed: Configuration definition package • When [Library] tab page is displayed: Program package and function package
 Unregister	Deletes the library registered in the library catalog.
 Operation	Clicking the [▼] button displays the following three menu options.  Add Group : Adds a new group.  Change Group name : Renames the group.  Delete Group : Deletes the selected group. Libraries registered to deleted groups are moved to "Uncategorized".
 Refresh	Refreshes the information in [Library List] area for the [Base Project] tab page, [Configuration Definition] tab page, and [Library] tab page.
 Create	Creates a new project file using the library selected in the [Create Project] area in the [Base Project] tab page or [Configuration Definition] tab page. The button is disabled if there is not at least one base project and configuration definition library registered in the [Create Project] area.

(b) [View] Tab



Type	Button	Description
Package filter ^{*1}	 Function	Toggles between displaying and hiding the library of the function package attributes in the library list.
	 Program	Toggles between displaying and hiding the library of the program package attributes in the library list.
	 Mechatronics Function	Toggles between displaying and hiding the library of the function package (Mechatronics) attributes ^{*2} in the library list.
	 Mechatronics Program	Toggles between displaying and hiding the library of the program package (Mechatronics) attributes ^{*2} in the library list.
Sort	 Name order	Select the display order within the library.
	 Registration date order	
	 Creation date order	
	 Ascending order  Descending order	Select the display order (ascending or descending order) within the library.
Style of view	 Icon  Detail	Select the display format (icons or details) within the library.

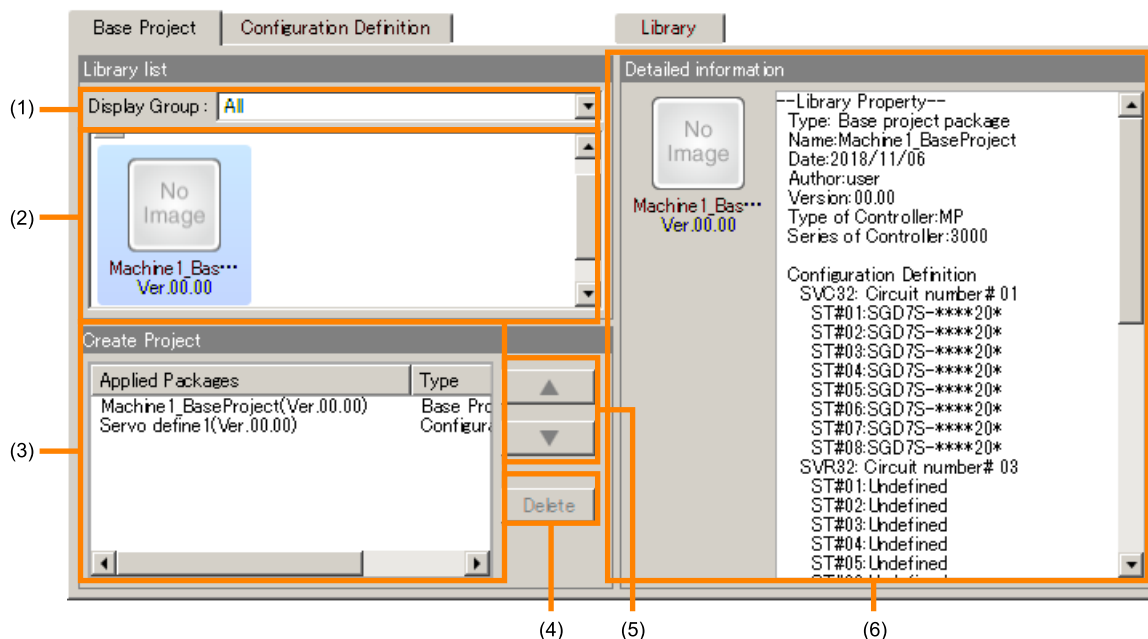
*1 If the [Base Project] tab page or [Configuration Definition] tab page is displayed, these buttons are hidden.

*2 Attributes assigned to libraries provided by Yaskawa.

(c) [Base Project] Tab Page and [Configuration Definition] Tab Page

The names and descriptions of the elements are shown below using the [Base Project] tab page as an example.

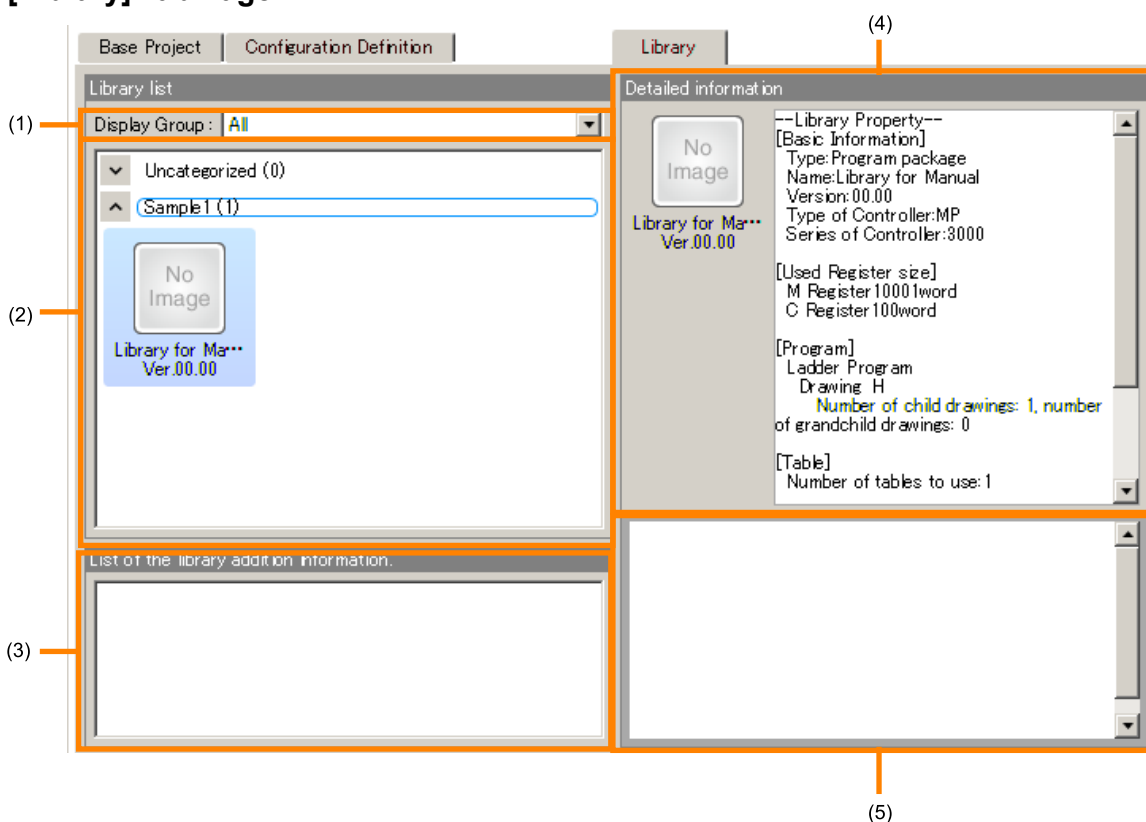
The names and descriptions of the elements in the [Configuration Definition] tab page are identical to those for the [Base Project] tab page.



No.	Item	Description
(1)	Display Group	Select the library group displayed in the library list ((2) area). • All: Shows all libraries. • Unclassified: Shows libraries not belonging to any group. • User-defined Group: Shows libraries belonging to a specified group.
(2)	Library List	The library list registered to the library catalog is displayed based on the settings for the display group ((1) area).
(3) *	Applied Package List	To register a library in this list, either double-click or drag and drop a library for a base project package or configuration definition package in the library list. (One base project package can be registered, and multiple configuration definition packages can be registered.)
(4)	[Delete] Button	Deletes registered libraries for the base project package and configuration definition package. Select the target library, and click the [Delete] button.
(5) *	[▲] Button [▼] Button	Change the order of a selected configuration definition package library within the applied package list. Select the target library, and click the [▲] button or [▼] button to move it up or down within the list. The order of a base project package library cannot be changed.
(6)	Detailed Information	Displays the properties information for the library selected in the library list ((2) area).

*1 The information in this item is shared between the [Base Project] tab page and [Configuration Definition] tab page. If the settings for one tab page are revised, the settings for the other tab page are also revised.

(d) [Library] Tab Page



No.	Item	Description
(1)	Display Group	Select the library group displayed in the library list ((2) area). • All: Shows all libraries. • Unclassified: Shows libraries not belonging to any group. • User-defined Group: Shows libraries belonging to a specified group.
(2)	Library List	The library list registered to the library catalog is displayed based on the settings for the display group ((1) area).
(3)	List of the library addition information	A list of library information that was previously expanded or saved (library expanded order or assignment information to library) is displayed.

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No.	Item	Description
(4)	Detailed Information	The properties information for the library selected in the library list (2) area) is displayed.
(5)	Guidance	The information for the guidance file registered to the library selected in the library list (2) area) is displayed.

(2) [Basic Information Settings] Window

The [Basic Information Settings] window will be displayed first when creating a library.

This window is used to set basic information, such as the library name, author, and other details, and to set various information linking to the library after conversion to a library.

After the library is registered, the settings can be viewed as the detailed information of the library.

No.	Item	Description	Setting
(1)	Library Name	Set the name of the library to be created.	Optional
(2)	Date	Set the date that the library was created.	Optional
(3)	Author	Set the author.	Required
(4)	Version	Set the version of the library.	Optional
(5)	Library Image File	Select the image (BMP, etc.) displayed when a library is imported to the catalog. Click the [...] button at the right end to select the image from the [Choose a Library Image] window.	Optional
(6)	Guidance File	Select the library description file (TEXT, PDF) displayed when a library is registered. Entering the following information into the guidance file will make it easier to identify the library when it is imported to a project file. <Example of Information Entered into Guidance File> Number of I/Os: 128 inputs, 64 outputs Size used: M register 1000 words	Optional

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No.	Item	Description	Setting
(7)	Manual File	Select the manual file of the library. There are no restrictions on the manual file. After a library is imported to the project file, this manual file is displayed in [Document] of the [System] window.	Optional
(8)	Included File	Select a file included within the project file. After a library is imported to the project file, this included file is displayed in [Document] of the [System] window.	Optional
(9) *1	Use the default password	Select this check box to set a password for the library.	Optional
(10) *1	Password	Enter a character string to set as the password.	Optional
(11) *1	Password (Confirmation)	To confirm, re-enter the character string to set as the password. Always enter manually without copying the field above.	Optional
(12)	[Back] Button	This button is always disabled.	—
(13)	[Next] Button	Displays the next window. If the required fields in this window are not set, next window does not appear.	—
(14)	[Complete] Button	- When creating a program package, function package, or configuration definition package: A dialog box appears with the message "The set value is not correct.". Click the [OK] button to display the next window. - When creating a base project package: The next window is displayed.	—
(15)	[Cancel] button	Cancels creation of the library.	—

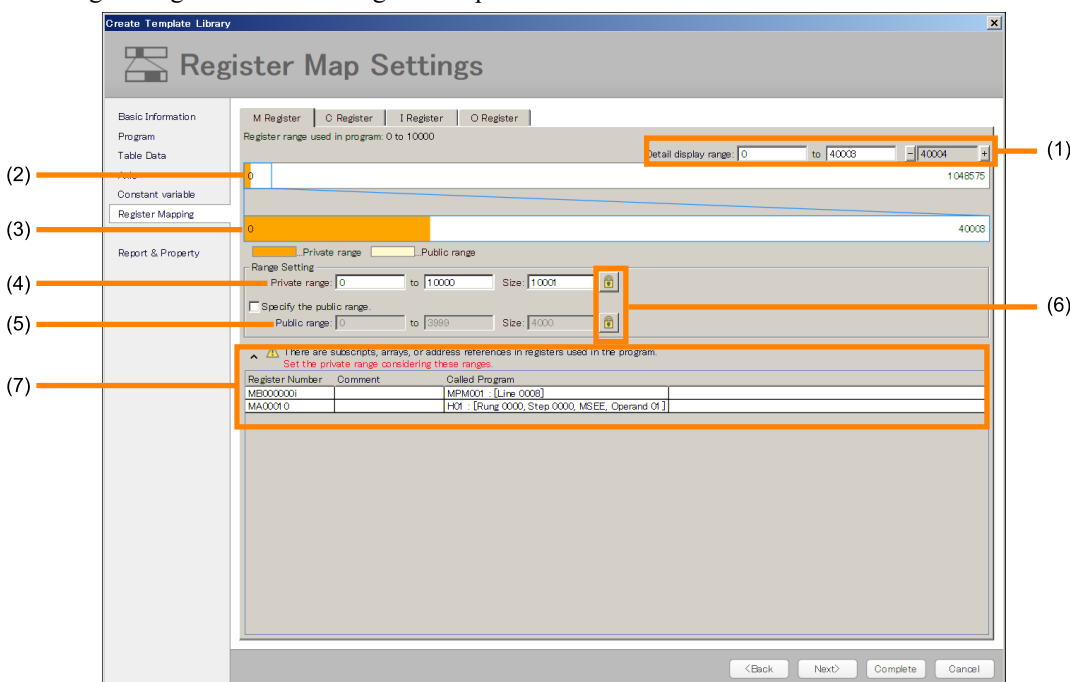
*1 This item does not appear when creating a configuration definition library.

(3) [Register Map Settings] Window

The [Register Map Settings] window is displayed when creating a library.

In the [Register Map Settings] window, the range of registers currently used in the program to export are displayed.

The range of registers can be changed as required.



No.	Item	Description	Setting
(1)	Detail display range	The range currently displayed in the lower graph is displayed in numeric values. When the blue frame of the upper graph is dragged horizontally, the numeric values of the detail display range also are changed. To considerably change the detail display range, click the [+] or [-] button.	Required
(2)	Upper graph	Indicates the entire range of registers (in the example above, the entire range of M registers).	Required
(3)	Lower graph	This is an enlarged view of the inside of the blue frame in the upper graph. Orange indicates the private range, and yellow indicates the public range.	Required
(4)	Private range	This is the range of the global registers that are used in the program. When the orange part of the lower graph is dragged horizontally, the numeric values of the private range also are changed. When changing the private range, include the register range that is currently used in the program in the project file. After the private range has been changed, the fields for entering numeric values change color to red if that private range is outside the register range that is currently used in the program in the project file.	Required
(5)	Public range	This is the range of registers to be reserved for sharing between two or more programs (range for performing communication with the touch panel or for transferring data between the libraries). This can be set when the [Specify the public range] check box is selected. When the yellow part of the lower graph is dragged horizontally, the numeric values of the public range also are changed.	Optional
(6)	 button	Clicking the  button grays out the size field and fixes the size. When the minimum value (or maximum value) is changed in this state, the maximum value (or minimum value) changes based upon the fixed size.	—
(7)	Precautions	If index registers, array registers, or address registers are used in the program, the used registers will be displayed here. If index registers, array registers, or address registers are used in the program, the range of registers used in the program cannot be completely identified. When setting the private range, take the range of these registers into consideration.	—

5.5.3 Creating a Library

Programs, user functions, information on which project files are based, and module configuration definitions can be exported from the project file to create libraries.

This section describes the procedure for creating a library



Important

Once a library is created, it cannot be edited.

If you want to change the content of an existing library, create a new one.

(1) Operation Procedures Common for All Libraries

There are four types of libraries: Program package, function package, base project package, and configuration definition package.

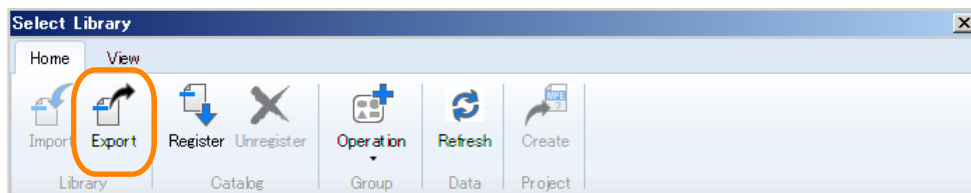
The first operations when creating a library are the same for all four types.

The procedures common for all libraries are shown below.

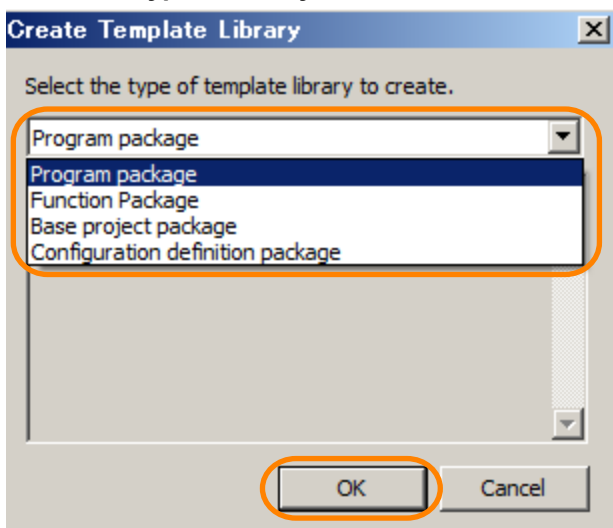
1. **Open the project file that will be used to create the library.**
2. **Click the [Library Catalog] button on the [My Tool] window.**

The [Select Library] window will be displayed.

3. Click [Export].



4. Select the type of library to be created, and click the [OK] button.



The next steps of the procedure vary depending on the selected item. Refer to the sections below based on the selected item.

Item	Reference
Program Package	(2) Creating a Program Package on page 331
Function Package	(3) Creating a Function Package on page 335
Base Project Package	(4) Creating a Base Project Package on page 338
Configuration Definition Package	(5) Creating a Configuration Definition Package on page 339

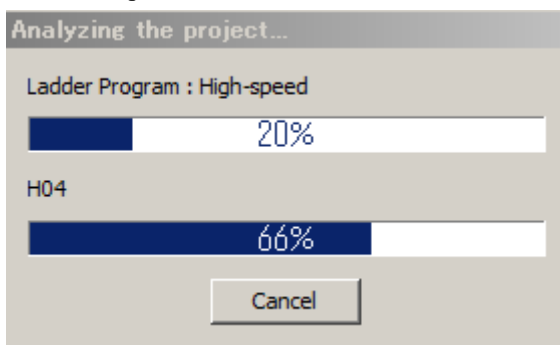
(2) Creating a Program Package

Use the following procedure to create a program package.

1. Perform the operations by referring to the section below.

(1) [Operation Procedures Common for All Libraries on page 330](#)

Information analysis (registers, axis usage status, and other information collection) for the target project file will be performed.



After the information analysis, the [Basic Information Settings] window will be displayed.

2. Set the basic information, and click the [Next] button.

Refer to the following section for details on the [Basic Information Settings] window.

(2) [Basic Information Settings] Window on page 328

The [Selection of Programs to Use] window will be displayed.

3. **Select the check boxes for the user function, ladder program, and motion program that will be used, and click the [Next] button.**

Information

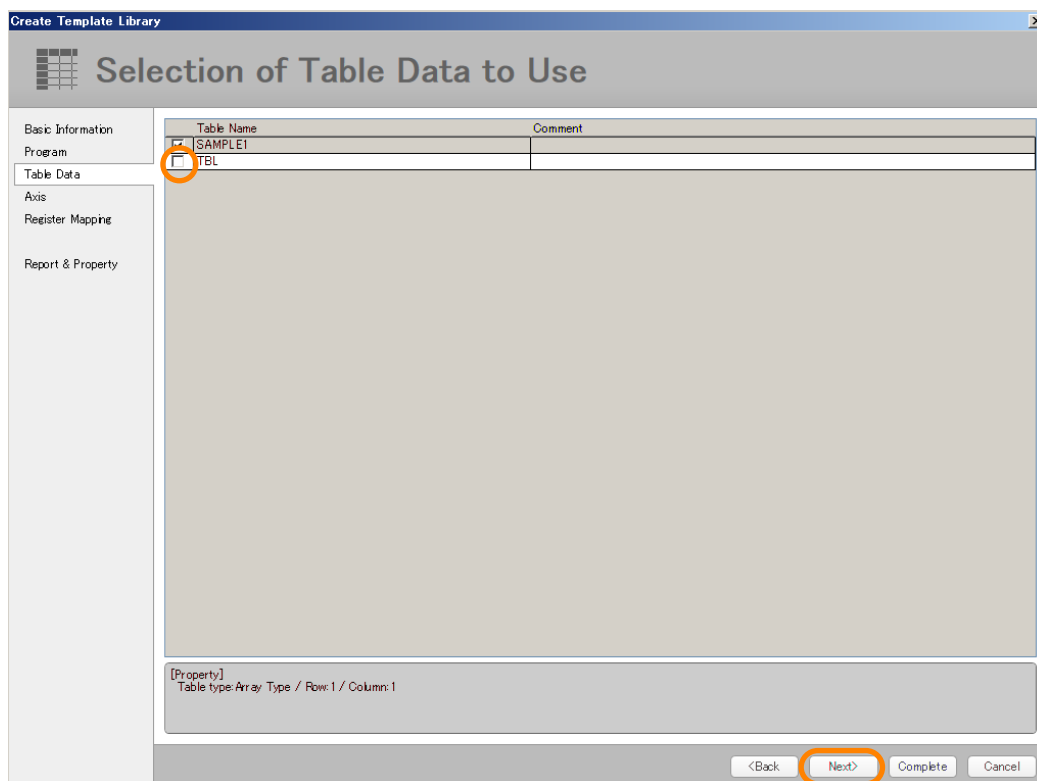
- When a check box is selected, the dependency relationship is automatically analyzed, and the check boxes for the dependent functions and motion programs are also selected. After the check boxes are selected automatically, you can select or clear the check individually.
- Clicking the [Select All] button selects all check boxes.
Clicking the [Clear All] button clears all check boxes.

The [Selection of Table Data to Use] window will be displayed.

4. **Select the check boxes for the table data that will be used, and click the [Next] button.**

Information

This window does not appear if there is no table data in the project file. If the window is not displayed, proceed to the next step.

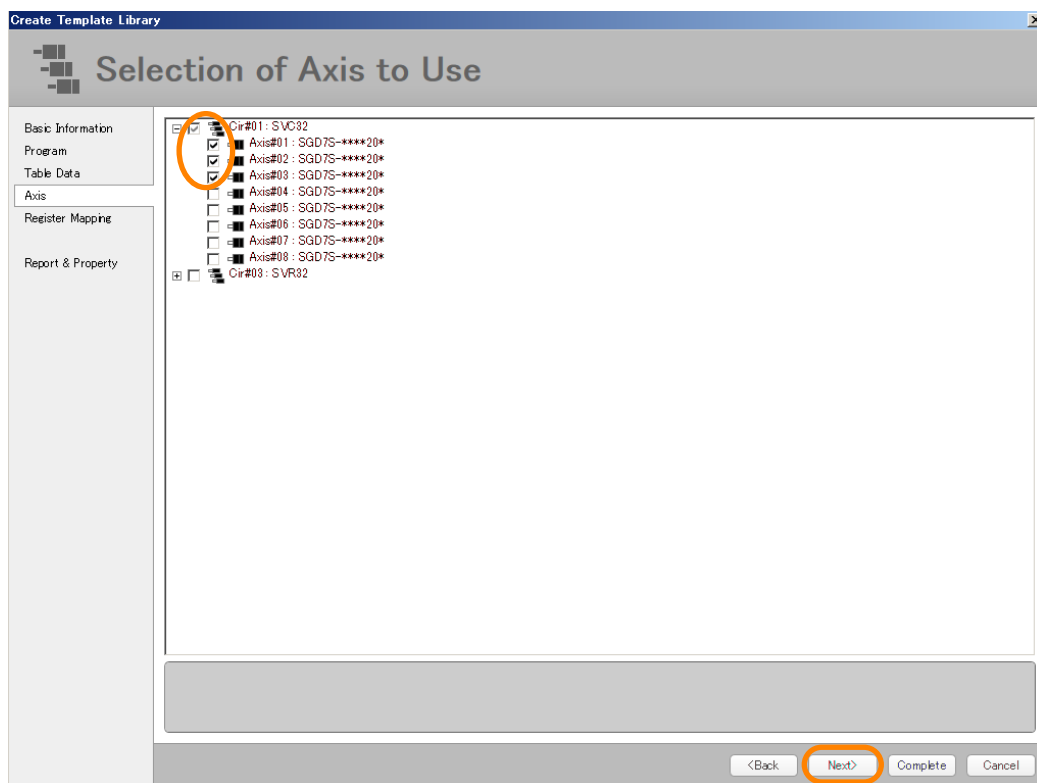


The [Selection of Axis to Use] window will be displayed.

5. **Select the check boxes for the axes that will be used, and click the [Next] button.**

Information

The axes used in the program selected in the previous window are analyzed by the system, and the check boxes are selected automatically. However, if a motion register is specified indirectly in the program, the axes that are used cannot be analyzed by the system. If this happens, a warning will be displayed. When a warning appears, confirm the selected check boxes for the axes to be used, and if necessary, manually adjust the selected check boxes.



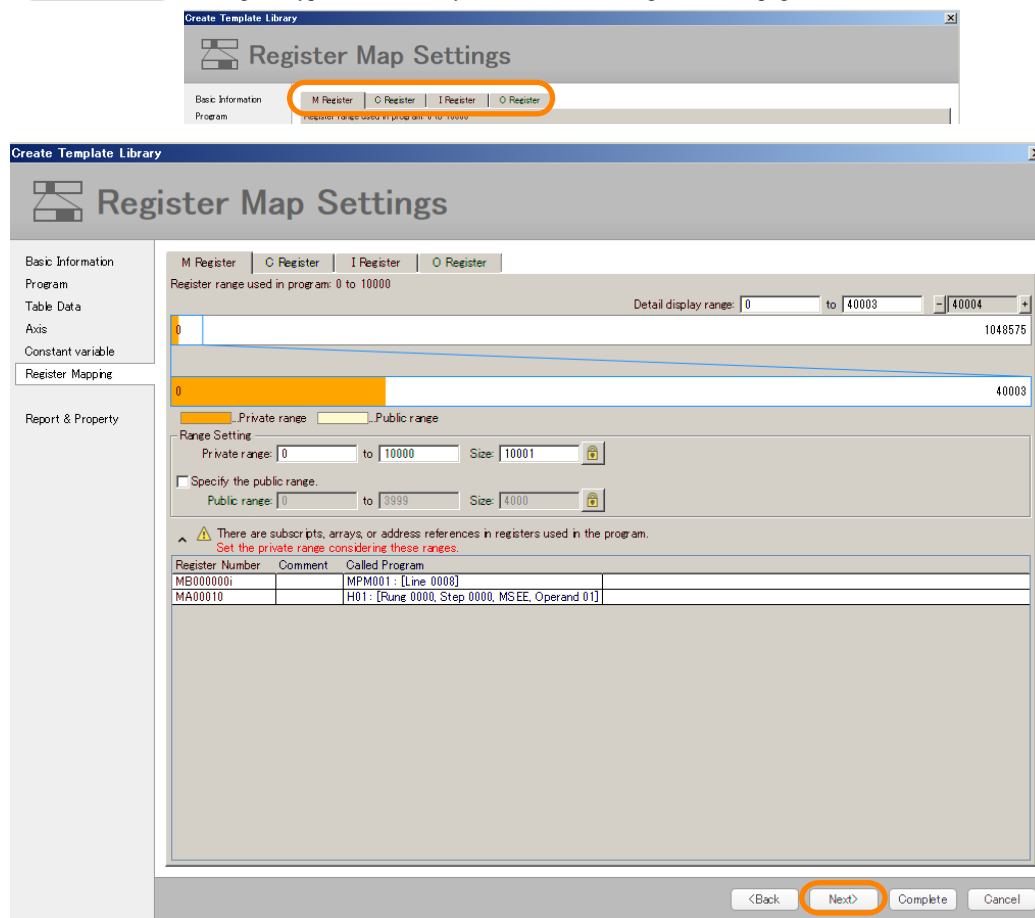
The [Register Map Settings] window will be displayed.

6. **Set the register range that is used in the program selected in the previous window, and click the [Next] button.**

Refer to the following section for details on this window.

 (3) *[Register Map Settings] Window on page 329*

Information The register types are divided by tabs. Make the settings for all tab pages.



Register range used in program: 0 to 10000

Detail display range: 0 to 40003

Private range: 0 to 10000 Size: 10001

Public range: 0 to 9999 Size: 4000

There are subscripts, arrays, or address references in registers used in the program.
Set the private range considering these ranges.

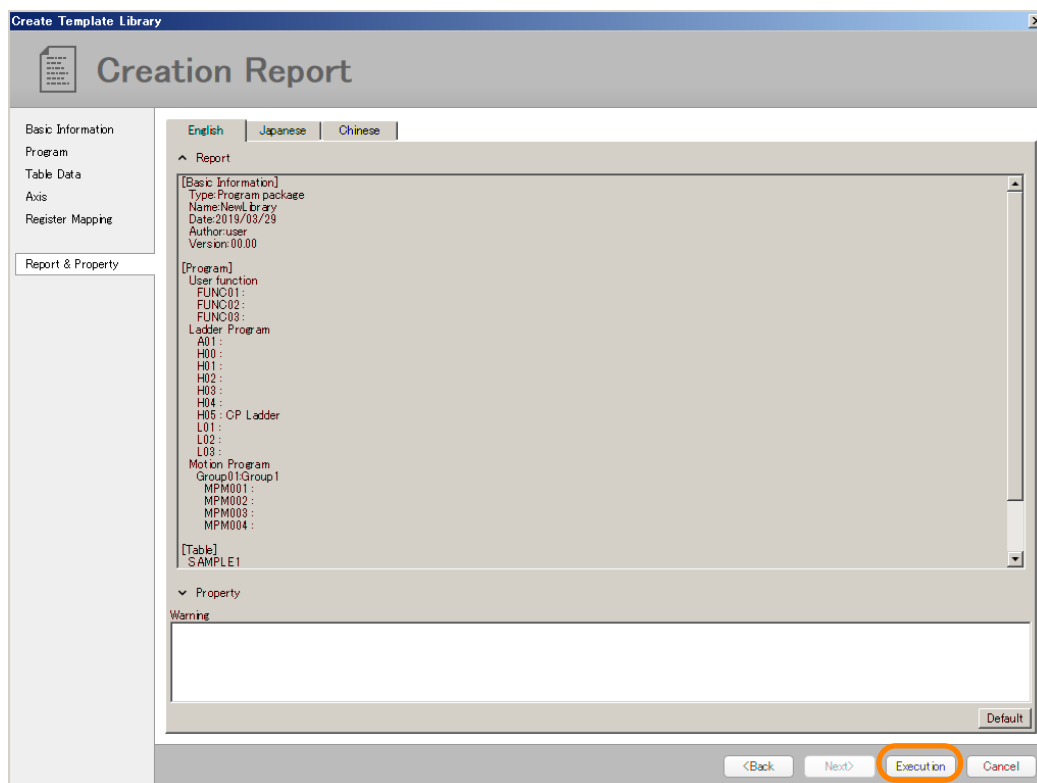
Register Number	Comment	Called Program
MB000000i	MPM001: [Line 0000]	
MA00010	H01: [Rung 0000, Step 0000, MSEE, Operand 01]	

<Back Next> Complete Cancel

The [Creation Report] window will be displayed.

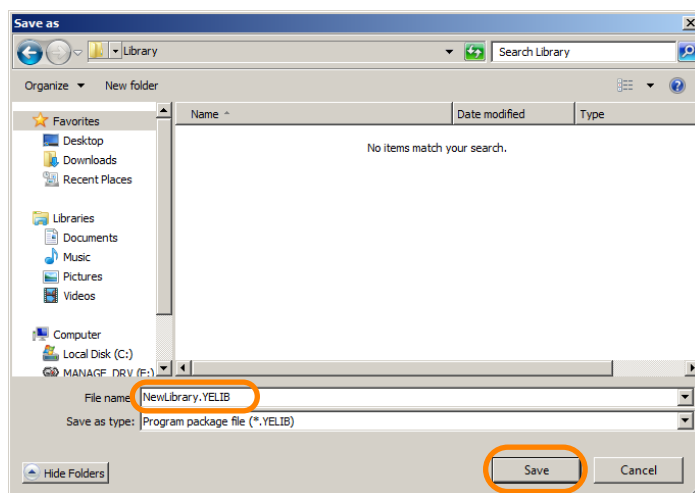
7. **Check the settings, and click the [Execution] button.**

To change the settings, click the [Back] button until the target window is displayed.



The [Save As] window will be displayed.

8. **Set the saving location and file name, and click the [Save] button.**



A program package file (*.YELIB) will be created based on these settings.

This concludes the procedure.

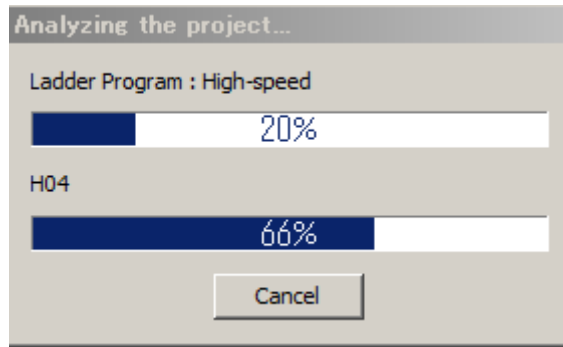
(3) Creating a Function Package

Use the following procedure to create a function package.

1. **Perform the operations by referring to the section below.**

 (1) *Operation Procedures Common for All Libraries on page 330*

Information analysis (registers, axis usage status, and other information collection) for the target project file will be performed.

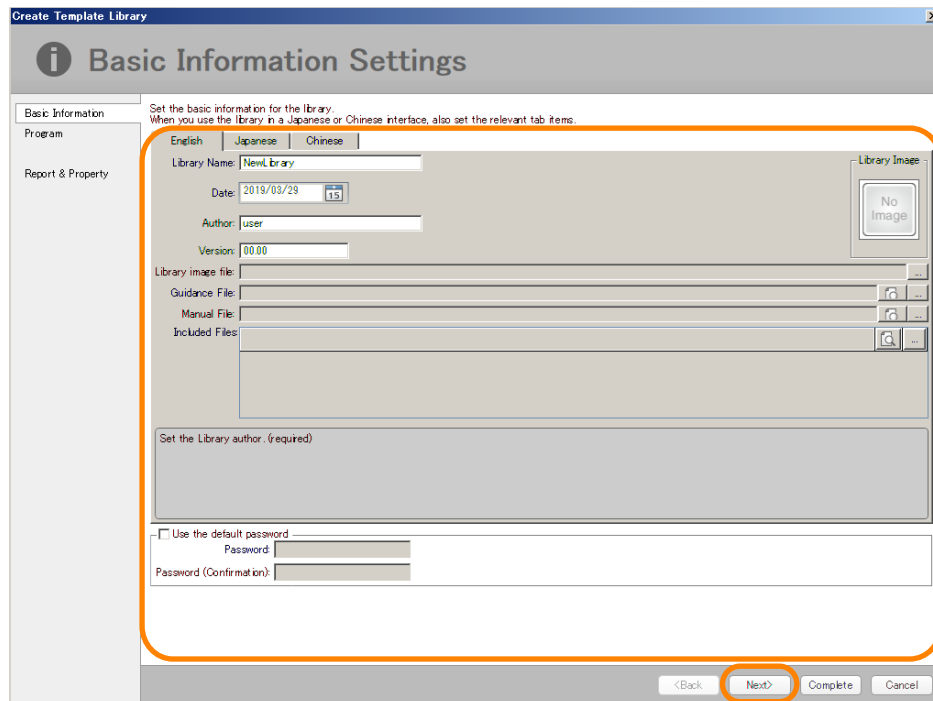


After the information analysis, the [Basic Information Settings] window will be displayed.

2. **Set the basic information, and click the [Next] button.**

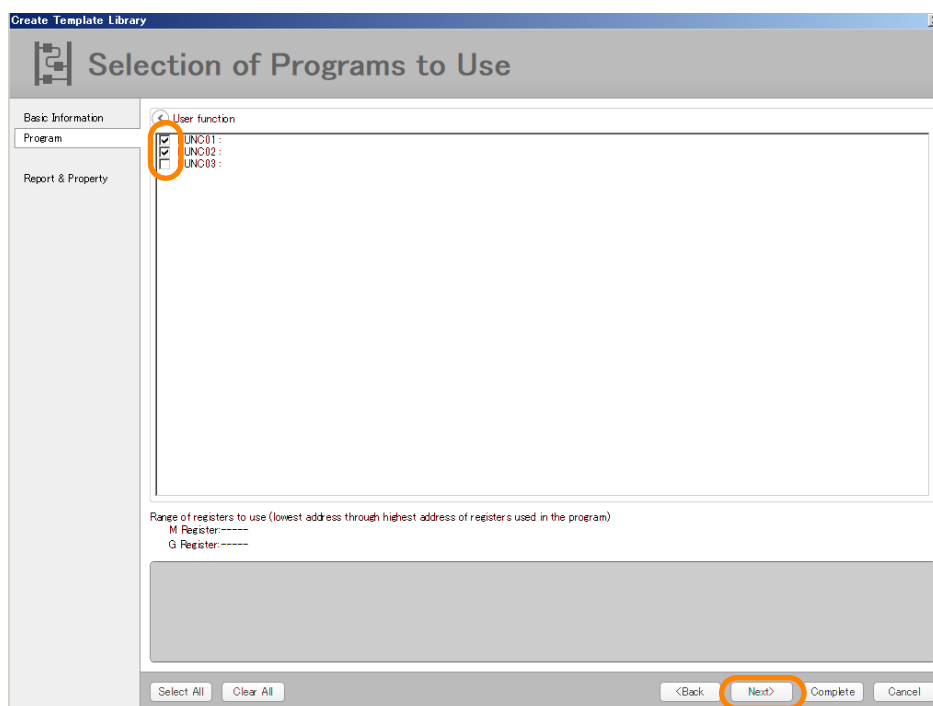
Refer to the following section for details on the [Basic Information Settings] window.

 (2) [\[Basic Information Settings\] Window on page 328](#)



The [Selection of Programs to Use] window will be displayed.

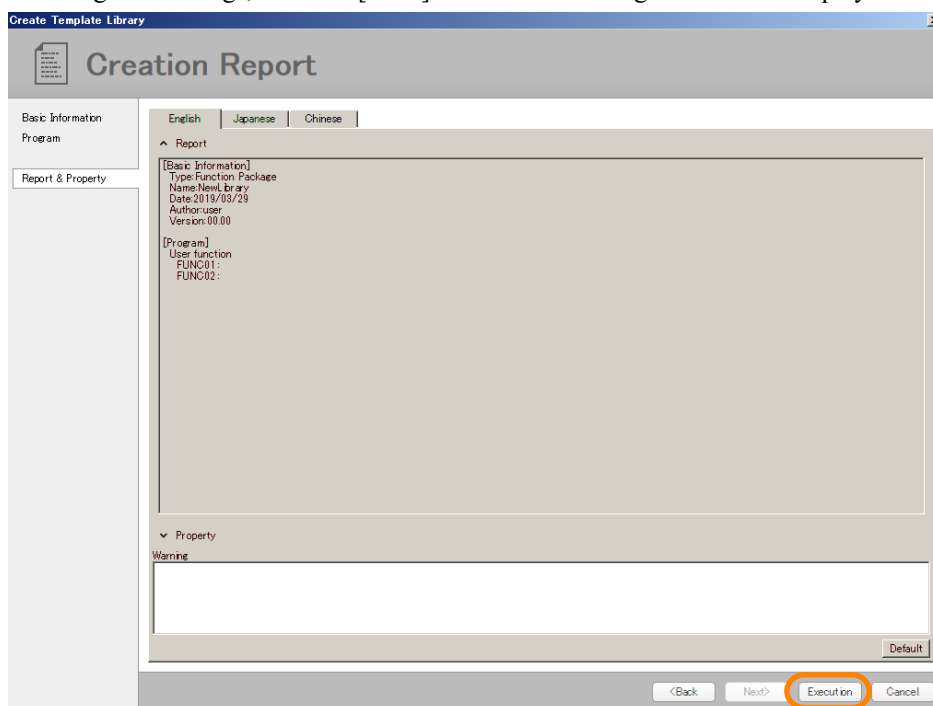
3. Select the check boxes for the user functions that will be used, and click the [Next] button.



The [Creation Report] window will be displayed.

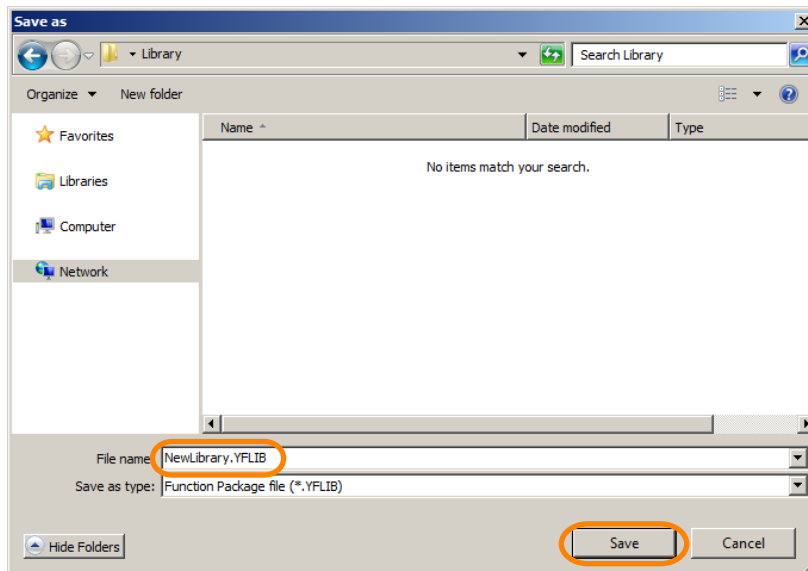
4. Check the settings, and click the [Execution] button.

To change the settings, click the [Back] button until the target window is displayed.



The [Save As] window will be displayed.

5. **Set the saving location and file name, and click the [Save] button.**



A function package file (*.YFLIB) will be created based on these settings.

This concludes the procedure.

(4) Creating a Base Project Package

Use the following procedure to create a base project package.

1. **Perform the operations by referring to the section below.**

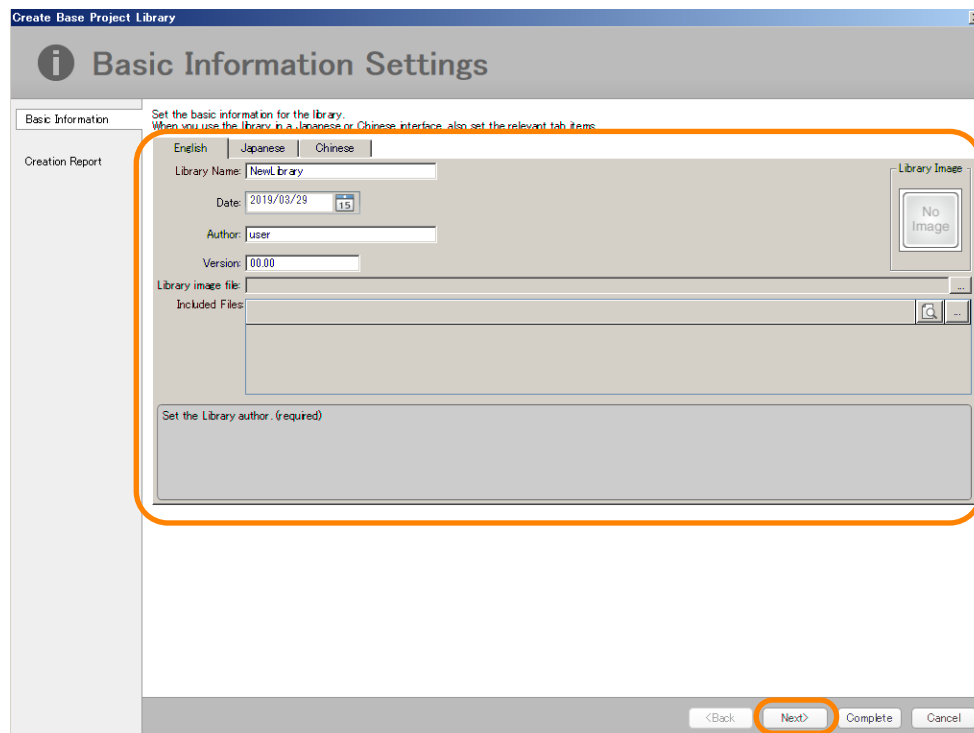
(1) *Operation Procedures Common for All Libraries on page 330*

The [Basic Information Settings] window will be displayed.

2. **Set the basic information, and click the [Next] button.**

Refer to the following section for details on the [Basic Information Settings] window.

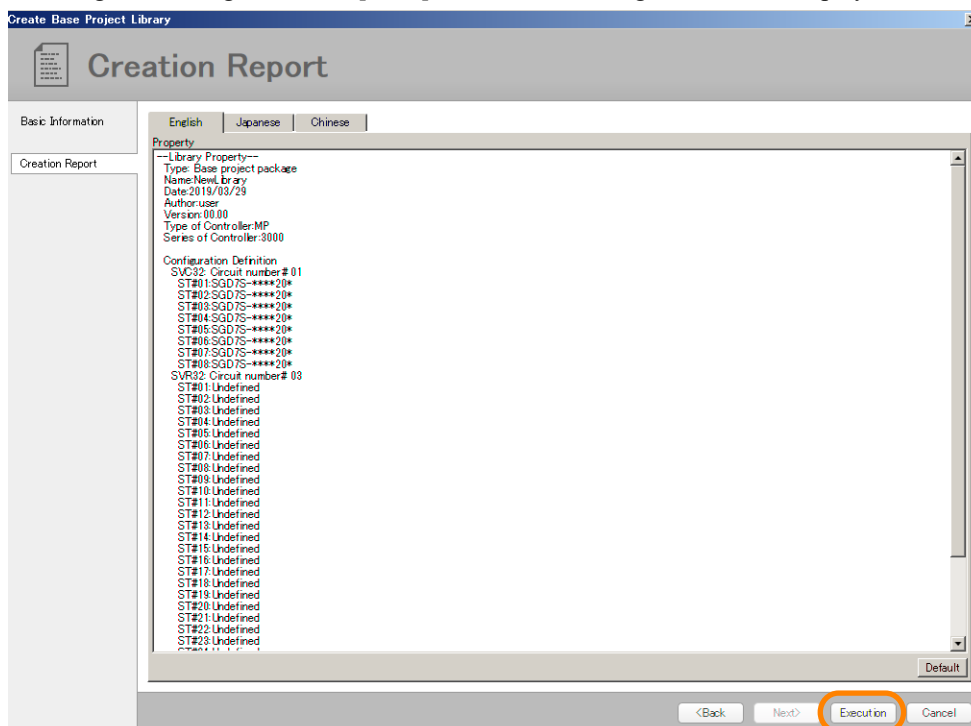
(2) *[Basic Information Settings] Window on page 328*



The [Creation Report] window will be displayed.

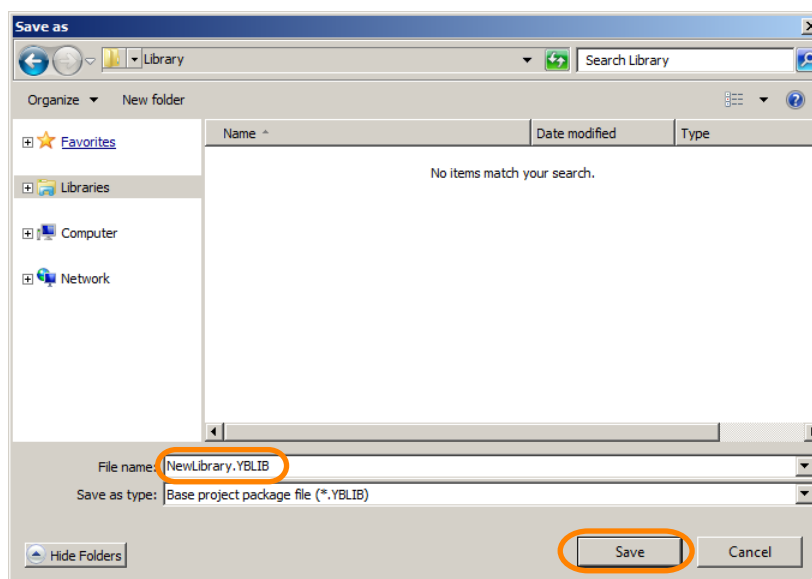
3. Check the settings, and click the [Execution] button.

To change the settings, click the [Back] button until the target window is displayed.



The [Save As] window will be displayed.

4. Set the saving location and file name, and click the [Save] button.



A base project package file (*.YBLIB) will be created based on these settings.

This concludes the procedure.

(5) Creating a Configuration Definition Package

Use the following procedure to create a configuration definition package.

1. Perform the operations by referring to the section below.

(1) *Operation Procedures Common for All Libraries on page 330*

The [Basic Information Settings] window will be displayed.

2. Set the basic information, and click the [Next] button.

Refer to the following section for details on the [Basic Information Settings] window.

(2) [Basic Information Settings] Window on page 328

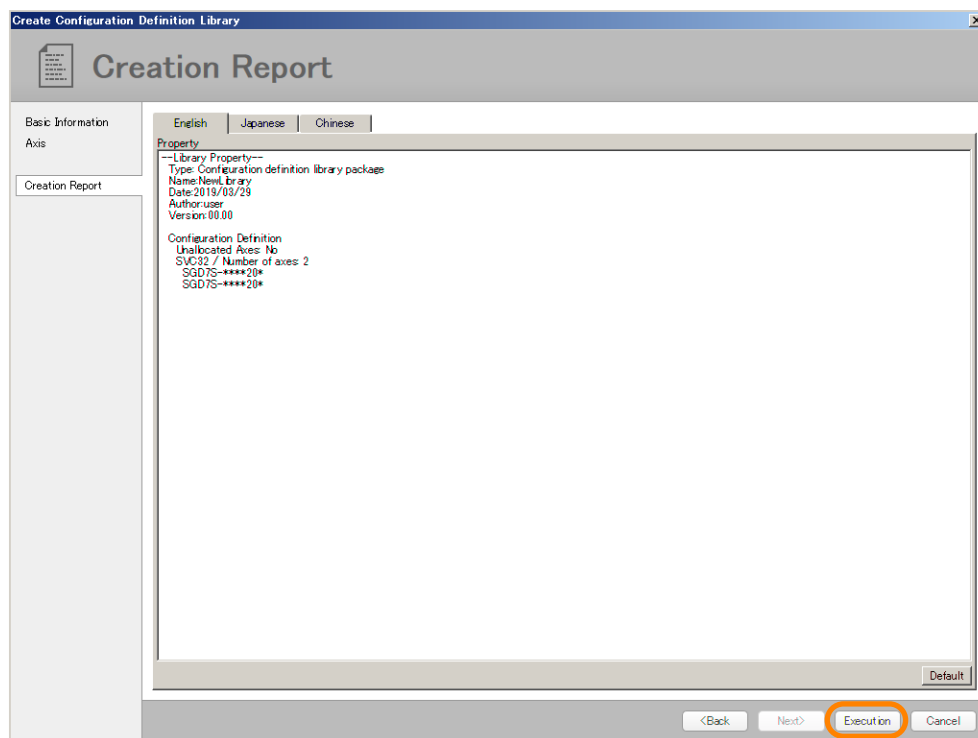
The [Selection of Axis to Use] window will be displayed.

3. **Select the axes that will be used, and click the [Next] button.**

The [Creation Report] window will be displayed.

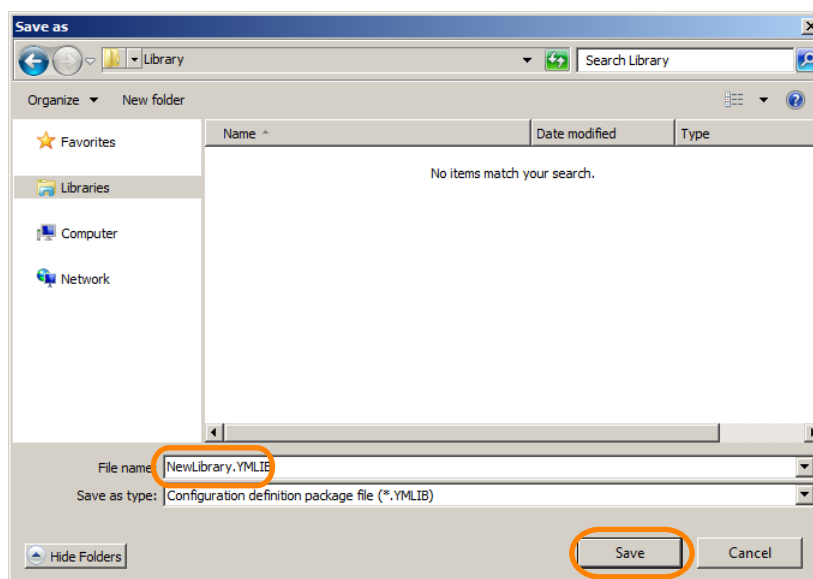
4. **Check the settings, and click the [Execution] button.**

To change the settings, click the [Back] button until the target window is displayed.



The [Save As] window will be displayed.

5. **Set the saving location and file name, and click the [Save] button.**



A configuration definition package file (*.YMLIB) will be created based on these settings.

This concludes the procedure.

5.5.4 Registering a Library to the MPE720

Use the following procedure to register a created library to the MPE720.

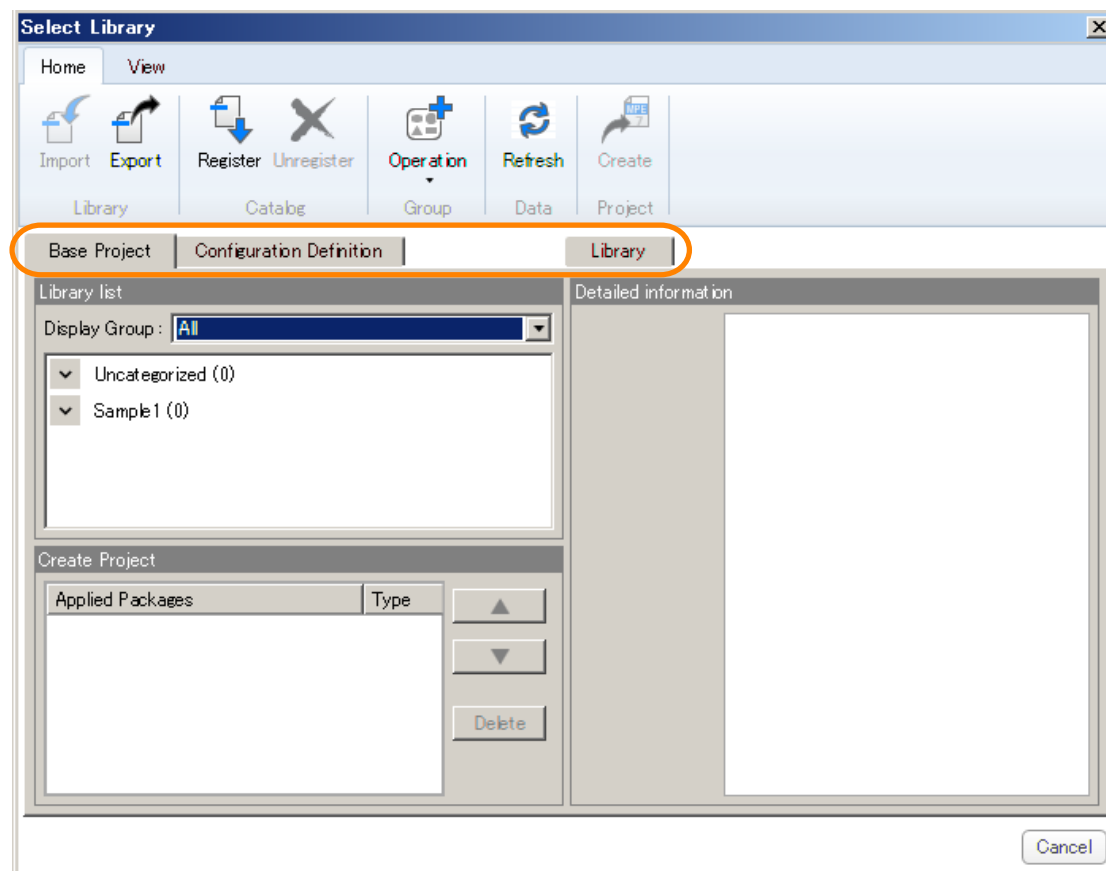
1. **Open the library catalog.**

The [Select Library] window will be displayed.

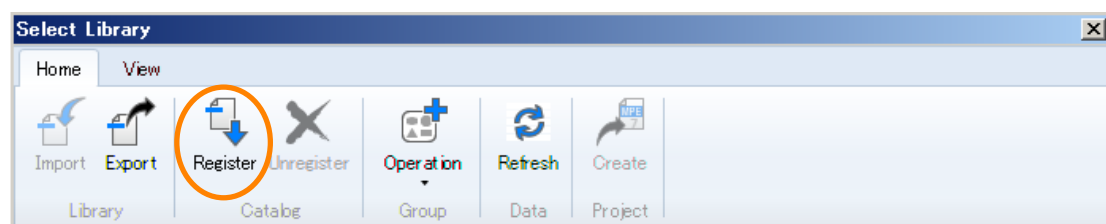
2. **Open the tab page for the library to be imported.**

The tab pages for the library to be imported are shown in the table below.

Item	Tab Page Name
Program Package	[Library] tab page
Function Package	
Base Project Package	[Base Project] tab page
Configuration Definition Package	[Configuration Definition] tab page



3. Click [Register].



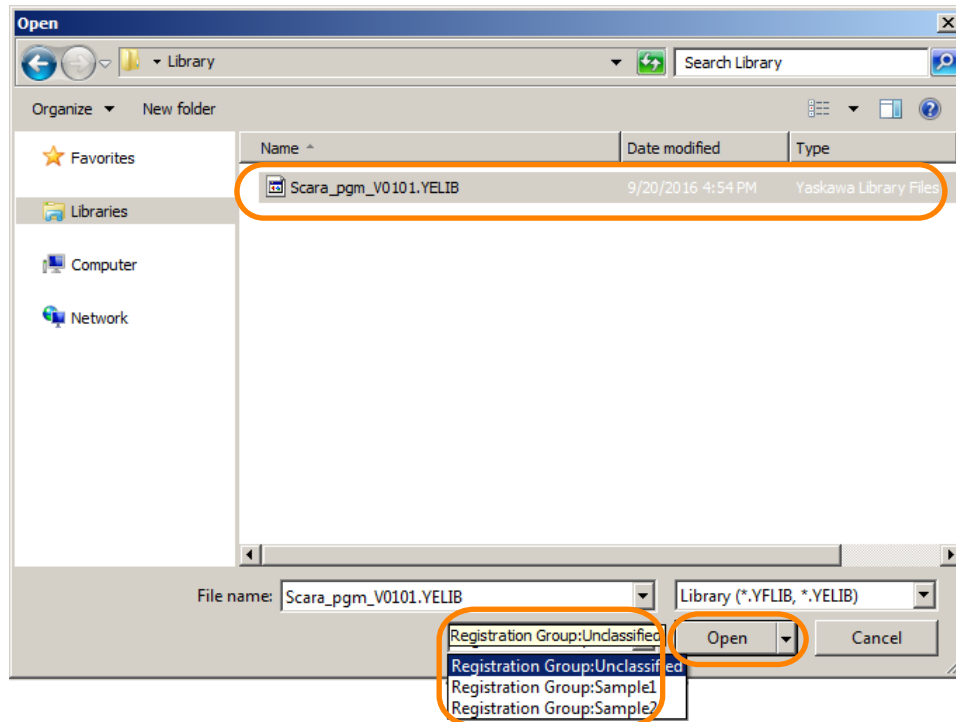
The [Open] window will be displayed.

4. Select the library file to be imported and registration group, and click the [Open] button.

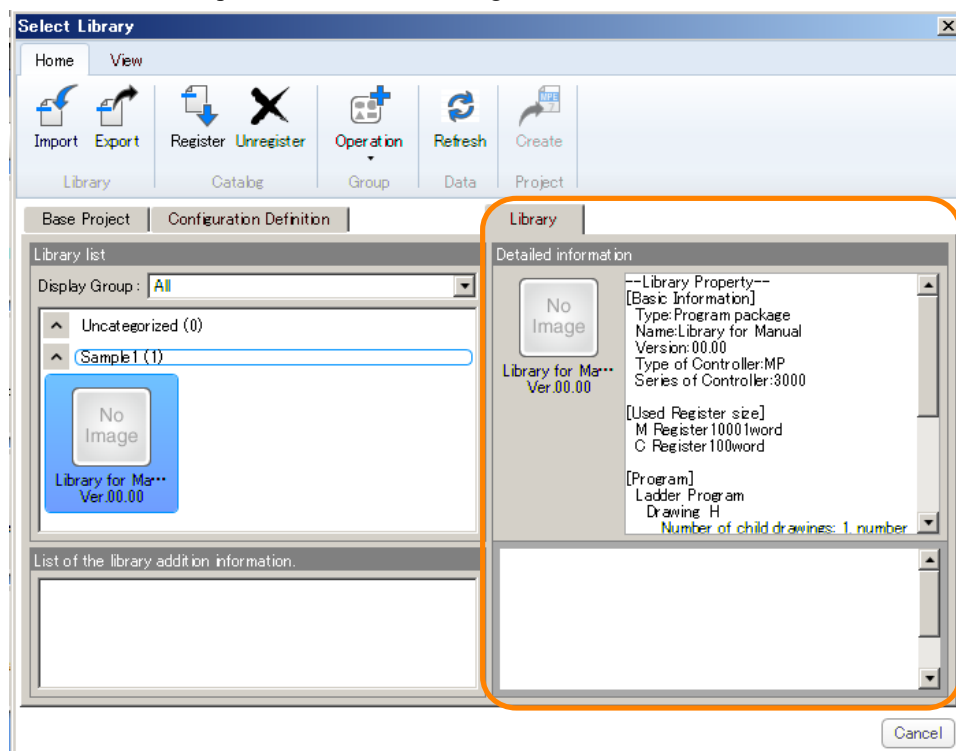
Information

The currently-registered groups are displayed as options. To classify the library file to be imported into a group that is not available as an option, first register it to one of the currently-registered groups, and then change the group later. Refer to the following section for details on adding and changing a group.

[5.5.5 Classifying Libraries in Groups on page 343](#)



The data will be imported based on the settings.



Details on the library that was selected in the library list are displayed here.

This concludes the procedure.

5.5.5 Classifying Libraries in Groups

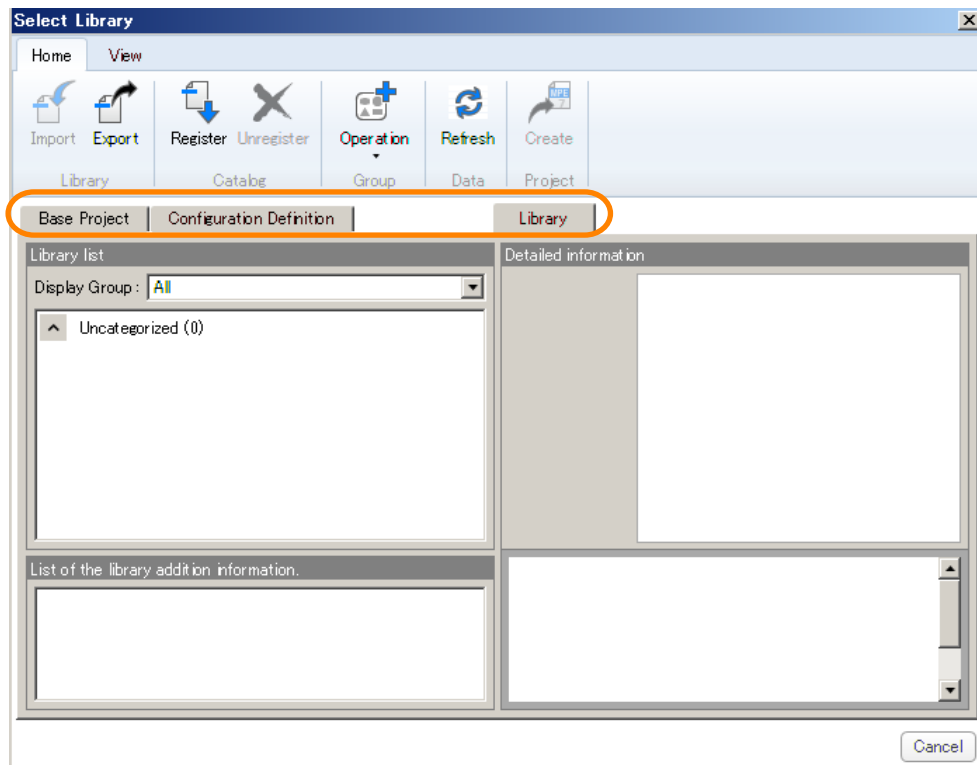
Libraries imported to the MPE720 can be easily managed if they are classified into groups. This section shows the procedures for groups.

(1) Adding a Group

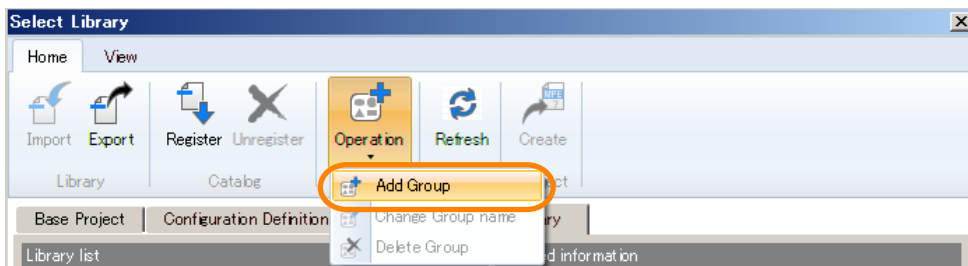
1. **Open the library catalog.**

The [Select Library] window will be displayed.

2. **Open the tab page where the group will be added.**



3. **Select [Operation] - [Add Group].**



The [Input Group Name] window will be displayed.

4. **Enter the group name, and click the [OK] button.**



The created group will be added to the library list.

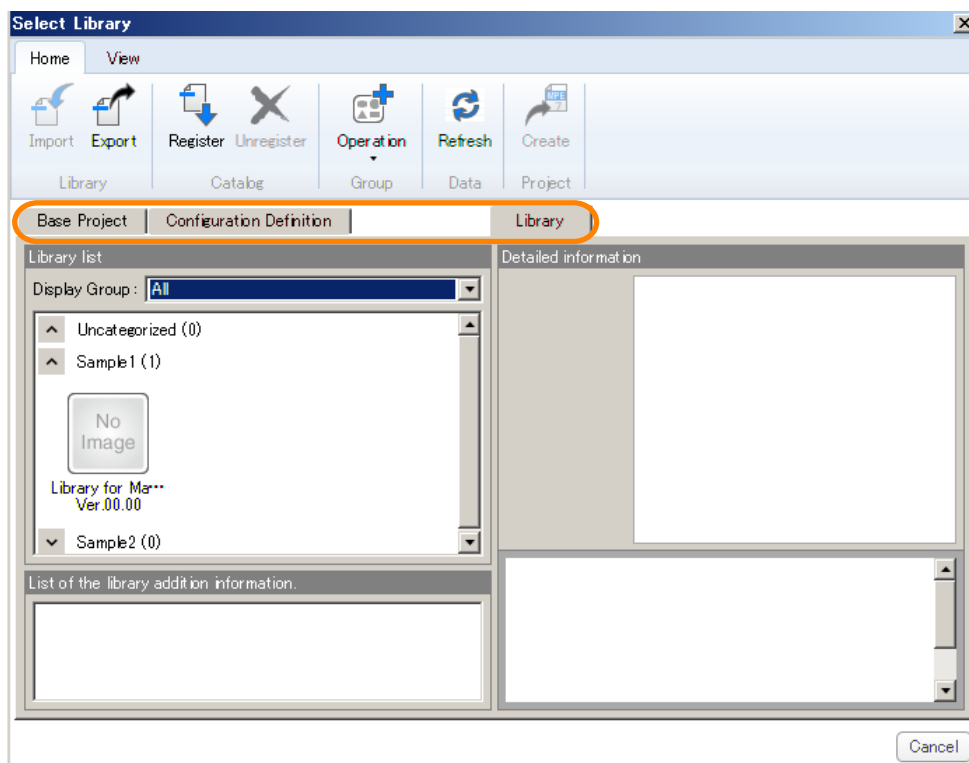
This concludes the procedure.

(2) Changing a Group

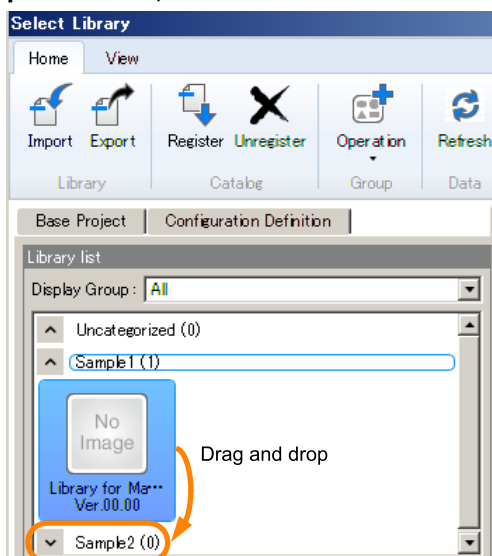
1. **Open the library catalog.**

The [Select Library] window will be displayed.

2. Open the tab page where the group will be changed.



3. Drag and drop the library to the group where the library will be moved to. To move multiple libraries, select the libraries while holding down the Shift key.



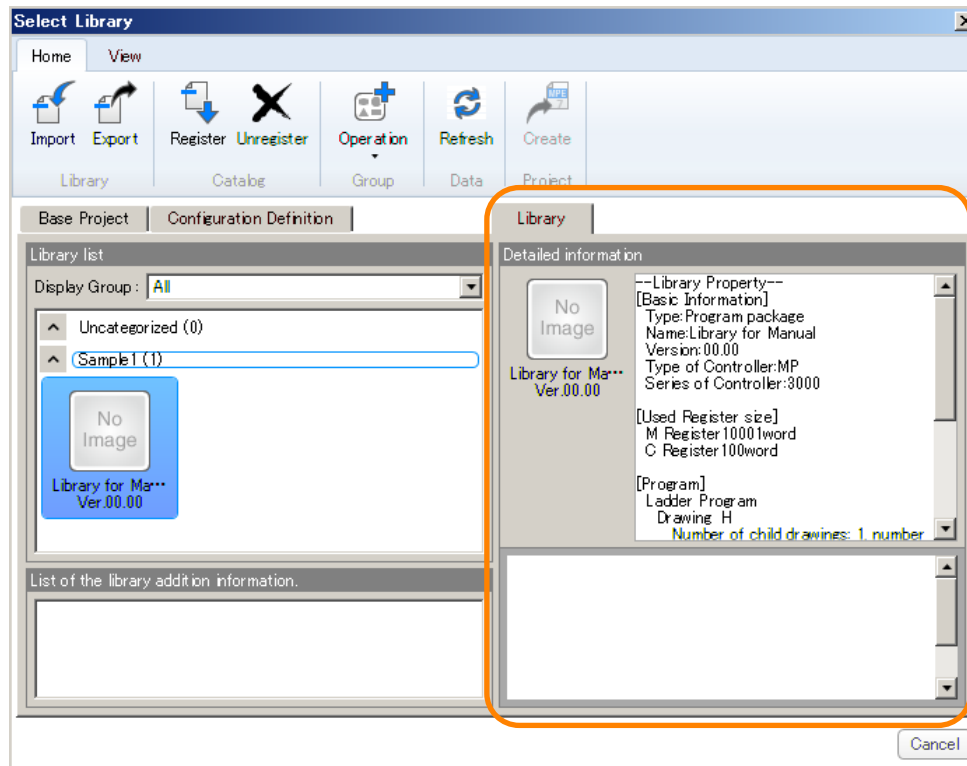
This concludes the procedure.

5.5.6 Importing Libraries to a Project File

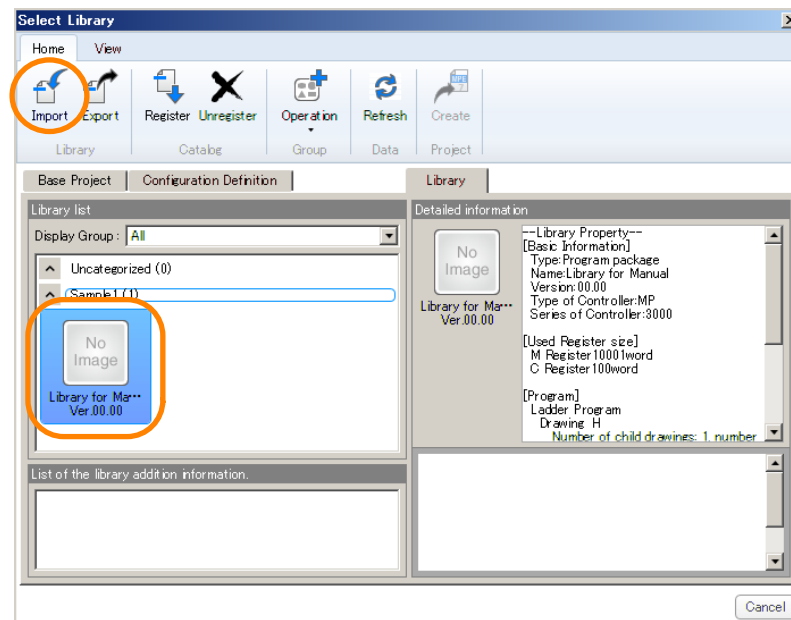
Use the following procedure to import libraries to a project file.

1. Open the project file where the library will be imported.
2. Click the [Library Catalog] button on the [My Tool] window.
The [Select Library] window will be displayed.

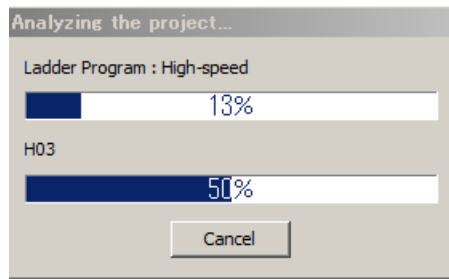
- On the [Library] tab page, select the library to be imported, and check the axes, module, and I/O assignments in the [Detailed information] area.



- Close the [Select Library] window.
- Open the Module Configuration Window, and set the library information (axes, module, and I/O assignments) that will be imported.
- Click the [Library Catalog] button on the [My Tool] window again.
The [Select Library] window will be displayed.
- On the [Library] tab page, select the library to be imported, and click [Import].



The analysis process will be executed for the selected library.



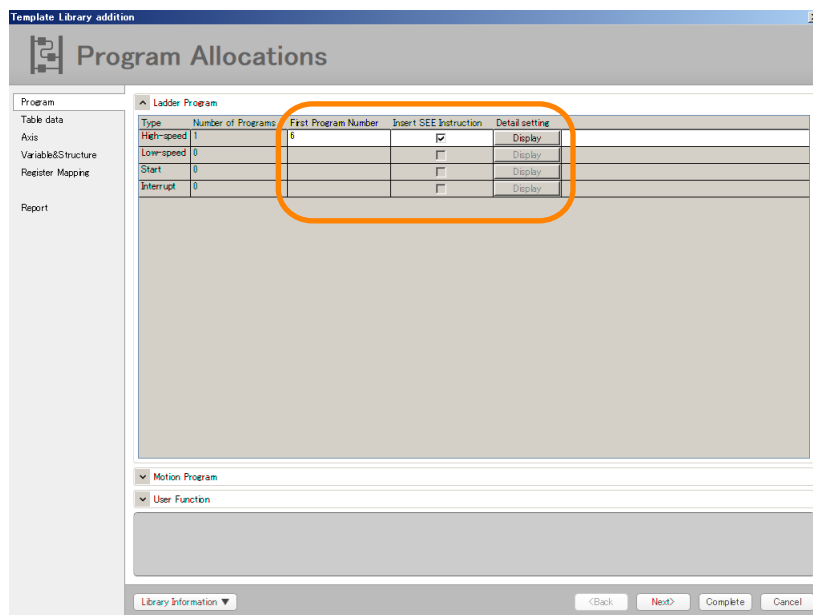
When the process is completed, the [Program Allocations] window will be displayed.

8. **Check that there are no problems with the first program number assigned to the project file and the SEE instruction insertion settings for the ladder program, motion program, and user function in the library.**

To change the settings, click the [Display] button.

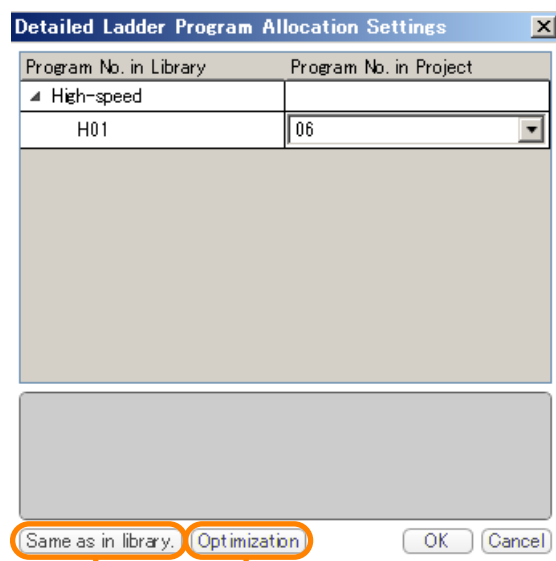
Information

The first program number in the library is found automatically by the system. The system automatically sets the first program number by referring to the search results and open program numbers in the project file.



The [Detailed Ladder Program Allocation Settings] window will be displayed.

9. **Change the number in Program No. in Project, and click the [OK] button.**



(1)

(2)

No.	Item	Description
(1)	Same as in library	Sets the same number as the program number of the library to the program at the import target location.
(2)	Optimization	Sets the smallest consecutive number that can be assigned to the program at the import target location.

10. Click the [Next] button.

The [Table Data Allocations] window will be displayed.

11. Check that the name does not duplicate (indicated by red text) any table names in the library or any table names in the project file. If the name is duplicated, click the cell, revise the table name, and click the [Next] button.

Information

This window does not appear if there is no table data in the library to import, or if there is no table data in the project file. If the window is not displayed, proceed to the next step.

The [Allocated Axis Selection] window will be displayed.

12. Set the axes that will be used in the project file, and click the [Next] button.

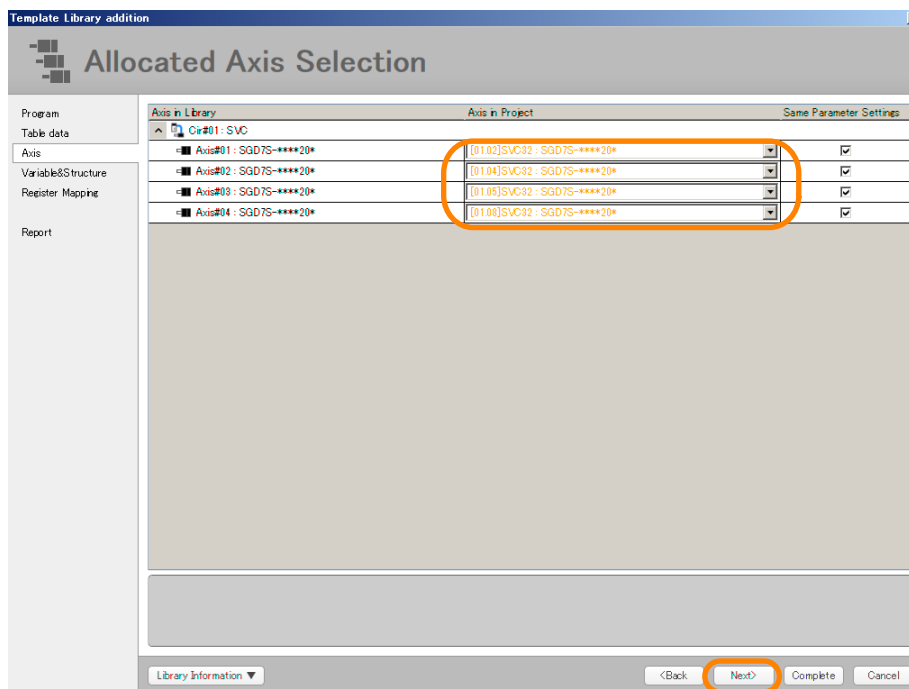


Important

If the text changes to yellow (warning indicator), this may be due to one of the following reasons.

- The motion module type is different.
- The SERVOPACK is different.

Although you can still proceed to the next step while the yellow text (warning indicator) appears, be aware that the SERVOPACK parameter is not extracted to the project file at the import target location.

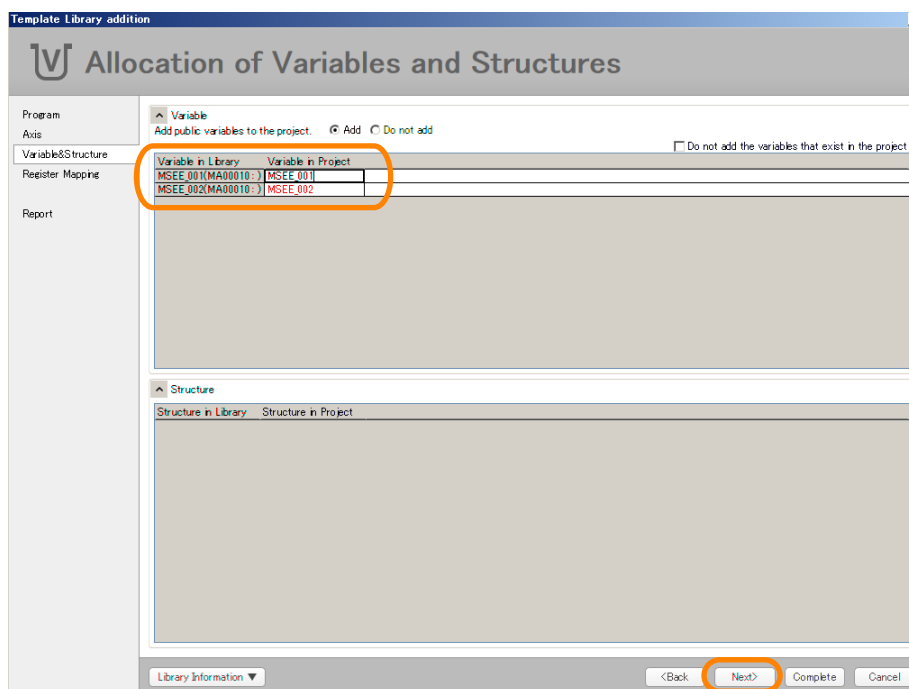


The [Allocation of Variables and Structures] window will be displayed.

13. Check that the variable name and structure name in the library do not duplicate (indicated by red text) any variable names or structure names in the project file. If the name is duplicated, click the cell, revise the name, and click the [Next] button.

Information

This window does not appear if there are no variables in the library to import, or if there are no variables in the project file. If the window is not displayed, proceed to the next step.



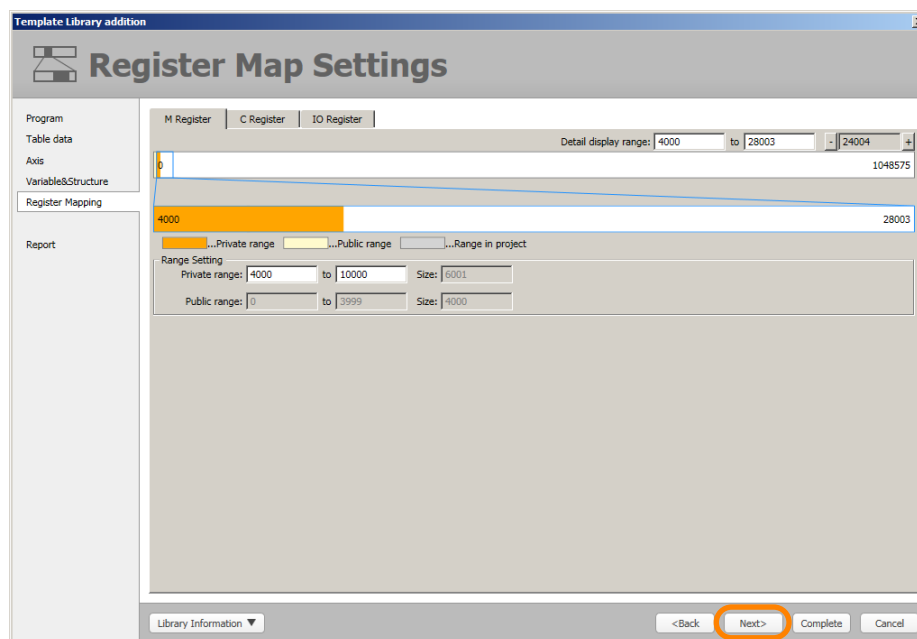
The [Register Map Settings] window will be displayed.

14. Use one of the following methods to set the private range, and click the [Next] button.

- Changing the values for the range setting
- Dragging the orange part to the range to be set.

Information

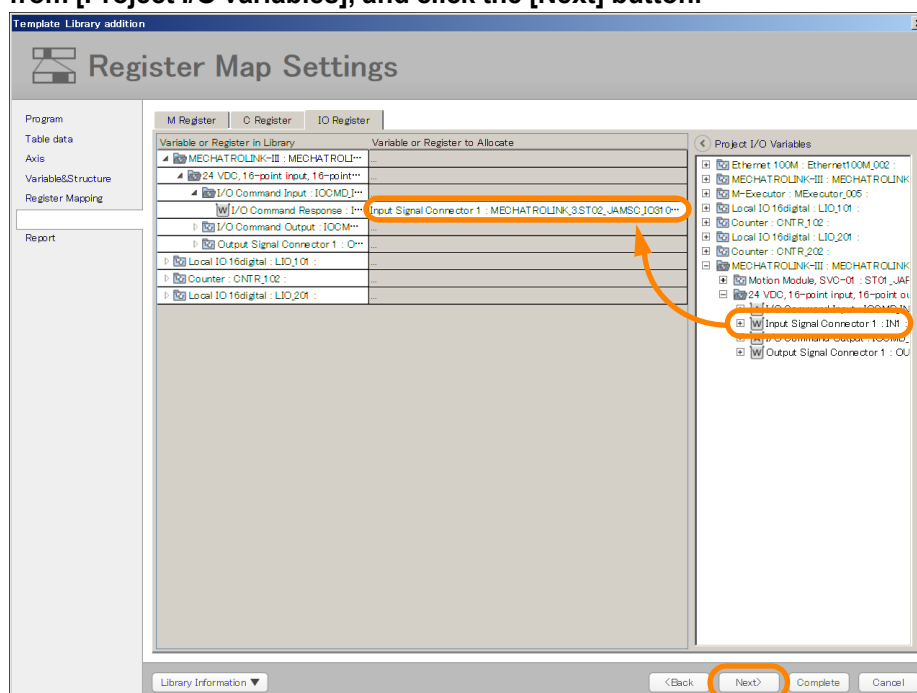
In the window below, the M register, G register, and C register are global registers.
Make the settings for the M register, G register, and C register.

**Note:**

The meaning of the terms appearing in the window are shown below.

- Private range
This is the range of the global registers that are used in the program to be imported to the project file.
- Public range
This is the range of registers to be reserved for sharing between two or more programs (range for performing communication with the touch panel or for transferring data between the libraries).
This is not displayed when the public range has not been set in the library.
- Range in project
This is the range of registers that are already used in the project file.
This is not displayed when no registers are currently in use or when the range is overlapping with the public range.

15. Open the [IO Register] tab page, drag and drop the variable or register to be assigned from [Project I/O variables], and click the [Next] button.



The [Addition Report] window will be displayed.

16. Check the information in the report, and click the [Execution] button.

To change the settings, click the [Back] button until the target window is displayed.



The library import process will be executed.

This concludes the procedure.

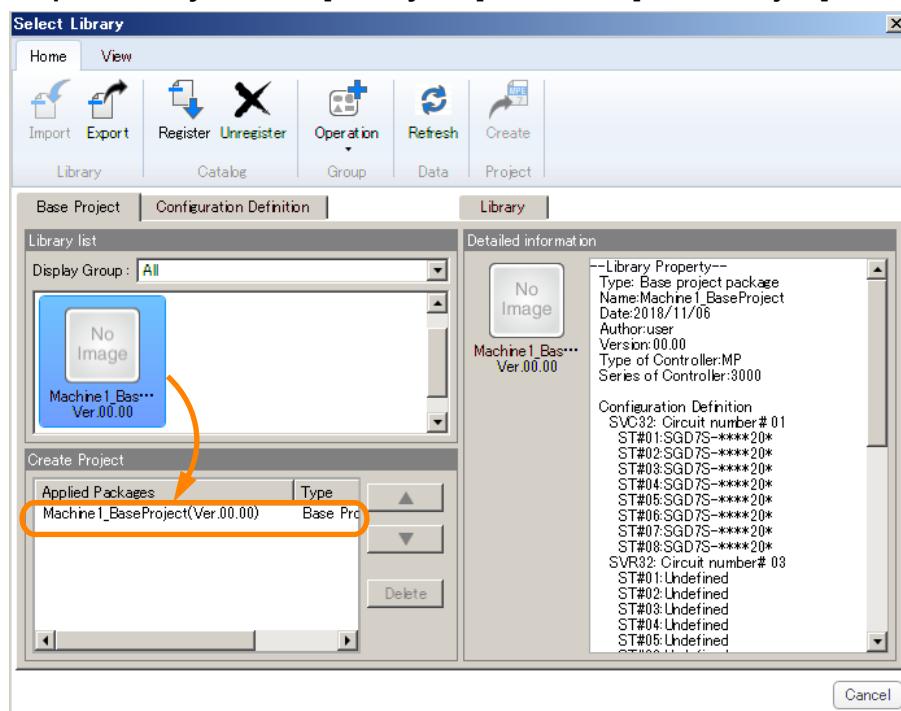
5.5.7 Creating a New Project File Using a Library

The base project package and configuration definition package in the library can be used to create a new project file.

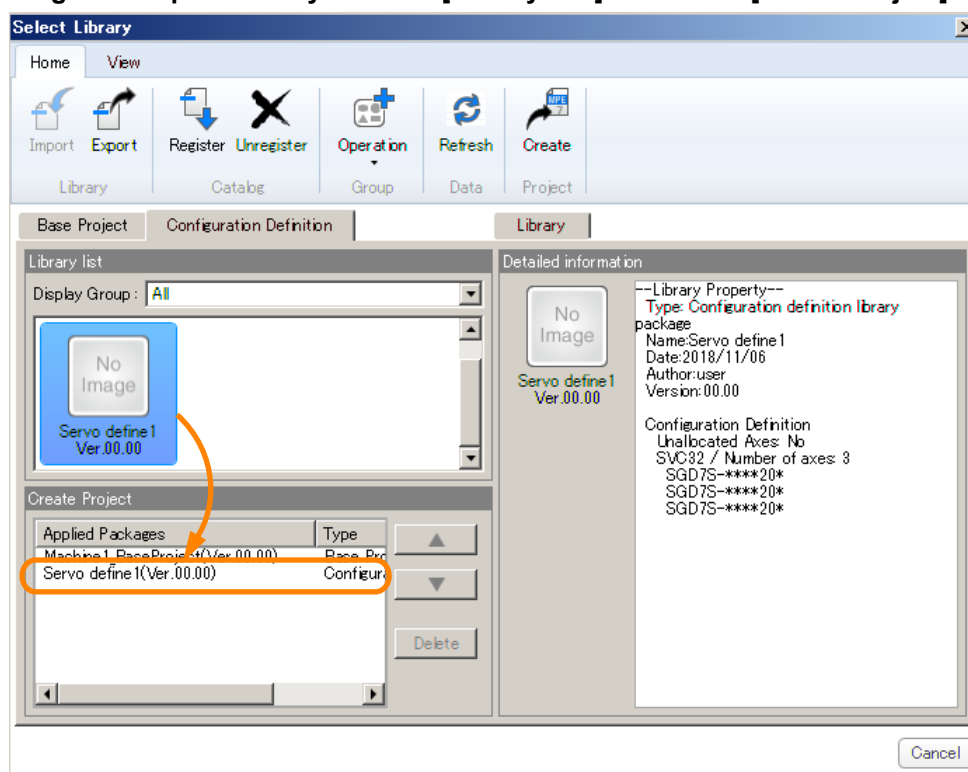
1. Open the library catalog.

The [Select Library] window will be displayed.

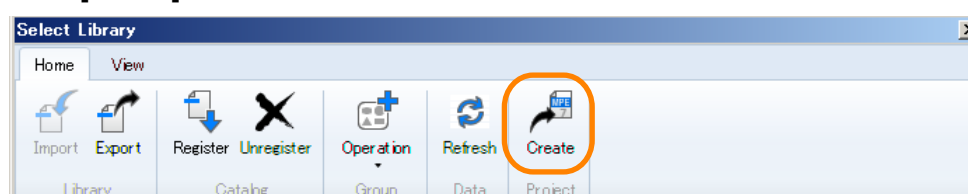
2. In the [Base Project] tab page, either double-click the library to be used, or drag and drop the library from the [Library List] area to the [Create Project] area.



3. In the [Configuration Definition] tab page, either double-click the library to be used, or drag and drop the library from the [Library List] area to the [Create Project] area.

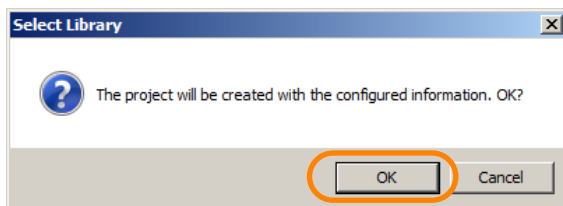


4. Click [Create].



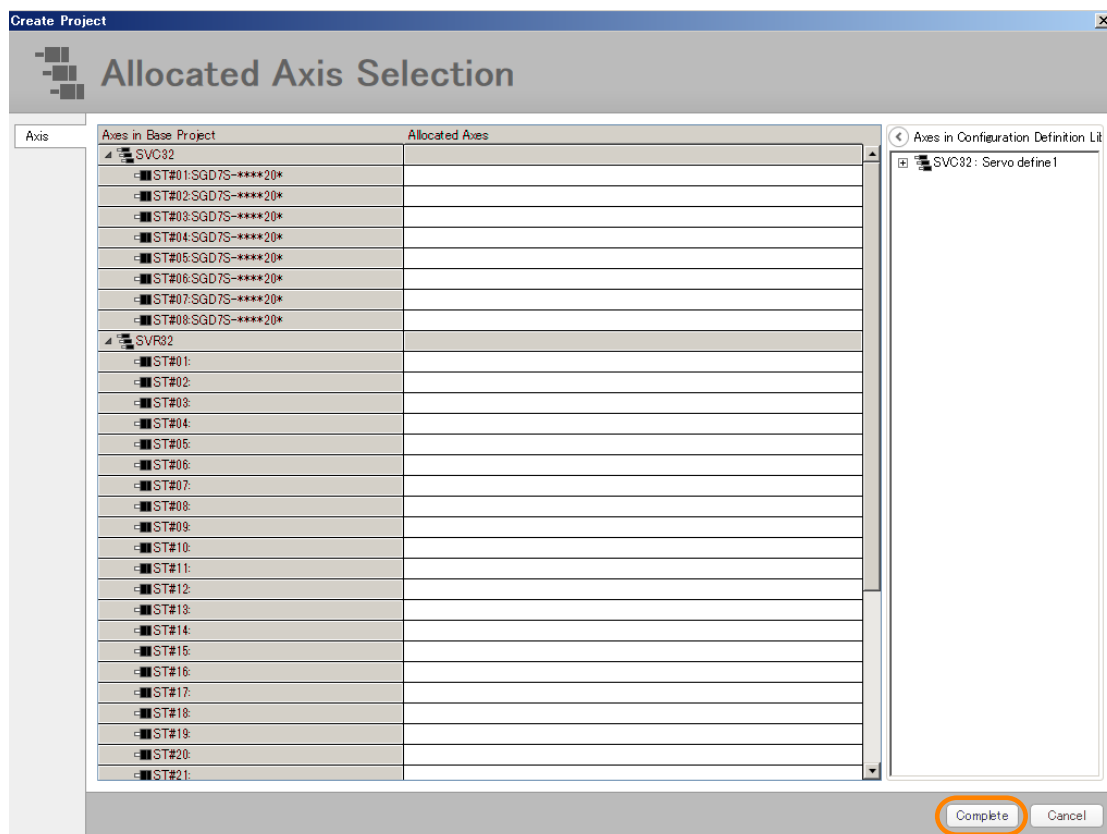
A message dialog box will be displayed.

5. Click the [OK] button.



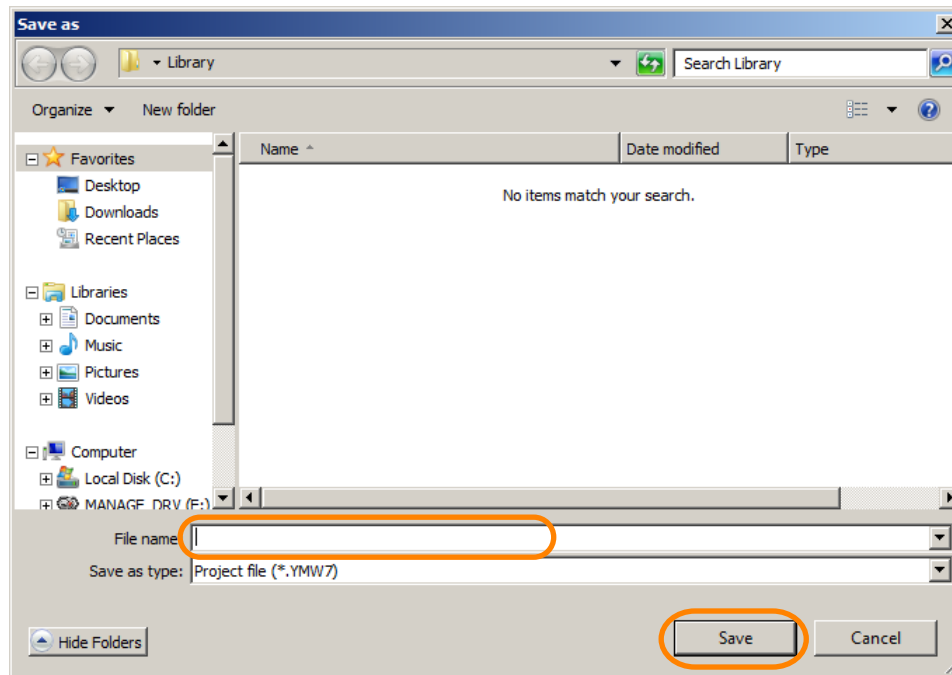
The [Allocated Axis Selection] window will be displayed.

6. Click the [Complete] button.



The [Save As] window will be displayed.

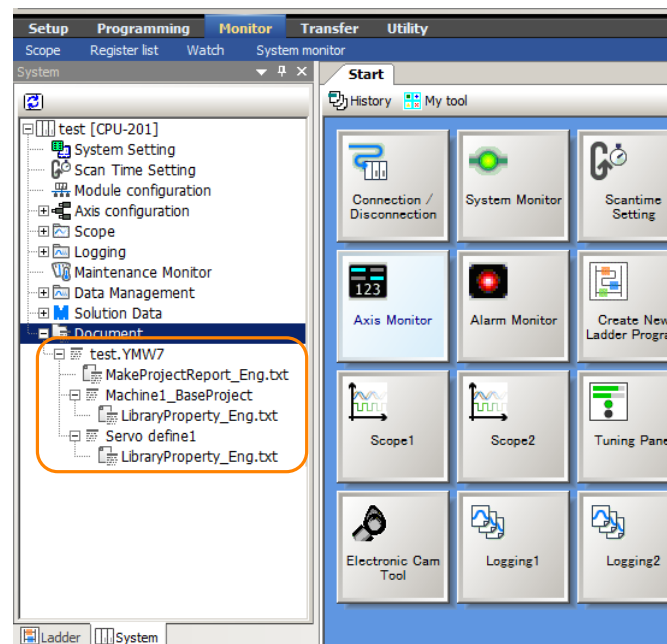
7. Set the file saving location and file name, and click the [Save] button.



A project file will be created based on the settings.

Information

The library guidance information and document information can be checked in the [System] window for the new project file that was created using the library function. This shows the settings that were made when creating the library, and so the displayed information varies depending on the library content.



This concludes the procedure.

5.6 Data Management

This section describes operations related to the various types of data management required in programming.

5.6.1 Cam Tool Data

Cam tool data is data that is used in the Electronic Cam Tool and managed in the MPE720.

This section describes the operations to create, import, edit, and delete cam tool data from the MPE720.

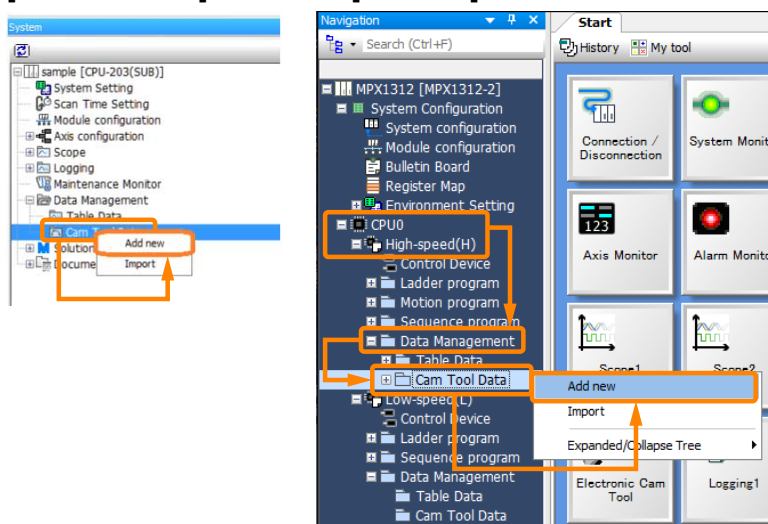
Refer to the following manual for how to use the Electronic Cam Tool.

Machine Controller MP900/MP2000 Series Electronic Cam Data Preparation Tool Operation Manual (Manual No.: SIEP C880700 18)

(1) Creating Cam Tool Data

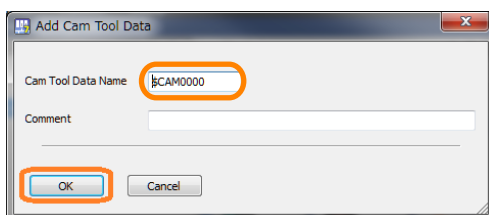
Use the following procedure to create cam tool data.

1. **When using a model that does not support multiple scans:** In the [System] window, right-click [Cam Tool Data] and select [Add new].
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan in which to create the cam tool data. Right-click [Cam Tool Data] and select [Add new].



The [Add Cam Tool Data] window will be displayed.

2. **Enter the cam tool data name, and click the [OK] button.**

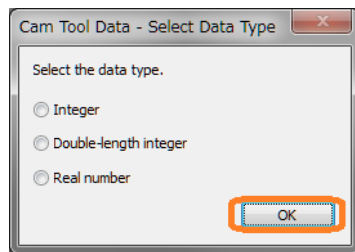


The Electronic Cam Tool will start, and the [Set Style] window will be displayed.

3. **Create and save the cam tool data using the Electronic Cam Tool.**

When you return to the MPE720, the [Cam Tool Data - Select Data Type] window will be displayed.

4. Select the data type, and then click the [OK] button.



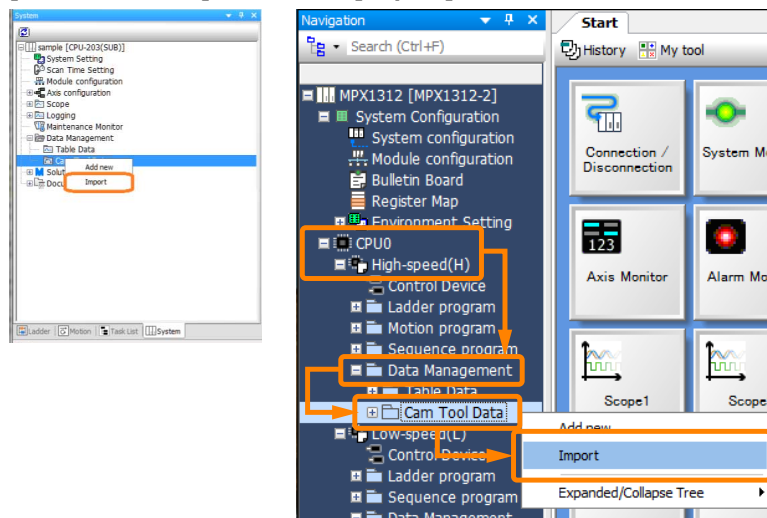
The created cam tool data will be displayed in the [System] or [Navigation] window.

This concludes the procedure.

(2) Importing Cam Tool Data

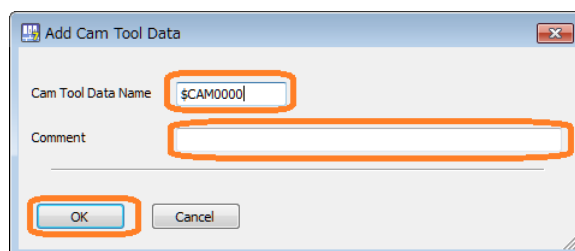
Use the following procedure to import cam tool data that was saved on the PC into the MPE720.

1. Establish an online connection to the controller or open a project file.
2. When using a model that does not support multiple scans: In the [System] window, right-click [Cam Tool Data] and select [Import].
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan in which to import the cam tool data. Right-click [Cam Tool Data] and select [Import].



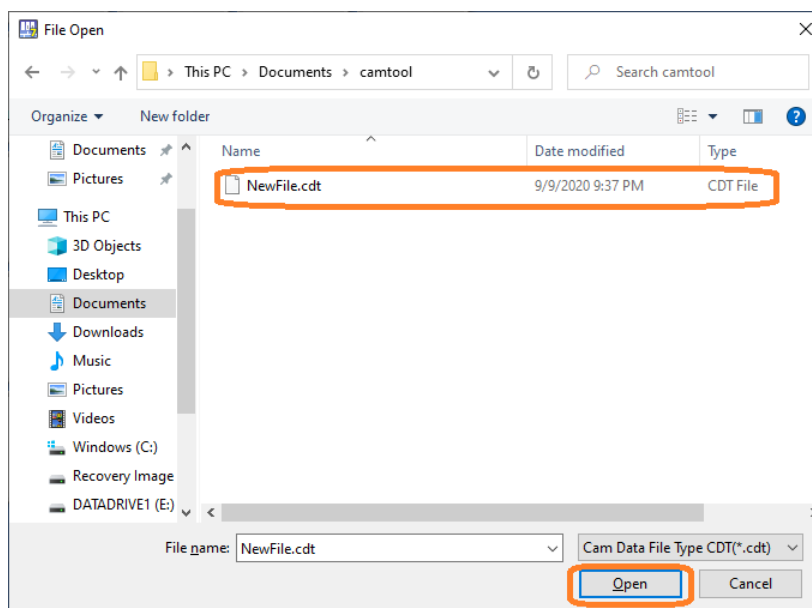
The [Add Cam Tool Data] window will be displayed.

3. Enter the cam tool data name and comment, and click the [OK] button.

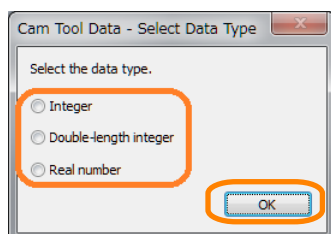


The [Open] window will be displayed.

4. Select the cam tool data file to import, and then click the [Open] button.



5. Select the data type, and then click the [OK] button.



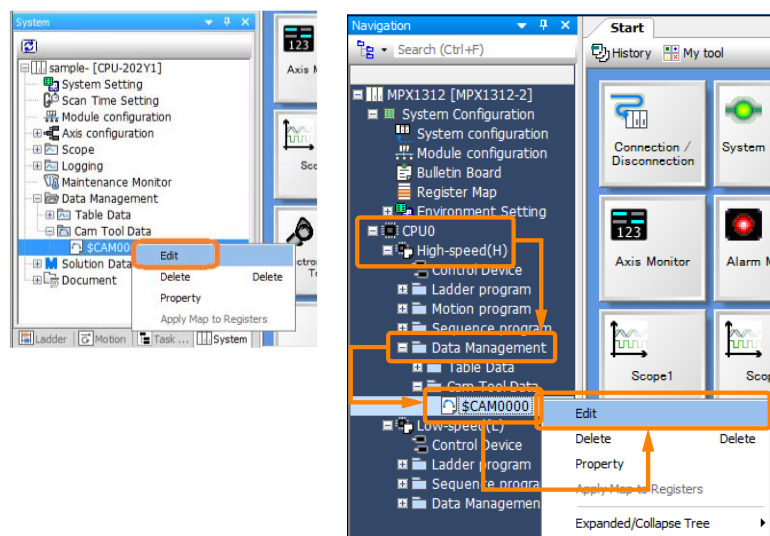
The imported cam tool data will be displayed in the [System] or [Navigation] window.

This concludes the procedure.

(3) Editing Cam Tool Data

Use the following procedure to edit cam tool data.

1. When using a model that does not support multiple scans: In the [System] window, right-click the cam tool data to edit and select [Edit].
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan with the cam tool data to edit. Right-click the cam tool data to edit and select [Edit].



The Electronic Cam Tool will start, and graph of the data will be displayed.

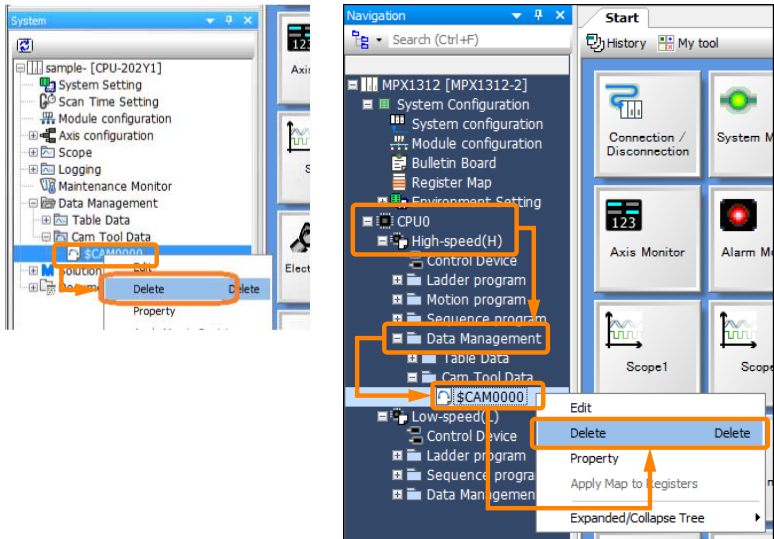
2. Edit the cam tool data using the Electronic Cam Tool.

This concludes the procedure.

(4) Deleting Cam Tool Data

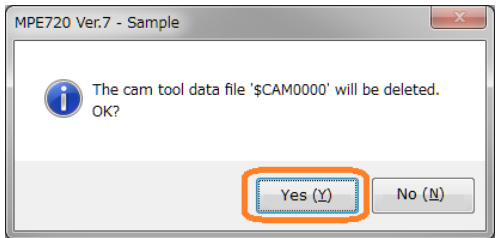
Use the following procedure to delete cam tool data.

1. When using a model that does not support multiple scans: In the [System] window, right-click the cam tool data to delete and select [Delete].
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan with the cam tool data to delete. Right-click the cam tool data to delete and select [Delete].



A message dialog box will be displayed.

2. Click the [Yes] button.



This concludes the procedure.

5.6.2 Table Data

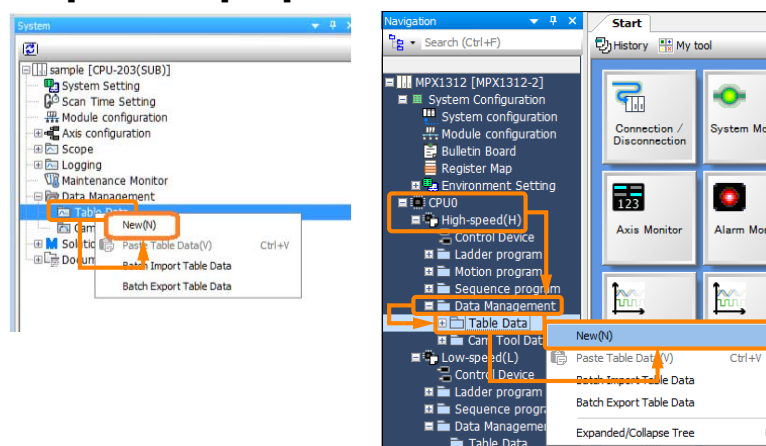
Table data is data in tabular form (arrays) that is used in the main program of a ladder program.
This section describes the operations to create, edit, delete, export, and import table data using the MPE720.

(1) Creating Table Data

Use the following procedure to create table data.

