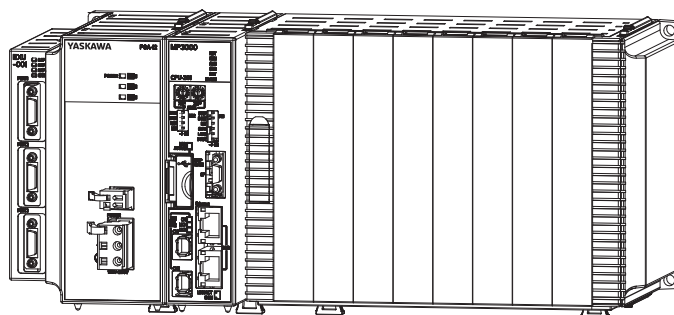# YASKAWA

## Machine Controller MP3000 Series
# MP3200
## USER'S MANUAL

Power Supply Unit model: JEPMC-PSA3012-E or JEPMC-PSD3012-E
CPU Unit model: JEPMC-CP3201-E or JEPMC-CP3202-E
Base Unit model: JEPMC-BUB3003-E, JEPMC-BUB3005-E, or JEPMC-BUB3008-E
Rack Expansion Interface Unit model: JEPMC-EXU3001-E or JEPMC-EXU3002-E

| | |
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| CPU Unit Functionality | 3 |
| Specifications | 4 |
| External Dimensions | 5 |

# About this Manual

This manual describes the specifications and system configuration of MP3200 Machine Controllers and the functionality of the CPU Units.

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

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

# Using this Manual

## ◆ Basic Terms

Unless otherwise specified, the following definitions are used:

| Basic Terms | Meaning |
|---|---|
| MP2000 | A Machine Controller in the MP2000 Series |
| MP3000 | A Machine Controller in the MP3000 Series |
| MPE720 | The Engineering Tool or a personal computer running the Engineering Tool |
| PLC | A Programmable Logic Controller |
| MP3200 | A generic name for the Power Supply Unit, CPU Unit, Base Unit, and Rack Expansion Interface Unit |
| Motion Control Function Modules | The Function Modules in the Motion Modules and the Function Modules in the SVC32 or SVR32 built into the CPU Units. |
| Communications Function Modules | The Function Modules in the Communications Modules and the Function Modules in the 218IFD built into the CPU Units. |

## ◆ MPE720 Engineering Tool Version Number

In this manual, the operation of MPE720 is described using screen captures of MPE720 version 7.

## ◆ Indication of Reverse Signals

In this manual, the names of reverse signals (ones that are valid when low) are written with a forward slash (/) before the signal name, as shown in the following example:

Notation Examples
- $\overline{\text{S-ON}}$ = /S-ON
- $\overline{\text{P-CON}}$ = /P-CON

## ◆ Terms Used to Describe "Torque"

Although the term "torque" is commonly used when describing rotary Servomotors and "force" is used when describing linear Servomotors, this manual uses "torque" when describing either one (excluding parameter names).

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## ◆ 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.

**Note**

Indicates items for which caution is required or precautions to prevent operating mistakes.

**Example**   Indicates operating or setting examples.

**Information**   Indicates supplemental information to deepen understanding or useful information.

**Terms**

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

# Related Manuals

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

Be aware of all product specifications and restrictions to product application before you attempt to use any product.

| Category | Manual Name | Manual Number | Contents |
|---|---|---|---|
| Basic func-tionality | Machine Controller MP2000/MP3000 Series Machine Controller System Setup Manual | SIEP C880725 00 | Describes the functions of the MP2000/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 MP3200 Troubleshooting Manual | SIEP C880725 01 | Describes troubleshooting an MP3000-series MP3200 Machine Controller. |
| | Machine Controller MP2200 User's Manual | SIEP C880700 14 | Describes the functions, specifications, and application methods of the MP2200 Machine Controller. |
| | Machine Controller MP2000 Series MPU-01 Multi-CPU Module User's Manual | SIEP C880781 05 | Describes the functions, specifications, operating methods, maintenance, inspections, and troubleshooting of the MP2000-series MPU-01 Multi-CPU Module. |
| Communica-tions func-tionality | 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 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. |
| | Machine Controller MP2000 Series 265IF-01 CompoNet Module User's Manual | SIEP C880700 44 | Describes the specifications and communications methods for the CompoNet Communications Module that can be connected to an MP2000-series Machine Controller. |

| Category | Manual Name | Manual Number | Contents |
|---|---|---|---|
| Motion control functionality | 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 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. |
| | 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. |
| Programming | Machine Controller MP3000 Series Ladder Programming Manual | SIEP C880725 13 | Describes the ladder programming specifications and instructions of MP3000-series Machine Controller. |
| | Machine Controller MP3000 Series Motion Programming Manual | SIEP C880725 14 | Describes the motion programming and sequence programming specifications and instructions of MP3000-series Machine Controller. |
| Engineering Tools | 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 Version 4 User's Manual | SIEP C880761 02 | Describes how to install and operate the MPLoad Maker. |
| | Machine Controller MP2000/MP3000 Series Engineering Tool MPE720 Version 7 User's Manual | SIEP C880761 03 | Describes how to operate MPE720 version 7. |
| I/O Modules | 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. |
| | 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. |

| Category | Manual Name | Manual Number | Contents |
|---|---|---|---|
| MECHA-TROLINK I/O | MECHATROLINK-III Compatible I/O Module User's Manual | SIEP C880781 04 | Describes the functions, specifications, operating methods, and MECHA-TROLINK-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. |

# Safety Precautions

The following signal words and marks are used to indicate safety precautions in this manual.

Information marked as shown below is important for safety. Always read this information and heed the precautions that are provided.

| | |
|---|---|
| ⚠ WARNING | Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury. |
| ⚠ CAUTION | Indicates precautions that, if not heeded, could result in relatively serious or minor injury, or property damage. |
| | If not heeded, even precautions classified as cautions ( ⚠ CAUTION ) can lead to serious results depending on circumstances. |
| ⊘ PROHIBITED | Indicates prohibited actions. For example, ⊘ indicates prohibition of open flame. |
| ❗ MANDATORY | Indicates mandatory actions. For example, ⏚ indicates that grounding is required. |

The following precautions are for storage, transportation, installation, wiring, operation, maintenance, inspection, and disposal. These precautions are important and must be observed.

## ◆ 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 Machine Controller 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 Machine Controller.
  There is a risk of electrical shock.

- 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.

- Do not attempt to modify the Machine Controller in any way.
  There is a risk of injury or device damage.

## ◆ Storage and Transportation

### ⚠ CAUTION

- Do not store the Machine Controller in any of the following locations.
  - Locations that are subject to direct sunlight
  - Locations that are subject to ambient temperatures that exceed the storage conditions
  - Locations that are subject to ambient humidity that exceeds the storage conditions
  - Locations that are subject to rapid temperature changes and condensation
  - Locations that are subject to corrosive or inflammable gas
  - Locations that are subject to excessive dust, dirt, salt, or metallic powder
  - Locations that are subject to water, oil, or chemicals
  - Locations that are subject to vibration or shock

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

- Hold onto the main body of the Machine Controller when transporting it.

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

- Do not overload the Machine Controller during transportation. (Follow all instructions.)

  There is a risk of injury or an accident.

- Never subject the Machine Controller 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, pallets, or plywood, the packing materials must be treated before the product is packaged, and methods other than fumigation must be used.

  Example: Heat treatment, where materials are kiln-dried to a core temperature of 56°C for 30 minutes or more.

  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.

## ◆ Installation

<div style="border:1px solid">

### ⚠ CAUTION

- Do not install the Machine Controller in any of the following locations.
  - Locations that are subject to direct sunlight
  - Locations that are subject to ambient temperatures that exceed the operating conditions
  - Locations that are subject to ambient humidity that exceeds the operating conditions
  - Locations that are subject to rapid temperature changes and condensation
  - Locations that are subject to corrosive or inflammable gas
  - Locations that are subject to excessive dust, dirt, salt, or metallic powder
  - Locations that are subject to water, oil, or chemicals
  - Locations that are subject to vibration or shock

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

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

  There is a risk of malfunction or damage.

- Do not step on the Machine Controller or place heavy objects on the Machine Controller.

  There is a risk of injury or an accident.

- Do not block the air exhaust ports on the Machine Controller. Do not allow foreign objects to enter the Machine Controller.

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

- Always mount the Machine Controller in the specified orientation.

  There is a risk of malfunction.

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

  There is a risk of fire or malfunction.

- Do not subject the Machine Controller to strong shock.

  There is a risk of 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.

- Do not touch the electrodes of the Battery.

  Static electricity may damage the Battery.

</div>

## ◆ Wiring

| ⚠ CAUTION |
|---|

- Check the wiring to be sure it has been performed correctly.
  There is a risk of motor run-away, injury, or accidents.

- Always use a power supply of the specified voltage.
  There is a risk of fire or accident.

- 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.

- Install breakers and other safety measures to provide protection against shorts in external wiring.
  There is a risk of fire.

- Provide sufficient shielding when using the Machine Controller in the following locations.
  - Locations that are subject to noise, such as from static electricity
  - Locations that are subject to strong electromagnetic or magnetic fields
  - Locations that are subject to radiation
  - Locations that are near power lines
  There is a risk of device damage.

- Configure the circuits to turn ON the power supply to the CPU Unit before the 24-V I/O power supply. Refer to the following manual for details on circuits.
  📖 *MP3000 Series CPU Unit Instructions* (Manual No.: TOBP C880725 16)

  If the power supply 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 supply 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 Machine Controller.
  There is a risk of injury or device damage.

- If you use MECHATROLINK I/O Modules, use the establishment of MECHATROLINK communications as an interlock output condition.
  There is a risk of device damage.

- Connect the Battery with the correct polarity.
  There is a risk of battery damage or explosion.

- Select the I/O signal wires for external wiring to connect the Machine Controller 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

  Steel separator

  Power cable | I/O signal cables in control circuits
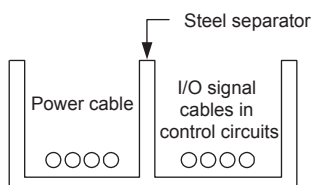
## ◆ Operation

### ⚠ CAUTION

- Follow the procedures and instructions in the user's 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.

- Implement interlock signals and other safety circuits external to the Machine Controller to ensure safety in the overall system even if the following conditions occur.
  - Machine Controller failure or errors caused by external factors
  - Shutdown of operation due to Machine Controller 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 Machine Controller 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 Machine Controller 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 Machine Controller through self-diagnosis.
  There is a risk of injury, device damage, or burning.

## ◆ Maintenance and Inspection

### ⚠ CAUTION

- Do not attempt to disassemble or repair the Machine Controller.
  There is a risk of electrical shock, injury, or device damage.

- Do not change any wiring while power is being supplied.
  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.

- Replace the Battery only while power is supplied to the MP3200.
  Replacing the Battery while the power supply to the MP3200 is turned OFF may result in loss of the data stored in memory in the MP3200.

- When you replace the Battery, do not touch the electrodes of the Battery.
  Static electricity may damage the Battery.

- 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.

### ◆ Disposal

| ⚠ CAUTION |
| :--- |
| • Dispose of the Machine Controller as general industrial waste. <br> • Observe all local laws and ordinances when you dispose of used Batteries. |

### ◆ Other General Precautions

| Observe the following general precautions to ensure safe application. |
| :--- |
| • 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. <br> • The illustrations that are presented in this manual are typical examples and may not match the product you received. <br> • 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. |

# Warranty

## ◆ Details of Warranty

### ■ Warranty Period

The warranty period for a product that was purchased (hereinafter called "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.

### ■ Warranty Scope

Yaskawa shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the warranty period above. 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
- Abuse 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

## ◆ 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.

## ◆ 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.

## ◆ 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.

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## 1  Introduction

## 2  Appearances and Parts

# 3 CPU Unit Functionality

# 4 Specifications

# 5 External Dimensions

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Revision History

# Introduction

1

This chapter introduces the MP3200.

## 1.1 Definition of Terms

This section defines terms that have specific meanings in this manual.

## MP3200

"MP3200" is a collective term that refers to the four Units in the following table.

| Unit Name | Primary Function |
|---|---|
| Power Supply Unit | Supplies the power that is needed for the operation of the Units that are connected to each other and to any Optional Modules that are connected in the Controller. |
| CPU Unit | Stores the module definitions and programs, and interprets the programs. The CPU Unit also controls the Optional Modules. |
| Base Unit | Used to mount Optional Modules. |
| Rack Expansion Interface Unit | Used to expand a Rack. |

## MP3200 Connection Example

The MP3200 is typically connected as shown in the following examples.
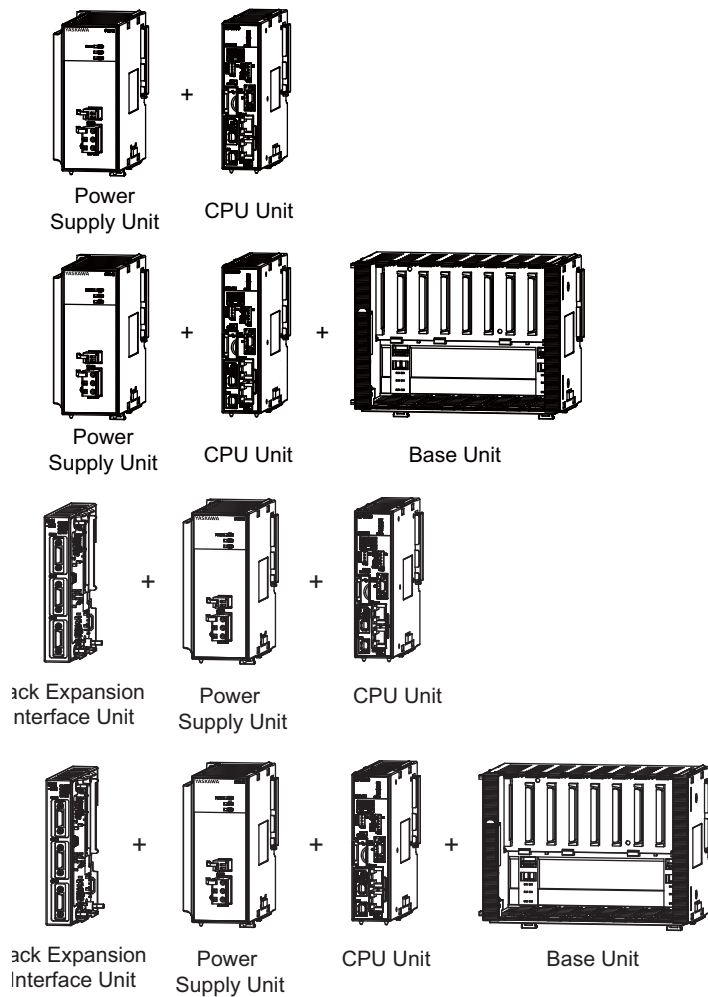
# Racks

A Rack is a set of Units that are connected to each other.

Connection Example



Power Supply Unit    +    CPU Unit    +    Optional Unit    +    Base Unit
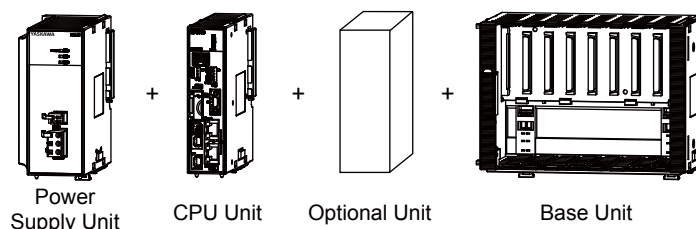
# Main Rack and Expansion Racks

You can add Units and Optional Modules to a Rack to expand functionality. However, if a restriction such as the power supply capacity or number of Base Unit slots for one Rack is exceeded, you must add an Expansion Rack.

You can achieve the following things by adding Units or Optional Modules to a Rack.
• Increase the number of Optional Modules that you can use.
• Increase the number of axes that are controlled.

• Use more than one CPU Unit to increase the speed of system response.*

  * You can not only add Expansion Racks, but you can also achieve more things by expanding the system.
    • If you add an Expansion Rack, you can use Sub CPU synchronization under a Main CPU Unit.
    • If you expand the system, you can use slave CPU synchronization with the CPU Units.

  Refer to the following section for details on Sub CPU synchronization and slave CPU synchronization.
  ☞ 3.3 Multi-CPU Functions (page 3-94)

If you add Racks, the Racks are classified into the Main Rack and Expansion Racks.

| Type | Description |
|---|---|
| Main Rack | The Main Rack contains the Main CPU Unit.<br>There can be only one Main Rack in any one system configuration. |
| Expansion Racks | Expansion Racks are connected to the Main Rack.<br>You can connect up to six Expansion Racks to the Main Rack. (You can connect up to three Expansion Racks by using a Rack Expansion Interface Unit and up to three Expansion Racks by using EXIOIF Modules.) |

The method for adding Expansion Racks depends on the number of CPU Units that you use.

| Number of CPU Units in Use | Method to Add Expansion Racks |
|---|---|
| One CPU Unit | Use MP2200 Base Units and EXIOIF Modules (MP2000-series Optional Modules) to add Expansion Racks.[1] |
| Two CPU Units | Use one of the following methods.<br>• Method 1<br>  Expand the Main Rack by connecting two CPU Units to it.[2]<br>• Method 2<br>  Use a Rack Expansion Interface Unit to add Expansion Racks. |
| Three or more CPU Units | Use the following method 1 and method 2 together, or use only method 2.<br>• Method 1<br>  Expand the Main Rack by connecting two CPU Units to it.[2]<br>• Method 2<br>  Use a Rack Expansion Interface Unit to add Expansion Racks. |

*1. Refer to the following manual for details on the MP2200 Base Unit and EXIOIF Module.
  📖 MP2200 Series User's Manual (Manual No.: SIEP C880700 14)

Introduction

1

Main Rack and Expansion Racks

*2. To mount the Unit with screws, use the JEPMC-OP3006-E or JEPMC-OP3007-E Rack Reinforcement Bracket.

Refer to the following section for an expansion example.

## MP3200 Expansion Example

An MP3200 expansion example is given in the following figure.
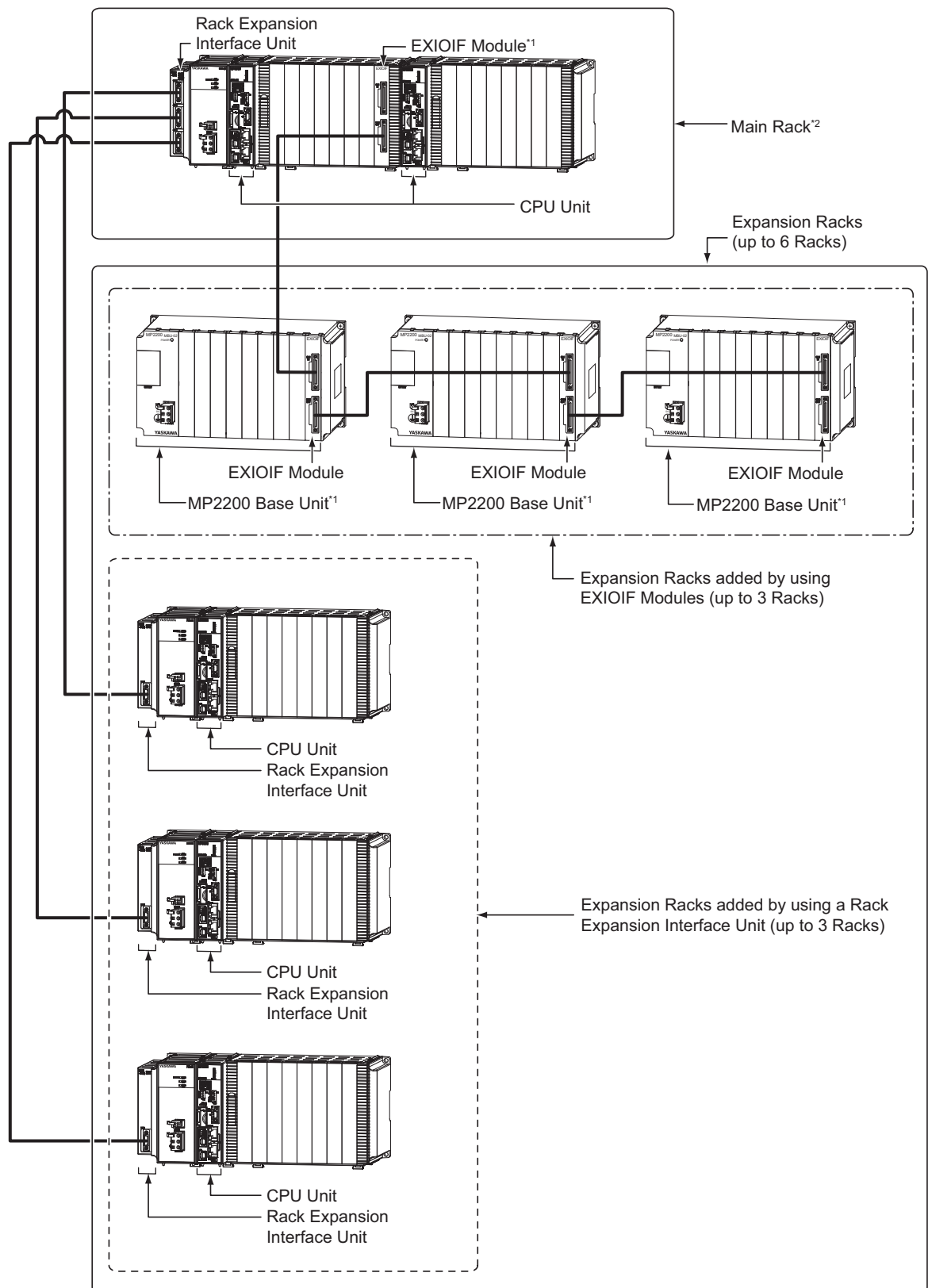


*1. Refer to the following manual for details on the MP2200 Base Unit and EXIOIF Module.
&#x1F4D6; *MP2200 Series User's Manual* (Manual No.: SIEP C880700 14)

*2. If you use two CPU Units, you can connect to the Main Rack without adding an Expansion Rack. To mount the CPU Units with screws, use the JEPMC-OP3006-E or JEPMC-OP3007-E Rack Reinforcement Bracket.

Introduction

1

# Rack Numbers

When you add Expansion Racks, the MPE720 automatically assigns a number to each Rack so that the Racks can be identified.

| Rack No. | Description | |
|---|---|---|
| Rack 1 | Main Rack | |
| Rack 2 | Expansion Racks added by using EXIOIF Modules | |
| Rack 3 | | |
| Rack 4 | | |
| Rack 5 | Expansion Racks added by using a Rack Expansion Interface Unit | The Expansion Rack that is connected to port 1 on the Rack Expansion Interface Unit on the Main Rack |
| Rack 6 | | The Expansion Rack that is connected to port 2 on the Rack Expansion Interface Unit on the Main Rack |
| Rack 7 | | The Expansion Rack that is connected to port 3 on the Rack Expansion Interface Unit on the Main Rack |

Information  Depending on how the Expansion Racks are connected, the Rack numbers may not be sequential. Example: If two Expansion Rack were connected with EXIOIF Modules and one Expansion Rack was connected with a Rack Expansion Interface Unit, the Rack numbers would be as shown below. There would be no rack 4.

Rack 1   Racks 2 and 3   Rack 5

— Rack number of Expansion Racks added by using the Rack Expansion Interface Unit
— Rack numbers of Expansion Racks added by using EXIOIF Modules
— Rack number of Main Rack
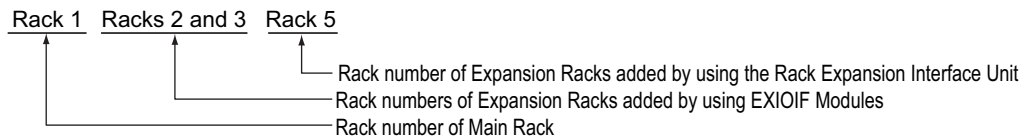
The following figure illustrates Rack numbers.
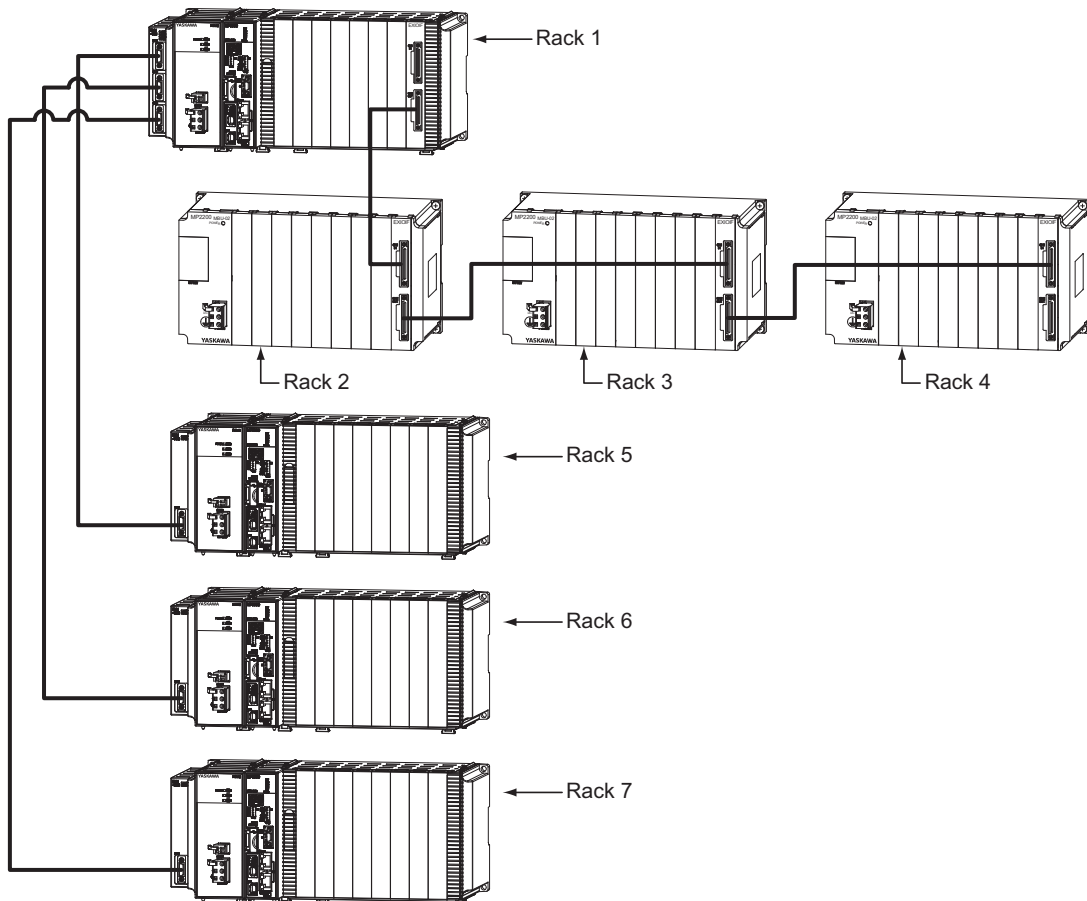
## Unit Numbers

The MPE720 automatically assigns Unit numbers to the Units on each Rack so that the Units can be identified.

Numbers 1 to 5 are assigned to the Units in order from the left.

## Slot Numbers

The MPE720 automatically assigns slot numbers to the slots on the Base Unit so that the slots can be identified.

Numbers 1 to 9* are assigned to the slots in order from the left.

* The highest slot number depends on the specifications of the Base Unit.

# 1.2 System Configuration Example

The following figure shows a typical system configuration. Refer to the following section for details on 1 to 11 in the following figure.

☞ *1.3 Devices and Components That Are Required to Build a System (page 1-9)*
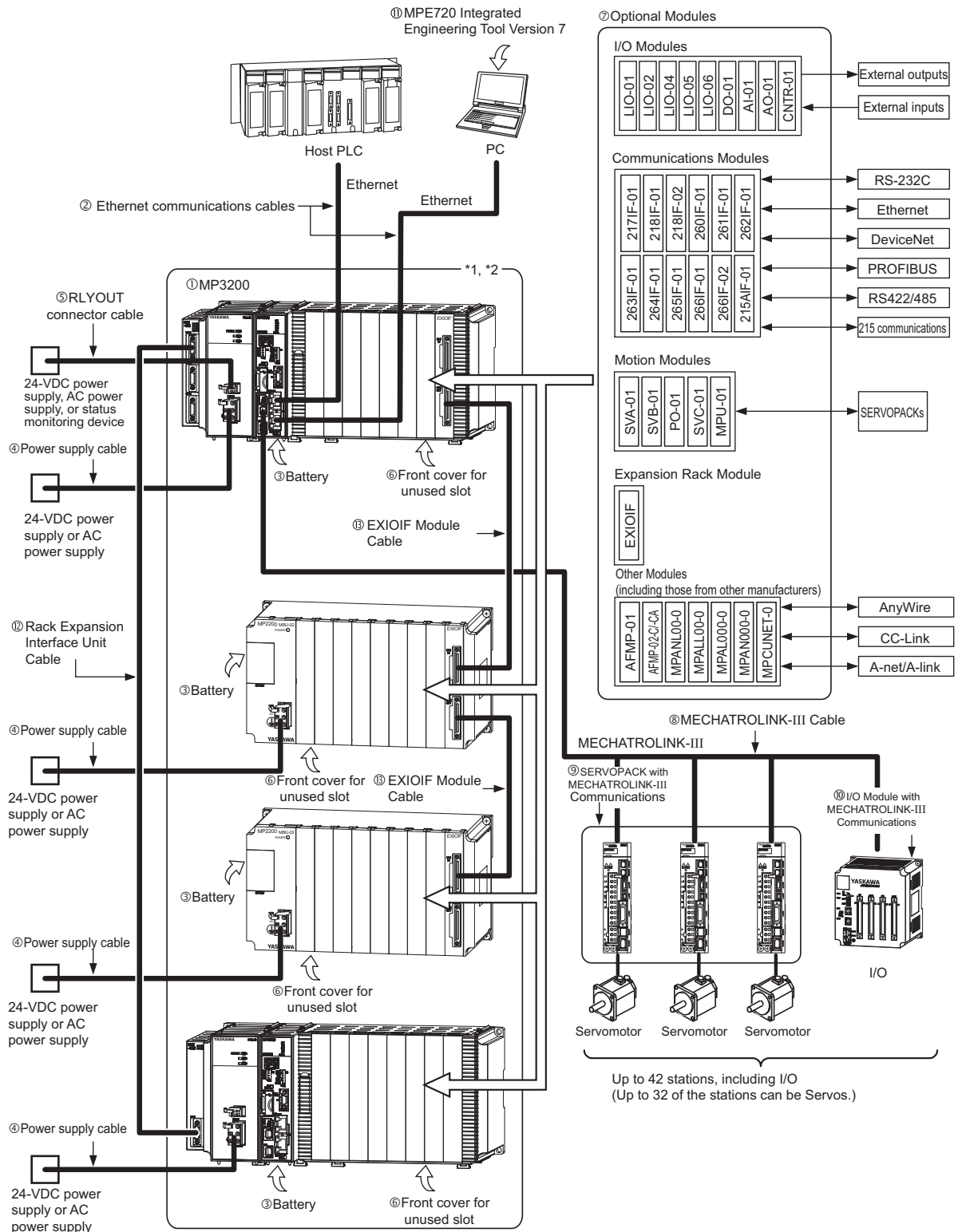


*1. This manual primarily describes this area.
*2. Refer to the following section for an MP3200 expansion example.

☞ *MP3200 Expansion Example (page 1-5)*

## 1.3 Devices and Components That Are Required to Build a System

The following table lists the devices and components that are required to build the system that is shown in *1.2 System Configuration Example (page 1-8)*. The numbers 1 to 13 correspond to the numbers in the figure in *1.2 System Configuration Example (page 1-8)*.

| No. | Name | | Use | Model | Remarks |
|---|---|---|---|---|---|
| ① | MP3200 | Power Supply Unit | Supplies the power that is needed for the operation of the Units that are connected to each other and to any Optional Modules that are connected in the Controller. | Refer to the following section for details.<br>☞ *MP3200 Unit List (page 1-11)* | |
| | | CPU Unit | Stores the module definitions and programs, and interprets the programs. The CPU Unit also controls the Optional Modules. | | |
| | | Base Unit | Used to mount Optional Modules. | | |
| | | Rack Expansion Interface Unit | Used to expand a Rack. | | |
| ② | Ethernet communications cables | | Used to connect the CPU Unit to Ethernet communications devices or to connect the CPU Unit to a PC that has the MPE720 installed on it. | Use a commercially available cable that meets the following conditions:<br>• Ethernet specification: 100Base-TX<br>• Category 5 or higher<br>• Twisted-pair cable with RJ-45 connectors<br><br>Use a cross cable that meets the above conditions to connect the Main CPU Unit to a Sub CPU Unit or to connect two Sub CPU Units. | |
| ③ | Battery with Special Connector | | Provides power for the calendar and backup memory while the power is turned OFF. | JEPMC-OP3005 | The Battery is provided with the CPU Unit. |
| ④ | Power supply cable | | Connects the Power Supply Unit to a 24-VDC power supply or an AC power supply. | Use a commercially available cable that meets the following conditions:<br>• Wire size: AWG18 to AWG13 (0.8 to 2.6 mm$^2$)<br>• Twisted-pair cable | |
| ⑤ | RLYOUT connector cable | | Connects the Power Supply Unit to a 24-VDC power supply, an AC power supply, or a status monitoring device. | Use a commercially available cable that meets the following conditions:<br>• Wire size: AWG28 to AWG14 (0.08 to 2.0 mm$^2$) | |
| ⑥ | Front cover for unused slot | | Used to cover unused slots on the Base Unit. | JEPMC-OP2300 | – |
| ⑦ | Optional Modules | | Motion Modules, I/O Modules, and Communications Modules are selected based on the application. | Refer to the following section for details.<br>☞ *Optional Modules (page 1-12)* | |

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| No. | Name | | Use | Model | Remarks | |
|---|---|---|---|---|---|---|
| ⑧ | MECHATROLINK-III Cable | | Connects the CPU Unit to MECHATROLINK-III Communications devices. | JEPMC-W6012-□□-E | Standard cable<br>Length: 0.2 to 50 m | |
| | | | | JEPMC-W6013-□□-E | Cable with ferrite cores<br>Length: 10 to 50 m | |
| | | | | JEPMC-W6014-□□-E | Cable with loose wires at one end<br>Length: 0.5 to 50 m | |
| ⑨ | SERVOPACK with MECHATROLINK-III Communications | | Used to control Servomotors. | SGDV-□□□□21□□□□□□□ | Σ-V-series AC SERVOPACK with MECHATROLINK-III Communications for Rotational Motor | |
| | | | | SGDV-□□□□25□□□□□□□ | Σ-V-series AC SERVOPACK with MECHATROLINK-III Communications for Linear Motor | |
| ⑩ | I/O Modules with MECHATROLINK-III Communications | 64-point I/O Module | Used to input or output digital, analog, or pulse train signals. | JEPMC-MTD2310-E | 24 VDC, 64 inputs, 64 outputs | |
| | | Analog Input Module | | JEPMC-MTA2900-E | 8 analog input channels | |
| | | Analog Output Module | | JEPMC-MTA2910-E | 4 analog output channels | |
| | | Pulse Train Input Module | | JEPMC-MTP2900-E | 2 pulse-train inputs | |
| | | Pulse Train Output Module | | JEPMC-MTP2910-E | 4 pulse-train outputs | |
| ⑪ | MPE720 Integrated Engineering Tool Version 7 | | Used to adjust, maintain, and program AC Servo Drives and Inverters that are connected to the network. | CPMC-MPE780 | – | |
| ⑫ | Rack Expansion Interface Unit Cable | | Used to use a Rack Expansion Interface Unit to connect the Main Rack to an Expansion Rack. | JEPMC-W3401-A5-E | Length: 0.5 m | • Connector on both ends with ferrite cores<br>• Wire size: AWG28<br>• Twin coaxial cable |
| | | | | JEPMC-W3401-2A5-E | Length: 2.5 m | |
| | | | | JEPMC-W3401-06-E | Length: 6.0 m | |
| ⑬ | EXIOIF Module Cable* | | Used to use an EXIOIF Module to connect the Main Rack to an Expansion Rack or to connect two Expansion Racks. | JEPMC-W2094-A5-E | Length: 0.5 m | • If you use more than one Cable, do not allow the total cable length to exceed 6 m.<br>• Connector on both ends with ferrite cores<br>• Wire size: AWG28<br>• Equivalent to UL20276. |
| | | | | JEPMC-W2094-01-E | Length: 1.0 m | |
| | | | | JEPMC-W2094-2A5-E | Length: 2.5 m | |

Continued from previous page.

| No. | Name | Use | Model | Remarks |
|-----|------|-----|-------|---------|
| – | Panel-mounting Bracket | Used to mount the MP3200 inside a control panel. | JEPMC-OP3001-E | This Attachment is provided with the Power Supply Unit. |
| – | Rack Reinforcement Bracket | Used to mount the Sub CPU Unit to the Main Rack with screws. | JEPMC-OP3006-E | Refer to the following manual for information on model selection and mounting methods.<br>📖 *MP2200/MP3000 Series Machine Controller System Setup Manual (Manual No.: SIEP C880725 00)* |
| | | | JEPMC-OP3007-E | |

* You cannot use an MP2000-series EXIOIF Module Cable (model: JEPMC-W2091-□□(□)).

# MP3200 Unit List

The following table lists the MP3200 Units.

> Observe all precautions when combining MP3200 Units. Refer to the following section for details.
> 📖 *Precautions When Combining MP3200 Units (page 1-14)*
>
> Note

| Unit | | Abbrevia-tion | Model | Description | Maximum Internal Current Consumption |
|------|--|---------------|-------|-------------|--------------------------------------|
| Power Supply Units | | PSA-12 | JEPMC-PSA3012-E | AC power supply | – |
| | | PSD-12 | JEPMC-PSD3012-E | DC power supply | – |
| CPU Unit | | CPU-201 | JEPMC-CP3201-E | – | 2,000 mA |
| | | CPU-202 | JEPMC-CP3202-E | – | 4,000 mA |
| | Motion Control Function Module | SVC32 | – | MECHATROLINK -III | – |
| | | SVR32 | – | Virtual axes* | – |
| | Communications Function Module | 218IFD | – | Ethernet | – |
| Base Units | | MBU-B03 | JEPMC-BUB3003-E | 3 slots | 10 mA |
| | | MBU-B05 | JEPMC-BUB3005-E | 5 slots | 10 mA |
| | | MBU-B08 | JEPMC-BUB3008-E | 8 slots | 10 mA |
| Rack Expansion Interface Unit | | EXU-001 | JEPMC-EXU3001-E | For Main Rack | 1,500 mA |
| | | EXU-002 | JEPMC-EXU3002-E | For Expansion Rack | 1,500 mA |

* Refer to the following section for details.
📖 *3.2 Function Modules* – *Motion Control Function Modules (SVC32 and SVR32) (page 3-50)*

# Optional Modules

You can add the Optional Modules that are listed in the following table for as many open slots there are in the Base Unit.

> **Note** Observe all precautions when combining Optional Modules. Refer to the following section for details.
> ☞ *Precautions When Combining Optional Modules (page 1-14)*

| Unit | Abbreviation | Model | Description | Maximum Internal Current Consumption |
|---|---|---|---|---|
| Motion Modules | SVC-01 | JAPMC-MC2320-E | MECHATROLINK -III × 1 | 460 mA |
| | SVB-01 | JAPMC-MC2310-E | MECHATROLINK -II × 1 | 470 mA |
| | SVA-01 | JAPMC-MC2300 | 2-axis analog servo interface | 540 mA |
| | PO-01 | JAPMC-PL2310-E | 4-axis control with pulse-train output | 760 mA |
| | MPU-01 | JAPMC-CP2700-E | Optional Module with CPU Unit and SVC-01 functionality MECHATROLINK -III × 1 | 580 mA |
| Communications Modules | 217IF-01 | JAPMC-CM2310-E | RS-232C/RS-422 communications | 240 mA |
| | 218IF-01 | JAPMC-CM2300-E | RS-232C/Ethernet communications (10Base-T) | 360 mA |
| | 218IF-02 | JAPMC-CM2302-E | RS-232C/Ethernet communications (100Base-TX/10Base-T) | 480 mA |
| | 260IF-01 | JAPMC-CM2320-E | RS-232C/DeviceNet communications | 150 mA |
| | 261IF-01 | JAPMC-CM2330-E | RS-232C/PROFIBUS communications | 260 mA |
| | 262IF-01 | JAPMC-CM2303-E | FL-net communications | 480 mA |
| | 263IF-01 | JAPMC-CM2304-E | EtherNet/IP communications | 480 mA |
| | 264IF-01 | JAPMC-CM2305-E | EtherCAT (EtherCAT slave) | 540 mA |
| | 265IF-01 | JAPMC-CM2390-E | CompoNet (I/O communications and message communications) | 200 mA |
| | 266IF-01 | JAPMC-CM2306-E | PROFINET master | 540 mA |
| | 266IF-02 | JAPMC-CM2307-E | PROFINET slave | 540 mA |
| | 215AIF-01 | JAPMC-CM2360-E | RS-232C/MPLINK communications | 410 mA |
| | | JAPMC-CM2361 | RS-232C/CP-215 communications | 420 mA |
| | AFMP-01 | – | Anywire-Master DB by Anywire Corporation | * |
| | AFMP-02-C | – | CC-Link by Anywire Corporation | * |
| | AFMP-02-CA | – | CC-Link and Anywire-Master DB by Anywire Corporation | * |
| | MPANL00-0 | – | A-net/A-Link by ALGO System | * |
| | MPALL00-0 | – | A-Link/A-Link by ALGO System | * |
| | MPAL000-0 | – | A-Link by ALGO System | * |
| | MPAN000-0 | – | A-net by ALGO System | * |
| | MPCUNET-0 | – | CUnet by ALGO System | * |

* Refer to the manuals for individual Optional Modules for details.

Continued from previous page.

| Unit | Abbreviation | Model | Description | Maximum Internal Current Consumption |
|------|-------------|-------|-------------|----------------------------|
| I/O Modules | LIO-01 | JAPMC-IO2300-E | 16 inputs, 16 sinking outputs, 1 pulse-train input | 300 mA |
| | LIO-02 | JAPMC-IO2301-E | 16 inputs, 16 sourcing outputs, 1 pulse-train input | 300 mA |
| | LIO-04 | JAPMC-IO2303-E | 32 inputs, 32 sinking outputs | 400 mA |
| | LIO-05 | JAPMC-IO2304-E | 32 inputs, 32 sourcing outputs | 400 mA |
| | LIO-06 | JAPMC-IO2305-E | 8 digital inputs, 8 digital sinking outputs 1 analog input channel and 1 analog output channel 1 pulse-train counter channel | 500 mA |
| | DO-01 | JAPMC-DO2300-E | 64 sinking outputs | 500 mA |
| | AI-01 | JAPMC-AN2300-E | 8 analog input channels | 340 mA |
| | AO-01 | JAPMC-AN2310-E | 4 analog output channels | 740 mA |
| | CNTR-01 | JAPMC-PL2300-E | 2 counter channels, input circuits: 5 V or 12 V | 610 mA |
| Expansion Rack Module | EXIOIF | JAPMC-EX2200-E | – | – |

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## 1.4 Precautions When Combining Products

The following precautions must be observed when combining the MP3200 Units and Optional Modules.

### Precautions When Combining MP3200 Units

There are restrictions in the order in which you can connect the Units. Build the Rack by connecting each Unit in the order that is shown below.



Rack Expansion Interface Unit (for Main Rack or Expansion Rack)       Power Supply Unit          CPU Unit                    Base Unit
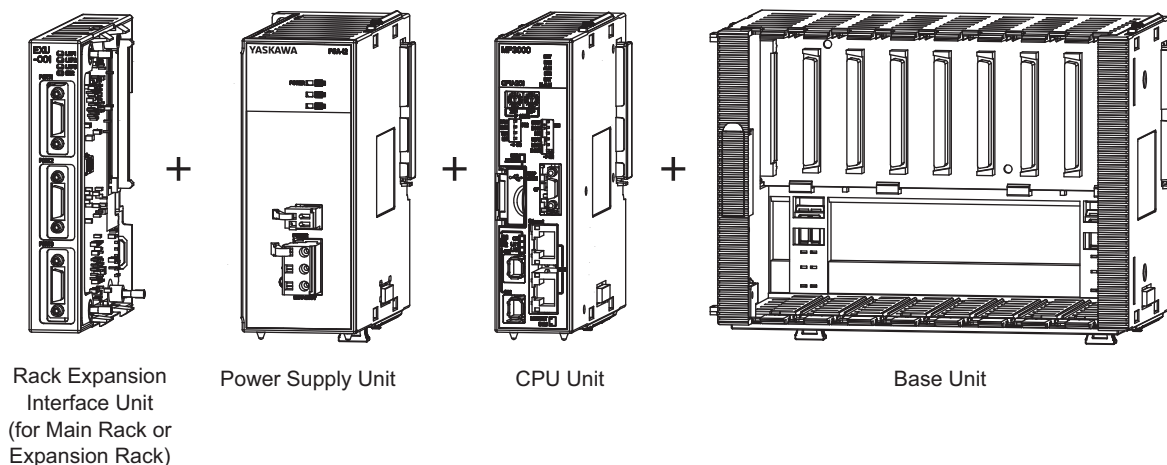
> **Note**
> The Units will not operate if they are connected in the wrong order (e.g., if the Base Unit is connected to the left side of the Power Supply Unit).

### Precautions When Combining Optional Modules

When combining Optional Modules, make sure the following conditions are met.

• The output current of the Power Supply Unit[*] must be held to approximately 75% (approximately 9 A) or less of the rated current capacity.

   * This is the total of the maximum internal current consumption of the Base Units and Optional Modules that are connected to the Power Supply Unit.

> **Note**
> Always attach the front covers to unused slots on the Base Unit.

## 1.5 Precautions When Setting the Parameters

Observe the following precautions when setting the MP3200.

## Precautions When Setting the Circuit Numbers

When assigning circuit numbers to the Motion Control and Communications Function Modules, the numbers must be within the following ranges.

| Unit | | Abbreviations of Built-in Modules | Circuit numbers |
|---|---|---|---|
| Function Modules in CPU Unit | Motion Control Function Module | SVC32, SVR32 | 1 to 16 |
| | Communications Function Module | 218IFD | 1 to 8 |
| Optional Modules | Motion Modules | SVA-01 (SVA), SVB-01 (SVB01), SVC-01 (SVC), MPU-01 (MPUIF), PO-01 (PO) | 1 to 16 |
| | Communications Modules | 217IF-01 (217IF) | 1 to 16 |
| | | 218IF-01 (218IF), 218IF-02 (218IFB), 260IF-01 (260IF (DeviceNet)), 261IF-01 (261IFS (Profibus)), 262IF-01 (FL-net), 263IF-01 (EtherNet/IP), 264IF-01 (EtherCAT-S), 265IF-01 (Componet), 266IF-01, 266IF-02, 215AIF-01 (MPLINK), 215AIF-01 (CP-215) | 1 to 8 |

## Precautions When Setting Module Configuration Definitions

Observe the following precautions when writing module configuration definitions.

- Write the module configuration definitions only when the high-speed scan has sufficient unused processing time.
  Otherwise, processing may exceed the time limit of the high-speed scan.
- Before writing module configuration definitions, make sure the machine is not in operation.
- Before you use the Machine Controller, save any written data to flash memory and turn the power supply to the Racks OFF and ON again.

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# Appearances and Parts

2

This section describes the appearance and parts of the MP3200.

## 2.1 Power Supply Units

The Power Supply Unit supplies the connected Units and Optional Modules with the power needed to operate. There are two Power Supply Units available: an AC Power Supply Unit and a DC Power Supply Unit.

This section shows the appearance and part names of the Power Supply Unit and describes the indicators and connectors.

## Appearance and Part Names

The following figure shows the appearance of the Power Supply Unit and the part names.
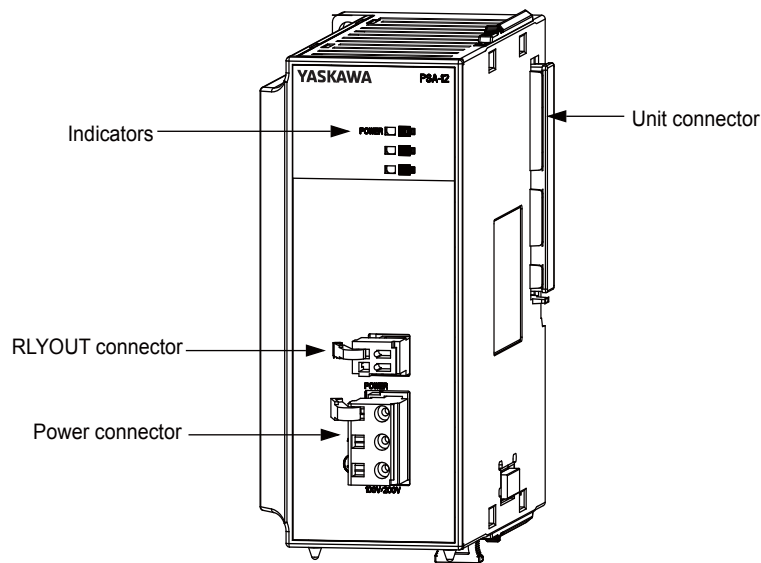


## Indicators

These indicators show the load on the Power Supply Unit.
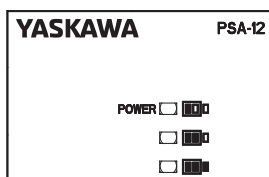


| Output Current | | | 8.9 A or less | 9.0 to 11.4 A | 11.5 to 13.9 A[*] | 14.0 A or more[*] |
|---|---|---|---|---|---|---|
| Load | | | Normal: Within power supply capacity | | Normal: Maximum power supply capacity | Error: Over power supply capacity |
| Indicator | POWER □ ▮▯▯ | Green | ● | ● | ● | ○ |
| | □ ▮▮▯ | Yellow | ○ | ● | ● | ○ |
| | □ ▮▮▮ | Red | ○ | ○ | ● | ○ |

Note: ●: Lit, ○: Not lit.

\* Reduce the number of Optional Modules that are connected.

# Connectors

The Power Supply Unit has three connectors: RLYOUT, power supply, and Unit connectors.

## RLYOUT Connector

This connector outputs the operating status of the CPU Unit.
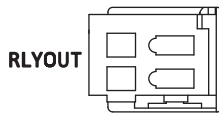


Model: 734-302

### ◆ Pin Assignments

| No. | Signal Label | Description |
|---|---|---|
| 1 | OUT | • Normal operation: Circuit closed. |
| 2 | OUT | • Error: Circuit open. |

## Power Connector

Connect the power supply to this connector.
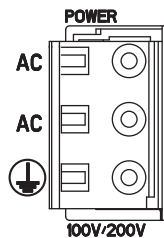
AC Power Supply Unit                    DC Power Supply Unit
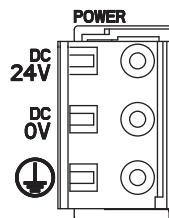


| Type | Model | Color |
|---|---|---|
| AC Power Supply Unit | 721-203/026-304 | Black |
| DC Power Supply Unit | 721-203/026-000 | White |

### ◆ Pin Assignments: AC Power Supply Unit

| Pin No. | Signal Label | Description |
|---|---|---|
| 3 | AC | AC input |
| 2 | AC | AC input |
| 1 | FG | Connects to the frame ground. (Ground to 100 Ω max.) |

### ◆ Pin Assignments: DC Power Supply Unit

| Pin No. | Signal Label | Description |
|---|---|---|
| 3 | 24 VDC | Power input wire for 24 VDC |
| 2 | 0 VDC | Power input wire for 0 VDC |
| 1 | FG | Connects to the frame ground. (Ground to 100 Ω max.) |

Appearances and Parts

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Connectors

## Unit Connector

This connector is used to connect the next Unit.

Refer to the following manual for details on connecting Units.

&#x1F4D6; *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

# 2.2 CPU Unit

The CPU Unit stores the module definitions and programs, and interprets the programs. The CPU Unit also controls the Optional Modules.

This section shows the appearance and part names of the CPU Unit and describes the indicators, switches, connectors, Fan,* and temperature sensor.*

* These are built into the CPU-202 only.

## Appearance and Part Names

The following figure shows the appearance of the CPU Unit and the part names.
CPU-201
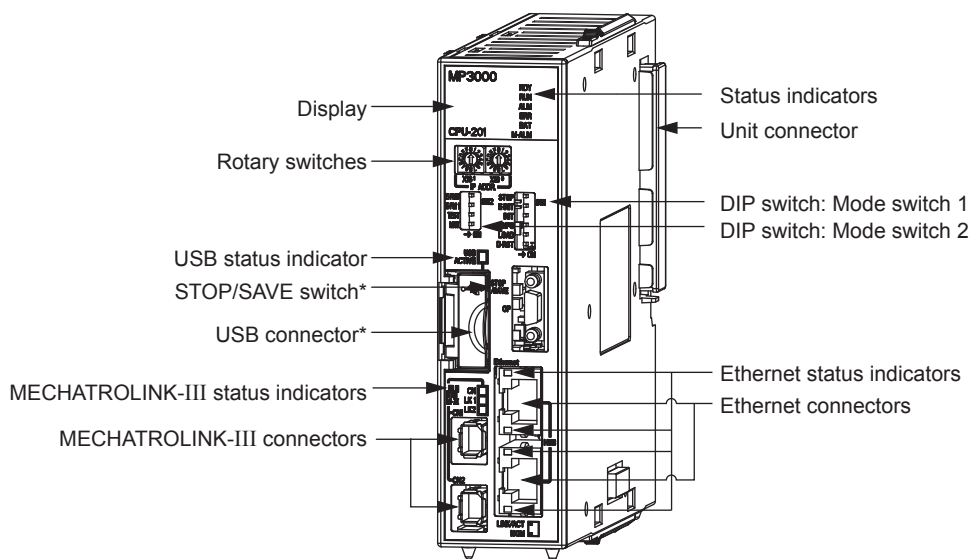


* Open the cover to access the switch and USB connector.
CPU-202
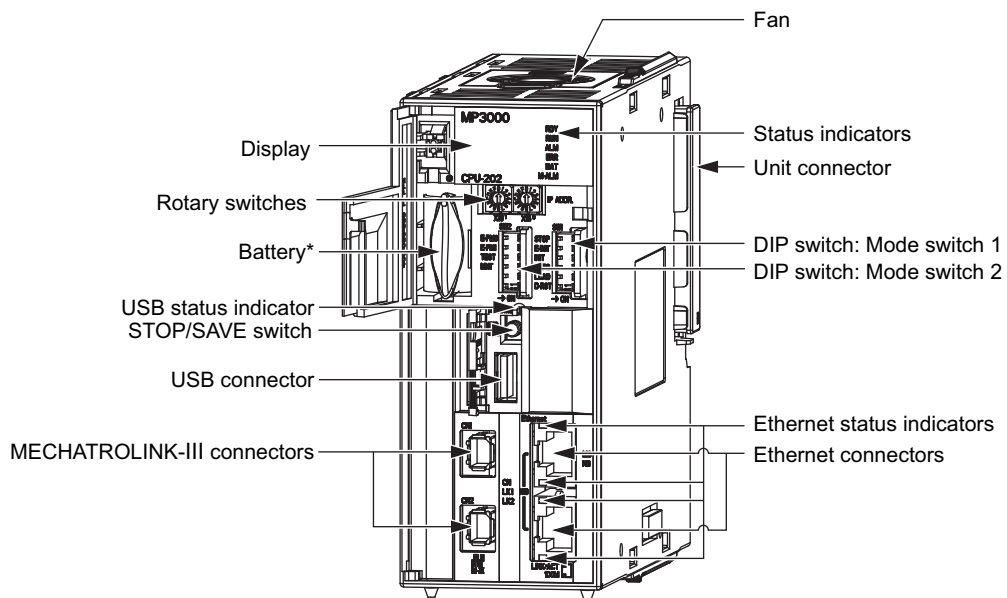


* Open the cover to connect or remove the Battery.

# Display and Indicators

The CPU Unit has the following display and four indicators.

- Display
- Status indicators
- USB status indicator
- MECHATROLINK-III status indicators
- Ethernet status indicators

## Display

The display shows the execution or error status of the CPU Unit.

| Color | Display | Status | Description |
|---|---|---|---|
| Red | (Lit dot at lower right) | Initializing | The CPU Unit started normally after the power was turned ON or after the system was reset. |
| | (Flashing dot at lower right) | Normal operation | The CPU Unit is operating normally. |
| | | USB memory batch transfer | Save or load is starting. |
| | | | Save or load is in progress. |
| | | | Save or load was completed. After 2 seconds, the display will indicate the status of the CPU Unit. |
| | (Displayed by CPU-202 only.) | Failsafe function stopped the CPU Unit. | Refer to the following manual for information on internal temperature errors and Fan operation failure. ☐ *MP3000 Series MP3200 Troubleshooting Manual* (Manual No.: SIEP C880725 01) |
| | Three digits after $E.$ or $A.$ | A system error occurred. | Refer to the following manual for details on errors. ☐ *MP3000 Series Basic Units Troubleshooting Manual* (Manual No.: SIEP C880725 01) |
| | | An alarm occurred. | |

## Status Indicators

These indicators show the status of the CPU Unit.

RDY □
RUN □
ALM □
ERR □
BAT □
M-ALM □

| Indicator Name | Color | Status When Lit* |
|---|---|---|
| RDY | Green | Operation is normal. |
| RUN | Green | A user program is being executed. |
| ALM | Red | An alarm occurred. |
| ERR | Red | An error occurred. |
| BAT | Red | The battery alarm occurred. |
| M_ALM | Red | An error occurred with one of the Servo axes:<br>• Warning<br>• Alarm<br>• Command Error Completed Status |

\* Refer to the following manual for details.

📖 *MP3000 Series MP3200 Troubleshooting Manual* (Manual No.: SIEP C880725 01)

## USB Status Indicator

This indicator shows the status of the USB memory.

| Indicator Name | Indicator Status | Status | Description |
|---|---|---|---|
| USB ACTIVE | □<br>Not lit | No USB memory device | No USB memory device has been inserted yet, or the USB memory device is ready to be removed. |
| | ■<br>Lit | USB memory device inserted | A USB memory device is inserted. |
| | ☀<br>Flashing | Accessing USB memory | The USB memory is being accessed. |

## MECHATROLINK-III Status Indicators

These indicators show the status of the MECHATROLINK-III communications.

M-III   CN □
        LK1 □
        LK2 □
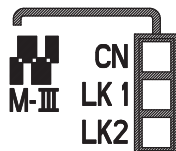
| Indicator Name | Color | Status When Lit |
|---|---|---|
| CN | Green | MECHATROLINK-III communications is established with the CPU Unit as a slave (i.e., the Connect command is ON). |
| LK1 | Green | MECHATROLINK-III communications are active on PORT1. |
| LK2 | Green | MECHATROLINK-III communications are active on PORT2. |

Appearances and Parts

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## Ethernet Status Indicators

These indicators show the status of Ethernet communications.
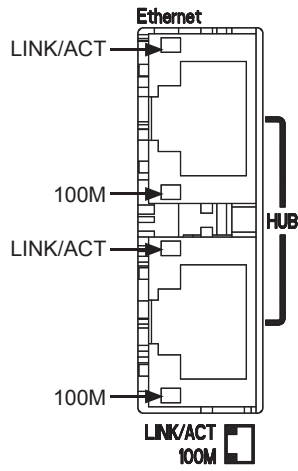


| Indicator Name | Color | Status When Not Lit, Lit, or Flashing |
|---|---|---|
| LINK/ACT | Yellow | Lit: Ethernet link established.<br>Flashing: Ethernet communications activity. |
| 100M | Green | Not lit: 10 M connection<br>Lit: 100 M connection |

# Switches

The CPU Unit has the following four switches.

- DIP switch: Mode switch 1
- DIP switch: Mode switch 2
- Rotary switches
- STOP/SAVE switch

## DIP Switch: Mode Switch 1

This DIP switch primarily sets the operating mode of the CPU Unit.
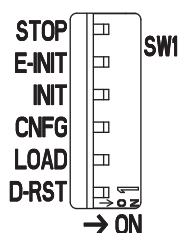


| Pin Name | Status | Operating Mode | Default | Remarks |
|----------|--------|----------------|---------|---------|
| STOP | ON | Stops the user programs. | OFF | Turn ON the pin to stop execution of the user program. |
| | OFF | Executes the user programs. | | |
| E-INIT | ON | Sets the IP address to 192.168.001.□□□. | OFF | The setting of □□□ is determined by the rotary switch setting. Refer to the following section for details on the setting. ☞ *Rotary Switches (page 2-10)* |
| | OFF | Sets the IP address that is set in the MPE720. | | – |
| INIT | ON | Resets memory. | OFF | Turn OFF the pin to execute the programs that are stored in the flash memory. |
| | OFF | Normal operation | | |
| CNFG | ON | Configuration Mode | OFF | Turn ON the pin to perform self configuration. Turn OFF the pin to operate according to the definitions that are stored in the flash memory. |
| | OFF | Normal operation | | |
| LOAD | ON | Load data. | OFF | Turn ON the pin and then turn ON the power to batch load data from the USB memory to the CPU Unit. Refer to the following section for details. ☞ *3.2 Function Modules – USB Memory (page 3-85)* |
| | OFF | Does not load data. | | |
| D-RST | ON | Reserved for system. | OFF | Keep this pin OFF at all times. |
| | OFF | Normal operation | | |

# DIP Switch: Mode Switch 2

This DIP switch primarily sets the operating mode of the CPU Unit.
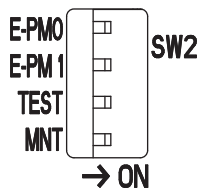


| Pin Name | Status | Operating Mode | Default | Remarks |
|----------|--------|----------------|---------|---------|
| E-PM0 | ON | Reserved for system. | OFF | Keep this pin OFF at all times. |
| | OFF | Normal operation | | |
| E-PM1 | ON | Reserved for system. | OFF | Keep this pin OFF at all times. |
| | OFF | Normal operation | | |
| TEST | ON | Reserved for system. | OFF | Keep this pin OFF at all times. |
| | OFF | Normal operation | | |
| MNT | ON | Reserved for system. | OFF | Keep this pin OFF at all times. |
| | OFF | Normal operation | | |

# Rotary Switches

When the E-INIT pin on Mode Switch 1 is ON, the IP address will be set to 192.168.001.□□□. The value of □□□ is set on the rotary switches, S1 and S2. Set the hexadecimal value.
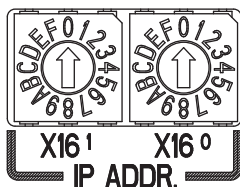


| Set Value | | IP Address |
|-----------|-----------|------------|
| $X16^1$ | $X16^0$ | |
| 0 | 0 | Reserved for system. |
| 0 | 1 | 192.168.001.001 (default setting) |
| 0 | 2 | 192.168.001.002 |
| ⋮ | ⋮ | ⋮ |
| F | E | 192.168.001.254 |
| F | F | Reserved for system. |

> **Note**
> To enable the rotary switch setting, turn ON the E-INIT pin on the mode switch 1. If the E-INIT pin is OFF, the IP address will be set from the MPE720.

## STOP/SAVE Switch

This switch is used when removing the USB memory device, or when batch saving data to the USB memory.



Open the cover.

STOP/SAVE switch
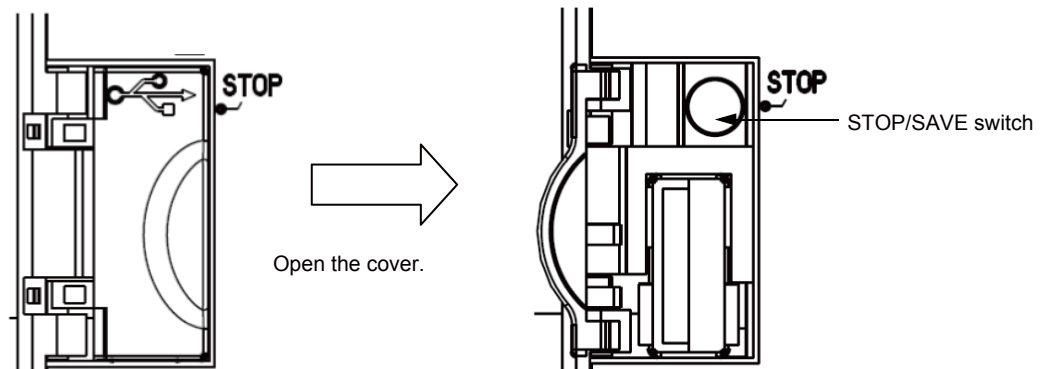
- Lightly press this switch to prepare the USB memory device for removal. The USB memory device can be safely removed when the USB status indicator changes from flashing to not lit.
- Press and hold this switch for at least 2 seconds to save all of the data to the USB memory. The display will show the progress of saving.

# Connectors

The CPU Unit has four connectors: MECHATROLINK-III, Ethernet, USB, and Unit connectors.

## MECHATROLINK-III Connectors

These connectors are used to connect MECHATROLINK-III communications devices.
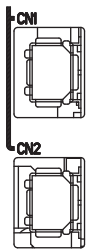


## Ethernet Connectors

These connectors are used to connect Ethernet communications devices.



Appearances and Parts

2

## USB Connector

This connector is used to connect a USB memory device.



Open the cover.

USB connector
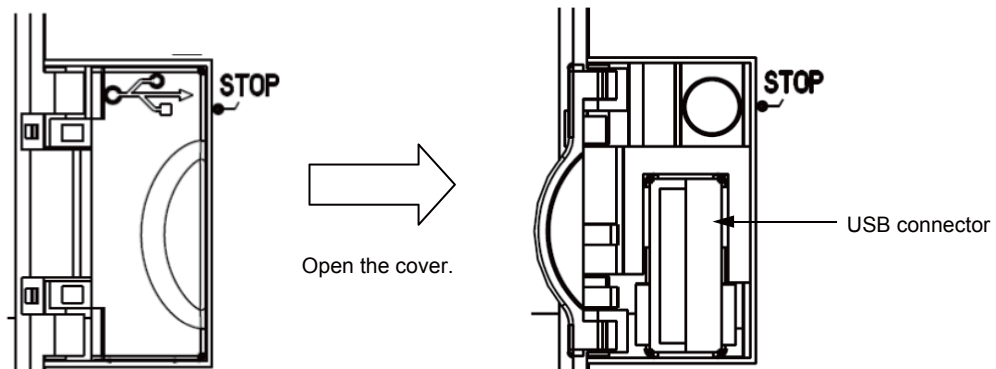
> **Note**
> Before removing the USB memory device, press the STOP/SAVE switch and wait until the USB status indicator goes out. If the USB memory device is removed while the USB status indicator is lit or flashing, the data may become corrupted.

## Unit Connector

This connector is used to connect the next Unit.

Refer to the following manual for details on connecting Units.

📖 *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

## Fan

A Fan is built into the CPU-202 CPU Unit.



Fan cover

Open the cover.
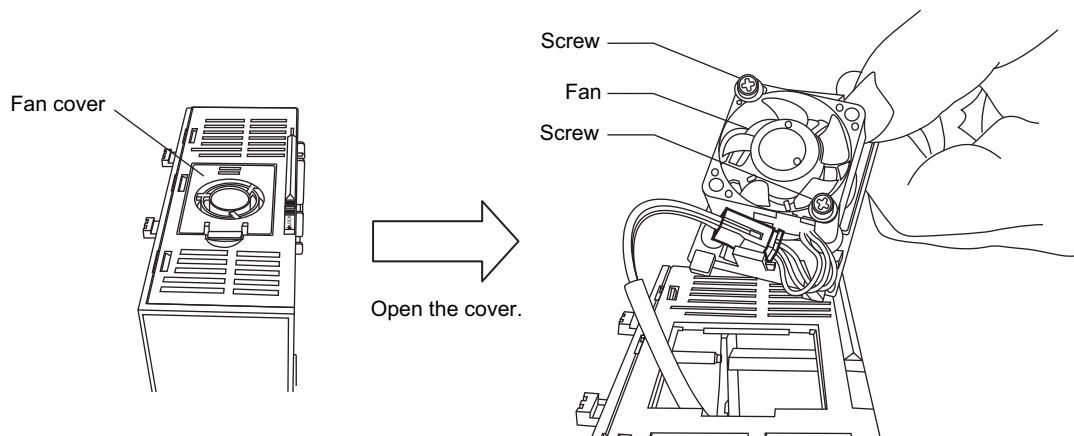
Screw
Fan
Screw

• Fan model: JEPMC-OP3101-E

• Screw specifications: M3 × 14 mm × 2 screws with spring washers

The Fan life is 50,000 hours minimum (at an average ambient operating temperature of 40°C). An alarm is displayed on the CPU-202 if the Fan stops.

There are three levels of alarms, as shown in the following table.

| Display | ALM Indicator | Error Description |
|---------|---------------|------------------|
| A.240 | Lit | A Fan operation failure was detected. |
| E.083 | Lit | The Fan remained stopped for more than a minute after A.240 was detected. (The CPU Unit will stop.) |
| h | Lit | The failsafe function was activated for E.083 (Fan Alarm) or E.082 (Temperature Warning). (The CPU Unit will stop.) (This alarm is displayed 5 seconds after E.083 is detected.) |

> **Important**
> If the above alarms occur, turn OFF the power supply to the CPU-202 immediately and replace the Fan.
> Refer to the following manual for the Fan replacement procedure.
> 📖 *MP3000 Series MP3200 Troubleshooting Manual* (Manual No.: SIEP C880725 01)

## Temperature Sensor

A temperature sensor is built into the CPU-202 CPU Unit.

The temperature sensor constantly monitors for abnormal temperatures in the CPU-202 Unit. If a temperature error is detected, an alarm is displayed on the CPU-202.

There are four levels of alarms, as shown in the following table.

| Display | ALM Indicator | Error Description |
|---------|---------------|------------------|
| A.241 | Lit | A rise in the internal temperature was detected. |
| E.081 | Lit | The temperature continued to increase after A.241 was detected and is approaching the permissible temperature of the internal parts. (The CPU Unit will stop.) |
| E.082 | Lit | The temperature continued to increase after E.081 was detected and has reached the permissible temperature of the internal parts. (The CPU Unit will stop.) |
| h | Lit | The failsafe function was activated for E.083 (Fan Alarm) or E.082 (Temperature Warning). (The CPU Unit will stop.) (This alarm is displayed if the temperature continues to increase after E.082 was detected.) |

> **Important**
> If the above alarms occur, turn OFF the power supply to the CPU-202 immediately and check the ambient environment and installation conditions.
> Refer to the following section for details on the ambient environment and installation requirements.
> ☞ *4.1 MP3200 Installation and Usage Conditions (page 4-2)*

Appearances and Parts

2

## 2.3 | Base Units

The Base Unit is used to mount Optional Modules. There are three models of Base Units, a three-slot model, a five-slot model, and an eight-slot model.

This section shows the appearance and part names of the Base Unit and describes the connector.

## Appearance and Part Names

The following figure shows the appearance of the Base Unit and a part name.
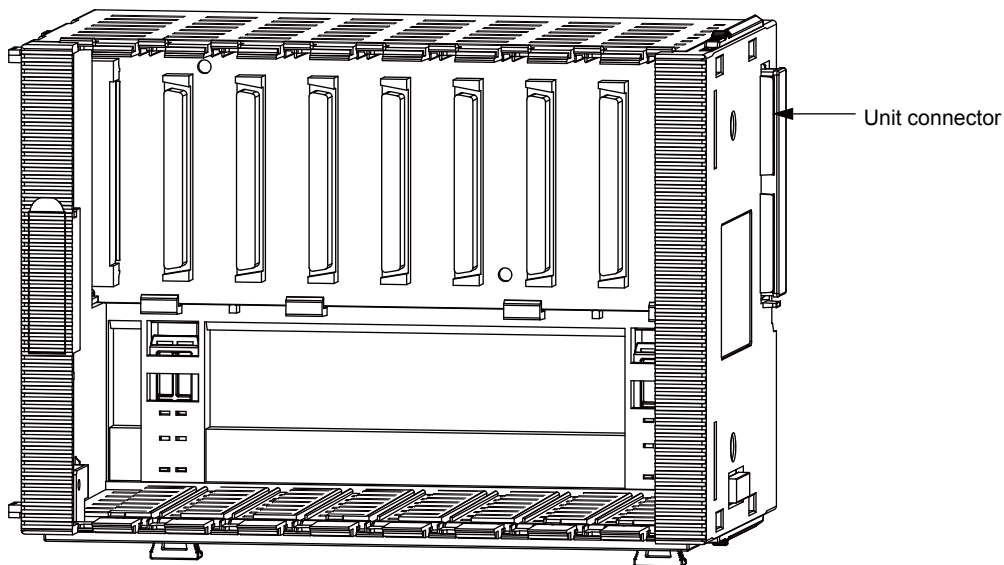


## Connector

The Base Unit has a Unit connector.

### Unit Connector

This connector is used to connect the next Unit.

Refer to the following manual for details on connecting Units.

📖 *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

## 2.4 Rack Expansion Interface Unit

A Rack Expansion Interface Unit is used to expand a Rack. There are two models of Rack Expansion Interface Units, a Main Rack Expansion Interface Unit and an Expansion Rack Expansion Interface Unit.

This section shows the appearance and part names of the Rack Expansion Interface Units and describes the indicators and connectors.

## Appearance and Part Names

The following figure shows the appearance of the Rack Expansion Interface Unit and the part names.

Main Rack Expansion
Interface Unit
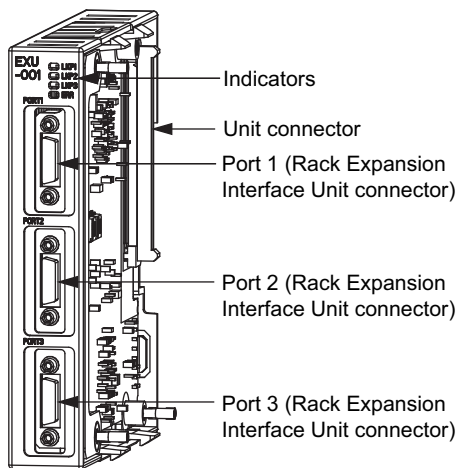
Expansion Rack Expansion Interface Unit

Indicators

Unit connector

Port 1 (Rack Expansion Interface Unit connector)

Port 2 (Rack Expansion Interface Unit connector)

Port 3 (Rack Expansion Interface Unit connector)

Indicators

Unit connector

Port 1 (Rack Expansion Interface Unit connector)

Appearances and Parts

2
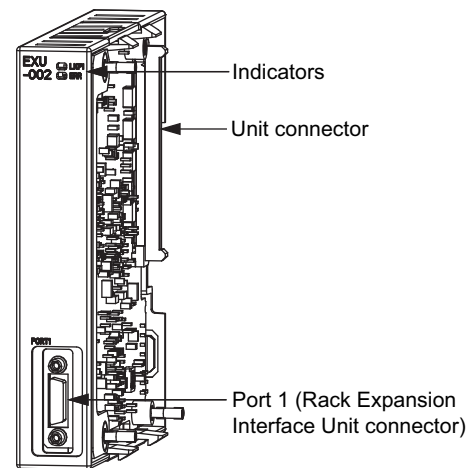
# Indicators

These indicators show the operating status of the Rack Expansion Interface Unit, the communications status of the cable, and the error status.

For Main Rack

☐ LKP1
☐ LKP2
☐ LKP3
☐ ERR

For Expansion Rack

☐ LKP1
☐ ERR

| Indicator Name | Color | | Status When Lit, Flashing, or Not Lit |
|---|---|---|---|
| LKP1 | Green | Lit | Communications are active with the Rack Expansion Interface Unit connected to port 1. |
| | | Not lit | • Consecutive communications errors occurred and communications cannot be recovered automatically.<br>• The cable was disconnected or was not connected to the port.<br>• The current Rack Expansion Interface Unit or another Rack Expansion Interface Unit connected to it has a hardware failure. |
| LKP2 | Green | Lit | Communications are active with the Rack Expansion Interface Unit connected to port 2. |
| | | Not lit | Same as LKP1. |
| LKP3 | Green | Lit | Communications are active with the Rack Expansion Interface Unit connected to port 3. |
| | | Not lit | Same as LKP1. |
| ERR | Red | Lit | • Consecutive communications errors occurred on one of the ports and communications cannot be recovered automatically.<br>• The cable was disconnected or was not connected. These errors are not shown on the Main Rack Expansion Interface Unit before the connection is established.<br>• The current Rack Expansion Interface Unit or another Rack Expansion Interface Unit connected to it has a hardware failure. |

> **Important**
> If communications errors occur consecutively during operation, communications between the Main Rack and Expansion Rack will stop.

# Connectors

The Rack Expansion Interface Unit has two connectors: Rack Expansion Interface Unit connector and Unit connector.

## Rack Expansion Interface Unit Connector

This connector is used to connect an Expansion Rack.

The Main Rack Expansion Interface Unit has three connectors (port 1, port 2, and port 3), and the Expansion Rack Expansion Interface Unit has one connector (port 1).
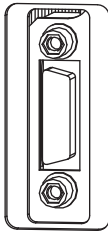


## Unit Connector

This connector is used to connect the next Unit.

Refer to the following manual for details on connecting Units.

📖 *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

# CPU Unit Functionality

# 3

This chapter describes the functionality of the MP3200 CPU Units.

## 3.1 Basic Functionality

This section describes the basic functionality of the CPU Unit.

## Programs

A program is a list of instructions to be processed by the CPU Unit.

This section describes the types of programs and gives an overview of each type.

### Types of Programs

There are three types of user programs:

• Ladder programs

• Motion programs

• Sequence programs

This section describes these programs.

#### ◆ Ladder Programs

Ladder programs are managed as drawings (ladder diagrams) that are identified by their drawing numbers (DWG numbers). These drawings form the basis of the user program.

##### ■ Drawing Types and Hierarchical Configuration

This section describes the types of ladder drawings and their hierarchical configuration.

• Types
  Ladder drawings are divided into four different types based on their purpose.
    • DWG.A (Startup Drawings)
      This type of ladder drawing is used to set register data. These ladder drawings are executed before high-speed scan process drawings and low-speed scan process drawings.
    • DWG.I (Interrupt Drawings)
      This type of ladder drawing is used to perform processing with priority given to signals input from an Optional Module. These ladder drawings are executed with higher priority than high-speed scan process drawings regardless of the scan cycle.
    • DWG.H (High-speed Scan Process Drawings)
      This type of ladder drawing is used to perform motion control or high-speed I/O control.
    • DWG.L (Low-speed Scan Process Drawings)
      This type of ladder drawing is used for communications with HMIs and external devices as well as for standard I/O control.

The following table lists the priority, execution conditions, and maximum number of drawings for each type of ladder drawing.

| Drawing Type | Priority* | Execution Condition | Maximum Number of Drawings |
|---|---|---|---|
| DWG.A (Startup Drawings) | 1 | Power ON (These drawings are executed once when the power supply is turned ON.) | 64 |
| DWG.I (Interrupt Drawings) | 2 | External interrupt (These drawings are executed when a DI interrupt or counter match interrupt is received from an Option Module.) | 64 |
| DWG.H (High-speed Scan Process Drawings) | 3 | Started at fixed intervals. (These drawings are executed once every high-speed scan.) | 200 |
| DWG.L (Low-speed Scan Process Drawings) | 4 | Started at fixed intervals. (These drawings are executed once every low-speed scan.) | 1000 |

* Drawings with lower numbers have higher priority.

- Hierarchical Configuration
There are four types of ladder drawings: parent drawings, child drawings, grandchild drawings, and operation error drawings.
  - Parent Drawings
  These drawings are automatically executed by the system program when the execution conditions are met.
  - Child Drawings
  These drawings are executed when they are called from a parent drawing with a SEE instruction.
  - Grandchild Drawings
  These drawings are executed when they are called from a child drawing with a SEE instruction.
  - Operation Error Drawings
  These drawings are automatically executed by the system program when an operation error occurs.

A parent drawing cannot call a child drawing from a different type of drawing. Similarly, a child drawing cannot call a grandchild drawing from a different type of drawing. A parent drawing cannot call a grandchild drawing directly. The parent drawing first must call the child drawing, and then the child drawing must call the grandchild drawing. This is called the hierarchical configuration of drawings. The following figure shows the parent-child-grandchild structure in which a program is created.



Note: □ = A, I, H, or L

Programs

DWG notation: DWG.□ □ . □

- Grandchild drawing number
- Child drawing number
- Parent drawing type (A, I, H, or L)
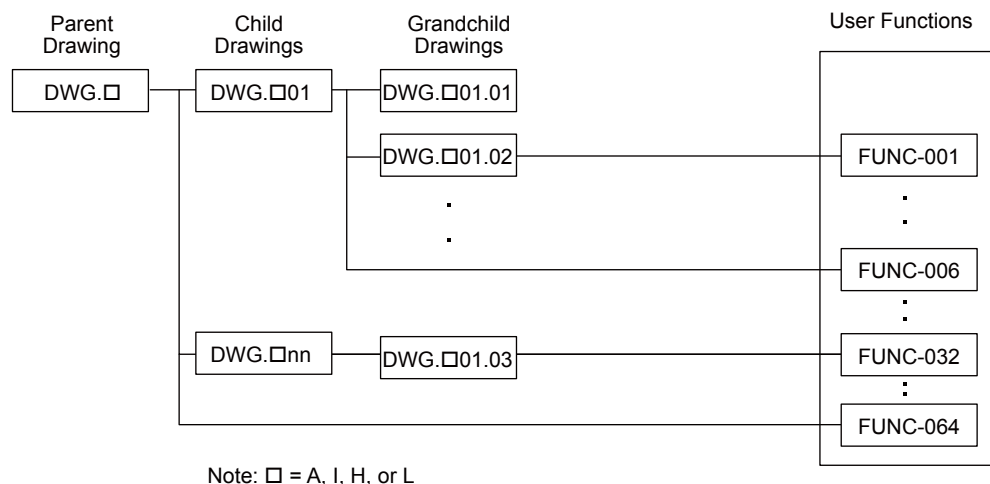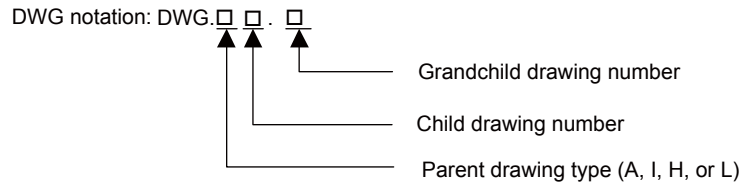
Note: The following notation is used for operation error drawings.

DWG.□ 00

- Fixed value (00)
- Parent drawing type (A, I, H, or L) of the drawing where the error occurs
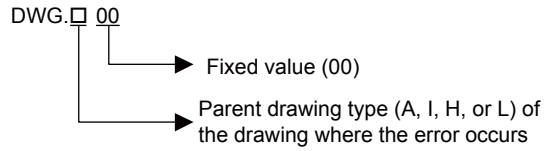
The breakdown of the number of ladder drawings in each category is given in the following table.

| Drawings | Number of Drawings | | | |
|---|---|---|---|---|
| | DWG.A | DWG.I | DWG.H | DWG.L |
| Parent Drawings | 1 | 1 | 1 | 1 |
| Operation Error Drawings | 1 | 1 | 1 | 1 |
| Child Drawings | Total of 62 max. | Total of 62 max. | Total of 998 max. | Total of 1,998 max. |
| Grandchild Drawings | | | | |

Information | There are separate functions that can be called from the drawings as required. Functions are executed when they are called from a parent, child, or grandchild drawing with the FUNC instruction. You can create up to 2,000 functions.

■ Execution Processing of Drawings

The drawings are executed by calling them from the top to the bottom, following the hierarchy of the drawings. The following figure illustrates the execution processing of a high-speed scan drawing (DWG.H).
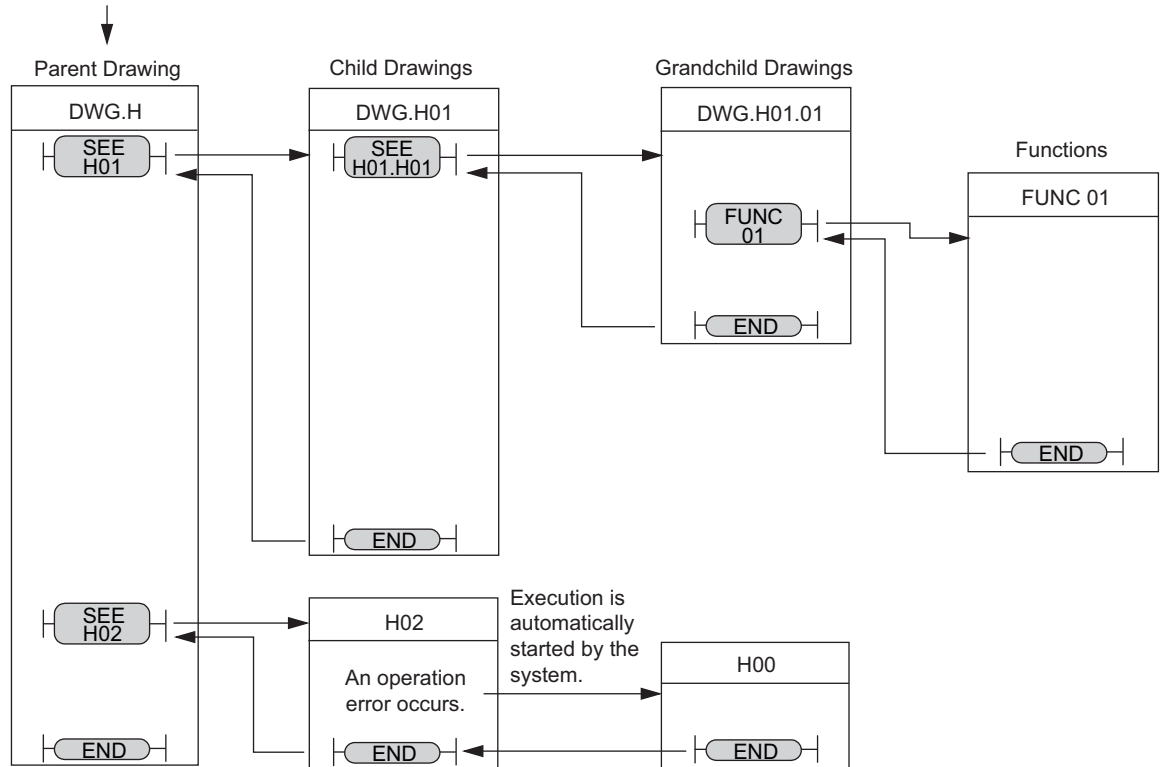


Note: 1. The parent drawing is automatically called and executed by the system. Child drawings and grandchild drawings are executed by calling them from a parent drawing or a child drawing using the SEE instruction.
2. You can call functions from any drawing. You can also call functions from other functions.
3. If an operation error occurs, the operation error drawing for the drawing type will be started automatically.
4. Always specify 00 as the drawing number for operation error drawings.

■ Functions

Functions are executed when they are called from a parent, child, or grandchild drawing with the FUNC instruction.

Functions can be freely called from any drawing. The same function can be called simultaneously from different types of drawings or different levels of drawings. You can also call functions from other functions that you have created.

The use of functions provides the following merits:

• Easy user program modularization
• Easy user program creation and maintenance

You can use standard functions that are provided by the system, and you can define user functions.

• Standard System Functions

The following functions for communications and other purposes are provided as standard functions in the system. You cannot change the system functions.

| Function | Name | Name Used in MPE720 |
|---|---|---|
| COUNTER | Counter | Counter |
| FINFOUT | First-in First-out | First-in First-out |
| TRACE | Trace | Trace |
| DTRC-RD | Read Data Trace | Data-Trace Read Extend |
| MSG-SND | Send Message | Send Message |
| MSG-SNDE | Send Message | Send Message Extend |
| MSG-RCV | Receive Message | Receive Message |
| MSG-RCVE | Receive Message Extended | Receive Message Extend |
| MOTREG-W | Write Motion Register | Write the Motion Parameter to Motion Register |
| MOTREG-R | Read Motion Register | Read the Motion Parameter from Motion Register |
| IMPORT | Import | Import |
| EXPORT | Export | Export |

• User Functions

You can freely program the body of a user function and program the user function definitions.

A maximum of 2,000 user function drawings can be defined.

| Information | Refer to the following manual for details on how to define functions.<br>📖 *MP3000 Series Ladder Programming Manual* (Manual No.: SIEP C880725 13) |
|---|---|

◆ Motion Programs

A motion program is a program that is written in a text-based motion language.

There are two types of motion programs.

| Type | Designation Method | Features | Number of Programs |
|---|---|---|---|
| Main programs | MPM□□□<br>(□□□=1 to 512) | • Main programs are called from a DWG.H drawing.<br>• Main programs are called from the M-EXECUTOR program execution definitions. | You can create up to 512 motion programs, including the following programs:<br>• Motion main programs<br>• Motion subprograms<br>• Sequence main programs<br>• Sequence subprograms |
| Subprograms | MPS□□□<br>(□□□=1 to 512) | Subprograms are called from a main program. | |

| Important | 1. The same numbers are used to manage the motion programs and sequence programs. Use a unique number for each program.<br> • Motion program numbers are given in the form MPM□□□ or MPS□□□.<br> • Sequence program numbers are given in the form SPM□□□ or SPS□□□.<br>2. The number of motion programs that can be executed simultaneously depends on the model of the Machine Controller. If the number of simultaneously executable programs is exceeded, an alarm will occur (No System Work Available Error). |
|---|---|

**Terms**

Motion Subprograms

Subprograms are created to perform common operations. They help minimizing the number of program steps and allow efficient use of memory.

| Main program | Main program | Main program |
|:---:|:---:|:---:|
| MPM001 | MPM002 | MPM003 |

Call (MSEE)        Call (MSEE)        Call (MSEE)

MPS010 — The common process is written as a subprogram.

Subprogram
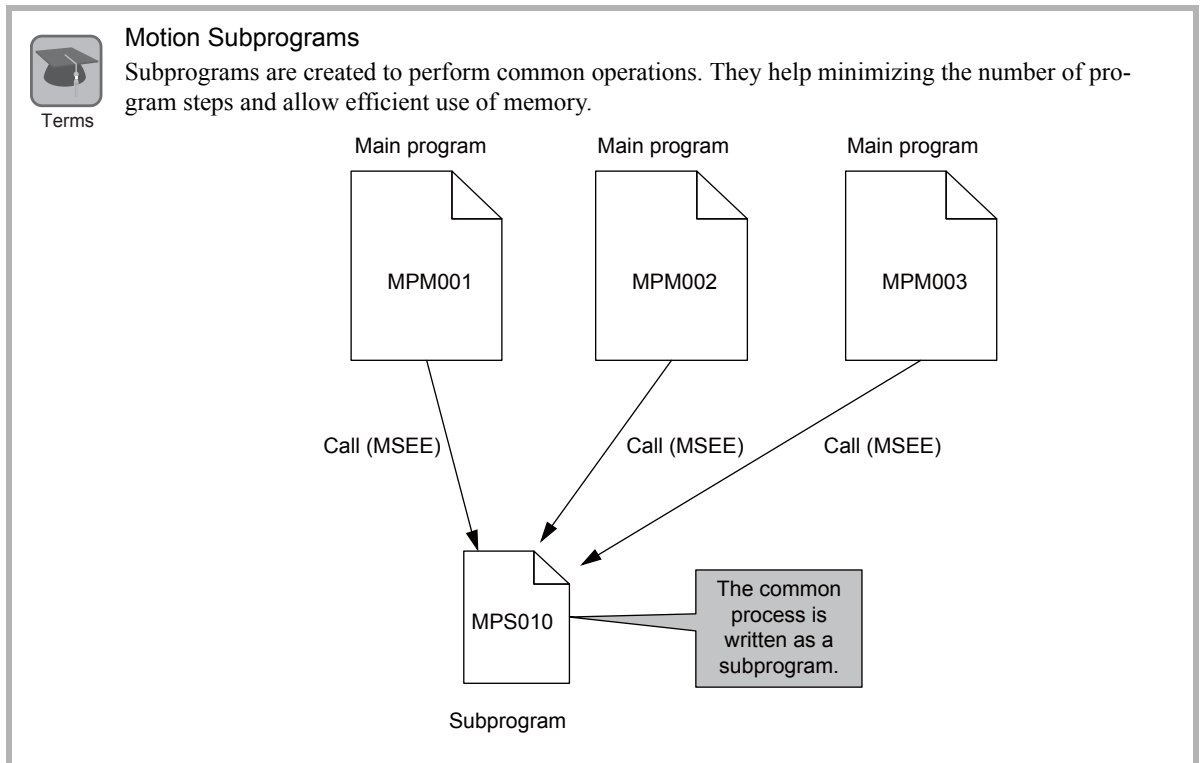
■ Motion Program Execution

Motion programs are called with an MSEE instruction from a ladder program in an H drawing.

> **Note** You can also register the motion program in the M-EXECUTOR (Motion Executor) to call it. Refer to the following section for details.
> ☞ *The M-EXECUTOR (page 3-56)*

After you create the motion program, place a Call Motion Program (MSEE) instruction in the ladder program of an H drawing. Motion programs can be called from any H drawing, regardless of whether it is a parent, child, or grandchild drawing.

The following figure shows an execution example.
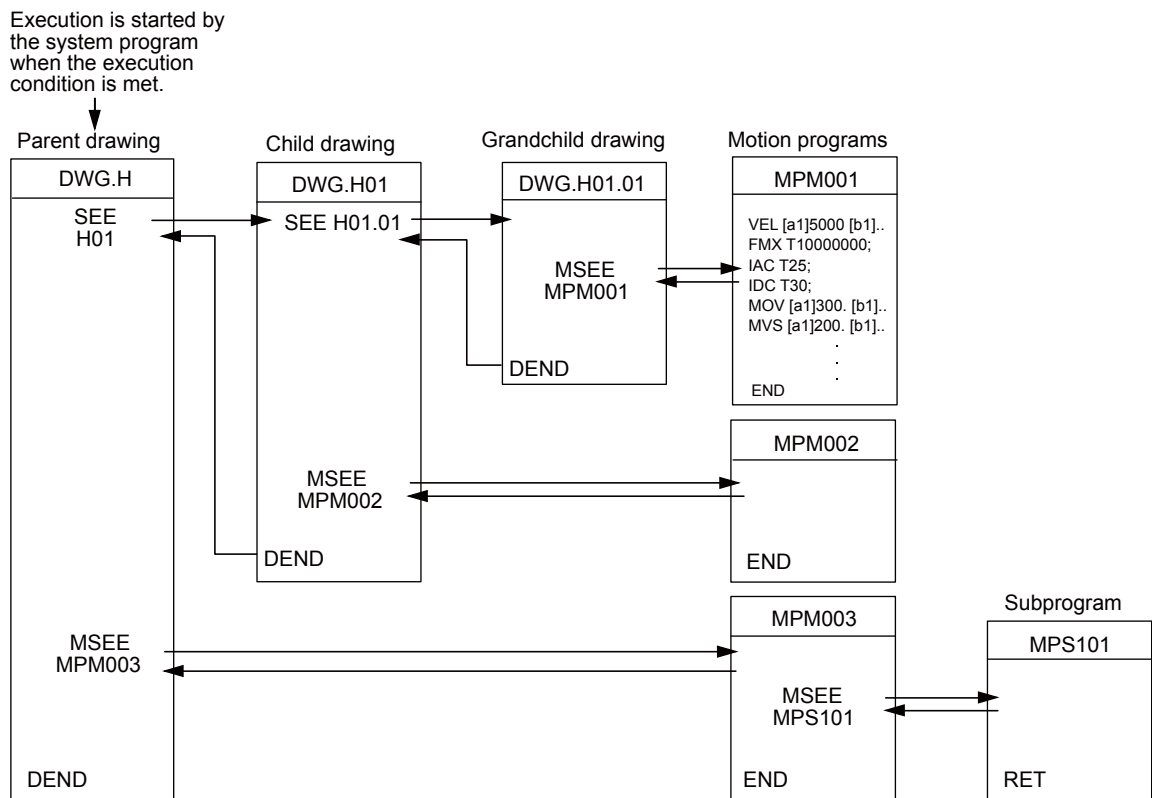


The ladder instruction in the H drawing is executed every high-speed scan cycle according to the hierarchical organization of parent-child-grandchild drawings.

The above programming only prepares for execution of the motion program. The motion program is not executed when the MSEE instruction is inserted. To start the motion program after inserting the MSEE instruction, use a control signal to turn ON the Request for Start of Program Operation.

The motion program is executed in the scan cycle, but unlike ladder programs, the entire program is not executed in a single scan. Motion programs are controlled specifically by the system's motion management.

> **Note**
>
> The following points must be taken into consideration when executing motion programs.
> - Motion programs that are registered in the M-EXECUTOR cannot be executed with MSEE instructions.
> - More than one instance of the same motion program (i.e., the same program number) cannot be executed with MSEE instructions.
> - Subprograms (MPS□□□) cannot be executed with MSEE instructions in a ladder program. You can call subprograms only from motion programs and motion subprograms (MPM□□□ and MPS□□□).
> - You cannot call the same subprogram more than once at the same time.
> - Sequence programs (SPM□□□ or SPS□□□) cannot be called with MSEE instructions from a ladder program.

## ■ Specifying Motion Programs

There are two methods that you can use to specify motion programs.

- Calling the motion program by specifying it directly
- Calling the motion program by specifying it indirectly

These two methods are described below.

### • Calling the Motion Program by Specifying It Directly

Direct designation is used to call a motion program by specifying its program number (MPM□□□) directly.

To call the motion program from a ladder program with the MSEE instruction, specify the program number in the Program Number operand of the MSEE instruction.
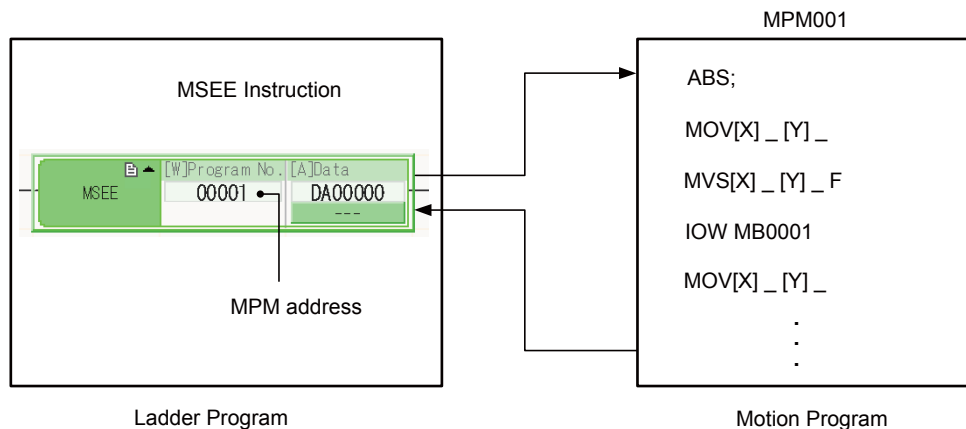


### • Calling the Motion Program by Specifying It Indirectly

Indirect designation is used to call a motion program by specifying its number in a register.

In this method, the program (MPM□□□) whose number is the same as the value that is stored in the register is called.

To call the motion program from a ladder program with an MSEE instruction, use the Program Number operand of the MSEE instruction to specify the M or D register that indirectly designates the motion program.

CPU Unit Functionality

3
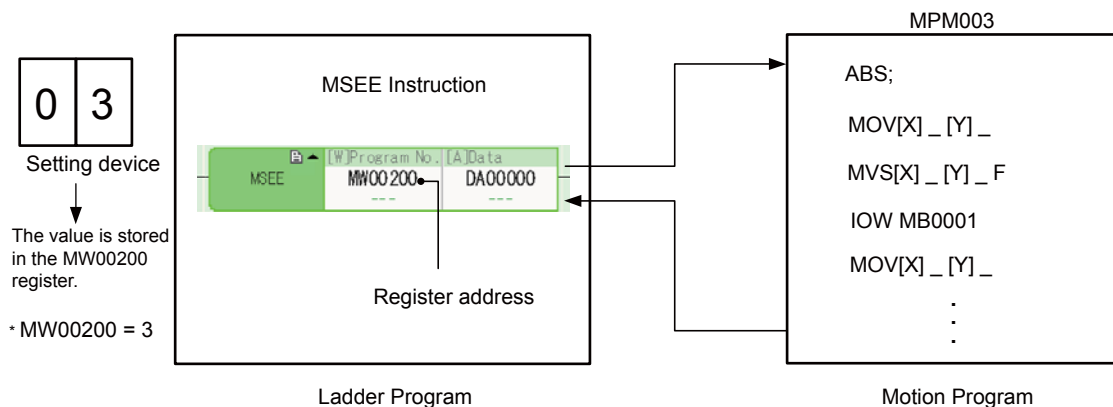
**■ Work Registers**

Work registers are used to set and monitor motion programs.

The address of the first work register for the motion program that is called with an MSEE instruction is specified in the MSEE instruction in the ladder program. The following figure shows the structure of the work registers.



Address of first work register
(M register or D register)
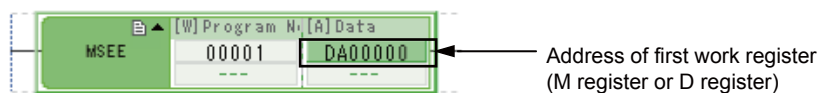
| Work Register | Contents | Reference |
|---|---|---|
| 1st register | Motion Program Status Flags | Page 3-10 |
| 2nd register | Motion Program Control Signals | Page 3-12 |
| 3rd register | Interpolation Override | Page 3-15 |
| 4th register | System Work Number | Page 3-15 |

**• Status Flags**

The Motion Program Status Flags give the execution condition of the motion program. The following table describes the meanings of the Status Flags.

| Bit No. | Name | Description |
|---|---|---|
| Bit 0 | Program Executing | This bit is set to 1 when a motion program is running.<br>　0: Motion program is stopped.<br>　1: Motion program is running. |
| Bit 1 | Program Paused | This bit is set to 1 when execution of a motion program is paused by a Request for Pause of Program.<br>After a Request for Pause of Program control signal is input, it is confirmed that the axis decelerated to a stop and then the status flag is turned ON.<br>　0: Program is not stopped by a pause request.<br>　1: Program is stopped by a pause request. |
| Bit 2 | Program Stopped for Stop Request | This bit is set to 1 when execution of a motion program is stopped by a Request for Stop of Program.<br>　0: Program is not stopped by a stop request.<br>　1: Program is stopped by a stop request. |
| Bit 3 | Reserved for system. | – |
| Bit 4 | Program Single-block Execution Stopped | This bit is set to 1 when execution of a single block is stopped in Debug Operation Mode.<br>　0: Single block execution is not stopped.<br>　1: Single block execution is stopped. |
| Bit 5 | Reserved for system. | – |

| Bit No. | Name | Description |
|---------|------|-------------|
| Bit 6 | Reserved for system. | – |
| Bit 7 | Reserved for system. | – |
| Bit 8 | Program Alarm | This bit is set to 1 when a program alarm occurs.<br>When this bit is set to 1, details on the error will be displayed in the Error Information Dialog Box and are given in the S registers.<br>　0: There is no program alarm.<br>　1: A program alarm occurred. |
| Bit 9 | Program Stopped at Breakpoint | This bit is set to 1 when execution of a program stops at a breakpoint in Debug Operation Mode.<br>　0: Not stopped at a breakpoint.<br>　1: Stopped at a breakpoint. |
| Bit A | Reserved for system. | – |
| Bit B | Debug Operation Mode | This bit is set to 1 when a program is running in Debug Operation Mode.<br>　0: Not in Debug Operation Mode (Normal Execution Mode).<br>　1: In Debug Operation Mode. |
| Bit C | Program Type | This bit reports whether the program that is being executed is a motion program or a sequence program.<br>　0: Motion program<br>　1: Sequence program |
| Bit D | Start Request History | This bit is set to 1 when the Request for Start of Program Operation is ON.<br>　0: Request for Start of Program Operation is OFF.<br>　1: Request for Start of Program Operation is ON. |
| Bit E | No System Work Error or Execution Scan Error | This bit is set to 1 when a system work number that was needed to execute a motion program could not be obtained, or when an MSEE instruction is programmed in a drawing other than a DWG.H.<br>　0: There is no system work error or execution scan error.<br>　1: A no system work error or execution scan error occurred. |
| Bit F | Main Program Number Limit Exceeded Error | This bit is set to 1 when the specified motion program number is out of range.<br>Motion program number range:1 to 512<br>　0: There is no motion program number error.<br>　1: A motion program number error occurred. |

Note: If a program alarm occurs, motion program error information is provided in the Error Information Dialog Box and given in the S registers.

- Control Signals

To control the execution of a motion program, you must input program control signals (Request for Start of Program Operation, or Request for Stop of Program, etc.). The following table describes the control signals for motion programs.

⊣⊢: This mark indicates that the signal must be kept ON until the system acknowledges it.

⌐: This mark indicates that the signal needs to be turned ON only for one high-speed scan.

| Bit No. | Name | Description |
|---|---|---|
| Bit 0 ⊣⊢ ⌐ | Request for Start of Program Operation | This bit makes a request to start execution of a motion program. The motion program starts when this bit changes from 0 to 1. This bit is ignored when there is a motion program alarm.<br>0: Turn OFF the request to start the program.<br>1: Turn ON the request to start the program. |
| Bit 1 ⊣⊢ | Request for Pause of Program | This bit makes a request to pause execution of a motion program.<br>Execution of the program that was paused will resume when the pause request is turned OFF.<br>0: Turn OFF the request to pause the program (i.e., cancel the pause).<br>1: Turn ON the request to pause the program. |
| Bit 2 ⊣⊢ | Request for Stop of Program | This bit makes a request to stop execution of a motion program.<br>A motion program alarm occurs if this bit is set to 1 while the axis is in motion.<br>0: Turn OFF the request to stop the program.<br>1: Turn ON the request to stop the program. |
| Bit 3 ⊣⊢ | Program Single-block Mode Selection | This bit makes a request to select Program Single-block Execution Mode.<br>This mode can be used in place of Debug Operation Mode.<br>0: Turn OFF the request to select single-block mode.<br>1: Turn ON the request to select single-block mode. |
| Bit 4 ⊣⊢ ⌐ | Program Single-block Start Request | When this bit is changed from 0 to 1, program execution changes to single-block execution (step execution). This bit is valid only when bit 3 (Program Single-block Mode Selection) in the control signals is set to 1.<br>0: Turn OFF the request to start the program in single-block mode.<br>1: Turn ON the request to start the program in single-block mode. |
| Bit 5 ⊣⊢ | Program Reset and Alarm Reset Request | This bit resets motion programs and alarms.<br>0: Turn OFF the request to reset the program and alarms.<br>1: Turn ON the request to reset the program and alarms. |
| Bit 6 ⊣⊢ ⌐ | Request for Start of Continuous Program Operation | This bit makes a request to resume execution of a program that was stopped by a Request for Stop of Program.<br>0: Turn OFF the request to resume the program.<br>1: Turn ON the request to resume the program. |
| Bit 7 | Reserved for system. | – |
| Bit 8 ⊣⊢ | Skip 1 Information | If this bit changes to 1 while an axis is in motion due to a SKP instruction (when the skip input signal selection is set to SS1), the axis will decelerate to a stop, and the reference in the remaining travel distance will be canceled.<br>0: Turn OFF the skip 1 signal.<br>1: Turn ON the skip 1 signal. |
| Bit 9 ⊣⊢ | Skip 2 Information | If this bit changes to 1 while an axis is in motion due to a SKP instruction (when the skip input signal selection is set to SS2), the axis will decelerate to a stop, and the reference in the remaining travel distance will be canceled.<br>0: Turn OFF the skip 2 signal.<br>1: Turn ON the skip 2 signal. |
| Bit A, B | Reserved for system. | – |
| Bit C | Reserved for system. | – |

<div align="right">Continued from previous page.</div>

| Bit No. | Name | Description |
|---------|------|-------------|
| Bit D ⊣⊢ | System Work Number Setting[*1] | To specify a system work number, set this bit to 1.<br>　0: Do not specify a system work number.<br>　1: Specify a system work number. |
| Bit E ⊣⊢ | Interpolation Override Setting[*2] | To specify an interpolation override, set this bit to 1.<br>　0: Do not specify an interpolation override.<br>　1: Specify an interpolation override. |
| Bit F | Reserved for system. | – |

*1. System Work Number Setting
　• When the Motion Program Is Registered in M-EXECUTOR:
　　The system work number cannot be specified. The system will use the definition number as the system work number.
　• When a Motion Program Is Called from a Ladder Program with an MSEE Instruction:
　　OFF: The system will use an automatically acquired system work number. The system work number will be different each time.
　　ON: The work number that is specified by the system will be used.
　　However, if the work number is assigned to the M-EXECUTOR, a No System Work Available Error (Status Flag Bit E) is reported.

*2. Interpolation Override Setting
　　OFF: The interpolation override is always 100%.
　　ON: The interpolation override in the parameter setting is used.

Note: 1. Use the specified signal types for the ladder program inputs.
　　2. At startup, the motion programs for which the Request for Start of Program Operation control signals are ON will be executed.

Programs

Example    Timing chart examples for axis operations and status flags after a control signal is input are pro-
vided below.

### Request for Start of Program Operation

Control signal: Request for Start of
Program Operation

Status flag: Program Executing

Axis operation: Pulse distribution

### Request for Pause

Control signal: Request for Start of
Program Operation

Control signal: Request for Pause of
Program

Status flag: Program Executing

Status flag: Program Paused

1 scan*

Axis operation: Pulse distribution
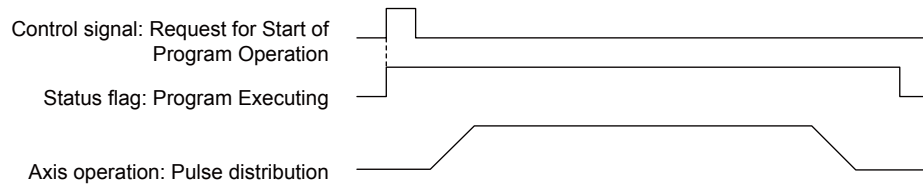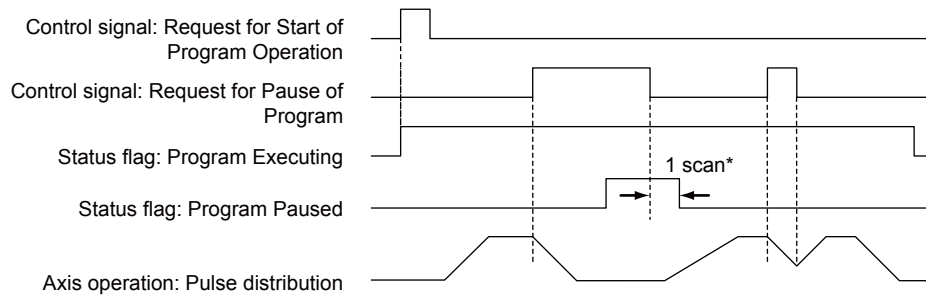
* Status flags related to control signal input are updated after one scan.

### Request for Stop

Control signal: Request for Start of
Program Operation

Control signal: Request for Stop of Program

Control signal: Program Reset and
Alarm Reset Request

Status flag: Program Executing

Status flag: Program Stopped for
Stop Request

1 scan

Status flag: Program Alarm

1 scan*

Axis operation: Pulse distribution for
Interpolation instruction

Axis operation: Pulse distribution for
Positioning instruction

Axis operation: Pulse distribution for
Zero Point Return instruction

* Status flags related to control signal input are updated after one scan.

If a Motion Program Alarm Occurs

Control signal: Request for Start of
Program Operation

Control signal: Program Reset and Alarm
Reset Request

Status flag: Program Executing

Status flag: Program Alarm

1 scan*

Axis operation: Pulse distribution for
Interpolation instruction

Axis operation: Pulse distribution for
Positioning instruction

Axis operation: Pulse distribution for
Zero Point Return instruction
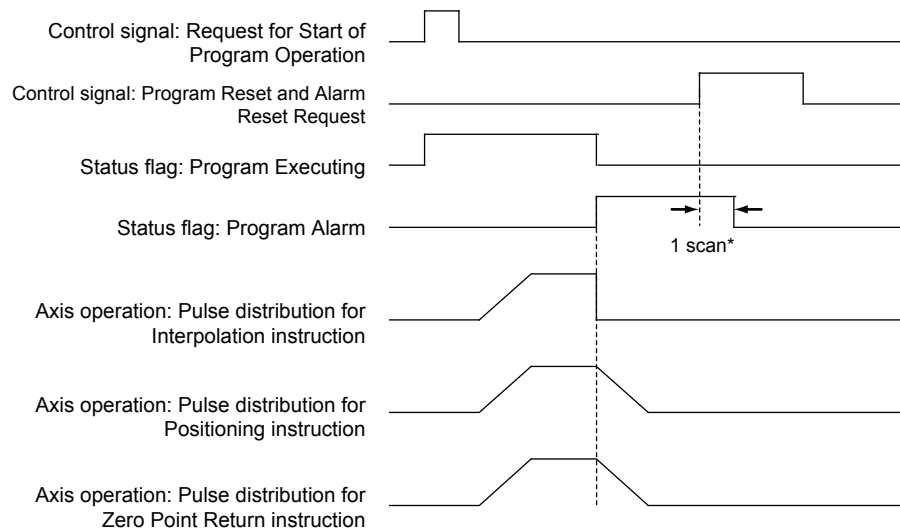
* Status flags related to control signal input are updated after one scan.

> **Important**
>
> 1. If the Request for Stop of Program control signal is turned ON while the axis is being controlled for a motion language instruction, an alarm will occur.
> 2. If the Request for Stop of Program control signal is turned ON while the axis is being controlled for an interpolation motion language instruction, the axes will stop immediately. To perform a deceleration stop, use the Request for Pause of Operation control signal.
> 3. The Request for Pause of Program control signal is not acknowledged while a Zero Point Return (ZRN) instruction is being executed. To stop the operation, use the Request for Stop of Program control signal.
> 4. If a motion program alarm occurs while an axis is in motion, the axis stops immediately.

Refer to the following manuals for details on programming examples for controlling motion programs.

📖 *MP3000 Series Motion Programming Manual* (Manual No.: SIEP C880725 14)

• Interpolation Override

An interpolation override allows you to change the output ratio of the axis movement speed reference for interpolation motion language instructions.

Set the override value to use when executing interpolation instructions (MVS, MCW, MCC, or SKP).

The interpolation override is valid only when bit E (Interpolation Override Setting) in the control signals is ON.

The setting range of the interpolation override is 0 to 32,767.

Unit: 1 = 0.01%

• System Work Numbers

When you call a motion program from a ladder program with the MSEE instruction, set the system work number to use to call the motion program. This system work number is valid only when bit D (System Work Number Setting) of the control signals is ON.

Setting range: 1 to 32

> **Important**
> When using MSEE instructions in ladder programs along with the M-EXECUTOR, do not specify the system work numbers that are for the M-EXECUTOR in the MSEE instructions in the ladder programs. If you specify one, a No System Work Error will occur.
> System work numbers for the M-EXECUTOR: 0 to the set value of the number of program definitions

> **Information**
> You cannot set the system work numbers when you use the M-EXECUTOR. The system will use system work numbers that are the same as the definition numbers.

### ■ Monitoring Motion Program Execution Information

The execution information for motion programs can be monitored using the S registers (SW03200 to SW05119 and SW08192 to SW09125).

The execution information is monitored differently, depending on whether the motion program is called from a ladder program with an MSEE instruction, or the motion program is registered in the M-EXECU-TOR program execution definitions.
This section describes these two monitoring methods.

#### • When the Motion Program Is Called from the Ladder Program with an MSEE Instruction

When a motion program is called from the ladder program with an MSEE instruction, the monitoring method depends on the setting of bit D (System Work Number Setting) in the Motion Program Control Signals.

| Bit D (System Work Number Setting) in the Control Signal Word for Motion Programs | Monitoring |
|---|---|
| ON | The execution information is reported in the Work n Program Information registers (SW03264 to SW05119 and SW08192 to SW09125). For example, if the system work number is 1, you can monitor the execution information of the motion program with the Work 1 Program Information registers (SW03264 to SW03321). |
| OFF | The system automatically determines the system work number to use. You can check the work numbers that are in use in the Active Program Numbers registers (SW03200 to SW03231). For example, if MPM001 is the motion program to be monitored and SW03202 contains a 1, the system work number is 3. You can therefore monitor the execution information of the motion program with the Work 3 Program Information registers (SW03380 to SW03437). |

#### • When the Motion Program Is Registered in the M-EXECUTOR Program Execution Definitions:

When the motion program is registered in the M-EXECUTOR program execution definitions, the system work number used will be the same as the program execution registration number in the M-EXECUTOR.

For example, if the motion program is registered for execution as number 3, system work number 3 is used. You can therefore monitor the execution information of the motion program with the Work 3 Program Information registers (SW03380 to SW03437).

## ◆ Sequence Programs

A sequence program is written in a text-based motion language.

There are two types of sequence programs.

| Type | Designation Method | Features | Number of Programs |
|---|---|---|---|
| Main programs | SPM□□□ (□□□=1 to 512) | Main programs are called from the M-EXECUTOR program execution definitions. | You can create up to 512 motion programs, including the following programs: • Motion main programs • Motion subprograms • Sequence main programs • Sequence subprograms |
| Subprograms | SPS□□□ (□□□=1 to 512) | Subprograms are called from a main program. | |

> **Important**
> The same numbers are used to manage the sequence programs and motion programs.
> Use a unique number for each program.
> • Motion program numbers are given in the form MPM□□□ or MPS□□□.
> • Sequence program numbers are given in the form SPM□□□ or SPS□□□.

### ■ Sequence Program Execution

A sequence program is executed by registering it in the M-EXECUTOR execution definitions.

The sequence programs are executed in ascending order.

The following figure shows an execution example.
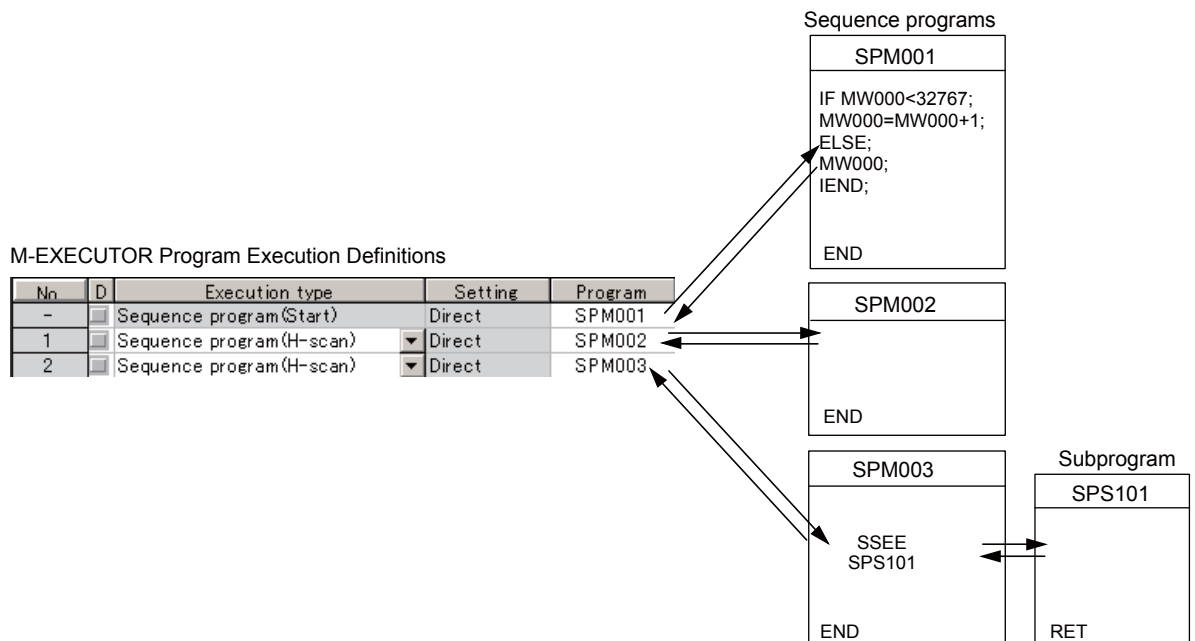


If the execution type is set to an H-scan sequence program or L-scan sequence program, then the program will be executed as soon as the definition is saved. If the execution type is set to a startup sequence program, then the program will be executed the next time when the power supply is turned ON.

■ Specifying Sequence Programs

Sequence programs must be specified directly. Indirect designations cannot be used.

Specify the program number of the sequence program to execute (SPM☐☐☐).

M-EXECUTOR Program Execution Definitions

Sequence program

SPM001

IF MW000<32767;
MW000=MW000+1;
ELSE;
MW000;
IEND;

| D | Execution type | Setting | Program |
|---|---|---|---|
| ☐ | Sequence program(Start) | Direct | SPM001 |
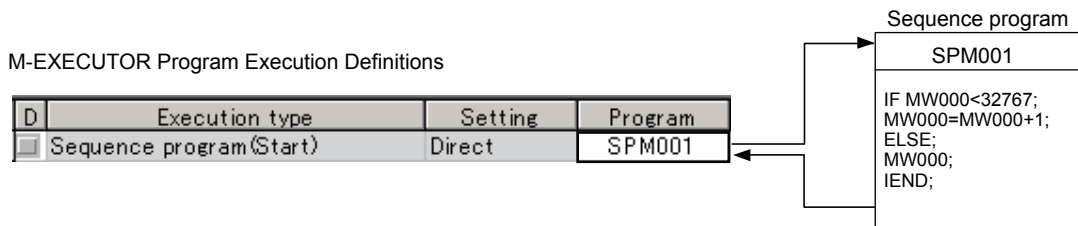
■ Work Registers

Work registers are used to monitor sequence programs.

The work registers have Status Flags inside the M-EXECUTOR control registers, in the same way as motion programs that are registered in the M-EXECUTOR.

• Sequence Program Status Flags

The Sequence Program Status Flags give the execution condition of the sequence program.

The following table describes the meanings of the Status Flags.

| Bit No. | Name | Status |
|---|---|---|
| 0 | Program Executing | Program is being executed. |
| 1 | – | Reserved for system. |
| 2 | – | Reserved for system. |
| 3 | – | Reserved for system. |
| 4 | – | Reserved for system. |
| 5 | – | Reserved for system. |
| 6 | – | Reserved for system. |
| 7 | – | Reserved for system. |
| 8 | Program Alarm | There is a program alarm. |
| 9 | Program Stopped at Breakpoint | Execution is stopped at a breakpoint. |
| A | – | Reserved for system. |
| B | Debug Operation Mode | The program is in Debug Mode (EWS debugging). |
| C | Program Type | Program Type, 1: Sequence program |
| D | Start Request History | There is a request to start program execution. |
| E | – | Reserved for system. |
| F | – | Reserved for system. |

Note

Sequence Program Alarms

When an error is detected, bit 8 (Program Alarm) turns ON in the Status Flags in the M-EXECUTOR control registers.

When the error is removed, this bit turns OFF.

The following errors can occur.

• The called program is not registered.
• The called program is not a sequence program.
• The called program is not a subprogram (a main program was called).
• Called Program Number Limit Exceeded Error
• Too Many Nesting Levels Error

# Registers

Registers are areas that store data within the Machine Controller. Variables are registers with labels (variable names).

There are two kinds of registers: global registers that are shared between all programs, and local registered that are used only by a specific program.

## Global Registers

Global registers are shared by ladder programs, user functions, motion programs, and sequence programs. Memory space for global registers is reserved by the system for each register type.

| Ladder program | User functions | Motion programs/ sequence programs |
|---|---|---|

**Global registers**

| S registers | M registers | G registers | I registers | O registers | C registers |
|---|---|---|---|---|---|
| 65,535 words | 1,048,576 words | 2,097,152 words | 65,536 words Input data + Monitor parameters + CPU interface inputs | 65,536 words Output data + Setting parameters + CPU interface outputs | 16,384 words |
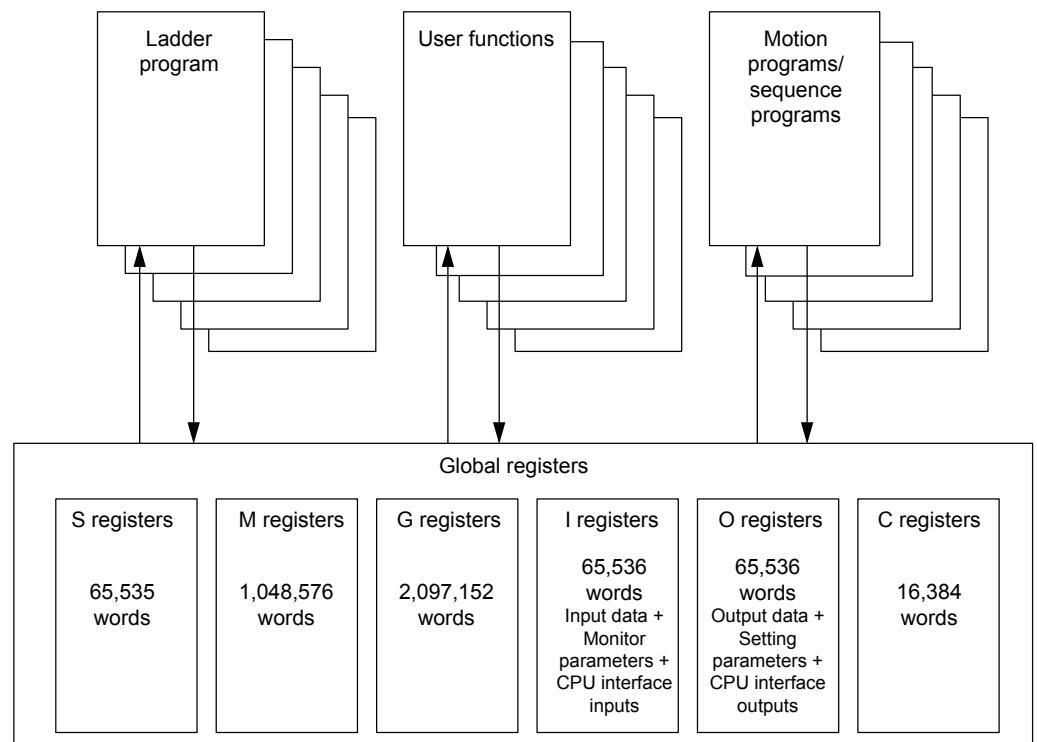
## Local Registers

Local registers can be used within each specific drawing. These registers cannot be shared by other drawings. Local registers are stored in the program memory for each drawing.

Ladder Program Conceptual Diagram

| Parent drawing H | Child drawing H01 | User function FUNC01 | User function FUNC02 |
|---|---|---|---|
| # registers D registers | # registers D registers | X registers Y registers Z registers # registers D registers | X registers Y registers Z registers # registers D registers |

These registers cannot be shared between different drawings.

These registers cannot be shared between different drawings.
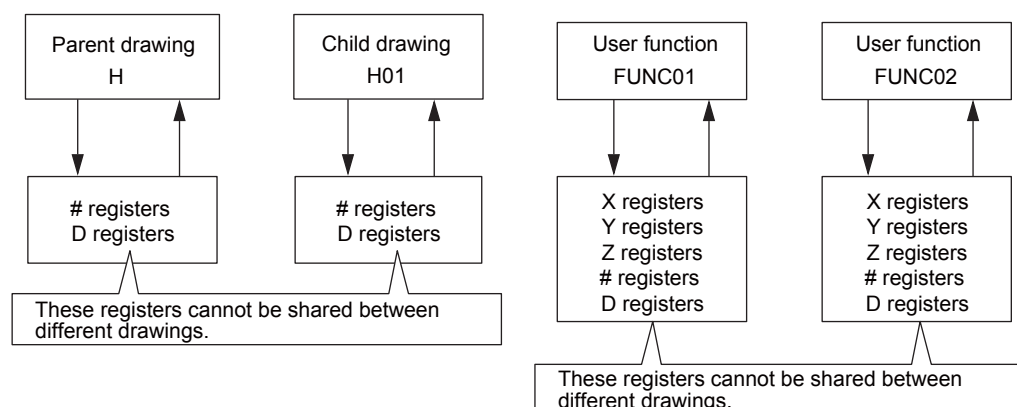
Motion Program Conceptual Diagram
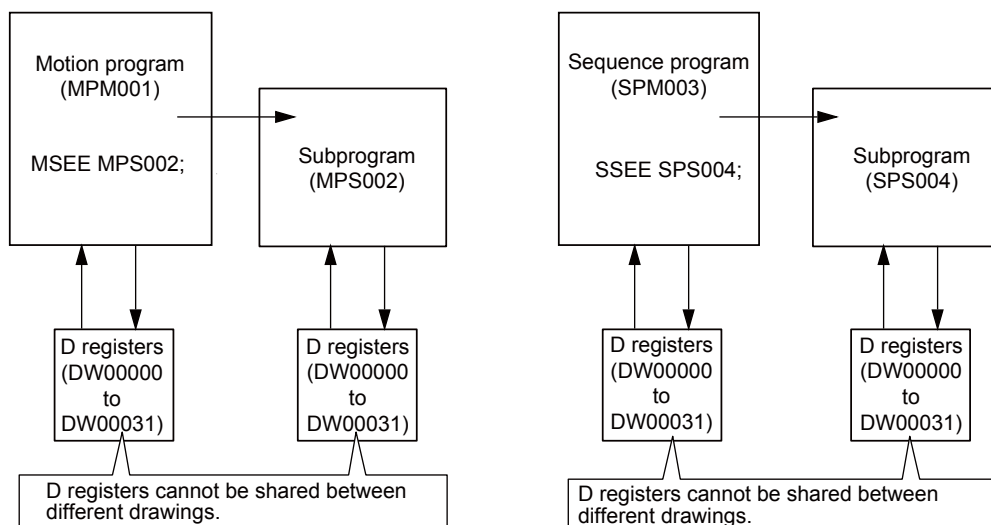


## Structure of Register Addresses

Register address = <u>S</u> <u>W</u> <u>00000</u>

- Range (The number of digits depends on the register type and data type.)
- Data type
- Register type
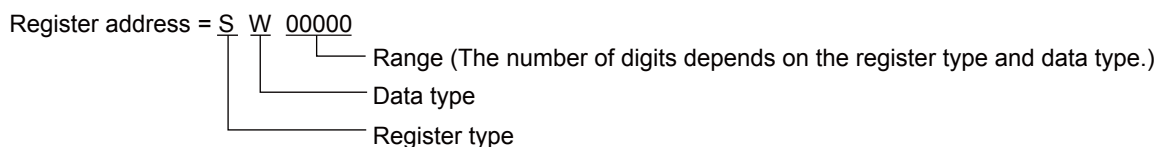
Information | You can also use index registers or array registers as variables to address specific registers.
Refer to the following sections for details.

☞ *Index Registers (i, j) (page 3-27)*

☞ *Array Registers ([ ]) (page 3-30)*

## Register Types

This section describes global and local registers.

### ◆ Global Registers

Global registers are shared by ladder programs, user functions, motion programs, and sequence programs. In other words, the operation results of a ladder program can be used by other user functions, motion programs, or sequence programs.

| Type | Name | Designation Method | Usable Range | Description |
|------|------|-------------------|--------------|-------------|
| S | System registers (S registers) | SBnnnnnh, SWnnnnn, SLnnnnn, SQnnnnn, SFnnnnn, SDnnnnn, SAnnnnn | SW00000 to SW65534 | These registers are prepared by the system. They report the status of the Machine Controller and other information. The system clears the registers from SW00000 to SW00049 to 0 at startup. They have a battery backup. |
| M | Data registers (M registers) | MBnnnnnnnh, MWnnnnnnn, MLnnnnnnn, MQnnnnnnn, MFnnnnnnn, MDnnnnnnn, MAnnnnnnn | MW0000000 to MW1048575 | These registers are used as interfaces between programs. They have a battery backup. |

| Type | Name | Designation Method | Usable Range | Description |
|---|---|---|---|---|
| G | G registers | GBnnnnnnnh, GWnnnnnnn, GLnnnnnnn, GQnnnnnnn, GFnnnnnnn, GDnnnnnnn, GAnnnnnnn | GW0000000 to GW2097151 | These registers are used as interfaces between programs. They do not have a battery backup. |
| I | Input registers (I registers) | IBhhhhhh, IWhhhhh, ILhhhhh, IQhhhhh, IFhhhhh, IDhhhhh, IAhhhhh | IW00000 to IW07FFF, IW10000 to IW17FFF | These registers are used for input data. |
| | | | IW08000 to IW0FFFF | These registers store the motion monitor parameters. These registers are used for Motion Modules. |
| | | | IW20000 to IW21FFF | These registers are used as interfaces between CPU Units when Expansion Racks are used (CPU interface registers). |
| O | Output registers (O registers) | OBhhhhhh, OWhhhhh, OLhhhhh, OQhhhhh, OFhhhhh, ODhhhhh, OAhhhhh | OW00000 to OW07FFF, OW10000 to OW17FFF | These registers are used for output data. |
| | | | OW08000 to OW0FFFF | These store the motion setting parameters. These registers are used for Motion Modules. |
| | | | OW20000 to OW21FFF | These registers are used as interfaces between CPU Units when Expansion Racks are used (CPU interface registers). |
| C | Constant registers (C registers) | CBnnnnnh, CWnnnnn, CLnnnnn, CQnnnnn, CFnnnnn, CDnnnnn, CAnnnnn | CW00000 to CW16383 | These registers can be read in programs but they cannot be written. The values are set from the MPE720. |

Note: n: decimal digit, h: hexadecimal digit

## ◆ Local Registers

Local registers are valid within only one specific program. The local registers in other programs cannot be accessed.

You specify the usable range from the MPE720.

| Type | Name | Designation Method | Description | Features |
|---|---|---|---|---|
| # | # registers | #Bnnnnnh, #Wnnnnn, #Lnnnnn, #Qnnnnn, #Fnnnnn, #Dnnnnn, #Annnnn | These registers can be read in programs but they cannot be written. The values are set from the MPE720. | Program-specific |
| D | D registers | DBnnnnnh, DWnnnnn, DLnnnnn, DQnnnnn, DFnnnnn, DDnnnnn, DAnnnnn | These registers can be used for general purposes within a program. By default, 32 words are reserved for each program. The default value after startup depends on the setting of the **D Register Clear when Start** option. Refer to the following section for details. ☞ *Setting the D Register Clear When Start Option (page 3-23)* | |
| X | Function input registers | XBnnnnnh, XWnnnnn, XLnnnnn, XQnnnnn, XFnnnnn, XDnnnnn | These registers are used for inputs to functions.<br>• Bit inputs: XB000000 to XB00000F<br>• Integer inputs: XW00001 to XW00016<br>• Double-length integers: XL00001 to XL00015<br>• Quadruple-length integers: XQ00001 to XQ00013<br>• Real numbers: XF00001 to XF00015<br>• Double-precision real numbers: XD00001 to XD00013 | Function-specific |
| Y | Function output registers | YBnnnnnh, YWnnnnn, YLnnnnn, YQnnnnn, YFnnnnn, YDnnnnn | These registers are used for outputs from functions.<br>• Bit outputs: YB000000 to YB00000F<br>• Integer outputs: YW00001 to YW00016<br>• Double-length integers: YL00001 to YL00015<br>• Quadruple-length integers: YQ00001 to YQ00013<br>• Real numbers: YF00001 to YF00015<br>• Double-precision real numbers: YD00001 to YD00013 | |
| Z | Function internal registers | ZBnnnnnh, ZWnnnnn, ZLnnnnn, ZQnnnnn, ZFnnnnn, ZDnnnnn | These are internal registers that are unique within each function. You can use them for internal processing in functions.<br>• Bits: ZB000000 to ZB00063F<br>• Integers: ZW00000 to ZW00063<br>• Double-length integers: ZL00000 to ZL00062<br>• Quadruple-length integers: ZQ00000 to ZQ00060<br>• Real numbers: ZF00000 to ZF00062<br>• Double-precision real numbers: ZD00000 to ZD00060 | |
| A | Function external registers | ABnnnnnh, AWnnnnn, ALnnnnn, AQnnnnn, AFnnnnn, ADnnnnn | These are external registers that use the address input value as the base address. When the address input value of an M or D register is provided by the source of the function call, then the registers of the source of the function call can be accessed from inside the function by using that address as the base. | |

Note: n: decimal digit, h: hexadecimal digit

> **Important** User functions can be called from any programs, any number of times.

■ Precautions When Using Local Registers within a User Function

When you call a user function, consider what values could be in the local registers, and perform initialization as needed.

| Name | Precautions |
|---|---|
| X registers (function input registers) | If input values are not set, the values will be uncertain.<br>Do not use X registers that are outside of the range that is specified in the input definitions. |
| Y registers (function output registers) | If output values are not set, the values will be uncertain.<br>Always set the values of the range of Y registers that is specified in the output definitions. |
| Z registers (function internal registers) | When the function is called, the previously set values will be lost and the values will be uncertain.<br>These registers are not appropriate for instructions if the previous value must be retained.<br>Use them only after initializing them within the function. |
| # registers | These are constant registers. Their values cannot be changed. |
| D registers | When the function is called, the previously set values are preserved.<br>If a previous value is not necessary, initialize the value, or use a Z register instead.<br>D registers retain the data until the power is turned OFF.<br>The default value after startup depends on the setting of the **D Register Clear when Start** option.<br>Refer to the following sections for details.<br>☞ *Setting the D Register Clear When Start Option (page 3-23)* |

• Setting the D Register Clear When Start Option

**1.** Select *File* – *Environment Setting* from the MPE720 Version 7 Window.

**2.** Select *Setup* – *System Setting*.

**3.** Select **Enable** or **Disable** for the **D Register Clear when Start** option.
   Disable: The initial values will be uncertain.
   Enable: The initial values will be 0.



CPU Unit Functionality

3
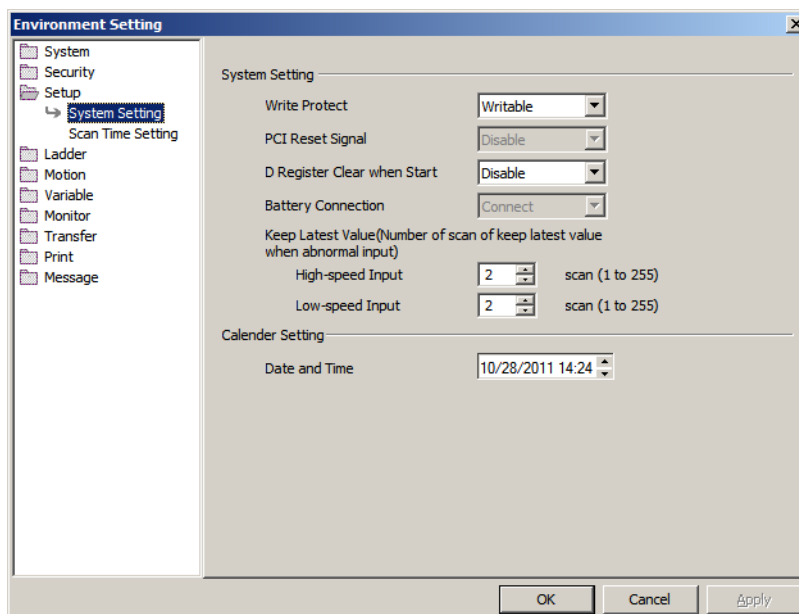
# Data Types

There are various data types that you can use depending on the purpose of the application: bit, integer, double-length integer, quadruple-length integer, real number, double-precision real number, and address.

| Symbol | Data Type | Range of Values | Data Size | Description |
|--------|-----------|-----------------|-----------|-------------|
| B | Bit | 1 (ON) or 0 (OFF) | – | Used in relay circuits and to determine ON/OFF status. |
| W | Integer | -32,768 to 32,767 (8000 to 7FFF hex) | 1 word | Used for numeric operations. The values in parentheses on the left are for logical operations. |
| L | Double-length integer | -2,147,483,648 to 2,147,483,647 (80000000 to 7FFFFFFF hex) | 2 words | Used for numeric operations. The values in parentheses on the left are for logical operations. |
| Q | Quadruple-length integer[*1] | -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 (8000000000000000 to 7FFFFFFFFFFFFFFF hex) | 4 words | Used for numeric operations. The values in parentheses on the left are for logical operations. |
| F | Real number | $\pm$ (1.175E - 38 to 3.402E + 38) or 0 | 2 words | Used for advanced numeric operations.[*2] |
| D | Double-precision real number[*1] | $\pm$ (2.225E - 308 to 1.798E + 308) or 0 | 4 words | Used for advanced numeric operations.[*2] |
| A | Address | 0 to 2,097,152 | – | Used only as pointers for addressing. |

*1. These data types cannot be used for indirect designation of motion programs.
*2. Conforms to IEEE754 standards.

> **Important**
>
> The MP3000-series Machine Controller does not have separate registers for each data type. As shown in the following figure, the same address will access the same register even if the data type is different. For example, MB00001003, a bit address, and the MW0000100, an integer address, have different data types, but they both access the same register, MW0000100.

Data Types and Register Designations

One word is allocated for each register address.

An extra digit that specifies the bit (3) is appended to the end of the register address (0000100).

Integer data type

[MB00001003] ← Bit data type

Address data type

[MW0000100]
F E D C B A 9 8 7 6 5 4 3 2 1 0

[MA0000101]

[ML0000100]
[MF0000100]

[MW0000101]

[MW0000102]

[ML0000102]
[MF0000102]

[MW0000103]

[MB0000103B] ← Bit data type

Double-length integer or real number data type

If MA0000101 is specified as a pointer, it addresses a continuous data area with the specified register address (0000101) as the starting address. This data area can be used with all data types in internal processing for functions.

The addressed register (0000102) and the following register (0000103) are combined as a 2-word area. Therefore the register addresses are specified at intervals of 2.