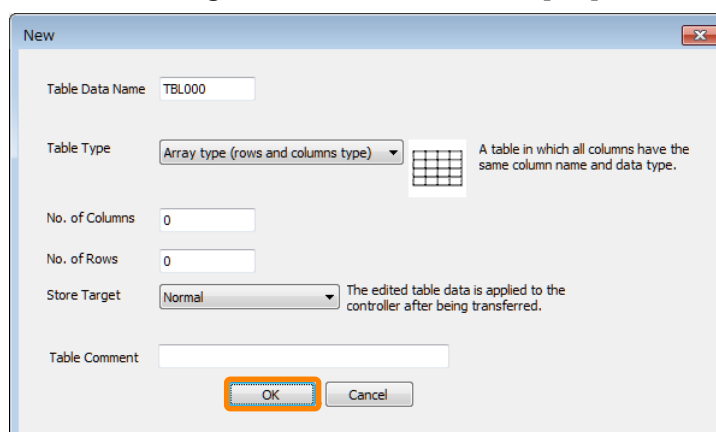
1. When using a model that does not support multiple scans: In the [System] window, right-click [Table Data] and select [New].

When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan in which to create the table data. Right-click [Table Data] and select [New].



The [New] window will be displayed.

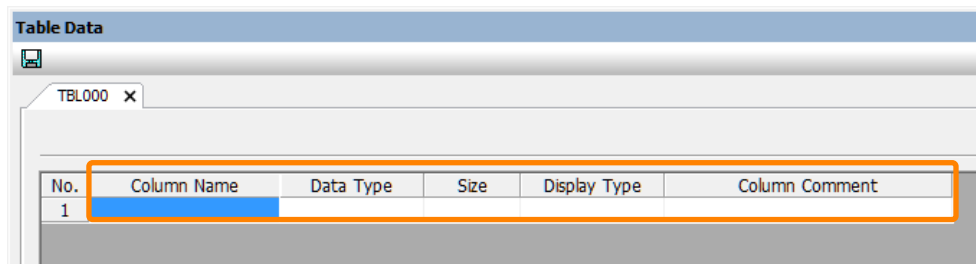
2. Set the following items, and then click the [OK] button.



Item	Description
Table Data Name	Set the name of the table data. <Setting Conditions> • 8 characters maximum. • The first character is an alphabetic character or "\$". • The second character and subsequent characters are alphabetic characters, numbers, "-", or "_". • Do not enter a space. • Do not enter the following characters that correspond to system reserved words in the Engineering Manager. COM1, COM2, COM3, COM4, PRN, NUL, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, AUX, CLOCK\$, CON, USERENV Note: If you enter a lowercase character, it will be automatically converted to uppercase.
Table Type	Select the table type. • Array type (rows and columns type): A table in which all columns have the same column name and data type. • Record type (list of columns type): A table in which the column name and data type are set for each column.
No. of Columns	Set the number of columns in the table. The maximum number of columns is 32,767.
No. of Rows	Set the number of rows in the table. The maximum number of rows is 65,535.
Store Target	Select the location to save the table data. • Normal: The edited table data is applied to the controller after being transferred. • Battery backup: The edited table data is applied to the controller immediately.
Table Comment	Set a comment related to the table.

The [Table Data] window will be displayed.

3. **Set the following items.**



Item	Description
Column Name	Set the column name. <Setting Conditions> 8 characters maximum.
Data Type	Double-click the cell and select one of the following data types. Integer, double-length integer, quadruple-length integer, real number, double-precision real number, or text string
Size	The size of the column is displayed. If the data type is set to text string, you can enter a value between 1 and 80.
Display Type	The display type is displayed according to the data type. If you selected integer, double-length integer, or quadruple-length integer for the data type, you can double-click the cell and select binary, decimal, or hexadecimal.
Column Comment	Set a comment related to the column.

4. **Click the button.**

This concludes the procedure.

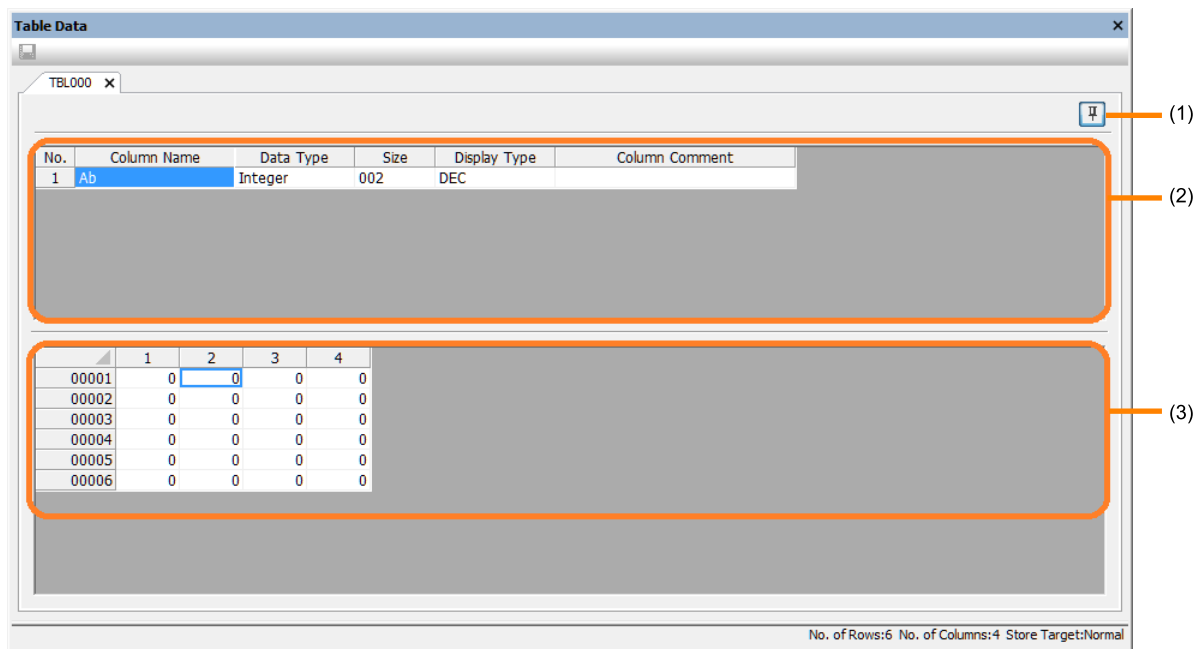
(2) Editing Table Data

Two modes are available for editing table data on the [Table Data] window: Edit Column Attributes Mode allows you to edit the column attributes and Edit Table Data Mode allows you to edit the table data.

(a) Window Description

◆ Edit Column Attributes Mode

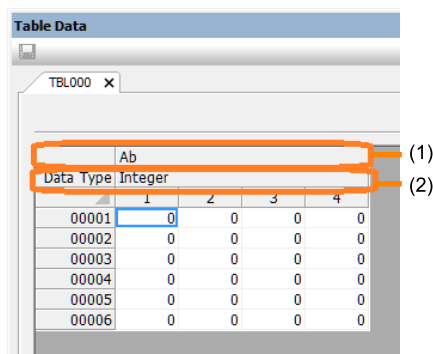
This mode is used to edit the column attributes.



No.	Item	Description
(1)	 (Pin) Button	Use this button to lock the display of the column attributes area. : Not pinned. : Pinned. When pinned, you can edit both the column attributes area and the table data area. The pinned state is canceled when the [Table Data] window is closed.
(2)	Column Attributes Area	This area is used to edit the column attributes (column name, data type, size, display type, and column comment). If the table type is array type (rows and columns type), all of the column attributes are the same. If the table type is record type (list of columns type), a different attribute can be set for each column.
(3)	Table Data Area	This area is used to edit the contents of the table data, as well as to add and delete rows and columns.

◆ Edit Table Data Mode

This mode is used to edit the table data.

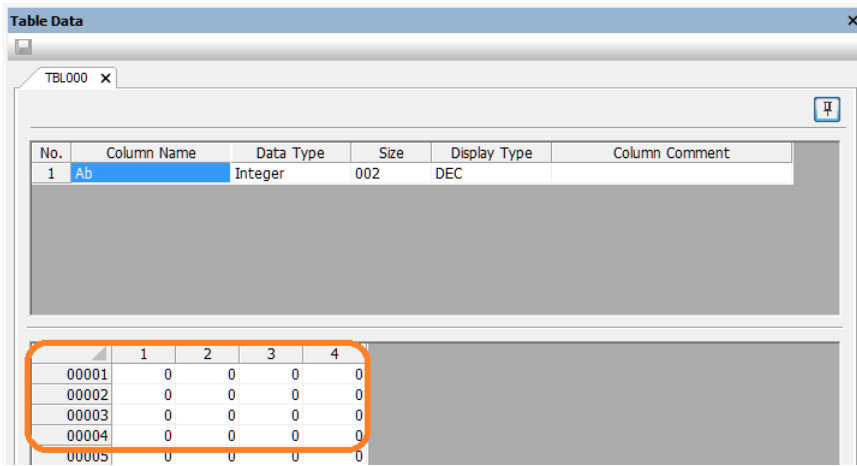


No.	Item	Description
(1)	Table Data	The table data name is displayed.
(2)	Data Type	The data type is displayed.

(b) Switching the Edit Modes

◆ Edit Column Attributes Mode → Edit Table Data Mode

Double-click inside the colored frame on the following window to switch to Edit Table Data Mode.

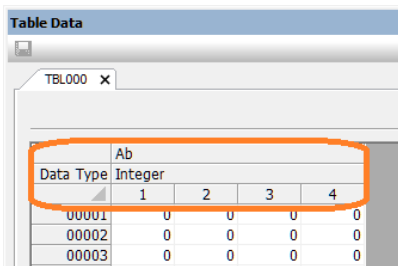


No.	Column Name	Data Type	Size	Display Type	Column Comment
1	Ab	Integer	002	DEC	

	1	2	3	4
00001	0	0	0	0
00002	0	0	0	0
00003	0	0	0	0
00004	0	0	0	0
00005	0	0	0	0

◆ Edit Table Data Mode → Edit Column Attributes Mode

Double-click inside the colored frame on the following window to switch to Edit Column Attributes Mode.



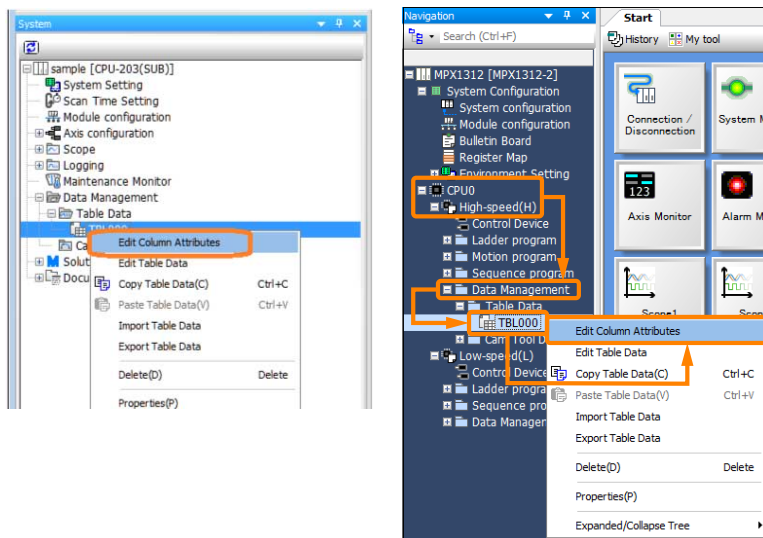
No.	Column Name	Data Type	Size	Display Type	Column Comment
1	Ab	Integer	002	DEC	

	1	2	3	4
00001	0	0	0	0
00002	0	0	0	0
00003	0	0	0	0

(c) Editing Column Attributes

Use the following procedure to edit column attributes.

1. **When using a model that does not support multiple scans:** In the [System] window, right-click the table data to edit and select [Edit Column Attributes].
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan with the table data to edit. Right-click the table data to edit and select [Edit Column Attributes].



The [Table Data] window will be displayed in Edit Column Attributes Mode.

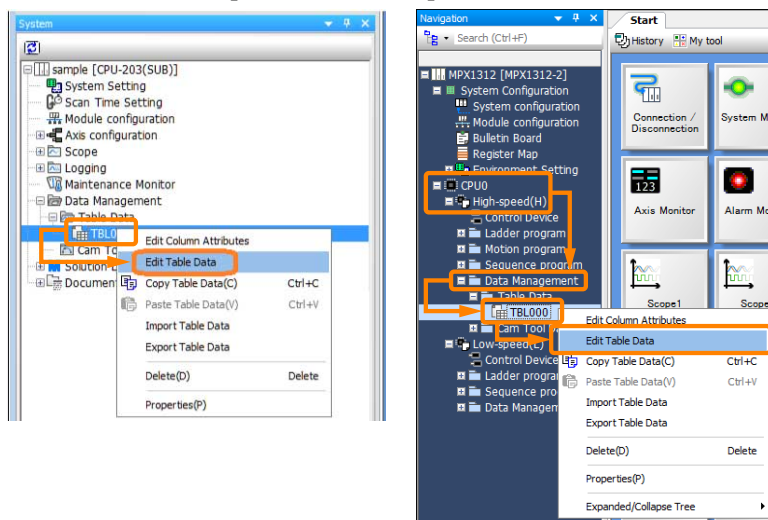
2. **Change the column attributes as required, and then click the [] button.**

This concludes the procedure.

(d) Editing Table Data

Use the following procedure to edit table data.

1. When using a model that does not support multiple scans: In the [System] window, right-click the table data to edit and select [Edit Table Data].
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan with the table data to edit. Right-click the table data to edit and select [Edit Table Data].



The [Table Data] window will be displayed in Edit Table Data Mode.

2. Change the table data as required, and then click the  button.

Refer to the following section for details on inserting and deleting columns and rows.

 ◆ [Inserting a Row or Column on page 363](#)

 ◆ [Deleting a Row or Column on page 364](#)

Information You can also use the following procedure to edit table data.

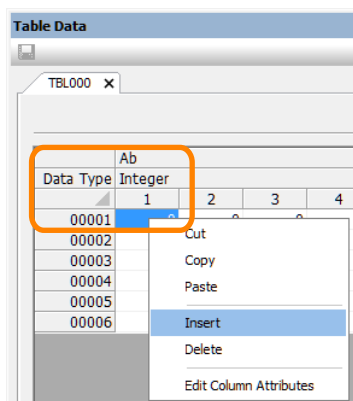
1. Double-click the table data.
2. Click the pin.
3. Edit the table data in the edit table data area.

This concludes the procedure.

◆ Inserting a Row or Column

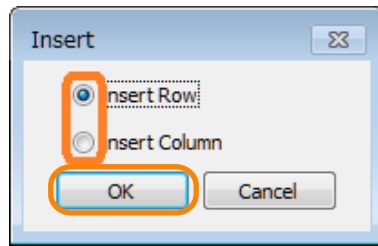
Use the following procedure to insert a row or column into the table data.

1. Right-click anywhere in the colored box, and select [Insert].



The [Insert] window will be displayed.

2. Select [Insert Row] or [Insert Column], and click the [OK] button.

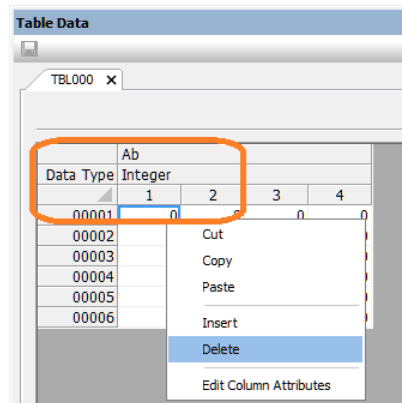


This concludes the procedure.

◆ Deleting a Row or Column

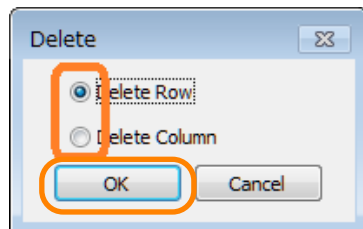
Use the following procedure to delete a row or column from the table data.

1. Right-click anywhere in the colored box, and select [Delete].



The [Delete] window will be displayed.

2. Select [Delete Row] or [Delete Column], and click the [OK] button.



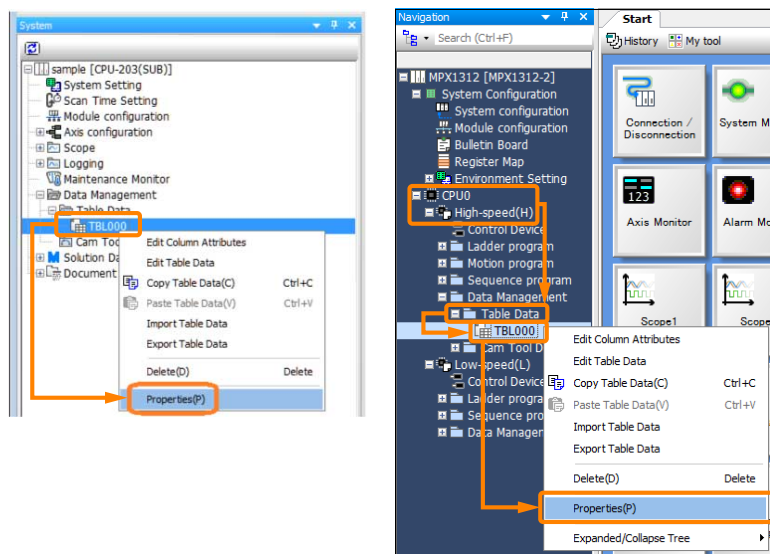
This concludes the procedure.

(3) Changing the Properties of Table Data

Use the following procedure to change the properties of table data.

1. When using a model that does not support multiple scans: In the [System] window, right-click the table data to change and select [Properties].

When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan with the table data to change. Right-click the table data to change and select [Properties].

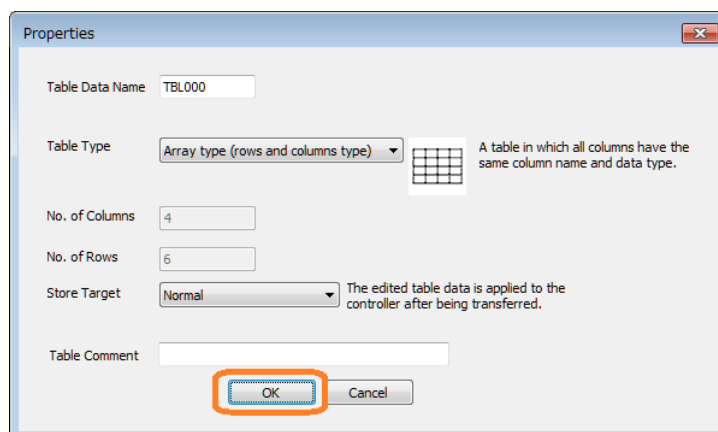


The [Properties] window will be displayed.

2. Change the properties as required, and then click the [OK] button.

Note:

You cannot change the number of columns or the number of rows.



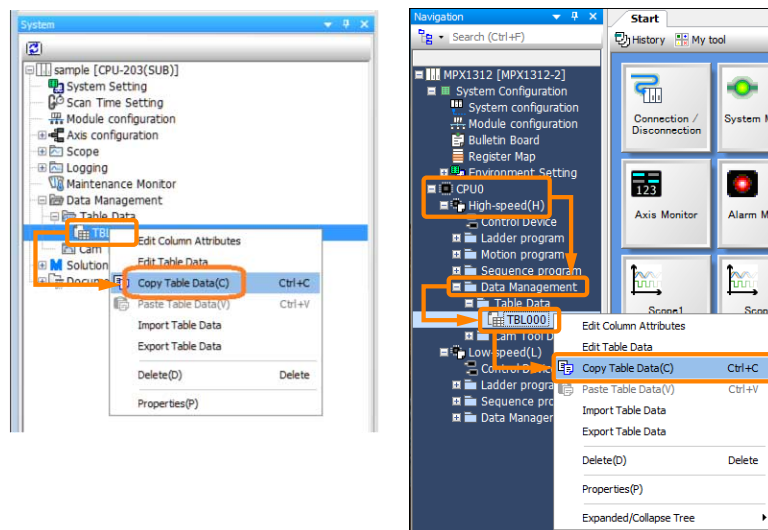
This concludes the procedure.

(4) Copying Table Data

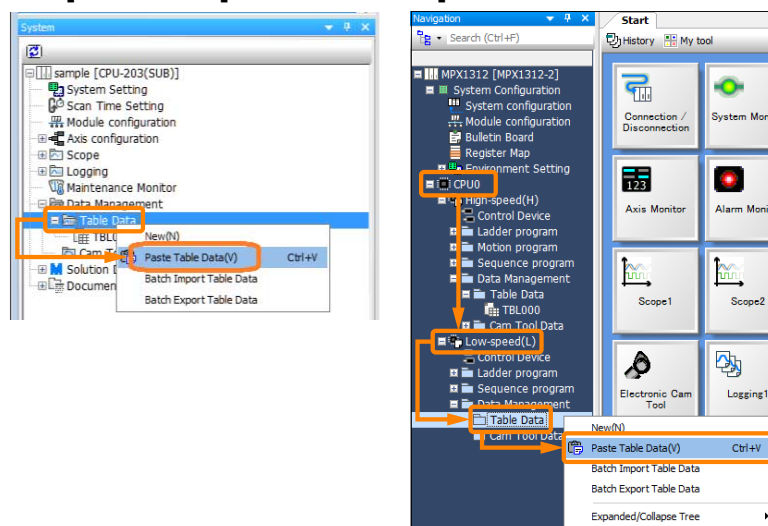
Use the following procedure to copy existing table data.

1. When using a model that does not support multiple scans: In the [System] window, right-click the table data to copy and select [Copy Table Data].

When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan with the table data to copy. Right-click the table data to copy and select [Copy Table Data].

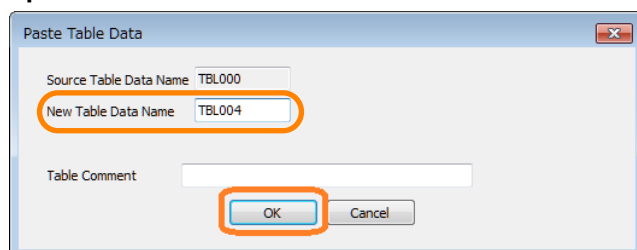


2. When using a model that does not support multiple scans: In the [System] window, right-click [Table Data] and select [Paste Table Data].
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan in which to copy the table data. Right-click [Table Data] and select [Paste Table Data].



The [Paste Table Data] window will be displayed.

3. Enter the new table data name, and click the [OK] button. The table comment is optional.

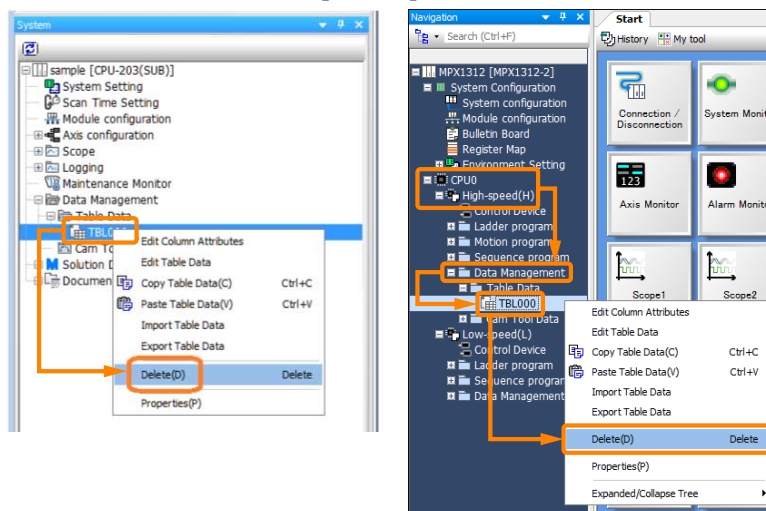


This concludes the procedure.

(5) Deleting Table Data

Use the following procedure to delete table data.

1. When using a model that does not support multiple scans: In the [System] window, right-click the table data to delete and select [Delete].
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan with the table data to delete. Right-click the table data to delete and select [Delete].



A message dialog box will be displayed.

2. Click the [Yes] button.

This concludes the procedure.

(6) Exporting and Importing Table Data

Use the following procedures to export and import table data.

(a) Export



Important

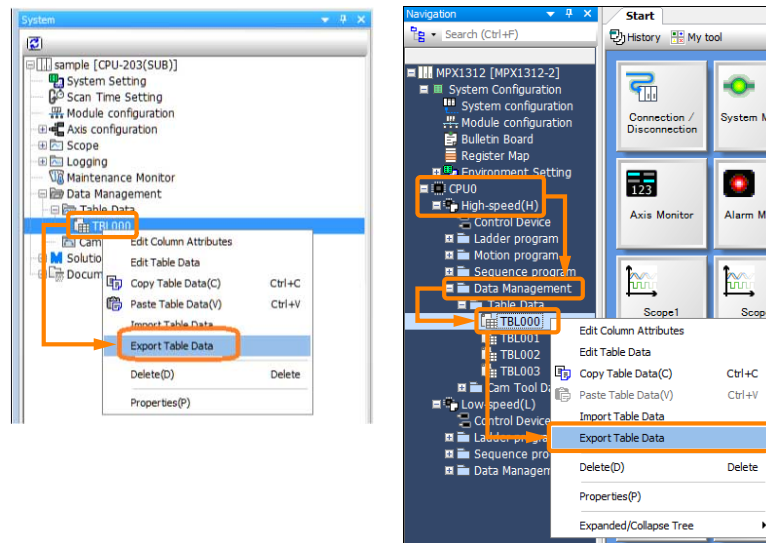
You cannot export table data when in online mode.

Use the following procedure to export table data.

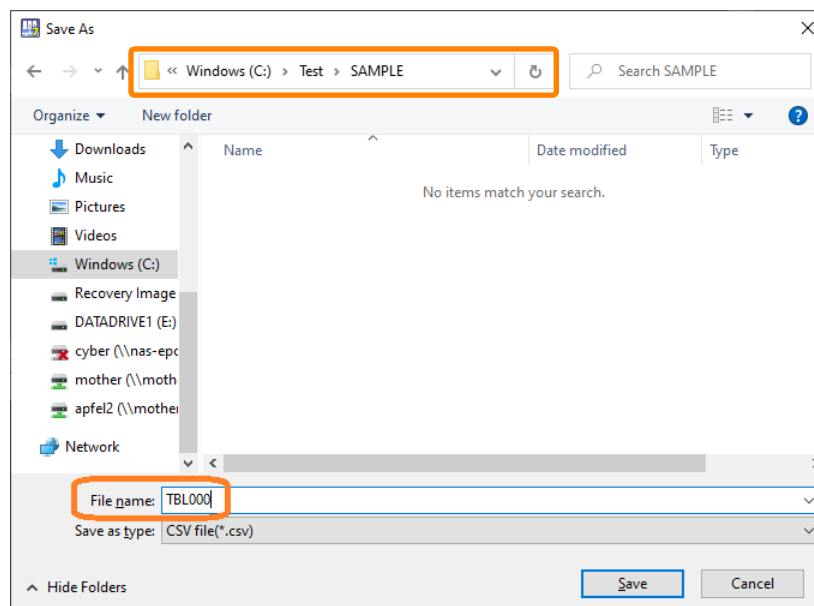
◆ Exporting One Set of Table Data

1. Open the project file.
2. When using a model that does not support multiple scans: In the [System] window, right-click the table data to export and select [Export Table Data].

When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan with the table data to export. Right-click the table data to export and select [Export Table Data].

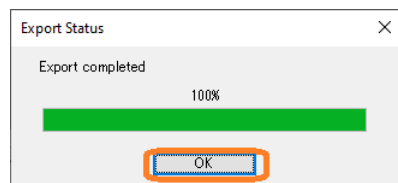


3. **Set the saving location and file name, and click the [Save] button.**



The [Export Status] window will be displayed.

4. **Click the [OK] button.**

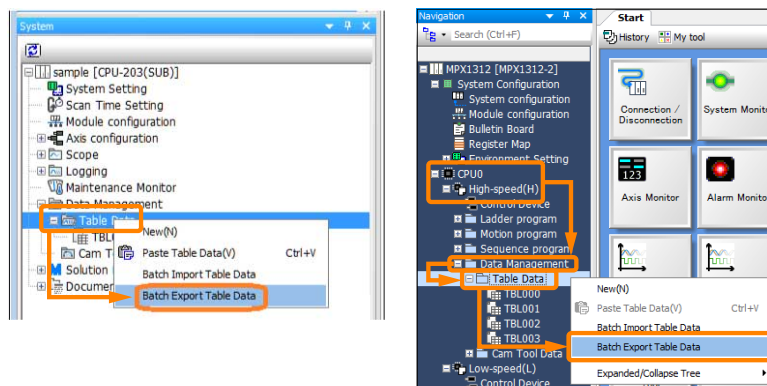


This concludes the procedure.

◆ Exporting Multiple Sets of Table Data

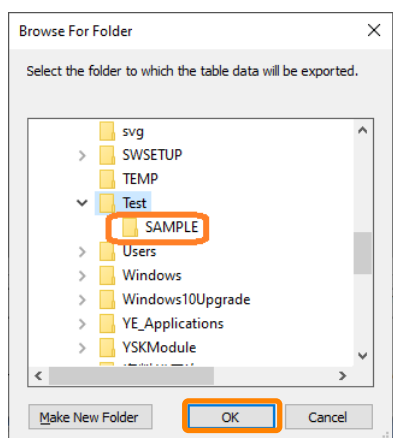
1. **When using a model that does not support multiple scans: In the [System] window, right-click [Table Data] and select [Batch Export Table Data].**
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under any scan. Right-click [Table Data] and select [Batch Export Table Data].

Information When using a model that supports multiple scans, it does not matter under which scan [Table Data] is located because the data to export with [Batch Export Table Data] will be selected in a later step.



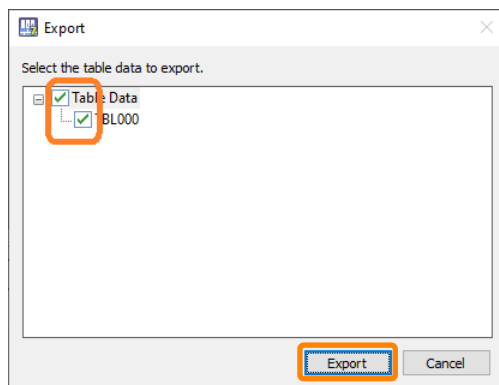
The [Browse For Folder] window will be displayed.

2. **Select the saving location, and click the [OK] button.**

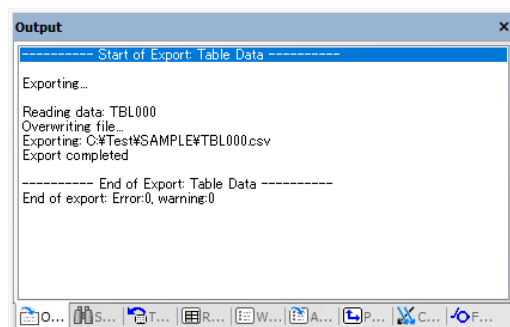


The [Export] window will be displayed.

3. **Select the table data to export, and click the [Export] button.**



The data will be exported, and the results will be displayed in the [Output] window.



This concludes the procedure.

(b) Import

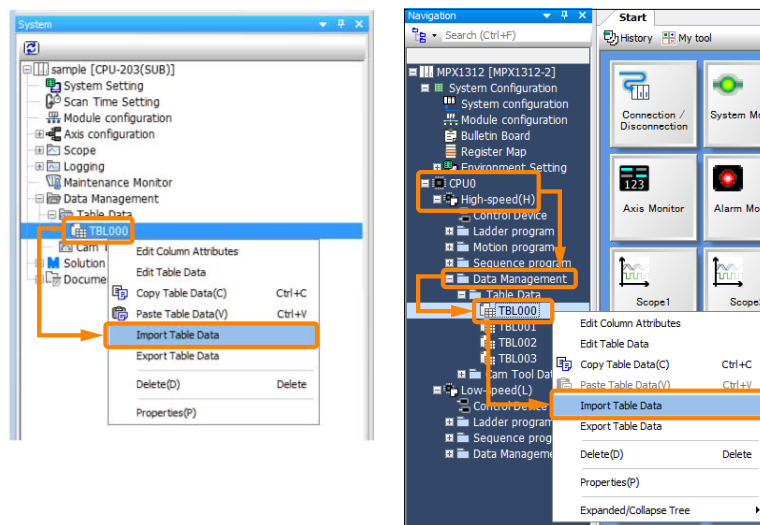
Important

- You cannot import table data when in online mode.
- When importing multiple sets of table data, you can import the table data only when there is table data with the same name as the file name to import inside the project file.

Use the following procedure to import table data.

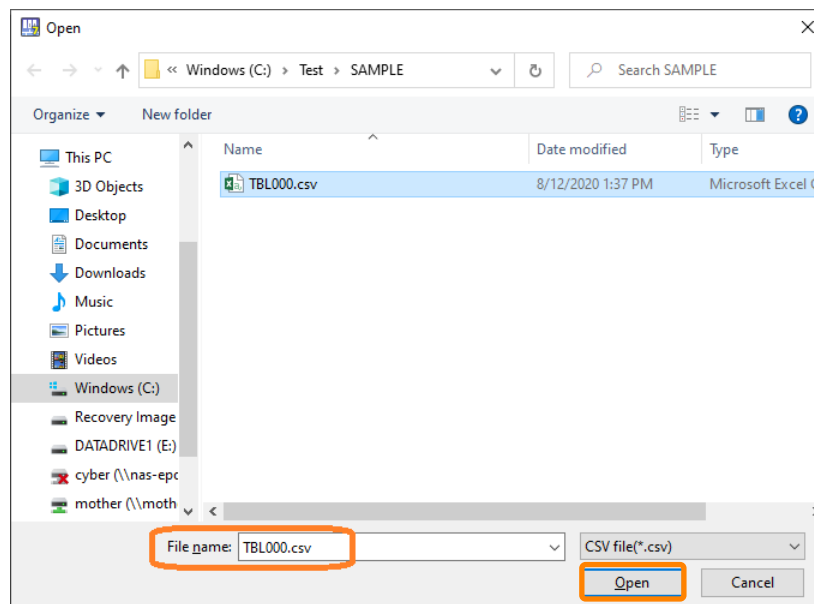
◆ **Importing One Set of Table Data**

1. **Open the project file.**
2. **When using a model that does not support multiple scans: In the [System] window, right-click the destination table data and select [Import Table Data].**
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under the scan with the destination table data. Right-click the destination table data and select [Import Table Data].



The [Open] window will be displayed.

3. **Select the CSV file to import, and click the [Open] button.**

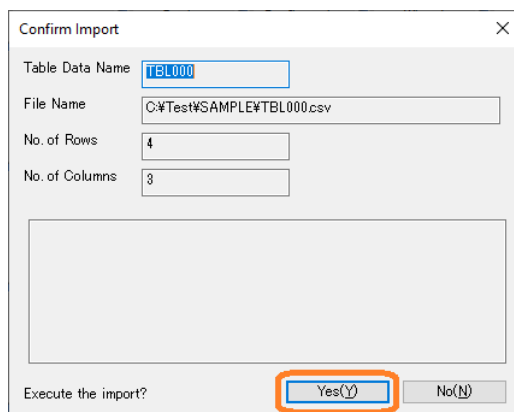


The [Confirm Import] window will be displayed.

4. **Check the destination table data name and the file name to import, and click the [Yes] button.**

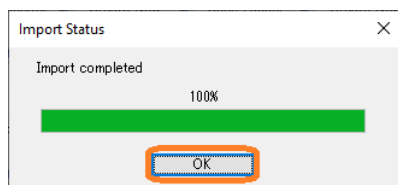
Note:

You can import the table data even if the table data name and file name are different.



The [Import Status] window will be displayed.

5. Click the [OK] button.



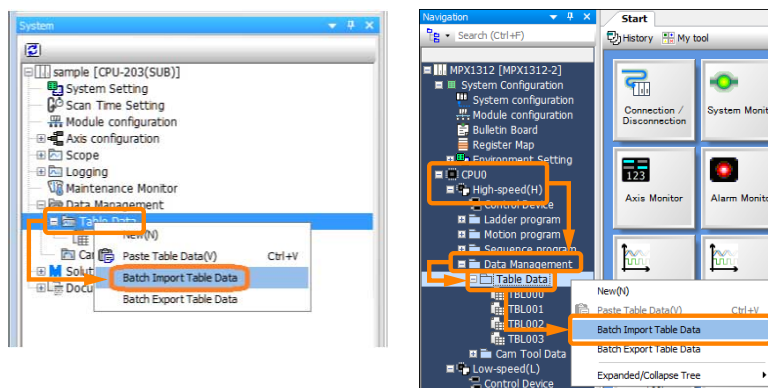
This concludes the procedure.

◆ Importing Multiple Sets of Table Data

1. When using a model that does not support multiple scans: In the [System] window, right-click [Table Data] and select [Batch Import Table Data].
When using a model that supports multiple scans: In the [Navigation] window, expand [Data Management] under any scan. Right-click [Table Data] and select [Batch Import Table Data].

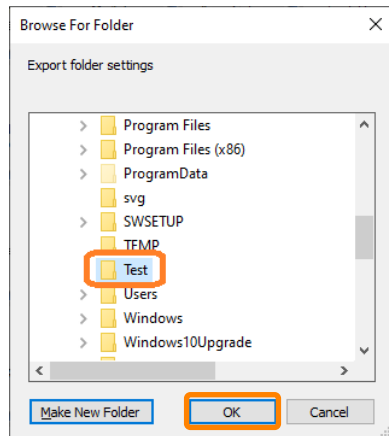
Information

When using a model that supports multiple scans, it does not matter under which scan [Table Data] is located because the data to export with [Batch Import] will be selected in a later step.



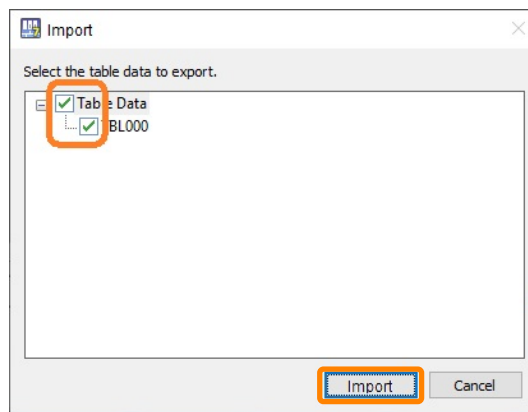
The [Browse For Folder] window will be displayed.

2. Select the saving location of the files to import, and click the [OK] button.

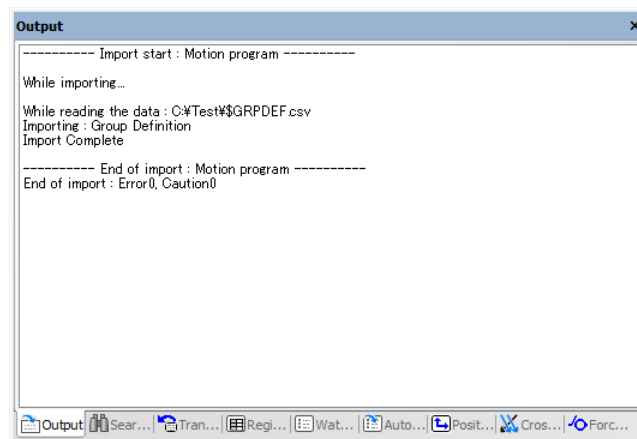


The [Import] window will be displayed.

3. Select the table data to import, and click the [Import] button.



The data will be imported, and the results will be displayed in the [Output] window.



This concludes the procedure.

Debugging

This chapter describes the functions for debugging ladder programs and motion programs.

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6.12.2	Running a Simulation	421

6.1 Register List

Register lists allow you to monitor the current values of the registers in a continuous area (register map). Real-time monitoring and editing of values is possible if the controller is connected.

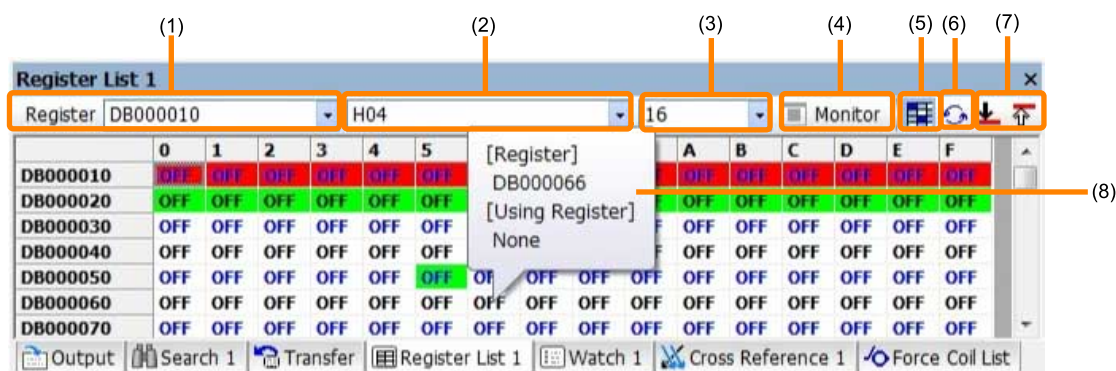
Information

- If you use a project link connection, the displayed results do not always match the project file because the data in the controller is displayed. If you display the register map when using a project link connection, first always transfer the controller data to the project file.
- The register list can display S, I, O, M, C, D, and G registers. However, C registers are read-only. They cannot be edited.

6.1.1 [Register List] Window

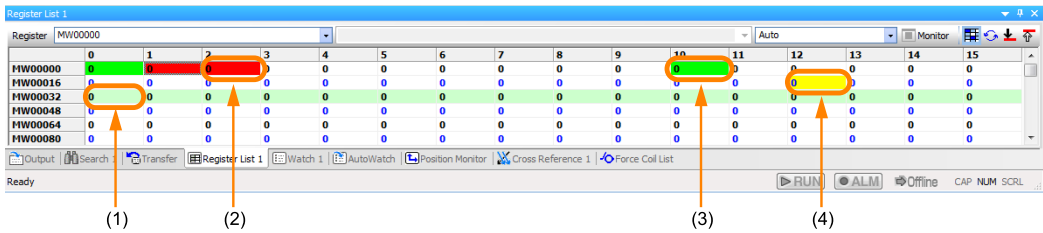
Information

The displayed items and other elements will depend on the model of the controller and the connection status.



No.	Item	Description
(1)	Register	Enter the address of the register for which to display a register map.
(2)	Program Number	For a D register, enter the program number.
(3)	Number of Registers Displayed in One Row	Enter the number of registers to display on one row of the register list, or select the value from the list. • Bit registers: Fixed to 16. • Other registers: You can set the number between 1 and 16. If you select [Auto], the number of displayed registers will be set automatically based on the width of the [Register List] window.
(4)	[Monitor] Button	This button is enabled only in online mode. Click this button to switch between monitoring ON () and monitoring OFF (). When monitoring is ON, the displayed register values are updated. When monitoring is OFF, the displayed register values are not updated.
(5)	Button	Click this button to display () and hide () the register map. When the register map is displayed, registers that are used in the ladder program are displayed with a green background, and registers that are used for more than one data type are displayed with a red background.
(6)	Button	Refreshes the values in the register map.
(7)	Button	Searches for redundant registers. The [] button searches for redundant registers upward, and the [] button searches downward. Redundant registers are displayed in blue cells.
(8)	Balloon Window	If you place the cursor over the register map, a balloon will show the register and the status at the cursor position.

Information Interpreting the Register List



No.	Color	Meaning
(1)	Light green	Address registers or registers that specify the number of transfer data with constants for specific instructions (SETW, MOVW, XCHG, and COPYW)
(2)	Red	Registers that use the same memory address as other registers
(3)	Green	Registers used in ladder or motion programming
(4)	Yellow	Registers that are used as the starting addresses for indexing (i or j) or registers that are used for specific instructions (SETW, MOVW, XCHG, and COPYW) for indirect addressing of the number of words to transfer. Note: An unspecified range of registers may be used after these registers.

6.1.2 Displaying a Register Map

Use the following procedure to display a register map.

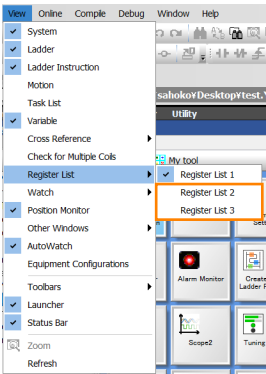
1. Select [Monitor] – [Register List] from the launcher.



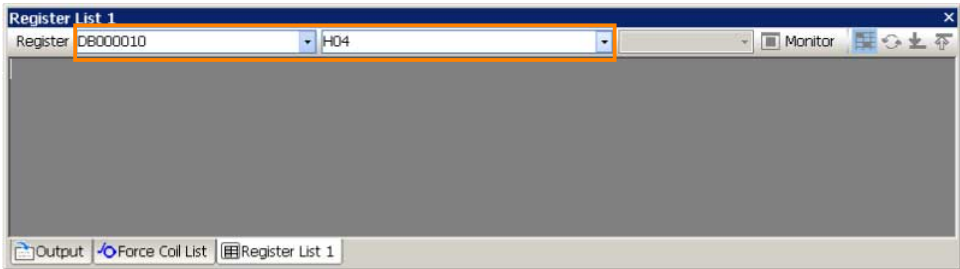
The [Register List] window will be displayed.

Note:

Up to three [Register List] windows can be displayed. The window displayed with the method above is the [Register List 1] window. To open the [Register List 2] and [Register List 3] windows, select [Register List] from the [View] menu.



2. Enter the address of the register for which to display a register map in [Register]. For a D register, also enter the program number.



Information You can also display the register map by opening the program, selecting a register, and clicking [Debug] - [Display Register Map] from the menu.

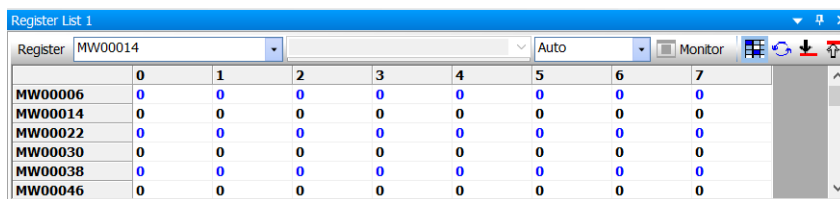
3. Press the Enter key.

The specified register will be displayed in the top row of the register map.

Information

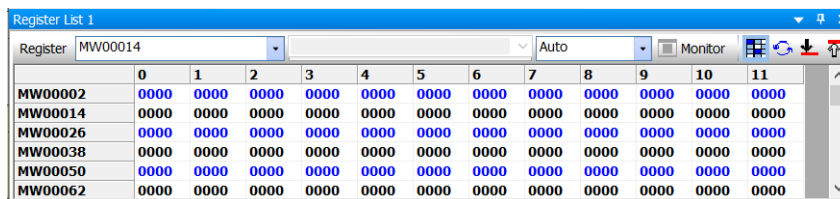
Right-click on the register map and select [Decimal], [Hexadecimal], [BIN], [ASCII], or [ON/OFF] to switch the display format of the register value.

<Decimal View>



Register	0	1	2	3	4	5	6	7
MW00006	0	0	0	0	0	0	0	0
MW00014	0	0	0	0	0	0	0	0
MW00022	0	0	0	0	0	0	0	0
MW00030	0	0	0	0	0	0	0	0
MW00038	0	0	0	0	0	0	0	0
MW00046	0	0	0	0	0	0	0	0

<Hexadecimal View>



Register	0	1	2	3	4	5	6	7	8	9	10	11
MW00002	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
MW00014	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
MW00026	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
MW00038	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
MW00050	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
MW00062	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000

6.1.3 Editing a Register Map

You can perform the following editing operations by double-clicking cells on the register map or by pressing the **F2** key to display the text cursor.

- Directly entering values
- Deleting values (setting values to 0)
- Copying and pasting data

Press the **Enter** key to confirm the change. If the controller is online, any changes in the values immediately affect the operation of the controller.

6.2 Watch

The Watch function allows you to monitor the values and comments of the specified registers. Realtime monitoring and editing of values is possible if the controller is connected.

Information

- When a project link connection is used, the data registered in the [Watch] window and [AutoWatch] window is saved only to the controller. To apply the watch data to the project file, transfer the data from the controller.
- The Watch function can display S, I, O, M, C, D, and G registers. However, C registers are read-only. They cannot be edited.

6.2.1 Displaying Watch Data

There are the following two methods that you can use to display watch data.

- [Watch] window: Allows you to monitor the values in registers with different data types.
- [AutoWatch] window: Allows you to monitor the values of registers just by selecting an instruction in a ladder program or motion program.

The procedures are given below.

(1) Displaying Data with the [Watch] Window

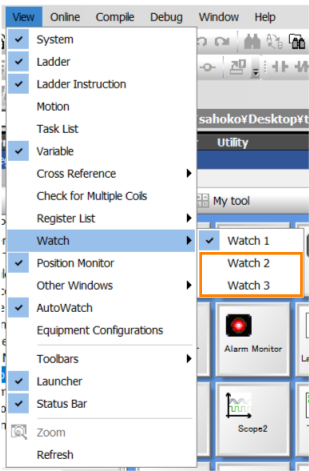
1. Select [Monitor] – [Watch] from the launcher.



The [Watch] window will be displayed.

Note:

Up to three [Watch] windows can be displayed. The window displayed with the method above is the [Watch 1] window. To open the [Watch 2] and [Watch 3] windows, select [Watch] from the [View] menu.

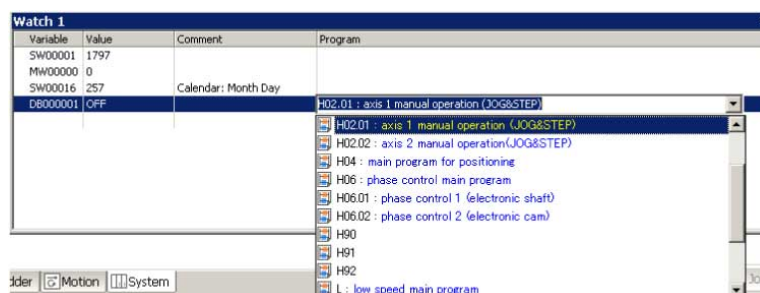


2. Use one of the following methods to enter a register or variable name to display as watch data.

- Double-click the [Variable] column or press **F2** to display the text cursor, and then enter the register or variable name.

Note:

For D registers, enter the program number as shown below.



- Drag and drop a ladder program instruction to the [Watch] window.
- Drag and drop a variable in the [Variable] window to the [Watch] window.

3. Press the Enter key.

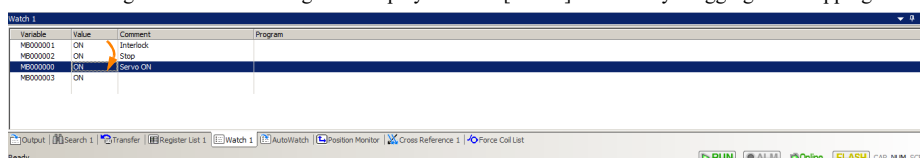
The values and comments of the specified registers will be displayed.

Information

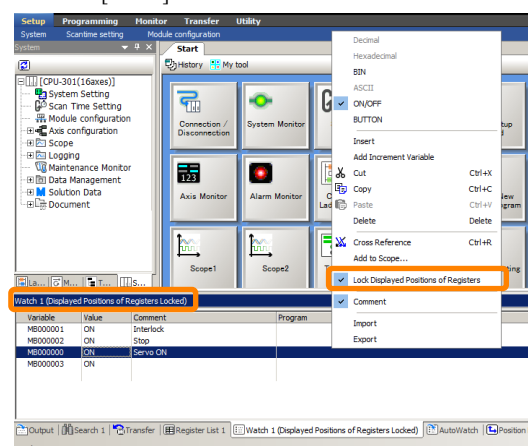
- Right-click on the [Watch] window and select [Decimal], [Hexadecimal], [BIN], [ASCII], or [ON/OFF] to switch the display format of the register value. You can set the display format for each individual register.

Watch 1		
Variable	Value	Comment
MotionCommand (MW00000)	H0000	X~MotionCommand
MW00101	0	
IB00000	☐ ON	ServoON

- You can change the order of the registers displayed in the [Watch] window by dragging and dropping them.



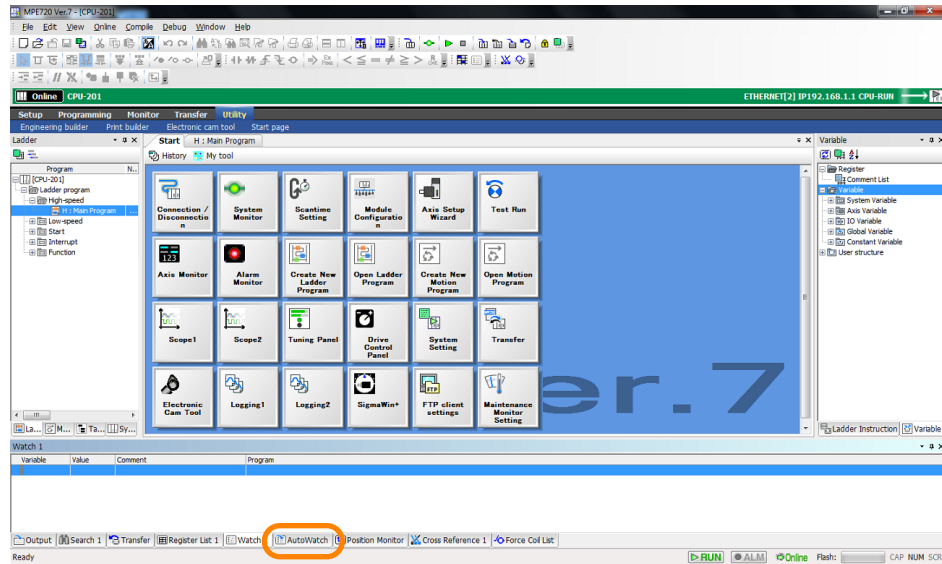
- You can also lock the [Watch] window so that the position of the displayed registers cannot be changed. Right-click on the [Watch] window and select [Lock Displayed Positions of Registers]. The positions of the displayed registers will be locked and "Displayed Positions of Registers Locked" will be displayed in the title of the [Watch] window.



(2) Displaying Data with the [AutoWatch] Window

1. Use one of the following methods to open the [AutoWatch] window.

- If the window is already open, select the [AutoWatch] tab.

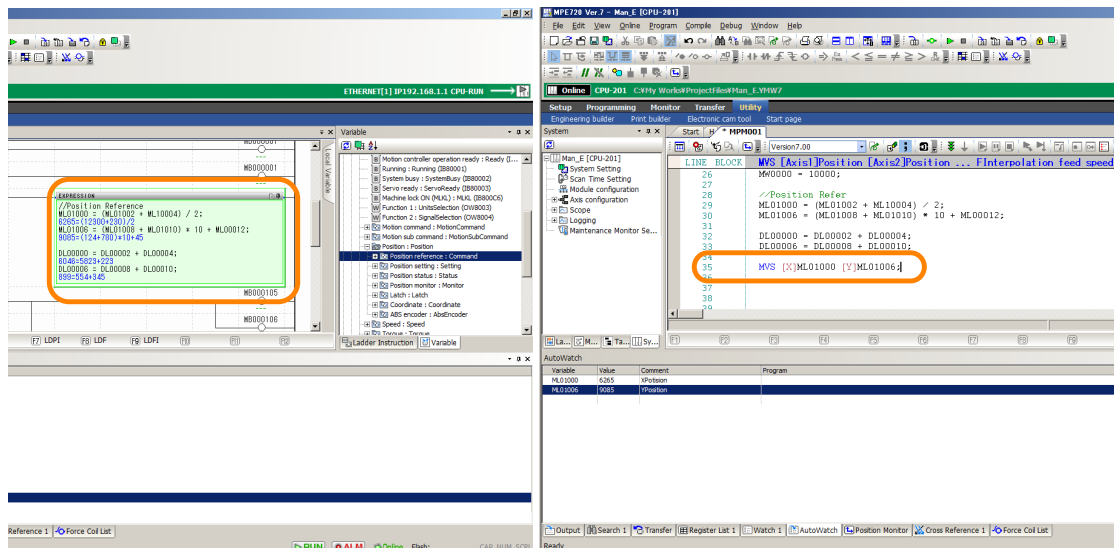


- If the window is not open, select [AutoWatch] from the [View] menu.

2. Select the instruction that includes the registers to display as watch data.

<Ladder Program>

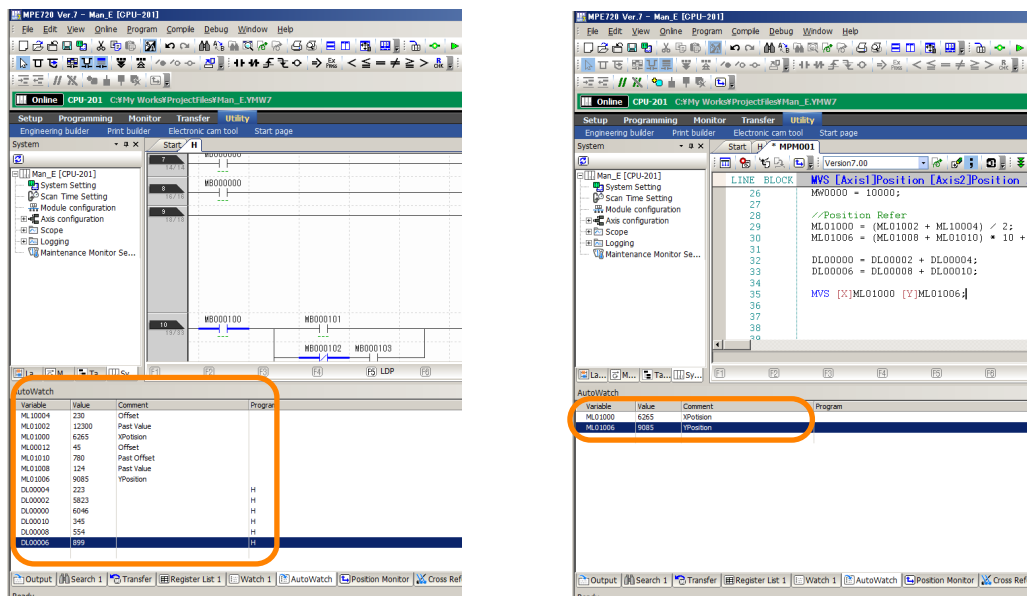
<Motion Program>



The values and comments of the registers included in the specified instruction will be displayed.

<Ladder Program>

<Motion Program>



Information

Right-click on a register and select [Decimal], [Hexadecimal], [BIN], [ASCII], or [ON/OFF] to switch the display format of the register value.

You can set the display format for each individual register.

AutoWatch		
Variable	Value	Comment
MW00000	0	
MB000040		

6.2.2 Editing Watch Data Values

You can perform the following editing operations by double-clicking a cell in the [Watch] window or the [Auto-Watch] window or by press the **F2** key to display the text cursor.

- Directly entering values
- Deleting values (setting values to 0)
- Copying and pasting

Press the **Enter** key to confirm the change. If the controller is online, any changes in the values immediately affect the operation of the controller.

6.3 Displaying Current Values

You can display the current values of registers in the Edit Ladder Program Window.

6.3.1 Online Current Values

You can monitor the status of registers in the Edit Ladder Program Window when there is an online connection to the controller. The status of registers is displayed as described below.

- Instruction objects are displayed with the current values of registers in blue.
- Instructions for contacts, coils, and so on are highlighted when the value of the register is 1.
- IF and ELSE instructions are highlighted when the condition is satisfied.



Important

If "!=" is used in the expression for an EXPRESSION instruction, the operand on the right side may display an inverted value. In this case, be aware that following types of inconsistencies will occur in online current values because 1 will be displayed when 0 should be displayed.

EXPRESSION

```
'MB000010'='MB000010'=='MB000010'
MB000010=MB000010=MB000010;
1=1=1
'MB000010'='MB000010'!='MB000010'
MB000010=MB000010!=MB000010;
0=1!=1
```

EXPRESSION

```
'MB000010'='MB000010'!='MB000010'
MB000010=MB000010!=MB000010;
0=0!=0
'MB000010'='MB000010'=='MB000010'
MB000010=MB000010=MB000010;
1=0=0
```

6.3.2 Offline Current Values

Select [Monitor Offline Value] from the [View] menu when the controller is not connected. The register values are displayed in blue in the Edit Ladder Program Window.

Information

- The current value cannot be displayed when offline for IF, ELSE, WHILE, and EXPRESSION instructions.
- When register data is transferred from the controller, the register data that was read will be displayed.
- If you changed a register value in a register list or by another means, the data for the relevant register will be updated, but the simulation will not be run (e.g., writing will not be performed by programming conditions being satisfied). For this reason, the data in other registers will not be updated.

Start H : Main Program **H01 : Servo ON Control** H02 : Jogging H03 : Zero Point Return H04 : Motion Program Operation

H01: Servo ON Control Sequence
Operation Ready Check Sequence
X-axis Status Check

0 0/0

1 2/3

IL8004 00000 X~Alarm

IL8002 00000 X~Warning

MB00200 0 No X~Alarm

MB00200 1 No X~Warning

F1 Help F2 Edit F3 Search Ne F4 Compile F5 NO Conta F6 NC Conta F7 Coil F8 Store F9 Create th F10 Join the b F11 Release tr F12

Register List 1

Register IL8000 Auto

Register	0	2	4	6	8	A	C
IL8000	11	0	0	0	16777216	0	11
IL8010	8	8	8	8	0	0	0
IL8020	0	0	0	0	552960	2309120	4
IL8030	599955511	0	599955511	0	0	0	0
IL8040	0	0	0	0	0	0	0
IL8050	0	0	0	0	0	0	0

6.4 Tuning Panel

The Tuning Panel allows you to check the operation of a created program by adding registers and displaying and editing current values.

6.4.1 [Tuning Panel] Tab Page

Click the [Tuning Panel] button in the [My Tool] window to display the [Tuning Panel] tab page.

The items displayed in the [Tuning Panel] tab page are described below.

Variable	Comment	Name	View definition	Current value	Unit	Lower limit	Visual monitor	Upper limit
H : Main Program[Changes]								
MW00000			XXXXXX	15		-32768	15	32767
db0c304(MB0000...	MP-RDY		ON/OFF	ON		----	●	----
ML00010			XXXXXXXXXX	0		-2147483...	0	2147483647
Please input vari...								
Please input Pro...								

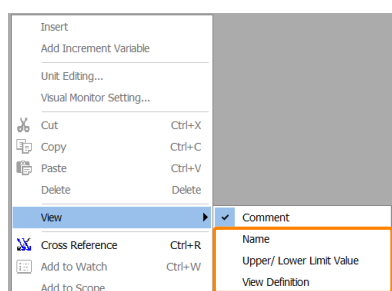
Item	Description
Variable	The variable names or registers are displayed.
Comment	The comment registered for the registers is displayed. If a comment is edited in the [Tuning Panel] tab page, the change will be applied to the variable in the [Variable] window and the comment list. <Setting Conditions> 255 alphanumeric characters maximum.
Name */	Set a name, for example, when you want to identify the purpose of the variable. <Setting Conditions> 48 alphanumeric characters maximum.
View definition */	Set the display format of the value. "X" indicates the number of digits to display. "." indicates the position of the decimal point. "U" at the beginning indicates an unsigned decimal number. "X" at the beginning indicates a hexadecimal number. Note: If the upper/lower limits must be changed because this setting was changed, the following message dialog box will be displayed.  It is necessary to recreate the upper/ lower limit by the change in the display definition. Please recreate upper/ lower limit of the interval. OK Cancel
Current value	The current value of the register is displayed. The current value is updated at fixed intervals. The current value can be edited by double-clicking this column to display the [Edit] window.
Unit	The unit is displayed. The unit can be specified by double-clicking this column to display the [Edit] window.

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Item	Description
Lower limit/Upper limit	The lower limit and upper limit of the normal range is displayed. The value can be set by double-clicking this column to display the [Visual Monitor Setting] window.
Visual monitor <i>*1</i>	The current value of the register is displayed in a visual manner. The visual monitor checks the current value against the upper and lower limits, and highlights the values in different colors to indicate whether they are within the range. When the current value is within the upper and lower limits: Displayed in green When the current value is outside the upper and lower limits: Displayed in red

*1 These items are not displayed by default. Right-click on the [Tuning Panel] tab page and select the item from [View] to add the column.



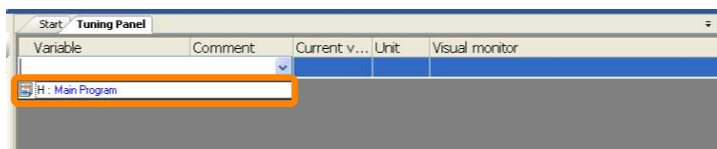
6.4.2 Adding a Register

Use the following procedure to add a register to the Tuning Panel.

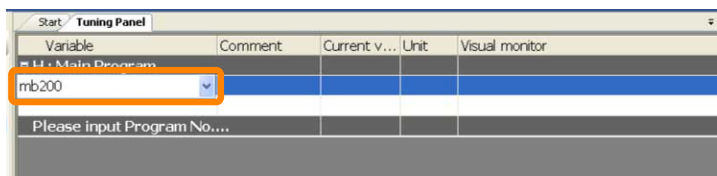
1. In the [Tuning Panel] tab page, select the program type.

Information

Programs that you have created will be listed as options in the box.

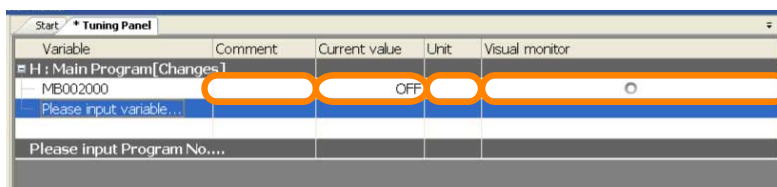


2. Enter the register to display in the [Variable] column.



3. Press the Enter key.

Information will be displayed in the [Comment], [Current value], [Unit], and [Visual monitor] columns.

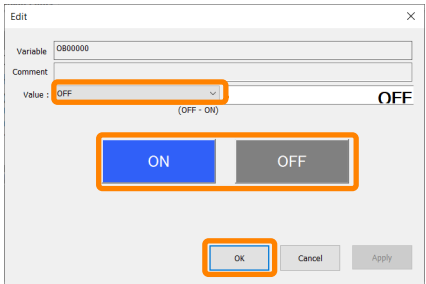


This concludes the procedure.

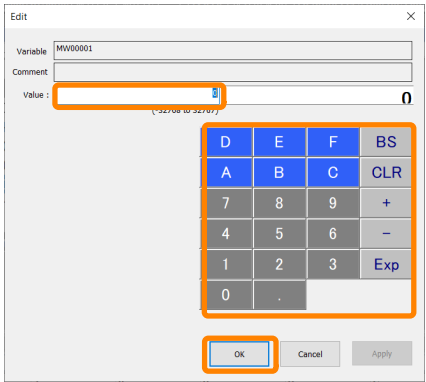
6.4.3 Editing a Current Value

Double-click the [Current value] column for a register that was added or directly enter a value to display the [Edit] window.

- Bit Register
Edit the current value by selecting the value from the [Value] list or by clicking the [ON] and [OFF] buttons.

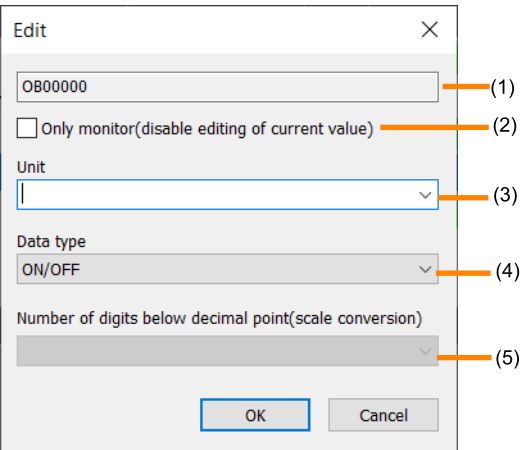


- All Other Registers
Edit the current value by directly entering the value in [Value], by entering the value with the keyboard, or by using the keypad in the window.



6.4.4 Editing a Unit

Double-click the [Unit] column for a register that was added or directly enter a value to display the [Edit] window.



No.	Item	Description
(1)	Register	The register that was added is displayed.
(2)	Only monitor	Select this check box to disable editing of the current value.

Continued on next page.

Continued from previous page.

No.	Item	Description
(3)	Unit	Select the unit from the options below. pulse, mm, deg, inch, and μm
(4)	Data type	Select the display format from the options below. Signed decimal, Unsigned decimal, and Hexadecimal
(5)	Number of digits below decimal point	Select the number of digits after the decimal point.

6.4.5 Editing the Visual Monitor

Double-click the [Visual monitor] column for a register that was added or directly enter a value to display the [Visual Monitor Setting] window.

- Bit Register

Item	Description
Displays by ON/OFF or 1/0	Indicates the ON/OFF or 1/0 status of the register with a lit or not lit button.
Displays normal/error	Indicates the ON/OFF or 1/0 status of the register with green (normal) and red (error). Select whether 1 or 0 is normal.

- All Other Registers

Item	Description
The normal range of the current value will be set and checked	Select this check box to enable the normal range settings.
Normal Range Setting	Set the upper and lower limits.

6.4.6 Saving Tuning Panel Data

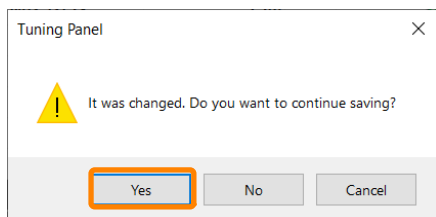
You can save the data edited in the Tuning Panel to the registered program. Use the following procedure.

Information If you delete a ladder program, the Tuning Panel data is also deleted.

1. **Select [Save Project] from the [File] menu.**

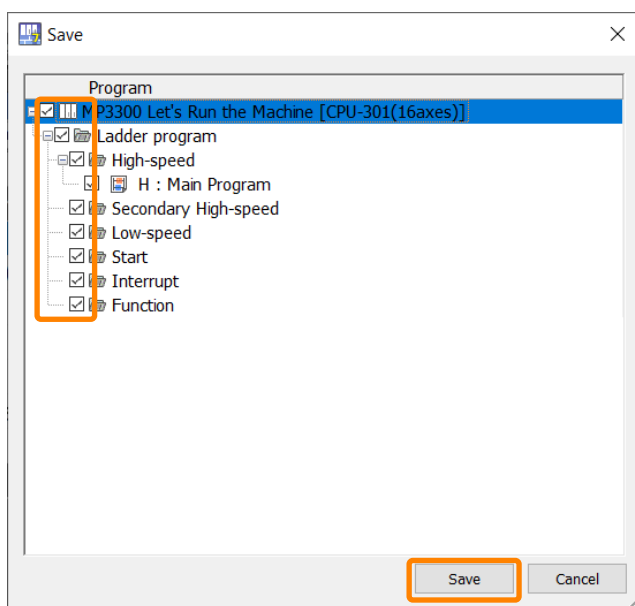
A message dialog box will be displayed.

2. **Click the [Yes] button.**



The [Save] window will be displayed.

3. **Select the ladder programs to save, and click the [Save] button.**



The Tuning Panel data will be saved.

This concludes the procedure.

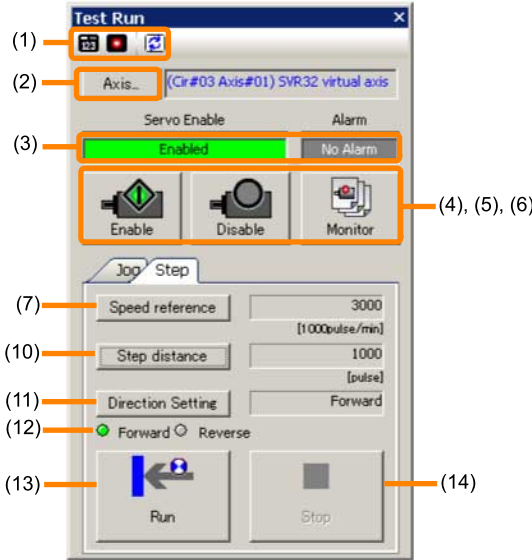
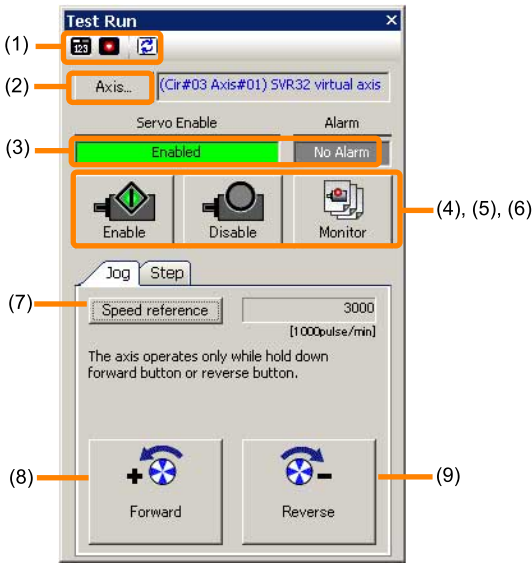
6.5 Test Run

Test run allows you to check operation of the SERVOPACK axis with controller references. You can check the following types of operations.

- Servo ON/servo OFF: Turns the servo ON and OFF for the specified axis.
- Jogging: Rotates the specified axis in one direction at a fixed speed.
- Step execution: Rotates the specified axis from the current position to the specified position.

6.5.1 [Test Run] Window

Click the [Test Run] button in the [My Tool] window to display the [Test Run] window. The items displayed in the [Test Run] window are described below.



No.	Item	Description
(1)	Toolbar	 Displays the [Axis Monitor] tab page.
		 Displays the [Alarm Monitor] tab page.
		 Refreshes the information in the window.
(2)	[Axis] Button	Displays the [Axis] window. After you select the axis, the axis name will be displayed in the area to the right.
(3)	Status	The operating status of the axis and the alarm status is displayed.
(4)	[Enable] Button	Turns ON the servo for the axis.
(5)	[Disable] Button	Turns OFF the servo for the axis.
(6)	[Monitor] Button	Displays the [Alarm/Warning] window. You can check detailed information on alarms and warnings.
(7)	[Speed reference] Button	Displays the [Speed reference] window. Set the speed when the axis rotates.
(8)	[Forward] Button	While this button is pressed, the axis rotates in the forward direction.
(9)	[Reverse] Button	While this button is pressed, the axis rotates in the reverse direction.
(10)	[Step distance] Button	Displays the [Step distance] window. Set the step travel distance for the axis.
(11)	[Direction Setting] Button	Displays the [Direction Setting] window. Set the direction for the axis to start step execution and the number of times to repeat step execution.
(12)	Forward/Reverse Status	The current direction of rotation for step execution is displayed with  .
(13)	[Run] Button	Performs step execution in the direction that was set in the [Direction Setting] window.
(14)	[Stop] Button	Stops step execution.

6.5.2 Performing a Test Run

Use the following procedure to perform a test run.



Important

- Carefully check safety in the surrounding area when operating axes.
- Before you start a test run, design the system to enable stopping axis movement whenever necessary.
- Stop the execution of all ladder and motion programs before you start a test run.

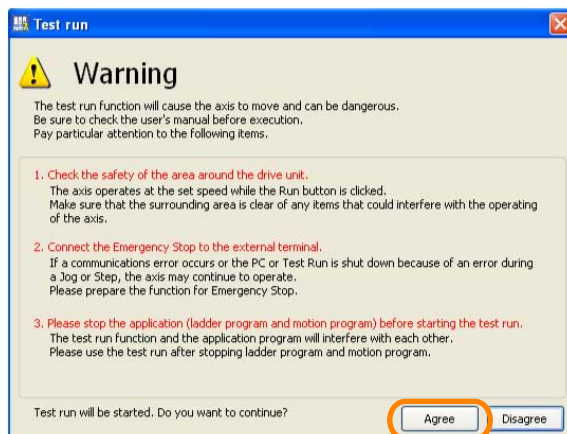
Information

Perform this procedure with the SERVOPACK and servomotor connected to the controller.

1. Click the [Test Run] button on the [My Tool] window.

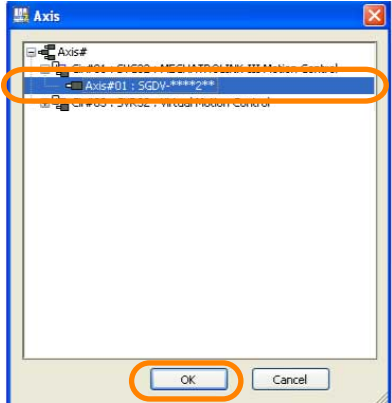
The warning dialog box will be displayed.

2. Read the warnings and click the [Agree] button.



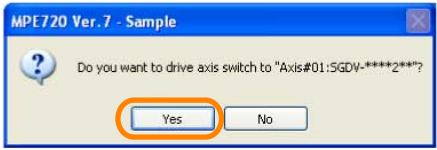
The [Axis] window will be displayed.

3. **Select the axis to operate, and click the [OK] button.**



A message dialog box will be displayed.

4. **Click the [Yes] button.**



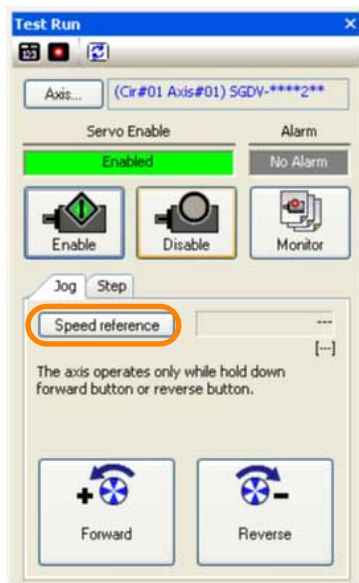
The [Test Run] window will be displayed.

5. **Click the [Enable] button.**



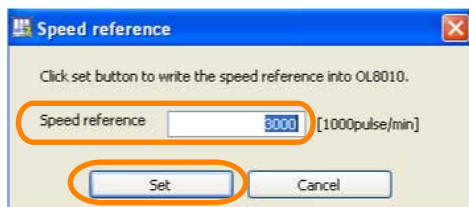
The axis can now be operated.

6. Click the [Speed reference] button on the [Jog] tab page.



The [Speed reference] window will be displayed.

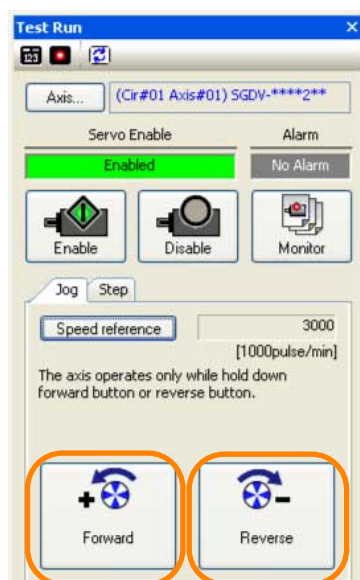
7. Enter the speed reference value, and click the [Set] button.



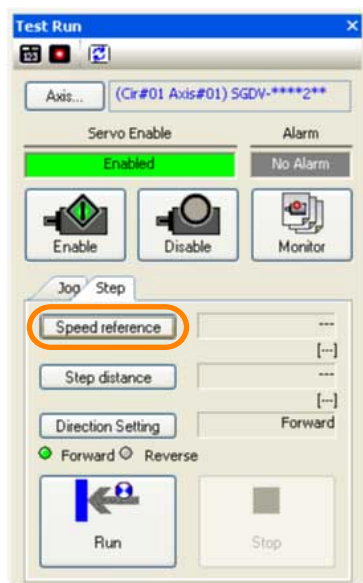
The [Speed reference] window will close.

8. Confirm the following information.

- While the [Forward] button is pressed, the motor rotates in the forward direction.
- While the [Reverse] button is pressed, the motor rotates in the reverse direction.

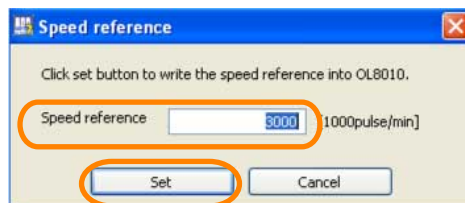


9. Click the [Speed reference] button on the [Step] tab page.



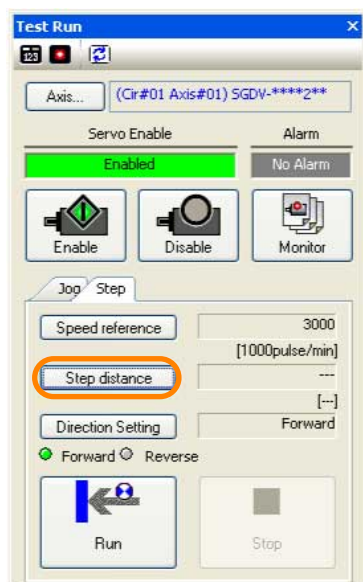
The [Speed reference] window will be displayed.

10. Enter the speed reference value, and click the [Set] button.



The [Speed reference] window will close.

11. Click the [Step distance] button.



The [Step distance] window will be displayed.

12. Enter the step distance, and click the [Set] button.



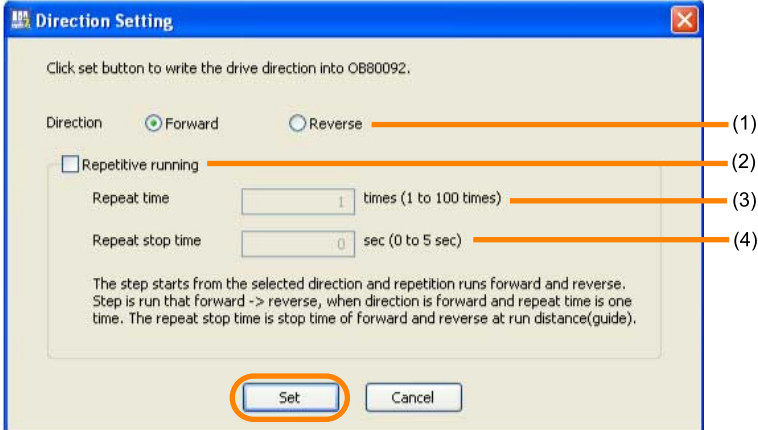
The [Step distance] window will close.

13. Click the [Direction Setting] button.



The [Direction Setting] window will be displayed.

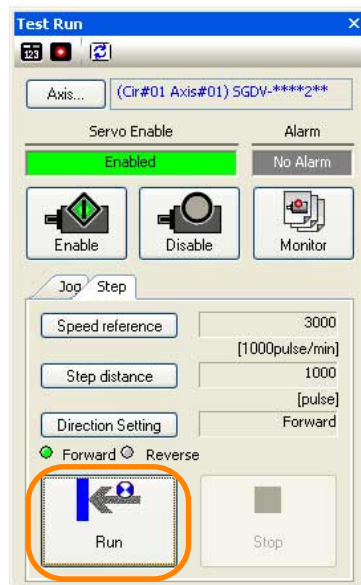
14. Set the following items, and then click the [Set] button.



No.	Item	Description
(1)	Direction	Set the direction to start step execution.
(2)	Repetitive running	Select this check box to run the axis with a repetitive motion.
(3)	Repeat time	Set the number of times to repeat forward and reverse. <Example> If you select [Reverse] and set [Repeat time] to 2, the axis will move in the following manner: reverse → forward → reverse → forward.
(4)	Repeat stop time	Set the interval of time between forward and reverse (stop time).

The [Direction Setting] window will close.

15. Click the [Run] button, and check if the axis runs according to the settings in step 14.



This concludes the procedure.

6.6 Drive Control Panel

The Drive Control Panel allows you to perform test runs of programs and monitor the operating status of programs that are currently in execution. You can send commands, such as start request, stop request, and alarm reset request, from the Drive Control Panel.

6.6.1 [Drive Control Panel] Tab Page

Click the [Drive Control Panel] button in the [My Tool] window to display the [Drive Control Panel] tab page.

(1)
(2)
(3)

(4)

Task	Task1	Task2	Task3	Task4
Main program	MPM001	No allocate	No allocate	No allocate
Motion Program Control Signals	OW0C01 H0000	SW03323 H0000	SW03381 H0000	SW03439 H0000
Bit 0 : Start request	☒	☐	☐	☐
Bit 1 : Pause request	☒	☐	☐	☐
Bit 2 : Stop request	☒	☐	☐	☐
Bit 3 : Single block mode selection	☒	☐	☐	☐
Bit 4 : Single block start request	☒	☐	☐	☐
Bit 5 : Alarm reset request	☒	☐	☐	☐
Bit 6 : Program continuous operation start request	☒	☐	☐	☐
Bit 8 : Skip1 information	☒	☐	☐	☐
Bit 9 : Skip2 information	☒	☐	☐	☐
Bit D : System work number setting	☒	☐	☐	☐
Bit E : Interpolation override setting	☒	☐	☐	☐
Status	IW0C00 H0000	SW03322 H0000	SW03380 H0000	SW03438 H0000
Bit 0 : Running	☒	☐	☐	☐
Bit 1 : Pausing	☐	☐	☐	☐
Bit 2 : Stopped	☐	☐	☐	☐
Bit 4 : Stopped under single block mode	☐	☐	☐	☐
Bit 8 : Alarm	☐	☐	☐	☐
Bit 9 : Stopped at break point	☐	☐	☐	☐
Bit B : Debugging mode	☐	☐	☐	☐
Bit D : Start request signal history	☐	☐	☐	☐
Bit E : No system work error	☐	☐	☐	☐
Bit F : Main program number limit error	☐	☐	☐	☐

No.	Item	Description
(1)	Task	The task numbers are displayed.
(2)	Main program	The main program numbers registered in the M-EXECUTOR are displayed.
(3)	Main Program Control Signals	The ON/OFF status of control signals is displayed. You can click a button to toggle the ON/OFF status. ☒ ON : ON state ☐ ON : OFF state ☐ : Control signal is not assigned
(4)	Status	The ON/OFF status of the execution status is displayed. ☒ : ON state ☐ : OFF state  : Bit 8 (Alarm) is ON

6.6.2 Operating the Drive Control Panel

Use the following procedure to operate the Drive Control Panel.

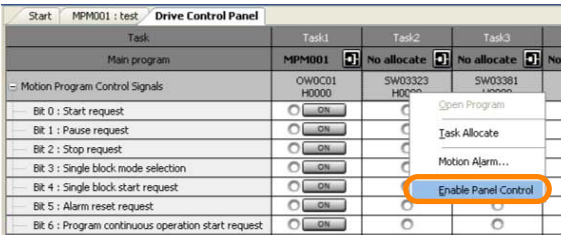

Important

- Carefully check safety in the surrounding area when operating axes.
- Be sure not to overwrite the motion program control registers from a sequence program or ladder program. Doing so may disable the control from the Drive Control Panel.
- Do not simultaneously execute travel command for one axis from more than one program. Unexpected operation may occur.

1. Register the program in the M-EXECUTOR.
- Refer to the following section for details.

 (2) *Registering and Calling Motion Programs in M-EXECUTOR on page 278*

2. Right-click on the [Drive Control Panel] window and select [Enable Panel Control].



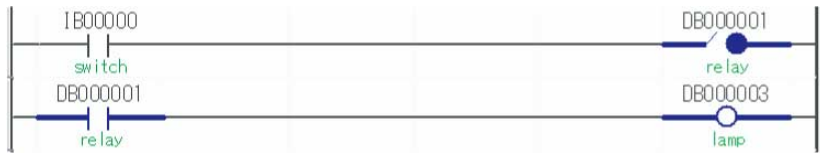
The controls on this panel will be enabled.

3. Click the [ON]/[OFF] buttons for the task to which the motion program to execute was allocated.

This concludes the procedure.

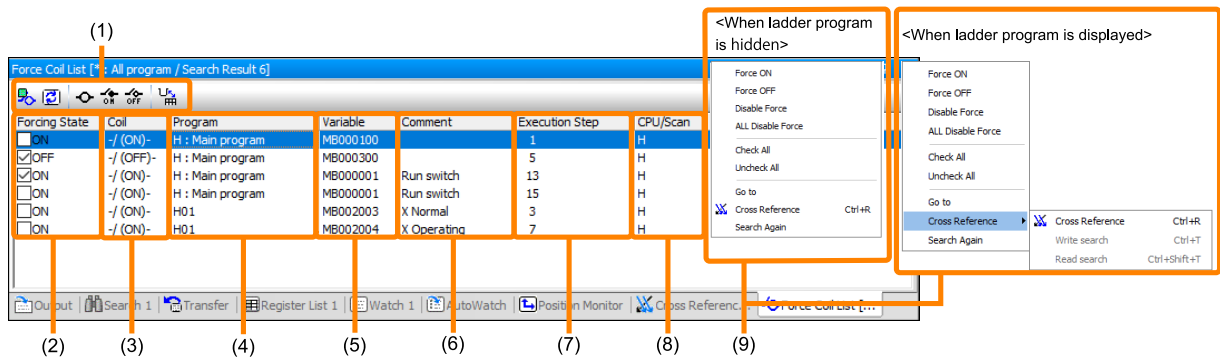
6.7 Forcing Coils ON and OFF

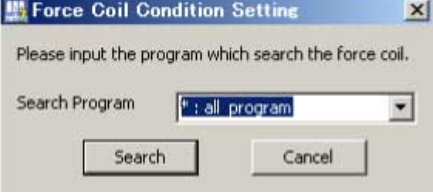
You can specify a coil in a ladder program and force it ON or OFF.
The coil will output ON or OFF regardless of the output of the instruction to the left of the coil.
In the following ladder program example, you can simulate turning ON the switch (IB00000) by forcing the DB000001 relay ON even though the physical switch does not exist.



6.7.1 Operations on the [Force Coil List] Window

Select [Force Coil List] from the [Debug] menu to display the [Force Coil List] window.
The [Force Coil List] window lists the ON/OFF status of the forced coils in the ladder program.
You can select a coil in the window and change or delete the forced ON/OFF status.



No.	Item	Description
(1)	 [Force Coil Condition Setting]	Displays the [Force Coil Condition Setting] window. Select the program and search for coils. 
	 [Search Again]	Searches for coils again after you change the condition setting and so on.
	 [Disable Force]	Cancels the forced status of the selected coils.
	 [Force ON]	Forces ON the selected coils.
	 [Force OFF]	Forces OFF the selected coils.
	 [Switch Variable]	Switches the display of the register that is used by the coil between a register or a variable.
(2)	Forcing State	The forced ON or OFF status of the coils that were found is displayed.

Continued on next page.

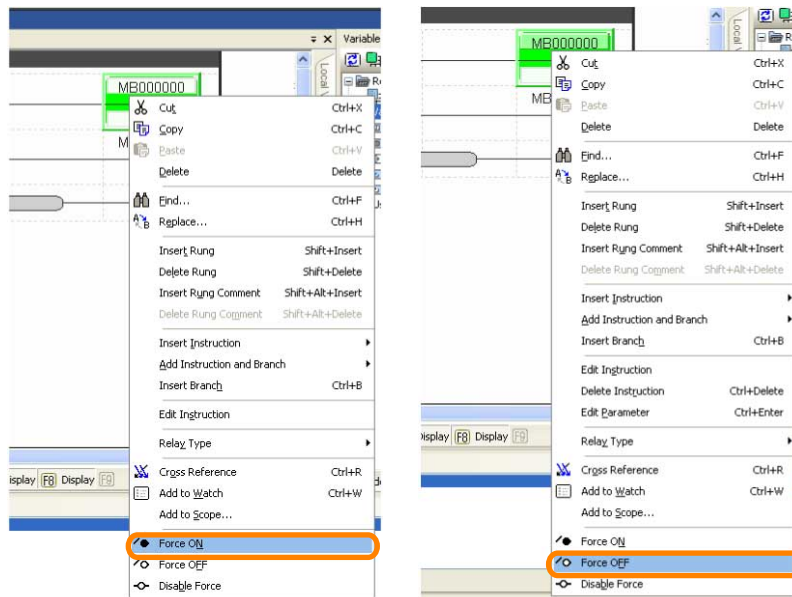
Continued from previous page.

No.	Item	Description
(3)	Coil	The coils that were found are displayed. The display will depend on the type of coil. - Coil: "-/ (ON)-" and "-/ (OFF)-" - Set Coil: "-/ (S ON)-" and "-/ (S OFF)-" - Reset Coil: "-/ (R ON)-" and "-/ (R OFF)-"
(4)	Program	The names of the programs that use the found coils are displayed.
(5)	Variable	The variables or registers that are set for the found coils are displayed.
(6)	Comment	The comments of the variables are displayed.
(7)	Execution Step	The execution step numbers of the found coils are displayed.
(8)	CPU/Scan	This item is displayed only when using a model that supports multiple scans. - When used in a startup drawing or interrupt drawing (i.e., A drawing or I drawing): Displays the CPU number. - When used in a drawing other than those listed above: Displays the scan type or scan number.
(9)	Context Menu	Right-click on the [Force Coil List] window to display the context menu. The displayed menu depends on whether the Edit Ladder Program window is displayed.
	[Force ON]	Refer to item (1) in this table.
	[Force OFF]	
	[Disable Force]	
	[All Disable Force]	Cancels the forced status of all coils displayed in the current window, regardless of the check box selections.
	[Check All]	Click this item to select all check boxes in the (2) [Forcing State] column of this table.
	[Uncheck All]	Click this item to clear all check boxes in the (2) [Forcing State] column of this table.
	[Go to]	The target location in the program will be displayed.
	[Cross Reference] [Write search] [Read search]	A cross reference, write search, or read search for the row of registers that was right-clicked will be executed, and the results will be displayed in the [Cross Reference] window. Refer to the following section for details on the cross reference.  6.10 Cross Reference on page 408
	[Search Again]	Refer to item (1) in this table.

6.7.2 Operations on the Edit Ladder Program Window

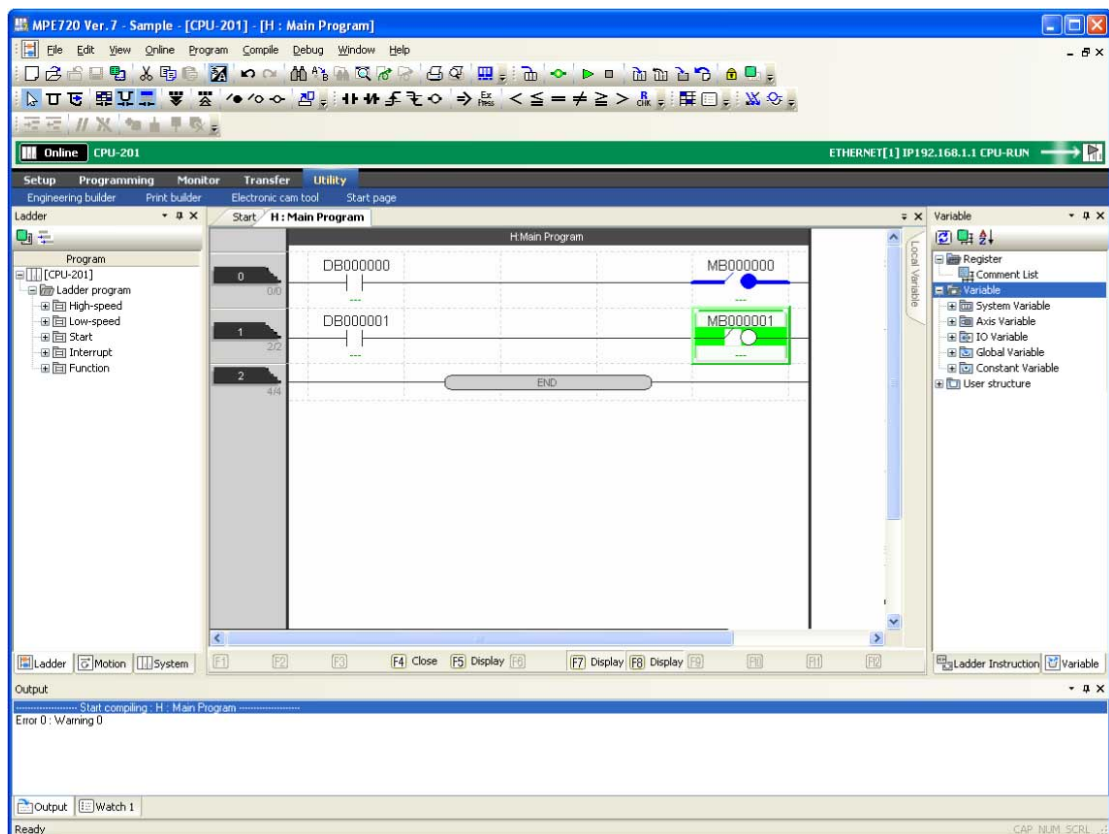
Use the following procedure in the Edit Ladder Program Window to force the specified coil ON or OFF.

1. Right-click the coil to control, and select [Force ON] or [Force OFF].

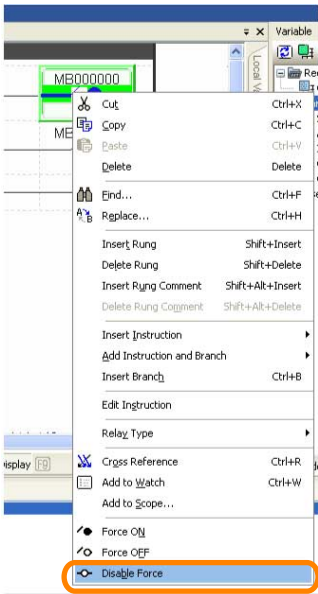


2. Confirm that the coil is forced ON or OFF.

- Forced ON state:
- Forced OFF state:



Information To release a coil, right-click the coil, and select [Disable Force].



This concludes the procedure.

6.8 Search

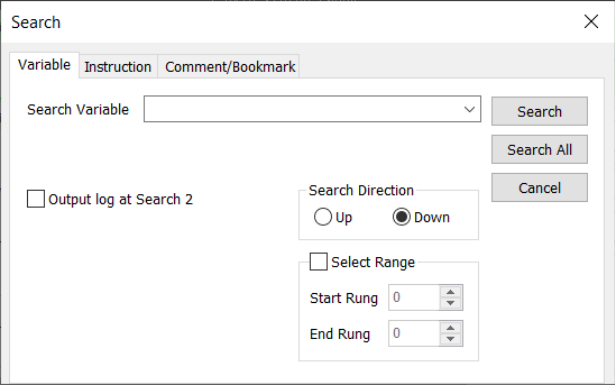
You can search for variables, instructions, and comments used in a program. There are the following two methods that you can use for searching.

- Searching within a program (searching within the displayed program)
- Searching within a project (searching within programs in the open project file)

The procedures are given below.

6.8.1 Searching within a Program: Ladder Program

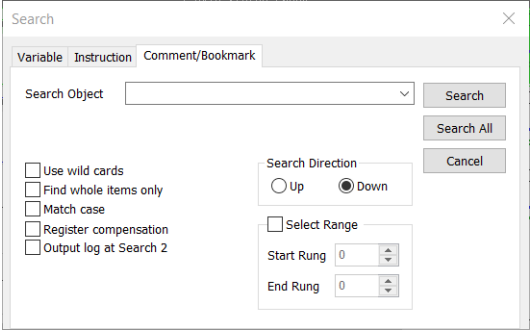
When a ladder program is displayed, select [Find] from the [Edit] menu to display the [Search] window.



- [Variable] tab page: Allows you to search for variables or registers. You can also enter the variable by copying it from the [Variable] window.
- [Instruction] tab page: Allows you to search for instructions or instruction keys.
- [Comment/Bookmark] tab page: Allows you to search for object comments, rung comments, program comments, expression comments, and bookmark names.

Information

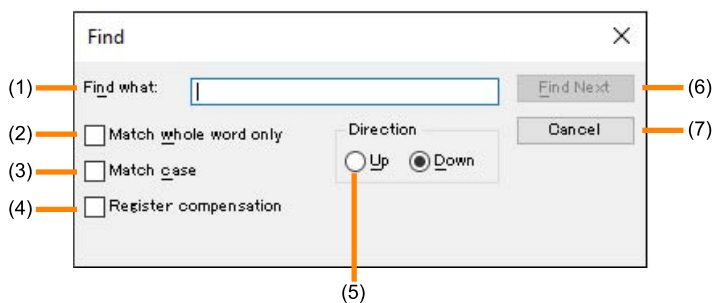
- The search results are output to the [Search 1] window by default. Select the [Output log at Search 2] check box to display the search results in the [Search 2] window without changing the contents of the [Search 1] window.
- The detailed setting items on the [Comment/Bookmark] tab page are described below.



Item	Description
Use wild cards	Select this check box to use wildcard characters (* and ?) in the search string.
Find whole items only	Select this check box to search for comments where the string in the comment box is exactly the same as the search string.
Match case	Select this check box to search by differentiating between uppercase and lowercase characters.
Register compensation	Select this check box to search by converting search strings that are recognized as registers into register notation.

6.8.2 Searching within a Program: Motion Program

When a motion program is displayed, select [Find] from the [Edit] menu to display the [Search] window.

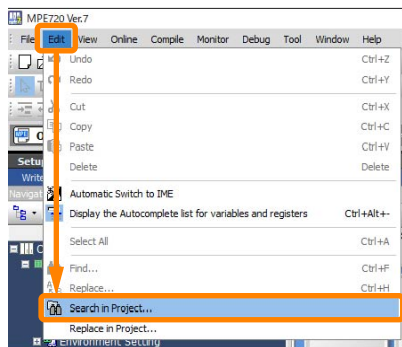


No.	Item	Description
(1)	Find what	Enter the text string to search for.
(2)	Match whole word only	Select this check box to match the text string entered in [Find what] as a whole word only.
(3)	Match case	Select this check box to perform a case-sensitive search.
(4)	Register compensation	Select this check box to search by converting search strings that are recognized as registers into register notation.
(5)	Direction	The search will be performed in the selected direction.
(6)	[Find Next] Button	Click this button to search for the text string entered in [Find what] from the current cursor position.
(7)	[Cancel] Button	Click this button to close the [Search] window.

6.8.3 Search in Project

You can search in a project only when offline.

1. Click [Edit] - [Search in Project] from the menu.



The [Search in project] window will be displayed.

2. Enter the search conditions and click [Search All].

Search in project

Variable

Instruction

Address

Comment Text

Line Comment

Search Variable

Q800001

Search All

Target Program

Text

*

Cancel

Program

Ladder program

Motion program

Sequence program

Output log at Search 2

- [Variable] tab page: Allows you to search for variables or registers. You can also enter the variable by copying it from the [Variable] window.
- [Instruction] tab page: Allows you to search for instructions or instruction keys.
- [Address] tab page: Allows you to search for addresses.
- [Comment Text] tab page: Allows you to search for rung comments, program comments, and bookmark names.
- [Line comment] tab page: Lists rung comments, program comments, and bookmark names in the specified range in the [Search] window. If you select the [Display First Line of Line Comment Only] check box, only the first line will be displayed when there are multiple lines of comments.

Information

- The search results are output to the [Search 1] window by default. Select the [Output log at Search 2] check box to display the search results in the [Search 2] window without changing the contents of the [Search 1] window.
- Insert commas and spaces to specify more than one program in [Text] under [Target Program]. The following wildcard (*) combinations can also be used:

Examples of [Text] Input		Description
Ex. 1	*	Performs the search in all programs in the project.
Ex. 2	H*,MPM*	Performs the search in all H drawings in the project and in all main programs (MPM).
	H* MPM*	

Add the wildcard after the project type. Other uses, such as "H01.*", are not allowed.

6.9 Replace

You can replace variables, comments, and other items used in a program. There are the following two methods that you can use for replacing.

- Replacing within a program (replacing within the displayed program)
- Replacing within a project (replacing within programs in the open project file)

The procedures are given below.

6.9.1 Replacing within a Program: Ladder Program

When a ladder program is displayed, select [Replace] from the [Edit] menu to display the [Replace] window.

The screenshot shows the 'Replace' dialog box with the 'Variable' tab selected. It contains fields for 'Search Variable' and 'Replace Variable', both with dropdown arrows. Below these are buttons for 'Search', 'Replace', 'Replace All', and 'Cancel'. There is a checkbox labeled 'Copy comments from search variables to replace variables'. To the right, there is a 'Search Direction' section with radio buttons for 'Up' and 'Down' (where 'Down' is selected). Below that is a 'Select Range' section with 'Start Rung' and 'End Rung' fields, both set to '0'.

- [Variable] tab page: Allows you to replace variables or registers. You can also enter the variable by copying it from the [Variable] window.
- [Comment/Bookmark] tab page: Allows you to replace object comments, rung comments, program comments, expression comments, and bookmark names.

Information

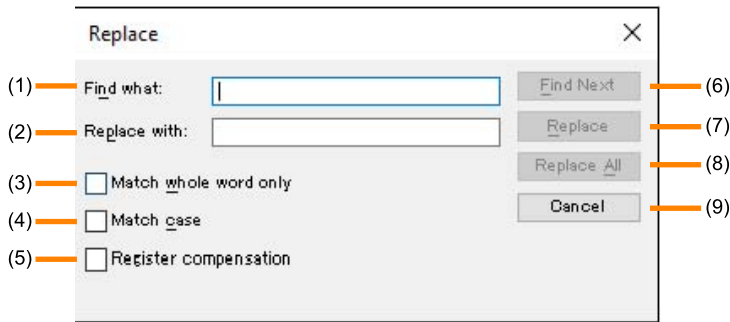
The detailed setting items on the [Comment/Bookmark] tab page are described below.

The screenshot shows the 'Replace' dialog box with the 'Comment/Bookmark' tab selected. It contains fields for 'Search Object' and 'Replace Object', both with dropdown arrows. Below these are buttons for 'Search', 'Replace', and 'Cancel'. There are four checkboxes: 'Use wild cards', 'Find whole items only', 'Match case', and 'Register compensation'. To the right, there is a 'Search Direction' section with radio buttons for 'Up' and 'Down' (where 'Down' is selected). Below that is a 'Select Range' section with 'Start Rung' and 'End Rung' fields, both set to '0'.

Item	Description
Use wild cards	Select this check box to use wildcard characters (* and ?) in the search string. If you enter an * or a ? character in [Replace Variable] or [Replace Object], they will not be handled as wildcards, but as regular characters.
Find whole items only	Select this check box to search for comments where the string in the comment box is exactly the same as the search string.
Match case	Select this check box to search by differentiating between uppercase and lowercase characters.
Register compensation	Select this check box to search by converting search strings that are recognized as registers into register notation.

6.9.2 Replacing within a Program: Motion Program

When a motion program is displayed, select [Replace] from the [Edit] menu to display the [Replace] window.



No.	Item	Description
(1)	Find what	Enter the text string to search for.
(2)	Replace with	Enter the text string to use to replace the search text string.
(3)	Match whole word only	Select this check box to match the text string entered in [Find what] as a whole word only.
(4)	Match case	Select this check box to perform a case-sensitive search.
(5)	Register compensation	Select this check box to search by converting search strings that are recognized as registers into register notation.
(6)	[Find Next] Button	Click this button to search for the text string entered in [Find what] from the current cursor position.
(7)	[Replace] Button	Click this button to replace the text string that was found with the text string entered in [Replace with], and then start the next search.
(8)	[Replace All] Button	Click this button to replace all matches of the text string entered in [Find what] with the text string entered in [Replace with].
(9)	[Cancel] Button	Click this button to close the [Replace] window.

6.9.3 Replacing within a Project

1. **Create a backup of the project file before replacement as necessary.**

Refer to the following section for details on backups.

 [2.2.4 Saving a New Project File on page 102](#)



Important

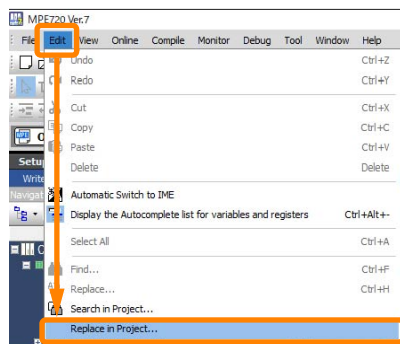
After you perform a replace operation in a project, the project file will be compiled and saved, and there will be no way to return to the previous version. Always create a backup before performing replacements on important files.

2. **If a CP ladder program is already open in Engineering Builder, close it.**

Information

If a CP ladder program is already open in the Engineering Builder before the replacement is executed, the program will not be automatically updated. Close the CP ladder program before executing the replacement operation.

3. Click [Edit] - [Replace in Project] from the menu.



The [Replace in the project] window will be displayed.

4. Enter the replacement conditions and click [Replace All].

• [Register] Tab Page

Replace in the project

Register Address

Search Register: B00001

Replace Register: B00000

☐ Move comments from search registers to replace registers. Target Program

☐ Leave search register comments. ☐ Text *

☐ Switch search registers and replace registers. ☒ Program

- ☒ Ladder program
- ☐ Motion program
- ☐ Sequence program

When the program is opened by Engineering Builder to the replacing execution, the program is not updated automatically. Please open again after closing the program or executing.

Information

Insert commas and spaces to specify more than one program in [Text] under [Target Program]. The following wildcard (*) combinations can also be used:

Examples of [Text] Input		Description
Ex. 1	*	Performs the replacement in all programs in the project.
Ex. 2	H*,MPM*	Performs the replacement in all H drawings in the project and in all main programs (MPM).
	H* MPM*	

Add the wildcard after the project type. Other uses, such as "H01.*", are not allowed.

• [Address] Tab Page

Replace in the project

Register Address

Source				Destination				Unit	Target Program	Copy Reg
Kind	Type/Circuit	Address/Axis No.	Direction	Kind	Type/Circuit	Address/Axis No.	Sizes			
1			<=>						*	Do n
2			=>							Do n
3			=>							Do n
4			=>							Do n
5			=>							Do n
6			=>							Do n
7			=>							Do n
8			=>							Do n
9			=>							Do n
10			=>							Do n
11			=>							Do n
12			=>							Do n
13			=>							Do n
14			=>							Do n
15			=>							Do n
16			=>							Do n
17			=>							Do n

When the program is opened by Engineering Builder to the replacing execution, the program is not updated automatically. Please open again after closing the program or executing.

Information

If you click the [Import] button, the previously exported replacement settings can be imported.
If you click the [Export] button, the current replacement settings can be exported.

6.10 Cross Reference

Cross referencing allows you to check whether a register is used in a program, and where it is used. If the value of a register is changes from its set value, it means that the value of the register may have been over-written somewhere in the program. In this case, you can search for the registers using cross references and locate the program that is overwriting them.

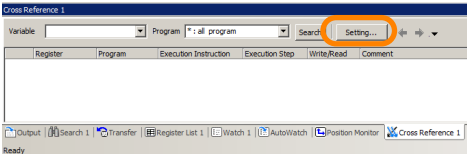
6.10.1 Cross Referencing

Use the following procedure to search for registers using cross referencing.

Information

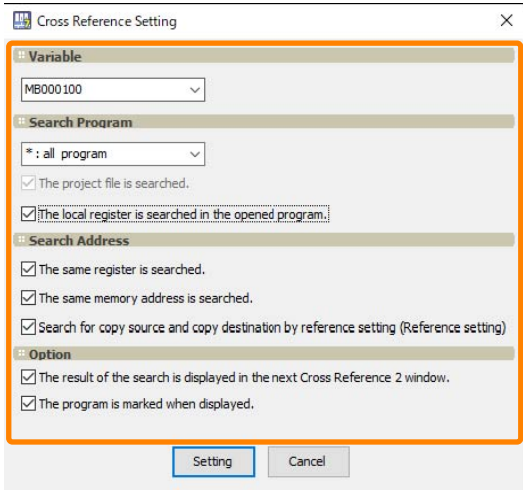
Click the register to search for in the Edit Ladder Program window, and then hold down the **Ctrl** key and press the R key. This allows you to search the register in a single operation.

1. **Select [Cross Reference] from the [Debug] menu.**
The [Cross Reference] window will be displayed.
2. **Click the [Setting] button.**



The [Cross Reference Setting] window will be displayed.

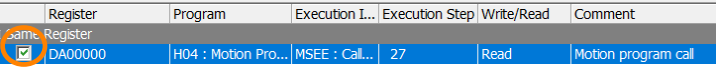
3. **Set the following items, and then click the [Setting] button.**



Item	Description
Variable	Enter the variable or register to search.
Search Program	Enter the programs to search.
The project file is searched	Select this check box to search for the register from the project file when using a project link connection. Clear this check box to search for the register from the controller. This item is disabled when using a model that supports multiple scans.
The local register is searched in the opened program	Select this check box to search local registers (D registers) in the one drawing that is currently active. Clear this check box to search local registers (D registers) in the specified drawing.

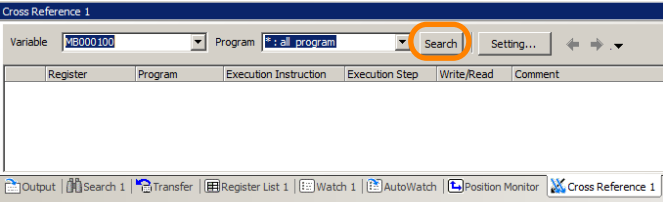
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Item	Description
The same register is searched	Select this check box to search for the same register as the specified register. For example, the same register will be displayed in a list when you search the following instruction for MW00000. Clear this check box if it is not necessary to search for the same register. 
The same memory address is searched	Select this check box to search for the same memory address. For example, registers with the same memory address will be displayed in a list when you search the following instruction for a different data type, such as ML00000. Clear this check box not to search for the same memory address. 
Search for copy source and copy destination by reference setting (Reference setting)	This item is displayed only when using a model that supports multiple scans. Select this check box when executing a cross reference that includes the registers set in [Copy Register Settings] on [Register Map].
The result of the search is displayed in the next Cross Reference 2 window	Select this check box to display the search results in a separate cross reference window when you perform cross referencing. Cross reference results can be displayed in up to 3 windows. Clear this check box to display the search results by updating the same cross reference window.
The program is marked when displayed	Select this check box to add a check mark to the left of the register when a program that displayed in the search results is open. 