**Terms**

Pointer Designation
When an address is passed to a function as a parameter, this is referred to as pointer designation. When pointer designation is used, the continuous data area starting from the address of the specified register address can be used in internal processing for functions with all data types.

## ◆ Precautions for Operations Using Different Data Types

If you perform an operation using different data types, be aware that the results will be different depending on the data type of the storage register, as described below.

• Storing Real Number Data in an Integer Register
  MW0000100 = MF0000200; the real number is stored after it is converted to an integer.
    (00001)    (1.234)

> Note: There may be rounding error due to storing a real number in an integer register.
> Whether numbers are rounded or truncated when converting a real number to an integer can be set in the properties of the drawing.
> ☞ ■ *Setting for Real Number Casting (page 3-26)*

  MW0000100 = MF0000200 + MF0000202
    (0124)    (123.48)    (0.02)    The result of the operation may be different depending on the value
                                      of the variable.
    (0123)    (123.49)    (0.01)

• Storing Real Number Data in a Double-length Integer Register
  ML0000100 = MF0000200; the real number is stored after it is converted to an integer.
    (65432)    (65432.1)

• Storing Double-length Integer Data in an Integer Register
  MW0000100 = ML0000200; the lower 16 bits of the double-length integer are stored without change.
    (-00001)    (65535)

• Storing Integer Data in a Double-length Integer Register
  ML0000100 = MW0000200; the integer is stored after it is converted to double-length integer data.
  (0001234)    (1234)

### ■ Setting for Real Number Casting

The casting method (truncating or rounding) can be set in the detailed definitions in the Drawing Properties Dialog Box. The method to use for real number casting is set for each drawing.

Use the following procedure to display the Program Property Dialog Box.

**1.** In the Ladder Pane, select the ladder program for which to view the properties.

**2.** Right-click the selected program and select **Property** from the pop-up menu.
The Program Property Dialog Box will be displayed.
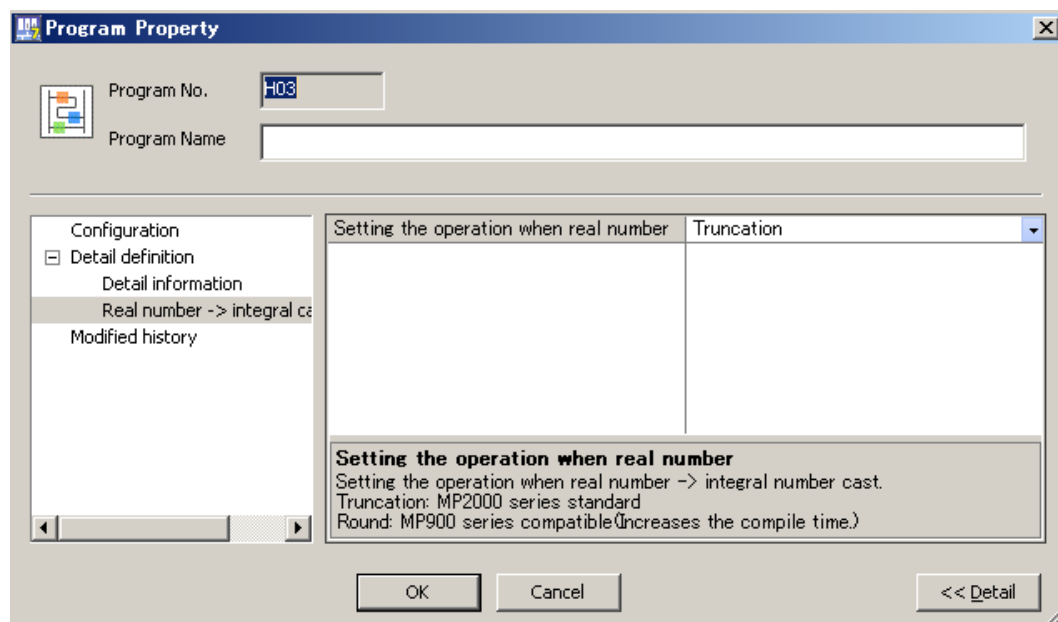
Information    The data is little endian, as shown in the following example.
- MB00001006

| | | | | | | | | | MB00001006 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Bit   F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0

MW0000100
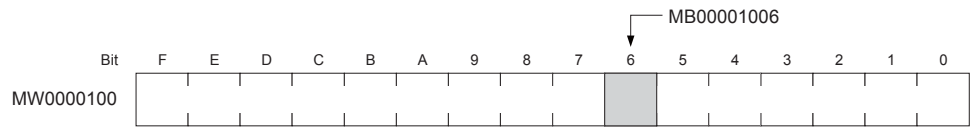
- MW0000100 = 1234 hex

| MW0000100 | 1234 hex |
|---|---|

- ML0000100 = 12345678 hex

| MW0000100 | 5678 hex |
|---|---|
| MW0000101 | 1234 hex |
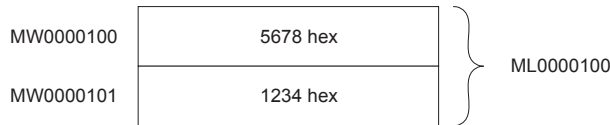
ML0000100

- MQ0000100 = 123456789ABCDEF0 hex

| MW0000100 | DEF0 hex |
|---|---|
| MW0000101 | 9ABC hex |
| MW0000102 | 5678 hex |
| MW0000103 | 1234 hex |

MQ0000100
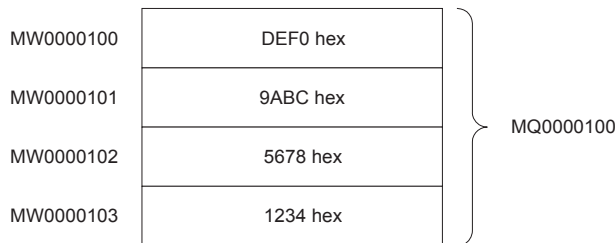
# Index Registers (i, j)

There are two special registers, i and j, that are used to modify relay and register addresses. The functions of i and j are identical. They are used to handle register addresses like variables.

There are subscript registers for each program type, as shown in the following figure.

| DWG.A | DWG.H | DWG.L | DWG.I | Motion program* | Sequence program* |
|---|---|---|---|---|---|
| ↕ | ↕ | ↕ | ↕ | ↕ | ↕ |
| i and j registers | i and j registers | i and j registers | i and j registers | i and j registers | i and j registers |
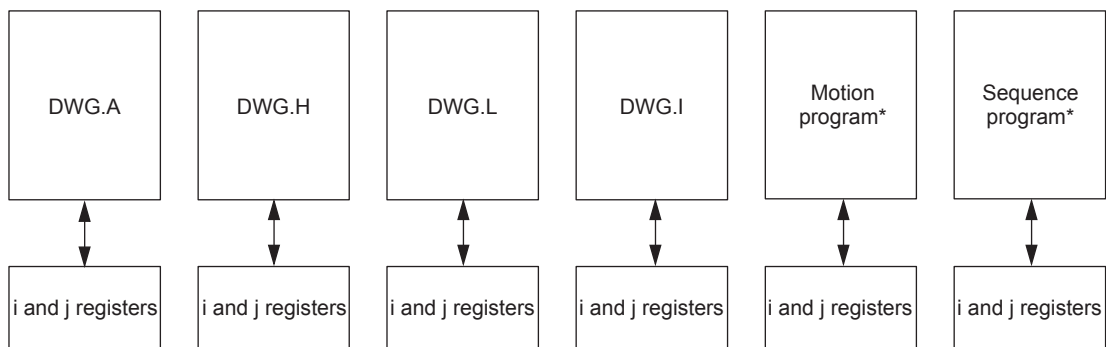
   * Motion programs and sequence programs have separate i and j registers for each task.

   Note: Functions reference the i and j registers that belong to the calling drawing.
        For example, a function called by DWG.H will reference the i and j registers for DWG.H.

We will describe this with examples for each register data type.

### ◆ Attaching an Index to a Bit Register

Using an index is the same as adding the value of i or j to the register address.

For example, if i = 2, MB00000000i is the same as MB00000002.

```
i = 2;
DB000000 = MB00000000i;        Equivalent        DB000000 = MB00000002;
```

### ◆ Attaching an Index to an Integer Register

Using an index is the same as adding the value of i or j to the register address.

For example, if j = 30, MW0000001j is the same as MW0000031.

```
j = 30;
DW00000 = MW0000001j;          Equivalent        DW00000 = MW0000031;
```

### ◆ Attaching an Index to a Double-length Integer or a Real Number Register

Using an index is the same as adding the value of i or j to the register address.

For example, if j = 1, ML0000000j is the same as ML0000001. Similarly, if j = 1, MF0000000j is the same as MF0000001.

| Double-length Integer | Upper Word MW0000001 | Lower Word MW0000000 |
|---|---|---|
| If j = 0, ML0000000j is ML0000000. | | |

| | MW0000002 | MW0000001 |
|---|---|---|
| If j = 1, ML0000000j is ML0000001. | | |

| Real Number | Upper Word MW0000001 | Lower Word MW0000000 |
|---|---|---|
| If j = 0, MF0000000j is MF0000000. | | |

| | MW0000002 | MW0000001 |
|---|---|---|
| If j = 1, MF0000000j is MF0000001. | | |
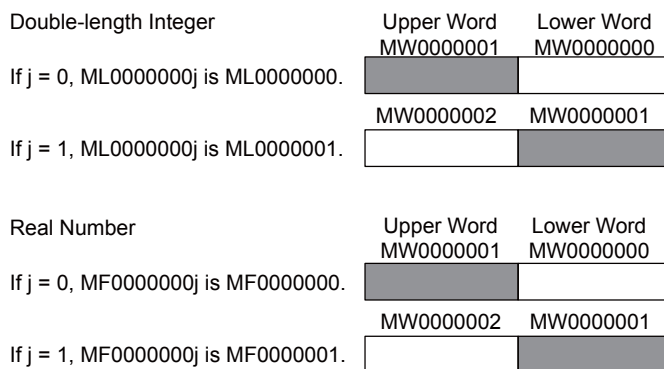
> **Note**
> Double-length integers and real numbers use a region that is 2 words in size. For example, when using ML0000000j with both j = 0 and j = 1, the one-word area of MW0000001 will overlap. Be careful of overlapping areas when indexing double-length integer or real number register addresses.

## ◆ Attaching an Index to a Quadruple-length Integer or a Double-precision Real Number Register

Using an index is the same as adding the value of i or j to the register address.

For example, if j = 2, MQ0000000j is the same as MQ0000002. Similarly, if j = 2, MD0000000j is the same as MD0000002.

Quadruple-length Integer

| Upper 2 words | | Lower 2 words | |
|---|---|---|---|
| MW0000003 | MW0000002 | MW0000001 | MW0000000 |

If j = 0, MQ0000000j is MQ0000000.

| Upper 2 words | | Lower 2 words | |
|---|---|---|---|
| MW0000005 | MW0000004 | MW0000003 | MW0000002 |

If j = 2, MQ0000000j is MQ0000002.

Double-precision Real Number

| Upper 2 words | | Lower 2 words | |
|---|---|---|---|
| MW0000003 | MW0000002 | MW0000001 | MW0000000 |

If j = 0, MD0000000j is MD0000000.

| Upper 2 words | | Lower 2 words | |
|---|---|---|---|
| MW0000005 | MW0000004 | MW0000003 | MW0000002 |

If j = 2, MD0000000j is MD0000002.
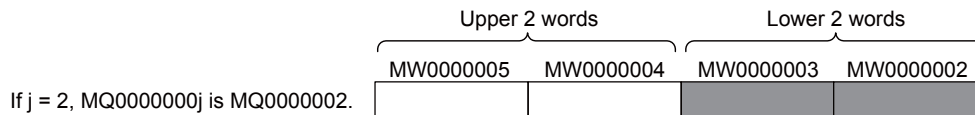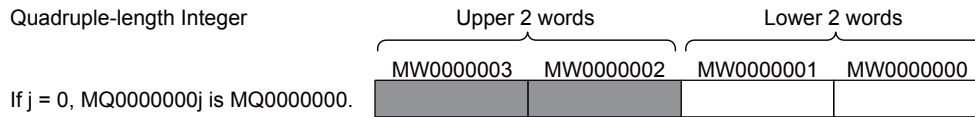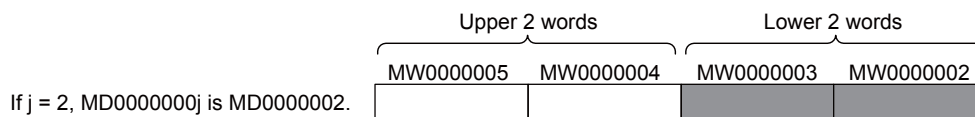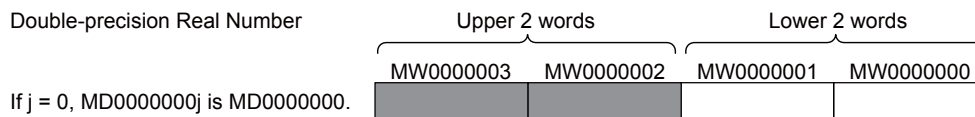
> **Note**  Quadruple-length integers and double-precision real numbers use a region that is 4 words in size. For example, when using MQ0000000j with both j = 0 and j = 2, the two-word area of MW0000002 and MW0000003 will overlap. Be careful of overlapping areas when indexing quadruple-length integer or double-precision real number register addresses.

# Array Registers ([ ])

Array registers are used to modify register addresses, and are denoted by square brackets [ ].

These are used to handle register addresses like variables.

Similarly to index registers, an offset is added to the register address.

## ◆ Attaching an Array Register to a Bit Register

Using an array register is the same as adding the value of the array register to the register address.

For example, if DW00000 = 2, MB00000000[DW00000] is the same as MB00000002.

```
DW00000 = 2;                                    Equivalent
DB000020 = MB00000000[DW00000];        ◄──────►        DB000020 = MB00000002;
```

## ◆ Attaching an Array Register to a Register Other Than a Bit Register

Using an array register is the same as adding the word size of the data type of the array register times the value of the array register to the register address.

For example, if DW00000 = 30, ML0000002[DW00000] is the same as ML0000062.

DL00002 = ML00000 $(30 \times 2 + 2)$ = ML0000062

```
DW00000 = 30;                                    Equivalent
DL00002 = ML0000002[DW00000];        ◄──────►        DL00002 = ML0000062;
```

# Execution Scheduling

This section describes the execution order of drawings.

## Controlling the Execution of Drawings

Drawings are executed based on their priorities, as shown in the following figure.
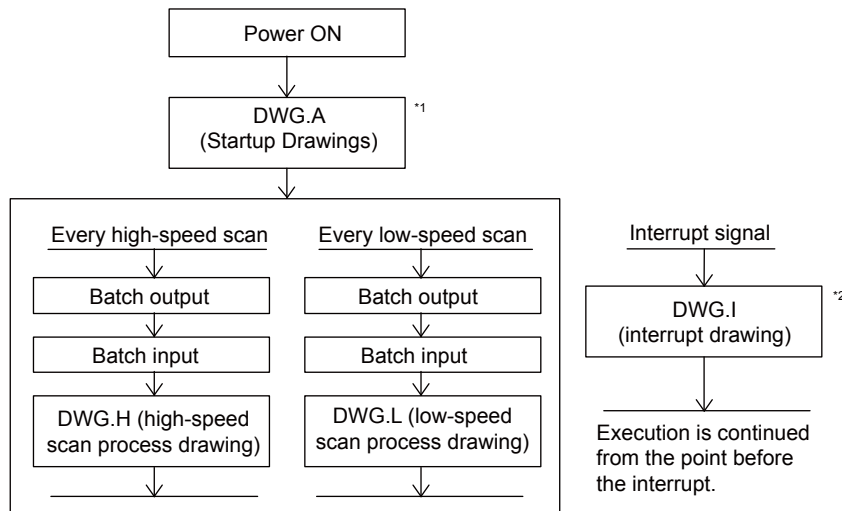


*1. DWG.A drawings are executed immediately after the power supply is turned ON.
*2. When an interrupt signal is input, execution of the DWG.I drawing is given priority even if execution of a DWG.H or DWG.L drawing is currently in progress.

Note: The parent drawing of each drawing is automatically called and executed by the system.

## Scheduling the Execution of High-speed and Low-speed Scan Process Drawings

High-speed scan process drawings (DWG.H) and low-speed scan process drawings (DWG.L) cannot be executed at the same time. DWG.L drawings are executed during the idle time of DWG.H drawings. The period during which DWG.H drawings are executed is called the high-speed scan time. The period during which DWG.L drawings are executed is called the low-speed scan time.
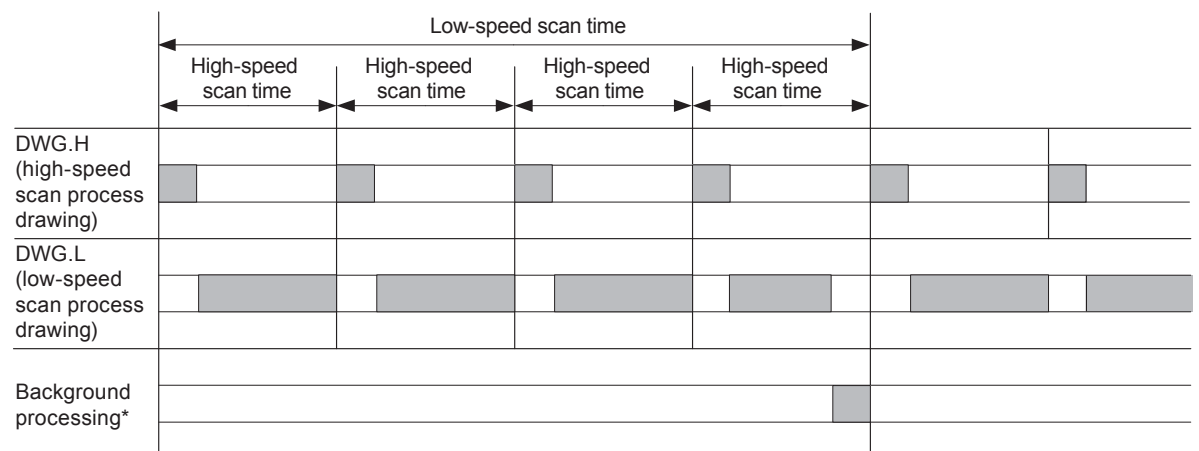


: Actual processing time during the scan

* Background processing is used to execute internal system processing, such as communications processing.

Refer to the following section for the setting procedure for the high-speed and low-speed scans.

☞ *Setting the High-speed and Low-speed Scan Times (page 3-34)*

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# Scans

A scan refers to the processing that starts at fixed intervals.

This section describes the scans.

## Types of Scans

The CPU Unit has two types of scans, the high-speed H scan and low-speed L scan.

A high-speed H scan has higher priority than a low-speed L scan. The fixed period for each scan, also known as the scan time, can be set by the user.

This section describes the settings for the scan times.

## High-speed (H) Scan

The following table shows the different high-speed scan time set values depending on whether the MP2000 Optional Module is used.

> **Note**
> There are restrictions on the set value of the high-speed scan time. Refer to the following section for details.
> ◆ *High-speed Scan Time Set Value Restrictions (page 3-32)*

| When the MP2000 Optional Module Is Not Used | When the MP2000 Optional Module Is Used |
|---|---|
| 0.125 to 32.0 ms (in 0.125-ms increments) | 0.125 ms, 0.250 ms, or 0.5 to 32.0 ms (in 0.5-ms increments) |

> Information    The default high-speed scan time is 4.0 ms.

### ◆ High-speed Scan Time Set Value Restrictions

This section describes the restrictions on the set value of the high-speed scan time.

#### ■ Restrictions Imposed by the MECHATROLINK-III Communications Cycle

The high-speed scan of the CPU Unit is synchronized with the MECHATROLINK-III communications cycle of the SVC32 Module built into the CPU Unit. This imposes the following restrictions in the set value of the high-speed scan time.

| Communica-tions Cycle | High-speed Scan Time Set Value Restrictions | Possible Set Values | |
|---|---|---|---|
| | | When MP2000 Optional Module Is Not Used | When MP2000 Optional Module Is Used |
| 125 µs | Integral multiple of 125 µs | 0.125 to 32.0 ms (in increments of 0.125 ms) | 0.125 ms, 0.250 ms, or 0.5 to 32.0 ms (in increments of 0.5 ms) |
| 250 µs | Integral multiple of 250 µs or 1 times the integer portion | 0.250 to 32.0 ms (in increments of 0.250 ms) | 0.250 ms or 0.5 to 32.0 ms (in increments of 0.5 ms) |
| 500 µs | Integral multiple of 500 µs or 1 times the integer portion | 0.5 to 32.0 ms (in increments of 0.5 ms) | 0.5 to 32.0 ms (in increments of 0.5 ms) |
| 1 ms | Integral multiple of 1 ms or 1 times the integer portion | 1.0 to 32.0 ms (in increments of 1 ms) | 1.0 to 32.0 ms (in increments of 1 ms) |
| 1.5 ms | Integral multiple of 1.5 ms or 1 times the integer portion | 1.5 to 31.5 ms (in increments of 1.5 ms) | 1.5 to 31.5 ms (in increments of 1.5 ms) |

| Communications Cycle | High-speed Scan Time Set Value Restrictions | Possible Set Values | |
|---|---|---|---|
| | | When MP2000 Optional Module Is Not Used | When MP2000 Optional Module Is Used |
| 2 ms | Integral multiple of 2 ms or 1 times the integer portion | 2.0 to 32.0 ms (in increments of 2 ms) | 2.0 to 32.0 ms (in increments of 2 ms) |
| 3 ms | Integral multiple of 3 ms or 1 times the integer portion | 3.0 to 30.0 ms (in increments of 3 ms) | 3.0 to 30.0 ms (in increments of 3 ms) |

If these restrictions are not observed, the high-speed scan cycle will stop and an alarm will occur. The alarm is reported in the M-III Restrictions Error Bit (SB00041D) in the CPU Error Status System Register. Refer to the following section for details.

☞ *4.3 CPU Unit Specifications – ◆ System Status (page 4-19)*

### ■ Restrictions Imposed by Σ-V SERVOPACKs

The specifications of MECHATROLINK-III Σ-V-series SERVOPACKs impose the following restrictions on the set value of the high-speed scan time.

| Σ-V SERVOPACK Version | Restrictions |
|---|---|
| Lower than version 21 | High-speed scan time set value ≤ (32 × Communications cycle) Example: If the MECHATROLINK-III communications cycle is 125 μs, the set value of the high-speed scan time can be up to 4.0 ms (125 μs × 32). |
| Version 21 or higher | High-speed scan time set value ≤ (254 × Communications cycle) Example: If the MECHATROLINK-III communications cycle is 125 μs, the set value of the high-speed scan time can be up to 31.75 ms (125 μs × 254). |

If these restrictions are not observed, an A.94B Data Setting Warning 2 (Data Out of Range) warning will occur in the SERVOPACK.

## ◆ I/O Processing

If the high-speed scan time is set to at least 0.5 ms, the I/O service (I/O processing) of the MP2000 Optional Module will be performed every scan.

If the high-speed scan time is set to less than 0.5 ms (0.125 ms or 0.250 ms), the I/O service (I/O processing) of the MP2000 Optional Module will be performed at the filtered basic cycle of 0.5 ms.

The following figures show the timing results for these settings.

### ■ Example: High-speed Scan Time Set to 0.5 ms
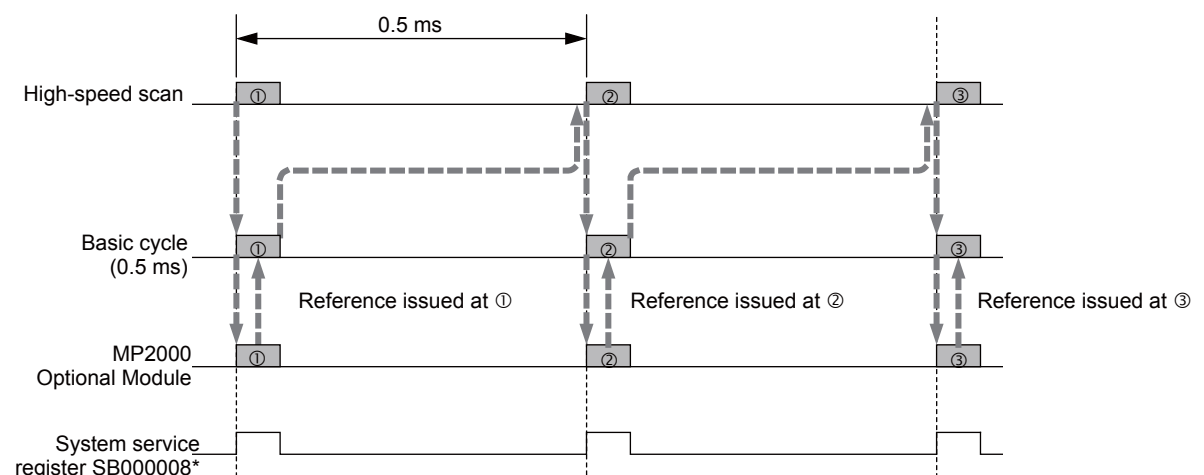


\* The purpose of this system service register is to determine from a ladder program whether the I/O scan service is being executed for MP2000 Optional Modules

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■ Example: High-speed Scan Time Set to 0.250 ms



* The purpose of this system service register is to determine from a ladder program whether the I/O scan service is being executed for MP2000 Optional Modules

■ Example: High-speed Scan Time Set to 0.125 ms
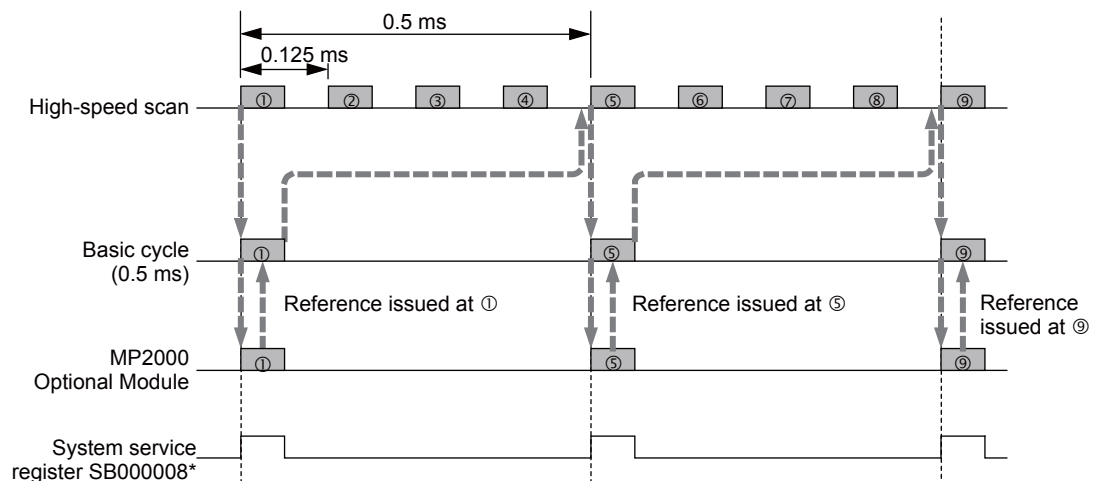


* The purpose of this system service register is to determine from a ladder program whether the I/O scan service is being executed for MP2000 Optional Modules

## Low-speed (L) Scan

The setting range for the low-speed scan time is 2.0 to 300.0 ms (in increments of 0.5 ms).

Information    The default low-speed scan time is 200.0 ms.

### ◆ I/O Processing

During the low-speed scan, the I/O service (I/O processing) is performed every scan, regardless of the set value.

## Setting the High-speed and Low-speed Scan Times

Use MPE720 version 7 and perform the procedure given below to set the high-speed and low-speed scan times.

**1.** Stop the CPU Unit.

2. Select *File – Environment Setting* from the menu bar. Alternatively, click the **System Setting** Icon on the Start Tab Page.

The Environment Setting Dialog Box will be displayed.

3. Select *Setup – Scan Time Setting*.

The following dialog box will be displayed.
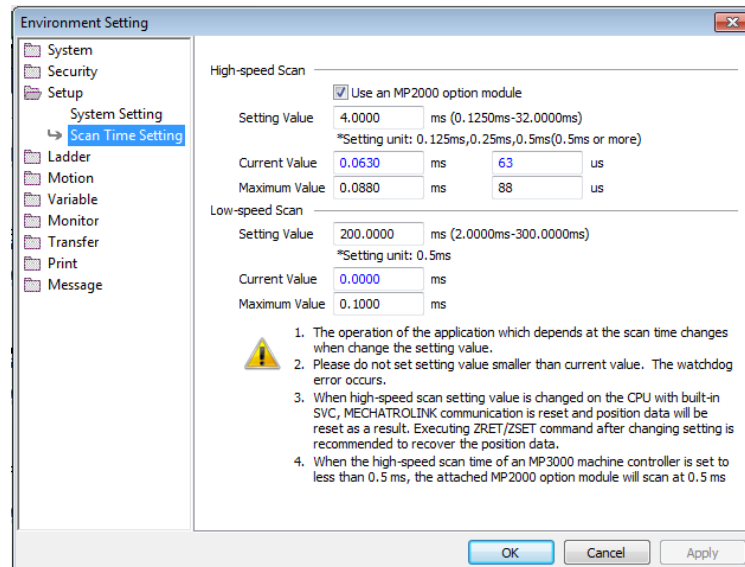


Setting Value:    Enter the scan time settings.

Current Value:    A value of 0.0 ms is displayed when the MPE720 is offline. Otherwise, the actual processing times for the scans are displayed.

Maximum Value:  The maximum processing time for the scan is displayed. You can set the maximum value. The setting is retained until it is exceeded.

4. Enter the high-speed scan time in the **Setting Value** Box under **High-speed Scan**. Enter the low-speed scan time in the **Setting Value** Box under **Low-speed Scan**.

The following table shows the possible set values and default values for each scan time.

| Item | Possible Set Values | Default |
|---|---|---|
| High-speed Scan Time | 0.125 to 32 ms (in 0.125-ms increments) | 4.0 ms |
| Low-speed Scan Time | 2.0 to 300.0 ms (in 0.5-ms increments) | 200.0 ms |

Note: The possible set values and default values depend on the model. Refer to the user's manual for the Module you are using for details.

5. Click the **OK** Button.

The settings will be saved and the Environment Setting Dialog Box will close.

---

**Important**

Observe the following precautions when setting the high-speed scan time and low-speed scan time.

1. Set the scan set value so that it is 1.25 times greater than the maximum value.

   If the scan set value is too close to the maximum value, the refresh rate of the MPE720 window will noticeably drop and can cause communications timeout errors to occur. If the maximum value exceeds the scan set value, a watchdog error may occur and cause the Machine Controller system to shut down.

2. If you are using MECHATROLINK-II or MECHATROLINK-III, set values that are an integral multiple of the communications cycle. If you change the communications cycle, check the scan time set values.

3. Do not change the scan set value while the Servo is ON. Never change the scan set value while an axis is in motion (i.e., while the motor is rotating). Doing so may cause the motor to rotate out of control.

4. After changing or setting a scan time, always save the data to flash memory.

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## Keep Latest Value Setting in High-speed/Low-speed Scans

You can use the Keep Latest Value setting to specify the number of scans to hold previous data when an input error occurs. If the input error still exists after the number of scans specified for the Keep Latest Value setting, the input values will be treated as 0. When the input error is removed, reading the input values is resumed automatically. There are separate Keep Latest Value settings for the high-speed scan and the low-speed scan.

◆ Operation

The following figure illustrates the operation for the Keep Latest Value setting.

Keep Latest Value setting: 3 scans for high-speed scan
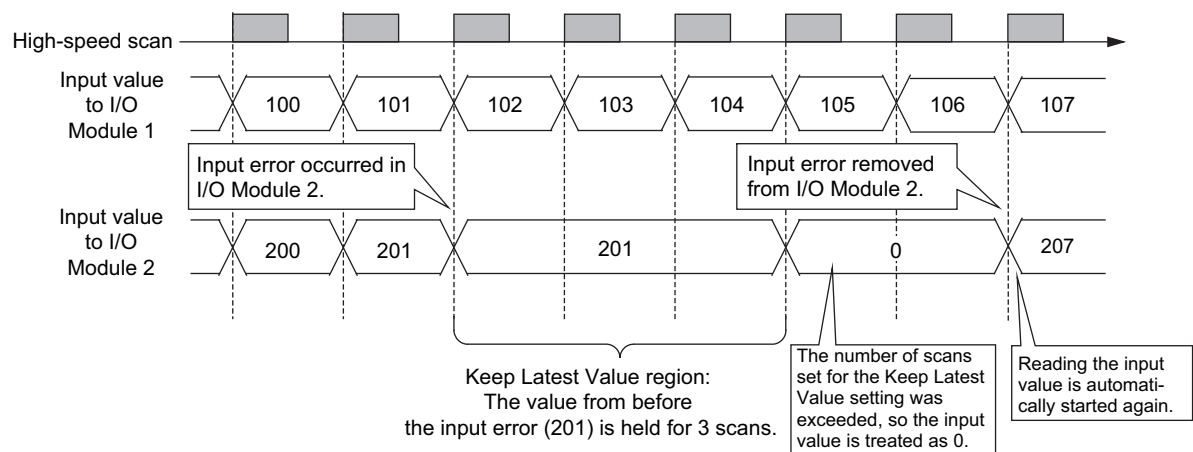


◆ Setting Procedure

Perform the following procedure with MPE720 version 7 to set the Keep Latest Value setting.

1. Select *File* – *Environment Setting* from the menu bar. Alternatively, click the **System Setting** Icon on the Start Tab Page.
   The Environment Setting Dialog Box will be displayed.

2. Select *Setup* – *System Setting*.
   The following dialog box will be displayed.
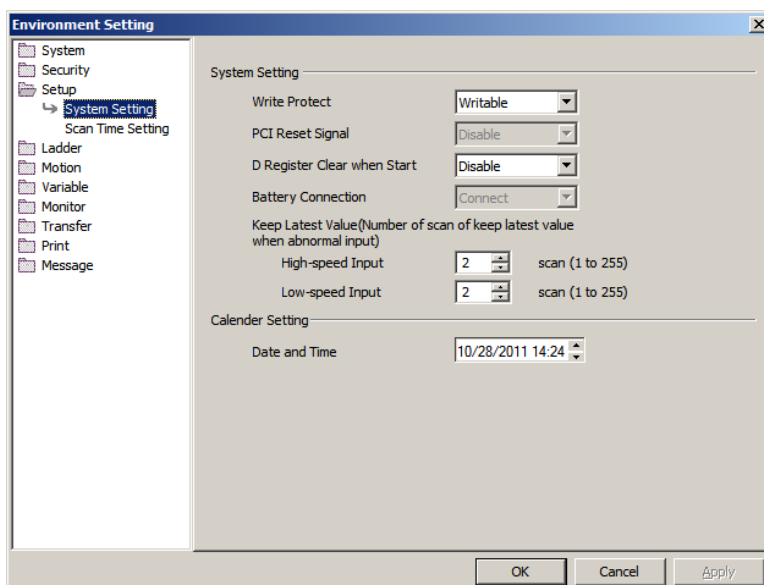


3. Set values in the **High-speed Input** and **Low-speed Input** Boxes in the **Keep Latest Value** Group.

**4.** Click the **OK** Button.

The settings will be saved and the Environment Setting Dialog Box will close.

Information    The Keep Latest Value setting specifies the number of scans to process before the I/O service clears the input registers.

If the high-speed scan time setting is set to 0.250 ms or 0.125 ms, the scan at which the input registers are cleared will differ for the MP2000-series Optional Module and the 218IFD and SVC32 Function Modules that are built into the CPU Unit.

In the following example, an input error occurs simultaneously on the MP2000-series Optional Module and the 218IFD and SVC32 Function Modules in the CPU Unit when the high-speed scan setting is set to 0.250 ms and the Keep Latest Value setting is set to 5 scans.

The input registers in the 218IFD and SVC32 Function Modules built into the CPU Unit are cleared on the sixth scan that immediately follows the specified number of scans, whereas on the MP2000-series Optional Module, the input registers are cleared on the seventh service scan that immediately follows the specified number of scans.
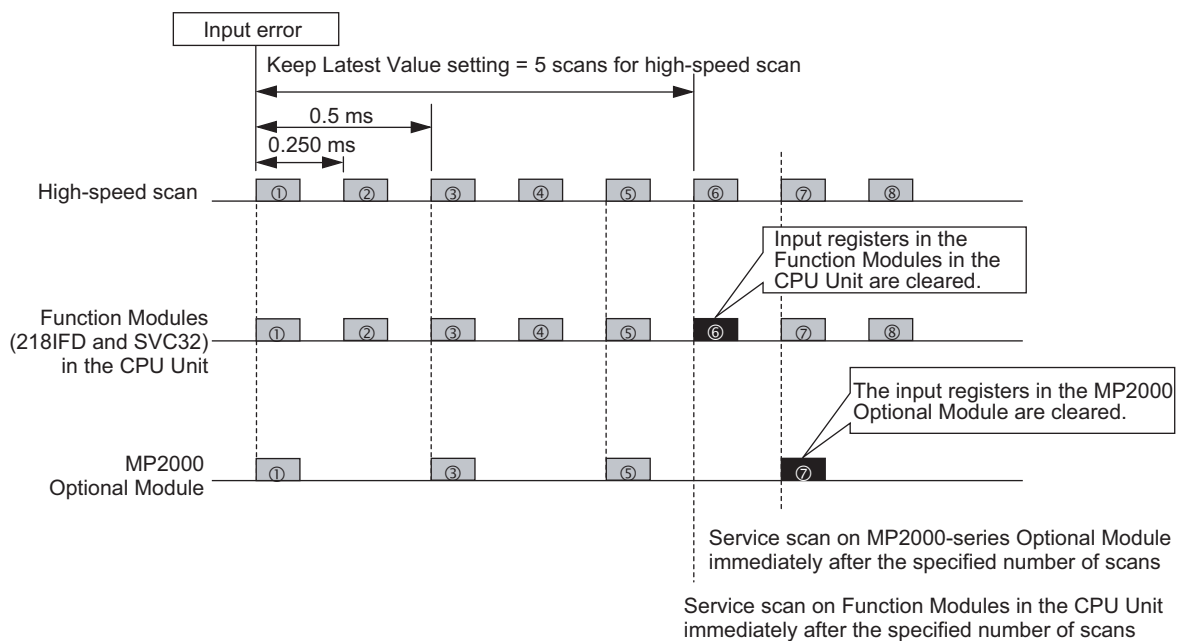
## 3.2 Function Modules

This section describes the Function Modules that are built into the CPU Unit.

## Self Configuration

Self configuration is a feature that automatically recognizes all the Optional Modules that are installed in the Machine Controller and all the slave devices that are connected via the MECHATROLINK connector (such as Servo Drives), and creates the module configuration definition files based on that information. Self configuration greatly reduces the steps that are required to set up the system. Use the DIP switch on the CPU Unit or use the MPE720 to execute self configuration.

The following figure illustrates self configuration.
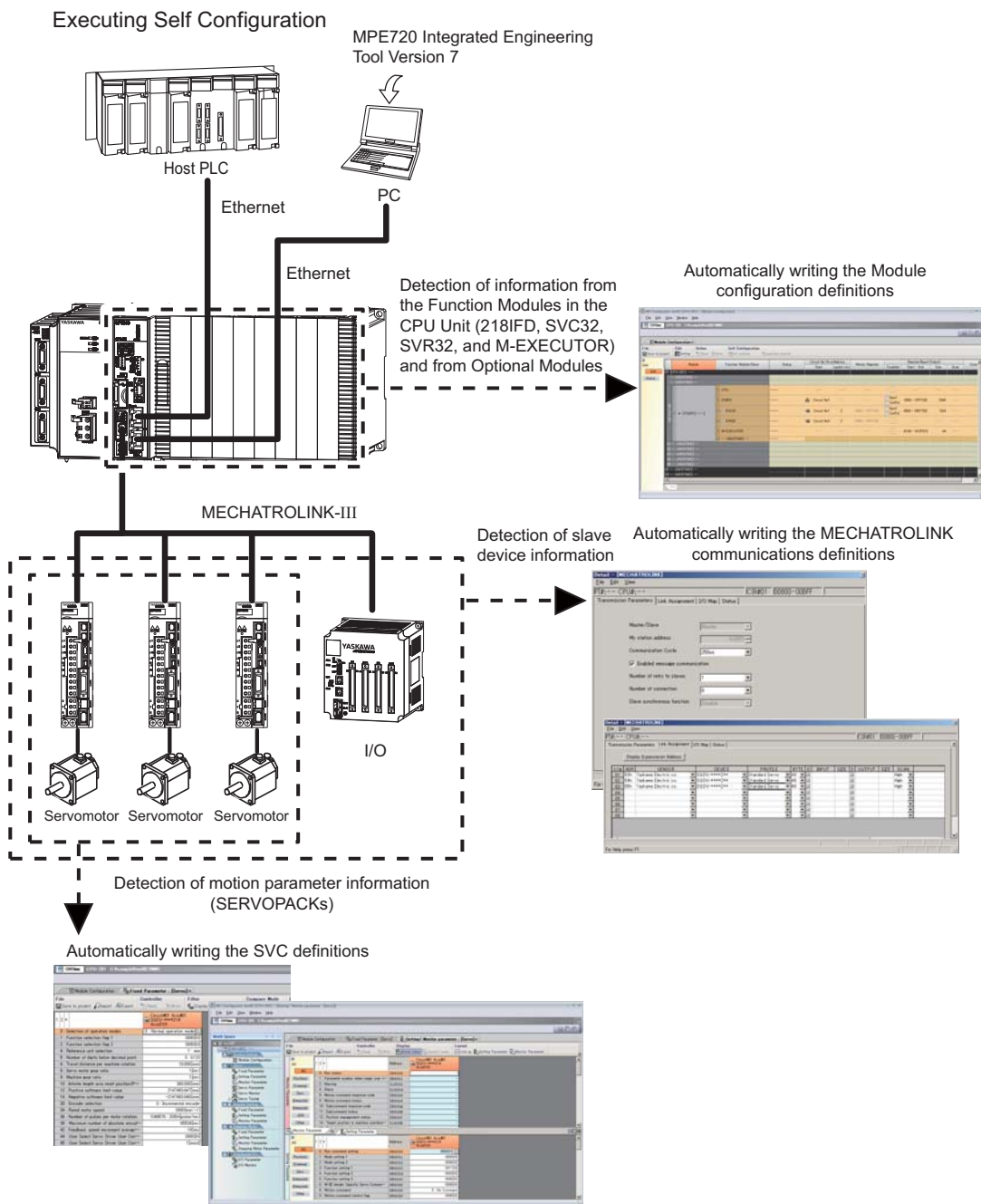
# Operating Procedures

This section describes the procedures for executing self configuration.

• Refer to the following section when you perform self configuration for the first time after connecting the devices.

☞ *Self Configuration Using the DIP Switch (page 3-39)*

• If the Machine Controller and the MPE720 are already connected, the self configuration can be performed by using the MPE720.

☞ *Self Configuration Using the MPE720 (page 3-42)*

## ◆ Self Configuration Using the DIP Switch

The procedure for executing self configuration using the DIP switch depends on whether self configuration is being done for the first time since the devices were connected, or if SERVOPACKs or other devices have been added.

Both procedures are described below.

### ■ First Self Configuration after Connecting the Devices

The following procedure performs a new self configuration of all Modules, and creates new definition files.

| | |
|---|---|
| **Important** | 1. Before performing this procedure, turn ON the power supply to the SERVOPACKs and other devices.<br>2. This procedure will clear the following data:<br>• All definition files<br>• All user programs<br>• All registers |

**1.** Turn OFF the power supply to the CPU Unit.

**2.** Turn ON only the INIT and CNFG pins on the SW1 DIP switch on the CPU Unit.
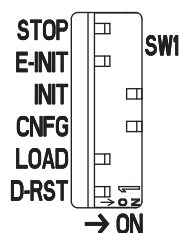


**3.** Turn ON the power supply to the CPU Unit.
Self configuration will be executed.

**4.** Confirm that the status indicators on the CPU Unit change in the following way:
• RDY: Goes out, and then lights.
• RUN: Goes out, flashes, and then lights.

**5.** Turn OFF the INIT and CNFG pins on the SW1 DIP switch on the CPU Unit.
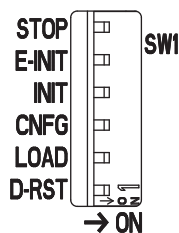


> **Important**
>
> 1. INIT Pin on the DIP Switch and RAM Data
>    If the power supply is turned OFF and ON again when the INIT pin on the Machine Controller SW1 DIP switch is turned ON, the data in RAM will be cleared.
>    If the power supply is turned OFF and ON again when the INIT pin is turned OFF, the data from the flash memory will be loaded and will overwrite the RAM data. Therefore, if the power supply must be turned OFF while writing or editing a program, make sure you save the data to the Machine Controller's flash memory to protect the RAM data.
> 2. Power Interruptions after Self Configuration
>    After performing self configuration, turn OFF the power supply to the Machine Controller only after the definition data is saved to the flash memory of the Machine Controller.
>    If by chance, the power supply is turned OFF before the data is saved, perform self configuration again.
>    Refer to the following manual for details on saving data to the flash memory.
>    
>    📖 *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

### ■ After Adding SERVOPACKs, Optional Modules, and Other Devices

The following procedure will create the definitions for devices and Function Modules that are newly detected by MECHATROLINK communications. This procedure will not update any of the definitions that were made for existing devices and Function Modules. The definitions before self configuration will be retained.

> **Important**
>
> Before performing this procedure, turn ON the power supply to the SERVOPACKs and other devices.

**1.** Turn OFF the power supply to the CPU Unit.

**2.** Turn ON only the CNFG pin on the SW1 DIP switch on the CPU Unit.
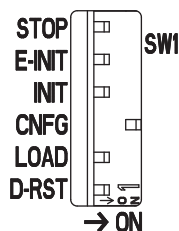


**3.** Turn ON the power supply to the CPU Unit.
Self configuration will be executed.

**4.** Confirm that the status indicators on the CPU Unit change in the following way:
  - RDY: Goes out, and then lights.
  - RUN: Goes out, flashes, and then lights.

**5.** Turn OFF the CNFG pin on the SW1 DIP switch on the CPU Unit.

```
STOP  ┌─┐
E-INIT │□│ SW1
INIT   │□│
CNFG   │□│
LOAD   │□│
D-RST  │□│
       └─┘
       → ON
```

┌─────────────────────────────────────────────────────────────────────────────┐
│  💡        Power Interruptions after Self Configuration                        │
│ Important   After performing self configuration, turn OFF the power supply to the Machine Controller only after │
│            the definition data is saved to the flash memory of the Machine Controller. │
│            If by chance, the power supply is turned OFF before the data is saved, perform self configuration │
│            again.                                                              │
│            Refer to the following manual for details on saving data to the flash memory. │
│            📖 *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00) │
└─────────────────────────────────────────────────────────────────────────────┘

CPU Unit Functionality

3

## ◆ Self Configuration Using the MPE720

There are two types of self configuration that can be performed with the MPE720.

• Self configuration of all Modules: Use this mode when the system is being set up for the first time, or after the entire system has been changed.

• Self configuration of specified Modules: Use this mode when a part of the system has been changed. This process will automatically recognize all devices that have been added or removed, and automatically generate definition files for them.

### ■ Self Configuration of All Modules

Before performing this procedure, turn ON the power supply to the SERVOPACKs and other devices.

**Important**

1.  Click the **Module Configuration** Icon on the Start Tab Page.



The following Module Configuration Definition Tab Page will be displayed.

**2.** Click the **Module** Button.



**3.** Click the **All modules** Button on the Launcher.
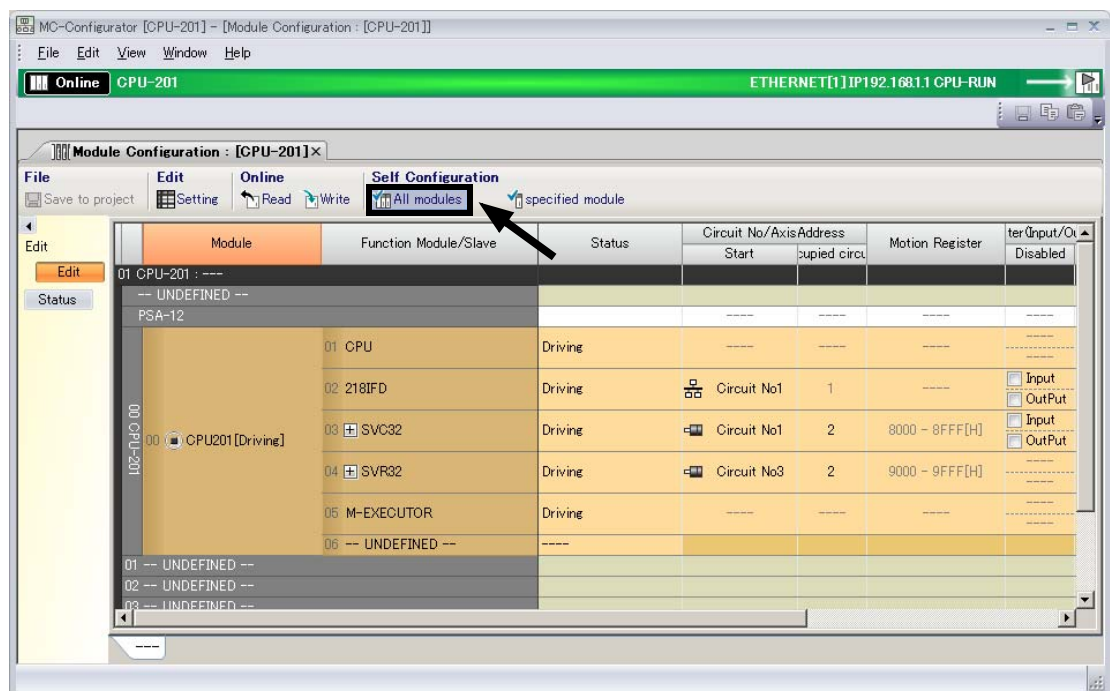


The MC-Configurator Dialog Box will be displayed.
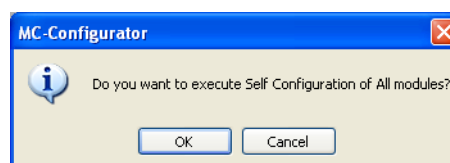


**4.** Click the **OK** Button.
Self configuration will be executed.

■ Self Configuration of Specified Modules

> Important
>
> Before performing this procedure, turn ON the power supply to the SERVOPACKs and other devices.

**1.** Click the **Module Configuration** Icon on the Start Tab Page.
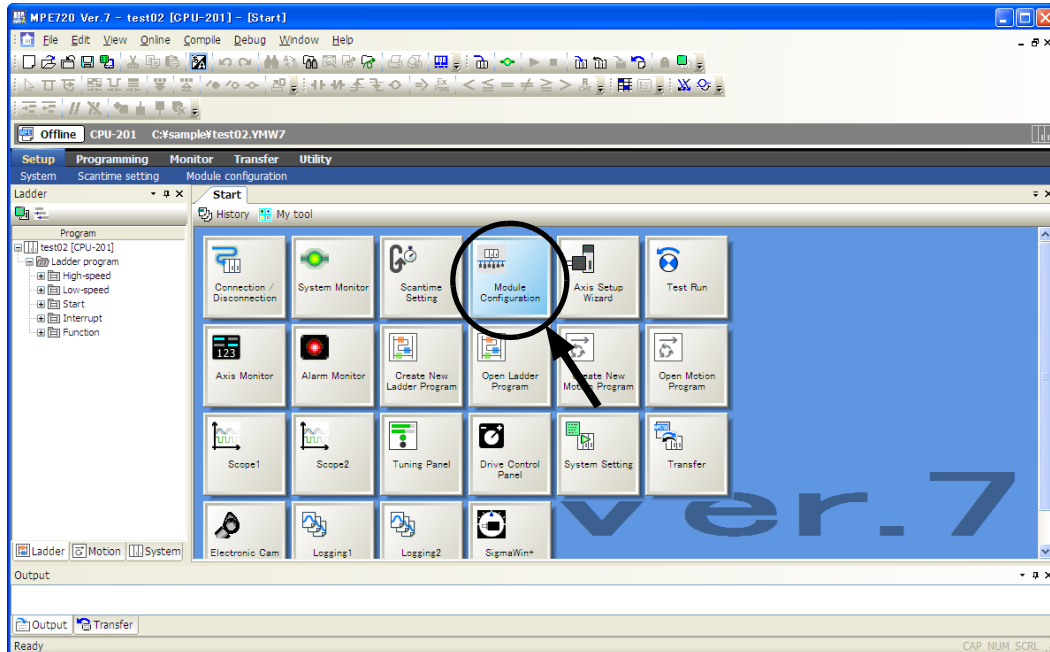


The following Module Configuration Definition Tab Page will be displayed.
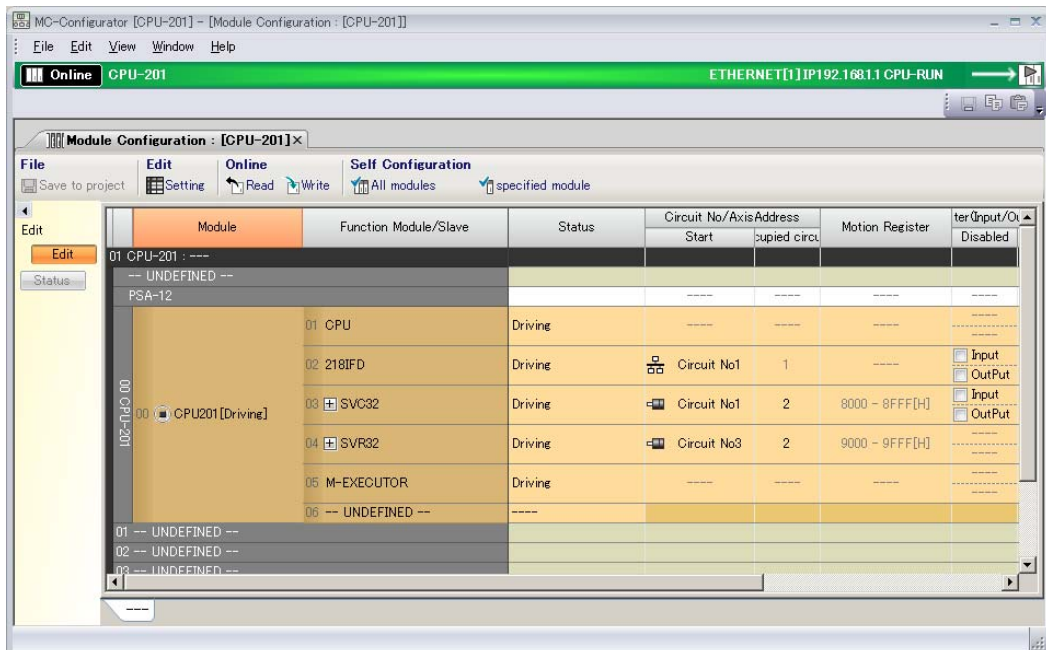


**2.** In the **Function Module/Slave** Column, select the Modules to configure using self configuration.

**3.** Click the **specified module** Button on the Launcher.
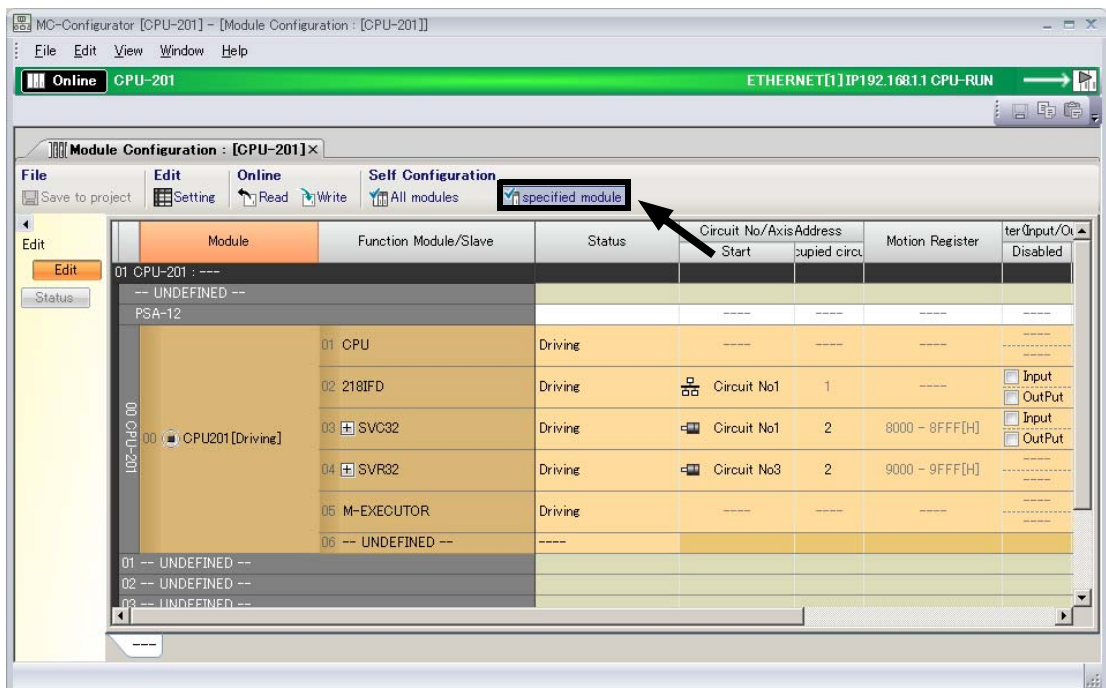


The MC-Configurator Dialog Box will be displayed.
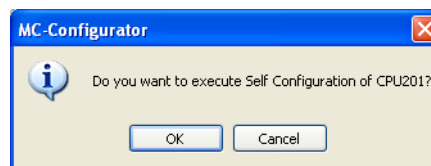


**4.** Click the **OK** Button.

Self configuration will be executed only for the new devices that are detected by MECHATROLINK communications.

# Definition Information Updated by Self Configuration

The definition information that is updated by self configuration is described below.

> **Note**
> This procedure will not update any of the definitions that were made for existing devices and Function Modules. The definitions before self configuration will be retained.

## ◆ I/O Registers

I/O registers are assigned to the Function Modules (218IFD, SVC32, SVR32, M-EXECUTOR, and CPUIF) in the CPU Unit as shown below.

I/O registers will also be automatically assigned to any Optional Modules mounted on the Base Unit.

| Item | | Settings after Self Configuration |
|---|---|---|
| 218IFD | | • First I/O registers: IW00000 and OW00000<br>• Last I/O registers: IW007FF and OW007FF<br>(input registers: IW00000 to IW007FF, output registers: OW00000 to OW007FF) |
| SVC | MECHA-TROLINK | • First I/O registers: IW00800 and OW00800<br>• Last I/O registers: IW00BFF and OW00BFF<br>(input registers: IW00800 to IW00BFF, output registers: OW00800 to OW00BFF) |
| | Motion parameters | • First motion registers: IW08000 and OW08000<br>• Last motion registers: IW087FF and OW087FF<br>(input registers: IW08000 to IW087FF, output registers: OW08000 to OW087FF) |
| SVR | Motion parameters | • First motion registers: IW08800 and OW08800<br>• Last motion registers: IW08FFF and OW08FFF<br>(input registers: IW08800 to IW08FFF, output registers: OW08800 to OW08FFF) |
| M-EXECUTOR | | • First I/O registers: IW00C00 and OW00C00<br>• Last I/O registers: IW00C3F and OW00C3F<br>(input registers: IW00C00 to IW00C3F, output registers: OW00C00 to OW00C3F) |
| CPUIF (Assigned only when Sub CPU synchronization is used.) | For high-speed scan | • First motion registers: IW20000 and OW20000<br>• Last motion registers: IW207FF and OW207FF<br>(input registers: IW20000 to IW207FF, output registers: OW20000 to OW207FF) |
| | For low-speed scan | No registers are assigned.<br>If you need to use low-speed scan registers, manually set the register addresses to use with the **Start** – **End** Boxes under **I/O Registers** on the Module Configuration Definition Tab Page. |

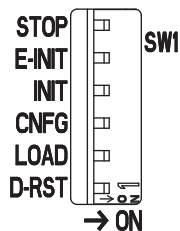## ◆ 218IFD Definition

| Item | Settings after Self Configuration |
|---|---|
| Local IP Address | 192.168.1.1 |
| Subnet Mask | 255.255.255.0 |
| Gateway IP Address | 0.0.0.0 |
| Module Name Definition | CONTROLLER NAME |
| Engineering Port | 9999 (UDP) |
| MEMOBUS Response Time | 0 s |
| Count of Retry | 0 |

Note: Self configuration sets up the 218IFD for an engineering communications connection with the MPE720.
　　　If you want to use MEMOBUS message communications, manually set up automatic reception or I/O message communications, or use MSG-SNDE and MSG-RCVE functions.

#### ◆ MECHATROLINK Communications Definition

##### ■ When Set as the Master

| Item | Settings after Self Configuration |
|------|-----------------------------------|
| Master/Slave | Master |
| My station address | 0×0001 |
| Communication Cycle | 250 μs |
| Message Communications | Enabled |
| Number of Retry to Slaves | 1 |
| Number of connection | 8 |
| Slave synchronous function | Disabled |

##### ■ When Set as a Slave

| Item | Settings after Self Configuration |
|------|-----------------------------------|
| Master/Slave | Slave |
| My station address | 0×0003 |
| Communication Cycle | – |
| Message Communications | Disabled |
| Number of Retry to Slaves | – |
| Number of connection | 1 |
| Slave synchronous function | Disabled |

| Information | To use the Module as a slave, set the parameter settings in the MECHATROLINK communications definition to **Slave** before performing self configuration in the MPE720. |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### ◆ SVC Definition

Refer to the following manual for details.

📖 *MP3000 Series Motion Control User's Manual* (Manual No.: SIEP C880725 11)

#### ◆ SVR Definition

| Item | Settings after Self Configuration |
|------|-----------------------------------|
| Defined Axes | 32 axes (unused axes) |

#### ◆ M-EXECUTOR Definition

| Item | Settings after Self Configuration |
|------|-----------------------------------|
| Program Definition Number | 8 |
| Program Assignments | Not supported. |
| Control Register Assignments | Not supported. |

#### ◆ CPUIF Definition (Only when Sub CPU synchronization is used.)

| Item | Settings after Self Configuration |
|------|-----------------------------------|
| For high-speed scan | Input registers: 64 words<br>Output registers: 64 words |
| For low-speed scan | No registers are assigned. |

# Communications Function Module (218IFD)

This Function Module is used for communications with a host device.

The following table describes the communication features.

| Function Module | Features | Remarks |
|---|---|---|
| Ethernet | The MP3000 Controller supports multiple protocols to enable general-purpose Ethernet communications with PLCs and touch panels from various manufacturers without writing special applications. | • Supported Protocols MODBUS/TCP, OMRON, MELSEC A-compatible 1E/QnA-compatible 3E, Extended MEMOBUS, MEMOBUS, and TOYOPUC |

# Setting Method

Settings are made on the 218IFD Dialog Box after connecting the MP3000-series Controller to the host device. Use the following procedure to display the 218IFD Dialog Box. Refer to the following manual for details on settings.

&#128366; *MP3000 Series Communications User's Manual* (Manual No.: SIEP C880725 12)

1. Connect the Machine Controller to the PC, and start the MPE720.
   Refer to the following manual for details.
   &#128366; *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

2. Execute self configuration as required.
   ☞ *Operating Procedures (page 3-39)*

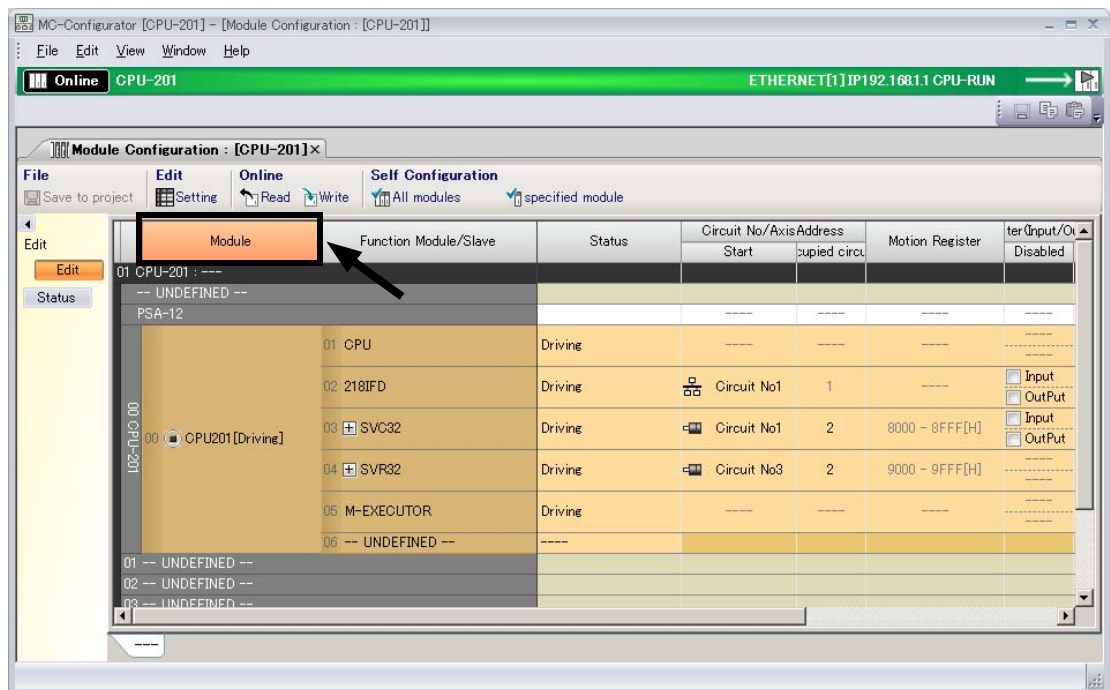3. Click the **Module Configuration** Icon on the Start Tab Page.
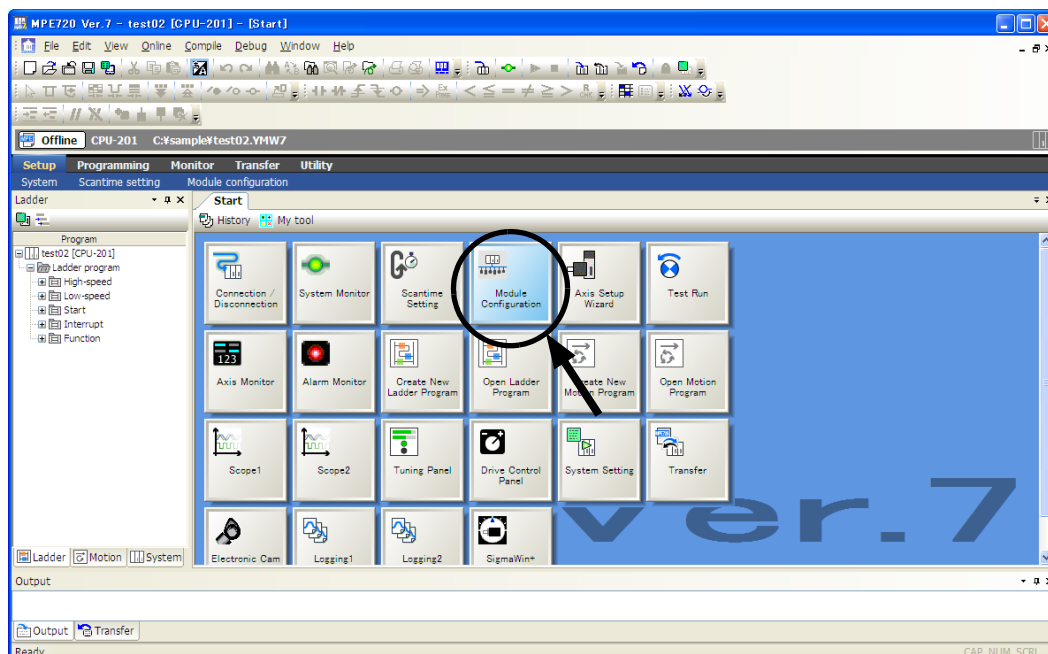
The following Module Configuration Definition Tab Page will be displayed.



Cells for 218IFD settings
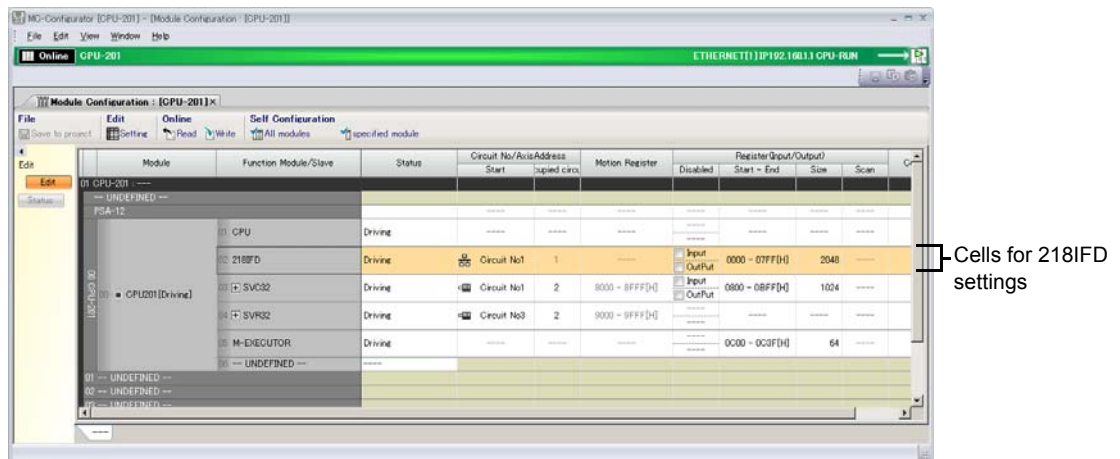
**4.** Double-click the **218IFD** cell.
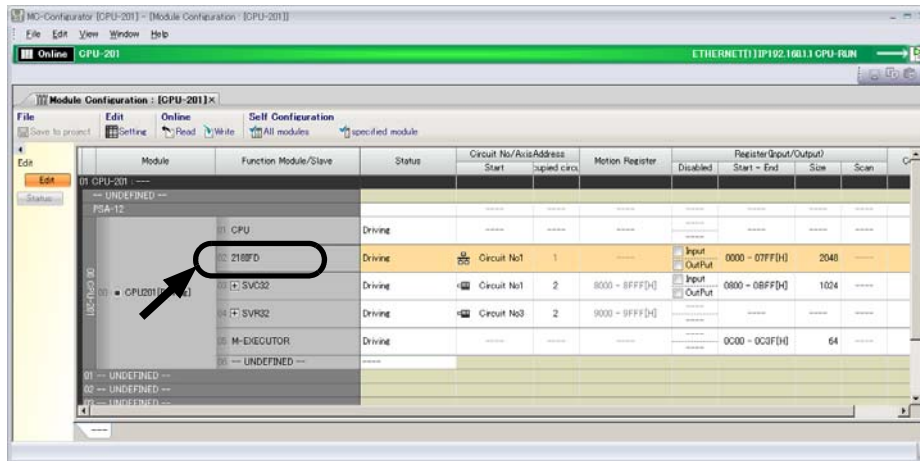


The 218IFD Detail Definition Dialog Box will be displayed.

Refer to the following manual for details on settings.

📖 *MP3000 Series Communications User's Manual* (Manual No.: SIEP C880725 12)

# Motion Control Function Modules (SVC32 and SVR32)

The Motion Control Function Module is used for communications with a MECHATROLINK communications device.

There are two Motion Control Function Modules, the SVC32 and SVR32. Both Modules can provide the following forms of motion control.

- Position control
- Synchronized phase control
- Torque control[*]
- Speed control[*]

\* The SVR32 contains some parameters that you cannot set or monitor.

> Information   Motion fixed and setting parameters must be set to use these controls.

The features of the SVC32 and SVR32 are described below.

| Function Module | Features |
|---|---|
| SVC32 | Controls MECHATROLINK-III-compatible interface devices, such as Servo Drives and I/O Modules. |
| SVR32 | Provides an interface for virtual axes. This allows you to test programs and create references without connecting to physical motors. |

Refer to the following manual for details.

&#x1F4D5; *MP3000 Series Motion Control User's Manual* (Manual No.: SIEP C880725 11)

## Setting Method

Settings are made in the locations given below after the MP3000-series Controller is connected to the MECHATROLINK device.

- MECHATROLINK Dialog Box
- SVC Definition Tab Page

Use the following procedure to display the tab pages and dialog boxes. Refer to the following manual for details on settings.

&#x1F4D5; *MP3000 Series Motion Control User's Manual* (Manual No.: SIEP C880725 11)

**1.** Connect the Machine Controller to the PC, and start the MPE720.
    Refer to the following manual for details.
    &#x1F4D5; *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

**2.** Execute self configuration as required.

**3.** Click the **Module Configuration** Icon on the Start Tab Page.



The following Module Configuration Definition Tab Page will be displayed.



Cells for SVC32 settings

Cells for SVR32 settings

Motion Control Function Modules (SVC32 and SVR32)

**4.** Double-click the **SVC32** cell in the Module Configuration Definition Tab Page.
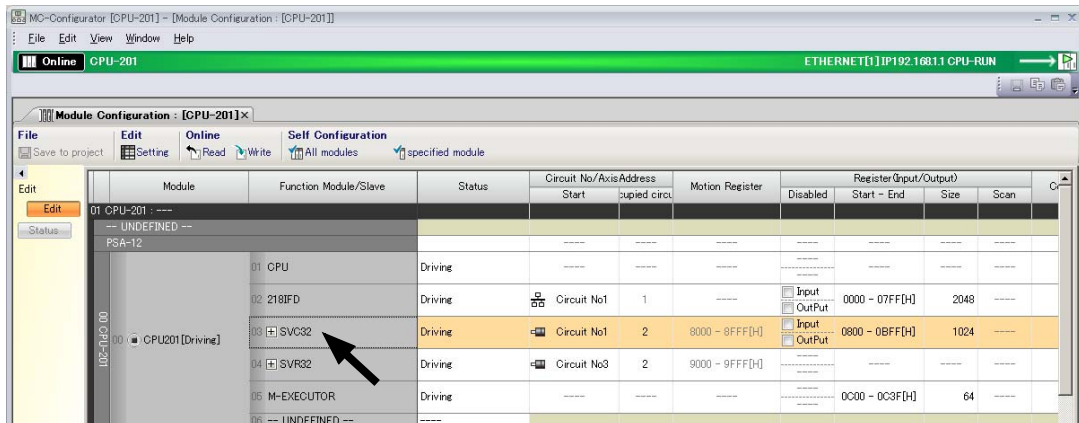


The MECHATROLINK Communications Definition Dialog Box is displayed.

Information | If more than one Module is mounted, select the Module to be checked or set.
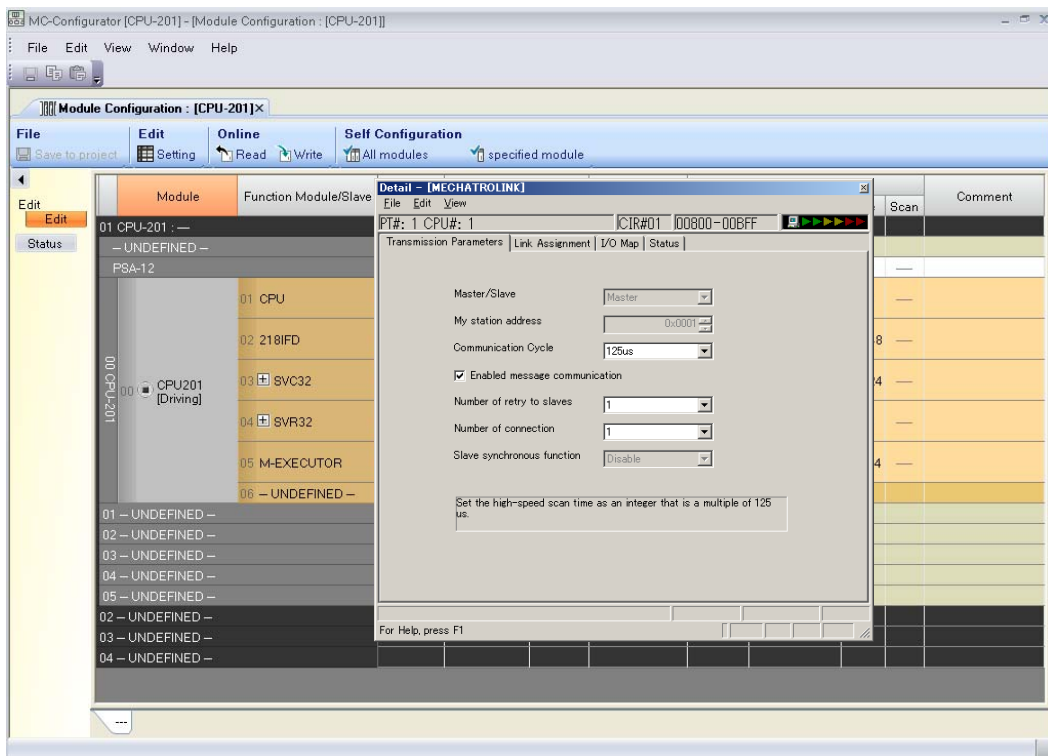


**5.** Set the MECHATROLINK communications definitions as required.
Refer to the following manual for details on settings.
📖 *MP3000 Series Motion Control User's Manual* (Manual No.: SIEP C880725 11)

**6.** Click the **Close** Button on the MECHATROLINK Communications Definition Dialog Box.

**7.** Select *View* − *Work Space* from the menu bar.
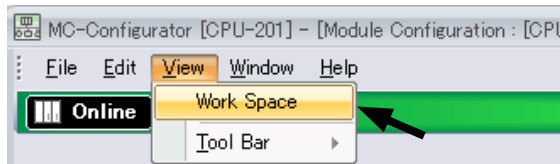


The Work Space Pane is displayed on the left side of the MC-Configurator Window.
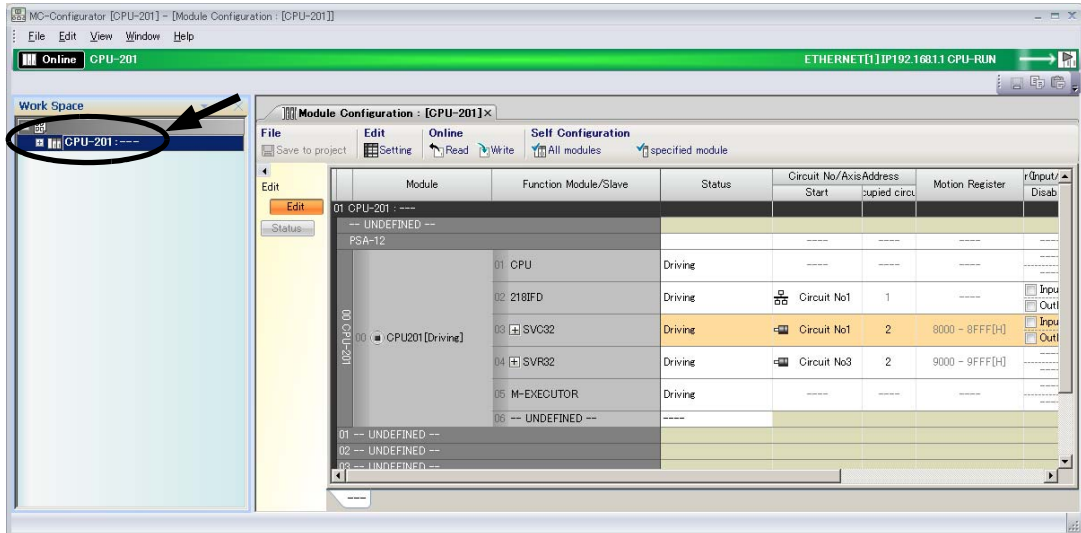


**8.** Click the **Expand [+]** Button beside each program in the Work Space Pane to display motion parameters as shown below.
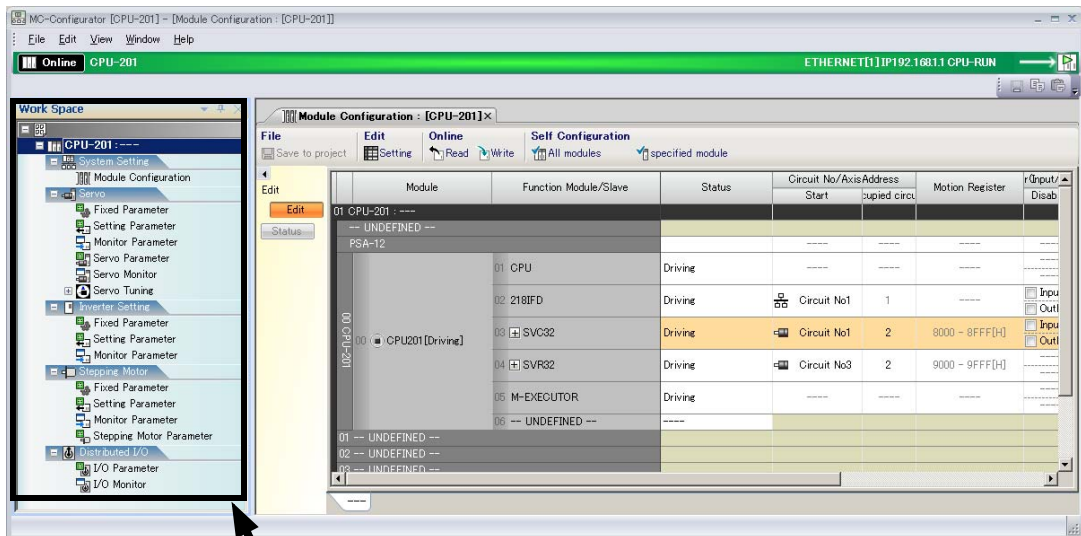
**9.** Double-click the motion parameter to set or monitor.
The Axis Display Selection Dialog Box ("Display in axis selected") will be displayed.
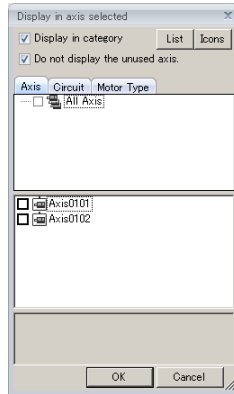


**10.** Select the axis to set or monitor, and then click the **OK** Button.
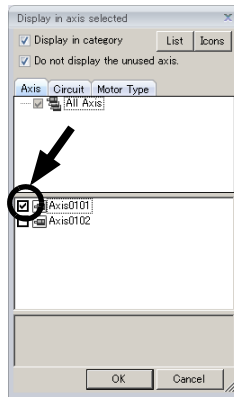


The SVC Definition Tab Page for the selected motion parameters will be displayed.

Information　To change which motion parameters are displayed, double-click the required motion parameters in the Work Space Pane.

The following examples show the SVC Definition Tab Page for each group of motion parameters.
• Fixed Parameters Tab Page

• Setting/Monitor Parameters Tab Page



• Servo/Servo Monitor Parameters Tab Page



**11.** Set the SVC definitions as required.

Refer to the following manual for details on settings.

📖 *MP3000 Series Motion Control User's Manual* (Manual No.: SIEP C880725 11)

# The M-EXECUTOR

This section describes the functionality of the M-EXECUTOR Motion Executor and the contents of its various displays.

---

**Terms**    The M-EXECUTOR is a software module that executes motion and sequence programs.

---

## Introduction

The M-EXECUTOR provides the following merits:

• Motion programs can be executed without using a ladder program.
Motion programs can be executed without placing MSEE instructions in the ladder programs.

> **Information**   It is still possible to use MSEE instructions in the ladder programs.

• Motion programs can be controlled without using the ladder programs.
Motion programs can be controlled directly from a host PLC.

• Sequence control can be written in motion language.
A sequence program can be used in place of a ladder program.
Refer to the following manuals for instructions that can be used in sequence programs.

  📖 *MP3000 Series Motion Programming Manual* (Manual No.: SIEP C880725 14)

> **Information**   The execution of a sequence program is completed in one scan.
> Sequence programs are written using the same text-based language as motion programs.

## Using the M-EXECUTOR



```
Set the M-EXECUTOR          ☞ Initializing the M-EXECUTOR (page 3-57)
(enable the M-EXECUTOR).

        ↓

Set the detailed settings for the    ☞ M-EXECUTOR Detail Settings (page 3-60)
M-EXECUTOR.

        ↓

Create motion programs.     📖 MP3000 Series Motion Programming Manual (Manual
                               No.: SIEP C880725 14)

        ↓

Register program execution.   ☞ Registering Program Execution (page 3-67)

        ↓

Programs are executed.
```
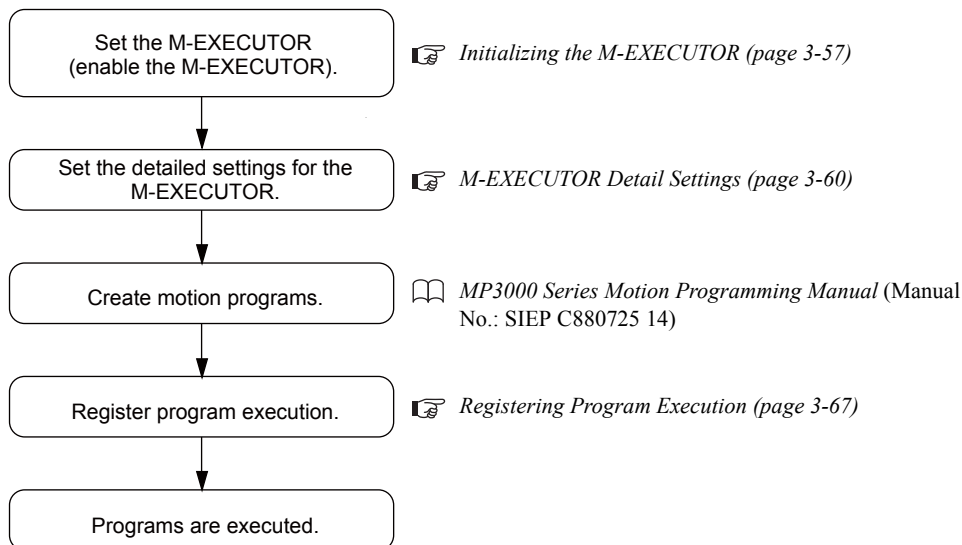
# Initializing the M-EXECUTOR

Use the following procedure to initialize the M-EXECUTOR.

**1.** Click the **Module Configuration** Icon on the Start Tab Page.
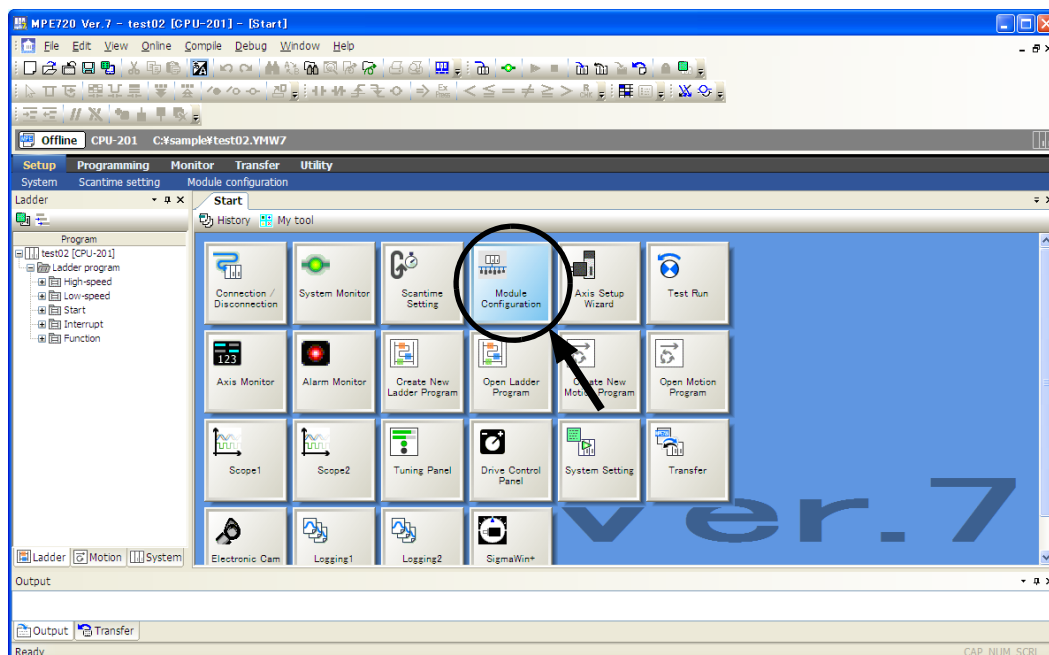


The Module Configuration Definition Tab Page will be displayed.
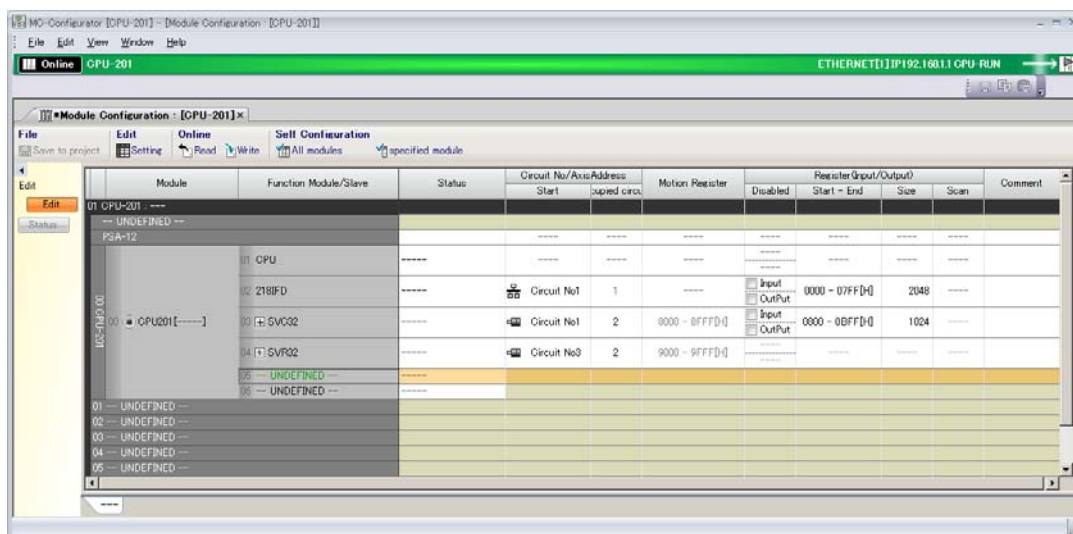
**2.** Double-click the **M-EXECUTOR** cell.
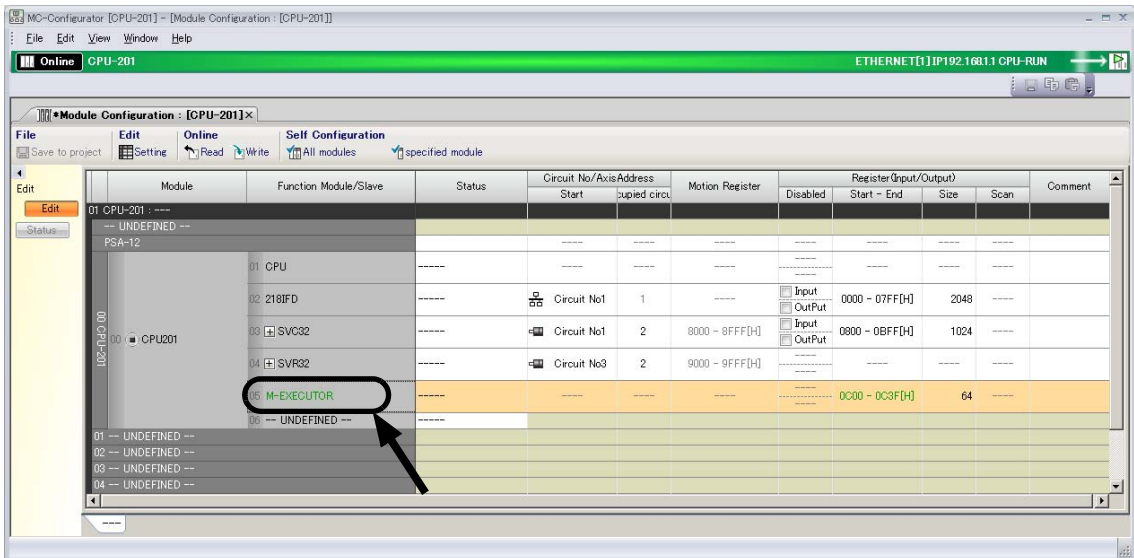


The M-EXECUTOR Definition Dialog Box will be displayed.
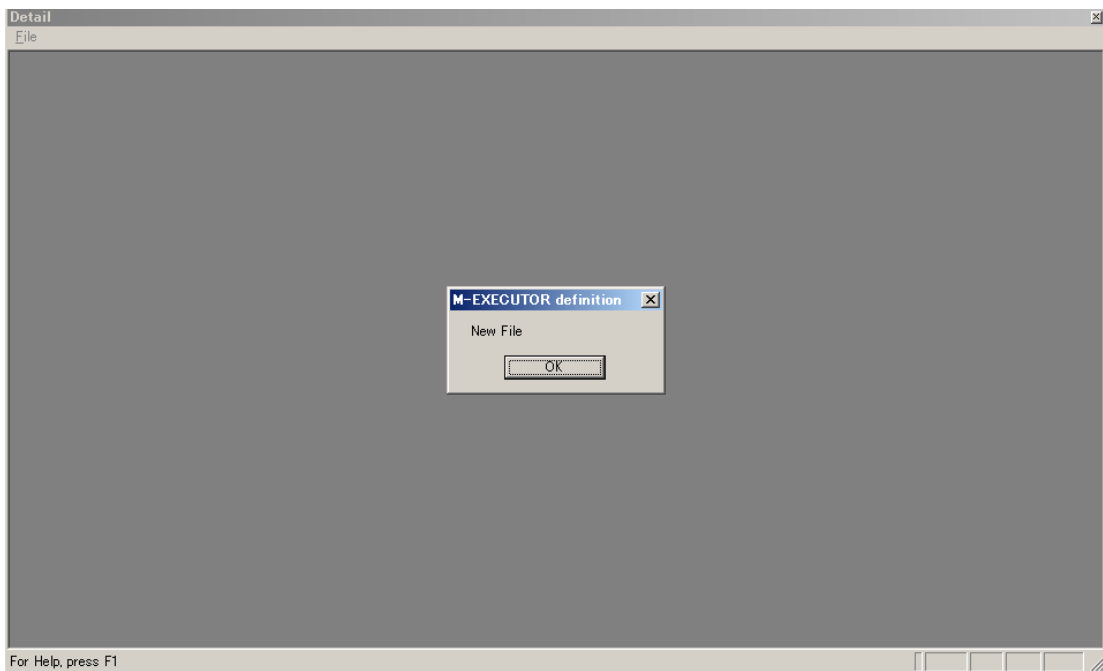
**3.** Click the **OK** Button.

The Detail Definition Dialog Box will be displayed.
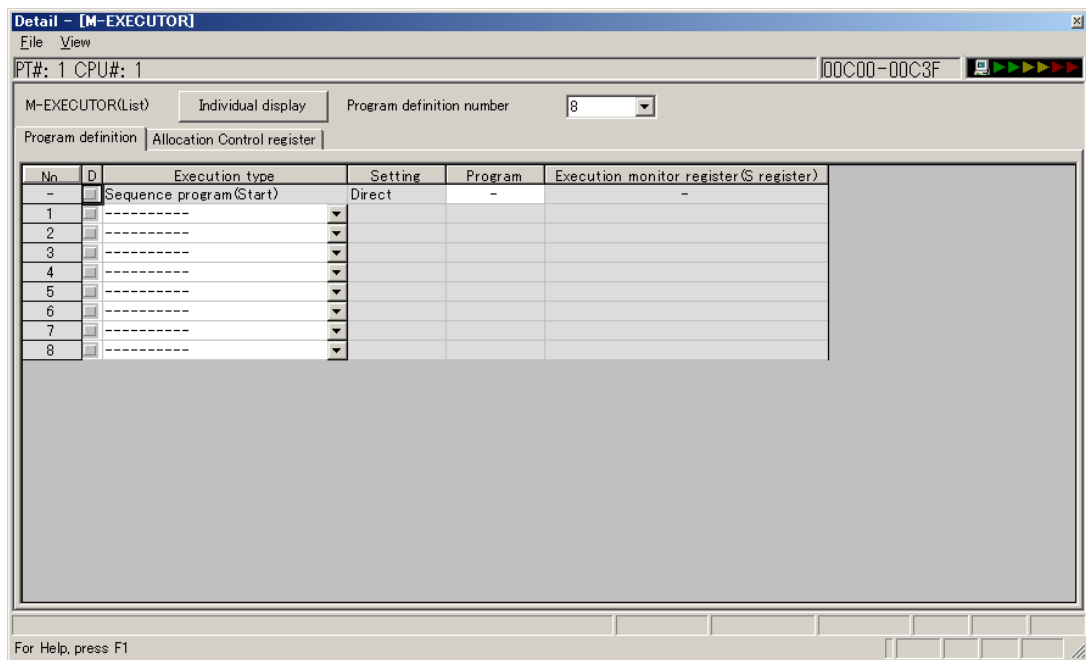


**4.** Select *File* – *Save* from the toolbar.

The M-EXECUTOR definitions will be saved.

# M-EXECUTOR Detail Settings

The detailed settings for the M-EXECUTOR are performed on the Module Configuration Tab Page and the Detail Definition Dialog Box.

This section provides the procedures to display this tab page and dialog box, and describes their contents.

## ◆ Module Configuration Definition Tab Page

Use the following procedure to display the Module Configuration Definition Tab Page.

• Click the **Module Configuration** Icon on the Start Tab Page.
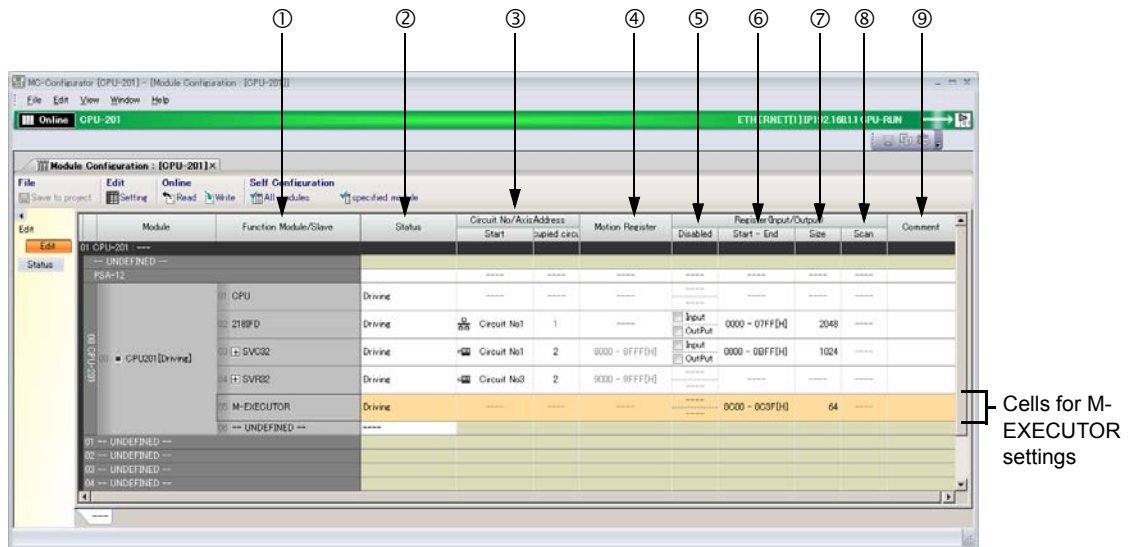
The following table describes the M-EXECUTOR items that are displayed on the Module Configuration Definition Tab Page.

| No. | Item | | Display/Setting Item | Editing |
|---|---|---|---|---|
| ① | Function Module/Slave | | Displays whether the M-EXECUTOR is enabled.<br>• UNDEFINED: Disabled<br>• M-EXECUTOR: Enabled | Possible |
| ② | Status | | Displays the status of the M-EXECUTOR. | Possible |
| ③ | Circuit No./Axis Address | Start | Not used.<br>"----" is always displayed. | Not possible |
| | | Occupied circuits | | |
| ④ | Motion Register | | Not used.<br>"----" is always displayed. | Not possible |
| ⑤ | Register (Input/ Output) | Disabled | Not used.<br>"----" is always displayed. | Not possible |
| ⑥ | | Start- End | Displays the range of registers that is used as the I/O area.<br>• Setting range: 00000 to 07FFF hex or 10000 to 17FFF hex<br>Refer to the following section for details.<br>☞ ◆ *Details on the I/O Registers (page 3-62)* | Possible |
| ⑦ | | Size | The size of the I/O area is displayed in words.<br>• Setting range: 64 to 128<br>Four words each of input registers and output registers are required to register a single motion program or sequence program in the M-EXECUTOR. If you need to register more than 16 programs, set the size with four additional words for each program to add. A maximum of 32 programs can be registered (maximum number of program definitions). | Possible |
| ⑧ | | Scan | Not used.<br>"----" is always displayed. | Not possible |
| ⑨ | Comment | | Display the user comment.<br>Enter a comment of up to 16 characters. | Possible |

◆ Details on the I/O Registers

The I/O registers that are assigned to the M-EXECUTOR are used to execute motion and sequence programs, as well as to monitor sequence programs.

The following tables give the contents of the M-EXECUTOR I/O registers.

| M-EXECUTOR Input Registers | | | M-EXECUTOR Output Registers | | |
|---|---|---|---|---|---|
| M-EXECUTOR Input Register | Item | | M-EXECUTOR Output Register | Item | |
| IW□□□□ + 0 | Definition No. 1 | Status | OW□□□□ + 0 | Definition No. 1 | Program Number |
| IW□□□□ + 1 | | Reserved. | OW□□□□ + 1 | | Control Signals |
| IW□□□□ + 2 | | Reserved. | OW□□□□ + 2 | | Override |
| IW□□□□ + 3 | | Reserved. | OW□□□□ + 3 | | Reserved. |
| IW□□□□ + 4 | Definition No. 2 | Status | OW□□□□ + 4 | Definition No. 2 | Program Number |
| IW□□□□ + 5 | | Reserved. | OW□□□□ + 5 | | Control Signals |
| IW□□□□ + 6 | | Reserved. | OW□□□□ + 6 | | Override |
| IW□□□□ + 7 | | Reserved. | OW□□□□ + 7 | | Reserved. |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| IW□□□□ + 3C | Definition No. 16 | Status | OW□□□□ + 3C | Definition No. 16 | Program Number |
| IW□□□□ + 3D | | Reserved. | OW□□□□ + 3D | | Control Signals |
| IW□□□□ + 3E | | Reserved. | OW□□□□ + 3E | | Override |
| IW□□□□ + 3F | | Reserved. | OW□□□□ + 3F | | Reserved. |
| IW□□□□ + 40 | Definition No. 17 | Status | OW□□□□ + 40 | Definition No. 17 | Program Number |
| IW□□□□ + 41 | | Reserved. | OW□□□□ + 41 | | Control Signals |
| IW□□□□ + 42 | | Reserved. | OW□□□□ + 42 | | Override |
| IW□□□□ + 43 | | Reserved. | OW□□□□ + 43 | | Reserved. |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| IW□□□□ + 7C | Definition No. 32 | Status | OW□□□□ + 7C | Definition No. 32 | Program Number |
| IW□□□□ + 7D | | Reserved. | OW□□□□ + 7D | | Control Signals |
| IW□□□□ + 7E | | Reserved. | OW□□□□ + 7E | | Override |
| IW□□□□ + 7F | | Reserved. | OW□□□□ + 7F | | Reserved. |

◆ Detail Definition Dialog Box

The Detail Definition Dialog Box has two tab pages, the Program Definition Tab Page and the Allocation Control Register Tab Page.

Use the following procedure to display the Detail Definition Dialog Box.

**1.** Click the **Module Configuration** Icon on the Start Tab Page.

**2.** Double-click the ⯮ Button in row 05 of the **Function Module/Slave** Column.

■ Program Definition Tab Page

Register the motion or sequence programs to execute.

This section describes the items that are displayed on the Program Definition Tab Page.
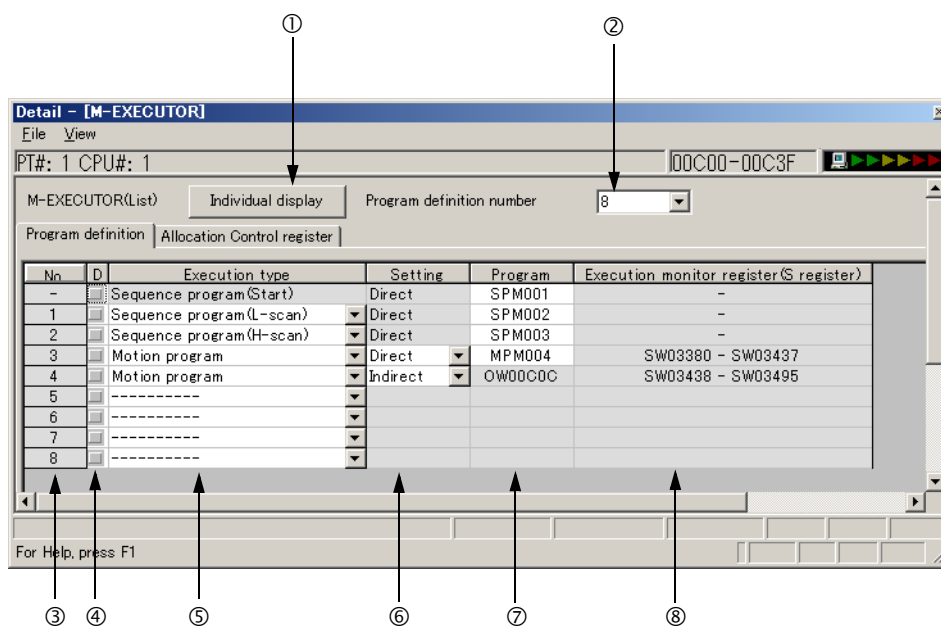


① Individual Display Button
Click this button to display the Program Execution Registration Dialog Box.

② Program Definition Number
Set the number of program definitions that can be registered in the M-EXECUTOR.
  • Setting range: 0 to 32
  • Default value: 8

③ No.
The execution order of the programs is displayed. Programs are executed in the scans in ascending order of their numbers.

④ D
Enable or disable the definitions.
  • Not selected: Definition is enabled.
  • Selected: Definition is disabled.

⑤ Execution Type
Set the execution type of the program.

| Execution Type | Executed Programs | Execution Condition |
|---|---|---|
| ---------- | Not supported. | – |
| Startup sequence program | | Startup (These programs are executed once when the power supply is turned ON.) |
| L-scan sequence program | Sequence programs | Started at a fixed interval. (These programs are executed once every low-speed scan cycle.) |
| H-scan sequence program | | Started at a fixed interval. (These programs are executed once every high-speed scan cycle.) |
| Motion program | Motion programs | Request for Start of Program Operation control signal (The program is executed when the Request for Start of Program Operation is turned ON.) |

⑥ Setting

Set the program designation method.

The designation method can be different for each program.

| Designation Method | Motion Programs | Sequence Programs | Description |
|---|---|---|---|
| Direct designation | Possible | Possible | The program is specified with the program number. Examples: MPM001 or SPM002 |
| Indirect designation | Possible | Not possible | The program is specified by specifying a register that contains the program number. Example: OW0C0C (If 1 is stored in OW0C0C, MPM001 will be called.) |

⑦ Program

Set the program number.

| Execution Type | Description |
|---|---|
| Sequence programs (Startup, L-scan, or H-scan) | If you enter *1* and press the **Enter** Key, SPM001 will be set automatically. You can specify a program that is not registered or leave the program number empty. In either case, no program will be executed. |
| Motion programs | Direct designation: If you enter *1* and press the **Enter** Key, MPM001 will be set automatically. You can specify a program that is not registered or leave the program number empty. In either case, no program will be executed.<br><br>Indirect designation: The O register of the M-EXECUTOR Module will be set automatically. Only the system can set this. |

⑧ Execution Monitor Registers (S Registers)

If the execution type is set to a motion program, the range of the execution monitor registers (S registers) will be displayed. Refer to the following section for details on the execution monitor registers.

☞ *4.3 CPU Unit Specifications* – ◆ *Motion Program Execution Information (page 4-32)*

### ■ Allocation Control Register Tab Page

This tab page is used to assign registers.

This section describes the items that are displayed on the Allocation Control Register Tab Page.
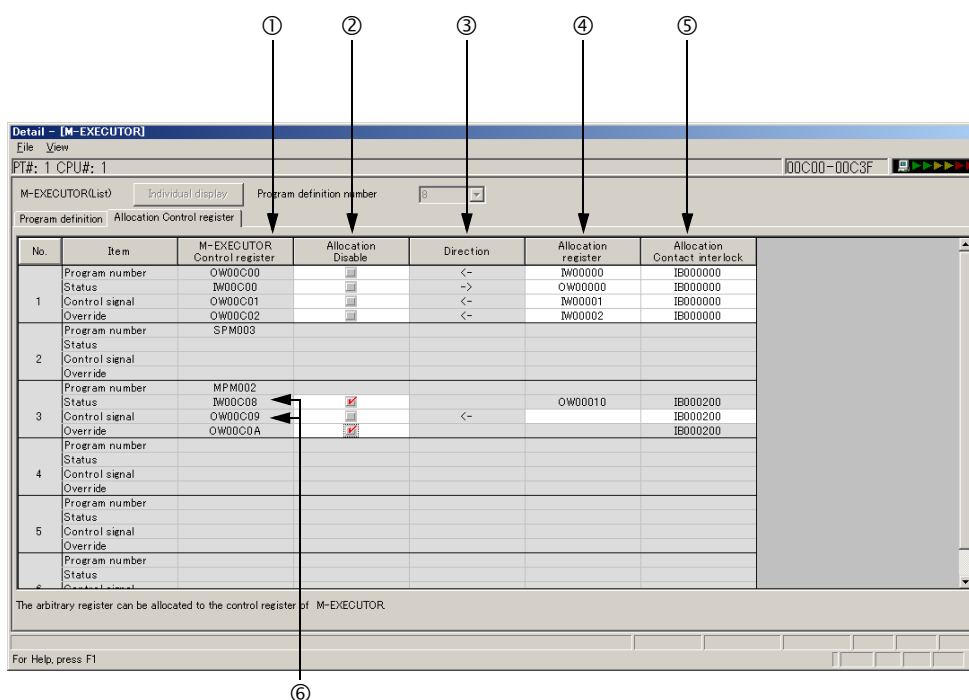


### ① M-EXECUTOR Control Registers

This column displays the I/O registers that are assigned to the M-EXECUTOR.

The M-EXECUTOR control registers are used to control or monitor the motion programs.

| M-EXECUTOR Control Register | Application |
|---|---|
| Program Number | Sets the program number.<br>This register is only used for indirect designation. |
| Status | Monitors the program execution status. |
| Control Signals | Controls the program. |
| Override | Sets the override value to use when executing interpolation motion instructions. |

### ② Allocation Disable

Use these check boxes to enable or disable the assigned registers.

• Not selected: Definition is enabled.

• Selected: Definition is disabled.

### ③ Direction

This column displays the data I/O directions.

### ④ Allocation Register

Data is copied between the assigned registers and the M-EXECUTOR control registers according to the arrow in the **Direction** Column (③). You can assign any registers.

> Information: You can set word-type I, O, or M registers (except motion registers) in the **Allocation register** Column.

⑤ Allocation Contact Interlock

This contact controls copying data between the assigned registers and the M-EXECUTOR control registers. When the assigned interlock contact is ON, the data in the assigned registers and the M-EXECUTOR control registers is copied in the direction that is given by the arrow in the **Direction** Column (③).
Any register bit number can be assigned as the interlock contact.

> Information   You can set bit-type I, O, S, M, or C registers (except motion registers) in the **Allocation Contact interlock** Column.

> Note   The assigned interlock contact is used to interlock motion program operation.
> If you assign a register, always assign an assigned interlock contact.

⑥ Status and Control Signal Details

Double-click the **Status** or the **Control signal** cell to display the Detail Dialog Box.
This dialog box is used to verify the status and the control signals.

• Status

| Detail | | | |
|---|---|---|---|
| Program execution registration No.1 | | | |
| Control signal | Status | | |
| | M-Executor Control register | Allocation register | Status |
| Program is running | IB00C000 | OB000000 | ○ : ON  ● : OFF |
| Program is pausing | IB00C001 | OB000001 | ○ : ON  ● : OFF |
| Program stopped with program stop | IB00C002 | OB000002 | ○ : ON  ● : OFF |
| Program stopped under single block | IB00C004 | OB000004 | ○ : ON  ● : OFF |
| Program alarm has been generated | IB00C008 | OB000008 | ○ : ON  ● : OFF |
| Stopped at break point | IB00C009 | OB000009 | ○ : ON  ● : OFF |
| Debugging mode(EWS debugging) | IB00C00B | OB00000B | ○ : ON  ● : OFF |
| Start request signal history | IB00C00D | OB00000D | ● : ON  ○ : OFF |
| "No system work" error | IB00C00E | OB00000E | ○ : ON  ● : OFF |
| Main program number limit error | IB00C00F | OB00000F | ○ : ON  ● : OFF |
| | | OK | |

• Control Signals

| Detail | | | |
|---|---|---|---|
| Program execution registration No.1 | | | |
| Control signal | Status | | |
| | M-Executor Control register | Allocation register | Status |
| Program start request | OB00C010 | IB000010 | ○ : ON  ● : OFF |
| Program pause request | OB00C011 | IB000011 | ○ : ON  ● : OFF |
| Program stop request | OB00C012 | IB000012 | ○ : ON  ● : OFF |
| Program single block mode selection | OB00C013 | IB000013 | ○ : ON  ● : OFF |
| Program single block start request | OB00C014 | IB000014 | ○ : ON  ● : OFF |
| Alarm reset request | OB00C015 | IB000015 | ○ : ON  ● : OFF |
| Program continuous operation start | OB00C016 | IB000016 | ○ : ON  ● : OFF |
| Skip1 information | OB00C018 | IB000018 | ○ : ON  ● : OFF |
| Skip2 information | OB00C019 | IB000019 | ○ : ON  ● : OFF |
| System work number setting | OB00C01D | IB00001D | ○ : ON  ● : OFF |
| Interpolation override setting | OB00C01E | IB00001E | ○ : ON  ● : OFF |
| | | OK | |

# Creating Motion Programs

Refer to the following manual for details.

📖 *MP3000 Series Motion Programming Manual* (Manual No.: SIEP C880725 14)

# Registering Program Execution

This section gives the procedure to register the execution of programs.

**1.** Display the program to register for execution.

**2.** Click the **Task Allocation** ( ) Icon.

The Task Allocation Dialog Box will be displayed.
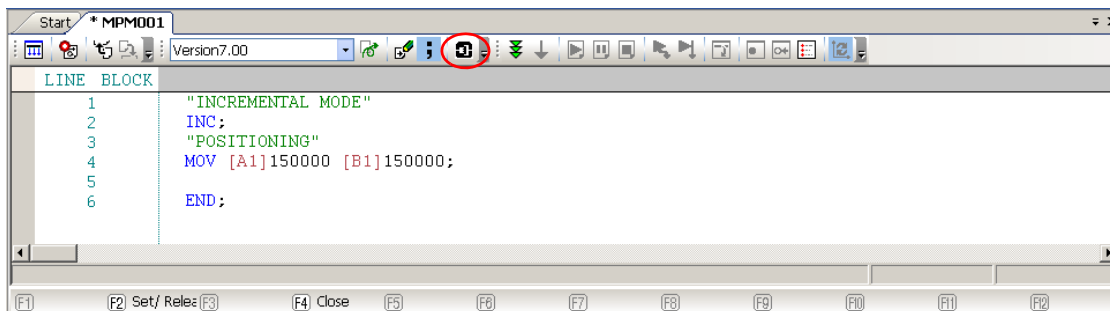
> **Information** You can also use the Task Allocation Dialog Box to change the settings. Refer to the following manual for details.
>
> 📖 *MP3000 Series Motion Programming Manual* (Manual No.: SIEP C880725 14)

**3.** Check that the settings match the contents of the Allocation Control Register Tab Page, and then click the **Set** Button.

The registered contents will be saved.
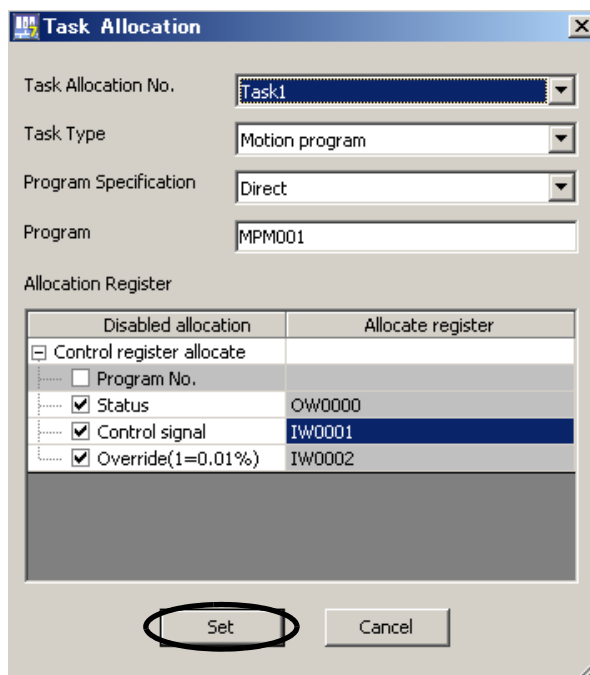
Refer to the following section for details on the Allocation Control Register Tab Page.

☞ ■*Allocation Control Register Tab Page (page 3-65)*

## Execution Scheduling

Programs that are registered in the M-EXECUTOR are executed in the order of their priority levels (execution types).

Programs that are registered in the M-EXECUTOR are executed immediately before processing the ladder programs.

```
                        ┌─────────────────┐
                        │  Power turned   │
                        │      ON.        │
                        └─────────────────┘
                                 │
                        ┌─────────────────────────┐
                        │ Startup sequence program│
                        └─────────────────────────┘
                                 │
                        ┌─────────────────┐
                        │     DWG.A       │
                        │(startup drawings)│
                        └─────────────────┘
                                 │
  ┌──────────────────────────────────────────────────────────────────────┐
  │                                                                        │
  │   Every high-speed scan               Every low-speed scan            │
  │          │                                    │                        │
  │   ┌──────────────┐                   ┌──────────────┐                  │
  │   │ Batch outputs│                   │ Batch outputs│                  │
  │   └──────────────┘                   └──────────────┘                  │
  │          │                                    │                        │
  │   ┌──────────────┐                   ┌──────────────┐                  │
  │   │ Batch inputs │                   │ Batch inputs │                  │
  │   └──────────────┘                   └──────────────┘                  │
  │          │                                    │                        │
  │   ┌────────────────────────┐         ┌────────────────────────┐        │
  │   │ H-scan sequence programs│        │ L-scan sequence programs│       │
  │   │ Motion programs        │         └────────────────────────┘        │
  │   └────────────────────────┘              │ The execution order        │
  │          │ The execution order            │ follows the definitions    │
  │          │ follows the definitions        │ in the M-EXECUTOR.         │
  │          │ in the M-EXECUTOR.             │                            │
  │   ┌──────────────┐                   ┌──────────────┐                  │
  │   │   DWG.H      │                   │   DWG.L      │                  │
  │   │(high-speed scan│                 │(low-speed scan│                 │
  │   │process drawings)│                │process drawings)│               │
  │   └──────────────┘                   └──────────────┘                  │
  │          │                                    │                        │
  │      ─────────                          ─────────                      │
  └──────────────────────────────────────────────────────────────────────┘
```

The following is an execution example.

• M-EXECUTOR Program Execution Definitions

Example    Sequence Program Execution Example
The following figure shows an example of the sequence programs registered in the M-EXECUTOR.
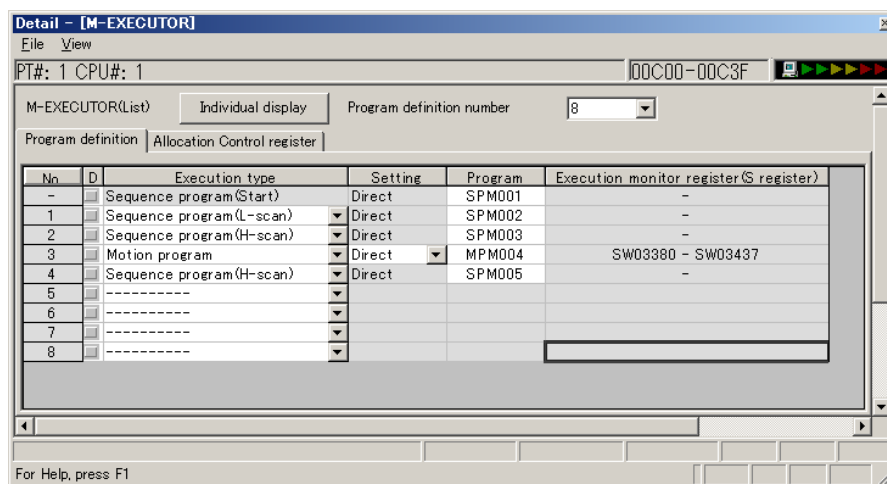


■ Execution Timing

This section describes the execution timing of programs in the above example.
The following figure shows program and drawing execution that is based on the order of registration in the M-EXECUTOR program definitions.
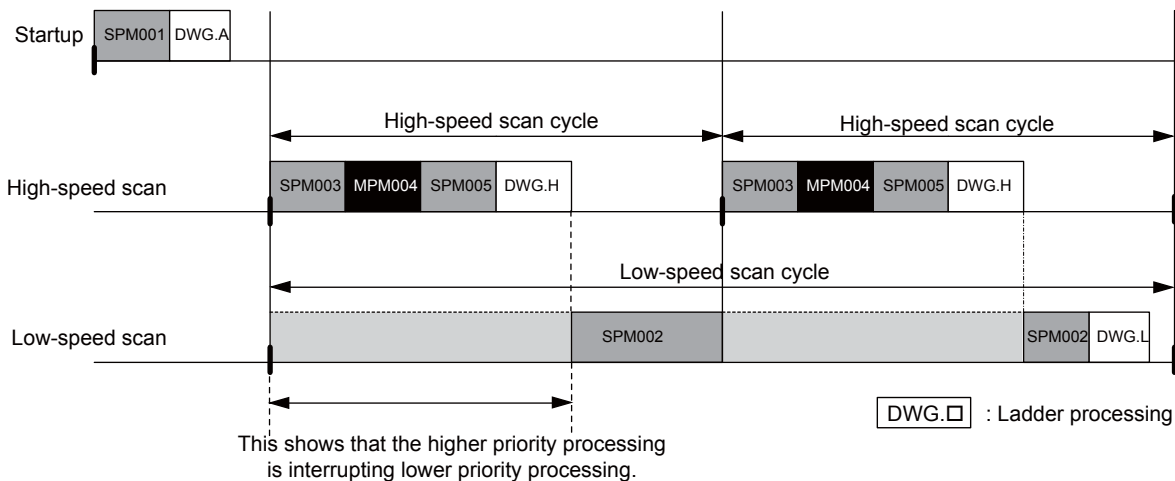
# Data Logging

Data logging saves the values of specified registers in a log file according to the preset trigger timing and conditions.

The data is stored in the RAM in the CPU Unit or on the USB memory device.

| Data Storage Location | Merits | Demerits |
|---|---|---|
| RAM in CPU Unit | The file writing speed is fast and the overhead that is placed on the scan is low. | • Data is lost when the power supply to the CPU Unit is turned OFF.<br>• Storage capacity is limited to 8 MB. |
| USB memory | • Data can be stored for a long time.<br>• Logged data can be viewed easily by inserting the USB memory device into a PC. | The file writing speed is slow and the overhead that is placed on the scan is high. |

## Operating Procedure

This section describes how to perform data logging.

**1.** Connect the Machine Controller to the PC, and start the MPE720.

Refer to the following manual for details.

 📖 *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

**2.** Select *View* – *System* from the menu bar.

The System Pane will be displayed on the left side of the window.

**3.** Click the **Expand [+]** Button next to the **Logging** item to display the log files in the System Pane and double-click **Logging1**.
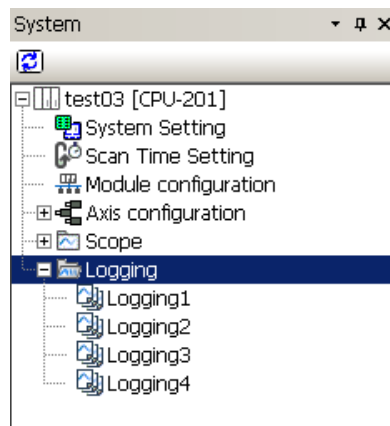
The Logging 1 Dialog Box will be displayed.
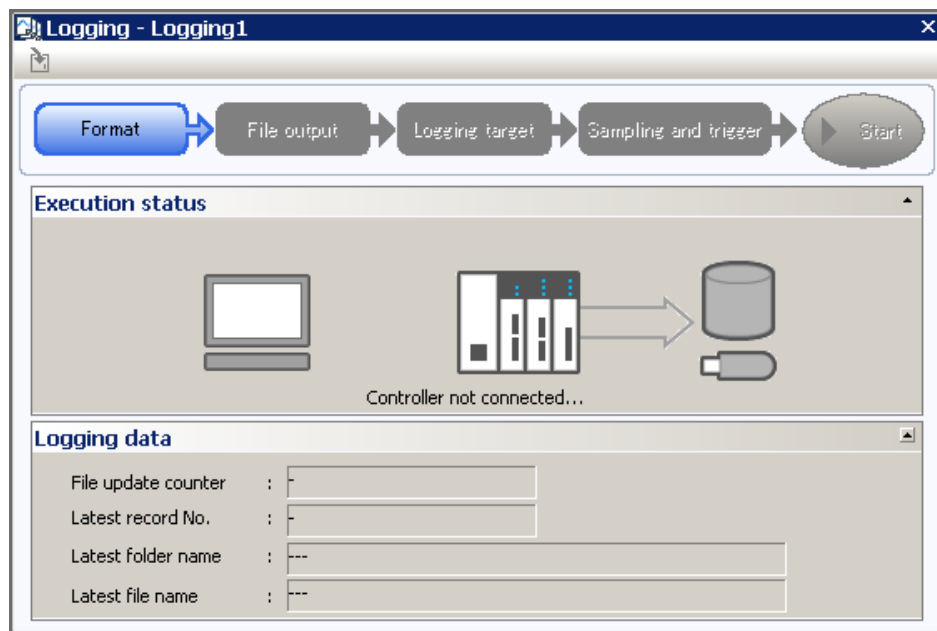


4. Click the **Format** Button.

The Format Dialog Box will be displayed.

5. Set the format.
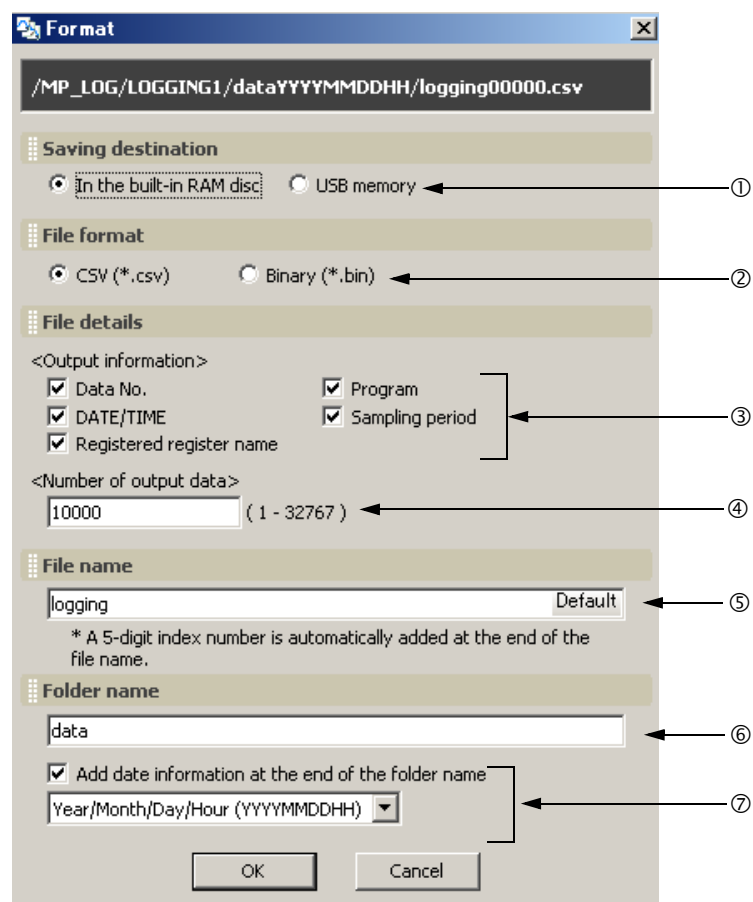
①Select the storage location.

| Setting | Description |
|---------|-------------|
| In the built-in RAM disk | Writes the sampled data to the built-in RAM disk in the CPU Unit. |
| USB memory | Writes the sampled data to the USB memory device in the CPU Unit. |

②Select the file format.

| Setting | Description |
|---------|-------------|
| 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 and with less overhead on the scan. |

③Select the file information to output.

The selected items are appended to the header information in the output file.

| Setting | Description |
|---------|-------------|
| Data No. | The number that is assigned to the sampled data |
| DATE/TIME | The date and time down to the seconds when the data was sampled Make sure to set the calendar in advance. Refer to the following section for details. ☞ *Calendar (page 3-93)* |
| Registered register name | Name of the register |
| Programs | Program name |
| Sampling period | The frequency at which data was sampled Set this in the Sampling and Trigger Dialog Box that is explained later in this section. |

④Enter the number of data items to output.

Enter the number of lines to write to a single file.

• Setting range: 1 to 32,767

⑤Set the file name.

• Characters allowed: Alphabet A to Z and a to z, numerals 0 to 9, the minus sign, and the underscore.

• Maximum string length: 32 characters

> Information
> 1. A five-digit index number that starts from 00001 is automatically added to the end of the specified file name.
> 2. Click the **Default** Button to enter "logging".

⑥Set the name of the folder to create.

• Characters allowed: Alphabet A to Z and a to z, numerals 0 to 9, the minus sign, and the underscore.

• Maximum string length: 32 characters[*]

* If you select **Year/Month/Day/Hour (YYYYMMDDHH)** in step ⑦, the maximum string length will be 31.

> Information
> 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.

⑦Select whether to add date information to the folder name.
- To omit date information, clear the selection of the check box.
- To add date information, select the check box and select the date format from the list.

| Setting | Description |
|---------|-------------|
| Year (YYYY) | Adds the year to the specified folder name.<br>Example: □□□2011 |
| Year/Month (YYYYMM) | Adds the year and month to the specified folder name.<br>Example: □□□201109 |
| Year/Month/Day (YYYYMMDD) | Adds the year, month, and day to the specified folder name.<br>Example: □□□20110920 |
| Year/Month/Day/Hour (YYYYMMDDHH) | Adds the year, month, and day to the specified folder name and creates another folder directly below it named with the hour.<br>Example: □□□20110920<br>└ 12 The sampled data is stored in this folder. |

Information  Click the **Cancel** Button to return to the Logging 1 Dialog Box without registering the settings.

**6.** Click the **OK** Button.
The Format Dialog Box closes.

**7.** Click the **File output** Button in the Logging 1 Dialog Box.
The File Output Dialog Box will be displayed.

**8.** Set the file output settings.
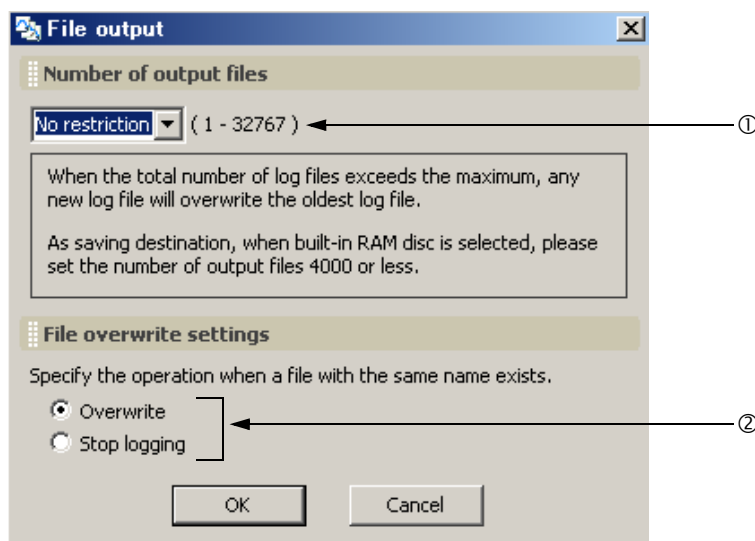


①Set the number of output files.[*1]
- Settings: No restriction[*2], 1, 10, 50, 100, 500, or 1,000

*1. This is the total number of files that are created from when the power supply is turned ON to when it is turned OFF.
*2. If the built-in RAM disk is the storage location, the upper limit is 4,000 files.
If the USB memory device is the storage location, the upper limit is 10,000 files.

②Set the file overwrite settings.

| Setting | Description |
|---|---|
| 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. |

> **Information**   Click the **Cancel** Button to return to the Logging 1 Dialog Box without registering the settings.

9. Click the **OK** Button.
   The File Output Dialog Box closes.

10. Click the **Logging target** Button in the Logging 1 Dialog Box.
    The Logging Target Dialog Box will be displayed.

11. Add the registers to log.



| No. | Item | Description |
|---|---|---|
| ① | Logging Target List | Displays a list of the registers that can be selected for logging.<br>• Right-click in the Logging Target List to display the pop-up menu to select or deselect registers.<br>**Add to Trace** adds the selected register to the Trace Target List.<br>**Clear** deselects multiple registers that were selected by using the **Shift** or the **Ctrl** Keys.<br>**Select All** selects all registers shown on the tab page. |
| ② | **Add** Button | Adds the selected register to the list of registers to be logged. |

| No. | Item | Description |
|-----|------|-------------|
| ③ | **Delete** Button | Removes the selected registers from the list of registers to be logged. |
| ④ | Logging Target | Displays a list of the registers that will be logged. Registers can be added to this list either by selecting them from the Logging Target List or by entering them directly.<br>• Right-click in the Logging Target Area to display a pop-up menu to edit the registers to be logged.<br>    ***Insert Row*** inserts a blank row.<br>    ***Delete Row*** deletes a row. If a logging target was added, then it will be deleted. |

Information      The following register types can be logged.
• S, M, G, I, O, and D registers

Information      Refer to the following table for the data size for each data type.

| Data Type | Data Size |
|-----------|-----------|
| B: bit | 1 word |
| W: integer | 1 word |
| L: double-length integer | 2 words |
| Q: quadruple-length integer | 4 words |
| F: single-precision real number | 2 words |
| F: double-precision real number | 4 words |

Information      Click the **Cancel** Button to return to the Logging 1 Dialog Box without registering the settings.

**12.** Click the **OK** Button.

The Logging Target Dialog Box closes.

**13.** Click the **Sampling and trigger** Button in the Logging 1 Dialog Box.

The Sampling and Trigger Dialog Box will be displayed.

CPU Unit Functionality

3

**14.** Set the sampling and trigger settings.
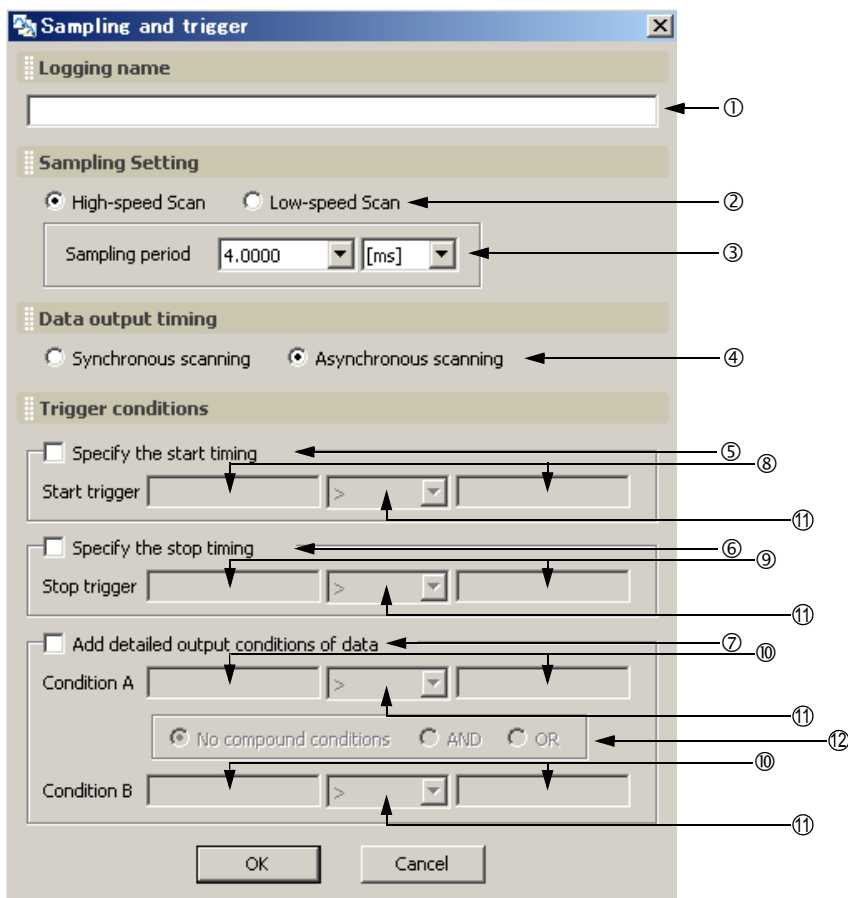


①Set the logging name.

• Maximum name length: 32 characters

②Set the data sampling rate.

| Setting | Description |
|---|---|
| High-speed scan | Samples data synchronized with the high-speed scan. Data is sampled immediately after completing execution of the DWG.H ladder program. |
| Low-speed scan | Samples data synchronized with the low-speed scan. Data is sampled immediately after completing execution of the DWG.L ladder program. |

③Set the data sampling period.
Specify the value and unit to control whether data is sampled every scan or once in more than one scan. To sample data every scan, specify the same value as the scan set value.

④Specify whether data is to be logged synchronized or asynchronized with the scan.

| Setting | Description | Merits | Demerits |
|---|---|---|---|
| Synchronous scanning | Data is written to the log synchronized with the scan | No data is lost. | This creates an overhead on the scan and can cause Watchdog Errors (E.001), or cause the CPU Unit to go down. |
| Asynchronous Scanning | Data is written to the log asynchronously with the scan. | There is no overhead on the scan. | If the scan setting is set to a fast rate or if the idle time of the scan is low, logging can fall behind or data can be missed if there are too many data points to sample. |

Refer to the following section for guidelines on scan settings.

⑤ to ⑫ Set the logging conditions using items ⑤ to ⑫.

| No. | Item | Description |
|---|---|---|
| ⑤ | Specify the start timing | If the check box is selected, register operation will control when logging starts. If conditions are set in items ⑧ and ⑪, logging will start when these conditions are met.<br>If the check box is cleared, logging will start according to manual operation of the button displayed by the MPE720. |
| ⑥ | Specify the stop timing | If the check box is selected, register operation will control when logging stops. If conditions are set in items ⑨ and ⑪, logging will stop when these conditions are met.<br>If the check box is cleared, logging will stop according to manual operation of the button displayed by the MPE720. |
| ⑦ | Add detailed output conditions of data | • If no detailed output conditions are specified: Clear the check box.<br>• If detailed output conditions are specified: Select the check box and specify the conditions for items ⑩, ⑪, and ⑫. Logging will start when these conditions are met. Even if logging stops when the output conditions are no longer met, it will start when the conditions are met again. |
| ⑧ | Start condition | Specify any S, M, G, I, or O register, and numeric value.<br>The start condition is when the rising edge is detected (when the register changes from OFF to ON). |
| ⑨ | Stop condition | The stop condition is detected by the state of the register. (If the register is ON, the condition is always detected.) |
| ⑩ | Condition A and Condition B | Specify any S, M, G, I, or O register and numeric value.<br>If a condition is entered for both condition A and condition B, specify the condition at (⑫). |
| ⑪ | Condition | Select one of the following operators.<br><br>{OPERATOR_TABLE} |
| ⑫ | Compound condition | If a condition is entered for both condition A and condition B, specify one of the following conditions.<br><br>{COMPOUND_TABLE} |

Operator table (item ⑪):

| Setting | Description |
|---|---|
| > | Condition is met when the left register value is greater than the right register value. |
| < | Condition is met when the left register value is less than the right register value. |
| = | Condition is met when the left register value is equal to the right register value. |
| < > | Condition is met when the left register value is not equal to the right register value. |
| >= | Condition is met when the left register value is greater than or equal to the right register value. |
| <= | Condition is met when the left register value is less than or equal to the right register value. |

Compound condition table (item ⑫):

| Setting | Description |
|---|---|
| No compound condition | The compound condition is met when Condition A is met. Condition B will be ignored, even if it is specified. |
| AND | The compound condition is met when both condition A and condition B are met. |
| OR | The compound condition is met when either condition A or condition B is met. |

Example    To automatically start logging when the power supply is turned ON, set the Start Trigger to the following condition.
- When the saving destination is set to USB memory:
  Setting example: Start trigger SB006540 = ON
  Note: The SB006540 register turns ON when a USB memory device is detected.
- 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 during the first scan of the high-speed scan.
        The SB000003 register turns ON during the first scan of the 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 >= Upper limit, Condition B <= Lower limit, Compound condition = OR
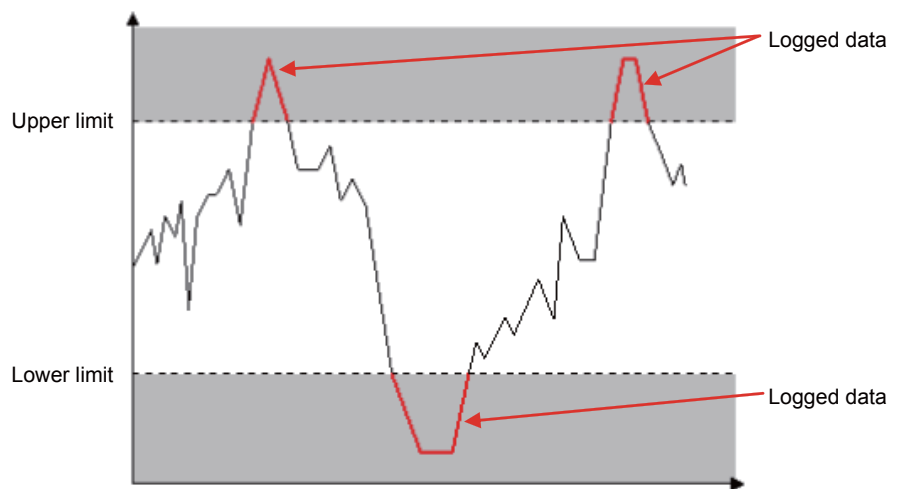


Information    Click the **Cancel** Button to return to the Logging 1 Dialog Box without registering the settings.