The [Cross Reference Setting] window will close, and the set conditions will be displayed in the [Cross Reference] window.

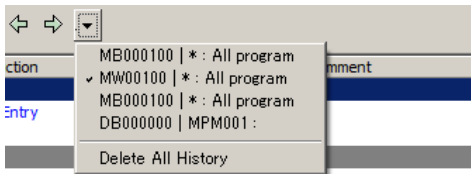
4. Click the [Search] button.



The search will be executed, and the search results will be displayed in the [Cross Reference] window.

(6)(5)(4)

Register	CPU/Scan	Source/Dest...	Program	Execution Instruction	Execution Step	Write/Read	Comment
Same Register							
☐ MB000000	CPU0	Source	A : Main Program	NOC : NO Contact	0	Read	
☐ MB000000	H	Source	FUNC01 : User Function 01	NOC : NO Contact	0	Read	
☐ MB000000	H	Source	H : Main Program	NOC : NO Contact	0	Read	
☐ MB000000	CPU0	Source	I : Main Program	NOC : NO Contact	0	Read	
☐ MB000000	L	Source	L : Main Program	NOC : NO Contact	0	Read	
Same Memory Address							
☐ MW000000	H	Source	H : Main Program	LOAD : Integer Entry	2	Read	
Reference setting							
☐ MB1499000	Scan2	Destination	-	-	-	-	-

No.	Item	Description
(1)	Same Register	Information is displayed on locations in the searched program where the same register is used as the search variable (search register). • [CPU/Scan] column: Displayed only when using a model that supports multiple scans. The number of the scan to which the relevant program belongs is displayed. If the search target is an I, O, or S register, the CPU number is displayed. For a function under a startup or interrupt scan, the scan type (i.e., [Start] or [Interrupt]) is displayed. • [Source/Destination] column: This column is displayed only when using a model that supports multiple scans. Source: The relevant register is not included in the register range set in [Source Registers] on [Register Map]. Destination: The relevant register is not included in the register range set in [Destination Registers] on [Register Map]. • [Write/Read] column Read (blue text): The register is used in reading (reference). Write (blue text): The register is used in writing.
(2)	Same Memory Address	Information is displayed on locations in the searched program where the used memory overlaps with the search variable (search register). <Example> For example, MW00001 and ML00000 are different registers, but they used the same memory address because ML00000 used two words of memory (MW00000 and MW00001). A search is made for registers like these. The details on the columns are the same as (1) in this table.
(3)	Reference setting	This area is displayed only when using a model that supports multiple scans and the [Search for copy source and copy destination by reference setting (Reference setting)] check box is selected on the [Cross Reference Setting] dialog box. • [Register] column The destination register addresses or the source register addresses are displayed. You can check which register addresses are displayed with the label of the [Source/Destination] column. • [CPU/Scan] column The number of the scan to which the relevant program belongs is displayed. If the search target is an I, O, or S register, the CPU number is displayed. • [Source/Destination] column Source: The search register is not included in the register range set in [Source Registers] on [Register Map]. Destination: The search register is not included in the register range set in [Destination Registers] on [Register Map].
(4)	History Button	Displays a cross reference history. Select an entry in the displayed history list to display the previous reference results and the drawing for the reference. Up to 20 records are saved in the history. 
(5)	Next Button	Every time you click this button, the next item in the cross reference history will be displayed.
(6)	Previous Button	Every time you click this button, the previous item in the cross reference history will be displayed.

Information Double-click on a row to go to the line with the instruction in the program where the search target register is used. However, you cannot go to a line from the registers listed in [Reference setting].

This concludes the procedure.

6.10.2 Write Searches and Read Searches

To search only for registers that are used to write data (i.e., output registers), perform a write search.

To search only for registers that are used to read data (i.e., input registers), perform a read search.

1. **Click the register to search for in the Edit Ladder Program Window.**
2. **Select [Cross Reference] - [Write search] or [Read search] from the [Debug] menu.**

The search results will be displayed in the [Cross Reference] window and the drawing in which the selected register is written or read will be displayed.

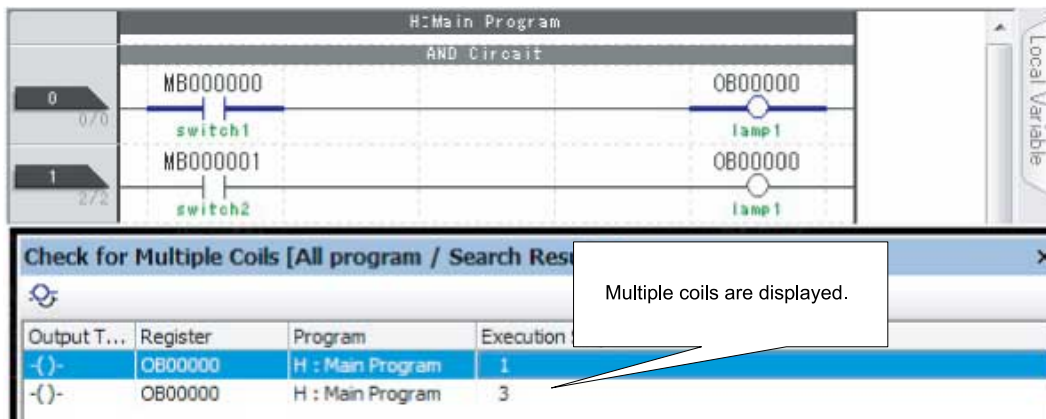
This concludes the procedure.

6.11 Check for Multiple Coils

Checking for multiple coils allows you to check for multiple coils (different coils that use the same register) in an entire ladder program and display the search results.

Select [Check for Multiple Coils] from the [Debug] menu to start searching for multiple coil and display the results in the [Check for Multiple Coils] window.

Double-click a row in the [Check for Multiple Coils] window or right-click and click [Go to] to display the target location in the program.



Information

- When you use a project link connection, the data in the project file is used. Sometimes the displayed results do not match the data in the linked controller.
If you check for multiple coils when using a project link connection, first always transfer the controller data to the project file.
- If [Enable to multiple coil check] is enabled in the compile options, a search for multiple coils will be performed during compilation and the results will be displayed in the [Output] window.
- Right-click a row in the [Check for Multiple Coils] window and click [Cross Reference] to execute a cross reference for the target row of registers. The results will be displayed in the [Cross Reference] window. Refer to the following section for details on the cross reference.

 [6.10 Cross Reference on page 408](#)

6.12 Simulation

You can check the operation of a project file by using the simulation even in an offline environment.

6.12.1 Restrictions

The restrictions for running a simulation are listed below.

(1) Requirements for Running a Simulation

The requirements for running a simulation are listed below.

- The MPE720 must be offline and a project must be opened.
- A simulation must not be running.
If you started multiple instances of the MPE720, confirm that a simulation is not running in all of the windows.
- The MPE720 must be operating in one of the following environments:
 - Windows 10
 - Windows 11
- The controller must be one of the following models:

Series	Model
MP3000	CPU-201
	CPU-202
	CPU-301(□□axes)
	CPU-302(□□axes)

(2) Restrictions When a Simulation Is Running

The following functions cannot be used when a simulation is running.

Function	Operation
Transfer	[Online] - [Transfer] from the menu bar
	[Transfer] - [Transfer] from the launcher
	[Transfer] on the [My Tool] window
	[Online] - [Write to Controller] from the menu bar
	[Write to Controller] button on the toolbar
	[Transfer] - [Write into controller] from the launcher
	[Online] - [Read from Controller] from the menu bar
	[Read from Controller] button on the toolbar
	[Transfer] - [Read from controller] from the launcher
Save to Flash Memory	[Online] - [Save to Flash] from the menu bar
	[Save to Flash] button on the toolbar
	[Transfer] - [Save to flash] from the launcher
	[Save to Flash] on the [My Tool] window
	[FLASH] button on the status bar
	[Save to Flash] button on the [System Monitor] window
Security Settings	[Online] - [Online Security Setting] from the menu bar

Continued on next page.

Function		Operation
Print Builder		[Tool] - [Print builder] from the menu bar
		[Print] button on the toolbar
		[Utility] - [Print builder] from the launcher
		[File] - [Print] from the menu bar on the [Engineering Builder] window
		[Print] button on the toolbar on the [Engineering Builder] window
Test Run		[Online] - [Test Run] from the menu bar
		[Test Run] button on the toolbar
		[Test Run] on the [My Tool] window
Axis Setup Wizard		[Tool] - [Axis Setup Wizard] from the menu bar
		[Axis Setup Wizard] button on the toolbar
		[Axis Setup Wizard] on the [My Tool] window
Logging		[Start] button on the [Logging] window
Calendar Setting		[Setup] - [Calendar Setting] on the [Environment Setting] window
Communications Setting		[Online] - [Communications Setting] from the menu bar
		[Communications Setting] button on the toolbar
		[Communications Setting] on the [My Tool] window
Module Configuration Definition	Self Configuration	[MC-Configurator] window - [Self Configuration] - [All modules]
		[MC-Configurator] window - [Self Configuration] - [specified module]
		[MC-Configurator] window - [Self Configuration] - [specified module (MECHATROLINK auto allocation)]
	Servo parameter settings	[MC-Configurator] window - [Work Space] window - [Servo Parameter]
		[MC-Configurator] window - [Function List] window - [Servo Parameter]
	Detailed Servo Settings	[MC-Configurator] window - [Function List] window - [Detailed Servo Settings]
	Monitor	[MC-Configurator] window - [Work Space] window - [Servo Monitor]
		[MC-Configurator] window - [Function List] window - [Servo Monitor]
	Servo tuning	[MC-Configurator] window - [Work Space] window - [Fixed Parameter]
		[MC-Configurator] window - [Function List] window - [Servo Tuning]
Reset CPU Memory		[Online] - [Reset CPU Memory] from the menu bar
Servo Tracing		[Sampling & Trigger Setting] window - [ServoTrace setting] button

(3) Restrictions on Operation

Since the simulation runs the project file in a virtual controller, it has the following differences from when a project file is run in a real controller.

Function	Restrictions
General	Data, such as programs and table data, may not be displayed when the simulation is started for a project file that will fail its transfer (e.g., exceeded the program size). The simulation may not be able to start for a program that will cause a watchdog timer error (alarm code: E001). Examples of this include a program with an infinite loop and a BPRESS instruction with Src and Dest areas that overlap.
MECHATROLINK Communications Device (SVC)	Access to devices is not executed. The operation differs as listed below according to the connected device. • [Servo]: Operation changes according to the setting of Fixed parameter 0: Operation Mode Selection. – 0 (Operation mode): Same operation as when set to 2 (Simulation mode). – 1 (Unused axis): No difference in operation. – 2 (Simulation mode): No difference in operation. – 3 (SERVOPACK transmission reference mode): Same operation as when an alarm occurs <i>*/</i> because the simulation is not supported. To prevent the same operation as when an alarm occurs, select a value other than "3" or delete the connected device settings. • [Inverter]: Same operation as when an alarm occurs <i>*/</i> because the simulation is not supported. To prevent the same operation as when an alarm occurs, delete the connected device settings. • [Stepping]: Same operation as when an alarm occurs <i>*/</i> because the simulation is not supported. To prevent the same operation as when an alarm occurs, delete the connected device settings. • [I/O]: Same operation as when an alarm occurs <i>*/</i> because the simulation is not supported. To prevent the same operation as when an alarm occurs, disable [Input]/[Output] (select the check boxes). If the simulation is started with the SVC32 module in slave mode and links are allocated, the module status will remain the [Waiting for initialization] status and not change to [Operating (Driving)]. To prevent this issue, write the module configuration definition after you start the simulation.
EtherNet/IP Communications Device (218IFG)	Communications are not possible with external devices when the connection setting is "Adapter" in the EtherNet/IP connection list.
Optional Module	Option modules (excluding the rack expansion interface unit, power supply unit, and CPU unit) operate as not installed even when set.
[Servo] - [Setting Parameter]	If the simulation is started with [0: Run command setting] - [[Bit0] Servo ON] set to "1: ON" in [Initial value], the status of the MECHATROLINK communications device (SVC) will remain the [Waiting for Initialization] status and not change to [Running].
Temperature Sensor	The temperature sensor does not operate because the value is not updated.
Fan Status	The fan stopped status cannot be detected.
Battery Status	Always "Normal."
Transmission Cycle and Scan Time Setting	If the settings are configured so that transmission cycle > scan time, the run status of the axis will be 0 and the servo cannot be turned ON. To prevent this issue, configure the settings so that transmission cycle ≤ scan time. Additionally, if you are using CPU-201, the minimum value of the communications cycle (i.e., the cycle at which data is updated) is 0.250 ms, so the servo cannot be turned ON when the scan time and transmission cycle are set to 0.125 ms. To prevent this issue, set the transmission cycle and scan time to 0.250 ms or more. Set the transmission cycle in [MC-Configurator] window - [Detail Definition] window. Set the scan time in [Environment Setting] window - [Setup] - [Scan Time Setting].

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Function	Restrictions
Scan Time Setting	Since the simulation runs with [Setting Value] = [Current Value], if the setting value during the simulation is changed to [Setting Value] $\geq$ [Current Value], the scan time will always be [Setting Value] = [Current Value] = [Maximum Value]. Additionally, if the setting value during the simulation is changed to [Setting Value] < [Current Value], the scan time will be [Setting Value] = [Current Value], but [Maximum Value] will not change. [Current Value] and [Maximum Value] are saved only when the scan time is changed. This means that if the simulation is ended without changing the scan time after the maximum value is cleared, [Current Value] and [Maximum Value] will hold the values before the maximum value was cleared.
Scan Processing	Refer to the following section for details.  (a) Scan Processing on page 417
Calendar	The displayed calendar information is different from when the project file is run in a real controller. The simulation is set to the date and time of the personal computer when the simulation is started. Additionally, the elapsed time of the calendar during the simulation will not match the system operating time.
Transfer	[Environment Setting] window - [Transfer] - [Save to Flash] - [Automatic Run Save to Flash Memory] Operates with the [No] setting even if set to [Yes].
FTP Client	The FTP client does not operate even if the [Environment Setting] window - [Setup] - [FTP Client] is set.
Battery Backup	Even if [Environment Setting] window - [Setup] - [System Setting] - [Battery Connection] is set to [Not connect], the values of M registers will not be cleared to zero. The simulation is not backed up by battery, so the values in the project file are applied to the values in the simulation when it is started.
[Alarm/Warning] Window	Alarm details for devices connected to the MECHATROLINK communications device (SVC) will not be displayed in the window or tab page *1.
[System Monitor] Window	
[Alarm Monitor] Tab Page	
[Axis Monitor] Tab Page	
[System Monitor] Window	Alarms may occur in an intermittent manner depending on the set times of the scan times. To keep alarms occurring in a continuous manner (e.g., to perform alarm analysis), adjust the scan time setting values so that the result of the equation shown below becomes smaller. Low-speed scan time / High-speed scan time For example, when the high-speed scan is set to 0.25 ms, the low-speed scan is set to 200 ms, and alarms occur in an intermittent manner, increase the setting value of the high-speed scan or decrease the setting value of the low-speed scan. Set the scan time in [Environment Setting] window - [Setup] - [Scan Time Setting].
Tracing	If the total of [Trace buffer size] for traces with [Tracing Mode Setting] set to "MP2000 Compatible" on the [Sampling & Trigger Setting] window exceeds the maximum applicable size of the model (i.e., 1024 kilowords for the MP3000 series), the simulation operates with the trace definitions disabled. To prevent this operation, configure one of the following: - Configure the settings so that the total of [Trace buffer size] $\leq$ the maximum applicable size of the model. - Disable the trace definition settings for traces not used recently.
Ladder Program	When you click the [Analyze] button on the [System Monitor] window, [Name of program where alarm occurred] will be displayed but [Execution step where alarm occurred] will be "___".
Ladder Instructions	Refer to the following section for details.  (b) Ladder Instruction on page 418
Motion Instructions	Refer to the following section for details.  (c) Motion Instructions on page 420

*1 In the simulation, the alarm details are not displayed on the following windows and tab pages.

- [Alarm/Warning] window
- [System Monitor] window
- [Alarm Monitor] tab page
- [Axis Monitor] tab page

Alarm details are not displayed on the above windows and tab pages, but you can check the status of alarms that have occurred by checking the alarm details in the system registers and on the [Register List] window, the [Watch] window, and other windows. The details listed below cover the alarm occurrence conditions and alarm details when alarms are assumed to be displayed on the windows and tab pages related to alarms and monitors. To check the alarm details in the system registers or other registers, check the corresponding registers below.

Alarm Occurrence Condition	Alarm Details
MECHATROLINK restrictions are not satisfied.	[System Monitor] window: A401 (MECHATROLINK Restrictions Error)
The following connected devices are set for the MECHATROLINK communications device (SVC). • I/O (note that the alarm will not occur if [Input] or [Output] is disabled)	[System Monitor] window: A101 (I/O Error (Rack 1)) Note: If the connected device is [I/O], this alarm will be displayed over multiple lines in [System Monitor] - [Alarm history].
The following connected devices are set for the MECHATROLINK communications device (SVC). • Servo (note that an alarm will occur only if fixed parameter 0 (Operation Mode Selection) is set to "3: SERVOPACK Transmission Reference Mode") • Inverter • Stepping	[Alarm/Warning] window • Bit 9 in IL□□□02 (Servo Driver Communications Warning) • Bit 12 in IL□□□04 (Servo Driver Command Timeout Error)
A motion instruction was issued to an axis allocated to a motion control module (option module).	[Axis Monitor] tab page or [Alarm Monitor] tab page: 008Bh (Command Cannot Be Executed)

(a) Scan Processing

The differences between the scan processing in the real controller and in the simulation are shown below.

For the real controller, each scan is executed by interrupting the scan time cycle. The low-speed scan has a lower priority than the high-speed scan and is therefore executed in the idle time of the high-speed scan.

The simulation, however, adds up the high-speed scan time at each time the high-speed scan is executed, and then it executes the low-speed scan when this accumulated time is greater than or equal to the low-speed scan time. This means the actual elapsed times and the times for the set scan times will not match.

An example of the differences between the scan processing in the real controller and in the simulation is shown below.

Status	Scan Processing Example					
Real controller	Low-speed scan time High-speed scan time High-speed scan time High-speed scan time High-speed scan time					
	DWG.H (High-speed scan process drawing)					
	DWG.L (Low-speed scan process drawing)					
	Background*1					
	: Actual processing time for each scan					
Simulation	In this example, the high-speed (H) scan time is set to 4 ms and the low-speed (L) scan time is set to 16 ms.					
	4 ms is added each time the high-speed scan is executed because the high-speed (H) scan time is set to 4 ms. The actual elapsed time for each scan may not be 4 ms. The high-speed scan is also executed 4 times, so the simulation detects 4 times x 4 ms = 16 ms. The actual elapsed time may not be 16 ms.					The simulation has detected that 16 ms (i.e., the low-speed (L) scan time) has elapsed, so the low-speed scan is executed.
	DWG.H (High-speed scan process drawing)					
	DWG.L (Low-speed scan process drawing)					
	Background*1	At what point the background processing is executed is not known because it has no priority.				
	: Actual processing time for each scan					

*1 This time is for executing the system's internal processing (e.g., communications processing).

(b) Ladder Instruction

Since the simulation runs the project file in a virtual controller, it has the following differences from when a project file is run in a real controller.

Information Text has been omitted for instructions with the same behavior.

Instruction		Restrictions
Relay Instructions		
	TON[1ms]	The scan setting is used as the elapsed time.
	TOFF[1ms]	
	TON[10ms]	
	TOFF[10ms]	
	TON[1s]	
	TOFF[1s]	
	ONP-COIL	If an index register is used, an error occurs.
	OFFP-COIL	
	Numeric Operations	

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Instruction		Restrictions
SUB		For a real number, an error may occur.
ADD		
MUL		
DIV		
REM		An error may occur.
INV		For a real number and non-numeric value, the result and operation error may differ.
ABS		
Logical Operations/Comparisons		
<		For a real number and non-numeric value, the result and operation error may differ.
≤		
=		
≠		
≥		
>		
RCHK		For a real number and non-numeric value, the result and the conditions for an operation error to occur may vary.
Basic Functions		
SQRT		For a real number, the result and operation error may differ.
SIN		
COS		
TAN		
ASIN		
ACOS		
ATAN		
EXP		
LN		
LOG		
DDC Instructions		
DZA		For a real number and non-numeric value, the result and operation error may differ.
DZB		
LIMIT		
PI		For a real number, an error may occur.
PD		For a real number and non-numeric value, the result and operation error may differ.
PID		
LAG		
LLAG		
FGN		
IFGN		
LAU		
SLAU		
System Functions		

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Instruction		Restrictions
	MLNK-SVW	The instruction is compiled and executed, but the Error output is turned ON.
	MLNK-SVR	
	FLASH-OP	
	ITRC-RD	
	ICNS-WR	
	ICNS-RD	
	SVTRC	
C Language Program		
	C-FUNC	The instruction is compiled and executed, but the Error output is turned ON.
	TSK-CTRL	
Storage Operation		
	FTPPUT	The instruction is compiled and executed, but the file transfer is not performed.

(c) Motion Instructions

Since the simulation runs the project file in a virtual controller, it has the following differences from when a project file is run in a real controller.

Information Text has been omitted for instructions with the same behavior.

Instruction		Restrictions
Sequence Instructions		
SIN	For a real number, the result and operation error may differ.	
COS		
TAN		
ASN		
ACS		
ATN		
SQT		
Operation Instructions		
+	For a real number, an error may occur.	
-		
*		
/		
==	For a real number and non-numeric value, the result and operation error may differ.	
<>		
>		
<		
>=		
<=		
Vision Instructions		

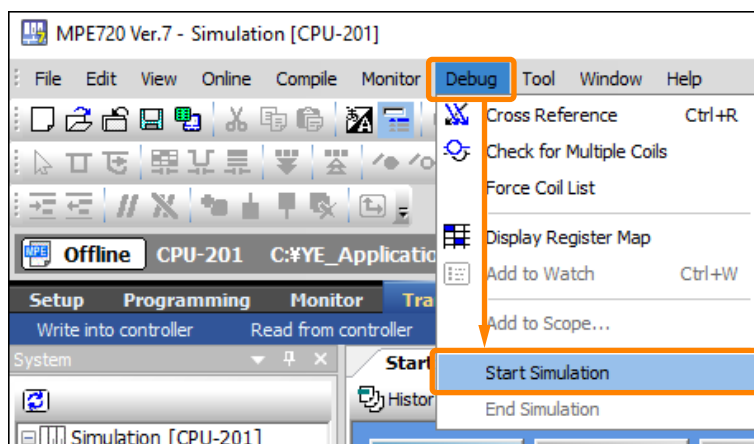
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Instruction	Restrictions
VCAP1	Not supported (The instruction is compiled and executed, but nothing happens.)
VCAPS	
VFIL	
VANA	
VRES	

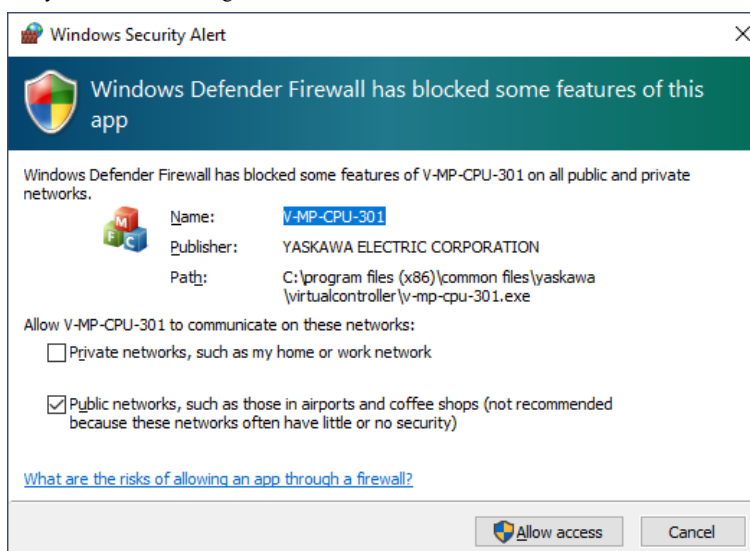
6.12.2 Running a Simulation

1. Confirm that you have finished creating the program.
2. Click [Debug] - [Start Simulation] on the menu bar.



Information If the following window is displayed, perform one of the operations according to the situation.

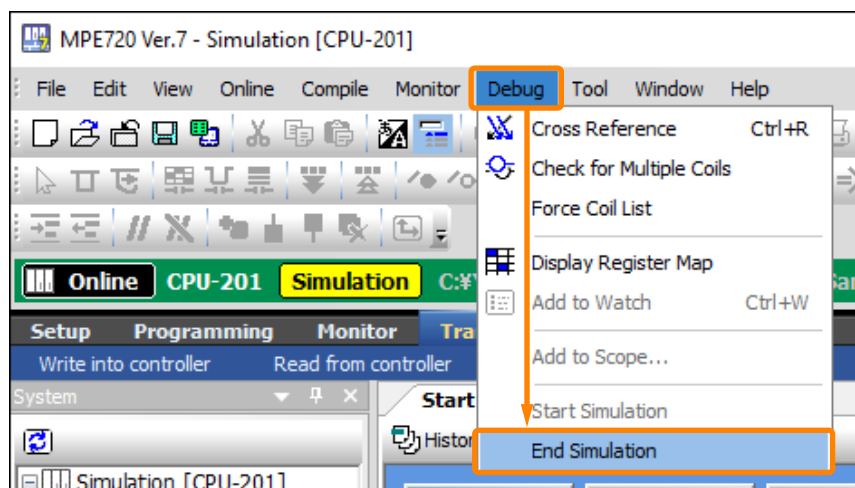
- When not running a communications simulation with an external device: Click [Cancel].
 - When running a communications simulation with an external device: Click [Allow access]. Then follow the on-screen instructions.
- If you do not allow access, communications will not be performed with the external device and an error may occur while running the simulation.



Preparations for the simulation will start. When the simulation is ready, [Simulation] will be displayed in the caption bar and the simulation will start.

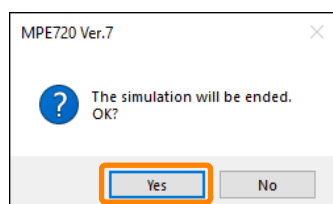
3. Check the operation of the project file.

4. When the simulation is complete, click **[Debug]** - **[End Simulation]** on the menu bar.



A message dialog box will be displayed.

5. Click the **[Yes]** button.



This concludes the procedure.

Monitor

This chapter describes the methods to monitor the status of the connected controller and the status of registers.

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7.1 System Monitor

Use the System Monitor to monitor the status of the controller after establishing an online connection between the MPE720 and controller.

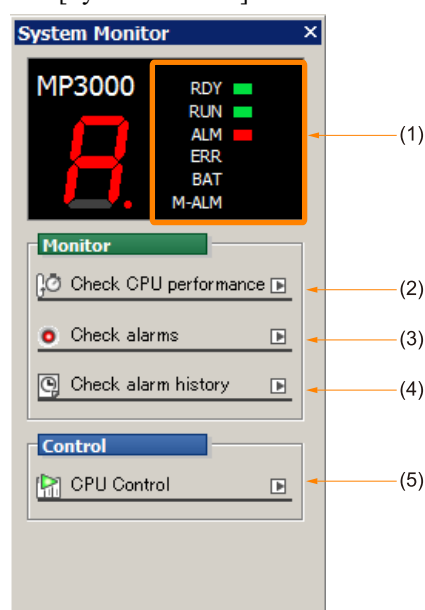
You can monitor the following items.

- Operating status of the controller
- Scan time
- Errors that occur on the controller
- Alarm History

7.1.1 [System Monitor] Window

Click the [System Monitor] button in the [My Tool] window to display the [System Monitor] window.

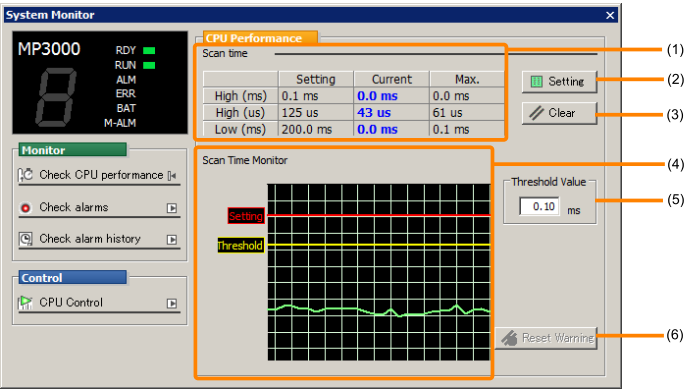
The [System Monitor] window will be automatically displayed if an error occurs on the controller.



No.	Item	Description
(1)	Operating Status	The operating status of the controller is displayed.
(2)	CPU Performance	Refer to the following section for details.  (1) CPU Performance on page 425
(3)	Alarms	Refer to the following section for details.  (2) Alarms on page 426
(4)	Alarm history	Refer to the following section for details.  (3) Alarm History on page 435
(5)	CPU Control	You can RUN and STOP the CPU and execute error reset and save to flash memory.

(1) CPU Performance

Click the [Check CPU performance] button to display the scan time values and graph.



No.	Item	Description
(1)	Scan Time	The set values, current values, and maximum values of the scan times are displayed.
(2)	[Setting] Button	Displays the [Environment Setting] window. You can change the set values for the scan times.
(3)	[Clear] Button	Clears the maximum values of the scan times.
(4)	Scan Time Monitor	The current value of the high-speed scan time is displayed as a green waveform. You can drag the cursor position of the threshold value to change it.
(5)	Threshold Value	Set the threshold value for the high-speed scan time. If the current value or maximum value of the high-speed scan time exceeds the threshold value, the [System Monitor] window will become active and a warning will be displayed.
(6)	[Reset Warning] Button	Resets the warning.

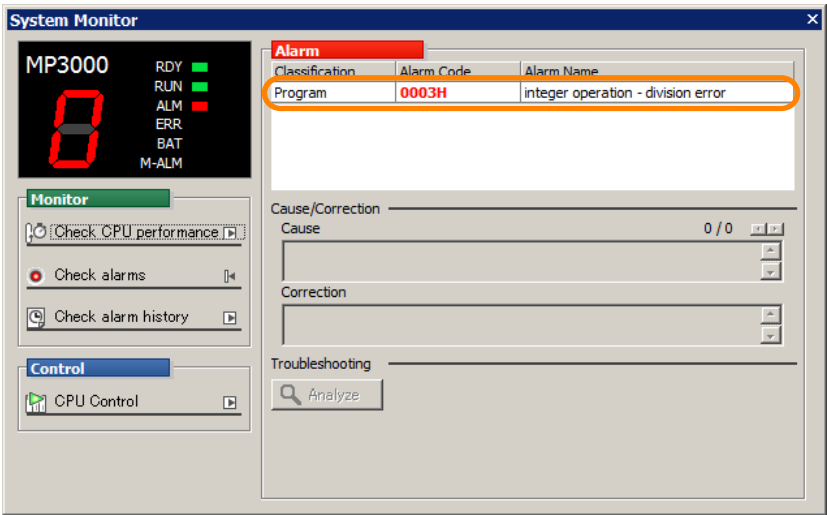
(2) Alarms

Click the [Check alarms] button to display detailed information on alarms. The content that is displayed depends on the type of alarm that occurred.

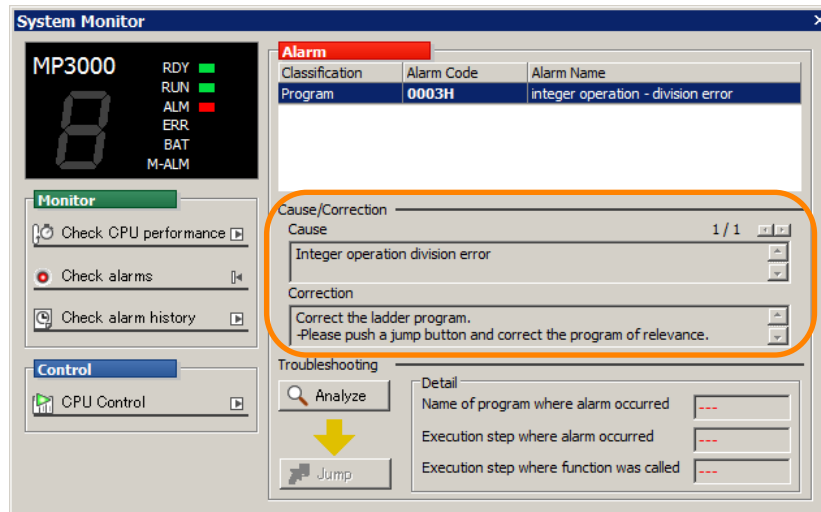
(a) Operation Errors

Operation errors are errors related to operations in ladder programs and motion programs. How to interpret and analyze the displayed information is shown below.

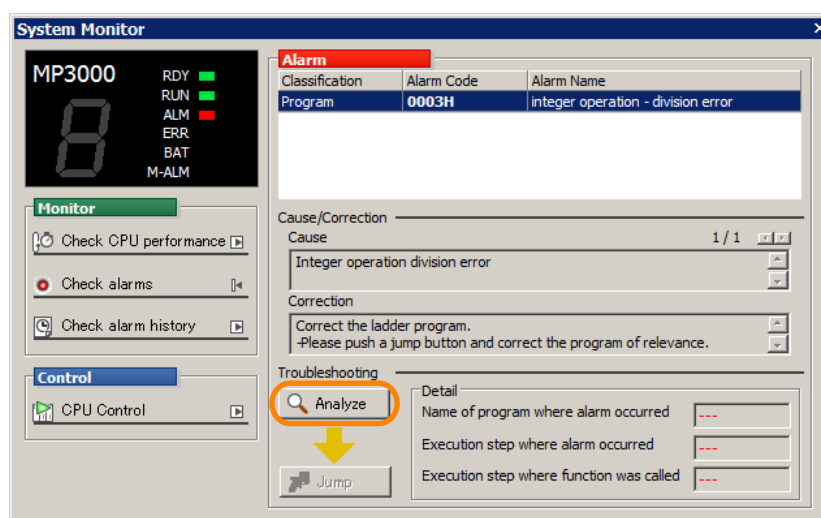
- 1. Click the alarm on which to access information.



The cause and correction method will be displayed.

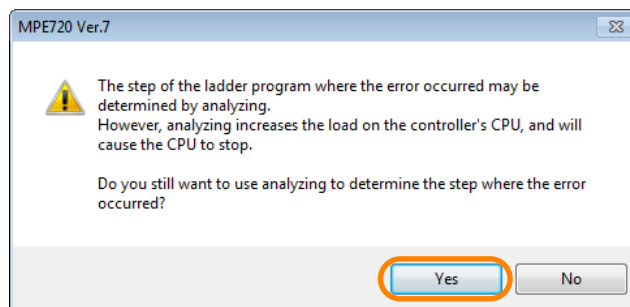


2. Click the [Analyze] button.

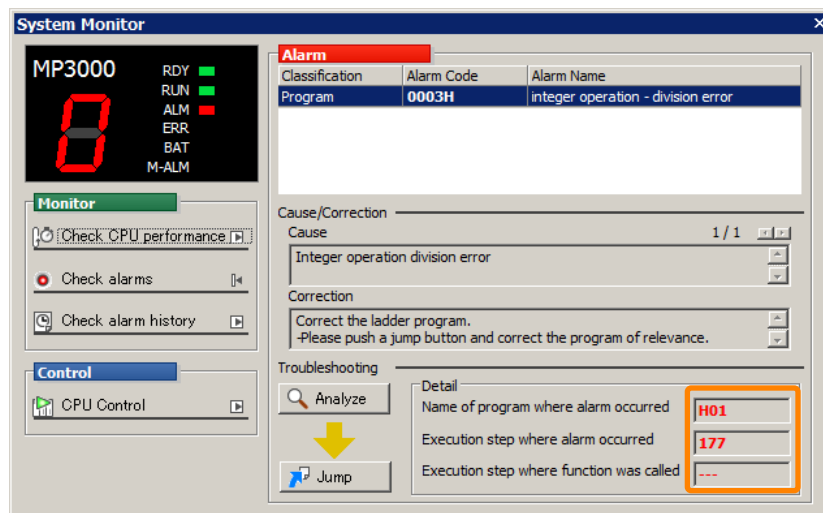


A message dialog box will be displayed.

3. Click the [Yes] button.



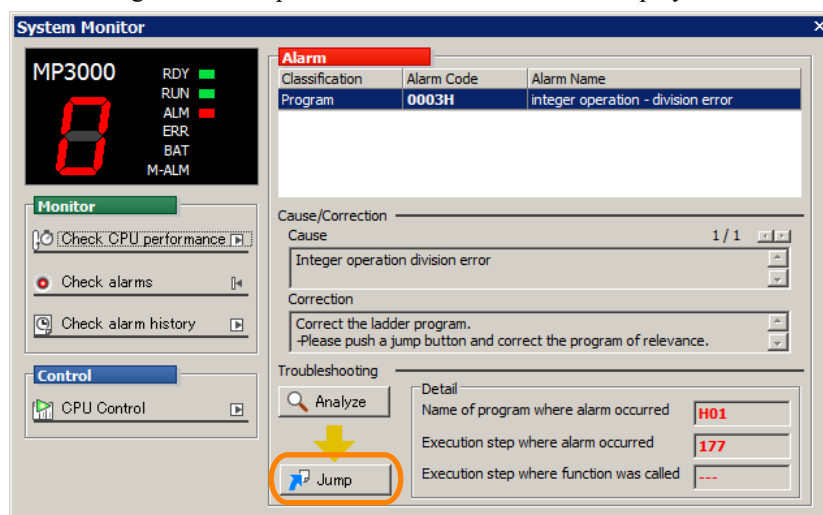
The location where the alarm occurred will be displayed.



Information Only [Name of program where alarm occurred] is displayed for an MP2000-series machine controller.

4. Click the [Jump] button.

The drawing where the operation error occurred will be displayed.



5. Resolve the operation error.

Refer to the ladder programming manual for your controller model for details on how to resolve operation errors.

6. Make the Edit Ladder Program window the active view and press the F4 key.

The program will be compiled.

7. Confirm that the alarm is no longer displayed in the [System Monitor] window.

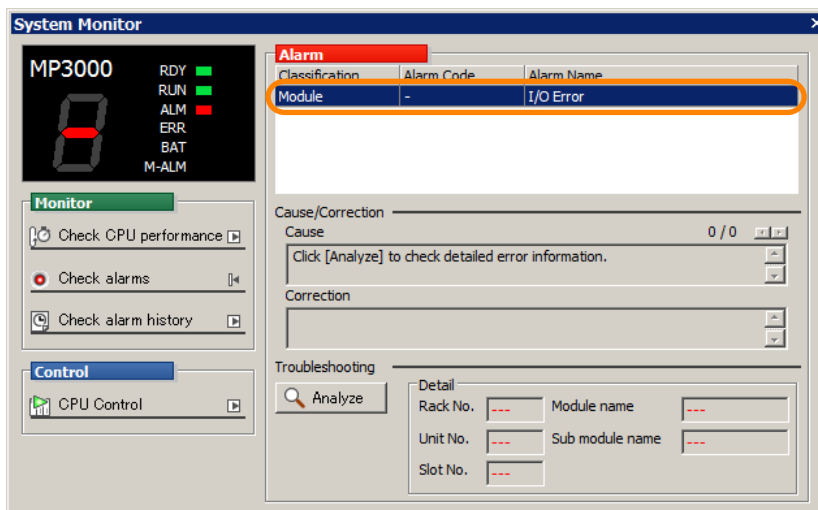
This concludes the procedure.

(b) I/O Errors

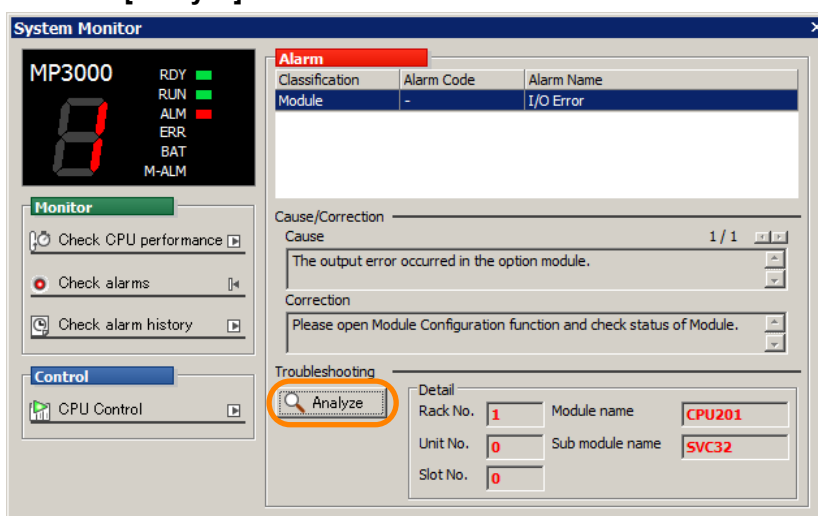
I/O errors are errors related to I/O modules.

How to interpret and analyze the displayed information is shown below.

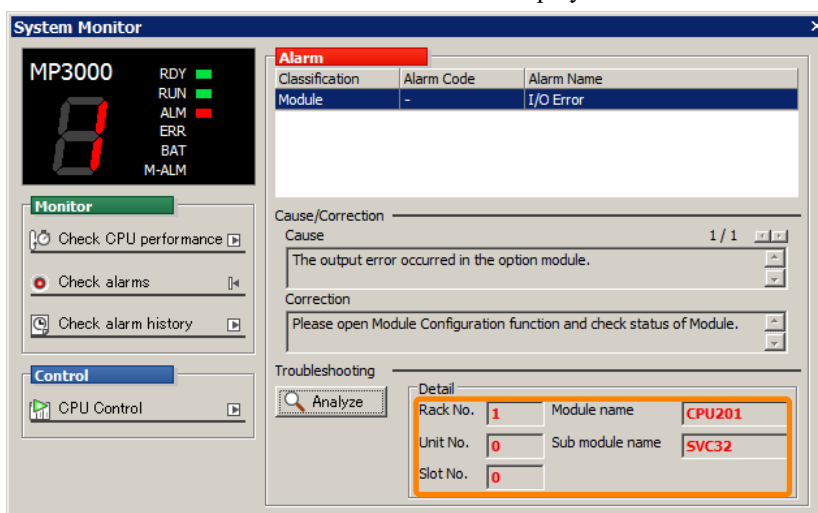
1. Click the alarm on which to access information.



2. Click the [Analyze] button.



The location where the alarm occurred will be displayed.



3. Resolve the I/O error.

Resolve the error by referring to the information in the [Detail] area and the manual for the relevant module.

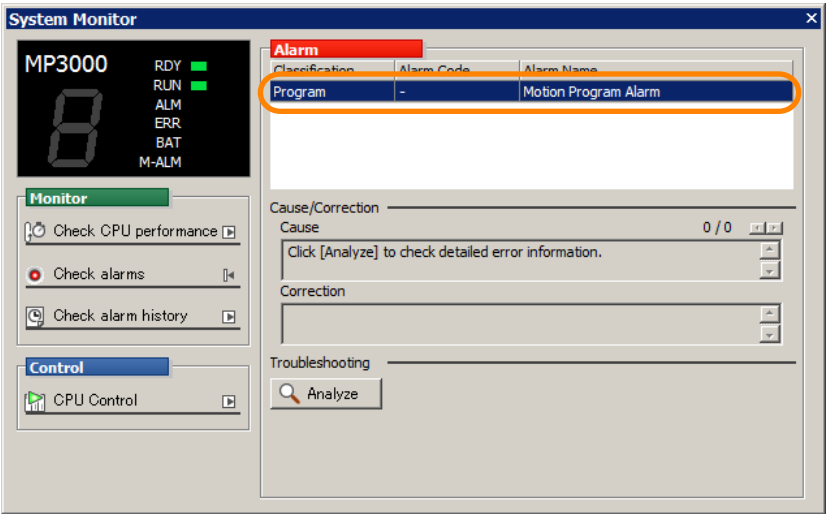
4. Confirm that the alarm is no longer displayed in the [System Monitor] window.

This concludes the procedure.

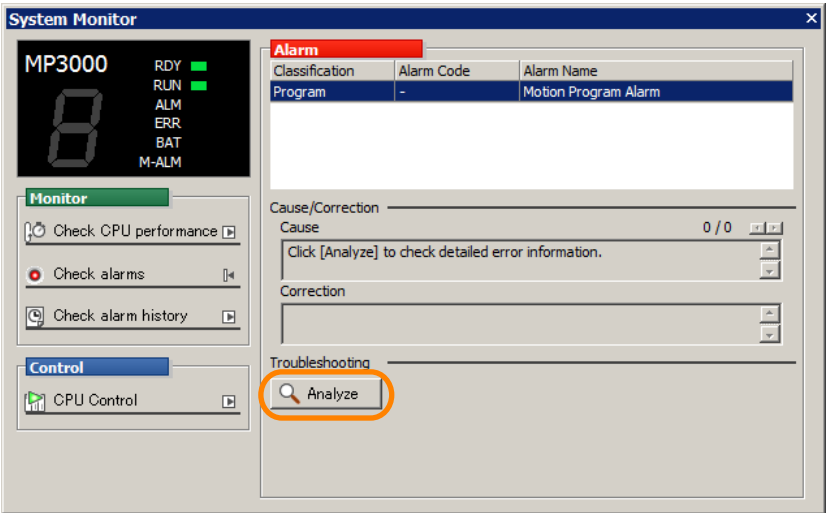
(c) Motion Alarms

Motion alarms are errors related to motion programs.
How to interpret and analyze the displayed information is shown below.

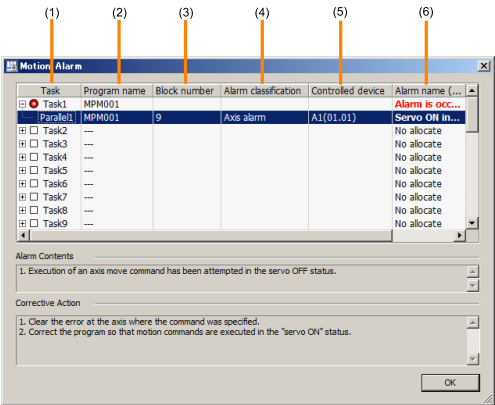
- 1. Click the alarm on which to access information.



- 2. Click the [Analyze] button.



The [Motion Alarm] window will be displayed.



No.	Item	Description
(1)	Task	The M-EXECUTOR task is displayed if an alarm occurs in a motion program that was registered in the M-EXECUTOR. "- - -" is displayed if an alarm occurs in a motion program that was called with an MSEE instruction from a ladder program.
(2)	Program name	The program name that was registered in the M-EXECUTOR is displayed if an alarm occurs in a motion program that was registered in the M-EXECUTOR. "- - -" is displayed if an alarm occurs in a motion program that was called with an MSEE instruction from a ladder program.
(3)	Block number	The block number where the error occurred is displayed. Double-click the block number to display the drawing where the error occurred
(4)	Alarm classification	The category of the alarm that occurred is displayed.
(5)	Controlled device	The logical axis name (circuit number, axis number) set in the motion program group definition is displayed.
(6)	Alarm name (status)	The alarm name and alarm code are displayed.

3. **Resolve the motion alarm.**

Refer to the ladder programming manual for your controller model for details on how to resolve motion alarms.

4. **Make the Edit Motion Program window the active view and press the F4 key.**

The program will be compiled.

5. **Confirm that the alarm is no longer displayed in the [System Monitor] window.**

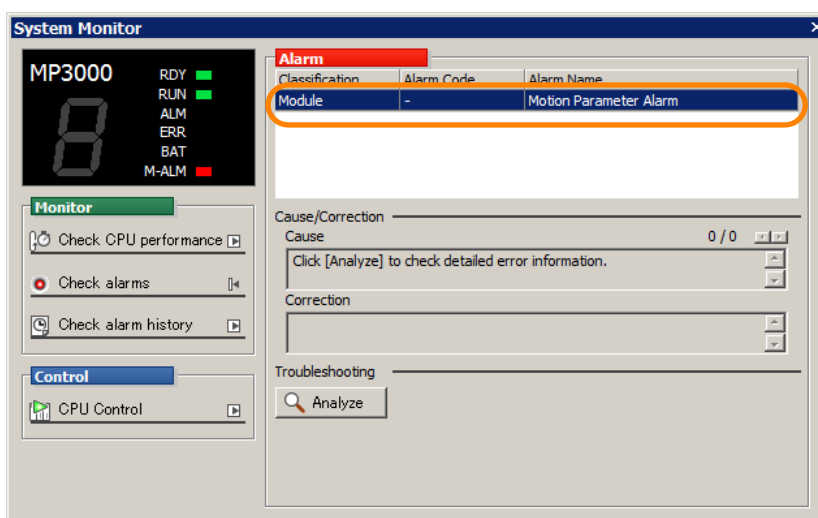
This concludes the procedure.

(d) Motion Module Alarms

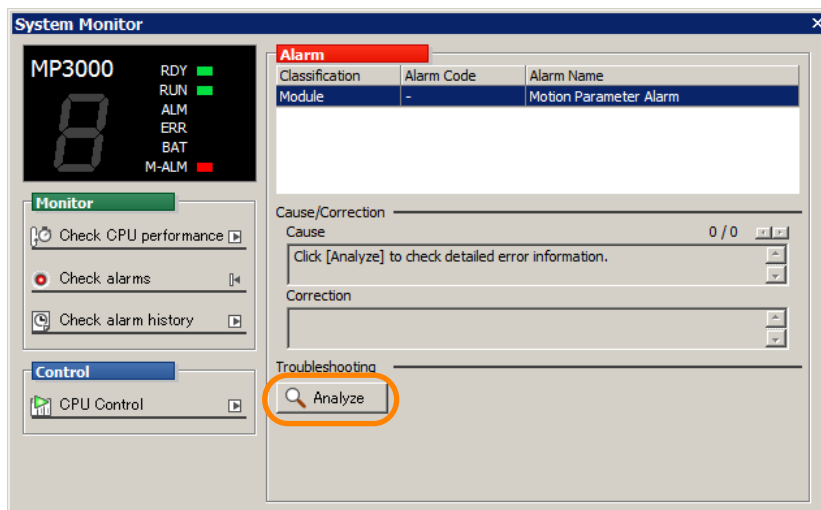
Motion module alarms are errors related to motion modules.

How to interpret and analyze the displayed information is shown below.

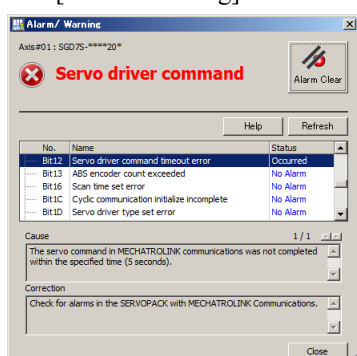
1. **Click the alarm on which to access information.**



2. Click the [Analyze] button.



The [Alarm/Warning] window will be displayed.



3. Resolve the motion module alarm.

Refer to the manual for your motion module for details on how to resolve motion module alarms.

4. Confirm that the alarm is no longer displayed in the [System Monitor] window.

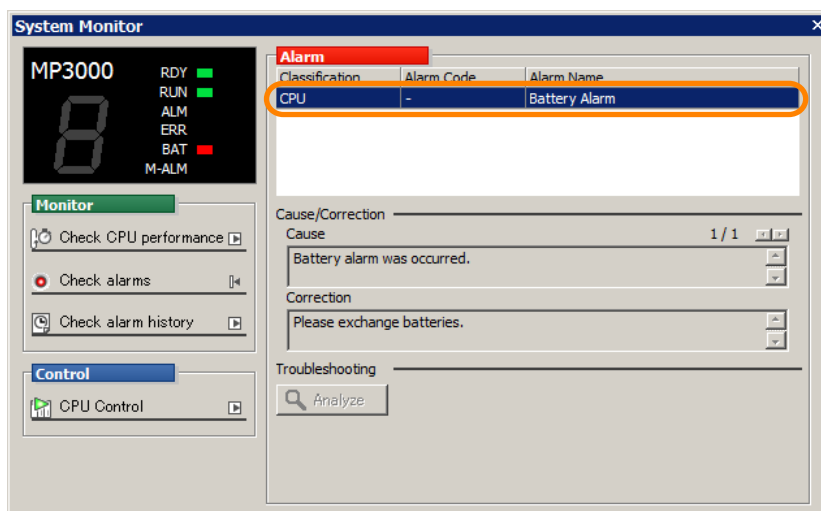
This concludes the procedure.

(e) Battery Alarms

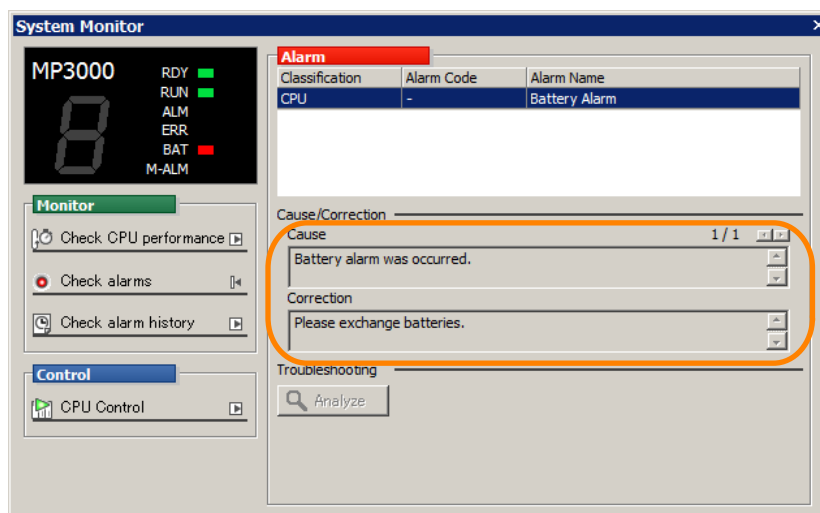
Battery alarms are errors related to the battery.

How to interpret and analyze the displayed information is shown below.

1. Click the alarm on which to access information.



The cause and correction method will be displayed.



2. **Replace the battery.**

Refer to the setup manual for your controller for how to replace the battery.

3. **Confirm that the alarm is no longer displayed in the [System Monitor] window.**

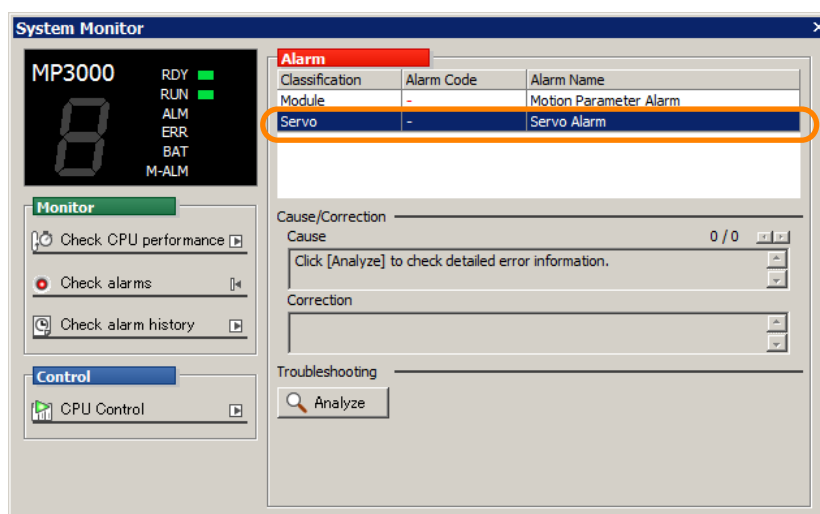
This concludes the procedure.

(f) **Servo Alarms**

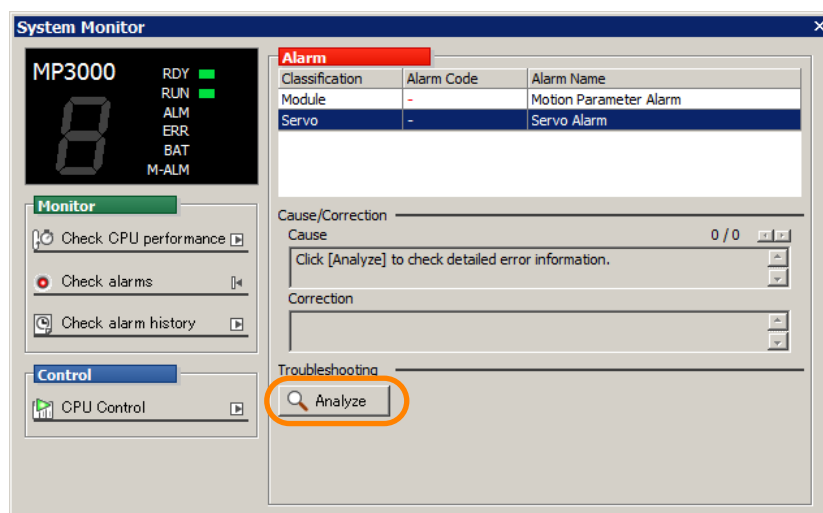
Servo alarms are errors related to SERVOPACKs.

How to interpret and analyze the displayed information is shown below.

1. **Click the alarm on which to access information.**



2. Click the [Analyze] button.

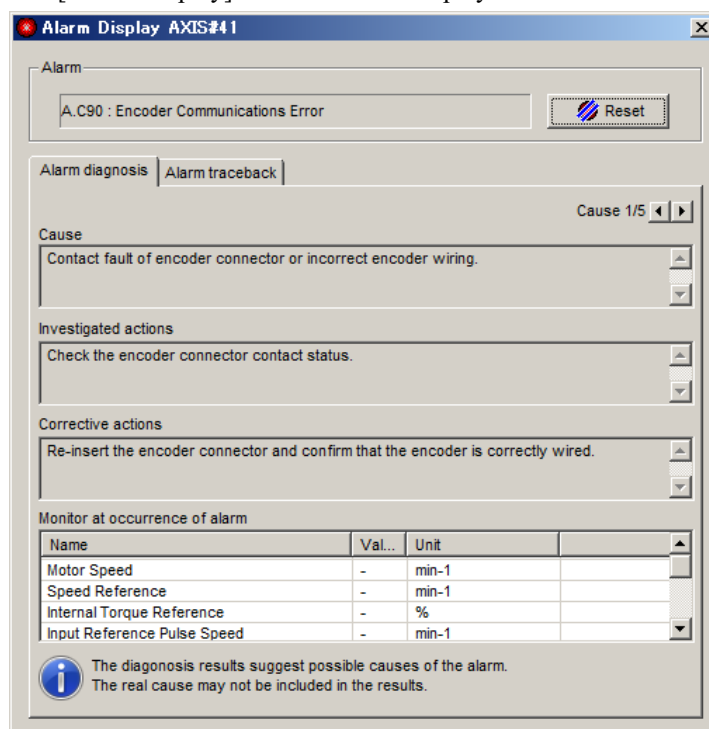


Start SigmaWin+.

3. Click the [Menu] button.



The [Alarm Display] window will be displayed.



4. Resolve the servo alarm.

Refer to the manual for the SERVOPACK that you are using for methods to resolve servo alarms.

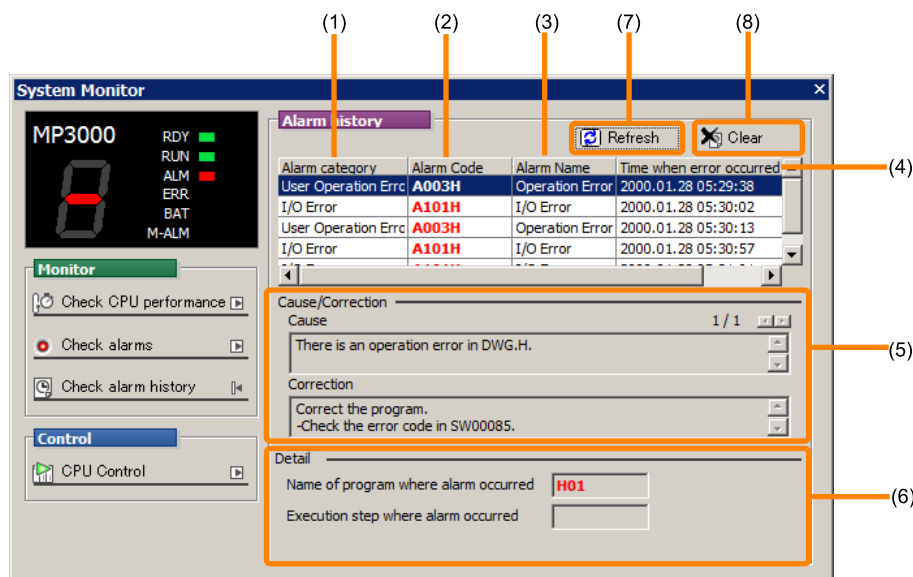
5. Confirm that the alarm is no longer displayed in the [System Monitor] window.

This concludes the procedure.

(3) Alarm History

Click the [Check alarm history] button to display the history of alarms that occurred. The alarm history retains up to 100 records.

Information You cannot check an alarm history for an MP2000-series machine controller.



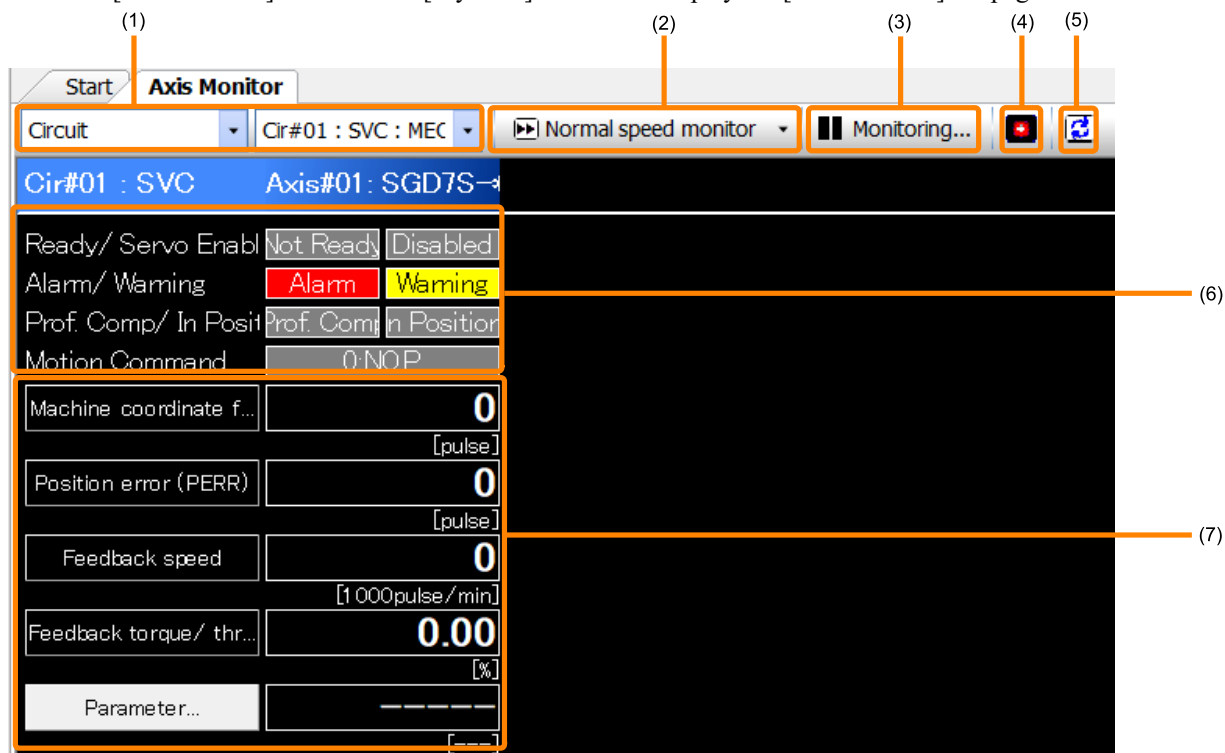
No.	Item	Description
(1)	Alarm Category	The category of the alarm that occurred is displayed.
(2)	Alarm Code	The code of the alarm that occurred is displayed.
(3)	Alarm Name	The name of the alarm that occurred is displayed.
(4)	Time when alarm occurred	The date and time when the alarm occurred is displayed.
(5)	Cause/Correction	The cause and correction method is displayed when an alarm is selected in the list.
(6)	Detailed Information	Detailed information is displayed when an alarm is selected in the list.
(7)	[Update] Button	Click this button to update to the most recent information.
(8)	[Clear] Button	Click this button to delete the alarm history that is displayed.

7.2 Axis Monitor

Use the Axis Monitor to monitor the operating status of axes connected to the controller.

7.2.1 [Axis Monitor] Tab Page

Click the [Axis Monitor] button in the [My Tool] window to display the [Axis Monitor] tab page.



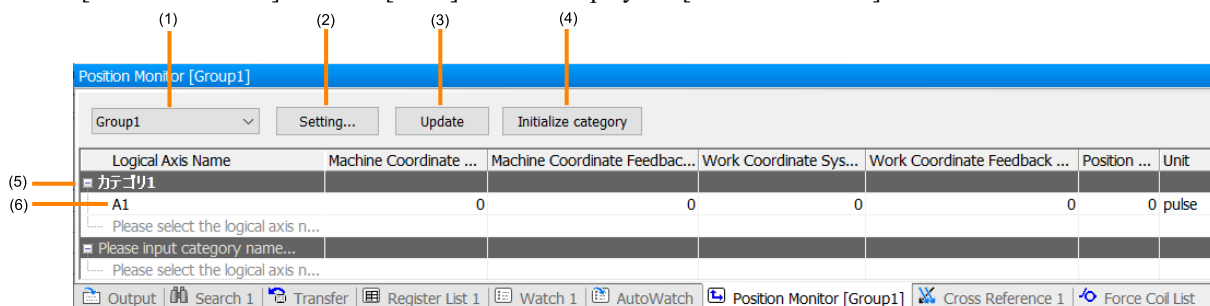
No.	Item	Description
(1)	Circuit/Group	Select from the following two options: - Circuit: Select the circuit number with the axes to monitor. - Group: Select the group with the axes to monitor.
(2)	Monitor Type	Select the cycle for updating the information from the following three options: - High speed monitor - Normal speed monitor - Low speed monitor
(3)	Stop monitor/Monitoring	Stop monitor: The monitor is stopped. Click this button to restart the monitor. Monitoring: The monitor is running. Click this button to stop the monitor.
(4)		Displays the [Alarm Monitor] tab page.
(5)		Refreshes the information in the window.
(6)	Axis Operating Status	The operating status of the axis is displayed.
(7)	Monitor Parameter	The names of the monitor parameters and their current values are displayed. You can display up to eight monitor parameters. Click the [Parameter...] button or a parameter name to display the window on which you can set and change the monitor parameters to display. The monitor parameters that are displayed will be kept when the [Axis Monitor] tab page is next opened.

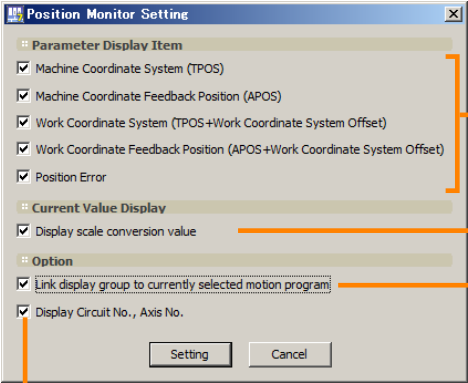
7.3 Position Monitor

Use the Position Monitor to monitor the position information of axes connected to the controller.

7.3.1 [Position Monitor] Window

Select [Position Monitor] from the [View] menu to display the [Position Monitor] window.



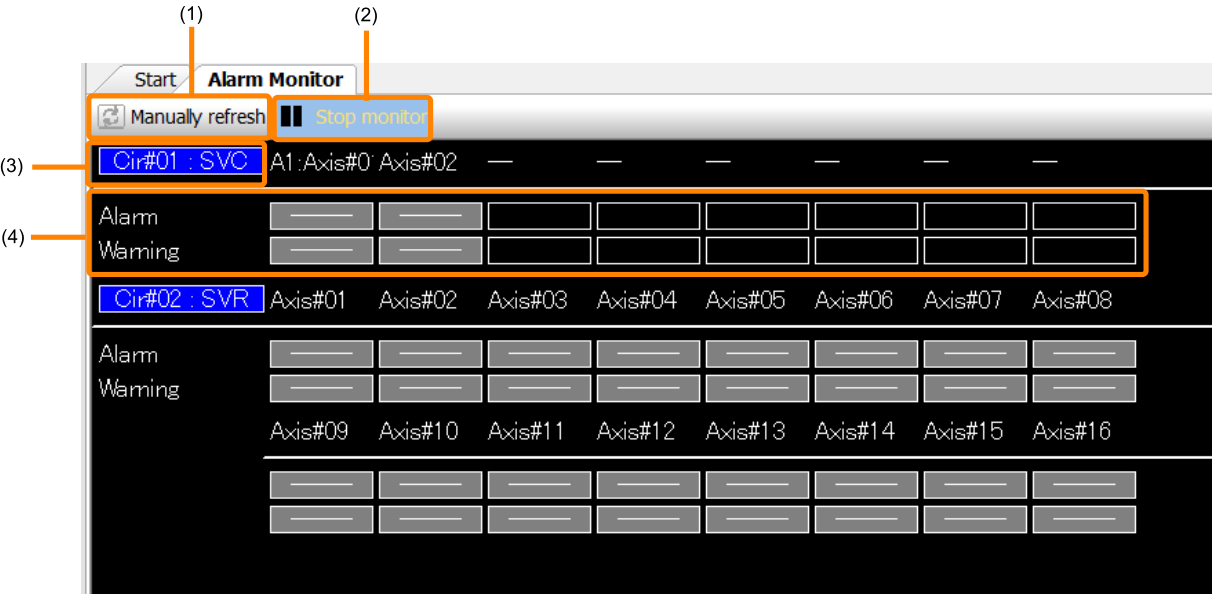
No.	Item	Description
(1)	Group Name	Select the name of the axis group.
(2)	[Setting...] Button	Click this button to display the [Position Monitor Setting] window. You can set the items that are displayed in the [Position Monitor] window.  The items that are selected will be displayed in the window. If this check box is selected, values are displayed in the unit set in the fixed parameters. If this check box is selected, the group displayed in the window is automatically switched when a motion program is selected. If this check box is selected, the circuit number and axis number are displayed in the [Logical Axis Name] column.
(3)	[Update] Button	Click this button to update the information in the window.
(4)	[Initialize category] Button	Click this button to initialize the display in the window.
(5)	Category Name	You can set the category name.
(6)	Axis Selection	You can add and delete the logical axes to display.

7.4 Alarm Monitor

Use the Alarm Monitor to monitor the status of all axes connected to the controller and the alarm/warning information.

7.4.1 [Alarm Monitor] Tab Page

Click the [Alarm Monitor] button in the [My Tool] window to display the [Alarm Monitor] tab page.



No.	Item	Description
(1)	[Manually refresh] Button	Refreshes the alarm/warning information in the window. Note: The information in this window is not automatically updated.
(2)	Stop monitor/Monitoring	Stop monitor: The monitor is stopped. Click this button to restart the monitor. Monitoring: The monitor is running. Click this button to stop the monitor.

Continued on next page.

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No.	Item	Description
(3)	Circuit Number/Module Name	Click this area to toggle between showing and hiding the monitor data for that circuit.
(4)	Status	The status of the axis is displayed. No Alarm : No alarm or warning has occurred. Alarm : An alarm has occurred. Warning : An error has occurred. Click the status to display the following window. You can check the information for each bit. Resolve the cause of the error and click the [Alarm Clear] button to clear the alarm that occurred. 

7.5 Trace

7.5.1 Overview

Tracing allows you to obtain and display the specified data from a controller.

The MPE720 has the following three trace functions.

Function Name	Description	
Real-Time Trace	You can monitor specified registers. This allows you to analyze register data to debug ladder programs.	You can monitor registers in real time. A maximum of 64 trace data can be monitored.
Trace Manager ^{*1}		You can monitor registers only during a specified time period. A maximum of 16 trace data can be monitored.
XY Trace	This trace function acquires the position data (target position, feedback position) of the X axis and Y axis every scan, and displays the data in a 2-dimensional graph. The 2-axis paths can be visually checked.	

*1 There are restrictions when using Trace Manager. Refer to the following section for details.

 (1) [Restrictions in Use of Trace Manager on page 440](#)

(1) Restrictions in Use of Trace Manager

The Trace Manager cannot be used for some register types and data types for tracing. Refer to the following table for details. Use a Real-Time Trace when the Trace Manager cannot be used.

- Register Types

Type	Applicable Range	Support	
		Trace Manager	Real-Time Trace
S Registers	SW00000 to SW08191	○	○
	SW08192 to SW65534	×	○
M Registers	MW00000 to MW65534	○	○
	MW65535 to MW1048575	×	○
G Registers	GW0000000 to GW2097151	×	○
I Registers	IW00000 to IW0FFFF	○	○
	IW10000 to IW27FFF	×	○
O Registers	OW00000 to OW0FFFF	○	○
	OW10000 to OW27FFF	×	○
D Registers	DW00000 to DW16383	○	○

- Data Types

Symbol	Data Type	Support	
		Trace Manager	Real-Time Trace
B	Bit	○	○
W	Integer	○	○
L	Double-length integer	○	○
Q	Quadruple-length integer	×	○
F	Real number	○	○
D	Double-precision real number	×	○
A	Address	×	×

(2) Trace Buffer Size

The maximum applicable trace buffer size that can be used for the trace function depends on the model of controller as follows.

Controller		Maximum Applicable Trace Buffer Size	
		Real-Time Trace/XY Trace	Trace Manager
MP2000 Series		32 kwords	
MP3000 Series	CPU-201, CPU-201 (SUB), CPU-202, CPU-202 (SUB), CPU-301 (32 axes)	1024 kwords	32 kwords
	CPU-301 (16axes)	256 kwords	
MPX1000 Series		1024 kwords	
YRM-7 Series			
YRM1000 Series			

(3) External Files

Trace data can be saved as an external file or read from an external file. However, supported file formats differ according to the trace function as follows.

Tracing	Command to Use on the [File] Menu	Supported File Formats	
		csv	dat/trd
Real-Time Trace	[Open Trace File]	○	○
	[Open External File]	○	○
	[Save in External File]	○	○ <i>*1</i>
Trace Manager	[Import]	○	○/-
	[Export]	○	—
XY Trace	[Open External File]	○	○
	[Save in External File]	○	○ <i>*1</i>

*1 For MP2000-series machine controllers, trace data can be saved to only dat files, and for machine controllers other than the MP2000 series, trace data can be saved to only trd files.

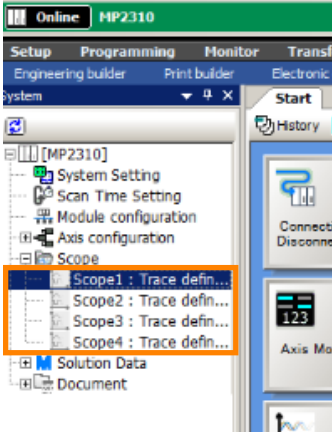
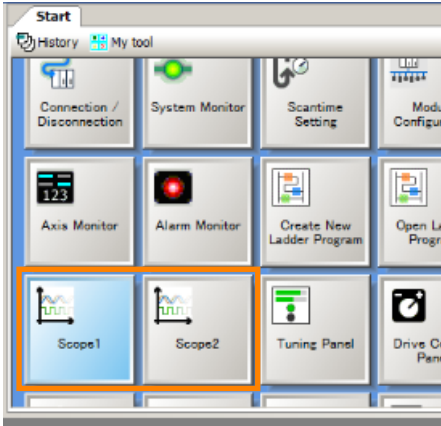
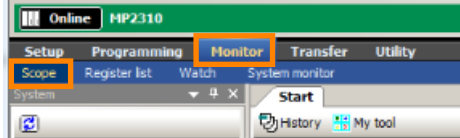
7.5.2 Startup

Use the following procedure to start tracing.

1. Use one of the following methods to display the [Trace Type] window.

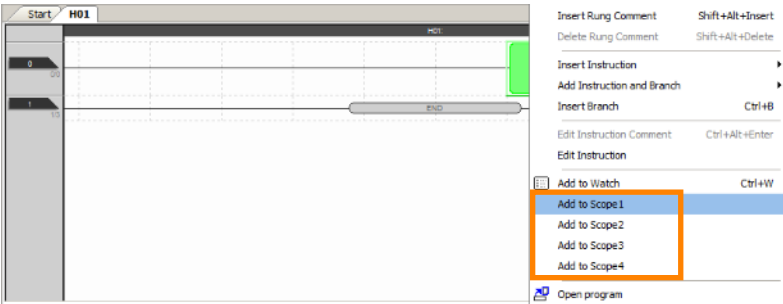
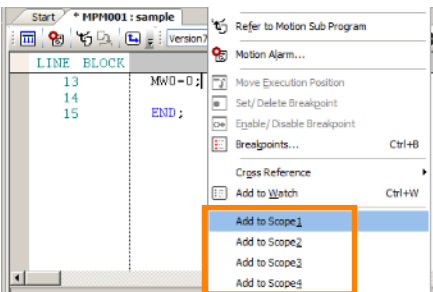
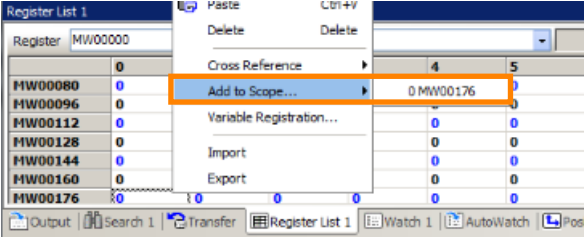
Information

There are four buttons for tracing, Scope1 to Scope4. The settings when tracing is executed are stored to the [Scope1] to [Scope4] buttons. This means that you can store up to four trace settings.

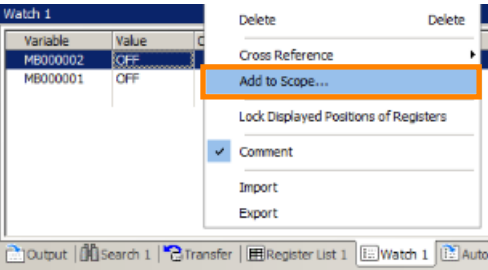
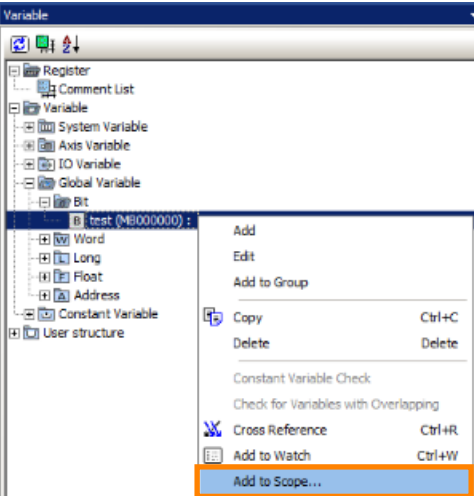
Screen Used for Startup	Operation
[System] Window	Double-click one of [Scope1] to [Scope4].  The same operation is also possible by right-clicking one of [Scope1] to [Scope4] and selecting [Open Real-Time Trace], [Open Trace Manager], or [Open XY Trace]. When this operation is performed, tracing will be started without displaying the [Trace Type] window.
[My Tool] Window	Double-click one of [Scope1] to [Scope4].  The [Scope3] and [Scope4] are not displayed by default. Refer to the following section for details on displaying buttons.  (a) Editing Buttons on the [My Tool] Window on page 86
Launcher	Click [Monitor] – [Scope]. 

Continued on next page.

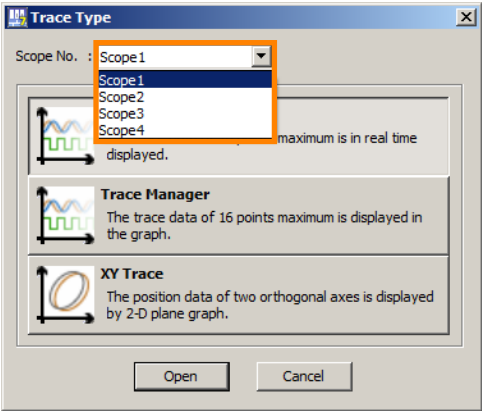
Continued from previous page.

Screen Used for Startup	Operation
Edit Ladder Program Window (Only the Real-Time Trace window can be started up.)	Right-click on the register used by the ladder instruction, and select [Add to Scope□].  • If you right-click on the operand, that register will be targeted for tracing. • If you right-click on the instruction, the registers included in that instruction will be targeted for tracing. • If you right-click on the rung, all registers included on that rung will be targeted for tracing. • If you right-click with multiple instructions or multiple rungs selected, all registers included in the selected range will be targeted for tracing.
Edit Motion Program Window (Only the Real-Time Trace window can be started up.)	Right-click on the register used by the motion program, and select [Add to Scope□].  • If you right-click without a range selected, the registers included on that cursor line will be targeted for tracing. • If you right-click with a range selected, all registers included in the selected range will be targeted for tracing.
[Register List] Window (Only the Real-Time Trace window and Trace Manager window can be started up.)	Right-click on the register address, and select [Add to Scope□] – register address. 

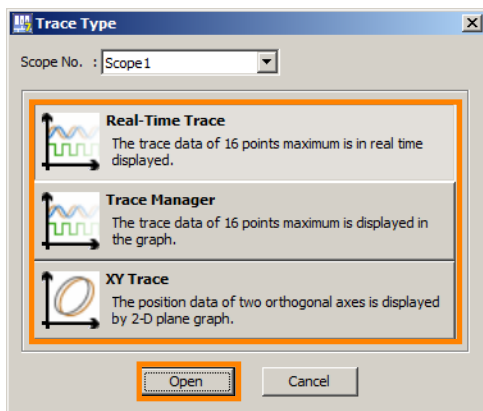
Continued on next page.

Screen Used for Startup	Operation
[Watch] Window (Only the Real-Time Trace window and Trace Manager window can be started up.)	Right-click on the variable, and select [Add to Scope].  Information [Add to Scope] is disabled when the variable register is outside the range of CPU registers in the project. Reselect the variable and execute the operation again.
[Variable] Window (Only the Real-Time Trace window and Trace Manager window can be started up.)	Right-click on a registered variable, and select [Add to Scope]. 

2. When Scope1 to Scope4 are not selected in Step 1, select [Scope No.].



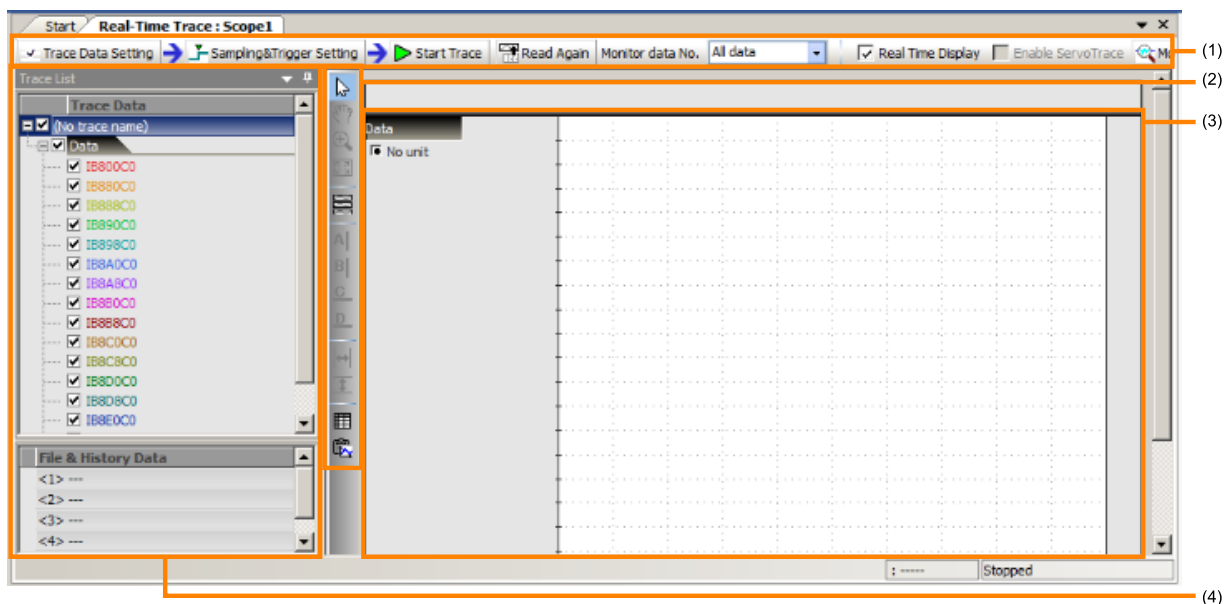
- Click the trace type, and click the [Open] button.



The selected trace tab page will be displayed.

This concludes the procedure.

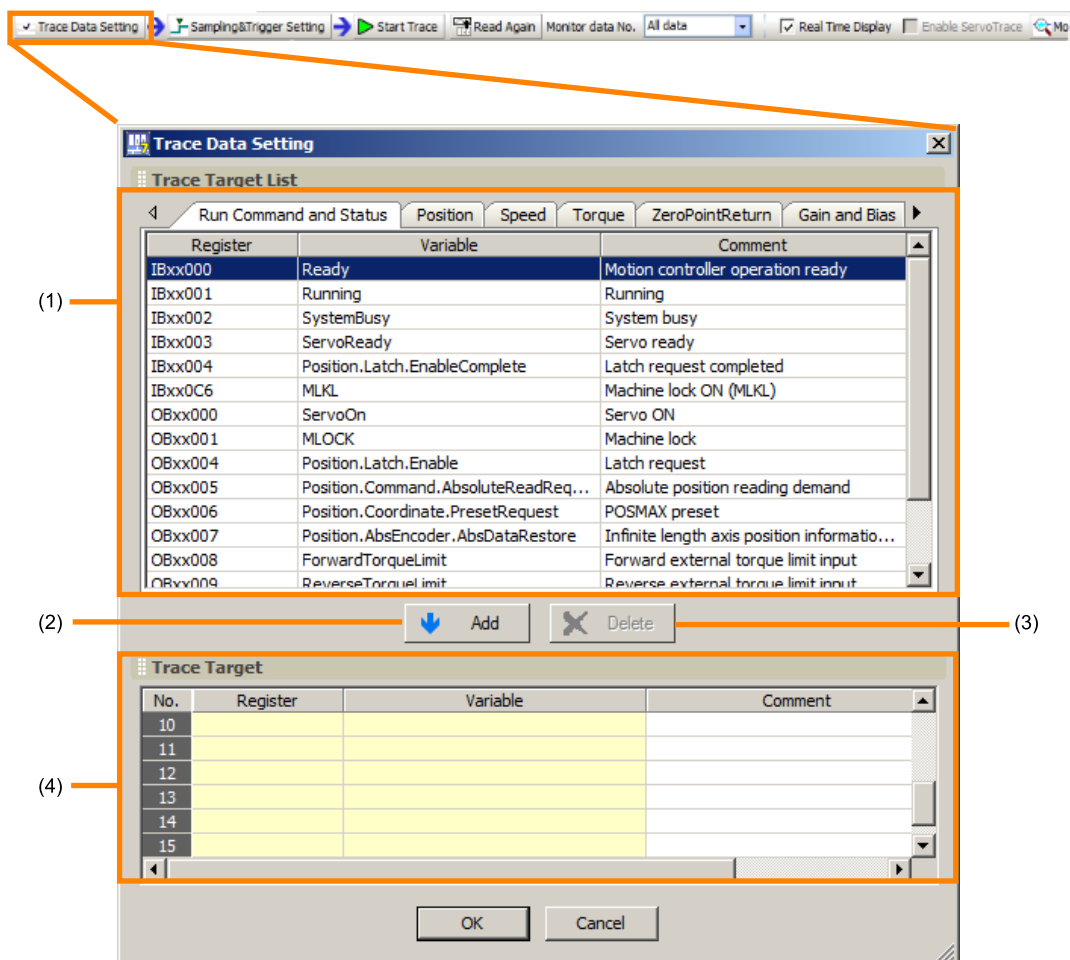
7.5.3 [Real-Time Trace] Tab Page



No.	Item	Description	Reference
(1)	Trace Data Setting	Set the trace target.	 (1) Trace Data Setting on page 446
	Sampling & Trigger Setting	Set the trace conditions.	 (2) Sampling and Trigger Settings on page 448
	Start Trace/Stop Trace	Starts and stops the trace. When the trace is started, the trace data is acquired and displayed in real time. When the trace is stopped, the buffer data of all traces is acquired and displayed.	-
	Read Again	Re-reads the trace data in the controller. By executing re-reading, the content of the trace data accumulated at that point can be checked. When re-reading is executed during execution of a trace, the real time display mode automatically turns OFF.	-
	Monitor Data No.	The number of trace data to acquire from the controller can be set. The actual number of acquired trace data is displayed at the bottom right of the trend graph.	-
	Real Time Display	When this check box is selected, the display shows the data moving during tracing in real time. When multiple trace tab pages are open, only one tab page is displayed.	-
	Enable ServoTrace	Enables the servo trace function.	-
	Motion Analyzer	Displays the [MotionAnalyzer] window.	-
(2)	Graph Toolbar	Groups together the buttons used for analyzing trace data.	 (3) Graph Toolbar on page 452
(3)	Trend Graph	The trace data is displayed. The graph toolbar, sliders and cursors can be used to analyze trace data in the Real-Time Trace Window.	 (4) Trend Graph on page 454
(4)	[Trace List] Window	A list of the registers that can be selected for tracing is displayed.	 (5) [Trace List] Window on page 455

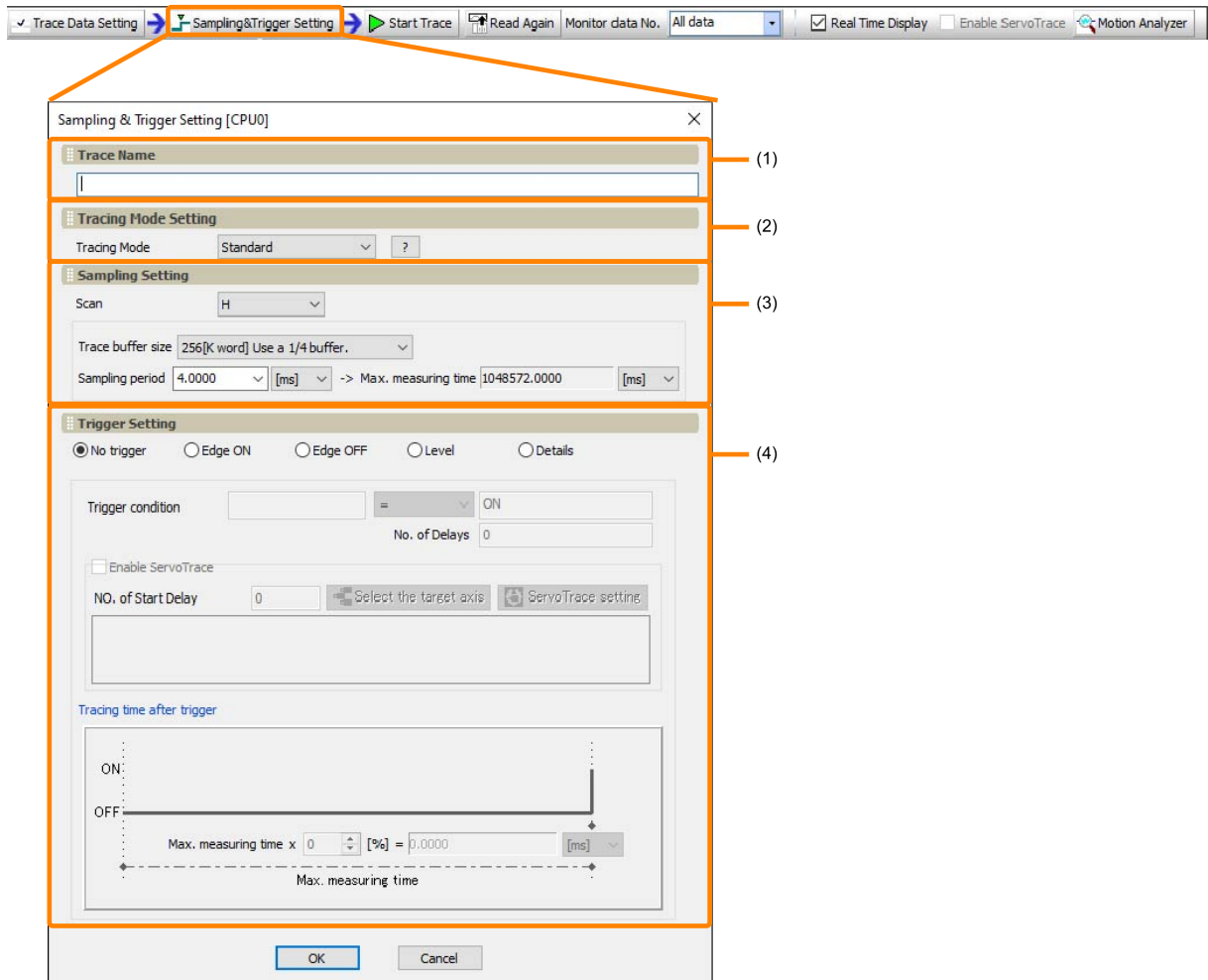
(1) Trace Data Setting

This is for setting the trace target.



No.	Item	Description
(1)	Trace Target List	The list of registers is displayed.
(2)	Add	Adds the register selected in [Trace Target List] to the list of registers to be traced. Clicking this button displays the [Axis] window. Select the check boxes for the axes to trace, and click the [OK] button to add the selected register to [Trace Target].
(3)	Delete	Removes the register selected in [Trace Target].
(4)	Trace Target	The registers that can be selected for tracing are displayed. Registers can be added to this list either by selecting them from the [Trace Target List] or by entering them directly.

(2) Sampling and Trigger Settings



No.	Item	Description
(1)	Trace Name	Set the trace name. <Setting Conditions> 32 characters maximum.
(2)	Tracing Mode Setting	Set the tracing mode. Refer to the following section for details.  (a) Details of Tracing Mode Setting on page 448 Clicking [?] displays a detailed description of trace mode. Models and software versions that support the tracing mode setting are shown below: • MP3000 series: Ver. 1.30 or later • Σ-7C SERVOPACK: Ver. 1.01 or later • MPX controller: All models • YRM controller: All models
(3)	Sampling Setting	Set the data sampling rate. Setting a value for [Sampling Period] will display an approximate maximum measuring time.
(4)	Trigger Setting	Specify the condition at which trace is executed. Refer to the following section for details.  (b) Details of Trigger Setting on page 449

(a) Details of Tracing Mode Setting

The following describes the differences between trace operation according to individual tracing mode.

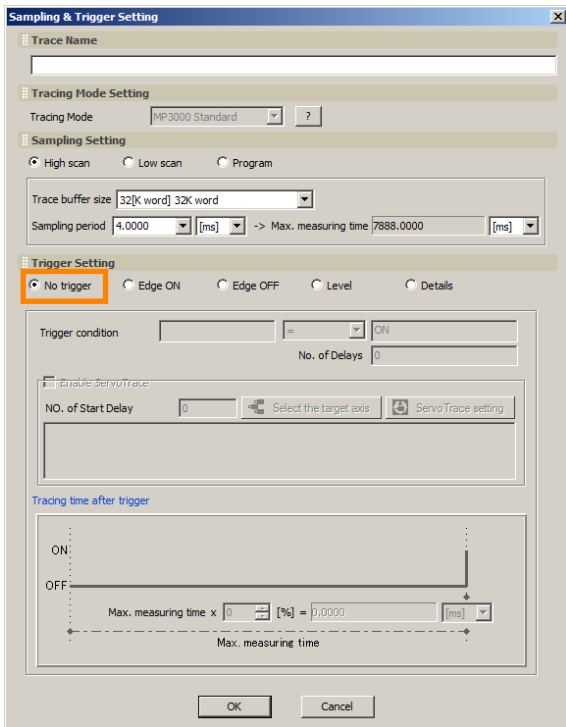
Status	Tracing Mode	
	Standard Mode	MP2000 Compatible
Trace definitions have been written to the controller	Tracing is started by clicking the [Start Trace] button.	There is no need to click the [Start Trace] button. Tracing is performed automatically.
Trace start trigger turns ON after the trace stop trigger condition is satisfied	Tracing is not performed.	Tracing is performed automatically.
Both the trace stop trigger and trace start trigger turn ON simultaneously	Tracing is not performed.	Tracing is performed automatically for one scan.

(b) Details of Trigger Setting

Specify the condition at which trace is executed. There are five setting options.

◆ [No trigger]

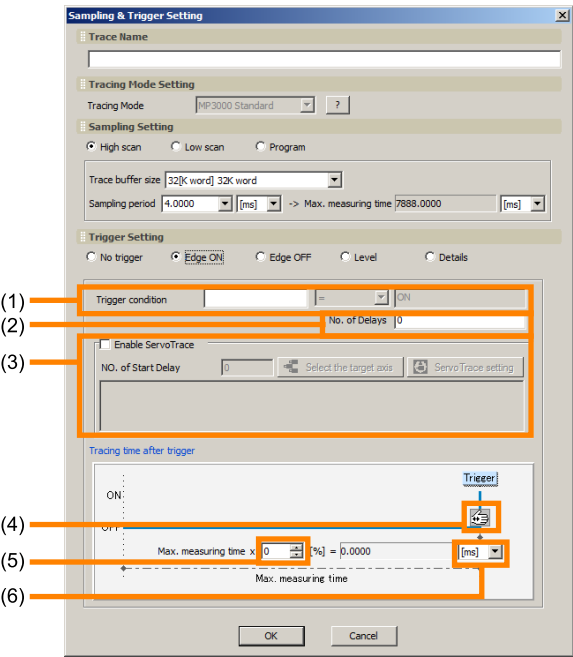
Start/stop of tracing can be performed manually.



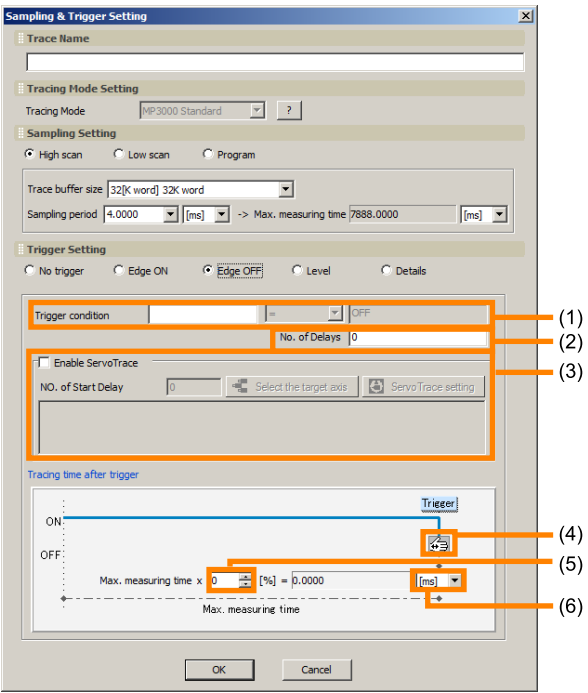
◆ [Edge ON] [Edge OFF]

When a specific bit changes state from OFF to ON or from ON to OFF, the preceding and subsequent data is acquired.

Edge ON:

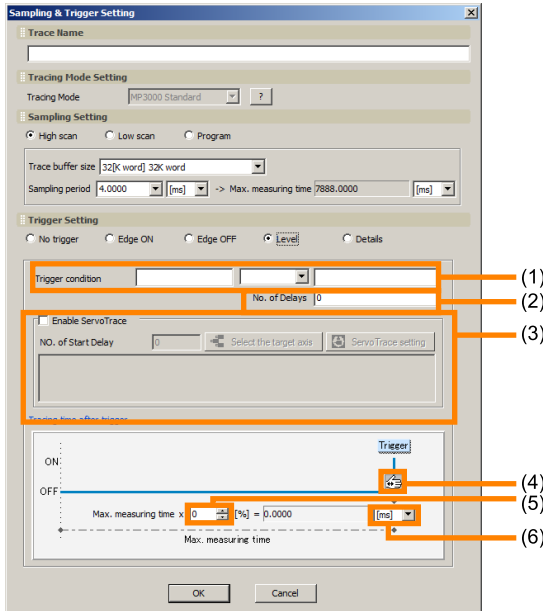


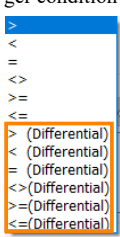
Edge OFF:



No.	Item	Description
(1)	Trigger Condition	Enter the register to be used as the trigger condition. Only bit registers (data type (B)) can be entered. Data types integer (W), double-length integer (L), quadruple-length integer (Q), real number (F), double-precision real number (D), and address (A) cannot be entered.
(2)	No. of Delays	Specify how many times sampling is performed before the trace is stopped after the stop conditions are satisfied.
(3)	Enable ServoTrace	If the controller and a SERVOPACK are connected, you can superimpose the trace results for a controller trace and SERVOPACK trace on multiple axes for analysis. Refer to the following section for details on applicable models and settings. 7.5.14 Superimposing SERVOPACK Trace Results on page 486
(4)		Drag to move this button and set the trigger position.
(5)	[%]	Select the numerical values, and set the trigger position.
(6)	Unit Selection	Set the unit for the maximum trace measuring time after a trigger condition is satisfied.

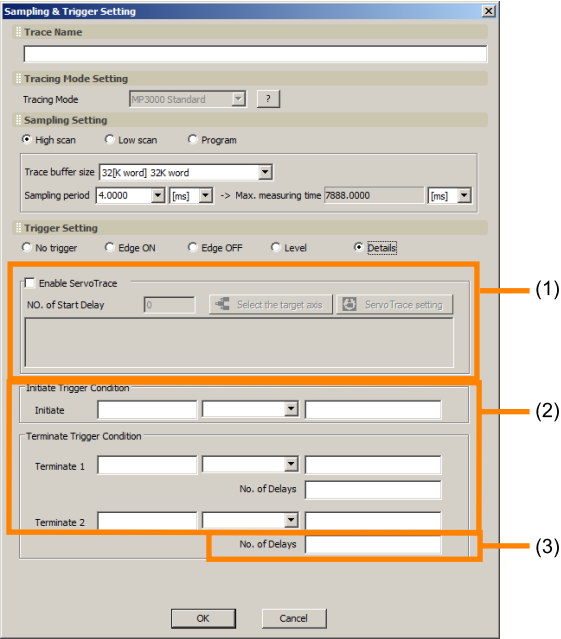
- ◆ [Level]
When a specific register matches the trigger condition, the preceding and subsequent data is acquired.

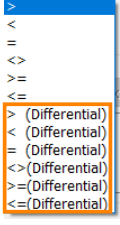


No.	Item	Description
(1)	Trigger Condition	Set the trigger condition for the trace. Only registers having the data type integer (W), double-length integer (L), quadruple-length integer (Q), real number (F), and double-precision real number (D) can be entered. Registers having the data type bit (B) and address (A) cannot be entered. <Operator Trigger Activation Conditions That Are Displayed with the MP3000 Series Only> > (Differential): The register value changes from a value less than the compared value to a value greater than the compared value. < (Differential): The register value changes from a value greater than the compared value to a value less than the compared value. = (Differential): The register value changes from a value different from the compared value to a value equal to the compared value. <> (Differential): The register value changes from a value equal to the compared value to a different value. >= (Differential): The register value changes from a value less than the compared value to a value equal to or greater than the compared value. <= (Differential): The register value changes from a value greater than the compared value to a value equal to or less than the compared value. However, if a trigger condition with a (differential) is set for the trigger condition of the stop trigger, the trigger condition is the same as a trigger condition without a (differential). 
(2)	No. of Delays	Specify how many times sampling is performed before the trace is stopped after the stop conditions are satisfied.
(3)	Enable ServoTrace	If an MP3000-series machine controller and a MECHATROLINK-III SERVOPACK in the Σ-7 series or later are connected, you can superimpose the trace results for a machine controller trace and SERVOPACK trace on multiple axes for analysis. Refer to the following section for details on the settings. 7.5.14 Superimposing SERVOPACK Trace Results on page 486
(4)		Drag to move this button and set the trigger position.
(5)	[%]	Select the numerical values, and set the trigger position.
(6)	Unit Selection	Set the unit for the maximum trace measuring time after a trigger condition is satisfied.

◆ [Details]

Any register set as the trigger can be traced. Tracing can be performed by freely combining the start and stop triggers.



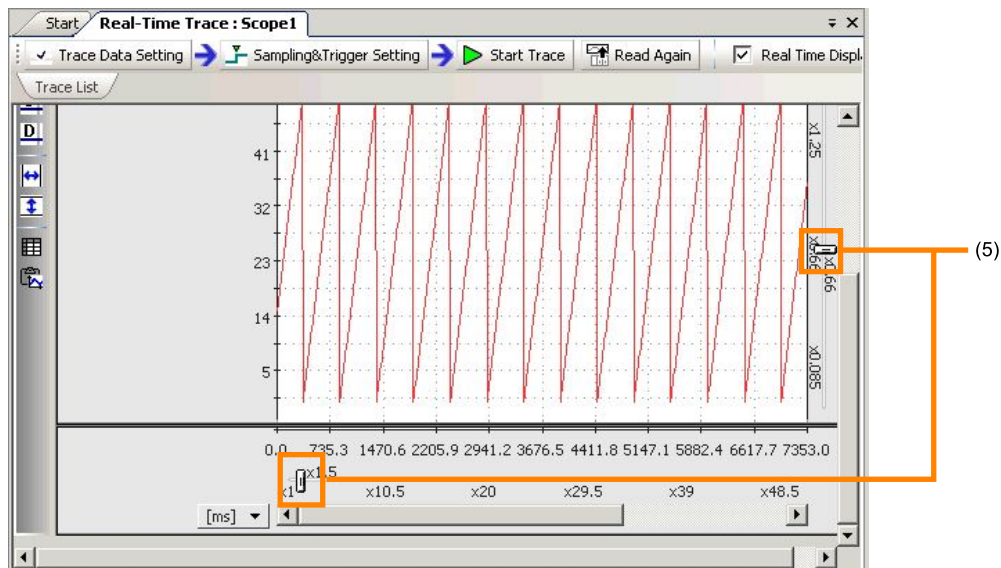
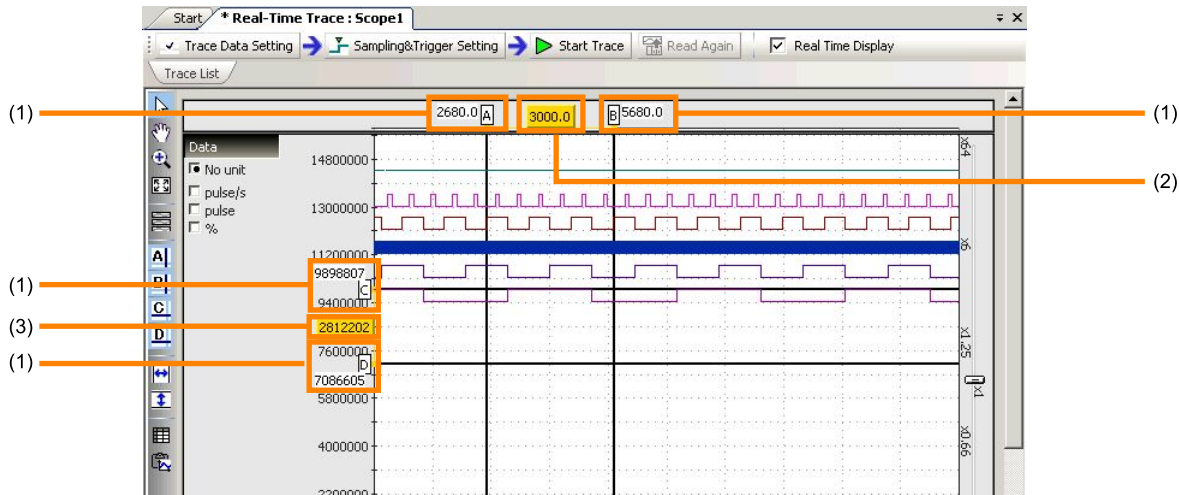
No.	Item	Description
(1)	Enable ServoTrace	You can superimpose the trace results for a controller trace and SERVOPACK trace on multiple axes for analysis. Refer to the following section for details on the settings.  7.5.14 Superimposing SERVOPACK Trace Results on page 486
(2)	Trigger Condition	Set the start trigger condition and stop trigger condition for the trace. Only registers having the data type bit (B), integer (W), real number (F), and double-length integer (L) can be entered. Data types quadruple-length integer (Q), double-precision real number (D), and address (A) cannot be entered. If the start trigger is not specified, the trace is started at the same time as start of sampling. If the stop trigger is not specified, the trace is executed until stop of sampling. <Operator Trigger Activation Conditions That Are Displayed with the MP3000 Series Only> • > (Differential): The register value changes from a value less than the compared value to a value greater than the compared value. • < (Differential) :The register value changes from a value greater than the compared value to a value less than the compared value. • = (Differential) :The register value changes from a value different from the compared value to a value equal to the compared value. • <> (Differential): The register value changes from a value equal to the compared value to a different value. • >= (Differential) :The register value changes from a value less than the compared value to a value equal to or greater than the compared value. • <= (Differential): The register value changes from a value greater than the compared value to a value equal to or less than the compared value. However, if a trigger condition with a (differential) is set for the trigger condition of the stop trigger, the trigger condition is the same as a trigger condition without a (differential). 
(3)	No. of Delays	Specify how many times sampling is performed before the trace is stopped after the stop conditions are satisfied.

(3) Graph Toolbar

The functions of each button are as follows.

Button	Function
	Double-clicking this allows you to zoom the graph.
	Dragging this allows you to scroll the graph. Double-clicking this also allows you to zoom the graph.
	Dragging or double-clicking this allows you to zoom the graph.
	Restores an enlarged graph to its original size.
	Displays the graph split into sections.
	Displays cursor A and the value at the intersecting point on the graph.
	Displays cursor B and the value at the intersecting point on the graph.
	Displays cursor C and the value at the intersecting point on the graph.
	Displays cursor D and the value at the intersecting point on the graph.
	Causes cursors A and B to move at a fixed width interlocked with each other.
	Causes cursors C and D to move at a fixed width interlocked with each other.
	Displays the list.
	Copies an image of the graph to the clipboard.

(4) Trend Graph



No.	Item	Description
(1)	Cursor Position	The value on the cursor position is displayed.
(2)	Cursor A-B Difference	The difference in values between the A and B cursor positions is displayed.
(3)	Cursor C-D Difference	The difference in values between the C and D cursor positions is displayed.

Continued on next page.

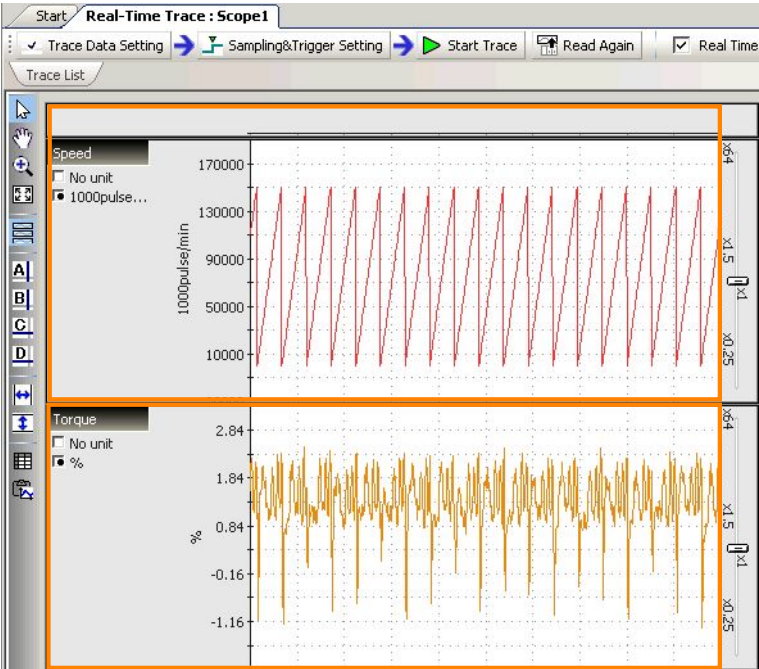
Continued from previous page.

No.	Item	Description
(4)	Graph Unit	The unit of the parameter selected in the [Trace Target List] of the [Trace Data Setting] window is displayed. When the currently displayed trace data includes two or more unit systems, you can switch the unit displayed on the vertical axis of the graph. The scale of the vertical axis is changed and the waveform is displayed to match the information (unit and number of digits after the decimal point) held by each axis. When the unit is switched, trace targets other than the selected unit are displayed by a line in the lighter color of the current color.
(5)	Scale	Moving the sliders horizontally and vertically allows you to rescale the graph. The scalable amounts in the horizontal and vertical directions are as follows: Vertical scale: 0.085x to 64x Horizontal scale: 1x to 48.5x

(a) Graph Split View

Click the  button on the graph toolbar to group the trace data and display it in split views.

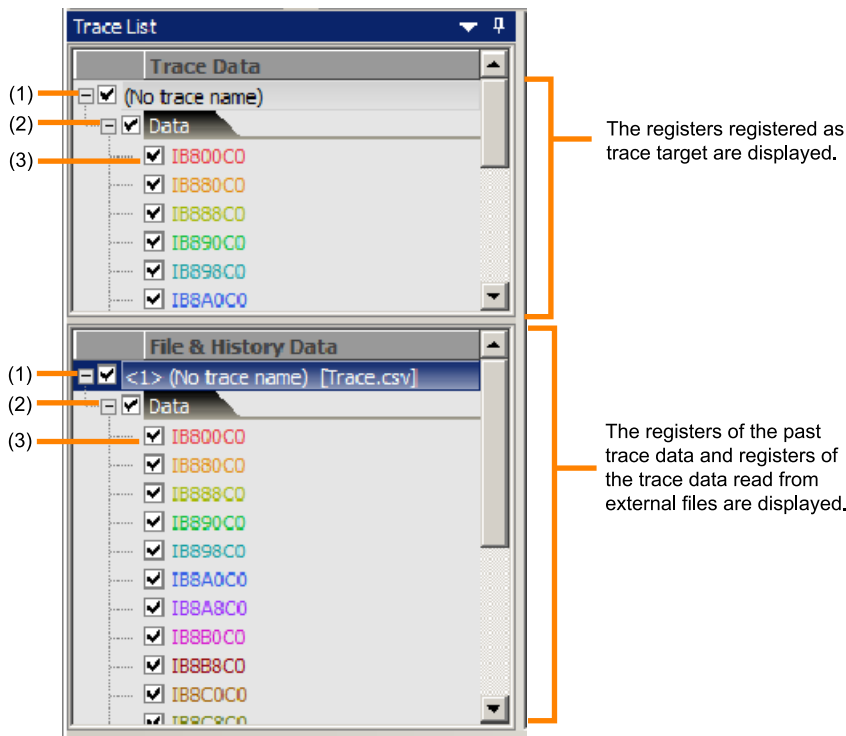
Trace targets are categorized by groups on the [Trace Target List] tabs of the [Trace Data Setting] window and by other groups of registers.



(5) [Trace List] Window

A list of the registers that can be selected for tracing is displayed.

Waveforms on the graphs can be displayed or hidden by selecting or deselecting respective check boxes.



No.	Item	Description
(1)	Trace Name	The trace name is displayed.
(2)	Trace Group Name	Registers are displayed categorized by groups on the [Trace Target List] tabs of the [Trace Data Setting] window (example: position, speed) and by other "Data" groups.
(3)	Registers	Registers are displayed in the same color as the graph.

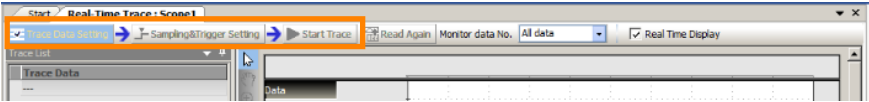
7.5.4 Overview of Real-Time Trace Operations

The flow for using real-time trace is given below.

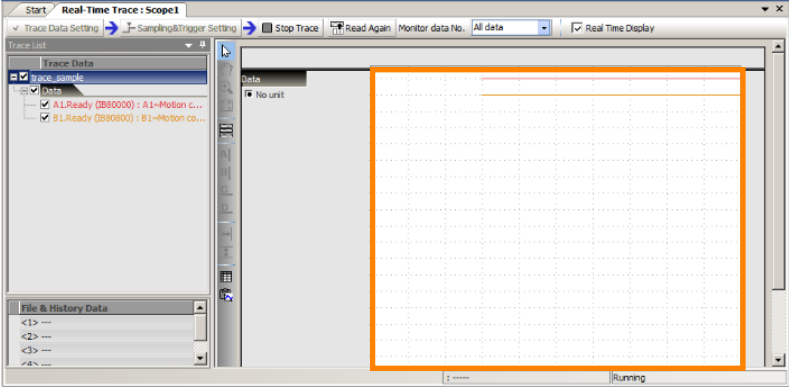
1. Display the [Real-Time Trace] tab page.
2. Set [Trace Data Setting] and [Sampling & Trigger Setting] in that order, and then click the [Start Trace] button.

Refer to the following section for details on the setting items displayed in the window.

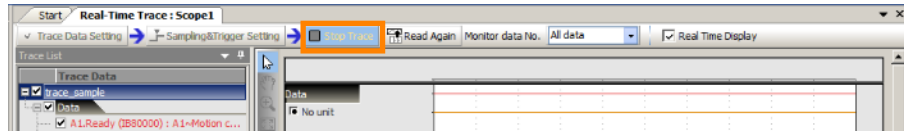
 [7.5.3 \[Real-Time Trace\] Tab Page on page 445](#)



The trace will start, and the graph will be displayed in real-time.



3. To stop the trace, click the [Stop Trace] button.



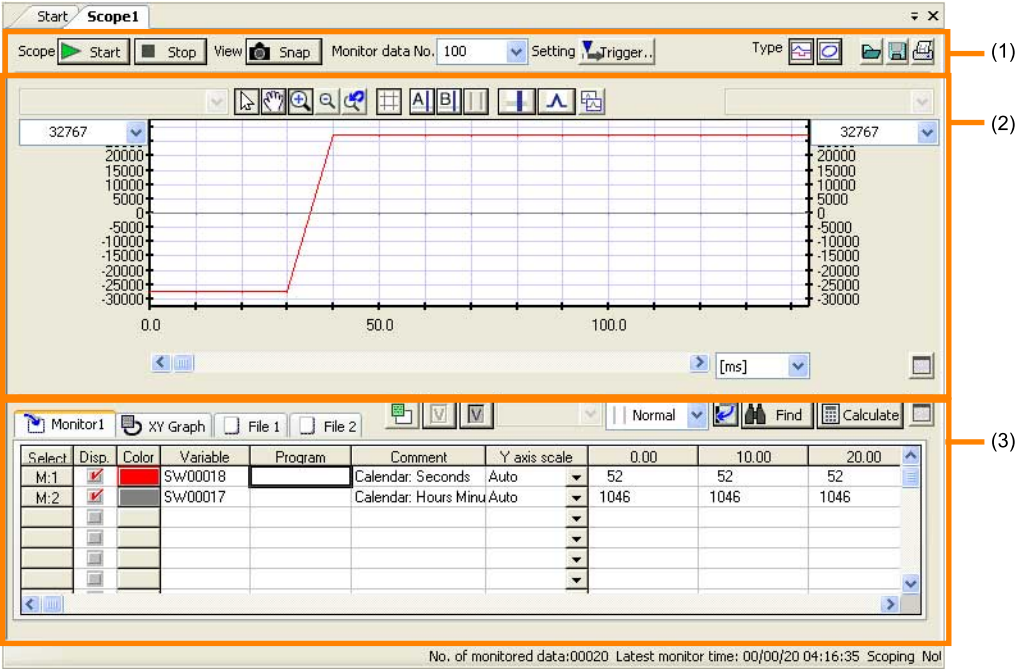
Tracing will stop.

This concludes the basic procedure.

The following table lists the other operations available in Real-Time Trace and the reference information.

Operation	Reference
Reading Trace Definition Files	7.5.9 Reading Trace Definition Files on page 480
Checking Sampling and Trigger Settings	7.5.10 Checking Sampling and Trigger Settings on page 481
Deleting Trace Definitions and Trace Data	7.5.11 Deleting Trace Definitions and Trace Data on page 482
Changing the Enabled/Disabled Setting of the Trace Definition Settings	7.5.12 Changing the Enabled/Disabled Setting of the Trace Definition Settings on page 483
Scaling the Trace Data Waveform	7.5.13 Scaling the Trace Data Waveform on page 485
Superimposing SERVOPACK Trace Results	7.5.14 Superimposing SERVOPACK Trace Results on page 486
Comparing I/O Registers and M Registers	(1) Comparing I/O Registers and M Registers on page 493
Comparing with Past Acquired Data	7.5.16 Comparing with Past Acquired Data on page 496
Checking the Trace Status	7.5.19 Checking the Trace Status on page 499
Saving Trace Data	7.5.20 Saving Trace Data on page 500
Reading Trace Data	7.5.21 Reading Trace Data on page 501
Switching Between Graph View and List View	7.5.22 Switching Between Graph View and List View on page 502
Copying an Image of the Graph	7.5.23 Copying an Image of the Graph on page 503

7.5.5 [Trace Manager] Tab Page



No.	Item	Description	Reference
(1)	Control Panel Area	Used for starting/stopping traces, setting triggers, etc., and for executing general operations relating to tracing. This area is displayed at all times regardless of the graph or list view mode.	 (1) Control Panel on page 458
(2)	Graph Area	The trace data graph is displayed. Graphs are displayed in either of the following formats: • Trend graph • X-Y graph When in the maximum view mode of the list, the graph area is not displayed.	 (2) Graph Area on page 460
(3)	List Area	Used for the operation of registering and clearing monitor variables. Monitor variables are displayed in list format. When in the maximum view mode of the graph, the list area is not displayed.	 (3) List Area on page 464



Monitor Variables :

A variable (register) that is targeted for graph plotting and monitoring is called a “monitor variable.” A monitor variable must be registered so that a variable (register) is treated as a monitor variable. Refer to the following sections for details on registration of monitor variables.

 [◆ How to Register Monitor Variables on page 466](#)

(1) Control Panel

The functions of each button are as follows.

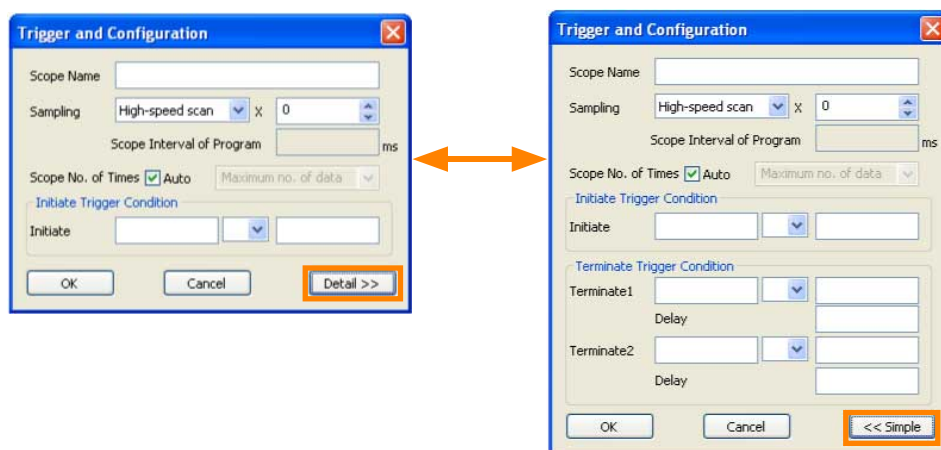
Button	Function
	Starts and stops the trace.
	  : Trace is executing (or waiting for trigger condition).   : Trace is stopped. This button is enabled only in the online mode. If a trace definition file has been loaded, the trace is started at the same time that the trace tab page is started up. So, the [Stop] button is ON at first.
	Clicking this button acquires and displays the content of the trace data memory for one scan. This button is enabled only in the online mode.
	The maximum value of the trace data that is acquired when the [Stop] button or the [Snap] button is clicked can be set. You can either select from the available options or click inside the cell and directly enter the value. The maximum value that can be entered directly is "32158".
	Clicking this displays the [Trigger & Configuration Setting] window. Refer to the following section for details.  (a) [Trigger and Configuration Setting] Window on page 459
	Clicking this displays the trend graph. The trend graph displays the values of registered monitor variables in time series as a graph. Refer to the following section for details.  (2) Graph Area on page 460
	Clicking this displays the X-Y graph. The X-Y graph displays the relation between variable X and variable Y at a certain time as a graph with two specified monitor variables (variable X and variable Y) taken for the horizontal axis and vertical axis. Refer to the following section for details.  (2) Graph Area on page 460
	Clicking this displays the [Open] window, and the trace data and data definitions can be read from the selected file.
	Clicking this opens the [Save As] window, and you can save trace data and trace definitions as a file.
	Clicking this displays the [Print] window, and you can print the [Trace Manager] window.

(a) [Trigger and Configuration Setting] Window

This window is displayed by clicking the  button on the control panel.

<Simple Settings View>

<Detail Settings View>

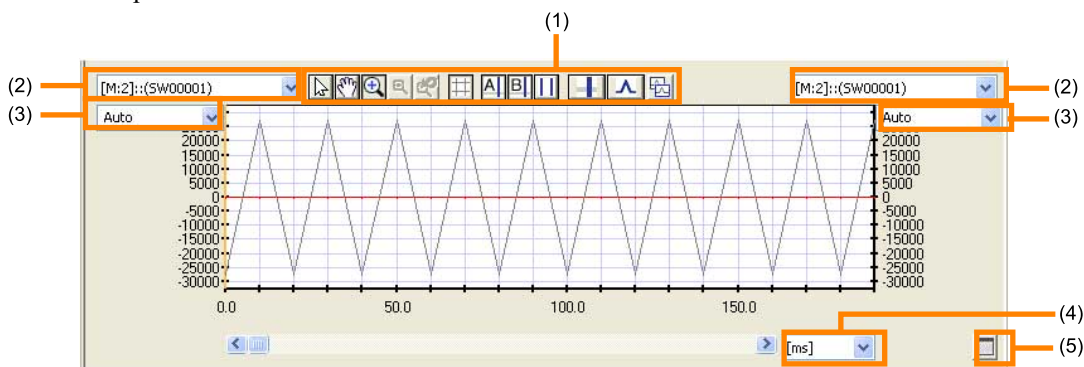


Item		Description
Scope Name		Set the trace condition name. <Setting Condition> 32 characters maximum.
Sampling	Sampling Conditions	Set the data sampling rate.
	Sampling Interval	Set the data sampling interval. When "0" is set, trace is executed at every scan. <Setting Range> 0 to 32767
Scope Interval of Program		Specify the time in ms units. The value specified here is used for the time axis. This setting is enabled only when sampling conditions are set to "Program designation". <Setting Range> 0.1 to 999.9
Scope No. of Times		Specify the number of points of data to acquire. When [Auto] is selected, the trace is executed until the stop trigger condition is satisfied or when the [Stop] button is clicked.
Initiate		Set the register, operator and numerical value that are used as the trigger for starting the trace. If the start trigger is not specified, the trace is started at the same time as start of sampling.
Terminate 1/2		Set the register, operator and numerical value that are used as the trigger for stopping the trace. Up to two stop triggers can be set. If the stop trigger is not specified, the trace is executed until stop of sampling.
Delay		Specify how many times sampling is performed before the trace is stopped after the stop conditions are satisfied. <Setting Range> 0 to 65534

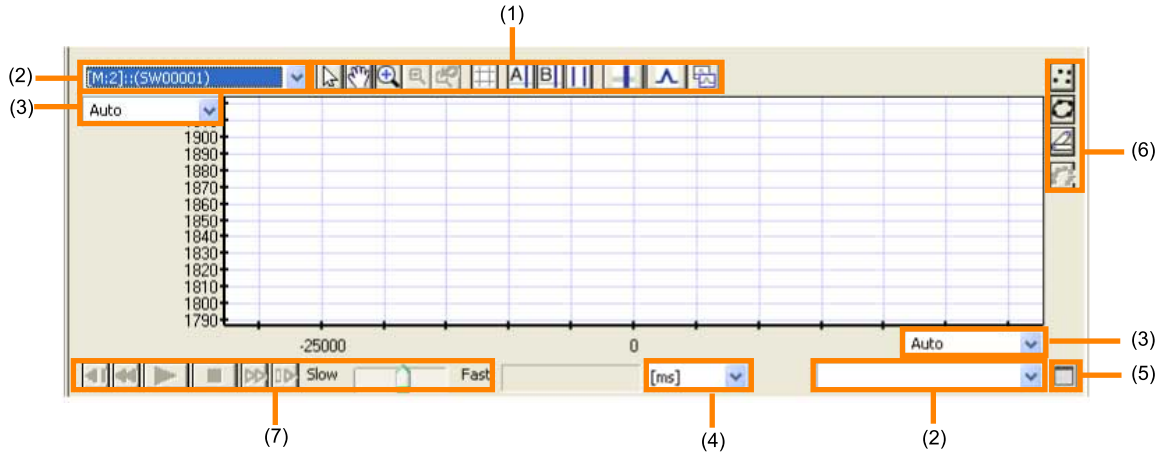
(2) Graph Area

Two graph view modes provided for the graph area are trend graph view and X-Y graph view. The view can be switched by clicking the  button and the  button.

<Trend Graph>

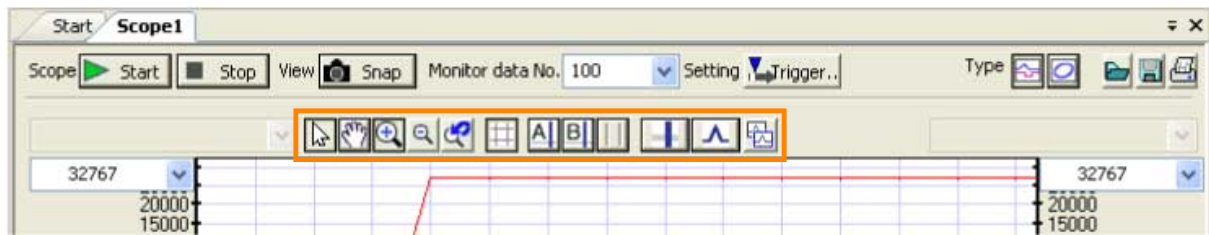


<X-Y Graph>



No.	Item	Description
(1)	Graph Area Operation Buttons	The graph area operation buttons are common to both the trend graph view mode and the X-Y graph view mode. The pointer and cursors can be set and switched, and the graph display can be switched, for example. Refer to the following section for details. (a) Graph Area Operation Buttons on page 462
(2)	Monitor Variable Selection	Different variable names and maximum values (units) can be set to the left and right vertical axes of trend graphs. Clicking the [V] button displays all variables as a list whose display setting is currently ON in the list area. Select the variables to set to the left and right vertical axes.
		Different variable names can be set to the vertical and horizontal axes of X-Y graphs. Clicking the [V] button displays all variables as a list whose display setting is currently ON in the list area. Select the variables to set to the vertical axis and the horizontal axis.
(3)	Maximum Value Selection	The maximum values of different monitor variables can be set to the left and right vertical axes of trend graphs. Double-clicking a cell allows you to enter directly. When [Auto] is selected, the maximum values are adjusted so that all of the acquired trace data is displayed in the graph area.
		The maximum values of different monitor variables can be set to the vertical axis and the horizontal axis of X-Y graphs. Double-clicking a cell allows you to enter directly. When [Auto] is selected, the maximum values are adjusted so that all of the acquired trace data is displayed in the graph area.
(4)	Unit Selection	The display unit of the horizontal axis (time axis) can be selected from [ms], [sec], [min] or [Data].
(5)	 	When the button is clicked, the list area is hidden so that the graph area becomes the maximum size, and the button is displayed.
		When the button is clicked, the graph area returns to its original size, and the list area is displayed.
(6)	X-Y Graph View Setting Operation Buttons	The view settings of the X-Y graph can be modified. Refer to the following section for details. (b) X-Y Graph View Setting Operation Buttons on page 464
(7)	Playback Related Operation Buttons	The playback function plays back and displays data acquired until the trace is stopped or data acquired by snapshot. Operations possible by this function include playback, stop, fast forward/rewind, and frame advance/return. Playback can be executed when in the X-Y graph view mode. As the X-Y graph does not include time information, this function is provided for displaying changes in data that are caused by the lapse of time. Refer to the following section for details. (c) Playback Related Operation Buttons on page 464

(a) Graph Area Operation Buttons



Button	Description	
	Dragging this allows you to vertically scroll the graph. Graph areas for which "Auto" is selected as the maximum vertical axis value on the list cannot be moved.	
	Dragging this allows you to horizontally scroll the graph.	
	Dragging this enlarges the selected area.	
	Clicking this when the graph is displayed enlarged makes the graph one step smaller. This is enabled when the graph is displayed enlarged.	
	Restores an enlarged graph to its original size. This is enabled when the graph is displayed enlarged.	
	Toggles between displaying and hiding the grid.	
	Toggles between displaying and hiding cursor A.	Refer to the following section for details. ◆ Details of Cursor A, Cursor B, Cursor A/B with Same Interval on page 462
	Toggles between displaying and hiding cursor B.	
	Causes cursors A and B to move at a fixed width interlocked with each other. This is enabled when both cursors A and B are displayed.	
	Displays the [Cursor Setting] window. Refer to the following section for details. ◆ [Cursor Setting] Window on page 462	
	Displays the [Scale Offset Adjust] window. Refer to the following section for details. ◆ [Scale Offset Adjust] Window on page 463	
	Copies the graph to the clipboard. The copied graph image can also be pasted to other Windows applications.	
	Hides the list area and maximizes the graph. This is enabled in the normal list view.	
	Displays the list area and restores the graph to its normal view. This is enabled in the maximum graph view.	

◆ Details of Cursor A, Cursor B, Cursor A/B with Same Interval

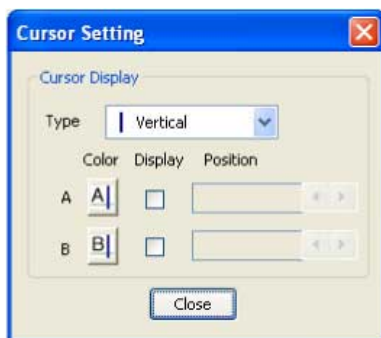
Two mouse cursors, cursor A and B, are provided for the graph area. You can use either one or both of these.

The cursor moves as described below according to the status of the graph area by left-clicking inside the graph.

Status		Cursor Movement
When only cursor A (or B) is displayed		Cursor A (B) moves to the place you clicked.
When both cursors A and B are displayed and movement of cursors A and B is interlocked		Cursor A moves to the place you clicked with cursors A and B interlocked with each other at a fixed width.
When both cursors A and B are displayed and movement of cursors A and B is not interlocked	When the cursor mode in the list area is either Normal or Cursor A	Cursor A moves to the place you clicked. At this time, cursor B does not move.
	When the cursor mode in the list area is Cursor B	Cursor B moves to the place you clicked. At this time, cursor A does not move.

◆ [Cursor Setting] Window

The [Cursor Setting] window is displayed by clicking the button in the graph area operation buttons.

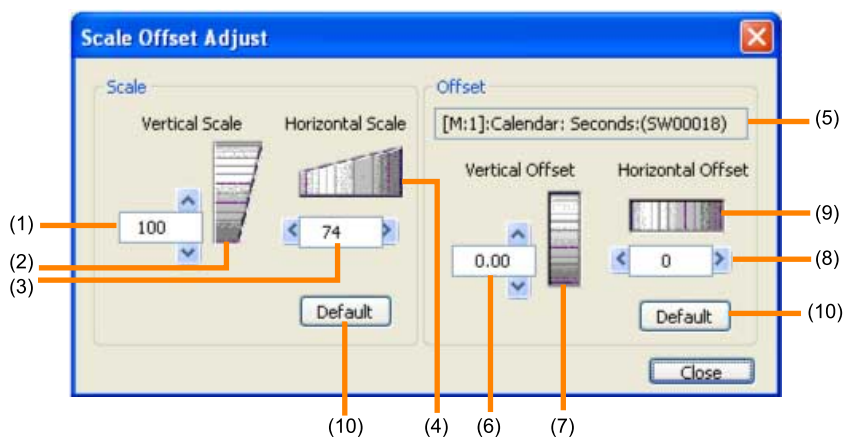


Item	Description
Type	Select the cursor shape. A vertical cursor () or cross cursor (+) can be selected. The cross cursor is displayed when a monitor variable is selected in the [Select] field in the list area. At this time, the center of the cross moves to on the selected monitor variable.
Color	Clicking this button displays the [Color Setting] window. The color of the cursor is selected of cursors A and B individually.
Display	The cursor of the selected check box is displayed.
Position	Set the display position of the cursor. Either enter directly or set by clicking the spin buttons. When the numerical value is entered directly, the display position is adjusted to the nearest grid position.

◆ [Scale Offset Adjust] Window

The [Scale Offset Adjust] window is displayed by clicking the  button in the graph area operation buttons. In this window, the scale (maximum value) of each axis and offset (shift from center) can be adjusted.

Information Offset adjustment is enabled when a variable for offset adjustment is selected in the [Select] field in the list area.



No.	Item	Description
(1)	Vertical Scale Setting	Set the vertical scale either by entering directly or clicking the spin buttons. <Setting Range> 100 to 1000
(2)	Vertical Scale Adjustment Bar	Drag this vertically to set the vertical scale.
(3)	Horizontal Scale Setting	Set the horizontal scale either by entering directly or clicking the spin buttons. <Setting Range> 10 to 1000
(4)	Horizontal Scale Adjustment Bar	Drag this horizontally to set the horizontal scale.
(5)	Variable Targeted for Offset adjustment	The name of the variable targeted for offset adjustment is displayed.

Continued on next page.

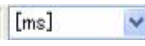
Continued from previous page.

No.	Item	Description
(6)	Vertical Offset Setting	Set the vertical offset either by entering directly or clicking the spin buttons. <Setting Range> -100.00 to 100.00
(7)	Vertical Offset Adjustment Bar	Drag this vertically to set the vertical offset.
(8)	Horizontal Offset Setting	Set the horizontal offset either by entering directly or clicking the spin buttons. <Setting Range> - When the target (sampling time) is selected on the [Monitor] tab page or the [File] tab page: -99 to 99 - When the target (variable) is selected on the [XY Graph] tab page: -100.00 to 100.00
(9)	Horizontal Offset Adjustment Bar	Drag this horizontally to set the horizontal offset.
(10)	Default	Restores the scale or offsets to their defaults. Vertical scale: 100 Horizontal scale: 100 Vertical offset: 0.00 Horizontal offset: 0 The horizontal offset default is 0.00 when the target on the [XY Graph] tab page is selected.

(b) X-Y Graph View Setting Operation Buttons

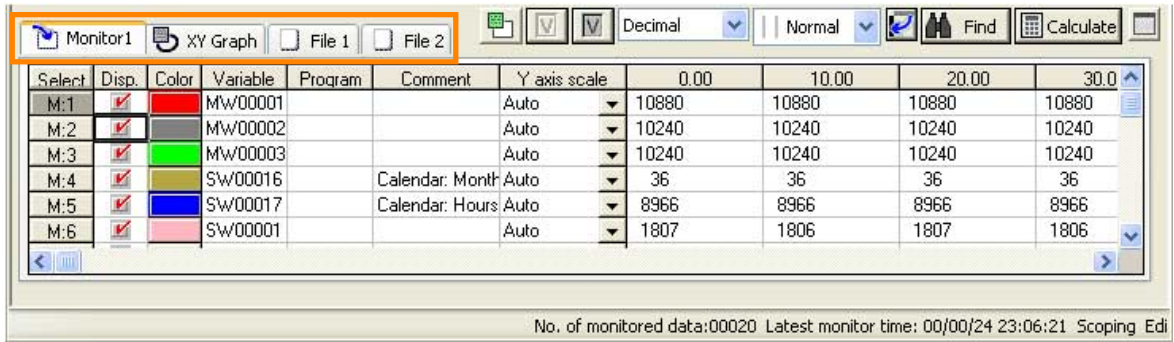
Button	Item	Description
	Point Display	Displays each coordinate as a point.
	Line Display	Displays each coordinate connected by a line.
	Model Display	Displays each coordinate connected by a line according to the information of the connection point. Refer to the following section for details on connection points.  (b) [XY Graph] Tab Page on page 466
	Leave Trace	Select whether or not to leave a trace. This is enabled only for point display.

(c) Playback Related Operation Buttons

Button	Item	Description
	Playback	Plays back the X-Y graph from the beginning of the traced data.
	Stop	Stops the X-Y graph during playback.
	Fast Forward/Rewind	Fast forwards and rewinds by a specified magnification. Playback is automatically continued when this operation is canceled. This operation is possible only during playback.
	Frame Advance/Return	Advances and returns playback one frame at a time.
Slow  Fast	Magnification Setting	Set the magnification of fast forward/rewind.
130.00  [ms] 	Run Time	The run time of the playback display is displayed. The unit can be selected from [ms], [sec], [min] or [Data].

(3) List Area

Three types of tab pages are displayed in the list area: [Monitor], [XY Graph], and [File].

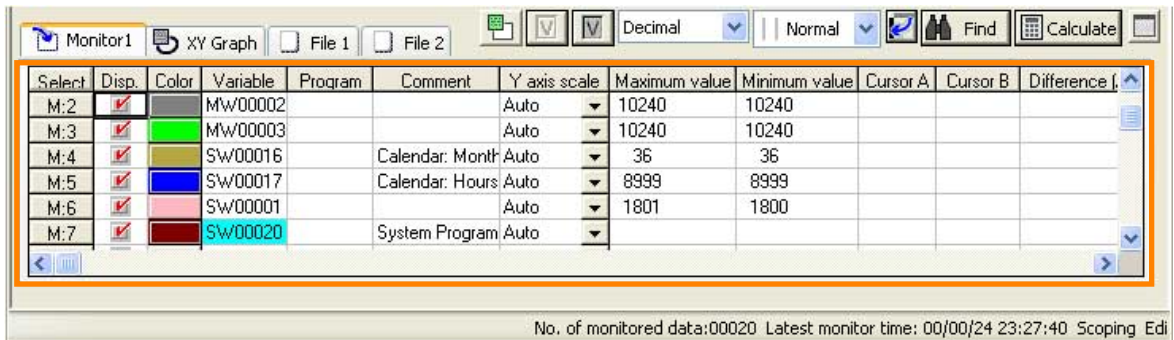


(a) [Monitor] Tab Page

In the [Monitor] tab page, monitor variables can be displayed, registered, deleted, and edited.

Refer to the following section for details on registration and editing of monitor variables.

◆ [How to Register Monitor Variables on page 466](#)



Item	Description
Select	Clicking this button selects the variable. Switching of data view, find, calculation, offset adjustment, and cross cursor display will be possible for the selected variable. The following describes the display items: - M:y : No.y of monitor - Fx:y: No.y of file x - SUB : Difference between 2 variables - ADD: Sum of 2 variables - REF : Reference variable
Display	Selecting this check box displays the variable graph.
Color	Double-clicking this button displays the [Color] window on which you can set the graph color.
Variable	Enter the name of the variable or the register to be traced.
Program	When entering a D register, enter the name of the program that is currently using the D register.
Comment	The comment is displayed.
Y axis scale	Select the scale of the Y-axis from "Auto", "Y1 axis" and "Y2 axis". When "Auto" is set, the scale is automatically adjusted and displayed for each individual monitor variable. When "Y1 axis" is selected, data is displayed according to the scale on the left edge of the graph, and when "Y2 axis" is selected, data is displayed according to the scale on the right edge of the graph
Maximum value	This is displayed by selecting [Minimum/Maximum Value] from the [List] menu. The maximum value of the trace data is displayed.
Minimum value	This is displayed by selecting [Minimum/Maximum Value] from the [List] menu. The minimum value of the trace data is displayed.
Cursor A	This is displayed by selecting [Cursor Position Value] from the [List] menu. The value of cursor A is displayed.
Cursor B	This is displayed by selecting [Cursor Position Value] from the [List] menu. The value of cursor B is displayed.

Continued on next page.

Item	Description
Difference (A – B)	This is displayed by selecting [Cursor Position Value] from the [List] menu. The difference (A – B) between the values for cursors A and B is displayed.
Conversion unit (x N)	This is displayed by selecting [Unit Conversion] from the [List] menu. The value for the convert unit is displayed as a multiplying factor. Data is displayed by variable value x multiplying factor. Set this value, for example, when swapping over to the machine coordinate system.

◆ How to Register Monitor Variables

Traces can be used by registering the variables that are to be monitored (monitor variables) in the list area. Up to 16 monitor variables can be registered.

Note:

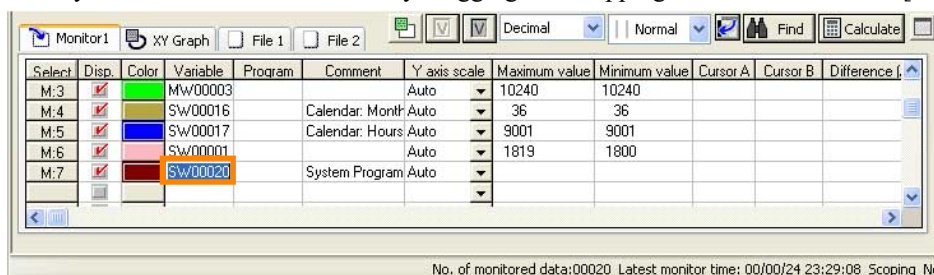
Up to 64 (16 x 4) monitor variables can be registered by setting the monitor in the [Select Monitor Setting] window. Up to 16 monitor variables, however, can be displayed at one time. Refer to the following section for details.

◆ [Select Monitor Setting] Window on page 468

The following methods can be used to register monitor variables.

• Registering Variables on the [Monitor] Tab Page

You can enter the variable by double-clicking the [Variable] cell. The variable name (register) can either be directly entered or it can be entered by dragging and dropping the variable from the [Variable] window.

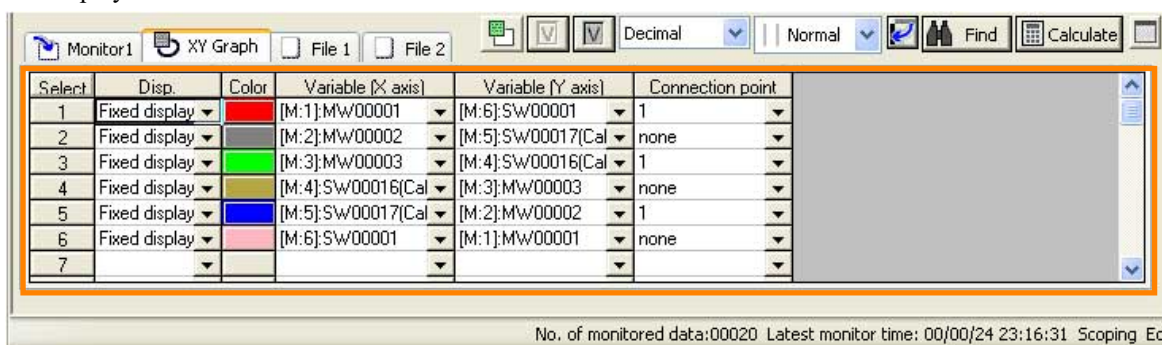


• Registering Variables from the Edit Ladder Program Window

Right-click an object in the Edit Ladder Program Window and select [Add to Scope] from the pop-up menu.

(b) [XY Graph] Tab Page

In the [XY Graph] tab page, the monitor variables to display on the X-Y graph can be registered, deleted, edited, and displayed.



Item	Description
Select	Clicking this button selects the variable. Offset adjustment and the cross cursor can be displayed for the selected variable.
Display	Select how the graph is displayed. - Hide: Data is not displayed on a graph. - Fixed display: Data is displayed on a graph when trace is executed. - Playback: Data is displayed on a graph when playback is executed.
Color	Double-clicking this button displays the [Color] window on which you can set the graph color.
Variable (X axis)	Specify the name of a variable to be traced on the X-axis (horizontal axis). The variable name can be selected from the variables set on the [Monitor] tab page.

Continued from previous page.

Item	Description
Variable (Y axis)	Specify the name of a variable to be traced on the Y-axis (vertical axis). The variable name can be selected from the variables set on the [Monitor] tab page.
Connection point	Set the No. in the model display to connect to. Select from none or the [Select] numbers of this tab page.
Cursor A	This is displayed by selecting [Cursor Position Value] from the [List] menu. The value of cursor A is displayed.
Cursor B	This is displayed by selecting [Cursor Position Value] from the [List] menu. The value of cursor B is displayed.
Difference (A – B)	This is displayed by selecting [Cursor Position Value] from the [List] menu. The difference (A – B) between the values for cursors A and B is displayed.

(c) [File] Tab Page

Monitor variable data imported from specified files (CSV files) can be displayed in the [File] tab page.

Use the following procedure to import the data.

1. **Display the [File] tab page in the list area.**
2. **Select [Import] from the [File] menu.**
The [Open] window will be displayed.
3. **Select the file (.csv) from which to import data, and click the [Open] button.**

The data in the selected file will be displayed.

The items displayed on a [File] tab page are the same as those on a [Monitor] tab page. Variables, programs, and comments depend on data imported from files, so they cannot be edited.

Information

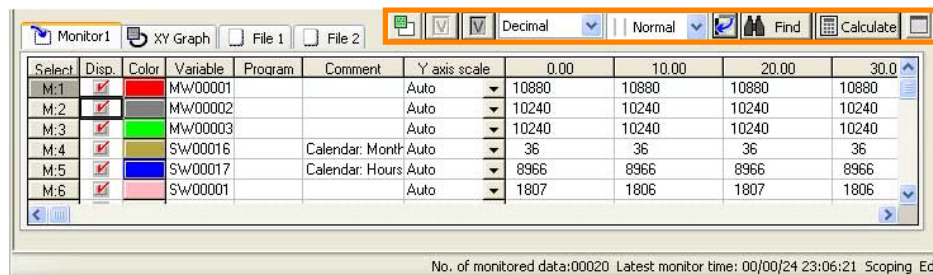
- Variables displayed on a [File] tab page are registered as monitor variables to be monitored on a [Monitor] tab page. Refer to the following section for details.

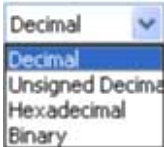
◆ [\[Object Variable Setting\] Window on page 468](#)

- The default setting for the number of [File] tab page displayed is two, but the number can be set for a maximum of eight. Refer to the following section for how to set the number of tab pages displayed.

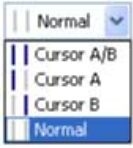
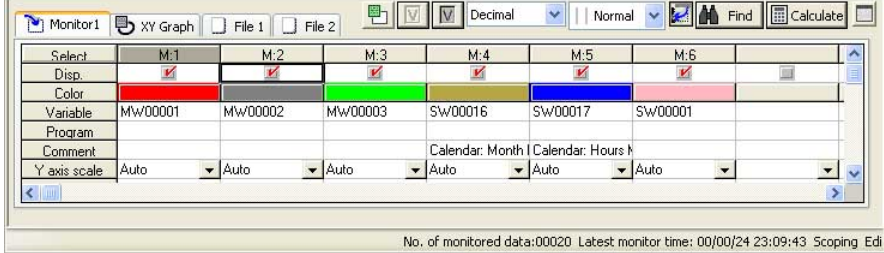
◆ [\(d\) \[List\] Tab Page on page 473](#)

(d) List Operation Buttons



Button	Description
	Clicking this button displays the [Select Monitor Setting] window. You can add [Monitor] tab pages that are displayed to expand the targets for monitoring. Refer to the following section for details. ◆ [Select Monitor Setting] Window on page 468
	Clicking this button displays the [Object Variable Setting] window. You can register the variables in the imported file as monitor variables. Refer to the following section for details. ◆ [Object Variable Setting] Window on page 468
	Select the display format for variables selected in the list.

Continued on next page.

Button	Description
	Select the cursor linked to the display positions. When Cursor A, Cursor B, or Cursor A/B is selected, the cursor position on the graph is linked with the data displayed on the [Monitor] tab page and [File] tab page of the list area. When cursor A (or cursor B) is not displayed, [Cursor A] (or [Cursor (B)]) cannot be selected. When [Cursor A/B with Same Interval] is not set in the graph area, [Cursor A/B] cannot be selected. The status will not change if unexecutable selections are selected.
	Toggles the display orientation of the list. When ON, all variable data is displayed in the vertical direction. When OFF, all variable data is displayed in the horizontal direction. <Vertical List Display Example> 
	Clicking this button with a monitor variable in the list selected displays the [Find] window, and the maximum value, minimum value, local maximum value, local minimum value, and time axis of the graph can be found. Refer to the following section for details.  ◆ [Find] Window on page 469
	Clicking this button with a monitor variable in the list selected displays the [Calculate] window, and the area, average, and absolute average calculation results for the selected variable can be referenced. Refer to the following section for details.  ◆ [Calculate] Window on page 470
	Hides the graph and maximizes the list. This is enabled in the normal list view.
	Clears the maximum list view and restores the list to its normal view (graph and list). This is enabled in the maximum list view.

◆ [Select Monitor Setting] Window

Click the  button to display the [Select Monitor Setting] window. The [Monitor] tab pages displayed in the window can be selected from [Monitor 1] to [Monitor 4].

The default setting is for only [Monitor 1] tab page to be displayed. For example, selecting [Monitor 3] and clicking the [OK] button will display the [Monitor 3] tab page.

A maximum of 16 monitor variables can be registered on a single [Monitor] tab page. The number of targets to be monitored can be expanded by using multiple tab pages.

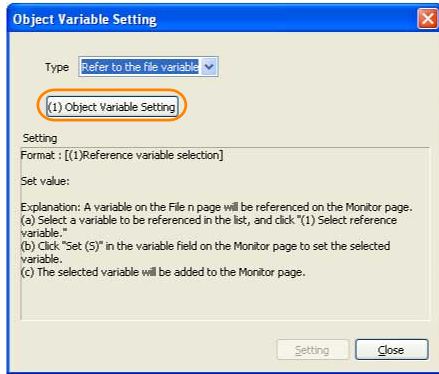


◆ [Object Variable Setting] Window

Click the  button to display the [Object Variable Setting] window. Variables displayed on a [File] tab page can be registered to a [Monitor] tab page as monitor variables.

Use the following procedure to register a monitor variable.

1. Select the variable to register in the list on the [File] tab page, and then click the [(1) Object Variable Setting] button in the [Object Variable Setting] window.



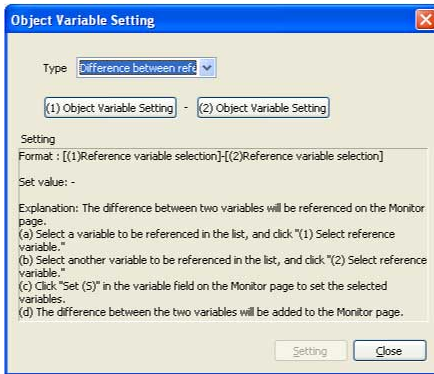
The selected variable name will be displayed in [Set value].

2. Select the [Variable] field on the [Monitor] tab page, and then click the [Setting] button in the [Object Variable Setting] window.

The variable will be added to the selected [Variable] field.

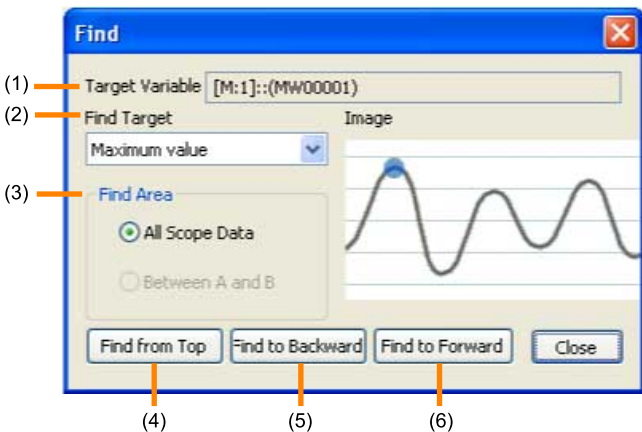
Information

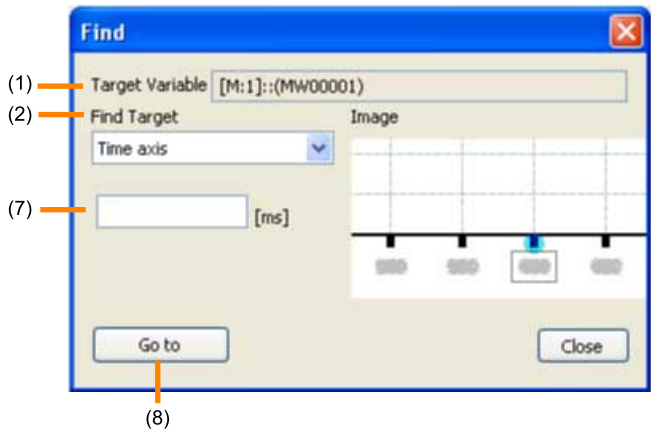
If you select [Difference between reference variables] or [Sum of reference variables] in the [Type] list box, you can register the difference or sum of register values.



◆ **[Find] Window**

Click the  button with a monitor variable selected in the list to display the [Find] window. The maximum value, minimum value, local maximum value, local minimum value, and time axis of the of the selected variable can be found.

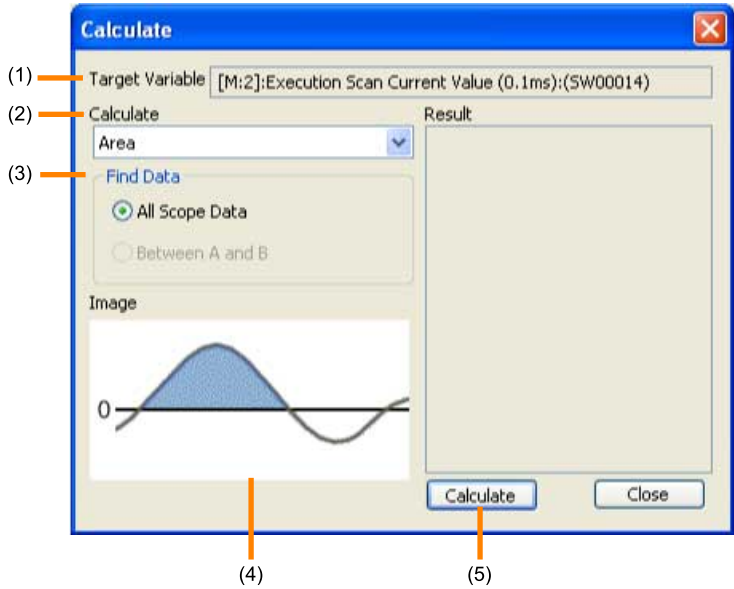




No.	Item	Description
(1)	Target Variable	The selected variable name is displayed.
(2)	Find Target	Select one of the following as the find target: "Maximum value", "Minimum value", "Local maximum value", "Local minimum value", and "Time axis".
(3)	Find Area	Select the search range. "Between A and B" cannot be selected when cursors A and B are hidden.
(4)	Find from Top	Searches from the top of the find area.
(5)	Find to Backward	Searches backward from the current position.
(6)	Find to Forward	Searches forward from the current position.
(7)	Time Setting	Set the destination time to jump to in units of ms.
(8)	Go to	Jumps to the data for the set time (proximity).

◆ [Calculate] Window

Click [Calculate] with a monitor variable selected in the list to display the [Calculate] window. The area, average, and absolute average calculation results for the selected variable can be referenced.



No.	Item	Description
(1)	Target Variable	The selected variable name is displayed.
(2)	Calculate	Select one of the following as the calculation type: [Area], [Average], or [Absolute average].
(3)	Find Data	Select the search range. "Between A and B" cannot be selected when cursors A and B are hidden.

Continued on next page.

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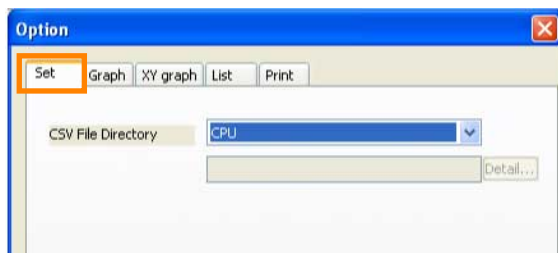
No.	Item	Description
(4)	Results Area	The calculation result is displayed.
(5)	Calculate	Executes the calculation.

(4) Optional Settings

Select [Option] from the [View] menu to display the [Option] window. There are five tab pages: [Set], [Graph], [XY graph], [List], and [Print].

(a) [Set] Tab Page

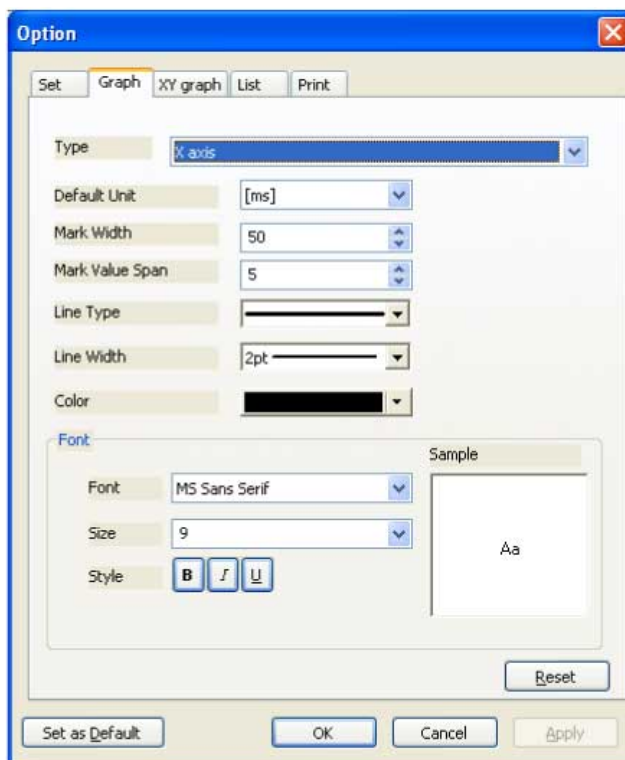
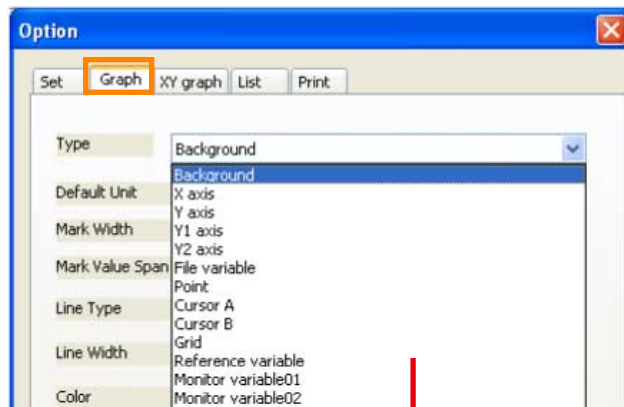
This tab page is used to set the default directory for when trace data is imported or exported.



Selection	Description
CPU	The directory to which the MPE720 is installed is set.
User setting	Click the [Detail] button and set the directory with the [Browse Folder] window.

(b) [Graph] Tab Page

General graph settings can be made on this tab page. Select the item to be set from [Type], and then set the detailed items.



The detailed items that are displayed depend on the item that was selected for [Type].

Item	Description
Default Unit	Set the default value for the X-axis unit (No. of data, ms, sec, mm).
Mark Width	Set the size of one X-axis mark. <Example> When the default unit is ms and the mark width is 50: one mark will be 50 ms.
Mark Value Span	Set the span of values (step) displayed for marks.
Line Type	Select a line type from solid line, wavy line, broken line, etc.
Line Width	Select a line width from 1 pt. to 6 pt.
Color	Clicking this button displays the [Color] window.
Font	Select the font for characters.
Size	Select a font size from 8 to 72 points. You can also input values directly. A decimal point cannot be entered.

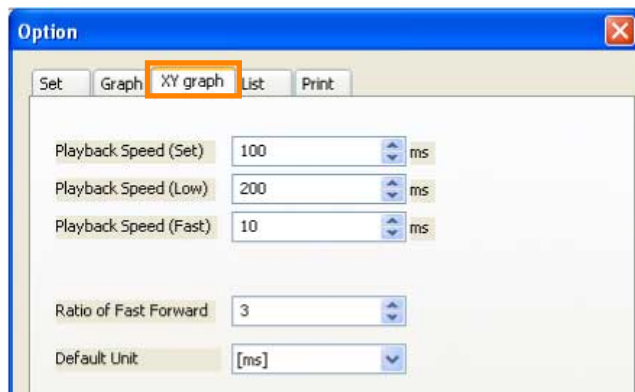
Continued on next page.

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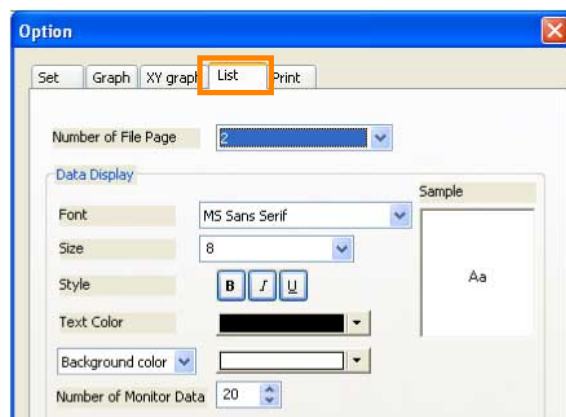
Default Unit	Set the default value for the X-axis unit (No. of data, ms, sec, mm).
Style	Set the font style as required. You can select more than one. • B: Bold • I: Italic • U: Underline
Sample	A sample will be displayed here when you set the font, size, and style.

(c) [XY Graph] Tab Page

Settings related to X-Y graph playback can be made on this tab page.

**(d) [List] Tab Page**

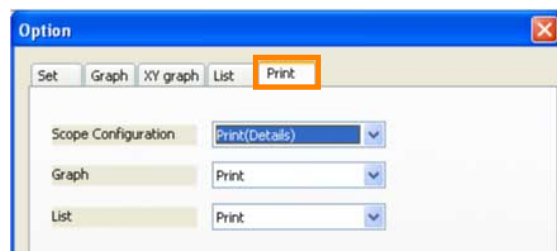
Settings related to the list area display can be made on this tab page.



Item	Description
Number of File Page	Select the default number of [File] tab page in the list area, from 1 to 8.
Number of Monitor Data	Set the number of data items to be displayed in the list area while tracing is being executed. All data is displayed when stopped or when a snapshot is taken.

(e) [Print] Tab Page

Settings related to the print object can be made on this tab page.



Information

Select [Print Setting] from the [File] menu to display the [Print Object Setting] window.

The content set on the [Option] window will be applied to the display items on the [Print Object Setting] window.

<Example>

When [List] is set to [Do not print] in the [Option] window, [List] is disabled in the [Print Object Setting] window.



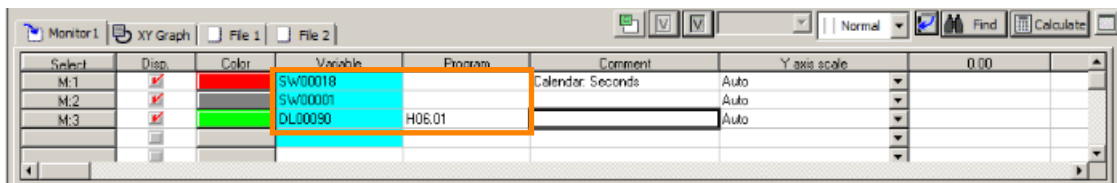
7.5.6 Overview of Trace Manager Operations

The flow for using Trace Manager is given below.

1. **Display the [Trace Manager] tab page.**
2. **Double-click the [Variable] field in the list area to display the text cursor, enter the register or variable name to monitor, and press the [Enter] key. When entering a D register, enter the name of the program to monitor in the [Program] field.**

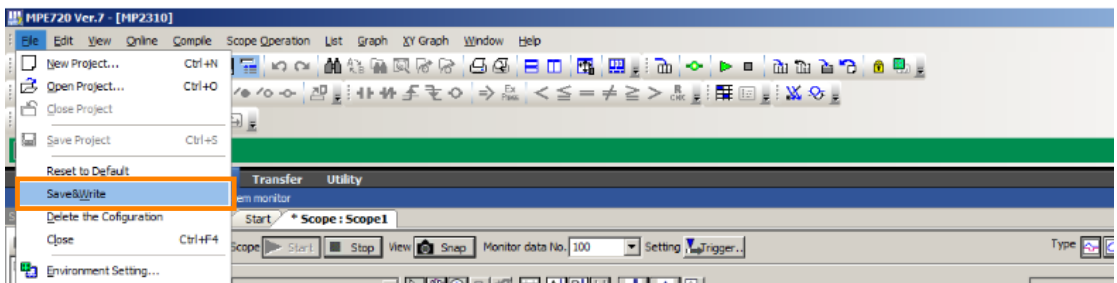
Refer to the following section for details on the setting items displayed in the window.

[7.5.5 \[Trace Manager\] Tab Page on page 458](#)



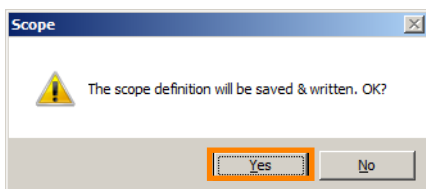
The background of the edited fields will change to blue.

3. **Select [Save & Write] from the [File] menu.**



A message dialog box will be displayed.

4. **Click the [Yes] button.**



This saves the setting, and the background color of the [Variable] field in the list returns to white.

5. **Click the [Start] button on the control panel.**

A message indicating that data is being acquired will be displayed, and then a graph of the acquired data will be displayed in the graph area.

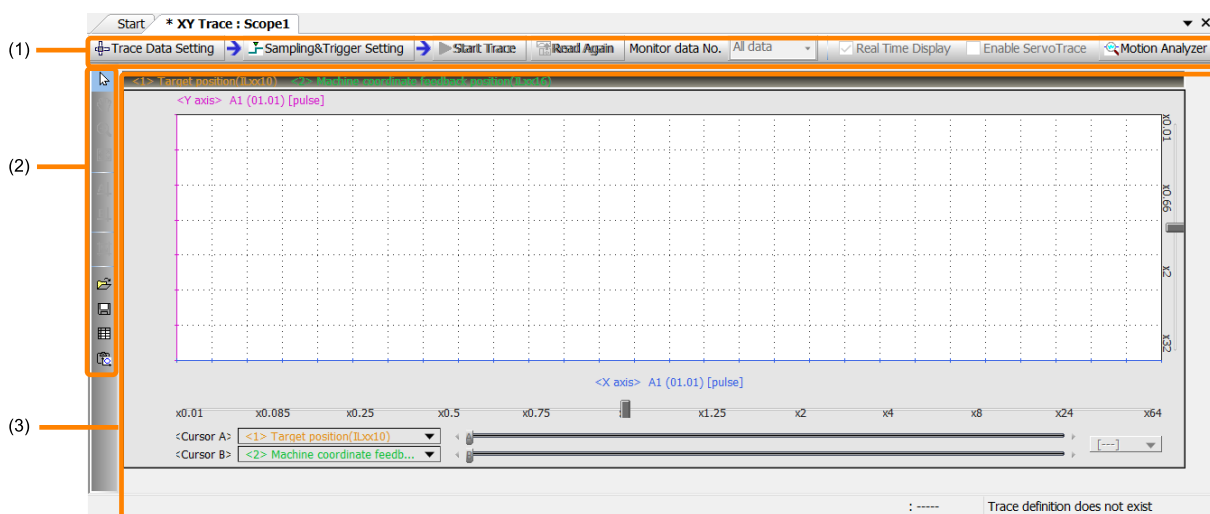
6. **Click the [Stop] button to stop tracing. Also, to upload the current information in trace memory, click the [Snap] button.**

This concludes the basic procedure.

The following table lists the other operations available in Trace Manager and the reference information.

Operation	Reference
Deleting Trace Definitions and Trace Data	 7.5.11 Deleting Trace Definitions and Trace Data on page 482
Changing the Enabled/Disabled Setting of the Trace Definition Settings	 7.5.12 Changing the Enabled/Disabled Setting of the Trace Definition Settings on page 483
Checking the Trace Status	 7.5.19 Checking the Trace Status on page 499

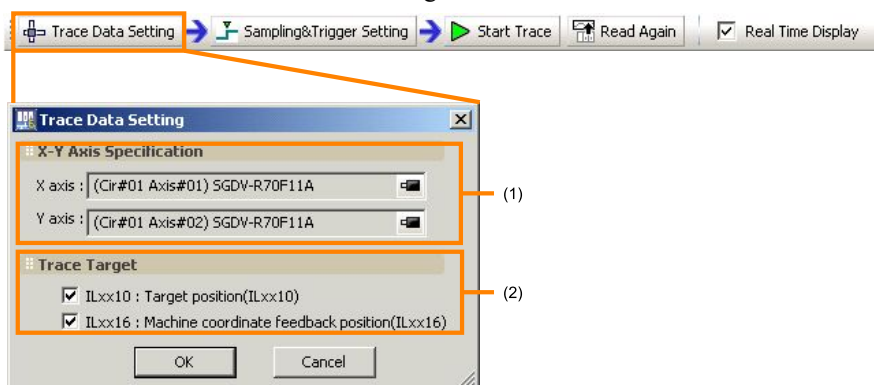
7.5.7 [XY Trace] Tab Page



No.	Item	Description	Reference
(1)	Trace Data Setting	Select the axis and then set the trace target.	 (1) Trace Data Setting on page 476
	Sampling and Trigger Settings	Set the trace conditions.	Settings are the same as those in Real-Time Trace.  (2) Sampling and Trigger Settings on page 448
	Start Trace/Stop Trace	Starts and stops the trace. When the trace is started, the trace data is acquired and displayed in real time. When the trace is stopped, the buffer data of all traces is acquired and displayed.	-
	Read Again	Re-reads the trace data in the controller. By executing re-reading, the content of the trace data accumulated at that point can be checked. When re-reading is executed during execution of a trace, the real time display mode automatically turns OFF.	-
	Monitor Data No.	The number of trace data to acquire from the controller can be set. The actual number of acquired trace data is displayed at the bottom right of the graph.	-
	Real Time Display	When this check box is selected, the display shows the data moving during tracing in real time.	-
	Enable ServoTrace	Enables the servo trace function.	-
	Motion Analyzer	Displays the [MotionAnalyzer] window.	-
(2)	Graph Toolbar	Groups together the buttons used for analyzing trace data.	 (2) Graph Toolbar on page 476
(3)	XY Graph	The trace data is displayed. The graph toolbar, sliders and cursors can be used to analyze trace data in the XY Trace Window.	 (3) XY Graph on page 477

(1) Trace Data Setting

Select the axis and then set the trace target.



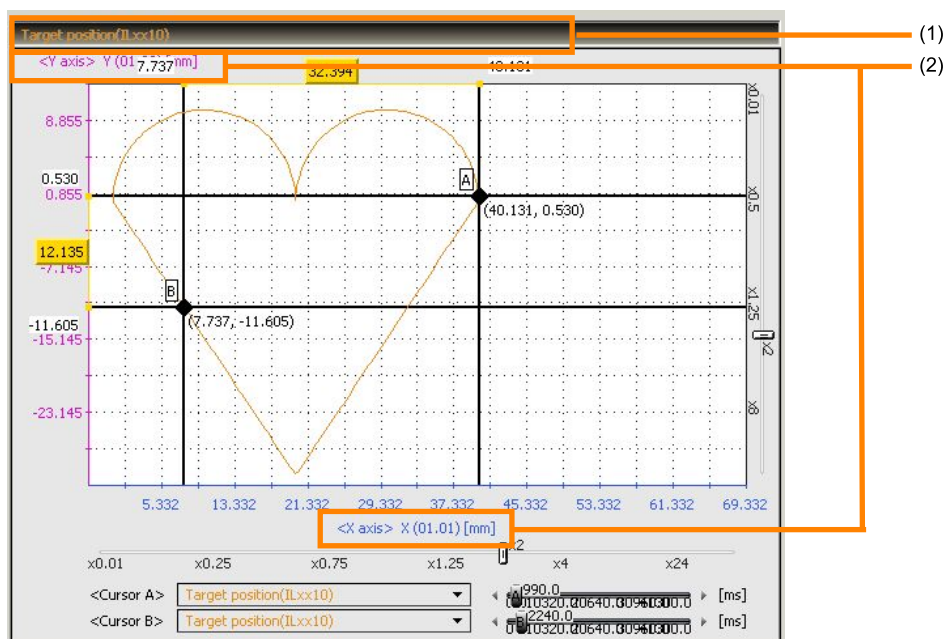
No.	Item	Description
(1)	X-Y Axis Specification	Select the X- and Y-axes.
(2)	Trace Target	Set the trace target. There are two motion parameters as follows: - IL□□10: Calculated position in machine coordinate system - IL□□16: Machine coordinate system feedback position

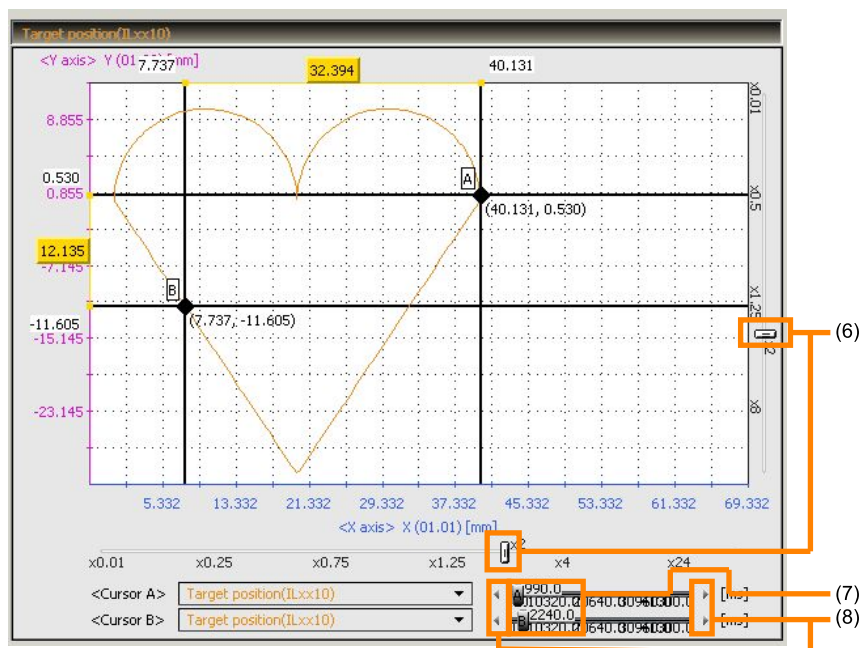
(2) Graph Toolbar

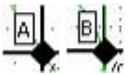
The functions of each button are as follows.

Button	Function
	Double-clicking this allows you to zoom the graph.
	Dragging this allows you to scroll the graph. Double-clicking this also allows you to zoom the graph.
	Dragging or double-clicking this allows you to zoom the graph.
	Restores an enlarged graph to its original size.
	Displays cursor A and the value at the intersecting point on the graph.
	Displays cursor B and the value at the intersecting point on the graph.
	Clicking this causes cursors A and B to move at a fixed width interlocked with each other.
	Displays the [Open] window, and the trace data can be read.
	Displays the [Save As] window.
	Displays the list.
	Copies an image of the graph to the clipboard.

(3) XY Graph





No.	Item	Description
(1)	Parameter Name	The parameters selected for the trace target are displayed.
(2)	X-axis, Y-axis	The X-axis, Y-axis, and unit will be displayed.
(3)	Difference	The difference in values between the A and B cursor positions is displayed.
(4)		The X and Y values at the intersecting point of cursor A and the graph, and the intersecting point of cursor B and the graph are displayed.
(5)		Set the trace target. • IL0010: Calculated position in machine coordinate system • IL0016: Machine coordinate system feedback position
(6)		Moving the sliders horizontally and vertically allows you to rescale the graph. Scaling can be set within 0.01x to 64x.
(7)		Dragging these to the left and right moves cursors A and B.
(8)		Clicking these arrow buttons makes the sliders move along the time axis by each individual marked scan interval.

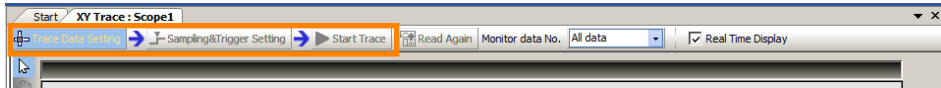
7.5.8 Overview of XY Trace Operations

The flow for using XY trace is given below.

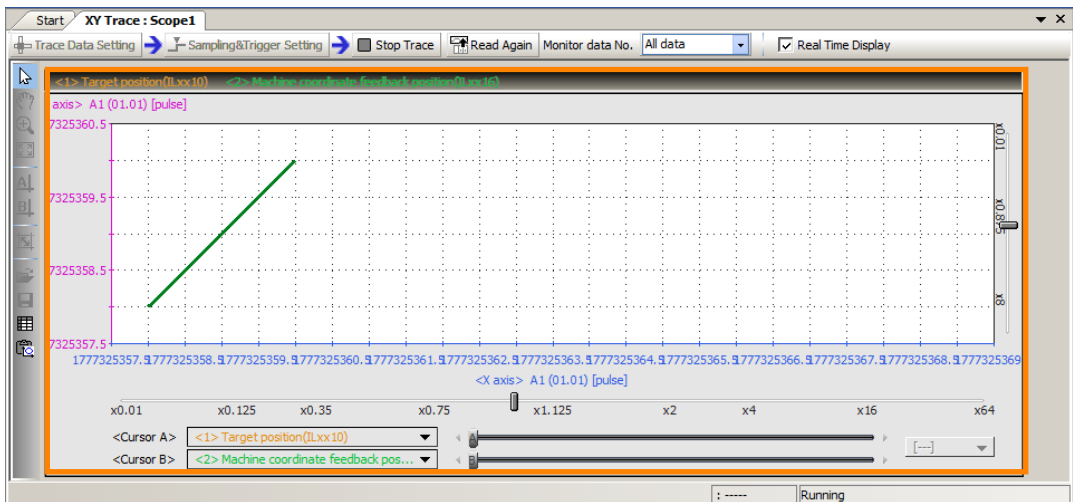
1. **Display the [XY Trace] tab page.**
2. **Set [Trace Data Setting] and [Sampling & Trigger Setting] in that order, and then click the [Start Trace] button.**

Refer to the following section for details on the setting items displayed in the window.

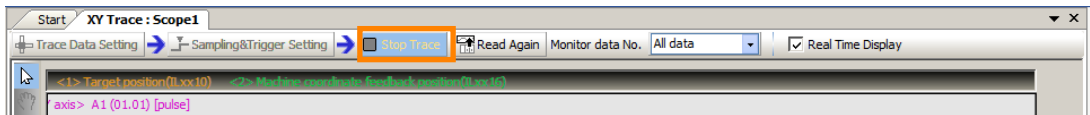
 [7.5.7 \[XY Trace\] Tab Page on page 475](#)



The trace will start, and the graph will be displayed in real-time.



3. **To stop the trace, click the [Stop Trace] button.**



Tracing will stop.

This concludes the basic procedure.

The following table lists the other operations available in XY Trace and the reference information.

Operation	Reference
Deleting Trace Definitions and Trace Data	 7.5.11 Deleting Trace Definitions and Trace Data on page 482
Changing the Enabled/Disabled Setting of the Trace Definition Settings	 7.5.12 Changing the Enabled/Disabled Setting of the Trace Definition Settings on page 483
Superimposing SERVOPACK Trace Results	 7.5.14 Superimposing SERVOPACK Trace Results on page 486
Comparing Target Position and Feedback Position	 (2) Comparing Target Position and Feedback Position on page 494
Measuring the Travel Time of the Axis	 7.5.17 Measuring the Travel Time of the Axis on page 497
Replaying the Axis Path	 7.5.18 Replaying the Axis Path on page 498
Checking the Trace Status	 7.5.19 Checking the Trace Status on page 499

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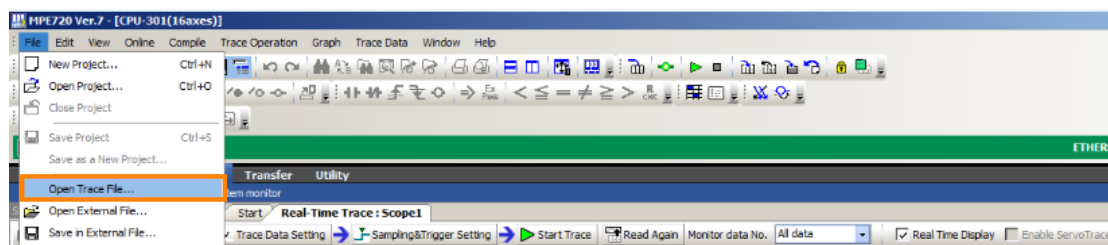
Operation	Reference
Saving Trace Data	 7.5.20 Saving Trace Data on page 500
Reading Trace Data	 7.5.21 Reading Trace Data on page 501
Switching Between Graph View and List View	 7.5.22 Switching Between Graph View and List View on page 502
Copying an Image of the Graph	 7.5.23 Copying an Image of the Graph on page 503

7.5.9 Reading Trace Definition Files

This operation is possible only with Real-Time Trace.

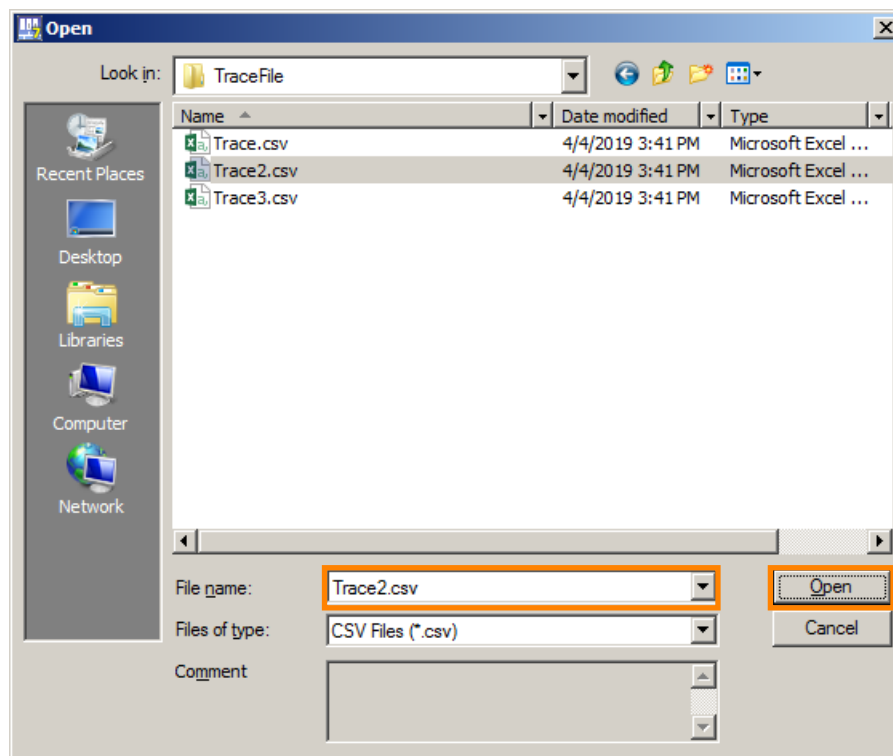
By reading a file that was saved in the past, existing trace definitions (trace settings and sampling & trigger settings) can be easily reused. Use the following procedure.

1. Select [Open Trace File] from the [File] menu.



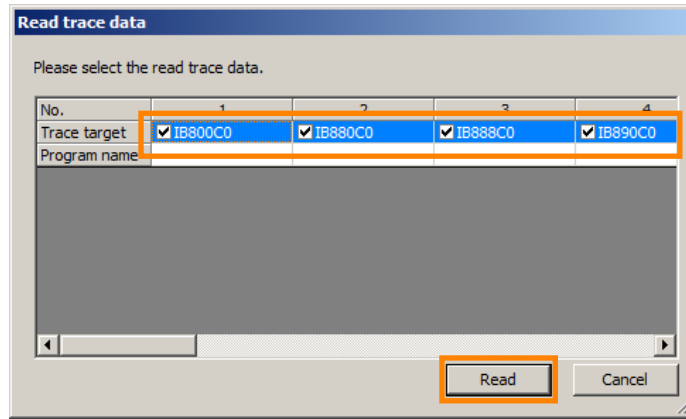
The [Open] window will be displayed.

2. Select the file containing the trace definitions you want to reuse, and click the [Open] button.



The [Read trace data] window will be displayed.

3. Select the check box of trace settings you want to read and click the [Read] button.



This reads the sampling & trigger settings and trace settings that you selected.

This concludes the procedure.

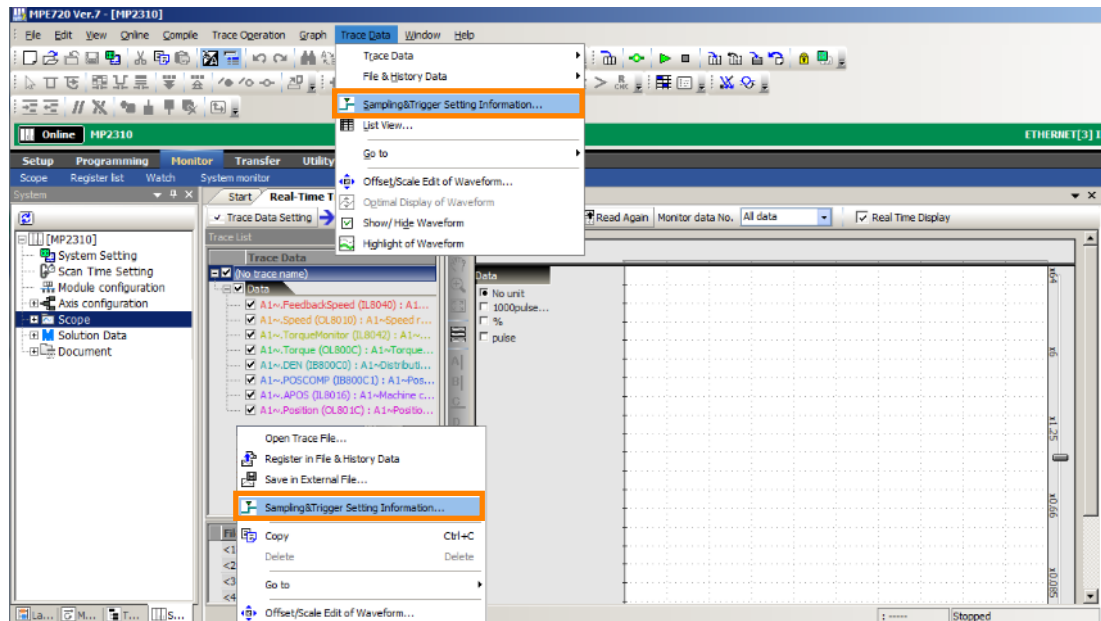
7.5.10 Checking Sampling and Trigger Settings

This operation is possible only with Real-Time Trace.

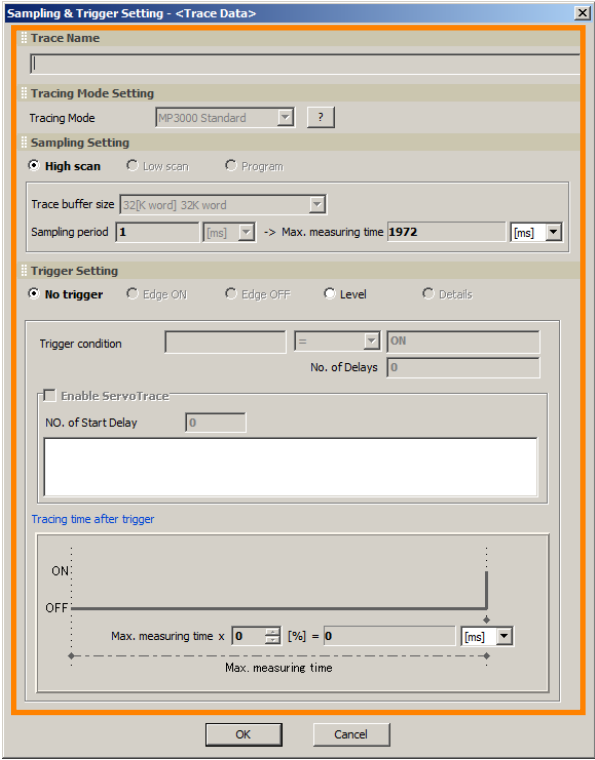
You can check the sampling and trigger settings for a trace when you read an existing trace definition file and in other situations. Use the following procedure.

Use one of the following methods to display the [Sampling & Trigger Setting] window.

- Select [Sampling & Trigger Setting Information] from the [Trace Data] menu.
- Right-click on the [Trace List] window, and select [Sampling & Trigger Setting Information] from the displayed menu.



The [Sampling & Trigger Setting] window will be displayed. Check the settings in the window.

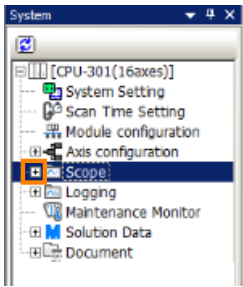


7.5.11 Deleting Trace Definitions and Trace Data

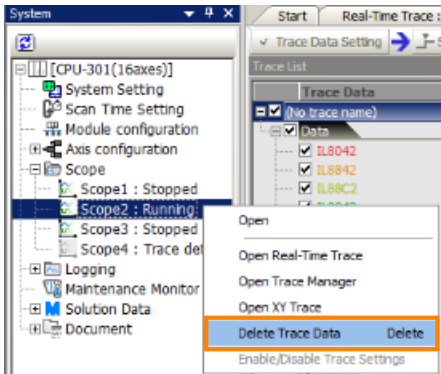
Use the following procedure to delete trace definitions and trace data acquired by the controller.

(1) When Using a Model That Does Not Support Multiple Scans

1. Expand the [Scope] tree in the [System] window.

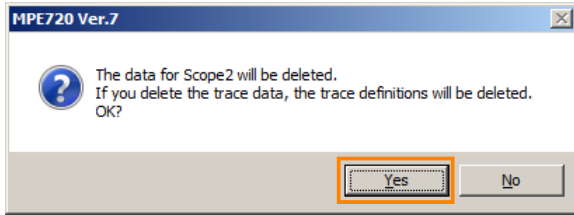


2. Right-click on the trace group you want to delete, and select [Delete Trace Data].



A message dialog box will be displayed.

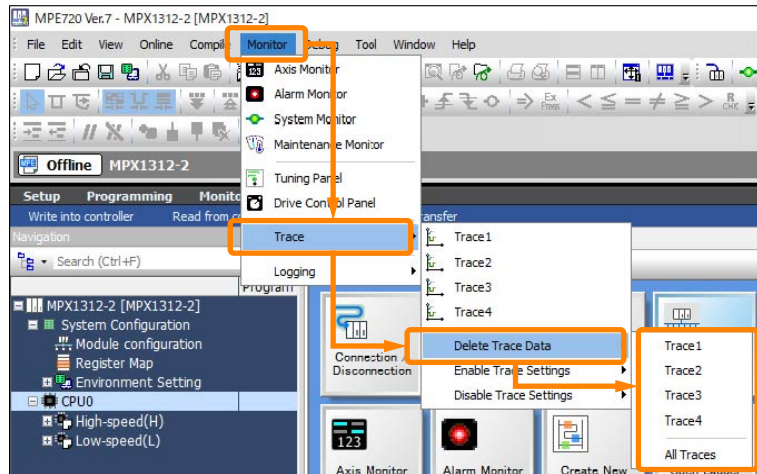
3. Read the message, and then click the [Yes] button.



This concludes the procedure.

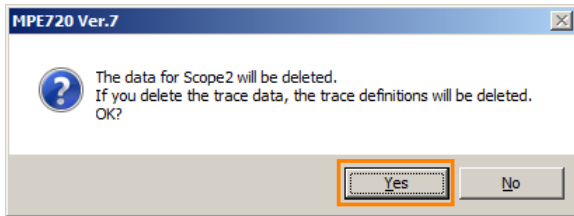
(2) When Using a Model That Supports Multiple Scans

1. From the [Monitor] menu, select [Trace] - [Delete Trace Data], and then select the trace number to delete ([Trace1] to [Trace4] or [All Traces]).



A message dialog box will be displayed.

2. Read the message, and then click the [Yes] button.



This concludes the procedure.

7.5.12 Changing the Enabled/Disabled Setting of the Trace Definition Settings

The trace definition settings can be switched between enabled and disabled.

Examples of use of this function are shown below.

Tracing is no longer possible when the trace buffer size set to Trace 1 to Trace 4 exceeds the maximum applicable trace buffer size. Without this function, some trace groups must be deleted to reduce the total trace buffer size. When a trace group is deleted, trace definitions must be set again. However, if trace definitions are disabled, the total trace buffer size will be reduced temporarily and tracing can be performed without deleting a trace group.

Models and software versions that support enabled/disabled switching of the trace definition settings are shown below:

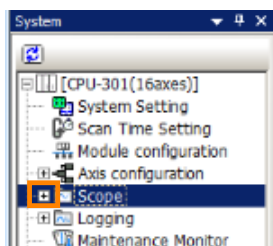
- YRM controllers and MPX controllers: All versions
- MP3000-series machine controllers: Ver. 1.37 or later (MP2000-series machine controllers are not supported)

- Σ -7C SERVOPACK: Ver. 1.04 or later

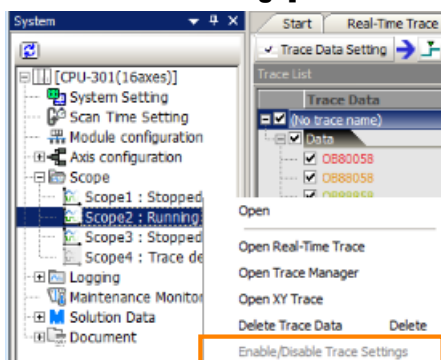
Use the following procedure.

(1) When Using a Model That Does Not Support Multiple Scans

1. Expand the [Scope] tree in the [System] window.

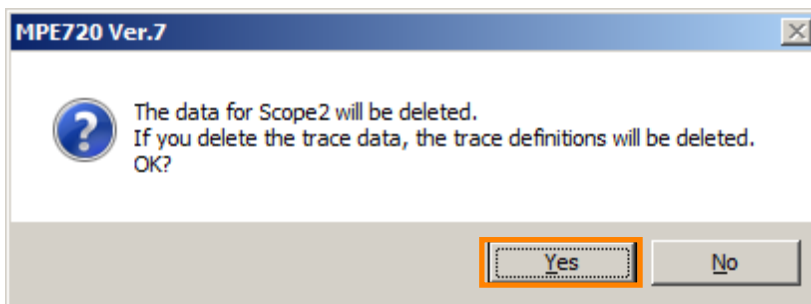


2. Right-click on the trace group whose settings you want to change, and select [Enable/Disable Trace Settings].



A message dialog box will be displayed.

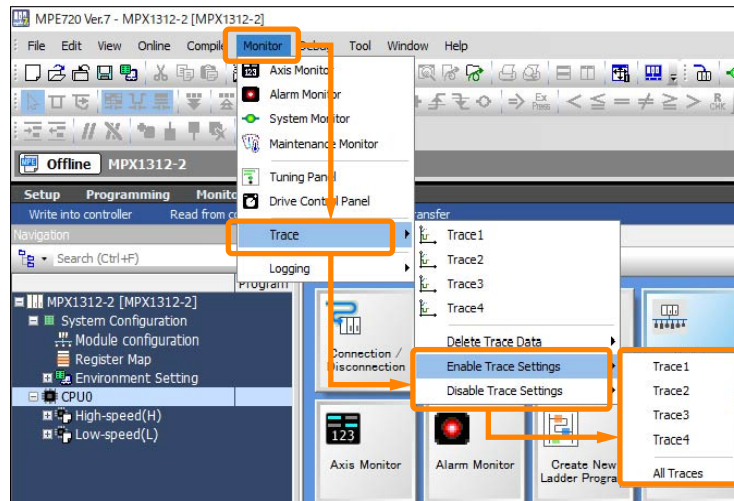
3. Read the message, and then click the [Yes] button.



This concludes the procedure.

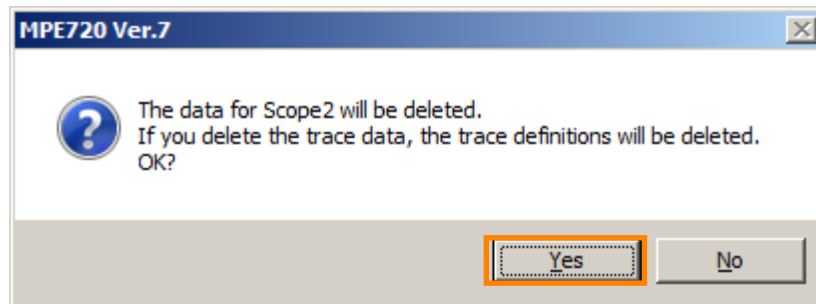
(2) When Using a Model That Supports Multiple Scans

1. From the [Monitor] menu, select [Trace] - [Enable Trace Settings] or [Disable Trace Settings], and then select the trace number to enable or disable ([Trace1] to [Trace4] or [All Traces]).



A message dialog box will be displayed.

2. Read the message, and then click the [Yes] button.



This concludes the procedure.

7.5.13 Scaling the Trace Data Waveform

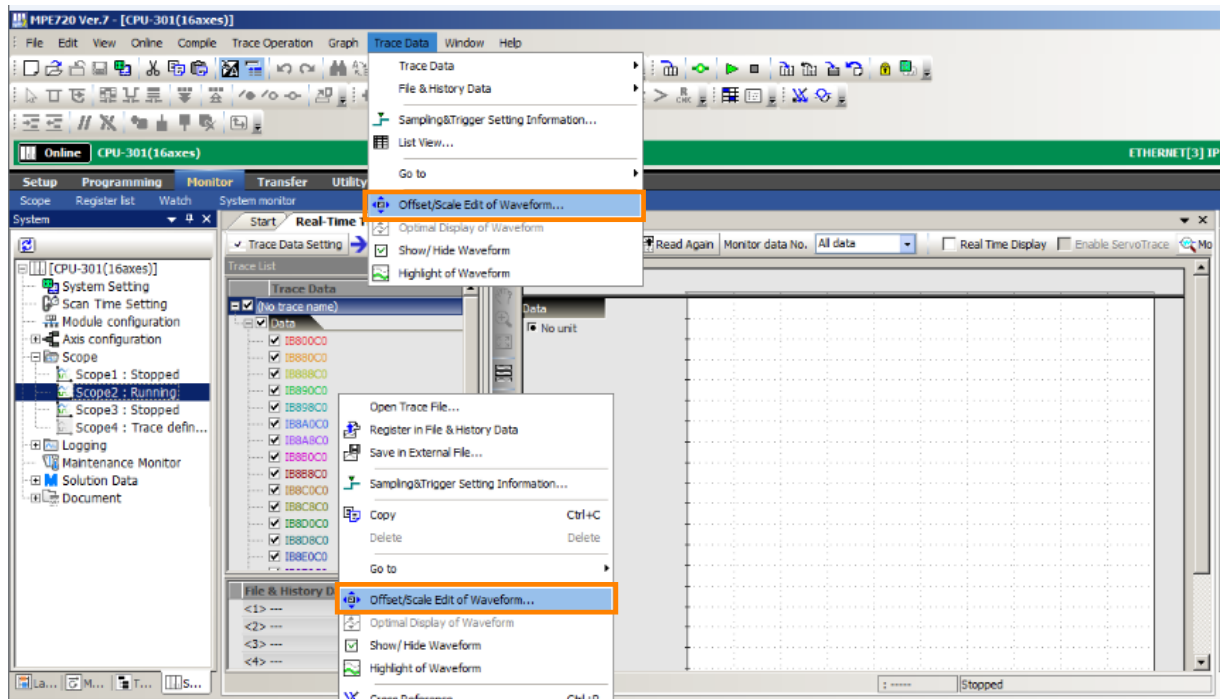
This operation is possible only with Real-Time Trace.

You can scale the waveform of the trace data and move the position of the waveform. By editing the size and position of the waveform, you can compare the waveform with other waveforms to analyze it.

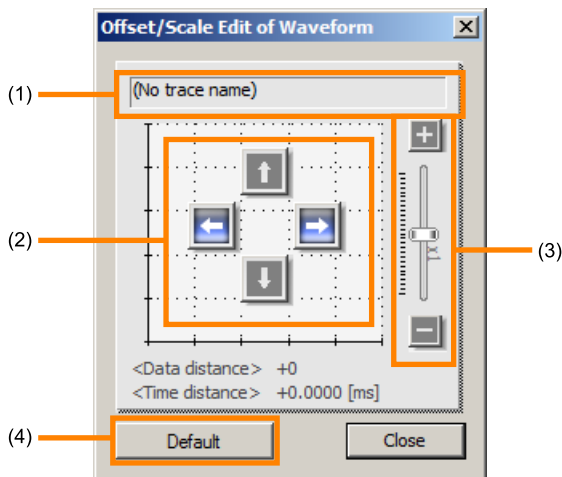
Edit trace data in the [Offset/Scale Edit of Waveform] window. Use one of the following methods to display the [Offset/Scale Edit of Waveform] window.

- Select [Offset/Scale Edit of Waveform] Enable [Trace Data] menu.
- Right-click a register on the [Trace List] window, and select [Offset/Scale Edit of Waveform] from the displayed menu.

- Information**
- When monitor data is updated, changes will be reset.
 - When a trace group name is selected, all of the waveforms in the group can be edited collectively.



The [Offset/Scale Edit of Waveform] window will be displayed.



No.	Display	Function
(1)	Trace Name	The trace name and file name are displayed.
(2)	Offset Move Buttons	Moves the waveform of the specified trace target register up, down, left, and right.
(3)	Scale Adjustment Slider	Scales the data amplitude of the specified trace target register.
(4)	[Default] Button	Restores the edited settings to the default settings.

7.5.14 Superimposing SERVOPACK Trace Results

This operation is possible only with Real-Time Trace and XY Trace.

If the controller and a SERVOPACK are connected, you can analyze the data by superimposing the trace results for a controller trace and SERVOPACK trace on multiple axes. This section describes how to link the controller trace function and the SERVOPACK trace function.

(1) Applicable Model

- The models that support this function are listed below.
- Controllers: MP3000 series, MPX1000 series, YRM-7 series, and YRM1000 series

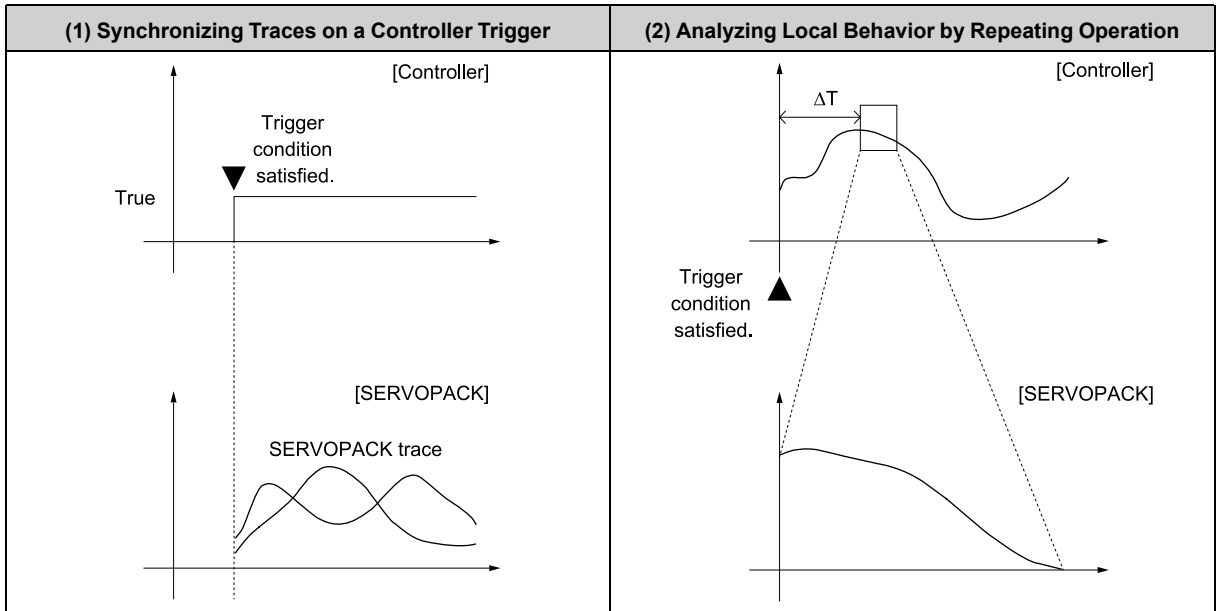
- SERVOPACKs: Σ -7 series (with MECHATROLINK-III communications references) and Σ -X series (with MECHATROLINK-III/-4 communications references)

(2) Applications

Superimposing traces can be used for the following types of applications.

- (1) Executing SERVOPACK traces in sync with a trigger condition on a controller
- (2) Analyzing local behavior by repeating operation based on a trigger condition in the controller

Condition: Repeating operation, e.g., every machine cycle, based on a trigger signal



(3) Execution Condition

- There must be an online connection.
- The SERVOPACK for which to execute the trace must be connected and usable.
- The trace trigger must be set.

Refer to the following section for details on the settings.

(4) [Trace Definition Setting Procedure on page 487](#)

(4) Trace Definition Setting Procedure

Use the following setting procedure to link with a SERVOPACK trace.

1. **Register the registers to trace for a Real-Time Trace or XY Trace.**

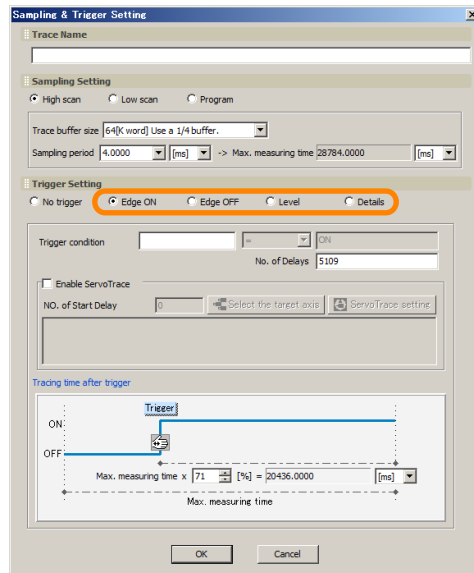
Refer to the following section for details.

[7.5.4 Overview of Real-Time Trace Operations on page 456](#)

[7.5.8 Overview of XY Trace Operations on page 479](#)

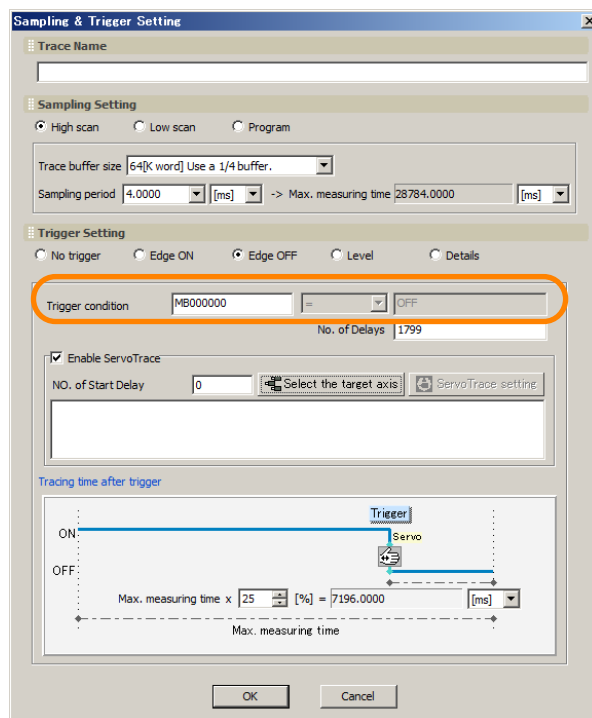
2. **Select one of the following in the [Sampling & Trigger Setting] window.**

- Edge ON
- Edge OFF
- Level
- Details

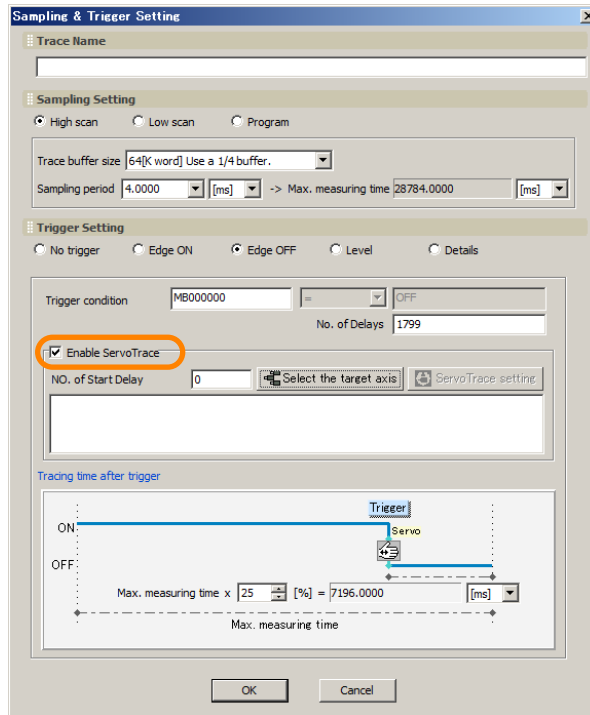


3. Set the trigger condition.

- Synchronizing Traces on a Controller Trigger
Set the trigger condition on which to execute a SERVOPACK trace.
- Analyzing Local Behavior by Repeating Operation
Set the register to use as the starting point for repeating operation from the viewpoint of the controller, such as one operation cycle of the application.

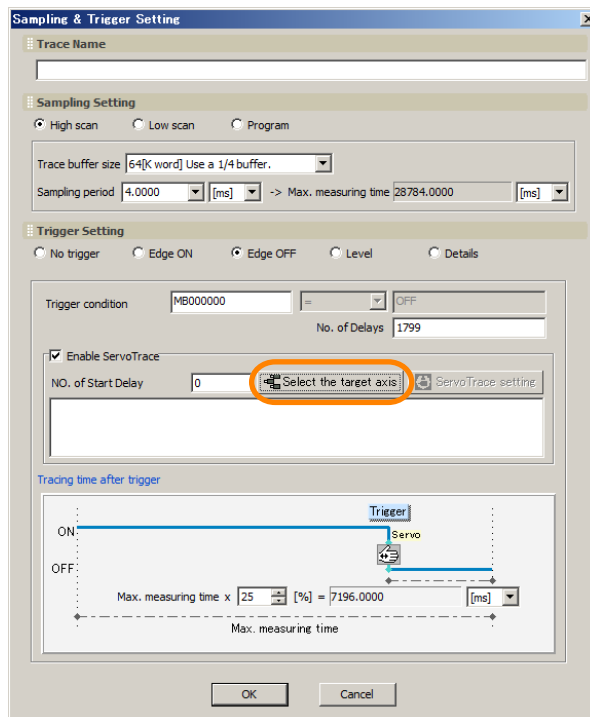


4. Select the [Enable ServoTrace] check box.



You will now be able to set the required locations.

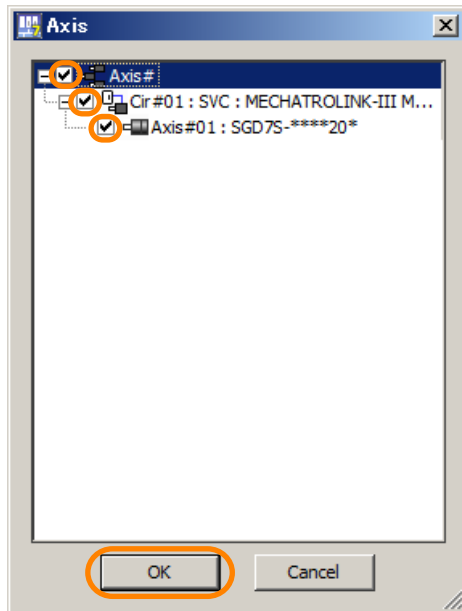
5. Click the [Select the target axis] button.



The [Axis] window will be displayed.

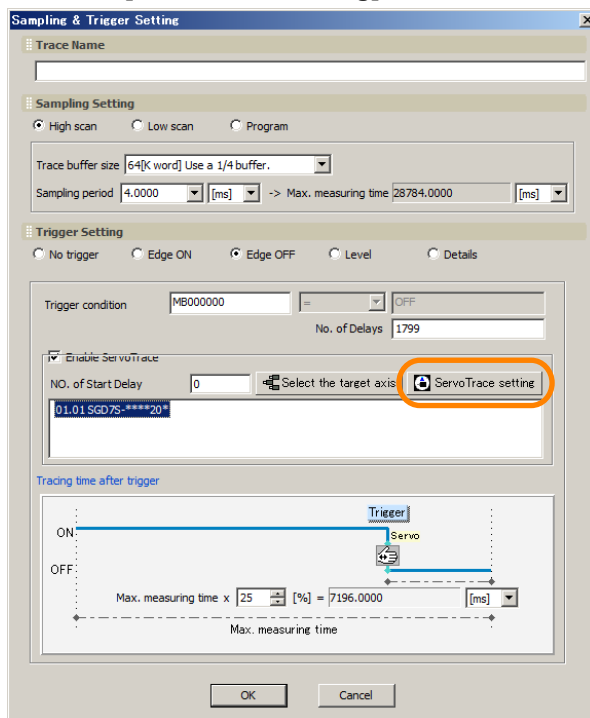
6. Select the axis for which to perform a SERVOPACK trace in sync with the trigger condition, and click the [OK] button.

You can select up to four axes.



The [Axis] window will close.

7. Click the [ServoTrace setting] button.

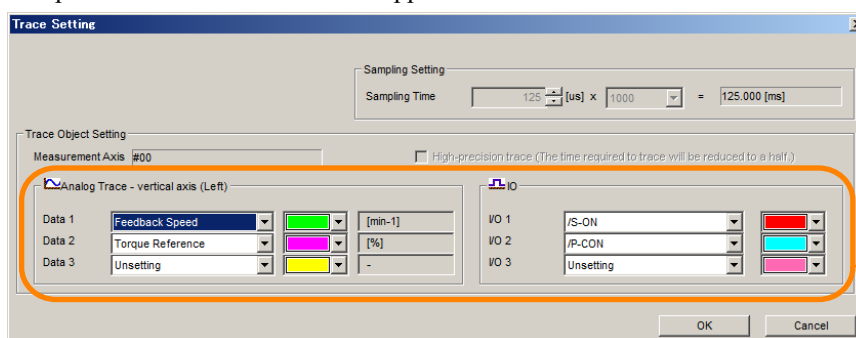


The [Trace Setting] window will be displayed.

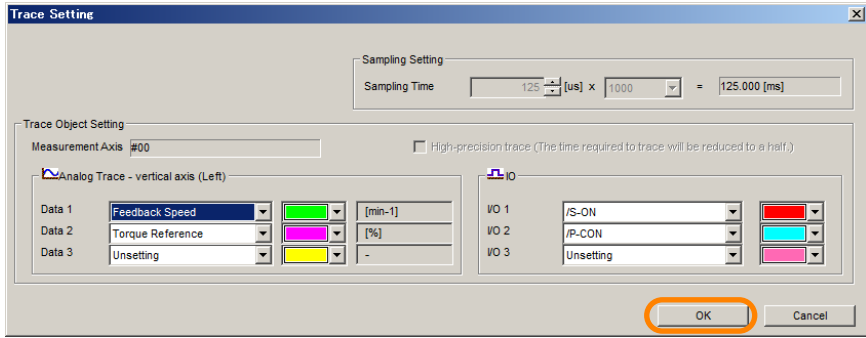
8. Set the **SERVOPACK** trace conditions.

Select the items to trace for the [Data 1] to [Data 3] boxes and the [I/O 1] to [I/O 3] boxes.

The preset trace conditions will be applied to all of the selected axes.



9. Click the [OK] button.



The [Trace Setting] window will close.

This concludes the procedure.

(5) SERVOPACK Trace Execution Procedure

Use the following operating procedure to link with a SERVOPACK trace.

(a) Synchronizing Traces on a Controller Trigger

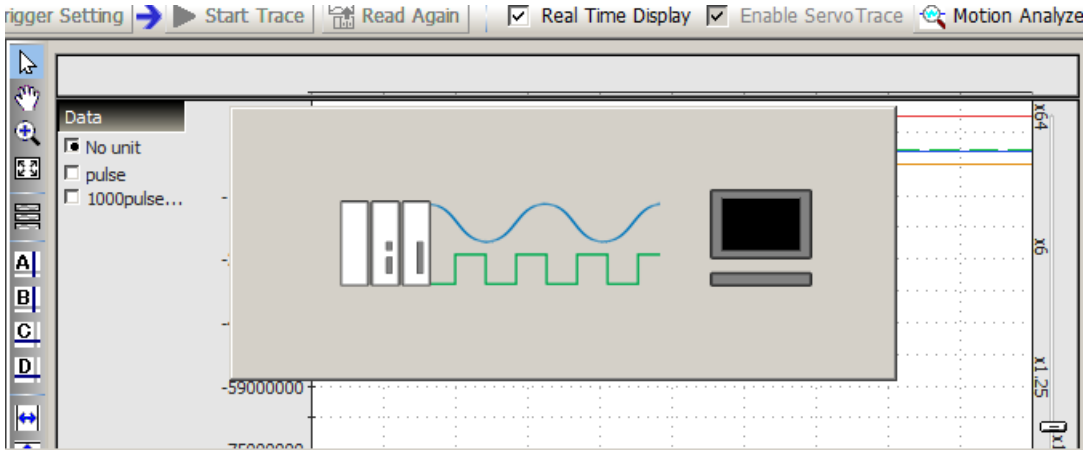
1. Confirm that the trace definition settings have been completed.

Refer to the following section for details.

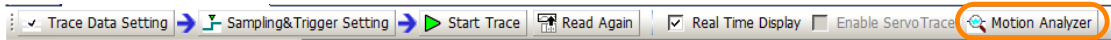
(4) [Trace Definition Setting Procedure on page 487](#)

2. Click the [Start Trace] button.

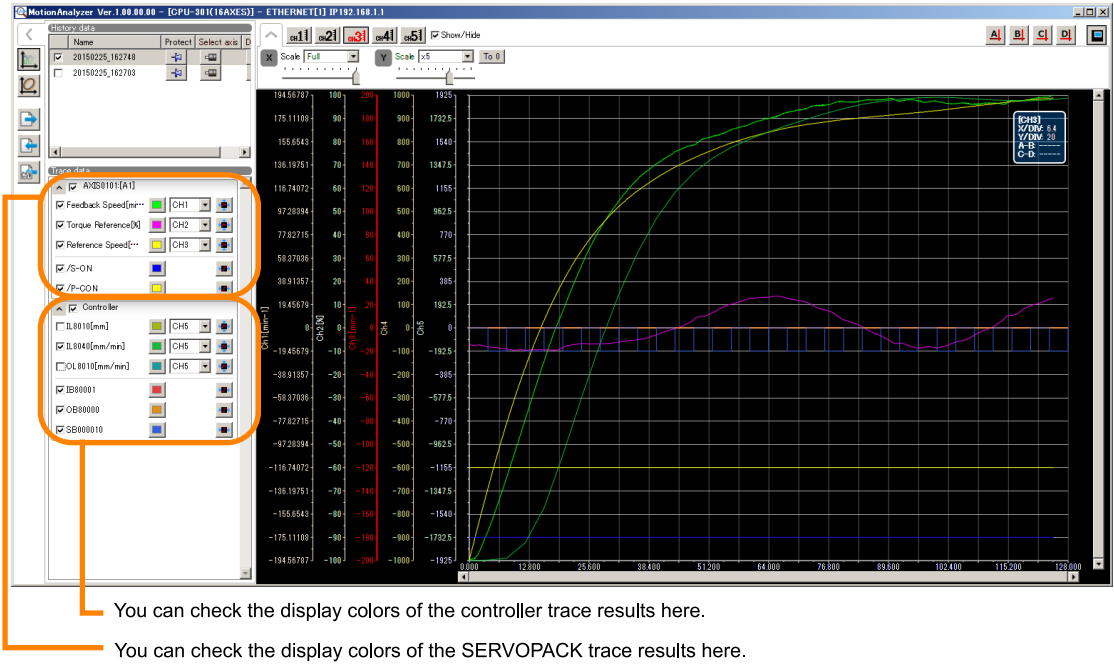
When the controller trigger condition is met, the SERVOPACK trace will be executed. When the trace is completed, the trace data will be automatically read from the controller.



3. When the data has been read, click the [Motion Analyzer] button.



The [Motion Analyzer] window will be displayed and the trace results from the controller and SERVOPACK will be superimposed on the display.



This concludes the procedure.