**15.** Click the **OK** Button.
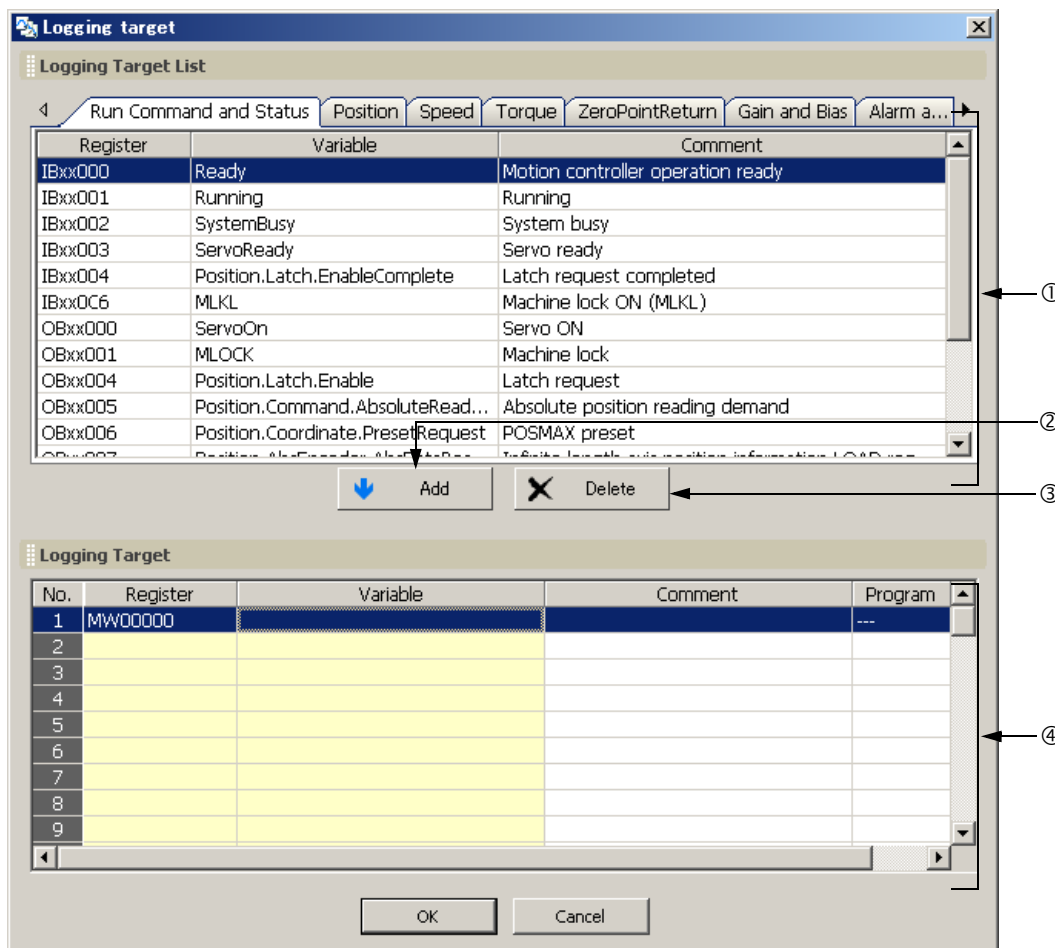
The Sampling and Trigger Dialog Box closed.

**16.** Click the **Start** Button in the Logging 1 Dialog Box.

Logging starts. While logging is in progress, the following items are displayed in the Logging 1 Dialog Box.

• File update counter
• Latest record number
• Latest folder name
• Latest file name
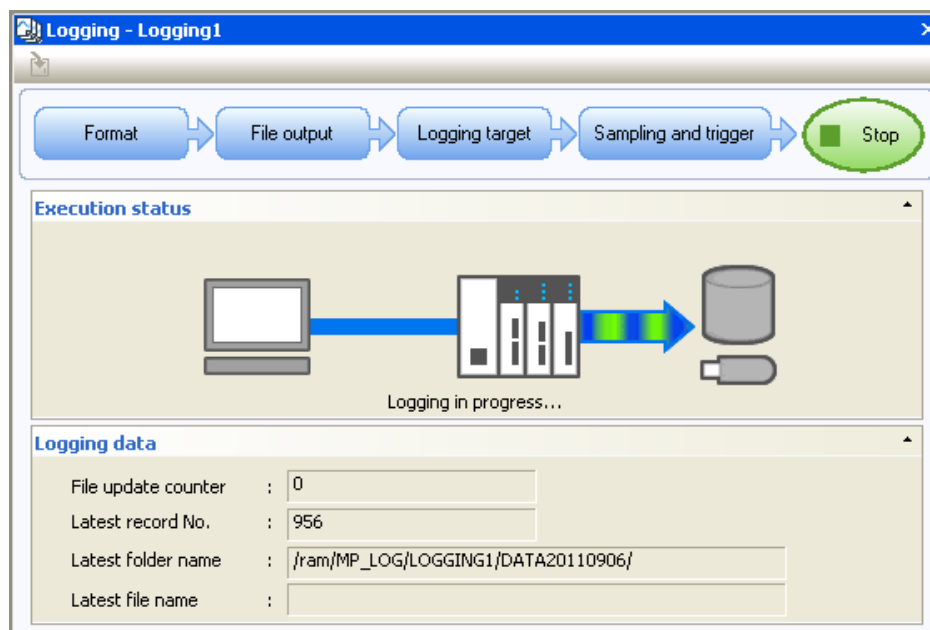


**17.** Click the **Stop** Button in the Logging 1 Dialog Box.

Logging will stop.

The following table gives the range of each data and the timing at which logging is reset.

| Data Name | Range | | Reset Timing |
|---|---|---|---|
| File Name | When the saving destination is set to USB memory | logging00001 to logging10000 | The file name resets to logging00001 when the power supply is turned ON. If a file already exists in memory, it will be overwritten. |
| | When the saving destination is set to built-in RAM disk | logging00001 to logging4000 | |
| Latest record number | 0 to 18,446,744,073,709,551,615 | | The latest record number is reset to 0 when logging starts after a stop. |

# Scan Setting Guidelines

This section describes guidelines for the scan settings based on when data is logged.

## ◆ If Logging Is Synchronous with the Scan

The general logging overhead is given below. Set the scan setting to a value that is larger than this value.

| Data Items | | 1 to 8 | 9 to 60 | 61 to 64 |
|---|---|---|---|---|
| Storage Location | In the built-in RAM disk | 1.0 ms | 1.5 ms | 2.0 ms |
| | USB memory | Due to the large overhead, USB memory cannot be used to log synchronously with the scan. | | |

Note: These overhead values are for word data without an application. Set the scan setting according to the application usage conditions (number of registers to log, register types, ladder programs, etc.).

This timing chart illustrates the logging process when performed synchronously with the scan.
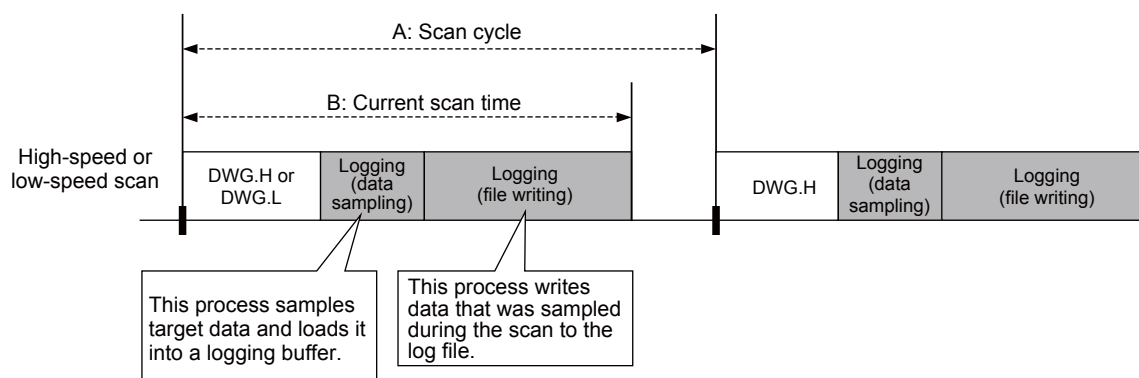


The logging processes for sampling the data and writing it to a file are performed within the scan cycle. Therefore, the scan cycle (time period A in the figure on the previous page), must be set to a value greater than the current scan time (time period B in the figure on the previous page).

If the scan cycle is shorter than the current scan time, a Scan Time Over Limit error will occur and the count of SW00044 (High-speed Scan Over Limit Counter) or SW00046 (Low-speed Scan Over Limit Counter) will be incremented. This can also cause a Watchdog Error (E.001) or cause the CPU Unit to go down.

Set the scan time so that it is long enough to log the number of registered data items.

## ◆ If Logging Is Asynchronous with the Scan

The scan setting for logging asynchronously with the scan should be set as given below.

| Storage Location | Scan Setting Guidelines |
|---|---|
| In the built-in RAM disk | 0.250 ms or longer |
| USB memory | 0.500 ms or longer |

Note: These values are for word data without an application. Set the scan setting according to the application usage conditions (number of registers to log, register types, ladder programs, etc.).

This timing chart illustrates the logging process when performed asynchronously with the scan.
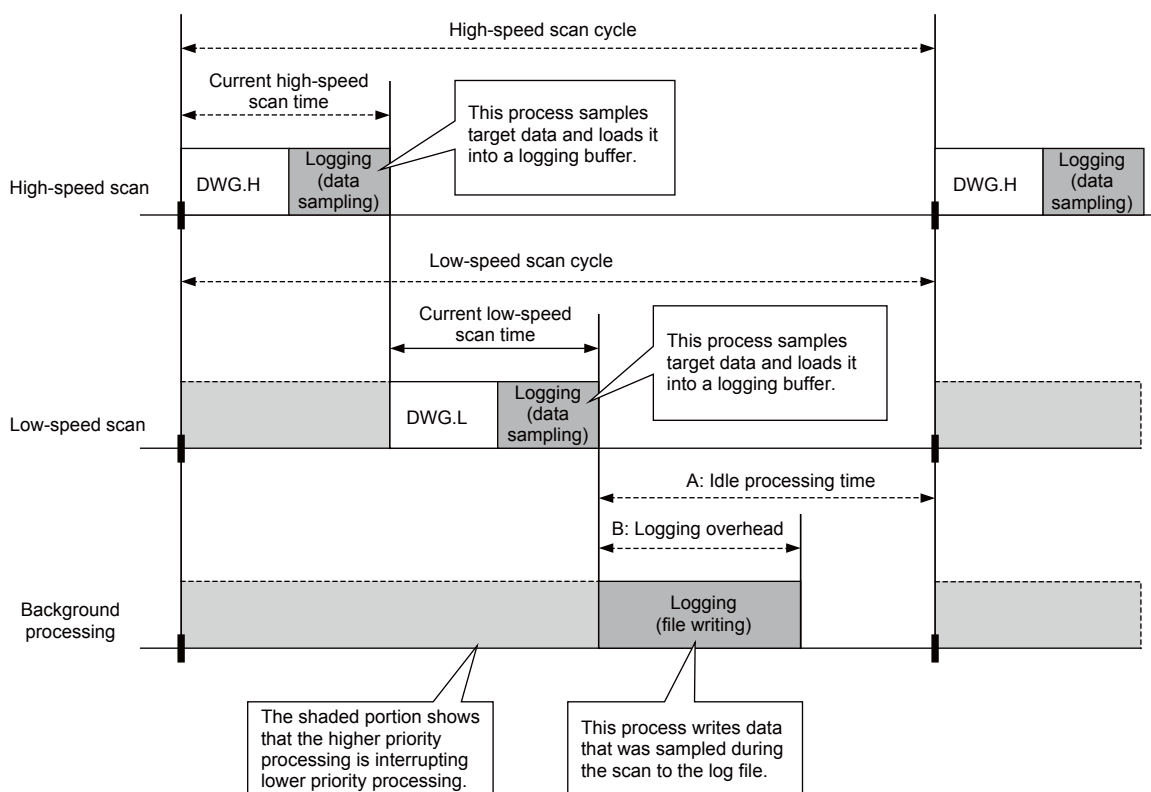
The logging process for sampling the data is performed within the scan, while the process of writing the data to a file is performed in background processing.

The background process is performed during the idle processing time of the scan. Therefore, the idle processing time (time period A in the above figure) must be longer than the logging overhead (time period B in the above figure).

If the logging overhead time is longer than the idle processing time of the scan, the file writing process can run into the next scan and cause an over limit error. The number of over limit errors can be checked in the over limit counter (SW24008).

## Monitoring the Logging Execution Status

You can monitor the execution status of data logging by checking the system registers. Refer to the following section for details.

## Viewing the Log Data

To view the log data in a PC, the data that is stored in the RAM in the CPU Unit or USB memory device must be transferred to the PC. Refer to the following section for details on data transfers.

CPU Unit Functionality

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# Analyzing Log Data

This section describes how the log data is formatted when viewed on a PC.

## ◆ CSV File Format

This example shows how log data that is stored in the CSV format appears when it is opened in Microsoft Excel.



- Header Details

| No. | Item | Description | Corresponding Item in MPE720 |
|---|---|---|---|
| ① | HeaderSize | Gives the size of the header that is appended to the file. | – |
| ②* | ScanType | The type of scan where the data was obtained (high-speed scan or low-speed scan) is displayed. | **Sampling period** on the Format Dialog Box. |
| ③* | ScanTime | Gives the data sampling period. | |
| ④* | Register | Gives the registers specified in the data settings. | **Registered register name** on the Format Dialog Box. |
| ⑤* | ProgramName | Gives the program name specified in the data settings. | **Program** on the Format Dialog Box. |
| ⑥* | No. | Gives the number of the data that was sampled. | **Data No.** on the Format Dialog Box. |
| ⑦* | DATE/TIME | Gives the time down to the seconds when the data was sampled. This is a running value from 1970, which is the lower limit of the calendar setting. | **DATE/TIME** on the Format Dialog Box. |

*These items may not be given depending on the settings in the MPE720. Refer to the following section for details.

## ◆ Binary File Format

This example shows how log data that was stored in the binary format appears when it is opened in a text editor.



① Header

The header is given in ASCII characters.

| Item | Description | Corresponding Item in MPE720 |
|---|---|---|
| HeaderSize | Gives the size of the header that is appended to the file. | – |
| ScanType* | The type of scan where the data was obtained (high-speed scan or low-speed scan) is displayed. | **Sampling period** on the Format Dialog Box. |
| ScanTime* | Gives the data sampling period. | |
| Register* | Gives the registers specified in the data settings. | **Registered register name** on the Format Dialog Box. |
| ProgramName* | Gives the program name specified in the data settings. | **Program** on the Format Dialog Box. |
| No.* | Gives the number of the data that was sampled. | **Data No.** on the Format Dialog Box. |
| DATE/TIME* | Gives the time down to the seconds when the data was sampled. This is a running value from 1970, which is the lower limit of the calendar setting. | **DATE/TIME** on the Format Dialog Box. |

\* These items may not be given depending on the settings in the MPE720. Refer to the following section for details.

② Bit Pattern of Header Information

③ Register Data

The register data is displayed here. The volume of data depends on the data types of the registers.

| Data Type | Data Size |
|---|---|
| B: bit | 2 bytes |
| W: integer | 2 bytes |
| L: double-length integer | 4 bytes |
| Q: quadruple-length integer | 8 bytes |
| F: single-precision real number | 4 bytes |
| F: double-precision real number | 8 bytes |

CPU Unit Functionality

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Example    The following example shows how the register data is given for the settings and conditions
           listed below.
           File Details to Output
           • **Data No.** and **DATE/TIME** are selected

           Target Register to Log
           • MW00000

           Status
           • **Data No.**: 000001
           • **DATE/TIME**: 2011/06/23 18:02:19
           • Value of MW00000 register: 100

           Actual Data
           The data is stored in little endian as shown below.
           <u>01 00 00 00 00 00 00 00</u> <u>11 00 23 06 02 18 19 00</u> <u>64 00</u>

                                                              MW00000 = 100
                                                              DATE/TIME =
                                                                 2011/06/23 18:02:19
                                                              Data No. = 1
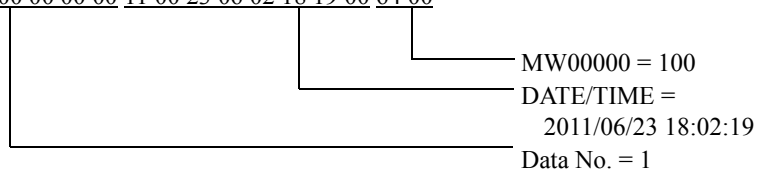
# USB Memory

You can transfer user application data between the RAM in the CPU Unit and the USB memory device.

| Operation | | Description | Reference |
|---|---|---|---|
| USB memory batch transfer | Batch load | Loads all of the user application data that is saved in the USB memory device to the CPU Unit's RAM. The data is also saved to flash memory. | ◆ *Batch Loading from USB Memory Device (page 3-85)* |
| | Batch save | Saves all of the user application data that is saved in the CPU Unit's RAM to the USB memory device. | ◆ *Batch Saving to USB Memory (page 3-86)* |
| Data logging | | Saves all of the logged data in the CPU Unit to the USB memory device. | *File Transfer (page 3-89)* |
| Import/ Export instructions | Batch load | Loads all of the user application data that is saved in the USB memory device to the CPU Unit's RAM from within a ladder program. | *MP3000 Series Ladder Programming Manual* (Manual No.: SIEP C880725 13) |
| | Batch save | Saves all of user application data that is saved in the CPU Unit's RAM to the USB memory device from within a ladder program. | |

## Operating Procedures

This section describes the procedures for loading all of the data from the USB memory device and saving all of the data to the USB memory device.

### ◆ Batch Loading from USB Memory Device

**1.** Turn OFF the power supply to the CPU Unit.

**2.** Insert the USB memory device that contains the application data to be transferred into the USB connector on the CPU Unit.

> Information: Make sure that the folder hierarchy and file naming where the application data is to be stored is as shown below.



**3.** Turn ON only the LOAD pin on the mode switch 1 on the CPU Unit.
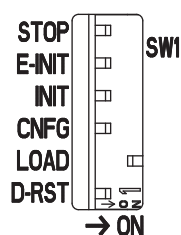
**4.** Set the INIT pin on the mode switch 1 on the CPU Unit according to the register type to load.

| Registers to Load | INIT Switch Setting | |
|---|---|---|
| | OFF | ON |
| M registers | Transferred. | Not transferred. |
| G registers | Not transferred regardless of DIP switch setting. | |
| S registers | | |
| I registers | | |
| O registers | | |
| C registers | Always transferred regardless of DIP switch setting. | |
| # registers | | |
| D registers | | |

**5.** Turn ON the power supply to the CPU Unit.

The batch load operation starts.

> **Information** If the load operation fails, an error code will be displayed on the display on the CPU Unit. Refer to the following manual to troubleshoot the problem, then perform the batch load again.
> 📖 *MP3000 Series MP3200 Troubleshooting Manual* (Manual No.: SIEP C880725 01)

The progress of processing will be shown on the display during the batch load operation as follows:
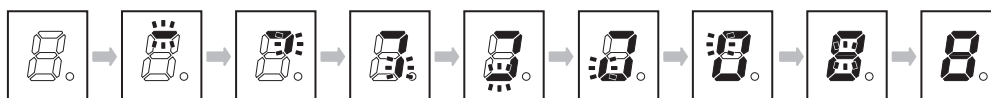


**6.** Turn OFF the power supply to the CPU Unit.

**7.** Remove the USB memory device from the USB connector on the CPU Unit.

**8.** Turn OFF the LOAD pin on the mode switch 1 on the CPU Unit.

**9.** Turn ON the power supply to the CPU Unit.

## ◆ Batch Saving to USB Memory

> **Note** When a save operation is performed to the USB memory device, any data that is stored on the USB memory device will be overwritten.

**1.** Turn ON the power supply to the CPU Unit.

**2.** Make sure the security password has not been set for the CPU Unit.

Otherwise, any attempts to perform a batch save will fail. Refer to the following manual for details on the security password.

📖 *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

**3.** Insert the USB memory device that contains the application data to save into the USB connector on the CPU Unit.

**4.** Set the INIT pin on the mode switch 1 on the CPU Unit according to the register type to save.

| Registers to Save | INIT Switch Setting | |
| --- | --- | --- |
| | OFF | ON |
| M registers | Transferred. | Not transferred. |
| G registers | Transferred. | Not transferred. |
| S registers | Transferred. | Not transferred. |
| I registers | Transferred. | Not transferred. |
| O registers | Transferred. | Not transferred. |
| C registers | Always transferred regardless of DIP switch setting. | |
| # registers | | |
| D registers | | |

**5.** Press and hold the STOP/SAVE switch on the CPU Unit for at least two seconds.
The batch save operation starts.

> **Information**    If the save operation fails, an error code will be displayed in the display on the CPU Unit.
> Refer to the following manual to troubleshoot the problem, then perform the batch save again.
> 📖 *MP3000 Series MP3200 Troubleshooting Manual* (Manual No.: SIEP C880725 01)

The progress of processing will be shown on the display during the batch save operation as follows:
The batch save operation has been completed when the normal operation display appears on the display
(i.e., the lower right dot will flash).



**6.** Press the STOP/SAVE switch. Confirm that the USB status indicator changes from flashing to not
lit and then remove the USB memory.

> **Information**    The hierarchy of the folders in which the application data was saved will be as shown below.
> Only the alarm history file will be in CSV format. It is stored with the following name:
> ALARM_HISTORY.csv.

## Alarm History File

This section describes the data that is displayed when an alarm history file is checked on a PC.

### ◆ Alarm History File Format

The following example shows how the CSV file is displayed when it is opened in a text editor.

```
No,Alarm Code,Alarm Detail Format,Date,Rack,Unit,Slot,Detail1,Detail2,Detail3,Detail4,Detail5
1,A101H,I/O error,2000/01/01 00:00_40s,1,0,0,0000H,0000H,0000H,0000H,0000H
2,A30BH,Other error,2000/01/01 00:00_56s,1,0,0,0000H,0000H,0000H,0000H,0000H
   ①    ②        ③               ④          ⑤⑥⑦  ⑧     ⑨      ⑩      ⑪      ⑫
```

| No. | Item | Remarks |
|-----|------|---------|
| ① | Index | Range: 1 to 100 |
| ② | Alarm Code | Refer to the following manual for details.<br>📖 *MP3000 Series MP3200/MP3300 Troubleshooting Manual*<br>(Manual No.: SIEP C880725 01) |
| ③ | Alarm Details Format Type | • Operation error<br>• I/O error<br>• Other error |
| ④ | Time when alarm occurred | yyyy/mm/dd/ hh:mm_ss |
| ⑤ | Alarm Rack Number | – |
| ⑥ | Alarm Unit Number | – |
| ⑦ | Alarm Slot Number | – |
| ⑧ | Alarm Detail 1 | Alarm Details<br>③The information depends on the alarm details format type.<br>• Operation Errors<br>  Alarm detail 1: Error drawing number<br>  Alarm detail 2: Referenced drawing number<br>  Alarm detail 3: Referenced drawing step number<br>  Alarm details 4 and 5: Reserved for system. |
| ⑨ | Alarm Detail 2 | |
| ⑩ | Alarm Detail 3 | |
| ⑪ | Alarm Detail 4 | • I/O Errors<br>  Alarm details 1 to 5: Reserved for system. |
| ⑫ | Alarm Detail 5 | • Other Errors<br>  Alarm details 1 to 5: Reserved for system. |

# File Transfer

The functionality of an FTP server is provided so that you can transfer data between the RAM in the CPU Unit or the USB memory device and a remote device capable of acting as an FTP client.

| Data to Transfer | Transfer Direction | Remarks | Reference |
|---|---|---|---|
| Log data | CPU Unit to Remote device | – | *Operating Procedure (page 3-70)* |
| Register data | CPU Unit to Remote device | Uses the Export instruction from a ladder program.* | *MP3000 Series Ladder Programming Manual* (Manual No.: SIEP C880725 13) |
| | Remote device to CPU Unit | Uses the Import instruction from a ladder program.* | |

* Can be used for the CPU Unit version 1.30 or higher and the MPE720 version 7.39 or higher.

**Note**
- The full path of the file to be transferred must be within 256 characters including all folder and file names.
- If you transfer too many files at the same time, a 426 error (connection closed; transfer aborted) will occur at the remote device and the files will not be transferred normally.
  If that occurs, separate the files into more than one transfer and transfer them again.

**Information**
1. The FTP server supports up to five simultaneous connections.
2. You can transfer up to 8 MB when using the RAM in the CPU Unit. You can transfer up to 4 GB of data for the recommended USB memory device.
3. The IP address of the FTP server is the same as the IP address that is set on the 218IFD Detail Definition Dialog Box for the Communications Module or the IP address that is set on the rotary switches. Refer to the following manual or section for details.
   - 218IFD Detail Definition Dialog Box
     - *MP3000 Series Communications User's Manual* (Manual No.: SIEP C880725 12)
   - Rotary switches
     - *2.2 CPU Unit − Rotary Switches (page 2-10)*

## Folder Structure

This section describes the folder structure of the FTP server.

```
/(FTP ROOT)
  ├─ ram
  │    └─ MP_LOG      Stores log data.
  └─ usb
       ├─ MP_BKUP     Stores batch transfer data for the USB memory device.
       ├─ MP_DATA     Stores data from an Import or Export instruction.
       └─ MP_LOG      Stores log data.
```
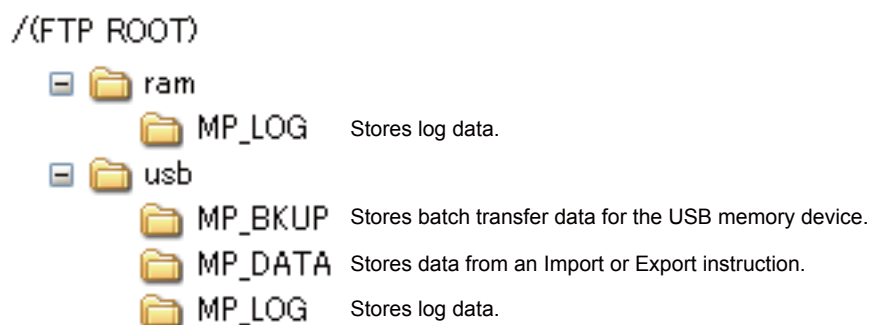
## Setting Up FTP Accounts

FTP accounts must be set up to allow FTP clients to access the FTP server. This section describes the default settings of an FTP account, and how to change those settings.

CPU Unit Functionality

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## ◆ Default

The default settings of an FTP account are given below.

| User Name | Password | FTP Privileges |
|-----------|----------|----------------|
| USER-A | USER-A | R/W* |

\* R: Files can be read from the FTP client.
 W: Files can be written from the FTP client.

## ◆ Setting Up FTP Accounts

If you need to change the default settings or add a new FTP account, use the MPE720. You can define up to five FTP accounts.

Use the following procedure.

**1.** Connect the Machine Controller to the PC, and start the MPE720.
Refer to the following manual for details.
   📖 *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

**2.** Select *File* − *Environment Setting* from the menu bar.

**3.** Select **Security** and then **User Registration**.
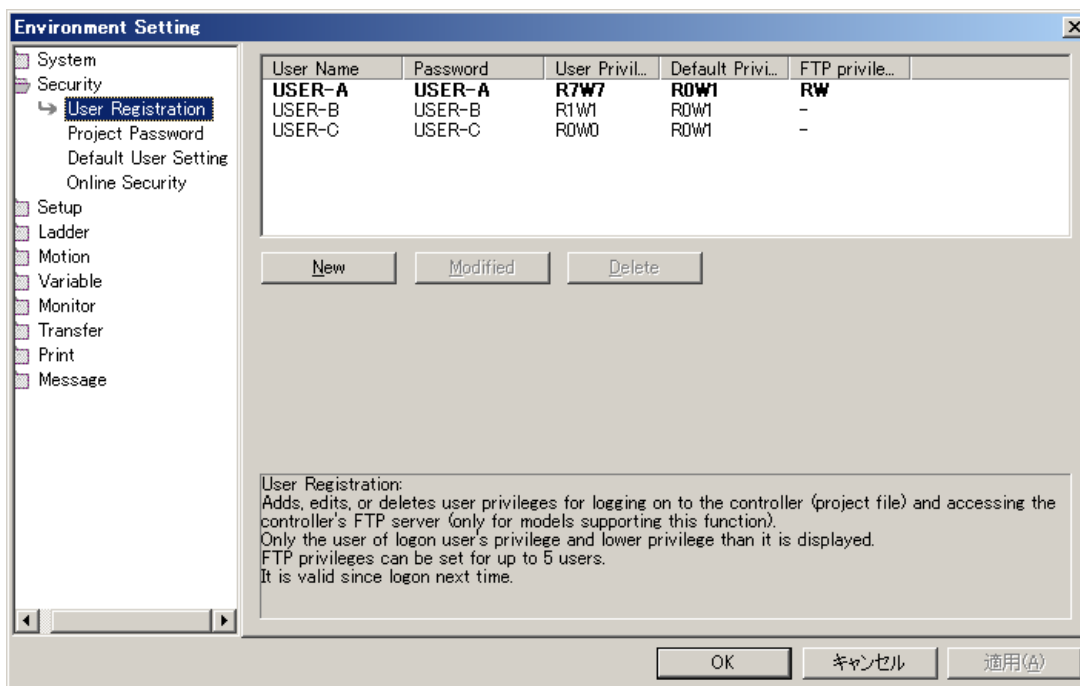


Adding a New FTP Account
Click the **New** Button.
The User Registration Dialog Box will be displayed.

Changing the Settings of an Existing FTP Account
Select the user name for the FTP account to be changed and click the **Modified** Button.
The User Registration Dialog Box will be displayed.

Deleting an Existing FTP Account
Select the user name for the FTP account to be deleted and click the **Delete** Button.
The selected FTP account will be deleted. Proceed to step 5.

**4.** Set the FTP account information in the User Registration Dialog Box.



| No. | Item | Description | Remarks |
|---|---|---|---|
| ① | User Name | This is the name that the FTP client on the remote device must use to log in to perform a file transfer. | • You can enter up to 16 characters.<br>• The string is case sensitive. |
| ② | Password | This is the password that the FTP client on the remote device must use to log in to perform a file transfer. | • You can enter up to 16 characters.<br>• The string is case sensitive. |
| ③ | User Privilege | Reserved for system. | Specify 0 for reading and writing. |
| ④ | Default Privilege | Reserved for system. | Specify 0 for reading and writing. |
| ⑤ | FTP Privilege | This is the file read and write privileges that the FTP client on the remote device will have during file transfers. | • Refer to the following section for details on the tasks that are affected by the FTP privilege settings.<br>☞ ■*FTP Privileges and Applicable FTP Commands (page 3-92)*<br>• A client cannot be set to writing only. |

**5.** Click the **OK** Button.

**6.** Log off from the MPE720.
The settings are enabled.

■ FTP Privileges and Applicable FTP Commands

| Item | Command | FTP Privileges R | FTP Privileges R/W | Description |
|---|---|---|---|---|
| Connection/Disconnection | bye | ○ | ○ | Disconnects and terminates the connection with the FTP server. |
| | close | ○ | ○ | Disconnects the connection with the FTP server. |
| | open | ○ | ○ | Starts a connection with the FTP server. |
| | quit | ○ | ○ | Disconnects and terminates the connection with the FTP server. |
| | user | ○ | ○ | Enters the user name when logging in to the FTP server. |
| File/Directory Operations | cd | ○ | ○ | Changes the current directory of the FTP server |
| | delete | × | ○ | Deletes a file on the FTP server. |
| | mdelete | × | ○ | Deletes multiple files on the FTP server. |
| | dir | ○ | ○ | Displays a list of the files in the current directory of the FTP server, including file names, sizes, and last revision dates. |
| | ls | ○ | ○ | Displays a list of the file names in the current directory of the FTP server. |
| | mkdir | × | ○ | Creates a directory in the FTP server. |
| | pwd | ○ | ○ | Displays the current directory of the FTP server. |
| | rename | × | ○ | Renames a file on the FTP server. |
| | rmdir | × | ○ | Deletes a directory in the FTP server. |
| File Transfers | get | ○ | ○ | Downloads a file from the FTP server. |
| | mget | ○ | ○ | Downloads multiple files from the FTP server. |
| | put | × | ○ | Uploads a file to the FTP server. |
| | mput | × | ○ | Uploads multiple files to the FTP server. |

Note: ○: Allowed, ×: Not allowed.

# Accessing the FTP Server

This section describes how to access the FTP server from a Windows PC.

**1.** Enter the address in the address bar.

The address structure is as follows:

```
ftp://USER-A:USER-A@192.168.1.1
```
- IP address of Controller
- Password
- User name
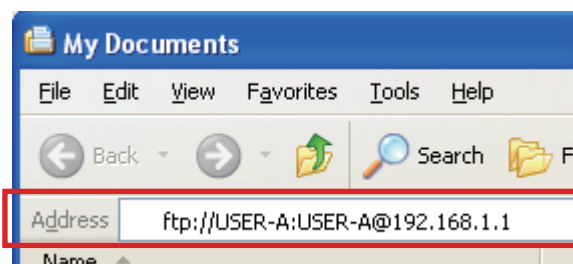
**2.** Press the **Enter** Key.

The folder of the FTP server will be displayed. That is, the contents of the USB memory device connected to the CPU Unit is displayed.
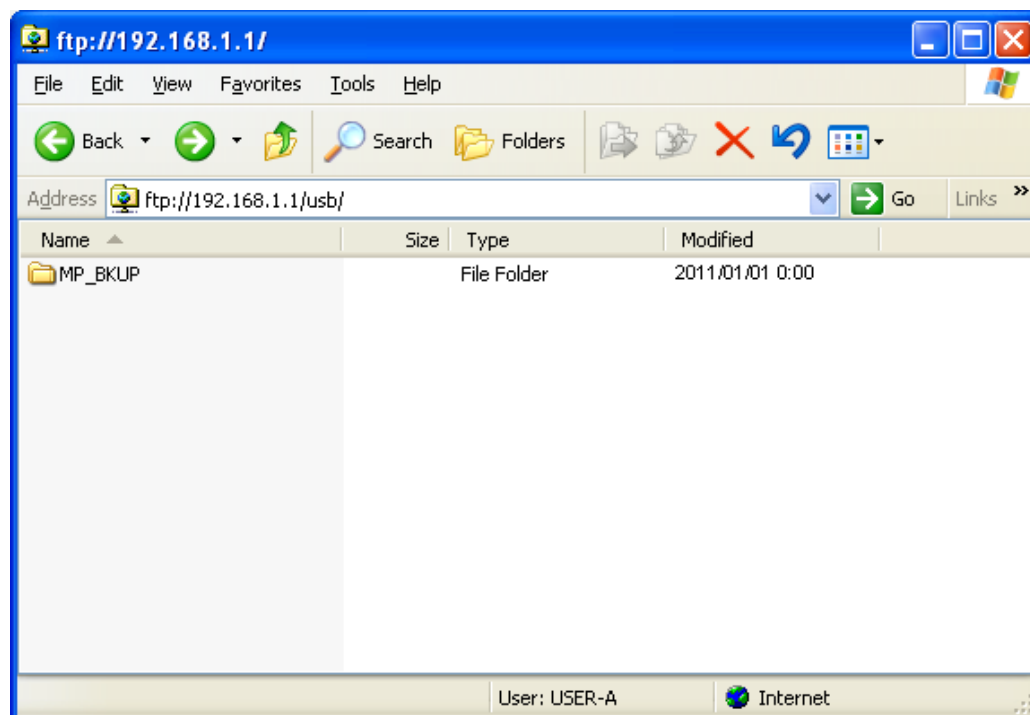


# Security

Security can be used to perform the following tasks.

• Set project passwords.

• Set program passwords.

• Set online passwords.

Refer to the following manual for operating details.

    *MP2000/MP3000 Series Machine Controller System Setup Manual* (Manual No.: SIEP C880725 00)

# Calendar

The calendar is used to manage dates and times in the CPU Unit. If the calendar has been set, the date and time will be automatically recorded when an alarm occurs.

The calendar is powered by the Battery. This allows it to maintain the correct time even if the power to the CPU Unit is turned OFF. The calendar has an error of 1 minute a month.

The date and time information can be set, changed, and accessed through the system registers. Refer to the following sections for details.

    *4.3 CPU Unit Specifications − ◆ System Service Registers − ■ Calendar (page 4-18)*

## 3.3 Multi-CPU Functions

The multi-CPU functions allow you to use more than one CPU Unit to control one system.

When you use more than one CPU Unit (i.e., when you use a multi-CPU function), you can divide the application programming of the Machine Controller. This distributes the application load among the CPU Units and increases the memory capacity.

There are the following two multi-CPU functions. Determine which function to use based on the number of CPU Units in the system, the distance between the Racks, etc.

• Sub CPU synchronization
• Slave CPU synchronization

Here, we describe the differences between Sub CPU synchronization and slave CPU synchronization and provide details on Sub CPU synchronization.

Refer to the following manual for details on slave CPU synchronization.

    📖 *MP3000 Series Motion Control User's Manual* (Manual No.: SIEP C880725 11)

Information    You can use Sub CPU synchronization and slave CPU synchronization at the same time.

## Differences between Sub CPU Synchronization and Slave CPU Synchronization

The following tables gives the differences between Sub CPU synchronization and slave CPU synchronization.

| Item | Sub CPU Synchronization | Slave CPU Synchronization |
|---|---|---|
| Connection Method | Connected through MP3000 bus | Connected with MECHATROLINK-III. |
| Maximum Number of CPU Units | 5 (Main CPU Unit × 1 and Sub CPU Units × 4) | 39 (Master CPU Unit × 1 and Slave CPU Units × 38) |
| Transmission Distance | Maximum distance between stations: 6 m | Maximum distance between stations: 100 m |
| Data Update Period between CPU Units | 125 μs, 250 μs, ..., 32 ms | 250 μs, ..., 32 ms<br>Refer to the following manual for details.<br>📖 *MP3000 Series Motion Control User's Manual* (Manual No.: SIEP C880725 11) |
| Communications Scans | Both the high-speed scan and low-speed scan can be used at the same time. | High-speed scan only |
| Size of Shared Registers | For both high-speed and low-speed scans<br>• Inputs: 2,048 words max.<br>• Outputs: 2,048 words max. | • Inputs: 32 words max. (Two of those words are used by the system.)<br>• Outputs: 32 words max. (Two of those words are used by the system.) |
| Starting and Stopping CPU Units | The Main CPU Unit and Sub CPU Units are linked. | The Main CPU Unit and Sub CPU Units are not linked. |
| WDT Errors | | |
| Turning Power ON/OFF | | |
| Motion Control Functionality | Both the Main CPU Unit and Sub CPU Units can be used as motion control masters. | The Master CPU Unit can be used as a motion control master.<br>A Slave CPU Unit cannot be used as a motion control master. |

## Sub CPU Synchronization

The following information is provided.

## Overview of Sub CPU Synchronization

You can connect more than one CPU Unit through a bus to completely synchronize operation of the Main CPU Unit and Sub CPU Units. The locations of the CPU Units are used to automatically determine which CPU Unit is the Main CPU Unit and which CPU Units are the Sub CPU Units.

The following figure shows a system configuration example.

CPU Unit Functionality

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Sub CPU Synchronization



Main CPU Unit

Sub CPU Unit 1

Base Unit with Optional Modules mounted: Controlled by Main CPU Unit

Base Unit with Optional Modules mounted: Controlled by Sub CPU Unit 1.

Sub CPU Unit 2

Base Unit with Optional Modules mounted: Controlled by Sub CPU Unit 2.

Sub CPU Unit 3

Base Unit with Optional Modules mounted: Controlled by Sub CPU Unit 3.

Sub CPU Unit 4

Base Unit with Optional Modules mounted: Controlled by Sub CPU Unit 4.

- You can have one Sub CPU Unit on the Main Rack and a total of three Sub CPU Units on Expansion Racks. You can therefore connect up to four Sub CPU Units in one system.
- The Optional Modules that are connected immediately to the right side of a CPU Unit are controlled by that CPU Unit.
- You can use the CPU interface registers for that CPU Unit to exchange up to 2,048 words of data each scan.
- You can completely synchronize the Main CPU Unit and Sub CPU Units. The following figure shows a timing chart.
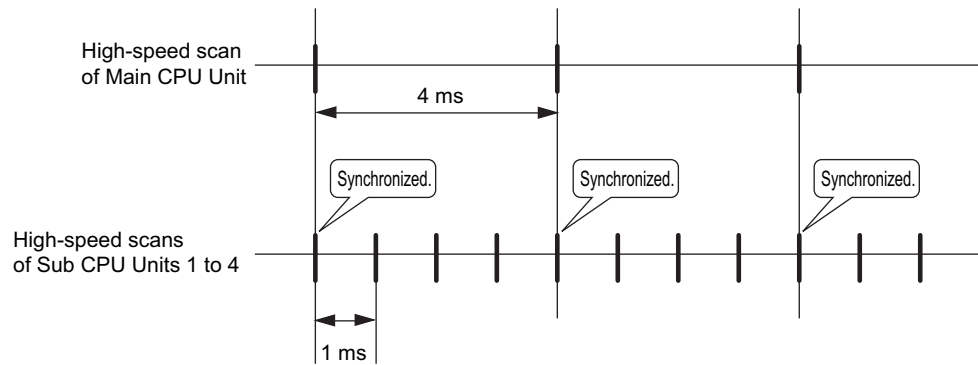


## Conditions for Using Sub CPU Synchronization

To use Sub CPU synchronization, conditions for the product versions and for the high-speed scan set values must be met.

### ◆ Applicable Versions

You must use the following versions of the CPU Units and MPE720.

| Name | Model | Abbreviation | Applicable Versions |
|---|---|---|---|
| CPU Units | JEPMC-CP3201-E | CPU-201 | Version 1.06 or higher |
| | JEPMC-CP3202-E | CPU-202 | All versions |
| MPE720 | CPMC-MPE780 | – | Version 7.21 or higher |

## ◆ Scan Set Values

The settings of the high-speed scans of the CPU Units must satisfy one of the following equations.

- High-speed scan set value of Main CPU Unit = High-speed scan set values of Sub CPU Units
- High-speed scan set value of Main CPU Unit = Integral multiple of high-speed scan set value of Sub CPU Unit

If one of these equations is not satisfied, the Controller will operate without synchronizing the cycle between the Main CPU Unit and Sub CPU Units.

> **Information**  You can check whether operation is currently synchronized or not in system register SB00040B (CPU Status) in the Sub CPU Units.
> - 0: High-speed scans synchronized.
> - 1: High-speed scans not synchronized.

> **Note**  If you perform any of the following operations when the CPU Units are synchronized and the equations given in *Scan Set Values (page 3-98)* are no longer satisfied, the CPU Units will change to non-synchronous operation
> 1. Change the high-speed scan set value of the Main CPU Unit or a Sub CPU Unit.
> 2. Save the SVC Transmission Definition of a Sub CPU Unit.
> 3. Perform self configuration for a Sub CPU Unit.
> 4. Set bit C (network reset) in motion setting parameter OW□□□00 in a Sub CPU Unit to 1 (ON).
>
> Also, if you perform any of items 2 to 4, above, MECHATROLINK communications will stop and the position information and zero point return completion information will be lost. This will disable the software limits.
>
> If you loose synchronization or the software limits are disabled, use the following steps to reset the CPU Units.
> - If necessary, set the high-speed scan set values again.
> - Enable the software limits.
> - Turn the power supply to the CPU Units OFF and ON again.
>
> Refer to the following manual for the procedure to enable the software limits.
> 📖 *MP3000 Series Motion Control User's Manual* (Manual No.: SIEP C880725 11)

## Precautions When Using Sub CPU Synchronization

This section provides precautions that must be followed when you use Sub CPU synchronization.

## ◆ Self Configuration

Self configuration is not performed for the Sub CPU Units even if you perform it for the Main CPU Unit. To perform self configuration for a Sub CPU Unit, use the DIP switch on the Sub CPU Unit or connect the MPE720 to the Sub CPU Unit. The procedure is the same as that for the Main CPU Unit. Refer to the following section for details.

☞ *Self Configuration (page 3-38)*

Refer to the following manual for the connection procedure between a Sub CPU Unit and the MPE720.

📖 *MPE720 Version 7 System Integrated Engineering Tool for MP2000/MP3000 Series Machine Controller User's Manual* (Manual No.: SIEP C880761 03)

#### ◆ Behavior when CPU Units Stop

| CPU Run/CPU Stop Setting | | CPU Run/CPU Stop Status | |
|---|---|---|---|
| Main CPU Unit Setting | Sub CPU Unit Setting | Main CPU Unit Status | Sub CPU Unit Status |
| Run | Run | Run | Run |
| Stop | Run | Stop | Stop[*1] |
| Run | Stop | Run[*2] | Stop |
| Stop | Stop | Stop | Stop |

*1. The Sub CPU Units will stop when the Main CPU Unit stops.
*2. The Main CPU Unit will not stop just because a Sub CPU Unit stops.

#### ◆ Behavior for Watchdog Timer Timeouts

If a watchdog timer timeout (WDT) error occurs for the Main CPU Unit or any Sub CPU Unit and the CPU Unit goes down, the other CPU Units will have WDT errors and will go down.

#### ◆ Behavior When Turning Power ON/OFF

In a system that uses an Expansion Rack, if the power supply to the Rack for either the Main CPU Unit or a Sub CPU Unit is turned ON or OFF, a hardware reset is performed for the other CPU Units and the power supply turns OFF and ON again.

#### ◆ Behavior When Actual Hardware Does Not Agree with Module Configuration Definitions in MPE720

The locations of the CPU Units are used by the MPE720 to automatically determine which CPU Unit is the Main CPU Unit and which CPU Units are the Sub CPU Units. However, it will not be possible for the MPE720 to correctly recognize the CPU Units for the following conditions in the Module configuration.

| Module Configuration Definitions[*1] | Main CPU Unit Behavior | Sub CPU Unit Behavior |
|---|---|---|
| When the Module configuration definitions of the Main CPU Unit are saved | The Main CPU Unit will operate correctly. | The scan service will stop.[*2] E.080 will be displayed on the CPU Unit's display. |
| When the Module configuration definitions of a Sub CPU Unit are saved | The scan service will stop.[*2] E.080 will be displayed on the CPU Unit's display. | The Sub CPU Unit will operate correctly. |
| When the Module configuration definitions are not saved (e.g., for INIT startup) | The Main CPU Unit will operate correctly. | The Sub CPU Unit will operate correctly. |

*1. You can check the Module configuration definitions in the Module Configuration Definition Tab Page on the MPE720.
*2. The Sub CPU Unit will stop, but you will be able to batch-save data to the USB memory and will be able to use the MPE720 to batch-read data.

CPU Unit Functionality

3

## ◆ Connecting the MPE720

You can simultaneously connect up to two PCs running the MPE720 directly to a Sub CPU Unit.

If you connect the MPE720 to Sub CPU Units through the Main CPU Unit, the MPE720 can successfully communicate with up to two Sub CPU Units at the same time. The MPE720 can actually communicate with up to five Sub CPU Units, but communications may become very slow. If you try to communicate with six or more Sub CPU Units, communications error may occur.

The following figure illustrates this feature.

Connecting the MPE720 Directly to a Sub CPU Unit
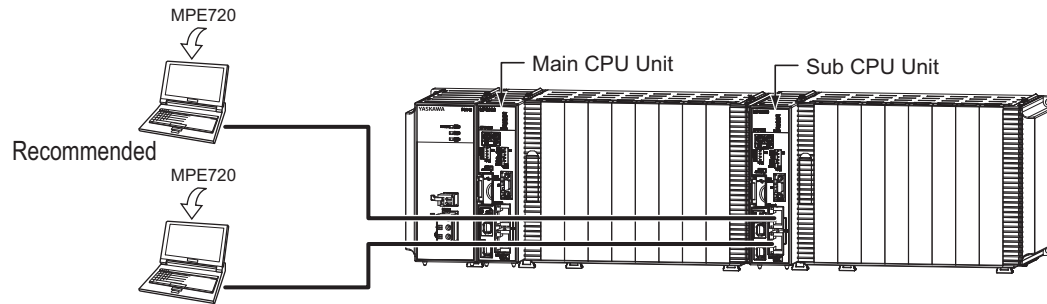


Connecting the MPE720 to a Sub CPU Unit through the Main CPU Unit
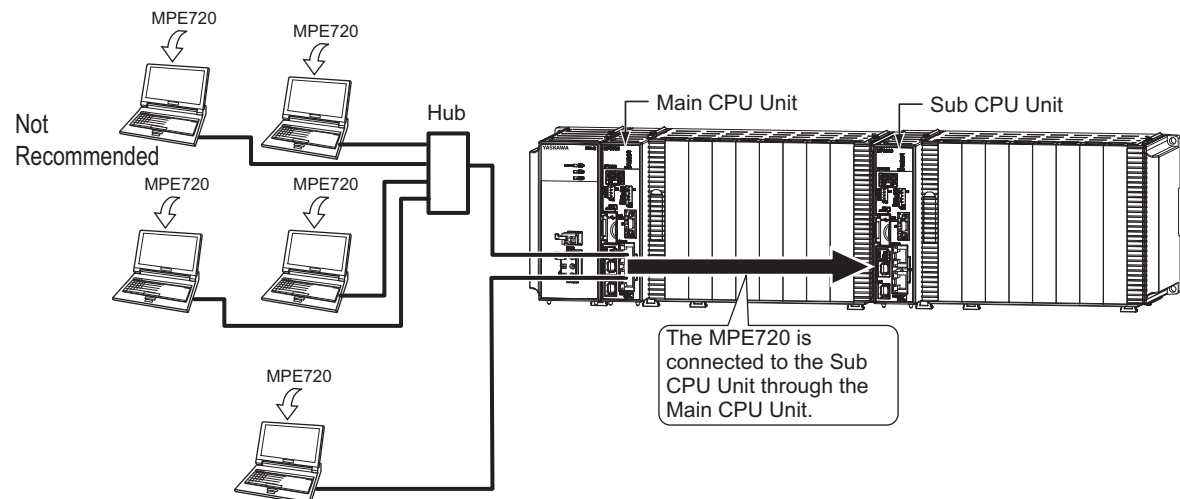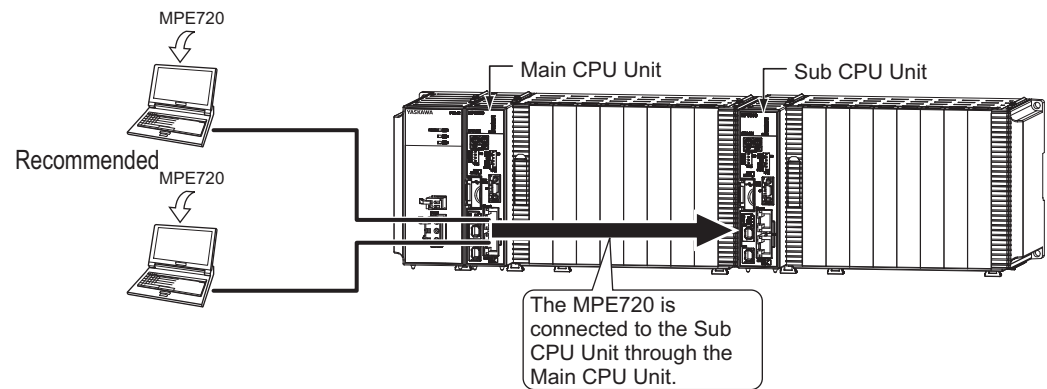


Refer to the following manual for the connection procedure between the MPE720 and a Sub CPU Unit.

📖 *MPE720 Version 7 System Integrated Engineering Tool for MP2000/MP3000 Series Machine Controller User's Manual* (Manual No.: SIEP C880761 03)

#### ◆ MPE720 Project File Management

Manage all of the project files for the Main CPU Unit and Sub CPU Units as separate files.
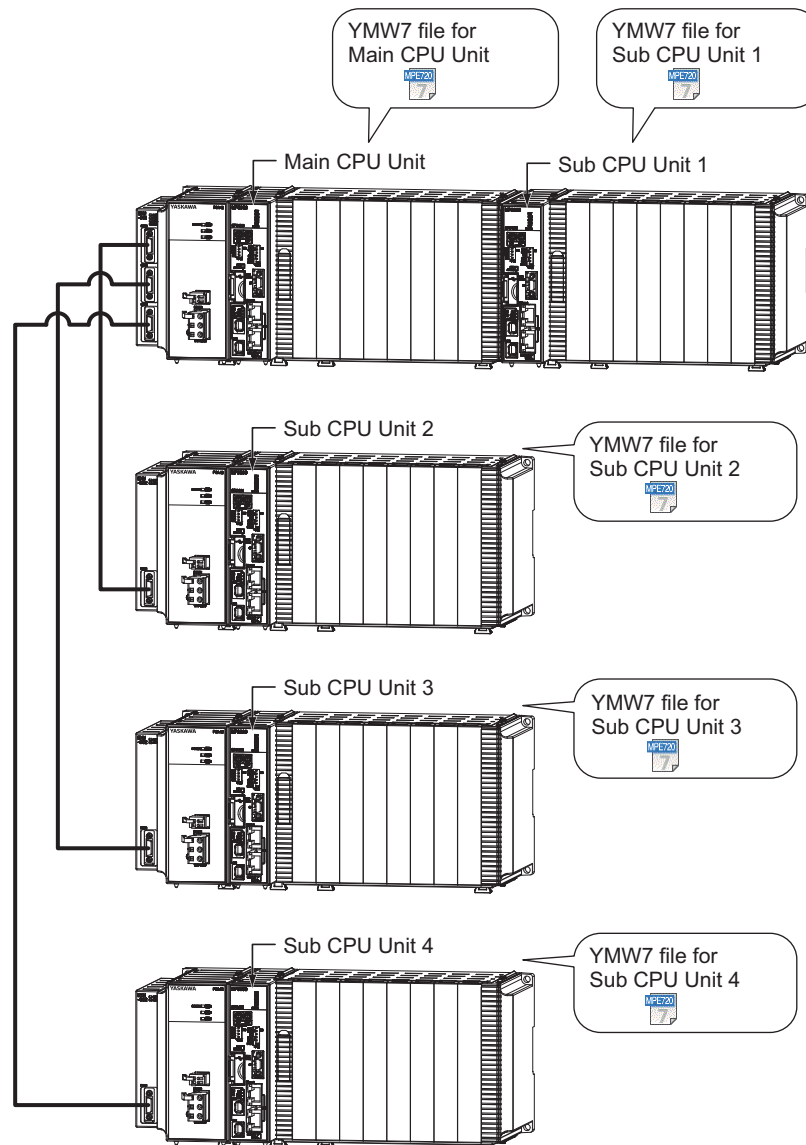


#### ◆ Sub CPU Unit Calendars

When you turn ON the power supply, the contents of the calendars in the Sub CPU Units will have the same settings as the calendar in the Main CPU Unit. Therefore, basically it is not necessary to set the calendars in the Sub CPU Units. However, you can use either of the following methods to set the calendars only in the Sub CPU Units.

- After communications are established between the Sub CPU Unit for which to change the settings with the MPE720, change the settings from the Environment Setting Dialog Box of the MPE720.
  Abbreviated operating procedure: ***Environment Setting Dialog Box − Setup − System Setting − Calendar − Setting Group***
- Use the ladder programming in the Sub CPU Unit for which to change the settings and write the settings to SW00015 to SW00019 (system registers: calendar).
  Refer to the following section for details.
  ☞ ■*Calendar (page 4-18)*

CPU Unit Functionality

3

| Information | Although the Main CPU Unit and Sub CPU Units will have the same calender settings after the power supply is turned ON, thereafter they run on their own power supplies. This can cause error to occur between the calendar settings of the Main CPU Unit and Sub CPU Units as time passes. If that occurs, set only the Sub CPU Units. |

## Differences between the Main CPU Unit and Sub CPU Units

The following table gives the differences between the Main CPU Unit and Sub CPU Units. Items for which there are no differences between the Main CPU Unit and Sub CPU Units have been omitted.

| Item | | Main CPU Unit | Sub CPU Unit |
|---|---|---|---|
| Connected Rack | | Can be connected only to Rack 1. | Can be connected to Rack 1 or 5 to 7. If you connect the Sub CPU Unit to Rack 1, connect it to the right of the Main CPU Unit. |
| Function Modules in CPU Unit | | • CPU<br>• 218IFD<br>• SVC32<br>• SVR32<br>• M-EXECUTOR | • CPU<br>• 218IFD<br>• SVC32<br>• SVR32<br>• M-EXECUTOR<br>• CPUIF |
| Self Configuration | | Recognizes Sub CPU Units. | Does not recognize the Main CPU Unit. |
| Starting and Stopping CPU Units | | The Main CPU Unit can be started and stopped independently. Doing so will not cause the Sub CPU Units to start or stop. | A Sub CPU Unit can be started and stopped independently. However, the start/stop link with the Main CPU Unit will be given priority. |
| Calendar | | • Set with the MPE720.<br>• Set with system registers. | • Calendar settings are synchronized with the Main CPU Unit when the power supplies are turned ON.<br>• Set with the MPE720.<br>• Set with system registers. |
| Sub CPU Unit Status | | Reported in system registers SW001475 to SW001482 (system status). | Reported in system registers SW00040 to SW00041 (system status). |
| Synchronization Status between CPU Units | | Not reported in system registers. | Reported in system register SB00040B (synchronization status with Main CPU Unit). |
| WDT Errors | WDT error in Main CPU Unit | • Error number E.001 is displayed on the CPU Unit.<br>• Reported by placing 0001 hex (watchdog timer timeout) in system register SW00050 (32-bit error code). | • Error number E.052 is displayed on the CPU Unit.<br>• Reported by placing 0052 hex (Main CPU Unit system down detected) in system register SW00050 (32-bit error code). |
| | WDT error in Sub CPU Unit | • Error number E.051 is displayed on the CPU Unit.<br>• Reported by placing 0051 hex (Module synchronization error) in system register SW00050 (32-bit error code). | • Error number E.001 is displayed on the CPU Unit.<br>• Reported by placing 0001 hex (watchdog timer timeout) in system register SW00050 (32-bit error code). |

| Item | | Main CPU Unit | Sub CPU Unit |
|---|---|---|---|
| MPE720 Connections | | Direct connection with MPE720 with Ethernet connector on Main CPU Unit | • The Main CPU Unit connects directly to the MPE720 through the Ethernet connector on the Main CPU Unit.<br>• The Sub CPU Unit connects to the MPE720 through the Main CPU Unit. The MPE720 is connected to the Ethernet connector on the Main CPU Unit. |
| Controller Search Name | | CPU-201 | CPU-201SUB |
| Slave CPU Synchronization | Master | Supported. | Supported. |
| | Slave | Supported. | Not supported. |

# I/O Registers Used for Sub CPU Synchronization

There are the following two types of registers for the Main CPU Unit and Sub CPU Units.

• High-speed scan CPU interface registers: Exchange data in the high-speed scan.

• Low-speed scan CPU interface registers: Exchange data in the low-speed scan.

These registers are assigned to CPU interface registers for the Safety CPU Unit service.

You can set the ranges of the CPU interface registers on the Module Configuration Definition Tab Page on the MPE720.

Module Configuration Definition Tab Page for the Main CPU Unit



Module Configuration Definition Tab Page for the Sub CPU Unit

#### ◆ CPU Interface Registers for High-speed Scan

When you set the circuit number on the Module Configuration Definition Tab Page, the ranges of CPU interfaces for the high-speed scan given in the following table are assigned. The default circuit number is 1.

> **Information**  You cannot set the same circuit number for more than one Sub CPU Unit on the Module Configuration Definition Tab Page for the Main CPU Unit. You can set the same circuit number for more than one Sub CPU Unit on the Module Configuration Definition Tab Page for a Sub CPU Unit.

| Circuit Number | Default I/O Registers | | Settable Range of I/O Registers | |
|---|---|---|---|---|
| | Register Addresses | Size | Register Addresses | Size |
| 1 | IW20000 to IW2003F and OW20000 to OW2003F | 64 words each | IW20000 to IW207FF and OW20000 to OW207FF | 2,048 words each |
| 2 | IW20800 to IW2083F and OW20800 to OW2083F | 64 words each | IW20800 to IW20FFF and OW20800 to OW20FFF | 2,048 words each |
| 3 | IW21000 to IW2103F and OW21000 to OW2103F | 64 words each | IW21000 to IW217FF and OW21000 to OW217FF | 2,048 words each |
| 4 | IW21800 to IW2183F and OW21800 to OW2183F | 64 words each | IW21800 to IW21FFF and OW21800 to OW21FFF | 2,048 words each |

> **Information**  1. If you change the register size, set a value that is an integral multiple of 16 words (32 bits).
> 2. You can set register sizes of up to 2,048 words for both input and output registers, but the larger the register sizes, the longer the processing time.

Data for the registers assigned to the high-speed scan cycle is transferred in the high-speed scan of the Sub CPU Unit. The data transfer size is the I/O size of the Sub CPU Unit.
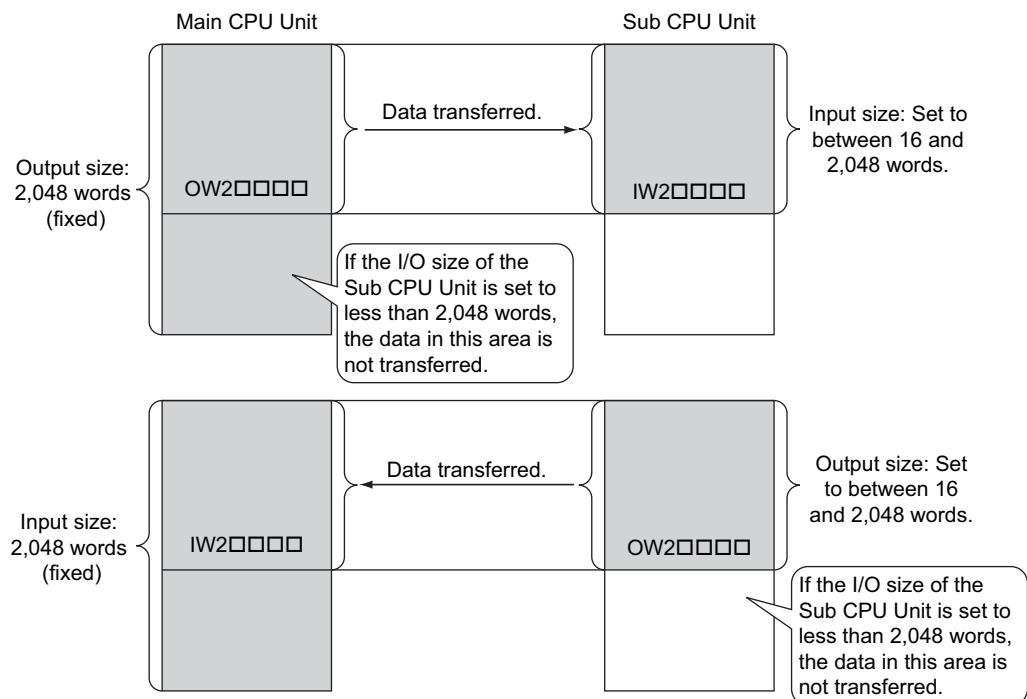
## ◆ CPU Interface Registers for Low-speed Scan

You can set register sizes of up to 2,048 words for both the input and output registers for the CPU interface registers for the low-speed scan. Set a value that is an integral multiple of 16 words (32 bits).

The data transfer size is the smaller of the I/O sizes of the Main CPU Unit and Sub CPU Unit. We recommend that you set the same I/O sizes for the Main CPU Unit and Sub CPU Units to make programming easier to understand.
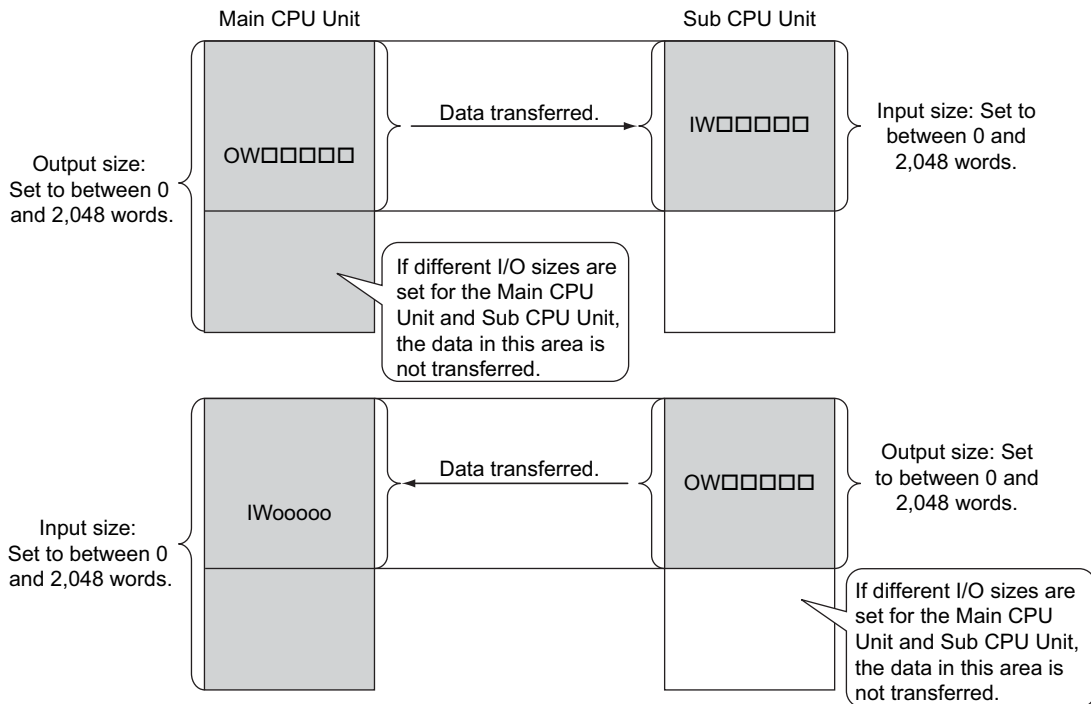
# Sub CPU Synchronization Data Transfer Timing

This section describes the timing of data transfer for the CPU interface registers for the high-speed and low-speed scans.

## ◆ CPU Interface Registers for High-speed Scan

The following figures show the data transfer timing for CPU interface registers for the high-speed scans.

### ■ When the Main CPU Unit and Sub CPU Unit Have the Same High-speed Scan Set Values

DWG.H

High-speed scan of Main CPU Unit (4 ms)

① ② ①

Output values from ① transferred to Sub CPU Unit.

Output values from Sub CPU Unit transferred to ③.

High-speed scan of Sub CPU Unit (4 ms)

DWG.H
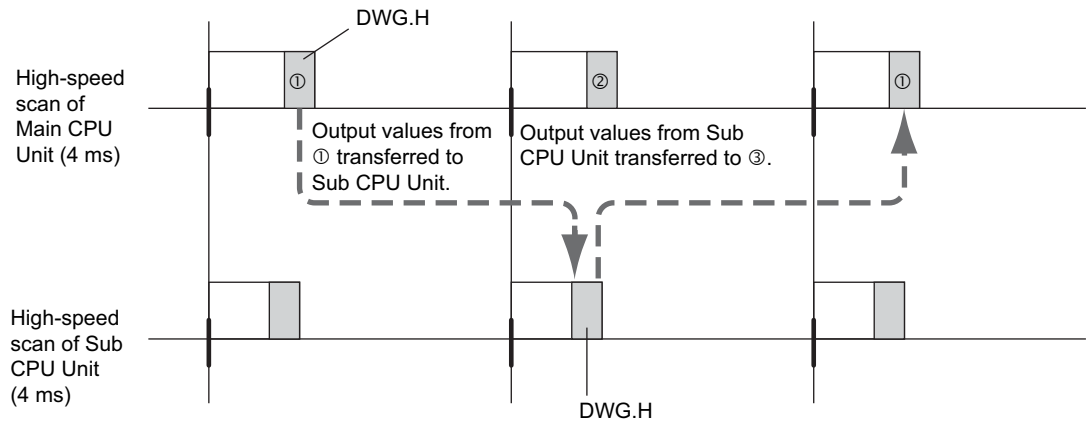
### ■ When High-speed Scan Set Value of Main CPU Unit Is An Integral Multiple of High-speed Scan Set Value of Sub CPU Unit

DWG.H

High-speed scan of Main CPU Unit (4 ms)

① ② ①

Output values from ① transferred to Sub CPU Unit.

Output values from Sub CPU Unit transferred to ③.

High-speed scan of Sub CPU Unit (2 ms)

DWG.H
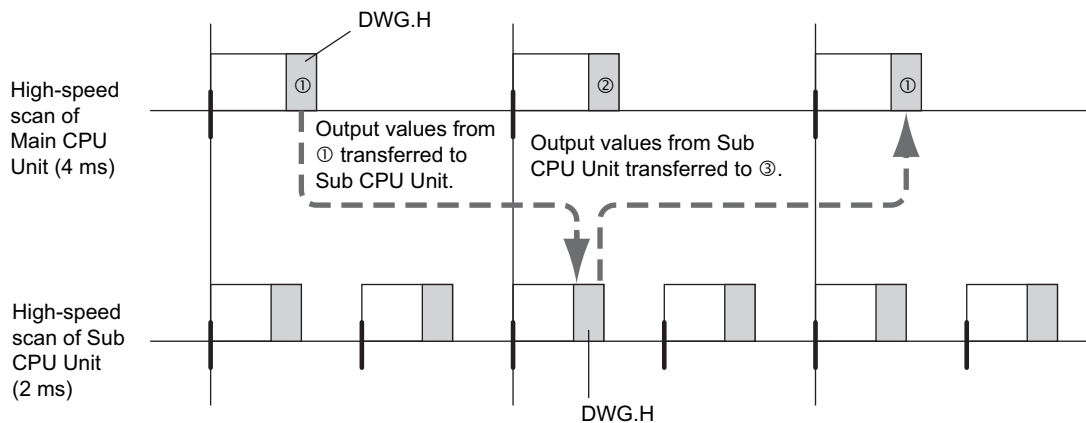
## ◆ CPU Interface Registers for Low-speed Scan

The low-speed scans are not synchronized, so data transfer for the CPU interface registers for the low-speed scans is not performed periodically in the way it is for the high-speed scans. However, the Sub CPU Unit will never read the low-speed scan data that is being transferred from the Main CPU Unit during its current low-speed scan. Also, the Main CPU Unit will never read the low-speed scan data that is being transferred from the Sub CPU Unit during its current low-speed scan. In other words, exclusive control is performed for the data to ensure data concurrency.

# Scan Overhead Guidelines When Using Sub CPU Synchronization

This section provides guidelines for the scan overhead times for the sizes of CPU interface registers for high-speed and low-speed scans.

## ◆ CPU Interface Registers for High-speed Scan

This section describes the data transfer timing for CPU interface registers for the high-speed scans.

| Item | I/O Size | | |
|---|---|---|---|
| | 512 Words | 1,024 Words | 2,048 Words |
| Guideline Times for CPU Interface Overhead | 25 μs | 50 μs | 100 μs |

If the time set for the high-speed scan in the CPU Unit is shorter than the overhead time, a scan exceeded error will occur and SW00044 (H Scan Exceeded Count) will be incremented. If that occurs, adjust the high-speed scan set value based on the above table.

The following figure illustrates high-speed scan processing.
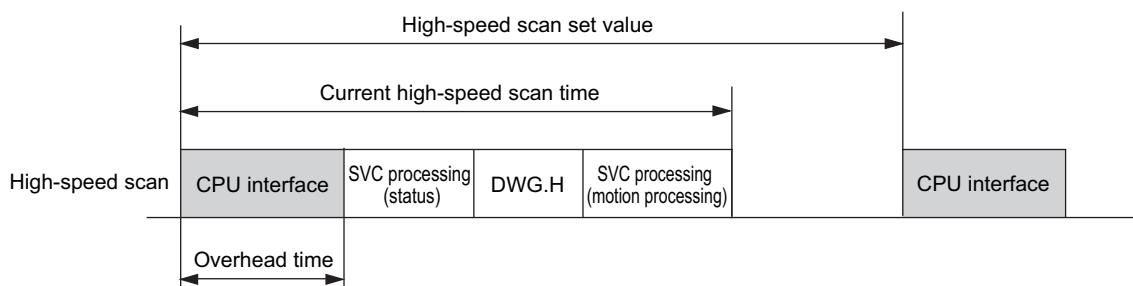


## ◆ CPU Interface Registers for Low-speed Scan

The following table gives approximate times for the low-speed scan overhead that is required for different sizes of CPU interface registers for the low-speed scan.

| Item | I/O Size | | |
|---|---|---|---|
| | 512 Words | 1,024 Words | 2,048 Words |
| Guideline Times for CPU Interface Overhead | 100 μs | 200 μs | 300 μs |

If the time set for the low-speed scan in the CPU Unit is shorter than the overhead time, a scan exceeded error will occur and SW00046 (L Scan Exceeded Count) will be incremented. If that occurs, adjust the low-speed scan set value based on the above table.

The following figure illustrates low-speed scan processing.
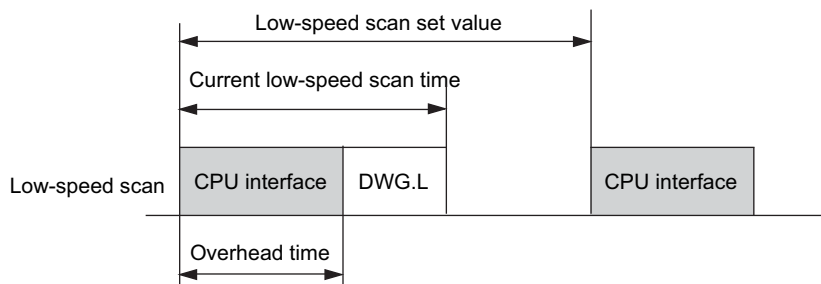


# Slave CPU Synchronization

Refer to the following manual for details on slave CPU synchronization.

  📖 *MP3000 Series Motion Control User's Manual* (Manual No.: SIEP C880725 11)

# Specifications

4

This section provides the installation and usage conditions of the MP3200. It also provides detailed specifications of the MP3200.

## 4.1 MP3200 Installation and Usage Conditions

The installation and usage conditions for the MP3200 are given in the following table.

| Item | | Specification |
|---|---|---|
| Environmental Conditions | Ambient Operating Temperature | 0 to 55°C |
| | Ambient Storage Temperature | -25 to 85°C |
| | Ambient Operating Humidity | 30% to 95% RH (with no condensation) |
| | Ambient Storage Humidity | 5% to 95% RH (with no condensation) |
| | Pollution Level | Conforms to JIS B 3502 Pollution Degree 2. |
| | Corrosive Gas | There must be no combustible or corrosive gas. |
| | Operating Altitude | 2,000 m max. |
| Mechanical Operating Conditions | Vibration Resistance | Conforms to JIS B 3502. • Continuous vibration: 5 to 9 Hz with single-amplitude of 1.75 mm  9 to 150 Hz with fixed acceleration of 4.9 $m/s^2$ • Intermittent vibration: 5 to 9 Hz with single-amplitude of 3.5 mm  9 to 150 Hz with fixed acceleration of 9.8 $m/s^2$ 10 sweeps each in X, Y, and Z directions for both intermittent and continuous vibration |
| | Shock Resistance | Size of shock: Peak acceleration of 147 $m/s^2$ (15 G) Duration: 11 ms 3 times each in X, Y, and Z directions |
| Electrical Operating Conditions | Noise Resistance | Conforming to EN 61000-6-2, EN 61000-6-4, EN 55011 (Group 1 Class A) |
| Installation Conditions | Ground | Ground to 100 Ω max. |
| | Cooling Method | Natural cooling or forced-air cooling Refer to the following section for details. ☞ *Control Panel Cooling Method (page 4-2)* |

## Control Panel Cooling Method

The components that are used in the Machine Controller require the ambient operating temperature to be between 0 and 55°C. Use one of the methods described below to ensure adequate cooling in the control panel.

> Note
> • If the ambient temperature exceeds 50°C, we recommend forced-air cooling.
> • The CPU-202 uses forced-air cooling with a built-in Fan.

## Control Panels with Natural Cooling

• Do not mount the Machine Controller at the top of the control panel, where the hot air that is generated inside the panel collects.

• Leave sufficient space above and below the Units, and maintain adequate distances from other devices, cable ducts, and other objects to ensure suitable air circulation.

• Do not mount the Machine Controller in any direction other than the specified direction.

• Do not mount the Machine Controller on top of any device that generates a significant amount of heat.

• Do not subject the Machine Controller to direct sunlight.

## Control Panels with Forced-air Cooling

Use one of the following methods to ensure 0.03 m$^3$/min average airflow below the CPU Unit.

• Forced draft method (A fan or a similar device is used to circulate the air in the interior and the exterior of the panel.)

• Forced circulation method (A fan or a similar device is mounted to the airtight panel to circulate the air inside.)

> Note
> Use the following guideline when selecting the fan:
> • CPU Unit's resistance to air flow: $6 \times 10^6$ (N·s$^2$/m$^8$)
> • The CPU-202 has a built-in Fan. You do not need to select or install a separate fan.
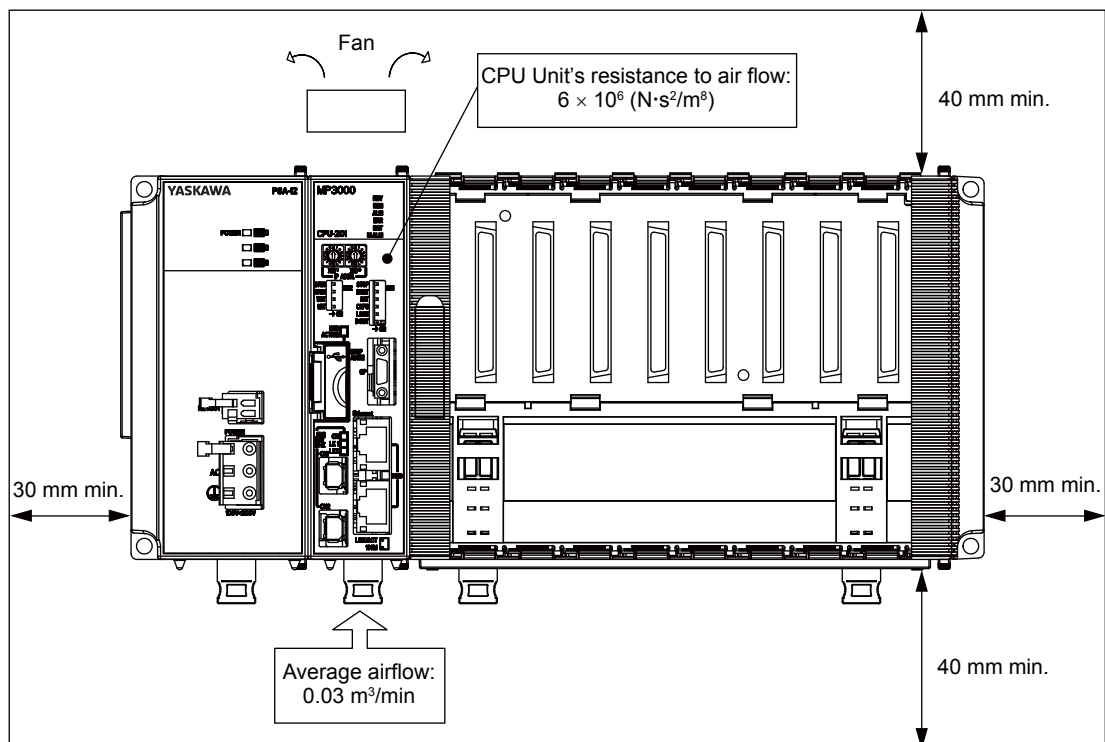
## 4.2 Power Supply Unit Specifications

The specifications of the Power Supply Unit are given in the following table.

| Item | | Specification | |
|---|---|---|---|
| | | AC Power Supply Unit | DC Power Supply Unit |
| Model | | JEPMC-PSA3012-E | JEPMC-PSD3012-E |
| Abbreviation | | PSA-12 | PSD-12 |
| Power Supply Section | Input Voltage | 100/200 VAC | 24 VDC |
| | Allowable Input Voltage Range | 85 to 132 VAC or 170 to 276 VAC | 19.2 to 28.8 VDC |
| | Allowable Frequency Range | 47 to 63 Hz | – |
| | Input Current | 4.0 A max. (at rated input/output) | 5.0 A max. (at rated input/output) |
| | Inrush Current | 25 A, 10 ms max. (fully discharged, 132-VAC input, rated output) / 50 A, 10 ms max. (fully discharged, 276-VAC input, rated output) | 50 A, 10 ms max. (fully discharged, 28.8-VDC input, rated output) |
| | Allowable Power Loss Time | 20 ms | 1 ms |
| | Rated Voltage | 5.15 V | |
| | Rated Current | 12.0 A | |
| | Output Current Range | 0 to 12.0 A | 0.2 to 12.0 A |
| | Constant Voltage Accuracy | 5.15 V ±2% max. (5.05 to 5.25 V) | |
| Status Output | | If the Power Supply Unit is mounted on the Main Rack, this output functions as normally closed contacts that are synchronized with the status of the CPU Unit. <br> • Normal operation: Circuit closed. <br> • Error: Circuit open. <br><br> Contact Ratings <br><br> | |
| Indicators | | POWER <br> Refer to the following section for details. <br> ☞ *Indicators (page 2-2)* | |
| Connectors | | • POWER: Power supply connector <br> • RLY OUT: Relay contact connector <br> • Unit connector <br> Refer to the following section for details. <br> ☞ *Connectors (page 2-3)* | |

Contact Ratings:

| Input Voltage | Current Capacity |
|---|---|
| 125 VAC | 0.4 A (resistive load) |
| | 0.2 A (inductive load) |
| 24 VDC | 0.5 A (resistive load) |
| | 0.25 A (inductive load) |

## 4.3 CPU Unit Specifications

This section provides the specifications that are related to the performance, hardware, functionality, and registers of the CPU Unit.

## Hardware Specifications

The hardware specifications of the CPU Unit are given in the following table.

| Item | Specification | |
|------|---------------|---|
| Model | JEPMC-CP3201-E | JEPMC-CP3202-E |
| Abbreviation | CPU-201 | CPU-202 |
| Flash Memory | Capacity: 40 MB (32 MB of user memory) | |
| SDRAM | Capacity: 128 MB | Capacity: 512 MB |
| SRAM | Capacity: 8 MB (battery backup) | |
| Calendar | Seconds, minutes, hour, day, week, month, year, day of week, and timing (battery backup) | |
| Battery | You can mount a memory backup Battery. | |
| Ethernet | 10Base-T or 100Base-TX × 2 ports (hub) | |
| MECHATROLINK | • MECHATROLINK-III: 1 circuit with 2 ports<br>• Master<br>• Slave | |
| USB | • USB 2.0 Type A host, 1 port<br>• Compatible devices: USB storage | |
| Indicators and Displays | • Seven-segment display<br>• Status indicators<br>• USB status indicator<br>• MECHATROLINK-III status indicators<br>• Ethernet status indicators<br>Refer to the following section for details.<br>☞ *Display and Indicators (page 2-6)* | |
| Switches | • DIP switch: Mode switch 1<br>• DIP switch: Mode switch 2<br>• Rotary switches<br>• STOP/SAVE switch<br>Refer to the following section for details.<br>☞ *Switches (page 2-9)* | |
| Connectors | • MECHATROLINK-III connectors<br>• Ethernet connectors<br>• USB connector<br>• Unit connector<br>Refer to the following section for details.<br>☞ *Connectors (page 2-11)* | |

# Performance Specifications

The performance specifications of the CPU Unit are given in the following table.

| Item | | Specification | | Remarks |
|---|---|---|---|---|
| | | CPU-201 | CPU-202 | |
| System Configuration | Maximum Number of Racks | 7 | | • Main Rack<br>• Expansion Racks added by using EXIOIF Modules: 3 max.<br>• Expansion Racks added by using a Rack Expansion Interface Unit: 3 max. |
| | Maximum Number of Units Connected on the Right of a CPU Unit | 5 | | – |
| | Maximum Number of Base Units Controllable by One CPU Unit | Main CPU Unit: 4 | | You must use EXIOIF Modules to add Expansion Racks. |
| | | Sub CPU Unit: 1 | | – |
| | Maximum Number of Optional Modules Controllable by the Main CPU Unit | 35 | | • Main Rack: 1 Base Unit × 8 slots<br>• Expansion Racks added by using EXIOIF Modules: 3 Base Units × 9 slots<br><br>Note: If you use a Rack Expansion Interface Unit to add Optional Modules on Expansion Racks, the Optional Modules are controlled by the Sub CPU Units and not by the Main CPU Unit. |
| Number of Controlled Axes | SVC32 | 16 axes in 1 circuit or 32 axes in 2 circuits | | Circuit number selected from 1 to 16. If two circuits are selected, only odd circuit numbers can be selected. |
| | SVR32 | 16 axes in 1 circuit or 32 axes in 2 circuits | | Circuit number selected from 1 to 16. If two circuits are selected, only odd circuit numbers can be selected. |
| | Maximum Number of Controlled Axes | 256 axes | | Optional Modules (SVB-01 or SVC-01 Modules) must be mounted.<br><br>Note: The number of controlled axes of the SVC32 and SVR32 given above are included. |
| Scan Time Settings | H Scan | 0.125 to 32.0 ms (in 0.125-ms increments) | | Refer to the following section for details.<br>☞ 3.1 Basic Functionality – Scans (page 3-32) |
| | L Scan | 2.0 to 300 ms (in 0.5-ms increments) | | – |
| | H Scan Default | 4 ms | | – |
| | L Scan Default | 200 ms | | – |
| Peripheral Devices | Calendar | Provided. | | – |
| | Communications Interface | Ethernet | | – |
| | USB | Provided. | | – |
| Memory Capacity | DRAM | 128 MB with ECC | 512 MB with ECC | – |
| | SRAM (battery backup) | 8 MB | | Use up to 3 MB with battery backup for table data. |
| | Program Capacity | 32 MB | | Total capacity including definition data, ladder programs, table data, etc. |

| Item | | Specification | | Remarks |
|---|---|---|---|---|
| | | CPU-201 | CPU-202 | |
| Ladder Programs | Number of Startup Drawings (DWG.A) | 64 | | Number of steps per drawing: 4,000 |
| | Number of Interrupt Drawings (DWG.I) | 64 | | |
| | Number of High-speed Scan Drawings (DWG.H) | 1000 | | |
| | Number of Low-speed Scan Drawings (DWG.L) | 2000 | | |
| | Number of User Function Drawings | 2000 | | |
| Motion Programs | Number of Programs | 512 | | Total of all programs listed below:<br>• Motion main programs<br>• Motion subprograms<br>• Sequence main programs<br>• Sequence subprograms |
| | Number of Groups | 16 | | – |
| | Number of Tasks | 32 | | – |
| | Number of Nesting Levels for IF Instructions | 8 | | – |
| | Number of Nesting Levels for MSEE Instructions | 8 | | – |
| | Number of Parallel Forks Per Task | 8 | | Select from the following four options:<br>• Main: 4 forks, Sub: 2 forks<br>• Main: 8 forks<br>• Main: 2 forks, Sub: 4 forks<br>• Sub: 8 forks |
| | Number of Simultaneously Controlled Axes Per Task | 32 axes | | – |
| Registers | S Registers | 64 Kwords | | – |
| | M Registers | 1 Mword | | Battery backup |
| | G Registers | 2 Mwords | | No battery backup |
| | I/O Registers | 64 Kwords | | – |
| | Motion Registers | 32 Kwords | | – |
| | C Registers | 16 Kwords | | – |
| | # Registers | 16 Kwords | | – |
| | D Registers | 16 Kwords | | – |
| Data Types | Bit (B) | Supported. | | 0, 1 |
| | Integer (W) | Supported. | | -32,768 to 32,767 |
| | Double-length Integer (L) | Supported. | | -2,147,483,648 to 2,147,483,647 |
| | Quadruple-length Integer (Q) | Supported. | | -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 |
| | Single-precision Real Number (F) | Supported. | | $\pm$ (1.175E-38 to 3.402E+38), 0 |
| | Double-precision Real Number (D) | Supported. | | $\pm$ (2.225E-308 to 1.798E+308), 0 |
| | Addresses (A) | Supported. | | 0 to 16,777,214 |
| Index Registers | Subscript i | Supported. | | Special registers for offsetting addresses. Subscripts i and j function identically. |
| | Subscript j | Supported. | | |
| | Array Registers | Supported. | | Used to handle registers as arrays |

Performance Specifications

| Item | | Specification | | Remarks |
|---|---|---|---|---|
| | | CPU-201 | CPU-202 | |
| Data Tracing | Number of Groups | 4 | | – |
| | Trace Memory | 1 Mword, 4 groups | | – |
| | Traceable Data Points | 16 points per group | | – |
| | Trigger Types | >, <, =, <>, >=,<= and differential detection of the above conditions | | – |
| Data Logging | Number of Groups | 4 | | – |
| | Log Storage Location | Built-in RAM disk or USB memory device | | – |
| | Log File Formats | CSV file format or binary file format | | – |
| | Data Logging Points | 64 points per group | | – |
| | Number of Log Files — Built-in RAM Disk | 1 to 4000 | | – |
| | Number of Log Files — USB Memory | 1 to 32,767 or unlimited | | The ultimate upper limit is 10,000 files even if unlimited is selected. |
| | Trigger Types | >, <, =, <>, >=, <= | | – |

| | Type | Abbreviation | Compatible CPU Unit Version | |
|---|---|---|---|---|
| | | | CPU-201 | CPU-202 |
| Compatibility with MP2000-series Optional Modules | Motion Modules | SVB-01 | Version 1.00 or higher | All versions |
| | | MPU-01, PO-01, SVA-01, SVC-01 | Version 1.01 or higher | All versions |
| | Communications Modules | 260IF-01 | Version 1.00 or higher | All versions |
| | | 215AIF-01, 217IF-01, 265IF-01 | Version 1.01 or higher | All versions |
| | | 218IF-01, 218IF-02, 261IF-01, 262IF-01, 263IF-01, 264IF-01 | Version 1.02 or higher | All versions |
| | | 266IF-01, 266IF-02 | Version 1.06 or higher | – |
| | Communications Modules (from other manufacturers) | AFMP-01 (from Anywire Corporation) | Version 1.00 or higher | All versions |
| | | AFMP-02-C, AFMP-02-CA (from Anywire Corporation) | Version 1.01 or higher | All versions |
| | | MPANL00-0, MPALL00-0, MPAL000-0, MPAN000-0 (from ALGO System) | Version 1.03 or higher | All versions |
| | | MPCUNET-0 (from ALGO System) | Version 1.05 or higher | – |
| | I/O Modules | LIO-01, LIO-02, LIO-04, LIO-05, LIO-06 | Version 1.00 or higher | All versions |
| | | AI-01, AO-01 | Version 1.01 or higher | All versions |
| | | DO-01, CNTR-01 | Version 1.02 or higher | All versions |
| | Expansion Rack Module | EXIOIF | Version 1.06 or higher | All versions |

# Communications Specifications

The specifications of the Communications Function Module that is built into the CPU Unit are given in the following table.

| Item | | | Specification | Remarks |
|---|---|---|---|---|
| Abbreviation | | | 218IFD | – |
| Common Items | Communications Interface | | 10Base-T or 100Base-TX | – |
| | Number of Communications Ports (Connectors) | | 2 | 2-port hub |
| | Communications Protocols | | TCP, UDP, IP, ARP, or ICMP | – |
| Ethernet Communications | Maximum Number of Communications Connections | | 20 + 2 (I/O message communications) | – |
| | Maximum Number of Communications Channels | | 10 + 2 (I/O message communications) | – |
| | Automatic Reception | | Supported. | Not supported for no-protocol communications. |
| | Maximum Number of Automatic Reception Connections | | 10 | – |
| | Maximum Size of Message Communications | MEMOBUS | Write: 100 words Read: 125 words | – |
| | | Extended MEMOBUS | Write: 2,043 words Read: 2,044 words | – |
| | | MELSEC (A-compatible 1E) | Write: 256 words Read: 256 words | – |
| | | MELSEC (QnA-compatible 3E) | Write: 960 words Read: 960 words | – |
| | | MODBUS/TCP | Write: 100 words Read: 125 words | – |
| | | OMRON | Write: 996 words Read: 999 words | – |
| | | TOYOPUC | Write: 1,022 words | – |
| | | No-protocol | Write: 2,046 words | – |
| | Maximum Size of I/O Message Communications | MEMOBUS | Write: 100 words Read: 125 words | – |
| | | Extended MEMOBUS | Write: 1,024 words Read: 1,024 words | – |
| | | MELSEC (A-compatible 1E) | Write: 256 words Read: 256 words | – |
| | | MELSEC (QnA-compatible 3E) | Write: 256 words Read: 256 words | – |
| | | MODBUS/TCP | Write: 100 words Read: 125 words | – |
| | | OMRON | Write: 996 words Read: 999 words | – |
| | Receive Buffer Mode Selection for No-protocol Communications | | Supported. | – |
| | Engineering Tool | Communications Platform | Ethernet | – |
| | | Controller Searches | Supported. | – |

Specifications

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# Motion Control Function Module Specifications

The specifications of the Motion Control Function Module that is built into the CPU Unit are given in the following table.

| Item | | | Specification | | Remarks |
|---|---|---|---|---|---|
| | | | CPU-201 | CPU-202 | |
| MECHA-TROLINK communications settings | | Communications ASIC | JL-100 | | – |
| | | Number of Communications Lines | 1 | | – |
| | | Number of Communications Ports (Connectors) | 2 | | – |
| | | Communications cycle (cycle for refreshing data) | 250 µs to 32.0 ms | 125 µs to 32.0 ms | – |
| | Master | Communications Method | M-III | | – |
| | | Baud Rate | 100 Mbps | | – |
| | | Communications Cycle | 125 µs/250 µs/0.5 ms/ 1 ms/1.5 ms/2 ms/3 ms | | – |
| | | Number of Connected Stations | 42 stations (up to 32 servo stations) | | – |
| | | Message Relaying | Supported. | | – |
| | | C2 Messages | Supported. | | Automatically set by the system. |
| | | Retries | Supported. | | – |
| | | Asynchronous Setting of High-speed Scan Cycle and Communications Cycle | Not supported. | | An alarm will occur if setting is attempted. |
| | Slave | Communications Method | M-III | | – |
| | | Communications Cycle | 125 µs to 3.0 ms | | – |
| | | Slave CPU synchronization | Supported. | | – |

# M-EXECUTOR Specifications

The specifications of the M-EXECUTOR in the CPU Unit are given in this section.

## Registerable Programs

| Program Type | | Number of Registered Programs |
|---|---|---|
| Motion Programs | | 32* |
| Sequence Programs | Startup | 1 |
| | Interrupt | Not possible. |
| | H Scan | 32* |
| | L Scan | 32* |

* The combined total of motion programs and sequence programs must not exceed 32.

## Program Control Methods

You can use the following control methods for the programs that are registered in the M-EXECUTOR:

| Item | Motion Programs | Sequence Programs |
|---|---|---|
| Execution method | Sequential execution | Startup: Event execution<br>H scan: Scan execution<br>L scan: Scan execution |
| System work | There is a one-to-one correspondence between the definition number and system work number.<br><br>| Definition No. | System Work Number |<br>|---|---|<br>| No.1 | 1 |<br>| No.2 | 2 |<br>| ⋮ | ⋮ |<br>| No.32 | 32 | | |
| Program designation method | Direct designation or indirect designation | Direct designation |
| Program execution method | Register the program in the definitions and start execution by turning ON the start signal. | Execution is started when the program is registered in the definitions. |
| Interpolation override setting | Supported. | Not supported. |
| I/O link definitions | Supported. | Not supported. |
| Motion program status reporting in S registers | Supported. | |
| Number of parallel forks | Up to 8<br>• Main: 4 forks, Sub: 2 forks<br>• Main: 8 forks<br>• Main: 2 forks, Sub: 4 forks<br>• Sub: 8 forks | No forks |
| Error diagram execution when an operation error occurs | Supported. | |

# USB Memory Specifications

The specifications of the USB memory in the CPU Unit are given in the following table.

| Item | Specification | Remarks |
|---|---|---|
| Supported Media | USB memory device | Refer to the following section for details.<br>☞ *Recommended USB Memory Device (page 4-12)* |
| Applicable FAT | FAT16/32 | – |
| Maximum number of nested directories | 10 | – |
| File information | Last update time-stamps are supported. | Uses the calendar in the Controller.<br>Refer to the following section for details.<br>☞ *3.2 Function Modules - Calendar (page 3-93)* |
| Maximum length for file name and directory names | 256 characters | – |
| Current Directory Function | 16 | – |
| Maximum number of simultaneously open files | 16 | – |
| Formatting | Not supported. | Use a formatted USB memory device. |

## Recommended USB Memory Device

The following USB memory device is recommended. It can be purchased from Yaskawa.

| Model | Specification | Manufacturer |
|---|---|---|
| SFU24096D1BP1TO-C-QT-111-CAP | 4 GB USB memory | Swissbit Japan Inc. |

# System Register Specifications

This section provides the specifications of the system registers.

> **Note** Do not use the registers reserved for the system.

## Overall Configuration

The following table shows the overall configuration of the system registers.

You can read error information and the operating status of the system by specifying the system register address.

| Register Address | Contents | Details |
|---|---|---|
| SW00000 to SW00029 | System Service Registers | ◆ *System Service Registers (page 4-15)* |
| SW00030 to SW00049 | System Status | ◆ *System Status (page 4-19)* |
| SW00050 to SW00079 | System Error Status | ◆ *System Error Status (page 4-20)* |
| SW00080 to SW00089 | User Operation Error Status | ◆ *User Operation Error Status (page 4-22)* |
| SW00090 to SW00103 | System Service Execution Status | ◆ *Detailed User Operation Error Status (page 4-25)* |
| SW00104 to SW00109 | Reserved for system. | – |
| SW00110 to SW00189 | Detailed User Operation Error Status | ◆ *Detailed User Operation Error Status (page 4-25)* |
| SW00190 to SW00199 | Reserved for system. | – |
| SW00200 to SW00503 | System I/O Error Status | ◆ *System I/O Error Status (page 4-26)* |
| SW00504 and SW00505 | Reserved for system. | – |
| SW00506 and SW00507 | Security Status | ◆ *Security Status (page 4-26)* |
| SW00508 to SW00649 | Reserved for system. | – |
| SW00650 to SW00667 | USB-related System Status | ◆ *USB-related System Status (page 4-27)* |
| SW00668 to SW00693 | Reserved for system. | – |
| SW00694 to SW00697 | Message Relaying Status | ◆ *Message Relaying Status (page 4-27)* |
| SW00698 to SW00789 | Interrupt Status | ◆ *Interrupt Status (page 4-28)* |
| SW00790 to SW00799 | Reserved for system. | – |

Specifications

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System Register Specifications

| Register Address | Contents | Details |
|---|---|---|
| SW00800 to SW01095 | Module Information | ◆ *Module Information (page 4-29)* |
| SW01096 to SW01410 | Reserved for system. | – |
| SW01411 to SW01442 | MPU-01 Module Status | ◆ *MPU-01 Module Status (page 4-31)* |
| SW01443 to SW03199 | Reserved for system. | – |
| SW03200 to SW05119 | Motion Program Information | ◆ *Motion Program Execution Information (page 4-32)* |
| SW05120 to SW05247 | Used by the system (system memory read). | – |
| SW05248 to SW08191 | Reserved for system. | – |
| SW08192 to SW09215 | Expansion Motion Program Information | ◆ *Motion Program Execution Information (page 4-32)* |
| SW09216 to SW09559 | Reserved for system. | – |
| SW09560 to SW13699 | Expansion System I/O Error Status | ◆ *Expansion System I/O Error Status (page 4-55)* |
| SW13700 to SW15795 | Expanded Unit and Module Information | ◆ *Expanded Unit and Module Information (page 4-59)* |
| SW15796 to SW15799 | Reserved for system. | – |
| SW15800 | Expansion System Status | ◆ *Expansion System Status (page 4-64)* |
| SW15801 to SW15997 | Reserved for system. | – |
| SW15998 to SW16011 | Expansion System Service Execution Status | ◆ *Expansion System Service Execution Status (page 4-64)* |
| SW16012 to SW16199 | Reserved for system. | – |
| SW16200 to SW17999 | Alarm History Information | ◆ *Alarm History Information (page 4-65)* |
| SW18000 to SW19999 | Reserved for system. | – |
| SW20000 to SW22063 | Product Information | ◆ *Product information (page 4-67)* |
| SW22064 to SW22999 | Reserved for system. | – |
| SW23000 to SW23159 | Unit and Rack Information | ◆ *Unit and Rack Information (page 4-67)* |
| SW23160 to SW23999 | Reserved for system. | – |
| SW24000 to SW24321 | Data Logging Execution Status | ◆ *Data Logging Execution Status (page 4-69)* |
| SW24322 to SW24999 | Reserved for system. | – |
| SW25000 to SW25671 | Automatic Reception Status for Ethernet Communications | ◆ *Automatic Reception Status for Ethernet Communications (page 4-71)* |
| SW25672 to SW65534 | Reserved for system. | – |

## Details

This section gives details on the system registers.

### ◆ System Service Registers
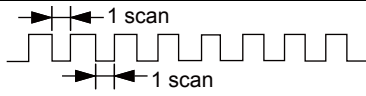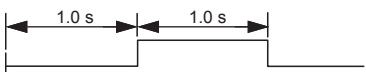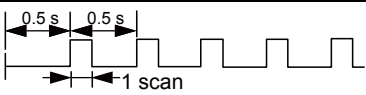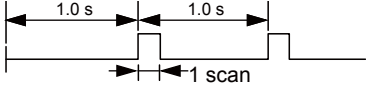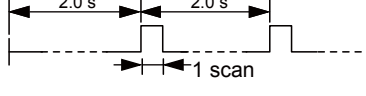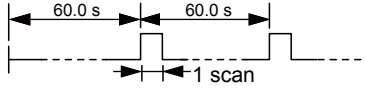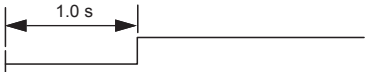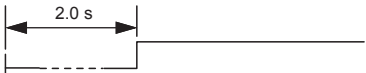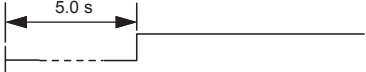
The data in these registers give the execution status and specifications of the programs. The System Service Registers are reset to zero when the system is started.

#### ■ Shared by All Drawings

| Register Address | | Name | Remarks |
|---|---|---|---|
| SW00000 | SB000000 | Reserved for system. | − |
| | SB000001 | High-speed Scan | ON for only the first scan after high-speed scan is started. |
| | SB000002 | Reserved for system. | − |
| | SB000003 | Low-speed Scan | ON for only the first scan after low-speed scan is started. |
| | SB000004 | Always ON | Always ON (set to 1). |
| | SB000005 | High-speed Scan 2 | Only ON for one scan when the high-speed scan starts after the CPU Unit is changed to RUN Mode. |
| | SB000006 | Low-speed Scan 2 | Only ON for one scan when the low-speed scan starts after the CPU Unit is changed to RUN Mode. |
| | SB000007 | High-speed Scan in Progress | 1: High-speed scan in progress |
| | SB000008 | MP2000 Option Service Executing | ON (set to 1) during service scan for the MP2000-series Optional Modules. |
| | SB000009 to SB00000F | Reserved for system. | − |
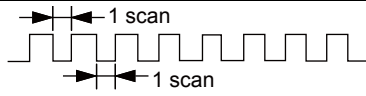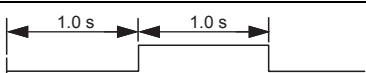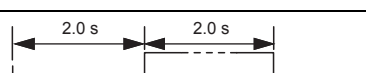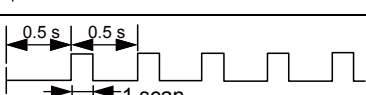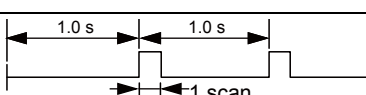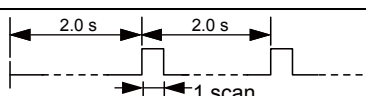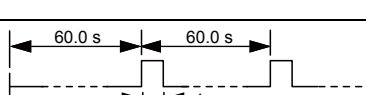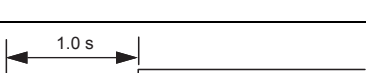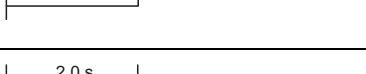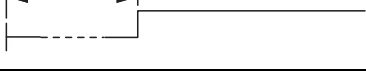
### ■ DWG.H Only

Operation starts when the high-speed scan starts.

| Register Address | | Name | Remarks |
|---|---|---|---|
| SW00001 | SB000010 | 1-scan Flicker Relay |  |
| | SB000011 | 0.5-s Flicker Relay |  |
| | SB000012 | 1.0-s Flicker Relay |  |
| | SB000013 | 2.0-s Flicker Relay |  |
| | SB000014 | 0.5-s Sampling Relay |  |
| | SB000015 | 1.0-s Sampling Relay |  |
| | SB000016 | 2.0-s Sampling Relay |  |
| | SB000017 | 60.0-s Sampling Relay |  |
| | SB000018 | 1.0 s After Start of Scan Process |  |
| SW00001 | SB000019 | 2.0 s After Start of Scan Process |  |
| | SB00001A | 5.0 s After Start of Scan Process |  |
| | SB00001B to SB00001F | Reserved for system. | – |
| SW00002 | | Reserved for system. | – |

■ DWG.L Only

Operation starts when the low-speed scan starts.

| Register Address | | Name | Remarks |
|---|---|---|---|
| SW00003 | SB000030 | 1-scan Flicker Relay |  |
| | SB000031 | 0.5-s Flicker Relay |  |
| | SB000032 | 1.0-s Flicker Relay |  |
| | SB000033 | 2.0-s Flicker Relay |  |
| | SB000034 | 0.5-s Sampling Relay |  |
| | SB000035 | 1.0-s Sampling Relay |  |
| | SB000036 | 2.0-s Sampling Relay |  |
| | SB000037 | 60.0-s Sampling Relay |  |
| | SB000038 | 1.0 s After Start of Scan Process |  |
| | SB000039 | 2.0 s After Start of Scan Process |  |
| | SB00003A | 5.0 s After Start of Scan Process |  |
| | SB00003B to SB00003F | Reserved for system. | – |

### ■ System Execution Status

| Register Address | Name | Remarks |
|---|---|---|
| SW00004 | High-speed Scan Set Value | High-speed scan set value (0.1 ms) |
| SW00005 | Current High-speed Scan Time | Current high-speed scan time (0.1 ms) |
| SW00006 | Maximum High-speed Scan Time | Maximum high-speed scan time (0.1 ms) |
| SW00007 | High-speed Scan Set Value 2 | High-speed scan set value (µs) |
| SW00008 | Current High-speed Scan Time 2 | Current high-speed scan time (µs) |
| SW00009 | Maximum High-speed Scan Time 2 | Maximum high-speed scan time (µs) |
| SW00010 | Low-speed Scan Set Value | Low-speed scan set value (0.1 ms) |
| SW00011 | Current Low-speed Scan Time | Current low-speed scan time (0.1 ms) |
| SW00012 | Maximum Low-speed Scan Time | Maximum low-speed scan time (0.1 ms) |
| SW00013 | Reserved for system. | – |
| SW00014 | Current Scan Time | Scan time of currently executing scan (0.1 ms) |

### ■ Calendar

| Register Address | Name | Remarks | Example |
|---|---|---|---|
| SW00015 | Calendar year | Gives the last two digits of the year in BCD format. | 2011: 0011 |
| SW00016 | Calendar Month and Day | Gives the month and day in BCD format. | December 31: 1231 |
| SW00017 | Calendar Hours and Minutes | Gives the hours and minutes in BCD format. | 23 hours 59 minutes: 2359 |
| SW00018 | Calendar Seconds | Gives the seconds in BCD format. | 59 seconds: 0059 |
| SW00019 | Calendar Week | Gives the day of the week as a number between 0 and 6. 0: Sunday, 1: Monday, 2: Tuesday, 3: Wednesday, 4: Thursday, 5: Friday, and 6: Saturday | – |

### ■ System Program Software Version

| Register Address | Name | Remarks |
|---|---|---|
| SW00020 | System Program Software Version | Ver. □□.□□ (Gives the version in BCD format.) |
| SW00021 to SW00025 | Reserved for system. | – |

### ■ Remaining Program Memory Capacity

| Register Address | Name | Remarks |
|---|---|---|
| SL00026 | Remaining Program Memory Capacity | Bytes |
| SL00028 | Total Memory Capacity | Bytes |

## ◆ System Status

The data in these registers give the operating status of the system or provide information about errors. You can check the following system registers to determine whether the cause of the error is hardware or software related. The System Status Registers are reset to zero when the system is started.

| Name | Register Address | | Contents | |
|---|---|---|---|---|
| Reserved for system. | SW00030 to SW00039 | | – | |
| CPU Status | SW00040 | SB000400 | READY | 0: Error, 1: Ready |
| | | SB000401 | RUN | 0: Stopped, 1: Running |
| | | SB000402 | ALARM | 0: Normal, 1: Alarm |
| | | SB000403 | ERROR | 0: Normal, 1: Error |
| | | SB000404 | Reserved for system. | – |
| | | SB000405 | M-ALM | 0: Normal, 1: Axis alarm |
| | | SB000406 | FLASH | 0: INIT Start, 1: Flash Operation |
| | | SB000407 | WEN | 0: Writing disabled, 1: Writing enabled |
| | | SB000408, SB000409 | Reserved for system. | – |
| | | SB00040A | Flash Save Request from MPE720 | 0: Not saving data to flash memory<br>1: Saving data to flash memory |
| | | SB00040B | Status of Synchronization with Main CPU Unit (Sub CPU Units only) | 0: High-speed scans synchronized<br>1: High-speed scans not synchronized |
| | | SB00040C | CPU Unit Mode | 0: Main CPU Unit, 1: Sub CPU Unit |
| | | SB00040D | Stop Operation Request from Main CPU Unit (Sub CPU Units only) | 0: RUN selected, 1: STOP selected |
| | | SB00040E | Operation Stop Request from MPE720 | 0: RUN selected, 1: STOP selected |
| | | SB00040F | Run Switch Status at Power ON | 0: STOP, 1: RUN |
| CPU Error Status | SW00041 | SB000410 | Serious Failure | 0: Normal, 1: Serious failure |
| | | SB000411, SB000412 | Reserved for system. | – |
| | | SB000413 | Exception Error | 0: Normal, 1: Exception error |
| | | SB000414 to SB000417 | Reserved for system. | – |
| | | SB000418 | User Operation Error | 0: Normal, 1: User operation error |
| | | SB000419 | I/O Error | 0: Normal, 1: I/O error |
| | | SB00041A | MPU-01 Error | 0: Normal, 1: MPU-01 error |
| | | SB00041B | Sub CPU Unit Error (Main CPU Unit only) | 0: Normal, 1: Sub CPU Unit error |
| | | SB00041C | Reserved for system. | – |
| | | SB00041D | M-III Restrictions Error | 0: Normal, 1: Restrictions error in MECHATROLINK-III communications cycle |
| | | SB00041E | Fan Alarm | 0: Normal, 1: Fan alarm |
| | | SB00041F | Temperature Warning | 0: Normal, 1: Temperature warning |

Specifications

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| Name | Register Address | | Contents | |
|---|---|---|---|---|
| H Scan Exceeded Counter | SW00044 | | H Scan Exceeded Count | |
| L Scan Exceeded Counter | SW00046 | | L Scan Exceeded Count | |
| Reserved for system. | SW00047 | SB000470 to SB00047F | Reserved for system. | – |
| Hardware Configuration Status | SW00048 | SB000480 | D-RST | Mode switch 1 setting status: 0: OFF, 1: ON |
| | | SB000481 | LOAD | |
| | | SB000482 | CNFG | |
| | | SB000483 | INIT | |
| | | SB000484 | E-INIT | |
| | | SB000485 | STOP | |
| | | SB000486 | Reserved for system. | – |
| | | SB000487 | Battery Alarm | – |
| | | SB000488, SB000489 | Reserved for system. | – |
| | | SB00048A | MNT | Mode switch 2 setting status: 0: OFF, 1: ON |
| | | SB00048B | TEST | |
| | | SB00048C | E-PM1 | |
| | | SB00048D | E-PM0 | |
| | | SB00048E, SB00048F | Reserved for system. | – |
| Reserved for system. | SW00049 | | Reserved for system. | – |

## ◆ System Error Status

The data in these registers give the error status of the system.

| Name | Register Address | Contents | |
|---|---|---|---|
| 32-bit Error Code | SW00050 | 0001 hex | Watchdog timeout error |
| | | 0051 hex | Module synchronization error |
| | | 0052 hex | Main CPU Unit System Down Detection (Sub CPU Units only) |
| | SW00051 | For system error analysis | |
| 32-bit Error Address | SW00052 and SW00053 | For system error analysis | |
| Program Error Task | SW00054 | 0000 hex | system |
| | | 0001 hex | DWG.A |
| | | 0002 hex | DWG.I |
| | | 0003 hex | DWG.H |
| | | 0005 hex | DWG.L |

| Name | Register Address | Contents | |
|------|------------------|----------|---|
| Program Type | SW00055 | 0000 hex | system |
| | | 0001 hex | DWG.A |
| | | 0002 hex | DWG.I |
| | | 0003 hex | DWG.H |
| | | 0005 hex | DWG.L |
| | | 0008 hex | Function |
| | | 000F hex | Motion program or sequence program |
| Program Error Drawing Number | SW00056 | FFFF hex | Ladder program parent drawing |
| | | 8000 hex | Ladder program function |
| | | □□00 hex | Ladder program child drawing (□□ hex: Child drawing No.) |
| | | □□□□ hex | Ladder program grandchild drawing<br><br>□□□□ hex<br>└── Grandchild drawing number<br>└── Child drawing number |
| | | F□□□ hex | Motion program or sequence program (□□□ hex: Program No.) |
| Drawing Type of Calling Program | SW00057 | Type of the calling drawing in which the error occurred | |
| | | 0001 hex | DWG.A |
| | | 0002 hex | DWG.I |
| | | 0003 hex | DWG.H |
| | | 0005 hex | DWG.L |
| | | 0008 hex | Function |
| | | 000F hex | Motion program/sequence program |
| Drawing No. of Calling Program | SW00058 | Number of the calling drawing in which the error occurred | |
| | | FFFF hex | Parent drawing |
| | | 8000 hex | Function |
| | | □□00 hex | Child drawing (□□ hex: Child drawing No.) |
| | | xxyy hex | Grandchild drawing (xx hex: Child drawing No., yy hex: Grandchild drawing No.) |
| Drawing Step No. in Calling Program | SW00059 | Step Number in the Calling Drawing in Which the Error Occurred<br>This is set to 0 if the error occurs in the parent drawing. | |

System Register Specifications

| Name | Register Address | Contents | |
|------|------------------|----------|---|
| Error Data | SW00060 and SW00061 | Reserved for system. | |
| | SW00062 to SW00065 | Name of task that caused the error | |
| | SW00066 and SW00067 | Reserved for system. | |
| | SW00068 | Year When Error Occurred | |
| | SW00069 | Month When Error Occurred | |
| | SW00070 | Day of Week When Error Occurred | |
| | SW00071 | Day When Error Occurred | |
| | SW00072 | Hour When Error Occurred | |
| | SW00073 | Minutes When Error Occurred | |
| | SW00074 | Seconds When Error Occurred | |
| | SW00075 | Milliseconds When Error Occurred | |
| | SW00076 | xyzz hex | Slot Where the Module Synchronization Error Was Detected (x: Rack number from 1 to 7, y: unit number from 1 to 4, zz: slot number from 01 to 09) |
| | SW00077 to SW00079 | Reserved for system. | |

## ◆ User Operation Error Status

The data in these registers give details when an operation error occurs in a user program.

| Drawing Type | Error Description | Register Address | Contents |
|--------------|-------------------|------------------|----------|
| DWG.A | Error Count | SW00080 | • Error Count |
| | Error Code | SW00081 | Gives the number of errors that have occurred. |
| DWG.I | Error Count | SW00082 | |
| | Error Code | SW00083 | • Error Code |
| DWG.H | Error Count | SW00084 | Gives the details of the error. |
| | Error Code | SW00085 | 0□□□ hex: Operation error |
| Reserved for system. | | SW00086, SW00087 | ☞ ■ *User Operation Error Code −1: Operation Errors (page 4-23)* |
| DWG.L | Error Count | SW00088 | x□□□ hex (x = 1, 2, 3): Index error |
| | Error Code | SW00089 | ☞ ■ *User Operation Error Code −2: Index Errors (page 4-24)* |

■ User Operation Error Code −1: Operation Errors

<table>
<tr><th></th><th>Error Code</th><th>Error Description</th><th colspan="4">Operation When an Error Occurs*</th></tr>
<tr><td rowspan="11">Integer Operations</td><td>0001 hex</td><td>Integer operation underflow</td><td colspan="4">[-32768]</td></tr>
<tr><td>0002 hex</td><td>Integer operation overflow</td><td colspan="4">[32767]</td></tr>
<tr><td>0003 hex</td><td>Integer operation division error</td><td colspan="4">[The A register stays the same.]</td></tr>
<tr><td>0009 hex</td><td>Double-length integer operation underflow</td><td colspan="4">[-2147483648]</td></tr>
<tr><td>000A hex</td><td>Double-length integer operation overflow</td><td colspan="4">[2147483647]</td></tr>
<tr><td>000B hex</td><td>Double-length integer operation division error</td><td colspan="4">[The A register stays the same.]</td></tr>
<tr><td>000C hex</td><td>Quadruple-length integer operation under-flow</td><td colspan="4">[-9223372036854775808]</td></tr>
<tr><td>000D hex</td><td>Quadruple-length integer operation over-flow</td><td colspan="4">[9223372036854775807]</td></tr>
<tr><td>000E hex</td><td>Quadruple-length integer operation division error</td><td colspan="4">[The A register stays the same.]</td></tr>
<tr><td>0101 hex to 010E hex</td><td>Integer operation error in Operation Error Drawing</td><td colspan="4">[The A register stays the same.]</td></tr>
<tr><td rowspan="22">Real Number Operations</td><td>0010 hex</td><td>Non-numerical integer storage error</td><td colspan="4">Data is not stored. [00000]</td></tr>
<tr><td>0011 hex</td><td>Integer storage underflow</td><td colspan="4">Data is not stored. [-32768]</td></tr>
<tr><td>0012 hex</td><td>Integer storage overflow</td><td colspan="4">Data is not stored. [+32767]</td></tr>
<tr><td>0021 hex</td><td>Real number storage underflow</td><td colspan="4">Data is not stored. [-1.0E+38]</td></tr>
<tr><td>0022 hex</td><td>Real number storage overflow</td><td colspan="4">Data is not stored. [1.0E+38]</td></tr>
<tr><td>0023 hex</td><td>Real number operation division by zero error</td><td colspan="4">Data is not stored. [F register stays the same]</td></tr>
<tr><td>0030 hex</td><td>Invalid real number operation (non-numeric)</td><td colspan="4">Data is not stored.</td></tr>
<tr><td>0031 hex</td><td>Real number operation exponent underflow</td><td colspan="4">0.0</td></tr>
<tr><td>0032 hex</td><td>Real number operation exponent overflow</td><td colspan="4">Maximum Value</td></tr>
<tr><td>0033 hex</td><td>Real number operation division error (0/0)</td><td colspan="4">Operation is not executed.</td></tr>
<tr><td>0034 hex</td><td>Real number storage exponent underflow</td><td colspan="4">Stores 0.0.</td></tr>
<tr><td rowspan="11">0040 hex to 0059 hex</td><td>Real number operation error in standard system function</td><td colspan="4">Operation is aborted and output is set to 0.0.</td></tr>
<tr><td>0040 hex: SQRT</td><td>0047 hex: EXP</td><td>004E hex: PD</td><td>0055 hex: SLAU</td></tr>
<tr><td>0041 hex: SIN</td><td>0048 hex: LN</td><td>004F hex: PID</td><td>0056 hex: REM</td></tr>
<tr><td>0042 hex: COS</td><td>0049 hex: LOG</td><td>0050 hex: LAG</td><td>0057 hex: RCHK</td></tr>
<tr><td>0043 hex: TAN</td><td>004A hex: DZA</td><td>0051 hex: LLAG</td><td>0058 hex: BSRCH</td></tr>
<tr><td>0044 hex: ASIN</td><td>004B hex: DZB</td><td>0052 hex: FGN</td><td>0059 hex: SORT</td></tr>
<tr><td>0045 hex: ACOS</td><td>004C hex: LIM</td><td>0053 hex: IFGN</td><td rowspan="2">–</td></tr>
<tr><td>0046 hex: ATAN</td><td>004D hex: PI</td><td>0054 hex: LAU</td></tr>
</table>

* The numeric values given in brackets [ ] are set by the system in the Changed A Register or Changed F Register before the operation error drawing is executed.

### ■ User Operation Error Code −2: Index Errors

| | Error Code | Error Description | | Operation When an Error Occurs | |
|---|---|---|---|---|---|
| Integer and Real Number Operations | 1000 hex | Index error in drawing | | Re-executed as if i and j were set to 0. (Both i and j registers stay the same.) | |
| | 2000 hex | Index error in function | | Re-executed as if i and j were set to 0. (Both i and j registers stay the same.) | |
| | 3000 hex | Index error in motion program or sequence program | | Re-executed as if i and j were set to 0. (Both i and j registers stay the same.) | |
| Real Number Operations | x040 hex to x059 hex (x=1,2,3) | Real number operation error in standard system function | | Operation is aborted and output is set to 0.0. | |
| | | x040 hex: SQRT | x047 hex: EXP | x04E hex: PD | x055 hex: SLAU |
| | | x041 hex: SIN | x048 hex: LN | x04F hex: PID | x056 hex: REM |
| | | x042 hex: COS | x049 hex: LOG | x050 hex: LAG | x057 hex: RCHK |
| | | x043 hex: TAN | x04A hex: DZA | x051 hex: LLAG | x058 hex: BSRCH |
| | | x044 hex: ASIN | x04B hex: DZB | x052 hex: FGN | x059 hex: SORT |
| | | x045 hex: ACOS | x04C hex: LIM | x053 hex: IFGN | − |
| | | x046 hex: ATAN | x04D hex: PI | x054 hex: LAU | |
| Integer Operations | x060 hex to x0C9 hex (x=1,2,3) | Integer operation error in standard system function | | Operation is aborted and output is set to input. [A register stays the same.] | |
| | | x06D hex: PI | x091 hex: ROTR | x0A0 hex: BEXTEND | x0B1 hex: SPEND |
| | | x06E hex: PD | x092 hex: MOVB | x0A1 hex: BPRESS | x0C0 hex: TBLBR |
| | | x06F hex: PID | x093 hex: MOVW | x0A2 hex: SORT | x0C1 hex: TBLBW |
| | | x070 hex: LAG | x094 hex: SETW | x0A4 hex: SORT | x0C2 hex: TBLSRL |
| | | x071 hex: LLAG | x095 hex: XCHG | x0A6 hex: RCHK | x0C3 hex: TBLSRC |
| | | x072 hex: FGN | x096 hex: LIMIT | x0A7 hex: RCHK | x0C4 hex: TBLCL |
| | | x073 hex: IFGN | x097 hex: LIMIT | x0A8 hex: COPYW | x0C5 hex: TBLMW |
| | | x074 hex: LAU | x098 hex: DZA | x0A9 hex: ASCII | x0C6 hex: QTBLR |
| | | x075 hex: SLAU | x099 hex: DZA | x0AA hex: BINASC | x0C7 hex: QTBLRI |
| | | x076 hex: FGN | x09A hex: DZB | x0AB hex: ASCBIN | x0C8 hex: QTBLW |
| | | x077 hex: IFGN | x09B hex: DZB | x0AC hex: BSRCH | x0C9 hex: QTBLWI |
| | | x08E hex: INS | x09C hex: PWM | x0AD hex: BSRCH | |
| | | x08F hex: OUTS | x09E hex: SHFTL | x0AE hex: TIMEADD | − |
| | | x090 hex: ROTL | x09F hex: SHFTR | x0AF hex: TIMSUB | |

## ◆ Detailed User Operation Error Status

The data in these registers give details when a user operation error occurs in a user program.

| Name | Register Address | | | | Remarks |
|------|------|------|------|------|---------|
| | DWG.A | DWG.I | DWG.H | DWG.L | |
| Error Count | SW00110 | SW00126 | SW00142 | SW00174 | • Error Drawing No. |
| Error Code | SW00111 | SW00127 | SW00143 | SW00175 | FFFF hex: Parent drawing |
| Error A Registers | SW00112 | SW00128 | SW00144 | SW00176 | □□00 hex: Child drawing (□□ hex: |
| | SW00113 | SW00129 | SW00145 | SW00177 | Child drawing No.) |
| Changed A Registers | SW00114 | SW00130 | SW00146 | SW00178 | xxyy hex: Grandchild drawing (xx hex: |
| | SW00115 | SW00131 | SW00147 | SW00179 | Child drawing No., yy hex: Grandchild drawing No.) |
| Error F Registers | SW00116 | SW00132 | SW00148 | SW00180 | 8000 hex: Function |
| | SW00117 | SW00133 | SW00149 | SW00181 | F□□□ hex: Motion program or |
| Changed F Registers | SW00118 | SW00134 | SW00150 | SW00182 | sequence program (□□□ hex: Program No.) |
| | SW00119 | SW00135 | SW00151 | SW00183 | |
| Address Where Error Occurred | SW00120 | SW00136 | SW00152 | SW00184 | • Calling Drawing No. |
| | SW00121 | SW00137 | SW00153 | SW00185 | Number of the calling drawing in which the operation error occurred |
| Error Drawing No. | SW00122 | SW00138 | SW00154 | SW00186 | |
| Calling Drawing No. | SW00123 | SW00139 | SW00155 | SW00187 | • Calling Drawing Step No. |
| Calling Drawing Step No. | SW00124 | SW00140 | SW00156 | SW00188 | Step number in the calling drawing in which the operation error occurred This number is set to 0 if the error occurs in the parent drawing. |
| Error Step No. | SW00125 | SW00141 | SW00157 | SW00189 | • Error Step No. Step number when the operation error occurred |

## ◆ System Service Execution Status

The data in these registers give the execution status of the system.

| Name | Register Address | | Remarks | |
|------|------|------|---------|---|
| Reserved for system. | SW00090 to SW00097 | | – | |
| Data Trace Definition Existence | SW00098 | SB000980 | Group 1 | 0: Definition does not exist 1: Definition exists |
| | | SB000981 | Group 2 | |
| | | SB000982 | Group 3 | |
| | | SB000983 | Group 4 | |
| | | SB000984 to SB00098F | Reserved for system. | |
| Data Trace Execution Status | SW00099 | SB000990 | Group 1 | 0: Tracing in progress 1: Tracing stopped |
| | | SB000991 | Group 2 | |
| | | SB000992 | Group 3 | |
| | | SB000993 | Group 4 | |
| | | SB000994 to SB00099F | Reserved for system. | |
| Group 1 Record No. | SW00100 | | Latest record number in group 1. | |
| Group 2 Record No. | SW00101 | | Latest record number in group 2. | |
| Group 3 Record No. | SW00102 | | Latest record number in group 3. | |
| Group 4 Record No. | SW00103 | | Latest record number in group 4. | |

Specifications

4

#### ◆ System I/O Error Status

The data in these registers give the I/O errors in the system for Racks 1 to 4.

The details of the error status depend on the Modules that are mounted and the error code. Refer to the following manual for details.

📖 *MP3000 Series MP3200 Troubleshooting Manual* (Manual No.: SIEP C880725 01)

| Name | Register Address | Remarks |
|------|------------------|---------|
| I/O Error Count | SW00200 | Number of I/O error occurrences |
| Input Error Count | SW00201 | Number of input error occurrences |
| Input Error Address | SW00202 | Latest input error address (register address in IW□□□□) |
| Output Error Count | SW00203 | Number of output error occurrences |
| Output Error Address | SW00204 | Latest output error address (register address in OW□□□□) |
| Reserved for system. | SW00205 to SW00207 | – |
| I/O Error Status | SW00208 to SW00215 | Error status of Rack 1, Slot 0 |
| | SW00216 to SW00223 | Reserved for system. |
| | SW00224 to SW00231 | Error status of Rack 1, Slot 1 (Depends on the Module that is mounted and the error code.) |
| | SW00232 to SW00239 | Error status of Rack 1, Slot 2 (Depends on the Modules that are mounted and the error code.) |
| | SW00240 to SW00247 | Error status of Rack 1, Slot 3 (Depends on the Modules that are mounted and the error code.) |
| | SW00248 to SW00255 | Error status of Rack 1, Slot 4 (Depends on the Modules that are mounted and the error code.) |
| | ⋮ | ⋮ |
| | SW00496 to SW00503 | Error status of Rack 4, Slot 9 (Depends on the Modules that are mounted and the error code.) |

> **Information** The I/O error status data for Racks 5 to 7 is stored in SW10628 to SW13699.
> Refer to the following section for details.
> 👉 ◆ *Expansion System I/O Error Status (page 4-55)*

#### ◆ Security Status

The data in these registers give the status of CPU Unit security.

| Name | Register Address | | Contents | |
|------|------------------|---|----------|---|
| Security Status | SW00506 | | 0: Security disabled, 1: Security enabled | |
| Security Read Protection Information | SW00507 | SB005070 to SB005073 | Restriction rights for file reading | □□□□ hex — Restriction rights level (0 to 7) — Reserved for system. — File reading restriction 0: Not restricted 1: Restricted — Reserved for system. |
| | | SB005074 to SB005076 | Reserved for system. | |
| | | SB005077 | File reading restriction | |
| | | SB005078 to SB00507F | Reserved for system. | |

◆ USB-related System Status

The data in these registers give information on the USB memory and give the error status.

| Name | Register Address | | Remarks |
|---|---|---|---|
| Available USB Memory | SL00650 | | Unit: Kilobytes |
| Total USB Memory | SL00652 | | |
| USB Status | SW00654 | SB006540 | 0: No USB memory device<br>1: USB memory device inserted |
| | | SB006541 | 0: Not supplying power<br>1: Supplying power |
| | | SB006542 | 0: Cannot recognize USB memory device<br>1: Recognized USB memory device |
| | | SB006543 | 0: Not accessing USB memory device<br>1: Accessing USB memory device |
| | | SB006544 | 0: –<br>1: Checking FAT file system |
| | | SB006545 to SB00654F | Reserved for system. |
| FAT Type | SW00655 | | 0002 hex    FAT16 |
| | | | 0003 hex    FAT32 |
| Reserved for system. | SW00656 and SW00657 | | – |
| Batch Load and Batch Save | SW00658 | SB006580 | 1: Batch load in progress |
| | | SB006581 | 1: USB memory read error |
| | | SB006582 | 1: Load file model mismatch error |
| | | SB006583 | 1: Load file write error |
| | | SB006584 | 1: Save to flash memory error |
| | | SB006585 | 1: Folder for batch loading does not exist |
| | | SB006586 | 1: Loading error due to program write protection |
| | | SB006587 | Reserved for system. |
| | | SB006588 | 1: Batch save in progress |
| | | SB006589 | 1: USB memory write error |
| | | SB00658A | 1: Save file read error |
| | | SB00658B | 1: Security error |
| | | SB00658C to SB00658F | Reserved for system. |
| Reserved for system. | SW00659 to SW00667 | | – |

◆ Message Relaying Status

The data in these registers give the message relaying status in the CPU Unit.

| Name | Register Address | Contents |
|---|---|---|
| Message Relaying Information | SW00694 | Normally processed command message counter |
| | SW00695 | Command message error counter |
| | SW00696 | Normally processed response message counter |
| | SW00697 | Response message error counter |

## ◆ Interrupt Status
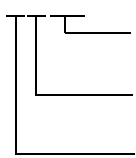
The data in these registers give the status of information provided by interrupts from each I/O Module.

### ■ Register Configuration

| Name | Register Address | Remarks | |
|------|-----------------|---------|---|
| Interrupt Detection Count | SW00698 | – | |
| Module Where an Interrupt Occurred | SW00699 | Number of Modules with a single interrupt | |
| Interrupt Modules | SW00700 to SW00702 | Interrupt Module 1 | Refer to the following section for details. ☞ ■*Details (page 4-28)* |
| | SW00703 to SW00705 | Interrupt Module 2 | |
| | ⋮ | ⋮ | |
| | SW00787 to SW00789 | Interrupt Module 30 | |

### ■ Details

The following table gives details on the Interrupt Module.

| Register Address | Remarks |
|------------------|---------|
| SW007□□ + 0 | Rack No., Unit No., Slot No.<br><br>□□□□ hex<br><br>01 to 09: Gives the slot number where the Module in which the interrupt occurred is mounted.<br>1 to 4: Gives the unit number of the Module in which the interrupt occurred is mounted.<br>1 to 7: Gives the Rack number where the Module in which the interrupt occurred is mounted. |
| SW007□□ + 1 | Interrupt Type<br>1: Reserved for system.<br>2: DI interrupt for LIO-01, LIO-02, LIO-04, or LIO-05<br>3: Counter interrupt for LIO-01, LIO-02, LIO-06, or CNTR-01 |
| SW007□□ + 2 | Register value for hardware interrupt cause<br>The contents depends on the hardware that is being used. Refer to the following manual for details.<br>📖 *MP3000 Series MP3200 Troubleshooting Manual* (Manual No.: SIEP C880725 01) |

#### ◆ Module Information

The data in these registers give hardware information about the CPU Unit and Optional Modules on Racks 1 to 4.

| Name | Register Address | Remarks | | | |
|---|---|---|---|---|---|
| CPU Unit Information | SW00800 | CPU Module ID | | | |
| | SW00801 | Hardware version (BCD) | | | |
| | SW00802 | Software version (BCD) | | | |
| | SW00803 | Number of sub-slots (hex) | | | |
| | SW00804 | Function Module 1 ID (hex) | | | |
| | SW00805 | Function Module 1 Status | | | |
| | SW00806 | Function Module 2 ID (hex) | | | |
| | SW00807 | Function Module 2 Status | | | |
| | SW00808 | Function Module 3 ID (hex) | | | |
| | SW00809 | Function Module 3 Status | | | |
| | SW00810 | Function Module 4 ID (hex) | | | |
| | SW00811 | Function Module 4 Status | | | |
| | SW00812 | Function Module 5 ID (hex) | | | |
| | SW00813 | Function Module 5 Status | | | |
| | SW00814 | Function Module 6 ID (hex) | | | |
| | SW00815 | Function Module 6 Status | | | |
| Optional Module Information | SW00816 | Rack 1 | Unit 1 | Slot 1 | Module ID |
| | SW00817 | | | | Hardware version (BCD) |
| | SW00818 | | | | Software version (BCD) |
| | SW00819 | | | | Number of sub-slots |
| | SW00820 | | | | ID of Function Module 1 |
| | SW00821 | | | | Status of Function Module 1 |
| | SW00822 | | | | ID of Function Module 2 |
| | SW00823 | | | | Status of Function Module 2 |
| | SW00824 to SW00831 | | | Slot 2 | Same as above. |
| | SW00832 to SW00839 | | | Slot 3 | Same as above. |
| | SW00840 to SW00847 | | | Slot 4 | Same as above. |
| | SW00848 to SW00855 | | | Slot 5 | Same as above. |
| | SW00856 to SW00863 | | | Slot 6 | Same as above. |
| | SW00864 to SW00871 | | | Slot 7 | Same as above. |
| | SW00872 to SW00879 | | | Slot 8 | Same as above. |
| Reserved for system. | SW00880 to SW01095 | – | | | |

System Register Specifications

| Name | Register Address | Remarks | | | |
|------|------------------|---------|---|---|---|
| Optional Module Information | SW00880 to SW00887 | Rack 2 | Unit 1 | Slot 1 | Same as above. |
| | SW00888 to SW00895 | | | Slot 2 | Same as above. |
| | SW00896 to SW00903 | | | Slot 3 | Same as above. |
| | SW00904 to SW00911 | | | Slot 4 | Same as above. |
| | SW00912 to SW00919 | | | Slot 5 | Same as above. |
| | SW00920 to SW00927 | | | Slot 6 | Same as above. |
| | SW00928 to SW00935 | | | Slot 7 | Same as above. |
| | SW00936 to SW00943 | | | Slot 8 | Same as above. |
| | SW00944 to SW00951 | | | Reserved for system. | Reserved for system. |
| | SW00952 to SW00959 | Rack 3 | Unit 1 | Slot 1 | Same as above. |
| | SW00960 to SW00967 | | | Slot 2 | Same as above. |
| | SW00968 to SW00975 | | | Slot 3 | Same as above. |
| | SW00976 to SW00983 | | | Slot 4 | Same as above. |
| | SW00984 to SW00991 | | | Slot 5 | Same as above. |
| | SW00992 to SW00999 | | | Slot 6 | Same as above. |
| | SW01000 to SW01007 | | | Slot 7 | Same as above. |
| | SW01008 to SW01015 | | | Slot 8 | Same as above. |
| | SW01016 to SW01023 | | | Reserved for system. | Reserved for system. |
| | SW01024 to SW01031 | Rack 4 | Unit 1 | Slot 1 | Same as above. |
| | SW01032 to SW01039 | | | Slot 2 | Same as above. |
| | SW01040 to SW01047 | | | Slot 3 | Same as above. |
| | SW01048 to SW01055 | | | Slot 4 | Same as above. |
| | SW01056 to SW01063 | | | Slot 5 | Same as above. |
| | SW01064 to SW01071 | | | Slot 6 | Same as above. |
| | SW01072 to SW01079 | | | Slot 7 | Same as above. |
| | SW01080 to SW01087 | | | Slot 8 | Same as above. |
| | SW01088 to SW01095 | | | Reserved for system. | Reserved for system. |

Information    The Optional Module information data for Racks 5 to 7 is stored in SW14260 to SW15795.
Refer to the following section for details.

☞ ◆ *Expanded Unit and Module Information (page 4-59)*

#### ◆ MPU-01 Module Status

The data in these registers give the status of the MPU-01 Multi-CPU Module.

| Name | Register Address | Contents |
|---|---|---|
| | SW01411 | Status of MPU-01 Module circuit number 1 |
| | SW01412 | Error status of MPU-01 Module circuit number 1 |
| | SW01413 | Status of MPU-01 Module circuit number 2 |
| | SW01414 | Error status of MPU-01 Module circuit number 2 |
| | SW01415 | Status of MPU-01 Module circuit number 3 |
| | SW01416 | Error status of MPU-01 Module circuit number 3 |
| | SW01417 | Status of MPU-01 Module circuit number 4 |
| | SW01418 | Error status of MPU-01 Module circuit number 4 |
| | SW01419 | Status of MPU-01 Module circuit number 5 |
| | SW01420 | Error status of MPU-01 Module circuit number 5 |
| | SW01421 | Status of MPU-01 Module circuit number 6 |
| | SW01422 | Error status of MPU-01 Module circuit number 6 |
| | SW01423 | Status of MPU-01 Module circuit number 7 |
| | SW01424 | Error status of MPU-01 Module circuit number 7 |
| | SW01425 | Status of MPU-01 Module circuit number 8 |
| MPU-01 Module Status | SW01426 | Error status of MPU-01 Module circuit number 8 |
| | SW01427 | Status of MPU-01 Module circuit number 9 |
| | SW01428 | Error status of MPU-01 Module circuit number 9 |
| | SW01429 | Status of MPU-01 Module circuit number 10 |
| | SW01430 | Error status of MPU-01 Module circuit number 10 |
| | SW01431 | Status of MPU-01 Module circuit number 11 |
| | SW01432 | Error status of MPU-01 Module circuit number 11 |
| | SW01433 | Status of MPU-01 Module circuit number 12 |
| | SW01434 | Error status of MPU-01 Module circuit number 12 |
| | SW01435 | Status of MPU-01 Module circuit number 13 |
| | SW01436 | Error status of MPU-01 Module circuit number 13 |
| | SW01437 | Status of MPU-01 Module circuit number 14 |
| | SW01438 | Error status of MPU-01 Module circuit number 14 |
| | SW01439 | Status of MPU-01 Module circuit number 15 |
| | SW01440 | Error status of MPU-01 Module circuit number 15 |
| | SW01441 | Status of MPU-01 Module circuit number 16 |
| | SW01442 | Error status of MPU-01 Module circuit number 16 |

### ◆ Motion Program Execution Information

The data in these registers give the execution status of the motion programs.