(b) Analyzing Local Behavior by Repeating Operation

1. **Confirm that the trace definition settings have been completed.**

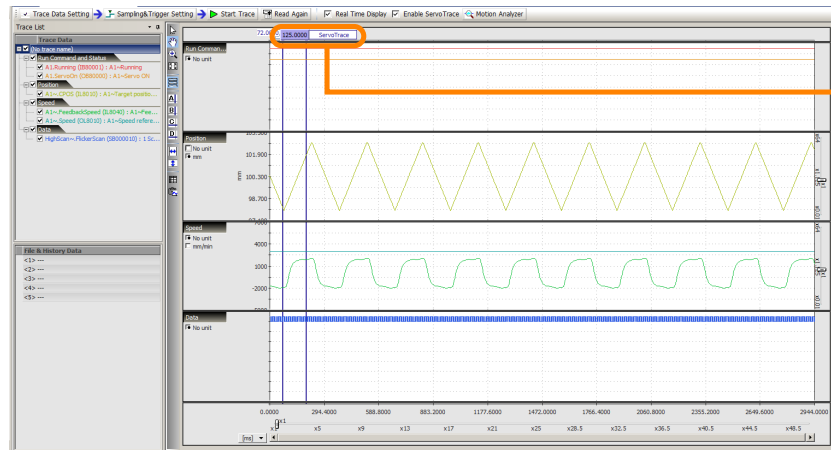
Refer to the following section for details.

(4) *Trace Definition Setting Procedure on page 487*

2. **Click the [Start Trace] button.**

The controller and SERVOPACK traces will be executed and the trace results will be displayed when they are completed.

3. **With the [ServoTrace] button still selected, you can fine-tune the region of the SERVOPACK trace results by moving the cursor to the location of the desired results.**

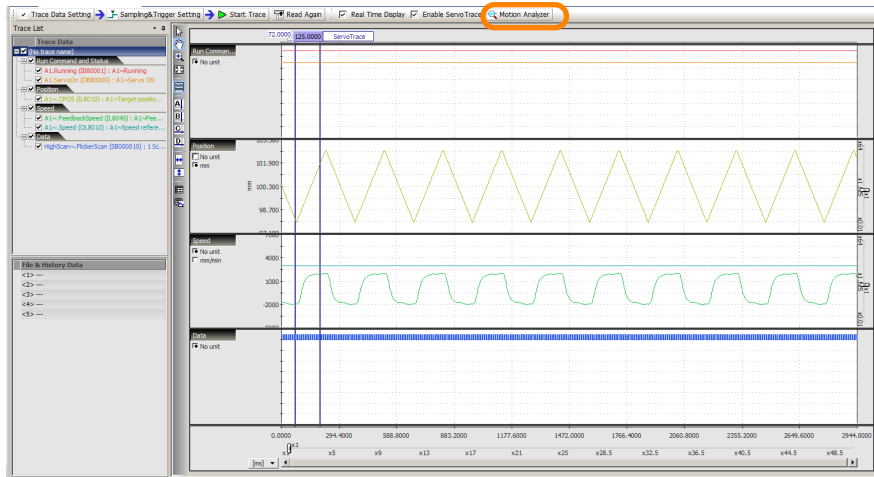


The time that is set in [Sampling Time] in the [Trace Setting] window is displayed.

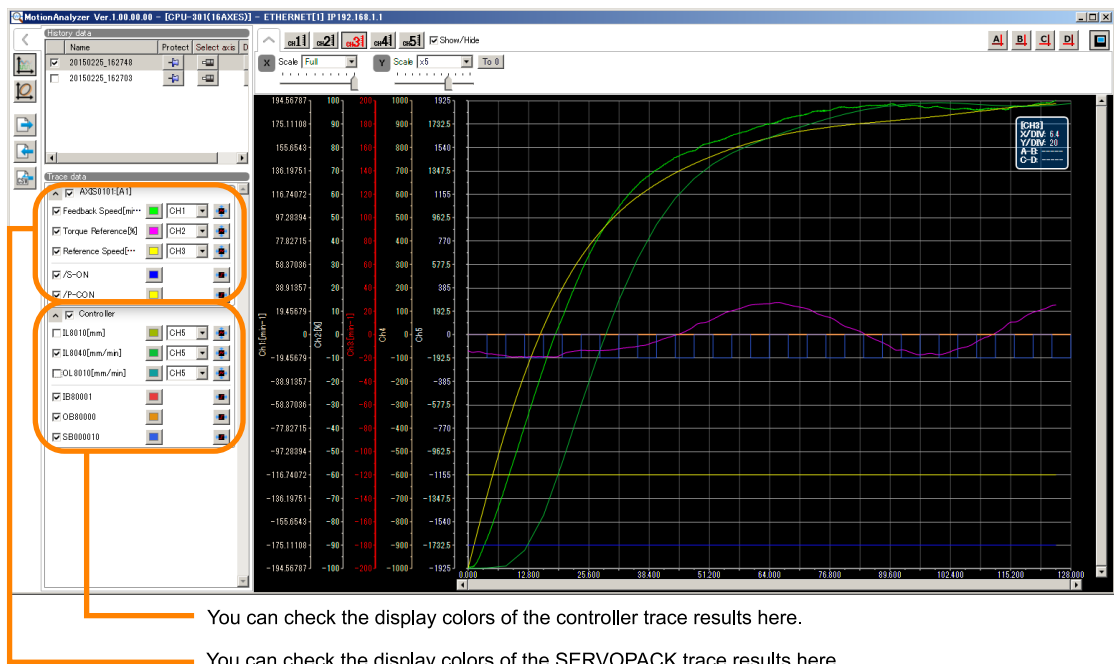
4. **Click the [Start Trace] button.**

The controller and SERVOPACK traces will be performed for the range specified in step 3.

5. Click the [Motion Analyzer] button.



The controller and SERVOPACK trace results for the specified region will be superimposed on the display.



This concludes the procedure.

7.5.15 Analyzing Differences Between Target Values and Actual Values

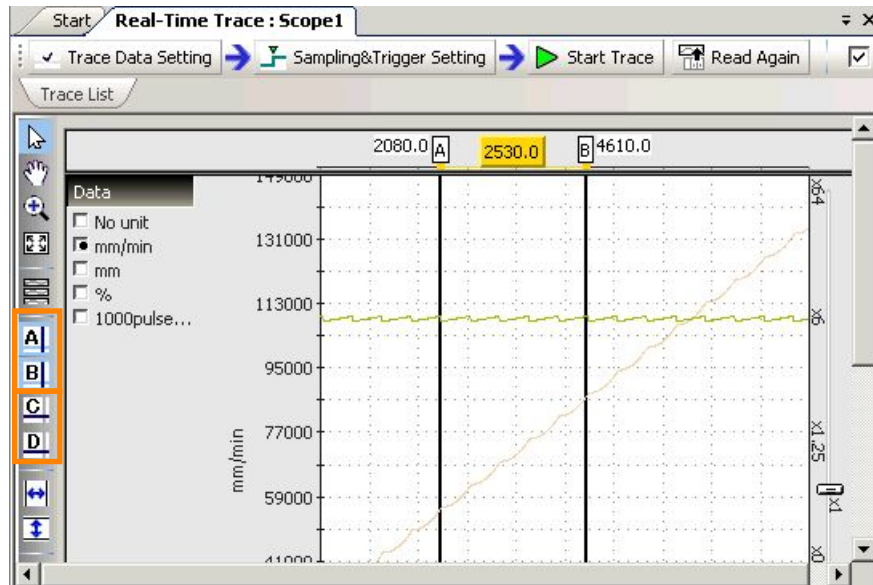
You can analyze the trace data by using the [Offset/Scale Edit of Waveform] window and toolbar buttons.

(1) Comparing I/O Registers and M Registers

This operation is possible only with Real-Time Trace.

1. Display the trace data to analyze on the graph.
2. Select [Offset/Scale Edit of Waveform] from the [Trace Data] menu bar. Or, right-click on [File & History Data] on the [Trace List] window, and select [Offset/Scale Edit of Waveform] from the displayed menu.
3. Using the arrow keys in the [Offset/Scale Edit of Waveform] window, move the waveform to the location you want to compare.

- Click cursors **A** and **B** or cursors **C** and **D** in the graph toolbar to display the cursor, and align the cursor with the register to analyze.



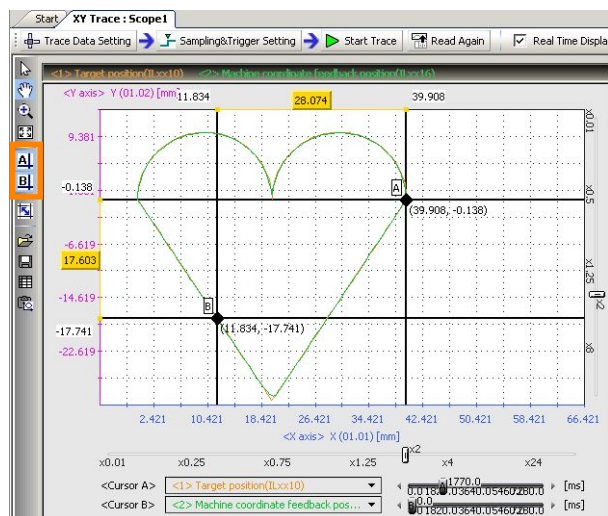
- Analyze the difference between the waveform of the preset register and the waveform of the actually output register.

This concludes the procedure.

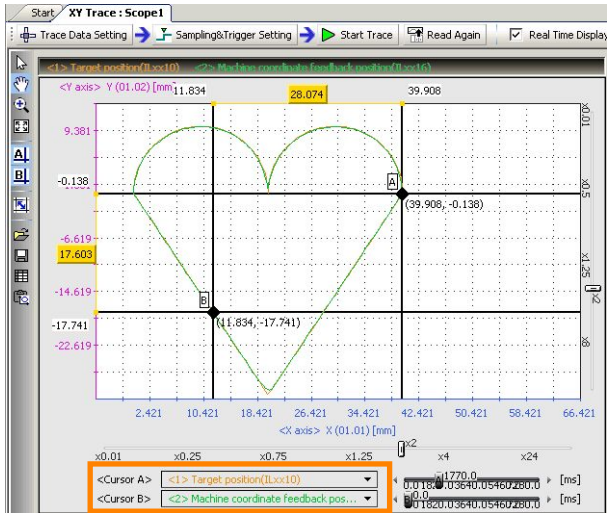
(2) Comparing Target Position and Feedback Position

This operation is possible only with XY Trace.

- Click cursors **A** and **B** in the graph toolbar to display the cursor.



2. Select the target position and feedback position for [Cursor A] and [Cursor B].

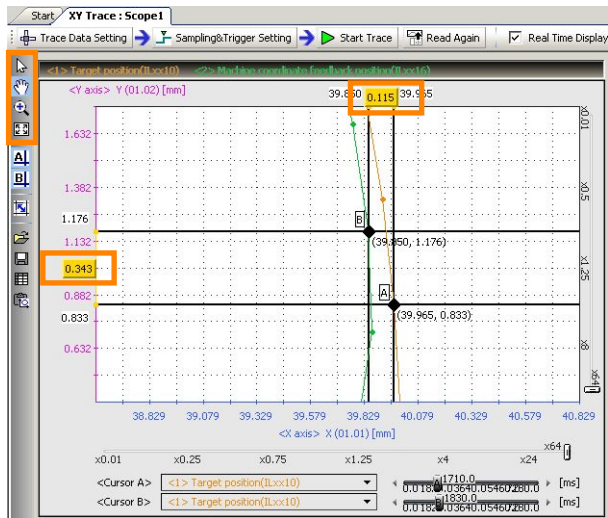


3. Align the sliders with the time to analyze.



4. Compare the difference value between the target position and feedback position.

Information The target location can be scaled by using the graph toolbar.



This concludes the procedure.

7.5.16 Comparing with Past Acquired Data

Compare trace data read from the controller with trace data acquired in the past.

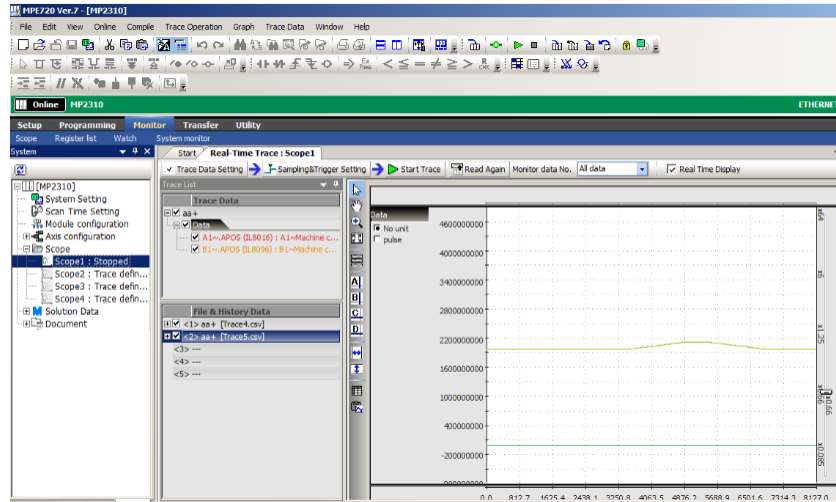
This operation is possible only with Real-Time Trace.

1. **Read trace data acquired in the past.**

Refer to the following section for operating details.

☞ [7.5.21 Reading Trace Data on page 501](#)

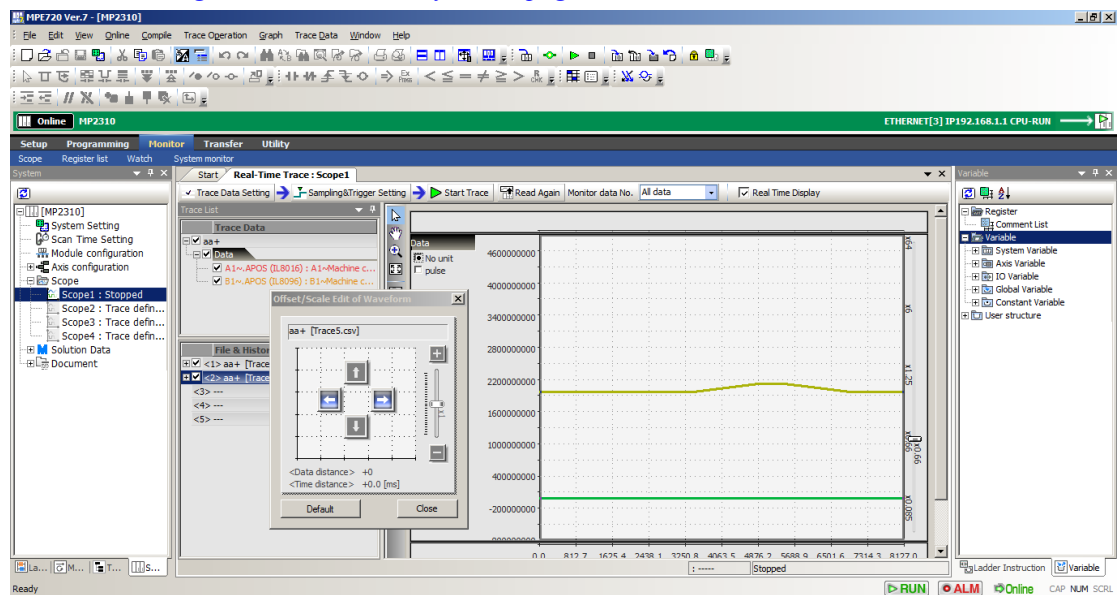
A waveform of the trace data will be displayed.



2. **Using the arrow keys in the window, move the data start position to the desired location.**
3. **Select [Offset/Scale Edit of Waveform] from the [Trace Data] menu. Or, right-click on [File & History Data] on the [Trace List] window, and select [Offset/Scale Edit of Waveform] from the displayed menu.**
4. **Use the [Offset/Scale Edit of Waveform] window to compare the data with the previous trace data.**

Refer to the following section for details on the [Offset/Scale Edit of Waveform] window.

☞ [7.5.13 Scaling the Trace Data Waveform on page 485](#)

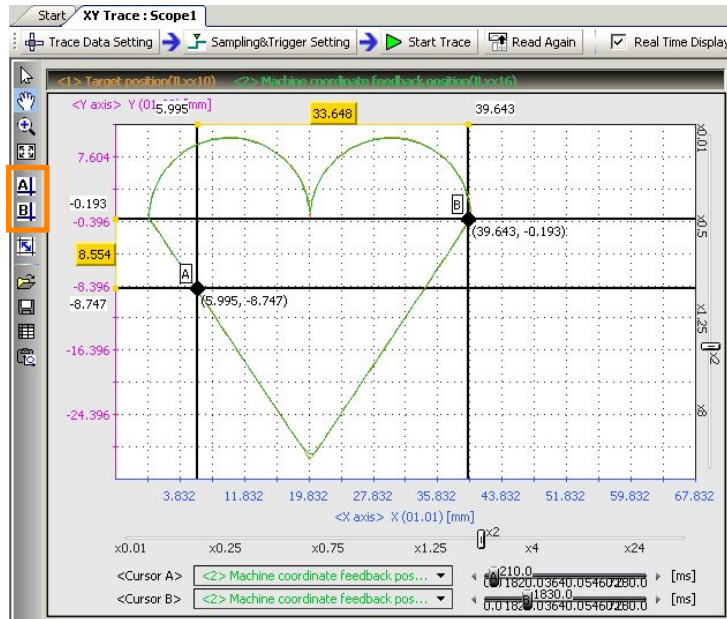


This concludes the procedure.

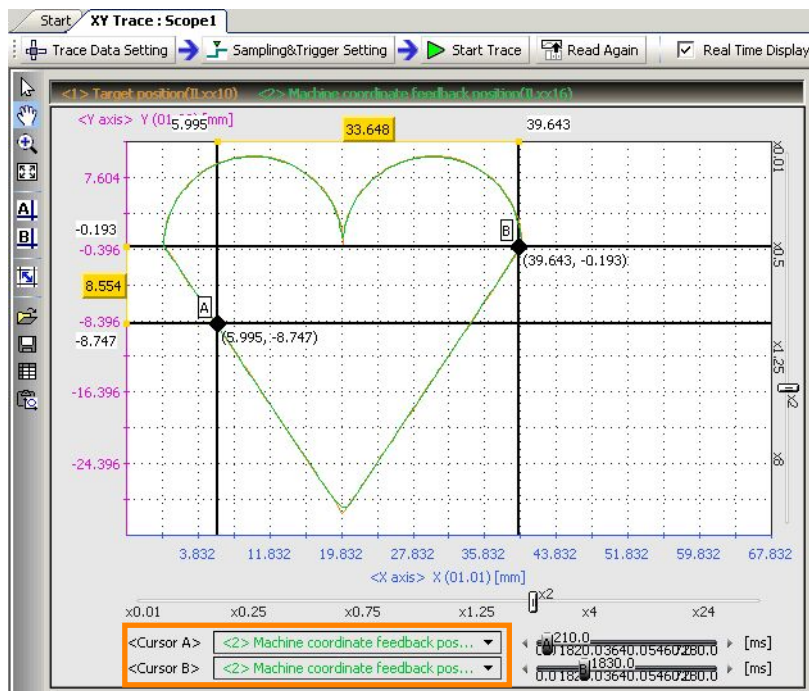
7.5.17 Measuring the Travel Time of the Axis

This operation is possible only with Real-Time Trace.

1. Click cursors **A** and **B** in the graph toolbar to display the cursor.

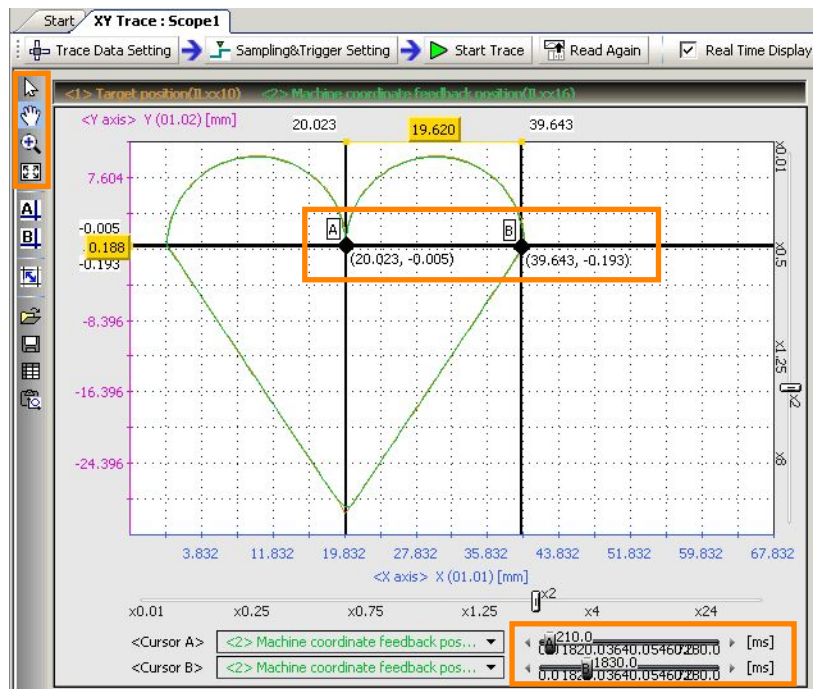


2. Set [Cursor A] and [Cursor B] to the same data.



3. Select the two points to measure.
4. Measure the time difference between the two points using the sliders.

Information The target location can be scaled by using the graph toolbar.



This concludes the procedure.

7.5.18 Replaying the Axis Path

This operation is possible only with XY Trace.

Use the following procedure to replay the axis path.

1. Click cursors A and B in the graph toolbar to display the cursor.



2. Select [Cursor A] and [Cursor B].



3. Move the sliders and analyze the axis path.

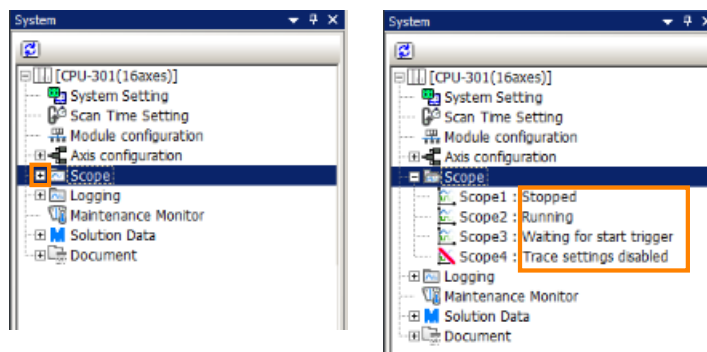


This concludes the procedure.

7.5.19 Checking the Trace Status

The trace status can be checked when the [Scope] tree is expanded in the [System] window.

Information This function is not available when using a model that supports multiple scans.



The details of the trace status display are as follows.

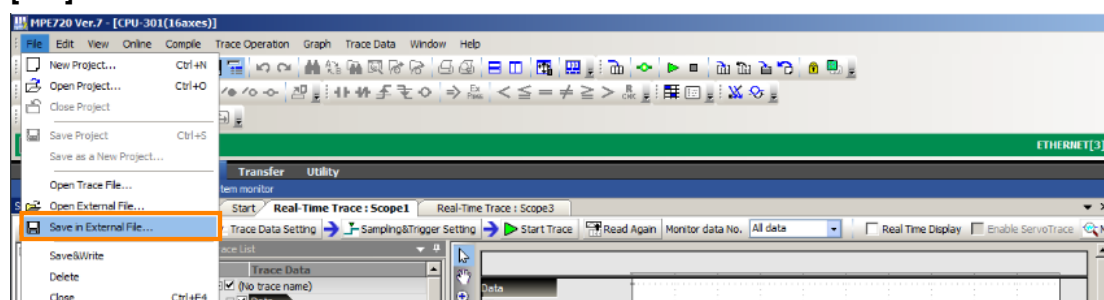
Connection Status	Status	Description
Online	Running	State while trace data is being acquired
	Waiting for start trigger	State when waiting for start trigger
	Stopped	State while trace is stopped
	Trace definition does not exist	State when trace definition is not set
	Trace settings disabled	State when trace definition setting is disabled
	Unconfirmed trace definition exists	State when trace definition during editing is present
Offline	Trace definition exists	State when trace definition is set
	Trace definition does not exist	State when trace definition is not set
	Trace settings disabled	State when trace definition setting is disabled

7.5.20 Saving Trace Data

This operation is possible only with Real-Time Trace and XY Trace.

Use the following procedure to save trace data.

1. With the trace data to save already displayed, select [Save in External File] from the [File] menu.



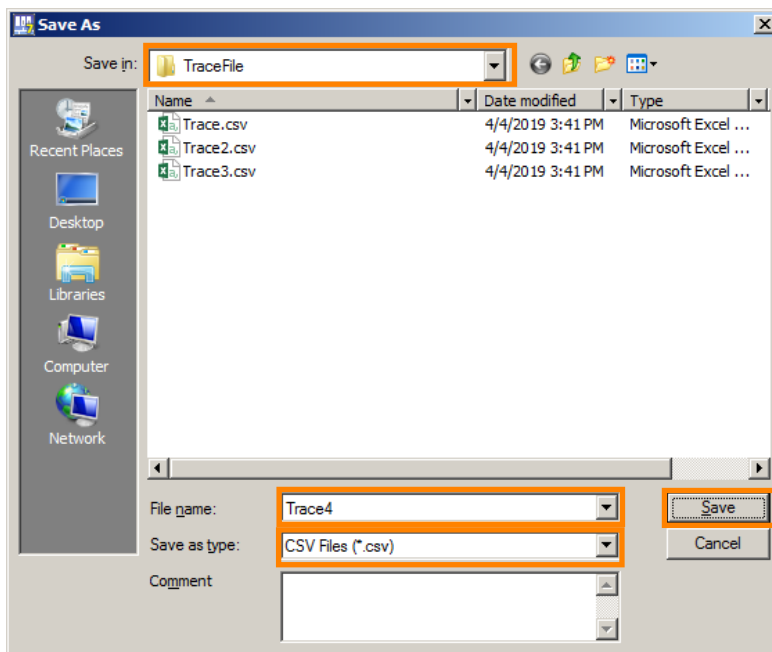
Information

With XY Trace, save operations are also possible using the [Save in External File] button on the toolbar.

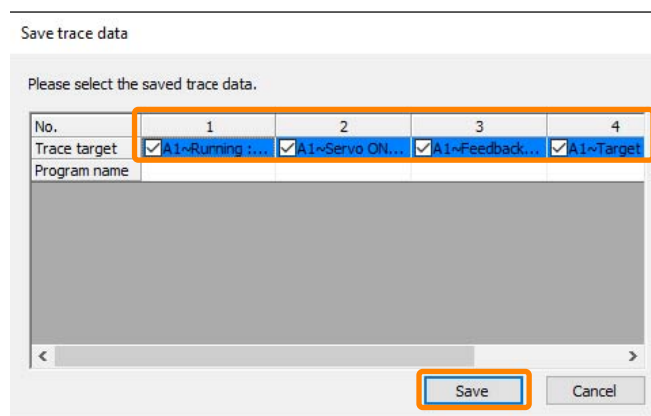


The [Save As] window will be displayed.

2. Set [Save in], [File name], and [Save as type], and then click the [Save] button.



3. Select the ladder programs to save, and click the [Save] button.



The selected trace data will be saved with the content set in step 2.

This concludes the procedure.

7.5.21 Reading Trace Data

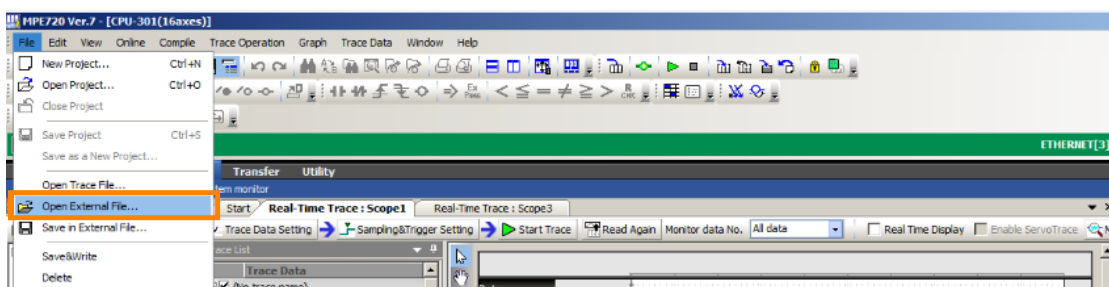
This operation is possible only with Real-Time Trace and XY Trace.

Use the following procedure to read trace data that was saved.

1. Select [Open External File] from the [File] menu.

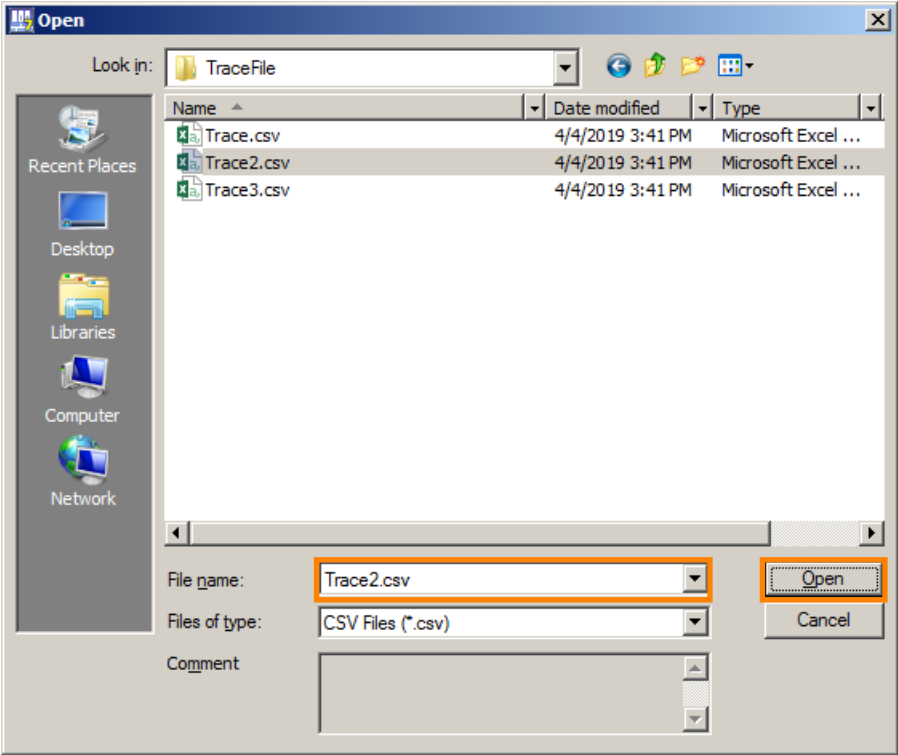
Information

When trace data has already been read, that trace data will be read when the trace definition check box at [File & History Data] on the [Trace List] window is selected.

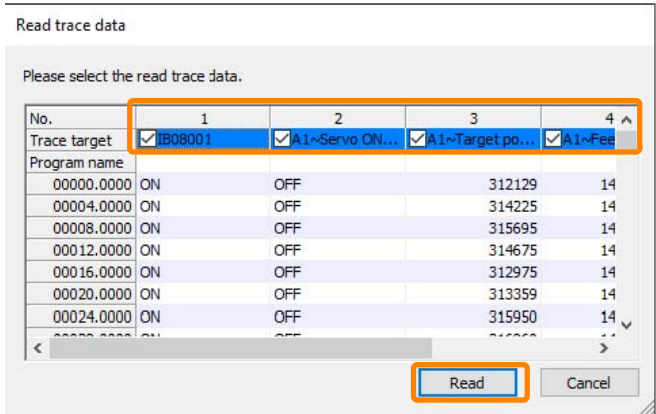


The [Open] window will be displayed.

2. Click the trace data file to read, and click the [Open] button.



3. Select the check box of trace data you want to read and click the [Read] button.



The selected trace data will be read.

This concludes the procedure.

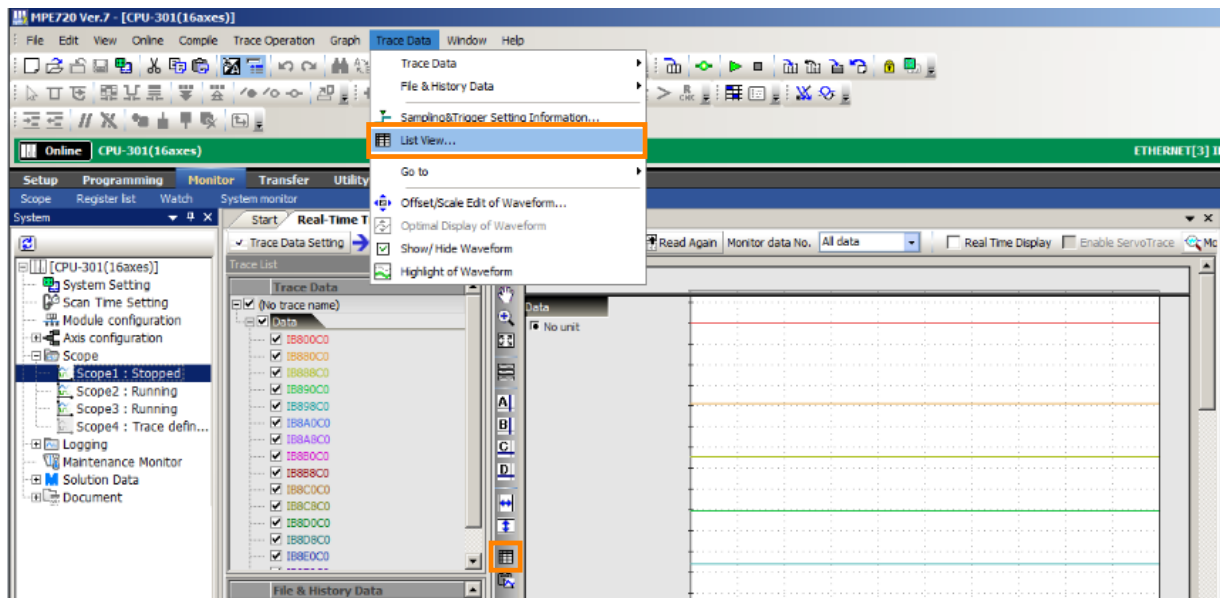
7.5.22 Switching Between Graph View and List View

This operation is possible only with Real-Time Trace and XY Trace.

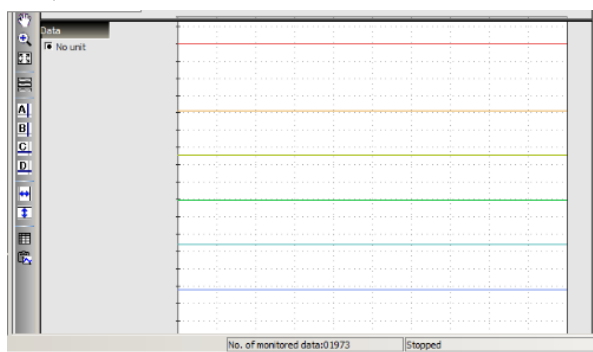
The monitor and history data currently displayed as a graph can be displayed in list format.

Select [List View] from the [Trace Data] menu or select the [List View] button to switch between the graph view and list view. You can also switch the view during tracing.

Information The trace data displayed in the list can be pasted to an Excel file.



<Graph View>



<List View>

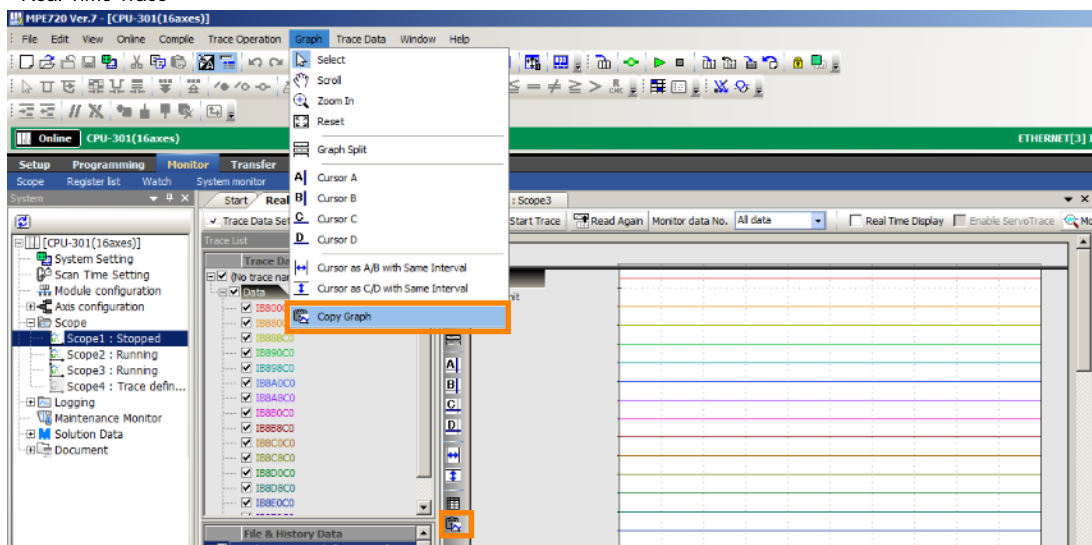
Variable	Monitor-01	Monitor-02	Monitor-03	Monitor-04	Monitor-05	Monitor-06	Monitor-07	Monitor-08
Time[ms]	IB800C0	IB880C0	IB888C0	IB890C0	IB898C0	IB8A0C0	IB8A8C0	IB8B0C0
0.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
4.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
8.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
12.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
16.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
20.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
24.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
28.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
32.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
36.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
40.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
44.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
48.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
52.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
56.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
60.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
64.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
68.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
72.0000	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

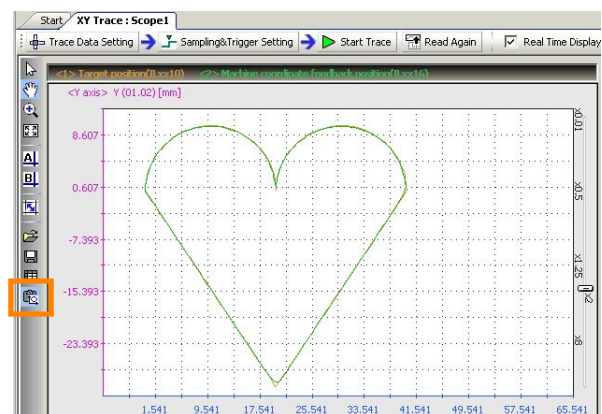
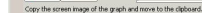
7.5.23 Copying an Image of the Graph

This operation is possible only with Real-Time Trace and XY Trace.

Select [Copy Graph] from the [Graph] menu or click the [Copy Graph] button on the toolbar to copy the graph image to the clipboard.

<Real-Time Trace>





7.6 Logging

Logging saves the values of specified registers in a log file according to the preset trigger timing and conditions. Logging stores data in external memory so that large amounts of data can be acquired.

Information This function is not available when using an MP2000-series machine controller.

The setting procedures for performing logging with the MPE720 and for performing logging with another tool are different.

The procedures are given below.

7.6.1 Using the MPE720

Use the following procedure to perform logging using the MPE720.

1. Click the **[Logging]** button on the **[My Tool]** window.

Information There are four buttons for logging, from [Logging1] to [Logging4]. You can save up to four logging settings because the settings are saved to each button.

The [Logging3] and [Logging4] buttons are not displayed by default. Refer to the following section for details on displaying buttons.

 (a) [Editing Buttons on the \[My Tool\] Window on page 86](#)

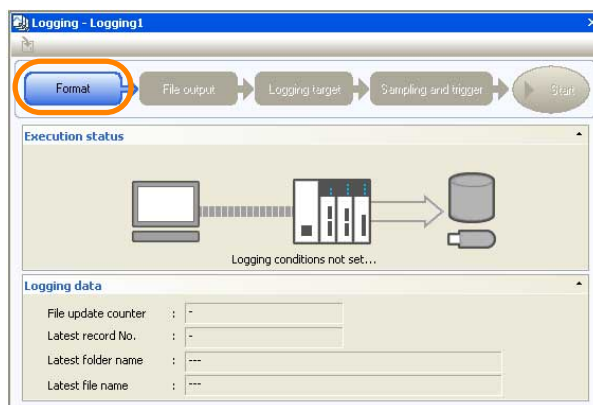
The [Logging] window will be displayed.

2. Click **[Format]**.

Information You can also import logging settings that were previously exported. Refer to the following section for details on the import operation.

 (2) [Importing Data on page 638](#)

Proceed to step 10 when you imported logging settings and those settings are acceptable without modifications. Proceed to the next step to modify the imported settings.



The [Format] window will be displayed.

3. Set the following items, and then click the [OK] button.

No.	Item	Description
(1)	Saving destination	Select the saving destination for the sampled data.
(2)	File format	Select the format of the file to output. • CSV: This file format can be opened in general-purpose applications such as Excel and Notepad. • Binary: This file format is not affected by the range of character codes (binary files are smaller than CSV files, so they can be written faster).
(3)	File details	Select the file information to output. The selected items are appended to the header information in the output file. • Data No.: This is the number that is assigned to the sampled data. • DATE/TIME <i>*I</i>: This is the date and time when the data was sampled (unit: sec.). • DATE/TIME(0.01us) <i>*I</i>: This is the date and time when the data was sampled (unit: 0.01 μs). • Registered register name: Register name • Program: Program name • System operation time: This is the system operation time when the data was sampled (unit: μs). • Sampling period: This is the frequency at which data was sampled (set this in the [Sampling & Trigger Settings] window that is explained later).
(4)	Number of output data	Enter the number of lines to write to a single file.
(5)	File Name	Set the name of the file to create. A five-digit index number that starts from 00001 is automatically added to the end of the specified file name. Click the [Default] button to enter "logging". <Setting Conditions> 32 alphanumeric characters and symbols (- and _ only) maximum.

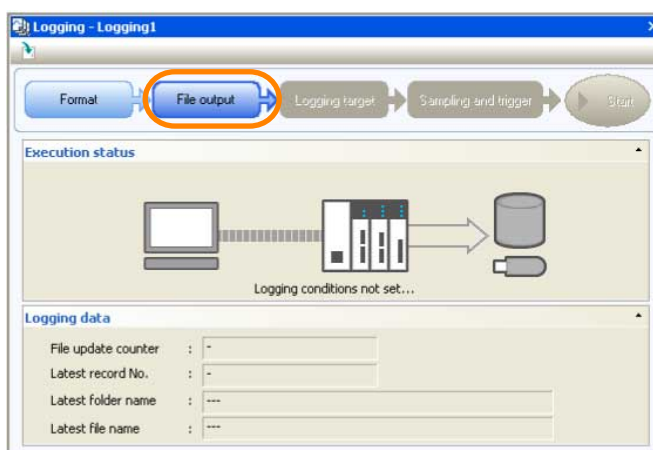
Continued on next page.

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No.	Item	Description
(6)	Folder name	Set the name of the folder to create. If this box is left blank, a folder will not be created. Instead, the file will be created in the root directory of the specified storage location. <Setting Conditions> 32 alphanumeric characters and symbols (- and _ only) maximum. Note: If you select Year/Month/Day/Hour (YYYYMMDDHH) in (7), the maximum string length will be 31.
(7)	Add date information at the end of the file name	Select this check box to add date information to the folder name. <Example> • Year: □□□2011 • Year/Month: □□□201109 • Year/Month/Day: □□□20110920 • Year/Month/Day/Hour: □□□20110920 (The "Hour" folder is created under this folder.)

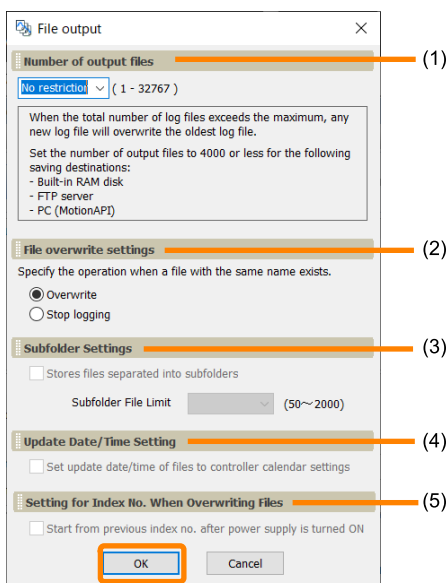
*1 Make sure to set the calendar in advance. Refer to the manual for your controller for details.

4. Click [File output].



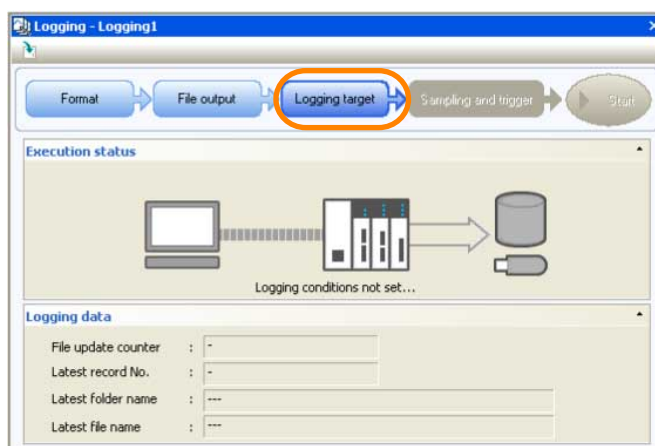
The [File output] window will be displayed.

5. Set the following items, and then click the [OK] button.



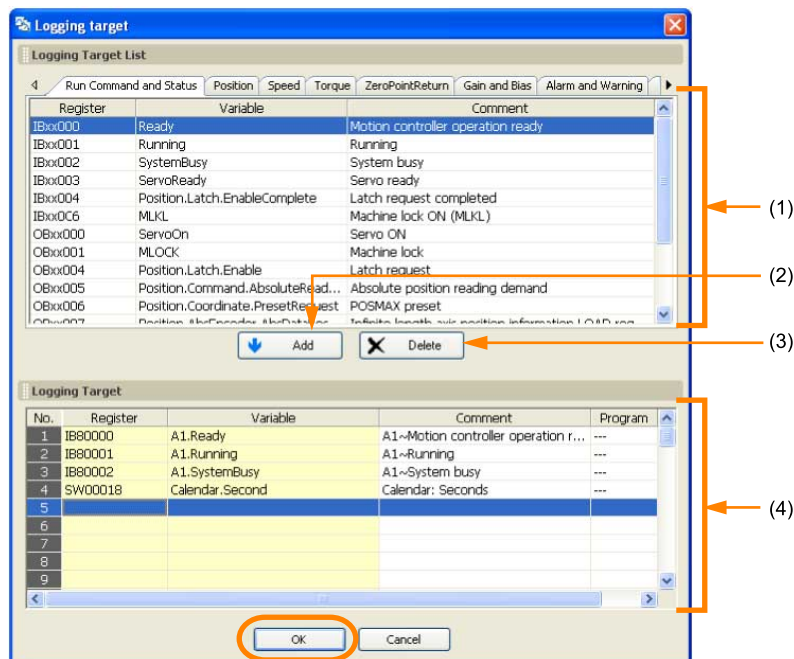
No.	Item	Description
(1)	Number of output files	Set the total number of files that are created from when the power is turned ON to when it is turned OFF. Note: 1. If you specify [No restriction] when the saving destination is a USB, the upper limit will be 10000 files. If you want to output 10001 or more files, directly input the desired value. 2. If you specify [No restriction] when the saving destination is other than USB memory, the upper limit will be 32767 files.
(2)	File overwrite settings	Specify the operation when there is a file with the same name. • Overwrite: When the file number reaches the upper limit on the specified number of output files, older files will be deleted to allow the creation of new files. • Stop logging: When the file number reaches the upper limit of the specified number of output files, logging will stop.
(3)	Subfolder Settings	Select this check box to store files separated into subfolders. When the set upper limit on the number of files is exceeded, a new subfolder will be created for saving files.
(4)	Update Date/Time Setting	Select this check box to set the update date/time of files synchronized to the calendar in the controller. The logging load may increase.
(5)	Setting for Index No. When Overwriting Files	Normally, if the power supply is turned OFF and ON again when the number of output files reaches the upper limit and old files will be overwritten, the index number at the end of the file name will be reset. Select this check box to continue the index number from the index number before the power supply was turned OFF. Note: The index number will not be reset until the number of output files reaches the upper limit, even if the power supply is turned OFF and ON again.

6. Click the [Logging target] button.



The [Logging target] window will be displayed.

7. Set the following items, and then click the [OK] button.



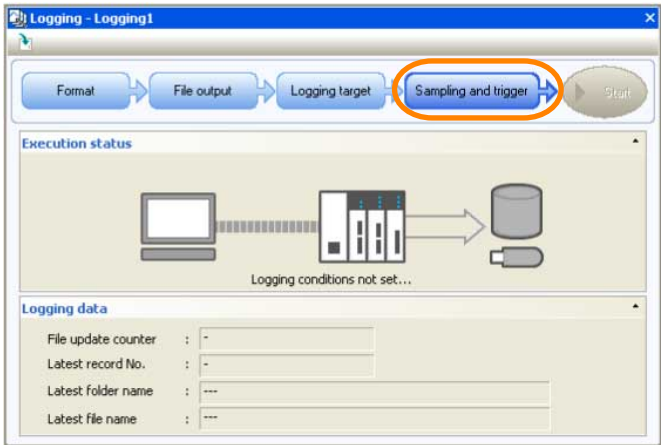
No.	Item	Description
(1)	Logging Target List	A list of the registers that can be selected for logging is displayed.
(2)	Add	Adds the selected register to the list of registers to be logged. Click this button to display the [Axis] window. Select the check boxes for the axes to log, and click the [OK] button to add the selected register to [Logging Target].
(3)	Delete	Removes the selected registers from the list of registers to be logged.
(4)	Logging Target	A list of the registers that will be logged is displayed. Registers can be added to this list either by selecting them from [Logging Target List] or by entering them directly. <Maximum Number of Logging Targets> - MP3000 series Ver. 1.43 or earlier and Σ-7C Ver. 1.08 or earlier: 64 - MP3000 series Ver. 1.44 or later, Σ-7C Ver. 1.09 or later, MPX1000 series, YRM-7 series, and YRM1000 series: 256

Information

- The following register types can be logged.
S, M, G, I, O, and D registers
- Refer to the following table for the data size for each data type.

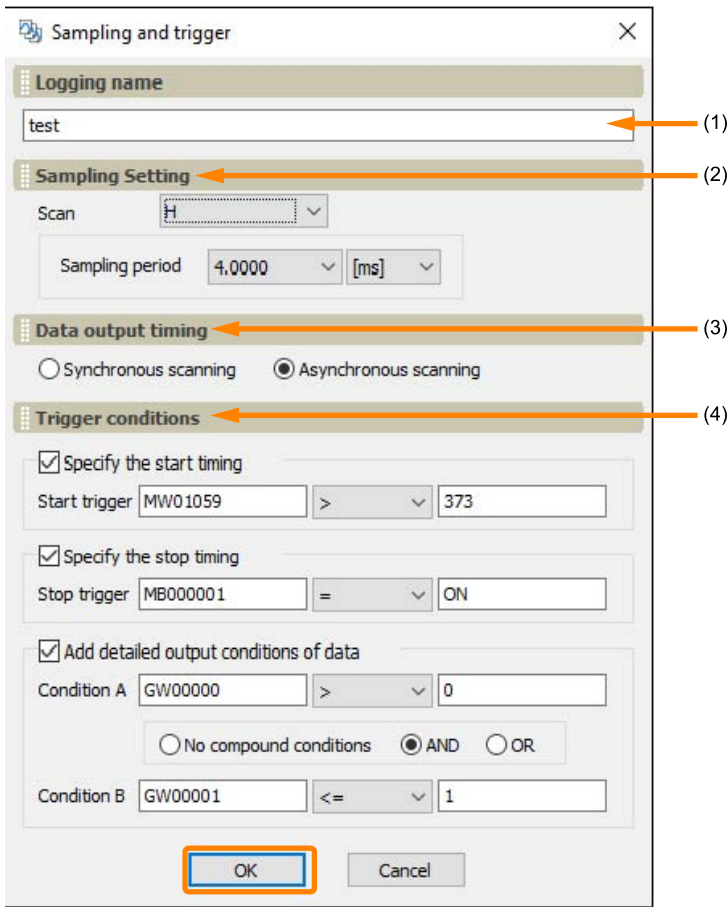
Data Type	Data Size
B: bit	1 words
W: integer	1 words
L: double-length integer	2 words
Q: quadruple-length integer	4 words
F: single-precision real number	2 words
D: double-precision real number	4 words

8. Click the [Sampling and trigger] button.



The [Sampling and trigger] window will be displayed.

9. Set the following items, and then click the [OK] button.



No.	Item	Description
(1)	Logging Name	Set the logging name. <Setting Conditions> 32 characters maximum.
(2)	Sampling Setting	Set the data sampling rate. To sample data every scan, specify the same value as the scan time set value in [Sampling period].

Continued on next page.

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No.	Item	Description
(3)	Data Output Timing	Specify whether data is to be logged synchronized or asynchronous with the scan. - Synchronous scanning: Data is written to the log synchronized with the scan, so data can be missed. - Asynchronous scanning: Data is written to the log asynchronously with the scan, so there is no overhead on the scan. Note: Due to the large overhead, synchronous scanning cannot be set if [USB memory] is set as [Saving destination] on the [Format Setting] window.
(4)	Trigger Condition	Set the logging output conditions. You can register S, M, G, I, and O registers as the conditions. If you select [No compound conditions], the condition is met when Condition A is met. Condition B will be ignored, even if it is specified.

<Example>

To automatically start logging when the power is turned ON, set the start trigger to the following condition.

- When "USB memory" is selected as the saving destination
Setting example: Start trigger SB006540 = ON

Note:

The SB006540 register turns ON when the system recognizes insertion of a USB memory device.

- When the saving destination is set to built-in RAM disk:
Setting example: Start trigger SB000001 or SB000003 = ON

Note:

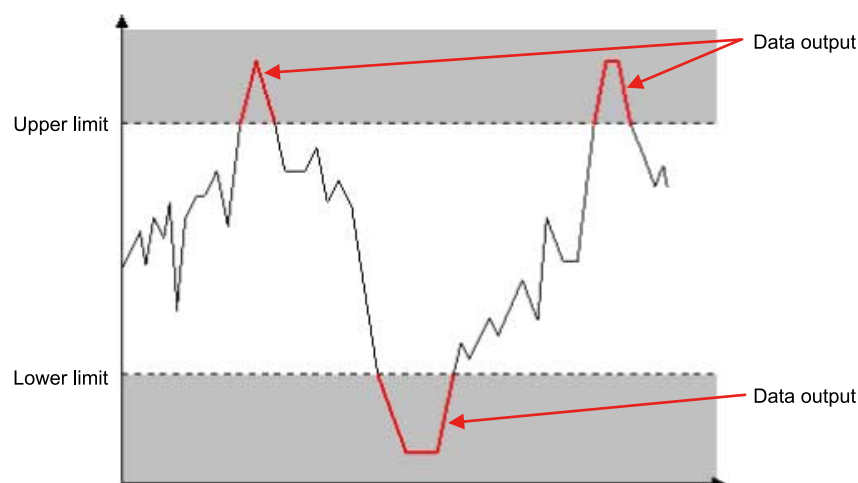
The SB000001 register turns ON for only one high-speed scan.

The SB000003 register turns ON for only one low-speed scan.

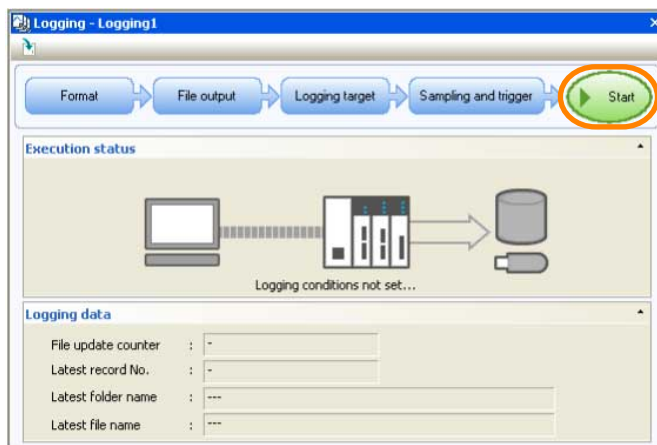
<Example>

In the following example, the output conditions are set to log only the data in the shaded region.

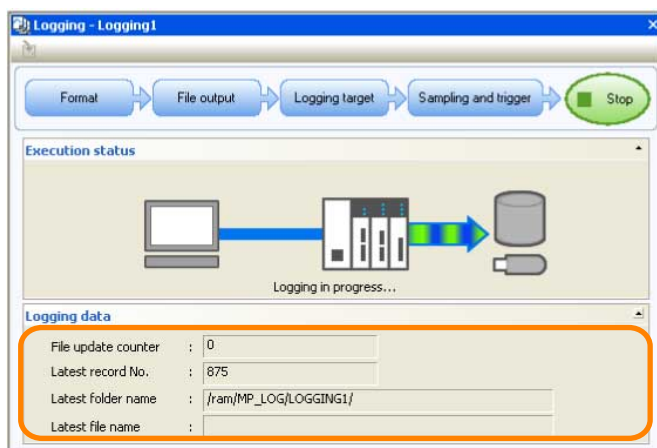
Setting example: Condition A $\geq$ Upper limit, Condition B $\leq$ Lower limit, Compound condition = OR



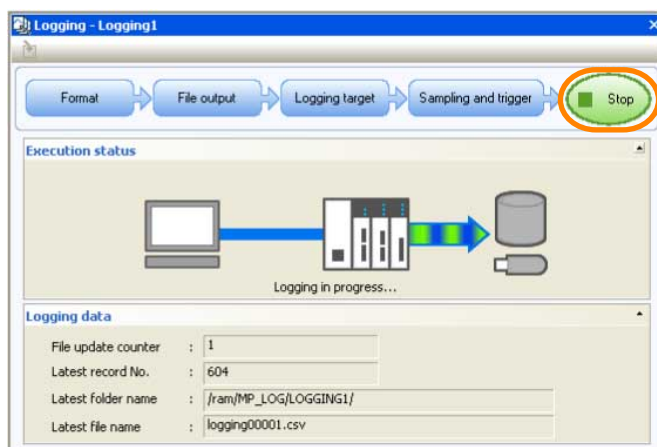
10. Click the [Start] button.



Logging starts. While logging is in progress, the following items are displayed in [Logging data].



11. Click the [Stop] button to stop logging.



Logging stops.

Each of the data ranges and reset timings are as follows.

Data Name	Range		Reset Timing
File Name	When "USB memory" is set as the saving destination	logging00001 to logging10000	The file is set to logging00001 when the power is turned ON.
	When "In the built-in RAM disk" is set as the saving destination	logging00001 to logging4000	This file is overwritten if it already exists in memory.
Latest Record Number	0 to 18446744073709551615		After logging stops, this is reset when next logging is started.

This concludes the procedure.

7.6.2 Preparations When Using Tools Other Than the MPE720

This section describes the procedure for preparations for performing logging using tools other than the MPE720.

(1) Description

If you enable [Permit Settings from Tools other than MPE720], you can change the target registers for logging from tools other than the MPE720.

Overhead for logging processing (the processing time for data acquisition and file writing) is added to the regular duration of time required for scanning. When you change the target registers for logging, the maximum value for scan time may exceed the setting value, resulting in the Watchdog Timer Error (E.001) occurring and the CPU shutting down. For this reason, the system is usually configured so that the target registers for logging cannot be changed while operating the machine.

When you use this function, the maximum number of target registers for logging is configured. When you execute logging after configuring the setting, the overhead for logging processing for the configured number of target registers for logging is added to the scan time. Based on this, with the MPE720, you can set the scan time in advance so that this error does not occur. Doing so can prevent an error from occurring when the maximum value for scan time exceeds the setting value, even if you change the target registers for logging from a tool other than MPE720 while operating the machine.

Information To calculate the overhead, perform a simulation at maximum load. The register for logging will be a double-precision real number (4 words) (e.g. SD□□□□□).
When actually executing the logging function with a tool other than the MPE720, the overhead time may be shorter than calculated.

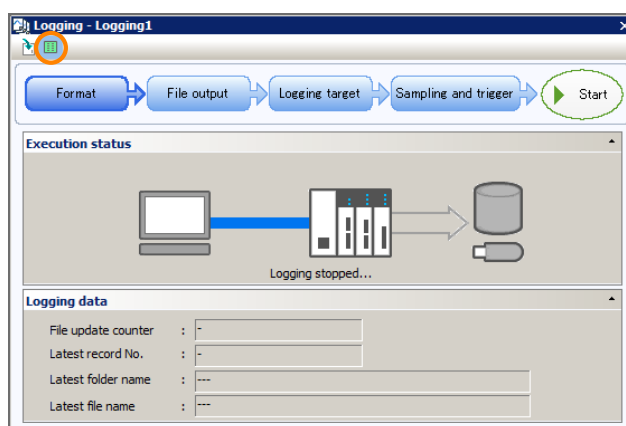
(2) Setting Procedure

The setting procedure for performing logging setting from a tool other than the MPE720 is described below.

Information You can also import logging settings that were previously exported.
To import the settings, perform the import operation before performing this operation. Permission to configure logging settings from a tool other than the MPE720 will be revoked by importing logging settings.
Refer to the following section for details on the import operation.

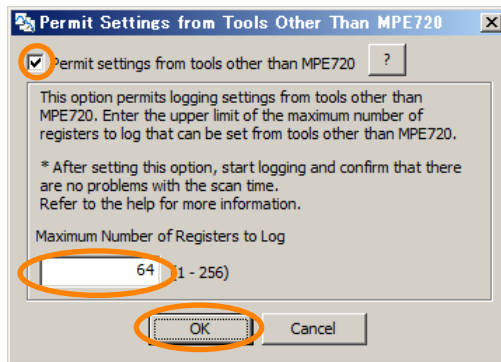
 (2) [Importing Data on page 638](#)

1. Click the [Permit Settings from Tools Other Than MPE720] button.



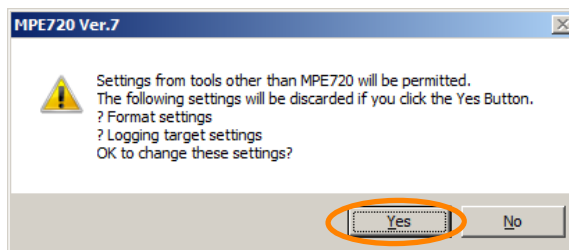
The [Permit Settings from Tools Other Than MPE720] window will be displayed.

2. Select the check box for [Permit settings from tools other than MPE720], enter the number of log registers to permit under [Maximum Number of Registers to Log], and then click the [OK] button.



A message dialog box will be displayed.

3. Click the [Yes] button.

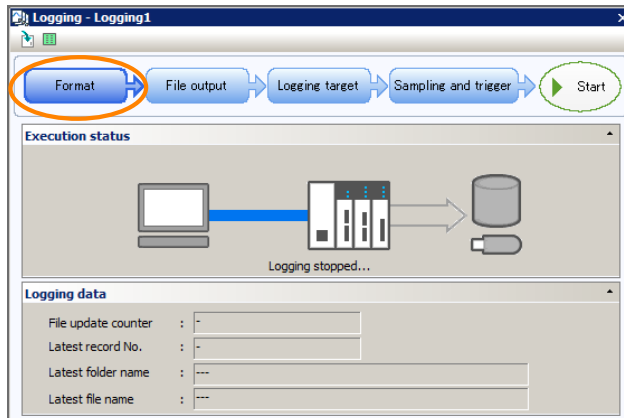


4. Click [Format].

Information

Proceed to step 12 when you imported logging settings and those settings are acceptable without modifications.

Proceed to the next step to modify the imported settings.



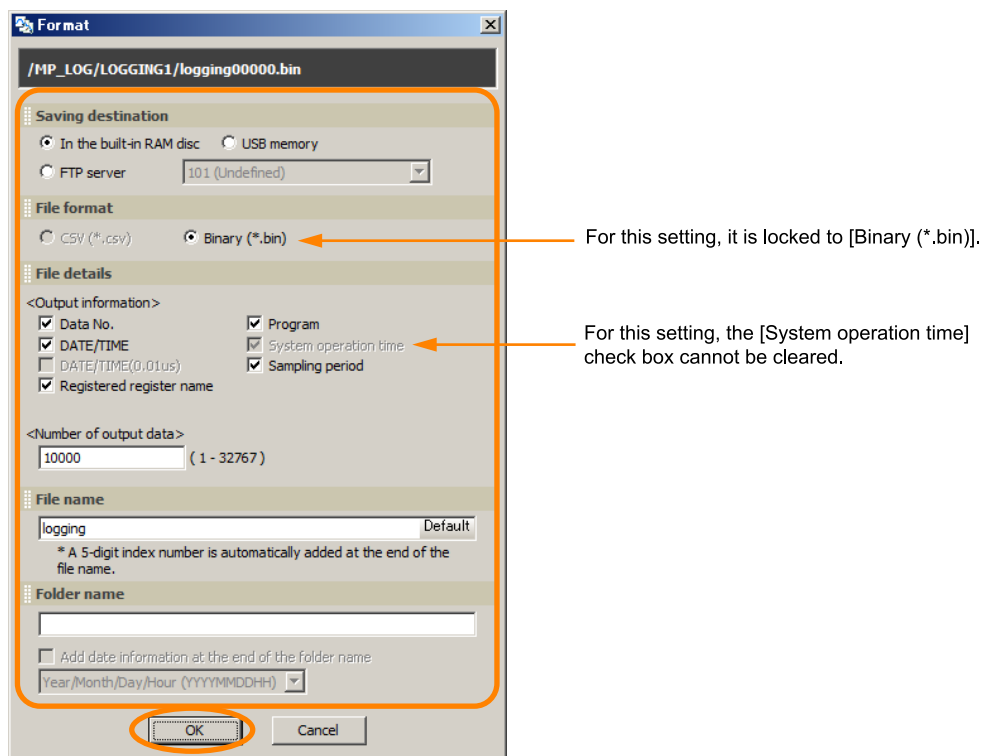
The [Format] window will be displayed.

5. Set the following items, and then click the [OK] button.

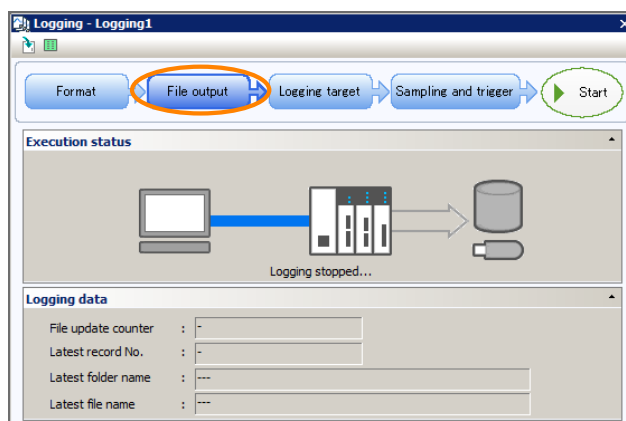
Information

Settings are the same as those when using the data logging with the MPE720. Refer to the following section for details.

 [7.6.1 Using the MPE720 on page 505](#)



6. Click [File output].

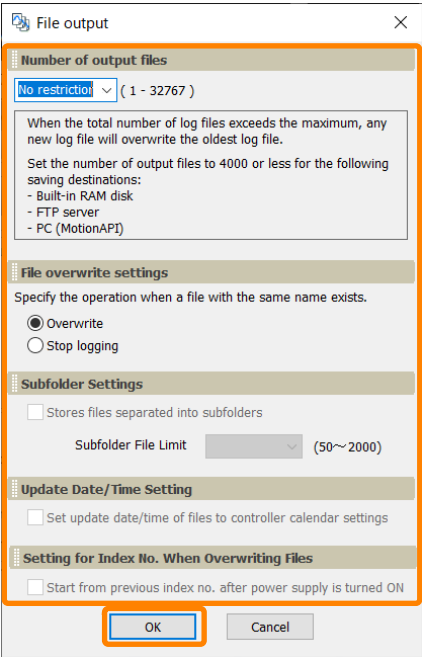


The [File output] window will be displayed.

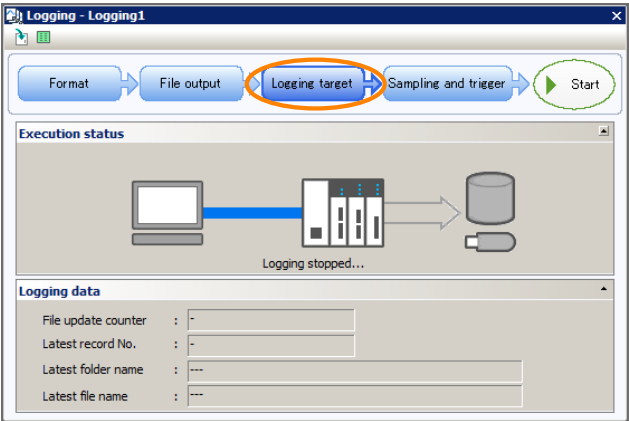
7. Set the following items, and then click the [OK] button.

Information Settings are the same as those when using the data logging with the MPE720. Refer to the following section for details.

 [7.6.1 Using the MPE720 on page 505](#)



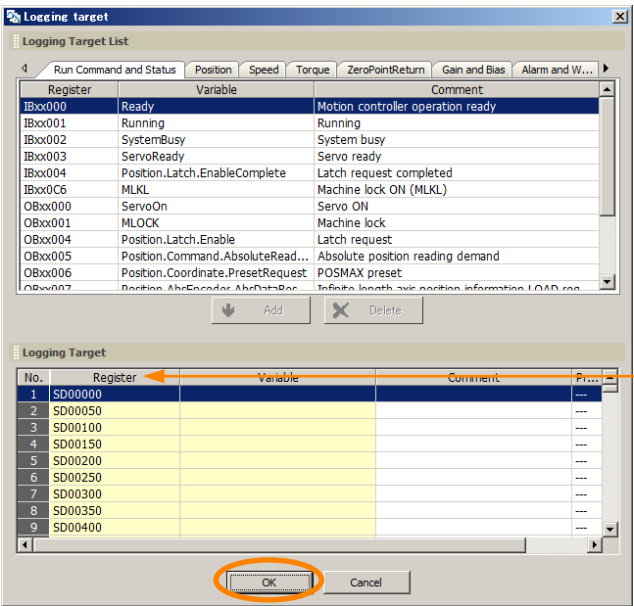
8. Click the [Logging target] button.



The [Logging target] window will be displayed.

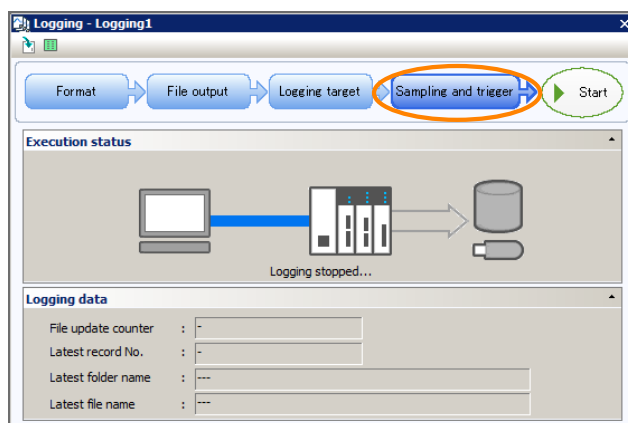
9. Click the [OK] button.

Information As this window is the settings window for simulations, the registers cannot be changed. Change registers during actual logging from the actual tool after completing this setting.



Dummy registers for logging will be automatically registered to calculate the overhead.

10. Click the [Sampling and trigger] button.

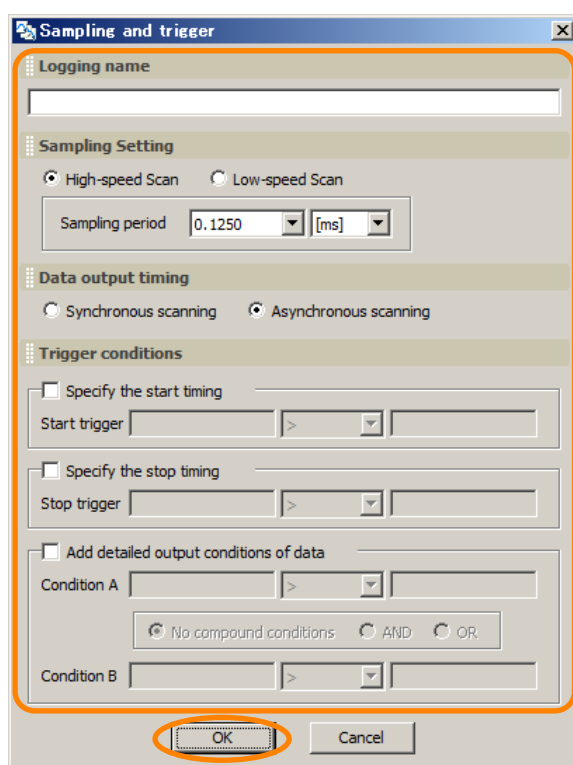


The [Sampling and trigger] window will be displayed.

11. Set the following items, and then click the [OK] button.

Information Settings are the same as those when using the data logging with the MPE720. Refer to the following section for details.

[7.6.1 Using the MPE720 on page 505](#)



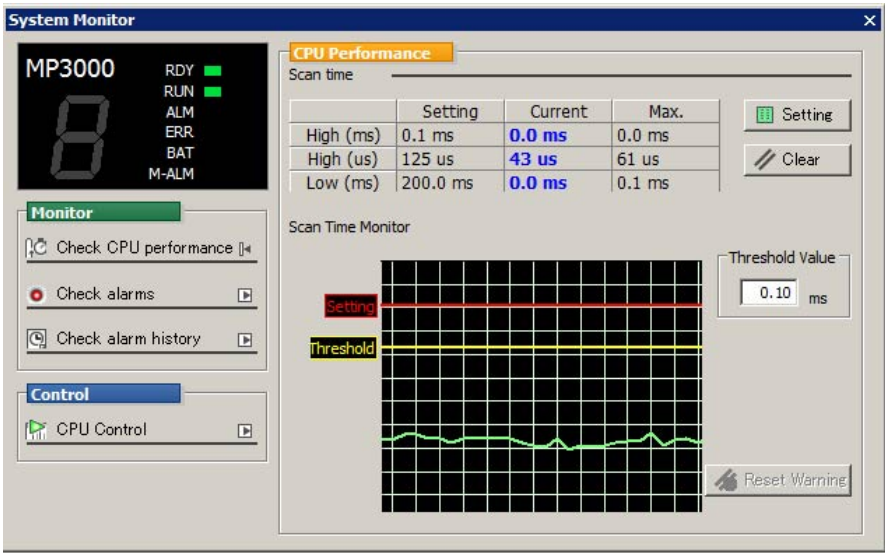
This completes configuration of the settings for logging simulation.

The next steps describe the procedure for executing and checking the results of a logging simulation.

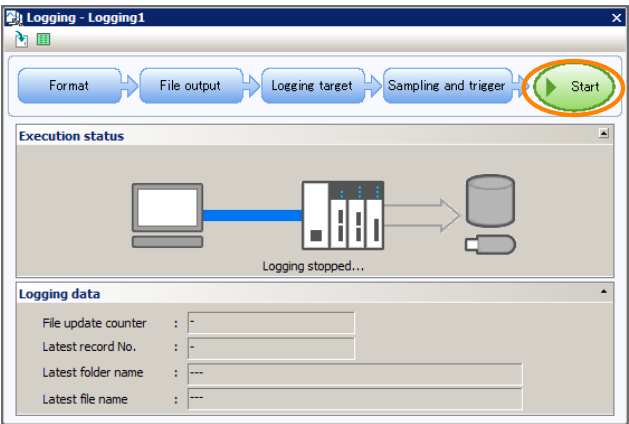
12. Click [Monitor] - [System monitor] from the launcher.



The [System Monitor] window will be displayed.



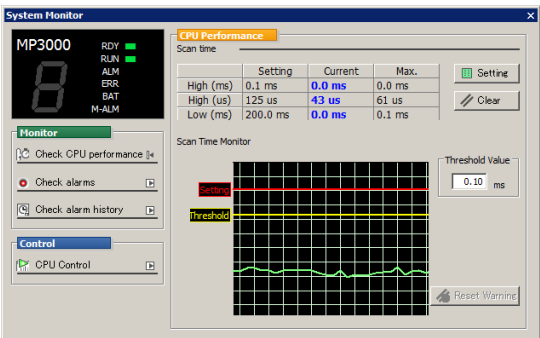
13. Return to the [Logging] window, and click the [Start] button.



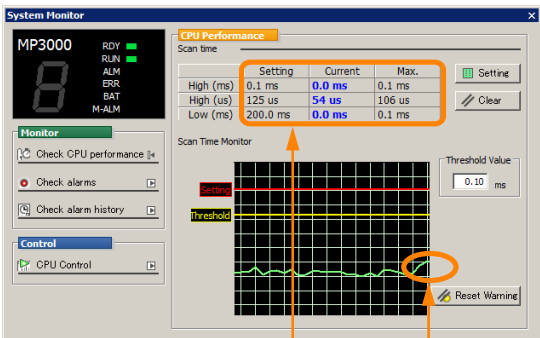
A logging simulation with the conditions you have set will begin.

14. In the [System Monitor] window, check that there is no problem with scan time increment.

<Before Logging Begins>



<After Logging Begins>



This increment is the overhead from logging.

If the maximum value after logging begins is smaller than the set value, there is no problem.

Information If the scan time exceeds the set value, click the [Setting] button in the [System Monitor] window and change the set value in the displayed [Environment Setting] window.
After you have changed the scan time, click [Start] button in the [Logging] window and perform logging simulation again.

This concludes the settings.
After completing these steps, you can configure logging settings from tools other than the MPE720.

7.7 Maintenance Monitor

Use the Maintenance Monitor to monitor maintenance data in controllers and SERVOPACKs connected to controllers.

- Information
- If you use the Maintenance Monitor while the SigmaWin+ is being used, the operating speed of both applications will slow down.
 - There is a 16 axis limit for SERVOPACKs that can be displayed at the same time.

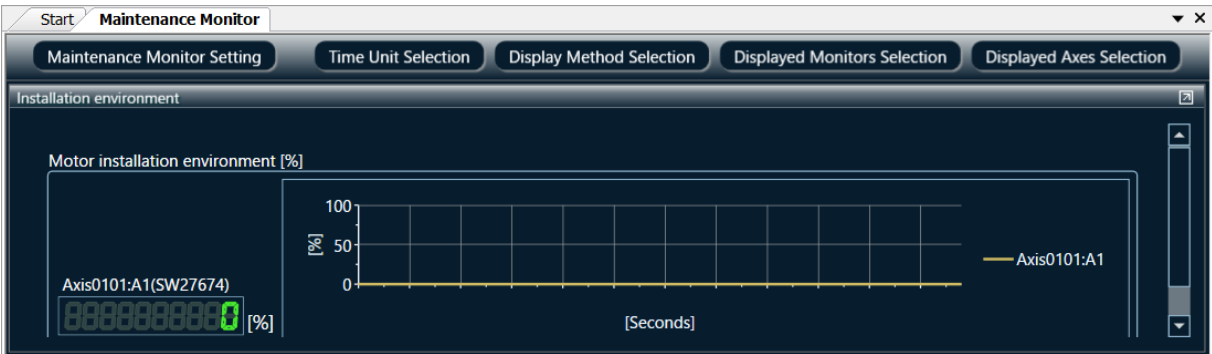
The supported models are:

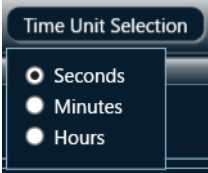
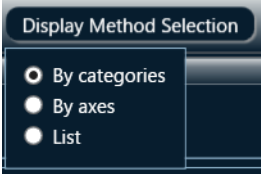
Product Category	Series
Controller	YRM1000 series <i>*1</i>
	YRM-7 series
	MP3000 series
SERVOPACK	Σ-X series (MECHATROLINK-III/4 communications references)
	Σ-7 series (MECHATROLINK-III communications references)

*1 Note that CPU-01 cannot use the Maintenance Monitor.

7.7.1 [Maintenance Monitor] Tab Page

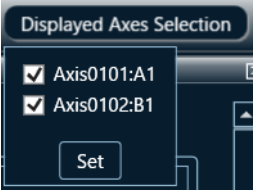
Click the [Maintenance Monitor] button in the [My Tool] window to display the [Maintenance Monitor] tab page. The monitor information will be displayed when you configure the settings by clicking the buttons at the top.



Item	Description
Maintenance Monitor Settings	Displays the [Maintenance Monitor] window. Refer to the following section for details. 7.7.2 [Maintenance Monitor] Window on page 520
Time Unit Selection	Select the time unit. The graph will be updated at the interval of the selected time unit. For example, if you select "Seconds", the graph will be updated every second. 
Display Method Selection	Select the display method for monitor information. 

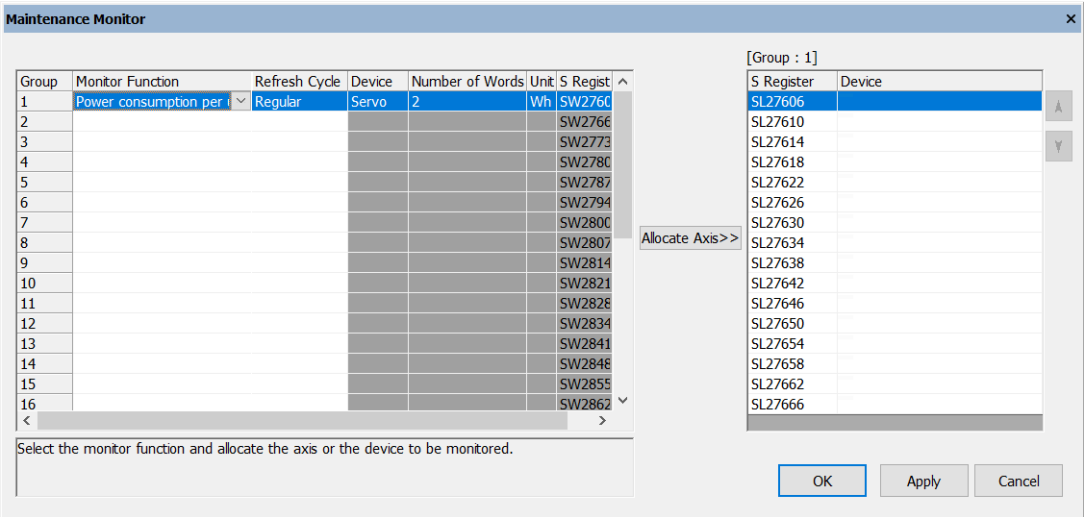
Continued on next page.

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Item	Description
Displayed Monitors Selection	Select the monitor items to display. The options are the monitor items displayed in the [Maintenance Monitor] window that is displayed by clicking the [Maintenance Monitor Setting] button. Select the check boxes of the monitor items and click the [Set] button to display the monitor information in the [Maintenance Monitor] tab page. 
Displayed Axes Selection	Select the axes to display. The options are the axes displayed in the [Maintenance Monitor] window that is displayed by clicking the [Maintenance Monitor Setting] button. Select the check boxes of the axes and click the [Set] button to display the monitor information in the [Maintenance Monitor] tab page. 

7.7.2 [Maintenance Monitor] Window

Click the [Maintenance Monitor Setting] button in the [Maintenance Monitor] tab page to display the [Maintenance Monitor] window. Set the monitor items and axes to monitor in this window.



Item	Description
Group	The group number is displayed. You can set up to 32 groups of monitor items.
Monitor Function	Select the monitor item. When you select a monitor item, [Refresh Cycle], [Device], [Number of Words], [Unit], and [S Register] are displayed. You can select the same monitor item as other groups.

Continued on next page.

Continued from previous page.

Item	Description
Refresh Cycle	Select the data update cycle. • Frequent: Data is updated approx. every second. • Regular: Data is updated approx. every 10 s. • Infrequent: Data is updated approx. every 100 s. Note: The above update cycles are approximate. The update cycle will increase as the number of monitored axes increases.
Device	The device to monitor is displayed. This item cannot be changed.
Number of Words	The size of the monitor data is displayed. This item cannot be changed.
Unit	The unit of the monitor data is displayed. This item cannot be changed.
S Register	First address of system registers to which to output the monitor data is displayed. This item cannot be changed.
[Allocate Axis] Button	Click this button with a monitor item selected in the left area to display [Axis] window. Select the axes and click the [OK] button to allocate the axes. Up to 16 axes can be allocated per group.

7.7.3 Monitor Items

The following table lists the items that can be selected for [Monitor Function] in the [Maintenance Monitor] window.

Selection	Description	Moni- tored Device	Num- ber of Wor- ds	Unit	Supporting Versions
Power consumption per unit time	The power consumption per unit time is displayed.	SERVO-PACK	2	1 Wh	MP3000: Version 1.12 or later YRM-7: All versions Σ-7: Ver. 000C or later Σ-X: All versions MPE720: Version 7.28 or later
Accumulated power consumption	The total power consumption from when operation was started is displayed.	SERVO-PACK	2	1 Wh	
Accumulated power consumption (after the decimal point)	The three digits below the decimal point of the total power consumption from when operation was started are displayed.	SERVO-PACK	2	0.001 Wh	
SERVOPACK installation environment	The load conditions of the temperature environment in the SERVOPACK are displayed.	SERVO-PACK	1	1%	
Motor installation environment	The load conditions of the temperature environment in the Servomotor are displayed.	SERVO-PACK	1	1%	
Total operation time (servo)	The total operating time of the SERVOPACK is displayed.	SERVO-PACK	2	100 ms	
Built-in fan lifetime	The total operating time of the cooling fan is displayed as a percentage. When usage is started, "100%" is displayed and the value decreases as the operating time increases. When "0%" is displayed, it is time to replace the fan.	SERVO-PACK	1	0.01%	
Built-in capacitor lifetime	The maintenance periods of the electrolytic capacitors (main circuit and control circuit) are displayed as percentages. When usage is started, "100%" is displayed and the value decreases as the operating time increases. When "0%" is displayed, it is time to replace the relay.	SERVO-PACK	1	0.01%	
Rush current prevention circuit lifetime	The maintenance period of the inrush-current prevention relay is displayed as a percentage. When usage is started, "100%" is displayed and the value decreases as the operating time increases. When "0%" is displayed, it is time to replace the fan.	SERVO-PACK	1	0.01%	MP3000: Ver. 1.14 or later (not compatible with CPU-201) YRM-7: All versions MPE720: Version 7.30 or later
Dynamic brake circuit lifetime	The maintenance period of the IGBT is displayed as a percentage. When usage is started, "100%" is displayed and the value decreases as the operating time increases. When "0%" is displayed, it is time to replace the IGBT.	SERVO-PACK	1	0.01%	
Controller installation environment	The load conditions of the temperature environment in the controller will be displayed.	Control- ler	1	1%	

Continued on next page.

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Selection	Description	Moni- tored Device	Num- ber of Wor- ds	Unit	Supporting Versions
Maximum value of amplitude of estimated vibration ^{*1}	The maximum value of vibration amplitude of the estimated vibration calculated inside the SERVOPACK is displayed. This is compared with the value during regular operation in order to determine changes in the device due to deterioration over time and similar causes. If this monitor value increases, vibration may occur in the device.	SERVO- PACK	1	1 min ⁻¹	MP3000: Version 1.12 or later YRM-7: All versions Σ-7: Version 002C or later Σ-X: All versions MPE720: Version 7.46 or later
Maximum value of estimated external disturbance torque (force) ^{*1}	The maximum value of the estimated external disturbance torque (force) calculated inside the SERVOPACK is displayed. This is compared with the value during regular operation in order to determine changes in the device due to deterioration over time and similar causes. If this monitor value increases, the external disturbance torque (force) applied to the servomotors may increase.	SERVO- PACK	1	1%	
Minimum value of estimated external disturbance torque (force) ^{*1}	The minimum value of the estimated external disturbance torque (force) calculated inside the SERVOPACK is displayed. This is compared with the value during regular operation in order to determine changes in the device due to deterioration over time and similar causes. If this monitor value decreases, the external disturbance torque (force) applied to the servomotors may increase.	SERVO- PACK	1	1%	
Number of serial encoder communications errors ^{*1}	The number of serial encoder communications errors is displayed. If this monitor value increases, the communication quality may decrease.	SERVO- PACK	2	1 time	
Number of MECHATROLINK communications errors ^{*1}	The number of MECHATROLINK communications errors is displayed. If this monitor value increases, the communication quality may decrease.	SERVO- PACK	2	1 time	
Temperature margin until Servomotor overheats ^{*1}	The temperature margin until servomotor overheating is displayed. The SERVOPACK detects A.860 (Encoder Overheat) if the temperature margin drops below 0 [°C]. Monitoring of this monitor allows you to prevent the system from stopping due to A.860.	Servo- motors	1	1°C	
Maximum value of accumulated load ratio ^{*1}	The maximum value of accumulated load ratio for the SERVOPACK is displayed. This is compared with the value during regular operation in order to determine changes in the device due to deterioration over time and similar causes. If this monitor value increases, the load applied to the servomotors may increase.	SERVO- PACK	1	1%	

*1 You can select this as an item and allocate the device to an S register, but the monitor information will not be displayed on the [Maintenance Monitor] tab page.

7.8 Motion Recorder

7.8.1 Overview

The motion recorder function constantly collects data selected as the recording target in memory, and when the save file trigger turns ON, it saves the recording data in memory to a file as the recording file.

The recording data in memory is constantly updated with new data by overwriting the oldest data.

The data in the saved recording file is given time information as a timestamp.

During playback, you can check the recorded data together with the time information in real-time traces and so on.



Important

- Recording is started in the controller after the project file (recording settings) is written to the controller.
- When a saved recording file is played back, the project file (recording settings) written to the controller is required. Store the project file (recording settings) in a safe and secure manner.

Information The registers used in the compiled programs can be set as the register target.

If you edited a program, edit the recording settings after compiling the program.

We recommend you create and edit recording settings while offline.

7.8.2 Applicable Controllers

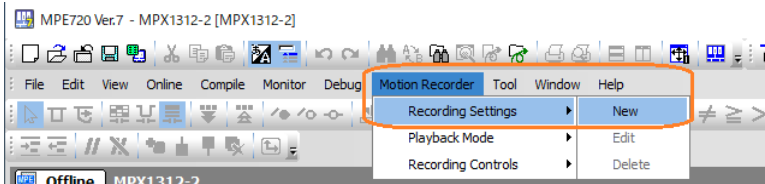
Controller			MPE720 Versions that Support the Motion Recorder Function
Series	Model	Versions that Support the Motion Recorder Function	
YRM1000 series	CPU-12	Ver. 2.09 or later	Ver. 7.A1 or later
MPX1000 series	MPX1312-2		
	MPX1312-1		
	MPX1012J-20		

7.8.3 Operations for Recording Settings

(1) New

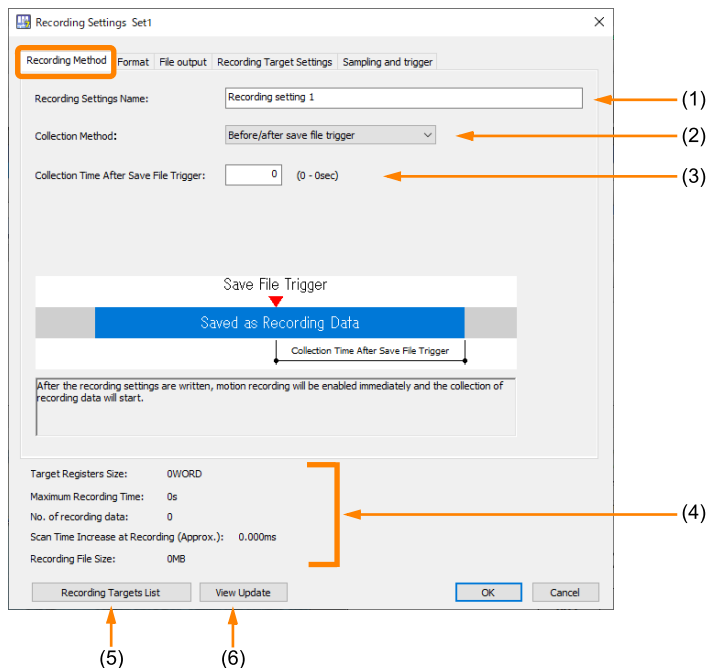
Use the following procedure to create new recording settings.

1. From the [Motion Recorder] menu, select [Recording Settings] - [New].



The [Recording Settings Set1] window will be displayed.

2. Select the [Recording Method] tab and set the recording method.



No.	Item	Description
(1)	Recording Settings Name	Specify the name of the recording settings.
(2)	Collection Method	"Before/after save file trigger" only.
(3)	Collection Time After Save File Trigger	Set the collection time for recording data from the time when the save file trigger turns ON. The default value is 0 (s).
(4)	Recording settings information	The recording settings information for the current recording settings are displayed. If you changed the recording settings, click the [View Update] button to update the content displayed for the recording settings information.
(5)	Recording Targets List	Click this button to display the [Recording Targets List] window that shows the current list of recording targets.
(6)	View Update	Click this button to update the recording settings information.

3. Select the [Format] tab and set the format of the recording file.

Recording Settings - Set1

Recording Method: **Format** | File output | Recording Target Settings | Sampling and trigger

Path: /MP_REC/RECORDING1/recording.motrc

Saving destination: ☒ SD card ☐ FTP server 101 (Undefined) (1)

File name: recording (2) [Default]

☐ Append data information to file name.

Date/Time:

☐ Year (4 digits):YYYY ☐ Month (2 digits):MM ☐ Day (2 digits):DD (3)

☐ Hours (2 digits):hh ☐ Minutes (2 digits):mm ☐ Seconds (2 digits):ss ☐ Milliseconds (3 digits):SSS

☐ Append save file trigger comment to file name. (4)

Folder name: (5)

☐ Add date information at the end of the folder name. (6)

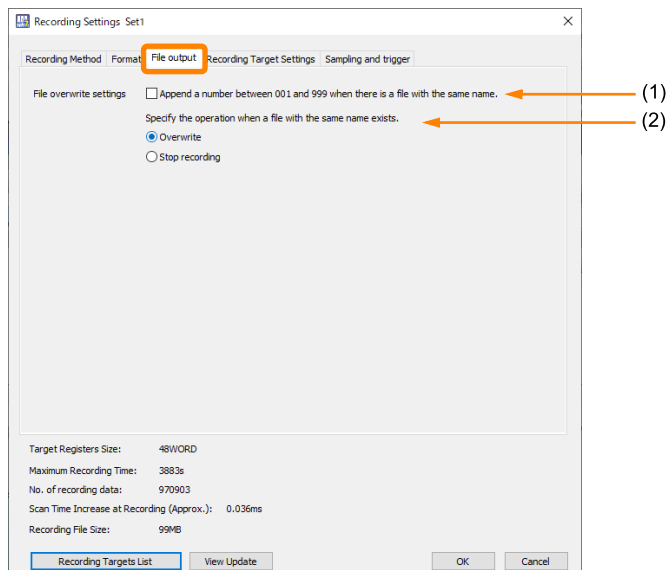
Year/Month/Day/YYYYMMDD

Target Registers Size: 48WORD
Maximum Recording Time: 3883s
No. of recording data: 970903
Scan Time Increase at Recording (Approx.): 0.036ms
Recording File Size: 99MB

[Recording Targets List] [View Update] [OK] [Cancel]

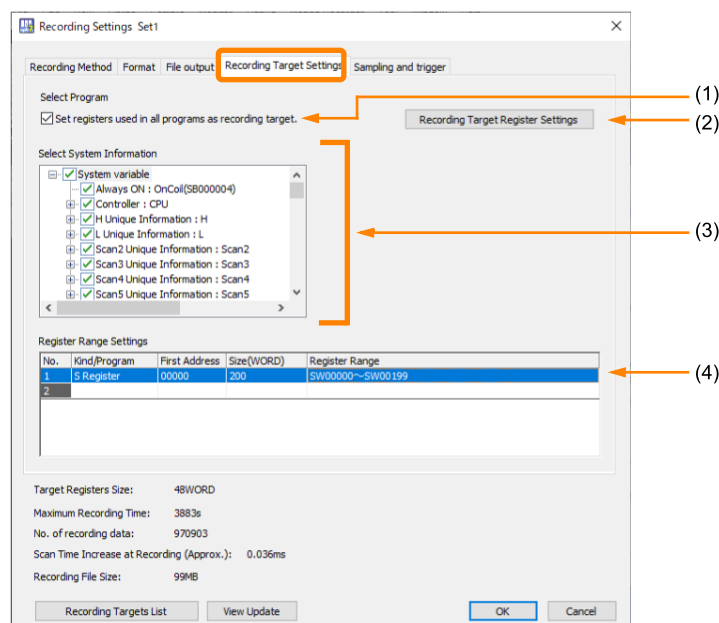
No.	Item	Description
(1)	Saving destination	Set the storage location for the recording file.
(2)	File name	Set the file name for the recording file. Click the [Default] button to enter "recording" as the file name. <Setting Conditions> 32 alphanumeric characters and symbols (- and _ only) maximum.
(3)	Append date information to file name.	Select this check box to add date/time information to the selected file name. Information The check boxes for items in the middle of the date/time cannot be cleared. <Example 1> Information with only the year and day cannot be added without adding the month of the date/time. <Example 2> Date/time with an uninterrupted day/hours/minutes/seconds can be added.
(4)	Append save file trigger comment to file name.	Select this check box to add the save file trigger comment to the file name.
(5)	Folder name	Set the folder name in which to store the recording file. <Setting Conditions> 32 alphanumeric characters (including the date information) and symbols (- and _ only) maximum.
(6)	Add date information at the end of the folder name.	Select this check box to enable the list box, and the selected Year/Month/Day (YYYYMMDD) or Year/Month/Day/Hour (YYYYMMDDHH) will be added to the end of the folder name.

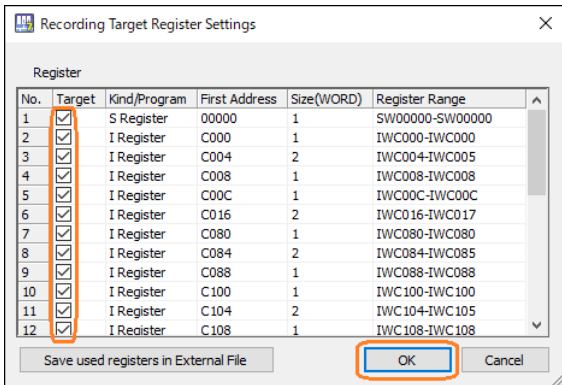
4. Select the [File output] tab and set the file output settings for the recording file.



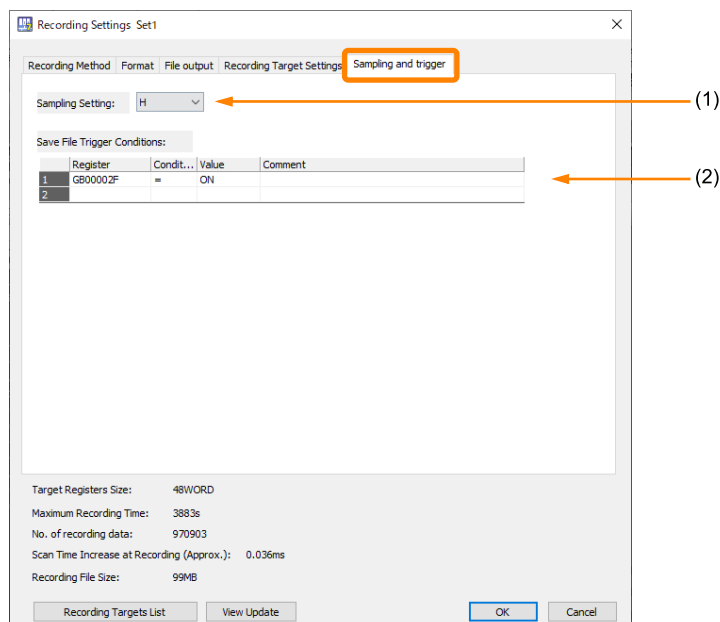
No.	Item	Description
(1)	Append a number between 001 and 999 when there is a file with the same name.	Select this check box to add a 3-digit number (001 to 999) to the end of the file name when there is a file with the same name in the destination. Information After 999 is added to the end of the file name, the file with 001 at the end will be overwritten.
(2)	Specify the operation when there is a file with the same name.	Set whether to overwrite or stop recording when there is a file with the same name in the destination.

5. Select the [Recording Target Settings] tab and set the recording target.



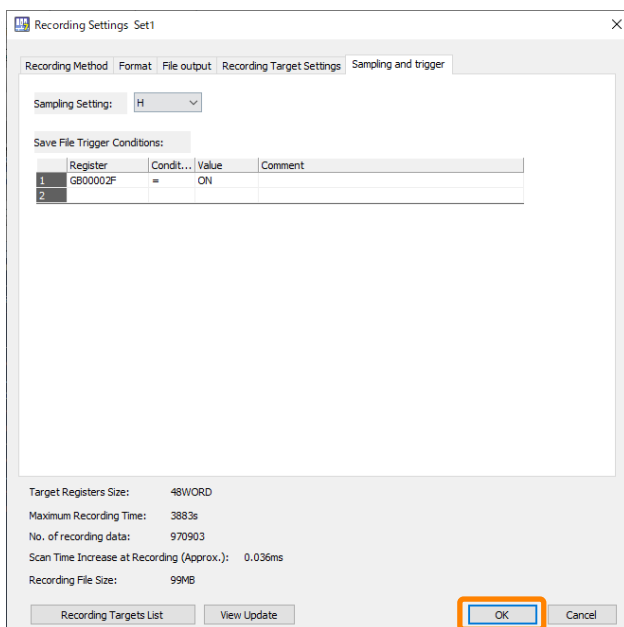
No.	Item	Description
(1)	Set registers used in all programs as recording target.	Select this check box to set the registers used in all programs as the recording target.
(2)	Recording Target Register Settings	Click the [Recording Target Register Settings] to display the [Recording Target Register Settings] window. Information The registers used in compiled programs will be displayed. If you edited a program, edit the recording settings after compiling the program. All registers used in all programs are the recording target. If used registers are continuous, they are displayed as one group. Clear the check box of any registers that do not need to be recorded, and then click the [OK] button.  Click the [Save used registers in External File] button to save the registers, variables, and comments used in each program to a CSV file.
(3)	Select System Information	Set the recording targets from registered system variables.
(4)	Register Range Settings	Set the recording targets from registers in the controller. To set a continuous range of registers, use one row. To set non-continuous ranges of registers, use multiple rows.

6. **Select the [Sampling and trigger] tab and set the sampling settings and save file trigger conditions.**



No.	Item	Description
(1)	Sampling Setting	Set the timing at which to obtain the recording data. • H: The recording data is obtained at the timing of the high-speed (H) scan. • L: The recording data is obtained at the timing of the low-speed (L) scan. • Scan□: The recording data is obtained at the timing of the high-speed (Scan□) scan. • Scan□: The recording data is obtained at the timing of the low-speed (Scan□) scan. Information Scan□ is displayed as a selection only when the corresponding scan was created.
(2)	Save File Trigger Conditions	Set the save file trigger conditions. A maximum of 16 trigger conditions can be saved. When you set multiple trigger conditions, the recording file will be saved if one of those trigger conditions is satisfied (OR judgment). You can register S, M, G, I, and O registers as the conditions. If you select a bit type, it means rising when set to "ON" and falling when set to "OFF". You can also set a comment for each save file trigger condition. <Setting Conditions> 32 alphanumeric characters and symbols (- and _ only) maximum.

7. Click the [OK] button.



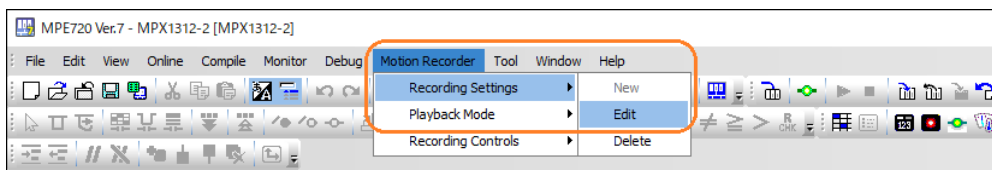
The [Recording Settings Set1] window will be closed.

8. The project file will be saved.

(2) Edit

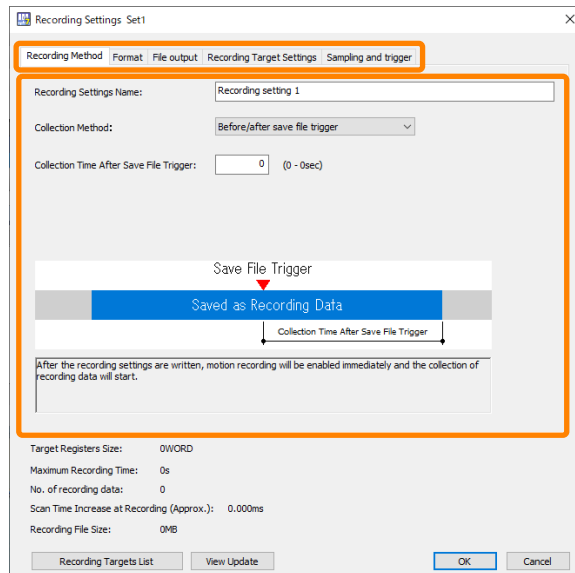
Use the following procedure to edit created recording settings.

1. From the [Motion Recorder] menu, select [Recording Settings] - [Edit].

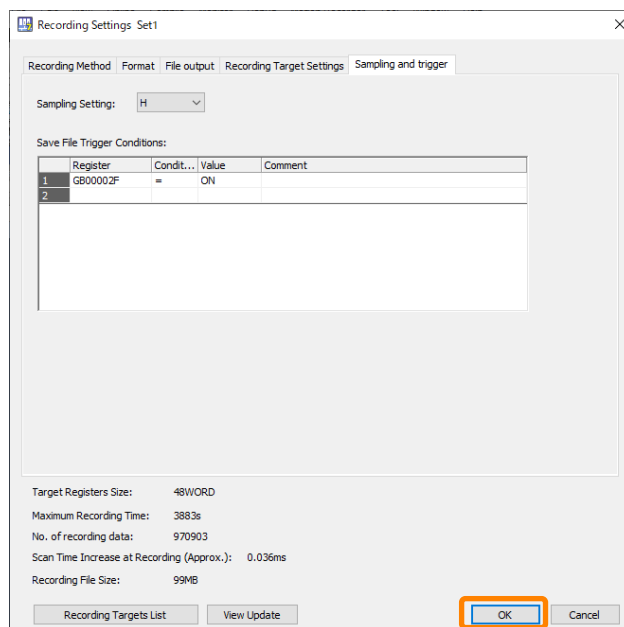


The [Recording Settings Set1] window will be displayed.

2. Edit the recording settings in the same manner as when you created them.



3. Click the [OK] button.

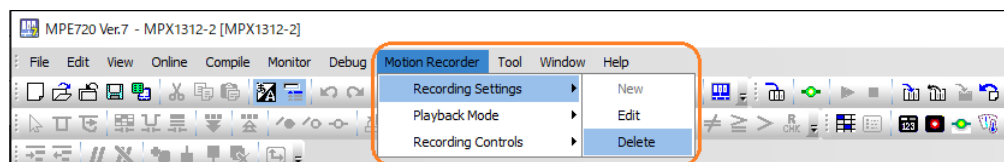


The [Recording Settings Set1] window will be closed.

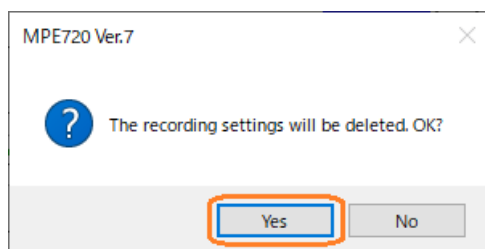
(3) Delete

Use the following procedure to delete created recording settings.

1. From the [Motion Recorder] menu, select [Recording Settings] - [Delete].



2. Click the [Yes] button.



The recording settings will be deleted.

7.8.4 Transfer Files

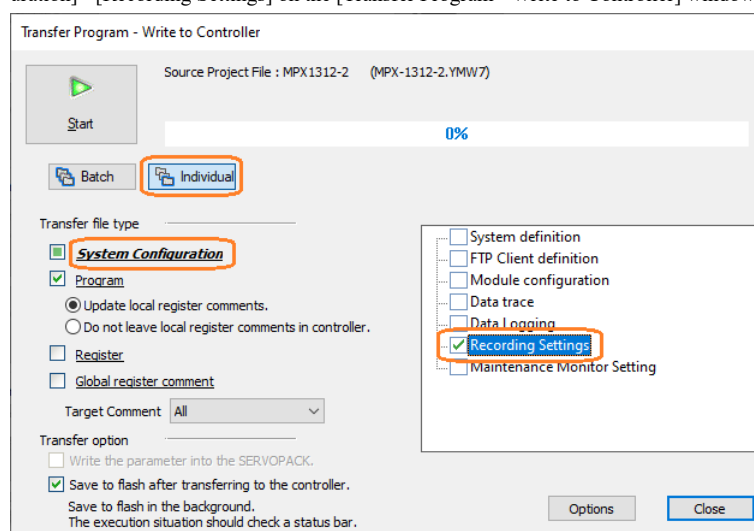
Write the project file (recording settings) to the controller.

Refer to the following section for details.

 [2.3.2 Write to Controller on page 109](#)

Information

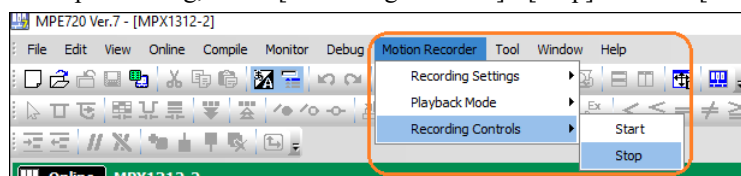
You can write only the recording settings in the project file to the controller by specifying [Individual] - [System Configuration] - [Recording Settings] on the [Transfer Program - Write to Controller] window.



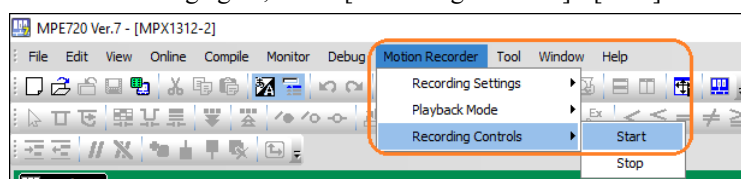
7.8.5 Recording Controls

Recording is started in the controller after the project file (recording settings) is written to the controller.

To stop recording, select [Recording Controls] - [Stop] from the [Motion Recorder] menu.



To start recording again, select [Recording Controls] - [Start] from the [Motion Recorder] menu.



7.8.6 Playback

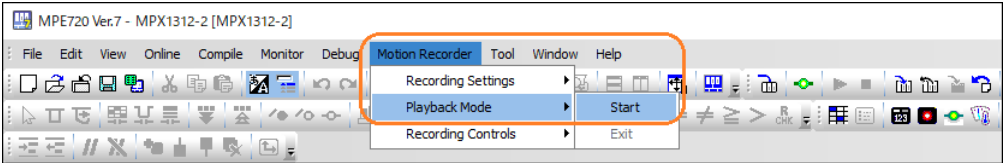
Use the following procedure for playback with the motion recorder function.



Important

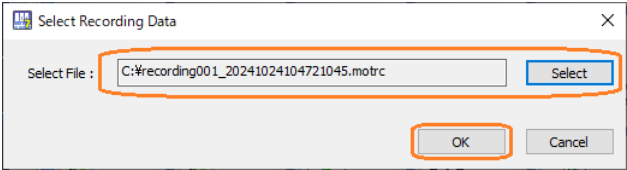
- To use playback, you must open the same project file that was written to the controller.
- Playback can be started only when offline.
- You can also modify and save a program and other information during playback mode. However, the correct operation of the program can no longer be verified due to those modifications. For this reason, do not modify a project which will be played back.

1. Download the recording file to the PC from the file storage location specified on the [Format] tab page.
2. Open the project file that was transferred to the controller.
3. If the MPE720 is online, set it to offline.
4. From the [Motion Recorder] menu, select [Playback Mode] - [Start].

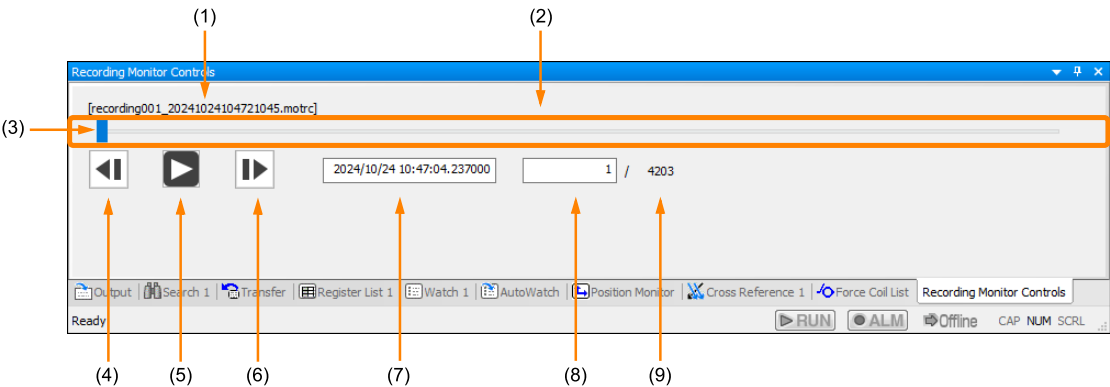
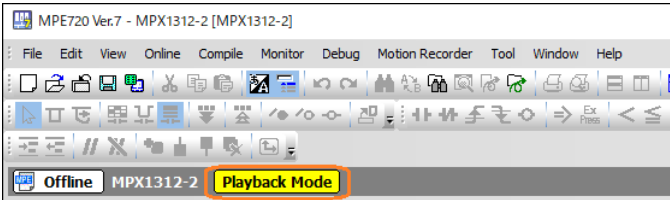


The [Select Recording Data] window will be displayed.