### ■ Register Configuration

| Register Address | Name | Reference |
|---|---|---|
| SW03200 | Number of Currently Executing Program for Work 1 | – |
| SW03201 | Number of Currently Executing Program for Work 2 | – |
| SW03202 | Number of Currently Executing Program for Work 3 | – |
| SW03203 | Number of Currently Executing Program for Work 4 | – |
| SW03204 | Number of Currently Executing Program for Work 5 | – |
| SW03205 | Number of Currently Executing Program for Work 6 | – |
| SW03206 | Number of Currently Executing Program for Work 7 | – |
| SW03207 | Number of Currently Executing Program for Work 8 | – |
| SW03208 | Number of Currently Executing Program for Work 9 | – |
| SW03209 | Number of Currently Executing Program for Work 10 | – |
| SW03210 | Number of Currently Executing Program for Work 11 | – |
| SW03211 | Number of Currently Executing Program for Work 12 | – |
| SW03212 | Number of Currently Executing Program for Work 13 | – |
| SW03213 | Number of Currently Executing Program for Work 14 | – |
| SW03214 | Number of Currently Executing Program for Work 15 | – |
| SW03215 | Number of Currently Executing Program for Work 16 | – |
| SW03216 | Number of Currently Executing Program for Work 17 | – |
| SW03217 | Number of Currently Executing Program for Work 18 | – |
| SW03218 | Number of Currently Executing Program for Work 19 | – |
| SW03219 | Number of Currently Executing Program for Work 20 | – |
| SW03220 | Number of Currently Executing Program for Work 21 | – |
| SW03221 | Number of Currently Executing Program for Work 22 | – |
| SW03222 | Number of Currently Executing Program for Work 23 | – |
| SW03223 | Number of Currently Executing Program for Work 24 | – |
| SW03224 | Number of Currently Executing Program for Work 25 | – |
| SW03225 | Number of Currently Executing Program for Work 26 | – |
| SW03226 | Number of Currently Executing Program for Work 27 | – |
| SW03227 | Number of Currently Executing Program for Work 28 | – |
| SW03228 | Number of Currently Executing Program for Work 29 | – |
| SW03229 | Number of Currently Executing Program for Work 30 | – |
| SW03230 | Number of Currently Executing Program for Work 31 | – |
| SW03231 | Number of Currently Executing Program for Work 32 | – |
| SW03232 to SW03263 | Program Running Bits | ■*Details (page 4-35)* |
| SW03264 to SW03321 | Work 1 Program Information | |
| SW03322 to SW03379 | Work 2 Program Information | |
| SW03380 to SW03437 | Work 3 Program Information | |
| SW03438 to SW03495 | Work 4 Program Information | *System Work Numbers 1 to 8* |
| SW03496 to SW03553 | Work 5 Program Information | *(page 4-46)* |
| SW03554 to SW03611 | Work 6 Program Information | |
| SW03612 to SW03669 | Work 7 Program Information | |
| SW03670 to SW03727 | Work 8 Program Information | |

| Register Address | Name | Reference |
|---|---|---|
| SW03728 to SW03785 | Work 9 Program Information | *System Work Numbers 9 to 16 (page 4-49)* |
| SW03786 to SW03843 | Work 10 Program Information | |
| SW03844 to SW03901 | Work 11 Program Information | |
| SW03902 to SW03959 | Work 12 Program Information | |
| SW03960 to SW04017 | Work 13 Program Information | |
| SW04018 to SW04075 | Work 14 Program Information | |
| SW04076 to SW04133 | Work 15 Program Information | |
| SW04134 to SW04191 | Work 16 Program Information | |
| SW04192 to SW04249 | Work 17 Program Information | *System Work Numbers 17 to 24 (page 4-51)* |
| SW04250 to SW04307 | Work 18 Program Information | |
| SW04308 to SW04365 | Work 19 Program Information | |
| SW04366 to SW04423 | Work 20 Program Information | |
| SW04424 to SW04481 | Work 21 Program Information | |
| SW04482 to SW04539 | Work 22 Program Information | |
| SW04540 to SW04597 | Work 23 Program Information | |
| SW04598 to SW04655 | Work 24 Program Information | |
| SW04656 to SW04713 | Work 25 Program Information | *System Work Numbers 25 to 32 (page 4-53)* |
| SW04714 to SW04771 | Work 26 Program Information | |
| SW04772 to SW04829 | Work 27 Program Information | |
| SW04830 to SW04887 | Work 28 Program Information | |
| SW04888 to SW04945 | Work 29 Program Information | |
| SW04946 to SW05003 | Work 30 Program Information | |
| SW05004 to SW05061 | Work 31 Program Information | |
| SW05062 to SW05119 | Work 32 Program Information | |
| SW08192 to SW08223 | Work 1 Extended Program Information | *System Work Numbers 1 to 8 (page 4-46)* |
| SW08224 to SW08255 | Work 2 Extended Program Information | |
| SW08256 to SW08287 | Work 3 Extended Program Information | |
| SW08288 to SW08319 | Work 4 Extended Program Information | |
| SW08320 to SW08351 | Work 5 Extended Program Information | |
| SW08352 to SW08383 | Work 6 Extended Program Information | |
| SW08384 to SW08415 | Work 7 Extended Program Information | |
| SW08416 to SW08447 | Work 8 Extended Program Information | |
| SW08448 to SW08479 | Work 9 Extended Program Information | *System Work Numbers 9 to 16 (page 4-49)* |
| SW08480 to SW08511 | Work 10 Extended Program Information | |
| SW08512 to SW08543 | Work 11 Extended Program Information | |
| SW08544 to SW08575 | Work 12 Extended Program Information | |
| SW08576 to SW08607 | Work 13 Extended Program Information | |
| SW08608 to SW08639 | Work 14 Extended Program Information | |
| SW08640 to SW08671 | Work 15 Extended Program Information | |
| SW08672 to SW08703 | Work 16 Extended Program Information | |
| SW08704 to SW08735 | Work 17 Extended Program Information | *System Work Numbers 17 to 24 (page 4-51)* |
| SW08736 to SW08767 | Work 18 Extended Program Information | |
| SW08768 to SW08799 | Work 19 Extended Program Information | |
| SW08800 to SW08831 | Work 20 Extended Program Information | |
| SW08832 to SW08863 | Work 21 Extended Program Information | |
| SW08864 to SW08895 | Work 22 Extended Program Information | |
| SW08896 to SW08927 | Work 23 Extended Program Information | |
| SW08928 to SW08959 | Work 24 Extended Program Information | |

Specifications

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System Register Specifications

| Register Address | Name | Reference |
|---|---|---|
| SW08960 to SW08991 | Work 25 Extended Program Information | *System Work Numbers 25 to 32 (page 4-53)* |
| SW08992 to SW09023 | Work 26 Extended Program Information | |
| SW09024 to SW09055 | Work 27 Extended Program Information | |
| SW09056 to SW09087 | Work 28 Extended Program Information | |
| SW09088 to SW09119 | Work 29 Extended Program Information | |
| SW09120 to SW09151 | Work 30 Extended Program Information | |
| SW09152 to SW09183 | Work 31 Extended Program Information | |
| SW09184 to SW09215 | Work 32 Extended Program Information | |

■ Details

The following table gives details on the Program Execution Bits from system register addresses SW03232 to SW03263.

| Register Address | | Contents | |
|---|---|---|---|
| SW03232 | SB032320 | MPM001 or MPS001 | |
| | SB032321 | MPM002 or MPS002 | |
| | SB032322 | MPM003 or MPS003 | |
| | SB032323 | MPM004 or MPS004 | |
| | SB032324 | MPM005 or MPS005 | |
| | SB032325 | MPM006 or MPS006 | |
| | SB032326 | MPM007 or MPS007 | |
| | SB032327 | MPM008 or MPS008 | |
| | SB032328 | MPM009 or MPS009 | |
| | SB032329 | MPM010 or MPS010 | |
| | SB03232A | MPM011 or MPS011 | |
| | SB03232B | MPM012 or MPS012 | |
| | SB03232C | MPM013 or MPS013 | |
| | SB03232D | MPM014 or MPS014 | |
| | SB03232E | MPM015 or MPS015 | |
| | SB03232F | MPM016 or MPS016 | 0: – |
| SW03233 | SB032330 | MPM017 or MPS017 | 1: Program running |
| | SB032331 | MPM018 or MPS018 | |
| | SB032332 | MPM019 or MPS019 | |
| | SB032333 | MPM020 or MPS020 | |
| | SB032334 | MPM021 or MPS021 | |
| | SB032335 | MPM022 or MPS022 | |
| | SB032336 | MPM023 or MPS023 | |
| | SB032337 | MPM024 or MPS024 | |
| | SB032338 | MPM025 or MPS025 | |
| | SB032339 | MPM026 or MPS026 | |
| | SB03233A | MPM027 or MPS027 | |
| | SB03233B | MPM028 or MPS028 | |
| | SB03233C | MPM029 or MPS029 | |
| | SB03233D | MPM030 or MPS030 | |
| | SB03233E | MPM031 or MPS031 | |
| | SB03233F | MPM032 or MPS032 | |

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System Register Specifications

| Register Address | | Contents | |
|---|---|---|---|
| SW03234 | SB032340 | MPM033 or MPS033 | |
| | SB032341 | MPM034 or MPS034 | |
| | SB032342 | MPM035 or MPS035 | |
| | SB032343 | MPM036 or MPS036 | |
| | SB032344 | MPM037 or MPS037 | |
| | SB032345 | MPM038 or MPS038 | |
| | SB032346 | MPM039 or MPS039 | |
| | SB032347 | MPM040 or MPS040 | |
| | SB032348 | MPM041 or MPS041 | |
| | SB032349 | MPM042 or MPS042 | |
| | SB03234A | MPM043 or MPS043 | |
| | SB03234B | MPM044 or MPS044 | |
| | SB03234C | MPM045 or MPS045 | |
| | SB03234D | MPM046 or MPS046 | |
| | SB03234E | MPM047 or MPS047 | |
| | SB03234F | MPM048 or MPS048 | |
| SW03235 | SB032350 | MPM049 or MPS049 | |
| | SB032351 | MPM050 or MPS050 | |
| | SB032352 | MPM051 or MPS051 | |
| | SB032353 | MPM052 or MPS052 | |
| | SB032354 | MPM053 or MPS053 | |
| | SB032355 | MPM054 or MPS054 | |
| | SB032356 | MPM055 or MPS055 | |
| | SB032357 | MPM056 or MPS056 | 0: – |
| | SB032358 | MPM057 or MPS057 | 1: Program running |
| | SB032359 | MPM058 or MPS058 | |
| | SB03235A | MPM059 or MPS059 | |
| | SB03235B | MPM060 or MPS060 | |
| | SB03235C | MPM061 or MPS061 | |
| | SB03235D | MPM062 or MPS062 | |
| | SB03235E | MPM063 or MPS063 | |
| | SB03235F | MPM064 or MPS064 | |
| SW03236 | SB032360 | MPM065 or MPS065 | |
| | SB032361 | MPM066 or MPS066 | |
| | SB032362 | MPM067 or MPS067 | |
| | SB032363 | MPM068 or MPS068 | |
| | SB032364 | MPM069 or MPS069 | |
| | SB032365 | MPM070 or MPS070 | |
| | SB032366 | MPM071 or MPS071 | |
| | SB032367 | MPM072 or MPS072 | |
| | SB032368 | MPM073 or MPS073 | |
| | SB032369 | MPM074 or MPS074 | |
| | SB03236A | MPM075 or MPS075 | |
| | SB03236B | MPM076 or MPS076 | |
| | SB03236C | MPM077 or MPS077 | |
| | SB03236D | MPM078 or MPS078 | |
| | SB03236E | MPM079 or MPS079 | |
| | SB03236F | MPM080 or MPS080 | |

| Register Address | | Contents | |
|---|---|---|---|
| SW03237 | SB032370 | MPM081 or MPS081 | |
| | SB032371 | MPM082 or MPS082 | |
| | SB032372 | MPM083 or MPS083 | |
| | SB032373 | MPM084 or MPS084 | |
| | SB032374 | MPM085 or MPS085 | |
| | SB032375 | MPM086 or MPS086 | |
| | SB032376 | MPM087 or MPS087 | |
| | SB032377 | MPM088 or MPS088 | |
| | SB032378 | MPM089 or MPS089 | |
| | SB032379 | MPM090 or MPS090 | |
| | SB03237A | MPM091 or MPS091 | |
| | SB03237B | MPM092 or MPS092 | |
| | SB03237C | MPM093 or MPS093 | |
| | SB03237D | MPM094 or MPS094 | |
| | SB03237E | MPM095 or MPS095 | |
| | SB03237F | MPM096 or MPS096 | |
| SW03238 | SB032380 | MPM097 or MPS097 | |
| | SB032381 | MPM098 or MPS098 | |
| | SB032382 | MPM099 or MPS099 | |
| | SB032383 | MPM100 or MPS100 | |
| | SB032384 | MPM101 or MPS101 | |
| | SB032385 | MPM102 or MPS102 | |
| | SB032386 | MPM103 or MPS103 | |
| | SB032387 | MPM104 or MPS104 | 0: – |
| | SB032388 | MPM105 or MPS105 | 1: Program running |
| | SB032389 | MPM106 or MPS106 | |
| | SB03238A | MPM107 or MPS107 | |
| | SB03238B | MPM108 or MPS108 | |
| | SB03238C | MPM109 or MPS109 | |
| | SB03238D | MPM110 or MPS110 | |
| | SB03238E | MPM111 or MPS111 | |
| | SB03238F | MPM112 or MPS112 | |
| SW03239 | SB032390 | MPM113 or MPS113 | |
| | SB032391 | MPM114 or MPS114 | |
| | SB032392 | MPM115 or MPS115 | |
| | SB032393 | MPM116 or MPS116 | |
| | SB032394 | MPM117 or MPS117 | |
| | SB032395 | MPM118 or MPS118 | |
| | SB032396 | MPM119 or MPS119 | |
| | SB032397 | MPM120 or MPS120 | |
| | SB032398 | MPM121 or MPS121 | |
| | SB032399 | MPM122 or MPS122 | |
| | SB03239A | MPM123 or MPS123 | |
| | SB03239B | MPM124 or MPS124 | |
| | SB03239C | MPM125 or MPS125 | |
| | SB03239D | MPM126 or MPS126 | |
| | SB03239E | MPM127 or MPS127 | |
| | SB03239F | MPM128 or MPS128 | |

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System Register Specifications

| Register Address | | Contents | |
|---|---|---|---|
| SW03240 | SB032400 | MPM129 or MPS129 | |
| | SB032401 | MPM130 or MPS130 | |
| | SB032402 | MPM131 or MPS131 | |
| | SB032403 | MPM132 or MPS132 | |
| | SB032404 | MPM133 or MPS133 | |
| | SB032405 | MPM134 or MPS134 | |
| | SB032406 | MPM135 or MPS135 | |
| | SB032407 | MPM136 or MPS136 | |
| | SB032408 | MPM137 or MPS137 | |
| | SB032409 | MPM138 or MPS138 | |
| | SB03240A | MPM139 or MPS139 | |
| | SB03240B | MPM140 or MPS140 | |
| | SB03240C | MPM141 or MPS141 | |
| | SB03240D | MPM142 or MPS142 | |
| | SB03240E | MPM143 or MPS143 | |
| | SB03240F | MPM144 or MPS144 | |
| SW03241 | SB032410 | MPM145 or MPS145 | |
| | SB032411 | MPM146 or MPS146 | |
| | SB032412 | MPM147 or MPS147 | |
| | SB032413 | MPM148 or MPS148 | |
| | SB032414 | MPM149 or MPS149 | |
| | SB032415 | MPM150 or MPS150 | |
| | SB032416 | MPM151 or MPS151 | |
| | SB032417 | MPM152 or MPS152 | 0: – |
| | SB032418 | MPM153 or MPS153 | 1: Program running |
| | SB032419 | MPM154 or MPS154 | |
| | SB03241A | MPM155 or MPS155 | |
| | SB03241B | MPM156 or MPS156 | |
| | SB03241C | MPM157 or MPS157 | |
| | SB03241D | MPM158 or MPS158 | |
| | SB03241E | MPM159 or MPS159 | |
| | SB03241F | MPM160 or MPS160 | |
| SW03242 | SB032420 | MPM161 or MPS161 | |
| | SB032421 | MPM162 or MPS162 | |
| | SB032422 | MPM163 or MPS163 | |
| | SB032423 | MPM164 or MPS164 | |
| | SB032424 | MPM165 or MPS165 | |
| | SB032425 | MPM166 or MPS166 | |
| | SB032426 | MPM167 or MPS167 | |
| | SB032427 | MPM168 or MPS168 | |
| | SB032428 | MPM169 or MPS169 | |
| | SB032429 | MPM170 or MPS170 | |
| | SB03242A | MPM171 or MPS171 | |
| | SB03242B | MPM172 or MPS172 | |
| | SB03242C | MPM173 or MPS173 | |
| | SB03242D | MPM174 or MPS174 | |
| | SB03242E | MPM175 or MPS175 | |
| | SB03242F | MPM176 or MPS176 | |

| Register Address | | Contents |
|---|---|---|
| SW03243 | SB032430 | MPM177 or MPS177 |
| | SB032431 | MPM178 or MPS178 |
| | SB032432 | MPM179 or MPS179 |
| | SB032433 | MPM180 or MPS180 |
| | SB032434 | MPM181 or MPS181 |
| | SB032435 | MPM182 or MPS182 |
| | SB032436 | MPM183 or MPS183 |
| | SB032437 | MPM184 or MPS184 |
| | SB032438 | MPM185 or MPS185 |
| | SB032439 | MPM186 or MPS186 |
| | SB03243A | MPM187 or MPS187 |
| | SB03243B | MPM188 or MPS188 |
| | SB03243C | MPM189 or MPS189 |
| | SB03243D | MPM190 or MPS190 |
| | SB03243E | MPM191 or MPS191 |
| | SB03243F | MPM192 or MPS192 |
| SW03244 | SB032440 | MPM193 or MPS193 |
| | SB032441 | MPM194 or MPS194 |
| | SB032442 | MPM195 or MPS195 |
| | SB032443 | MPM196 or MPS196 |
| | SB032444 | MPM197 or MPS197 |
| | SB032445 | MPM198 or MPS198 |
| | SB032446 | MPM199 or MPS199 |
| | SB032447 | MPM200 or MPS200 |
| | SB032448 | MPM201 or MPS201 |
| | SB032449 | MPM202 or MPS202 |
| | SB03244A | MPM203 or MPS203 |
| | SB03244B | MPM204 or MPS204 |
| | SB03244C | MPM205 or MPS205 |
| | SB03244D | MPM206 or MPS206 |
| | SB03244E | MPM207 or MPS207 |
| | SB03244F | MPM208 or MPS208 |
| SW03245 | SB032450 | MPM209 or MPS209 |
| | SB032451 | MPM210 or MPS210 |
| | SB032452 | MPM211 or MPS211 |
| | SB032453 | MPM212 or MPS212 |
| | SB032454 | MPM213 or MPS213 |
| | SB032455 | MPM214 or MPS214 |
| | SB032456 | MPM215 or MPS215 |
| | SB032457 | MPM216 or MPS216 |
| | SB032458 | MPM217 or MPS217 |
| | SB032459 | MPM218 or MPS218 |
| | SB03245A | MPM219 or MPS219 |
| | SB03245B | MPM220 or MPS220 |
| | SB03245C | MPM221 or MPS221 |
| | SB03245D | MPM222 or MPS222 |
| | SB03245E | MPM223 or MPS223 |
| | SB03245F | MPM224 or MPS224 |

(The fourth column, spanning these rows, reads:)
0: –
1: Program running

Specifications

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System Register Specifications

| Register Address | | Contents | |
|---|---|---|---|
| SW03246 | SB032460 | MPM225 or MPS225 | |
| | SB032461 | MPM226 or MPS226 | |
| | SB032462 | MPM227 or MPS227 | |
| | SB032463 | MPM228 or MPS228 | |
| | SB032464 | MPM229 or MPS229 | |
| | SB032465 | MPM230 or MPS230 | |
| | SB032466 | MPM231 or MPS231 | |
| | SB032467 | MPM232 or MPS232 | |
| | SB032468 | MPM233 or MPS233 | |
| | SB032469 | MPM234 or MPS234 | |
| | SB03246A | MPM235 or MPS235 | |
| | SB03246B | MPM236 or MPS236 | |
| | SB03246C | MPM237 or MPS237 | |
| | SB03246D | MPM238 or MPS238 | |
| | SB03246E | MPM239 or MPS239 | |
| | SB03246F | MPM240 or MPS240 | |
| SW03247 | SB032470 | MPM241 or MPS241 | |
| | SB032471 | MPM242 or MPS242 | |
| | SB032472 | MPM243 or MPS243 | |
| | SB032473 | MPM244 or MPS244 | |
| | SB032474 | MPM245 or MPS245 | |
| | SB032475 | MPM246 or MPS246 | |
| | SB032476 | MPM247 or MPS247 | |
| | SB032477 | MPM248 or MPS248 | 0: – |
| | SB032478 | MPM249 or MPS249 | 1: Program running |
| | SB032479 | MPM250 or MPS250 | |
| | SB03247A | MPM251 or MPS251 | |
| | SB03247B | MPM252 or MPS252 | |
| | SB03247C | MPM253 or MPS253 | |
| | SB03247D | MPM254 or MPS254 | |
| | SB03247E | MPM255 or MPS255 | |
| | SB03247F | MPM256 or MPS256 | |
| SW03248 | SB032480 | MPM257 or MPS257 | |
| | SB032481 | MPM258 or MPS258 | |
| | SB032482 | MPM259 or MPS259 | |
| | SB032483 | MPM260 or MPS260 | |
| | SB032484 | MPM261 or MPS261 | |
| | SB032485 | MPM262 or MPS262 | |
| | SB032486 | MPM263 or MPS263 | |
| | SB032487 | MPM264 or MPS264 | |
| | SB032488 | MPM265 or MPS265 | |
| | SB032489 | MPM266 or MPS266 | |
| | SB03248A | MPM267 or MPS267 | |
| | SB03248B | MPM268 or MPS268 | |
| | SB03248C | MPM269 or MPS269 | |
| | SB03248D | MPM270 or MPS270 | |
| | SB03248E | MPM271 or MPS271 | |
| | SB03248F | MPM272 or MPS272 | |

| Register Address | | Contents |
|---|---|---|
| SW03249 | SB032490 | MPM273 or MPS273 |
| | SB032491 | MPM274 or MPS274 |
| | SB032492 | MPM275 or MPS275 |
| | SB032493 | MPM276 or MPS276 |
| | SB032494 | MPM277 or MPS277 |
| | SB032495 | MPM278 or MPS278 |
| | SB032496 | MPM279 or MPS279 |
| | SB032497 | MPM280 or MPS280 |
| | SB032498 | MPM281 or MPS281 |
| | SB032499 | MPM282 or MPS282 |
| | SB03249A | MPM283 or MPS283 |
| | SB03249B | MPM284 or MPS284 |
| | SB03249C | MPM285 or MPS285 |
| | SB03249D | MPM286 or MPS286 |
| | SB03249E | MPM287 or MPS287 |
| | SB03249F | MPM288 or MPS288 |
| SW03250 | SB032500 | MPM289 or MPS289 |
| | SB032501 | MPM290 or MPS290 |
| | SB032502 | MPM291 or MPS291 |
| | SB032503 | MPM292 or MPS292 |
| | SB032504 | MPM293 or MPS293 |
| | SB032505 | MPM294 or MPS294 |
| | SB032506 | MPM295 or MPS295 |
| | SB032507 | MPM296 or MPS296 |
| | SB032508 | MPM297 or MPS297 |
| | SB032509 | MPM298 or MPS298 |
| | SB03250A | MPM299 or MPS299 |
| | SB03250B | MPM300 or MPS300 |
| | SB03250C | MPM301 or MPS301 |
| | SB03250D | MPM302 or MPS302 |
| | SB03250E | MPM303 or MPS303 |
| | SB03250F | MPM304 or MPS304 |
| SW03251 | SB032510 | MPM305 or MPS305 |
| | SB032511 | MPM306 or MPS306 |
| | SB032512 | MPM307 or MPS307 |
| | SB032513 | MPM308 or MPS308 |
| | SB032514 | MPM309 or MPS309 |
| | SB032515 | MPM310 or MPS310 |
| | SB032516 | MPM311 or MPS311 |
| | SB032517 | MPM312 or MPS312 |
| | SB032518 | MPM313 or MPS313 |
| | SB032519 | MPM314 or MPS314 |
| | SB03251A | MPM315 or MPS315 |
| | SB03251B | MPM316 or MPS316 |
| | SB03251C | MPM317 or MPS317 |
| | SB03251D | MPM318 or MPS318 |
| | SB03251E | MPM319 or MPS319 |
| | SB03251F | MPM320 or MPS320 |

Contents column (spanning SW03250 region): 0: –
1: Program running

System Register Specifications

| Register Address | | Contents | |
|---|---|---|---|
| SW03252 | SB032520 | MPM321 or MPS321 | |
| | SB032521 | MPM322 or MPS322 | |
| | SB032522 | MPM323 or MPS323 | |
| | SB032523 | MPM324 or MPS324 | |
| | SB032524 | MPM325 or MPS325 | |
| | SB032525 | MPM326 or MPS326 | |
| | SB032526 | MPM327 or MPS327 | |
| | SB032527 | MPM328 or MPS328 | |
| | SB032528 | MPM329 or MPS329 | |
| | SB032529 | MPM330 or MPS330 | |
| | SB03252A | MPM331 or MPS331 | |
| | SB03252B | MPM332 or MPS332 | |
| | SB03252C | MPM333 or MPS333 | |
| | SB03252D | MPM334 or MPS334 | |
| | SB03252E | MPM335 or MPS335 | |
| | SB03252F | MPM336 or MPS336 | |
| SW03253 | SB032530 | MPM337 or MPS337 | |
| | SB032531 | MPM338 or MPS338 | |
| | SB032532 | MPM339 or MPS339 | |
| | SB032533 | MPM340 or MPS340 | |
| | SB032534 | MPM341 or MPS341 | |
| | SB032535 | MPM342 or MPS342 | |
| | SB032536 | MPM343 or MPS343 | |
| | SB032537 | MPM344 or MPS344 | 0: – |
| | SB032538 | MPM345 or MPS345 | 1: Program running |
| | SB032539 | MPM346 or MPS346 | |
| | SB03253A | MPM347 or MPS347 | |
| | SB03253B | MPM348 or MPS348 | |
| | SB03253C | MPM349 or MPS349 | |
| | SB03253D | MPM350 or MPS350 | |
| | SB03253E | MPM351 or MPS351 | |
| | SB03253F | MPM352 or MPS352 | |
| SW03254 | SB032540 | MPM353 or MPS353 | |
| | SB032541 | MPM354 or MPS354 | |
| | SB032542 | MPM355 or MPS355 | |
| | SB032543 | MPM356 or MPS356 | |
| | SB032544 | MPM357 or MPS357 | |
| | SB032545 | MPM358 or MPS358 | |
| | SB032546 | MPM359 or MPS359 | |
| | SB032547 | MPM360 or MPS360 | |
| | SB032548 | MPM361 or MPS361 | |
| | SB032549 | MPM362 or MPS362 | |
| | SB03254A | MPM363 or MPS363 | |
| | SB03254B | MPM364 or MPS364 | |
| | SB03254C | MPM365 or MPS365 | |
| | SB03254D | MPM366 or MPS366 | |
| | SB03254E | MPM367 or MPS367 | |
| | SB03254F | MPM368 or MPS368 | |

| Register Address | Contents | |
|---|---|---|
| SW03255 | SB032550 | MPM369 or MPS369 | |
| | SB032551 | MPM370 or MPS370 | |
| | SB032552 | MPM371 or MPS371 | |
| | SB032553 | MPM372 or MPS372 | |
| | SB032554 | MPM373 or MPS373 | |
| | SB032555 | MPM374 or MPS374 | |
| | SB032556 | MPM375 or MPS375 | |
| | SB032557 | MPM376 or MPS376 | |
| | SB032558 | MPM377 or MPS377 | |
| | SB032559 | MPM378 or MPS378 | |
| | SB03255A | MPM379 or MPS379 | |
| | SB03255B | MPM380 or MPS380 | |
| | SB03255C | MPM381 or MPS381 | |
| | SB03255D | MPM382 or MPS382 | |
| | SB03255E | MPM383 or MPS383 | |
| | SB03255F | MPM384 or MPS384 | |
| SW03256 | SB032560 | MPM385 or MPS385 | |
| | SB032561 | MPM386 or MPS386 | |
| | SB032562 | MPM387 or MPS387 | |
| | SB032563 | MPM388 or MPS388 | |
| | SB032564 | MPM389 or MPS389 | |
| | SB032565 | MPM390 or MPS390 | |
| | SB032566 | MPM391 or MPS391 | |
| | SB032567 | MPM392 or MPS392 | 0: – |
| | SB032568 | MPM393 or MPS393 | 1: Program running |
| | SB032569 | MPM394 or MPS394 | |
| | SB03256A | MPM395 or MPS395 | |
| | SB03256B | MPM396 or MPS396 | |
| | SB03256C | MPM397 or MPS397 | |
| | SB03256D | MPM398 or MPS398 | |
| | SB03256E | MPM399 or MPS399 | |
| | SB03256F | MPM400 or MPS400 | |
| SW03257 | SB032570 | MPM401 or MPS401 | |
| | SB032571 | MPM402 or MPS402 | |
| | SB032572 | MPM403 or MPS403 | |
| | SB032573 | MPM404 or MPS404 | |
| | SB032574 | MPM405 or MPS405 | |
| | SB032575 | MPM406 or MPS406 | |
| | SB032576 | MPM407 or MPS407 | |
| | SB032577 | MPM408 or MPS408 | |
| | SB032578 | MPM409 or MPS409 | |
| | SB032579 | MPM410 or MPS410 | |
| | SB03257A | MPM411 or MPS411 | |
| | SB03257B | MPM412 or MPS412 | |
| | SB03257C | MPM413 or MPS413 | |
| | SB03257D | MPM414 or MPS414 | |
| | SB03257E | MPM415 or MPS415 | |
| | SB03257F | MPM416 or MPS416 | |

System Register Specifications

| Register Address | | Contents | |
|---|---|---|---|
| SW03258 | SB032580 | MPM417 or MPS417 | |
| | SB032581 | MPM418 or MPS418 | |
| | SB032582 | MPM419 or MPS419 | |
| | SB032583 | MPM420 or MPS420 | |
| | SB032584 | MPM421 or MPS421 | |
| | SB032585 | MPM422 or MPS422 | |
| | SB032586 | MPM423 or MPS423 | |
| | SB032587 | MPM424 or MPS424 | |
| | SB032588 | MPM425 or MPS425 | |
| | SB032589 | MPM426 or MPS426 | |
| | SB03258A | MPM427 or MPS427 | |
| | SB03258B | MPM428 or MPS428 | |
| | SB03258C | MPM429 or MPS429 | |
| | SB03258D | MPM430 or MPS430 | |
| | SB03258E | MPM431 or MPS431 | |
| | SB03258F | MPM432 or MPS432 | |
| SW03259 | SB032590 | MPM433 or MPS433 | |
| | SB032591 | MPM434 or MPS434 | |
| | SB032592 | MPM435 or MPS435 | |
| | SB032593 | MPM436 or MPS436 | |
| | SB032594 | MPM437 or MPS437 | |
| | SB032595 | MPM438 or MPS438 | |
| | SB032596 | MPM439 or MPS439 | |
| | SB032597 | MPM440 or MPS440 | 0: – |
| | SB032598 | MPM441 or MPS441 | 1: Program running |
| | SB032599 | MPM442 or MPS442 | |
| | SB03259A | MPM443 or MPS443 | |
| | SB03259B | MPM444 or MPS444 | |
| | SB03259C | MPM445 or MPS445 | |
| | SB03259D | MPM446 or MPS446 | |
| | SB03259E | MPM447 or MPS447 | |
| | SB03259F | MPM448 or MPS448 | |
| SW03260 | SB032600 | MPM449 or MPS449 | |
| | SB032601 | MPM450 or MPS450 | |
| | SB032602 | MPM451 or MPS451 | |
| | SB032603 | MPM452 or MPS452 | |
| | SB032604 | MPM453 or MPS453 | |
| | SB032605 | MPM454 or MPS454 | |
| | SB032606 | MPM455 or MPS455 | |
| | SB032607 | MPM456 or MPS456 | |
| | SB032608 | MPM457 or MPS457 | |
| | SB032609 | MPM458 or MPS458 | |
| | SB03260A | MPM459 or MPS459 | |
| | SB03260B | MPM460 or MPS460 | |
| | SB03260C | MPM461 or MPS461 | |
| | SB03260D | MPM462 or MPS462 | |
| | SB03260E | MPM463 or MPS463 | |
| | SB03260F | MPM464 or MPS464 | |

Continued from previous page.

| Register Address | | Contents |
|---|---|---|
| SW03261 | SB032610 | MPM465 or MPS465 |
| | SB032611 | MPM466 or MPS466 |
| | SB032612 | MPM467 or MPS467 |
| | SB032613 | MPM468 or MPS468 |
| | SB032614 | MPM469 or MPS469 |
| | SB032615 | MPM470 or MPS470 |
| | SB032616 | MPM471 or MPS471 |
| | SB032617 | MPM472 or MPS472 |
| | SB032618 | MPM473 or MPS473 |
| | SB032619 | MPM474 or MPS474 |
| | SB03261A | MPM475 or MPS475 |
| | SB03261B | MPM476 or MPS476 |
| | SB03261C | MPM477 or MPS477 |
| | SB03261D | MPM478 or MPS478 |
| | SB03261E | MPM479 or MPS479 |
| | SB03261F | MPM480 or MPS480 |
| SW03262 | SB032620 | MPM481 or MPS481 |
| | SB032621 | MPM482 or MPS482 |
| | SB032622 | MPM483 or MPS483 |
| | SB032623 | MPM484 or MPS484 |
| | SB032624 | MPM485 or MPS485 |
| | SB032625 | MPM486 or MPS486 |
| | SB032626 | MPM487 or MPS487 |
| | SB032627 | MPM488 or MPS488 |
| | SB032628 | MPM489 or MPS489 |
| | SB032629 | MPM490 or MPS490 |
| | SB03262A | MPM491 or MPS491 |
| | SB03262B | MPM492 or MPS492 |
| | SB03262C | MPM493 or MPS493 |
| | SB03262D | MPM494 or MPS494 |
| | SB03262E | MPM495 or MPS495 |
| | SB03262F | MPM496 or MPS496 |
| SW03263 | SB032630 | MPM497 or MPS497 |
| | SB032631 | MPM498 or MPS498 |
| | SB032632 | MPM499 or MPS499 |
| | SB032633 | MPM500 or MPS500 |
| | SB032634 | MPM501 or MPS501 |
| | SB032635 | MPM502 or MPS502 |
| | SB032636 | MPM503 or MPS503 |
| | SB032637 | MPM504 or MPS504 |
| | SB032638 | MPM505 or MPS505 |
| | SB032639 | MPM506 or MPS506 |
| | SB03263A | MPM507 or MPS507 |
| | SB03263B | MPM508 or MPS508 |
| | SB03263C | MPM509 or MPS509 |
| | SB03263D | MPM510 or MPS510 |
| | SB03263E | MPM511 or MPS511 |
| | SB03263F | MPM512 or MPS512 |

The contents column spans all rows with: 0: –  1: Program running

Specifications

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System Register Specifications

■ Registers Used for System Work Numbers 1 to 32

The registers that are used for system work numbers 1 to 32 are given in the following table.
Two system registers are given in the register table for the alarm code, but we recommend that you use system registers SL26□□□. You can use the system registers that are given in parentheses to check for alarms in most cases, but they do not report all alarms.
Refer to the following manual for details on alarm codes.

📖 *MP3000 Series MP3200 Troubleshooting Manual* (Manual No.: SIEP C880725 01)

• System Work Numbers 1 to 8

| System Work Number | | Work 1 | Work 2 | Work 3 | Work 4 | Work 5 | Work 6 | Work 7 | Work 8 |
|---|---|---|---|---|---|---|---|---|---|
| Executing Main Program No. | | SW03200 | SW03201 | SW03202 | SW03203 | SW03204 | SW03205 | SW03206 | SW03207 |
| Status | | SW03264 | SW03322 | SW03380 | SW03438 | SW03496 | SW03554 | SW03612 | SW03670 |
| Control Signals | | SW03265 | SW03323 | SW03381 | SW03439 | SW03497 | SW03555 | SW03613 | SW03671 |
| Fork 0 | Program Number | SW03266 | SW03324 | SW03382 | SW03440 | SW03498 | SW03556 | SW03614 | SW03672 |
| | Block Number | SW03267 | SW03325 | SW03383 | SW03441 | SW03499 | SW03557 | SW03615 | SW03673 |
| | Alarm Code | SL26000 (SW03268) | SL26016 (SW03326) | SL26032 (SW03384) | SL26048 (SW03442) | SL26064 (SW03500) | SL26080 (SW03558) | SL26096 (SW03616) | SL26112 (SW03674) |
| Fork 1 | Program Number | SW03269 | SW03327 | SW03385 | SW03443 | SW03501 | SW03559 | SW03617 | SW03675 |
| | Block Number | SW03270 | SW03328 | SW03386 | SW03444 | SW03502 | SW03560 | SW03618 | SW03676 |
| | Alarm Code | SL26002 (SW03271) | SL26018 (SW03329) | SL26034 (SW03387) | SL26050 (SW03445) | SL26066 (SW03503) | SL26082 (SW03561) | SL26098 (SW03619) | SL26114 (SW03677) |
| Fork 2 | Program Number | SW03272 | SW03330 | SW03388 | SW03446 | SW03504 | SW03562 | SW03620 | SW03678 |
| | Block Number | SW03273 | SW03331 | SW03389 | SW03447 | SW03505 | SW03563 | SW03621 | SW03679 |
| | Alarm Code | SL26004 (SW03274) | SL26020 (SW03332) | SL26036 (SW03390) | SL26052 (SW03448) | SL26068 (SW03506) | SL26084 (SW03564) | SL26100 (SW03622) | SL26116 (SW03680) |
| Fork 3 | Program Number | SW03275 | SW03333 | SW03391 | SW03449 | SW03507 | SW03565 | SW03623 | SW03681 |
| | Block Number | SW03276 | SW03334 | SW03392 | SW03450 | SW03508 | SW03566 | SW03624 | SW03682 |
| | Alarm Code | SL26006 (SW03277) | SL26022 (SW03335) | SL26038 (SW03393) | SL26054 (SW03451) | SL26070 (SW03509) | SL26086 (SW03567) | SL26102 (SW03625) | SL26118 (SW03683) |
| Fork 4 | Program Number | SW03278 | SW03336 | SW03394 | SW03452 | SW03510 | SW03568 | SW03626 | SW03684 |
| | Block Number | SW03279 | SW03337 | SW03395 | SW03453 | SW03511 | SW03569 | SW03627 | SW03685 |
| | Alarm Code | SL26008 (SW03280) | SL26024 (SW03338) | SL26040 (SW03396) | SL26056 (SW03454) | SL26072 (SW03512) | SL26088 (SW03570) | SL26104 (SW03628) | SL26120 (SW03686) |
| Fork 5 | Program Number | SW03281 | SW03339 | SW03397 | SW03455 | SW03513 | SW03571 | SW03629 | SW03687 |
| | Block Number | SW03282 | SW03340 | SW03398 | SW03456 | SW03514 | SW03572 | SW03630 | SW03688 |
| | Alarm Code | SL26010 (SW03283) | SL26026 (SW03341) | SL26042 (SW03399) | SL26058 (SW03457) | SL26074 (SW03515) | SL26090 (SW03573) | SL26106 (SW03631) | SL26122 (SW03689) |
| Fork 6 | Program Number | SW03284 | SW03342 | SW03400 | SW03458 | SW03516 | SW03574 | SW03632 | SW03690 |
| | Block Number | SW03285 | SW03343 | SW03401 | SW03459 | SW03517 | SW03575 | SW03633 | SW03691 |
| | Alarm Code | SL26012 (SW03286) | SL26028 (SW03344) | SL26044 (SW03402) | SL26060 (SW03460) | SL26076 (SW03518) | SL26092 (SW03576) | SL26108 (SW03634) | SL26124 (SW03692) |
| Fork 7 | Program Number | SW03287 | SW03345 | SW03403 | SW03461 | SW03519 | SW03577 | SW03635 | SW03693 |
| | Block Number | SW03288 | SW03346 | SW03404 | SW03462 | SW03520 | SW03578 | SW03636 | SW03694 |
| | Alarm Code | SL260014 (SW03289) | SL26030 (SW03347) | SL26046 (SW03405) | SL26062 (SW03463) | SL26078 (SW03521) | SL26094 (SW03579) | SL26110 (SW03637) | SL26126 (SW03695) |
| Logical Axis 1 Program Current Position | | SL03290 | SL03348 | SL03406 | SL03464 | SL03522 | SL03580 | SL03638 | SL03696 |
| Logical Axis 2 Program Current Position | | SL03292 | SL03350 | SL03408 | SL03466 | SL03524 | SL03582 | SL03640 | SL03698 |

| System Work Number | Work 1 | Work 2 | Work 3 | Work 4 | Work 5 | Work 6 | Work 7 | Work 8 |
|---|---|---|---|---|---|---|---|---|
| Logical Axis 3 Program Current Position | SL03294 | SL03352 | SL03410 | SL03468 | SL03526 | SL03584 | SL03642 | SL03700 |
| Logical Axis 4 Program Current Position | SL03296 | SL03354 | SL03412 | SL03470 | SL03528 | SL03586 | SL03644 | SL03702 |
| Logical Axis 5 Program Current Position | SL03298 | SL03356 | SL03414 | SL03472 | SL03530 | SL03588 | SL03646 | SL03704 |
| Logical Axis 6 Program Current Position | SL03300 | SL03358 | SL03416 | SL03474 | SL03532 | SL03590 | SL03648 | SL03706 |
| Logical Axis 7 Program Current Position | SL03302 | SL03360 | SL03418 | SL03476 | SL03534 | SL03592 | SL03650 | SL03708 |
| Logical Axis 8 Program Current Position | SL03304 | SL03362 | SL03420 | SL03478 | SL03536 | SL03594 | SL03652 | SL03710 |
| Logical Axis 9 Program Current Position | SL03306 | SL03364 | SL03422 | SL03480 | SL03538 | SL03596 | SL03654 | SL03712 |
| Logical Axis 10 Program Current Position | SL03308 | SL03366 | SL03424 | SL03482 | SL03540 | SL03598 | SL03656 | SL03714 |
| Logical Axis 11 Program Current Position | SL03310 | SL03368 | SL03426 | SL03484 | SL03542 | SL03600 | SL03658 | SL03716 |
| Logical Axis 12 Program Current Position | SL03312 | SL03370 | SL03428 | SL03486 | SL03544 | SL03602 | SL03660 | SL03718 |
| Logical Axis 13 Program Current Position | SL03314 | SL03372 | SL03430 | SL03488 | SL03546 | SL03604 | SL03662 | SL03720 |
| Logical Axis 14 Program Current Position | SL03316 | SL03374 | SL03432 | SL03490 | SL03548 | SL03606 | SL03664 | SL03722 |
| Logical Axis 15 Program Current Position | SL03318 | SL03376 | SL03434 | SL03492 | SL03550 | SL03608 | SL03666 | SL03724 |
| Logical Axis 16 Program Current Position | SL03320 | SL03378 | SL03436 | SL03494 | SL03552 | SL03610 | SL03668 | SL03726 |
| Logical Axis 17 Program Current Position | SL08192 | SL08224 | SL08256 | SL08288 | SL08320 | SL08352 | SL08384 | SL08416 |
| Logical Axis 18 Program Current Position | SL08194 | SL08226 | SL08258 | SL08290 | SL08322 | SL08354 | SL08386 | SL08418 |
| Logical Axis 19 Program Current Position | SL08196 | SL08228 | SL08260 | SL08292 | SL08324 | SL08356 | SL08388 | SL08420 |
| Logical Axis 20 Program Current Position | SL08198 | SL08230 | SL08262 | SL08294 | SL08326 | SL08358 | SL08390 | SL08422 |
| Logical Axis 21 Program Current Position | SL08200 | SL08232 | SL08264 | SL08296 | SL08328 | SL08360 | SL08392 | SL08424 |
| Logical Axis 22 Program Current Position | SL08202 | SL08234 | SL08266 | SL08298 | SL08330 | SL08362 | SL08394 | SL08426 |
| Logical Axis 23 Program Current Position | SL08204 | SL08236 | SL08268 | SL08300 | SL08332 | SL08364 | SL08396 | SL08428 |
| Logical Axis 24 Program Current Position | SL08206 | SL08238 | SL08270 | SL08302 | SL08334 | SL08366 | SL08398 | SL08430 |
| Logical Axis 25 Program Current Position | SL08208 | SL08240 | SL08272 | SL08304 | SL08336 | SL08368 | SL08400 | SL08432 |
| Logical Axis 26 Program Current Position | SL08210 | SL08242 | SL08274 | SL08306 | SL08338 | SL08370 | SL08402 | SL08434 |
| Logical Axis 27 Program Current Position | SL08212 | SL08244 | SL08276 | SL08308 | SL08340 | SL08372 | SL08404 | SL08436 |
| Logical Axis 28 Program Current Position | SL08214 | SL08246 | SL08278 | SL08310 | SL08342 | SL08374 | SL08406 | SL08438 |

Specifications

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System Register Specifications

| System Work Number | Work 1 | Work 2 | Work 3 | Work 4 | Work 5 | Work 6 | Work 7 | Work 8 |
|---|---|---|---|---|---|---|---|---|
| Logical Axis 29 Program Current Position | SL08216 | SL08248 | SL08280 | SL08312 | SL08344 | SL08376 | SL08408 | SL08440 |
| Logical Axis 30 Program Current Position | SL08218 | SL08250 | SL08282 | SL08314 | SL08346 | SL08378 | SL08410 | SL08442 |
| Logical Axis 31 Program Current Position | SL08220 | SL08252 | SL08284 | SL08316 | SL08348 | SL08380 | SL08412 | SL08444 |
| Logical Axis 32 Program Current Position | SL08222 | SL08254 | SL08286 | SL08318 | SL08350 | SL08382 | SL08414 | SL08446 |

• System Work Numbers 9 to 16

| | System Work Number | Work 9 | Work 10 | Work 11 | Work 12 | Work 13 | Work 14 | Work 15 | Work 16 |
|---|---|---|---|---|---|---|---|---|---|
| | Executing Main Program No. | SW03208 | SW03209 | SW03210 | SW03211 | SW03212 | SW03213 | SW03214 | SW03215 |
| | Status | SW03728 | SW03786 | SW03844 | SW03902 | SW03960 | SW04018 | SW04076 | SW04134 |
| | Control Signals | SW03729 | SW03787 | SW03845 | SW03903 | SW03961 | SW04019 | SW04077 | SW04135 |
| Fork 0 | Program Number | SW03730 | SW03788 | SW03846 | SW03904 | SW03962 | SW04020 | SW04078 | SW04136 |
| | Block Number | SW03731 | SW03789 | SW03847 | SW03905 | SW03963 | SW04021 | SW04079 | SW04137 |
| | Alarm Code | SL26128 (SW03732) | SL26144 (SW03790) | SL26160 (SW03848) | SL26176 (SW03906) | SL26192 (SW03964) | SL26208 (SW04022) | SL26224 (SW04080) | SL26240 (SW04138) |
| Fork 1 | Program Number | SW03733 | SW03791 | SW03849 | SW03907 | SW03965 | SW04023 | SW04081 | SW04139 |
| | Block Number | SW03734 | SW03792 | SW03850 | SW03908 | SW03966 | SW04024 | SW04082 | SW04140 |
| | Alarm Code | SL26130 (SW03735) | SL26146 (SW03793) | SL26162 (SW03851) | SL26178 (SW03909) | SL26194 (SW03967) | SL26210 (SW04025) | SL26226 (SW04083) | SL26242 (SW04141) |
| Fork 2 | Program Number | SW03736 | SW03794 | SW03852 | SW03910 | SW03968 | SW04026 | SW04084 | SW04142 |
| | Block Number | SW03737 | SW03795 | SW03853 | SW03911 | SW03969 | SW04027 | SW04085 | SW04143 |
| | Alarm Code | SL26132 (SW03738) | SL26148 (SW03796) | SL26164 (SW03854) | SL26180 (SW03912) | SL26196 (SW03970) | SL26212 (SW04028) | SL26228 (SW04086) | SL26244 (SW04144) |
| Fork 3 | Program Number | SW03739 | SW03797 | SW03855 | SW03913 | SW03971 | SW04029 | SW04087 | SW04145 |
| | Block Number | SW03740 | SW03798 | SW03856 | SW03914 | SW03972 | SW04030 | SW04088 | SW04146 |
| | Alarm Code | SL26134 (SW03741) | SL26150 (SW03799) | SL26166 (SW03857) | SL26182 (SW03915) | SL26198 (SW03973) | SL26214 (SW04031) | SL26230 (SW04089) | SL26246 (SW04147) |
| Fork 4 | Program Number | SW03742 | SW03800 | SW03858 | SW03916 | SW03974 | SW04032 | SW04090 | SW04148 |
| | Block Number | SW03743 | SW03801 | SW03859 | SW03917 | SW03975 | SW04033 | SW04091 | SW04149 |
| | Alarm Code | SL26136 (SW03744) | SL26152 (SW03802) | SL26168 (SW03860) | SL26184 (SW03918) | SL26200 (SW03976) | SL26216 (SW04034) | SL26232 (SW04092) | SL26248 (SW04150) |
| Fork 5 | Program Number | SW03745 | SW03803 | SW03861 | SW03919 | SW03977 | SW04035 | SW04093 | SW04151 |
| | Block Number | SW03746 | SW03804 | SW03862 | SW03920 | SW03978 | SW04036 | SW04094 | SW04152 |
| | Alarm Code | SL26138 (SW03747) | SL26154 (SW03805) | SL26170 (SW03863) | SL26186 (SW03921) | SL26202 (SW03979) | SL26218 (SW04037) | SL26234 (SW04095) | SL26250 (SW04153) |
| Fork 6 | Program Number | SW03748 | SW03806 | SW03864 | SW03922 | SW03980 | SW04038 | SW04096 | SW04154 |
| | Block Number | SW03749 | SW03807 | SW03865 | SW03923 | SW03981 | SW04039 | SW04097 | SW04155 |
| | Alarm Code | SL26140 (SW03750) | SL26156 (SW03808) | SL26172 (SW03866) | SL26188 (SW03924) | SL26204 (SW03982) | SL26220 (SW04040) | SL26236 (SW04098) | SL26252 (SW04156) |
| Fork 7 | Program Number | SW03751 | SW03809 | SW03867 | SW03925 | SW03983 | SW04041 | SW04099 | SW04157 |
| | Block Number | SW03752 | SW03810 | SW03868 | SW03926 | SW03984 | SW04042 | SW04100 | SW04158 |
| | Alarm Code | SL26142 (SW03753) | SL26158 (SW03811) | SL26174 (SW03869) | SL26190 (SW03927) | SL26206 (SW03985) | SL26222 (SW04043) | SL26238 (SW04101) | SL26254 (SW04159) |
| | Logical Axis 1 Program Current Position | SL03754 | SL03812 | SL03870 | SL03928 | SL03986 | SL04044 | SL04102 | SL04160 |
| | Logical Axis 2 Program Current Position | SL03756 | SL03814 | SL03872 | SL03930 | SL03988 | SL04046 | SL04104 | SL04162 |
| | Logical Axis 3 Program Current Position | SL03758 | SL03816 | SL03874 | SL03932 | SL03990 | SL04048 | SL04106 | SL04164 |
| | Logical Axis 4 Program Current Position | SL03760 | SL03818 | SL03876 | SL03934 | SL03992 | SL04050 | SL04108 | SL04166 |
| | Logical Axis 5 Program Current Position | SL03762 | SL03820 | SL03878 | SL03936 | SL03994 | SL04052 | SL04110 | SL04168 |
| | Logical Axis 6 Program Current Position | SL03764 | SL03822 | SL03880 | SL03938 | SL03996 | SL04054 | SL04112 | SL04170 |
| | Logical Axis 7 Program Current Position | SL03766 | SL03824 | SL03882 | SL03940 | SL03998 | SL04056 | SL04114 | SL04172 |

Specifications

4

System Register Specifications

| System Work Number | Work 9 | Work 10 | Work 11 | Work 12 | Work 13 | Work 14 | Work 15 | Work 16 |
|---|---|---|---|---|---|---|---|---|
| Logical Axis 8 Program Current Position | SL03768 | SL03826 | SL03884 | SL03942 | SL04000 | SL04058 | SL04116 | SL04174 |
| Logical Axis 9 Program Current Position | SL03770 | SL03828 | SL03886 | SL03944 | SL04002 | SL04060 | SL04118 | SL04176 |
| Logical Axis 10 Program Current Position | SL03772 | SL03830 | SL03888 | SL03946 | SL04004 | SL04062 | SL04120 | SL04178 |
| Logical Axis 11 Program Current Position | SL03774 | SL03832 | SL03890 | SL03948 | SL04006 | SL04064 | SL04122 | SL04180 |
| Logical Axis 12 Program Current Position | SL03776 | SL03834 | SL03892 | SL03950 | SL04008 | SL04066 | SL04124 | SL04182 |
| Logical Axis 13 Program Current Position | SL03778 | SL03836 | SL03894 | SL03952 | SL04010 | SL04068 | SL04126 | SL04184 |
| Logical Axis 14 Program Current Position | SL03780 | SL03838 | SL03896 | SL03954 | SL04012 | SL04070 | SL04128 | SL04186 |
| Logical Axis 15 Program Current Position | SL03782 | SL03840 | SL03898 | SL03956 | SL04014 | SL04072 | SL04130 | SL04188 |
| Logical Axis 16 Program Current Position | SL03784 | SL03842 | SL03900 | SL03958 | SL04016 | SL04074 | SL04132 | SL04190 |
| Logical Axis 17 Program Current Position | SL08448 | SL08480 | SL08512 | SL08544 | SL08576 | SL08608 | SL08640 | SL08672 |
| Logical Axis 18 Program Current Position | SL08450 | SL08482 | SL08514 | SL08546 | SL08578 | SL08610 | SL08642 | SL08674 |
| Logical Axis 19 Program Current Position | SL08452 | SL08484 | SL08516 | SL08548 | SL08580 | SL08612 | SL08644 | SL08676 |
| Logical Axis 20 Program Current Position | SL08454 | SL08486 | SL08518 | SL08550 | SL08582 | SL08614 | SL08646 | SL08678 |
| Logical Axis 21 Program Current Position | SL08456 | SL08488 | SL08520 | SL08552 | SL08584 | SL08616 | SL08648 | SL08680 |
| Logical Axis 22 Program Current Position | SL08458 | SL08490 | SL08522 | SL08554 | SL08586 | SL08618 | SL08650 | SL08682 |
| Logical Axis 23 Program Current Position | SL08460 | SL08492 | SL08524 | SL08556 | SL08588 | SL08620 | SL08652 | SL08684 |
| Logical Axis 24 Program Current Position | SL08462 | SL08494 | SL08526 | SL08558 | SL08590 | SL08622 | SL08654 | SL08686 |
| Logical Axis 25 Program Current Position | SL08464 | SL08496 | SL08528 | SL08560 | SL08592 | SL08624 | SL08656 | SL08688 |
| Logical Axis 26 Program Current Position | SL08466 | SL08498 | SL08530 | SL08562 | SL08594 | SL08626 | SL08658 | SL08690 |
| Logical Axis 27 Program Current Position | SL08468 | SL08500 | SL08532 | SL08564 | SL08596 | SL08628 | SL08660 | SL08692 |
| Logical Axis 28 Program Current Position | SL08470 | SL08502 | SL08534 | SL08566 | SL08598 | SL08630 | SL08662 | SL08694 |
| Logical Axis 29 Program Current Position | SL08472 | SL08504 | SL08536 | SL08568 | SL08600 | SL08632 | SL08664 | SL08696 |
| Logical Axis 30 Program Current Position | SL08474 | SL08506 | SL08538 | SL08570 | SL08602 | SL08634 | SL08666 | SL08698 |
| Logical Axis 31 Program Current Position | SL08476 | SL08508 | SL08540 | SL08572 | SL08604 | SL08636 | SL08668 | SL08700 |
| Logical Axis 32 Program Current Position | SL08478 | SL08510 | SL08542 | SL08574 | SL08606 | SL08638 | SL08670 | SL08702 |

• System Work Numbers 17 to 24

| System Work Number | | Work 17 | Work 18 | Work 19 | Work 20 | Work 21 | Work 22 | Work 23 | Work 24 |
|---|---|---|---|---|---|---|---|---|---|
| Executing Main Program No. | | SW03216 | SW03217 | SW03218 | SW03219 | SW03220 | SW03221 | SW03222 | SW03223 |
| Status | | SW04192 | SW04250 | SW04308 | SW04366 | SW04424 | SW04482 | SW04540 | SW04598 |
| Control Signals | | SW04193 | SW04251 | SW04309 | SW04367 | SW04425 | SW04483 | SW04541 | SW04599 |
| Fork 0 | Program Number | SW04194 | SW04252 | SW04310 | SW04368 | SW04426 | SW04484 | SW04542 | SW04600 |
| | Block Number | SW04195 | SW04253 | SW04311 | SW04369 | SW04427 | SW04485 | SW04543 | SW04601 |
| | Alarm Code | SL26256 (SW04196) | SL26272 (SW04254) | SL26288 (SW04312) | SL26304 (SW04370) | SL26320 (SW04428) | SL26336 (SW04486) | SL26352 (SW04544) | SL26368 (SW04602) |
| Fork 1 | Program Number | SW04197 | SW04255 | SW04313 | SW04371 | SW04429 | SW04487 | SW04545 | SW04603 |
| | Block Number | SW04198 | SW04256 | SW04314 | SW04372 | SW04430 | SW04488 | SW04546 | SW04604 |
| | Alarm Code | SL26258 (SW04199) | SL26274 (SW04257) | SL26290 (SW04315) | SL26306 (SW04373) | SL26322 (SW04431) | SL26338 (SW04489) | SL26354 (SW04547) | SL26370 (SW04605) |
| Fork 2 | Program Number | SW04200 | SW04258 | SW04316 | SW04374 | SW04432 | SW04490 | SW04548 | SW04606 |
| | Block Number | SW04201 | SW04259 | SW04317 | SW04375 | SW04433 | SW04491 | SW04549 | SW04607 |
| | Alarm Code | SL26260 (SW04202) | SL26276 (SW04260) | SL26292 (SW04318) | SL26308 (SW04376) | SL26324 (SW04434) | SL26340 (SW04492) | SL26356 (SW04550) | SL26372 (SW04608) |
| Fork 3 | Program Number | SW04203 | SW04261 | SW04319 | SW04377 | SW04435 | SW04493 | SW04551 | SW04609 |
| | Block Number | SW04204 | SW04262 | SW04320 | SW04378 | SW04436 | SW04494 | SW04552 | SW04610 |
| | Alarm Code | SL26262 (SW04205) | SL26278 (SW04263) | SL26294 (SW04321) | SL26310 (SW04379) | SL26326 (SW04437) | SL26342 (SW04495) | SL26358 (SW04553) | SL26374 (SW04611) |
| Fork 4 | Program Number | SW04206 | SW04264 | SW04322 | SW04380 | SW04438 | SW04496 | SW04554 | SW04612 |
| | Block Number | SW04207 | SW04265 | SW04323 | SW04381 | SW04439 | SW04497 | SW04555 | SW04613 |
| | Alarm Code | SL26264 (SW04208) | SL26280 (SW04266) | SL26296 (SW04324) | SL26312 (SW04382) | SL26328 (SW04440) | SL26344 (SW04498) | SL26360 (SW04556) | SL26376 (SW04614) |
| Fork 5 | Program Number | SW04209 | SW04267 | SW04325 | SW04383 | SW04441 | SW04499 | SW04557 | SW04615 |
| | Block Number | SW04210 | SW04268 | SW04326 | SW04384 | SW04442 | SW04500 | SW04558 | SW04616 |
| | Alarm Code | SL26266 (SW04211) | SL26282 (SW04269) | SL26298 (SW04327) | SL26314 (SW04385) | SL26330 (SW04443) | SL26346 (SW04501) | SL26362 (SW04559) | SL26378 (SW04617) |
| Fork 6 | Program Number | SW04212 | SW04270 | SW04328 | SW04386 | SW04444 | SW04502 | SW04560 | SW04618 |
| | Block Number | SW04213 | SW04271 | SW04329 | SW04387 | SW04445 | SW04503 | SW04561 | SW04619 |
| | Alarm Code | SL26268 (SW04214) | SL26284 (SW04272) | SL26300 (SW04330) | SL26316 (SW04388) | SL26332 (SW04446) | SL26348 (SW04504) | SL26364 (SW04562) | SL26380 (SW04620) |
| Fork 7 | Program Number | SW04215 | SW04273 | SW04331 | SW04389 | SW04447 | SW04505 | SW04563 | SW04621 |
| | Block Number | SW04216 | SW04274 | SW04332 | SW04390 | SW04448 | SW04506 | SW04564 | SW04622 |
| | Alarm Code | SL26270 (SW04217) | SL26286 (SW04275) | SL26302 (SW04333) | SL26318 (SW04391) | SL26334 (SW04449) | SL26350 (SW04507) | SL26366 (SW04565) | SL26382 (SW04623) |
| Logical Axis 1 Program Current Position | | SL04218 | SL04276 | SL04334 | SL04392 | SL04450 | SL04508 | SL04566 | SL04624 |
| Logical Axis 2 Program Current Position | | SL04220 | SL04278 | SL04336 | SL04394 | SL04452 | SL04510 | SL04568 | SL04626 |
| Logical Axis 3 Program Current Position | | SL04222 | SL04280 | SL04338 | SL04396 | SL04454 | SL04512 | SL04570 | SL04628 |
| Logical Axis 4 Program Current Position | | SL04224 | SL04282 | SL04340 | SL04398 | SL04456 | SL04514 | SL04572 | SL04630 |
| Logical Axis 5 Program Current Position | | SL04226 | SL04284 | SL04342 | SL04400 | SL04458 | SL04516 | SL04574 | SL04632 |
| Logical Axis 6 Program Current Position | | SL04228 | SL04286 | SL04344 | SL04402 | SL04460 | SL04518 | SL04576 | SL04634 |
| Logical Axis 7 Program Current Position | | SL04230 | SL04288 | SL04346 | SL04404 | SL04462 | SL04520 | SL04578 | SL04636 |

Specifications

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System Register Specifications

| System Work Number | Work 17 | Work 18 | Work 19 | Work 20 | Work 21 | Work 22 | Work 23 | Work 24 |
|---|---|---|---|---|---|---|---|---|
| Logical Axis 8 Program Current Position | SL04232 | SL04290 | SL04348 | SL04406 | SL04464 | SL04522 | SL04580 | SL04638 |
| Logical Axis 9 Program Current Position | SL04234 | SL04292 | SL04350 | SL04408 | SL04466 | SL04524 | SL04582 | SL04640 |
| Logical Axis 10 Program Current Position | SL04236 | SL04294 | SL04352 | SL04410 | SL04468 | SL04526 | SL04584 | SL04642 |
| Logical Axis 11 Program Current Position | SL04238 | SL04296 | SL04354 | SL04412 | SL04470 | SL04528 | SL04586 | SL04644 |
| Logical Axis 12 Program Current Position | SL04240 | SL04298 | SL04356 | SL04414 | SL04472 | SL04530 | SL04588 | SL04646 |
| Logical Axis 13 Program Current Position | SL04242 | SL04300 | SL04358 | SL04416 | SL04474 | SL04532 | SL04590 | SL04648 |
| Logical Axis 14 Program Current Position | SL04244 | SL04302 | SL04360 | SL04418 | SL04476 | SL04534 | SL04592 | SL04650 |
| Logical Axis 15 Program Current Position | SL04246 | SL04304 | SL04362 | SL04420 | SL04478 | SL04536 | SL04594 | SL04652 |
| Logical Axis 16 Program Current Position | SL04248 | SL04306 | SL04364 | SL04422 | SL04480 | SL04538 | SL04596 | SL04654 |
| Logical Axis 17 Program Current Position | SL08704 | SL08736 | SL08768 | SL08800 | SL08832 | SL08864 | SL08896 | SL08928 |
| Logical Axis 18 Program Current Position | SL08706 | SL08738 | SL08770 | SL08802 | SL08834 | SL08866 | SL08898 | SL08930 |
| Logical Axis 19 Program Current Position | SL08708 | SL08740 | SL08772 | SL08804 | SL08836 | SL08868 | SL08900 | SL08932 |
| Logical Axis 20 Program Current Position | SL08710 | SL08742 | SL08774 | SL08806 | SL08838 | SL08870 | SL08902 | SL08934 |
| Logical Axis 21 Program Current Position | SL08712 | SL08744 | SL08776 | SL08808 | SL08840 | SL08872 | SL08904 | SL08936 |
| Logical Axis 22 Program Current Position | SL08714 | SL08746 | SL08778 | SL08810 | SL08842 | SL08874 | SL08906 | SL08938 |
| Logical Axis 23 Program Current Position | SL08716 | SL08748 | SL08780 | SL08812 | SL08844 | SL08876 | SL08908 | SL08940 |
| Logical Axis 24 Program Current Position | SL08718 | SL08750 | SL08782 | SL08814 | SL08846 | SL08878 | SL08910 | SL08942 |
| Logical Axis 25 Program Current Position | SL08720 | SL08752 | SL08784 | SL08816 | SL08848 | SL08880 | SL08912 | SL08944 |
| Logical Axis 26 Program Current Position | SL08722 | SL08754 | SL08786 | SL08818 | SL08850 | SL08882 | SL08914 | SL08946 |
| Logical Axis 27 Program Current Position | SL08724 | SL08756 | SL08788 | SL08820 | SL08852 | SL08884 | SL08916 | SL08948 |
| Logical Axis 28 Program Current Position | SL08726 | SL08758 | SL08790 | SL08822 | SL08854 | SL08886 | SL08918 | SL08950 |
| Logical Axis 29 Program Current Position | SL08728 | SL08760 | SL08792 | SL08824 | SL08856 | SL08888 | SL08920 | SL08952 |
| Logical Axis 30 Program Current Position | SL08730 | SL08762 | SL08794 | SL08826 | SL08858 | SL08890 | SL08922 | SL08954 |
| Logical Axis 31 Program Current Position | SL08732 | SL08764 | SL08796 | SL08828 | SL08860 | SL08892 | SL08924 | SL08956 |
| Logical Axis 32 Program Current Position | SL08734 | SL08766 | SL08798 | SL08830 | SL08862 | SL08894 | SL08926 | SL08958 |

• System Work Numbers 25 to 32

| System Work Number | | Work 25 | Work 26 | Work 27 | Work 28 | Work 29 | Work 30 | Work 31 | Work 32 |
|---|---|---|---|---|---|---|---|---|---|
| Executing Main Program No. | | SW03224 | SW03225 | SW03226 | SW03227 | SW03228 | SW03229 | SW03230 | SW03231 |
| Status | | SW04656 | SW04714 | SW04772 | SW04830 | SW04888 | SW04946 | SW05004 | SW05062 |
| Control Signals | | SW04657 | SW04715 | SW04773 | SW04831 | SW04889 | SW04947 | SW05005 | SW05063 |
| Fork 0 | Program Number | SW04658 | SW04716 | SW04774 | SW04832 | SW04890 | SW04948 | SW05006 | SW05064 |
| Fork 0 | Block Number | SW04659 | SW04717 | SW04775 | SW04833 | SW04891 | SW04949 | SW05007 | SW05065 |
| Fork 0 | Alarm Code | SL26384 (SW04660) | SL26400 (SW04718) | SL26416 (SW04776) | SL26432 (SW04834) | SL26448 (SW04892) | SL26464 (SW04950) | SL26480 (SW05008) | SL26496 (SW05066) |
| Fork 1 | Program Number | SW04661 | SW04719 | SW04777 | SW04835 | SW04893 | SW04951 | SW05009 | SW05067 |
| Fork 1 | Block Number | SW04662 | SW04720 | SW04778 | SW04836 | SW04894 | SW04952 | SW05010 | SW05068 |
| Fork 1 | Alarm Code | SL26386 (SW04663) | SL26402 (SW04721) | SL26418 (SW04779) | SL26434 (SW04837) | SL26450 (SW04895) | SL26466 (SW04953) | SL26482 (SW05011) | SL26498 (SW05069) |
| Fork 2 | Program Number | SW04664 | SW04722 | SW04780 | SW04838 | SW04896 | SW04954 | SW05012 | SW05070 |
| Fork 2 | Block Number | SW04665 | SW04723 | SW04781 | SW04839 | SW04897 | SW04955 | SW05013 | SW05071 |
| Fork 2 | Alarm Code | SL26388 (SW04666) | SL26404 (SW04724) | SL26420 (SW04782) | SL26436 (SW04840) | SL26452 (SW04898) | SL26468 (SW04956) | SL26484 (SW05014) | SL26500 (SW05072) |
| Fork 3 | Program Number | SW04667 | SW04725 | SW04783 | SW04841 | SW04899 | SW04957 | SW05015 | SW05073 |
| Fork 3 | Block Number | SW04668 | SW04726 | SW04784 | SW04842 | SW04900 | SW04958 | SW05016 | SW05074 |
| Fork 3 | Alarm Code | SL26390 (SW04669) | SL26406 (SW04727) | SL26422 (SW04785) | SL26438 (SW04843) | SL26454 (SW04901) | SL26470 (SW04959) | SL26486 (SW05017) | SL26502 (SW05075) |
| Fork 4 | Program Number | SW04670 | SW04728 | SW04786 | SW04844 | SW04902 | SW04960 | SW05018 | SW05076 |
| Fork 4 | Block Number | SW04671 | SW04729 | SW04787 | SW04845 | SW04903 | SW04961 | SW05019 | SW05077 |
| Fork 4 | Alarm Code | SL26392 (SW04672) | SL26408 (SW04730) | SL26424 (SW04788) | SL26440 (SW04846) | SL26456 (SW04904) | SL26472 (SW04962) | SL26488 (SW05020) | SL26504 (SW05078) |
| Fork 5 | Program Number | SW04673 | SW04731 | SW04789 | SW04847 | SW04905 | SW04963 | SW05021 | SW05079 |
| Fork 5 | Block Number | SW04674 | SW04732 | SW04790 | SW04848 | SW04906 | SW04964 | SW05022 | SW05080 |
| Fork 5 | Alarm Code | SL26394 (SW04675) | SL26410 (SW04733) | SL26426 (SW04791) | SL26442 (SW04849) | SL26458 (SW04907) | SL26474 (SW04965) | SL26490 (SW05023) | SL26506 (SW05081) |
| Fork 6 | Program Number | SW04676 | SW04734 | SW04792 | SW04850 | SW04908 | SW04966 | SW05024 | SW05082 |
| Fork 6 | Block Number | SW04677 | SW04735 | SW04793 | SW04851 | SW04909 | SW04967 | SW05025 | SW05083 |
| Fork 6 | Alarm Code | SL26396 (SW04678) | SL26412 (SW04736) | SL26428 (SW04794) | SL26444 (SW04852) | SL26460 (SW04910) | SL26476 (SW04968) | SL26492 (SW05026) | SL26508 (SW05084) |
| Fork 7 | Program Number | SW04679 | SW04737 | SW04795 | SW04853 | SW04911 | SW04969 | SW05027 | SW05085 |
| Fork 7 | Block Number | SW04680 | SW04738 | SW04796 | SW04854 | SW04912 | SW04970 | SW05028 | SW05086 |
| Fork 7 | Alarm Code | SL26398 (SW04681) | SL26414 (SW04739) | SL26430 (SW04797) | SL26446 (SW04855) | SL26462 (SW04913) | SL26478 (SW04971) | SL26494 (SW05029) | SL26510 (SW05087) |
| Logical Axis 1 Program Current Position | | SL04682 | SL04740 | SL04798 | SL04856 | SL04914 | SL04972 | SL05030 | SL05088 |
| Logical Axis 2 Program Current Position | | SL04684 | SL04742 | SL04800 | SL04858 | SL04916 | SL04974 | SL05032 | SL05090 |
| Logical Axis 3 Program Current Position | | SL04686 | SL04744 | SL04802 | SL04860 | SL04918 | SL04976 | SL05034 | SL05092 |
| Logical Axis 4 Program Current Position | | SL04688 | SL04746 | SL04804 | SL04862 | SL04920 | SL04978 | SL05036 | SL05094 |
| Logical Axis 5 Program Current Position | | SL04690 | SL04748 | SL04806 | SL04864 | SL04922 | SL04980 | SL05038 | SL05096 |
| Logical Axis 6 Program Current Position | | SL04692 | SL04750 | SL04808 | SL04866 | SL04924 | SL04982 | SL05040 | SL05098 |
| Logical Axis 7 Program Current Position | | SL04694 | SL04752 | SL04810 | SL04868 | SL04926 | SL04984 | SL05042 | SL05100 |

Specifications

4

System Register Specifications

| System Work Number | Work 25 | Work 26 | Work 27 | Work 28 | Work 29 | Work 30 | Work 31 | Work 32 |
|---|---|---|---|---|---|---|---|---|
| Logical Axis 8 Program Current Position | SL04696 | SL04754 | SL04812 | SL04870 | SL04928 | SL04986 | SL05044 | SL05102 |
| Logical Axis 9 Program Current Position | SL04698 | SL04756 | SL04814 | SL04872 | SL04930 | SL04988 | SL05046 | SL05104 |
| Logical Axis 10 Program Current Position | SL04700 | SL04758 | SL04816 | SL04874 | SL04932 | SL04990 | SL05048 | SL05106 |
| Logical Axis 11 Program Current Position | SL04702 | SL04760 | SL04818 | SL04876 | SL04934 | SL04992 | SL05050 | SL05108 |
| Logical Axis 12 Program Current Position | SL04704 | SL04762 | SL04820 | SL04878 | SL04936 | SL04994 | SL05052 | SL05110 |
| Logical Axis 13 Program Current Position | SL04706 | SL04764 | SL04822 | SL04880 | SL04938 | SL04996 | SL05054 | SL05112 |
| Logical Axis 14 Program Current Position | SL04708 | SL04766 | SL04824 | SL04882 | SL04940 | SL04998 | SL05056 | SL05114 |
| Logical Axis 15 Program Current Position | SL04710 | SL04768 | SL04826 | SL04884 | SL04942 | SL05000 | SL05058 | SL05116 |
| Logical Axis 16 Program Current Position | SL04712 | SL04770 | SL04828 | SL04886 | SL04944 | SL05002 | SL05060 | SL05118 |
| Logical Axis 17 Program Current Position | SL08960 | SL08992 | SL09024 | SL09056 | SL09088 | SL09120 | SL09152 | SL09184 |
| Logical Axis 18 Program Current Position | SL08962 | SL08994 | SL09026 | SL09058 | SL09090 | SL09122 | SL09154 | SL09186 |
| Logical Axis 19 Program Current Position | SL08964 | SL08996 | SL09028 | SL09060 | SL09092 | SL09124 | SL09156 | SL09188 |
| Logical Axis 20 Program Current Position | SL08966 | SL08998 | SL09030 | SL09062 | SL09094 | SL09126 | SL09158 | SL09190 |
| Logical Axis 21 Program Current Position | SL08968 | SL09000 | SL09032 | SL09064 | SL09096 | SL09128 | SL09160 | SL09192 |
| Logical Axis 22 Program Current Position | SL08970 | SL09002 | SL09034 | SL09066 | SL09098 | SL09130 | SL09162 | SL09194 |
| Logical Axis 23 Program Current Position | SL08972 | SL09004 | SL09036 | SL09068 | SL09100 | SL09132 | SL09164 | SL09196 |
| Logical Axis 24 Program Current Position | SL08974 | SL09006 | SL09038 | SL09070 | SL09102 | SL09134 | SL09166 | SL09198 |
| Logical Axis 25 Program Current Position | SL08976 | SL09008 | SL09040 | SL09072 | SL09104 | SL09136 | SL09168 | SL09200 |
| Logical Axis 26 Program Current Position | SL08978 | SL09010 | SL09042 | SL09074 | SL09106 | SL09138 | SL09170 | SL09202 |
| Logical Axis 27 Program Current Position | SL08980 | SL09012 | SL09044 | SL09076 | SL09108 | SL09140 | SL09172 | SL09204 |
| Logical Axis 28 Program Current Position | SL08982 | SL09014 | SL09046 | SL09078 | SL09110 | SL09142 | SL09174 | SL09206 |
| Logical Axis 29 Program Current Position | SL08984 | SL09016 | SL09048 | SL09080 | SL09112 | SL09144 | SL09176 | SL09208 |
| Logical Axis 30 Program Current Position | SL08986 | SL09018 | SL09050 | SL09082 | SL09114 | SL09146 | SL09178 | SL09210 |
| Logical Axis 31 Program Current Position | SL08988 | SL09020 | SL09052 | SL09084 | SL09116 | SL09148 | SL09180 | SL09212 |
| Logical Axis 32 Program Current Position | SL08990 | SL09022 | SL09054 | SL09086 | SL09118 | SL09150 | SL09182 | SL09214 |

◆ Expansion System I/O Error Status

The data in these registers give the I/O errors in the system for Racks 1 and 5 to 7.