5. Specify the recording file, and click the [Open] button.



"Playback Mode" will be displayed in the caption bar and playback mode will start. After playback mode is started, the [Recording Monitor Controls] window will be displayed.



No.	Item	Description
(1)	Recording file name	Displays the file name of the selected recording file.
(2)	Seek bar	Displays the location being played back in the recording data.
(3)	Slider	Move the slider to set the desired playback location.

Continued on next page.

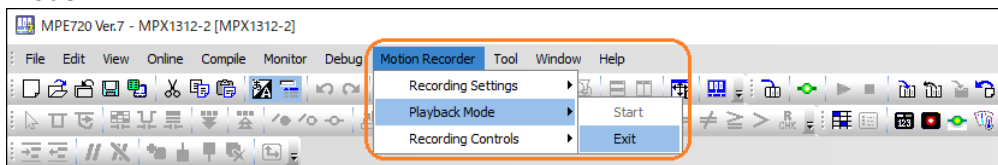
Continued from previous page.

No.	Item	Description
(4)	Frame return	Steps backward to the previous item of recording data.
(5)	Play/pause	Automatically plays the recording data at a constant speed. The button changes to  during playback, which can be clicked to pause recording data playback. Information The automatic playback speed cannot be changed.
(6)	Frame advance	Steps forward to the next item of recording data.
(7)	Recording data time	Displays the timestamp information of the recording data. When playback is stopped, the playback location in the recording data can be set to the desired time.
(8)	Recording data item number	Displays the current recording data item number. When playback is stopped, the playback location in the recording data can be set to the desired recording data item number.
(9)	Number of recording data items	Displays the number of recording data items saved in the recording file.

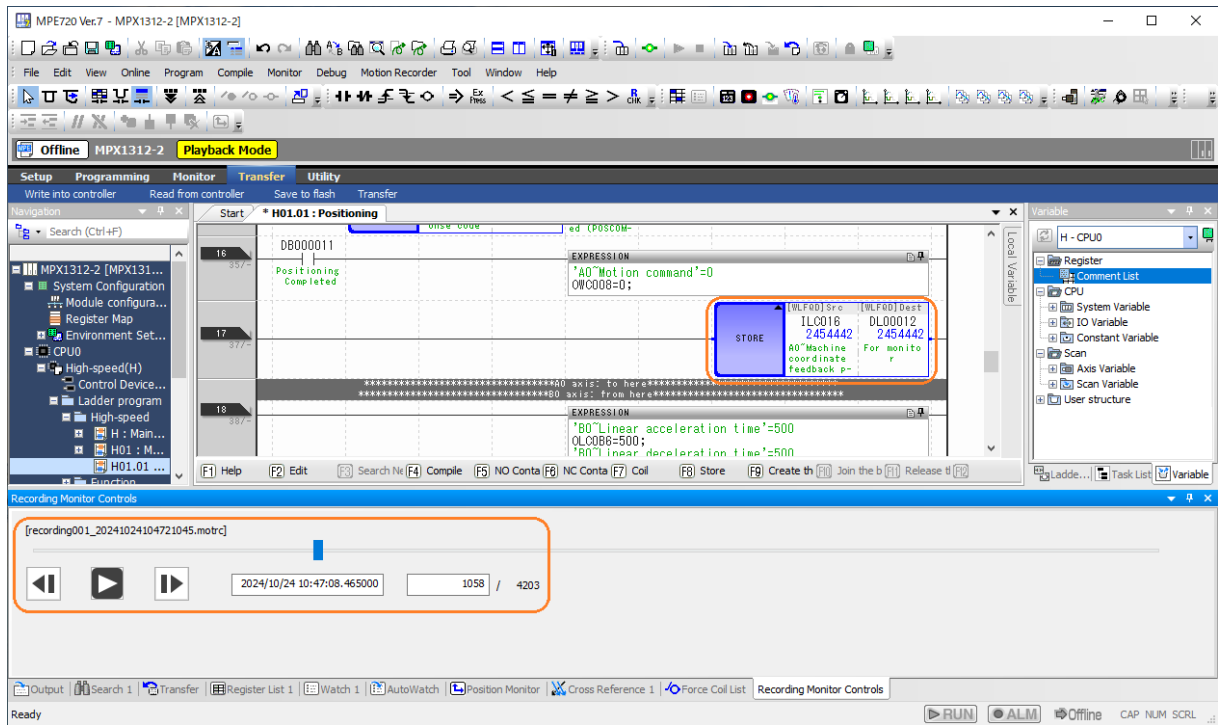
6. If necessary, open the following windows and check the recording data.

Window	Reference
Edit Ladder Program window	 (1) Edit Ladder Program Window on page 534
[Register List] window	 (2) Register List on page 534
[Watch] window	 (3) Watch on page 534
[AutoWatch] window	 (3) Watch on page 534
[Real-Time Trace] tab page	 (5) Real-Time Trace on page 535

7. From the [Motion Recorder] menu, select [Playback Mode] - [Exit] to end playback mode.



(1) Edit Ladder Program Window

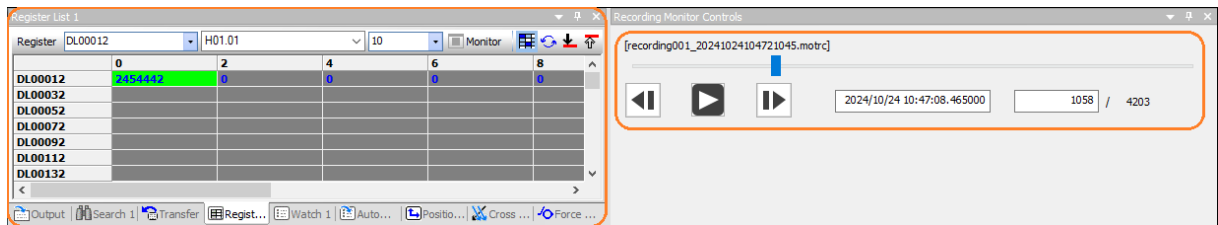


This window displays the numeric values of motion command registers with the specified time.

Refer to the following section for details on the Edit Ladder Program window.

5.1 Ladder Program on page 231

(2) Register List



This window displays the numeric values of registers with the specified time.

Registers that do not exist in the recording file are grayed out.

Refer to the following section for additional details on the [Register List] window.

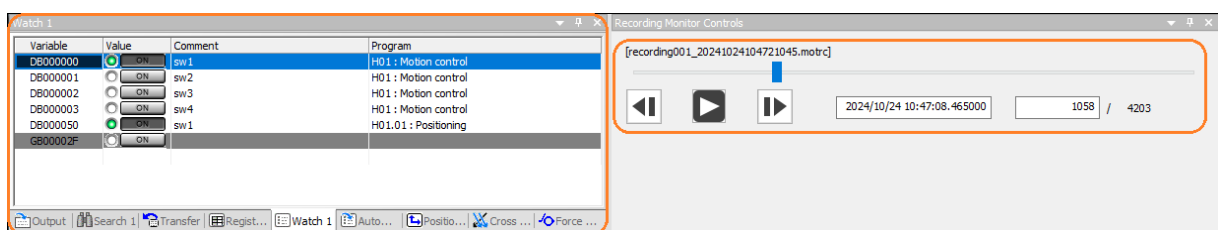
6.1 Register List on page 375

You can also export the values of the registers displayed during playback mode to a file.

Refer to the following section for details on exporting register data.

10.3.6 Register Data on page 614

(3) Watch



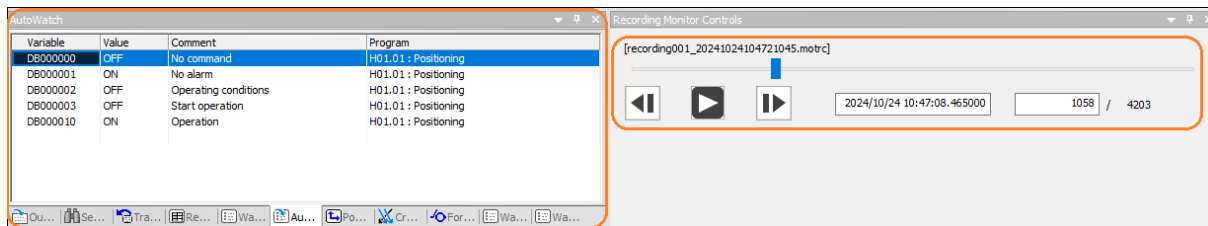
This window displays the numeric values of registers with the specified time.

Registers that do not exist in the recording file are grayed out.

Refer to the following section for additional details on the [Watch] window.

 [6.2 Watch on page 378](#)

(4) Auto Watch



This window displays the values of variables with the specified time.

Registers that do not exist in the recording file are grayed out.

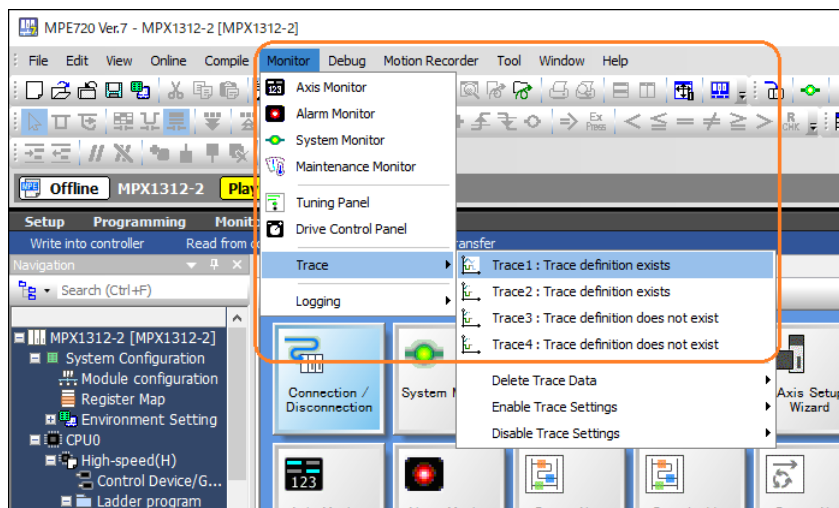
Refer to the following section for additional details on the [AutoWatch] window.

 [6.2 Watch on page 378](#)

(5) Real-Time Trace

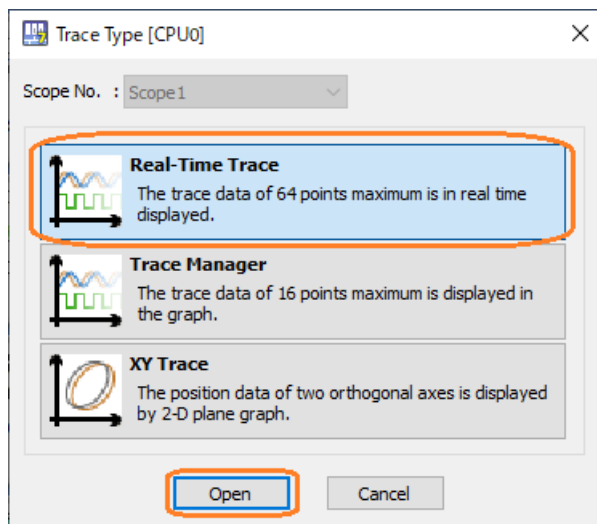
Use the following procedure to check the trace waveform of the specified registers.

1. From the [Monitor] menu, select [Trace] - [Trace 1] to [Trace 4].



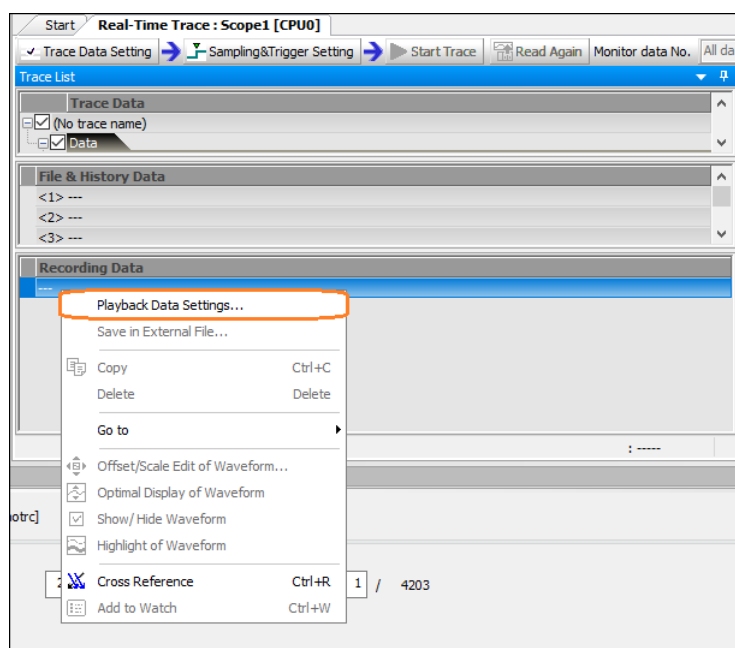
The [Trace Type [CPU0]] window will be displayed.

2. Select [Real-Time Trace], and click the [Open] button.



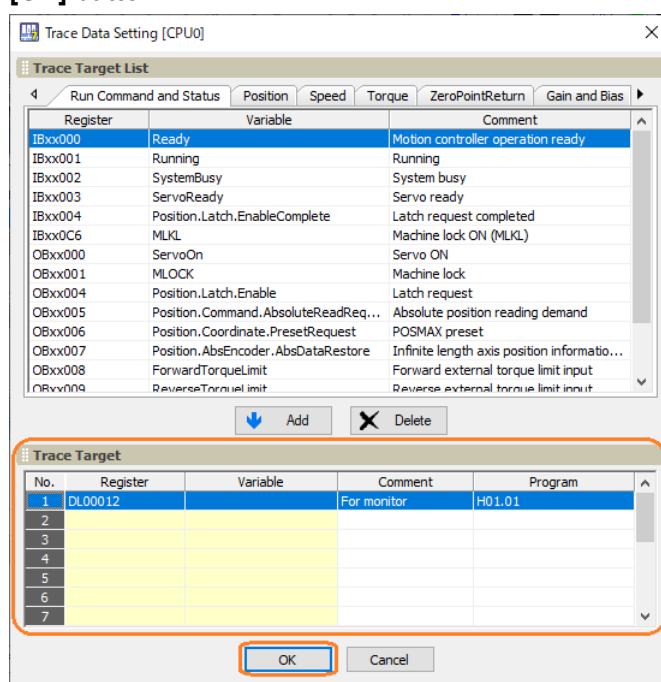
The [Real-Time Trace] tab page will be displayed.

3. Select the [Recording Data] window, and right-click and select [Playback Data Settings] from the context menu.



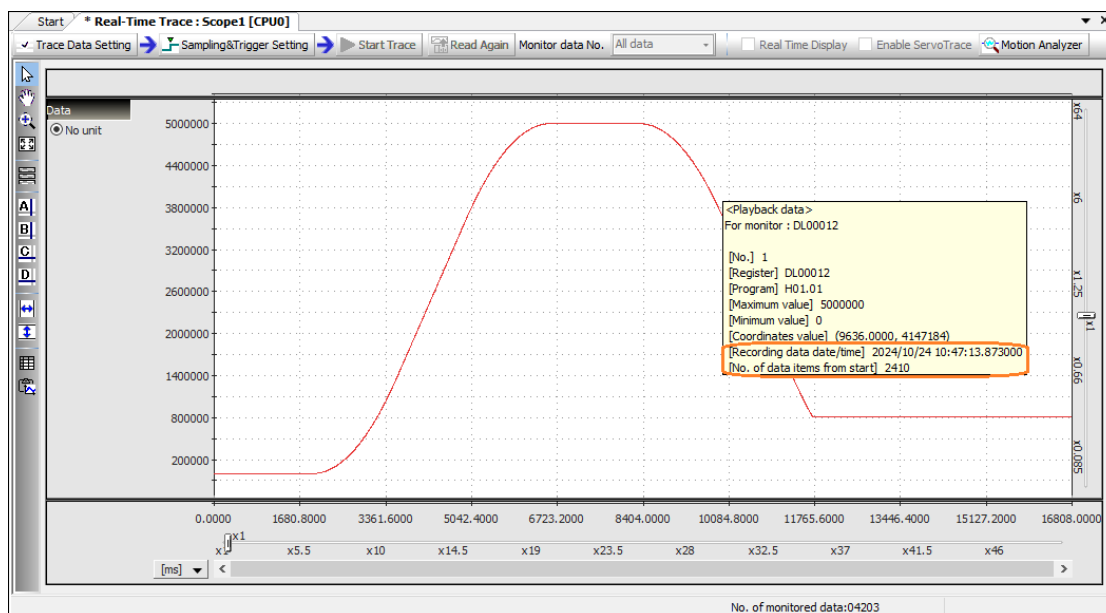
The [Trace Data Setting [CPU0]] window will be displayed.

4. Set the register with the trace waveform to display as the trace target, and then click the [OK] button.

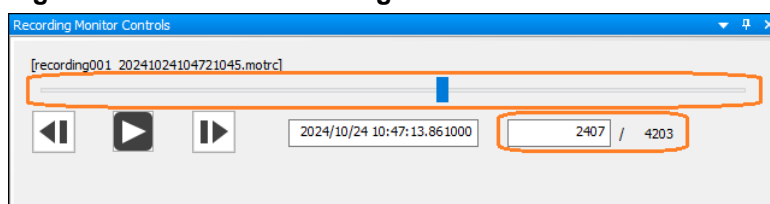


The trace waveform from the start time to the end time in the recording file will be displayed.

- To check register information at a specific time, move the mouse cursor to the trace waveform, and check time or the number of data items from the start of the recording data to observe.



- On the [Recording Monitor Controls] window, move the slider to the time of the recording data or enter the recording data item number.



- If necessary, open the following windows and check the register values.

- Edit Ladder Program window
- [Register List] window
- [Watch] window
- [AutoWatch] window

Refer to the following section for additional details on the [Real-Time Trace] tab page.

[7.5 Trace on page 440](#)

Security

This chapter describes the security functions available in the MPE720 for users, controllers, projects, and programs.

8.1	User Management	540
8.1.1	Adding a New User.....	540
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8.4	Security Settings for Programs	555
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8.4.3	Changing Program Passwords	556
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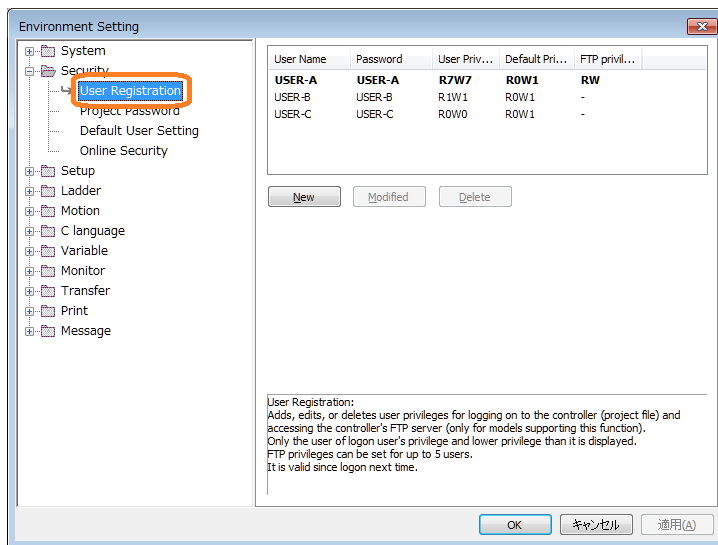
8.1 User Management

You can register and modify the users that can open project files.

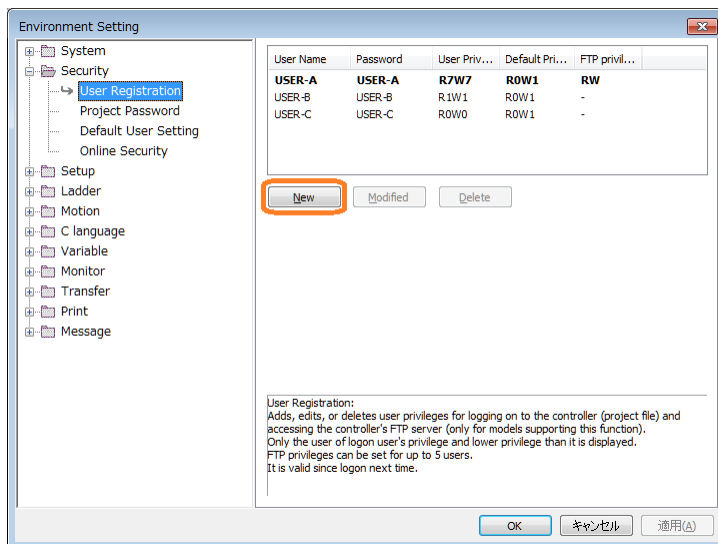
This function can be set only when a project file is open or a controller is connected. Access and write privileges to the data in the controller's RAM are set when using a direct connection to the controller or a project link connection.

8.1.1 Adding a New User

1. Select [Environment Setting] from the [File] menu.
2. Select [Security] - [User Registration].



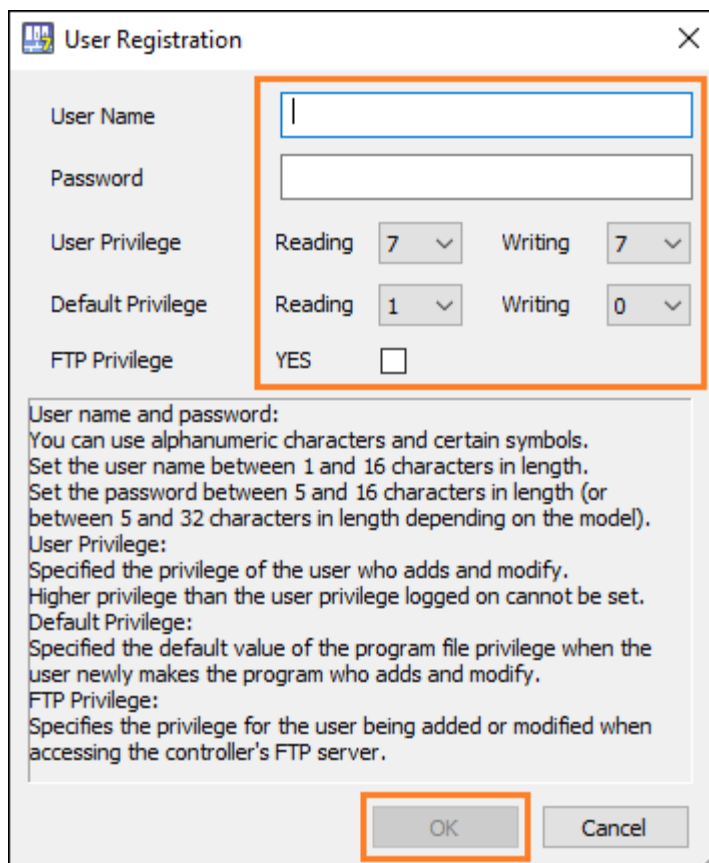
3. Click the [New] button.



The [User Registration] window will be displayed.

4. Set the following items, and then click the [OK] button.

Refer to text at the bottom of the window for the setting conditions of the item and other information.



The image shows a 'User Registration' dialog box with the following fields and options:

- User Name:** A text input field.
- Password:** A text input field.
- User Privilege:** Two dropdown menus. The 'Reading' dropdown is set to '7' and the 'Writing' dropdown is set to '7'.
- Default Privilege:** Two dropdown menus. The 'Reading' dropdown is set to '1' and the 'Writing' dropdown is set to '0'.
- FTP Privilege:** A checkbox labeled 'YES' which is currently unchecked.

Below the input fields, there is a text area containing the following instructions:

User name and password:
 You can use alphanumeric characters and certain symbols.
 Set the user name between 1 and 16 characters in length.
 Set the password between 5 and 16 characters in length (or between 5 and 32 characters in length depending on the model).
 User Privilege:
 Specified the privilege of the user who adds and modify.
 Higher privilege than the user privilege logged on cannot be set.
 Default Privilege:
 Specified the default value of the program file privilege when the user newly makes the program who adds and modify.
 FTP Privilege:
 Specifies the privilege for the user being added or modified when accessing the controller's FTP server.

At the bottom right, there are 'OK' and 'Cancel' buttons.

Information

The higher the numbers of the user privilege the higher the privilege levels.

The read privilege and write privilege levels are items created to maintain program security.

To open a program, a user must have a user privilege level that is greater than or equal to the read privilege level of that program. In the same manner, to edit and save a program, a user must have a user privilege level that is greater than or equal to the write privilege level of that program.

This concludes the procedure.



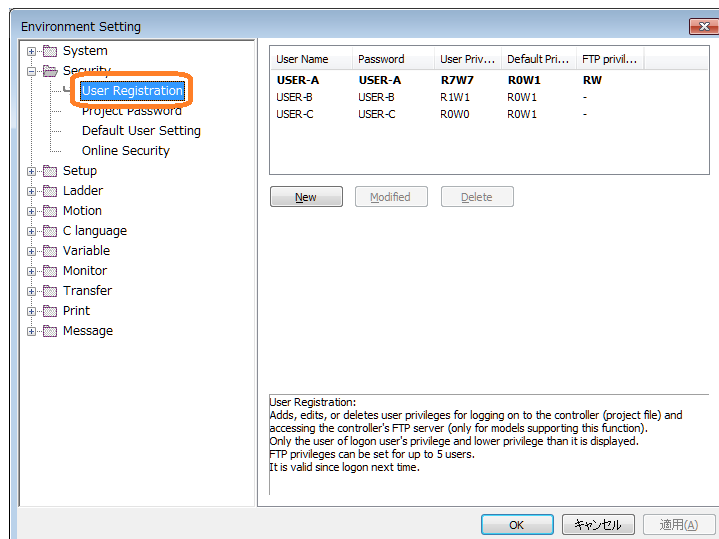
Important

There is no way to recover a password if the user forgets it, so the user will no longer be able to open the project file. Be careful so that passwords are not forgotten.

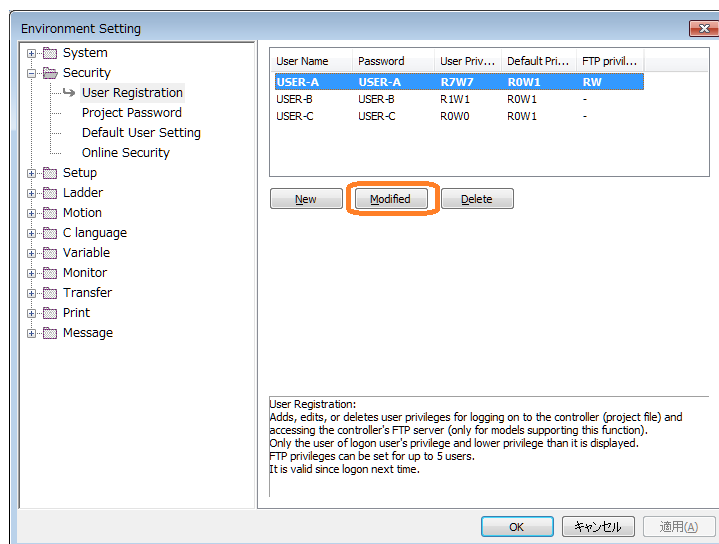
8.1.2 Changing Registered Information

1. Select [Environment Setting] from the [File] menu.

2. Select [Security] - [User Registration].



3. When the user with information to change is selected, click the [Modified] button.



The [User Registration] window will be displayed.

4. Change the required items.

5. Click the [OK] button.

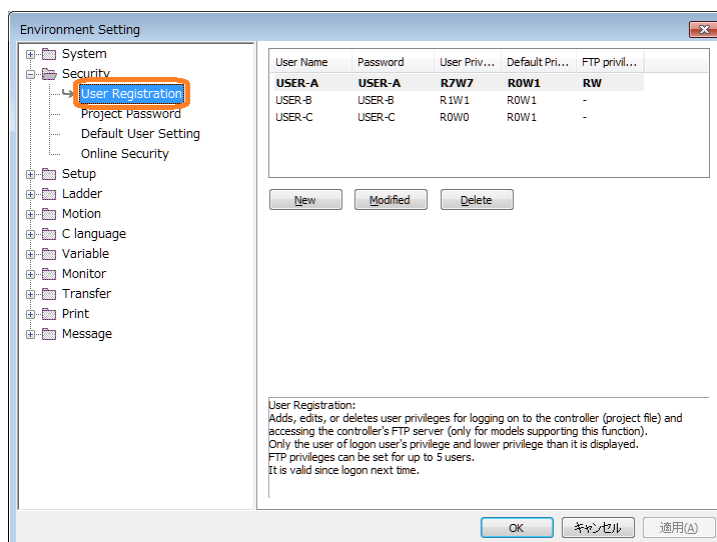
This concludes the procedure.

Information If the selected user is the default user, you can change only the default and FTP privileges.

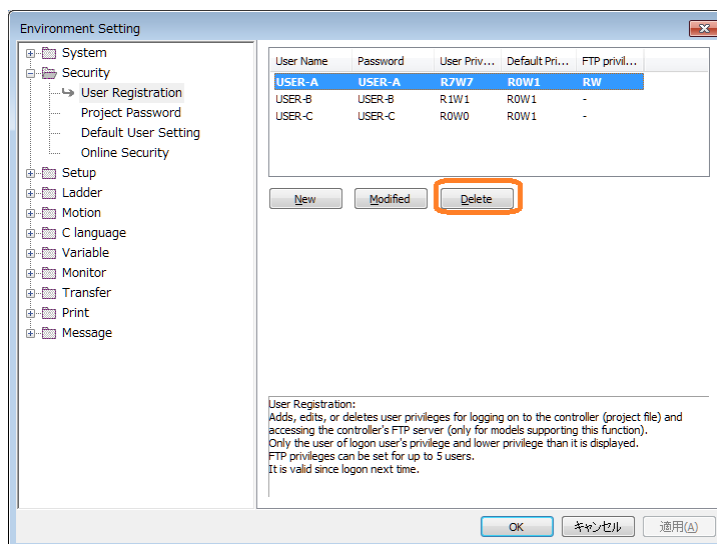
8.1.3 Deleting a Registered User

1. Select [Environment Setting] from the [File] menu.

2. Select [Security] - [User Registration].

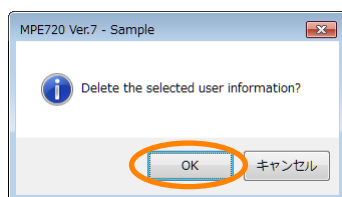


3. When the user to delete is selected, click the [Delete] button.



A message dialog box will be displayed.

4. Click the [OK] button.



This concludes the procedure.

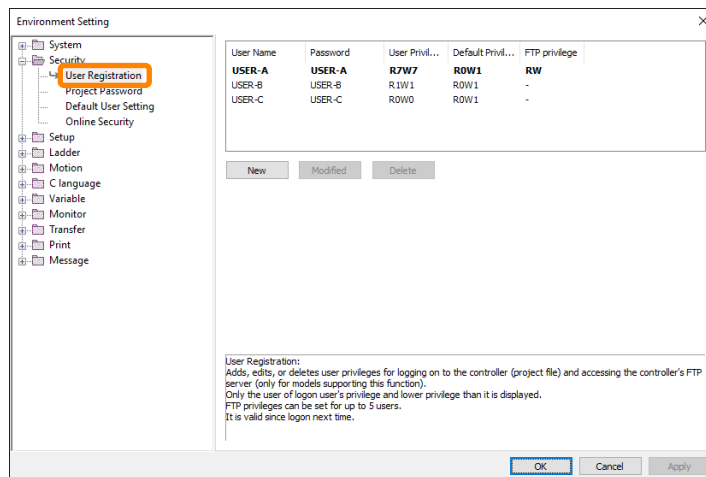
8.1.4 Checking and Switching the User

1. Select [Environment Setting] from the [File] menu.
2. Select [Security] - [User Registration].

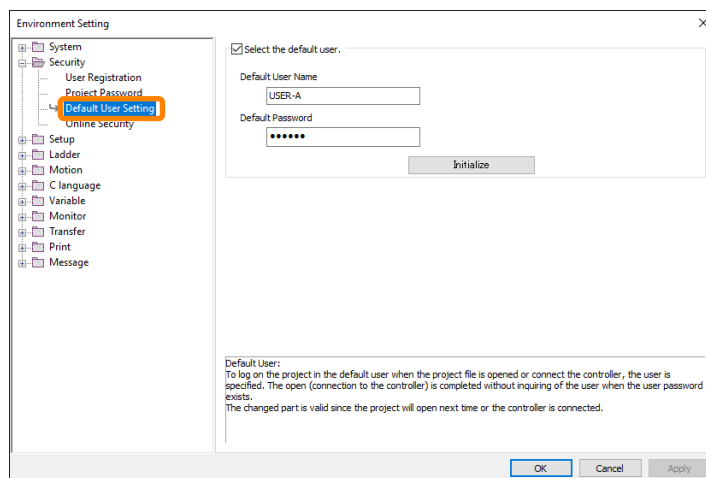
The current user is displayed in bold text.

To switch the user, you will need the [User Name] and [Password] for the user to switch to when you next log in. Once you have this information, proceed to the next step.

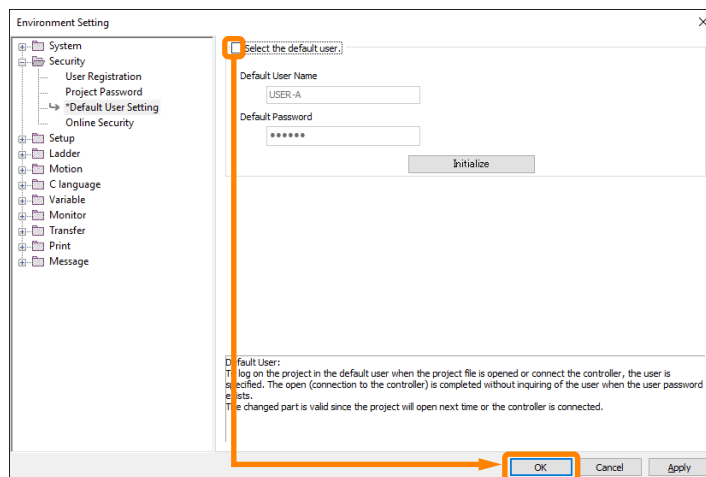
If you do not need to switch the user, skip the rest of this procedure. Click the [Cancel] button.



3. Select [Security] - [Default User Setting].



4. Clear the [Select the default user] check box, and then click the [OK] button.

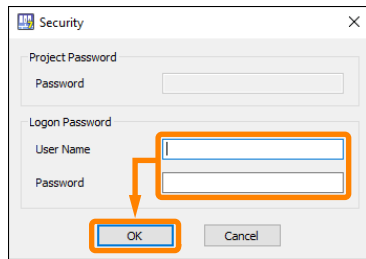


5. Close the project file or disconnect communications with the controller.

6. Open the project file or connect to the controller.

The [Security] dialog box will be displayed.

7. Enter [User Name] and [Password] for the user to switch to, and then click the [OK] button.



The project file will be opened or the connection to the controller will be started with the user information you entered.

This concludes the procedure.

8.2 Security Settings for the Controller

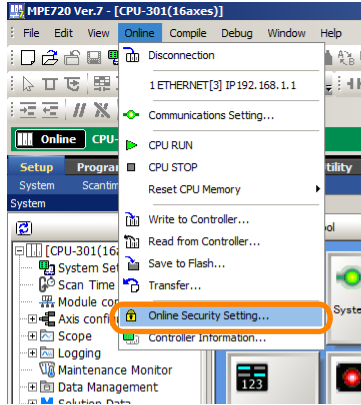
You can protect programs from being read from the controller by changing the controller's security settings. (This is called online security.) Use the following procedure to enable security on the controller.

1. Confirm that the user privileges are R7W7.

Information

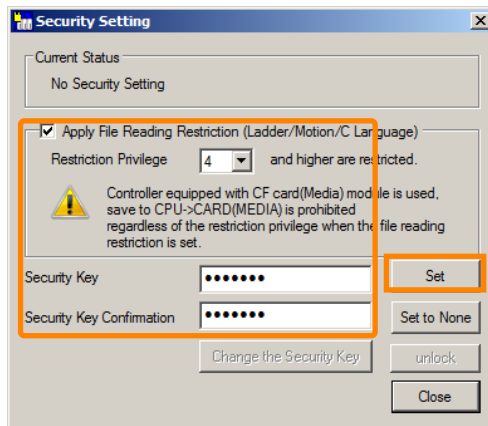
You can confirm the user privileges by clicking [File] - [Environment Setting] to display the [Environment Setting] window, and then clicking [Security] - [User Registration] in that window.

2. Select [Security Setting] from the [Online] menu.



The [Security Setting] window will be displayed.

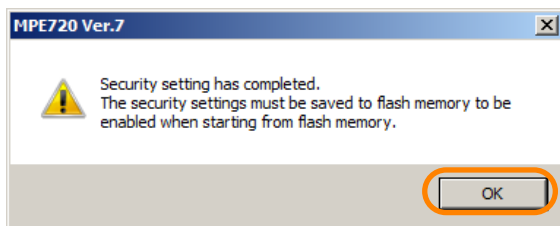
3. Set the following items, and then click the [Set] button.



Item	Description
Apply File Reading Restriction (Ladder/Motion/C Language)	Select the check box.
Restriction Privilege	Set the restriction privilege. (Setting range: 1 to 8) Only users with a privilege level at least as high as this setting can open controller programs and read programs from controllers. You can confirm user privileges in the [Environment Setting] window that is displayed by selecting [Environment Setting] from the [File] menu.
Security Key	Set a password. <Setting Conditions> Between 5 and 8 alphanumeric characters. The password is case sensitive.
Security Key Confirmation	Enter the password again that was set in [Security Key].

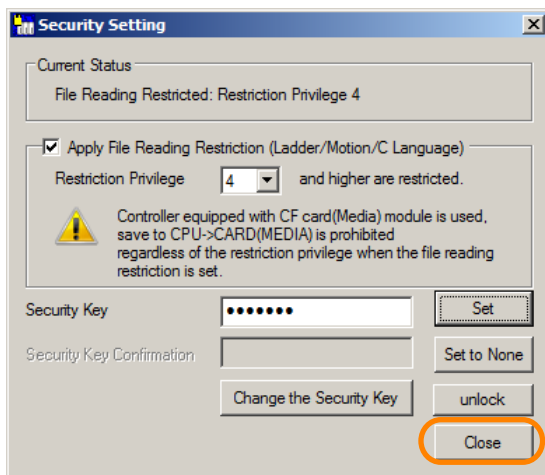
A message dialog box will be displayed.

- Click the [OK] button.



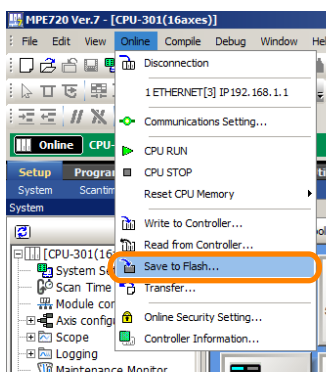
A message dialog box will close.

- Click the [Close] button.



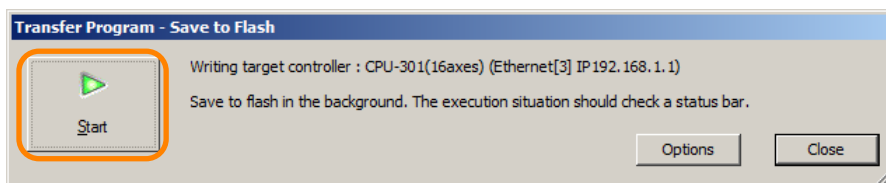
The [Security Setting] window will be closed.

- Select [Save to Flash] from the [Online] menu.



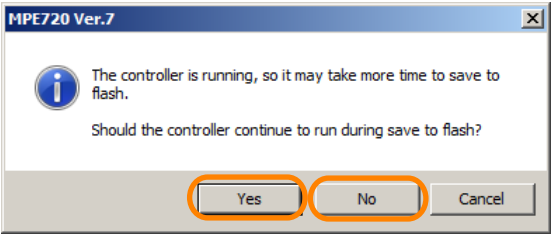
The [Transfer Program - Save to Flash] window will be displayed.

- Click the [Start] button.



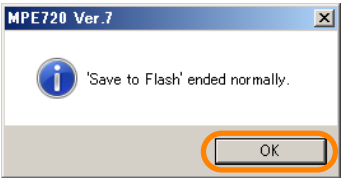
A message dialog box will be displayed.

8. Click the [Yes] or [No] button.

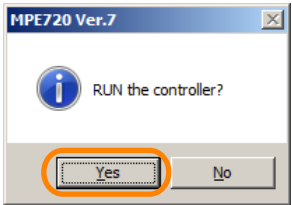


The MPE720 will begin saving the data to flash memory. When data transfer is completed, a message dialog box will be displayed.

9. Click the [OK] button.



Information If you clicked the [No] button in step 8, the following message dialog box will be displayed. Click the [Yes] button.



This concludes the procedure.



Important

When online security is enabled, any attempt to open a program with a higher privilege level will cause the following message to appear, and reading the program will be denied.





Important

To permanently or temporarily disable online security, or to change the security key or the restriction privilege, enter the security key.

If security is temporarily disabled, it will become enabled again after the power is turned OFF and ON again.

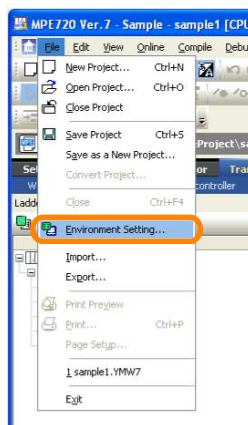
8.3 Security Settings for Project Files

This section gives the procedures for managing security settings for project files.

8.3.1 Protecting Project Files with a Password

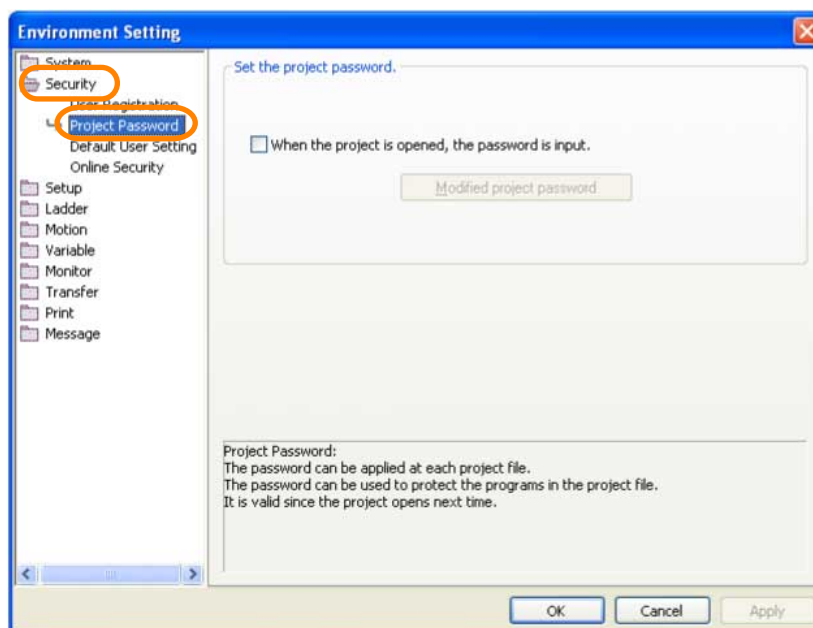
To protect project files with a password, you must first set the password. Use the following procedure.

1. Open the project file for which to enable password protection.
2. Select [Environment Setting] from the [File] menu.

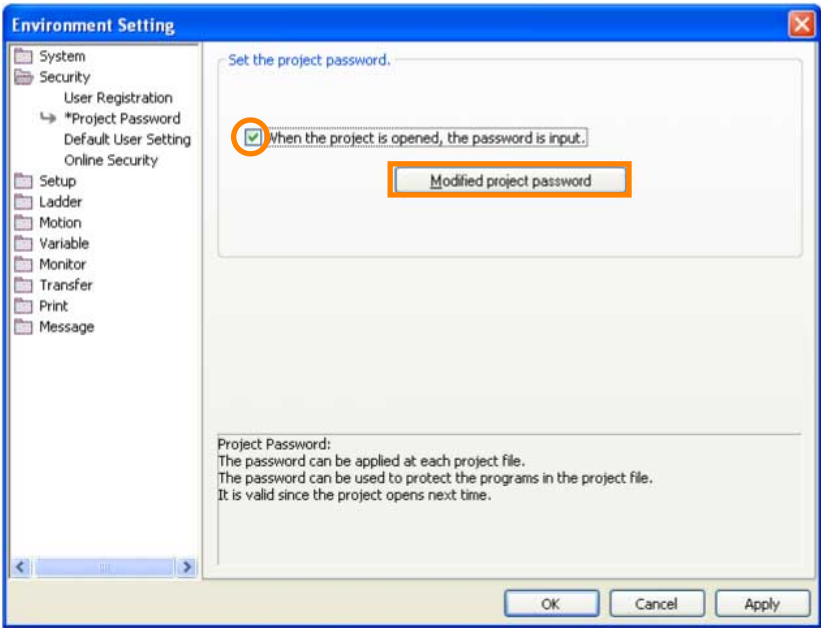


Displays the [Environment Setting] window.

3. Select [Security] – [Project Password].

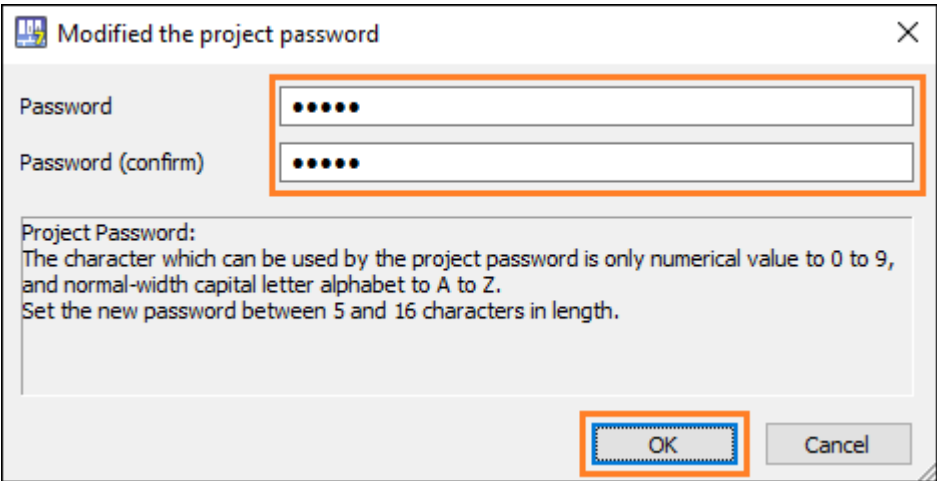


4. Select the [When the project is opened, the password is input] check box, and then click the [Modified project password] button.



The [Modified the project password] window will be displayed.

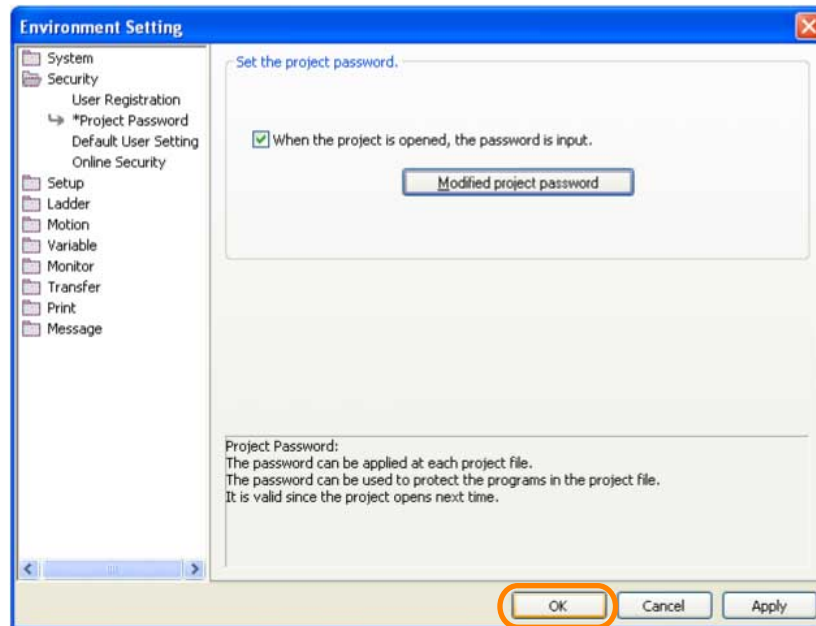
5. Set the following items, and then click the [OK] button.



Item	Description
Password	Set a password. Refer to text at the bottom of the window for the setting conditions.
Password (confirm)	Enter the password that was set in [Password].

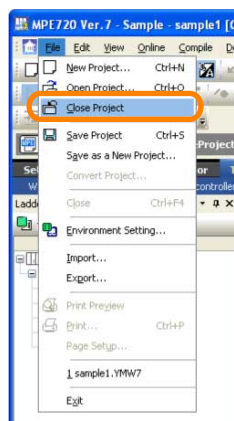
The [Modified the project password] window will be closed.

6. Click the [OK] button.



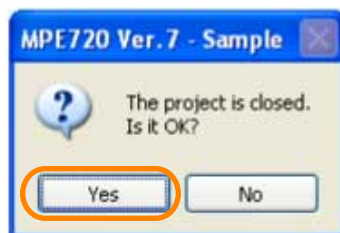
The [Environment Setting] window will be displayed.

7. Select [Close Project] from the [File] menu.



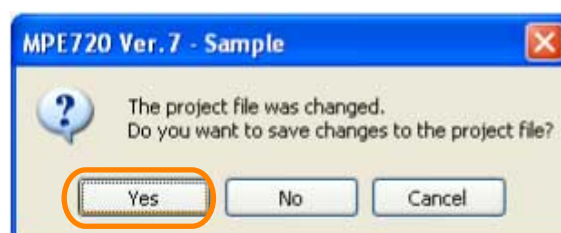
A message dialog box will be displayed.

8. Click the [Yes] button.



A message dialog box will be displayed.

9. Click the [Yes] button.

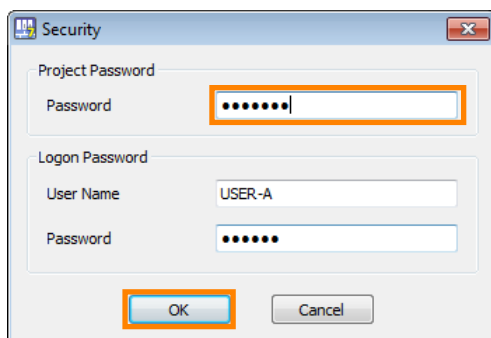


The project file will close, and password protection will be enabled for the project file.

This concludes the procedure.

8.3.2 Opening a Password-protected Project File

1. **Open the project file.**
The [Security] window will be displayed.
2. **Enter the password that was set previously, and click the [OK] button.**



The project file will be opened.

Information If the password is incorrect, the following dialog box will be displayed.



Click the [Retry] button and enter the password again.

This concludes the procedure.

8.3.3 Changing the Project File Password

To change the password of a project file, perform the same procedure that you used to protect the project file with a password. Refer to the following section for details.

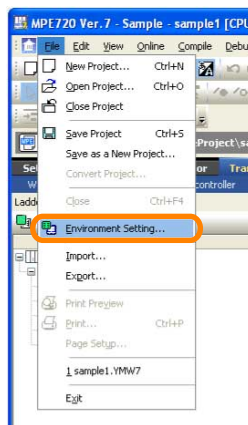
 [8.3.1 Protecting Project Files with a Password on page 549](#)

8.3.4 Disabling Password Protection of a Project File

Use the following procedure to disable password protection of a project file.

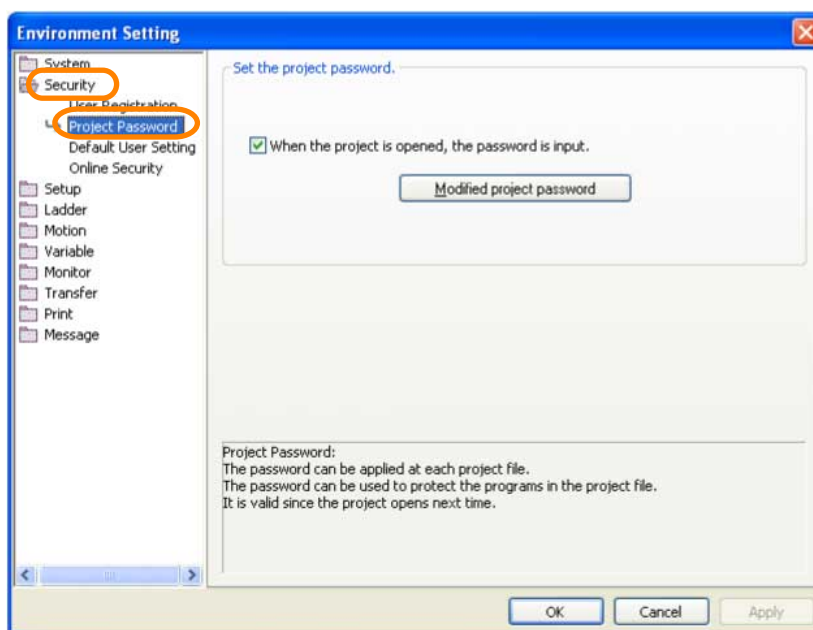
1. **Open the project file for which to disable password protection.**

2. Select [Environment Setting] from the [File] menu.

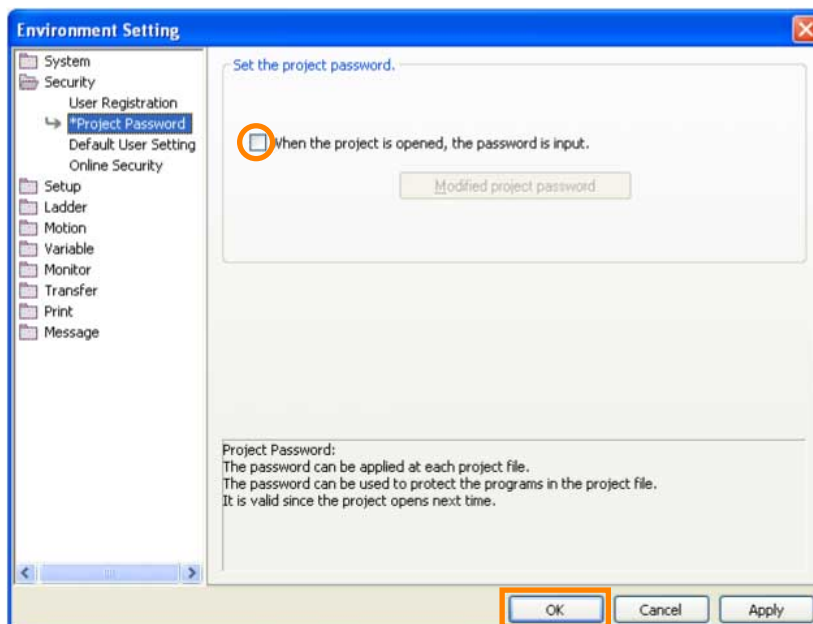


[Environment Setting] window will be displayed.

3. Select [Security] – [Project Password].



4. Clear the [When the project is opened, the password is input] check box, and then click the [OK] button.



This concludes the procedure.

8.4 Security Settings for Programs

This section gives the procedures for managing security settings for programs.

8.4.1 Protecting Programs with a Password

To protect programs with a password, you must first set a password. Use the following procedure.

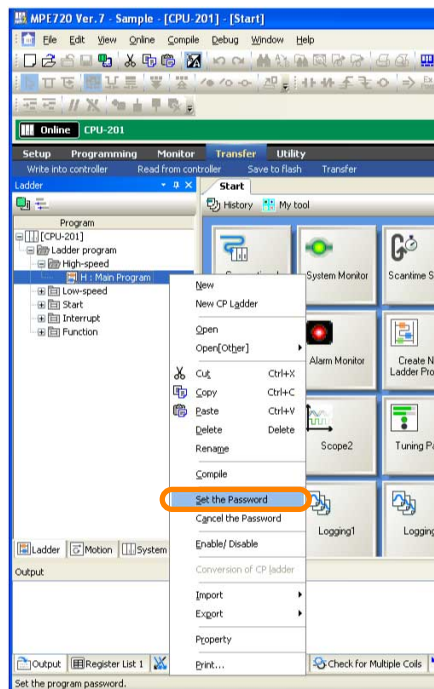
1. Establish an online connection or open a project file.
2. In the [Ladder] window, [Motion] window, or [Navigation] window, right-click the program for which to set the password, and then select [Set the Password].

Note:

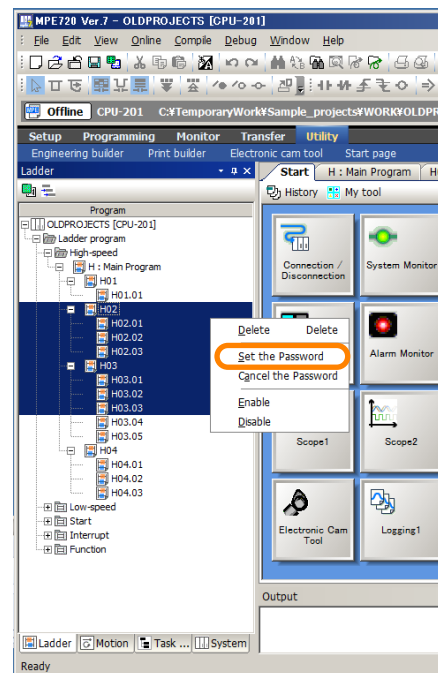
You can select more than one drawing.

- To open a number of consecutive drawings: Select the first drawing in the group of drawings to open, hold down the Shift key, and then select the last drawing in the group of drawings to open. To open a number of consecutive drawings: Select the first drawing in the group of drawings to open, hold down the **Shift** key, and then select the last drawing in the group of drawings to open.
- To open a number of drawings that are not consecutive: Hold down the Ctrl key and click the drawings to open. To open a number of drawings that are not consecutive: Hold down the **Ctrl** key and click the drawings to open.

<If Only One Drawing Is Selected>



<If More Than One Drawing Is Selected>



The [Program Password] window will be displayed.

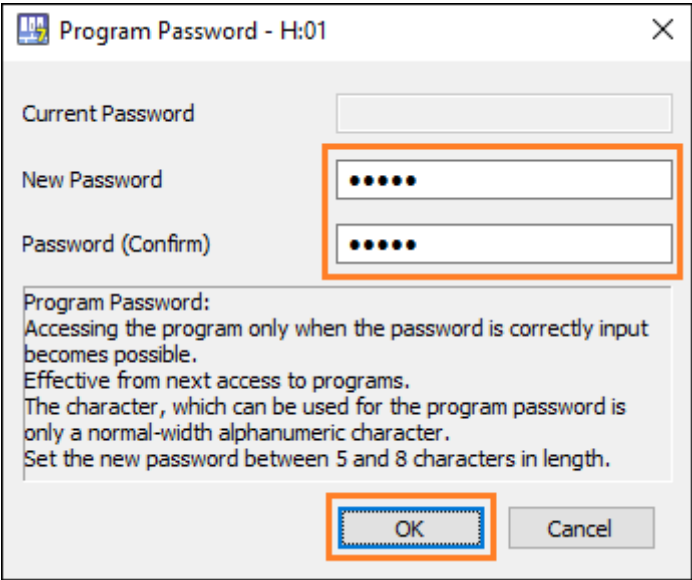
3. Set the following items, and then click the [OK] button.

Information

- If you can enter a password into [Current Password], security is already active. Refer to the following section.

 [8.4.3 Changing Program Passwords on page 556](#)

- If more than one drawing is selected and a password was previously set for one of the drawings, an error will occur.



Item	Description
Password	Set a password. Refer to text at the bottom of the window for the setting conditions.
Password (Confirm)	Enter the password that was set in [New Password].

The password-locked icon  will be displayed next to the icon of the program set with the password.
This concludes the procedure.

8.4.2 Opening a Password-protected Program

If you attempt to open a password-protected program, the [Program Password] window will be displayed.

- Information
- You can open more than one drawing at the same time.
- To open a number of consecutive drawings: Select the first drawing in the group of drawings to open, hold down the **Shift** key, and then select the last drawing in the group of drawings to open.
 - To open a number of drawings that are not consecutive: Hold down the **Ctrl** key and click the drawings to open.

Enter the password in the [Program Password], and then click the [OK] button to open the program. If more than one drawing is selected, you can open only the drawings that have the password that was entered.



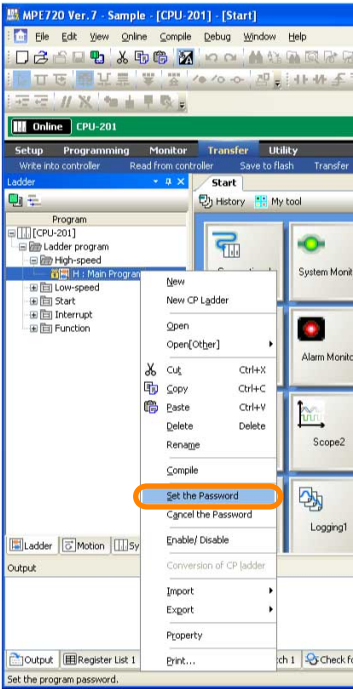
8.4.3 Changing Program Passwords

Use the following procedure to change the password of a program.

- Information
- You cannot change the password for more than one drawing at the same time. Change the passwords one drawing at a time.

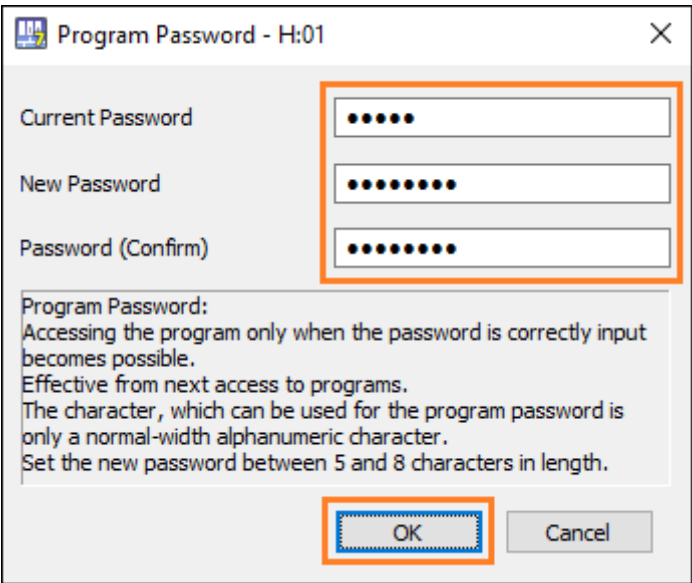
1. **Establish an online connection or open a project file.**

2. In the [Ladder] window, [Navigation] window, or [Motion] window, right-click the program for which to change the password, and then select [Set the Password].



The [Program Password] window will be displayed.

3. Set the following items, and then click the [OK] button.



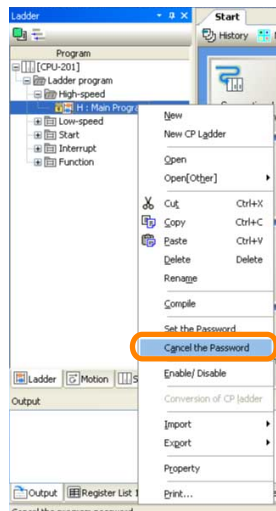
Item	Description
Current Password	Enter the old password. If you enter the wrong password, an error will be displayed after you click the [OK] button.
New Password	Set the new password. Refer to text at the bottom of the window for the setting conditions.
Password (Confirm)	Enter the password that was set in [New Password].

This concludes the procedure.

8.4.4 Disabling Password Protection of a Program

Use the following procedure to disable password protection of a program.

1. Establish an online connection or open a project file.
2. In the [Ladder] window, [Motion] window, or [Navigation] window, right-click the program for which to disable the password, and then select [Cancel the Password].



The [Program Password] window will be displayed.

3. Enter the password in the [Program Password] box, and then click the [OK] button.



The password-locked icon  will disappear from the program that was selected in step 2.

This concludes the procedure.

Settings Related to YRM Controllers

This chapter describes the settings related to YRM controllers.

9.1	Equipment Definitions	560
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9.2.1	[Data Sharing Settings] Window	564
9.2.2	[Amount of Data to Share] Area.....	565
9.2.3	Configuring Data Sharing Settings	566
9.2.4	Changing the Display Method of Variables	568

9.1 Equipment Definitions

Equipment definitions define logical groups in multiple pieces of equipment that are connected to a YRM controller. You can efficiently perform data acquisition and feedback in the YRM controller system by configuring the equipment definitions.

9.1.1 Creating an Equipment Definition

Use the following procedure to create an equipment definition.

Information Create an equipment definition after you save the device definition to the project file in the Module Configuration window.

1. Click the **[New Equipment Configuration Definition]** button on the **[My Tool]** window.
The **[New Equipment Definition]** window will be displayed.
2. Set the following items, and then click the **[OK]** or **[Register]** button.

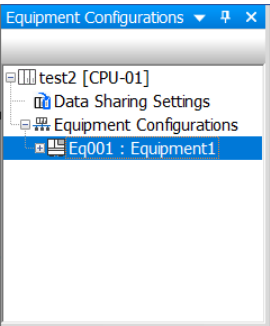
Item	Description
Equipment ID	"Eq□□□" is displayed by default. Set the equipment ID as required. <Setting Conditions> • 16 alphanumeric characters maximum. • Cannot use "VAR", "C", or "VARC".
Equipment	Set the equipment name.
List of Controller Types	Select the check box for the controllers that control the equipment.
Equipment Configuration Settings	The contents that are displayed will depend on the items selected in [List of Controller Types]. • YRM is selected: Nothing is displayed. • MP or other PLC is selected: Module configuration definition 218IF setting information is displayed. When both MP and other PLC are selected, specify either MP or other PLC for the controller by selecting either combo box in the [Type] column. • YRC is selected: Module configuration definition SVK setting information is displayed.
Axis Settings	These settings can be configured when YRM is selected in [List of Controller Types]. Click the [Select Axis] button and select the axes on the [Axis Selection] window.

Continued on next page.

Continued from previous page.

Item	Description
Register	Saves the settings. The window will not be closed. You can create the next equipment definition by changing the equipment ID.
OK	Saves the settings and closes the window.

The equipment definition that was created will be displayed in the [Equipment Configurations] window.

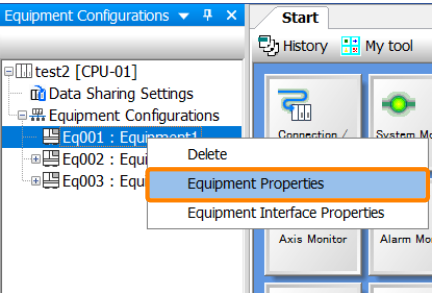


This concludes the procedure.

9.1.2 Editing an Equipment Definition

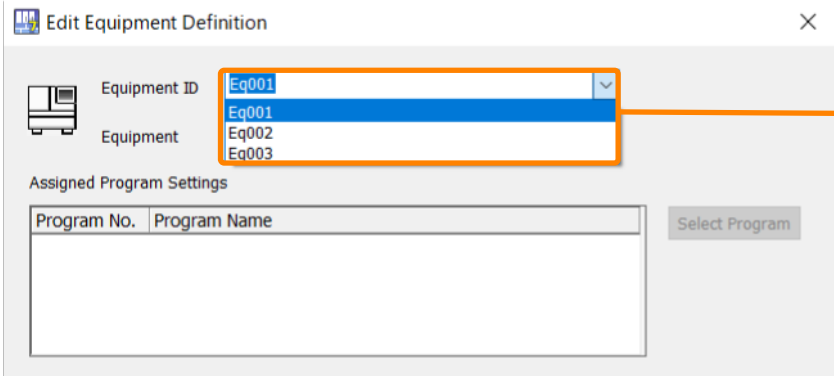
Use the following procedure to edit an equipment definition that was created.

1. In the [Equipment Configurations] window, right-click the equipment ID, and then select [Equipment Properties].



The [Edit Equipment Definition] window will be displayed.

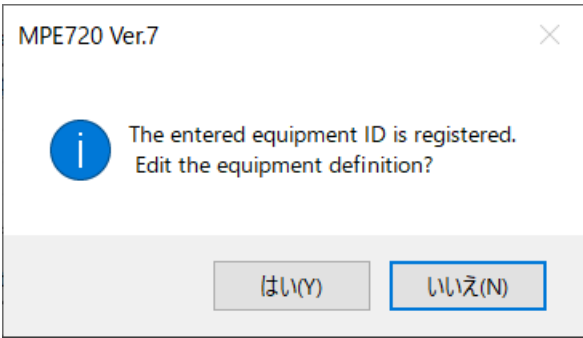
2. Select the equipment ID of the equipment to edit from the list.



The equipment IDs that you have created are displayed.

3. Set the items to edit, and then click the [OK] or [Register] button.

Information The following message dialog box will be displayed when you attempt to edit the equipment definition. Click the [Yes] button.

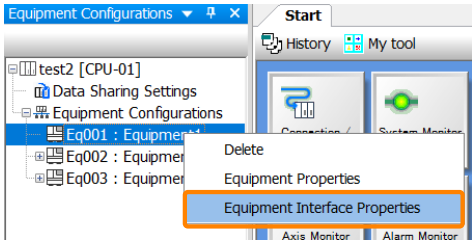


This concludes the procedure.

9.1.3 Configuring an Equipment Interface

You can configure the variables (interface) for an item of equipment that was created. Use the following procedure.

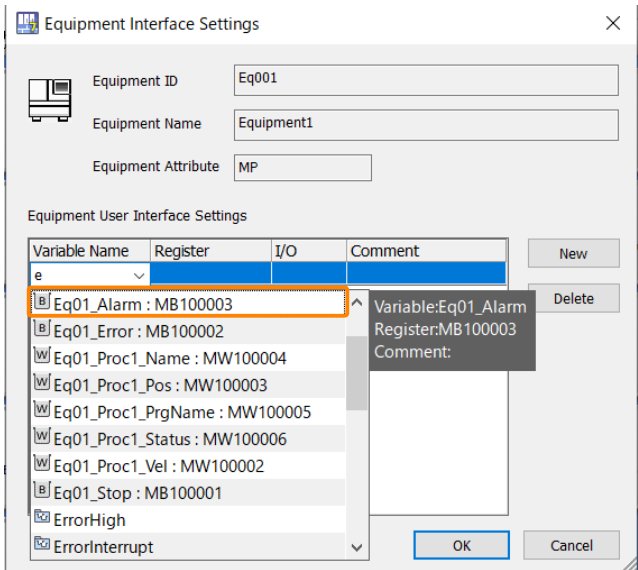
1. In the [Equipment Configurations] window, right-click the equipment ID, and then select [Equipment Interface Properties].



The [Equipment Interface Settings] window will be displayed.

2. Set the variables to allocate to the equipment in [Variable Name].

If you enter text in [Variable Name], a list of candidate variables will be displayed. Click the variable to allocate and press the **Enter** key.



The selected variable will be allocated to the [Equipment User interface Settings].

- Information
- Click the [New] button to display the [Variable Definition] window. You can create and allocate variables that are not registered to the [Variable] window. The variables that you create will also be displayed in the [Variable] window.
 - If you select a variable and click the [Delete] button, the variable allocation will be deleted.

Equipment Interface Settings



Equipment ID
Eq001

Equipment Name
Equipment1

Equipment Attribute
MP

Equipment User Interface Settings

Variable Name	Register	I/O	Comment
Eq01_Alarm	MB100003	I	

New

Delete

OK

Cancel

3. Repeat step 2 to set all variables to allocate to the equipment, and then click the [OK] button.

Equipment Interface Settings



Equipment ID
Eq001

Equipment Name
Equipment1

Equipment Attribute
MP

Equipment User Interface Settings

Variable Name	Register	I/O	Comment
Eq01_Alarm	MB100003	I	
Eq01_Error	MB100002	I	
Eq01_Proc1_Name	MW100004	I	
Eq01_Proc1_Pos	MW100003	I	
Eq01_Proc1_PrgName	MW100005	I	
Eq01_Proc1_Status	MW100006	I	
Eq01_Proc1_Vel	MW100002	I	
Eq01_Stop	MB100001	I	

New

Delete

OK

Cancel

The settings will be saved, and the window will close.
This concludes the procedure.

9.2 Data Sharing Settings

The data sharing settings are used to set the range of data in the CPU unit to share with the IoT unit. The data that is shared with the IoT unit is transferred to YCP2 and received as feedback from YCP2 and updated.



YCP2 (YASKAWA Cockpit 2) :

YCP2 is software that collects the equipment group data from the YRM controller, monitors the condition and operating status of the YRM controller, and provides the platform for analysis modules that perform data feedback.

9.2.1 [Data Sharing Settings] Window

Click the [Data Sharing Settings] button in the [My Tool] window to display the [Data Sharing Settings] window.

The variables will be displayed in the [Data Sharing Settings] window grouped by equipment.

- Information
- The groups are displayed in order of the group name (equipment ID) text string.
 - The variables in each group are displayed in the following order: system variables → axis variables → I/O variables → global variables or scan variables → constant variables.

(1)

(2)

Data Sharing Settings

Refresh Information

Public Variables

Unit	Equipment I/O	Level 1	Level 2	Level 3	Variable Name	Data Type	Batch	IoT Collection	IoT Feedback
▶ [System Variable] (260 items)									
▲ (8 items)									
CPU	-	-	-	-	Ea0t_Stop	Bit		☐	☐
CPU	-	-	-	-	Ea0t_Error	Bit		☐	☐
CPU	-	-	-	-	Ea0t_Alarm	Bit		☐	☐
CPU	-	-	-	-	Ea0t_Prod_Vel	Word		☐	☐
CPU	-	-	-	-	Ea0t_Prod_Pos	Word		☐	☐
CPU	-	-	-	-	Ea0t_Prod_Name	Word		☐	☐
CPU	-	-	-	-	Ea0t_Prod_PrghName	Word		☐	☐
CPU	-	-	-	-	Ea0t_Prod_Status	Word		☐	☐

When [Lock Data Sharing Time] is not selected.

Amount of Data to Share

☐ Lock Data Sharing Time

Estimate Utilization

Sharing Settings	Utilization	Estimated Time for Data Sharing Processing	Maximum Value of High-Speed Scan Time	Setting Value of High-Speed Scan Time
IoT Collection	0.00%	0.0000ms	0.0000ms	4.0000ms
IoT Feedback	0.00%			

OK Cancel Apply

(3)

When [Lock Data Sharing Time] is selected.

Amount of Data to Share

☒ Lock Data Sharing Time

Estimate Utilization

Sharing Settings	Maximum Size of Sharing Data	Utilization	Required Scan Time	Maximum Value of High-Speed Scan Time	Setting Value of High-Speed Scan Time
IoT Collection	0 Word	0.00%	0.0000ms	0.0000ms	4.0000ms
IoT Feedback	0 Word	0.00%	0.0000ms		

No.	Item	Description
(1)	Refresh Information	Updates the content displayed in the window to the latest information.
(2)	Unit	The name of the unit to which the variable belongs is displayed.
	Equipment I/O	The attribute (IN/OUT) of variables assigned to each piece of equipment is displayed. Since the direction is given based on the unit, IN means a device → unit data flow and OUT means a unit → device data flow.
	Level 1 to Level 3	Displayed if the variable has levels.
	Variable Name	The variable name is displayed. If the variable has levels, the variable name of the bottom level is displayed.
	Data Type	The data type of the register in the variable is displayed.
	Scan	The number of the scan to which the variable belongs is displayed.
	IoT Collection	Select a check box and the data for that variable will be collected in the IoT unit.
	IoT Feedback	Select a check box and the data for that variable will receive feedback from the IoT unit and be overwritten.
(3)	Amount of Data to Share	Refer to the following section for details.  9.2.2 [Amount of Data to Share] Area on page 565

9.2.2 [Amount of Data to Share] Area

You can check if the amount of data in the variables to share exceeds the upper limit of the memory area in the controller.

The items that are displayed will depend on whether the [Lock Data Sharing Time] check box is selected or cleared.

Information If the [Lock Data Sharing Time] check box is selected and you specify the IoT collection and feedback data sizes, the scan time used for data sharing will be fixed. You will no longer need to take into consideration the fluctuations in scan time due to the number of variables that will be used for data collection and feedback.

- When the [Lock Data Sharing Time] Check Box Is Not Selected

No.	Item	Description
(1)	Estimate Utilization	Calculates [Utilization] and [Estimated Time for Data Sharing Processing] from the checked items in the sharing settings and the high-speed scan time set value and maximum value, and displays those values.
(2)	Utilization	The percentage of the data size of the variables to share in relation to the maximum data size of sharing memory in the controller is displayed.
(3)	Estimated Time for Data Sharing Processing	The estimated time required to process the variables to share is displayed.
(4)	Maximum Value of High-Speed Scan Time	The maximum value of the high-speed scan time is displayed.
	H/L/Scan□ Maximum Value of Scan Time	
	Setting Value of High-Speed Scan Time	The set value of the high-speed scan time is displayed.
(5)	H/L/Scan□ Maximum Value of Scan Time	

- When the [Lock Data Sharing Time] Check Box Is Selected

Amount of Data to Share

☒ Lock Data Sharing Time Estimate Utilization

Sharing Settings	Maximum Size of Sharing Data	Utilization	Required Scan Time	Maximum Value of High-Speed Scan Time	Setting Value of High-Speed Scan Time
IoT Collection	30 Word	1,016.67%	0.0026ms	0.0000ms	4.0000ms
IoT Feedback	50 Word	4.00%	0.0084ms		

(1) (2) (3) (4) (5) (6)

No.	Item	Description
(1)	Estimate Utilization	Calculates [Utilization] and [Required Scan Time] from the checked items in the sharing settings, [Maximum Size of Sharing Data], and the high-speed scan time set value and maximum value, and displays those values.
(2)	Maximum Size of Sharing Data	Set the upper limit on the data size of variables to share. <Setting Range> 0 to 16384
(3)	Utilization	The percentage of the data size of the variables to share in relation to the data size that was set in [Maximum Size of Sharing Data] is displayed.
(4)	Required Scan Time	The scan time based on the data size that was set in [Maximum Size of Sharing Data] is displayed.
(5)	Maximum Value of High-Speed Scan Time	The maximum value of the high-speed scan time is displayed.
	Scan□ Maximum Value of Scan Time	
(6)	Setting Value of High-Speed Scan Time	The set value of the high-speed scan time is displayed.
	Scan□ Setting Value of Scan Time	

9.2.3 Configuring Data Sharing Settings

Use the following procedure to configure the data sharing settings.

Information Configure the data sharing settings after you complete the equipment definitions.

1. If you select the [Lock Data Sharing Time] check box, set [Maximum Size of Sharing Data].

The maximum value that can be set is 16384 words.

Amount of Data to Share

☒ Lock Data Sharing Time Estimate Utilization

Sharing Settings	Maximum Size of Sharing Data	Utilization	Required Scan Time	Maximum Value of High-Speed Scan Time	Setting Value of High-Speed Scan Time
IoT Collection	32 Word	9.38%	0.0028ms	0.0000ms	4.0000ms
IoT Feedback	32 Word	0.00%	0.0053ms		

2. Select the check boxes of the variables to share.

Data Sharing Settings

Refresh Information

Public Variables

Unit	Equipment I/O	Level 1	Level 2	Level 3	Variable Name	Data Type	Sharing Settings	
							☒ Batch	☐ Batch
							☒ IoT Collection	☐ IoT Feedback

▶ [System Variable] (260 items)

▲ (8 items)

CPU	-	-	-	-	Ea01_Stop	Bit	☒	☐
CPU	-	-	-	-	Ea01_Error	Bit	☒	☐
CPU	-	-	-	-	Ea01_Alarm	Bit	☒	☐
CPU	-	-	-	-	Ea01_Proct_Vel	Word	☒	☐
CPU	-	-	-	-	Ea01_Proct_Pos	Word	☒	☐
CPU	-	-	-	-	Ea01_Proct_Name	Word	☒	☐
CPU	-	-	-	-	Ea01_Proct_Program	Word	☒	☐
CPU	-	-	-	-	Ea01_Proct_Status	Word	☒	☐

Amount of Data to Share

☒ Lock Data Sharing Time

Estimate Utilization

Sharing Settings	Maximum Size of Sharing Data	Utilization	Required Scan Time	Maximum Value of High-Speed Scan Time	Setting Value of High-Speed Scan Time
IoT Collection	32 Word	9.38%	0.0028ms	0.0000ms	4.0000ms
IoT Feedback	32 Word	0.00%	0.0053ms		

OK Cancel Apply

3. Click the [Estimate Utilization] button to check if the amount of data to share satisfies the conditions.

- When the [Lock Data Sharing Time] Check Box Is Not Selected

Amount of Data to Share

☐ Lock Data Sharing Time

Estimate Utilization

Sharing Settings	Utilization
IoT Collection	1.87%
IoT Feedback	0.00%

Check if these values are 100% or less.

Estimated Time for Data Sharing Processing	Maximum Value of High-Speed Scan Time	Setting Value of High-Speed Scan Time
0.0265ms	0.0000ms	4.0000ms

Check if [Estimated Time for Data Sharing Processing] + [Maximum Value of High-Speed Scan Time] is less than or equal to [Setting Value of High-Speed Scan Time].

- When the [Lock Data Sharing Time] Check Box Is Selected

Amount of Data to Share

☒ Lock Data Sharing Time

Estimate Utilization

Sharing Settings	Maximum Size of Sharing Data	Utilization
IoT Collection	32 Word	953.13%
IoT Feedback	32 Word	0.00%

Check if these values are 100% or less.

Required Scan Time	Maximum Value of High-Speed Scan Time	Setting Value of High-Speed Scan Time
0.0028ms	0.0000ms	4.0000ms
0.0053ms		

Check if [Required Scan Time] + [Maximum Value of High-Speed Scan Time] is less than or equal to [Setting Value of High-Speed Scan Time].

- Information

If the amount of data to share does not satisfy the conditions, take one of the following corrective actions.
- Reduce the variables to share.
 - Change the set value and maximum value of the high-speed scan time in the [Environment Setting] window.
 - When the [Lock Data Sharing Time] check box is selected only: Increase the setting of [Maximum Size of Sharing Data].

4. Click the [OK] button.

Unit	Equipment I/O	Level 1	Level 2	Level 3	Variable Name	Data Type	Batch	IoT Feedback
[System Variable] (260 items)								
8 items								
CPU	-	-	-	-	Eq01_Stop	Bit	☒	☐
CPU	-	-	-	-	Eq01_Error	Bit	☒	☐
CPU	-	-	-	-	Eq01_Alarm	Bit	☒	☐
CPU	-	-	-	-	Eq01_Prod_Vel	Word	☒	☐
CPU	-	-	-	-	Eq01_Prod_Pos	Word	☒	☐
CPU	-	-	-	-	Eq01_Prod_Name	Word	☒	☐
CPU	-	-	-	-	Eq01_Prod_ProName	Word	☒	☐
CPU	-	-	-	-	Eq01_Prod_Status	Word	☒	☐

Sharing Settings	Maximum Size of Sharing Data	Utilization	Required Scan Time	Maximum Value of High-Speed Scan Time	Setting Value of High-Speed Scan Time
IoT Collection	32 Word	46.88%	0.0028ms	0.0000ms	4.0000ms
IoT Feedback	32 Word	0.00%	0.0053ms		

The settings will be saved, and the window will close.

5. With the [Program] - [Data sharing settings] check box selected in the [Transfer] window, click the [Start] button.

Refer to the following section for details on the transfer function.

2.3 Transfer on page 107

Transfer file type

☒ System Configuration

☒ **Program**

☒ Update local register comments.

☐ Do not leave local register comments in project.

☐ Register

☐ Global register comment

Target: All

- ☒ Ladder program
- ☒ Motion program
- ☒ Sequence program
- ☒ Table data
- ☒ Variable
- ☒ **Data sharing settings**
- ☒ User Structure
- ☒ Watch

The data sharing settings will be written to the controller.

This concludes the procedure.

9.2.4 Changing the Display Method of Variables

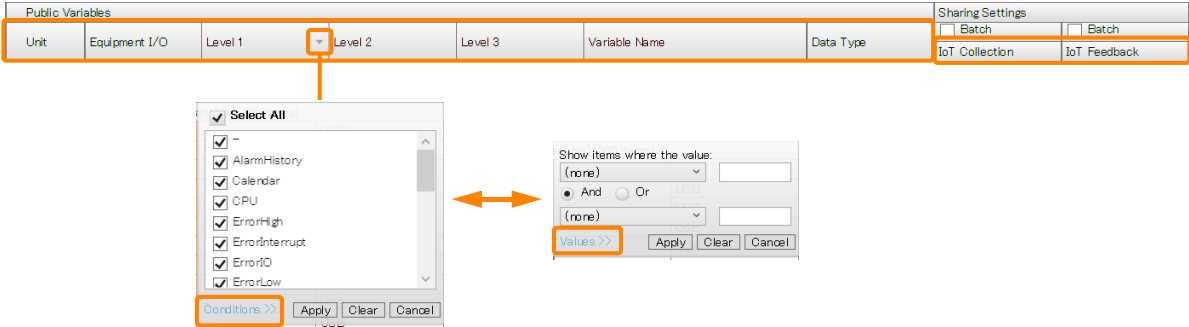
If there are many variables that are displayed, you can easily change the display settings by using sorting, filtering, and the check boxes for batch selecting and clearing. Each method is described below.

- Sort
Click the cell for the columns under [Public Variables] to change the display order of the variables. An arrow will be displayed on the cell when you click it.

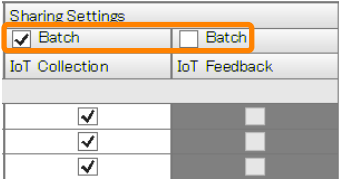
Public Variables						
Unit	Equipment I/O	Level 1	Level 2	Level 3	Variable Name	Data Type
Display	Description					
None	Variables are displayed in order of the text strings (default display order).					
▲	Variables are displayed in symbols → A to Z order.					
▼	Variables are displayed in Z to A → symbols order.					

- Filtering
If you place the mouse cursor on the cell shown below, the [▼] button will be displayed. Click this button and select the items in the displayed window to filter the variables.

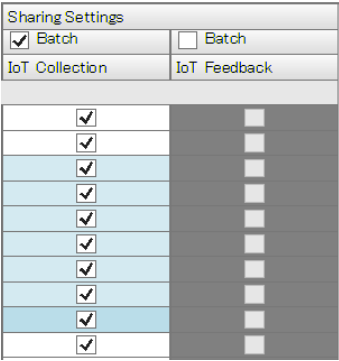
If the [Conditions] button is displayed at the lower left of the window, click this button to switch the display. You can specify detailed filtering conditions.



- Check Boxes for Batch Selecting and Clearing
Click [Batch] under [Sharing Settings] to batch select and clear the check boxes for all displayed variables.



You can also select a range of variables in [IoT Collection] and [IoT Feedback] and press the space bar to batch select and clear that range of variables.



Convenient Functions

This chapter describes convenient functions in the MPE720, such as the environment settings, printing, and importing and exporting data.

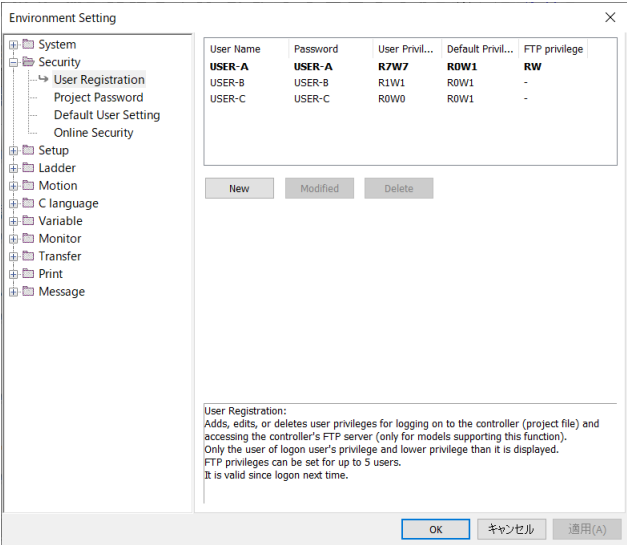
10.1	Environment Setting	573
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10.1.3	[System] - [Controller Type]	574
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10.3.12	Version 5 CMT File	635
10.3.13	Logging Settings	637
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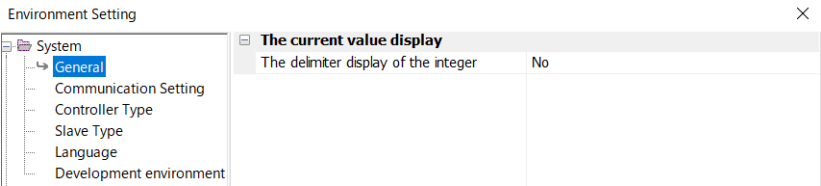
10.1 Environment Setting

Select [File] - [Environment Setting] from the menu bar to display the [Environment Setting] window. You can configure the various settings related to the MPE720 and project files on this window.

This section describes setting items on the [Environment Setting] window in the order the setting items are displayed in the tree.

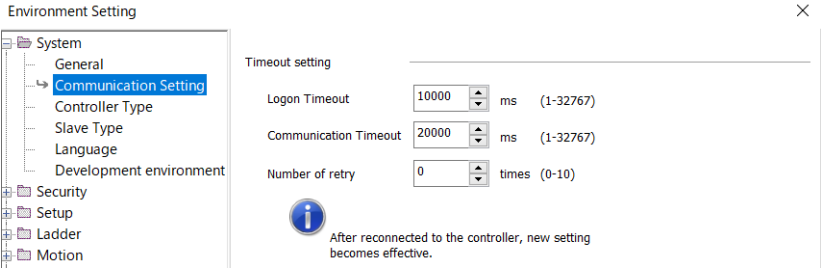


10.1.1 [System] - [General]



Item	Description						
The delimiter display of the integer	If set to [Yes], a comma will be inserted into numeric values and current values every third digit. Watch 1 <table><tr><th>Variable</th><th>Value</th></tr><tr><td>MQ00000</td><td>111,111,111,111,111,222</td></tr><tr><td>MQ00004</td><td>333,333,333,333,333,333</td></tr></table>	Variable	Value	MQ00000	111,111,111,111,111,222	MQ00004	333,333,333,333,333,333
Variable	Value						
MQ00000	111,111,111,111,111,222						
MQ00004	333,333,333,333,333,333						

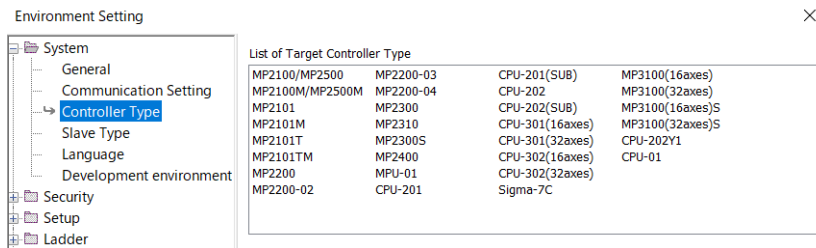
10.1.2 [System] - [Communication Setting]



10.1 Environment Setting

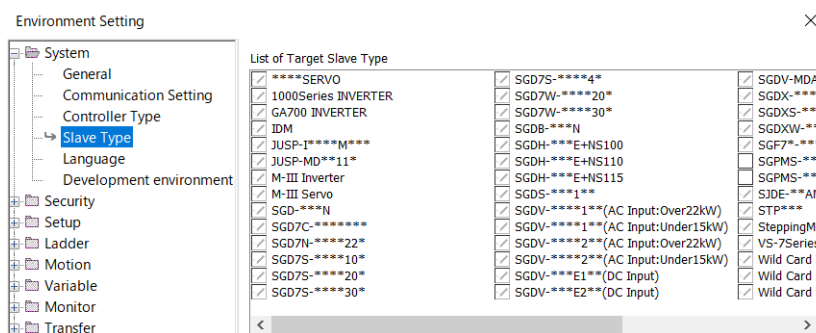
Item	Description
Logon Timeout	Set the duration of the timeout when connecting to the controller. An error will be displayed if the connection to the controller is not completed within the set time.
Communication Timeout	Set the duration of the communications timeout with the controller. An error will be displayed if communications with the controller are not restarted within the set time when communications are lost.
Number of retry	Set the number of retries when communications with the controller are lost.

10.1.3 [System] - [Controller Type]



Item	Description
List of Target Controller Type	The controller models are displayed that can be selected when creating a project file.

10.1.4 [System] - [Slave Type]



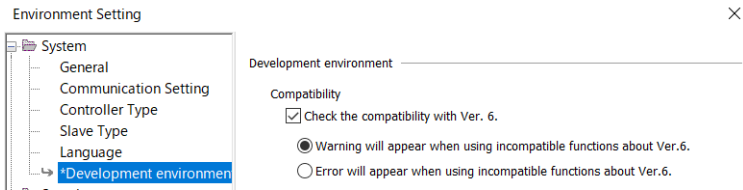
Item	Description
List of Target Slave Type	The slave models are displayed that can be allocated in module configuration definitions.

10.1.5 [System] - [Language]



Item	Description
Language	Select the language displayed in the MPE720 from English, Japanese, Chinese (simplified), or Chinese (traditional). The change is applied after the MPE720 is restarted.

10.1.6 [System] - [Development environment]

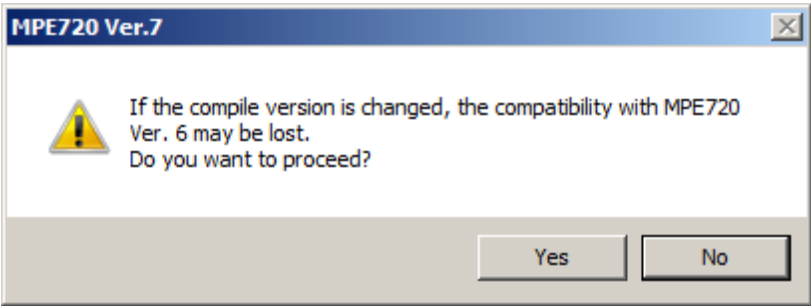


Item	Description
Check the compatibility with Ver. 6.	If this check box is selected, a warning or error will be displayed when functions or instructions are used that are not supported by MPE720 Ver.6. This item can be set only when a version 6 project file (file name extension: .YMW) is open.

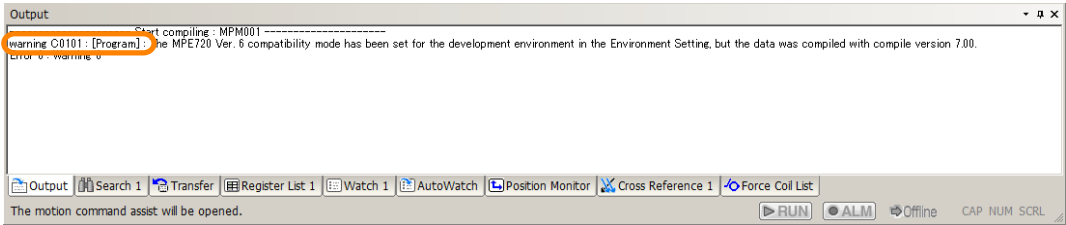


- In the following cases, a message dialog box and warning/error in the [Output] window will be displayed.
- When the Expression ladder program instruction or the motion program compiling mode is changed from "Ver.6 Compatible" to "Version 7.00"
 - When a program is compiled while the "Version 7.00" compiling mode is selected for the Expression ladder program instruction or the motion program compiling mode
 - When a ladder program that contains parallel rungs supported for version 7.20 or higher is compiled

<Message Dialog Box>



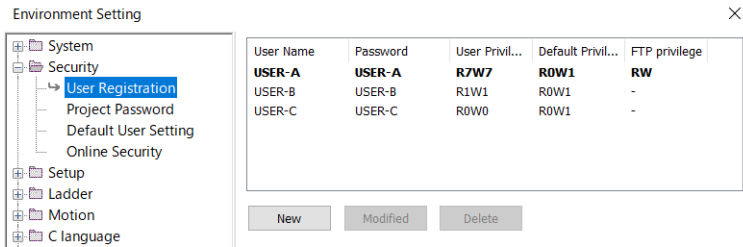
<[Output] Window>



10.1.7 [Security] - [User Registration]

Refer to the following section for details on the settings.

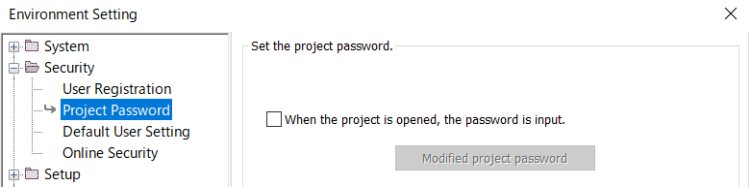
[8.1 User Management on page 540](#)



10.1.8 [Security] - [Project Password]

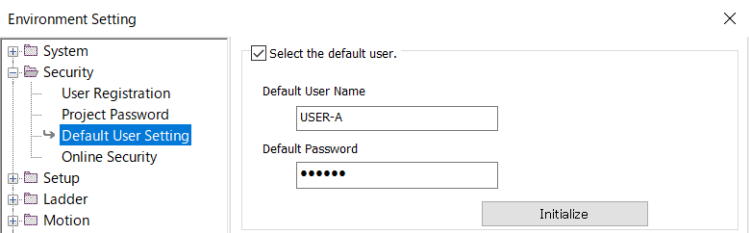
Refer to the following section for details on the settings.

 [8.3 Security Settings for Project Files on page 549](#)



10.1.9 [Security] - [Default User Setting]

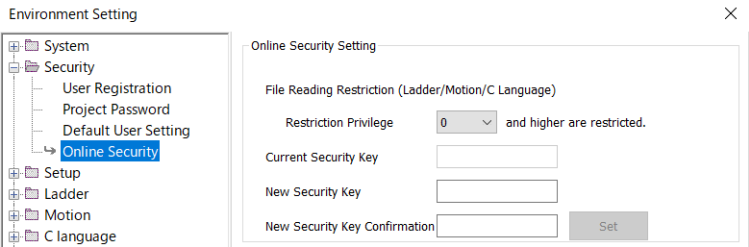
The user name and password set here will be required when opening a project file or connecting to the controller. A project file can be opened without logging in if the user with the same settings is registered in the project file.



10.1.10 [Security] - [Online Security]

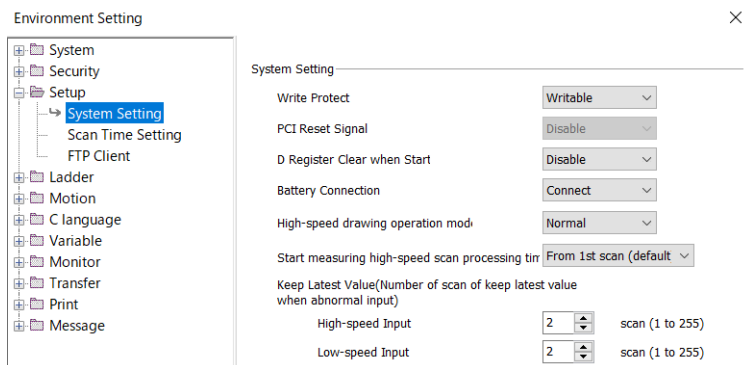
The setting items are the same as the setting items for online security described in the following section.

 [8.2 Security Settings for the Controller on page 546](#)

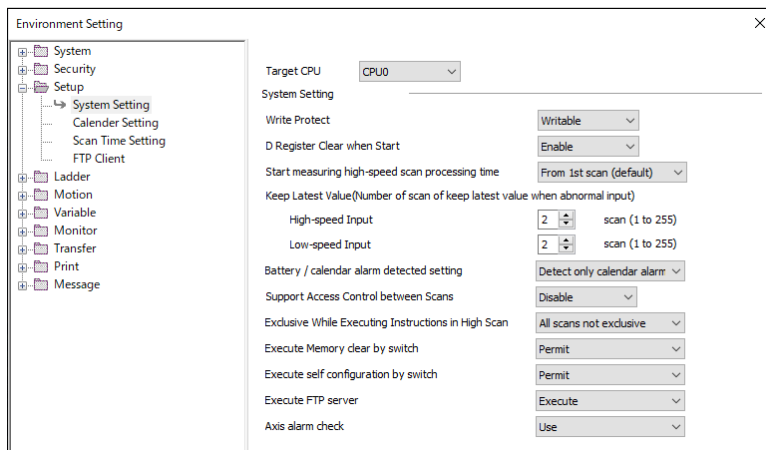


10.1.11 [Setup] - [System Setting]

The items that are displayed and can be set will depend on the model of the controller that is set in the project.
Example 1: MP3000-series CPU-301



Example 2: MP1000-series MPX-1312-2



Item	Description
Target CPU	Fixed to CPU0.
Write Protect	Select whether to permit writing program data to the controller. If set to [Write Protect], data cannot be transferred to the controller and program editing and compiling cannot be performed when online.
PCI Reset Signal	Select whether to enable the PCI reset signal. This item can be set only if the controller that is set in the project is a board-type controller.
D Register Clear when Start	Select whether to clear the value of D registers when the controller is restarted. If set to [Enable], the value of D registers will be 0 after the controller is restarted. If set to [Disable], the value of D registers will be indefinite after the controller is restarted.
Battery Connection	Set the battery connection state of the controller.
High-speed drawing operation mode	Select the mode for high-speed scan process drawings from normal mode or high-speed mode. If set to [High-speed], the processing of high-speed scan process drawings can be optimized because interrupt process drawings will not be executed. Select [Normal] to use interrupt process drawings.
Start measuring high-speed scan processing time	Select from which scan to start measuring the high-speed scan processing time. You can select from [From 1st scan (default)] and [From 2nd scan].
Keep Latest Value	Set the number of high-speed scans and low-speed scans to keep the previous values when an I/O error occurs.
Battery/calendar alarm detected setting	Select whether to detect battery and calendar alarms.
Support Access Control between Scans	Select whether to enable the function to support access control. If this function is enabled, processing will be added to check the register addresses used in the programs based on the settings in [Register Map] when the programs are compiled. Refer to the following section for details. 4.5 Configuring the Register Map Settings on page 214

Continued on next page.

Continued from previous page.

Item	Description
Exclusive While Executing Instructions in High-Speed Scan	Set whether to perform exclusive processing for executing relay circuit instructions and numeric operation instructions for global registers. If you create programs so that global variables and scan variables at the same word addresses will not be written between different programs, you can speed up the processing time of relay circuit instructions and numeric operation instructions for global variables and scan variables by setting this to [Not exclusive]. When using a model that supports multiple scans: Fixed to [All scans not exclusive] when a P□ drawing is created.
Execute Memory clear by switch	Set whether to allow execution of clear memory with the SW3 switch on the CPU unit.
Execute self configuration by switch	Set whether to allow execution of self configuration with the CNFG switch on the CPU unit.
Execute FTP server	Set whether to allow access to the FTP/SFTP server.
Axis alarm check	If set to [Valid], the commands to all axes will be canceled when an axis alarm occurs, and a motion program alarm will be displayed. If set to [Invalid], the commands will continue to axes without alarms when an axis alarm occurs.

10.1.12 [Setup] - [Calendar Setting]

The items that are displayed and can be set will depend on the model and connection status of the controller that is set in the project.

(1) For the YRM1000 Series/MPX1000 Series

Environment Setting

System
Security
Setup
 System Setting
 Calendar Setting
 Scan Time Setting
 FTP Client
Ladder
Motion
Variable
Monitor
Transfer
Print
Message

Calendar Setting

Auto time adjustment: Invalid

GMT Offset: (+09:00)Korea,NorthKorea,Tokyo,Transbaikal,Yakutsk

9 hrs 0 min

☐ Use SNTP

IP Address of SNTP Server: 0 . 0 . 0 . 1

Time Data Acquisition Cycle: 60 min ☐ Get Data at Power ON

Date and Time: 2023/07/03 15:37

Date and Time (0.01 us): 2023/07/03 15:37.442476

System Operation

Current Operation: 35317320796

Settings for Using SNTP
 IP Address of SNTP Server: Sets the IP address of the SNTP server.
 GMT Offset: Sets the offset time. The time set here is added to the UTC time acquired from the SNTP server and used as the CPU time.
 The setting range is -23 hours to +23 hours in increments of 15 minutes.
 Time Data Acquisition Cycle: Sets the interval for synchronizing with the SNTP server. 0 means the data is not acquired at a regular cycle. The maximum value is 10,080 minutes (seven days).
 Get Data at Power ON: Select this check box to acquire data from the SNTP server when the power is turned ON.
 Date and Time, Date and Time (0.01 us): Both of these items display the date on the controller as given by the S registers. If you change setting values on this window, the changed content is applied to the S registers. If SNTP is used, the acquired time data is applied to the S registers.
 *When the time is set, the values less than second (millisecond for YRM-X) are reset to zero.

Item	Description
Auto time adjustment	Select whether to disable the auto time adjustment function, to use the SNTP client, or to use the SNTP server.
GMT Offset	Set the time difference from Greenwich Mean Time (GMT). Set the region in which the controller will be used and the offset time.
Use SNTP	If [SNTP client] is selected in [Auto time adjustment], this check box is automatically selected. If [Disable] or [SNTP server] is selected in [Auto time adjustment], this check box cannot be selected.

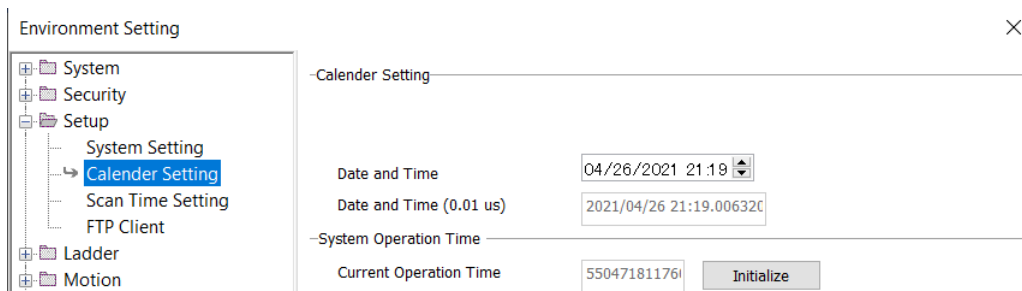
Continued on next page.

Continued from previous page.

Item	Description
IP Address of SNTP Server	If [SNTP client] is selected in [Auto time adjustment], set the IP address of the NTP or SNTP server. If [Disable] or [SNTP server] is selected in [Auto time adjustment], this check box cannot be selected.
Time Data Acquisition Cycle	If [SNTP client] is selected in [Auto time adjustment], set the cycle at which to acquire time data from the NTP or SNTP server. 0 means the data is not acquired at a regular cycle. The maximum value is 10,080 minutes (seven days). If [Disable] or [SNTP server] is selected in [Auto time adjustment], this check box cannot be selected.
Get Data at Power ON	Select this check box to acquire time data from the when the power is turned ON.
Date and Time	The date and time data of the controller is displayed.
Date and Time (0.01 μ s)	You can change the time data by entering the time. You do not need to set the time data when using the auto time adjustment function.
System Operation	The accumulated operation time of the system is displayed. The current operation time is also counted when the power supply to the controller is OFF. The count of the total time is increased when high-speed scan is executed. The maximum value of the system operation time is 99,999,999,999,999 (unit: 0.01 μ s, approximately 277,777 hours). The system operation time is reset to zero and counting restarted in the following cases: - The system operation time when the power is turned ON exceeds the maximum value. - The initialization operation was performed by using the MP720 (i.e., when the below [Initialize] button is clicked).
Initialize	Click this button to initialize [System Operation] to 0.

(2) All Other Cases

This is displayed only in online mode.



Item	Description
Calendar Setting	Set the calendar information in the controller. The accurate date and time (unit: s or μ s) will be stored when an alarm occurs.
System Operation Time	The accumulated operation time of the system is displayed. If the calendar is backed up by a battery, the current operation time is also counted when the power supply to the controller is OFF. If the [Initialize] button is clicked, the system operation time can be reset to 0.

10.1.13 [Setup] - [Scan Time Setting]

The items that are displayed and can be set will depend on the model of the controller that is set in the project.

(1) When Using a Model That Does Not Support Multiple Scans

Environment Setting

System

Security

Setup

System Setting

Scan Time Setting

FTP Client

Ladder

Motion

C language

Variable

Monitor

Transfer

Print

Message

High-speed Scan

☒ Use an MP2000 option module

Setting Value

4.0000

ms (0.2500ms-32.0000ms)

*Setting unit: 0.25ms,0.5ms(0.5ms or more)

Current Value

0.0000

ms

0

us

Maximum Value

0.0000

ms

0

us

Low-speed Scan

Setting Value

200.0000

ms (2.0000ms-300.0000ms)

*Setting unit: 0.5ms

Current Value

0.0000

ms

Maximum Value

0.0000

ms



1. The operation of the application which depends at the scan time changes when change the setting value.

2. Please do not set setting value smaller than current value. The watchdog error occurs.

3. When high-speed scan setting value is changed on the CPU with built-in SVC, the controller is lost the position information and the zero point return (complete) information.

4. When the high-speed scan time of an YRM controller/MP3000 series/Sigma-7 series (Built-in Controller) machine controller is set to less than 0.5 ms, the attached MP2000 option module will scan at 0.5

Item	Description
Use an MP2000 option module	Select this check box to use an MP2000 option module.
Setting Value	Set the scan processing time.
Current Value	The actual scan processing time is displayed in real-time when online.
Maximum Value	The maximum value of the actual scan processing time is displayed. The maximum value can be edited. If the actual scan processing time exceeds the edited value, the value is updated.

(2) When Using a Model That Supports Multiple Scans

Environment Setting

System

Security

Setup

System Setting

Calendar Setting

Scan Time Setting

FTP Client

Ladder

Motion

Variable

Monitor

Transfer

Print

Message

Scan List

CPU STOP

CPU RUN

CPU Status: -

Smallest Common Multiple of All Scan Time Settings:

200.000[ms]



Scan Name	Scan Type	Scan Time(ms)		
		Transmission Cycle	Set Value	Current Value
☒ CPU0				
H	High-speed	-	4.000	-
L	Low-speed	-	200.000	-
Scan2	High-speed	-	4.000	-

Execution Timing

Select Scan

All Scans

Unit: 4.000 ms

Scan Name	0	1	2	3	4	5	6	7	8	9	10
☒ CPU0											
H											
L											
Scan2											
Scan3											

OK

Cancel

Apply

Item	Description
CPU STOP	Click this button to stop the CPU of the connected controller.
CPU RUN	Click this button to run the CPU of the connected controller.
CPU Status	The operating status of the CPU is displayed.
Smallest Common Multiple of All Scan Time Settings	The smallest common multiple of all set scan time settings is displayed.
Scan List	For details on the items, refer to the description displayed when you place the mouse cursor on an item.
Select Scan	
Execution Timing	



Important

The following items are affected by the [Execution Core] selection.

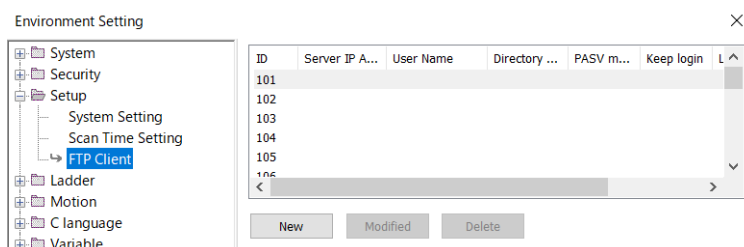
- Change in execution timing: Scans are executed in parallel on each core. If multiple scans are assigned to the same core, the scan with the smaller scan time set value is executed with priority.
- Data access timing: Scans assigned to different cores may update the same registers at the same time. In the case, there may be a negative impact on the operation of the equipment because the value of the register may be indefinite. To change this behavior, set [Support Access Control between Scans] to "Enable" in [Environment Setting] - [Setup] - [System Setting], and then compile the programs.

[4.5.1 Enabling Support Access Control between Scans on page 214](#)

10.1.14 [Setup] - [FTP Client]

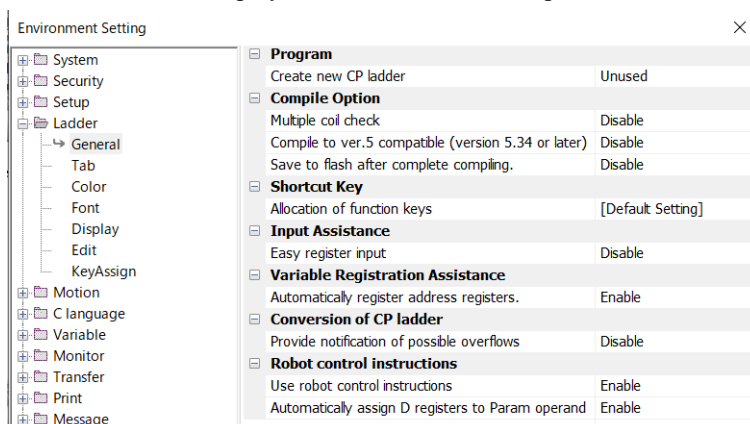
You can register an FTP server to use the FTP client.

Refer to the product manual for your controller for details on the settings related to FTP functionality.



10.1.15 [Ladder] - [General]

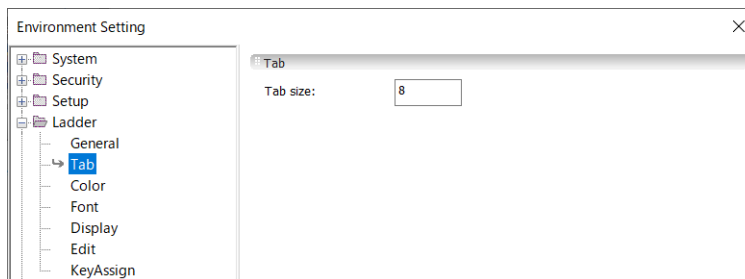
The items that are displayed and can be set will depend on the model of the controller that is set in the project.



10.1 Environment Setting

Item	Description
Create new CP ladder	If set to [Use], [New CP Ladder] will be displayed in the menu that is displayed when you right-click a program in the [Ladder] window.
Multiple coil check	If set to [Enable], a check will be performed for registers that are used multiple times in coil instructions when the ladder program is compiled. If multiple registers are being used, an error message will be displayed in the [Output] window.
Compile to ver.5 compatible	If set to [Enable], the ladder program will be compiled in a data format that can also be used in the MPE720 Ver. 5.
Save to flash after complete compiling	If set to [Enable], save to flash memory will be executed after the program is compiled.
Allocation of function keys	The function keys are allocated differently in the MPE720 Ver. 7 and Ver. 6. If set to [Ver. 6 Compatible], the function keys will be allocated the same as in the MPE720 Ver. 6.
Easy register input	If set to [Enable], suggestions will be displayed when entering a register.
Automatically register address registers	If set to [Enable], address registers will be automatically registered as variables when you use instructions for which address registers are specified. Refer to the following section for details. 5.1.8 Automatically Registering Address Registers as Variables on page 249
Provide notification of possible overflows	A warning will be displayed in the [Output] window if there is the possibility that an overflow may occur during CP ladder conversion.
Use robot control instructions	If set to [Disable], the operational performance of the MPE720 will be improved. Note: MLx function structures will be simplified, so there will be an impact on the functionality and operations related to MLx functions. To use robot control instructions, set this item to [Enable].
Automatically assign D registers to Param operand	If set to [Enable], the D registers that are not used in the drawing are automatically assigned to the [Param] operand when an MLx instruction is inserted into the drawing.

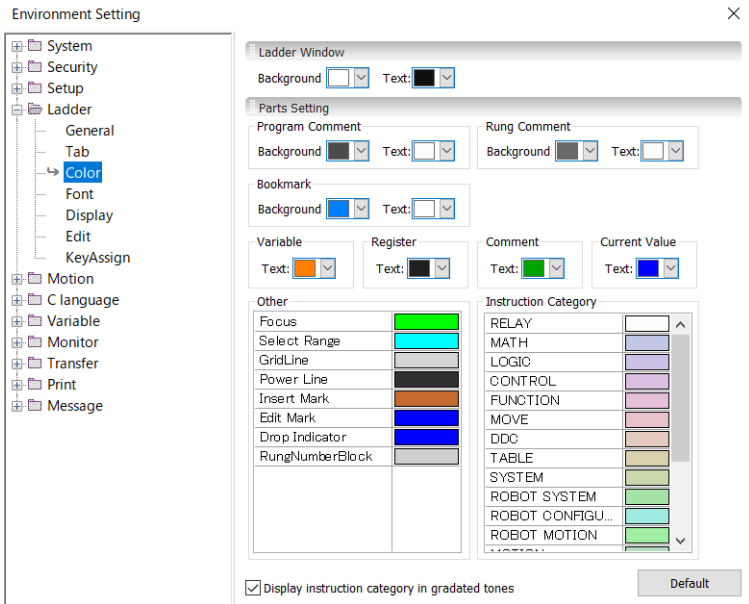
10.1.16 [Ladder] - [Tab]



Item	Description
Tab size	Set the size of the tab (white space) that is inserted when the Tab key is pressed in the editor on the [Expression Editor] window and other windows.

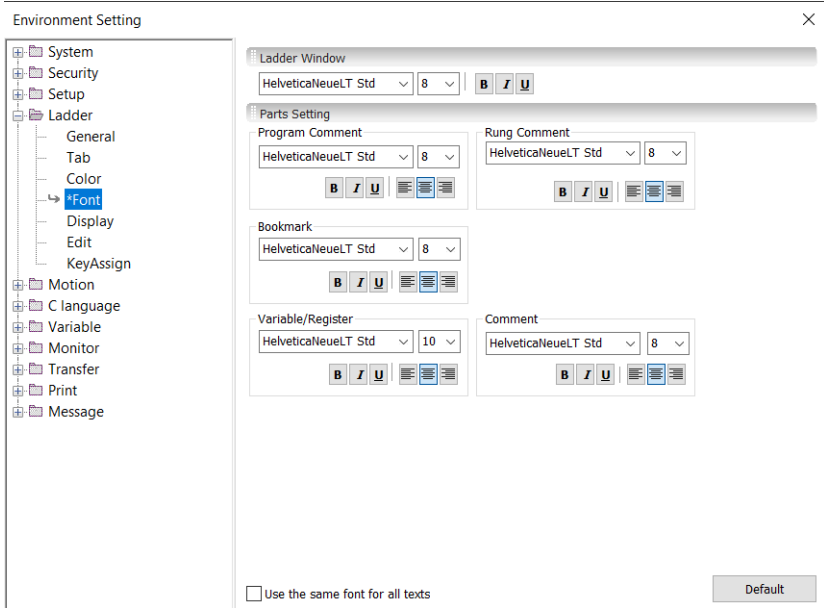
10.1.17 [Ladder] - [Color]

You can change the colors of the various elements displayed in the Edit Ladder Program window.

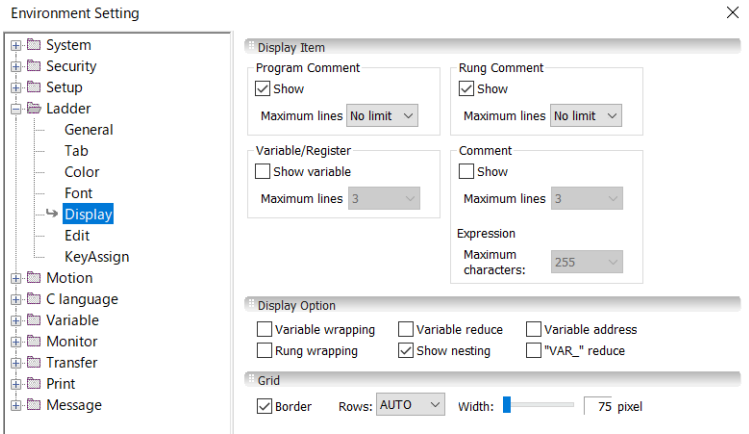


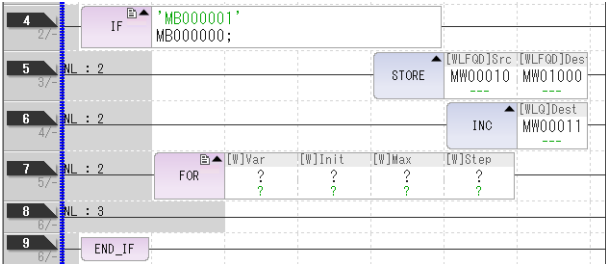
10.1.18 [Ladder] - [Font]

You can set the fonts of the various elements displayed in the Edit Ladder Program window.

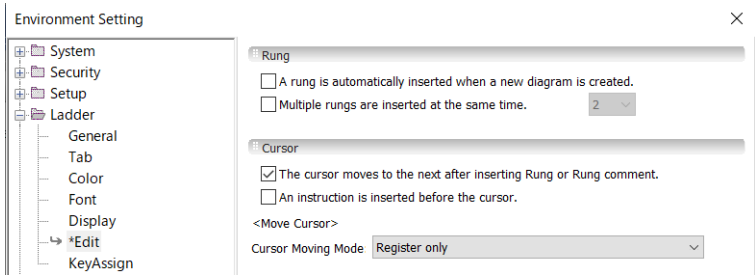


10.1.19 [Ladder] - [Display]



Item		Description
Display Item	Program Comment	Set whether to show or hide program comments and the maximum number of lines to use for those comments.
	Rung Comment	Set whether to show or hide rung comments and the maximum number of lines to use for those comments.
	Variable/Register	Set whether to show or hide variables or registers and the maximum number of lines to use for those comments.
	Comment	Set whether to show or hide register comments, the maximum number of lines to use for those comments, and the maximum number of characters to use for comments in the Expression instruction. If a comment exceeds the maximum number of characters that is set, "-" will be displayed.
Display Option	Variable wrapping	Wraps the variable if the variable is long.
	Variable reduce	Shortens the variable using "~" if the variable is long.
	Variable address	Displays the address of the register in the variable.
	Rung wrapping	Displays one rung using two lines if the window is narrow.
	Show nesting	Uses shading for the nested structure of IF, FOR, and WHILE instructions. 
Grid	"VAR_" reduce	Omits the "VAR_" prefix of variables registered for local registers.
	Border	If this check box is selected, the grid lines are displayed.
	Rows	Set the number of rows to display in the Edit Ladder Program window. If set to [AUTO], the number of rows changes according to the width of the window.
	Width	Set the width of the rows using the slider.

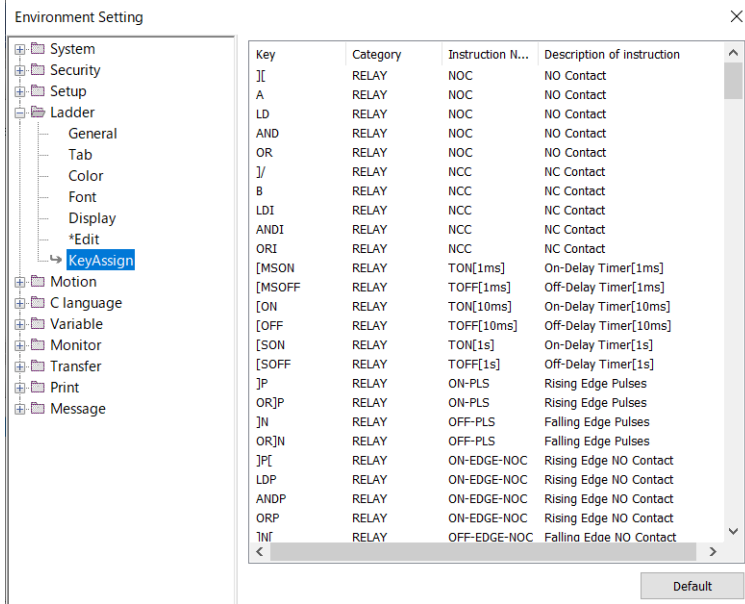
10.1.20 [Ladder] - [Edit]



Item		Description
Rung	A rung is automatically inserted when a new diagram is created.	If this check box is selected, a drawing with one rung already inserted will be opened when creating a new drawing.
	Multiple rungs are inserted at the same time.	If this check box is selected and the number of rungs is set, that many rungs can be inserted at one time.
Cursor	The cursor moves to the next after inserting Rung or Rung comment.	If this check box is selected, the cursor is displayed on the rung after the rung is inserted.
	An instruction is inserted before the cursor.	If this check box is selected, an instruction is inserted before the object selected by the cursor.
	Cursor Moving Mode	The cursor can be moved when you press the Enter key in a program. You can change the order of the movement with this item.

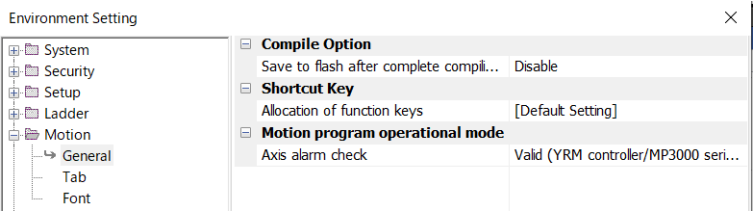
10.1.21 [Ladder] - [KeyAssign]

The list of keys to use when entering instructions is displayed.



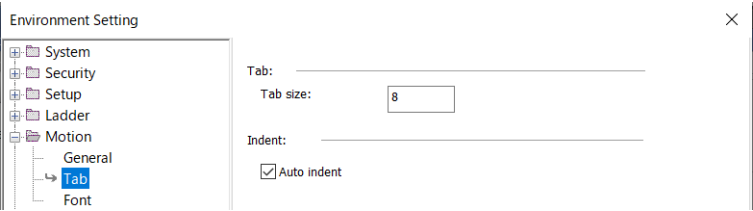
10.1.22 [Motion] - [General]

The items that are displayed and can be set will depend on the model of the controller that is set in the project.



Item	Description
Save to flash after complete compiling	If set to [Enable], save to flash memory will be executed after the program is compiled.
Allocation of function keys	The function keys are allocated differently in the MPE720 Ver. 7 and Ver. 6. If set to [Ver. 6 Compatible], the function keys will be allocated the same as in the MPE720 Ver. 6.
Axis alarm check	If set to [Valid], the commands to all axes will be canceled when an axis alarm occurs, and a motion program alarm will be displayed. If set to [Invalid], the commands will continue to axes without alarms when an axis alarm occurs.

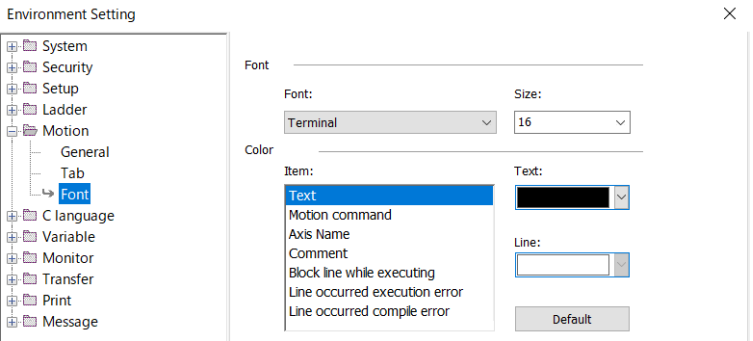
10.1.23 [Motion] - [Tab]



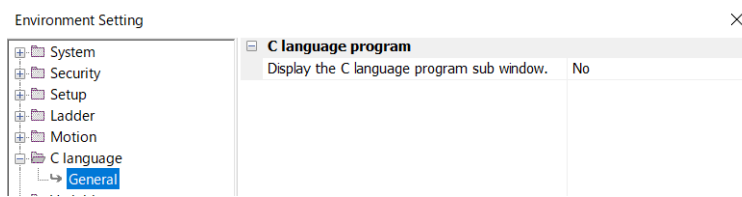
Item	Description
Tab size	Set the size of the tab (white space) that is inserted when the Tab key is pressed in the editor on the Edit Motion Program window.
Auto indent	If this check box is selected, spaces are inserted so that the new line has the same indenting as the previous line.

10.1.24 [Motion] - [Font]

You can set the fonts and colors of the various elements displayed in the Edit Motion Program window.

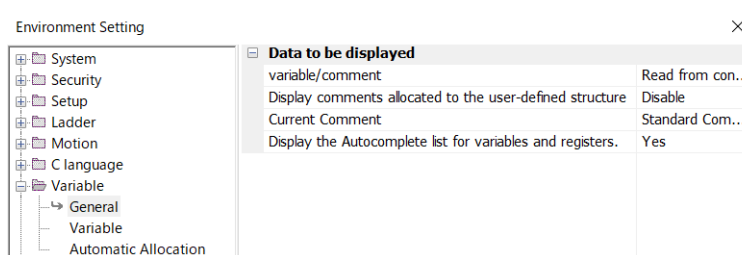


10.1.25 [C language] - [General]



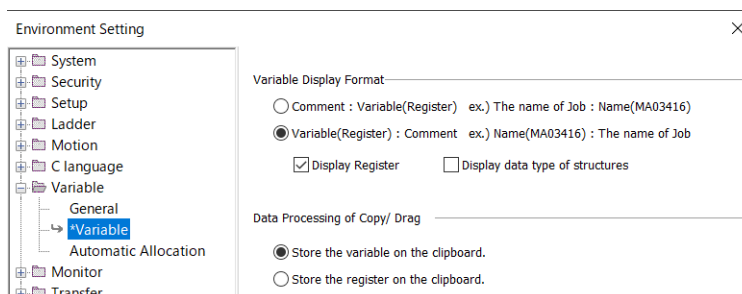
Item	Description
Display the C language program sub window	If set to [Yes], the [C Language] window is displayed. This is a function for managing C language applications in the MPE720 that were created with external development tools.

10.1.26 [Variable] - [General]



Item	Description
variable/comment	Select the reading source of the global register variables/comments to display in the MPE720 from [Read from controller] or [Read from project]. The setting is enabled the next time the controller is connected.
Display comments allocated to the user-defined structure	If set to [Enable], user-defined structure comments are displayed when user-defined structures are allocated to variables. However, register comments are excluded if registered to variables.
Current Comment	Select the type of comments that are displayed and updated from [Standard Comment], [Extended Comment 1], [Extended Comment 2], and [Extended Comment 3].
Display the Autocomplete list for variables and registers	Displays a list of possible variables and registers.

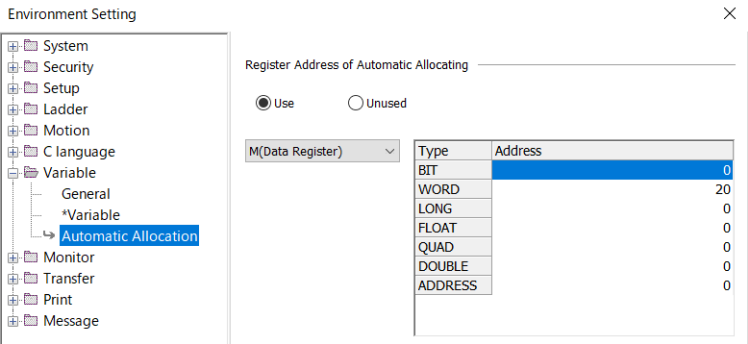
10.1.27 [Variable] - [Variable]



Item	Description
Variable Display Format	Set the display format of variables, registers, and comments. If [Display Register] or [Display data type of structures] are selected, the "ex.)" label will change according to the settings.
Data Processing of Copy/ Drag	Select the data to store in the clipboard when copying or dragging a variable.

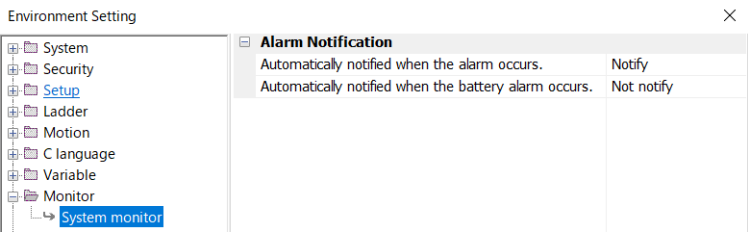
10.1.28 [Variable] - [Automatic Allocation]

The items that are displayed and can be set will depend on the model of the controller that is set in the project.



Item	Description
Register Address of Automatic Allocating	Set whether to automatically allocate the range of registers to use.

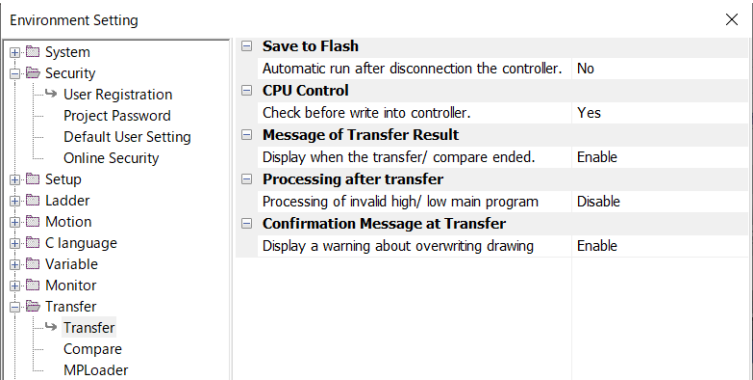
10.1.29 [Monitor] - [System monitor]

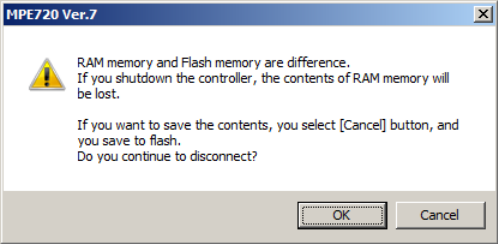


Item	Description
Automatically notified when the alarm occurs	If set to [Notify], the [System Monitor] window is automatically started and the alarm information is displayed when an alarm occurs.
Automatically notified when the battery alarm occurs	If set to [Notify], the [System Monitor] window is automatically started and the alarm information is displayed when a battery alarm occurs.

10.1.30 [Transfer] - [Transfer]

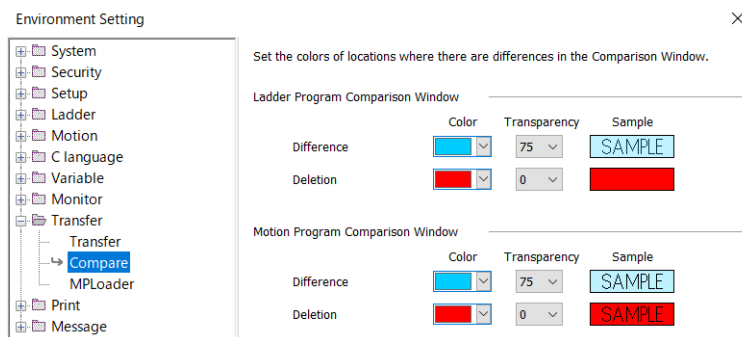
The items that are displayed and can be set will depend on the model of the controller that is set in the project.



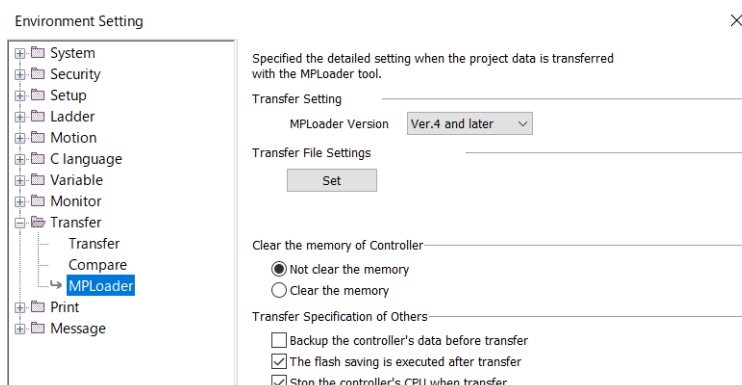
Item	Description
Automatic run after disconnection the controller.	If set to [Yes], the data in RAM is compared with the data in flash memory when the connection to the controller is disconnected. If the data does not match, the data will be automatically saved to flash memory. Even if this setting is not made, data in RAM is compared with data in flash memory when the connection to the controller is disconnected. If the data does not match, the following message dialog box will be displayed. 
Check before write into controller.	If set to [Yes], a message asking for confirmation to stop the CPU will be displayed before writing data into the controller.
Display when the transfer/comparison ended.	If set to [Enable], a message will be displayed when the transfer or comparison has completed.
Processing of invalid high/low main program.	If set to [Enable], the main program will be disabled after a write error occurs.
Disable main program processing	
Display a warning about overwriting drawing	If set to [Enable], a warning message will be displayed when overwriting the program with the same drawing number in the destination.

10.1.31 [Transfer] - [Compare]

You can change the colors of locations with differences that are displayed in the comparison window.



10.1.32 [Transfer] - [MPLoader]

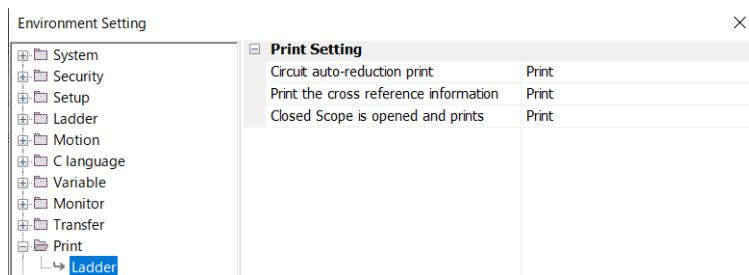


10.1 Environment Setting

Item	Description
Transfer Setting	Select the MPLoader version.
Transfer File Settings	Click the [Set] button and select the data to transfer in the displayed window.
Clear the memory of Controller	Select whether to clear the memory of the controller after the transfer.
Backup the controller's data before transfer	If this check box is selected, the controller data is backed up before the transfer.
The flash saving is executed after transfer	If this check box is selected, save to flash memory is executed after the transfer.
Stop the controller's CPU when transfer	If this check box is selected, the controller's CPU is stopped during the transfer.

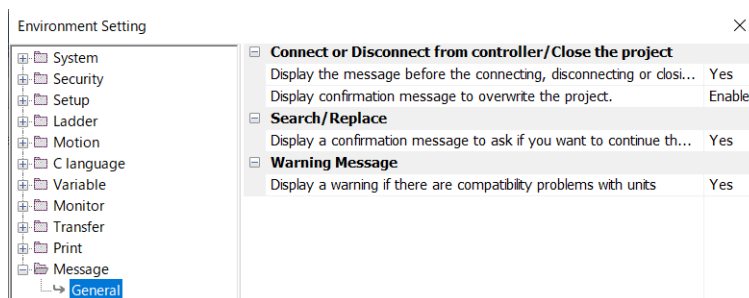
10.1.33 [Print] - [Ladder]

The items that are displayed and can be set will depend on the model of the controller that is set in the project.



Item	Description
Circuit auto-reduction print	If set to [Print], the drawing is reduced to fit the width of one page when printing.
Print the cross reference information	If set to [Print], the drawing is printed with the cross reference information displayed to the right of the ladder program.
Closed Scope is opened and prints	If set to [Print], the drawing is printed with all instruction objects displayed that were reduced.

10.1.34 [Message] - [General]



Item	Description
Display the message before the connecting, disconnecting or closing	If set to [Yes], a confirmation message is displayed when connecting/disconnecting the controller and when closing the project file.
Display confirmation message to overwrite the project	If set to [Enable], an overwrite confirmation message is displayed when closing the project file. If set the [Disable], the project file is automatically overwritten.

Continued on next page.

Continued from previous page.

Item	Description
Display a confirmation message to ask if you want to continue the search	If set to [Yes], a confirmation message is displayed when the search reaches the beginning or end of the program.
Display a warning if there are compatibility problems with units	If set to [Yes], a warning message is displayed if there is a risk that units in the module configuration definition cannot be displayed in older versions of MPE720.

10.2 Printing

The MPE720 has the following printing functions.

- Printing ladder program and motion program drawings
- Printing program information, register information, and definition information

The printing procedures are given below.

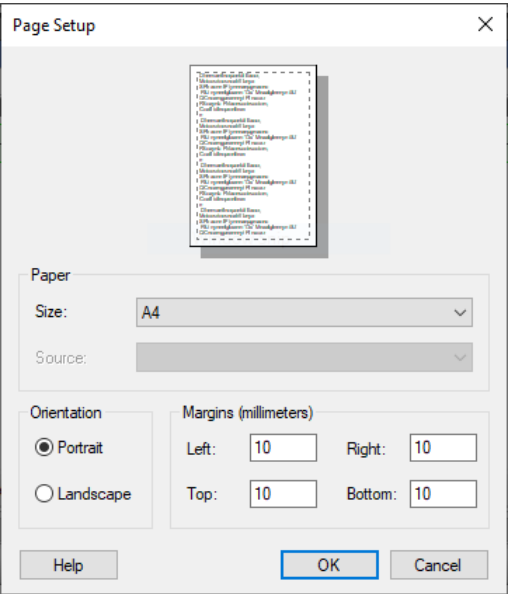
10.2.1 Printing Drawings

This section describes the settings and operations for printing ladder program and motion program drawings.

(1) Page Setup

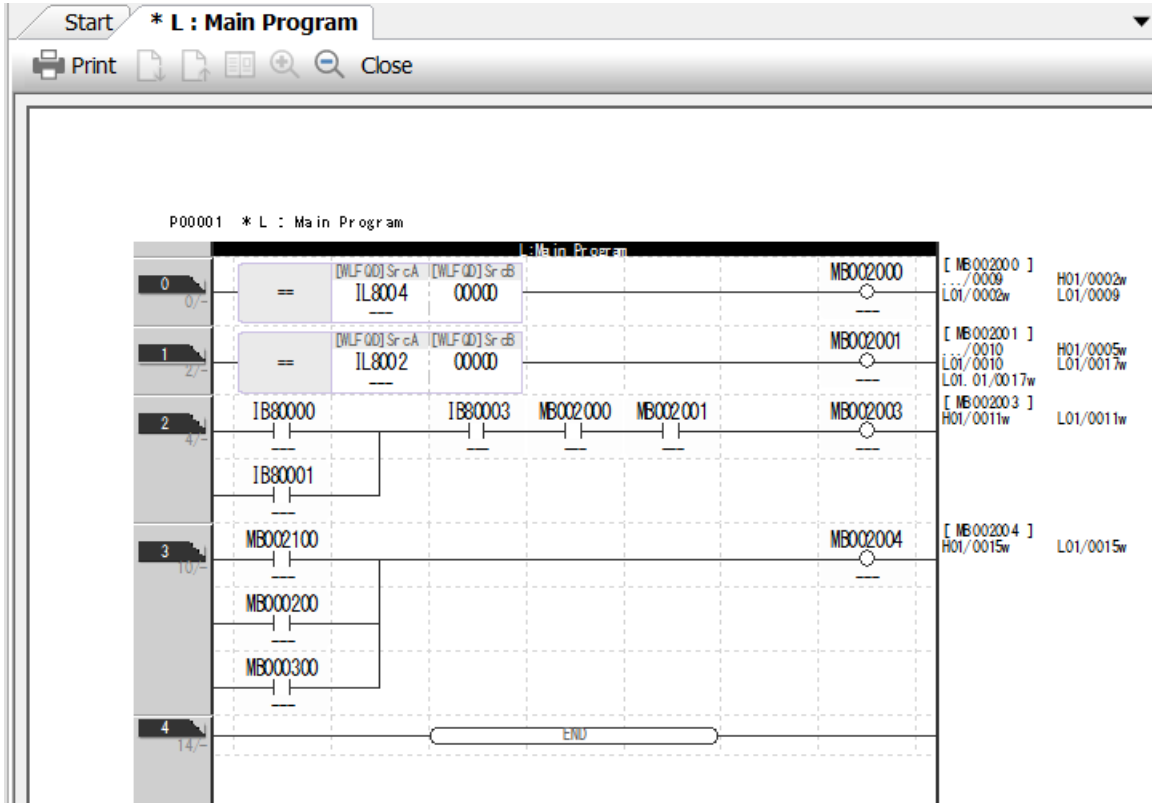
Select [Page Setup] from the [File] menu to display the [Page Setup] window.

You can set the paper size, orientation, and margins here.



(2) Print Preview

Select [Print Preview] from the [File] menu to display the print preview tab page in the center window.



Item	Description
[Print] Button	Displays the [Print] window. You can set up the page and print the drawing.
	Moves between pages when the print preview has multiple pages.
	Changes the number of pages that are displayed when the print preview has multiple pages. Click this button to switch between displaying one page and two pages.
	Changes the magnification in three steps.
[Close] Button	Exits the print preview.

(3) Printing

There are the following two methods that you can use to print a program drawing.

- Printing from the [File] menu
- Printing from the [Ladder] window

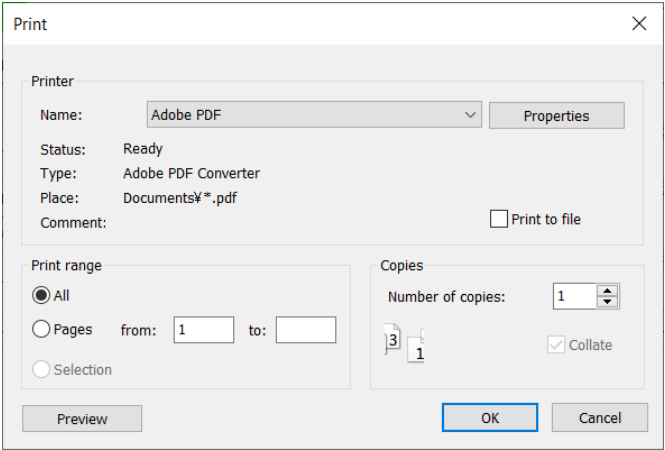
The procedures are given below.

(a) Printing from the [File] Menu

Use the following procedure to print a drawing from the [File] menu.

1. **Open the drawing to print.**
2. **Select [Print] from the [File] menu.**
The [Print] window will be displayed.

3. Set the necessary items, and then click the [OK] button.



This concludes the procedure.

(b) Printing from the [Ladder] Window

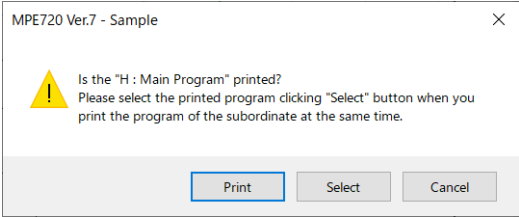
Use the following procedure to print a drawing from the [Ladder] window.

1. Right-click the drawing to print in the [Ladder] window, and select [Print].

Information

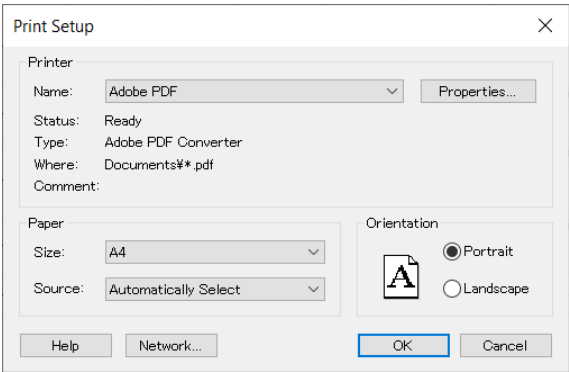
If there are drawings on the level under the selected drawing, the following message dialog box will be displayed.

To print only the selected drawing, click the [Print] button. To also print the program under the selected drawing, click the [Select] button.



The [Print Setup] window will be displayed.

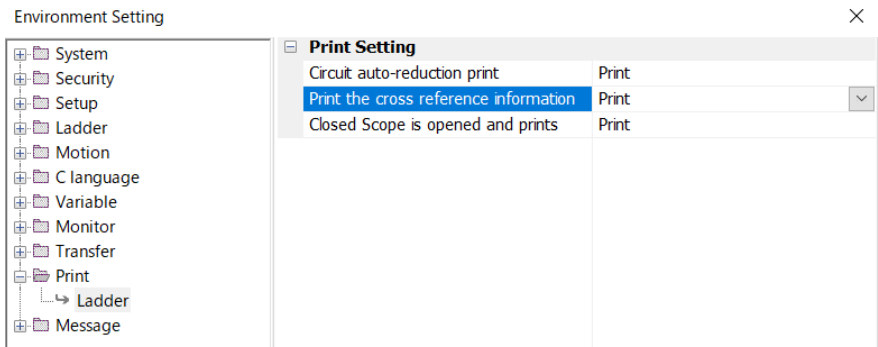
2. Set the necessary items, and then click the [OK] button.



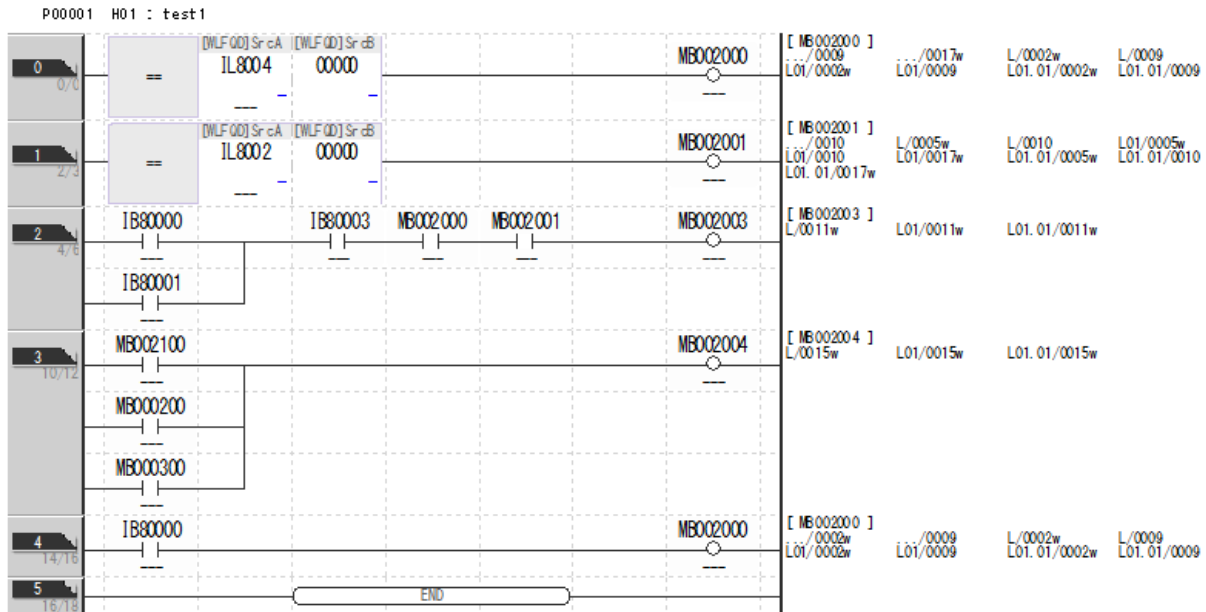
This concludes the procedure.

(4) Printing Cross Reference Information

If you set the following items in the [Environment Setting] window, you can print the cross reference information displayed to the right of the ladder program. The cross reference information can be printed only when the project file is opened offline.



The cross reference information is displayed in the following format: program number/step number + additional information.



Item	Description	Display Example
Program Number	The program numbers are displayed in the following order. High-speed → low-speed → start → interrupt → function Level 1 → level 2 → level 3	H H01.01 FUNC01
Step Number	The step number is displayed as a four digit number.	0001 1000
Additional Information	An index is displayed as "i" or "j".	H01/0010i H01/0010j
	An output register is displayed as "w".	H01/0010w

10.2.2 Printing Program Information, Register Information, and Definition Information

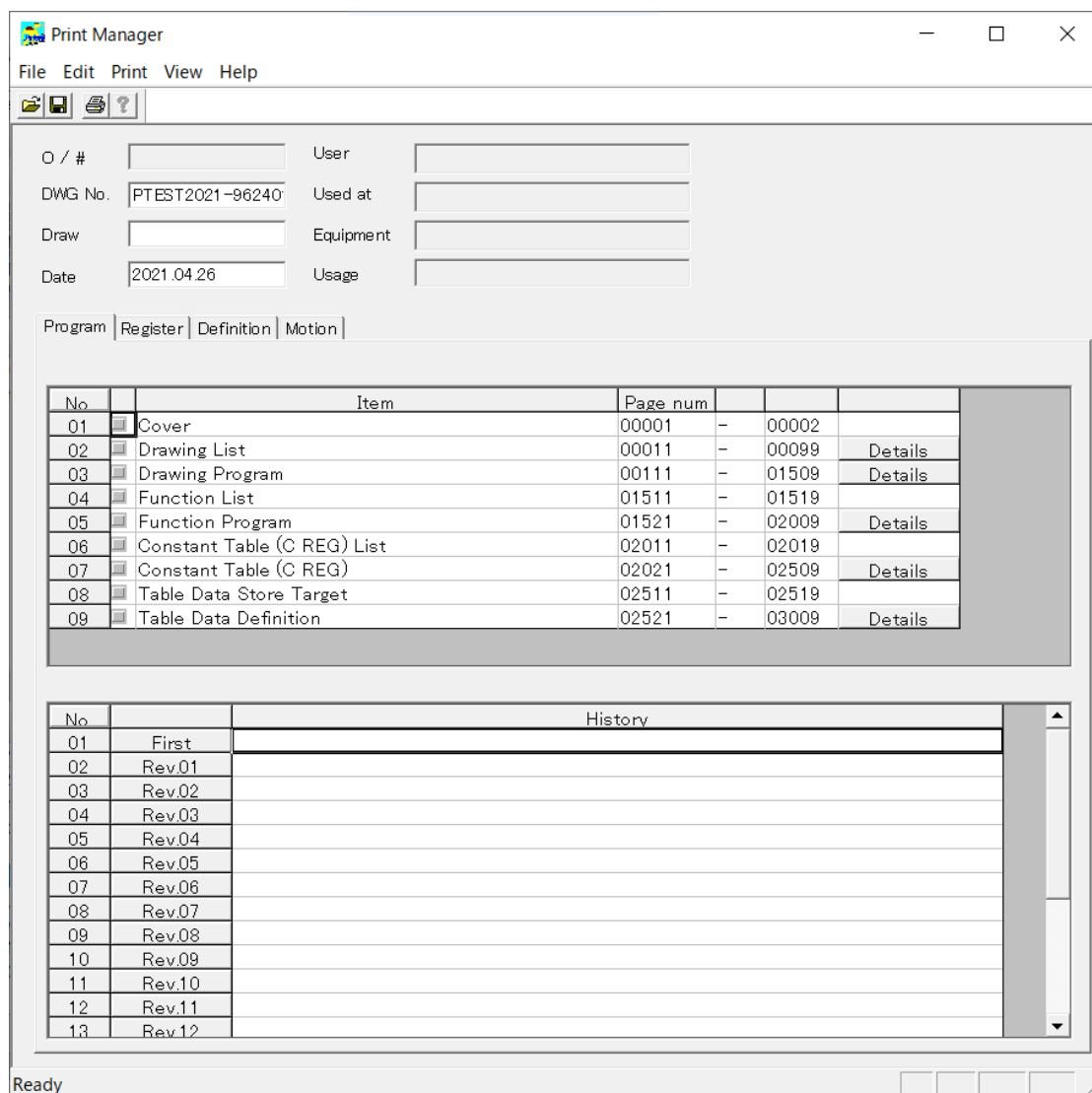
In the Print Manager, you can print program information, register information, and definition information. Use the following procedure.

1. **Select [Utility] - [Print builder] from the launcher.**

The [Print Manager] window will be displayed.

Information When you open the [Print Manager] window, the [List Manager] window will open at the same time and show the printing status.

2. Select the items to print.



Print Manager

File Edit Print View Help

O / # User
 DWG No. PTEST2021-96240 Used at
 Draw Equipment
 Date 2021.04.26 Usage

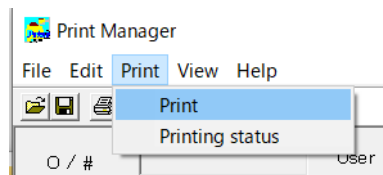
Program | Register | Definition | Motion |

No	Item	Page num			
01	Cover	00001	-	00002	
02	Drawing List	00011	-	00099	Details
03	Drawing Program	00111	-	01509	Details
04	Function List	01511	-	01519	
05	Function Program	01521	-	02009	Details
06	Constant Table (C REG) List	02011	-	02019	
07	Constant Table (C REG)	02021	-	02509	Details
08	Table Data Store Target	02511	-	02519	
09	Table Data Definition	02521	-	03009	Details

No	History
01	First
02	Rev.01
03	Rev.02
04	Rev.03
05	Rev.04
06	Rev.05
07	Rev.06
08	Rev.07
09	Rev.08
10	Rev.09
11	Rev.10
12	Rev.11
13	Rev.12

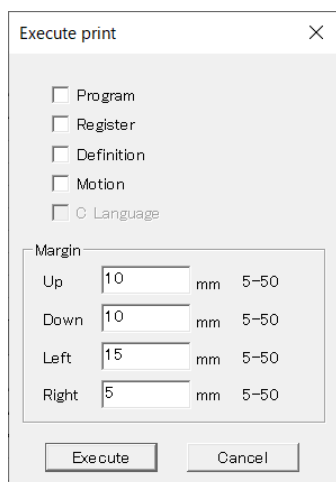
Ready

3. Select [Print] from the [Print] menu.



The [Execute print] window will be displayed.

4. **Set the printing targets and margins, and click the [Execute] button.**



The 'Execute print' dialog box is shown. It has a title bar with a close button (X). Inside, there are five unchecked checkboxes: 'Program', 'Register', 'Definition', 'Motion', and 'C: Language'. Below these is a 'Margin' section with four rows: 'Up' (10 mm, 5-50), 'Down' (10 mm, 5-50), 'Left' (15 mm, 5-50), and 'Right' (5 mm, 5-50). At the bottom are 'Execute' and 'Cancel' buttons.

Target	Value	Unit	Range
Up	10	mm	5-50
Down	10	mm	5-50
Left	15	mm	5-50
Right	5	mm	5-50

The [Print Setup] window will be displayed.

5. **Set the necessary items, and then click the [OK] button.**

This concludes the procedure.

10.3 Export/Import

This section describes the procedures to export and import data in the MPE720.

10.3.1 Ladder Programs and Motion Programs

(1) Exporting Data

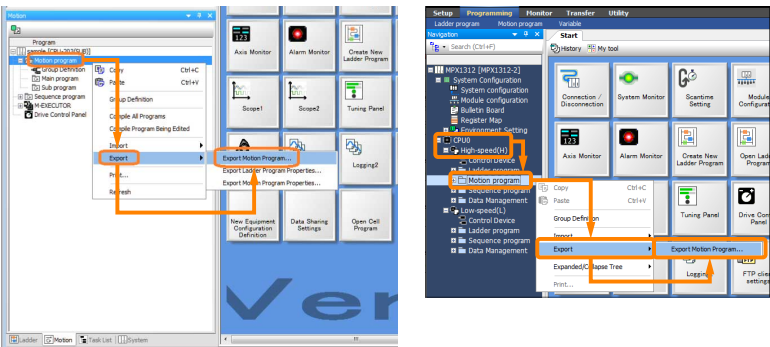
Use the following procedure to export a ladder program or motion program.



You cannot export a program when in online mode.

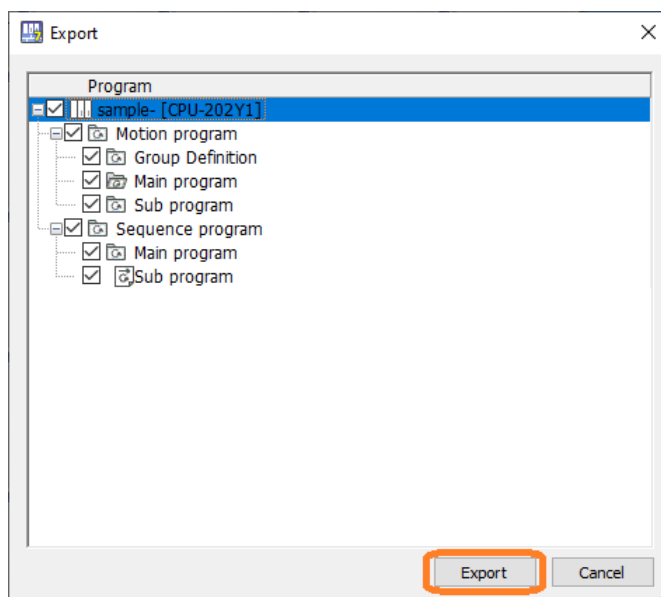
- 1. Open the project file.
- 2. Perform one of the following operations depending on the controller model and the program to export.

Controller Model	Program to Export	Operation
A controller model that does not support multiple scans	Ladder program	In the [Ladder] window, right-click on [Ladder program], and select [Export] - [Export Ladder Program].
	Motion program	In the [Motion] window, right-click on [Motion program], and select [Export] - [Export Motion Program].
A controller model that supports multiple scans	Ladder program	In the [Navigation] window, right-click on [Ladder program] under the scan from which to export the motion program, and select [Export] - [Export Ladder Program].
	Motion program	In the [Navigation] window, right-click on [Motion program] under the scan from which to export the motion program, and select [Export] - [Export Motion Program].



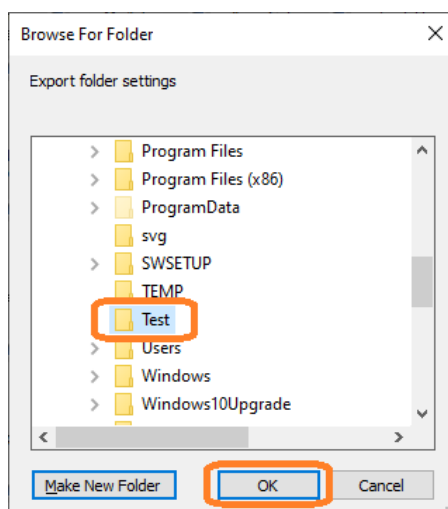
The [Export] window will be displayed.

3. Select the check box of the programs to export, and click the [Export] button.

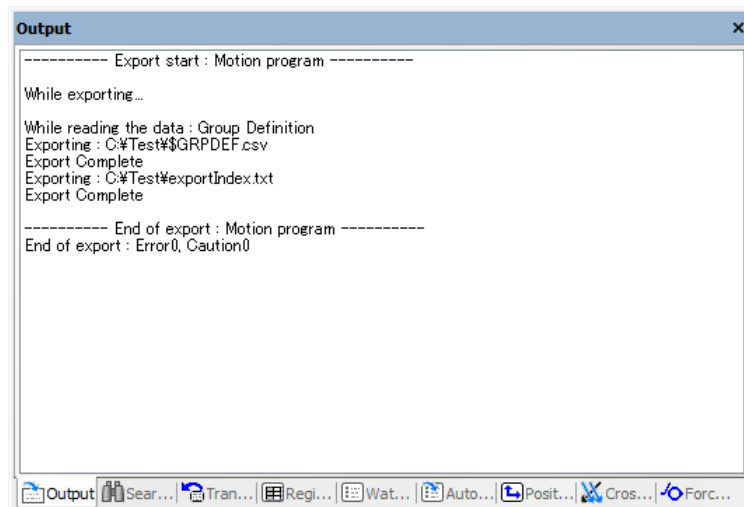


The [Browse For Folder] window will be displayed.

4. Select the destination folder, and click the [OK] button.



The data will be exported, and the results will be displayed in the [Output] window.



5. Confirm that the exported files have been stored in the selected folder.

The files to be exported depend on whether the program is a ladder program or motion program as shown below.

- For a ladder program: ypi file
- For a motion program:

File	Description
CSV File	Group Definition
Text File	Motion program
exportIndex.txt	List of exported file names

This concludes the procedure.

(2) Importing Data

Use the following procedure to import a ladder program or motion program.

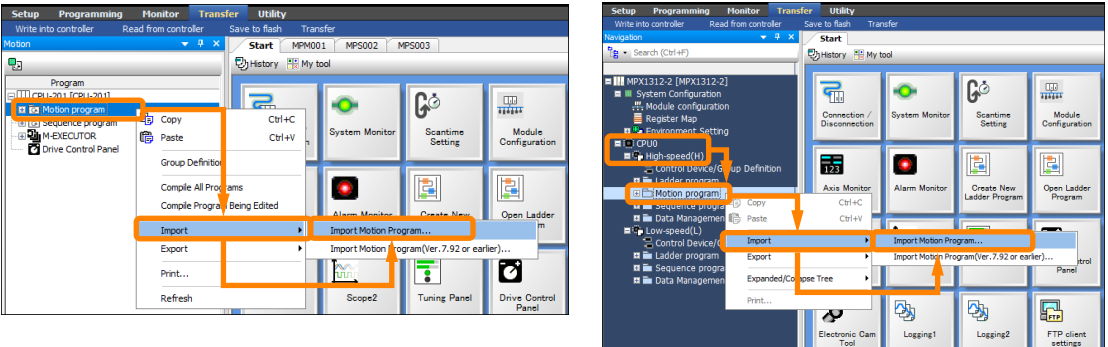


You cannot import a program when in online mode.

Important

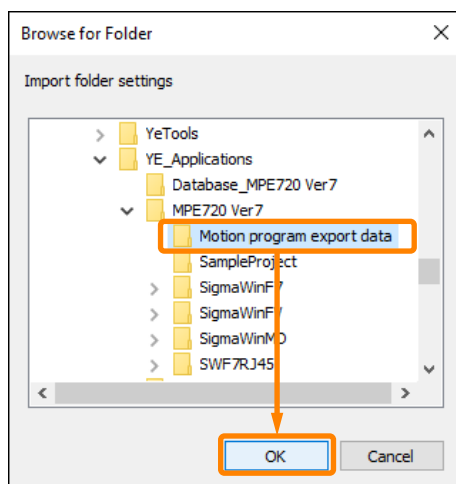
1. Open the project file.
2. Perform one of the following operations depending on the controller model and the program to import.

Controller Model	Program to Import	Operation
A controller model that does not support multiple scans	Ladder program	In the [Ladder] window, right-click on [Ladder program], and select [Import] - [Import Ladder Program].
	Motion program	In the [Motion] window, right-click on [Motion program], and select [Import] - [Import Motion Program] or [Import Motion Program(Ver. 7.92 or earlier)].
A controller model that supports multiple scans	Ladder program	In the [Navigation] window, right-click on [Ladder program] under the scan in which to import the motion program, and select [Import] - [Import Ladder Program].
	Motion program	In the [Navigation] window, right-click on [Motion program] under the scan in which to import the motion program, and select [Import] - [Import Motion Program] or [Import Motion Program(Ver. 7.92 or earlier)].

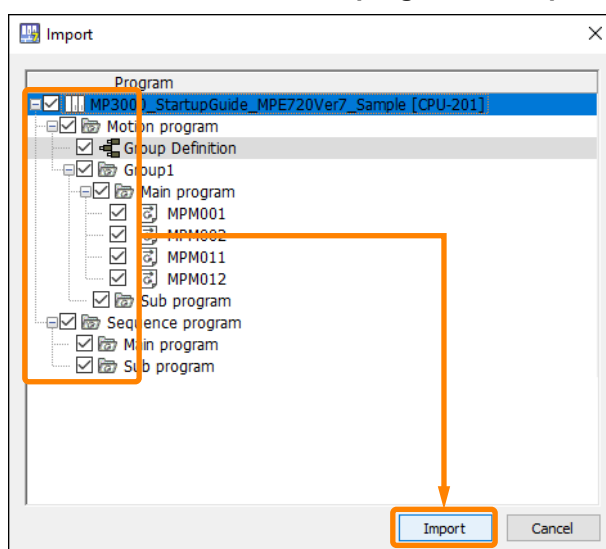


The [Browse For Folder] window will be displayed.

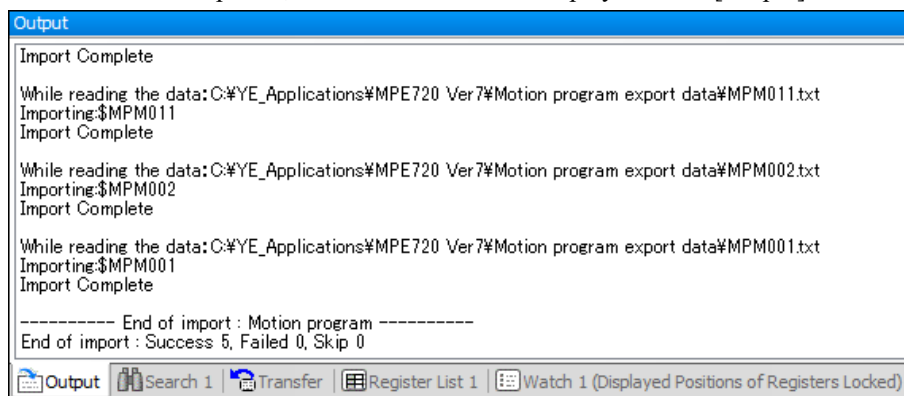
3. Select the folder where the program to import is stored, and click the [OK] button.



4. Select the check box of the programs to import, and click the [Import] button.



The data will be imported, and the results will be displayed in the [Output] window.



5. Select [Compile Program Being Edited] from the [Compile] menu.

This concludes the procedure.

10.3.2 Ladder Program Line Comments

(1) Exporting Data

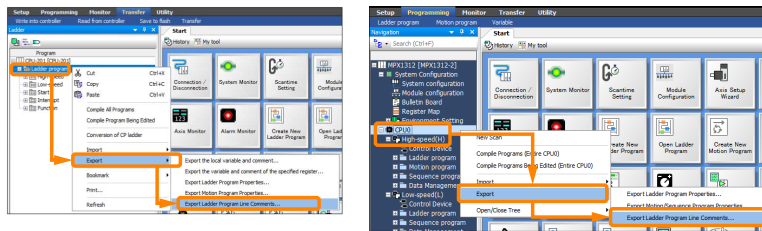
Use the following procedure to export ladder program line comments.



Important

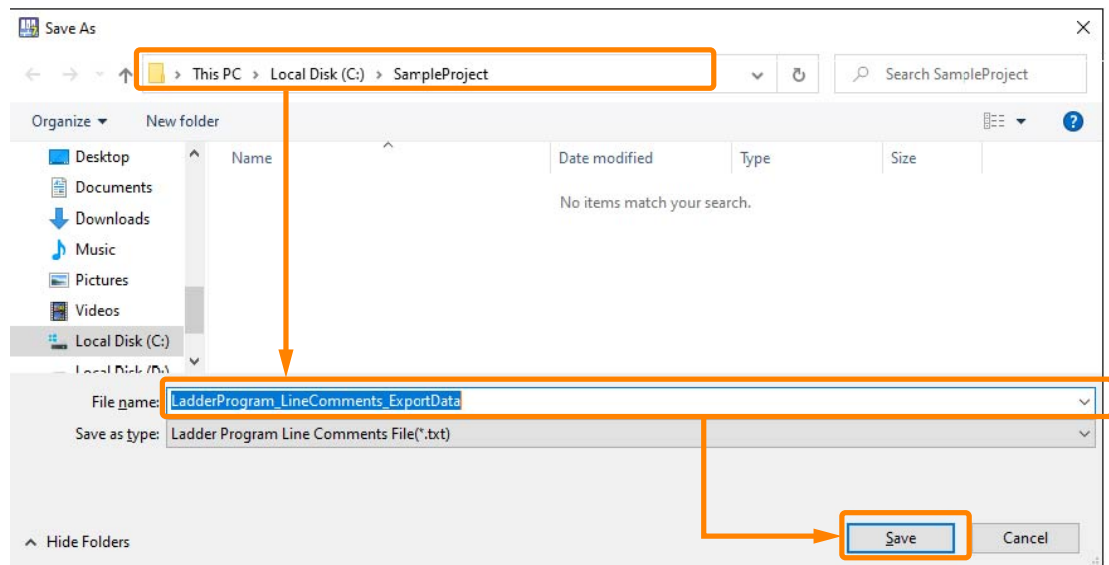
You cannot export ladder program line comments when in online mode.

1. Open the project file.
2. When using a model that does not support multiple scans: In the [Ladder] window, right-click on [Ladder program], and select [Export] - [Export Ladder Program Line Comments].
When using a model that supports multiple scans: In the [Navigation] window, right-click under the scan from which to export line comments, and select [Export] - [Export Ladder Program Line Comments].

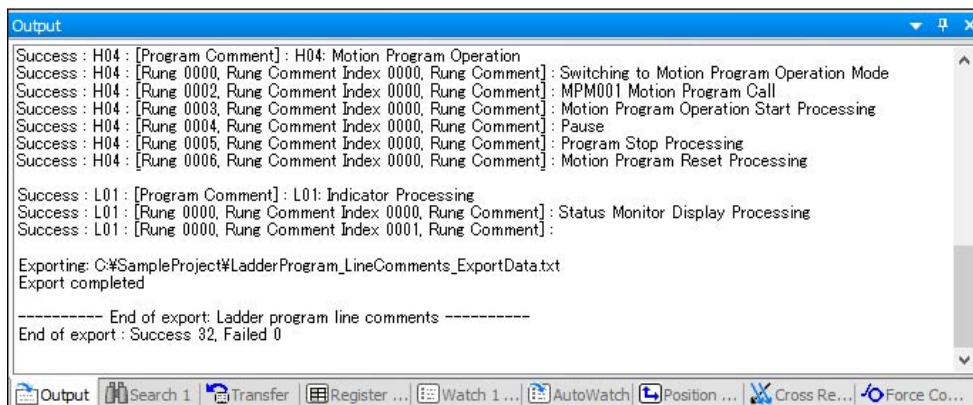


The [Save As] window will be displayed.

3. Select the destination folder for the file, enter the file name, and click the [Save] button.



The data will be exported, and the results will be displayed in the [Output] window.



4. Confirm that the exported files have been stored in the selected folder.

This concludes the procedure.

(2) Importing Data

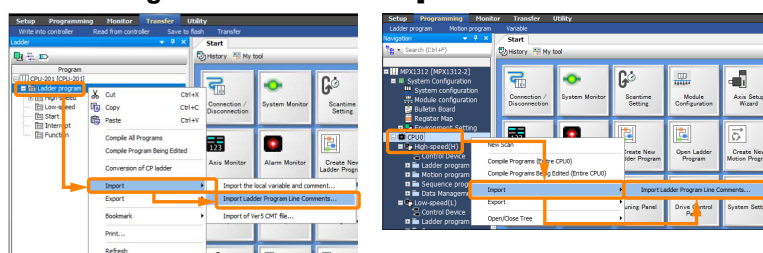
Use the following procedure to import ladder program line comments.



Important

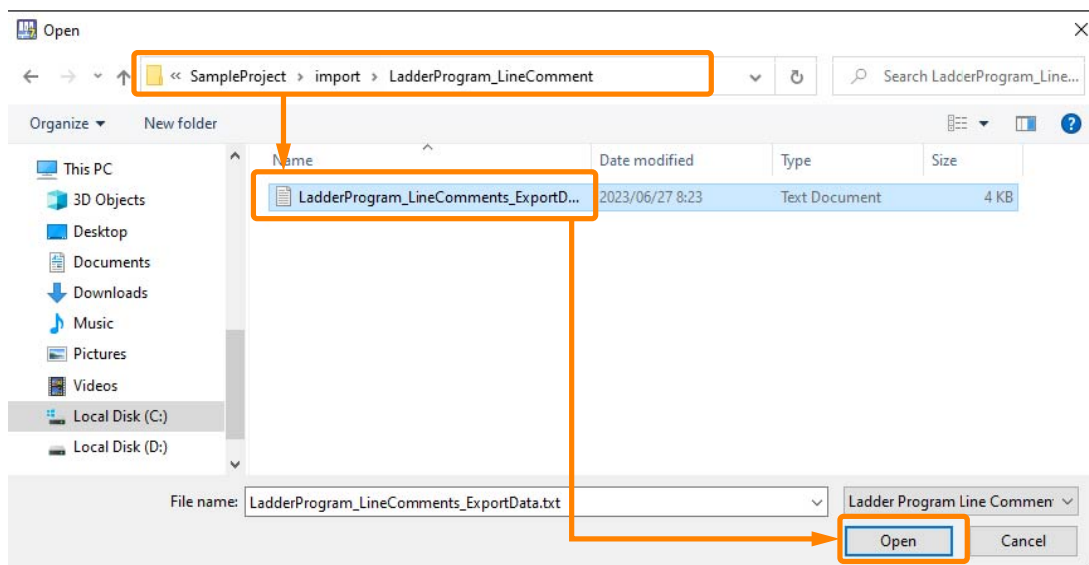
- You cannot import ladder program line comments when in online mode.
- You can import a motion program only when there is a program with the same name as the file name to import in the project file.

1. Open the project file.
2. When using a model that does not support multiple scans: In the [Ladder] window, right-click on [Ladder program], and select [Import] - [Import Ladder Program Line Comments].
When using a model that supports multiple scans: In the [Navigation] window, right-click under the scan in which to import the line comments, and select [Import] - [Import Ladder Program Line Comments].

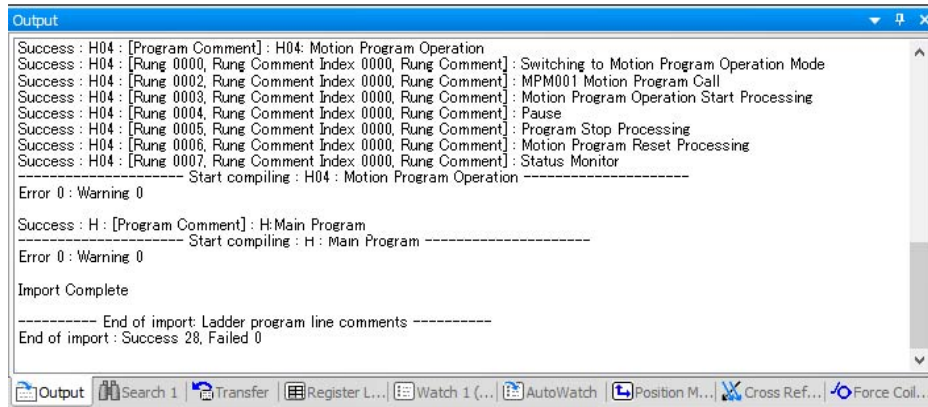


The [Open] window will be displayed.

3. Select the folder where the program to import is stored, and click the [Open] button.



The data will be imported, and the results will be displayed in the [Output] window.



This concludes the procedure.

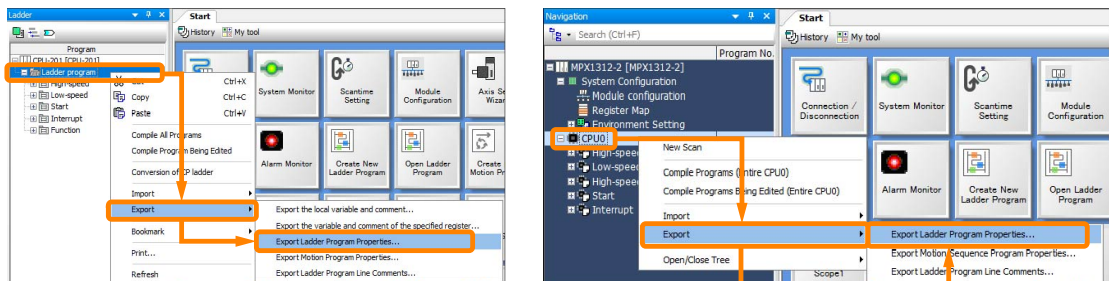
10.3.3 Program Properties

Use the following procedures to export the properties information of a ladder program and a motion program to a CSV file.

(1) Exporting Ladder Program Properties

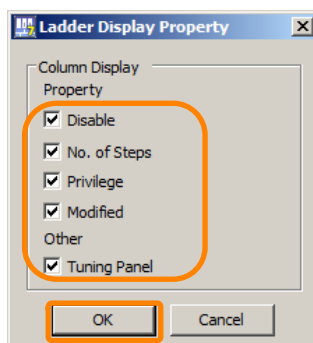
Use the following procedure to export the properties information of a ladder program.

1. Establish an online connection or open a project file.
2. When using a model that does not support multiple scans: Right-click on [Ladder program] in the [Ladder] window, and select [Export] - [Export Ladder Program Properties]. When using a model that supports multiple scans: Right-click on the CPU number to export in the [Navigation] window, and select [Export] - [Export Ladder Program Properties].



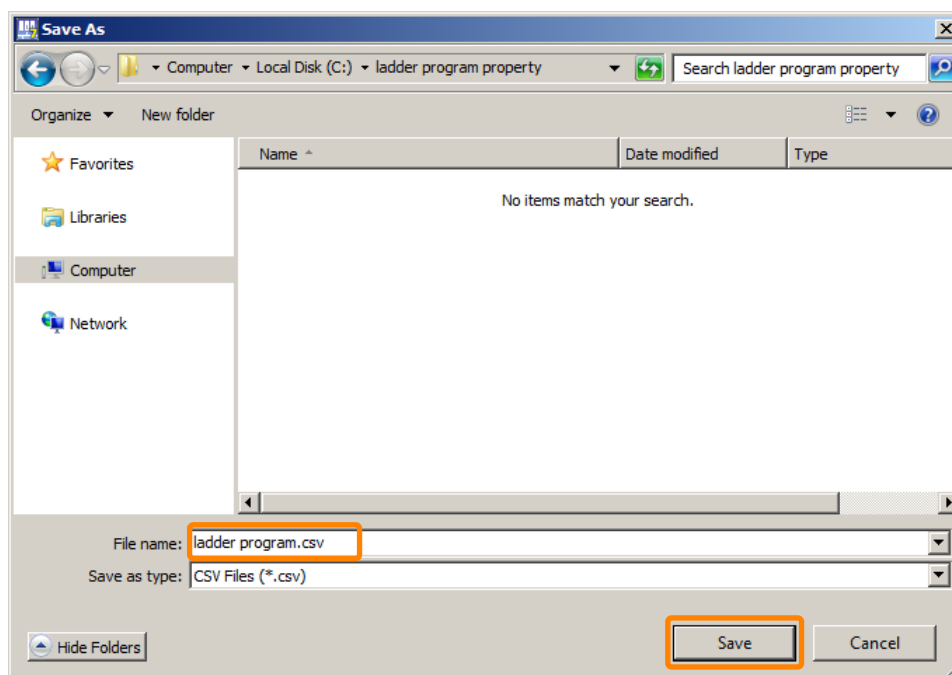
The [Ladder Display Property] window will be displayed.

3. Select the properties to export, and click the [OK] button.

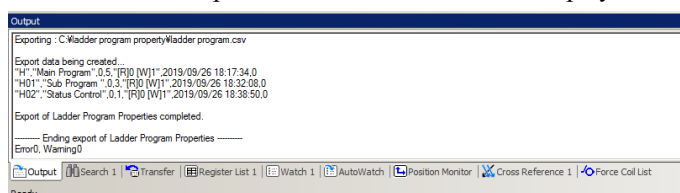


The [Save As] window will be displayed.

4. Set the file name, and click the [Save] button.



The data will be exported, and the results will be displayed in the [Output] window.

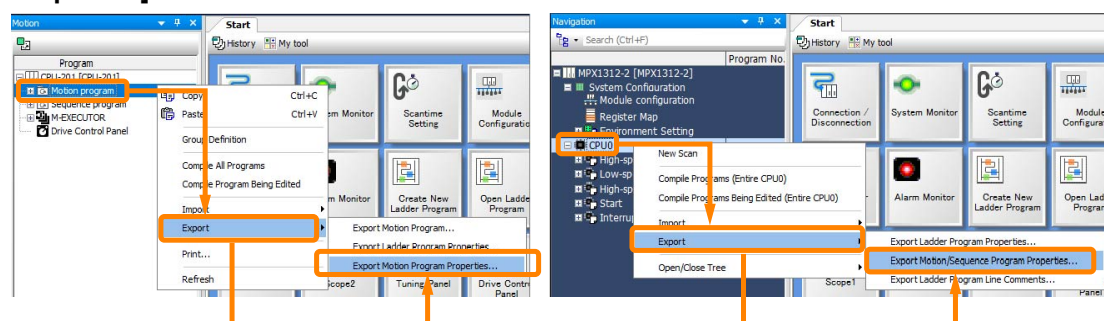


This concludes the procedure.

(2) Exporting Motion Program Properties

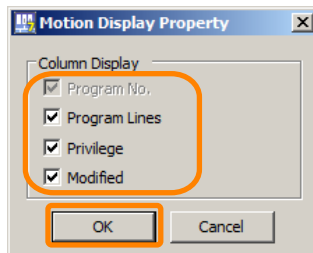
Use the following procedure to export the properties information of a motion program.

1. Establish an online connection or open a project file.
2. When using a model that does not support multiple scans: Right-click on [Motion program] in the [Motion] window, and select [Export] - [Export Motion Program Properties]. When using a model that supports multiple scans: Right-click on the CPU number to export in the [Navigation] window, and select [Export] - [Export Motion/Sequence Properties].



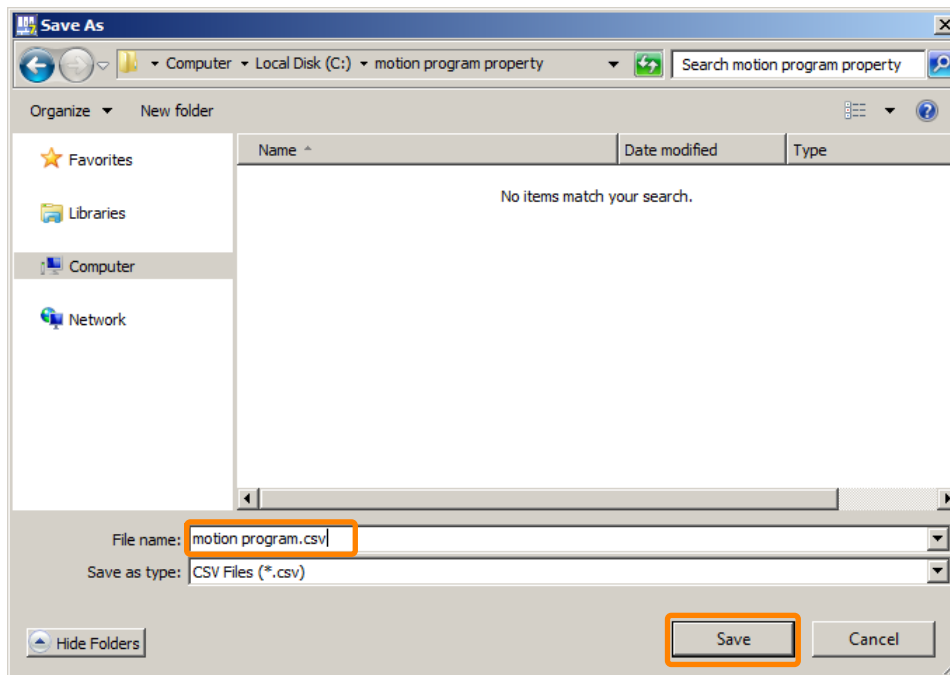
The [Motion Display Property] window will be displayed.

3. Select the properties to export, and click the [OK] button.

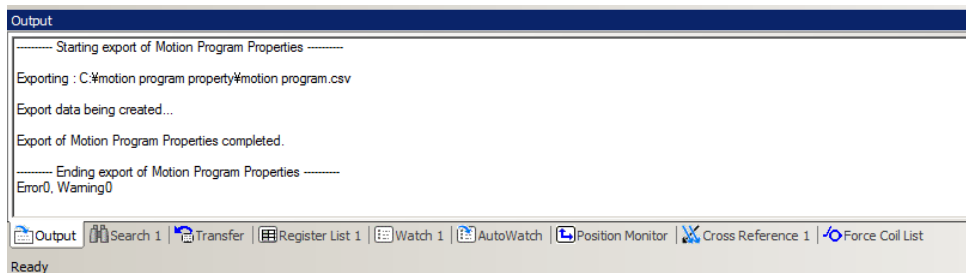


The [Save As] window will be displayed.

4. Set the file name, and click the [Save] button.



The data will be exported, and the results will be displayed in the [Output] window.



This concludes the procedure.

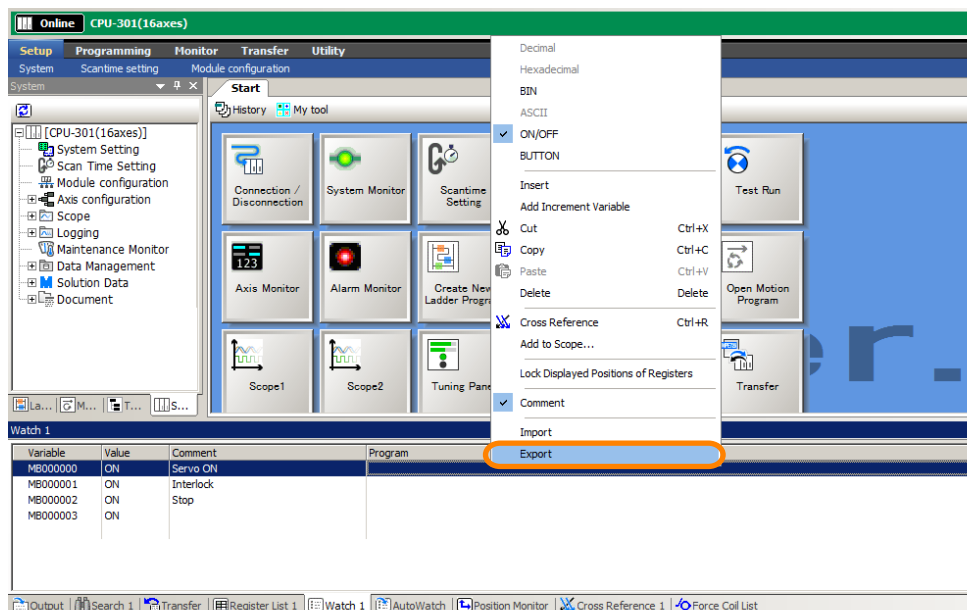
10.3.4 Watch Data

(1) Exporting Data

Use the following procedure to export watch data (variables or registers) registered to the [Watch] window.

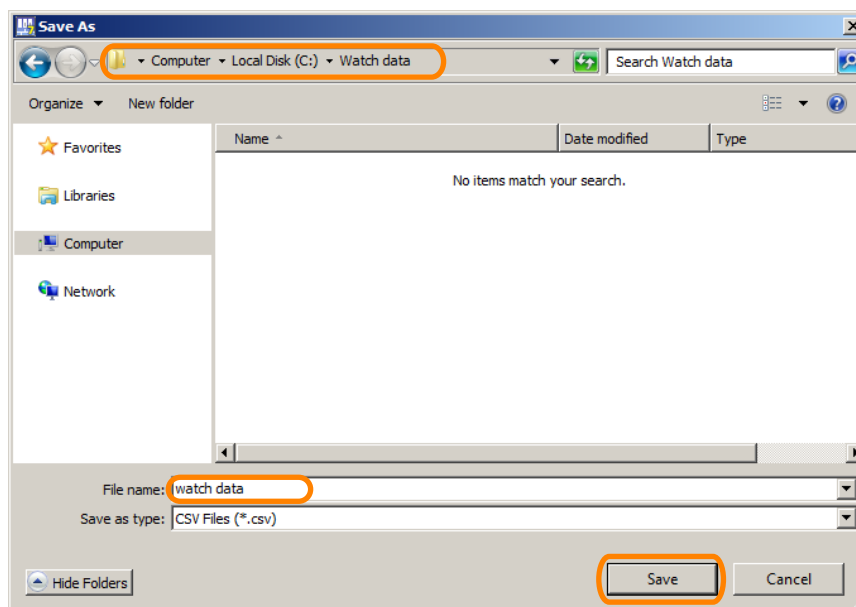
1. Establish an online connection or open a project file.
2. Register the watch data to export to the [Watch] window.

3. Right-click on the [Watch] window, and select [Export].

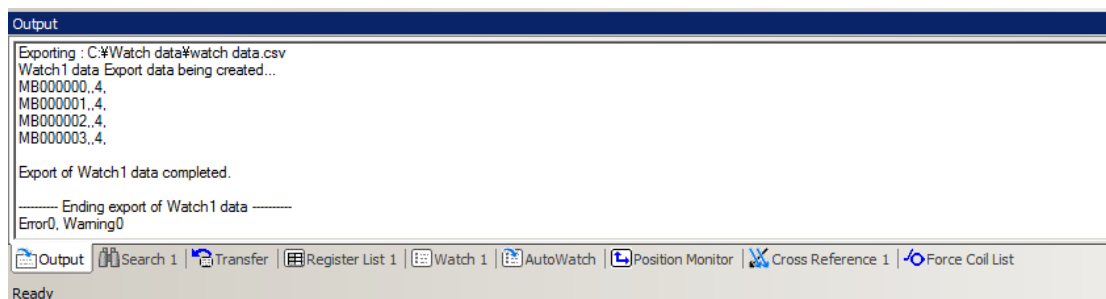


The [Save As] window will be displayed.

4. Specify the destination folder and file name, and click the [Save] button.



The data will be exported, and the results will be displayed in the [Output] window.

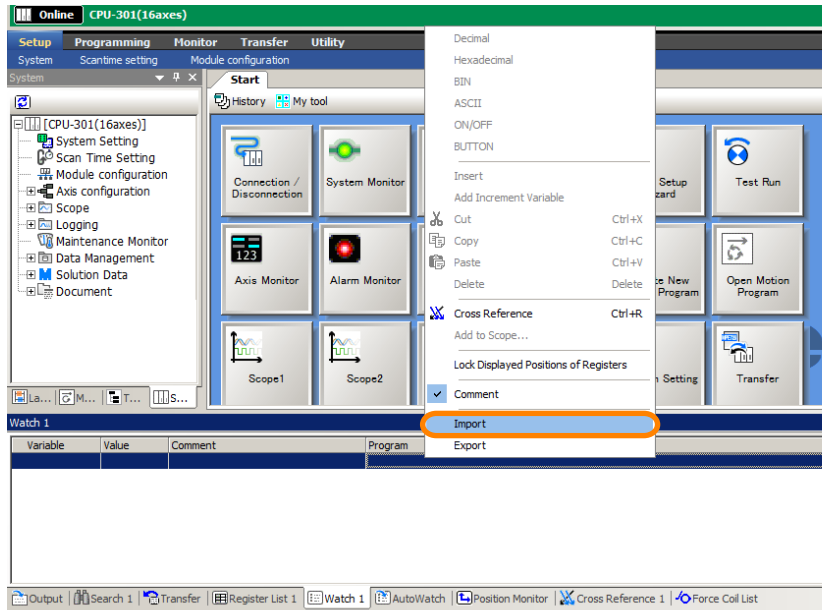


This concludes the procedure.

(2) Importing Data

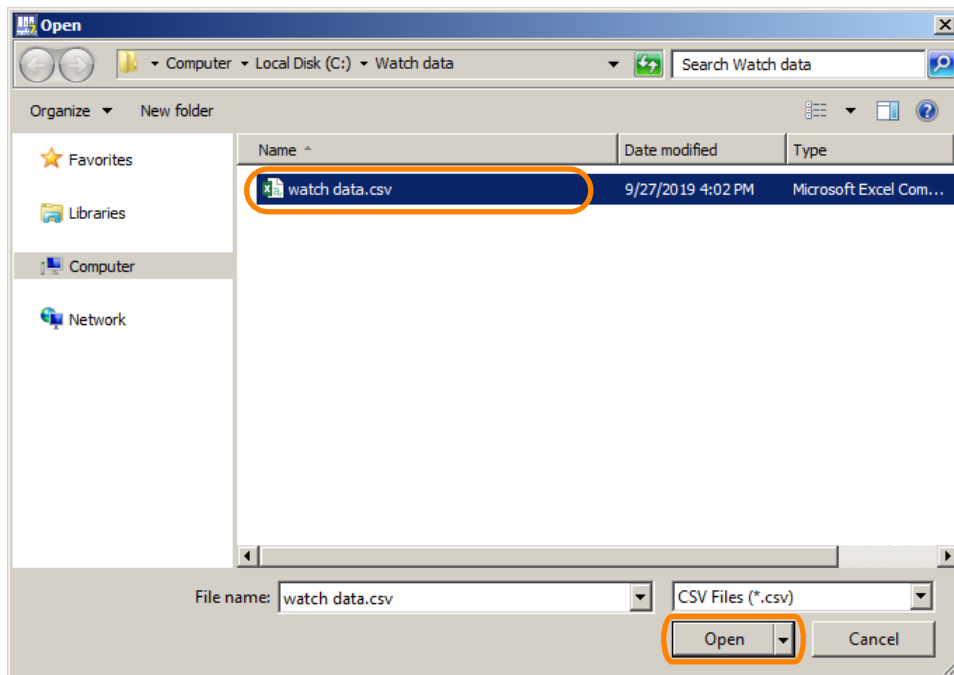
Use the following procedure to import watch data (variables or registers).

1. Establish an online connection or open a project file.
2. Right-click on the [Watch] window, and select [Import].

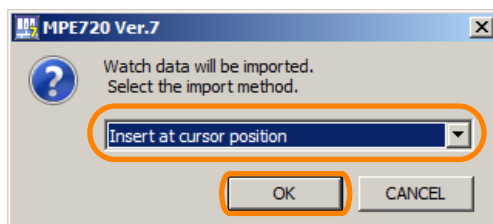


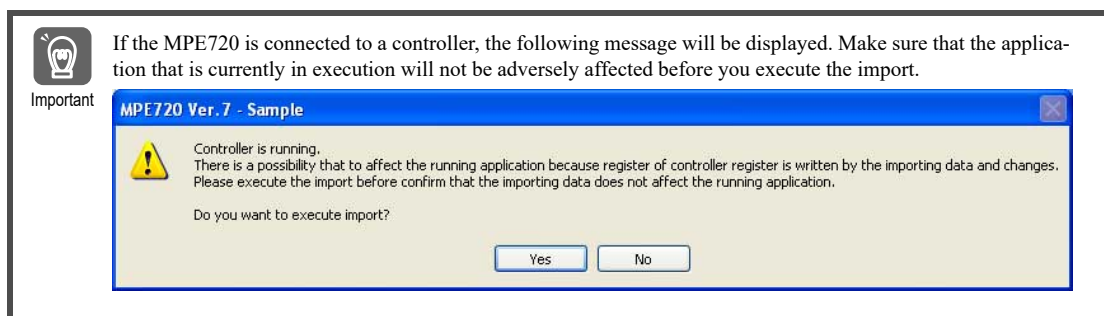
The [Open] window will be displayed.

3. Specify the CSV file to import, and click the [Open] button.

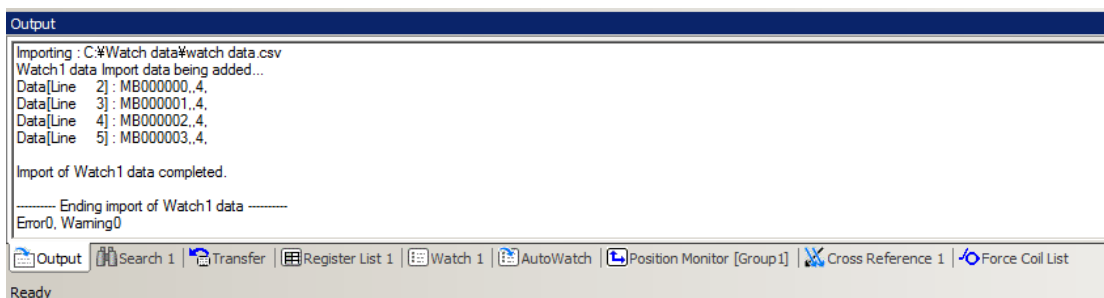


4. Select the import method, and click the [OK] button.





The data will be imported, and the results will be displayed in the [Output] window.



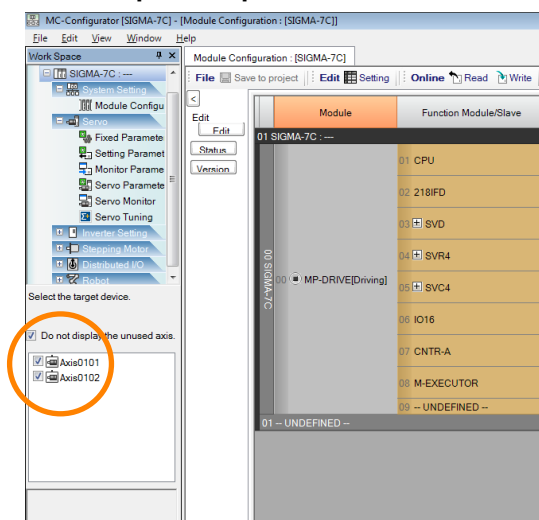
This concludes the procedure.

10.3.5 Axis Parameters

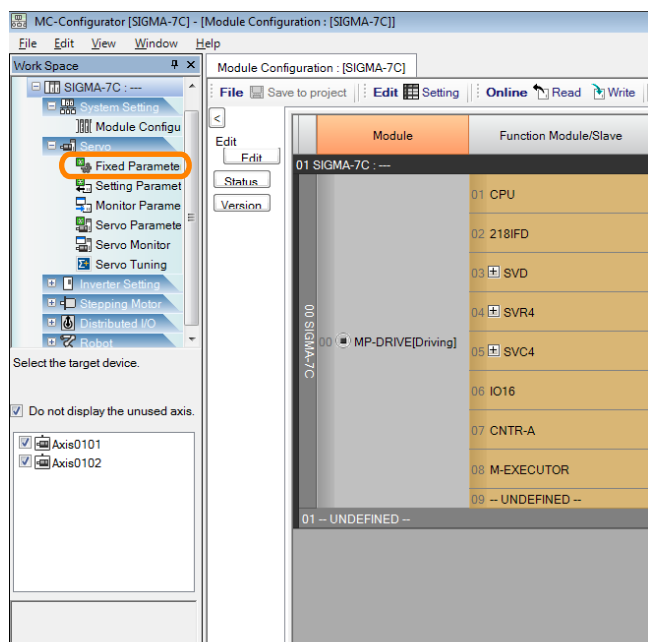
(1) Exporting Data

Use the following procedure to export axis parameters.

1. **Establish an online connection or open a project file.**
2. **Click the [Module Configuration] button on the [My Tool] window.**
The Module Configuration Window will be displayed.
3. **In the [Work Space] window, select the check boxes for the servo axes for which you want to export the parameters.**

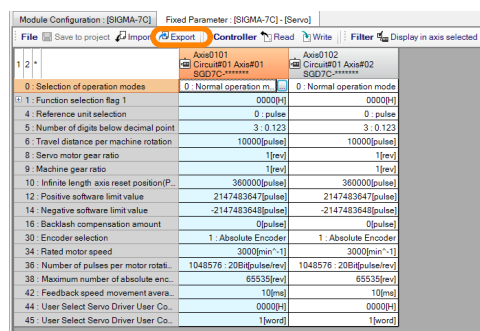


4. Double-click [Fixed Parameter].



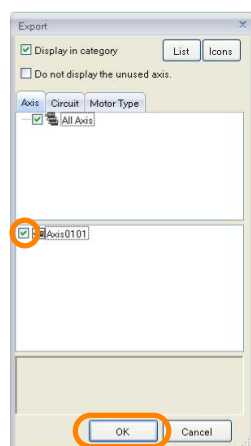
The tab page for the selected axis will be displayed.

5. Click the [Export] button.



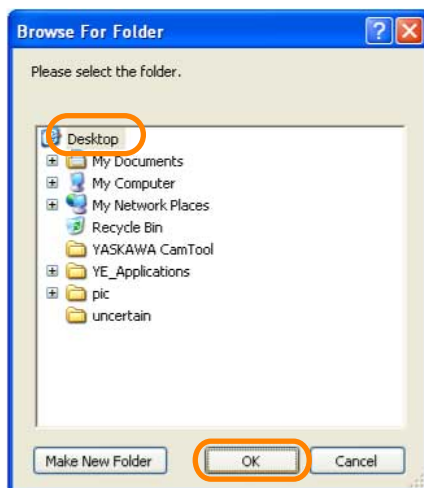
The [Export] window will be displayed.

6. Select the axis for which to export the parameters, and click the [OK] button.



The [Browse For Folder] window will be displayed.

7. **Specify the folder in which to store the exported CSV file, and click the [OK] button.**



When the export is completed, a message dialog box will be displayed.

8. **Click the [OK] button.**



9. **Confirm that the exported data has been stored in the selected folder.**

Information

The name of the data will be displayed as given below.

Data name example: FixPrm □□ □□ .csv

Extension

Circuit number

Axis number

Underbar

Parameter name

- Fixed parameters: FixPrm
- Setting parameters: SetPrm
- Servo parameters: SrvPrm

This concludes the procedure.

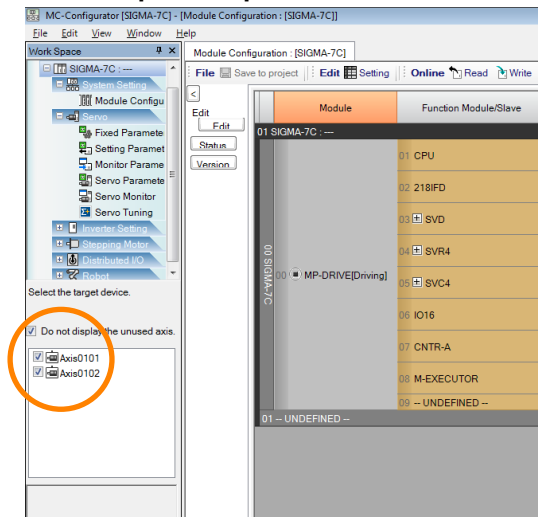
(2) Importing Data

Use the following procedure to import axis parameters.

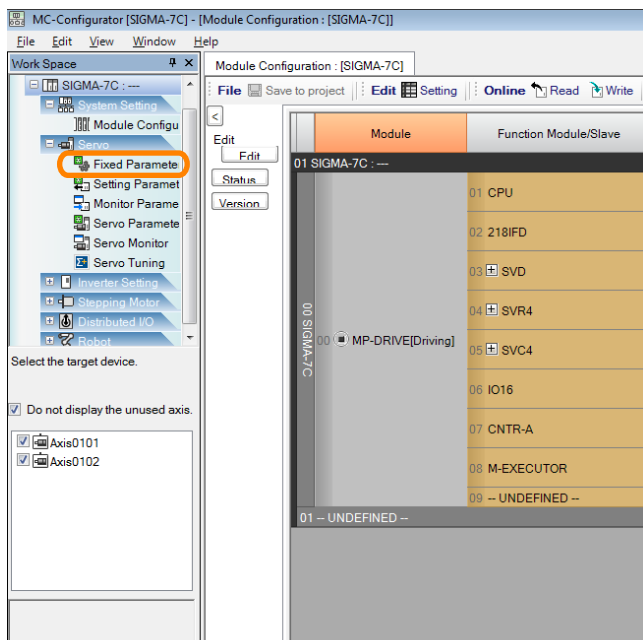
1. **Establish an online connection or open a project file.**
2. **Click the [Module Configuration] button on the [My Tool] window.**

The Module Configuration Window will be displayed.

3. In the [Work Space] window, select the check boxes for the servo axes for which you want to import the parameters.

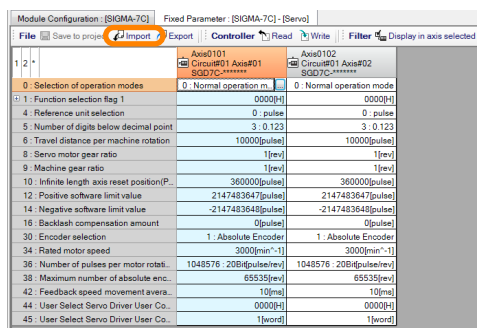


4. Double-click [Fixed Parameter].



The tab page for the selected axis will be displayed.

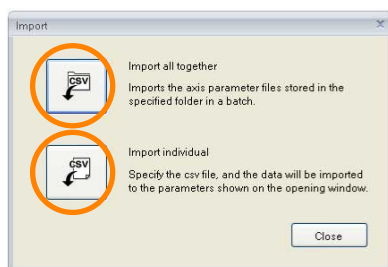
5. Click the [Import] button.



The [Import] window will be displayed.

6. Click the [Import all together] button or the [Import individual] button.

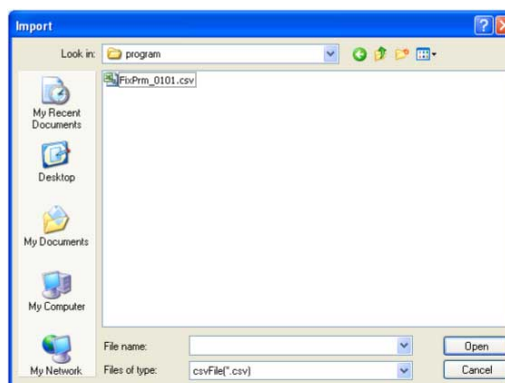
- Import all together: Imports multiple axis parameters in a batch.
- Import individual: Imports individual axis parameters.



- If you clicked the [Import all together] button: The [Browse For Folder] window will be displayed.
- If you clicked the [Import individual] button: The [Import] window will be displayed.

<Import All Together>

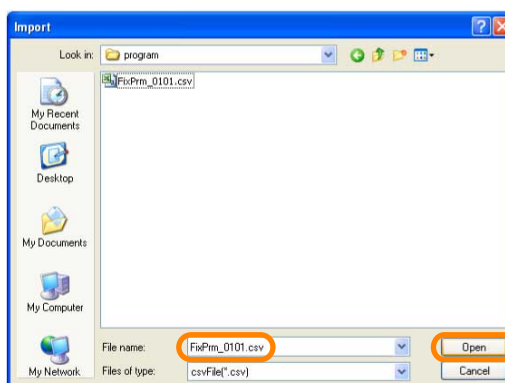
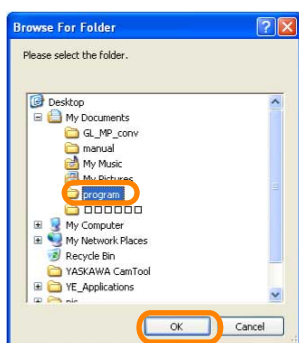
<Import Individual>



7. Specify the folder or file to import, and click the [OK] button or the [Open] button.

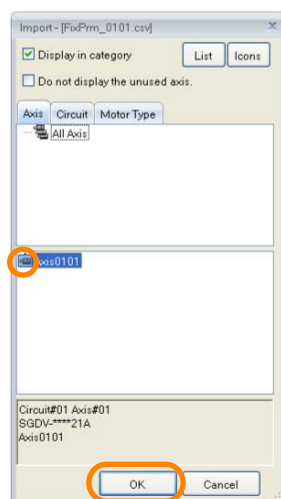
<Import All Together>

<Import Individual>



The [Import] window will be displayed.

8. Select the axis to import, and click the [OK] button.



When the import is completed, a message dialog box will be displayed.

9. Click the [OK] button.



This concludes the procedure.

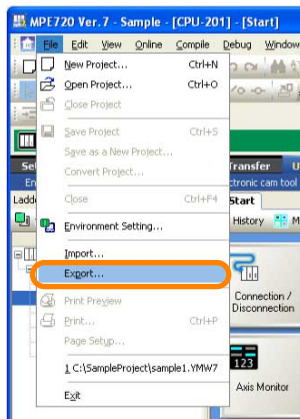
10.3.6 Register Data

You can export register data to or import register data from CSV files to easily back up or change the register data. Users may also create the data that is imported.

(1) Exporting Data

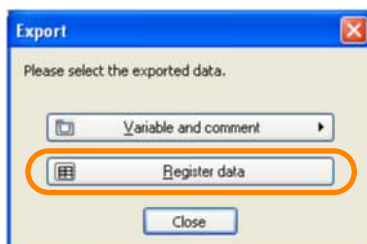
Use the following procedure to export register data.

1. Establish an online connection or open a project file.
2. Select [Export] from the [File] menu.



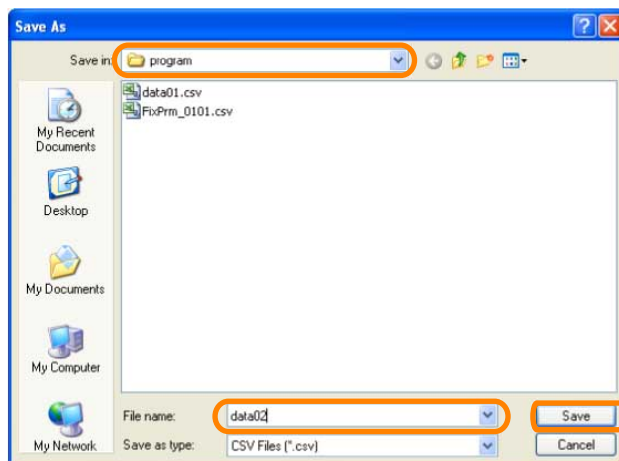
The [Export] window will be displayed.

3. Click the [Register data] button.



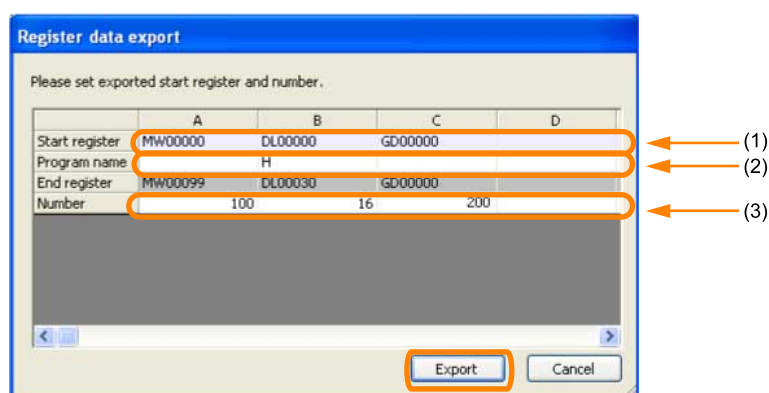
The [Save As] window will be displayed.

4. Specify the destination folder and file name, and click the [Save] button.



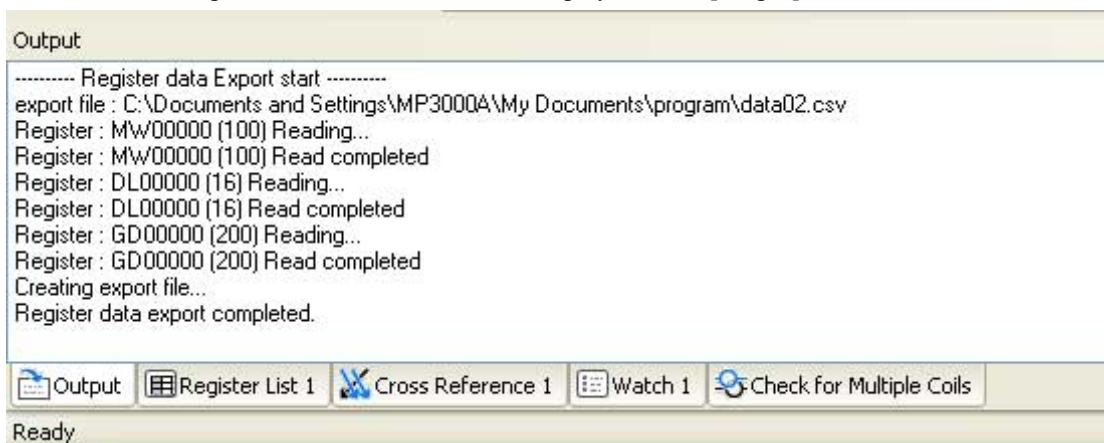
The [Register data export] window will be displayed.

5. Enter the following items, and click the [Export] button.



- (1) The first address of the registers to export
 (2) The program name (for local registers only)
 (3) The number of registers from the first address of the registers to export

The data will be exported, and the results will be displayed in the [Output] window.



6. Confirm that the exported data has been stored in the selected folder.



If a warning dialog box appears, the specified register address may be outside the register range, or the format may be incorrect. Change the value and try again.

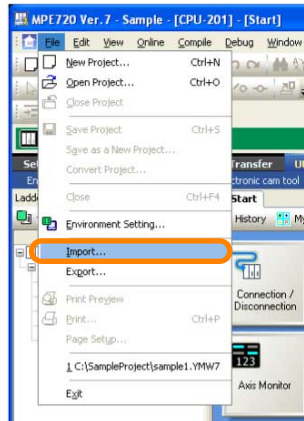
Important

This concludes the procedure.

(2) Importing Data

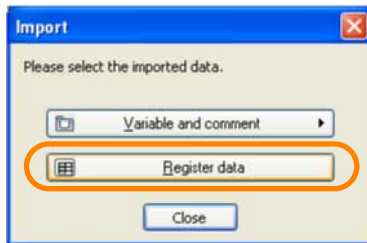
Use the following procedure to import register data.

1. Select [Import] from the [File] menu.



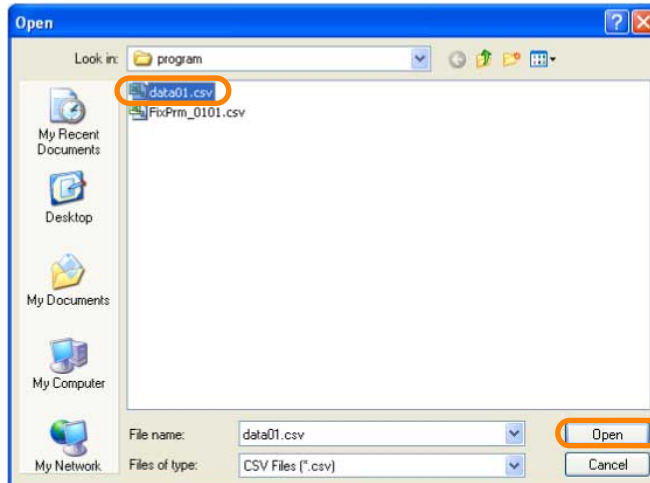
The [Import] window will be displayed.

2. Click the [Register data] button.



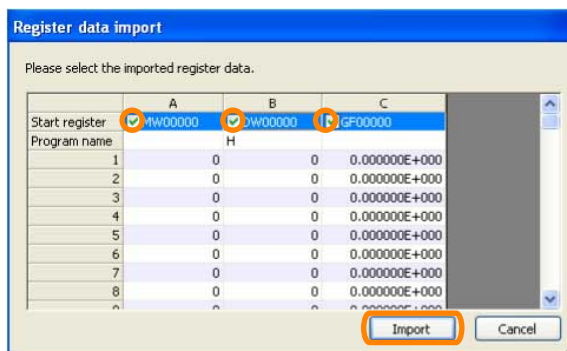
The [Open] window will be displayed.

3. Select the CSV file to import, and click the [Open] button.

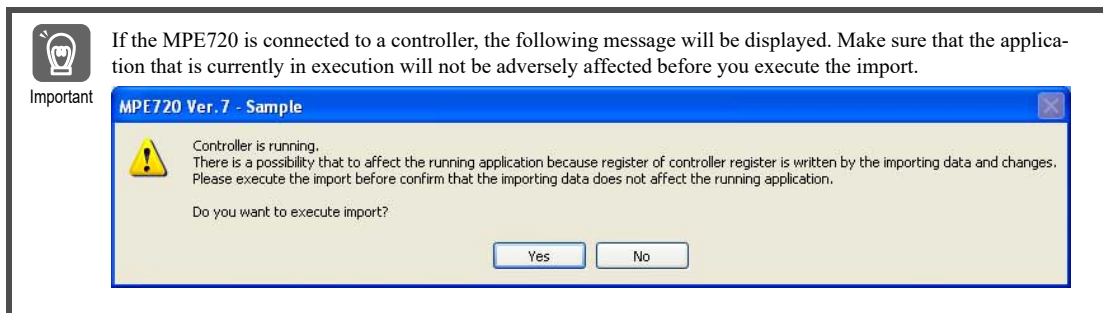


The [Register data import] window will be displayed.

4. Select the check box of the registers to import, and click the [Import] button.



The data will be imported.



This concludes the procedure.

10.3.7 Global Variables and Comments & Variables and Comments

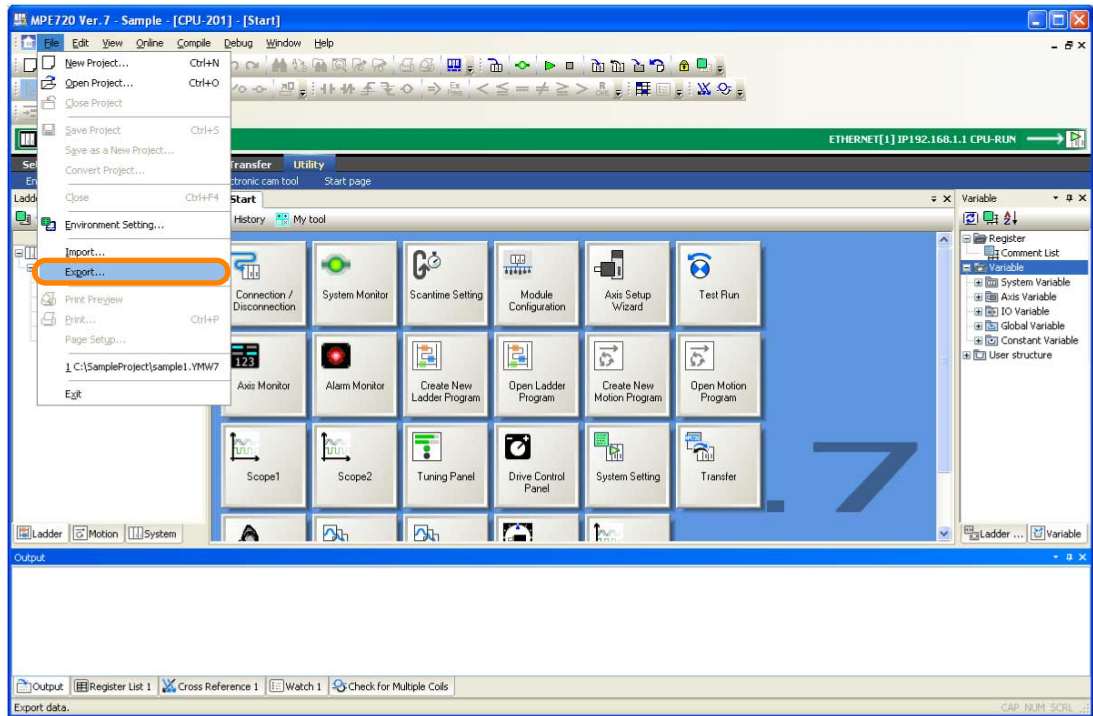
Information When using a model that does not support multiple scans, you can import and export global variables and comments.
When using a model that supports multiple scans, you can import and export scan variables and comments.

(1) Exporting Data

Use the following procedure to export global variables and comments or scan variables and comments.

1. Establish an online connection or open a project file.

2. Select [Export] from the [File] menu.

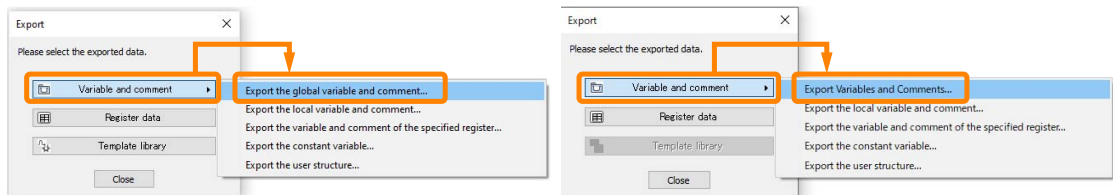


Information

You can also right-click on the [Comment List] tab page and select [Export] - [Export the global variable and comment] or [Export Variables and Comments] from the displayed menu.

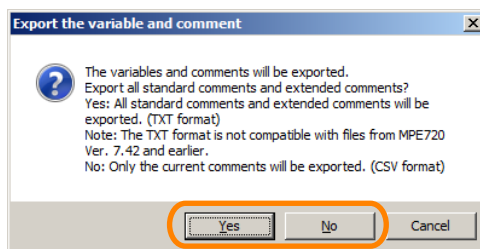
The [Export] window will be displayed.

3. Click the [Variable and comment] button and select [Export the global variable and comment] or [Export Variables and Comments].



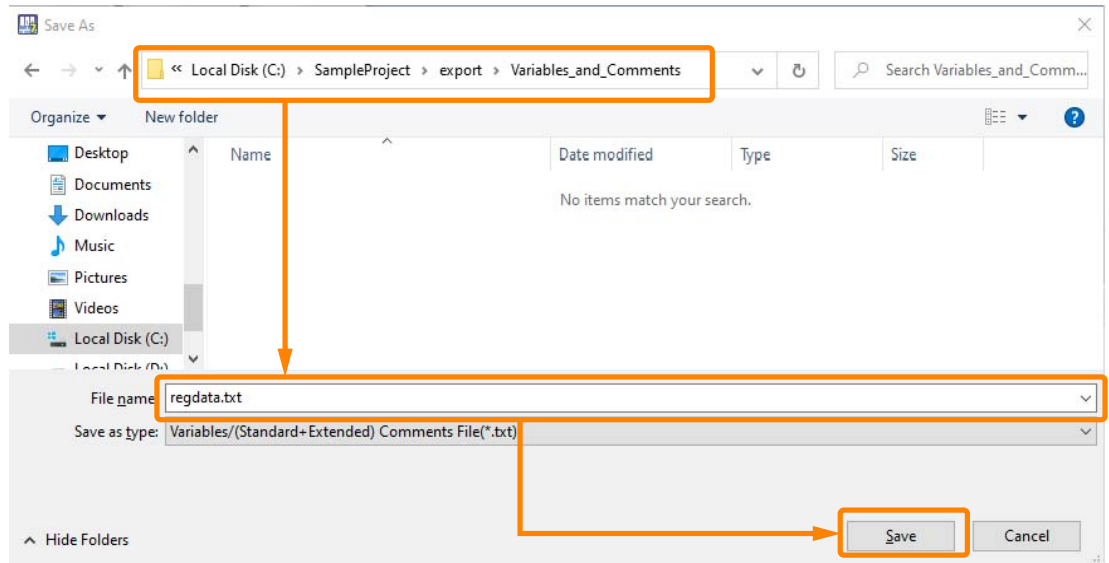
A message dialog box will be displayed.