The details of the error status depend on the Modules that are mounted and the error code. Refer to the following manual for details.

📖 *MP3000 Series MP3200 Troubleshooting Manual* (Manual No.: SIEP C880725 01)

| Name | Register Addresses | Remarks | | |
|---|---|---|---|---|
| I/O Error Count | SW09560 | Number of I/O error occurrences | | |
| Input Error Count | SW09561 | Number of input error occurrences | | |
| Input Error Address | SL09562 | Latest input error address (register address in IW□□□□) | | |
| Reserved for system. | SW09564 | – | | |
| Output Error Count | SW09565 | Number of output error occurrences | | |
| Output Error Address | SL09566 | Latest output error address (register address in OW□□□□) | | |
| Reserved for system. | SW09568 to SW09571 | – | | |
| Extended I/O Error Status | SW09572 to SW09603 | CPU Unit | | |
| | SW09604 to SW09635 | Rack 1 | Unit 1 | Slot 1 |
| | SW09636 to SW09667 | | | Slot 2 |
| | SW09668 to SW09699 | | | Slot 3 |
| | SW09700 to SW09731 | | | Slot 4 |
| | SW09732 to SW09763 | | | Slot 5 |
| | SW09764 to SW09795 | | | Slot 6 |
| | SW09796 to SW09827 | | | Slot 7 |
| | SW09828 to SW09859 | | | Slot 8 |
| | SW09860 to SW09891 | | Unit 2 | Slot 1 |
| | SW09892 to SW09923 | | | Slot 2 |
| | SW09924 to SW09955 | | | Slot 3 |
| | SW09956 to SW09987 | | | Slot 4 |
| | SW09988 to SW10019 | | | Slot 5 |
| | SW10020 to SW10051 | | | Slot 6 |
| | SW10052 to SW10083 | | | Slot 7 |
| | SW10084 to SW10115 | | | Slot 8 |
| | SW10116 to SW10147 | | Unit 3 | Slot 1 |
| | SW10148 to SW10179 | | | Slot 2 |
| | SW10180 to SW10211 | | | Slot 3 |
| | SW10212 to SW10243 | | | Slot 4 |
| | SW10244 to SW10275 | | | Slot 5 |
| | SW10276 to SW10307 | | | Slot 6 |
| | SW10308 to SW10339 | | | Slot 7 |
| | SW10340 to SW10371 | | | Slot 8 |
| | SW10372 to SW10403 | | Unit 4 | Slot 1 |
| | SW10404 to SW10435 | | | Slot 2 |
| | SW10436 to SW10467 | | | Slot 3 |
| | SW10468 to SW10499 | | | Slot 4 |
| | SW10500 to SW10531 | | | Slot 5 |
| | SW10532 to SW10563 | | | Slot 6 |
| | SW10564 to SW10595 | | | Slot 7 |
| | SW10596 to SW10627 | | | Slot 8 |

Specifications

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System Register Specifications

| Name | Register Addresses | Remarks | | |
|---|---|---|---|---|
| Extended I/O Error Status | SW10628 to SW10659 | Rack 5 | Unit 1 | Slot 1 |
| | SW10660 to SW10691 | | | Slot 2 |
| | SW10692 to SW10723 | | | Slot 3 |
| | SW10724 to SW10755 | | | Slot 4 |
| | SW10756 to SW10787 | | | Slot 5 |
| | SW10788 to SW10819 | | | Slot 6 |
| | SW10820 to SW10851 | | | Slot 7 |
| | SW10852 to SW10883 | | | Slot 8 |
| | SW10884 to SW10915 | | Unit 2 | Slot 1 |
| | SW10916 to SW10947 | | | Slot 2 |
| | SW10948 to SW10979 | | | Slot 3 |
| | SW10980 to SW11011 | | | Slot 4 |
| | SW11012 to SW11043 | | | Slot 5 |
| | SW11044 to SW11075 | | | Slot 6 |
| | SW11076 to SW11107 | | | Slot 7 |
| | SW11108 to SW11139 | | | Slot 8 |
| | SW11140 to SW11171 | | Unit 3 | Slot 1 |
| | SW11172 to SW11203 | | | Slot 2 |
| | SW11204 to SW11235 | | | Slot 3 |
| | SW11236 to SW11267 | | | Slot 4 |
| | SW11268 to SW11299 | | | Slot 5 |
| | SW11300 to SW11331 | | | Slot 6 |
| | SW11332 to SW11363 | | | Slot 7 |
| | SW11364 to SW11395 | | | Slot 8 |
| | SW11396 to SW11427 | | Unit 4 | Slot 1 |
| | SW11428 to SW11459 | | | Slot 2 |
| | SW11460 to SW11491 | | | Slot 3 |
| | SW11492 to SW11523 | | | Slot 4 |
| | SW11524 to SW11555 | | | Slot 5 |
| | SW11556 to SW11587 | | | Slot 6 |
| | SW11588 to SW11619 | | | Slot 7 |
| | SW11620 to SW11651 | | | Slot 8 |

| Name | Register Addresses | Remarks | | |
|---|---|---|---|---|
| Extended I/O Error Status | SW11652 to SW11683 | Rack 6 | Unit 1 | Slot 1 |
| | SW11684 to SW11715 | | | Slot 2 |
| | SW11716 to SW11747 | | | Slot 3 |
| | SW11748 to SW11779 | | | Slot 4 |
| | SW11780 to SW11811 | | | Slot 5 |
| | SW11812 to SW11843 | | | Slot 6 |
| | SW11844 to SW11875 | | | Slot 7 |
| | SW11876 to SW11907 | | | Slot 8 |
| | SW11908 to SW11939 | | Unit 2 | Slot 1 |
| | SW11940 to SW11971 | | | Slot 2 |
| | SW11972 to SW12003 | | | Slot 3 |
| | SW12004 to SW12035 | | | Slot 4 |
| | SW12036 to SW12067 | | | Slot 5 |
| | SW12068 to SW12099 | | | Slot 6 |
| | SW12100 to SW12131 | | | Slot 7 |
| | SW12132 to SW12163 | | | Slot 8 |
| | SW12164 to SW12195 | | Unit 3 | Slot 1 |
| | SW12196 to SW12227 | | | Slot 2 |
| | SW12228 to SW12259 | | | Slot 3 |
| | SW12260 to SW12291 | | | Slot 4 |
| | SW12292 to SW12323 | | | Slot 5 |
| | SW12324 to SW12355 | | | Slot 6 |
| | SW12356 to SW12387 | | | Slot 7 |
| | SW12388 to SW12419 | | | Slot 8 |
| | SW12420 to SW12451 | | Unit 4 | Slot 1 |
| | SW12452 to SW12483 | | | Slot 2 |
| | SW12484 to SW12515 | | | Slot 3 |
| | SW12516 to SW12547 | | | Slot 4 |
| | SW12548 to SW12579 | | | Slot 5 |
| | SW12580 to SW12611 | | | Slot 6 |
| | SW12612 to SW12643 | | | Slot 7 |
| | SW12644 to SW12675 | | | Slot 8 |

System Register Specifications

| Name | Register Addresses | Remarks | | |
|---|---|---|---|---|
| Extended I/O Error Status | SW12676 to SW12707 | Rack 7 | Unit 1 | Slot 1 |
| | SW12708 to SW12739 | | | Slot 2 |
| | SW12740 to SW12771 | | | Slot 3 |
| | SW12772 to SW12803 | | | Slot 4 |
| | SW12804 to SW12835 | | | Slot 5 |
| | SW12836 to SW12867 | | | Slot 6 |
| | SW12868 to SW12899 | | | Slot 7 |
| | SW12900 to SW12931 | | | Slot 8 |
| | SW12932 to SW12963 | | Unit 2 | Slot 1 |
| | SW12964 to SW12995 | | | Slot 2 |
| | SW12996 to SW13027 | | | Slot 3 |
| | SW13028 to SW13059 | | | Slot 4 |
| | SW13060 to SW13091 | | | Slot 5 |
| | SW13092 to SW13123 | | | Slot 6 |
| | SW13124 to SW13155 | | | Slot 7 |
| | SW13156 to SW13187 | | | Slot 8 |
| | SW13188 to SW13219 | | Unit 3 | Slot 1 |
| | SW13220 to SW13251 | | | Slot 2 |
| | SW13252 to SW13283 | | | Slot 3 |
| | SW13284 to SW13315 | | | Slot 4 |
| | SW13316 to SW13347 | | | Slot 5 |
| | SW13348 to SW13379 | | | Slot 6 |
| | SW13380 to SW13411 | | | Slot 7 |
| | SW13412 to SW13443 | | | Slot 8 |
| | SW13444 to SW13475 | | Unit 4 | Slot 1 |
| | SW13476 to SW13507 | | | Slot 2 |
| | SW13508 to SW13539 | | | Slot 3 |
| | SW13540 to SW13571 | | | Slot 4 |
| | SW13572 to SW13603 | | | Slot 5 |
| | SW13604 to SW13635 | | | Slot 6 |
| | SW13636 to SW13667 | | | Slot 7 |
| | SW13668 to SW13699 | | | Slot 8 |

Information | The I/O error status data for Racks 2 to 4 is stored in SW00288 to SW00503. Refer to the following sections for details.

☞ ◆ *System I/O Error Status (page 4-26)*

## ◆ Expanded Unit and Module Information

The data in these registers give hardware information about the CPU Unit and Optional Modules on Racks 1 and 5 to 7.

| Name | Register Addresses | Remarks |
|---|---|---|
| CPU Unit Information | SW13700 | CPU Unit ID (Low) |
| | SW13701 | CPU Unit ID (High) |
| | SW13702 | Hardware version (BCD) |
| | SW13703 | Software version (BCD) |
| | SW13704 | Number of sub-slots (hex) |
| | SW13705 to SW13707 | Reserved for system. |
| | SW13708 | Function Module 1 ID (Low) |
| | SW13709 | Function Module 1 ID (High) |
| | SW13710 | Function Module 1 Status |
| | SW13711 | Reserved for system. |
| | SW13712 | Function Module 2 ID (Low) |
| | SW13713 | Function Module 2 ID (High) |
| | SW13714 | Function Module 2 Status |
| | SW13715 | Reserved for system. |
| | SW13716 | Function Module 3 ID (Low) |
| | SW13717 | Function Module 3 ID (High) |
| | SW13718 | Function Module 3 Status |
| | SW13719 | Reserved for system. |
| | SW13720 | Function Module 4 ID (Low) |
| | SW13721 | Function Module 4 ID (High) |
| | SW13722 | Function Module 4 Status |
| | SW13723 | Reserved for system. |
| | SW13724 | Function Module 5 ID (Low) |
| | SW13725 | Function Module 5 ID (High) |
| | SW13726 | Function Module 5 Status |
| | SW13727 | Reserved for system. |
| | SW13728 | Function Module 6 ID (Low) |
| | SW13729 | Function Module 6 ID (High) |
| | SW13730 | Function Module 6 Status |
| | SW13731 | Reserved for system. |
| | SW13732 | Function Module 7 ID (Low) |
| | SW13733 | Function Module 7 ID (High) |
| | SW13734 | Function Module 7 Status |
| | SW13735 | Reserved for system. |
| | SW13736 | Function Module 8 ID (Low) |
| | SW13737 | Function Module 8 ID (High) |
| | SW13738 | Function Module 8 Status |
| | SW13739 | Reserved for system. |
| | SW13740 | Function Module 9 ID (Low) |
| | SW13741 | Function Module 9 ID (High) |
| | SW13742 | Function Module 9 Status |
| | SW13743 | Reserved for system. |
| | SW13744 | Function Module 10 ID (Low) |
| | SW13745 | Function Module 10 ID (High) |
| | SW13746 | Function Module 10 Status |
| | SW13747 | Reserved for system. |

Continued on next page.

Specifications

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System Register Specifications

| Name | Register Addresses | Remarks | | | |
|---|---|---|---|---|---|
| Unit and Optional Module Information | SW13748 | Rack 1 | Unit 1 | Slot 1 | Optional Unit and Module ID (Low) |
| | SW13749 | | | | Optional Unit and Module ID (High) |
| | SW13750 | | | | Hardware version (BCD) |
| | SW13751 | | | | Software version (BCD) |
| | SW13752 | | | | Number of sub-slots (hex) |
| | SW13753 to SW13755 | | | | Reserved for system. |
| | SW13756 | | | | Function Module 1 ID (Low) |
| | SW13757 | | | | Function Module 1 ID (High) |
| | SW13758 | | | | Function Module 1 Status |
| | SW13759 | | | | Reserved for system. |
| | SW13760 | | | | Function Module 2 ID (Low) |
| | SW13761 | | | | Function Module 2 ID (High) |
| | SW13762 | | | | Function Module 2 Status |
| | SW13763 | | | | Reserved for system. |
| | SW13764 to SW13779 | | | Slot 2 | |
| | SW13780 to SW13795 | | | Slot 3 | |
| | SW13796 to SW13811 | | | Slot 4 | |
| | SW13812 to SW13827 | | | Slot 5 | |
| | SW13828 to SW13843 | | | Slot 6 | |
| | SW13844 to SW13859 | | | Slot 7 | |
| | SW13860 to SW13875 | | | Slot 8 | |
| | SW13876 to SW13891 | | Unit 2 | Slot 1 | |
| | SW13892 to SW13907 | | | Slot 2 | |
| | SW13908 to SW13923 | | | Slot 3 | |
| | SW13924 to SW13939 | | | Slot 4 | |
| | SW13940 to SW13955 | | | Slot 5 | Same as above. |
| | SW13956 to SW13971 | | | Slot 6 | |
| | SW13972 to SW13987 | | | Slot 7 | |
| | SW13988 to SW14003 | | | Slot 8 | |
| | SW14004 to SW14019 | | Unit 3 | Slot 1 | |
| | SW14020 to SW14035 | | | Slot 2 | |
| | SW14036 to SW14051 | | | Slot 3 | |
| | SW14052 to SW14067 | | | Slot 4 | |
| | SW14068 to SW14083 | | | Slot 5 | |
| | SW14084 to SW14099 | | | Slot 6 | |
| | SW14100 to SW14115 | | | Slot 7 | |
| | SW14116 to SW14131 | | | Slot 8 | |

| Name | Register Addresses | Remarks | | | |
|---|---|---|---|---|---|
| Unit and Optional Module Information | SW14132 to SW14147 | Rack 1 | Unit 4 | Slot 1 | Same as above. |
| | SW14148 to SW14163 | | | Slot 2 | |
| | SW14164 to SW14179 | | | Slot 3 | |
| | SW14180 to SW14195 | | | Slot 4 | |
| | SW14196 to SW14211 | | | Slot 5 | |
| | SW14212 to SW14227 | | | Slot 6 | |
| | SW14228 to SW14243 | | | Slot 7 | |
| | SW14244 to SW14259 | | | Slot 8 | |
| | SW14260 to SW14275 | Rack 5 | Unit 1 | Slot 1 | Same as above. |
| | SW14276 to SW14291 | | | Slot 2 | |
| | SW14292 to SW14307 | | | Slot 3 | |
| | SW14308 to SW14323 | | | Slot 4 | |
| | SW14324 to SW14339 | | | Slot 5 | |
| | SW14340 to SW14355 | | | Slot 6 | |
| | SW14356 to SW14371 | | | Slot 7 | |
| | SW14372 to SW14387 | | | Slot 8 | |
| | SW14388 to SW14403 | | Unit 2 | Slot 1 | |
| | SW14404 to SW14419 | | | Slot 2 | |
| | SW14420 to SW14435 | | | Slot 3 | |
| | SW14436 to SW14451 | | | Slot 4 | |
| | SW14452 to SW14467 | | | Slot 5 | |
| | SW14468 to SW14483 | | | Slot 6 | |
| | SW14484 to SW14499 | | | Slot 7 | |
| | SW14500 to SW14515 | | | Slot 8 | |
| | SW14516 to SW14531 | | Unit 3 | Slot 1 | |
| | SW14532 to SW14547 | | | Slot 2 | |
| | SW14548 to SW14563 | | | Slot 3 | |
| | SW14564 to SW14579 | | | Slot 4 | |
| | SW14580 to SW14595 | | | Slot 5 | |
| | SW14596 to SW14611 | | | Slot 6 | |
| | SW14612 to SW14627 | | | Slot 7 | |
| | SW14628 to SW14643 | | | Slot 8 | |
| | SW14644 to SW14659 | | Unit 4 | Slot 1 | |
| | SW14660 to SW14675 | | | Slot 2 | |
| | SW14676 to SW14691 | | | Slot 3 | |
| | SW14692 to SW14707 | | | Slot 4 | |
| | SW14708 to SW14723 | | | Slot 5 | |
| | SW14724 to SW14739 | | | Slot 6 | |
| | SW14740 to SW14755 | | | Slot 7 | |
| | SW14756 to SW14771 | | | Slot 8 | |

System Register Specifications

| Name | Register Addresses | Remarks | | |
|---|---|---|---|---|
| Unit and Optional Module Information | SW14772 to SW14787 | Rack 6 | Unit 1 | Slot 1 | Same as above. |
| | SW14788 to SW14803 | | | Slot 2 | |
| | SW14804 to SW14819 | | | Slot 3 | |
| | SW14820 to SW14835 | | | Slot 4 | |
| | SW14836 to SW14851 | | | Slot 5 | |
| | SW14852 to SW14867 | | | Slot 6 | |
| | SW14868 to SW14883 | | | Slot 7 | |
| | SW14884 to SW14899 | | | Slot 8 | |
| | SW14900 to SW14915 | | Unit 2 | Slot 1 | |
| | SW14916 to SW14931 | | | Slot 2 | |
| | SW14932 to SW14947 | | | Slot 3 | |
| | SW14948 to SW14963 | | | Slot 4 | |
| | SW14964 to SW14979 | | | Slot 5 | |
| | SW14980 to SW14995 | | | Slot 6 | |
| | SW14996 to SW15011 | | | Slot 7 | |
| | SW15012 to SW15027 | | | Slot 8 | |
| | SW15028 to SW15043 | | Unit 3 | Slot 1 | |
| | SW15044 to SW15059 | | | Slot 2 | |
| | SW15060 to SW15075 | | | Slot 3 | |
| | SW15076 to SW15091 | | | Slot 4 | |
| | SW15092 to SW15107 | | | Slot 5 | |
| | SW15108 to SW15123 | | | Slot 6 | |
| | SW15124 to SW15139 | | | Slot 7 | |
| | SW15140 to SW15155 | | | Slot 8 | |
| | SW15156 to SW15171 | | Unit 4 | Slot 1 | |
| | SW15172 to SW15187 | | | Slot 2 | |
| | SW15188 to SW15203 | | | Slot 3 | |
| | SW15204 to SW15219 | | | Slot 4 | |
| | SW15220 to SW15235 | | | Slot 5 | |
| | SW15236 to SW15251 | | | Slot 6 | |
| | SW15252 to SW15267 | | | Slot 7 | |
| | SW15268 to SW15283 | | | Slot 8 | |

Continued from previous page.

| Name | Register Addresses | Remarks | | | |
|------|--------------------|---------|--|--|--|
| Unit and Optional Module Information | SW15284 to SW15299 | Rack 7 | Unit 1 | Slot 1 | Same as above. |
| | SW15300 to SW15315 | | | Slot 2 | |
| | SW15316 to SW15331 | | | Slot 3 | |
| | SW15332 to SW15347 | | | Slot 4 | |
| | SW15348 to SW15363 | | | Slot 5 | |
| | SW15364 to SW15379 | | | Slot 6 | |
| | SW15380 to SW15395 | | | Slot 7 | |
| | SW15396 to SW15411 | | | Slot 8 | |
| | SW15412 to SW15427 | | Unit 2 | Slot 1 | |
| | SW15428 to SW15443 | | | Slot 2 | |
| | SW15444 to SW15459 | | | Slot 3 | |
| | SW15460 to SW15475 | | | Slot 4 | |
| | SW15476 to SW15491 | | | Slot 5 | |
| | SW15492 to SW15507 | | | Slot 6 | |
| | SW15508 to SW15523 | | | Slot 7 | |
| | SW15524 to SW15539 | | | Slot 8 | |
| | SW15540 to SW15555 | | Unit 3 | Slot 1 | |
| | SW15556 to SW15571 | | | Slot 2 | |
| | SW15572 to SW15587 | | | Slot 3 | |
| | SW15588 to SW15603 | | | Slot 4 | |
| | SW15604 to SW15619 | | | Slot 5 | |
| | SW15620 to SW15635 | | | Slot 6 | |
| | SW15636 to SW15651 | | | Slot 7 | |
| | SW15652 to SW15667 | | | Slot 8 | |
| | SW15668 to SW15683 | | Unit 4 | Slot 1 | |
| | SW15684 to SW15699 | | | Slot 2 | |
| | SW15700 to SW15715 | | | Slot 3 | |
| | SW15716 to SW15731 | | | Slot 4 | |
| | SW15732 to SW15747 | | | Slot 5 | |
| | SW15748 to SW15763 | | | Slot 6 | |
| | SW15764 to SW15779 | | | Slot 7 | |
| | SW15780 to SW15795 | | | Slot 8 | |

Information    The Optional Module information data for Racks 2 to 4 is stored in SW00880 to SW01095. Refer to the following sections for details.

☞    ◆ *Module Information (page 4-29)*

#### ◆ Expansion System Status

The data in these registers give the status of the Power Supply Units on Racks 1 and 5 to 7.

| Name | Register Addresses | | Name | Remarks |
|---|---|---|---|---|
| Power Supply Status | SW15800 | SB158000 | RACK1 WARN1 | 0: No warning 1 for Rack 1 Power Supply Unit<br>1: Warning 1 for Rack 1 Power Supply Unit |
| | | SB158001 | RACK1 WARN2 | 0: No warning 2 for Rack 1 Power Supply Unit<br>1: Warning 2 for Rack 1 Power Supply Unit |
| | | SB158002, SB158003 | Reserved for system. | – |
| | | SB158004 | RACK5 WARN1 | 0: No warning 1 for Rack 5 Power Supply Unit<br>1: Warning 1 for Rack 5 Power Supply Unit |
| | | SB158005 | RACK5 WARN2 | 0: No warning 2 for Rack 5 Power Supply Unit<br>1: Warning 2 for Rack 5 Power Supply Unit |
| | | SB158006 | RACK5 PWOFF | 0: Power ON to Rack 5 Power Supply Unit<br>1: Power OFF to Rack 5 Power Supply Unit |
| | | SB158007 | Reserved for system. | – |
| | | SB158008 | RACK6 WARN1 | 0: No warning 1 for Rack 6 Power Supply Unit<br>1: Warning 1 for Rack 6 Power Supply Unit |
| | | SB158009 | RACK6 WARN2 | 0: No warning 2 for Rack 6 Power Supply Unit<br>1: Warning 2 for Rack 6 Power Supply Unit |
| | | SB15800A | RACK6 PWOFF | 0: Power ON to Rack 6 Power Supply Unit<br>1: Power OFF to Rack 6 Power Supply Unit |
| | | SB15800B | Reserved for system. | – |
| | | SB15800C | RACK7 WARN1 | 0: No warning 1 for Rack 7 Power Supply Unit<br>1: Warning 1 for Rack 7 Power Supply Unit |
| | | SB15800D | RACK7 WARN2 | 0: No warning 2 for Rack 7 Power Supply Unit<br>1: Warning 2 for Rack 7 Power Supply Unit |
| | | SB15800E | RACK7 PWOFF | 0: Power ON to Rack 7 Power Supply Unit<br>1: Power OFF to Rack 7 Power Supply Unit |
| | | SB15800F | Reserved for system. | – |

#### ◆ Expansion System Service Execution Status

The data in these registers give the execution status of the system when the Units are expanded.

| Name | Register Addresses | | Remarks | |
|---|---|---|---|---|
| Data Trace Definition Existence | SW15998 | SB159980 | Group 1 | 0: Definition does not exist,<br>1: Definition exists |
| | | SB159981 | Group 2 | |
| | | SB159982 | Group 3 | |
| | | SB159983 | Group 4 | |
| | | SB159984 to SB15998F | Reserved for system. | |
| Data Trace Execution Status | SW15999 | SB159990 | Group 1 | 0: Tracing in progress,<br>1: Tracing stopped |
| | | SB159991 | Group 2 | |
| | | SB159992 | Group 3 | |
| | | SB159993 | Group 4 | |
| | | SB159994 to SB15999F | Reserved for system. | |
| Group 1 Record No. | SL16000 | | Latest record number in group 1. | |
| Group 2 Record No. | SL16002 | | Latest record number in group 2. | |
| Group 3 Record No. | SL16004 | | Latest record number in group 3. | |

| Name | Register Addresses | Remarks |
|---|---|---|
| Group 4 Record No. | SL16006 | Latest record number in group 4. |
| Reserved for system. | SL16008 | Reserved for system. |
| Reserved for system. | SL16010 | Reserved for system. |

## ◆ Alarm History Information

The data in these registers provide alarm history information for the system registers.
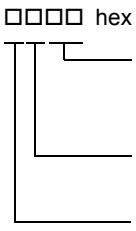
### ■ Register Configuration

| Name | Register Address | Remarks | |
|---|---|---|---|
| Current Alarm | SW16200 | Cleared when the power is turned ON. | |
| Alarm History Entries | SW16201 | Alarm history entries | |
| Alarm Clear | SW16202 | 1: Alarm cleared<br>2: Current alarm and history cleared | |
| Alarm History | SW16203 to SW16218 | Alarm History Entry 1 | Refer to the following section for details.<br>☞ *Details (page 4-65)* |
| | SW16219 to SW16234 | Alarm History Entry 2 | |
| | ⋮ | ⋮ | |
| | SW17787 to SW17802 | Alarm History Entry 100 | |
| Reserved for system. | SW17803 to SW17999 | – | |

### ■ Details

The registers for the alarm history entries are structured as shown below. This example shows the system register addresses for alarm history entry 1.

| Register Address | Remarks | Register Address Example |
|---|---|---|
| SW□□□□□ + 0 | □□□□ hex<br><br>01 to 09: Gives the slot number where the Module in which the alarm occurred is mounted.<br>1 to 4: Gives the unit number of the Module in which the alarm occurred is mounted.<br>1 to 7: Gives the Rack number where the Module in which the alarm occurred is mounted. | SW16203 |
| SW□□□□□ + 1 | Alarm Code | SW16204 |
| SW□□□□□ + 2 | Alarm Detail Format<br>1: Operation error<br>2: I/O error<br>3: Other error | SW16205 |
| SW□□□□□ + 3 | Year when alarm occurred | SW16206 |
| SW□□□□□ + 4 | Month when alarm occurred | SW16207 |

| Register Address | Remarks | Register Address Example |
|---|---|---|
| SW□□□□□ + 5 | Day when alarm occurred | SW16208 |
| SW□□□□□ + 6 | Hour when alarm occurred | SW16209 |
| SW□□□□□ + 7 | Minutes when alarm occurred | SW16210 |
| SW□□□□□ + 8 | Seconds when alarm occurred | SW16211 |
| SW□□□□□ + 9 | Alarm details<br>The information depends on the alarm details format.<br>☞ ■ *Alarm Details (page 4-66)* | SW16212 |
| SW□□□□□ + 10 | | SW16213 |
| SW□□□□□ + 11 | | SW16214 |
| SW□□□□□ + 12 | | SW16215 |
| SW□□□□□ + 13 | | SW16216 |
| SW□□□□□ + 14 | Reserved for system. | SW16217 |
| SW□□□□□ + 15 | Reserved for system. | SW16218 |

### ■ Alarm Details

Alarm details are given based on the alarm details format.

#### • Alarm Detail Format = 1 (operation error)

| Register Address | Remarks | Register Address Example |
|---|---|---|
| SW□□□□□ + 9 | Error Drawing No. | SW16212 |
| SW□□□□□ + 10 | Calling Drawing No. | SW16213 |
| SW□□□□□ + 11 | Calling Drawing Step No. | SW16214 |
| SW□□□□□ + 12 | Reserved for system. | SW16215 |
| SW□□□□□ + 13 | Reserved for system. | SW16216 |

#### • Alarm Detail Format = 2 (I/O error)

| Register Address | Remarks | Register Address Example |
|---|---|---|
| SW□□□□□ + 9 | Depends on the specifications of the Optional Module. | SW16212 |
| SW□□□□□ + 10 | Depends on the specifications of the Optional Module. | SW16213 |
| SW□□□□□ + 11 | Depends on the specifications of the Optional Module. | SW16214 |
| SW□□□□□ + 12 | Depends on the specifications of the Optional Module. | SW16215 |
| SW□□□□□ + 13 | Depends on the specifications of the Optional Module. | SW16216 |

#### • Alarm Detail Format = 3 (other error)

| Register Address | Remarks | Register Address Example |
|---|---|---|
| SW□□□□□ + 9 | Reserved for system. | SW16212 |
| SW□□□□□ + 10 | Reserved for system. | SW16213 |
| SW□□□□□ + 11 | Reserved for system. | SW16214 |
| SW□□□□□ + 12 | Reserved for system. | SW16215 |
| SW□□□□□ + 13 | Reserved for system. | SW16216 |

## ◆ Product information

The data in these registers give information on the CPU Unit.

| Name | Register Address | Remarks |
|---|---|---|
| Serial ID Information | SW20000 | CPU Unit serial ID (15 ASCII characters + NULL character) |
| | SW20001 | |
| | SW20002 | |
| | SW20003 | |
| | SW20004 | |
| | SW20005 | |
| | SW20006 | |
| | SW20007 | |
| | SW20008 to SW20015 | Reserved for system. |
| Reserved for system. | SW20016 to SW22063 | – |

## ◆ Unit and Rack Information

The data in these registers give hardware information on the Racks and Units for Racks 1 and 5 to 7.

### ■ Register Configuration

| Name | Register Address | Remarks | | |
|---|---|---|---|---|
| Unit and Rack Information | SW23000 | Rack 1 | | 0: Rack not mounted, 1: Rack mounted |
| | SW23001 | | | Rack Status<br>Refer to the following section for details.<br>☞ ■ *Rack Status Details (page 4-68)* |
| | SW23002 to SW23007 | | | Reserved for system. |
| | SW23008 | | Rack Expansion Interface Unit | Unit ID (Low) |
| | SW23009 | | | Unit ID (High) |
| | SW23010 | | | Unit Status<br>Refer to the following sections for details on the Unit status.<br>☞ ■ *Unit Status Details (page 4-68)* |
| | SW23011 | | | Reserved for system. |
| | SW23012 to SW23015 | | Power Supply Unit | Same as above. |
| | SW23016 to SW23019 | | CPU Unit | Same as above. |
| | SW23020 to SW23023 | | Unit 1 | Same as above. |
| | SW23024 to SW23027 | | Unit 2 | Same as above. |
| | SW23028 to SW23031 | | Unit 3 | Same as above. |
| | SW23032 to SW23035 | | Unit 4 | Same as above. |
| | SW23036 to SW23039 | | Unit 5 | Same as above. |

System Register Specifications

| Name | Register Address | Remarks | | |
|------|------------------|---------|---|---|
| Unit and Rack Information | SW23040 | Rack 5 | 0: Rack not mounted, 1: Rack mounted | |
| | SW23041 | | Rack Status<br>Refer to the following section for details.<br>☞ ■ *Rack Status Details (page 4-68)* | |
| | SW23042 to SW23047 | | Reserved for system. | |
| | SW23048 to SW23051 | | Rack Expansion Interface Unit | Same as above. |
| | SW23052 to SW23055 | | Power Supply Unit | Same as above. |
| | SW23056 to SW23059 | | Unit 1 | Same as above. |
| | SW23060 to SW23063 | | Unit 2 | Same as above. |
| | SW23064 to SW23067 | | Unit 3 | Same as above. |
| | SW23068 to SW23071 | | Unit 4 | Same as above. |
| | SW23072 to SW23075 | | Unit 5 | Same as above. |
| | SW23076 to SW23079 | | Unit 6 | Same as above. |
| | SW23080 to SW23119 | Rack 6 | Same as above. | |
| | SW23120 to SW23159 | Rack 7 | Same as above. | |

### ■ Rack Status Details

The possible Rack status values are listed in the following table.

| Value | Status |
|-------|--------|
| 0 | No Rack has been set up. |
| 1 | A Rack has been set up, but has not been mounted. |
| 2 | A Rack has been set up, and a Rack that matches the settings has been mounted. |
| 3 or more | Reserved for system. |

Information  Refer to the Module Configuration Definitions Tab Page for details on Rack settings.

### ■ Unit Status Details

The possible Unit status values are listed in the following table.

| Value | Status |
|-------|--------|
| 0 | No Unit has been set up. |
| 1 | A Unit has been set up, but it has not been mounted. |
| 2 | A Unit has been set up, and a Unit that matches the settings has been mounted. |
| 3 and 4 | Reserved for system. |
| 5 | A Unit has been set up, but the Unit mounted does not match the settings. |
| 6 or more | Reserved for system. |

Information  Refer to the Module Configuration Definitions Tab Page for details on Unit settings.

## ◆ Data Logging Execution Status

The data in these registers give the execution status of data logging.

| Name | Register Address | | Remarks |
|---|---|---|---|
| Data Logging Definition Existence | SW24000 | SB240000 | 0: Logging 1 definition does not exist, 1: Logging 1 definition exists |
| | | SB240001 | 0: Logging 2 definition does not exist, 1: Logging 2 definition exists |
| | | SB240002 | 0: Logging 3 definition does not exist, 1: Logging 3 definition exists |
| | | SB240003 | 0: Logging 4 definition does not exist, 1: Logging 4 definition exists |
| | | SB240004 to SB24000F | Reserved for system. |
| Data Logging Execution Status | SW24001 | SB240010 | 0: Logging 1 is in progress, 1: Logging 1 is stopped |
| | | SB240011 | 0: Logging 2 is in progress, 1: Logging 2 is stopped |
| | | SB240012 | 0: Logging 3 is in progress, 1: Logging 3 is stopped |
| | | SB240013 | 0: Logging 4 is in progress, 1: Logging 4 is stopped |
| | | SB240014 to SB240017 | Reserved for system. |
| | | SB240018 | 0: Logging 1 is not waiting for trigger condition, 1: Logging 1 is waiting for trigger condition |
| | | SB240019 | 0: Logging 2 is not waiting for trigger condition, 1: Logging 2 is waiting for trigger condition |
| | | SB24001A | 0: Logging 3 is not waiting for trigger condition, 1: Logging 3 is waiting for trigger condition |
| | | SB24001B | 0: Logging 4 is not waiting for trigger condition, 1: Logging 4 is waiting for trigger condition |
| | | SB24001C to SB24001F | Reserved for system. |

Specifications

4

System Register Specifications

Continued from previous page.

| Name | | Register Address | Remarks |
|---|---|---|---|
| Data Logging Execution Status Details | Logging 1 | SL24002 | File update counter |
| | | SQ24004 | Latest record number |
| | | SW24008 | Overrun counter |
| | | SW24009 | Error Code<br>0000 hex: No error,<br>0001 hex: No USB memory device at start of logging,<br>0002 hex: No USB memory device while logging is in progress,<br>0003 hex: Directory creation error,<br>0004 hex: File creation error,<br>0005 hex: File write error |
| | | SW24010 and SW24011 | Reserved for system. |
| | | SW24012 to SW24043 | Latest folder name |
| | | SW24044 to SW24065 | Latest file name (includes extension such as .csv) |
| | Logging 2 | SW24066 to SW24129 | Same as Logging 1. |
| | Logging 3 | SW24130 to SW24193 | Same as Logging 1. |
| | Logging 4 | SW24194 to SW24257 | Same as Logging 1. |
| Reserved for system. | | SW24258 to SW24321 | – |

## ◆ Automatic Reception Status for Ethernet Communications

The data in these registers give the execution status of automatic reception.

| Name | | Register Address | Contents |
|---|---|---|---|
| Circuit Number 1 | Common Status | SW25000 | Rack No. |
| | | SW25001 | Unit No. |
| | | SW25002 | Slot No. |
| | | SW25003 | Sub-slot No. |
| | CH1 Status | SW25004 | Transmission status<br>Refer to the following section for details.<br>☞ ■ *Transmission Status (page 4-78)* |
| | | SW25005 | Latest error status<br>Refer to the following section for details.<br>☞ ■ *Error Status (page 4-79)* |
| | | SW25006 | Transmission pass counter |
| | | SW25007 | Reception pass counter |
| | | SW25008 | Error counter |
| | | SW25009 to SW25011 | Reserved for system. |
| | CH2 Status | SW25012 to SW25019 | Same as CH1 status. |
| | CH3 Status | SW25020 to SW25027 | Same as CH1 status. |
| | CH4 Status | SW25028 to SW25035 | Same as CH1 status. |
| | CH5 Status | SW25036 to SW25043 | Same as CH1 status. |
| | CH6 Status | SW25044 to SW25051 | Same as CH1 status. |
| | CH7 Status | SW25052 to SW25059 | Same as CH1 status. |
| | CH8 Status | SW25060 to SW25067 | Same as CH1 status. |
| | CH9 Status | SW25068 to SW25075 | Same as CH1 status. |
| | CH10 Status | SW25076 to SW25083 | Same as CH1 status. |

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System Register Specifications

| Name | | Register Address | Contents |
|---|---|---|---|
| Circuit Number 2 | Common Status | SW25084 | Rack No. |
| | | SW25085 | Unit No. |
| | | SW25086 | Slot No. |
| | | SW25087 | Sub-slot No. |
| | CH1 Status | SW25088 | Transmission status Refer to the following section for details. ☞ ■ *Transmission Status (page 4-78)* |
| | | SW25089 | Latest error status Refer to the following section for details. ☞ ■ *Error Status (page 4-79)* |
| | | SW25090 | Transmission pass counter |
| | | SW25091 | Reception pass counter |
| | | SW25092 | Error counter |
| | | SW25093 to SW25095 | Reserved for system. |
| | CH2 Status | SW25096 to SW25103 | Same as CH1 status. |
| | CH3 Status | SW25104 to SW25111 | Same as CH1 status. |
| | CH4 Status | SW25112 to SW25119 | Same as CH1 status. |
| | CH5 Status | SW25120 to SW25127 | Same as CH1 status. |
| | CH6 Status | SW25128 to SW25135 | Same as CH1 status. |
| | CH7 Status | SW25136 to SW25143 | Same as CH1 status. |
| | CH8 Status | SW25144 to SW25151 | Same as CH1 status. |
| | CH9 Status | SW25152 to SW25159 | Same as CH1 status. |
| | CH10 Status | SW25160 to SW25167 | Same as CH1 status. |

| Name | | Register Address | Contents |
|---|---|---|---|
| Circuit Number 3 | Common Status | SW25168 | Rack No. |
| | | SW25169 | Unit No. |
| | | SW25170 | Slot No. |
| | | SW25171 | Sub-slot No. |
| | CH1 Status | SW25172 | Transmission status<br>Refer to the following section for details.<br>☞ ■ *Transmission Status (page 4-78)* |
| | | SW25173 | Latest error status<br>Refer to the following section for details.<br>☞ ■ *Error Status (page 4-79)* |
| | | SW25174 | Transmission pass counter |
| | | SW25175 | Reception pass counter |
| | | SW25176 | Error counter |
| | | SW25177 to SW25179 | Reserved for system. |
| | CH2 Status | SW25180 to SW25187 | Same as CH1 status. |
| | CH3 Status | SW25188 to SW25195 | Same as CH1 status. |
| | CH4 Status | SW25196 to SW25203 | Same as CH1 status. |
| | CH5 Status | SW25204 to SW25211 | Same as CH1 status. |
| | CH6 Status | SW25212 to SW25219 | Same as CH1 status. |
| | CH7 Status | SW25220 to SW25227 | Same as CH1 status. |
| | CH8 Status | SW25228 to SW25235 | Same as CH1 status. |
| | CH9 Status | SW25236 to SW25243 | Same as CH1 status. |
| | CH10 Status | SW25244 to SW25251 | Same as CH1 status. |

System Register Specifications

| Name | | Register Address | Contents |
|---|---|---|---|
| Circuit Number 4 | Common Status | SW25252 | Rack No. |
| | | SW25253 | Unit No. |
| | | SW25254 | Slot No. |
| | | SW25255 | Sub-slot No. |
| | CH1 Status | SW25256 | Transmission status Refer to the following section for details. ☞ ■ *Transmission Status (page 4-78)* |
| | | SW25257 | Latest error status Refer to the following section for details. ☞ ■ *Error Status (page 4-79)* |
| | | SW25258 | Transmission pass counter |
| | | SW25259 | Reception pass counter |
| | | SW25260 | Error counter |
| | | SW25261 to SW25263 | Reserved for system. |
| | CH2 Status | SW25264 to SW25271 | Same as CH1 status. |
| | CH3 Status | SW25272 to SW25279 | Same as CH1 status. |
| | CH4 Status | SW25280 to SW25287 | Same as CH1 status. |
| | CH5 Status | SW25288 to SW25295 | Same as CH1 status. |
| | CH6 Status | SW25296 to SW25303 | Same as CH1 status. |
| | CH7 Status | SW25304 to SW25311 | Same as CH1 status. |
| | CH8 Status | SW25312 to SW25319 | Same as CH1 status. |
| | CH9 Status | SW25320 to SW25327 | Same as CH1 status. |
| | CH10 Status | SW25328 to SW25335 | Same as CH1 status. |

| Name | | Register Address | Contents |
|---|---|---|---|
| Circuit Number 5 | Common Status | SW25336 | Rack No. |
| | | SW25337 | Unit No. |
| | | SW25338 | Slot No. |
| | | SW25339 | Sub-slot No. |
| | CH1 Status | SW25340 | Transmission status<br>Refer to the following section for details.<br>☞ ■ *Transmission Status (page 4-78)* |
| | | SW25341 | Latest error status<br>Refer to the following section for details.<br>☞ ■ *Error Status (page 4-79)* |
| | | SW25342 | Transmission pass counter |
| | | SW25343 | Reception pass counter |
| | | SW25344 | Error counter |
| | | SW25345 to SW25347 | Reserved for system. |
| | CH2 Status | SW25348 to SW25355 | Same as CH1 status. |
| | CH3 Status | SW25356 to SW25363 | Same as CH1 status. |
| | CH4 Status | SW25364 to SW25371 | Same as CH1 status. |
| | CH5 Status | SW25372 to SW25379 | Same as CH1 status. |
| | CH6 Status | SW25380 to SW25387 | Same as CH1 status. |
| | CH7 Status | SW25388 to SW25395 | Same as CH1 status. |
| | CH8 Status | SW25396 to SW25403 | Same as CH1 status. |
| | CH9 Status | SW25404 to SW25411 | Same as CH1 status. |
| | CH10 Status | SW25412 to SW25419 | Same as CH1 status. |

System Register Specifications

| Name | | Register Address | Contents |
|---|---|---|---|
| Circuit Number 6 | Common Status | SW25420 | Rack No. |
| | | SW25421 | Unit No. |
| | | SW25422 | Slot No. |
| | | SW25423 | Sub-slot No. |
| | CH1 Status | SW25424 | Transmission status<br>Refer to the following section for details.<br>☞ ■ *Transmission Status (page 4-78)* |
| | | SW25425 | Latest error status<br>Refer to the following section for details.<br>☞ ■ *Error Status (page 4-79)* |
| | | SW25426 | Transmission pass counter |
| | | SW25427 | Reception pass counter |
| | | SW25428 | Error counter |
| | | SW25429 to SW25431 | Reserved for system. |
| | CH2 Status | SW25432 to SW25439 | Same as CH1 status. |
| | CH3 Status | SW25440 to SW25447 | Same as CH1 status. |
| | CH4 Status | SW25448 to SW25455 | Same as CH1 status. |
| | CH5 Status | SW25456 to SW25463 | Same as CH1 status. |
| | CH6 Status | SW25464 to SW25471 | Same as CH1 status. |
| | CH7 Status | SW25472 to SW25479 | Same as CH1 status. |
| | CH8 Status | SW25480 to SW25487 | Same as CH1 status. |
| | CH9 Status | SW25488 to SW25495 | Same as CH1 status. |
| | CH10 Status | SW25496 to SW25503 | Same as CH1 status. |

| Name | | Register Address | Contents |
|---|---|---|---|
| Circuit Number 7 | Common Status | SW25504 | Rack No. |
| | | SW25505 | Unit No. |
| | | SW25506 | Slot No. |
| | | SW25507 | Sub-slot No. |
| | CH1 Status | SW25508 | Transmission status<br>Refer to the following section for details.<br>☞ ■ *Transmission Status (page 4-78)* |
| | | SW25509 | Latest error status<br>Refer to the following section for details.<br>☞ ■ *Error Status (page 4-79)* |
| | | SW25510 | Transmission pass counter |
| | | SW25511 | Reception pass counter |
| | | SW25512 | Error counter |
| | | SW25513 to SW25515 | Reserved for system. |
| | CH2 Status | SW25516 to SW25523 | Same as CH1 status. |
| | CH3 Status | SW25524 to SW25531 | Same as CH1 status. |
| | CH4 Status | SW25532 to SW25539 | Same as CH1 status. |
| | CH5 Status | SW25540 to SW25547 | Same as CH1 status. |
| | CH6 Status | SW25548 to SW25555 | Same as CH1 status. |
| | CH7 Status | SW25556 to SW25563 | Same as CH1 status. |
| | CH8 Status | SW25564 to SW25571 | Same as CH1 status. |
| | CH9 Status | SW25572 to SW25579 | Same as CH1 status. |
| | CH10 Status | SW25580 to SW25587 | Same as CH1 status. |

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System Register Specifications

| Name | | Register Address | Contents |
|---|---|---|---|
| Circuit Number 8 | Common Status | SW25588 | Rack No. |
| | | SW25589 | Unit No. |
| | | SW25590 | Slot No. |
| | | SW25591 | Sub-slot No. |
| | CH1 Status | SW25592 | Transmission status<br>Refer to the following section for details.<br>☞ ■ *Transmission Status (page 4-78)* |
| | | SW25593 | Latest error status<br>Refer to the following section for details.<br>☞ ■ *Error Status (page 4-79)* |
| | | SW25594 | Transmission pass counter |
| | | SW25595 | Reception pass counter |
| | | SW25596 | Error counter |
| | | SW25597 to SW25599 | Reserved for system. |
| | CH2 Status | SW25600 to SW25607 | Same as CH1 status. |
| | CH3 Status | SW25608 to SW25615 | Same as CH1 status. |
| | CH4 Status | SW25616 to SW25623 | Same as CH1 status. |
| | CH5 Status | SW25624 to SW25631 | Same as CH1 status. |
| | CH6 Status | SW25632 to SW25639 | Same as CH1 status. |
| | CH7 Status | SW25640 to SW25647 | Same as CH1 status. |
| | CH8 Status | SW25648 to SW25655 | Same as CH1 status. |
| | CH9 Status | SW25656 to SW25663 | Same as CH1 status. |
| | CH10 Status | SW25664 to SW25671 | Same as CH1 status. |

■ Transmission Status

| Register Value | Status | Contents |
|---|---|---|
| 0 | – | Unused connection. |
| 1 | IDLE | Standby mode for executing message functions. |
| 2 | WAIT | Waiting to establish a connection. |
| 3 | CONNECT | Ready to send and receive data. |

### ■ Error Status

| Register Value | Status | Contents |
|---|---|---|
| 0 | No Error | Normal |
| 1 | Socket Creation Error | System error |
| 2 | Local Port Number Error | Setting error in local station port number (The same address is bound during disconnection of the TCP connection.) |
| 3 | Changing Socket Attribute Error | System error (for TCP) |
| 4 | M-SND Connection Error | Connection error (The connection was rejected by the remote station when establishing a connection with an unpassive open for TCP.) |
| 5 | M-RCV Connection Error | Connection error (connection with passive open for TCP) |
| 6 | System Error | System error |
| 7 | TCP Data Send Error | Data sending error (The remote station does not exist or has not started when using TCP.) |
| 8 | UDP Data Send Error | Data sending error (for UDP) |
| 9 | TCP Data Receive Error | Data reception error (The MP3000 received a request to disconnect from the remote station for TCP.) |
| 10 | UDP Data Receive Error | Data reception error (for UDP) |
| 11 | Changing Socket Option Error | System error |
| 12 | Data Conversion Error | Error in converting data |

Specifications

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# 4.4 Base Unit Specifications

The specifications of the Base Units are listed in the following table.

| Item | Specification | | |
|---|---|---|---|
| | 3 slots | 5 slots | 8 slots |
| Model | JEPMC-BUB3003-E | JEPMC-BUB3005-E | JEPMC-BUB3008-E |
| Abbreviation | MBU-B03 | MBU-B05 | MBU-B08 |
| Number of Slots | 3 | 5 | 8 |
| Applicable Modules | MP2000-series Optional Modules | | |

# Rack Expansion Interface Unit Specifications

This table gives the hardware specifications of the Rack Expansion Interface Units.

| Item | Specifications | |
| --- | --- | --- |
| | For Main Rack | For Expansion Rack |
| Model | JEPMC-EXU3001-E | JEPMC-EXU3002-E |
| Abbreviation | EXU-001 | EXU-002 |
| Number of Ports | 3 | 1 |
| Applicable Racks | Main Rack | Expansion Rack |
| Rack Numbers | Rack 1 (Main Rack) | Racks are numbered as follows according to the connection port on the EXU-001.<br>• Connected to port 1: Rack 5<br>• Connected to port 2: Rack 6<br>• Connected to port 3: Rack 7 |
| Indicators and Displays | LKP1, LKP2, LKP3, and ERR | LKP1 and ERR |
| | Refer to the following section for details.<br>☞ *Indicators (page 2-16)* | |

Information  Turn ON the power for the Expansion Racks first, followed by the Main Rack.
If the power for the Expansion Racks is turned ON after the Main Rack, a reset operation will cause the Main Rack to reset.

Specifications

4

# External Dimensions

# 5

This section provides external diagrams and dimensions for the MP3200.

# 5.1    Power Supply Units

M4 mounting screw holes
(5.3-dia. × 2)
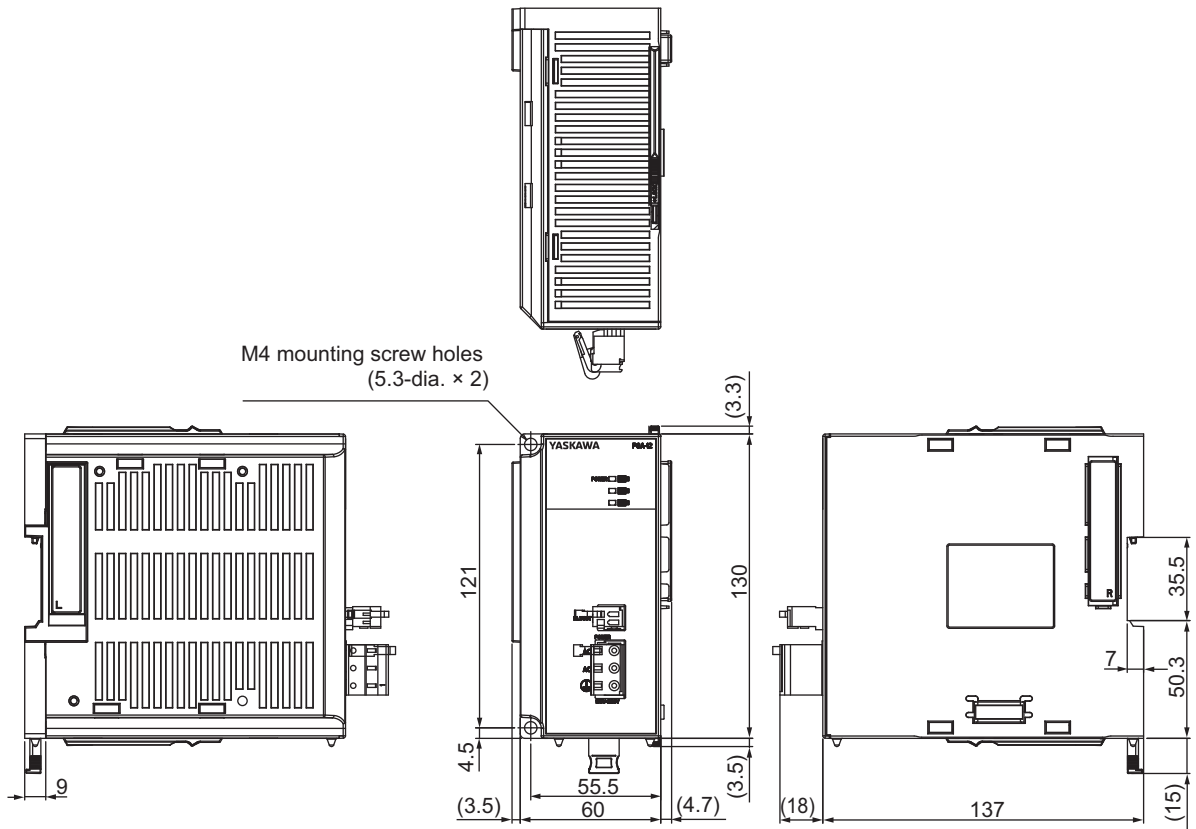
Approx. weight: 0.6 kg

## 5.2 CPU Units

CPU-201
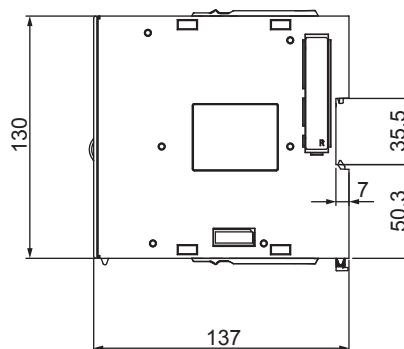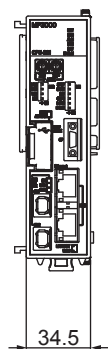


Approx. weight: 0.6 kg

CPU-202
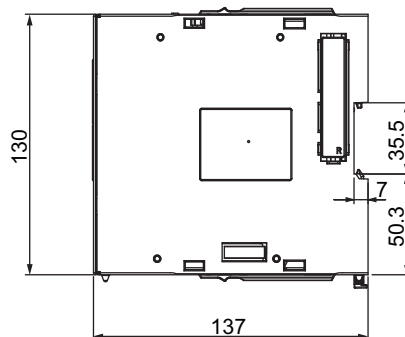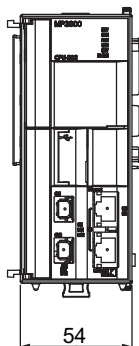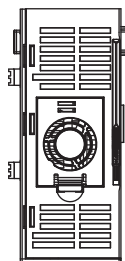


Approx. weight: 0.7 kg

# 5.3 Base Units

Three-slot Base Unit



(3.3)

130

(15)

(6.2)  86.5  (4.7)

7

R

35.5

50.3

108
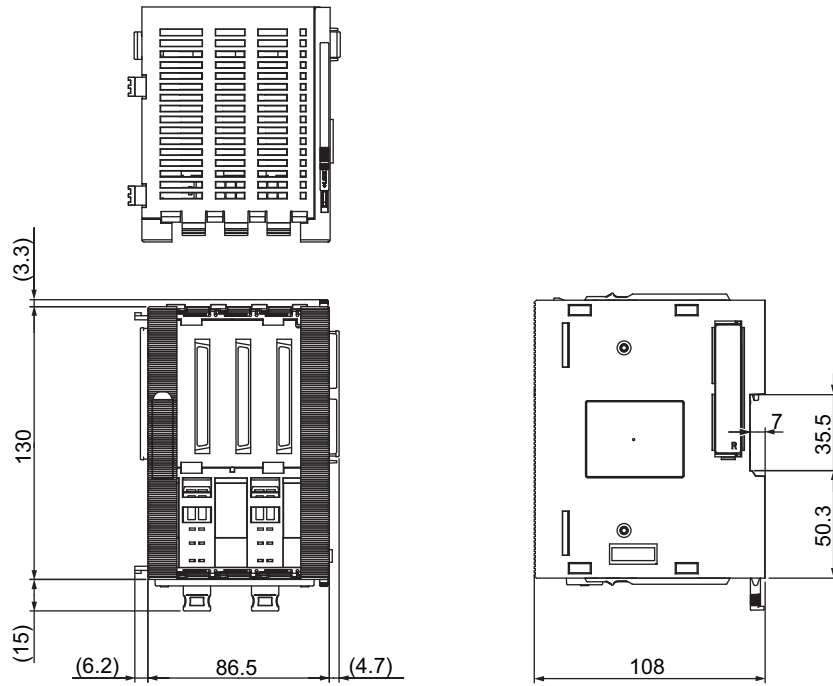
Approx. weight: 0.4 kg

Five-slot Base Unit



(3.3)

130

(15)

(6.2)  125.5  (4.7)

7

R

35.5

50.3

108
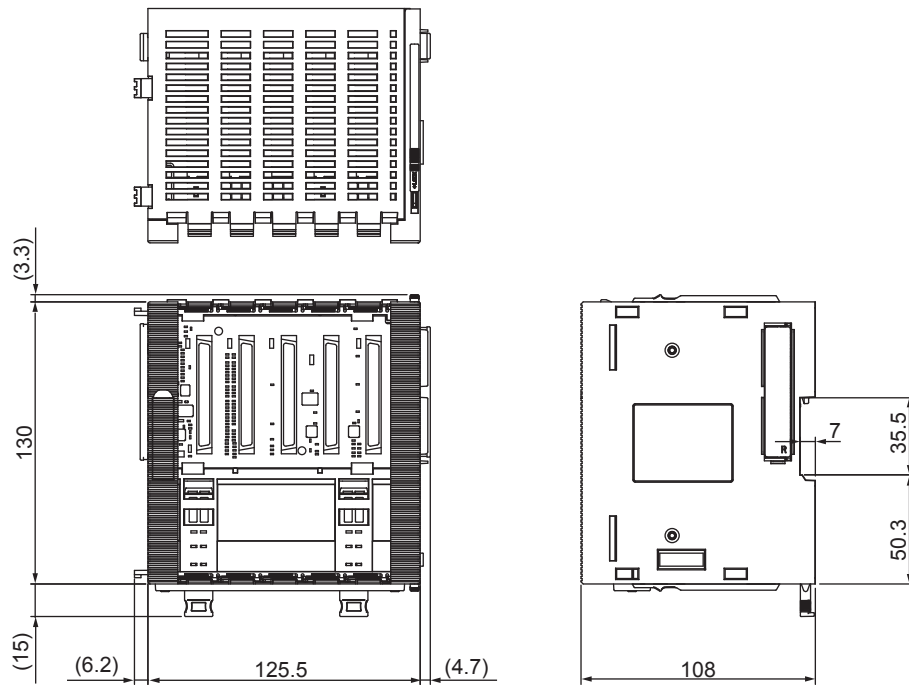
Approx. weight: 0.4 kg

Eight-slot Base Unit
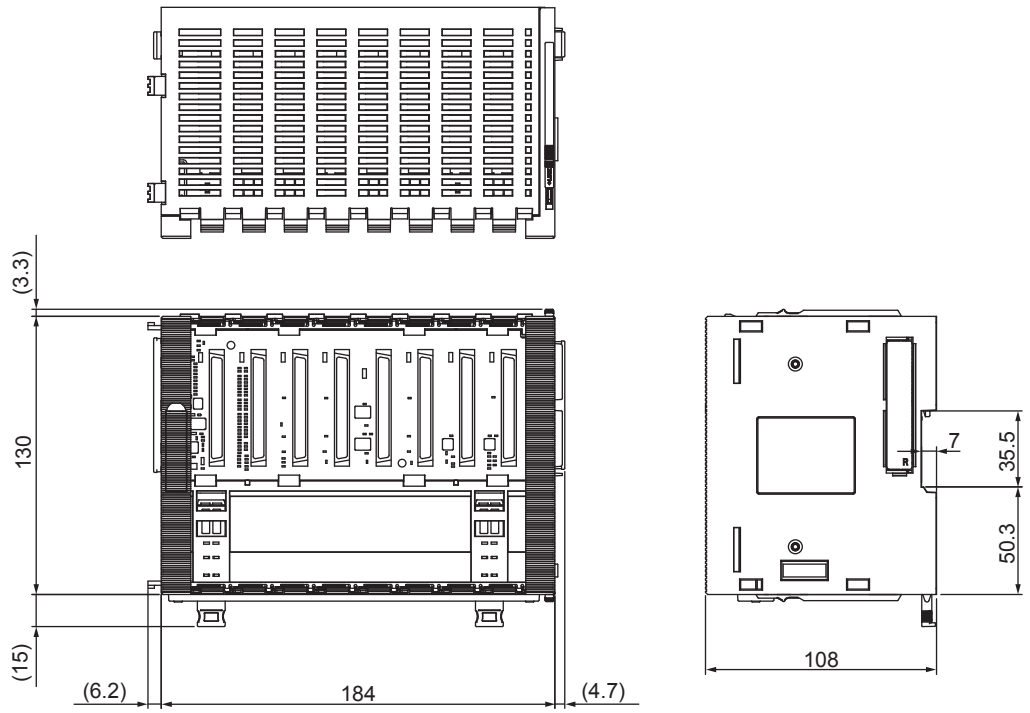


Approx. weight: 0.4 kg

# 5.4 Rack Expansion Interface Units

115

20    (6)

112

EXU
-001
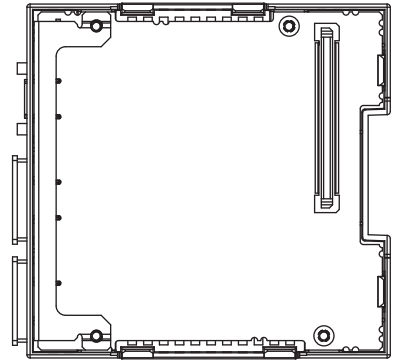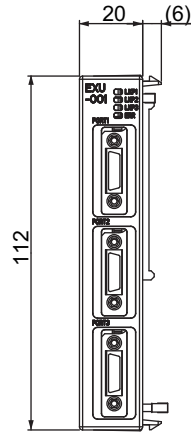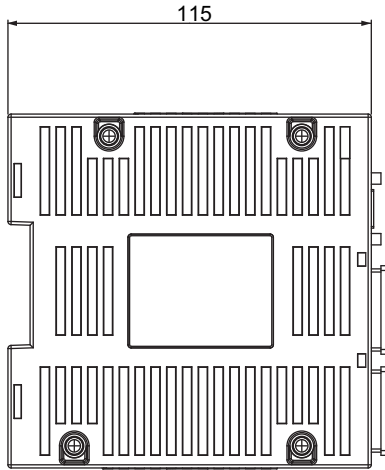
Approx. weight: 0.2 kg

# Index

# Revision History

The date of publication, revision number, and web revision number are given at the bottom right of the back cover.
Refer to the following example.

MANUAL NO.  SIEP C880725 10A <0>-1
└─────┬─────┘ └┬┘
                │    └────── WEB revision number
                └────────── Revision number

Published in Japan   March 2012
                     └────┬────┘
                          └────────── Date of publication

| Date of Publication | Rev. No. | WEB Rev. No. | Section | Revised Contents |
|---|---|---|---|---|
| March 2018 | <4> | 0 | – | Printed version of the manual that is available on the web (web version: SIEP C880725 10D <3>-3) |
| | | | 4.1 | Revision: Noise Resistance |
| | | | Back cover | Revision: Address |
| March 2017 | <3> | 3 | 3.2 | Revision: Correction of terms used in the table about batch saving to USB memory (Change from "Registers to Load" to "Registers to Save".) |
| February 2017 | | 2 | 3.2 | Addition: Information on versions that support file transfer for the CPU Unit and MPE720 |
| | | | Back cover | Revision: Address |
| June 2016 | | 1 | 3.2 | Revision: Information on batch transfer and batch loading with USB memory. |
| November 2015 | | 0 | Front cover | Revision: Format |
| | | | 3.2 | Addition: Information related to the alarm history |
| | | | Back cover | Revision: Address and format |
| January 2014 | <2> | 0 | – | Based on Japanese user's manual, SIJP C880725 10D<4>-0, published in September 2013. |
| | | | All chapters | Revision: Terminology ("Base Unit" changed to "MP3200.") |
| | | | | Addition: Information related to Rack Expansion Interface Unit |
| | | | | Addition: Information related to the CPU-202 CPU Unit |
| | | | | Addition: Information related to the MBU-B03 Base Unit |
| | | | Chapter 1 | Addition: Information on JEPMC-OP3007-E Rack Reinforcement Bracket |
| | | | 3.3 | Addition: Information related to multi-CPU functions |
| | | | Back cover | Revision: Address |
| September 2012 | <1> | 0 | – | Based on Japanese user's manual, SIJP C880725 10B<1>-0, published in May 2012. |
| March 2012 | <0> | 1 | All chapters | Deletion: Description of Rack Expansion Interface Unit |
| December 2011 | – | – | – | First edition |

Machine Controller MP3000 Series
# MP3200
# USER'S MANUAL

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