4. Select [Yes] or [No].



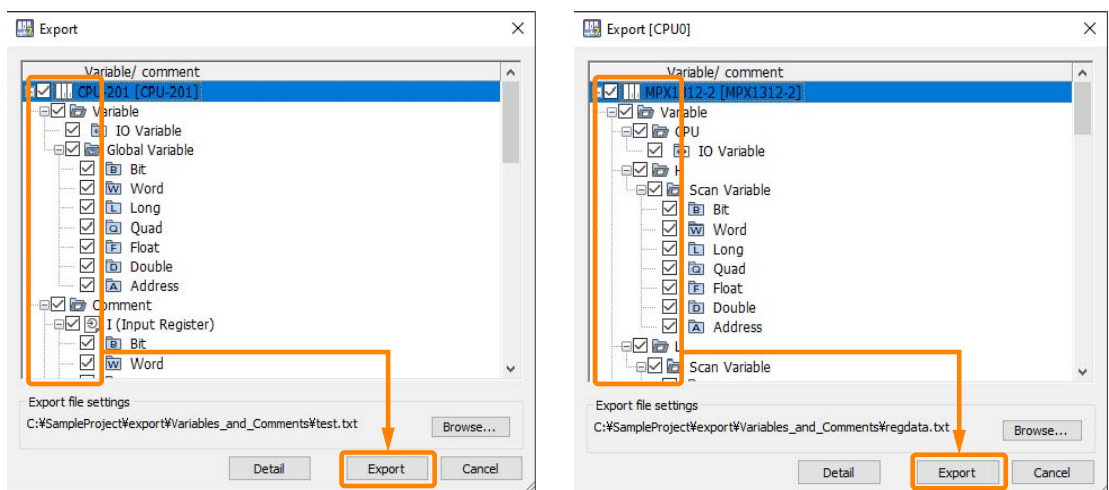
The [Save As] window will be displayed.

5. Specify the destination folder and file name for the export data, and click the [Save] button.



The [Export] window will be displayed.

6. Select the check box of the variables and comments to export, and click the [Export] button.



The data will be exported.

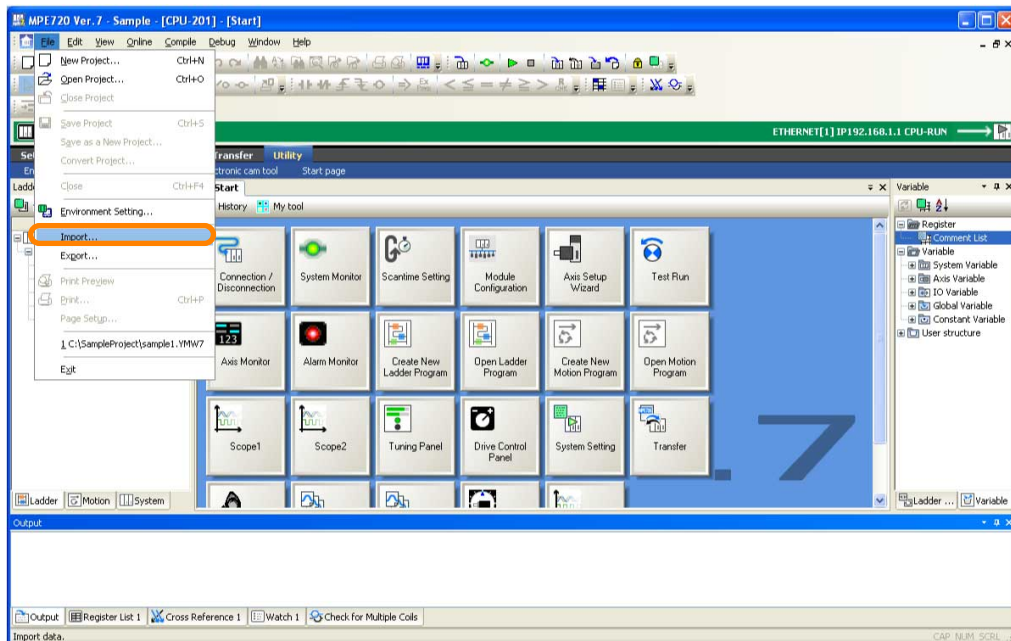
This concludes the procedure.

(2) Importing Data

Use the following procedure to import global variables and comments or scan variables and comments.

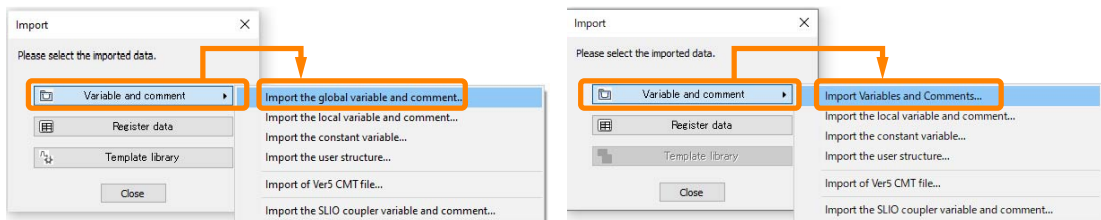
1. Establish an online connection or open a project file.

2. Select [Import] from the [File] menu.



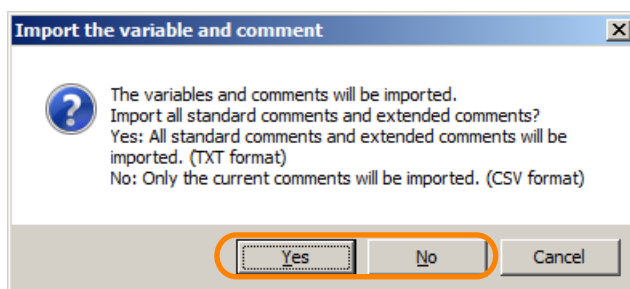
The [Import] window will be displayed.

3. Click the [Variable and comment] button and select [Import the global variable and comment] or [Import Variables and Comments].



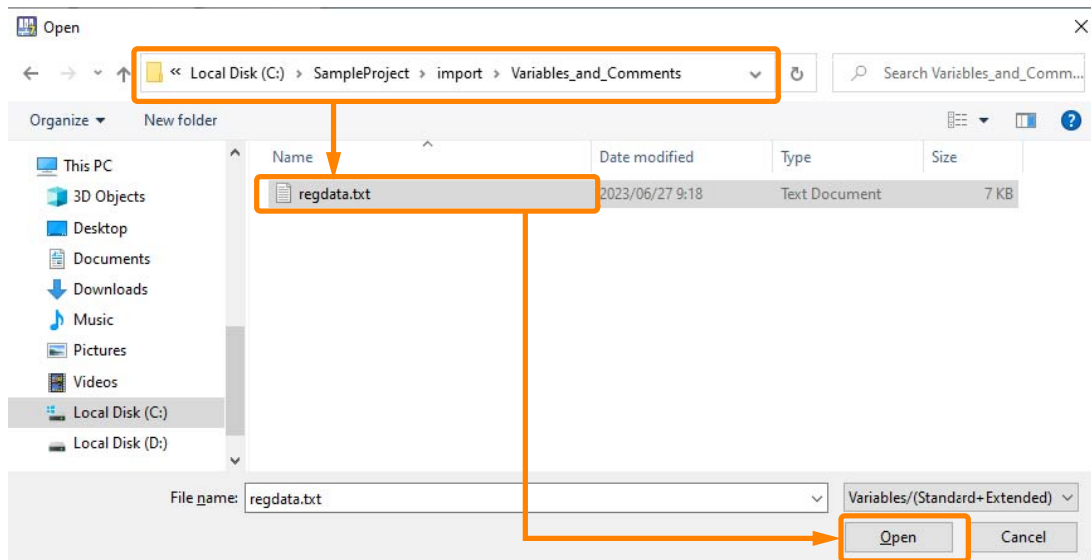
A message dialog box will be displayed.

4. Select [Yes] or [No].



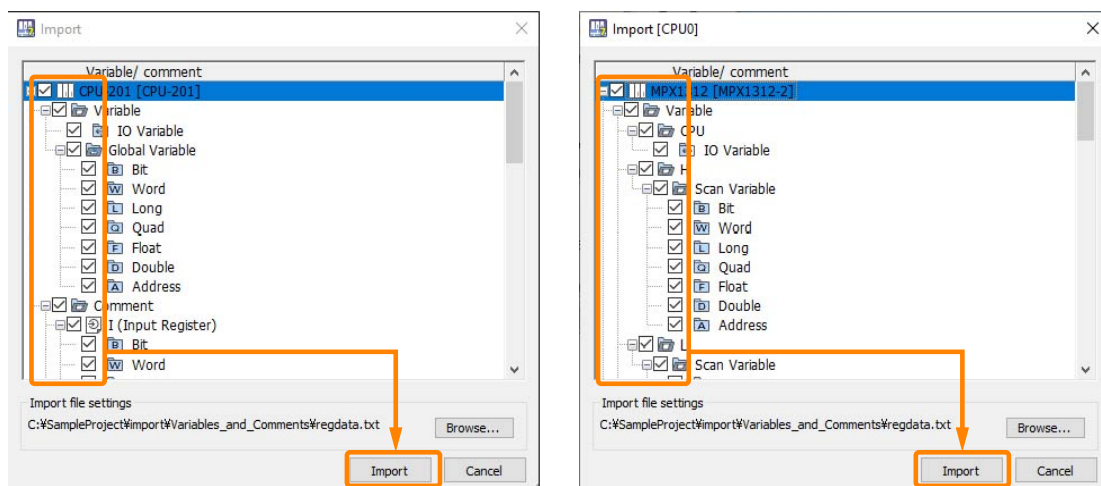
The [Open] window will be displayed.

5. Specify the file to import, and click the [Open] button.



The [Import] window will be displayed.

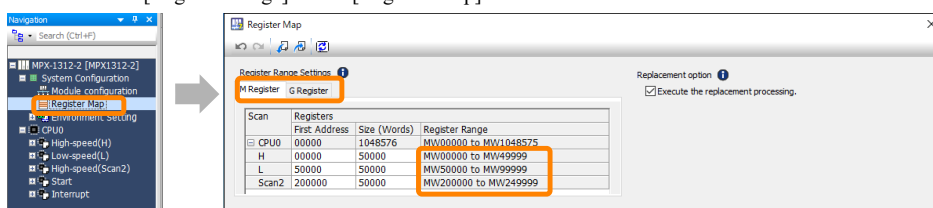
6. Select the check box of the variables and comments to import, and click the [Import] button.



Information

When using a model that supports multiple scans and there are registers not included in the scan number selected for the variable/comment to import, that register data will not be imported.

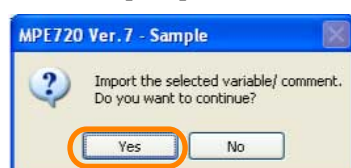
Double-click [Register Map] in the [Navigation] window and you can check the registers included in the scan number in [Register Range] on the [Register Map] window.



For example, if only "H" is selected in the above [Import] window, only the data in registers MW00000 to MW49999 will be imported, and the data in the other registers will not be imported.

A message dialog box will be displayed.

7. Click the [Yes] button.



The data will be imported.

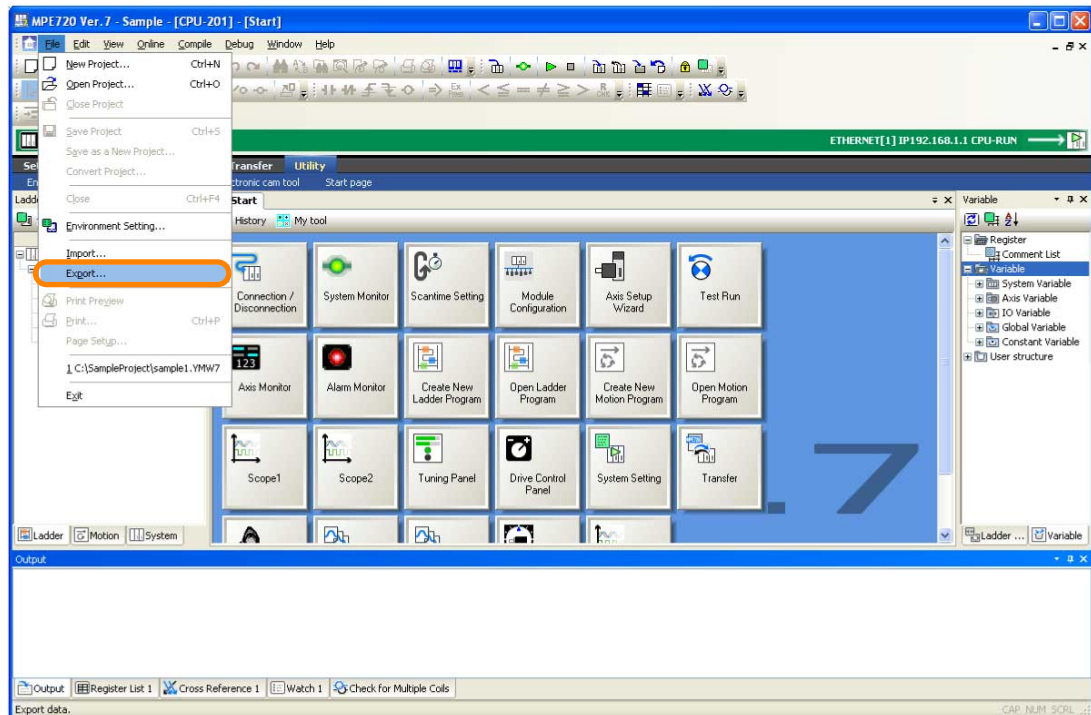
This concludes the procedure.

10.3.8 Local Variables and Comments

(1) Exporting Data

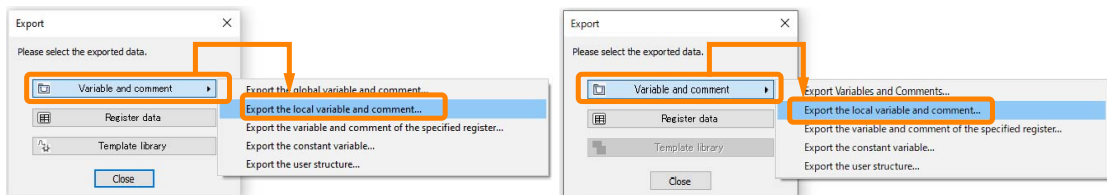
Use the following procedure to export local variables and comments.

1. Establish an online connection or open a project file.
2. Select [Export] from the [File] menu.



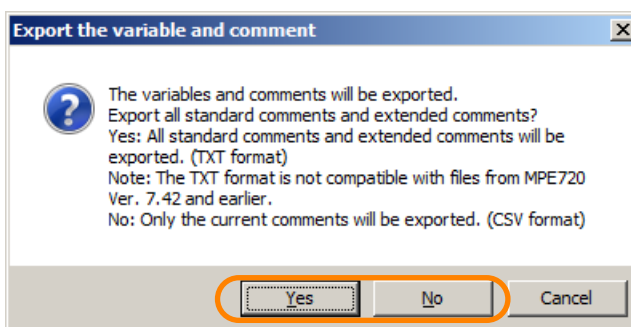
The [Export] window will be displayed.

3. Click the [Variable and comment] button and select [Export the local variable and comment].



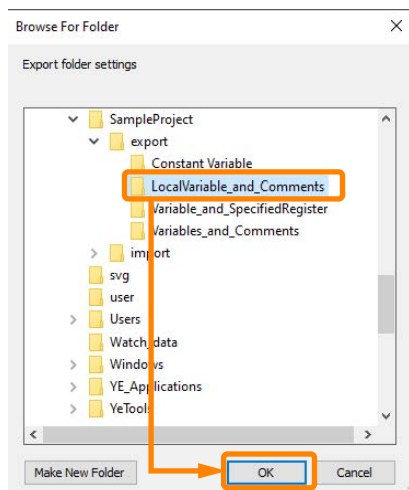
A message dialog box will be displayed.

4. Select [Yes] or [No].



The [Browse For Folder] window will be displayed.

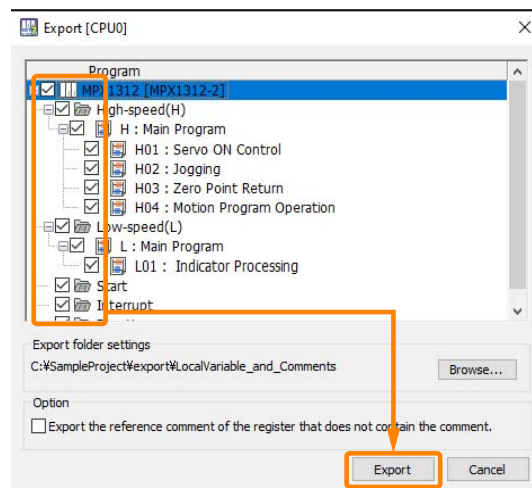
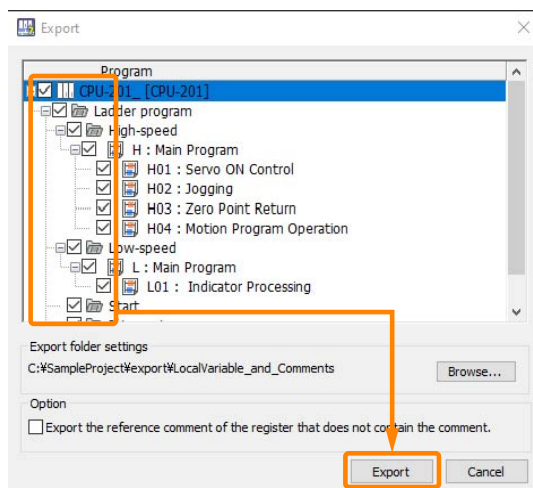
5. **Specify the folder to which the data will be exported, and click the [OK] button.**



The [Export] window will be displayed.

6. **Select the check box of the programs to export, and click the [Export] button.**

Information Select the check box under [Option] as necessary.



The data will be exported.

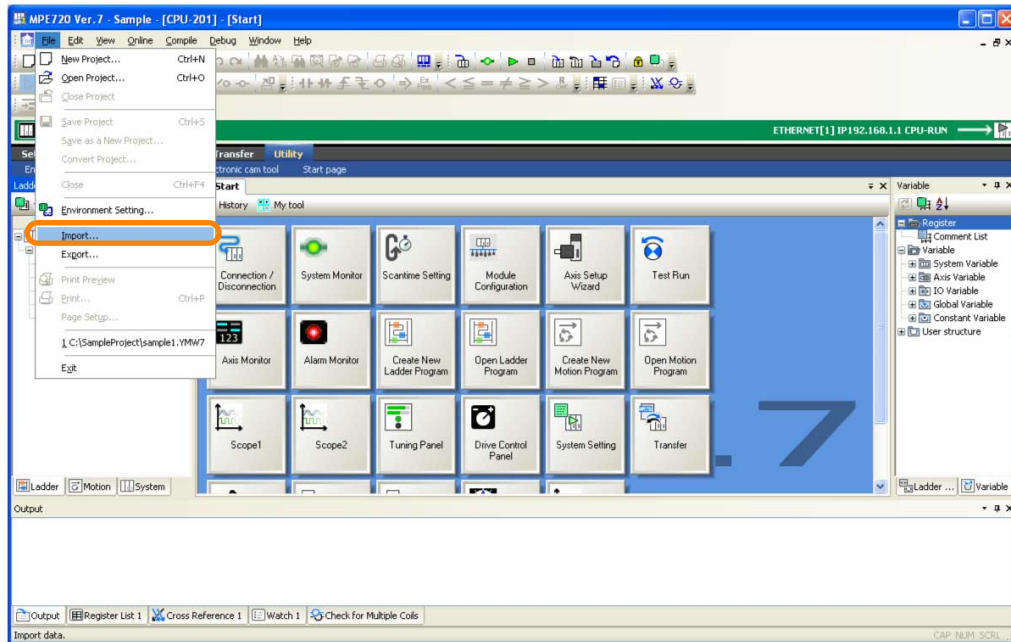
This concludes the procedure.

(2) Importing Data

Use the following procedure to import local variables and comments.

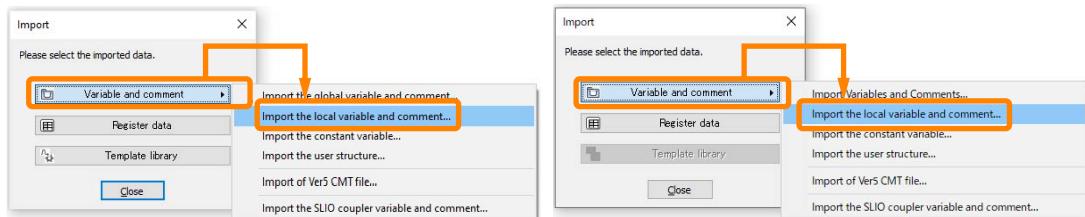
1. **Establish an online connection or open a project file.**

2. Select [Import] from the [File] menu.



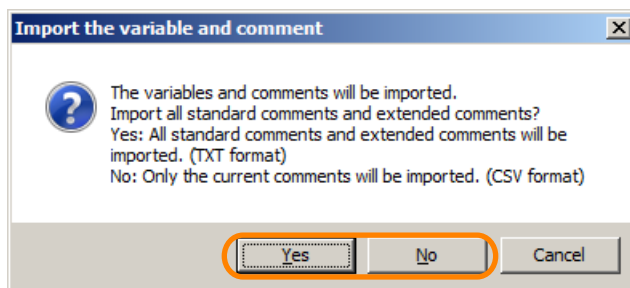
The [Import] window will be displayed.

3. Click the [Variable and comment] button and select [Import the local variable and comment].



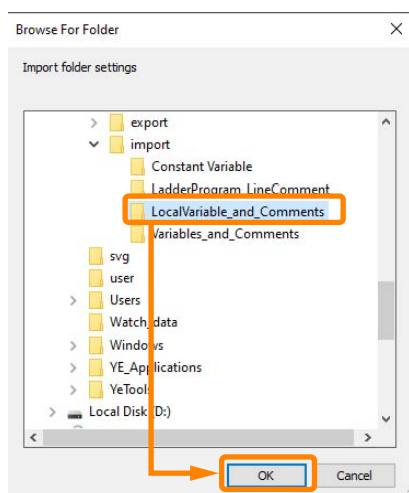
A message dialog box will be displayed.

4. Select [Yes] or [No].



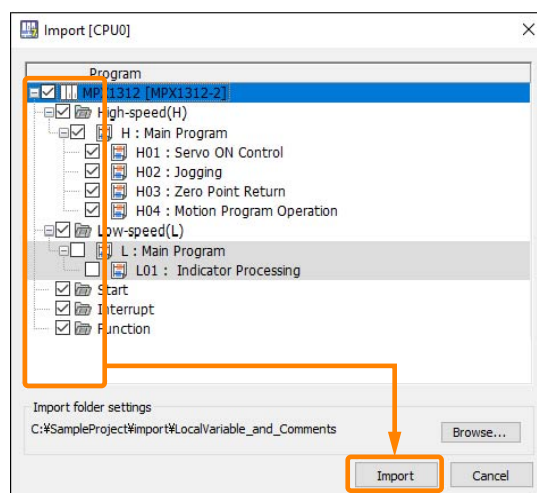
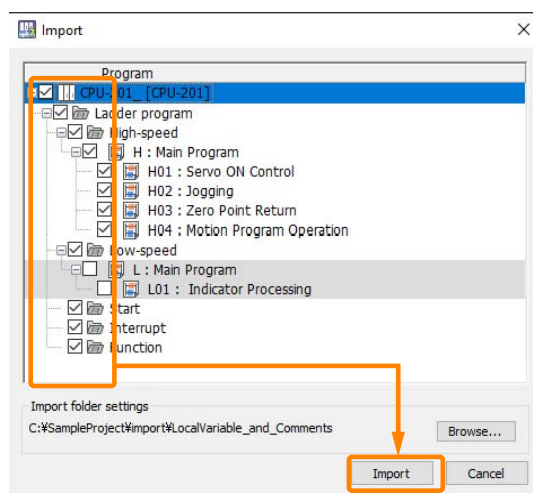
The [Browse For Folder] window will be displayed.

5. Specify the folder from which the data will be imported, and click the [OK] button.



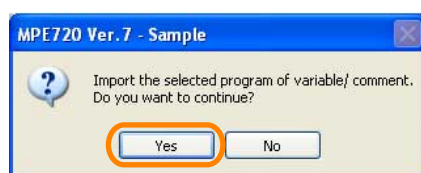
The [Import] window will be displayed.

6. Select the check box of the programs to import, and click the [Import] button.



A message dialog box will be displayed.

7. Click the [Yes] button.



The data will be imported.

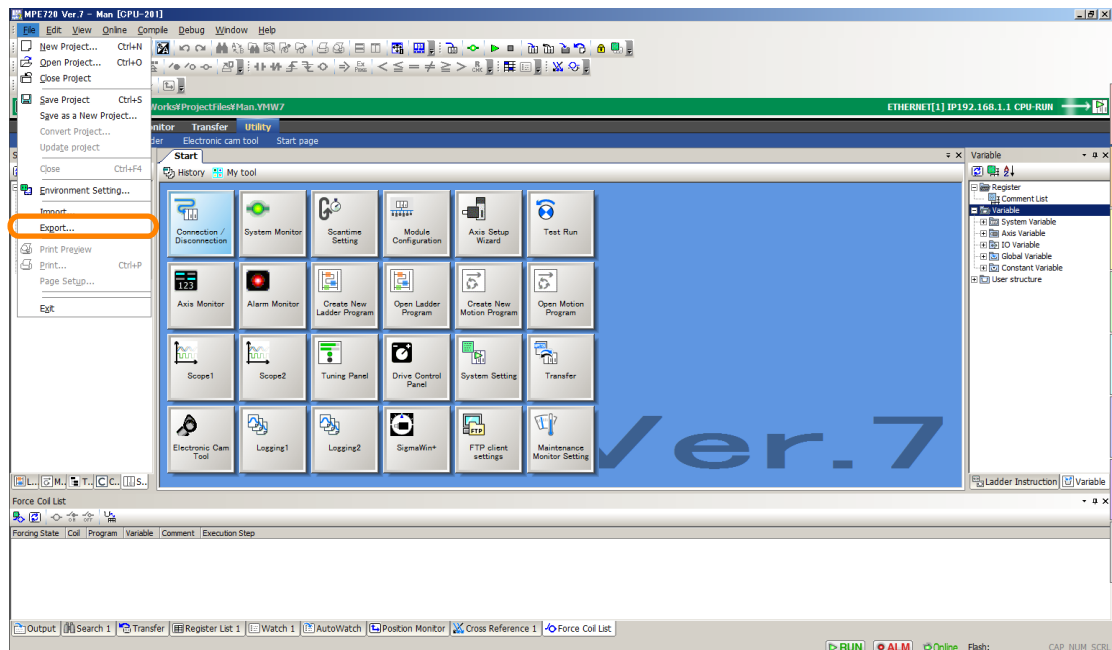
This concludes the procedure.

10.3.9 Specified Register Variables and Comments

Use the following procedure to export the specified range of register variables and comments.

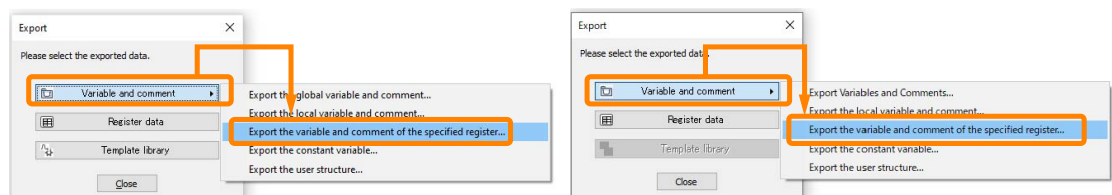
1. Establish an online connection or open a project file.

2. Select [Export] from the [File] menu.



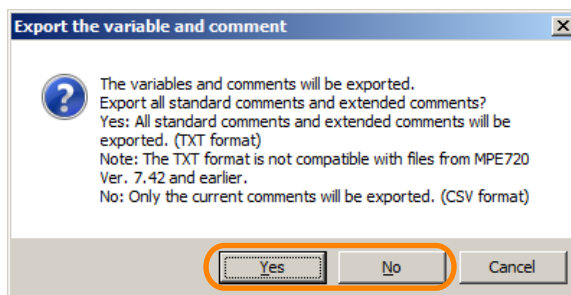
The [Export] window will be displayed.

3. Click the [Variable and comment] button and select [Export the variable and comment of the specified register].



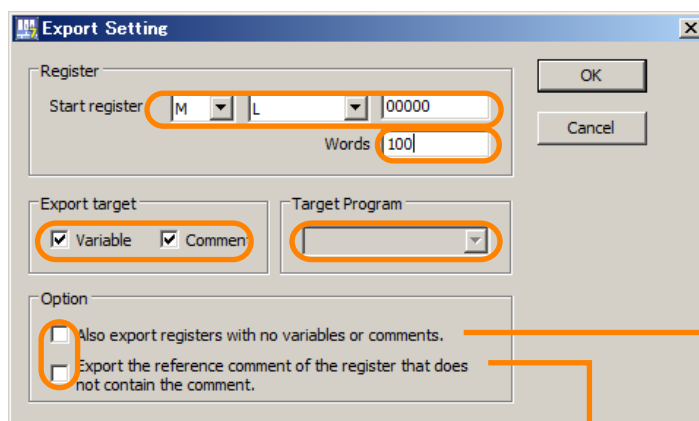
A message dialog box will be displayed.

4. Select [Yes] or [No].



The [Export Setting] window will be displayed.

5. Set the following items, and then click the [OK] button.

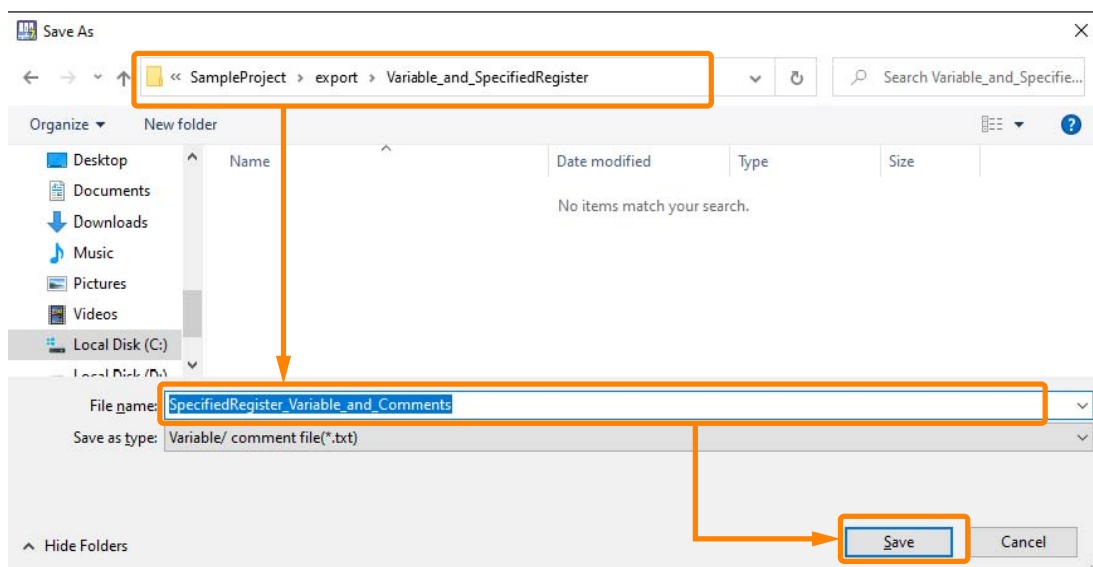


If this check box is selected, the specified range of registers will be exported even if there are registers for which variables and comments are not registered.

If this check box is selected, reference comments will also be exported.

The [Save As] window will be displayed.

6. Specify the destination folder and file name, and click the [Save] button.



The data will be exported.

This concludes the procedure.

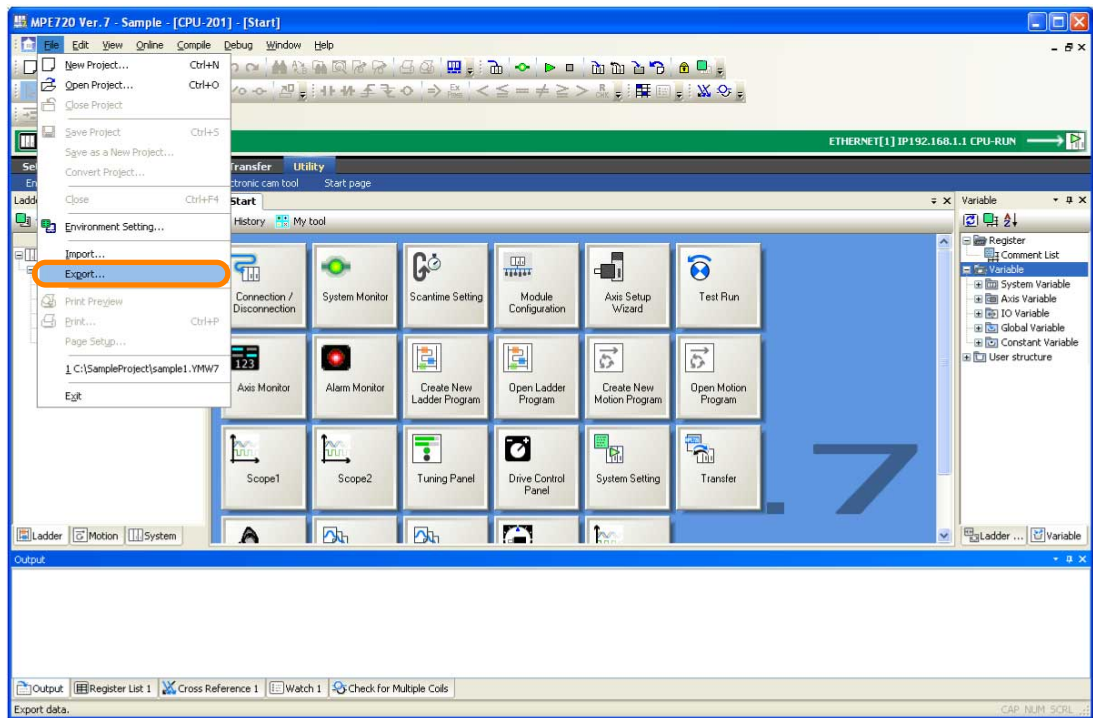
10.3.10 Constant Variables

(1) Exporting Data

Use the following procedure to export constant variables.

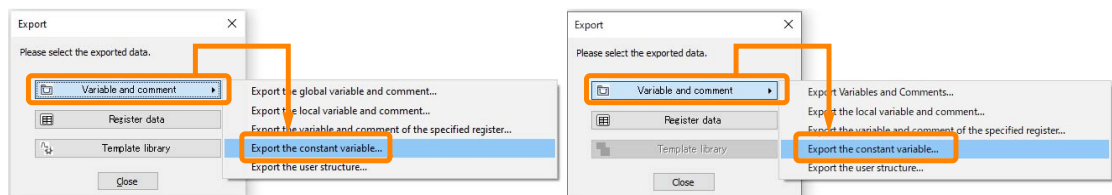
1. Establish an online connection or open a project file.

2. Select [Export] from the [File] menu.



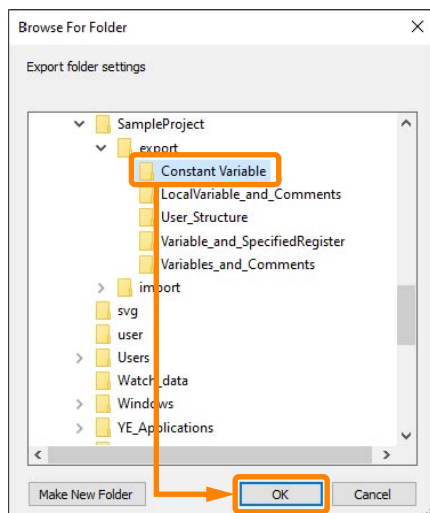
The [Export] window will be displayed.

3. Click the [Variable and comment] button and select [Export the constant variable].



The [Browse For Folder] window will be displayed.

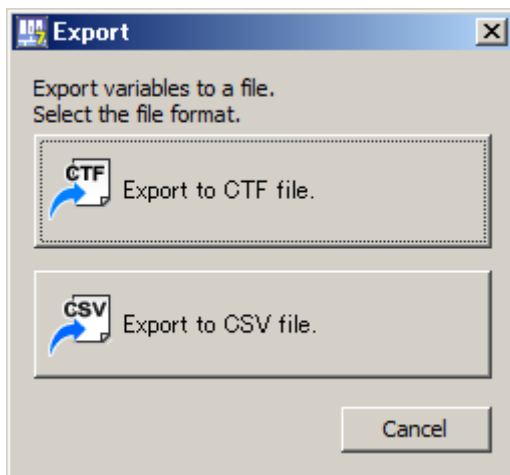
4. Specify the folder to which the data will be exported, and click the [OK] button.



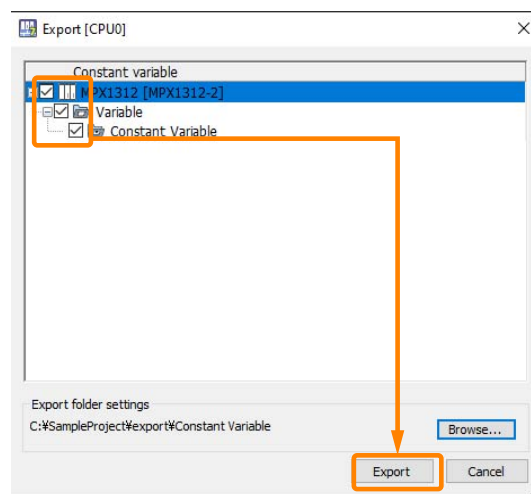
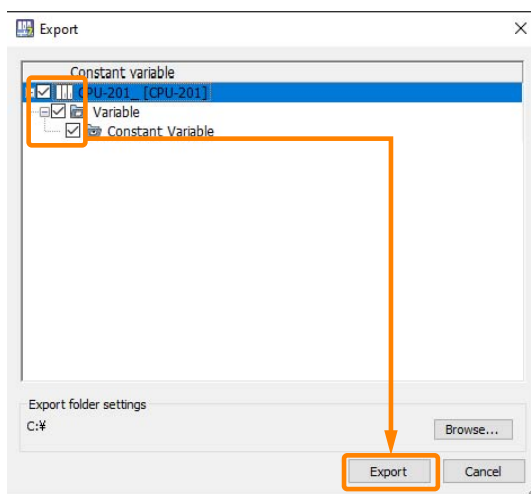
The [Export] window will be displayed.

5. Select the format of the file to export.

- CTF file: Binary file format
- CSV file: CSV file format



6. Select the check box of the constant variables to export, and click the [Export] button.



The data will be exported.

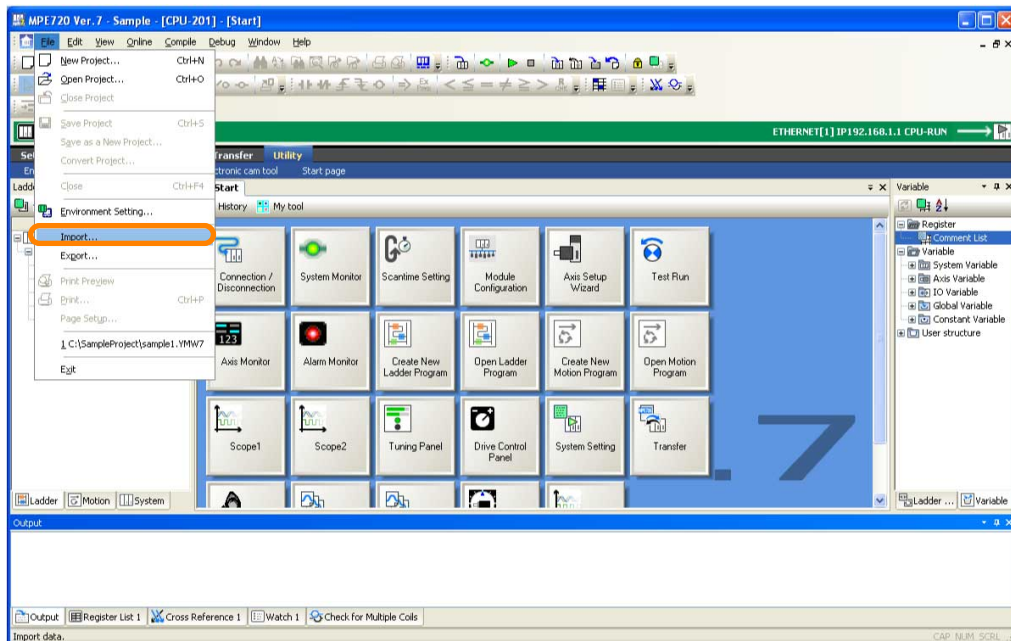
This concludes the procedure.

(2) Importing Data

Use the following procedure to import constant variables.

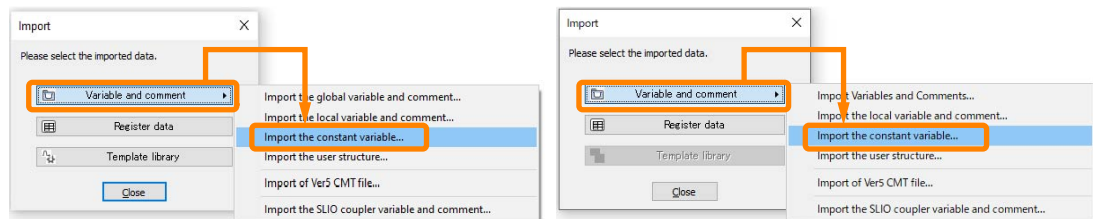
1. Establish an online connection or open a project file.

2. Select [Import] from the [File] menu.



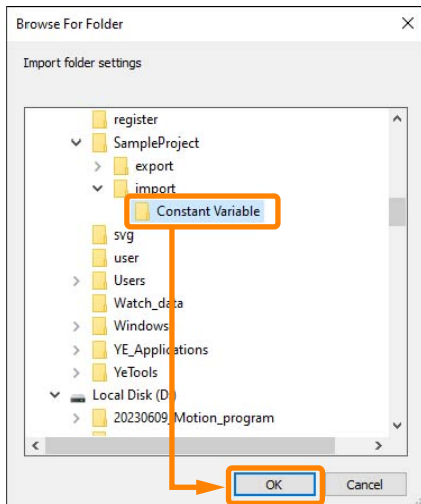
The [Import] window will be displayed.

3. Click the [Variable and comment] button and select [Import the constant variable].



The [Browse For Folder] window will be displayed.

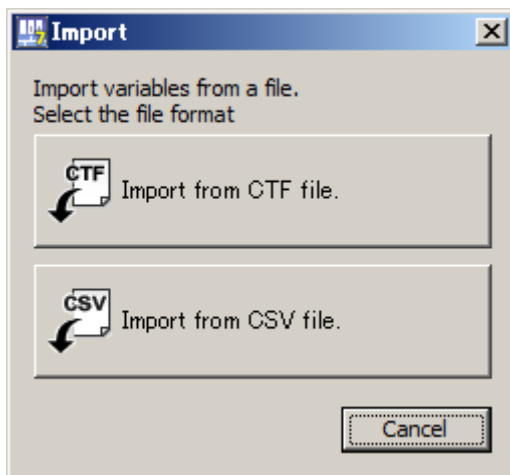
4. Select the folder from which the data will be imported, and click the [OK] button.



The [Import] window will be displayed.

5. Select the format of the file to import.

- CTF file: Binary file format
- CSV file: CSV file format

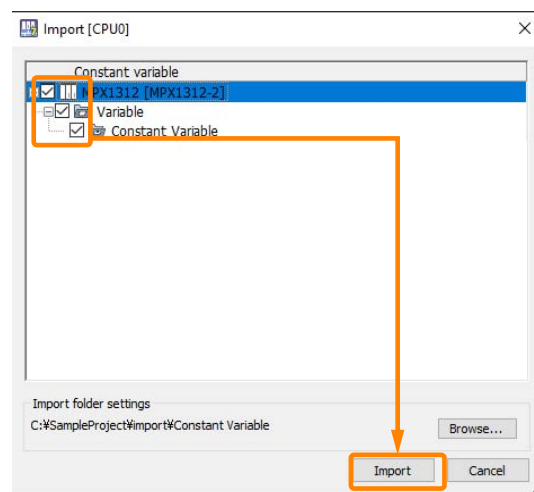
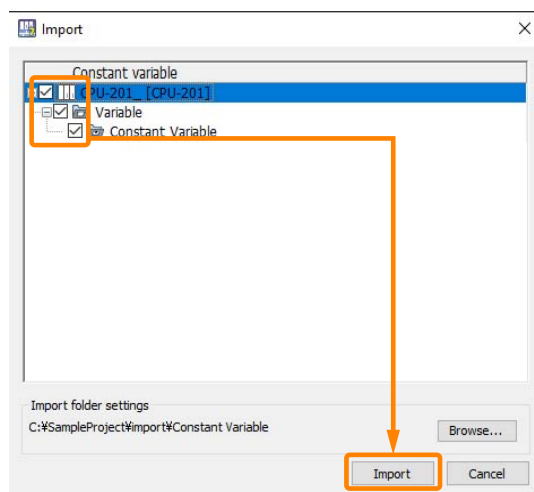


6. Select the check box of the variables to import, and click the [Import] button.

Information

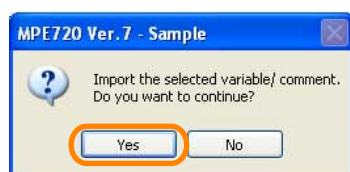
The import may fail if the number of constant variables to import exceeds 200 variables.

You can import more than 200 constant variables, but splitting those constant variables into smaller groups is recommended.



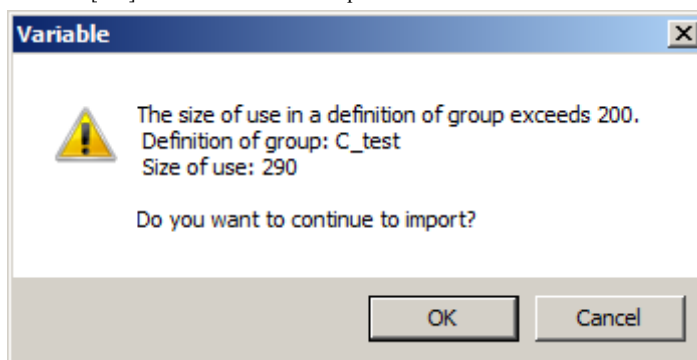
A message dialog box will be displayed.

7. Click the [Yes] button.



Information

If there are more than 200 constant variables to import, the following message dialog box will be displayed. Click the [OK] button to execute the import.



The data will be imported.

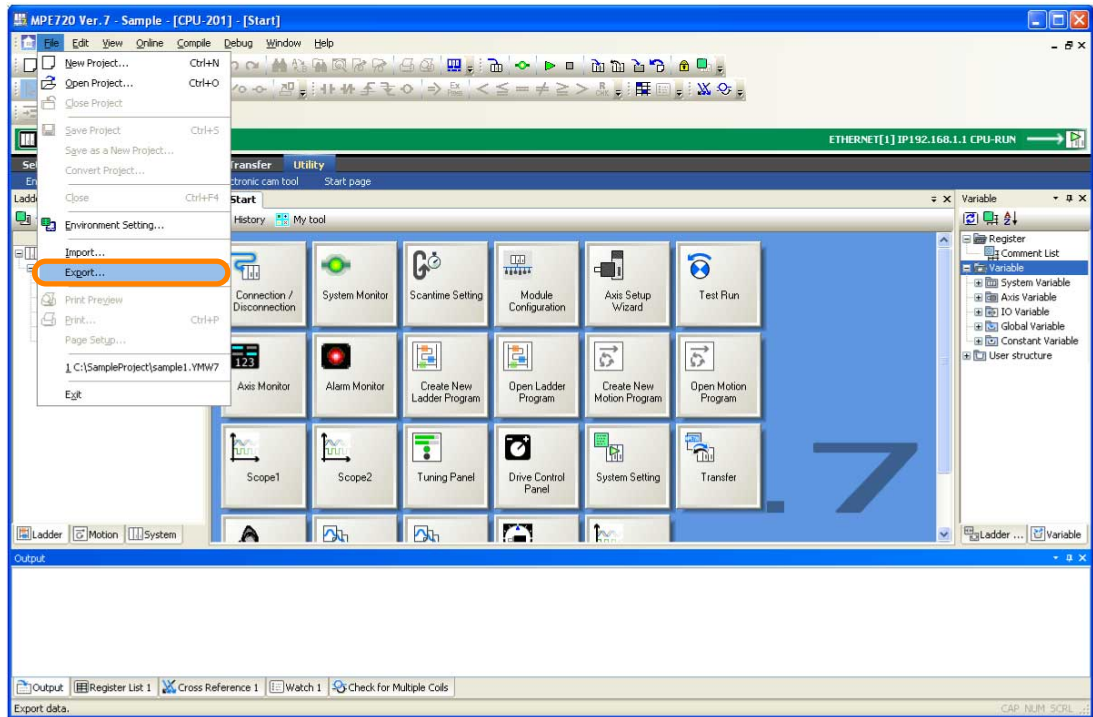
This concludes the procedure.

10.3.11 User-Defined Structures

(1) Exporting Data

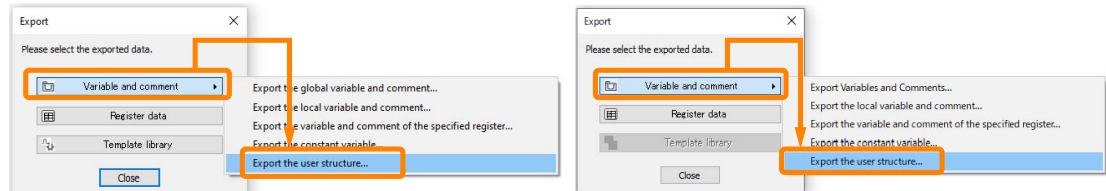
Use the following procedure to export user-defined structures.

1. Establish an online connection or open a project file.
2. Select [Export] from the [File] menu.



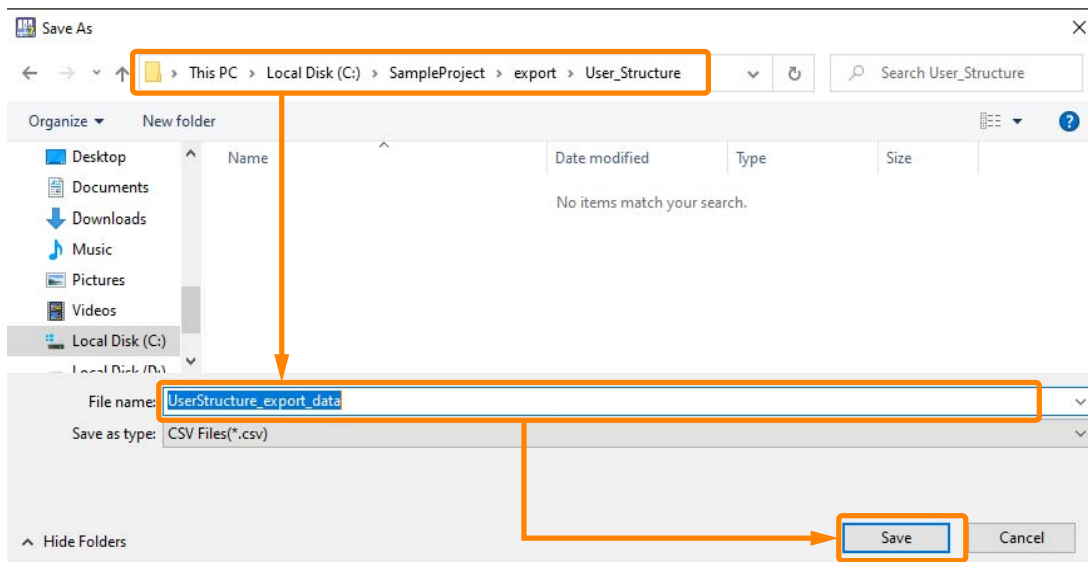
The [Export] window will be displayed.

3. Click the [Variable and comment] button and select [Export the user structure].



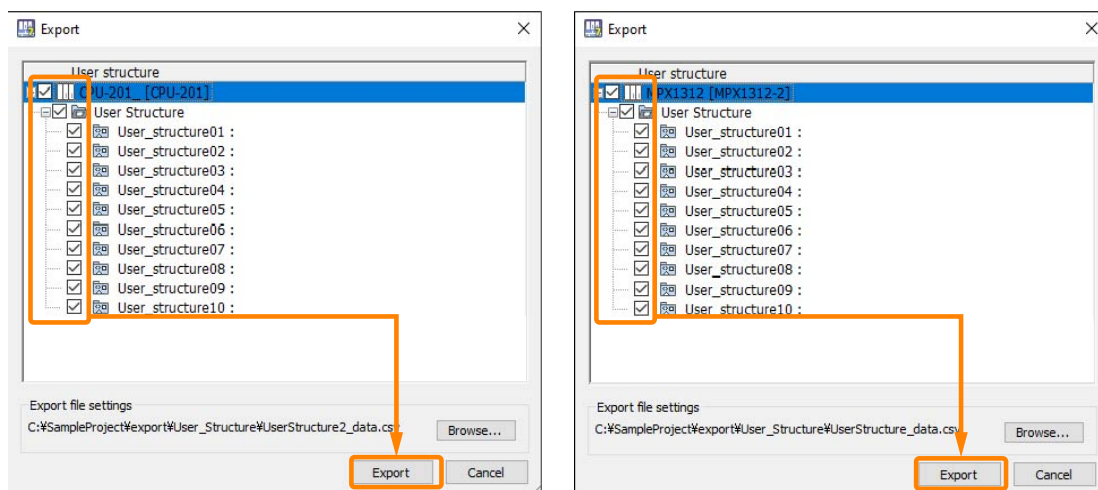
The [Save As] window will be displayed.

4. Specify the destination folder and file name, and click the [Save] button.



The [Export] window will be displayed.

5. Select the check box of the user-defined structures to export, and click the [Export] button.



The data will be exported.

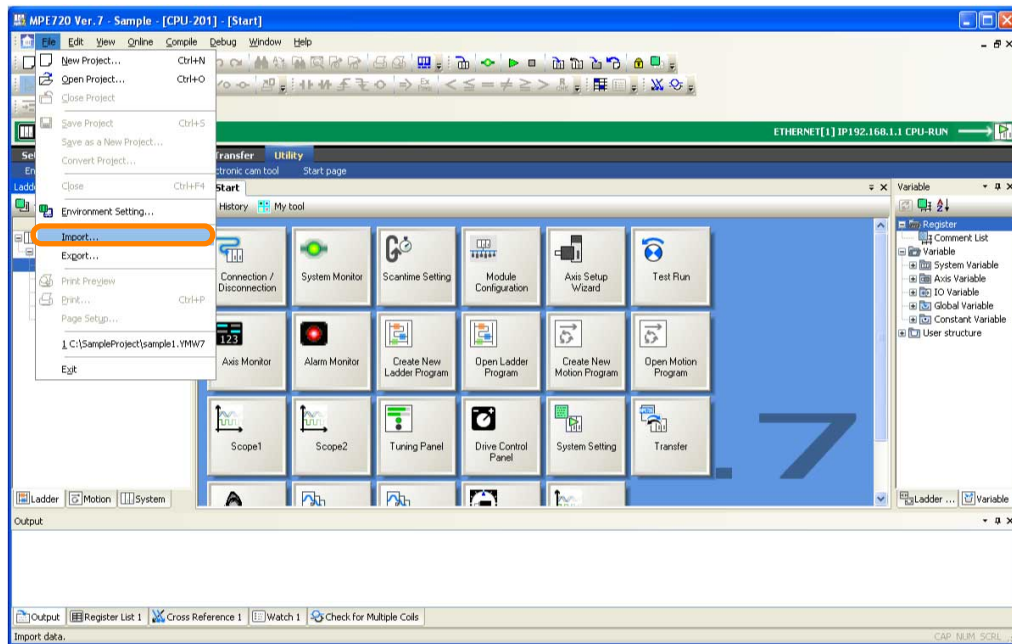
This concludes the procedure.

(2) Importing Data

Use the following procedure to import user-defined structures.

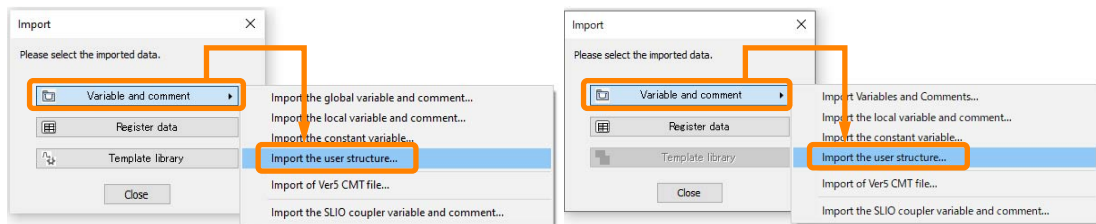
1. Establish an online connection or open a project file.

2. Select [Import] from the [File] menu.



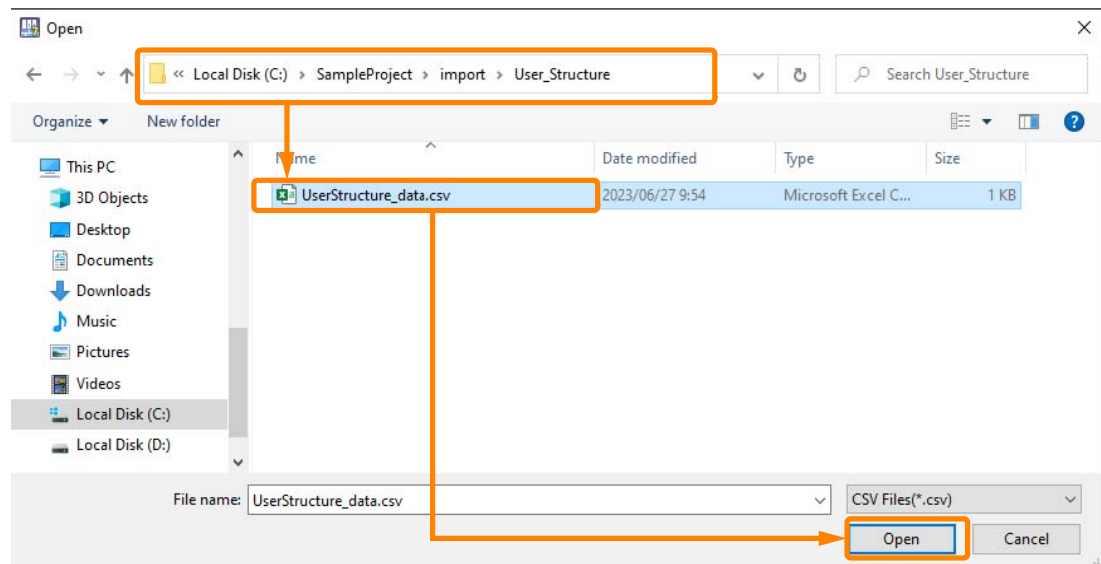
The [Import] window will be displayed.

3. Click the [Variable and comment] button and select [Import the user structure].



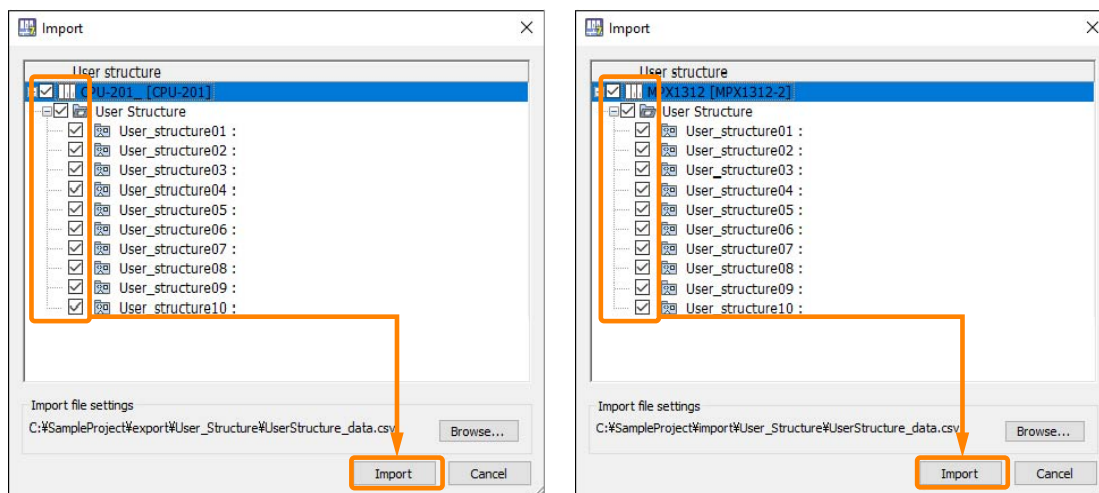
The [Open] window will be displayed.

4. Specify the file to import, and click the [Open] button.



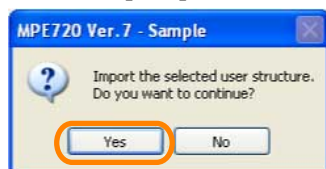
The [Import] window will be displayed.

5. Select the check box of the user-defined structures to import, and click the [Import] button.



A message dialog box will be displayed.

6. Click the [Yes] button.



The data will be imported.

This concludes the procedure.

10.3.12 Version 5 CMT File

You can individually import local comments and registers in programs created with the MPE720 Ver.5 into the MPE720 Ver.7.

Use the following procedure to import comment data (CMT file) created in the MPE720 Ver.5.

Information Registers and comments can be imported. If you want to use symbols to which comments were allocated in the MPE720 Ver.5 for variables in the MPE720 Version 7, use the following procedure to import the symbols into the MPE720 Ver.7.

1. Export the variables and create a CSV file.
2. Enter the symbols into the variables column in the CSV file.
3. Import the CSV file that you edited.

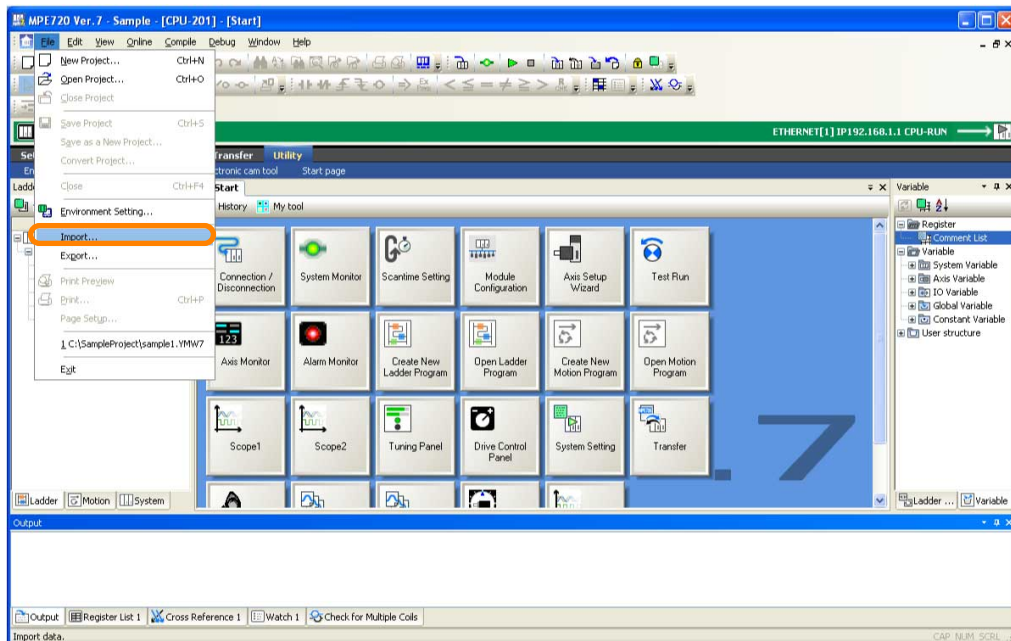
Refer to the following sections for the procedures to import and export variables.

[10.3.7 Global Variables and Comments & Variables and Comments on page 617](#)

[10.3.8 Local Variables and Comments on page 622](#)

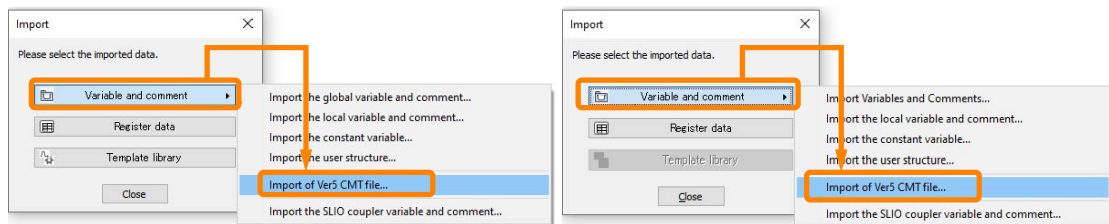
1. Establish an online connection or open a project file.

2. Select [Import] from the [File] menu.



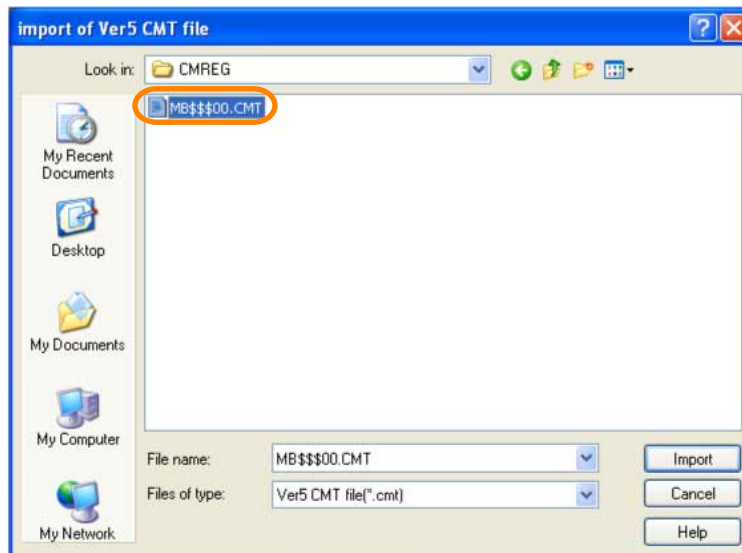
The [Import] window will be displayed.

3. Click the [Variable and comment] button and select [Import of Ver5 CMT file].



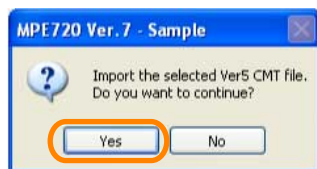
The [Import of Ver5 CMT file] window will be displayed.

4. Specify the data to import, and click the [Import] button.



A message dialog box will be displayed.

- Click the [Yes] button.



The data will be imported.

This concludes the procedure.

10.3.13 Logging Settings

(1) Exporting Data

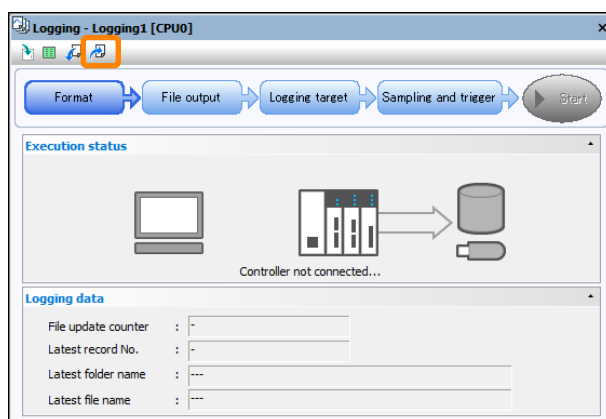
Use the following procedure to export logging settings.

- Open the logging settings to export.

Information To create and export new logging settings, refer to the following section and configure logging.

 [7.6.1 Using the MPE720 on page 505](#)

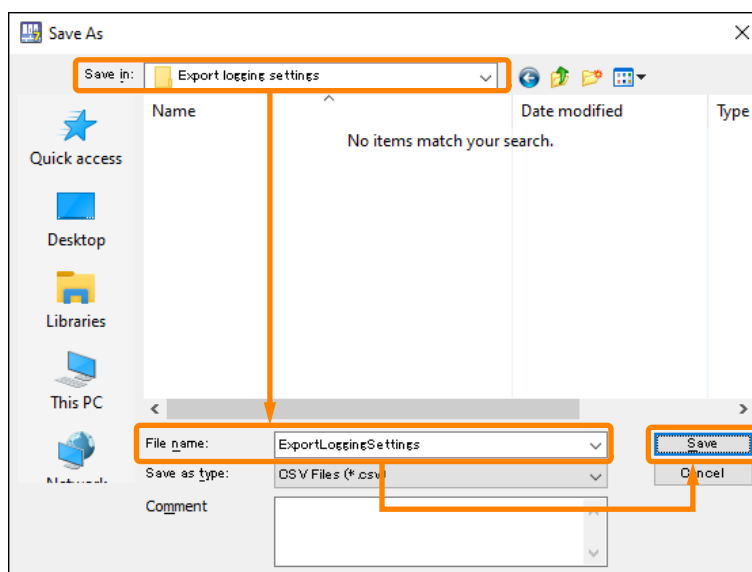
- Click the [Export setting] button.



The [Save As] window will be displayed.

- Set [Save in] and [File name], and then click the [Save] button.

Information You can also add a comment to the file by entering text in [Comment]. Use the comment as necessary.



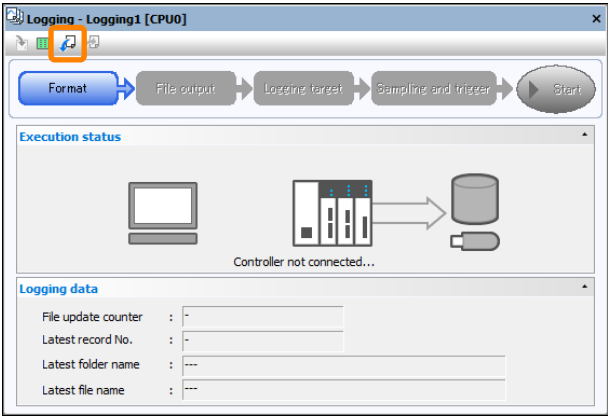
- 4. Confirm that the file was exported to the specified location.

This concludes the procedure.

(2) Importing Data

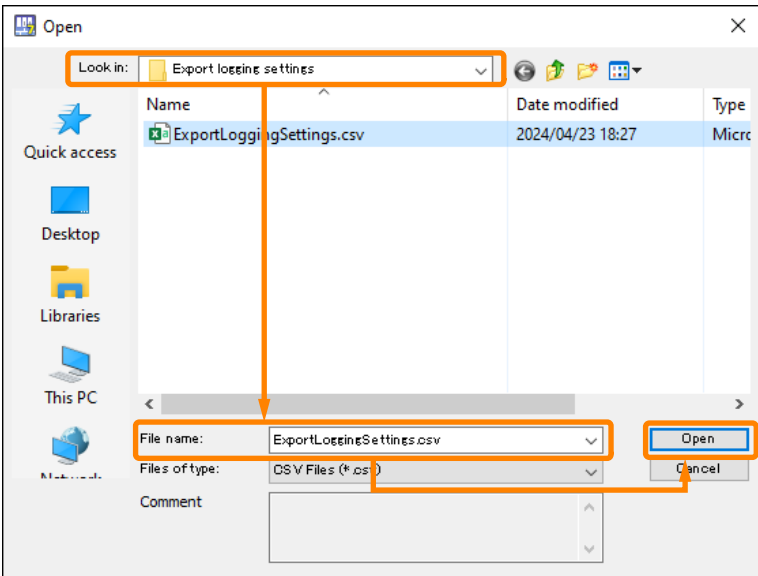
Use the following procedure to import logging settings.

- 1. Open the [Logging] window for the project file into which to import the logging settings.
- 2. Click the [Import setting] button.



The [Open] window will be displayed.

- 3. Set [Look in] and [File name], and then click the [Open] button.



The logging settings in the specified file will be imported.

This concludes the procedure.

Refer to the following section to change the imported logging settings.

 [7.6.1 Using the MPE720 on page 505](#)

10.3.14 Data Formats for Exporting and Importing

This section gives an overview of the data formats for exporting and importing.

To create your own import data, use the following format.



Important

Observe the following items when creating the import data.

- Operation is not guaranteed (including the import operation itself) if a value is set outside the appropriate range.
- Use the same character encoding as the export data.

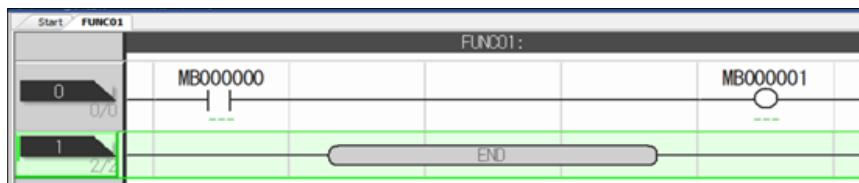
Information

Exported constant variable data cannot be edited.

(1) Ladder Program

"ProgramName.ypi" is the data name and extension of the export/import data for a ladder program.

An example of the ladder program (function) and import/export data is shown below.



```

VERSION_NUMBER=10
PROGRAM_MD5="-"
PROGRAM_COMMENT=7,"FUNC01:"
CONFIG_PROGRAM_TITLE=""
CONFIG_READ_PRIVILEGE=1
CONFIG_WRITE_PRIVILEGE=0
CONFIG_DREGISTER_COUNT=32
CONFIG_REGISTER_COUNT=0
CONFIG_CAST_ACTION=0
CONFIG_IJ_LIMIT_CHECK=0
FUNCIO_INPUT_TYPE=1
FUNCIO_INPUT_COMMENT="B-VAL"
FUNCIO_ADDRESS_TYPE=128
FUNCIO_ADDRESS_COMMENT="Comment"
FUNCIO_OUTPUT_TYPE=1
FUNCIO_OUTPUT_COMMENT="B-VAL"
RUNG_SIZE=2
RUNG=0,0,1,4,1,0
MATRIX=0,0,0,0,0,2,0,0
MATRIX=0,1,1,0,1,4097,1,2,"MB000000",0
MATRIX=0,2,2,0,1,4105,1,2,"MB000001",0
MATRIX=0,3,3,0,0,3,0,0
RUNG=1,4,1,3,1,0
MATRIX=1,4,0,0,0,2,0,0
MATRIX=1,5,1,0,1,16388,0,0
MATRIX=1,6,2,0,0,3,0,0
  
```

The details of the import/export data for ladder programs are shown below.

Item	Description	Value
Header information		
VERSION_NUMBER	File version number	Fixed as "10"
PROGRAM_MD5	Not used	—
Program comment information		
PROGRAM_COMMENT	A comma (,) is used to separate the following content.	
	Program comment length	Any number
	Program comment	Any text string
Properties information		
CONFIG_PROGRAM_TITLE	Program name	Text string 48 characters maximum
CONFIG_READ_PRIVILEGE	Read privilege	0 to 7

Continued on next page.

Continued from previous page.

Item	Description	Value
CONFIG_WRITE_PRIVILEGE	Write privilege	0 to 7
CONFIG_DREGISTER_COUNT	Number of D registers	0 to 16384
CONFIG_#REGISTER_COUNT	# Number of registers	0 to 16384
CONFIG_CAST_ACTION	Setting the operation when real number	0: Truncate 1: Round
CONFIG_IJ_LIMIT_CHECK	Subscript register limit check	0: Enabled 1: Disabled
Properties information: I/O definitions (function only)		
FUNCIO_INPUT_TYPE	Function input definition The file contains 1 to 16 items. When there are two or more inputs, "FUNCIO_INPUT_COMMENT" below is added to the file in the amount of inputs.	1: BIT (B-VAL) 16: WORD (I-REG) 32: LONG (L-REG) 48: FLOAT (F-REG) 64: QUAD (Q-REG) 80: DOUBLE (D-REG)
FUNCIO_INPUT_COMMENT	A comment for the function input definition	Text string 8 characters maximum
FUNCIO_ADDRESS_TYPE	Function address definition The file contains 0 or 1 item.	Fixed as "128: ADDRESS"
FUNCIO_ADDRESS_COMMENT	A comment for the function address definition	Text string 8 characters maximum
FUNCIO_OUTPUT_TYPE	Function output definition The file contains 1 to 16 items. When there are two or more outputs, "FUNCIO_OUTPUT_COMMENT" below is added to the file in the amount of outputs.	Same as "FUNCIO_INPUT_TYPE" above
FUNCIO_OUTPUT_COMMENT	A comment for the function output definition	Text string 8 characters maximum
Program information [*] /		
RUNG_SIZE	Number of rungs	—
RUNG	Rung information	—
RUNG_COMMENT	Rung comment	—
MATRIX	Program information in rung	—

*1 If you will edit export data and import that data, do not correct the program information. Correct the program information on the Edit Ladder Program window after you import it.

(2) Motion Program

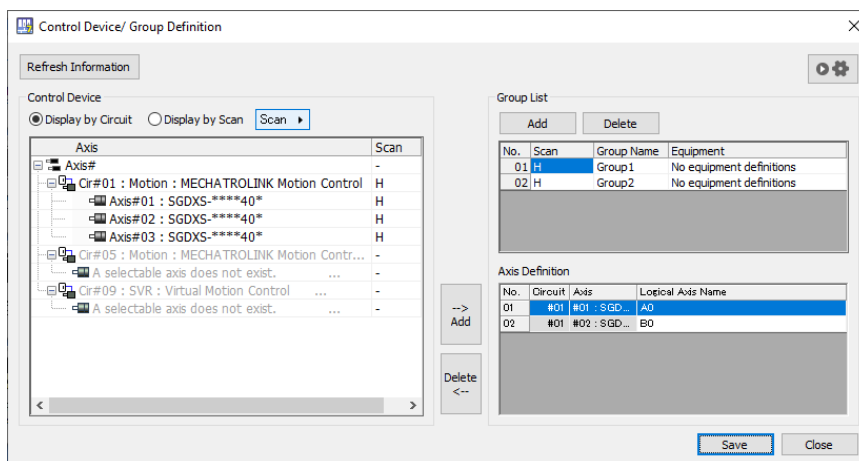
The import/export data for a motion program is composed of two types of files: the group definition file and the program file.

(a) Group Definition File

"\$GRPDEF.csv" is the data name and extension of the group definition file.

The group definition file contains the settings on the [Group Definition] window or the [Control Device/Group Definition] window.

An example of the group definition and import/export data is shown below.



```
[Header]
1

[Group]
1,"Group1","H"
2,"Group2","H"

[Axis]
1,1,1,"A0"
1,1,2,"B0"
2,1,3,"A0"
```

The details of the group definition import/export data are shown below.

Item	Description	Value
Header information		
[Header]	File version number	Fixed as "1"
Group information		
[Group]	A comma (,) is used to separate the following content.	
	Group No.	1 to 16
	Group name	Text string 16 characters maximum
	Scan number	Scan number (Examples: "High-speed (H)" is "H" and "High-speed (Scan2)" is "2")
Axis definition information		
[Axis]	A comma (,) is used to separate the following content.	
	Group number of [Group] to which the axis is registered	1 to 16
	Circuit number	1 to 16
	Axis number	1 to 64
	Logical axis name	Text string 8 characters maximum
Vision definition information (when using a vision unit only)		
[Vision]	A comma (,) is used to separate the following content.	
	Group number of [Group] to which the vision unit is registered	1 to 16
	Circuit number	1 to 12
	Unit name	Text string 8 characters maximum

(b) Program File

"ProgramName.txt" is the data name and extension of the program file.

The program file contains information about the motion program.

An example of the data in the program file is shown below.

```
VERSION_NUMBER=1
GROUP_NAME="GROUP1"
CONFIG_PROGRAM_TITLE="User program"
CONFIG_READ_PRIVILEGE=1
CONFIG_WRITE_PRIVILEGE=0
CONFIG_DREGISTER_COUNT=32
CONFIG_CAST_ACTION=0
CONFIG_IJ_LIMIT_CHECK=0
CONFIG_PFORK_PMODE=4
PRGVER=2
PRGTX="VAR;
// TODO : Add the variable here.

END_VAR;
// TODO : Add the program here.

MW00000=1;
END;"
```

The details of the program file are shown below.

Item	Description	Value
Header information		
VERSION_NUMBER	File version number	Fixed as "1"
GROUP_NAME	Group name This item is not used for a sequence program.	Text string 16 characters maximum
SCAN_NO	Scan number Valid only when using a model that supports multiple scans and the program is a sequence program (i.e., not used for a model that does not support multiple scans or for a motion program).	Scan number (Examples: "High-speed (H)" is "H", "Low-speed (L)" is "L", and "High-speed (Scan2)" is "2")
Properties information		
CONFIG_PROGRAM_TITLE	Program name	Text string 48 characters maximum
CONFIG_READ_PRIVILEGE	Read privilege	0 to 7
CONFIG_WRITE_PRIVILEGE	Write privilege	0 to 7
CONFIG_DREGISTER_COUNT	Number of D registers	0 to 16384
CONFIG_CAST_ACTION	Setting the operation when real number	0: Truncate 1: Round
CONFIG_IJ_LIMIT_CHECK	Subscript register limit check	0: Enabled 1: Disabled
CONFIG_PFORK_PMODE	PFORK parallel mode Valid only when the program is a motion program and the main program.	1: 1 main program and 8 sub programs 2: 2 main programs and 4 sub programs 4: 4 main programs and 2 sub programs 8: 8 main programs and 1 sub program
Program information		
PRGVER	Compilation version	1: Version 6 compatible 2: Version 7.00
PRGTX	Program	—

(3) Ladder Program Line Comments

Program No.	Comment Type	Rung No.	Rung Comment Index	Comment
H	Program Comment			H: Main program (Ver. 1.00)
H01	Program Comment			H01: Servo control drawing
H01.01	Program Comment			H01.01:AX1: Servo control drawing
H01.01	Rung Comment	0	0	Axis check
H01.01	Rung Comment	0	1	Alarm check
H01.01	Rung Comment	1	0	Warning check
H01.01	Rung Comment	2	0	Axial normal
H01.01	Rung Comment	3	0	
H01.01	Rung Comment	3	1	
H01.01	Rung Comment	3	2	External interlock
H01.01	Rung Comment	3	3	Startup interlock
H01.01	Rung Comment	4	0	Operation interlock

(4) Ladder Program Properties

Program No.	Program Name	Disable	No. of Steps	Privilege	Modified	Tuning Panel
H	Main program	0	5	[R]0 [W]1	5/10/12 19:25	0
H01	Servo control drawing	0	3	[R]0 [W]1	5/10/12 19:25	0
H01.01	AX1: Servo control drawing	0	68	[R]0 [W]1	2/25/13 13:58	0
H01.02	AX2: Servo control drawing	0	68	[R]0 [W]1	2/25/13 13:58	0
H02	JOG control drawing	0	3	[R]0 [W]1	5/10/12 19:25	0
H02.01	AX1: JOG control drawing	0	52	[R]0 [W]1	5/10/12 19:25	0
H02.02	AX2: JOG control drawing	0	52	[R]0 [W]1	5/10/12 19:25	0
H03	Origin setting control drawing	0	3	[R]0 [W]1	5/10/12 19:25	0
H03.01	AX1: MPM001 (origin setting) call	0	16	[R]0 [W]1	5/10/12 19:25	0
H03.02	AX2: MPM002 (origin setting) call	0	16	[R]0 [W]1	5/10/12 19:25	0
H04	Position control drawing	0	3	[R]0 [W]1	5/10/12 19:25	0
H04.01	AX1: MPM011 (positioning) call	0	18	[R]0 [W]1	5/10/12 19:25	0
H04.02	AX2: MPM012 (positioning) call	0	18	[R]0 [W]1	5/10/12 19:25	0

(5) Motion Program Properties

Program No.	Program Name	Program Lines	Privilege	Modified
MPM001	Axis 1 origin setting	18	[R]0 [W]1	5/10/12 19:08
MPM002	Axis 2 origin setting	20	[R]0 [W]1	5/10/12 19:08
MPM011	Axis 1 Positioning	15	[R]0 [W]1	5/10/12 19:18
MPM012	Axis 2 Positioning	15	[R]0 [W]1	5/10/12 19:08

(6) Axis Parameters

0	Selection of operation modes		0
1	Function selection flag 1	0000 H	-
2	Function selection flag 2	0000 H	-
4	Reference unit selection		0
5	Number of digits below decimal point		3
6	Travel distance per machine rotation		10000 pulse
8	Servo motor gear ratio		1 rev
9	Machine gear ratio		1 rev
10	Infinite length axis reset position(POS MAX)		360000 pulse
12	Positive software limit value		2147483647 pulse
14	Negative software limit value		-2147483648 pulse
30	Encoder selection		1
34	Rated motor speed		3000 min ⁻¹
36	Number of pulses per motor rotation		1048576 pulse/rev
38	Maximum number of absolute encoder turns rotation		65535 rev
42	Feedback speed movement averaging time constant		10 ms
44	User Select Servo Driver User Constant Number	0000 H	-
45	User Select Servo Driver User Constant Size		1 word

- Unit
- Set value
- Parameter name
- Parameter number

(7) Register Data

MW000000	DL000000	GD01 000
H		
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00
0	0	0.00E+00

Register addresses
Drawing type (for local registers only)

Data

- Specified register information

(8) Global Variables and Comments or Scan Variables and Comments

ME000000		test		
MW000001		test2		
MW000002		test3		

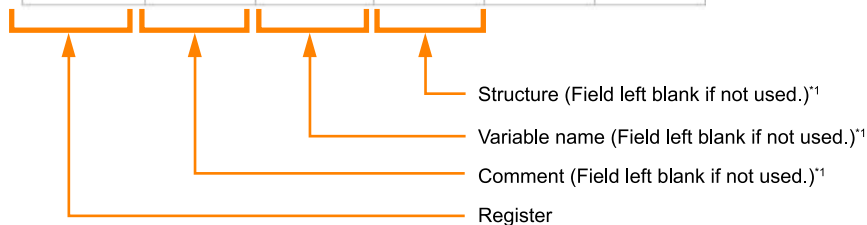
Structure (Field left blank if not used.)*1
Variable name (Field left blank if not used.)*1
Comment (Field left blank if not used.)*1
Register

*1 There are restrictions to the information that can be entered. Refer to the following section for details.

 (a) *Registering a Global Variable or a Scan Variable on page 303*

(9) Local Variables and Comments

DB000000		VAR_test			
DW000001		VAR_test2			
DW000002		VAR_test3			

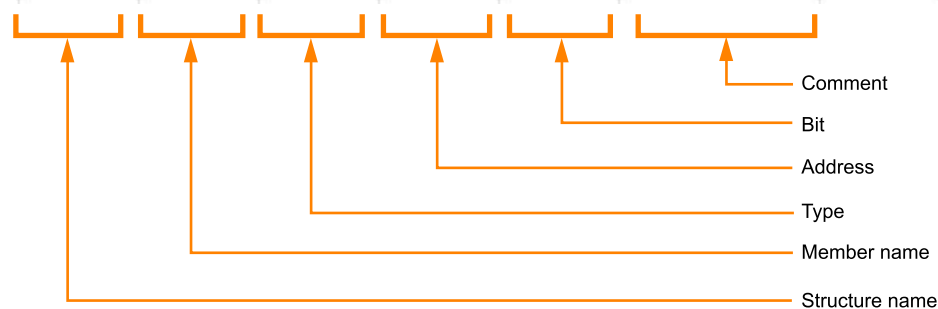


*1 There are restrictions to the information that can be entered. Refer to the following section for details.

 (a) *Registering a Local Variable on page 312*

(10) User-Defined Structures

test					User structure
test	member1	Word	0		
test	member2	Word	1		
test	member3	Long	2		
test	member4	Long	4		



(11) Logging

".csv" is the extension of the import/export data for logging settings.

An example of the import/export data for logging settings is shown below.

```

***< File Info.>***
[FileType],"Logging Setting File"
[FileSpec],1
[MadeBy],"MPE720 Ver.7"
[Data-Time],"2023/10/24 16:40:30"
[Comment],"Logging setting sample data"
***< Format Setting >***
[Destination],2
[FileFormat],2
[FileDetails-DataNo],1
[FileDetails-DateTime],2
[FileDetails-RegisterName],1
[FileDetails-Program],1
[FileDetails-SystemOperationTime],0
[FileDetails-SamplingPeriod],1
[FileDetails-OutputDataNum],25000
[FileName],"SampleData"
[FolderName],"LoggingData"
[FolderName-AddDateInfo],3
***< File Output Setting >***
[OutputFilesNum],500
[FileOverwrite],0
[SubfolderFileLimit],0
[UpdateDateTime],0
[StartPreviousIndexNo],0
***< Sampling and trigger Setting >***
[LoggingName],"Sample data"
[Sampling-Scan],"H"
[Sampling-Period],"s",60
[DataOutputTiming],1
[Trigger-Start],"MW00100","=",0"
[Trigger-Stop],"MW00100", ">=",500"
[Trigger-ConditionA],"MW00100", "<=",50"
[Trigger-CompoundConditions],1
[Trigger-ConditionB],"MW00100", ">=",450"
***< Logging Target >***
[TargetNo],1,2
[Register],"MW00100", "DF00015"
[ProgramName], "H01"

```

The details of the import/export data for logging settings are shown below.

Item	Description	Value
Header information		
< File Info.>	A comment that indicates the subsequent information is header information.	—
[FileType],	File type	Fixed as "Logging Setting File"
[FileSpec],	File specification number (file version)	Fixed as "1"
[MadeBy],	Name of application that created the file	Any text string
[Data-Time],	Data and time the file was created	yyyy/mm/dd hh:mm:ss
[Comment],	File comment	Any text string
Format settings information		
< Format Setting >	A comment that indicates the subsequent information is format settings information.	—
[Destination],	Saving destination	1: USB memory device/SD card 2: Built-in RAM disk 3: Personal computer (MotionAPI) (for logging 1 only) 101 to 120: FTP server
[FileFormat],	File format	1: Binary (*.bin) 2: CSV (*.csv)
[FileDetails-DataNo],	Setting to output data numbers to file	0: Do not output 1: Output

Continued on next page.

Continued from previous page.

Item	Description	Value
[FileDetails-DateTime],	Setting to output date/time to file	0: Do not output 1: Output 2: Output (0.01 μ s)
[FileDetails-RegisterName],	Setting to output registered register name to file	0: Do not output 1: Output
[FileDetails-Program],	Setting to output program to file	
[FileDetails-SystemOperationTime],	Setting to output system operation time to file	
[FileDetails-SamplingPeriod],	Setting to output sampling cycle to file	
[FileDetails-OutputDataNum],	Amount of data to output to file	1 to 32767
[FileName],	File name	Text string 32 characters maximum
[FolderName],	Folder name When setting "FolderName-AddDateInfo" below, make sure the folder name including that number of characters fits in 31 characters.	Text string 31 characters maximum
[FolderName-AddDateInfo],	Setting to add date information to the end of the folder name. Even if this setting is set to add the date, nothing will be output if "FolderName" above is not set.	0: Do not add 1: Add (YYYY) 2: Add (YYYYMM) 3: Add (YYYYMMDD) 4: Add (YYYYMMDDHH)
File output settings information		
< File Output Setting >	A comment that indicates the subsequent information is the format output settings.	—
[OutputFilesNum],	Number of output files	0 to 32767 (0: No restriction)
[FileOverwrite],	File overwrite settings	0: Overwrite 1: Stop logging
[SubfolderFileLimit],	Subfolder file limit If "Destination" in the format settings information is set to a value other than "1: USB memory device/SD card," set this value to 0.	0, 50, 100, 500, 1000, 1500, 2000 (0: Do not separate files into subfolders when they are saved)
[UpdateDateTime],	Set whether to set the last modified date/time of the file to the calendar settings of the controller. If "Destination" in the format settings information is set to a value other than "1: USB memory device/SD card," set this value to 0.	0: Do not set 1: Set
[StartPreviousIndexNo],	Set whether the file index number will start from the previous index number after the power supply is turned ON. If "Destination" in the format settings information is set to a value other than "1: USB memory device/SD card," set this value to 0.	0: Do not start from previous index number 1: Start from previous index number
Sampling and trigger settings information		
< Sampling and trigger Setting >	A comment that indicates the subsequent information is sampling and trigger settings information.	—
[LoggingName],	Logging name	Text string 32 characters maximum
[Sampling-Scan],	Scan	Scan number or Program (Scan number examples: "High-speed (H)" is "H", "Low-speed (L)" is "L", and "High-speed (Scan2)" is "2")
[Sampling-Period],	Sampling cycle If "Sampling-Scan" above is set to "Program: Program", the value of this setting is ignored.	A value that can be set on the [Sampling and trigger] window

Continued on next page.

Continued from previous page.

Item	Description	Value
[DataOutputTiming],	Data Output Timing If "Destination" in the format settings information is set to a value other than "1: USB memory device/SD card," set this value to 0.	0: Not synchronized to scan 1: Synchronized to scan
[Trigger-Start],	Start trigger condition	A value that can be set on the [Sampling and trigger] window
[Trigger-Stop],	Stop trigger condition	
[Trigger-ConditionA],	Detailed data output condition A	
[Trigger-CompoundConditions],	Setting for using a compound condition for the detailed data output conditions	0: No compound condition 1: OR 2: AND
[Trigger-ConditionB],	Detailed data output condition B	A value that can be set on the [Sampling and trigger] window
Logging target settings information		
< Logging Target >	A comment that indicates the subsequent information is logging target settings information.	—
[TargetNo],	Logging target numbers A comma (,) is used to separate the amount of logging targets as sequential numbers. Example: "1,2,3,4"	1 to available number on model
[Register],	Logging target register name A comma (,) is used to separate the amount of logging targets. Example: "MW00100","DF00015","MW00200","DF00115"	Register address
[ProgramName],	Target program number Only when "Register" above has local registers A comma (,) is used to separate the amount of logging targets. Example: ,"H01",,"H01" (Example when the second and forth registers are local registers)	Any text string

Appendices

This chapter describes error messages and the corrective action to perform when an error is displayed.

11.1	Error Messages and Reference Sections for Corrective Action	650
11.2	Corrective Action When an Error Message Is Displayed	651
11.2.1	Tracing Could Not Be Started.	651
11.2.2	An Error Occurred during the Transfer to the Controller.	654

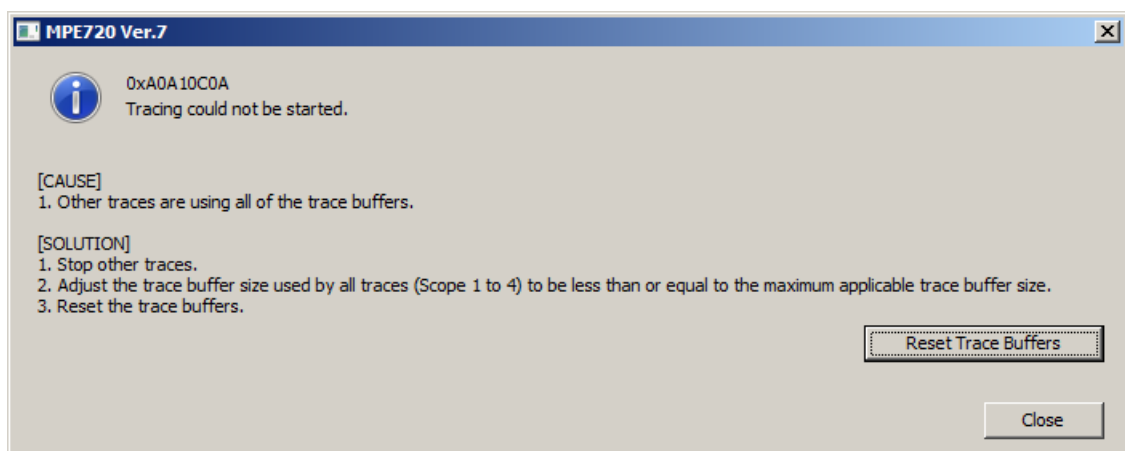
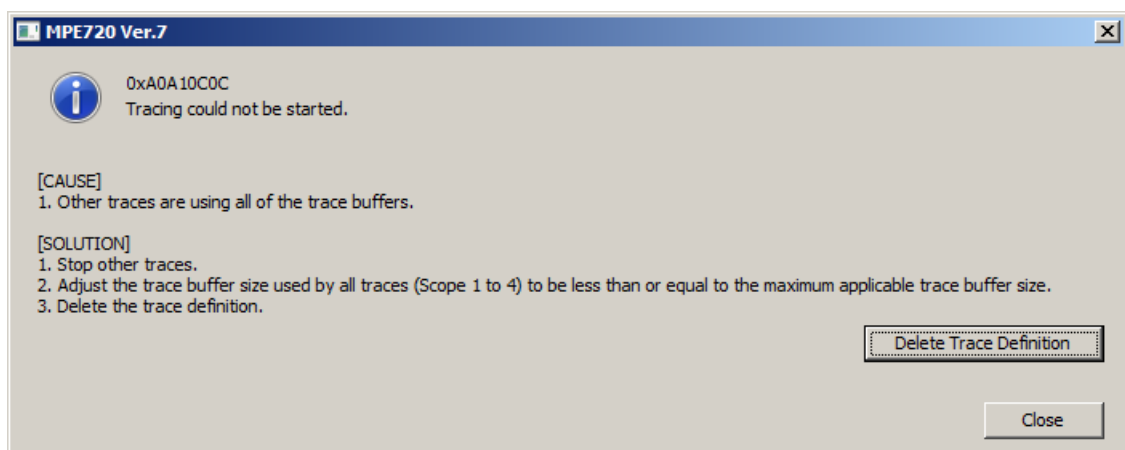
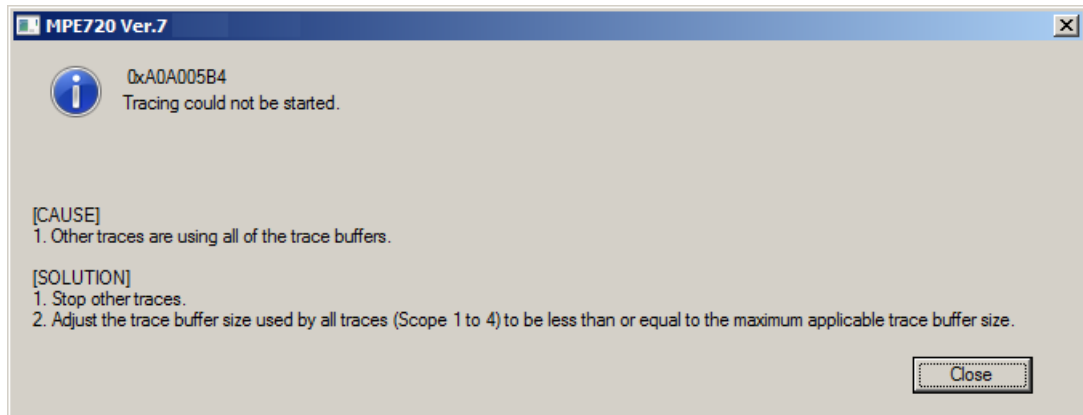
11.1 Error Messages and Reference Sections for Corrective Action

Error Message	Error No.	Reference
An error occurred during the transfer to the controller.	—	 11.2.2 An Error Occurred during the Transfer to the Controller. on page 654
The selected trace could not be started.	0xA0A10C0B	 7.5.12 Changing the Enabled/Disabled Setting of the Trace Definition Settings on page 483
Tracing could not be started.	0xA0A005B4	 11.2.1 Tracing Could Not Be Started. on page 651
	0xA0A10C0A	
	0xA0A10C0C	

11.2 Corrective Action When an Error Message Is Displayed

11.2.1 Tracing Could Not Be Started.

(1) Error Message Dialog Box



(2) Corrective Action

1. Stop tracing of other groups.
2. Display the trace window again.

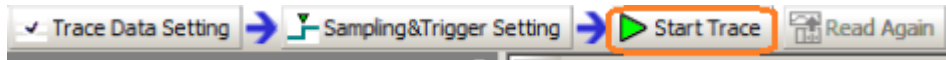
3. In the [Sampling & Trigger Setting] window, check the trace buffer size, and check that the total value of the trace buffers of all groups is at or below the maximum applicable trace buffer size. When there are two or more trace groups, check the trace buffer size of all trace groups.

Refer to the following section for details on the maximum applicable trace buffer size.

☞ (2) [Trace Buffer Size on page 441](#)

When the trace buffer size is greater than the maximum applicable trace buffer size, change the settings in the [Sampling & Trigger Setting] window.

4. Start tracing again by clicking the [Start Trace] button.



If no error messages are displayed, this concludes the procedure.

In the case of machine controllers Ver. 1.30 or higher, the error message is sometimes displayed again even if the above corrective action is taken. The trace definitions and trace buffers must be deleted only in this case. Refer to either of the following sections according to the message that is displayed.

☞ (a) [Corrective Action \(Continued\): Deleting the Trace Buffer on page 652](#)

☞ (b) [Corrective Action \(Continued\): Deleting Trace Definitions on page 653](#)

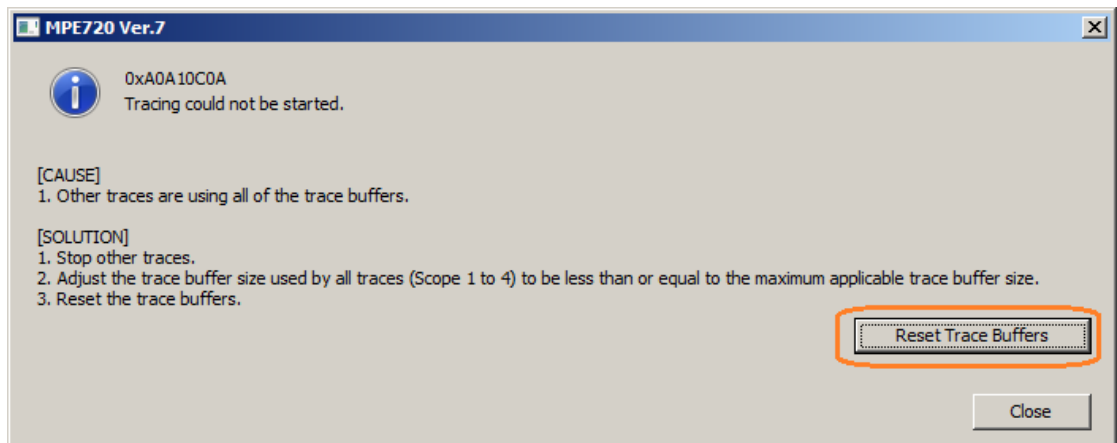
(a) Corrective Action (Continued): Deleting the Trace Buffer

1. Confirm that adjustment of the trace buffer size has been completed.

Refer to the following section for details.

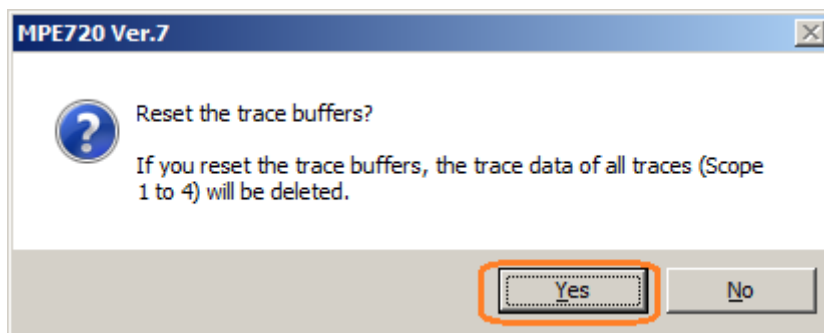
☞ (2) [Corrective Action on page 651](#)

2. Click the [Reset Trace Buffers] button.



A message dialog box will be displayed.

3. Click the [Yes] button.



Important

When the trace buffers are reset, the acquired trace data is deleted. Even if trace buffers are reset, trace definitions are not deleted.

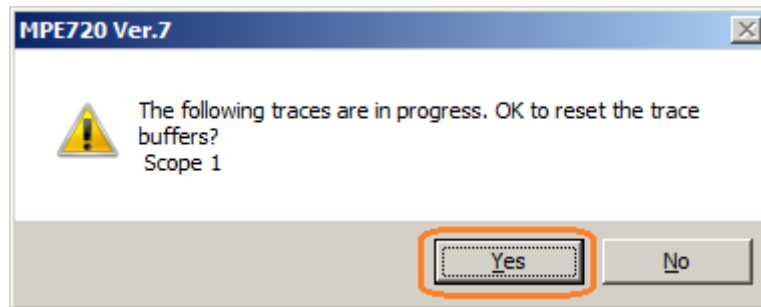
To save acquired trace data, click the [No] button, and perform the following procedure to save the trace data.

Open the trace – [File] – [Save in External File]

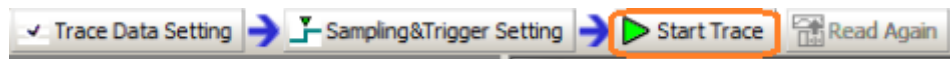
To save the trace data of two or more trace groups, perform this operation for each trace group.

A message dialog box will be displayed.

4. Click the [Yes] button.



5. Start tracing again by clicking the [Start Trace] button.



This concludes the procedure.

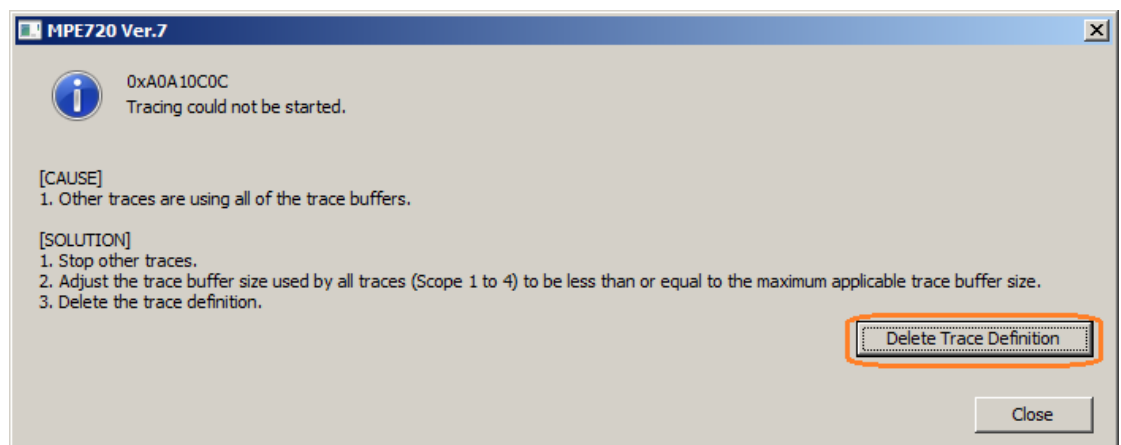
(b) Corrective Action (Continued): Deleting Trace Definitions

1. Confirm that adjustment of the trace buffer size has been completed.

Refer to the following section for details.

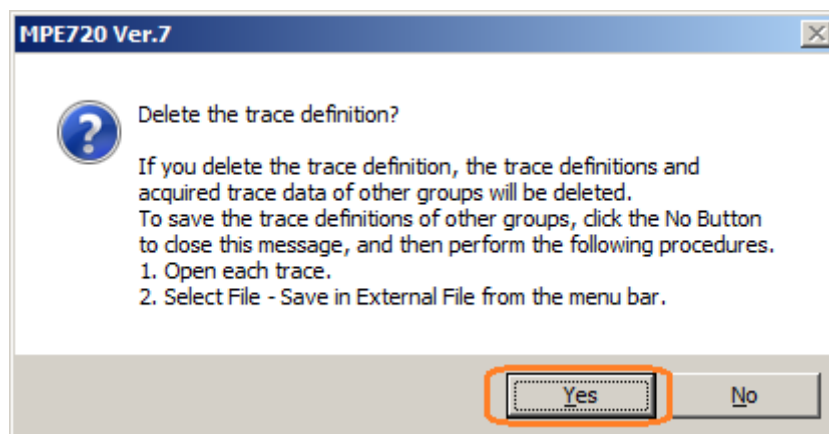
(2) *Corrective Action on page 651*

2. Click the [Delete Trace Definition] button.



A message dialog box will be displayed.

3. Click the [Yes] button.





Important

When the trace definitions are deleted, the acquired trace data and trace definitions including other trace groups are deleted.

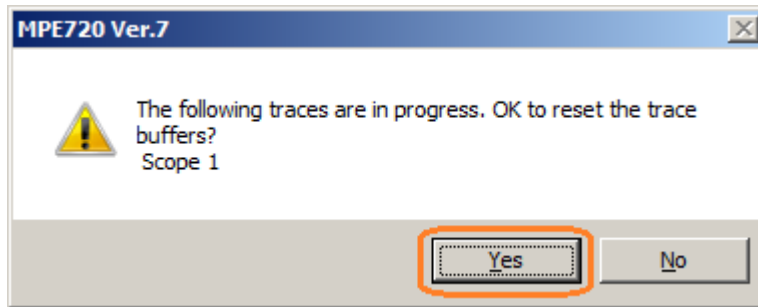
To save the trace definitions and acquired trace data, click the [No] button, and perform the following procedure to save the trace definitions and trace data.

Bring the target trace by clicking the tab – [File] – [Save in External File]

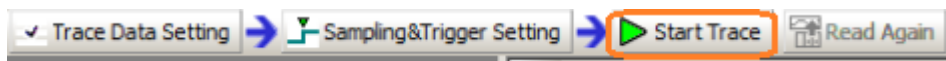
To save the trace definitions and trace data of two or more trace groups, perform this operation for each trace group.

A message dialog box will be displayed.

4. Click the [Yes] button.



5. Start tracing again by clicking the [Start Trace] button.



This concludes the procedure.

11.2.2 An Error Occurred during the Transfer to the Controller.

(1) Corrective Action

1. If the MPE720 is online, click the [Connection/Disconnection] button on the [My Tool] window of the [Start] tab page to set the MPE720 to offline.
2. Select [Programs] – [YE_Applications] – [Communication Platform] from the Windows Start Menu.

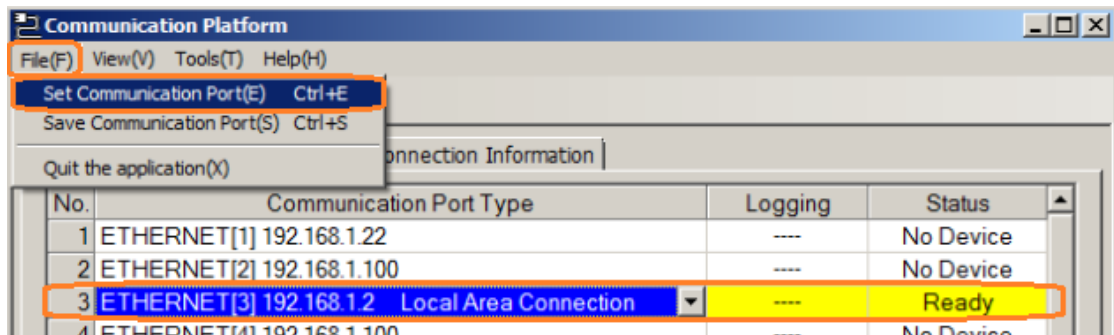
The [Communication Platform] icon will be displayed at the bottom right of the PC screen.

3. Double-click the [Communication Platform] icon.



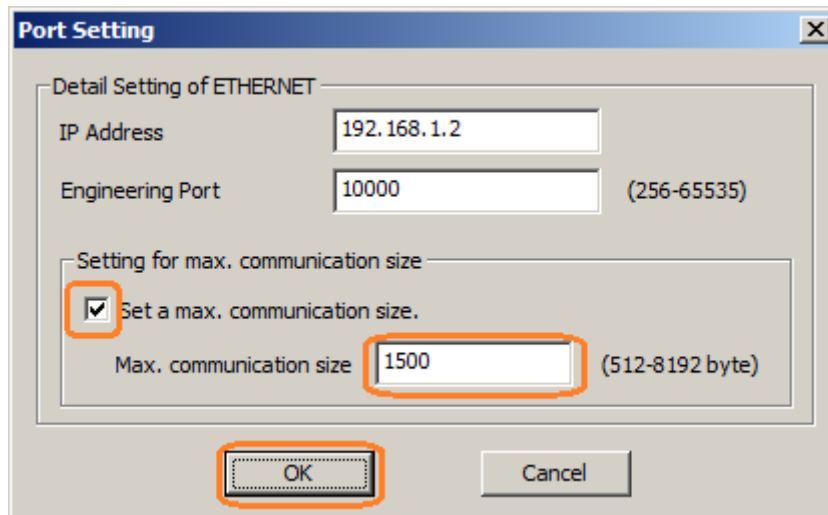
The [Communication Platform] window will be displayed.

4. Select a communication port that is in use, then click [File] – [Set Communication Port].



The [Port Setting] window will be displayed.

5. Select the [Set a max. communication size.] check box, set [Max. communication size] to "1500", and click the [OK] button.



The settings will be applied and the [Port Setting] window will close.

6. Click the [Save] icon.

This concludes the procedure.

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MPE720 Ver. 7

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